Barrel roller bearings

FAG

Matrix for bearing preselection

The matrix gives an overview of the types and design features of barrel roller bearings.

It can be used to make a preliminary assessment of whether a bearing is fundamentally suitable for the envisaged application.

The additional information provided in the product chapter (see column "detailed information") and in the Technical principles must, however, be observed in addition to this overview in selection of the bearing.

Design features and suitability			Barrel roller bearings		
+++ extremely suitable ++ highly suitable + suitable (+) suitable with restrictions – not suitable/not applicable ✓ available			cylindrical or tapered bore	with adapter sleeve	detailed information ➤ 642
Load carrying capacity	radial		+++	+++	➤643|1.2
	axial, one direction		+	+	➤643|1.2
	axial, both directions		+	+	➤643|1.2
	moments		–	–	
Compensation of angular misalignments	static		+++	+++	➤644|1.3
	dynamic		+	+	➤644|1.3
Bearing design	cylindrical bore		✓	✓	➤642|1.1
	tapered bore		✓	–	➤642|1.1
	separable		–	–	➤652|1.17
Lubrication	greased		–	–	➤644|1.4
Sealing	open		✓	✓	➤644|1.5
	non-contact		–	–	
	contact		–	–	
Operating temperature in °C	from to		–30 +150[1]	–30 +150[1]	➤645|1.8
Suitability for	high speeds		+	+	➤64
	high running accuracy		(+)	(+)	➤646|1.11 ➤114
	low-noise running		(+)	(+)	➤644|1.7 ➤27
	high rigidity		++	++	➤54
	reduced friction		+	+	➤56
	length compensation within bearing		–	–	
	non-locating bearing arrangement		+	+	➤139
	locating bearing arrangement		+	+	➤139
X-life bearings		X-life	–	–	
Bearing bore[2] d in mm	from to		20 260[3]	20 140[3]	➤654
Product tables	from page ➤		654	660	

1) Data valid for bearings with brass cages, D ≦ 120 mm

2) For bearings with adapter sleeve: inside diameter of adapter sleeve

3) Larger catalogue bearings ➤ 🕮 *GL 1*

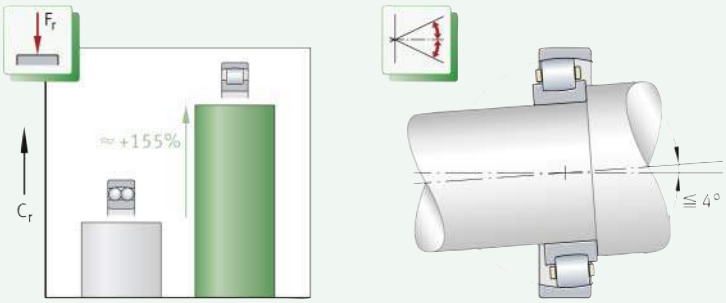
1 Barrel roller bearings

Barrel roller bearings are suitable:
- for compensating angular misalignments where there is skewing between the outer and inner ring ➤*644*|*1.3*
- where high radial shock type loads occur, as a result of the line contact ➤*643*|*1.2*
- where angular misalignments and high radial loads occur, but speed is not a priority ➤*642*|🗀*1*.

For an overview of other product-specific features, see the Matrix for bearing preselection ➤*641*.

🗀**1**
Barrel roller bearing: comparison of load carrying capacity with self-aligning ball bearing, compensation of misalignments

F_r = *radial load*
C_r = *radial basic dynamic load rating*



1.1 Bearing design

✎*Design variants*

Barrel roller bearings are available as:
- bearings of basic design ➤*643*|🗀*2*
- bearings with adapter sleeve ➤*643*|🗀*3*.

Bearings of basic design

✎*The outer ring has a curved raceway*

Barrel roller bearings are single row, self-retaining radial roller bearings, which are part of the group of self-aligning bearings. The outer ring has a concave raceway. As a result, the bearings permit the compensation of static and dynamic angular misalignments (skewing between the inner and outer ring) within certain limits ➤*644*|*1.3*. The inner ring has a formed raceway for the rolling elements and two rigid ribs. The rollers are barrel-shaped and are guided between the inner ring ribs. Their outside surface line closely follows the raceway profile of the outer and inner ring. Solid cages made from polyamide PA66 or brass are used ➤*645*|▦*2*.

✎*The bore is cylindrical or tapered*

Barrel roller bearings of basic design are available with a cylindrical or tapered bore, as a function of the bore diameter d ➤*643*|🗀*2*.

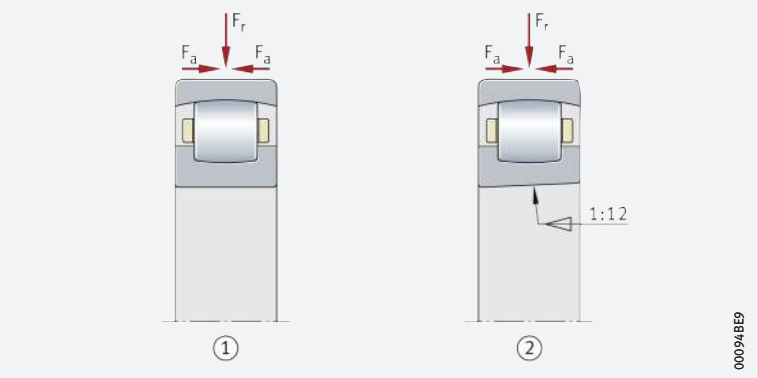
DIN ISO

Bearings with a tapered bore have a bore taper of 1:12 and the suffix K ➤*647*|▦*5*.

2
Barrel roller bearings of basic design

F_r = *radial load*
F_a = *axial load*

① *Barrel roller bearing with cylindrical bore*
② *Barrel roller bearing with tapered bore, bore taper 1:12*



Bearings with adapter sleeve

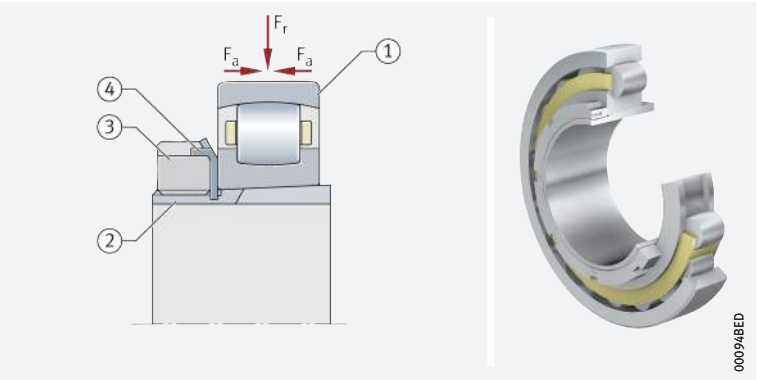
Ready-to-fit bearing mounting kits facilitate the ordering and mounting of barrel roller bearings

Complete bearing mounting kits comprising the bearing of basic design, slotted adapter sleeve, tab washer and locknut, are also available for use in the location of barrel roller bearings with a tapered bore on a cylindrical shaft journal (series 202..-K + H, 203..-K + H) ➤*643*|*3*. Adapter sleeves allow bearings to be located on smooth and stepped shafts. The adapter sleeves must also be stated when placing the order. Ordering example ➤*647*|*5*.

3
Barrel roller bearing with adapter sleeve

F_r = *radial load*
F_a = *axial load*

① *Barrel roller bearing with tapered bore*
② *Adapter sleeve*
③ *Locknut*
④ *Tab washer*



1.2 Load carrying capacity

Suitable for high radial loads

The rolling elements are in line contact with the raceways. As a result, barrel roller bearings have a very high radial load carrying capacity ➤*643*|*2*. In contrast, they have only a low axial load carrying capacity.

Axial load carrying capacity of bearings with adapter sleeve

Where bearings with adapter sleeves are located on a smooth shaft without a fixed stop (e.g. rigid shoulder), their axial load carrying capacity is dependent on the friction between the shaft and the sleeve.

If there is any uncertainty regarding the axial load carrying capacity of the adapter sleeve location method, please consult Schaeffler.

1.3 Compensation of angular misalignments

Barrel roller bearings compensate dynamic and static angular misalignments

Due to the concave rolling element raceway in the outer ring, barrel roller bearings are capable of angular adjustment ➤642|1.1. As a result, they permit skewing between the outer and inner ring within certain limits, without causing damage to the bearings, and can thus compensate misalignments, shaft deflections and housing deformations.

Permissible adjustment angle

With a rotating inner ring, barrel roller bearings can swivel up to 4° from their central position

The magnitude of alignment and angular defects may only be so large when the bearings are mounted that the contact surfaces of the rolling elements under load still lie within the width of the raceway. Under normal operating conditions and with a rotating inner ring, barrel roller bearings can swivel by up to 4° from their central position. The extent to which this value can be used for skewing between the inner and outer ring is, however, essentially dependent on the design of the bearing arrangement.

If the outer ring rotates or the inner ring undergoes tumbling motion, the angular adjustment facility is smaller. In such cases, please consult Schaeffler.

1.4 Lubrication

Oil or grease lubrication

The bearings are not greased. They must be lubricated with oil or grease and can be lubricated from the end faces.

Compatibility with plastic cages

When using bearings with plastic cages, compatibility between the lubricant and the cage material must be ensured if synthetic oils, lubricating greases with a synthetic oil base or lubricants containing a high proportion of EP additives are used.

Observe oil change intervals

Aged oil and additives in the oil can impair the operating life of plastics at high temperatures. As a result, stipulated oil change intervals must be strictly observed.

1.5 Sealing

The bearings are open; provide seals in the adjacent construction

Barrel roller bearings are supplied without seals. As a result, sealing of the bearing position must be carried out in the adjacent construction. The sealing system should reliably prevent:

- moisture and contaminants from entering the bearing
- the egress of lubricant from the bearing position.

1.6 Speeds

The product tables give the limiting speed n_G. This is the kinematically permissible speed of a bearing. Even under favourable mounting and operating conditions, this value should not be exceeded without prior consultation with Schaeffler ➤64.

1.7 Noise

Schaeffler Noise Index

The Schaeffler Noise Index (SGI) is not yet available for this bearing type ➤69. The data for these bearing series will be introduced and updated in stages.

Further information:

- ***medias*** ➤ *https://medias.schaeffler.com*.

1.8 Temperature range

✎ *Limiting values*

The operating temperature of the bearings is limited by:

- the dimensional stability of the bearing rings and rolling elements
- the cage
- the lubricant.

Possible operating temperatures of barrel roller bearings ➤*645*|▦ *1*.

▦ **1**
Permissible temperature ranges

Operating temperature	Barrel roller bearings	
	with brass cage	with polyamide cage PA66
	–30 °C to +150 °C, for D > 120 mm up to +200 °C	–30 °C to +120 °C

In the event of anticipated temperatures which lie outside the stated values, please contact Schaeffler.

1.9 Cages

Standard cages for barrel roller bearings ➤*645*|▦ *2*.

▦ **2**
Cage, cage suffix, bore code

Bearing series	Solid cage made from polyamide PA66 TVP	Solid brass cage MB
	Bore code	
202	up to 16	from 17
203	up to 12	from 13

For high continuous temperatures and applications with difficult operating conditions, bearings with brass cages should be used. If there is any uncertainty regarding cage suitability, please consult Schaeffler.

1.10 Internal clearance

Radial internal clearance – bearings with cylindrical bore

✎ *The standard is CN*

Barrel roller bearings with cylindrical bore are manufactured as standard with radial internal clearance CN (normal) ➤*645*|▦ *3*. CN is not stated in the designation.

Certain sizes are also available by agreement with the smaller internal clearance C2 and with the larger internal clearance C3 and C4.

Values for radial internal clearance ➤*645*|▦ *3*. These are valid for bearings which are free from load and measurement forces (without elastic deformation).

▦ **3**
Radial internal clearance of barrel roller bearings with cylindrical bore

Nominal bore diameter d mm		Radial internal clearance							
		C2 µm		CN µm		C3 µm		C4 µm	
over	incl.	min.	max.	min.	max.	min.	max.	min.	max.
–	30	2	9	9	17	17	28	28	40
30	40	3	10	10	20	20	30	30	45
40	50	3	13	13	23	23	35	35	50
50	65	4	15	15	27	27	40	40	55
65	80	5	20	20	35	35	55	55	75
80	100	7	25	25	45	45	65	65	90

continued ▼

3
Radial internal clearance of barrel roller bearings with cylindrical bore

Nominal bore diameter d mm		Radial internal clearance							
		C2 (Group 2) µm		CN (Group N) µm		C3 (Group 3) µm		C4 (Group 4) µm	
over	incl.	min.	max.	min.	max.	min.	max.	min.	max.
100	120	10	30	30	50	50	70	70	95
120	140	15	35	35	55	55	80	80	110
140	160	20	40	40	65	65	95	95	125
160	180	25	45	45	70	70	100	100	130
180	225	30	50	50	75	75	105	105	135
225	250	35	55	55	80	80	110	110	140
250	280	40	60	60	85	85	115	115	145

continued ▲

Radial internal clearance – bearings with tapered bore

✎ *C3 is normally used*

Barrel roller bearings with tapered bore are normally manufactured with the larger radial internal clearance C3 ➤646|⊞4.

Certain sizes are also available by agreement with the smaller internal clearance C2, with internal clearance CN (normal) and with the larger internal clearance C4.

Values for radial internal clearance ➤646|⊞4. These are valid for bearings which are free from load and measurement forces (without elastic deformation).

4
Radial internal clearance of barrel roller bearings with tapered bore

Nominal bore diameter d mm		Radial internal clearance							
		C2 µm		CN µm		C3 µm		C4 µm	
over	incl.	min.	max.	min.	max.	min.	max.	min.	max.
–	30	9	17	17	28	28	40	40	55
30	40	10	20	20	30	30	45	45	60
40	50	13	23	23	35	35	50	50	65
50	65	15	27	27	40	40	55	55	75
65	80	20	35	35	55	55	75	75	95
80	100	25	45	45	65	65	90	90	120
100	120	30	50	50	70	70	95	95	125
120	140	35	55	55	80	80	110	110	140
140	160	40	65	65	95	95	125	125	155
160	180	45	70	70	100	100	130	130	160
180	225	50	75	75	105	105	135	135	165
225	250	55	80	80	110	110	140	140	170
250	280	60	85	85	115	115	145	145	175

1.11 Dimensions, tolerances

Dimension standards

DIN ISO

The main dimensions of barrel roller bearings correspond to DIN 635-1:2010. Nominal dimensions of barrel roller bearings ➤654|⊞.

Chamfer dimensions

DIN ISO

The limiting dimensions for chamfer dimensions correspond to DIN 620-6:2004. Overview and limiting values ➤135|7.11. Nominal value of chamfer dimension ➤654|⊞.

Tolerances

The tolerances for the dimensional and running accuracy of barrel roller bearings correspond to tolerance class Normal in accordance with ISO 492:2014. Tolerance values in accordance with ISO 492 ➤*122*|▦*8*.

1.12 Suffixes

For a description of the suffixes used in this chapter ➤*647*|▦*5* and ***medias*** interchange ➤*https://www.schaeffler.de/std/1D52*.

▦*5*
Suffixes and corresponding descriptions

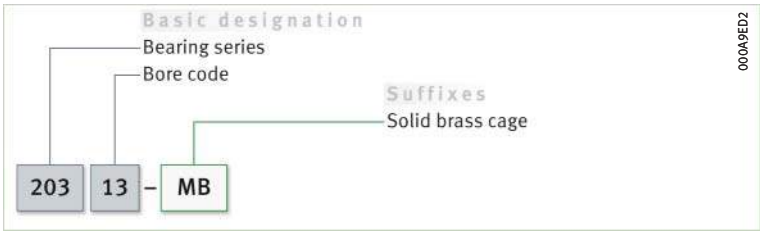
Suffix	Description of suffix	
C2	Radial internal clearance C2 (smaller than normal)	Special design, available by agreement
C3	Radial internal clearance C3 (larger than normal)	Normally used for bearings with tapered bore, available by agreement for bearings with cylindrical bore
C4	Radial internal clearance C4 (larger than C3)	Special design, available by agreement
CN	Radial internal clearance CN (normal)	Standard for bearings with cylindrical bore, available by agreement for bearings with tapered bore
K	Tapered bore, taper 1:12	Standard
MB	Solid brass cage, guided on inner ring	Standard, cage material dependent on bore code
TVP	Solid cage made from glass fibre reinforced polyamide PA66	

1.13 Structure of bearing designation

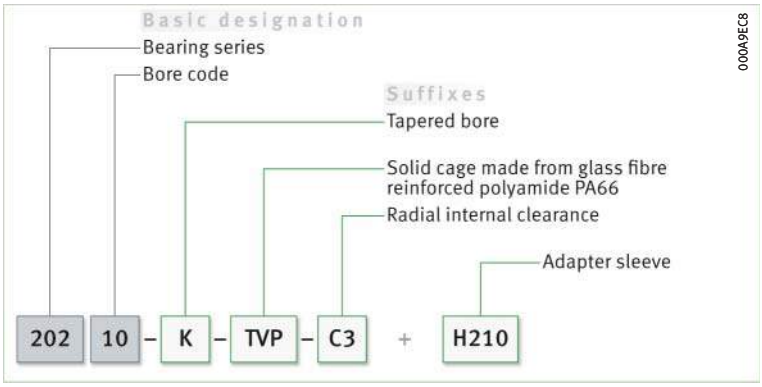
✎*Examples of composition of bearing designation*

The designation of bearings follows a set model. Examples ➤*647*|⧉*4* and ➤*647*|⧉*5*. The composition of designations is subject to DIN 623-1➤*102*|⧉*10*.

⧉*4*
Barrel roller bearing with cylindrical bore: designation structure



⧉*5*
Barrel roller bearing with tapered bore and adapter sleeve: designation structure



1.14 Dimensioning

Equivalent dynamic bearing load

✎ P = F_r under purely radial load of constant magnitude and direction

The basic rating life equation $L = (C_r/P)^p$ used in the dimensioning of bearings under dynamic load assumes a load of constant magnitude and direction. In radial bearings, this is a purely radial load F_r. If this condition is met, the bearing load F_r is used in the rating life equation for P ($P = F_r$).

✎ P is a substitute force for combined load and various load cases

If this condition is not met, a constant radial force must first be determined for the rating life calculation that (in relation to the rating life) represents an equivalent load. This force is known as the equivalent dynamic bearing load P.

To calculate P for barrel roller bearings under dynamic load ➤648| 1.

1
Equivalent dynamic load

$$P = F_r + 9{,}5 \cdot F_a$$

Legend

P	N	Equivalent dynamic bearing load
F_r	N	Radial load
F_a	N	Axial load.

Equivalent static bearing load

For barrel roller bearings subjected to static load ➤648| 2.

2
Equivalent static load

$$P_0 = F_{0r} + 5 \cdot F_{0a}$$

Legend

P_0	N	Equivalent static bearing load
F_{0r}, F_{0a}	N	Largest radial or axial load present (maximum load).

Static load safety factor

✎ $S_0 = C_0/P_0$

In addition to the basic rating life L (L_{10h}), it is also always necessary to check the static load safety factor S_0 ➤648| 3.

3
Static load safety factor

$$S_0 = \frac{C_0}{P_0}$$

Legend

S_0	–	Static load safety factor
C_0	N	Basic static load rating
P_0	N	Equivalent static bearing load.

1.15 Minimum load

✎ In order to prevent damage due to slippage, a minimum radial load of $P > C_{0r}/60$ is required

In order that no slippage occurs between the contact partners, the barrel roller bearings must be constantly subjected to a sufficiently high load. Based on experience, a minimum radial load of the order of $P > C_{0r}/60$ is thus necessary. In most cases, however, the radial load is already higher than the requisite minimum load due to the weight of the supported parts and the external forces.

If the minimum radial load is lower than indicated above, please consult Schaeffler.

1.16 Design of bearing arrangements

Support bearing rings over their entire circumference and width

In order to allow full utilisation of the load carrying capacity of the bearings and achieve the requisite rating life, the bearing rings must be rigidly and uniformly supported by means of contact surfaces over their entire circumference and over the entire width of the raceway. Support can be provided by means of a cylindrical or tapered seating surface ➤650|6 to ➤650|8. The seating and contact surfaces should not be interrupted by grooves, holes or other recesses. The accuracy of mating parts must meet specific requirements ➤651|6 to ➤651|8.

Radial location – fit recommendations for bearings with cylindrical bore

For secure radial location, tight fits are necessary

In addition to supporting the rings adequately, the bearings must also be securely located in a radial direction, to prevent creep of the bearing rings on the mating parts under load. This is generally achieved by means of tight fits between the bearing rings and the mating parts. If the rings are not secured adequately or correctly, this can cause severe damage to the bearings and adjacent machine parts. Influencing factors, such as the conditions of rotation, magnitude of the load, internal clearance, temperature conditions, design of the mating parts and the mounting and dismounting options must be taken into consideration in the selection of fits.

If shock type loads occur, tight fits (transition fit or interference fit) are required to prevent the rings from coming loose at any point. Clearance, transition or interference fits ➤150|6 and ➤158|7.

The following information provided in Technical principles must be taken into consideration in the design of bearing arrangements:

- conditions of rotation ➤145
- tolerance classes for cylindrical shaft seats (radial bearings) ➤147|2
- shaft fits ➤150|6
- tolerance classes for bearing seats in housings (radial bearings) ➤148|4
- housing fits ➤158|7
- shaft tolerances for adapter sleeves and withdrawal sleeves ➤166|8.

Axial location – location methods for bearings with cylindrical bore

The bearings must also be securely located in an axial direction

As a tight fit alone is not normally sufficient to also locate the bearing rings securely on the shaft and in the housing bore in an axial direction, this must usually be achieved by means of an additional axial location or retention method. The axial location of the bearing rings must be matched to the type of bearing arrangement. Shaft and housing shoulders, housing covers, nuts, spacer rings, retaining rings, adapter and withdrawal sleeves etc., are fundamentally suitable.

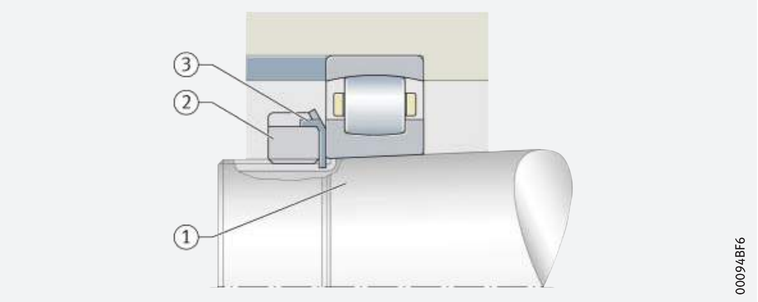
Location of bearings with tapered bore

Location by means of locknut and tab washer

If a bearing with a tapered bore is mounted directly on a tapered journal, the bearing can be axially located with ease using a locknut and tab washer ➤650| 6.

6
Barrel roller bearing with tapered bore, mounted directly on the tapered shaft journal

1. *Tapered journal with fixing thread*
2. *Locknut*
3. *Tab washer*



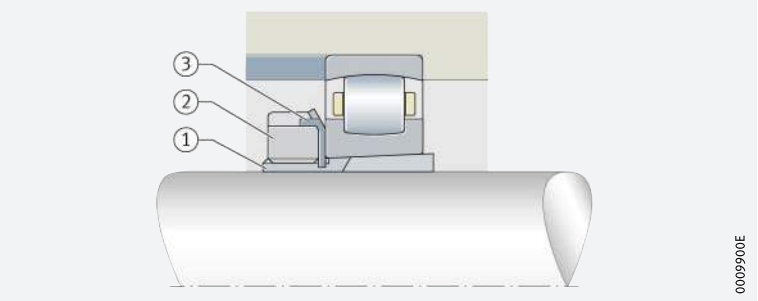
Location of bearings by means of adapter sleeve

Mounting can be carried out quickly and reliably by means of wrench sets from Schaeffler

Barrel roller bearings with a tapered bore can be located easily and with operational reliably on smooth or stepped shafts by means of an adapter sleeve ➤650| 7. The adapter sleeves do not need to be secured on the shaft by any additional means. The bearings can be positioned at any point on smooth shafts. Axial load carrying capacity of bearing arrangements by means of adapter sleeve connection ➤643|1.2.

7
Barrel roller bearing with adapter sleeve, located on smooth shaft

1. *Adapter sleeve*
2. *Locknut*
3. *Tab washer*

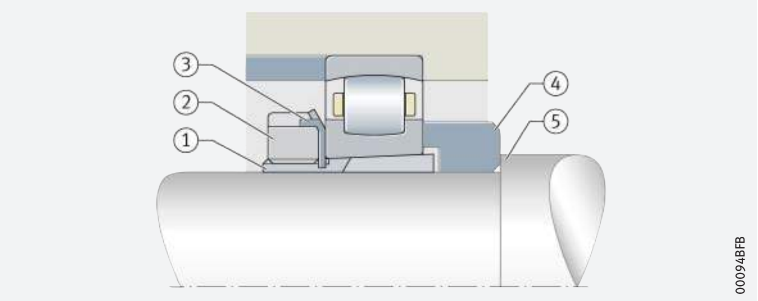


Location by means of adapter sleeve, axial abutment by means of a support ring

If very high axial forces are present, a support ring can also be used to provide axial abutment ➤650| 8. In this instance, the mounting dimensions of the support ring B_a and d_b in the product tables must be observed ➤660|.

8
Stepped shaft, axial abutment by means of a support ring

1. *Adapter sleeve*
2. *Locknut*
3. *Tab washer*
4. *Support ring*
5. *Shaft shoulder*



Dimensional, geometrical and running accuracy of cylindrical bearing seats

A minimum of IT6 should be provided for the shaft seat and a minimum of IT7 for the housing seat

The accuracy of the cylindrical bearing seat on the shaft and in the housing should correspond to the accuracy of the bearing used.
For barrel roller bearings with the tolerance class Normal, the shaft seat should correspond to a minimum of standard tolerance grade IT6 and the housing seat to a minimum of IT7. Guide values for the geometrical and positional tolerances of bearing seating surfaces ➤651|▦6, tolerances t_1 to t_3 in accordance with ➤168|🗀11. Numerical values for IT grades ➤651|▦7.

▦6 *Guide values for the geometrical and positional tolerances of bearing seating surfaces*

Bearing tolerance class		Bearing seating surface	Standard tolerance grades to ISO 286-1 (IT grades)			
to ISO 492	to DIN 620		Diameter tolerance	Roundness tolerance t_1	Parallelism tolerance t_2	Total axial runout tolerance of abutment shoulder t_3
Normal	PN (P0)	Shaft	IT6 (IT5)	Circumferential load IT4/2	Circumferential load IT4/2	IT4
				Point load IT5/2	Point load IT5/2	
		Housing	IT7 (IT6)	Circumferential load IT5/2	Circumferential load IT5/2	IT5
				Point load IT6/2	Point load IT6/2	

▦7 *Numerical values for ISO standard tolerances (IT grades) to ISO 286-1:2010*

IT grade	Nominal dimension in mm						
	over	18	30	50	80	120	180	250
	incl.	30	50	80	120	180	250	315
	Values in µm							
IT4	6	7	8	10	12	14	16
IT5	9	11	13	15	18	20	23
IT6	13	16	19	22	25	29	32
IT7	21	25	30	35	40	46	52

Roughness of cylindrical bearing seating surfaces

Ra must not be too high

The roughness of the bearing seats must be matched to the tolerance class of the bearings. The mean roughness value Ra must not be too high, in order to maintain the interference loss within limits. The shafts must be ground, while the bores must be precision turned. Guide values as a function of the IT grade of bearing seating surfaces ➤651|▦8.

▦8 *Roughness values for cylindrical bearing seating surfaces – guide values*

Nominal diameter of the bearing seat d (D) mm		Recommended mean roughness value for ground bearing seats Ramax µm			
		Diameter tolerance (IT grade)			
over	incl.	IT7	IT6	IT5	IT4
–	80	1,6	0,8	0,4	0,2
80	500	1,6	1,6	0,8	0,4

Tolerances for tapered bearing seats

Specifications for tapered bearing seats

For bearings located directly on a tapered shaft journal ➤650|🗀6, the data are in accordance with ➤171|🗀12.

Mounting dimensions for the contact surfaces of bearing rings

The contact surfaces for the rings must be of sufficient height

The mounting dimensions of the shaft and housing shoulders, and spacer rings etc., must ensure that the contact surfaces for the bearing rings are of sufficient height. However, they must also reliably prevent rotating parts of the bearing from grazing stationary parts. Proven mounting dimensions for the radii and diameters of the abutment shoulders are given in the product tables. These dimensions are limiting dimensions (maximum or minimum dimensions); the actual values should not be higher or lower than specified.

Suitable bearing housings for barrel roller bearings

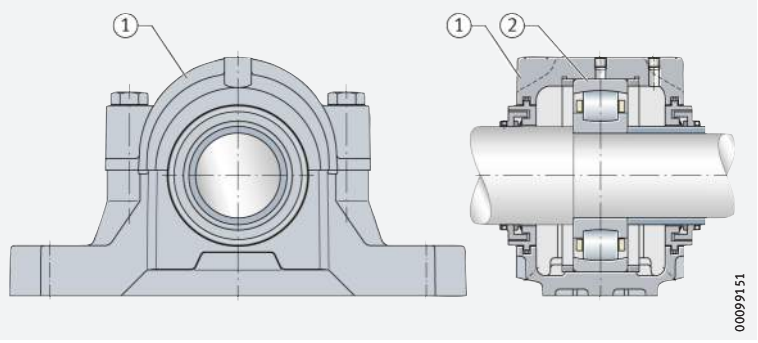
A large range of housings is available

For economical, operationally reliable and easily interchangeable bearing arrangement units, the barrel roller bearings can also be combined with Schaeffler bearing housings ➤652|9. These easy-to-fit units fulfil all of the requirements for modern machine and plant designs with favourable maintenance-related characteristics.

Due to the large number of application areas, an extensive range of split plummer block housings and flanged housings is available for bearings with cylindrical and tapered bores. Detailed information on bearing housings can be found in publication GK 1 ➤*https://www.schaeffler.de/std/1D54*. This book can be ordered from Schaeffler.

9
Split plummer block housing with a barrel roller bearing

① *Split plummer block housing SNV*
② *Barrel roller bearing*



1.17 Mounting and dismounting

The mounting and dismounting options for barrel roller bearings, by thermal, hydraulic or mechanical methods, must be taken into consideration in the design of the bearing position.

Ensure that the bearings are not damaged during mounting

Barrel roller bearings are not separable. In the mounting of non-separable bearings, the mounting forces must always be applied to the bearing ring with a tight fit.

Bearings with tapered bore – methods for achieving a sufficiently tight fit

Suitable methods: measuring the reduction in radial internal clearance or axial drive-up distance

Bearings with a tapered bore are mounted with a tight fit on the shaft or adapter and withdrawal sleeve. The tight fit can be checked:

- by measuring the reduction in radial internal clearance or
- by measuring the axial drive-up distance of the inner ring on the tapered bearing seat.

The malfunction-free operation of barrel roller bearings presupposes that these have been mounted correctly. An insufficient operating clearance or inadequately tight fit on the shaft generally leads to bearing damage.

If there is any uncertainty regarding the practical application of both methods, Schaeffler must always be consulted.

Schaeffler Mounting Handbook

✎ Rolling bearings must be handled with great care

Rolling bearings are well-proven precision machine elements for the design of economical and reliable bearing arrangements, which offer high operational security. In order that these products can function correctly and achieve the envisaged operating life without detrimental effect, they must be handled with care.

The Schaeffler Mounting Handbook MH 1 gives comprehensive information about the correct storage, mounting, dismounting and maintenance of rotary rolling bearings ➤ *https://www.schaeffler.de/std/1D53*. It also provides information which should be observed by the designer, in relation to the mounting, dismounting and maintenance of bearings, in the original design of the bearing position. This book is available from Schaeffler on request.

1.18 Legal notice regarding data freshness

✎ The further development of products may also result in technical changes to catalogue products

Of central interest to Schaeffler is the further development and optimisation of its products and the satisfaction of its customers. In order that you, as the customer, can keep yourself optimally informed about the progress that is being made here and with regard to the current technical status of the products, we publish any product changes which differ from the printed version in our electronic product catalogue.

§ We therefore reserve the right to make changes to the data and illustrations in this catalogue. This catalogue reflects the status at the time of printing. More recent publications released by us (as printed or digital media) will automatically precede this catalogue if they involve the same subject. Therefore, please always use our electronic product catalogue to check whether more up-to-date information or modification notices exist for your desired product.

Link to electronic product catalogue

The following link will take you to the Schaeffler electronic product catalogue: ➤ *https://medias.schaeffler.com*.

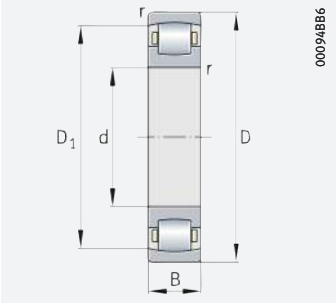
1.19 Further information

In addition to the data in this chapter, the following chapters in Technical principles must also be observed in the design of bearing arrangements:

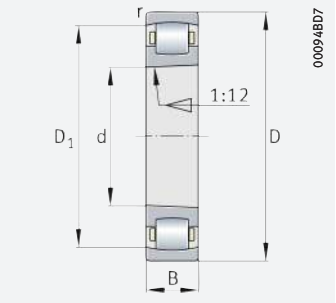
- Determining the bearing size ➤ *34*
- Rigidity ➤ *54*
- Friction and increases in temperature ➤ *56*
- Speeds ➤ *64*
- Bearing data ➤ *97*
- Lubrication ➤ *70*
- Sealing ➤ *182*
- Design of bearing arrangements ➤ *139*
- Mounting and dismounting ➤ *191*.

Barrel roller bearings

With cylindrical or tapered bore



Cylindrical bore

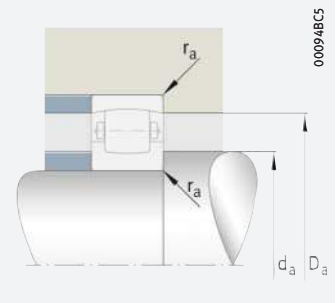


Tapered bore

d = 20 – 65 mm

Main dimensions			Basic load ratings		Fatigue limit load	Limiting speed	Mass	Designation
d	D	B	dyn. C_r	stat. C_{0r}	C_{ur}	n_G	m	➤*647|1.12* ➤*647|1.13*
			N	N	N	min^{-1}	≈ kg	
20	47	14	20 400	19 400	1 680	13 100	0,114	**20204-TVP**
	52	15	27 000	24 600	2 300	11 800	0,152	**20304-TVP**
25	52	15	24 100	24 900	2 190	11 500	0,132	**20205-K-TVP-C3**
	52	15	24 100	24 900	2 190	11 500	0,134	**20205-TVP**
	62	17	36 000	35 000	2 950	9 800	0,243	**20305-TVP**
30	62	16	28 000	28 500	2 850	10 800	0,203	**20206-K-TVP-C3**
	62	16	28 000	28 500	2 850	10 800	0,207	**20206-TVP**
	72	19	48 500	48 500	4 200	8 800	0,37	**20306-TVP**
35	72	17	41 000	43 000	4 900	9 700	0,296	**20207-K-TVP-C3**
	72	17	41 000	43 000	4 900	9 700	0,301	**20207-TVP**
	80	21	58 000	61 000	5 400	8 000	0,493	**20307-TVP**
40	80	18	49 500	53 000	5 000	8 700	0,38	**20208-K-TVP-C3**
	80	18	49 500	53 000	5 000	8 700	0,386	**20208-TVP**
	90	23	76 000	81 000	7 100	7 000	0,671	**20308-TVP**
45	85	19	52 000	58 000	5 900	8 400	0,433	**20209-K-TVP-C3**
	85	19	52 000	58 000	5 900	8 400	0,441	**20209-TVP**
	100	25	87 000	94 000	8 400	6 500	0,914	**20309-TVP**
50	90	20	59 000	69 000	7 000	7 700	0,489	**20210-K-TVP-C3**
	90	20	59 000	69 000	7 000	7 700	0,499	**20210-TVP**
	110	27	108 000	118 000	10 300	5 800	1,17	**20310-TVP**
55	100	21	74 000	85 000	8 700	7 100	0,642	**20211-K-TVP-C3**
	100	21	74 000	85 000	8 700	7 100	0,653	**20211-TVP**
	120	29	120 000	138 000	12 300	5 400	1,49	**20311-K-TVP-C3**
	120	29	120 000	138 000	12 300	5 400	1,53	**20311-TVP**
60	110	22	85 000	100 000	10 700	6 600	0,822	**20212-K-TVP-C3**
	110	22	85 000	100 000	10 700	6 600	0,836	**20212-TVP**
	130	31	147 000	171 000	15 000	4 950	1,89	**20312-K-TVP-C3**
	130	31	147 000	171 000	15 000	4 950	1,92	**20312-TVP**
65	120	23	94 000	117 000	12 400	6 000	1,07	**20213-K-TVP-C3**
	120	23	94 000	117 000	12 400	6 000	1,08	**20213-TVP**
	140	33	168 000	195 000	17 700	4 700	2,14	**20313-K-MB-C3**
	140	33	168 000	195 000	17 700	4 700	2,18	**20313-MB**

medias ➤ *https://www.schaeffler.de/std/1D88*

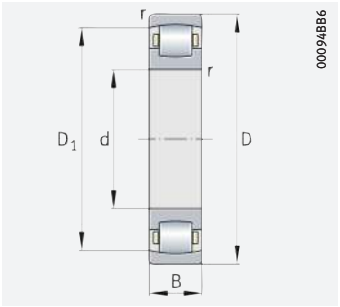


Mounting dimensions

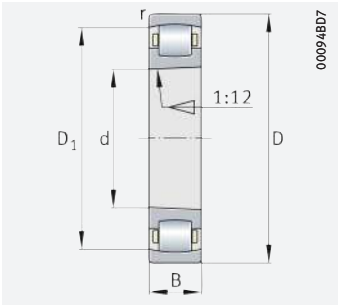
Dimensions			Mounting dimensions		
d	r	D_1	d_a	D_a	r_a
	min.	≈	min.	max.	max.
20	1	39	25,6	41,4	1
	1,1	43,5	27	45	1
25	1	43,9	30,6	46,4	1
	1	43,9	30,6	46,4	1
	1,1	51,9	32	55	1
30	1	53	35,6	56,4	1
	1	53	35,6	56,4	1
	1,1	60,7	37	65	1
35	1,1	62,3	42	65	1
	1,1	62,3	42	65	1
	1,5	67,4	44	71	1,5
40	1,1	70,1	47	73	1
	1,1	70,1	47	73	1
	1,5	76,8	49	81	1,5
45	1,1	74,6	52	78	1
	1,1	74,6	52	78	1
	1,5	85,2	54	91	1,5
50	1,1	79,5	57	83	1
	1,1	79,5	57	83	1
	2	94,4	61	99	2
55	1,5	89,2	64	91	1,5
	1,5	89,2	64	91	1,5
	2	101,7	66	109	2
	2	101,7	66	109	2
60	1,5	97,8	69	101	1,5
	1,5	97,8	69	101	1,5
	2,1	111,2	72	118	2,1
	2,1	111,2	72	118	2,1
65	1,5	105,1	74	111	1,5
	1,5	105,1	74	111	1,5
	2,1	120,6	77	128	2,1
	2,1	120,6	77	128	2,1

Barrel roller bearings

With cylindrical or tapered bore



Cylindrical bore

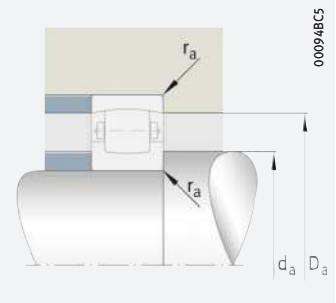


Tapered bore

d = 70 – 140 mm

Main dimensions			Basic load ratings		Fatigue limit load	Limiting speed	Mass	Designation
d	D	B	dyn. C_r	stat. C_{0r}	C_{ur}	n_G	m	➤*647|1.12* ➤*647|1.13*
			N	N	N	min^{-1}	≈ kg	
70	125	24	107 000	133 000	13 900	5 700	1,17	**20214-TVP**
	150	35	184 000	215 000	19 400	4 450	3,15	**20314-MB**
75	130	25	112 000	143 000	16 000	5 500	1,25	**20215-K-TVP-C3**
	130	25	112 000	143 000	16 000	5 500	1,28	**20215-TVP**
	160	37	216 000	255 000	22 200	4 100	3,76	**20315-MB**
80	140	26	126 000	163 000	15 400	5 200	1,56	**20216-K-TVP-C3**
	140	26	126 000	163 000	15 400	5 200	1,58	**20216-TVP**
	170	39	243 000	285 000	25 000	3 950	4,58	**20316-MB**
85	150	28	155 000	201 000	20 200	4 750	2,19	**20217-K-MB-C3**
	150	28	155 000	201 000	20 200	4 750	2,22	**20217-MB**
	180	41	270 000	320 000	28 500	3 750	5,25	**20317-MB**
90	160	30	174 000	220 000	21 900	4 550	2,68	**20218-K-MB-C3**
	160	30	174 000	220 000	21 900	4 550	2,72	**20218-MB**
	190	43	300 000	360 000	30 500	3 500	6,17	**20318-K-MB-C3**
	190	43	300 000	360 000	30 500	3 500	6,25	**20318-MB**
95	170	32	206 000	265 000	26 000	4 200	3,19	**20219-MB**
	200	45	330 000	400 000	33 500	3 400	7,29	**20319-MB**
100	180	34	225 000	290 000	28 000	4 000	3,9	**20220-K-MB-C3**
	180	34	225 000	290 000	28 000	4 000	3,96	**20220-MB**
	215	47	365 000	440 000	37 500	3 250	8,58	**20320-K-MB-C3**
	215	47	365 000	440 000	37 500	3 250	8,69	**20320-MB**
105	190	36	244 000	315 000	30 000	3 850	4,74	**20221-MB**
110	200	38	285 000	370 000	34 000	3 600	5,45	**20222-K-MB-C3**
	200	38	285 000	370 000	34 000	3 600	5,53	**20222-MB**
	240	50	405 000	480 000	44 500	3 000	11,6	**20322-MB**
120	215	40	305 000	415 000	37 500	3 350	6,51	**20224-K-MB-C3**
	215	40	305 000	415 000	37 500	3 350	6,6	**20224-MB**
	260	55	490 000	630 000	51 000	2 750	15,2	**20324-MB**
130	230	40	330 000	450 000	42 000	3 300	7,21	**20226-K-MB-C3**
	230	40	330 000	450 000	42 000	3 300	7,31	**20226-MB**
	280	58	560 000	720 000	58 000	2 600	18,4	**20326-MB**
140	250	42	395 000	540 000	49 500	3 050	8,98	**20228-K-MB-C3**
	250	42	395 000	540 000	49 500	3 050	9,09	**20228-MB**
	300	62	650 000	840 000	66 000	2 370	22,5	**20328-MB**

medias ➤ *https://www.schaeffler.de/std/1D89*

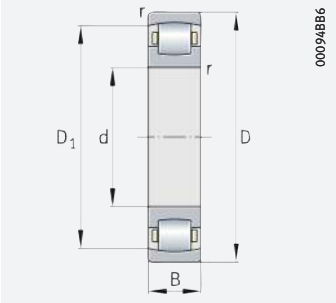


Mounting dimensions

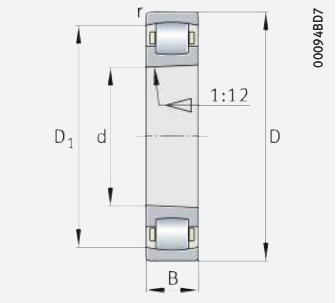
Dimensions			Mounting dimensions		
d	r	D_1	d_a	D_a	r_a
	min.	≈	min.	max.	max.
70	1,5	111	79	116	1,5
	2,1	128,7	82	138	2,1
75	1,5	115,9	84	121	1,5
	1,5	115,9	84	121	1,5
	2,1	138,1	87	148	2,1
80	2	124,5	91	129	2
	2	124,5	91	129	2
	2,1	147,5	92	158	2,1
85	2	133,9	96	139	2
	2	133,9	96	139	2
	3	156,9	99	166	2,5
90	2	143,8	101	149	2
	2	143,8	101	149	2
	3	165,1	104	176	2,5
	3	165,1	104	176	2,5
95	2,1	152,7	107	158	2,1
	3	174,5	109	186	2,5
100	2,1	160,8	112	168	2,1
	2,1	160,8	112	168	2,1
	3	186,6	114	201	2,5
	3	186,6	114	201	2,5
105	2,1	169,2	117	178	2,1
110	2,1	178,6	122	188	2,1
	2,1	178,6	122	188	2,1
	3	208,1	124	226	2,5
120	2,1	191,1	132	203	2,1
	2,1	191,1	132	203	2,1
	3	222,3	134	246	2,5
130	3	205,7	144	216	2,5
	3	205,7	144	216	2,5
	4	240,3	147	263	3
140	3	223,9	154	236	2,5
	3	223,9	154	236	2,5
	4	257,9	157	283	3

Barrel roller bearings

With cylindrical or tapered bore



Cylindrical bore

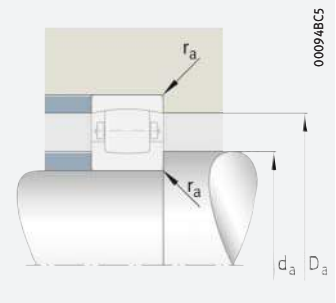


Tapered bore

d = 150 – 200 mm

Main dimensions			Basic load ratings		Fatigue limit load	Limiting speed	Mass	Designation
d	D	B	dyn. C_r	stat. C_{0r}	C_{ur}	n_G	m	➤*647|1.12* ➤*647|1.13*
			N	N	N	min^{-1}	≈ kg	
150	270	45	430 000	610 000	54 000	2 850	11,6	**20230-K-MB-C3**
	270	45	430 000	610 000	54 000	2 850	11,7	**20230-MB**
	320	65	720 000	950 000	74 000	2 250	26,9	**20330-MB**
160	290	48	500 000	720 000	63 000	2 650	14,4	**20232-K-MB-C3**
	290	48	500 000	720 000	63 000	2 650	14,5	**20232-MB**
170	310	52	570 000	830 000	70 000	2 460	17,9	**20234-MB**
180	320	52	590 000	850 000	73 000	2 420	18,4	**20236-MB**
190	340	55	650 000	950 000	80 000	2 290	22,5	**20238-MB**
200	360	58	730 000	1 080 000	90 000	2 180	26,7	**20240-MB**

medias ➤ *https://www.schaeffler.de/std/1D8A*

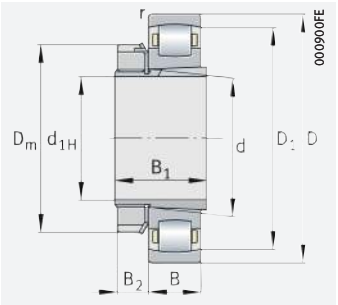


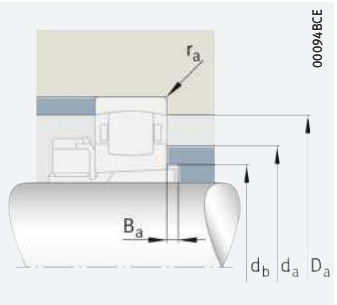
Mounting dimensions

Dimensions			Mounting dimensions		
d	r min.	D_1 ≈	d_a min.	D_a max.	r_a max.
150	3	238,6	164	256	2,5
	3	238,6	164	256	2,5
	4	275,8	167	303	3
160	3	256,5	174	276	2,5
	3	256,5	174	276	2,5
170	4	273,1	187	293	3
180	4	284,3	197	303	3
190	4	301,2	207	323	3
200	4	319	217	343	3

Barrel roller bearings

With adapter sleeve





Mounting dimensions

d_{1H} = 20 – 140 mm

Main dimensions				Basic load ratings		Fatigue limit load	Limiting speed	Mass m		Designation ➤*647|1.12* ➤*647|1.13*	
d_{1H}	d	D	B	dyn. C_r N	stat. C_{0r} N	C_{ur} N	n_G min^{-1}	Bearing ≈ kg	Adapter sleeve ≈ kg	Bearing	Adapter sleeve
20	25	52	15	24 100	24 900	2 190	11 500	0,132	0,07	**20205-K-TVP-C3**	**H205**
25	30	62	16	28 000	28 500	2 850	10 800	0,203	0,1	**20206-K-TVP-C3**	**H206**
30	35	72	17	41 000	43 000	4 900	9 700	0,296	0,136	**20207-K-TVP-C3**	**H207**
35	40	80	18	49 500	53 000	5 000	8 700	0,38	0,177	**20208-K-TVP-C3**	**H208**
40	45	85	19	52 000	58 000	5 900	8 400	0,433	0,23	**20209-K-TVP-C3**	**H209**
45	50	90	20	59 000	69 000	7 000	7 700	0,489	0,276	**20210-K-TVP-C3**	**H210**
50	55	100	21	74 000	85 000	8 700	7 100	0,642	0,319	**20211-K-TVP-C3**	**H211**
	55	120	29	120 000	138 000	12 300	5 400	1,49	0,358	**20311-K-TVP-C3**	**H311**
55	60	110	22	85 000	100 000	10 700	6 600	0,822	0,35	**20212-K-TVP-C3**	**H212**
	60	130	31	147 000	171 000	15 000	4 950	1,89	0,401	**20312-K-TVP-C3**	**H312**
60	65	120	23	94 000	117 000	12 400	6 000	1,07	0,4	**20213-K-TVP-C3**	**H213**
	65	140	33	168 000	195 000	17 700	4 700	2,14	0,471	**20313-K-MB-C3**	**H313**
65	75	130	25	112 000	143 000	16 000	5 500	1,25	0,71	**20215-K-TVP-C3**	**H215**
70	80	140	26	126 000	163 000	15 400	5 200	1,56	0,89	**20216-K-TVP-C3**	**H216**
75	85	150	28	155 000	201 000	20 200	4 750	2,19	1,03	**20217-K-MB-C3**	**H217**
80	90	160	30	174 000	220 000	21 900	4 550	2,68	1,21	**20218-K-MB-C3**	**H218**
	90	190	43	300 000	360 000	30 500	3 500	6,17	1,41	**20318-K-MB-C3**	**H318**
90	100	180	34	225 000	290 000	28 000	4 000	3,9	1,52	**20220-K-MB-C3**	**H220**
	100	215	47	365 000	440 000	37 500	3 250	8,58	1,76	**20320-K-MB-C3**	**H320**
100	110	200	38	285 000	370 000	34 000	3 600	5,45	1,95	**20222-K-MB-C3**	**H222**
110	120	215	40	305 000	415 000	37 500	3 350	6,51	2,01	**20224-K-MB-C3**	**H3024**
115	130	230	40	330 000	450 000	42 000	3 300	7,21	2,96	**20226-K-MB-C3**	**H3026**
125	140	250	42	395 000	540 000	49 500	3 050	8,98	3,3	**20228-K-MB-C3**	**H3028**
135	150	270	45	430 000	610 000	54 000	2 850	11,6	4,02	**20230-K-MB-C3**	**H3030**
140	160	290	48	500 000	720 000	63 000	2 650	14,4	5,44	**20232-K-MB-C3**	**H3032**

medias ➤ *https://www.schaeffler.de/std/1D8B*

Dimensions						Mounting dimensions				
d_{1H}	r min.	D_1 ≈	D_m ≈	B_1	B_2 ≈	d_a max.	D_a max.	d_b min.	B_a min.	r_a max.
20	1	43,9	25	26	8,25	33	46,4	28	6	1
25	1	53	45	27	8,25	39	56,4	33	5	1
30	1,1	62,3	52	29	9,25	45	65	38	5	1
35	1,1	70,1	58	31	10,25	51	73	43	5	1
40	1,1	74,6	65	33	11,25	56	78	48	5	1
45	1,1	79,5	70	35	12,25	61	83	53	5	1
50	1,5	89,2	75	37	12,5	68	91	60	6	1,5
	2	101,7	75	45	12,5	72	109	60	6	2
55	1,5	97,8	80	38	12,5	73	101	64	6	1,5
	2,1	111,2	80	47	12,5	78	118	65	5	2,1
60	1,5	105,1	85	40	13,5	80	111	70	5	1,5
	2,1	120,6	85	50	13,5	84	128	70	5	2,1
65	1,5	115,9	98	43	14,5	90	121	80	5	1,5
70	2	124,5	105	46	16,75	96	129	85	5	2
75	2	133,9	110	50	17,75	102	139	90	6	2
80	2	143,8	120	52	17,75	108	149	95	6	2
	3	165,1	120	65	17,75	113	176	96	6	2,5
90	2,1	160,8	130	58	19,75	120	168	106	7	2,1
	3	186,6	130	71	19,75	127	201	108	7	2,5
100	2,1	178,6	145	63	20,75	132	188	116	7	2,1
110	2,1	191,1	145	72	22	143	203	127	13	2,1
115	3	205,7	155	80	23	154	216	137	20	2,5
125	3	223,9	165	82	24	166	236	147	19	2,5
135	3	238,6	180	87	26	181	256	158	19	2,5
140	3	256,5	190	93	27,5	193	276	168	20	2,5

Spherical roller bearings

FAG

Matrix for bearing preselection

The matrix gives an overview of the types and design features of spherical roller bearings.

It can be used to make a preliminary assessment of whether a bearing is fundamentally suitable for the envisaged application.

The additional information provided in the product chapter (see column "detailed information") and in the Technical principles must, however, be observed in addition to this overview in selection of the bearing.

Design features and suitability			Spherical roller bearings		
+++ extremely suitable ++ highly suitable + suitable (+) suitable with restrictions – not suitable/not applicable ✓ available			cylindrical or tapered bore	sealed	detailed information ➤ 666
Load carrying capacity	radial		+++	+++	➤ 672 | 1.2
	axial, one direction		++	++	➤ 672 | 1.2
	axial, both directions		++	++	➤ 672 | 1.2
	moments		–	–	
Compensation of angular misalignments	static		+++	+++	➤ 673 | 1.3
	dynamic		+	+	➤ 673 | 1.3
Bearing design	cylindrical bore		✓	✓	➤ 666 | 1.1
	tapered bore		✓	✓[4]	➤ 666 | 1.1
	separable		–	–	➤ 691 | 1.17
Lubrication	greased		–	✓	➤ 673 | 1.4
Sealing	open		✓	–	➤ 674 | 1.5
	non-contact		–	–	
	contact		–	✓	➤ 674 | 1.5
Operating temperature in °C		from to	–30 +200[1]	–30 +180[2]	➤ 675 | 1.8
Suitability for	high speeds		+	(+)	➤ 675 | 1.6
	high running accuracy		+	+	➤ 679 | 1.11 ➤ 114
	low-noise running		(+)	+	➤ 27
	high rigidity		++	++	➤ 54
	reduced friction		+	+	➤ 56
	length compensation within bearing		–	–	
	non-locating bearing arrangement		+	+	➤ 139
	locating bearing arrangement		++	++	➤ 139
X-life bearings			✓	✓	➤ 671
Bearing bore[3] d in mm		from to	20 1800	25 620	➤ 696
Product tables		from page ➤	696	752	

1) Data valid for bearings with brass or sheet steel cages

2) Valid only for bearing series 240, 241. Series 222, 223: –40 °C to +100 °C

3) For bearings with adapter sleeve or withdrawal sleeve: inside diameter of adapter or withdrawal sleeve

4) Available by agreement

5) Larger catalogue bearings ➤ 🕮 GL 1

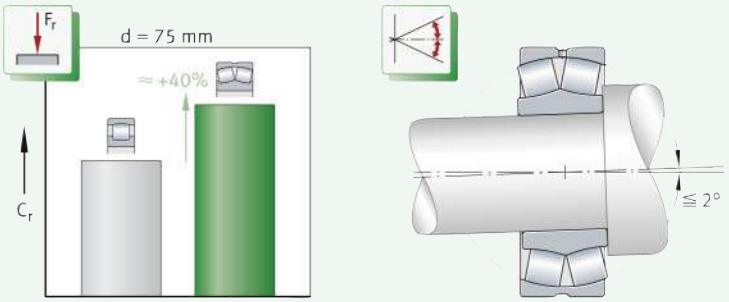
	Spherical roller bearings for vibratory machinery						
	with adapter sleeve	with withdrawal sleeve	cylindrical or tapered bore	with adapter sleeve	with withdrawal sleeve	detailed information ➤ 666	
	+++	+++	+++	+++	+++	➤672|1.2	
	++	++	++	++	++	➤672|1.2	
	++	++	++	++	++	➤672|1.2	
	–	–	–	–	–		
	+++	+++	+++	+++	+++	➤673|1.3	
	+	+	+	+	+	➤673|1.3	
	✓	✓	✓	✓	✓	➤666|1.1	
	–	–	✓	–	–	➤666|1.1	
	–	–	–	–	–	➤691|1.17	
	–	–	–	–	–	➤673|1.4	
	✓	✓	✓	✓	✓	➤674|1.5	
	–	–	–	–	–		
	–	–	–	–	–		
	–30 +200[1]	–30 +200[1]	–30 +200[1]	–30 +200[1]	–30 +200[1]	➤675|1.8	
	+	+	+	+	+	➤675|1.6	
	(+)	(+)	(+)	(+)	(+)	➤679|1.11 ➤114	
	+	+	+	+	+	➤27	
	++	++	++	++	++	➤54	
	+	+	+	+	+	➤56	
	–	–	–	–	–		
	+	+	+	+	+	➤139	
	++	++	++	++	++	➤139	
	✓	✓	✓	✓	✓	➤671	
	20 850[5]	35 850[5]	40 220	35 200	35 200	➤756	
	756	770	788	792	794		

1 Spherical roller bearings

Spherical roller bearings are suitable where:

- bearing arrangements are subjected to high and very high radial loads ➤*672|1.2*
- relatively high axial loads occur on one or both sides, in addition to high radial forces ➤*672|1.2*
- dynamic or static misalignments of the shaft relative to the housing, or deflections of the shaft, must be freely compensated by the bearing ➤*673|1.3*
- high shock type loads must be supported dynamically
- locating bearings with a very high load carrying capacity are required.

For an overview of other product-specific features, see the Matrix for bearing preselection ➤*664*.



1
Spherical roller bearing: comparison of load carrying capacity with barrel roller bearing of the same dimensions, compensation of misalignments

F_r = *radial load*
C_r = *basic dynamic load rating*

1.1 Bearing design

✎ *Design variants*

The standard product range of spherical roller bearings comprises:

- bearings of the open design ➤*667|3*, ➤*668|4* and ➤*668|5*
- bearings with adapter sleeve or withdrawal sleeve ➤*671|7*
- sealed bearings ➤*670|6*
- bearings for vibratory machinery ➤*670*.

The bearings are available in the majority of sizes as X-life designs with significantly higher performance ➤*671*. Larger catalogue bearings and other bearing designs ➤ 🕮 *GL 1*.

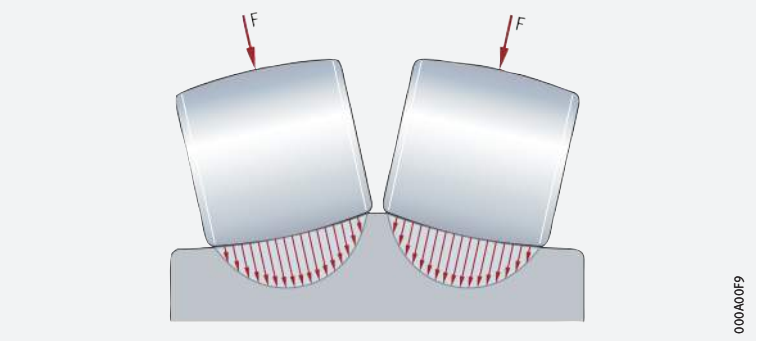
Bearings of basic design

✎ *The outer ring has a curved raceway*

Spherical roller bearings are part of the group of radial roller bearings. These self-retaining rolling bearings have two rows of rollers with a mutually curved raceway in the outer ring and two raceways inclined relative to the bearing axis in the inner ring. This raceway design allows these bearings to combine a range of characteristics, which are essential to many applications, in one bearing, such as angular adjustability for example ➤*673|1.3*. The symmetrical barrel rollers are guided by brass, sheet steel or polyamide cages ➤*676|1.9*.

✎ Roller contact design

The stress distribution at the contact points between the rollers and raceways is determined by the contact surface of the rollers. As a result, the roller geometry is matched to the raceway. This gives a favourable load distribution over the entire length of the roller and prevents both edge stresses and stress peaks at the ends of the roller ➤667|2.



2 *Uniform load distribution due to optimised roller and raceway profile*

F = *load on the rollers*

✎ The bore is cylindrical or tapered

Bearings of basic design are supplied without seals and with a cylindrical bore. With the exception of series 233..-A, these bearings are also available with a tapered bore ➤668|4.

Bearings with a tapered bore have a bore taper of 1:12 and the suffix K, whereas spherical roller bearings of the series 249, 240 and 241 have a bore taper of 1:30 and the suffix K30 ➤668|4 and ➤681|1.12.

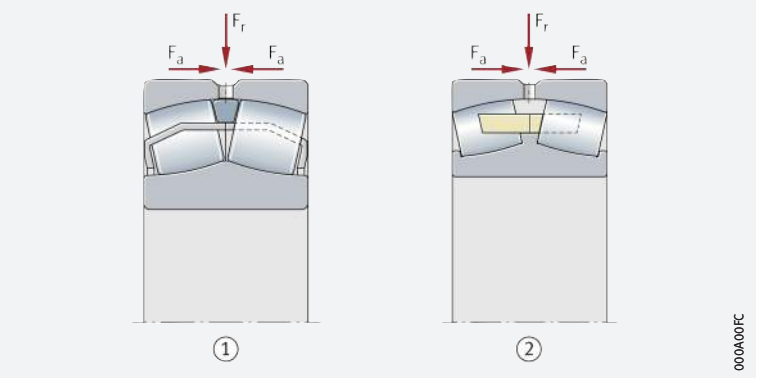
✎ Distinguishing features of bearings in the basic design

In addition to the design of the bore (cylindrical or tapered), the specific bearing design is also dependent on the bearing series and bearing size. The key distinguishing features are the:

- design of the inner ring
  - bearings without a central rib on the inner ring ➤667|3, ➤668|4 and ➤668|1
  - bearings with a rigid central rib on the inner ring ➤667|3, ➤668|4 and ➤669|2
  - bearings with a loose central rib on the inner ring ➤668|5 and ➤669|3
- design of the cage ➤676|1.9.

✎ Bearings with a loose central rib on the inner ring

A loose central rib provides axial guidance of the rollers in the load-free zone ➤668|5 and ➤669|3. This reduces friction in the bearing, which in turn leads to lower operating temperatures.



3 *Spherical roller bearings of basic design, cylindrical bore*

F_r = *radial load*
F_a = *axial load*

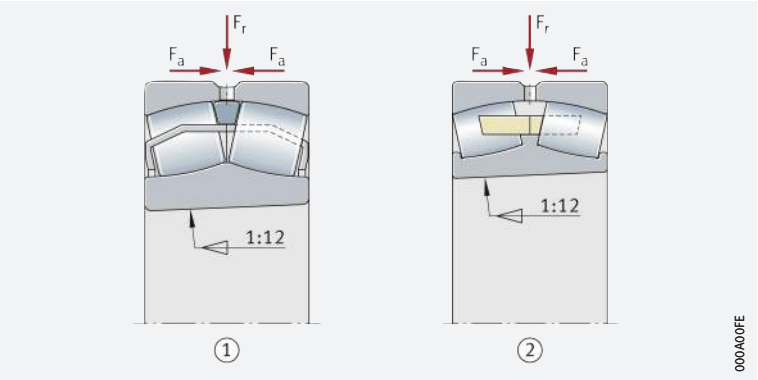
① *Spherical roller bearing without central rib on inner ring*

② *Spherical roller bearing with rigid central rib on inner ring*

4
Spherical roller bearings of basic design, tapered bore

F_r = *radial load*
F_a = *axial load*

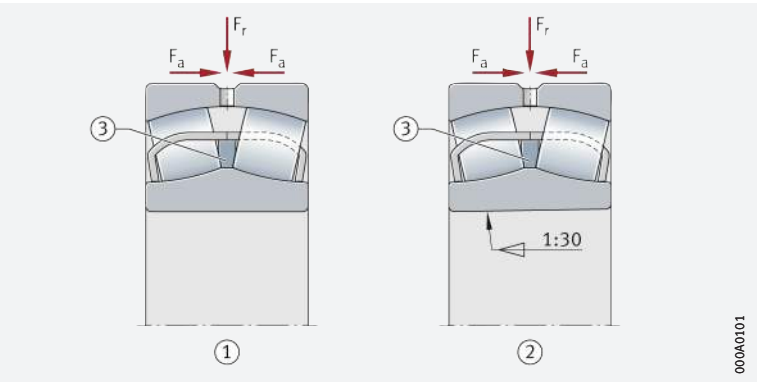
① *Spherical roller bearing without central rib on inner ring*
② *Spherical roller bearing with rigid central rib on inner ring*



5
Spherical roller bearings of basic design, cylindrical or tapered bore, with loose central rib

F_r = *radial load*
F_a = *axial load*

① *Cylindrical bore*
② *Tapered bore*
③ *Loose central rib*

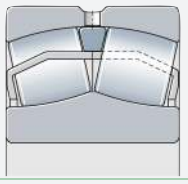
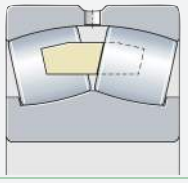
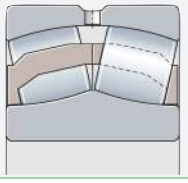


Basic bearing design variants

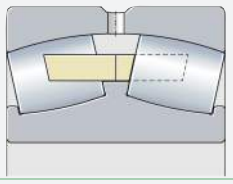
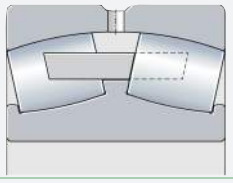
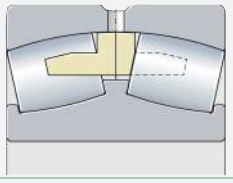
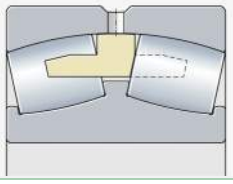
Bearings of basic design are available in the following variants:

- bearings without central rib on inner ring ➤*668*|▦ *1*
- bearings with rigid central rib on inner ring ➤*669*|▦ *2*
- bearings with loose central rib ➤*669*|▦ *3*.

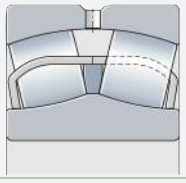
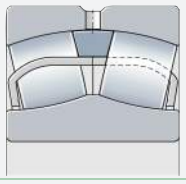
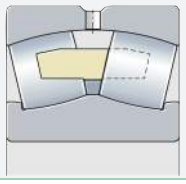
1
Bearing design for bearings without central rib on inner ring

Design			Suffix
①		Two sheet steel cages, surface hardened or coated, guidance on outer ring, X-life	E1-XL
②		One brass double comb cage, guided by rollers, inner ring with two lateral retaining ribs, X-life	E1A-XL-M
③		Two window cages made from glass fibre reinforced polyamide, guidance on inner ring, X-life	E1-XL-TVPB

2 *Bearing design for bearings with rigid central rib on inner ring*

Design			Suffix
①		Two brass cages, guidance on inner ring, inner ring with two lateral retaining ribs and one central rib	MB B-MB
②		One steel double comb cage, guidance on inner ring, inner ring with two lateral retaining ribs and one central rib	B-FB1
③		Two brass cages, guidance on outer ring, inner ring with two lateral retaining ribs and one central rib	A-MA AS-MA
④		One brass double comb cage, guidance on outer ring, inner ring with two lateral retaining ribs and one central rib, X-life	XL-MA1

3 *Bearing design for bearings with loose central rib*

Design			Suffix
①		Two sheet steel cages, surface hardened, guidance on inner ring, X-life	BE-XL
②		Two sheet steel cages, surface hardened, guidance on outer ring, X-life, vibrating screen design	BE-XL-JPA-T41A
③		One brass double comb cage, guidance on inner ring, inner ring with two lateral retaining ribs, X-life	BEA-XL-MB1

Sealed spherical roller bearings

A selection of standard bearings is also available with seals on both sides ➤*670*|*6* and ➤*674*|*1.5*.

✎*Series 222, 223*

Sealed bearings of series 222 and 223 include an oversize width and the prefix WS in the designation ➤*670*|*6* and ➤*676*|*1.9*.

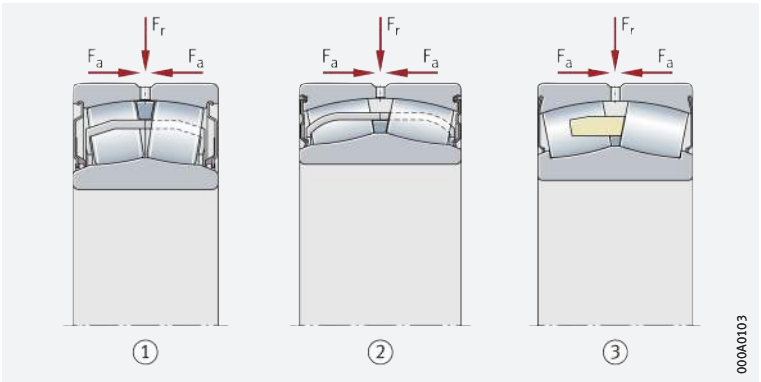
✎*Series 240, 241*

The main dimensions of sealed bearings of series 240 and 241 correspond to the main dimensions of open bearings.

Further information on sealed spherical roller bearings ➤ 🕮 *TPI 218*.

6
Spherical roller bearings of basic design, sealed on both sides

① *Bearing with contact seal 2RSR (D < 160)*
② *Bearing with contact seal 2VSR (160 < D ≦ 320)*
③ *Bearing with contact seal 2RSR (320 < D ≦ 620)*



Spherical roller bearings for vibratory machinery

The rolling bearings fitted in vibratory machinery must support not only high loads and high speeds but also accelerations and centrifugal forces. In many cases, these applications involve adverse environmental conditions such as contamination and moisture.

✎*Spherical roller bearings are matched to the operating conditions of vibratory machinery*

The special spherical roller bearings developed by Schaeffler are matched to the operating conditions in vibratory machinery and have proved highly successful in practical use. In particular, the cages of the rolling bearings are subjected to stresses arising from high radial accelerations. In unfavourable cases, these may be overlaid by axial accelerations as well.

✎*The support of angular misalignments reduces additional sliding motions*

The rotating imbalance generates a rotating shaft deflection and additional sliding motion within the bearings. This increases the friction and therefore the operating temperature of the bearings. The special spherical roller bearings can support dynamic angular misalignments up to 0,15°.

✎*Basic designs of special spherical roller bearings*

Schaeffler special spherical roller bearings for vibratory machinery have the main dimensions of dimension series 23 (DIN 616:2000, ISO 15:2017).

✎*Specification T41A (T41D)*

Schaeffler spherical roller bearings for vibratory machinery are manufactured in accordance with the specification T41A or T41D ➤*680*|▦ *10*. This takes into consideration the particular requirements of the application. The specification defines, for example, the tolerances of the bore and outside diameter, as well as the radial internal clearance of the bearings. The other tolerances are in accordance with tolerance class Normal to ISO 492:2014.

Schaeffler spherical roller bearings for vibratory machinery are described in detail in TPI 197. This can be requested from Schaeffler.

Bearings with adapter sleeve or withdrawal sleeve

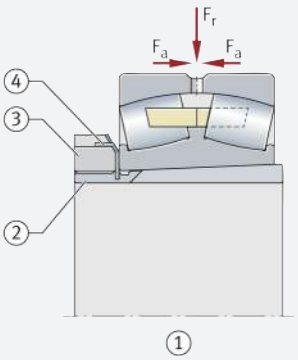
Ready-to-fit mounting kits facilitate the ordering and mounting of bearings

Complete bearing mounting kits are also available for use in locating spherical roller bearings with a tapered bore onto a cylindrical shaft journal. These units comprise the bearing, adapter sleeve, tab washer and locknut, or bearing and withdrawal sleeve ➤671|7. Adapter sleeves and withdrawal sleeves allow bearings to be located on smooth and stepped shafts ➤687|16 and ➤687|17. The fixing elements are described in the product tables and must also be stated when placing the order.

7
Spherical roller bearing with adapter sleeve

F_r = *radial load*
F_a = *axial load*

① *Spherical roller bearing with rigid central rib on inner ring, with adapter sleeve*
② *Adapter sleeve*
③ *Locknut*
④ *Tab washer*



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X-life premium quality

Spherical roller bearings are available in numerous series and dimensions as X-life bearings ➤671|8. These bearings exhibit considerably higher performance than conventional spherical roller bearings. This is achieved, for example, through the modified internal construction, higher surface quality of the contact areas, optimised contact geometry between rollers and raceways, new roller dimensions with crowned ends and the optimised cage design, as well as through the higher quality of the steel and rolling elements and a loose central rib ➤669|3.

8
Spherical roller bearing in X-life design

① *Cage*
② *Barrel roller*
③ *Outer ring*
④ *Inner ring*

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Advantages

Increased customer benefits due to X-life

These technical enhancements offer a range of advantages, such as:

- a more favourable load distribution in the bearing and thus a higher dynamic load carrying capacity of the bearings ➤667|2
- a higher running accuracy and smooth running
- running with reduced friction and greater energy efficiency
- lower heat generation in the bearing
- higher possible speeds
- lower lubricant consumption and therefore longer maintenance intervals if relubrication is carried out
- a measurably longer operating life of the bearings
- high operational security
- compact, environmentally-friendly bearing arrangements.

Lower operating costs, higher machine availability

In conclusion, these advantages improve the overall cost-efficiency of the bearing position significantly and thus bring about a sustainable increase in the efficiency of the machine and equipment.

Suffix XL

X-life spherical roller bearings include the suffix XL in the designation ➤681|1.12 and ➤696|▦.

Areas of application

Suitable for a further area of application

Due to their special technical features, X-life spherical roller bearings are highly suitable for bearing arrangements in:

- dryer rolls and calenders
- mining machinery, conveyor belts, crushers, vibrating screens, vertical mills, roller presses
- continuous casting plant
- passenger elevators
- marine propulsion systems.

X-life indicates a high product performance density and thus a particularly significant benefit to the customer. Further information on X-life ➤10.

1.2 Load carrying capacity

Suitable for very high radial loads and high axial loads

Spherical roller bearings can support high axial loads in both directions and very high radial loads. They are designed for very high load carrying capacity and, since they have the maximum possible number of large and particularly long barrel rollers (bearings in E1 design), are also suitable for the heaviest loads ➤666|1.1.

Axial load carrying capacity of bearings with adapter sleeve or withdrawal sleeve

Due to their internal construction, spherical roller bearings can support high axial loads. Where bearings with adapter sleeves or withdrawal sleeves are located on a smooth shaft without a fixed axial stop (e. g. rigid shoulder), the axial load carrying capacity of the bearing arrangement is dependent on the friction between the shaft and the sleeve.

If there is any doubt about the axial load carrying capacity of the location method, please consult Schaeffler.

Axial load and higher speeds

Friction in the bearing rises with increasing load and speed

Spherical roller bearings support high axial forces from both directions. However, if very high axial loads occur in combination with very high speeds, the resulting increase in friction and temperature in the bearing must be taken into consideration.

1.3 Compensation of angular misalignments

Spherical roller bearings compensate dynamic and static angular misalignments

Due to the concave rolling element raceway in the outer ring, spherical roller bearings are capable of angular adjustment ➤666|1.1. As a result, they permit skewing between the outer and inner ring within certain limits, without causing damage to the bearings, and can thus compensate misalignments, shaft deflections and housing deformations.

Permissible adjustment angle

The possible skewing is dependent on the magnitude of the load

The permissible adjustment angle is stated for loads $P < 0{,}1 \cdot C_r$ ➤673|▦4. The adjustment angles apply if:

- the angular deviation is constant (static angular misalignment)
- the rotating component is the inner ring.

The extent to which the stated values can be used in practice is essentially dependent on the design of the bearing arrangement, sealing etc.

Reduced adjustment angle

If the rotating component is the outer ring, the inner ring undergoes tumbling motion or the adjustment angles are larger than stated in the table, the angular adjustment facility of the bearings is smaller. In such cases, please consult Schaeffler.

Permissible adjustment angle for sealed bearings

The permissible adjustment angle is smaller for sealed bearings

In sealed spherical roller bearings, the angular adjustment facility is 0,5° from the central position. The sealing function is not adversely affected by misalignments occurring up to this value.

▦4 *Permissible adjustment angle of spherical roller bearings*

Bearing series	Adjustment angle °
213..-E1, 222..-E1, 222..-BE(BEA),230, 230..-E1(E1A), 230..-BE(BEA), 238, 239, 240	1,5
223..-E1, 223.. -BE(BEA), 231, 231..E1(E1A), 231..-BE(BEA), 232, 232..-E1(E1A), 232.. -BE(BEA), 233..-A, 240..-BE(BEA), 241, 241..-BE(BEA)	2

1.4 Lubrication

The bearings can be lubricated via a circumferential groove and lubrication holes

In order to ensure good lubrication, most spherical roller bearings have a circumferential groove and three lubrication holes in the outer ring. The lubricant is pressed into the bearing via the groove and holes ➤674|9. Due to the direct and symmetrical feed system, a uniform supply of lubricant to the rows of rollers is achieved. On both sides of the bearing, sufficiently large cavities for collection of the used grease or openings for the escape of grease must be provided.

Series 213

Bearings of series 213 with a bore diameter d ≦ 35 mm do not have a lubrication groove and lubrication hole.

Lubrication for ungreased bearings

Open spherical roller bearings are not greased. These bearings must be lubricated with oil or grease.

If shafts with a vertical axis are supported using spherical roller bearings, particular attention must be paid to ensuring the reliable provision of lubricant to the bearings.

Compatibility with plastic cages

When using bearings with plastic cages, compatibility between the lubricant and the cage material must be ensured if synthetic oils, lubricating greases with a synthetic oil base or lubricants containing a high proportion of EP additives are used.

Observe oil change intervals

Aged oil and additives in the oil can impair the operating life of plastics at high temperatures. As a result, stipulated oil change intervals must be strictly observed.

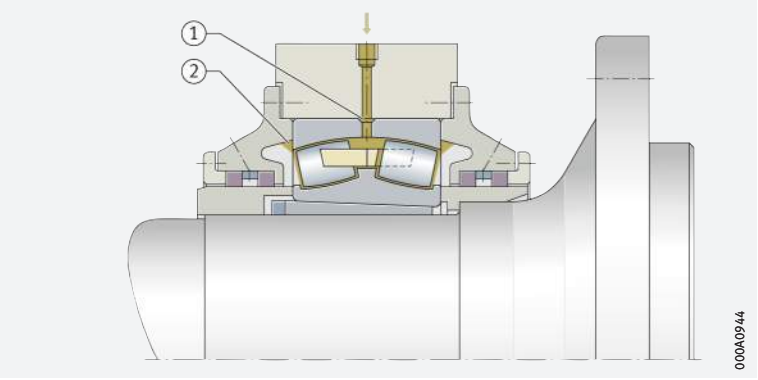
Lubrication-specific suffixes

✎ *Suffixes*

H40	without lubrication groove and lubrication holes
H40CA	6 lubrication holes in the outer ring
H40AB	6 lubrication holes in the inner ring
H40AC	6 lubrication holes and one lubrication groove in the inner ring
S	lubrication groove and lubrication holes in the outer ring
SY	3 lubrication holes in the outer ring, no lubrication groove

9
Lubrication of the bearing via a lubrication groove and lubrication holes in the outer ring

① *Lubrication groove with lubrication holes*
② *Cavity for collecting grease*



Sealed bearings

✎ *Greased bearings are normally maintenance-free*

Sealed bearings are supplied already filled with a high quality lithium soap grease with a mineral oil base and are maintenance-free for most applications. Whether or not a bearing requires relubrication during its operating life is dependent on the operating conditions (e.g. on the operating temperatures and operating speeds). Where bearings cannot be relubricated, the grease operating life must be observed.

1.5 Sealing

✎ *Certain bearings are also available with seals*

Sealed spherical roller bearings have sealing shields on both sides, which protect the bearing reliably against contamination. In order to ensure optimum sealing integrity, various sealing concepts are used, which are determined by size. The bearings should not be heated above +80 °C or washed out prior to mounting.

Series 240, 241

✎ *The seal material used is FKM*

For spherical roller bearings of series 240 and 241, the standard seal material is fluoro elastomer.

Seals made from fluoro elastomer, such as Viton (FKM, FPM) for example, comprise particularly high performance materials which, when heated above approx. +300 °C, may release vapours and gases that are harmful to health if they are inhaled or come into contact with the eyes. Contact with seals which have been heated to such high temperatures is still dangerous even after cooling. Contact with skin must be avoided in all cases. A doctor must be consulted immediately if such vapours are inhaled. In all cases, the user is responsible for the safe handling of the seals during the operating life, as well as for scrapping the seals and disposing of them correctly.

Such temperatures may occur, for example, if a welding torch is used in the dismantling of a bearing. In these cases, the currently valid safety data sheet must be observed.

1.6 Speeds

✎ *Speeds in the product tables*

Two speeds are indicated in the product tables ➤*696*|▦:

- the kinematic limiting speed n_G
- the thermal speed rating $n_{\vartheta r}$.

Limiting speeds

The limiting speed n_G is the kinematically permissible speed of the bearing. Even under favourable mounting and operating conditions, this value should not be exceeded without prior consultation with Schaeffler ➤*64*.

Reference speeds

✎ *$n_{\vartheta r}$ is used to calculate n_ϑ*

The thermal speed rating $n_{\vartheta r}$ is not an application-oriented speed limit, but is a calculated ancillary value for determining the thermally safe operating speed n_ϑ ➤*64*.

✎ *Bearings with contact seals*

For bearings with contact seals, no reference speeds are defined in accordance with DIN ISO 15312:2004. As a result, only the limiting speed n_G is given in the product tables for these bearings.

1.7 Noise

Schaeffler Noise Index

The Schaeffler Noise Index (SGI) is not yet available for this bearing type ➤*69*. The data for these bearing series will be introduced and updated in stages.

Further information:

- ***medias*** ➤*https://medias.schaeffler.com*.

1.8 Temperature range

✎ *Limiting values*

The operating temperature of the bearings is limited by:

- the dimensional stability of the bearing rings and rolling elements
- the cage
- the lubricant
- the seals.

Possible operating temperatures of spherical roller bearings ➤*675*|▦ *5*.

▦ ***5***
Permissible temperature ranges

Operating temperature	Open spherical roller bearings		Sealed spherical roller bearings	
	with brass or sheet steel cage	with polyamide cage PA66	Series 222, 223	Series 240, 241
	–30 °C to +200 °C	–30 °C to +120 °C	–40 °C to +100 °C, for short periods up to +120 °C, limited by the lubricant and seal material	–30 °C to +180 °C, for short periods up to +200 °C, limited by the lubricant and seal material

In the event of anticipated temperatures which lie outside the stated values, please contact Schaeffler.

1.9 Cages

✎ *Solid brass cages are used as standard*

Standard cages for spherical roller bearings ➤*668*|▦ *1*, ➤*669*|▦ *2*, ➤*669*|▦ *3*, ➤*677*|▦ *6*. Other cage designs are available by agreement. With such cages, however, suitability for high speeds and temperatures as well as the basic load ratings may differ from the values for the bearings with standard cages. Essential information on cages ➤*110*.

Cages in design B and in bearings without a suffix

✎ *Solid brass cage or sheet metal cage*

Spherical roller bearings with a rigid central rib on the inner ring (design B or bearings without a suffix) have a solid brass cage. Bearings without a cage suffix have sheet metal cages ➤*669*|▦ *2* and ➤*677*|▦ *6*.

Cages in bearings with the suffix MB/MB1, MA/MA1

✎ *Solid brass cage*

Bearings with the suffix MB or MB1 have solid brass cages, which are guided on the inner ring. In bearings with the suffix MA or MA1, the solid brass cages are guided on the outer ring ➤*669*|▦ *2*, ➤*669*|▦ *3* and ➤*677*|▦ *6*.

Bearings with the suffix M

✎ *Solid brass cage*

Bearings with the suffix M have a roller-guided solid brass cage ➤*668*|▦ *1* and ➤*677*|▦ *6*.

Bearings with the suffix E1/BE

✎ *Sheet steel cage, solid brass cage or solid cage made from polyamide PA66*

Bearings with the suffix E1 and BE and without a cage suffix have sheet steel cages. The two cage halves are retained by a guiding ring or loose central rib in the outer or inner ring ➤*668*|▦ *1* and ➤*677*|▦ *6*. The other bearings of E1 design have solid cages made from glass fibre reinforced polyamide PA66 or solid brass cages (suffix TVPB or M). The sheet steel cages are surface hardened or coated and, as a result, are particularly well protected against wear.

6 Cage, cage suffix, bore code

Bearing series	Cage design								Table/Figure
	Sheet steel cages		Plastic cage	Brass cage				Steel cage	
	Guidance on			Guidance by rollers	Guidance on				
	inner ring	outer ring	inner ring		inner ring		outer ring		
	–	–	TVPB	M	MB1	MB	MA	FB1	
	Bore code								
213..-E1-XL	–	08 to 18	04 to 07 19 to 22	–	–	–	–	–	➤668 ▦ 1, ① and ③
222..-E1-XL	–	05 to 36	–	–	–	–	–	–	➤668 ▦ 1, ①
222..-BE-XL	38 to 48	–	–	–	–	–	–	–	➤669 ▦ 3, ①
222..-BEA-XL	–	–	–	–	52 to 72	–	–	–	➤669 ▦ 3, ③
223..-E1-XL	–	08 to 30	–	–	–	–	–	–	➤668 ▦ 1, ①
223..-BE-XL	32 to 44	–	–	–	–	–	–	–	➤669 ▦ 3, ①
223..-BE..-XL-JPA	–	32 to 44	–	–	–	–	–	–	➤669 ▦ 3, ②
223..-BEA-XL	–	–	–	–	48 to 56	–	–	–	➤669 ▦ 3, ③
230..-E1-XL	–	–	22 to 40	–	–	–	–	–	➤668 ▦ 1, ③
230..-E1A-XL	–	–	–	22 to 40	–	–	–	–	➤668 ▦ 1, ②
230..-BE-XL	44 to 60	–	–	–	–	–	–	–	➤669 ▦ 3, ①
230..-BEA-XL	–	–	–	–	64 to /630	–	–	–	➤669 ▦ 3, ③
230	–	–	–	–	–	/670 to /1250	–	–	➤669 ▦ 2, ①
231..-E1-XL	–	–	20 to 38	–	–	–	–	–	➤668 ▦ 1, ③
231..-E1A-XL	–	–	–	20 to 38	–	–	–	–	➤668 ▦ 1, ②
231..-BE-XL	40 to 56	–	–	–	–	–	–	–	➤669 ▦ 3, ①
231..-BEA-XL	–	–	–	–	60 to /560	–	–	–	➤669 ▦ 3, ③
231	–	–	–	–	–	/600 to /1000	–	–	➤669 ▦ 2, ①
232..-E1-XL	–	–	18 to 36	–	–	–	–	–	➤668 ▦ 1, ③
232..-E1A-XL	–	–	–	18 to 36	–	–	–	–	➤668 ▦ 1, ②
232..-BE-XL	38 to 48	–	–	–	–	–	–	–	➤669 ▦ 3, ①
232..-BEA-XL	–	–	–	–	52 to /500	–	–	–	➤669 ▦ 3, ③
232	–	–	–	–	–	/530 to /800	–	–	➤669 ▦ 2, ①
233..-A, ..-AS	–	–	–	–	–	–	20 to 40	–	➤669 ▦ 2, ③
238	–	–	–	–	–	/600 to /1180	/630[1)]	–	➤669 ▦ 2, ① and ④
239	–	–	–	–	–	36 to /1180	–	–	➤669 ▦ 2, ①
240..-BE-XL	24 to 60	–	–	–	–	–	–	–	➤669 ▦ 3, ①
240..-BEA-XL	–	–	–	–	64 to /630	–	–	–	➤669 ▦ 3, ③
240	–	–	–	–	–	/670 to /1120	–	–	➤669 ▦ 2, ①
241..-BE-XL	22 to 88	–	–	–	–	–	–	–	➤669 ▦ 3, ①
241..-BEA-XL	–	–	–	–	92 to /560	–	–	–	➤669 ▦ 3, ③
241	–	–	–	–	–	/600 to /1000	–	up to /900	➤669 ▦ 2, ① and ②
248	–	–	–	–	–	92 to /1800	–	–	➤669 ▦ 2, ①
249	–	–	–	–	–	/670 to /1320	–	–	➤669 ▦ 2, ①

1) *Cage designation MA1.*

For high continuous temperatures and applications with difficult operating conditions, bearings with brass or sheet steel cages should be used. If there is any uncertainty regarding cage suitability, please consult Schaeffler.

1.10 Internal clearance

Radial internal clearance

✎ *The standard is CN*

Spherical roller bearings with cylindrical and tapered bore are manufactured as standard with radial internal clearance CN (normal) ➤*678*|▦ *7* and ➤*679*|▦ *8*.

A number of bearings are also available by agreement with the smaller internal clearance C2 and with the larger internal clearance C3 and C4 ➤*678*|▦ *7* and ➤*679*|▦ *8*.

Spherical roller bearings with cylindrical bore

The values for radial internal clearance correspond to DIN 620-4:2004 (ISO 5753-1:2009) ➤*678*|▦ *7*. They are valid for bearings which are free from load and measurement forces (without elastic deformation).

▦ *7*
Radial internal clearance of spherical roller bearings with cylindrical bore

Nominal bore diameter		Radial internal clearance							
d		C2 (Group 2)		CN (Group N)		C3 (Group 3)		C4 (Group 4)	
mm		µm		µm		µm		µm	
over	incl.	min.	max.	min.	max.	min.	max.	min.	max.
18	24	10	20	20	35	35	45	45	60
24	30	15	25	25	40	40	55	55	75
30	40	15	30	30	45	45	60	60	80
40	50	20	35	35	55	55	75	75	100
50	65	20	40	40	65	65	90	90	120
65	80	30	50	50	80	80	110	110	145
80	100	35	60	60	100	100	135	135	180
100	120	40	75	75	120	120	160	160	210
120	140	50	95	95	145	145	190	190	240
140	160	60	110	110	170	170	220	220	280
160	180	65	120	120	180	180	240	240	310
180	200	70	130	130	200	200	260	260	340
200	225	80	140	140	220	220	290	290	380
225	250	90	150	150	240	240	320	320	420
250	280	100	170	170	260	260	350	350	460
280	315	110	190	190	280	280	370	370	500
315	355	120	200	200	310	310	410	410	550
355	400	130	220	220	340	340	450	450	600
400	450	140	240	240	370	370	500	500	660
450	500	140	260	260	410	410	550	550	720
500	560	150	280	280	440	440	600	600	780
560	630	170	310	310	480	480	650	650	850
630	710	190	350	350	530	530	700	700	920
710	800	210	390	390	580	580	770	770	1 010
800	900	230	430	430	650	650	860	860	1 120
900	1000	260	480	480	710	710	930	930	1 220
1000	1120	290	530	530	770	770	1050	1050	1 430
1120	1250	320	580	580	840	840	1 140	1 140	1 560
1250	1400	350	630	630	910	910	1 240	1 240	1 700
1400	1600	380	700	700	1020	1020	1 390	1 390	1 890
1600	1800	420	780	780	1 140	1 140	1 550	1 550	2 090

Spherical roller bearings with tapered bore

The values for radial internal clearance correspond to DIN 620-4:2004 (ISO 5753-1:2009) ➤679| 8. These are valid for bearings which are free from load and measurement forces (without elastic deformation).

8 *Radial internal clearance of spherical roller bearings with tapered bore*

Nominal bore diameter d mm		Radial internal clearance							
		C2 (Group 2) µm		CN (Group N) µm		C3 (Group 3) µm		C4 (Group 4) µm	
over	incl.	min.	max.	min.	max.	min.	max.	min.	max.
18	24	15	25	25	35	35	45	45	60
24	30	20	30	30	40	40	55	55	75
30	40	25	35	35	50	50	65	65	85
40	50	30	45	45	60	60	80	80	100
50	65	40	55	55	75	75	95	95	120
65	80	50	70	70	95	95	120	120	150
80	100	55	80	80	110	110	140	140	180
100	120	65	100	100	135	135	170	170	220
120	140	80	120	120	160	160	200	200	260
140	160	90	130	130	180	180	230	230	300
160	180	100	140	140	200	200	260	260	340
180	200	110	160	160	220	220	290	290	370
200	225	120	180	180	250	250	320	320	410
225	250	140	200	200	270	270	350	350	450
250	280	150	220	220	300	300	390	390	490
280	315	170	240	240	330	330	430	430	540
315	355	190	270	270	360	360	470	470	590
355	400	210	300	300	400	400	520	520	650
400	450	230	330	330	440	440	570	570	720
450	500	260	370	370	490	490	630	630	790
500	560	290	410	410	540	540	680	680	870
560	630	320	460	460	600	600	760	760	980
630	710	350	510	510	670	670	850	850	1 090
710	800	390	570	570	750	750	960	960	1 220
800	900	440	640	640	840	840	1 070	1 070	1 370
900	1000	490	710	710	930	930	1 190	1 190	1 520
1 000	1 120	540	780	780	1 020	1 020	1 300	1 300	1 650
1 120	1 250	600	860	860	1 120	1 120	1 420	1 420	1 800
1 250	1 400	660	940	940	1 220	1 220	1 550	1 550	1 960
1 400	1 600	740	1 060	1 060	1 380	1 380	1 750	1 750	2 200
1 600	1 800	820	1 180	1 180	1 540	1 540	1 950	1 950	2 500

1.11 Dimensions, tolerances

Dimension standards

The main dimensions of spherical roller bearings correspond to DIN 635-2:2009, DIN 616:2000 and ISO 15:2017.

✎ *Width tolerances for bearings with the suffixes BE and BEA*

For spherical roller bearings with the suffixes BE and BEA, the width tolerances are reduced by half compared to the standard values. Values ➤680| 9. The running accuracy corresponds to tolerance class 5.

9
Width tolerances for spherical roller bearings with the suffixes BE and BEA

Tolerance symbols ➤*115*|▦*6*
U = *upper limit deviation*
L = *lower limit deviation*

Nominal bore diameter d mm		Width deviation $t_{\Delta Bs}$ µm	
over	incl.	U	L
18	30	0	−60
30	50	0	−60
50	80	0	−75
80	120	0	−100
120	180	0	−125
180	250	0	−150
250	315	0	−175
315	400	0	−200
400	500	0	−225
500	630	0	−250
630	800	0	−375
800	1000	0	−500

Specification T41A and T41D

✎ *The tolerances for d and D are restricted*

Spherical roller bearings to specification T41A and T41D have restricted tolerances for the inside and outside diameter ➤*680*|▦*10*. In bearings with a tapered bore, the reduced tolerance range applies to the outside diameter only.

10
Restricted diameter tolerances for the inner and outer ring in bearings to specification T41A and T41D

Tolerance symbols ➤*115*|▦*6*
U = *upper limit deviation*
L = *lower limit deviation*

Inner ring				Outer ring			
Nominal bore diameter d mm		Bore deviation $t_{\Delta dmp}$ µm		Nominal outer ring diameter D mm		Outside diameter deviation $t_{\Delta Dmp}$ µm	
over	incl.	U	L	over	incl.	U	L
30	50	0	−7	80	150	−5	−13
50	80	0	−9	150	180	−5	−18
80	120	0	−12	180	315	−10	−23
120	180	0	−15	315	400	−13	−28
180	250	0	−18	400	500	−13	−30
250	315	0	−21	500	630	−15	−35

Chamfer dimensions

The limiting dimensions for chamfer dimensions correspond to DIN 620-6:2004. Overview and limiting values ➤*135*|*7.11*. Nominal value of chamfer dimension ➤*696*|▦.

Tolerances

The tolerances for the dimensional and running accuracy of spherical roller bearings correspond to tolerance class Normal in accordance with ISO 492:2014. Tolerance values ➤*122*|▦*8*. The tolerance values for tapered bores with a taper angle 1:12 correspond to ISO 492 ➤*132*|▦*23*; the tolerance values for tapered bores with a taper angle 1:30 correspond to ➤*132*|▦*24*. The running tolerances for spherical roller bearings with the suffixes BE and BEA correspond to tolerance class 5. Tolerance values in accordance with ISO 492 ➤*126*|▦*14*.

For bearing arrangements with higher requirements for dimensional and running accuracy, spherical roller bearings are available with the tolerance class 5 to ISO 492:2014. In such cases, please consult Schaeffler.

1.12 Suffixes

For a description of the suffixes used in this chapter ➤681|▦11 and ***medias*** interchange ➤*https://www.schaeffler.de/std/1D52*.

▦**11**
Suffixes and corresponding descriptions

Suffix	Description of suffix	
A-MA, AS-MA	Two brass cages, guidance on outer ring, inner ring with two lateral retaining ribs and one central rib	Standard combinations
B-FB1	One steel cage, guidance on inner ring, inner ring with two lateral retaining ribs and one central rib	
BE-XL	Two sheet steel cages, surface hardened, guidance on inner ring, X-life	
BE-XL-JPA	Two sheet steel cages, surface hardened, guidance on outer ring, X-life	
BEA-XL-MB1	One brass double comb cage, guidance on inner ring, inner ring with two lateral retaining ribs, X-life	
E1-XL	Two sheet steel cages, surface hardened or coated, guidance on outer ring, X-life	
E1-XL-TVPB	Two window cages made from glass fibre reinforced polyamide, guidance on inner ring, X-life	
E1A-XL-M	One brass double comb cage, guided by rollers, inner ring with two lateral retaining ribs, X-life	
MB, B-MB	Two brass cages, guidance on inner ring, inner ring with two lateral retaining ribs and one central rib	
MA1	One brass cage, guidance on outer ring, inner ring with two lateral retaining ribs and one central rib	
2RSR	Contact seal (lip seal) on both sides with sheet steel reinforcement, made from nitrile rubber (NBR); grease fill level 25% to 40%, filled with high pressure grease	Standard
2VSR	Contact seal (lip seal) on both sides with sheet steel reinforcement, made from fluoro rubber (FKM); grease fill level 60% to 100%, filled with high temperature grease	

continued ▼

11
Suffixes and corresponding descriptions

Suffix	Description of suffix	
C2	Radial internal clearance C2 (smaller than normal)	Available by agreement
C3	Radial internal clearance C3 (larger than normal)	
C4	Radial internal clearance C4 (larger than C3)	
H40	Without lubrication groove and lubrication holes	
H40CA	6 lubrication holes in the outer ring	
H40AB	6 lubrication holes in the inner ring	
H40AC	6 lubrication holes and one lubrication groove in the inner ring	
H78(*)	3 uniformly distributed threaded holes in one end face of the outer ring (* weight-oriented module letter, please contact us)	
H151	One 45° retaining slot in the outer ring	
H151B	One 15° retaining slot in the outer ring	
K	Tapered bore, taper 1:12	
K30	Tapered bore, taper 1:30	
P5	Dimensional and running accuracy in accordance with ISO tolerance class 5	
S	Lubrication groove and lubrication holes in outer ring	
SY	3 lubrication holes in the outer ring, no lubrication groove	
T41A	For oscillating load with restricted diameter tolerances, radial internal clearance C4	
T41D	For oscillating load with restricted diameter tolerances, radial internal clearance C4, bore with thin chromium coating	
W209B	Inner ring made from case hardening steel	
XL	X-life bearing	

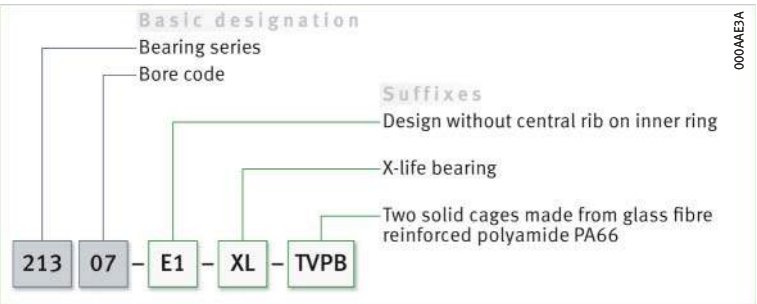
continued ▲

1.13 Structure of bearing designation

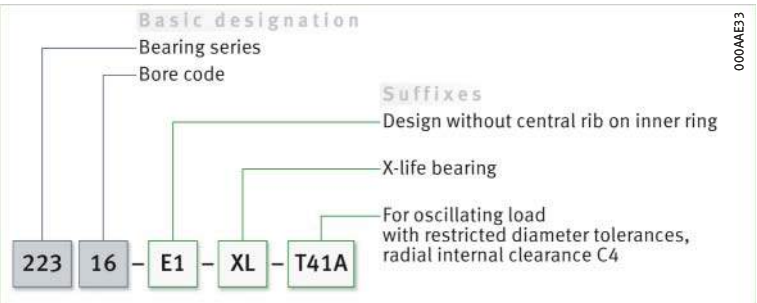
✎ *Examples of composition of bearing designation*

The designation of bearings follows a set model. Examples ➤*683*|🗀*10* to ➤*683*|🗀*13*. The composition of designations is subject to DIN 623-1 ➤*102*|🗀*10*.

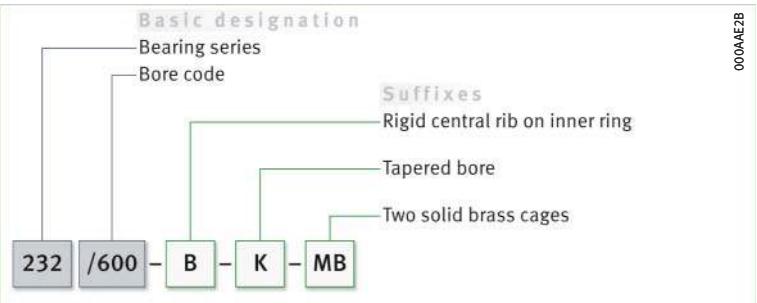
🗀**10**
Spherical roller bearing with cylindrical bore, without central rib on inner ring: designation structure



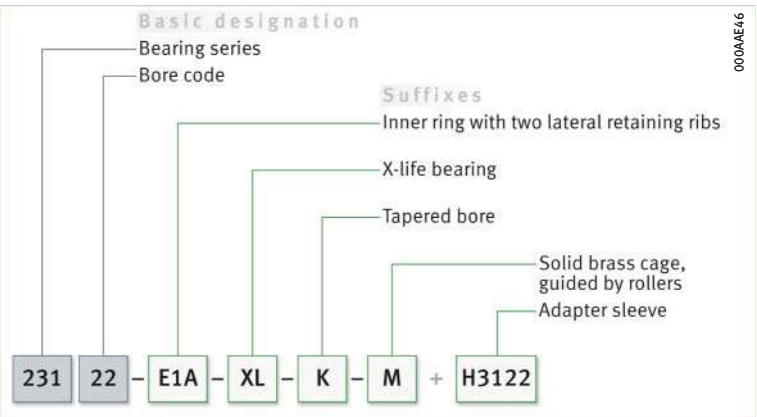
🗀**11**
Spherical roller bearing for vibratory machinery, with cylindrical bore, without central rib on inner ring, to specification T41A: designation structure



🗀**12**
Spherical roller bearing with tapered bore, rigid central rib on inner ring: designation structure



🗀**13**
Spherical roller bearing with tapered bore and adapter sleeve, without central rib on inner ring: designation structure



1.14 Dimensioning

Equivalent dynamic bearing load

✎ *P = a substitute force for combined load and various load cases*

The basic rating life equation $L = (C/P)^p$ used in the dimensioning of bearings under dynamic load assumes a load of constant magnitude and direction. In radial bearings, this is a purely radial load. If this condition is not met, an equivalent dynamic bearing load P must be determined for the rating life calculation. In the case of radial bearings, this is a radial load of constant magnitude and direction, which has the same effect on the rating life as the load occurring in practice.

✎ *$F_a/F_r \leqq e$ or $F_a/F_r > e$*

The calculation of P is dependent on the load ratio F_a/F_r and the calculation factor e ➤*227*| *1* and ➤*227*| *2*.

1
Equivalent dynamic load

$$\frac{F_a}{F_r} \leqq e \quad \Rightarrow \quad P = F_r + Y_1 \cdot F_a$$

2
Equivalent dynamic load

$$\frac{F_a}{F_r} > e \quad \Rightarrow \quad P = 0{,}67 \cdot F_r + Y_2 \cdot F_a$$

Legend

P	N	Equivalent dynamic bearing load
F_r	N	Radial load
F_a	N	Axial load
e, Y_1, Y_2	–	Factors ➤*696*|

Equivalent static bearing load

For spherical roller bearings subjected to static load ➤*684*| *3*.

3
Equivalent static load

$$P_0 = F_{0r} + Y_0 \cdot F_{0a}$$

Legend

P_0	N	Equivalent static bearing load
F_{0r}, F_{0a}	N	Largest radial or axial static bearing load present (maximum load)
Y_0	–	Factor ➤*696*|

Static load safety factor

✎ *$S_0 = C_0/P_0$*

In addition to the basic rating life L (L_{10h}, L_{hmr}), it is also always necessary to check the static load safety factor S_0 ➤*684*| *4*.

4
Static load safety factor

$$S_0 = \frac{C_0}{P_0}$$

Legend

S_0	–	Static load safety factor
C_0	N	Basic static load rating
P_0	N	Equivalent static bearing load.

Axial load carrying capacity of bearings with adapter sleeve

Where bearings with adapter sleeves are located on a smooth shaft without a fixed axial stop (e.g. rigid shoulder), their axial load carrying capacity is dependent on the friction between the shaft and the sleeve ➤*672*| *1.2*.

If there is any doubt about the axial load carrying capacity of the location method, please consult Schaeffler.

1.15 Minimum load

In continuous operation, a minimum load of $P = C_{0r}/100$ is required

In order that no slippage occurs between the contact partners, the spherical roller bearings must be constantly subjected to a sufficiently high radial load. Based on experience, a minimum radial load of the order of $P = C_{0r}/100$ is thus necessary for continuous operation.

If the minimum radial load is lower than indicated above, please consult Schaeffler.

1.16 Design of bearing arrangements

Support bearing rings over their entire circumference and width

In order to allow full utilisation of the load carrying capacity of the bearings and thus also achieve the requisite rating life, the bearing rings must be rigidly and uniformly supported by means of contact surfaces over their entire circumference and over the entire width of the raceway. Support can be provided by means of a cylindrical or tapered seating surface ➤*687*|*16* to ➤*687*|*18*. The accuracy of mating parts must meet specific requirements ➤*688*|*12*, ➤*689*|*13*, ➤*689*|*14*.

Radial location – bearings with cylindrical bore

For secure radial location, tight fits are necessary

In addition to supporting the rings adequately, the bearings must also be securely located in a radial direction, to prevent creep of the bearing rings on the mating parts under load ➤*686*|*14*. This is generally achieved by means of tight fits between the bearing rings and the mating parts. If the rings are not secured adequately or correctly, this can cause severe damage to the bearings and adjacent machine parts. Influencing factors, such as the conditions of rotation, magnitude of the load, internal clearance, temperature conditions, design of the mating parts, mounting and dismounting options etc., must be taken into consideration in the selection of fits.

If shock type loads occur, tight fits (transition fit or interference fit) are required to prevent the rings from coming loose at any point. Clearance, transition or interference fits ➤*150*|*6* and ➤*158*|*7*.

The following information provided in Technical principles must be taken into consideration in the design of bearing arrangements:

- conditions of rotation ➤*145*
- tolerance classes for cylindrical shaft seats (radial bearings) ➤*147*|*2*
- shaft fits ➤*150*|*6*
- tolerance classes for bearing seats in housings (radial bearings) ➤*148*|*4*
- housing fits ➤*158*|*7*
- shaft tolerances for adapter sleeves and withdrawal sleeves ➤*166*|*8*.

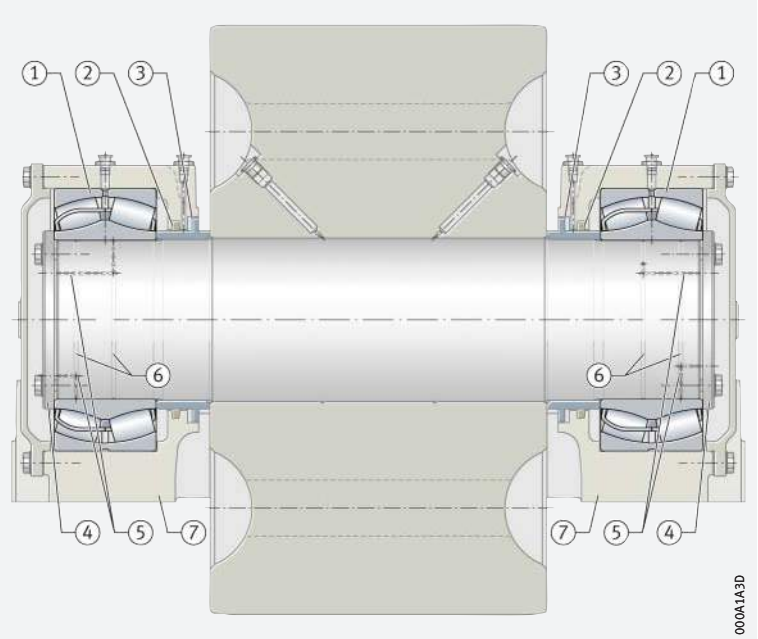
Axial location – bearings with cylindrical bore

The bearings must also be securely located in an axial direction

As a tight fit alone is not normally sufficient to also locate the bearing rings securely on the shaft or in the housing bore in an axial direction, this must usually be achieved by means of an additional axial location or retention method. The axial location of the bearing rings must be matched to the type of bearing arrangement. Shaft and housing shoulders, housing covers, nuts, spacer rings and retaining rings etc., are fundamentally suitable ➤*686*|*14*, ➤*686*|*15*, ➤*687*|*16* and ➤*687*|*17*.

14
Location of a spherical roller bearing in a rotary kiln – example

① *Spherical roller bearing 24164-BE-XL*
② *Felt ring seals*
③ *Labyrinths with relubrication facility*
④ *End cap*
⑤ *Oil feed ducts*
⑥ *Oil grooves*
⑦ *Flake graphite cast iron housing*



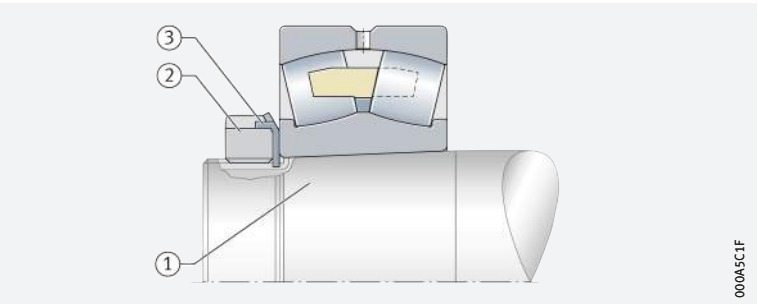
Axial location – bearings with tapered bore

Location by means of locknut and tab washer

If a bearing with a tapered bore is mounted directly on a tapered shaft journal, the bearing can be axially located with ease using a locknut and tab washer ➤*686*|*15*.

15
Spherical roller bearing with tapered bore, mounted directly on the tapered shaft journal

① *Tapered journal with fixing thread*
② *Locknut*
③ *Tab washer*



Location of bearings by means of adapter sleeve or withdrawal sleeve

Mounting can be carried out quickly and reliably by means of wrench sets from Schaeffler

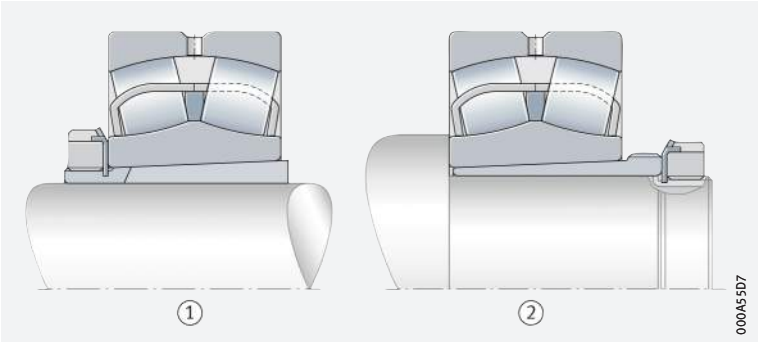
The location of spherical roller bearings by means of adapter sleeve or withdrawal sleeve on a smooth or stepped cylindrical shaft is an easy-to-fit and operationally reliable method ➤*666*|*1.1* and ➤*687*|*16*.
It requires no additional means of retention on the shaft. The bearings can be positioned at any point on smooth shafts. Axial load carrying capacity of such bearing arrangements ➤*672*|*1.2*. Further information on adapter sleeves ➤*1692*.

Mounting of the adapter sleeve and withdrawal sleeve

While the bearing is being slid onto the adapter sleeve, the withdrawal sleeve is pressed into the tapered bearing bore until the required reduction in radial internal clearance is achieved. The position is fixed by means of a locknut. The inner ring is abutted against a shoulder on the shaft ➤*687*|*16*. The required adapter sleeves or withdrawal sleeves must be stated additionally in the order ➤*666*|*1.1* and ➤*756*|▦.

16
Location of spherical roller bearings by means of adapter sleeve or withdrawal sleeve

① *Bearing with adapter sleeve, adapter sleeve nut (shaft nut) and tab washer*
② *Bearing with withdrawal sleeve, locknut and tab washer, abutment of the inner ring against a shaft shoulder*

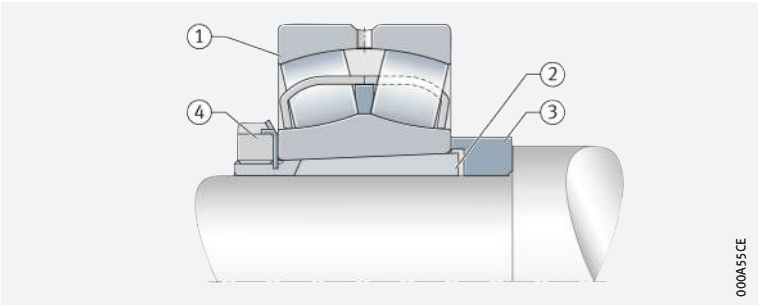


Location by means of adapter sleeve, axial abutment by means of a support ring

If an adapter sleeve connection is used and it is expected that the frictional forces of the sleeve cannot reliably support high axial forces, the bearing inner ring can be abutted by means of a support ring against a shaft shoulder ➤*687*| 16. Axial guidance forces in the opposing direction are supported by means of form fit. The mounting dimensions of the support ring in the product tables must be observed ➤*756*|.

17
Location of a spherical roller bearing by means of adapter sleeve and support ring on a stepped shaft

① *Spherical roller bearing*
② *Adapter sleeve*
③ *Support ring*
④ *Locknut with tab washer*



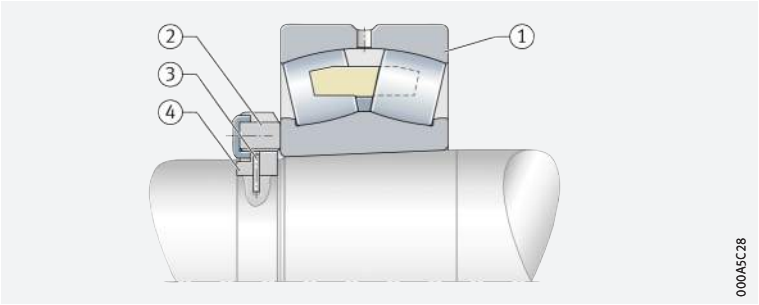
Location of bearings with a tapered bore on a tapered shaft

✎*Axial location by means of fixing nut, ring nut and locking pin*

Where shafts must support high torques, it is not always permissible to cut the thread for the fixing nut of the bearing into the shaft due to the notch effect. In this case, a slot with well rounded transitions is grooved into the shaft. A split ring with an external thread is inserted in the slot and secured by means of a feather key or pin. The fixing nut is screwed onto the ring nut and secured ➤*687*| 18.

18
Location of a spherical roller bearing on a tapered shaft

① *Spherical roller bearing*
② *Fixing nut with retaining bracket*
③ *Retaining pin*
④ *Ring nut*



Dimensional, geometrical and running accuracy of cylindrical bearing seats

✎A minimum of IT6 should be provided for the shaft seat and a minimum of IT7 for the housing seat

The accuracy of the cylindrical bearing seat on the shaft and in the housing should correspond to the accuracy of the bearing used. For spherical roller bearings with the tolerance class Normal, the shaft seat should correspond to a minimum of standard tolerance grade IT6 and the housing seat to a minimum of IT7. Guide values for the geometrical and positional tolerances of bearing seating surfaces ➤*688*|▦ *12*, tolerances t_1 to t_3 in accordance with ➤*168*|⧉ *11*. Numerical values for IT grades ➤*689*|▦ *13*.

▦ 12
Guide values for the geometrical and positional tolerances of bearing seating surfaces

Bearing tolerance class		Bearing seating surface	Standard tolerance grades to ISO 286-1 (IT grades)			
to ISO 492	to DIN 620		Diameter tolerance	Roundness tolerance t_1	Parallelism tolerance t_2	Total axial runout tolerance of abutment shoulder t_3
Normal	PN (P0)	Shaft	IT6 (IT5)	Circumferential load IT4/2	Circumferential load IT4/2	IT4
				Point load IT5/2	Point load IT5/2	
		Housing	IT7 (IT6)	Circumferential load IT5/2	Circumferential load IT5/2	IT5
				Point load IT6/2	Point load IT6/2	
5	P5	Shaft	IT5	Circumferential load IT2/2	Circumferential load IT2/2	IT2
				Point load IT3/2	Point load IT3/2	
		Housing	IT6	Circumferential load IT3/2	Circumferential load IT3/2	IT3
				Point load IT4/2	Point load IT4/2	

13
Numerical values for ISO standard tolerances (IT grades) to ISO 286-1:2010

IT grade	Nominal dimension in mm							
	over	18	30	50	80	120	180	250	315
	incl.	30	50	80	120	180	250	315	400
	Values in µm								
IT2		2,5	2,5	3	4	5	7	8	9
IT3		4	4	5	6	8	10	12	13
IT4		6	7	8	10	12	14	16	18
IT5		9	11	13	15	18	20	23	25
IT6		13	16	19	22	25	29	32	36
IT7		21	25	30	35	40	46	52	57

continued ▼

13
Numerical values for ISO standard tolerances (IT grades) to ISO 286-1:2010

IT grade	Nominal dimension in mm						
	over	400	500	630	800	1 000	1 250	1 600
	incl.	500	630	800	1 000	1 250	1 600	2 000
	Values in µm							
IT2		10	11	13	15	18	21	25
IT3		15	16	18	21	24	29	35
IT4		20	22	25	28	33	39	46
IT5		27	32	36	40	47	55	65
IT6		40	44	50	56	66	78	92
IT7		63	70	80	90	105	125	150

continued ▲

Roughness of cylindrical bearing seating surfaces

✎ Ra must not be too high

The roughness of the bearing seats must be matched to the tolerance class of the bearings. The mean roughness value Ra must not be too high, in order to maintain the interference loss within limits. The shafts must be ground, while the bores must be precision turned. Guide values as a function of the IT grade of bearing seating surfaces ➤*689*|▦ *14*.

14
Roughness values for cylindrical bearing seating surfaces – guide values

Nominal diameter of the bearing seat d (D) mm		Recommended mean roughness value for ground bearing seats Ramax µm			
		Diameter tolerance (IT grade)			
over	incl.	IT7	IT6	IT5	IT4
–	80	1,6	0,8	0,4	0,2
80	500	1,6	1,6	0,8	0,4
500	1 250	3,2[1)]	1,6	1,6	0,8

[1)] *For the mounting of bearings using the hydraulic method, a value Ra = 1,6 µm must not be exceeded*

Tolerances for tapered bearing seats

✎ Specifications for tapered bearing seats

For bearings located directly on a tapered shaft journal, the data are in accordance with ➤*171*|⧉ *12*.

Mounting dimensions for the contact surfaces of bearing rings

✎ The contact surfaces for the rings must be of sufficient height

The mounting dimensions of the shaft and housing shoulders, and spacer rings etc., must ensure that the contact surfaces for the bearing rings are of sufficient height. However, they must also reliably prevent rotating parts of the bearing from grazing stationary parts. Proven mounting dimensions for the radii and diameters of the abutment shoulders are given in the product tables. These dimensions are limiting dimensions (maximum or minimum dimensions); the actual values should not be higher or lower than specified.

Suitable bearing housings for spherical roller bearings

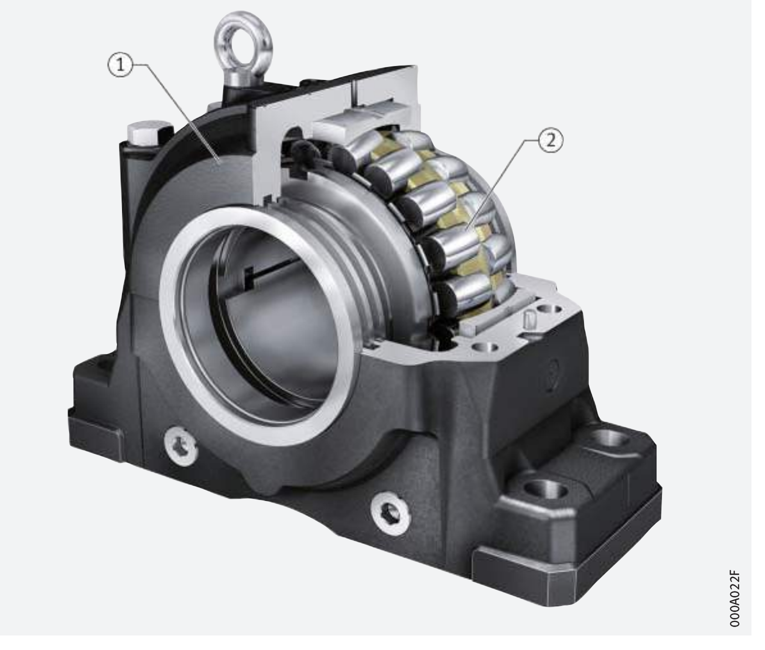
✎ A large range of housings is available

For economical, operationally reliable and easily interchangeable bearing arrangement units, the spherical roller bearings can also be combined with Schaeffler bearing housings ➤690 | 19. These easy-to-fit units fulfil all of the requirements for modern machine and plant designs with favourable maintenance-related characteristics.

Due to the large number of application areas, an extensive range of bearing housings is available for bearings with cylindrical and tapered bores. These include split and unsplit plummer block housings, take-up housings, flanged housings and housings for specific industrial and railway applications. Detailed information on bearing housings can be found in publication GK 1 ➤ *https://www.schaeffler.de/std/1D54*. This book can be ordered from Schaeffler.

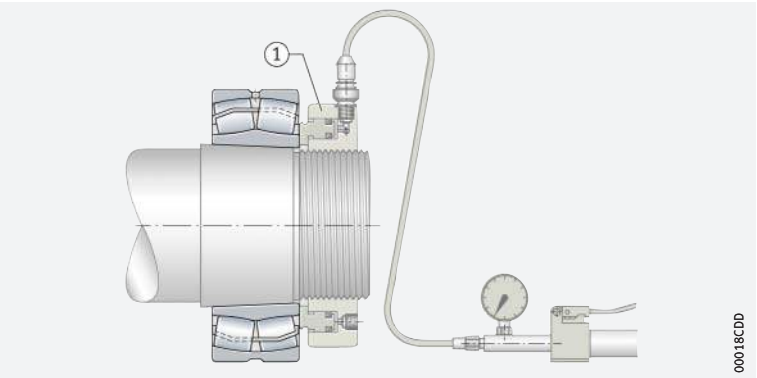
19
Split plummer block housing SNS with a spherical roller bearing

① *Split plummer block housing SNS*
② *Spherical roller bearing*



1.17 Mounting and dismounting

The mounting and dismounting options for spherical roller bearings, by thermal, hydraulic or mechanical methods, must also be taken into consideration in the design of the bearing position.
Example ➤691|20.



20 *Mounting of large bearings with a hydraulic nut*

① *Spherical roller bearing with tapered bore mounted directly on the tapered shaft journal*
② *Hydraulic nut*

✎ *Ensure that the bearings are not damaged during mounting*

Spherical roller bearings are not separable. In the mounting of non-separable bearings, the mounting forces must always be applied to the bearing ring with a tight fit.

Mounting of bearings with a tapered bore

✎ *Suitable methods*

Bearings with a tapered bore are mounted with a tight fit on the shaft or adapter and withdrawal sleeve ➤686|15, ➤687|16 and ➤687|17. The measurement of the reduction in radial internal clearance or of the axial drive-up distance of the inner ring on the tapered bearing seat serves as an indication of the tight fit.

Measuring the reduction in radial internal clearance during mounting of the bearings

The measurement is usually carried out with a feeler gauge

The reduction in radial internal clearance is the difference between the radial internal clearance before mounting and the bearing clearance after mounting of the bearing ➤*692*|◻ *21*, ➤*693*|▦ *15* and ➤*694*|▦ *16*. The radial internal clearance must be measured first. During pressing on, the radial clearance (bearing clearance) must be checked until the necessary reduction in the radial internal clearance and thus the required tight fit is achieved.

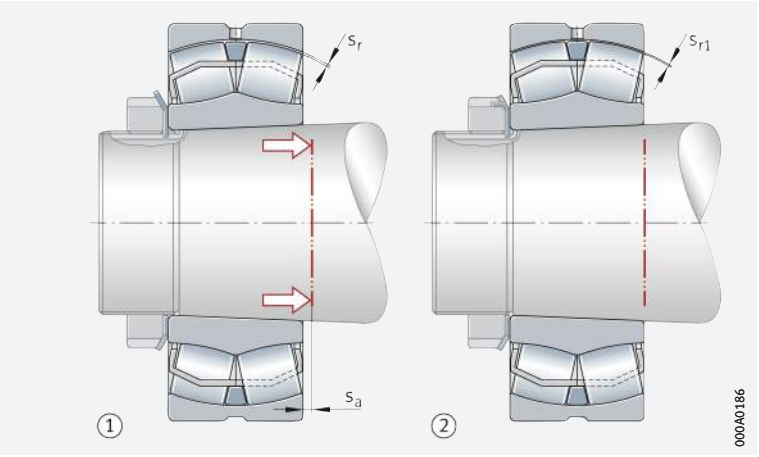
If the values in the table are observed, secure radial location of the bearings will be achieved, i.e. the inner ring will be prevented from creeping under load. However, the mounting method does not ensure that an operating clearance which is appropriate to the application is also achieved simultaneously. In order to select the requisite internal clearance class, other factors influencing the operating clearance, such as the temperature difference between the inner and outer ring and the housing bore tolerance for example, must be taken into consideration.

If there is any uncertainty regarding the selection of an internal clearance class for a specific application, please consult Schaeffler.

◻ ***21***
Reduction in radial internal clearance

s_a = *axial press-on distance (axial drive-up distance of the bearing)*
s_r = *radial internal clearance before mounting*
s_{r1} = *radial internal clearance after mounting*
$s_r - s_{r1}$ = *reduction in radial internal clearance*

① *Before mounting*
② *After mounting*



15
Reduction in radial internal clearance in mounting of spherical roller bearings with tapered bore

Nominal bore diameter d mm		Radial internal clearance before mounting in accordance with DIN 620-4:2004 (ISO 5753-1:2009)						Reduction in radial internal clearance during mounting[1] mm	
		CN (Group N) mm		C3 (Group 3) mm		C4 (Group 4) mm			
over	incl.	min.	max.	min.	max.	min.	max.	min.	max.
24	30	0,03	0,04	0,04	0,055	0,055	0,075	0,015	0,02
30	40	0,035	0,05	0,05	0,065	0,065	0,085	0,02	0,025
40	50	0,045	0,06	0,06	0,08	0,08	0,1	0,025	0,03
50	65	0,055	0,075	0,075	0,095	0,095	0,12	0,03	0,04
65	80	0,07	0,095	0,095	0,12	0,12	0,15	0,04	0,05
80	100	0,08	0,11	0,11	0,14	0,14	0,18	0,045	0,06
100	120	0,1	0,135	0,135	0,17	0,17	0,22	0,05	0,07
120	140	0,12	0,16	0,16	0,2	0,2	0,26	0,065	0,09
140	160	0,13	0,18	0,18	0,23	0,23	0,3	0,075	0,1
160	180	0,14	0,2	0,2	0,26	0,26	0,34	0,08	0,11
180	200	0,16	0,22	0,22	0,29	0,29	0,37	0,09	0,13
200	225	0,18	0,25	0,25	0,32	0,32	0,41	0,1	0,14
225	250	0,2	0,27	0,27	0,35	0,35	0,45	0,11	0,15
250	280	0,22	0,3	0,3	0,39	0,39	0,49	0,12	0,17
280	315	0,24	0,33	0,33	0,43	0,43	0,54	0,13	0,19
315	355	0,27	0,36	0,36	0,47	0,47	0,59	0,15	0,21
355	400	0,3	0,4	0,4	0,52	0,52	0,65	0,17	0,23
400	450	0,33	0,44	0,44	0,57	0,57	0,72	0,2	0,26
450	500	0,37	0,49	0,49	0,63	0,63	0,79	0,21	0,28
500	560	0,41	0,54	0,54	0,68	0,68	0,87	0,24	0,32
560	630	0,46	0,6	0,6	0,76	0,76	0,98	0,26	0,35
630	710	0,51	0,67	0,67	0,85	0,85	1,09	0,3	0,4
710	800	0,57	0,75	0,75	0,96	0,96	1,22	0,34	0,45
800	900	0,64	0,84	0,84	1,07	1,07	1,37	0,37	0,5
900	1 000	0,71	0,93	0,93	1,19	1,19	1,52	0,41	0,55
1 000	1 120	0,78	1,02	1,02	1,3	1,3	1,65	0,45	0,6
1 120	1 250	0,86	1,12	1,12	1,42	1,42	1,8	0,49	0,65
1 250	1 400	0,94	1,22	1,22	1,55	1,55	1,96	0,55	0,72

[1] *Valid only for solid steel shafts and hollow shafts with a bore no larger than half the shaft diameter. The following applies: bearings with a radial internal clearance before mounting in the upper half of the tolerance range are mounted using the larger value for the reduction in radial internal clearance, while bearings in the lower half of the tolerance range are mounted using the smaller value for the reduction in radial internal clearance.*

Measuring the axial drive-up distance of the inner ring

16 *Axial drive-up distance of the inner ring in spherical roller bearings with a tapered bore*

Nominal bore diameter		Drive-up distance on taper 1:12[1]				Drive-up distance on taper 1:30[1]				Minimum radial internal clearance required after mounting, control value		
d		Shaft		Sleeve		Shaft		Sleeve		With CN (Group N)	With C3 (Group 3)	With C4 (Group 4)
mm		mm		mm		mm		mm		mm	mm	mm
over	incl.	min.	max.	min.	max.	min.	max.	min.	max.	min.	min.	min.
24	30	0,3	0,35	0,3	0,4	–	–	–	–	0,015	0,02	0,035
30	40	0,35	0,4	0,35	0,45	–	–	–	–	0,015	0,025	0,04
40	50	0,4	0,45	0,45	0,5	–	–	–	–	0,02	0,03	0,05
50	65	0,45	0,6	0,5	0,7	–	–	–	–	0,025	0,035	0,055
65	80	0,6	0,75	0,7	0,85	–	–	–	–	0,025	0,04	0,07
80	100	0,7	0,9	0,75	1	1,7	2,2	1,8	2,4	0,035	0,05	0,08
100	120	0,7	1,1	0,8	1,2	1,9	2,7	2	2,8	0,05	0,065	0,1
120	140	1,1	1,4	1,2	1,5	2,7	3,5	2,8	3,6	0,055	0,08	0,11
140	160	1,2	1,6	1,3	1,7	3	4	3,1	4,2	0,055	0,09	0,13
160	180	1,3	1,7	1,4	1,9	3,2	4,2	3,3	4,6	0,06	0,1	0,15
180	200	1,4	2	1,5	2,2	3,5	4,5	3,6	5	0,07	0,1	0,16
200	225	1,6	2,2	1,7	2,4	4	5,5	4,2	5,7	0,08	0,12	0,18
225	250	1,7	2,4	1,8	2,6	4,2	6	4,6	6,2	0,09	0,13	0,2
250	280	1,9	2,6	2	2,9	4,7	6,7	4,8	6,9	0,1	0,14	0,22
280	315	2	3	2,2	3,2	5	7,5	5,2	7,7	0,11	0,15	0,24
315	355	2,4	3,4	2,6	3,6	6	8,2	6,2	8,4	0,12	0,17	0,26
355	400	2,6	3,6	2,9	3,9	6,5	9	6,8	9,2	0,13	0,19	0,29
400	450	3,1	4,1	3,4	4,4	7,7	10	8	10,4	0,13	0,2	0,31
450	500	3,3	4,4	3,6	4,8	8,2	11	8,4	11,2	0,16	0,23	0,35
500	560	3,7	5	4,1	5,4	9,2	12,5	9,6	12,8	0,17	0,25	0,36
560	630	4	5,4	4,4	5,9	10	13,5	10,4	14	0,2	0,29	0,41
630	710	4,6	6,2	5,1	6,8	11,5	15,5	12	16	0,21	0,31	0,45
710	800	5,3	7	5,8	7,6	13,3	17,5	13,6	18	0,23	0,35	0,51
800	900	5,7	7,8	6,3	8,5	14,3	19,5	14,8	20	0,27	0,39	0,57
900	1 000	6,3	8,5	7	9,4	15,8	21	16,4	22	0,3	0,43	0,64
1 000	1 120	6,8	9	7,6	10,2	17	23	18	24	0,32	0,48	0,7
1 120	1 250	7,4	9,8	8,3	11	18,5	25	19,6	26	0,34	0,54	0,77
1 250	1 400	8,3	10,8	9,3	12,1	21	27	22,2	28,3	0,36	0,59	0,84

[1] *Valid only for solid steel shafts and hollow shafts with a bore no larger than half the shaft diameter. The following applies: bearings with a radial internal clearance before mounting in the upper half of the tolerance range are mounted using the larger value for the axial drive-up distance, while bearings in the lower half of the tolerance range are mounted using the smaller value for the axial drive-up distance.*

Schaeffler Mounting Handbook

✎ Rolling bearings must be handled with great care

Rolling bearings are well-proven precision machine elements for the design of economical and reliable bearing arrangements, which offer high operational security. In order that these products can function correctly and achieve the envisaged operating life without detrimental effect, they must be handled with care.

The Schaeffler Mounting Handbook MH 1 gives comprehensive information about the correct storage, mounting, dismounting and maintenance of rotary rolling bearings ➤ *https://www.schaeffler.de/std/1D53*. It also provides information which should be observed by the designer, in relation to the mounting, dismounting and maintenance of bearings, in the original design of the bearing position. This book is available from Schaeffler on request.

1.18 Legal notice regarding data freshness

✎ The further development of products may also result in technical changes to catalogue products

Of central interest to Schaeffler is the further development and optimisation of its products and the satisfaction of its customers. In order that you, as the customer, can keep yourself optimally informed about the progress that is being made here and with regard to the current technical status of the products, we publish any product changes which differ from the printed version in our electronic product catalogue.

§ We therefore reserve the right to make changes to the data and illustrations in this catalogue. This catalogue reflects the status at the time of printing. More recent publications released by us (as printed or digital media) will automatically precede this catalogue if they involve the same subject. Therefore, please always use our electronic product catalogue to check whether more up-to-date information or modification notices exist for your desired product.

Link to electronic product catalogue

The following link will take you to the Schaeffler electronic product catalogue: ➤ *https://medias.schaeffler.com*.

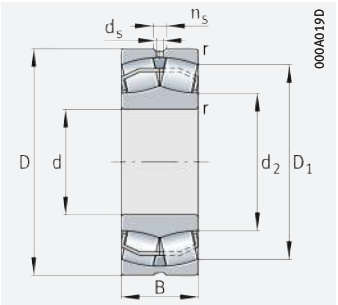
1.19 Further information

In addition to the data in this chapter, the following chapters in Technical principles must also be observed in the design of bearing arrangements:

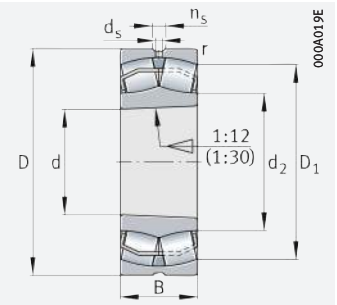
- Determining the bearing size ➤ *34*
- Rigidity ➤ *54*
- Friction and increases in temperature ➤ *56*
- Speeds ➤ *64*
- Bearing data ➤ *97*
- Lubrication ➤ *70*
- Sealing ➤ *182*
- Design of bearing arrangements ➤ *139*
- Mounting and dismounting ➤ *191*.

Spherical roller bearings

With cylindrical or tapered bore



Cylindrical bore

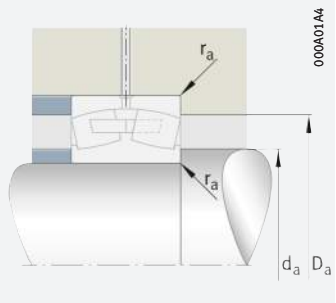


Tapered bore

d = 20 – 50 mm

Main dimensions			Basic load ratings		Fatigue limit load	Limiting speed	Speed rating	Mass	Designation
d	D	B	dyn. C_r	stat. C_{0r}	C_{ur}	n_G	$n_{\vartheta r}$	m	➤*681* | *1.12* ➤*683* | *1.13* X-life ➤*671*
			kN	kN	N	min^{-1}	min^{-1}	≈ kg	
20	52	15	41	33	3 700	16 000	9 700	0,16	**21304-E1-XL-TVPB**
25	52	18	48,5	42,5	4 800	14 400	9 200	0,191	**22205-E1-XL**
	52	18	48,5	42,5	4 800	14 400	9 200	0,175	**22205-E1-XL-K**
	62	17	52	43,5	4 750	13 900	8 400	0,254	**21305-E1-XL-TVPB**
30	62	20	64	57	6 900	12 500	7 800	0,275	**22206-E1-XL**
	62	20	64	57	6 900	12 500	7 800	0,275	**22206-E1-XL-K**
	72	19	72	63	7 000	12 000	7 300	0,386	**21306-E1-XL-TVPB**
35	72	23	89	81	9 400	10 700	7 000	0,434	**22207-E1-XL**
	72	23	89	81	9 400	10 700	7 000	0,434	**22207-E1-XL-K**
	80	21	83	74	8 100	10 900	6 800	0,496	**21307-E1-XL-K-TVPB**
	80	21	83	74	8 100	10 900	6 800	0,503	**21307-E1-XL-TVPB**
40	80	23	101	91	11 800	10 500	6 200	0,528	**22208-E1-XL**
	80	23	101	91	11 800	10 500	6 200	0,528	**22208-E1-XL-K**
	90	23	109	107	14 300	9 800	5 200	0,749	**21308-E1-XL**
	90	23	109	107	14 300	9 800	5 200	0,749	**21308-E1-XL-K**
	90	33	156	149	13 100	7 600	5 500	1,05	**22308-E1-XL**
	90	33	156	149	13 100	7 600	5 500	1	**22308-E1-XL-K**
45	85	23	104	99	12 700	10 100	5 600	0,589	**22209-E1-XL**
	85	23	104	99	12 700	10 100	5 600	0,577	**22209-E1-XL-K**
	100	25	129	130	17 300	9 000	4 750	0,999	**21309-E1-XL**
	100	25	129	130	17 300	9 000	4 750	0,999	**21309-E1-XL-K**
	100	36	187	183	16 000	6 800	5 000	1,39	**22309-E1-XL**
	100	36	187	183	16 000	6 800	5 000	1,4	**22309-E1-XL-K**
50	90	23	109	107	14 300	9 800	5 100	0,606	**22210-E1-XL**
	90	23	109	107	14 300	9 800	5 100	0,608	**22210-E1-XL-K**
	110	27	129	130	17 300	9 000	5 400	1,32	**21310-E1-XL**
	110	27	129	130	17 300	9 000	5 400	1,32	**21310-E1-XL-K**
	110	40	229	223	20 100	6 300	4 800	1,9	**22310-E1-XL**
	110	40	229	223	20 100	6 300	4 800	1,9	**22310-E1-XL-K**

medias ➤ *https://www.schaeffler.de/std/1EC9*

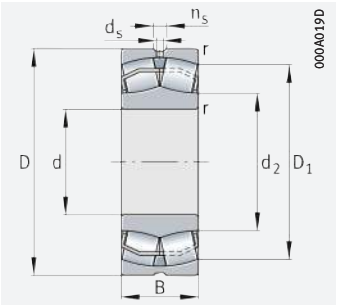


Mounting dimensions

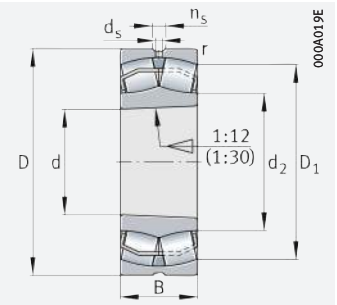
Dimensions						Mounting dimensions			Calculation factors			
d	r min.	D_1 ≈	d_2 ≈	d_s	n_s	d_a min.	D_a max.	r_a max.	e	Y_1	Y_2	Y_0
20	1,1	43	28,9	–	–	27	45	1	0,3	2,25	3,34	2,2
25	1	44,4	31,5	3,2	4,8	30,6	46,4	1	0,33	2,07	3,09	2,03
	1	44,4	31,5	3,2	4,8	30,6	46,4	1	0,33	2,07	3,09	2,03
	1,1	51	35,2	–	–	32	55	1	0,28	2,43	3,61	2,37
30	1	53,7	38,1	3,2	4,8	35,6	56,4	1	0,3	2,26	3,37	2,21
	1	53,7	38,1	3,2	4,8	35,6	54,6	1	0,3	2,26	3,37	2,21
	1,1	59,9	41,5	–	–	37	65	1	0,27	2,49	3,71	2,43
35	1,1	62,5	43,9	3,2	4,8	42	65	1	0,31	2,21	3,29	2,16
	1,1	62,5	43,9	3,2	4,8	42	65	1	0,31	2,21	3,29	2,16
	1,5	66,6	47,4	–	–	44	71	1,5	0,26	2,55	3,8	2,5
	1,5	66,6	47,4	–	–	44	71	1,5	0,26	2,55	3,8	2,5
40	1,1	70,4	48,8	3,2	4,8	47	73	1	0,27	2,49	3,71	2,43
	1,1	70,4	48,8	3,2	4,8	47	73	1	0,27	2,49	3,71	2,43
	1,5	80,8	59,9	3,2	4,8	49	81	1,5	0,23	2,95	4,4	2,89
	1,5	80,8	59,9	3,2	4,8	49	81	1,5	0,23	2,95	4,4	2,89
	1,5	76	52,4	3,2	6,5	49	81	1,5	0,36	1,86	2,77	1,82
	1,5	76	52,4	3,2	6,5	49	81	1,5	0,36	1,86	2,77	1,82
45	1,1	75,6	55	3,2	4,8	52	78	1	0,25	2,74	4,08	2,68
	1,1	75,6	55	3,2	4,8	52	78	1	0,25	2,74	4,08	2,68
	1,5	89,8	67,6	3,2	4,8	54	91	1,5	0,21	3,17	4,72	3,1
	1,5	89,8	67,6	3,2	4,8	54	91	1,5	0,21	3,17	4,72	3,1
	1,5	84,7	58,9	3,2	6,5	54	91	1,5	0,36	1,9	2,83	1,86
	1,5	84,7	58,9	3,2	6,5	54	91	1,5	0,36	1,9	2,83	1,86
50	1,1	80,8	59,9	3,2	4,8	57	83	1	0,23	2,95	4,4	2,89
	1,1	80,8	59,9	3,2	4,8	57	83	1	0,23	2,95	4,4	2,89
	2	89,8	67,7	3,2	4,8	61	99	2	0,21	3,17	4,72	3,1
	2	89,8	67,7	3,2	4,8	61	99	2	0,21	3,17	4,72	3,1
	2	92,6	63	3,2	6,5	61	99	2	0,36	1,86	2,77	1,82
	2	92,6	63	3,2	6,5	61	99	2	0,36	1,86	2,77	1,82

Spherical roller bearings

With cylindrical or tapered bore



Cylindrical bore

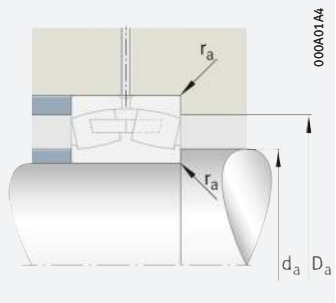


Tapered bore

d = 55 – 75 mm

Main dimensions			Basic load ratings		Fatigue limit load	Limiting speed	Speed rating	Mass	Designation
d	D	B	dyn. C_r	stat. C_{0r}	C_{ur}	n_G	$n_{\vartheta r}$	m	➤*681*|*1.12* ➤*683*|*1.13* X-life ➤*671*
			kN	kN	N	min^{-1}	min^{-1}	≈ kg	
55	100	25	129	130	17 300	9 000	4 650	0,822	**22211-E1-XL**
	100	25	129	130	17 300	9 000	4 650	0,825	**22211-E1-XL-K**
	120	29	160	155	20 200	8 100	5 100	1,28	**21311-E1-XL**
	120	29	160	155	20 200	8 100	5 100	1,28	**21311-E1-XL-K**
	120	43	265	260	23 900	5 800	4 500	2,27	**22311-E1-XL**
	120	43	265	260	23 900	5 800	4 500	2,2	**22311-E1-XL-K**
60	110	28	160	155	20 200	8 100	4 550	1,12	**22212-E1-XL**
	110	28	160	155	20 200	8 100	4 550	1,09	**22212-E1-XL-K**
	130	31	211	226	28 000	6 700	4 100	1,89	**21312-E1-XL**
	130	31	211	226	28 000	6 700	4 100	1,89	**21312-E1-XL-K**
	130	46	310	310	28 000	5 400	4 200	2,97	**22312-E1-XL**
	130	46	310	310	28 000	5 400	4 200	2,8	**22312-E1-XL-K**
65	120	31	202	210	25 500	7 000	4 200	1,55	**22213-E1-XL**
	120	31	202	210	25 500	7 000	4 200	1,52	**22213-E1-XL-K**
	140	33	250	270	33 500	6 200	3 600	2,13	**21313-E1-XL**
	140	33	250	270	33 500	6 200	3 600	2,13	**21313-E1-XL-K**
	140	48	350	365	32 500	5 000	3 800	3,57	**22313-E1-XL**
	140	48	350	365	32 500	5 000	3 800	3,5	**22313-E1-XL-K**
70	125	31	211	226	28 000	6 700	3 950	1,65	**22214-E1-XL**
	125	31	211	226	28 000	6 700	3 950	1,61	**22214-E1-XL-K**
	150	35	250	270	33 500	6 200	3 950	3,13	**21314-E1-XL**
	150	35	250	270	33 500	6 200	3 950	3,13	**21314-E1-XL-K**
	150	51	390	390	36 500	4 800	3 700	4,21	**22314-E1-XL**
	150	51	390	390	36 500	4 800	3 700	4,1	**22314-E1-XL-K**
75	130	31	216	237	29 500	6 500	3 700	1,72	**22215-E1-XL**
	130	31	216	237	29 500	6 500	3 700	1,68	**22215-E1-XL-K**
	160	37	305	325	38 000	5 700	3 750	3,79	**21315-E1-XL**
	160	37	305	325	38 000	5 700	3 750	3,74	**21315-E1-XL-K**
	160	55	445	450	40 500	4 500	3 550	5,38	**22315-E1-XL**
	160	55	445	450	40 500	4 500	3 550	5,3	**22315-E1-XL-K**

medias ➤ *https://www.schaeffler.de/std/1ECA*

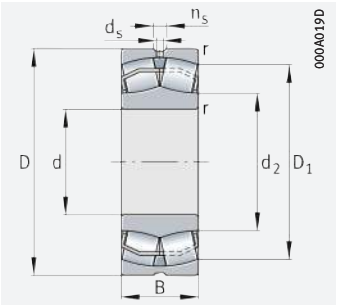


Mounting dimensions

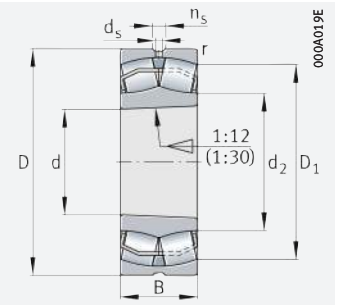
Dimensions						Mounting dimensions			Calculation factors			
d	r min.	D_1 ≈	d_2 ≈	d_s	n_s	d_a min.	D_a max.	r_a max.	e	Y_1	Y_2	Y_0
55	1,5	89,8	67,6	3,2	4,8	64	91	1,5	0,21	3,17	4,72	3,1
	1,5	89,8	67,6	3,2	4,8	64	91	1,5	0,21	3,17	4,72	3,1
	2	98,3	71,6	3,2	6,5	66	109	2	0,23	2,98	4,44	2,92
	2	98,3	71,6	3,2	6,5	66	109	2	0,23	2,98	4,44	2,92
	2	101,4	68,9	3,2	6,5	66	109	2	0,36	1,89	2,81	1,84
	2	101,4	68,9	3,2	6,5	66	109	2	0,36	1,89	2,81	1,84
60	1,5	98,7	71,6	3,2	6,5	69	101	1,5	0,23	2,98	4,44	2,92
	1,5	98,7	71,6	3,2	6,5	69	101	1,5	0,23	2,98	4,44	2,92
	2,1	112,5	84,4	3,2	6,5	72	118	2,1	0,23	2,95	4,4	2,89
	2,1	112,5	84,4	3,2	6,5	72	118	2,1	0,23	2,95	4,4	2,89
	2,1	110,1	74,8	3,2	6,5	72	118	2,1	0,35	1,91	2,85	1,87
	2,1	110,1	74,8	3,2	6,5	72	118	2,1	0,35	1,91	2,85	1,87
65	1,5	107,3	79,1	3,2	6,5	74	111	1,5	0,24	2,81	4,19	2,75
	1,5	107,3	79,1	3,2	6,5	74	111	1,5	0,24	2,81	4,19	2,75
	2,1	126,8	94,9	3,2	6,5	77	128	2,1	0,22	3,14	4,67	3,07
	2,1	126,8	94,9	3,2	6,5	77	128	2,1	0,22	3,14	4,67	3,07
	2,1	119,3	83,2	4,8	9,5	77	128	2,1	0,34	2	2,98	1,96
	2,1	119,3	83,2	4,8	9,5	77	128	2,1	0,34	2	2,98	1,96
70	1,5	112,5	84,4	3,2	6,5	79	116	1,5	0,23	2,95	4,4	2,89
	1,5	112,5	84,4	3,2	6,5	79	116	1,5	0,23	2,95	4,4	2,89
	2,1	126,2	94,9	3,2	6,5	82	138	2,1	0,22	3,14	4,67	3,07
	2,1	126,2	94,9	3,2	6,5	82	138	2,1	0,22	3,14	4,67	3,07
	2,1	128	86,7	4,8	9,5	82	138	2,1	0,34	2	2,98	1,96
	2,1	128	86,7	4,8	9,5	82	138	2,1	0,34	2	2,98	1,96
75	1,5	117,7	89,8	3,2	6,5	84	121	1,5	0,22	3,1	4,62	3,03
	1,5	117,7	89,8	3,2	6,5	84	121	1,5	0,22	3,1	4,62	3,03
	2,1	135,2	99,7	3,2	6,5	87	148	2,1	0,22	3,04	4,53	2,97
	2,1	135,2	99,7	3,2	6,5	87	148	2,1	0,22	3,04	4,53	2,97
	2,1	136,3	92,4	4,8	9,5	87	148	2,1	0,34	1,99	2,96	1,94
	2,1	136,3	92,4	4,8	9,5	87	148	2,1	0,34	1,99	2,96	1,94

Spherical roller bearings

With cylindrical or tapered bore



Cylindrical bore

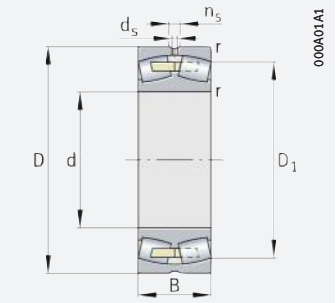


Tapered bore

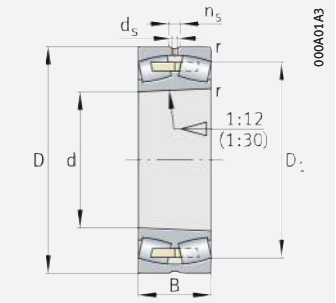
d = 80 – 95 mm

Main dimensions			Basic load ratings		Fatigue limit load	Limiting speed	Speed rating	Mass	Designation
d	D	B	dyn. C_r	stat. C_{0r}	C_{ur}	n_G	$n_{\vartheta r}$	m	➤*681* | *1.12* ➤*683* | *1.13* X-life ➤*671*
			kN	kN	N	min^{-1}	min^{-1}	≈ kg	
80	140	33	250	270	33 500	6 200	3 550	2,1	**22216-E1-XL**
	140	33	250	270	33 500	6 200	3 550	2,08	**22216-E1-XL-K**
	170	39	305	325	38 000	5 700	4 050	4,54	**21316-E1-XL**
	170	39	305	325	38 000	5 700	4 050	4,54	**21316-E1-XL-K**
	170	58	495	510	45 000	4 250	3 400	6,27	**22316-E1-XL**
	170	58	495	510	45 000	4 250	3 400	6,1	**22316-E1-XL-K**
85	150	36	305	325	38 000	5 700	3 450	2,65	**22217-E1-XL**
	150	36	305	325	38 000	5 700	3 450	2,59	**22217-E1-XL-K**
	180	41	345	375	42 500	5 200	3 800	5,36	**21317-E1-XL**
	180	41	345	375	42 500	5 200	3 800	5,3	**21317-E1-XL-K**
	180	60	540	560	49 500	4 100	3 200	7,06	**22317-E1-XL**
	180	60	540	560	49 500	4 100	3 200	7,1	**22317-E1-XL-K**
90	160	40	345	375	42 500	5 200	3 400	3,42	**22218-E1-XL**
	160	40	345	375	42 500	5 200	3 400	3,35	**22218-E1-XL-K**
	160	52,4	445	520	48 500	4 250	2 650	4,1	**23218-E1-XL-K-TVPB**
	160	52,4	445	520	48 500	4 250	2 650	4,3	**23218-E1-XL-TVPB**
	160	52,4	445	520	48 500	4 250	2 650	4,3	**23218-E1A-XL-K-M**
	160	52,4	445	520	48 500	4 250	2 650	4,5	**23218-E1A-XL-M**
	190	43	380	415	47 000	4 850	3 600	6,26	**21318-E1-XL**
	190	43	380	415	47 000	4 850	3 600	6,26	**21318-E1-XL-K**
	190	64	610	630	55 000	3 850	3 000	8,69	**22318-E1-XL**
	190	64	610	630	55 000	3 850	3 000	8,5	**22318-E1-XL-K**
95	170	43	380	415	47 000	4 850	3 300	4,13	**22219-E1-XL**
	170	43	380	415	47 000	4 850	3 300	4,04	**22219-E1-XL-K**
	200	45	425	450	47 500	4 600	3 250	6,63	**21319-E1-XL-K-TVPB**
	200	45	425	450	47 500	4 600	3 250	6,81	**21319-E1-XL-TVPB**
	200	67	670	700	59 000	3 700	2 800	9,69	**22319-E1-XL**
	200	67	670	700	59 000	3 700	2 800	9,5	**22319-E1-XL-K**

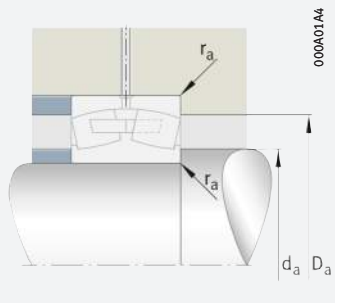
medias ➤ *https://www.schaeffler.de/std/1ECB*



Solid cage, brass or steel; cylindrical bore



Solid cage, brass or steel; tapered bore

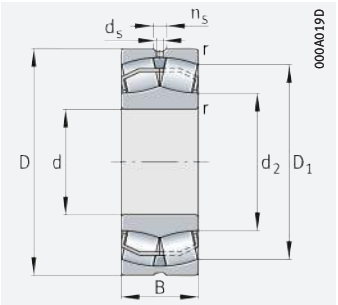


Mounting dimensions

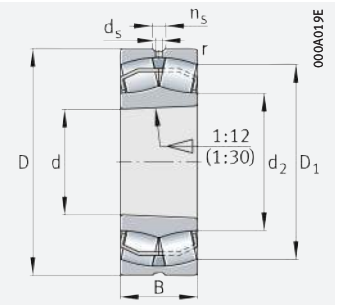
Dimensions						Mounting dimensions			Calculation factors			
d	r min.	D_1 ≈	d_2 ≈	d_s	n_s	d_a min.	D_a max.	r_a max.	e	Y_1	Y_2	Y_0
80	2	126,8	94,9	3,2	6,5	91	129	2	0,22	3,14	4,67	3,07
	2	126,8	94,9	3,2	6,5	91	129	2	0,22	3,14	4,67	3,07
	2,1	135,4	99,7	3,2	6,5	92	158	2,1	0,22	3,04	4,53	2,97
	2,1	135,4	99,8	3,2	6,5	92	158	2,1	0,22	3,04	4,53	2,97
	2,1	145,1	98,3	4,8	9,5	92	158	2,1	0,34	1,99	2,96	1,94
	2,1	145,1	98,3	4,8	9,5	92	158	2,1	0,34	1,99	2,96	1,94
85	2	135,4	99,7	3,2	6,5	96	139	2	0,22	3,04	4,53	2,97
	2	135,4	99,7	3,2	6,5	96	139	2	0,22	3,04	4,53	2,97
	3	143,9	106,1	4,8	9,5	99	166	2,5	0,23	2,9	4,31	2,83
	3	143,9	106,1	4,8	9,5	99	166	2,5	0,23	2,9	4,31	2,83
	3	154,2	104,4	4,8	9,5	99	166	2,5	0,33	2,04	3,04	2
	3	154,2	104,4	4,8	9,5	99	166	2,5	0,33	2,04	3,04	2
90	2	143,9	106,1	3,2	6,5	101	149	2	0,23	2,9	4,31	2,83
	2	143,9	106,1	3,2	6,5	101	149	2	0,23	2,9	4,31	2,83
	2	140	104,1	3,2	6,5	101	149	2	0,31	2,2	3,27	2,15
	2	140	104,1	3,2	6,5	101	149	2	0,31	2,2	3,27	2,15
	2	140	–	3,2	6,5	101	149	2	0,31	2,2	3,27	2,15
	2	140	–	3,2	6,5	101	149	2	0,31	2,2	3,27	2,15
	3	152,7	112,6	4,8	9,5	104	176	2,5	0,24	2,87	4,27	2,8
	3	152,7	112,6	4,8	9,5	104	176	2,5	0,24	2,87	4,27	2,8
	3	162,5	110,2	6,3	12,2	104	176	2,5	0,33	2,03	3,02	1,98
	3	162,5	110,2	6,3	12,2	104	176	2,5	0,33	2,03	3,02	1,98
95	2,1	152,7	112,6	4,8	9,5	107	158	2,1	0,24	2,87	4,27	2,8
	2,1	152,7	112,6	4,8	9,5	107	158	2,1	0,24	2,87	4,27	2,8
	3	169,4	124,3	4,8	9,5	109	186	2,5	0,22	3,04	4,53	2,97
	3	169,4	124,3	4,8	9,5	109	186	2,5	0,22	3,04	4,53	2,97
	3	171,2	116	6,3	12,2	109	186	2,5	0,33	2,03	3,02	1,98
	3	171,2	116	6,3	12,2	109	186	2,5	0,33	2,03	3,02	1,98

Spherical roller bearings

With cylindrical or tapered bore



Cylindrical bore

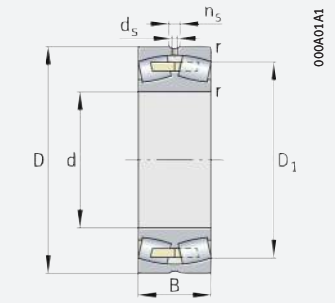


Tapered bore

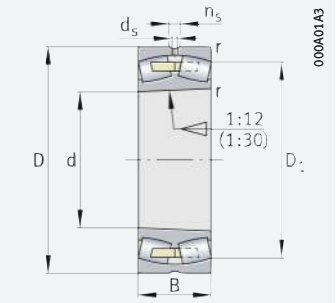
d = 100 – 100 mm

Main dimensions			Basic load ratings		Fatigue limit load	Limiting speed	Speed rating	Mass	Designation
d	D	B	dyn. C_r	stat. C_{0r}	C_{ur}	n_G	$n_{\vartheta r}$	m	➤*681* | *1.12* ➤*683* | *1.13* X-life ➤*671*
			kN	kN	N	min^{-1}	min^{-1}	≈ kg	
100	165	52	450	570	52 000	4 000	2 750	4,1	**23120-E1-XL-K-TVPB**
	165	52	450	570	52 000	4 000	2 750	4,2	**23120-E1-XL-TVPB**
	165	52	450	570	52 000	4 000	2 750	4,2	**23120-E1A-XL-K-M**
	165	52	450	570	52 000	4 000	2 750	4,4	**23120-E1A-XL-M**
	180	46	430	475	52 000	4 550	3 150	4,96	**22220-E1-XL**
	180	46	430	475	52 000	4 550	3 150	4,91	**22220-E1-XL-K**
	180	60,3	560	660	60 000	3 750	2 410	6,1	**23220-E1-XL-K-TVPB**
	180	60,3	560	660	60 000	3 750	2 410	6,3	**23220-E1-XL-TVPB**
	180	60,3	560	660	60 000	3 750	2 410	6,3	**23220-E1A-XL-K-M**
	180	60,3	560	660	60 000	3 750	2 410	6,5	**23220-E1A-XL-M**
	215	47	495	530	60 000	4 400	3 050	8,08	**21320-E1-XL-K-TVPB**
	215	47	495	530	60 000	4 400	3 050	8,19	**21320-E1-XL-TVPB**
	215	73	810	920	75 000	3 300	2 380	13,1	**22320-E1-XL**
	215	73	810	920	75 000	3 300	2 380	13	**22320-E1-XL-K**

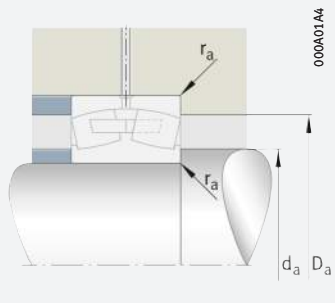
medias ➤ *https://www.schaeffler.de/std/1ECC*



Solid cage, brass or steel; cylindrical bore



Solid cage, brass or steel; tapered bore

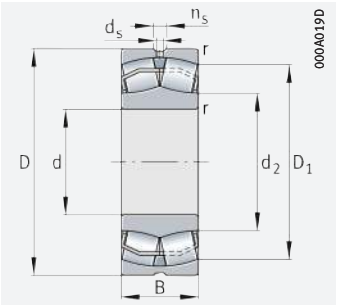


Mounting dimensions

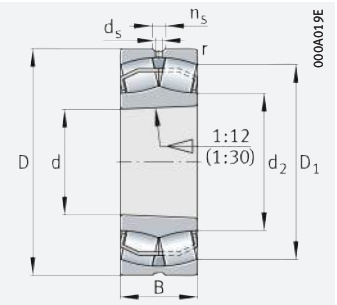
Dimensions						Mounting dimensions			Calculation factors			
d	r min.	D_1 ≈	d_2 ≈	d_s	n_s	d_a min.	D_a max.	r_a max.	e	Y_1	Y_2	Y_0
100	2	146,3	113,9	3,2	6,5	111	154	2	0,28	2,37	3,53	2,32
	2	146,3	113,9	3,2	6,5	111	154	2	0,28	2,37	3,53	2,32
	2	146,3	–	3,2	6,5	111	154	2	0,28	2,37	3,53	2,32
	2	146,3	–	3,2	6,5	111	154	2	0,28	2,37	3,53	2,32
	2,1	161,4	119	4,8	9,5	112	168	2,1	0,24	2,84	4,23	2,78
	2,1	161,4	119	4,8	9,5	112	168	2,1	0,24	2,84	4,23	2,78
	2,1	156,7	116,7	4,8	9,5	112	168	2,1	0,31	2,15	3,2	2,1
	2,1	156,7	116,7	4,8	9,5	112	168	2,1	0,31	2,15	3,2	2,1
	2,1	156,7	–	4,8	9,5	112	168	2,1	0,31	2,15	3,2	2,1
	2,1	156,7	–	4,8	9,5	112	168	2,1	0,31	2,15	3,2	2,1
	3	182	132	4,8	9,5	114	201	2,5	0,22	3,14	4,67	3,07
	3	182	132	4,8	9,5	114	201	2,5	0,22	3,14	4,67	3,07
	3	184,7	130,2	6,3	12,2	114	201	2,5	0,33	2,03	3,02	1,98
	3	184,7	130,2	6,3	12,2	114	201	2,5	0,33	2,03	3,02	1,98

Spherical roller bearings

With cylindrical or tapered bore



Cylindrical bore

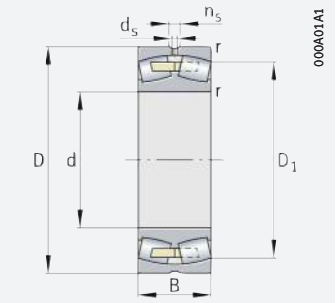


Tapered bore

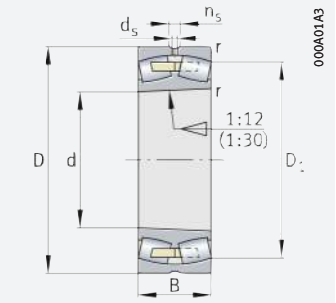
d = 110 – 110 mm

Main dimensions			Basic load ratings		Fatigue limit load	Limiting speed	Speed rating	Mass	Designation
d	D	B	dyn. C_r	stat. C_{0r}	C_{ur}	n_G	$n_{\vartheta r}$	m	➤*681*|*1.12* ➤*683*|*1.13* X-life ➤*671*
			kN	kN	N	min^{-1}	min^{-1}	≈ kg	
110	170	45	400	530	53 000	4 200	3 000	3,4	**23022-E1-XL-K-TVPB**
	170	45	400	530	53 000	4 200	3 000	3,5	**23022-E1-XL-TVPB**
	170	45	400	530	53 000	4 200	3 000	3,8	**23022-E1A-XL-K-M**
	170	45	400	530	53 000	4 200	3 000	3,9	**23022-E1A-XL-M**
	180	56	530	680	60 000	3 700	2 550	4,9	**23122-E1-XL-K-TVPB**
	180	56	530	680	60 000	3 700	2 550	5,3	**23122-E1-XL-TVPB**
	180	56	530	680	60 000	3 700	2 550	5,1	**23122-E1A-XL-K-M**
	180	56	530	680	60 000	3 700	2 550	5,5	**23122-E1A-XL-M**
	180	69	530	750	84 000	3 350	1 960	6,8	**24122-BE-XL**
	180	69	530	750	84 000	3 350	1 960	6,7	**24122-BE-XL-K30**
	200	53	550	600	62 000	4 100	3 000	6,99	**22222-E1-XL**
	200	53	550	600	62 000	4 100	3 000	6,99	**22222-E1-XL-K**
	200	69,8	710	870	71 000	3 250	2 100	8,8	**23222-E1-XL-K-TVPB**
	200	69,8	710	870	71 000	3 250	2 100	9,2	**23222-E1-XL-TVPB**
	200	69,8	710	870	71 000	3 250	2 100	9,3	**23222-E1A-XL-K-M**
	200	69,8	710	870	71 000	3 250	2 100	9,5	**23222-E1A-XL-M**
	240	50	600	640	69 000	4 000	2 700	10,91	**21322-E1-XL-K-TVPB**
	240	50	600	640	69 000	4 000	2 700	11,06	**21322-E1-XL-TVPB**
	240	80	950	1 070	90 000	3 000	2 130	17,7	**22322-E1-XL**
	240	80	950	1 070	90 000	3 000	2 130	17,4	**22322-E1-XL-K**

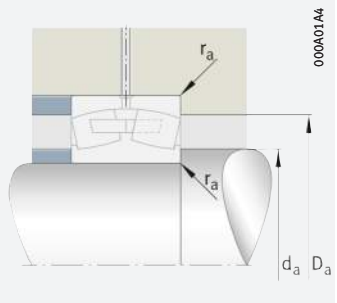
medias ➤ *https://www.schaeffler.de/std/1ECD*



Solid cage, brass or steel; cylindrical bore



Solid cage, brass or steel; tapered bore

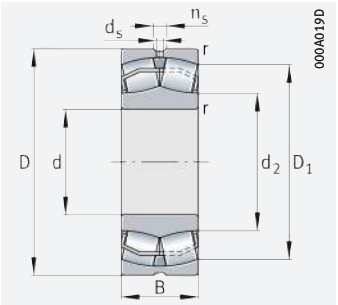


Mounting dimensions

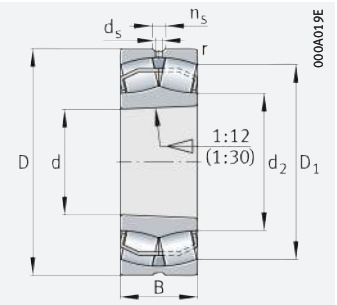
Dimensions						Mounting dimensions			Calculation factors			
d	r min.	D_1 ≈	d_2 ≈	d_s	n_s	d_a min.	D_a max.	r_a max.	e	Y_1	Y_2	Y_0
110	2	154,6	123,7	3,2	6,5	118,8	161,2	2	0,23	2,9	4,31	2,83
	2	154,6	123,7	3,2	6,5	118,8	161,2	2	0,23	2,9	4,31	2,83
	2	154,6	–	3,2	6,5	118,8	161,2	2	0,23	2,9	4,31	2,83
	2	154,6	–	3,2	6,5	118,8	161,2	2	0,23	2,9	4,31	2,83
	2	160	124,6	4,8	9,5	121	169	2	0,28	2,39	3,56	2,34
	2	160	124,6	4,8	9,5	121	169	2	0,28	2,39	3,56	2,34
	2	160	–	4,8	9,5	121	169	2	0,28	2,41	3,59	2,35
	2	160	–	4,8	9,5	121	169	2	0,28	2,41	3,59	2,35
	2	154,9	125,6	3,2	6,5	121	169	2	0,34	1,96	2,92	1,92
	2	154,9	125,6	3,2	6,5	121	169	2	0,34	1,96	2,92	1,92
	2,1	178,7	129,4	4,8	9,5	122	188	2,1	0,25	2,71	4,04	2,65
	2,1	178,7	129,4	4,8	9,5	122	188	2,1	0,25	2,71	4,04	2,65
	2,1	172,7	129,1	4,8	9,5	122	188	2,1	0,33	2,06	3,06	2,01
	2,1	172,7	129,1	4,8	9,5	122	188	2,1	0,33	2,06	3,06	2,01
	2,1	172,7	–	4,8	9,5	122	188	2,1	0,33	2,06	3,06	2,01
	2,1	172,7	–	4,8	9,5	122	188	2,1	0,33	2,06	3,06	2,01
	3	202,5	146,4	6,3	12,2	124	226	2,5	0,21	3,24	4,82	3,16
	3	202,5	146,4	6,3	12,2	124	226	2,5	0,21	3,24	4,82	3,16
	3	204,9	143,1	8	15	124	226	2,5	0,33	2,07	3,09	2,03
	3	204,9	143,1	8	15	124	226	2,5	0,33	2,07	3,09	2,03

Spherical roller bearings

With cylindrical or tapered bore



Cylindrical bore

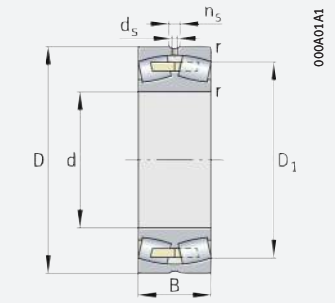


Tapered bore

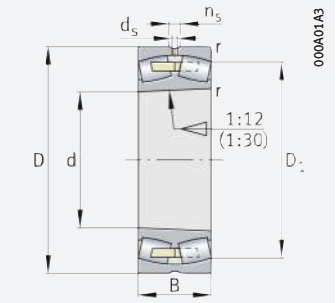
d = 120 – 120 mm

Main dimensions			Basic load ratings		Fatigue limit load	Limiting speed	Speed rating	Mass	Designation
d	D	B	dyn. C_r	stat. C_{0r}	C_{ur}	n_G	$n_{\vartheta r}$	m	➤*681*|*1.12* ➤*683*|*1.13* X-life ➤*671*
			kN	kN	N	min^{-1}	min^{-1}	≈ kg	
120	180	46	430	580	58 000	3 950	2 800	3,7	**23024-E1-XL-K-TVPB**
	180	46	430	580	58 000	3 950	2 800	3,9	**23024-E1-XL-TVPB**
	180	46	430	580	58 000	3 950	2 800	4,1	**23024-E1A-XL-K-M**
	180	46	430	580	58 000	3 950	2 800	4,2	**23024-E1A-XL-M**
	180	60	450	690	84 000	3 450	2 360	5,6	**24024-BE-XL**
	180	60	450	690	84 000	3 450	2 360	5,4	**24024-BE-XL-K30**
	200	62	630	800	72 000	3 400	2 290	7,1	**23124-E1-XL-K-TVPB**
	200	62	630	800	72 000	3 400	2 290	7,4	**23124-E1-XL-TVPB**
	200	62	630	800	72 000	3 400	2 290	7,6	**23124-E1A-XL-K-M**
	200	62	630	800	72 000	3 400	2 290	7,7	**23124-E1A-XL-M**
	200	80	680	950	101 000	2 950	1 740	10,4	**24124-BE-XL**
	200	80	680	950	101 000	2 950	1 740	10,2	**24124-BE-XL-K30**
	215	58	640	740	71 000	3 650	2 700	8,84	**22224-E1-XL**
	215	58	640	740	68 000	3 650	2 700	8,84	**22224-E1-XL-K**
	215	76	820	1 020	80 000	3 000	1 910	11,1	**23224-E1-XL-K-TVPB**
	215	76	820	1 020	80 000	3 000	1 910	11,5	**23224-E1-XL-TVPB**
	215	76	820	1 020	80 000	3 000	1 910	11,4	**23224-E1A-XL-K-M**
	215	76	820	1 020	80 000	3 000	1 910	12,1	**23224-E1A-XL-M**
	260	86	1 080	1 170	102 000	2 850	2 000	22,3	**22324-E1-XL**
	260	86	1 080	1 170	102 000	2 850	2 000	22,1	**22324-E1-XL-K**

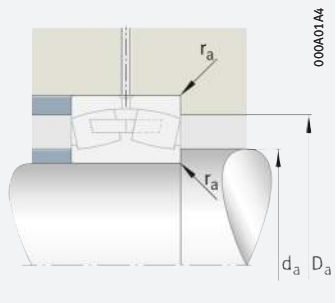
medias ➤ *https://www.schaeffler.de/std/1ECE*



Solid cage, brass or steel; cylindrical bore



Solid cage, brass or steel; tapered bore

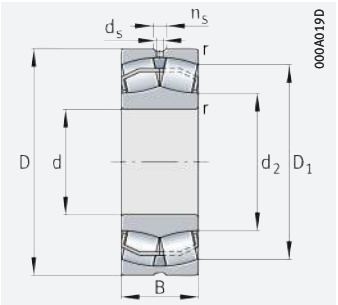


Mounting dimensions

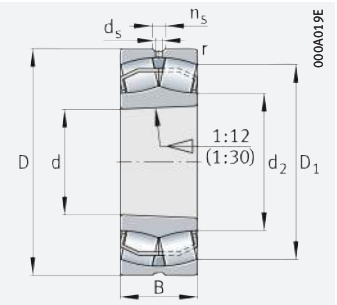
Dimensions						Mounting dimensions			Calculation factors			
d	r min.	D_1 ≈	d_2 ≈	d_s	n_s	d_a min.	D_a max.	r_a max.	e	Y_1	Y_2	Y_0
120	2	164,7	133	3,2	6,5	128,8	171,2	2	0,22	3,04	4,53	2,97
	2	164,7	133	3,2	6,5	128,8	171,2	2	0,22	3,04	4,53	2,97
	2	164,7	–	3,2	6,5	128,8	171,2	2	0,22	3,04	4,53	2,97
	2	164,7	–	3,2	6,5	128,8	171,2	2	0,22	3,04	4,53	2,97
	2	159,8	134,5	3,2	6,5	128,8	171,2	2	0,29	2,33	3,47	2,28
	2	159,8	134,5	3,2	6,5	128,8	171,2	2	0,29	2,33	3,47	2,28
	2	177,4	136,2	4,8	9,5	131	189	2	0,28	2,39	3,56	2,34
	2	177,4	136,2	4,8	9,5	131	189	2	0,28	2,39	3,56	2,34
	2	177,4	–	4,8	9,5	131	189	2	0,28	2,39	3,56	2,34
	2	177,4	–	4,8	9,5	131	189	2	0,28	2,39	3,56	2,34
	2	170,3	136,6	3,2	6,5	131	189	2	0,37	1,84	2,74	1,8
	2	170,3	136,6	3,2	6,5	131	189	2	0,37	1,84	2,74	1,8
	2,1	192	141,9	6,3	12,2	132	203	2,1	0,25	2,71	4,04	2,65
	2,1	192	141,9	6,3	12,2	132	203	2,1	0,25	2,71	4,04	2,65
	2,1	185,5	139	4,8	9,5	132	203	2,1	0,33	2,03	3,02	1,98
	2,1	185,5	139	4,8	9,5	132	203	2,1	0,33	2,03	3,02	1,98
	2,1	185,5	–	4,8	9,5	132	203	2,1	0,33	2,03	3,02	1,98
	2,1	185,5	–	4,8	9,5	132	203	2,1	0,33	2,03	3,02	1,98
	3	222,4	150,8	8	15	134	246	2,5	0,33	2,06	3,06	2,01
	3	222,4	150,7	8	15	134	246	2,5	0,33	2,06	3,06	2,01

Spherical roller bearings

With cylindrical or tapered bore



Cylindrical bore

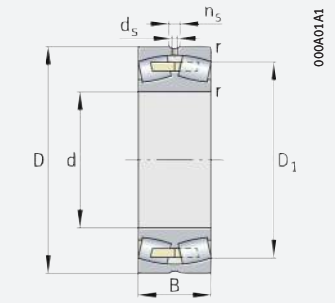


Tapered bore

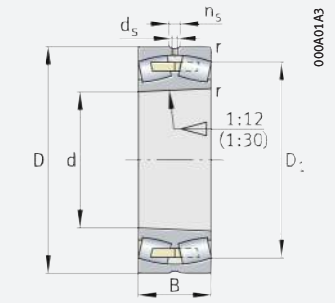
d = 130 – 130 mm

Main dimensions			Basic load ratings		Fatigue limit load	Limiting speed	Speed rating	Mass	Designation
d	D	B	dyn. C_r	stat. C_{0r}	C_{ur}	n_G	$n_{\vartheta r}$	m	➤*681* | *1.12* ➤*683* | *1.13* X-life ➤*671*
			kN	kN	N	min^{-1}	min^{-1}	≈ kg	
130	200	52	540	730	69 000	3 600	2 600	5,4	**23026-E1-XL-K-TVPB**
	200	52	540	730	69 000	3 600	2 600	5,6	**23026-E1-XL-TVPB**
	200	52	540	730	69 000	3 600	2 600	5,7	**23026-E1A-XL-K-M**
	200	52	540	730	69 000	3 600	2 600	6	**23026-E1A-XL-M**
	200	69	570	860	100 000	3 100	2 130	8,4	**24026-BE-XL**
	200	69	570	860	100 000	3 100	2 130	8,1	**24026-BE-XL-K30**
	210	64	680	890	78 000	3 200	2 110	7,8	**23126-E1-XL-K-TVPB**
	210	64	680	890	78 000	3 200	2 110	8,1	**23126-E1-XL-TVPB**
	210	64	680	890	78 000	3 200	2 110	8,1	**23126-E1A-XL-K-M**
	210	64	680	890	78 000	3 200	2 110	8,5	**23126-E1A-XL-M**
	210	80	710	1 050	109 000	2 800	1 560	11	**24126-BE-XL**
	210	80	710	1 050	109 000	2 800	1 560	10,8	**24126-BE-XL-K30**
	230	64	760	890	79 000	3 350	2 500	11,1	**22226-E1-XL**
	230	64	760	890	79 000	3 350	2 500	10,9	**22226-E1-XL-K**
	230	80	910	1 150	88 000	2 850	1 740	12,6	**23226-E1-XL-K-TVPB**
	230	80	910	1 150	88 000	2 850	1 740	13,4	**23226-E1-XL-TVPB**
	230	80	910	1 150	88 000	2 850	1 740	13,6	**23226-E1A-XL-K-M**
	230	80	910	1 150	88 000	2 850	1 740	14	**23226-E1A-XL-M**
	280	93	1 250	1 370	116 000	2 650	1 820	28	**22326-E1-XL**
	280	93	1 250	1 370	116 000	2 650	1 820	27,4	**22326-E1-XL-K**

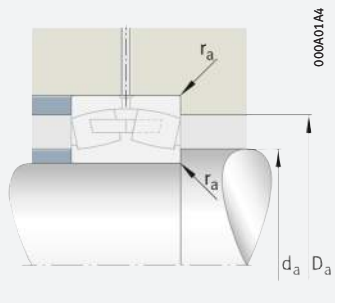
medias ➤ *https://www.schaeffler.de/std/1ECF*



Solid cage, brass or steel; cylindrical bore



Solid cage, brass or steel; tapered bore

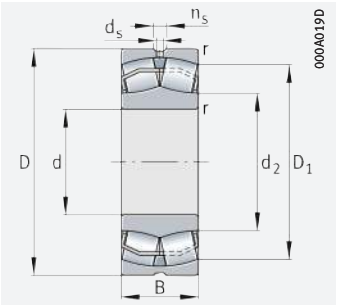


Mounting dimensions

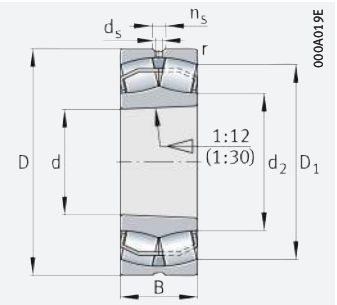
Dimensions						Mounting dimensions			Calculation factors			
d	r min.	D_1 ≈	d_2 ≈	d_s	n_s	d_a min.	D_a max.	r_a max.	e	Y_1	Y_2	Y_0
130	2	182,3	145,9	4,8	9,5	138,8	191,2	2	0,23	2,95	4,4	2,89
	2	182,3	145,9	4,8	9,5	138,8	191,2	2	0,23	2,95	4,4	2,89
	2	182,3	–	4,8	9,5	138,8	191,2	2	0,23	2,95	4,4	2,89
	2	182,3	–	4,8	9,5	138,8	191,2	2	0,23	2,95	4,4	2,89
	2	176,1	146,2	3,2	6,5	138,8	191,2	2	0,31	2,21	3,29	2,16
	2	176,1	146,2	3,2	6,5	138,8	191,2	2	0,31	2,21	3,29	2,16
	2	187,3	146	4,8	9,5	141	199	2	0,28	2,45	3,64	2,39
	2	187,3	146	4,8	9,5	141	199	2	0,28	2,45	3,64	2,39
	2	187,3	–	4,8	9,5	141	199	2	0,28	2,45	3,64	2,39
	2	187,3	–	4,8	9,5	141	199	2	0,28	2,45	3,64	2,39
	2	181,2	148,3	3,2	6,5	141	199	2	0,34	1,98	2,94	1,93
	2	181,2	148,3	3,2	6,5	141	199	2	0,34	1,98	2,94	1,93
	3	205	151,7	6,3	12,2	144	216	2,5	0,26	2,62	3,9	2,56
	3	205	151,7	6,3	12,2	144	216	2,5	0,26	2,62	3,9	2,56
	3	199,3	150	4,8	9,5	144	216	2,5	0,33	2,07	3,09	2,03
	3	199,3	150	4,8	9,5	144	216	2,5	0,33	2,07	3,09	2,03
	3	199,3	–	4,8	9,5	144	216	2,5	0,33	2,07	3,09	2,03
	3	199,3	–	4,8	9,5	144	216	2,5	0,33	2,07	3,09	2,03
	4	239,5	162,2	9,5	17,7	147	263	3	0,33	2,06	3,06	2,01
	4	239,5	162,2	9,5	17,7	147	263	3	0,33	2,06	3,06	2,01

Spherical roller bearings

With cylindrical or tapered bore



Cylindrical bore

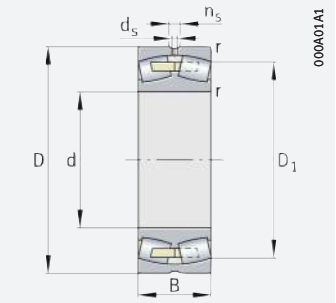


Tapered bore

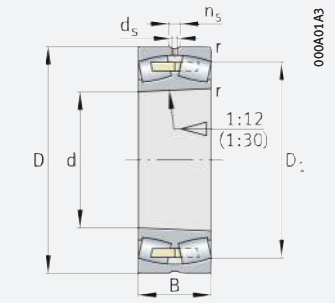
d = 140 – 140 mm

Main dimensions			Basic load ratings		Fatigue limit load	Limiting speed	Speed rating	Mass	Designation
d	D	B	dyn. C_r	stat. C_{0r}	C_{ur}	n_G	$n_{\vartheta r}$	m	➤*681*|*1.12* ➤*683*|*1.13* X-life ➤*671*
			kN	kN	N	min^{-1}	min^{-1}	≈ kg	
140	210	53	570	800	75 000	3 450	2 390	5,8	**23028-E1-XL-K-TVPB**
	210	53	570	800	75 000	3 450	2 390	6	**23028-E1-XL-TVPB**
	210	53	570	800	75 000	3 450	2 390	6	**23028-E1A-XL-K-M**
	210	53	570	800	75 000	3 450	2 390	6,5	**23028-E1A-XL-M**
	210	69	590	930	108 000	2 950	1 950	8,4	**24028-BE-XL**
	210	69	590	930	108 000	2 950	1 950	8,1	**24028-BE-XL-K30**
	225	68	760	1 010	87 000	3 000	1 930	9,5	**23128-E1-XL-K-TVPB**
	225	68	760	1 010	87 000	3 000	1 930	9,8	**23128-E1-XL-TVPB**
	225	68	760	1 010	87 000	3 000	1 930	10,2	**23128-E1A-XL-K-M**
	225	68	760	1 010	87 000	3 000	1 930	10,4	**23128-E1A-XL-M**
	225	85	800	1 190	124 000	2 650	1 430	13,8	**24128-BE-XL**
	225	85	800	1 190	124 000	2 650	1 430	13,5	**24128-BE-XL-K30**
	250	68	870	1 040	97 000	3 150	2 250	14,1	**22228-E1-XL**
	250	68	870	1 040	97 000	3 150	2 250	13,7	**22228-E1-XL-K**
	250	88	1 090	1 400	113 000	2 600	1 550	17,1	**23228-E1-XL-K-TVPB**
	250	88	1 090	1 400	113 000	2 600	1 550	17,1	**23228-E1-XL-TVPB**
	250	88	1 090	1 400	113 000	2 600	1 550	17,6	**23228-E1A-XL-K-M**
	250	88	1 090	1 400	113 000	2 600	1 550	18,3	**23228-E1A-XL-M**
	300	102	1 460	1 630	131 000	2 420	1 660	34,6	**22328-E1-XL**
	300	102	1 460	1 630	131 000	2 420	1 660	34,4	**22328-E1-XL-K**

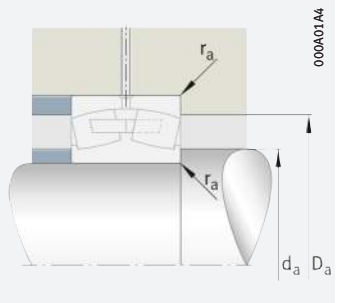
medias ➤ *https://www.schaeffler.de/std/1ED0*



Solid cage, brass or steel; cylindrical bore



Solid cage, brass or steel; tapered bore

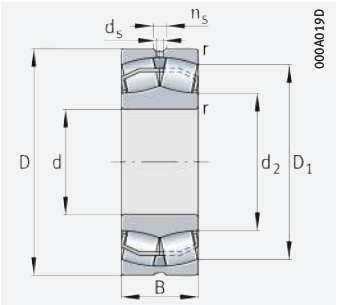


Mounting dimensions

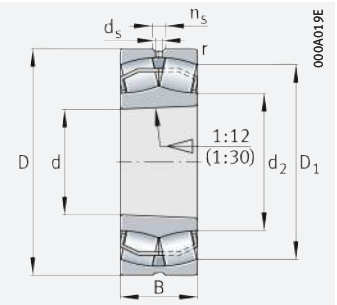
Dimensions						Mounting dimensions			Calculation factors			
d	r min.	D_1 ≈	d_2 ≈	d_s	n_s	d_a min.	D_a max.	r_a max.	e	Y_1	Y_2	Y_0
140	2	192,3	155,4	4,8	9,5	148,8	201,2	2	0,22	3,07	4,57	3
	2	192,3	155,4	4,8	9,5	148,8	201,2	2	0,22	3,07	4,57	3
	2	192,3	–	4,8	9,5	148,8	201,2	2	0,22	3,07	4,57	3
	2	192,3	–	4,8	9,5	148,8	201,2	2	0,22	3,07	4,57	3
	2	186,4	157,1	3,2	6,5	148,8	201,2	2	0,28	2,37	3,53	2,32
	2	186,4	157,1	3,2	6,5	148,8	201,2	2	0,28	2,37	3,53	2,32
	2,1	201	157,1	4,8	9,5	152	213	2,1	0,27	2,49	3,71	2,43
	2,1	201	157,1	4,8	9,5	152	213	2,1	0,27	2,49	3,71	2,43
	2,1	201	–	4,8	9,5	152	213	2,1	0,27	2,49	3,71	2,43
	2,1	201	–	4,8	9,5	152	213	2,1	0,27	2,49	3,71	2,43
	2,1	194,4	158,9	4,8	9,5	152	213	2,1	0,34	1,99	2,96	1,94
	2,1	194,4	158,9	4,8	9,5	152	213	2,1	0,34	1,99	2,96	1,94
	3	223,1	164,9	6,3	12,2	154	236	2,5	0,25	2,67	3,97	2,61
	3	223,1	164,9	6,3	12,2	154	236	2,5	0,25	2,67	3,97	2,61
	3	216	162	6,3	12,2	154	236	2,5	0,33	2,04	3,04	2
	3	216	162	6,3	12,2	154	236	2,5	0,33	2,04	3,04	2
	3	216	–	6,3	12,2	154	236	2,5	0,33	2,04	3,04	2
	3	216	–	6,3	12,2	154	236	2,5	0,33	2,04	3,04	2
	4	255,7	173,5	9,5	17,7	157	283	3	0,34	2	2,98	1,96
	4	255,7	173,5	9,5	17,7	157	283	3	0,34	2	2,98	1,96

Spherical roller bearings

With cylindrical or tapered bore



Cylindrical bore

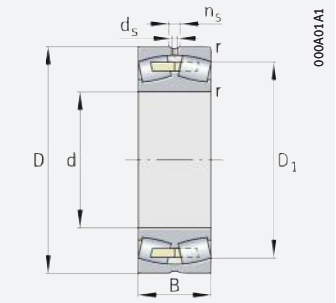


Tapered bore

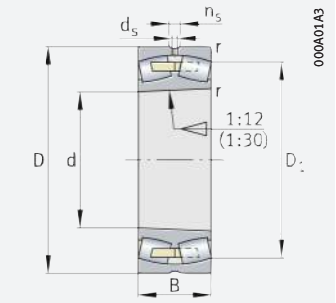
d = 150 – 150 mm

Main dimensions			Basic load ratings		Fatigue limit load	Limiting speed	Speed rating	Mass	Designation
d	D	B	dyn. C_r	stat. C_{0r}	C_{ur}	n_G	$n_{\vartheta r}$	m	➤*681*|*1.12* ➤*683*|*1.13* X-life ➤*671*
			kN	kN	N	min^{-1}	min^{-1}	≈ kg	
150	225	56	630	880	85 000	3 250	2 210	7,3	**23030-E1-XL-K-TVPB**
	225	56	630	880	85 000	3 250	2 210	7,6	**23030-E1-XL-TVPB**
	225	56	630	880	85 000	3 250	2 210	7,3	**23030-E1A-XL-K-M**
	225	56	630	880	85 000	3 250	2 210	7,8	**23030-E1A-XL-M**
	225	75	680	1 090	122 000	2 750	1 790	11,1	**24030-BE-XL**
	225	75	680	1 090	122 000	2 750	1 790	10,7	**24030-BE-XL-K30**
	250	80	1 000	1 330	141 000	2 650	1 720	14,5	**23130-E1-XL-K-TVPB**
	250	80	1 000	1 330	141 000	2 650	1 720	15	**23130-E1-XL-TVPB**
	250	80	1 000	1 330	141 000	2 650	1 720	15,8	**23130-E1A-XL-K-M**
	250	80	1 000	1 330	141 000	2 650	1 720	16,3	**23130-E1A-XL-M**
	250	100	1 050	1 520	148 000	2 370	1 270	20,6	**24130-BE-XL**
	250	100	1 050	1 520	148 000	2 370	1 270	20,2	**24130-BE-XL-K30**
	270	73	1 010	1 210	111 000	2 900	2 050	18,2	**22230-E1-XL**
	270	73	1 010	1 210	111 000	2 900	2 050	17,8	**22230-E1-XL-K**
	270	96	1 280	1 660	129 000	2 400	1 400	22,3	**23230-E1-XL-K-TVPB**
	270	96	1 280	1 660	129 000	2 400	1 400	22,9	**23230-E1-XL-TVPB**
	270	96	1 280	1 660	129 000	2 400	1 400	22,9	**23230-E1A-XL-K-M**
	270	96	1 280	1 660	129 000	2 400	1 400	23,8	**23230-E1A-XL-M**
	320	108	1 640	1 850	147 000	2 290	1 520	42,2	**22330-E1-XL**
	320	108	1 640	1 850	147 000	2 290	1 520	40,9	**22330-E1-XL-K**

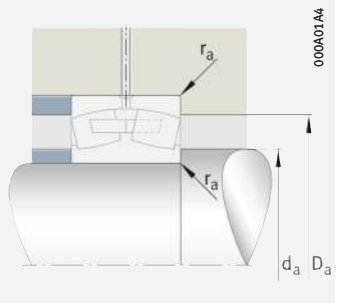
medias ➤ *https://www.schaeffler.de/std/1ED1*



Solid cage, brass or steel; cylindrical bore



Solid cage, brass or steel; tapered bore

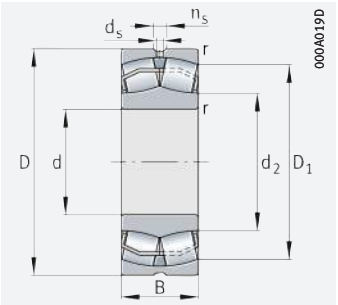


Mounting dimensions

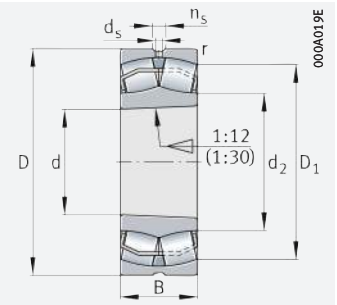
Dimensions						Mounting dimensions			Calculation factors			
d	r min.	D_1 ≈	d_2 ≈	d_s	n_s	d_a min.	D_a max.	r_a max.	e	Y_1	Y_2	Y_0
150	2,1	206,3	166,6	4,8	9,5	160,2	214,8	2,1	0,22	3,1	4,62	3,03
	2,1	206,3	166,6	4,8	9,5	160,2	214,8	2,1	0,22	3,1	4,62	3,03
	2,1	206,3	–	4,8	9,5	160,2	214,8	2,1	0,22	3,1	4,62	3,03
	2,1	206,3	–	4,8	9,5	160,2	214,8	2,1	0,22	3,1	4,62	3,03
	2,1	199,4	168,1	3,2	6,5	160,2	214,8	2,1	0,29	2,32	3,45	2,26
	2,1	199,4	168,1	3,2	6,5	160,2	214,8	2,1	0,29	2,32	3,45	2,26
	2,1	220,8	170,1	6,3	12,2	162	238	2,1	0,29	2,32	3,45	2,26
	2,1	220,8	170,2	6,3	12,2	162	238	2,1	0,29	2,32	3,45	2,26
	2,1	220,8	–	6,3	12,2	162	238	2,1	0,29	2,32	3,45	2,26
	2,1	220,8	–	6,3	12,2	162	238	2,1	0,29	2,32	3,45	2,26
	2,1	213	170,3	4,8	9,5	162	238	2,1	0,37	1,83	2,72	1,79
	2,1	213	170,3	4,8	9,5	162	238	2,1	0,37	1,83	2,72	1,79
	3	240,8	177,9	8	15	164	256	2,5	0,25	2,69	4	2,63
	3	240,8	177,9	8	15	164	256	2,5	0,25	2,69	4	2,63
	3	232,6	174	6,3	12,2	164	256	2,5	0,33	2,02	3	1,97
	3	232,6	174	6,3	12,2	164	256	2,5	0,33	2,02	3	1,97
	3	232,6	–	6,3	12,2	164	256	2,5	0,33	2,02	3	1,97
	3	232,6	–	6,3	12,2	164	256	2,5	0,33	2,02	3	1,97
	4	273,2	185,3	9,5	17,7	167	303	3	0,33	2,02	3	1,97
	4	273,2	185,3	9,5	17,7	167	303	3	0,33	2,02	3	1,97

Spherical roller bearings

With cylindrical or tapered bore



Cylindrical bore

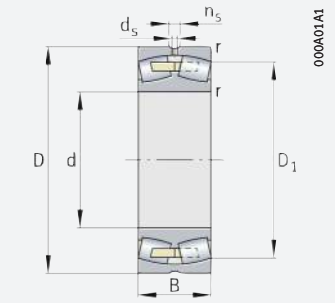


Tapered bore

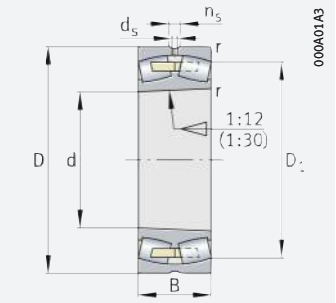
d = 160 – 160 mm

Main dimensions			Basic load ratings		Fatigue limit load	Limiting speed	Speed rating	Mass	Designation
d	D	B	dyn. C_r	stat. C_{0r}	C_{ur}	n_G	$n_{\vartheta r}$	m	➤*681*|*1.12* ➤*683*|*1.13* X-life ➤*671*
			kN	kN	N	min^{-1}	min^{-1}	≈ kg	
160	240	60	720	1 010	95 000	3 050	2 060	8,7	**23032-E1-XL-K-TVPB**
	240	60	720	1 010	95 000	3 050	2 060	9	**23032-E1-XL-TVPB**
	240	60	720	1 010	95 000	3 050	2 060	9,4	**23032-E1A-XL-K-M**
	240	60	720	1 010	95 000	3 050	2 060	9,5	**23032-E1A-XL-M**
	240	80	770	1 240	137 000	2 550	1 660	12,7	**24032-BE-XL**
	240	80	770	1 240	137 000	2 550	1 660	12,2	**24032-BE-XL-K30**
	270	86	1 160	1 550	162 000	2 490	1 560	18,5	**23132-E1-XL-K-TVPB**
	270	86	1 160	1 550	162 000	2 490	1 560	19,1	**23132-E1-XL-TVPB**
	270	86	1 160	1 550	162 000	2 490	1 560	18,6	**23132-E1A-XL-K-M**
	270	86	1 160	1 550	162 000	2 490	1 560	20	**23132-E1A-XL-M**
	270	109	1 220	1 800	168 000	2 180	1 140	25,4	**24132-BE-XL**
	270	109	1 220	1 800	168 000	2 180	1 140	24,9	**24132-BE-XL-K30**
	290	80	1 150	1 400	125 000	2 650	1 900	23,3	**22232-E1-XL**
	290	80	1 150	1 400	125 000	2 650	1 900	22,4	**22232-E1-XL-K**
	290	104	1 460	1 910	146 000	2 210	1 280	27,7	**23232-E1-XL-K-TVPB**
	290	104	1 460	1 910	146 000	2 210	1 280	28,6	**23232-E1-XL-TVPB**
	290	104	1 460	1 910	146 000	2 210	1 280	28,5	**23232-E1A-XL-K-M**
	290	104	1 460	1 910	146 000	2 210	1 280	29,8	**23232-E1A-XL-M**
	340	114	1 680	1 990	157 000	2 250	1 420	48,4	**22332-BE-XL**
	340	114	1 680	1 990	157 000	2 250	1 420	47,3	**22332-BE-XL-K**

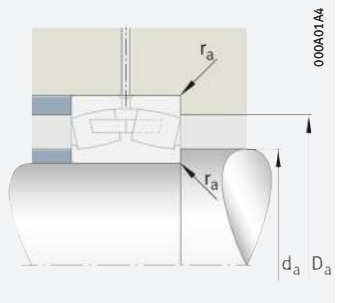
medias ➤ *https://www.schaeffler.de/std/1ED2*



Solid cage, brass or steel; cylindrical bore



Solid cage, brass or steel; tapered bore

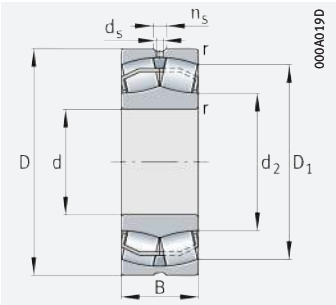


Mounting dimensions

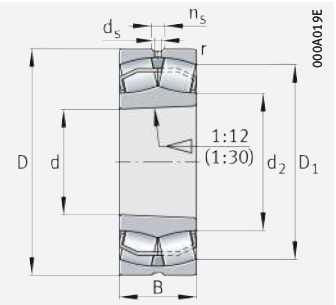
Dimensions						Mounting dimensions			Calculation factors			
d	r min.	D_1 ≈	d_2 ≈	d_s	n_s	d_a min.	D_a max.	r_a max.	e	Y_1	Y_2	Y_0
160	2,1	219,9	177	6,3	12,2	170,2	229,8	2,1	0,22	3,1	4,62	3,03
	2,1	219,9	177,5	6,3	12,2	170,2	229,8	2,1	0,22	3,1	4,62	3,03
	2,1	219,9	–	6,3	12,2	170,2	229,8	2,1	0,22	3,1	4,62	3,03
	2,1	219,9	–	6,3	12,2	170,2	229,8	2,1	0,22	3,1	4,62	3,03
	2,1	212,5	179,3	4,8	9,5	170,2	229,8	2,1	0,29	2,32	3,45	2,26
	2,1	212,5	179,3	4,8	9,5	170,2	229,8	2,1	0,29	2,32	3,45	2,26
	2,1	238,3	183,2	8	15	172	258	2,1	0,29	2,32	3,45	2,26
	2,1	238,3	183,2	8	15	172	258	2,1	0,29	2,32	3,45	2,26
	2,1	238,3	–	8	15	172	258	2,1	0,29	2,32	3,45	2,26
	2,1	238,3	–	8	15	172	258	2,1	0,29	2,32	3,45	2,26
	2,1	228,9	183,4	4,8	9,5	172	258	2,1	0,37	1,8	2,69	1,76
	2,1	228,9	183,4	4,8	9,5	172	258	2,1	0,37	1,8	2,69	1,76
	3	258,2	190,9	8	15	174	276	2,5	0,26	2,64	3,93	2,58
	3	258,2	190,9	8	15	174	276	2,5	0,26	2,64	3,93	2,58
	3	249,3	186,7	8	15	174	276	2,5	0,34	2	2,98	1,96
	3	249,3	186,7	8	15	174	276	2,5	0,34	2	2,98	1,96
	3	249,3	–	8	15	174	276	2,5	0,34	2	2,98	1,96
	3	249,3	–	8	15	174	276	2,5	0,34	2	2,98	1,96
	4	286,7	201,2	9,5	17,7	177	323	3	0,35	1,94	2,88	1,89
	4	286,7	201,2	9,5	17,7	177	323	3	0,35	1,94	2,88	1,89

Spherical roller bearings

With cylindrical or tapered bore



Cylindrical bore

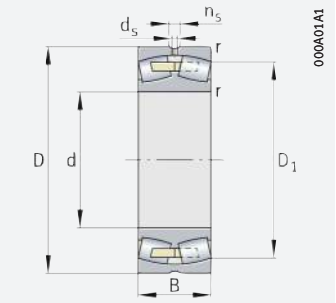


Tapered bore

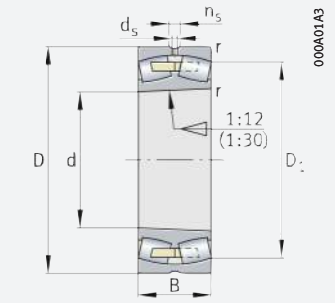
d = 170 – 170 mm

Main dimensions			Basic load ratings		Fatigue limit load	Limiting speed	Speed rating	Mass	Designation
d	D	B	dyn. C_r	stat. C_{0r}	C_{ur}	n_G	$n_{\vartheta r}$	m	➤*681*|*1.12* ➤*683*|*1.13* X-life ➤*671*
			kN	kN	N	min^{-1}	min^{-1}	≈ kg	
170	260	67	880	1 230	148 000	2 800	1 890	11,9	**23034-E1-XL-K-TVPB**
	260	67	880	1 230	148 000	2 800	1 890	12,3	**23034-E1-XL-TVPB**
	260	67	880	1 230	148 000	2 800	1 890	12,5	**23034-E1A-XL-K-M**
	260	67	880	1 230	148 000	2 800	1 890	12,8	**23034-E1A-XL-M**
	260	90	940	1 480	158 000	2 380	1 540	17,2	**24034-BE-XL**
	260	90	940	1 480	158 000	2 380	1 540	16,5	**24034-BE-XL-K30**
	280	88	1 220	1 690	173 000	2 380	1 460	19,9	**23134-E1-XL-K-TVPB**
	280	88	1 220	1 690	173 000	2 380	1 460	20,7	**23134-E1-XL-TVPB**
	280	88	1 220	1 690	173 000	2 380	1 460	19,5	**23134-E1A-XL-K-M**
	280	88	1 220	1 690	173 000	2 380	1 460	22,1	**23134-E1A-XL-M**
	280	109	1 260	1 900	179 000	2 110	1 060	26,4	**24134-BE-XL**
	280	109	1 260	1 900	179 000	2 110	1 060	25,9	**24134-BE-XL-K30**
	310	86	1 320	1 570	140 000	2 550	1 780	27,8	**22234-E1-XL**
	310	86	1 320	1 570	140 000	2 550	1 780	27,1	**22234-E1-XL-K**
	310	110	1 640	2 170	163 000	2 090	1 160	33,1	**23234-E1-XL-K-TVPB**
	310	110	1 640	2 170	163 000	2 090	1 160	34,9	**23234-E1-XL-TVPB**
	310	110	1 640	2 170	163 000	2 090	1 160	34,6	**23234-E1A-XL-K-M**
	310	110	1 640	2 170	163 000	2 090	1 160	35,7	**23234-E1A-XL-M**
	360	120	1 870	2 220	173 000	2 130	1 320	58,2	**22334-BE-XL**
	360	120	1 870	2 220	173 000	2 130	1 320	56,9	**22334-BE-XL-K**

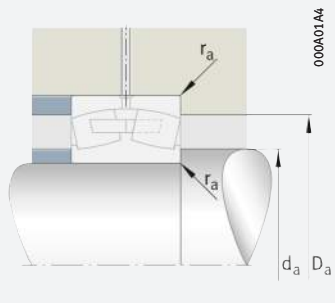
medias ➤ *https://www.schaeffler.de/std/1ED3*



Solid cage, brass or steel; cylindrical bore



Solid cage, brass or steel; tapered bore

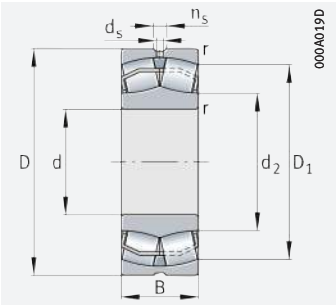


Mounting dimensions

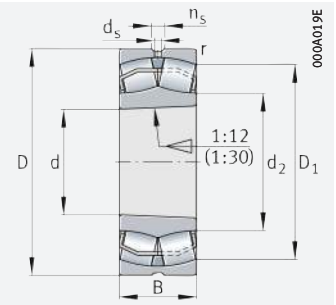
Dimensions						Mounting dimensions			Calculation factors			
d	r min.	D_1 ≈	d_2 ≈	d_s	n_s	d_a min.	D_a max.	r_a max.	e	Y_1	Y_2	Y_0
170	2,1	237,2	189,8	6,3	12,2	180,2	249,8	2,1	0,23	2,98	4,44	2,92
	2,1	237,2	189,8	6,3	12,2	180,2	249,8	2,1	0,23	2,98	4,44	2,92
	2,1	237,2	–	6,3	12,2	180,2	249,8	2,1	0,23	2,98	4,44	2,92
	2,1	237,2	–	6,3	12,2	180,2	249,8	2,1	0,23	2,98	4,44	2,92
	2,1	228,4	190	4,8	9,5	180,2	249,8	2,1	0,31	2,2	3,27	2,15
	2,1	228,4	190	4,8	9,5	180,2	249,8	2,1	0,31	2,2	3,27	2,15
	2,1	248,1	193,4	8	15	182	268	2,1	0,28	2,37	3,53	2,32
	2,1	248,1	193,4	8	15	182	268	2,1	0,28	2,37	3,53	2,32
	2,1	248,1	–	8	15	182	268	2,1	0,28	2,37	3,53	2,32
	2,1	248,1	–	8	15	182	268	2,1	0,28	2,37	3,53	2,32
	2,1	240	194,1	4,8	9,5	182	268	2,1	0,36	1,9	2,83	1,86
	2,1	240	194,1	4,8	9,5	182	268	2,1	0,36	1,9	2,83	1,86
	4	275,4	199,8	9,5	17,7	187	293	3	0,26	2,6	3,87	2,54
	4	275,4	199,8	9,5	17,7	187	293	3	0,26	2,6	3,87	2,54
	4	267,4	199,8	8	15	187	293	3	0,33	2,03	3,02	1,98
	4	267,4	199,8	8	15	187	293	3	0,33	2,03	3,02	1,98
	4	267,4	–	8	15	187	293	3	0,33	2,03	3,02	1,98
	4	267,4	–	8	15	187	293	3	0,33	2,03	3,02	1,98
	4	303,9	213,1	9,5	17,7	187	343	3	0,35	1,95	2,9	1,91
	4	303,9	213,1	9,5	17,7	187	343	3	0,35	1,95	2,9	1,91

Spherical roller bearings

With cylindrical or tapered bore



Cylindrical bore

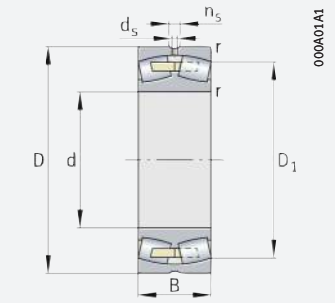


Tapered bore

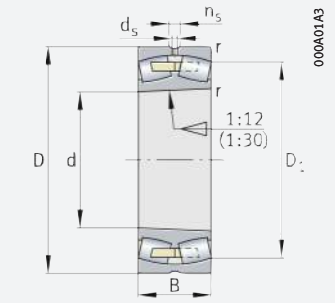
d = 180 – 180 mm

Main dimensions			Basic load ratings		Fatigue limit load	Limiting speed	Speed rating	Mass	Designation
d	D	B	dyn. C_r	stat. C_{0r}	C_{ur}	n_G	$n_{\vartheta r}$	m	➤*681*|*1.12* ➤*683*|*1.13* X-life ➤*671*
			kN	kN	N	min^{-1}	min^{-1}	≈ kg	
180	250	52	445	840	57 000	3 200	1 850	7,8	**23936-S-K-MB**
	250	52	445	840	57 000	3 200	1 850	8	**23936-S-MB**
	280	74	1 040	1 450	169 000	2 600	1 760	15,6	**23036-E1-XL-K-TVPB**
	280	74	1 040	1 450	169 000	2 600	1 760	15,9	**23036-E1-XL-TVPB**
	280	74	1 040	1 450	169 000	2 600	1 760	16	**23036-E1A-XL-K-M**
	280	74	1 040	1 450	169 000	2 600	1 760	16,8	**23036-E1A-XL-M**
	280	100	1 130	1 770	180 000	2 200	1 420	22,7	**24036-BE-XL**
	280	100	1 130	1 770	180 000	2 200	1 420	21,8	**24036-BE-XL-K30**
	300	96	1 420	1 950	194 000	2 230	1 350	25,9	**23136-E1-XL-K-TVPB**
	300	96	1 420	1 950	194 000	2 230	1 350	27,3	**23136-E1-XL-TVPB**
	300	96	1 420	1 950	194 000	2 230	1 350	25,5	**23136-E1A-XL-K-M**
	300	96	1 420	1 950	194 000	2 230	1 350	26,1	**23136-E1A-XL-M**
	300	118	1 460	2 170	203 000	2 000	980	33,2	**24136-BE-XL**
	300	118	1 460	2 170	203 000	2 000	980	32,5	**24136-BE-XL-K30**
	320	86	1 360	1 680	148 000	2 470	1 670	29,2	**22236-E1-XL**
	320	86	1 360	1 680	148 000	2 470	1 670	28,5	**22236-E1-XL-K**
	320	112	1 720	2 340	173 000	2 010	1 090	36	**23236-E1-XL-K-TVPB**
	320	112	1 720	2 340	173 000	2 010	1 090	37,2	**23236-E1-XL-TVPB**
	320	112	1 720	2 340	173 000	2 010	1 090	37	**23236-E1A-XL-K-M**
	320	112	1 720	2 340	173 000	2 010	1 090	38,5	**23236-E1A-XL-M**
	380	126	2 060	2 460	190 000	2 030	1 230	68,1	**22336-BE-XL**
	380	126	2 060	2 460	190 000	2 030	1 230	66,6	**22336-BE-XL-K**

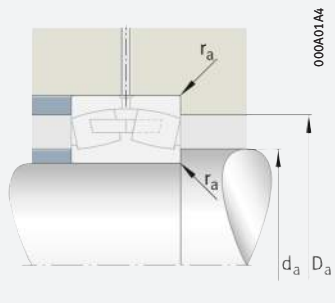
medias ➤ *https://www.schaeffler.de/std/1ED4*



Solid cage, brass or steel; cylindrical bore



Solid cage, brass or steel; tapered bore

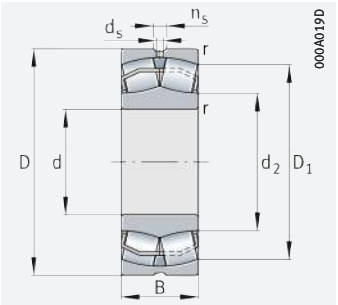


Mounting dimensions

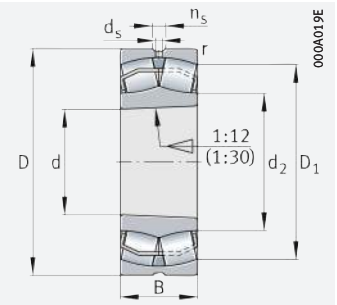
Dimensions						Mounting dimensions			Calculation factors			
d	r min.	D_1 ≈	d_2 ≈	d_s	n_s	d_a min.	D_a max.	r_a max.	e	Y_1	Y_2	Y_0
180	2	230,9	–	4,8	9,5	188,8	241,2	2	0,2	3,42	5,09	3,34
	2	230,9	–	4,8	9,5	188,8	241,2	2	0,2	3,42	5,09	3,34
	2,1	254,3	201,8	8	15	190,2	269,8	2,1	0,23	2,9	4,31	2,83
	2,1	254,3	201,8	8	15	190,2	269,8	2,1	0,23	2,9	4,31	2,83
	2,1	254,3	–	8	15	190,2	269,8	2,1	0,23	2,9	4,31	2,83
	2,1	254,3	–	8	15	190,2	269,8	2,1	0,23	2,9	4,31	2,83
	2,1	244,6	201,7	4,8	9,5	190,2	269,8	2,1	0,32	2,1	3,13	2,06
	2,1	244,6	201,7	4,8	9,5	190,2	269,8	2,1	0,32	2,1	3,13	2,06
	3	264,8	204,1	8	15	194	286	2,5	0,29	2,32	3,45	2,26
	3	264,8	204,1	8	15	194	286	2,5	0,29	2,32	3,45	2,26
	3	264,8	–	8	15	194	286	2,5	0,29	2,32	3,45	2,26
	3	264,8	–	8	15	194	286	2,5	0,29	2,32	3,45	2,26
	3	255,7	204,8	6,3	12,2	194	286	2,5	0,36	1,86	2,77	1,82
	3	255,7	204,8	6,3	12,2	194	286	2,5	0,36	1,86	2,77	1,82
	4	285,9	211,3	9,5	17,7	197	303	3	0,25	2,71	4,04	2,65
	4	285,9	211,3	9,5	17,7	197	303	3	0,25	2,71	4,04	2,65
	4	277,3	210,6	8	15	197	303	3	0,33	2,07	3,09	2,03
	4	277,3	210,6	8	15	197	303	3	0,33	2,07	3,09	2,03
	4	277,3	–	8	15	197	303	3	0,33	2,07	3,09	2,03
	4	277,3	–	8	15	197	303	3	0,33	2,07	3,09	2,03
	4	320,8	224,9	12,5	23,5	197	363	3	0,34	1,96	2,92	1,92
	4	320,8	224,9	12,5	23,5	197	363	3	0,34	1,96	2,92	1,92

Spherical roller bearings

With cylindrical or tapered bore



Cylindrical bore

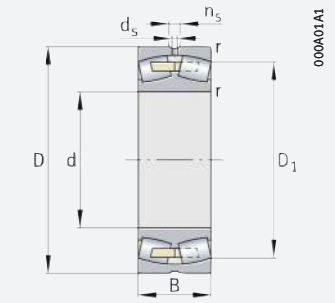


Tapered bore

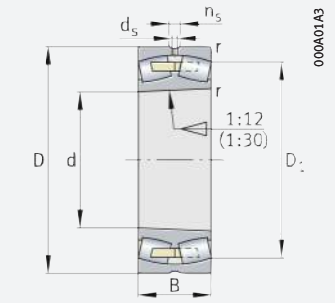
d = 190 – 190 mm

Main dimensions			Basic load ratings		Fatigue limit load	Limiting speed	Speed rating	Mass	Designation
d	D	B	dyn. C_r	stat. C_{0r}	C_{ur}	n_G	$n_{\vartheta r}$	m	➤*681*|*1.12* ➤*683*|*1.13* X-life ➤*671*
			kN	kN	N	min^{-1}	min^{-1}	≈ kg	
190	260	52	470	890	62 000	3 150	1 750	8,1	**23938-S-K-MB**
	260	52	470	890	62 000	3 150	1 750	8,4	**23938-S-MB**
	290	75	1 080	1 550	179 000	2 490	1 660	16,3	**23038-E1-XL-K-TVPB**
	290	75	1 080	1 550	179 000	2 490	1 660	17,2	**23038-E1-XL-TVPB**
	290	75	1 080	1 550	179 000	2 490	1 660	17,7	**23038-E1A-XL-K-M**
	290	75	1 080	1 550	179 000	2 490	1 660	18,3	**23038-E1A-XL-M**
	290	100	1 160	1 860	192 000	2 140	1 330	23,7	**24038-BE-XL**
	290	100	1 160	1 860	192 000	2 140	1 330	22,8	**24038-BE-XL-K30**
	320	104	1 610	2 220	216 000	2 070	1 260	30,3	**23138-E1-XL-K-TVPB**
	320	104	1 610	2 220	216 000	2 070	1 260	32	**23138-E1-XL-TVPB**
	320	104	1 610	2 220	216 000	2 070	1 260	32,4	**23138-E1A-XL-K-M**
	320	104	1 610	2 220	216 000	2 070	1 260	33,9	**23138-E1A-XL-M**
	320	128	1 680	2 550	226 000	1 850	880	41,5	**24138-BE-XL**
	320	128	1 680	2 550	226 000	1 850	880	40,7	**24138-BE-XL-K30**
	340	92	1 360	1 760	159 000	2 480	1 620	36,8	**22238-BE-XL**
	340	92	1 360	1 760	159 000	2 480	1 620	36	**22238-BE-XL-K**
	340	120	1 740	2 400	200 000	1 990	1 070	44,1	**23238-BE-XL**
	340	120	1 740	2 400	200 000	1 990	1 070	42,6	**23238-BE-XL-K**
	400	132	2 220	2 650	207 000	1 940	1 160	78,9	**22338-BE-XL**
	400	132	2 220	2 650	207 000	1 940	1 160	77,2	**22338-BE-XL-K**

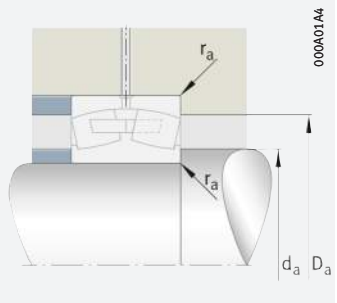
medias ➤ *https://www.schaeffler.de/std/1ED5*



Solid cage, brass or steel; cylindrical bore



Solid cage, brass or steel; tapered bore

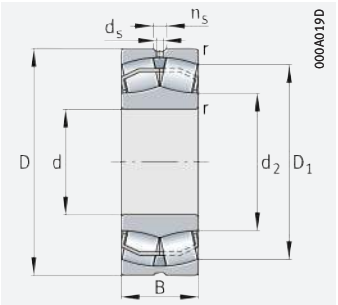


Mounting dimensions

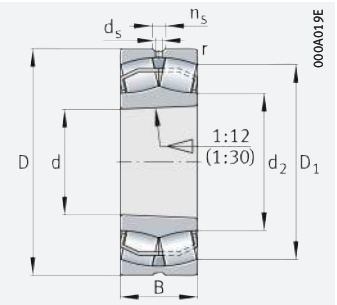
Dimensions						Mounting dimensions			Calculation factors			
d	r min.	D_1 ≈	d_2 ≈	d_s	n_s	d_a min.	D_a max.	r_a max.	e	Y_1	Y_2	Y_0
190	2	240,2	–	4,8	9,5	198,8	251,2	2	0,18	3,66	5,46	3,58
	2	240,2	–	4,8	9,5	198,8	251,2	2	0,18	3,66	5,46	3,58
	2,1	264,5	211,9	8	15	200,2	279,8	2,1	0,23	2,98	4,44	2,92
	2,1	264,5	211,9	8	15	200,2	279,8	2,1	0,23	2,98	4,44	2,92
	2,1	264,5	–	8	15	200,2	279,8	2,1	0,23	2,98	4,44	2,92
	2,1	264,5	–	8	15	200,2	279,8	2,1	0,23	2,98	4,44	2,92
	2,1	255	211,9	4,8	9,5	200,2	279,8	2,1	0,31	2,2	3,27	2,15
	2,1	255	211,9	4,8	9,5	200,2	279,8	2,1	0,31	2,2	3,27	2,15
	3	281,6	217	8	15	204	306	2,5	0,3	2,28	3,39	2,23
	3	281,6	217	8	15	204	306	2,5	0,3	2,28	3,39	2,23
	3	281,6	–	8	15	204	306	2,5	0,3	2,28	3,39	2,23
	3	281,6	–	8	15	204	306	2,5	0,3	2,28	3,39	2,23
	3	271,6	217,4	6,3	12,2	204	306	2,5	0,37	1,82	2,7	1,78
	3	271,6	217,4	6,3	12,2	204	306	2,5	0,37	1,82	2,7	1,78
	4	295,2	225,2	9,5	17,7	207	323	3	0,26	2,6	3,87	2,54
	4	295,2	225,2	9,5	17,7	207	323	3	0,26	2,6	3,87	2,54
	4	289	222,4	9,5	17,7	207	323	3	0,34	1,98	2,94	1,93
	4	289	222,4	9,5	17,7	207	323	3	0,34	1,98	2,94	1,93
	5	338,1	236,8	12,5	23,5	210	380	4	0,34	1,96	2,92	1,92
	5	338,1	236,8	12,5	23,5	210	380	4	0,34	1,96	2,92	1,92

Spherical roller bearings

With cylindrical or tapered bore



Cylindrical bore

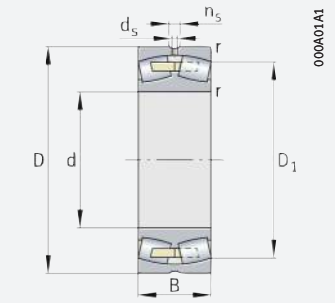


Tapered bore

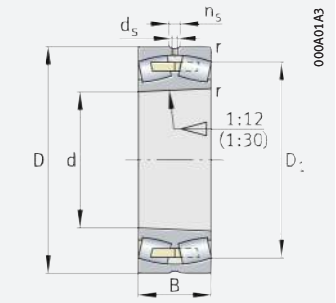
d = 200 – 200 mm

Main dimensions			Basic load ratings		Fatigue limit load	Limiting speed	Speed rating	Mass	Designation
d	D	B	dyn. C_r	stat. C_{0r}	C_{ur}	n_G	$n_{\vartheta r}$	m	➤*681*|*1.12* ➤*683*|*1.13* X-life ➤*671*
			kN	kN	N	min^{-1}	min^{-1}	≈ kg	
200	280	60	550	1 070	71 000	2 800	1 650	11,5	**23940-S-K-MB**
	280	60	550	1 070	71 000	2 800	1 650	11,8	**23940-S-MB**
	310	82	1 270	1 800	202 000	2 330	1 550	20,8	**23040-E1-XL-K-TVPB**
	310	82	1 270	1 800	202 000	2 330	1 550	21,5	**23040-E1-XL-TVPB**
	310	82	1 270	1 800	202 000	2 330	1 550	21,4	**23040-E1A-XL-K-M**
	310	82	1 270	1 800	202 000	2 330	1 550	22,8	**23040-E1A-XL-M**
	310	109	1 350	2 150	215 000	2 010	1 240	30,1	**24040-BE-XL**
	310	109	1 350	2 150	215 000	2 010	1 240	28,9	**24040-BE-XL-K30**
	340	112	1 610	2 270	188 000	2 040	1 230	41,5	**23140-BE-XL**
	340	112	1 610	2 270	188 000	2 040	1 230	40,9	**23140-BE-XL-K**
	340	140	1 880	2 800	250 000	1 780	840	49,5	**24140-BE-XL**
	340	140	1 880	2 800	250 000	1 780	840	48,5	**24140-BE-XL-K30**
	360	98	1 520	1 990	175 000	2 330	1 510	43,3	**22240-BE-XL**
	360	98	1 520	1 990	175 000	2 330	1 510	42,3	**22240-BE-XL-K**
	360	128	1 940	2 700	219 000	1 870	1 000	59	**23240-BE-XL**
	360	128	1 940	2 700	219 000	1 870	1 000	57,3	**23240-BE-XL-K**
	420	138	2 440	2 950	225 000	1 830	1 080	89,4	**22340-BE-XL**
	420	138	2 440	2 950	225 000	1 830	1 080	87,4	**22340-BE-XL-K**

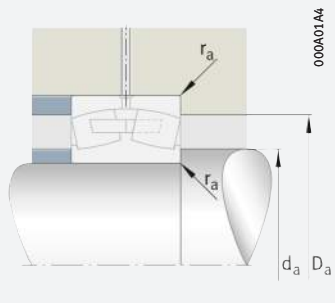
medias ➤ *https://www.schaeffler.de/std/1ED6*



Solid cage, brass or steel; cylindrical bore



Solid cage, brass or steel; tapered bore

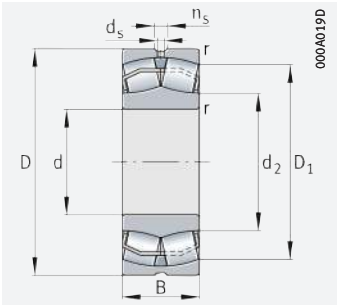


Mounting dimensions

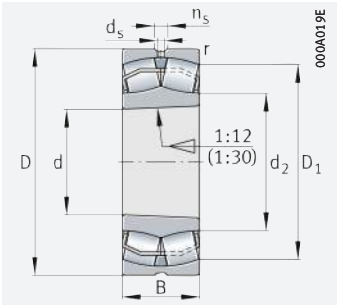
Dimensions						Mounting dimensions			Calculation factors			
d	r min.	D_1 ≈	d_2 ≈	d_s	n_s	d_a min.	D_a max.	r_a max.	e	Y_1	Y_2	Y_0
200	2,1	256,9	–	6,3	12,2	210,2	269,8	2,1	0,2	3,42	5,09	3,34
	2,1	256,9	–	6,3	12,2	210,2	269,8	2,1	0,2	3,42	5,09	3,34
	2,1	281,6	223,4	8	15	210,2	299,8	2,1	0,23	2,9	4,31	2,83
	2,1	281,6	223,4	8	15	210,2	299,8	2,1	0,23	2,9	4,31	2,83
	2,1	281,6	–	8	15	210,2	299,8	2,1	0,23	2,9	4,31	2,83
	2,1	281,6	–	8	15	210,2	299,8	2,1	0,23	2,9	4,31	2,83
	2,1	271,6	223,6	6,3	12,2	210,2	299,8	2,1	0,32	2,13	3,17	2,08
	2,1	271,6	223,6	6,3	12,2	210,2	299,8	2,1	0,32	2,13	3,17	2,08
	3	295,8	230,4	9,5	17,7	214	326	2,5	0,32	2,1	3,13	2,06
	3	295,8	230,4	9,5	17,7	214	326	2,5	0,32	2,1	3,13	2,06
	3	287,9	227,1	6,3	12,2	214	326	2,5	0,39	1,71	2,54	1,67
	3	287,9	227,1	6,3	12,2	214	326	2,5	0,39	1,71	2,54	1,67
	4	310,9	238,2	9,5	17,7	217	343	3	0,26	2,57	3,83	2,52
	4	310,9	238,2	9,5	17,7	217	343	3	0,26	2,57	3,83	2,52
	4	305,3	235	9,5	17,7	217	343	3	0,35	1,95	2,9	1,91
	4	305,3	235	9,5	17,7	217	343	3	0,35	1,95	2,9	1,91
	5	355,1	248,8	12,5	23,5	220	400	4	0,34	1,98	2,94	1,93
	5	355,1	248,8	12,5	23,5	220	400	4	0,34	1,98	2,94	1,93

Spherical roller bearings

With cylindrical or tapered bore



Cylindrical bore

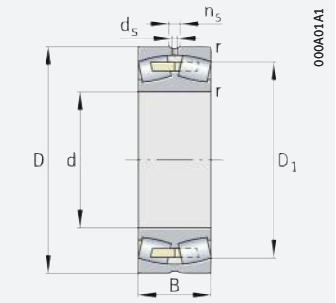


Tapered bore

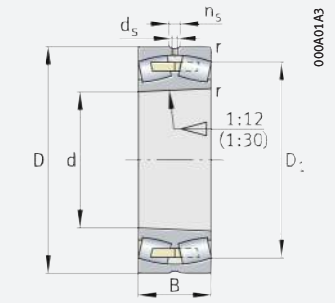
d = 220 – 240 mm

Main dimensions			Basic load ratings		Fatigue limit load	Limiting speed	Speed rating	Mass	Designation
d	D	B	dyn. C_r	stat. C_{0r}	C_{ur}	n_G	$n_{\vartheta r}$	m	➤*681* | *1.12* ➤*683* | *1.13* X-life ➤*671*
			kN	kN	N	min^{-1}	min^{-1}	≈ kg	
220	300	60	610	1 240	72 000	2 600	1 460	12,3	**23944-S-K-MB**
	300	60	610	1 240	72 000	2 600	1 460	12,3	**23944-S-MB**
	340	90	1 260	1 900	177 000	2 230	1 450	29,4	**23044-BE-XL**
	340	90	1 260	1 900	177 000	2 230	1 450	28,5	**23044-BE-XL-K**
	340	118	1 620	2 600	250 000	1 830	1 090	39,3	**24044-BE-XL**
	340	118	1 620	2 600	250 000	1 830	1 090	37,7	**24044-BE-XL-K30**
	370	120	1 860	2 700	217 000	1 860	1 080	52,2	**23144-BE-XL**
	370	120	1 860	2 700	217 000	1 860	1 080	50,5	**23144-BE-XL-K**
	370	150	2 190	3 250	290 000	1 650	750	64	**24144-BE-XL**
	370	150	2 190	3 250	290 000	1 650	750	62,7	**24144-BE-XL-K30**
	400	108	1 840	2 360	210 000	2 140	1 350	59,6	**22244-BE-XL**
	400	108	1 840	2 360	210 000	2 140	1 350	58,3	**22244-BE-XL-K**
	400	144	2 380	3 300	265 000	1 700	880	77,7	**23244-BE-XL**
	400	144	2 380	3 300	265 000	1 700	880	75,3	**23244-BE-XL-K**
	460	145	2 800	3 400	265 000	1 690	950	117	**22344-BE-XL**
	460	145	2 800	3 400	265 000	1 690	950	114	**22344-BE-XL-K**
240	320	60	640	1 370	93 000	2 440	1 310	13,4	**23948-K-MB**
	320	60	640	1 370	93 000	2 440	1 310	13,9	**23948-MB**
	360	92	1 350	2 120	194 000	2 080	1 310	32,6	**23048-BE-XL**
	360	118	1 670	2 850	275 000	1 710	980	44,1	**24048-BE-XL**
	400	128	2 130	3 150	248 000	1 700	970	64	**23148-BE-XL**
	400	160	2 600	3 900	330 000	1 470	650	83,2	**24148-BE-XL**
	440	120	2 230	2 900	247 000	1 900	1 200	83,6	**22248-BE-XL**
	440	160	2 850	4 000	310 000	1 500	770	106	**23248-BE-XL**
	500	155	3 200	4 050	305 000	1 510	830	151	**22348-BEA-XL-MB1**

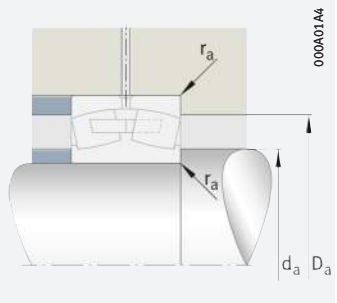
medias ➤ *https://www.schaeffler.de/std/1ED7*



Solid cage, brass or steel; cylindrical bore



Solid cage, brass or steel; tapered bore

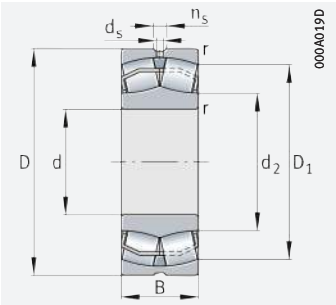


Mounting dimensions

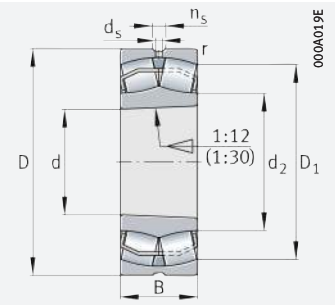
Dimensions						Mounting dimensions			Calculation factors			
d	r min.	D_1 ≈	d_2 ≈	d_s	n_s	d_a min.	D_a max.	r_a max.	e	Y_1	Y_2	Y_0
220	2,1	277,4	–	6,3	12,2	230,2	289,8	2,1	0,18	3,76	5,59	3,67
	2,1	277,4	–	6,3	12,2	230,2	289,8	2,1	0,18	3,76	5,59	3,67
	3	304,5	248,8	8	15	232,4	327,6	2,5	0,24	2,81	4,19	2,75
	3	304,5	248,8	8	15	232,4	327,6	2,5	0,24	2,81	4,19	2,75
	3	295,7	245	6,3	12,2	232,4	327,6	2,5	0,32	2,1	3,13	2,06
	3	295,7	245	6,3	12,2	232,4	327,6	2,5	0,32	2,1	3,13	2,06
	4	323	254,8	9,5	17,7	237	353	3	0,31	2,15	3,2	2,1
	4	323	254,8	9,5	17,7	237	353	3	0,31	2,15	3,2	2,1
	4	314,3	247,6	6,3	12,2	237	353	3	0,39	1,74	2,59	1,7
	4	314,3	247,6	6,3	12,2	237	353	3	0,39	1,74	2,59	1,7
	4	346,6	260,1	9,5	17,7	237	383	3	0,26	2,57	3,83	2,52
	4	346,6	260,1	9,5	17,7	237	383	3	0,26	2,57	3,83	2,52
	4	338	255,8	9,5	17,7	237	383	3	0,36	1,9	2,83	1,86
	4	338	255,8	9,5	17,7	237	383	3	0,36	1,9	2,83	1,86
	5	391,1	273,4	12,5	23,5	240	440	4	0,33	2,06	3,06	2,01
	5	391,1	273,4	12,5	23,5	240	440	4	0,33	2,06	3,06	2,01
240	2,1	297,8	–	6,3	12,2	250,2	309,8	2,1	0,17	4,05	6,04	3,96
	2,1	297,8	–	6,3	12,2	250,2	309,8	2,1	0,17	4,05	6,04	3,96
	3	324,6	269,5	8	15	252,4	347,6	2,5	0,23	2,98	4,44	2,92
	3	317,2	268,5	6,3	12,2	252,4	347,6	2,5	0,3	2,28	3,39	2,23
	4	349,9	275,9	9,5	17,7	257	383	3	0,31	2,18	3,24	2,13
	4	339	267,3	6,3	12,2	257	383	3	0,39	1,71	2,54	1,67
	4	380,4	285,6	12,5	23,5	257	423	3	0,26	2,55	3,8	2,5
	4	370,8	280,8	12,5	23,5	257	423	3	0,36	1,87	2,79	1,83
	5	426,4	–	12,5	23,5	260	480	4	0,32	2,12	3,15	2,07

Spherical roller bearings

With cylindrical or tapered bore



Cylindrical bore

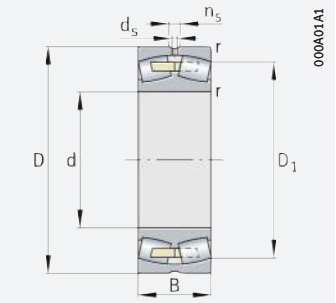


Tapered bore

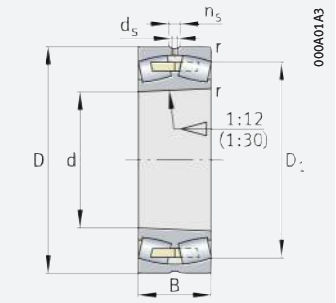
d = 260 – 280 mm

Main dimensions			Basic load ratings		Fatigue limit load	Limiting speed	Speed rating	Mass	Designation
d	D	B	dyn. C_r	stat. C_{0r}	C_{ur}	n_G	$n_{\vartheta r}$	m	➤*681* | *1.12* ➤*683* | *1.13* X-life ➤*671*
			kN	kN	N	min^{-1}	min^{-1}	≈ kg	
260	360	75	940	1 940	108 000	2 100	1 190	22,4	**23952-K-MB**
	360	75	940	1 940	108 000	2 100	1 190	24,1	**23952-MB**
	400	104	1 670	2 600	233 000	1 850	1 170	47,4	**23052-BE-XL**
	400	104	1 670	2 600	233 000	1 850	1 170	45,9	**23052-BE-XL-K**
	400	140	2 210	3 650	335 000	1 510	880	63,8	**24052-BE-XL**
	400	140	2 210	3 650	335 000	1 510	880	61,2	**24052-BE-XL-K30**
	440	144	2 600	3 900	305 000	1 500	860	90	**23152-BE-XL**
	440	144	2 600	3 900	305 000	1 500	860	87,2	**23152-BE-XL-K**
	440	180	3 150	4 900	390 000	1 290	560	110	**24152-BE-XL**
	440	180	3 150	4 900	390 000	1 290	560	108	**24152-BE-XL-K30**
	480	130	2 600	3 450	290 000	1 720	1 070	104	**22252-BEA-XL-K-MB1**
	480	130	2 600	3 450	290 000	1 720	1 070	106	**22252-BEA-XL-MB1**
	480	174	3 350	4 750	360 000	1 360	690	134	**23252-BEA-XL-K-MB1**
	480	174	3 350	4 750	360 000	1 360	690	139	**23252-BEA-XL-MB1**
	540	165	3 650	4 650	350 000	1 390	740	179	**22352-BEA-XL-K-MB1**
	540	165	3 650	4 650	350 000	1 390	740	182	**22352-BEA-XL-MB1**
280	380	75	970	2 040	129 000	2 000	1 100	24,7	**23956-K-MB**
	380	75	970	2 040	129 000	2 000	1 100	25,5	**23956-MB**
	420	106	1 780	2 850	255 000	1 740	1 090	50,9	**23056-BE-XL**
	420	106	1 780	2 850	255 000	1 740	1 090	49,3	**23056-BE-XL-K**
	420	140	2 290	3 950	360 000	1 420	800	70,6	**24056-BE-XL**
	420	140	2 290	3 950	360 000	1 420	800	67,8	**24056-BE-XL-K30**
	460	146	2 750	4 200	315 000	1 420	790	96,3	**23156-BE-XL**
	460	146	2 750	4 200	315 000	1 420	790	93,1	**23156-BE-XL-K**
	460	180	3 300	5 200	425 000	1 230	520	116	**24156-BE-XL**
	460	180	3 300	5 200	425 000	1 230	520	114	**24156-BE-XL-K30**
	500	130	2 750	3 700	310 000	1 650	990	109	**22256-BEA-XL-K-MB1**
	500	130	2 750	3 700	310 000	1 650	990	112	**22256-BEA-XL-MB1**
	500	176	3 550	5 200	385 000	1 280	630	143,7	**23256-BEA-XL-K-MB1**
	500	176	3 550	5 200	385 000	1 280	630	148	**23256-BEA-XL-MB1**
	580	175	4 150	5 300	395 000	1 280	670	223	**22356-BEA-XL-K-MB1**
	580	175	4 150	5 300	395 000	1 280	670	228	**22356-BEA-XL-MB1**

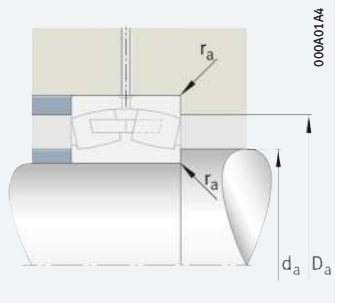
medias ➤ *https://www.schaeffler.de/std/1ED8*



Solid cage, brass or steel; cylindrical bore



Solid cage, brass or steel; tapered bore

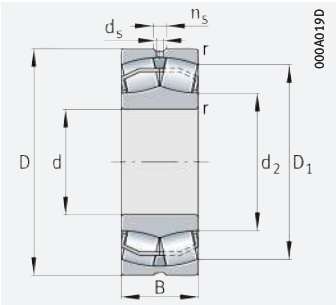


Mounting dimensions

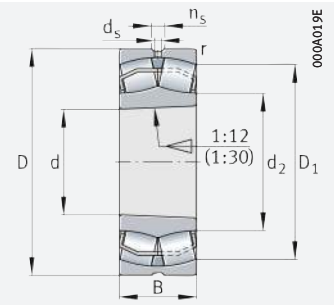
Dimensions						Mounting dimensions			Calculation factors			
d	r min.	D_1 ≈	d_2 ≈	d_s	n_s	d_a min.	D_a max.	r_a max.	e	Y_1	Y_2	Y_0
260	2,1	330,5	–	8	15	270,2	349,8	2,1	0,19	3,54	5,27	3,46
	2,1	330,5	–	8	15	270,2	349,8	2,1	0,19	3,54	5,27	3,46
	4	358,7	295,5	9,5	17,7	274,6	385,4	3	0,23	2,9	4,31	2,83
	4	358,7	295,5	9,5	17,7	274,6	385,4	3	0,23	2,9	4,31	2,83
	4	349	288,3	6,3	12,2	274,6	385,4	3	0,32	2,09	3,11	2,04
	4	349	288,3	6,3	12,2	274,6	385,4	3	0,32	2,09	3,11	2,04
	4	382,7	301,7	9,5	17,7	277	423	3	0,32	2,12	3,15	2,07
	4	382,7	301,7	9,5	17,7	277	423	3	0,32	2,12	3,15	2,07
	4	370,6	292,2	8	15	277	423	3	0,4	1,67	2,49	1,63
	4	370,6	292,2	8	15	277	423	3	0,4	1,67	2,49	1,63
	5	415,1	–	12,5	23,5	280	460	4	0,26	2,57	3,83	2,52
	5	415,1	–	12,5	23,5	280	460	4	0,26	2,57	3,83	2,52
	5	404,3	–	12,5	23,5	280	460	4	0,36	1,87	2,79	1,83
	5	404,3	–	12,5	23,5	280	460	4	0,36	1,87	2,79	1,83
	6	460,6	–	12,5	23,5	286	514	5	0,31	2,15	3,2	2,1
	6	460,6	–	12,5	23,5	286	514	5	0,31	2,15	3,2	2,1
280	2,1	350	–	8	15	290,2	369,8	2,1	0,18	3,76	5,59	3,67
	2,1	350	–	8	15	290,2	369,8	2,1	0,18	3,76	5,59	3,67
	4	379,2	314,3	9,5	17,7	294,6	405,4	3	0,22	3,01	4,48	2,94
	4	379,2	314,3	9,5	17,7	294,6	405,4	3	0,22	3,01	4,48	2,94
	4	370,5	310,3	6,3	12,2	294,6	405,4	3	0,3	2,23	3,32	2,18
	4	370,5	310,3	6,3	12,2	294,6	405,4	3	0,3	2,23	3,32	2,18
	5	403,4	321,4	9,5	17,7	300	440	4	0,31	2,21	3,29	2,16
	5	403,4	321,4	9,5	17,7	300	440	4	0,31	2,21	3,29	2,16
	5	392,4	312,8	8	15	300	440	4	0,38	1,76	2,62	1,72
	5	392,4	312,8	8	15	300	440	4	0,38	1,76	2,62	1,72
	5	436	–	12,5	23,5	300	480	4	0,25	2,71	4,04	2,65
	5	436	–	12,5	23,5	300	480	4	0,25	2,71	4,04	2,65
	5	425,4	–	12,5	23,5	300	480	4	0,34	1,96	2,92	1,92
	5	425,4	–	12,5	23,5	300	480	4	0,34	1,96	2,92	1,92
	6	495,5	–	12,5	23,5	306	554	5	0,31	2,18	3,24	2,13
	6	495,5	–	12,5	23,5	306	554	5	0,31	2,18	3,24	2,13

Spherical roller bearings

With cylindrical or tapered bore



Cylindrical bore

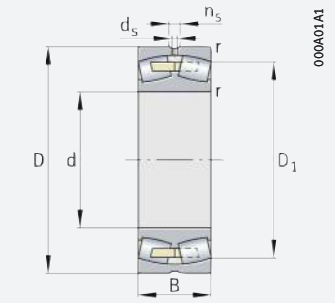


Tapered bore

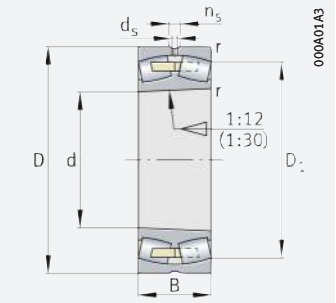
d = 300 – 320 mm

Main dimensions			Basic load ratings		Fatigue limit load	Limiting speed	Speed rating	Mass	Designation
d	D	B	dyn. C_r	stat. C_{0r}	C_{ur}	n_G	$n_{\vartheta r}$	m	➤*681* | *1.12* ➤*683* | *1.13* X-life ➤*671*
			kN	kN	N	min^{-1}	min^{-1}	≈ kg	
300	420	90	1 270	2 650	165 000	1 780	1 000	39,1	**23960-B-K-MB**
	420	90	1 270	2 650	165 000	1 780	1 000	40,6	**23960-B-MB**
	460	118	2 160	3 450	295 000	1 570	980	70,5	**23060-BE-XL**
	460	118	2 160	3 450	295 000	1 570	980	68,4	**23060-BE-XL-K**
	460	160	2 850	4 900	425 000	1 250	720	101	**24060-BE-XL**
	460	160	2 850	4 900	425 000	1 250	720	97	**24060-BE-XL-K30**
	500	160	3 250	4 950	365 000	1 300	720	126	**23160-BEA-XL-K-MB1**
	500	160	3 250	4 950	365 000	1 300	720	130	**23160-BEA-XL-MB1**
	500	200	3 950	6 400	485 000	1 100	450	164	**24160-BE-XL**
	500	200	3 950	6 400	485 000	1 100	450	161	**24160-BE-XL-K30**
	540	140	3 100	4 250	355 000	1 500	900	139	**22260-BEA-XL-K-MB1**
	540	140	3 100	4 250	355 000	1 500	900	142	**22260-BEA-XL-MB1**
	540	192	4 100	6 100	440 000	1 160	560	187	**23260-BEA-XL-K-MB1**
	540	192	4 100	6 100	440 000	1 160	560	193	**23260-BEA-XL-MB1**
320	440	90	1 310	2 750	201 000	1 700	930	41	**23964-K-MB**
	440	90	1 310	2 750	201 000	1 700	930	41,8	**23964-MB**
	480	121	2 300	3 750	320 000	1 480	920	75,6	**23064-BEA-XL-K-MB1**
	480	121	2 300	3 750	320 000	1 480	920	78	**23064-BEA-XL-MB1**
	480	160	2 950	5 200	455 000	1 200	670	99	**24064-BEA-XL-K30-MB1**
	480	160	2 950	5 200	455 000	1 200	670	102	**24064-BEA-XL-MB1**
	540	176	3 800	5 900	415 000	1 170	650	161	**23164-BEA-XL-K-MB1**
	540	176	3 800	5 900	415 000	1 170	650	165	**23164-BEA-XL-MB1**
	540	218	4 600	7 300	560 000	1 010	415	209	**24164-BE-XL**
	540	218	4 600	7 300	560 000	1 010	415	205	**24164-BE-XL-K30**
	580	150	3 550	4 700	395 000	1 410	830	171	**22264-BEA-XL-K-MB1**
	580	150	3 550	4 700	395 000	1 410	830	174	**22264-BEA-XL-MB1**
	580	208	4 650	7 000	495 000	1 060	510	229,6	**23264-BEA-XL-K-MB1**
	580	208	4 650	7 000	495 000	1 060	510	237	**23264-BEA-XL-MB1**

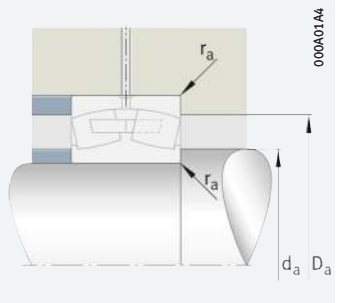
medias ➤ *https://www.schaeffler.de/std/1ED9*



Solid cage, brass or steel; cylindrical bore



Solid cage, brass or steel; tapered bore

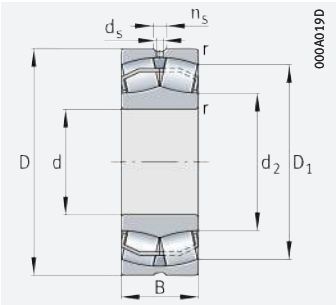


Mounting dimensions

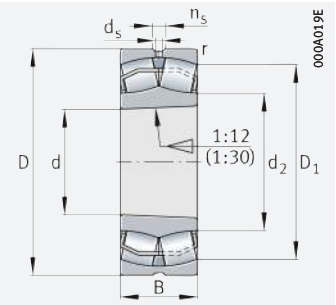
Dimensions						Mounting dimensions			Calculation factors			
d	r min.	D_1 ≈	d_2 ≈	d_s	n_s	d_a min.	D_a max.	r_a max.	e	Y_1	Y_2	Y_0
300	3	384,6	–	9,5	17,7	312,4	407,6	2,5	0,2	3,42	5,09	3,34
	3	384,6	–	9,5	17,7	312,4	407,6	2,5	0,2	3,42	5,09	3,34
	4	413	340	9,5	17,7	314,6	445,4	3	0,23	2,92	4,35	2,86
	4	413	340	9,5	17,7	314,6	445,4	3	0,23	2,92	4,35	2,86
	4	403	334,8	8	15	314,6	445,4	3	0,32	2,12	3,15	2,07
	4	403	334,8	8	15	314,6	445,4	3	0,32	2,12	3,15	2,07
	5	436,8	–	9,5	17,7	320	480	4	0,31	2,18	3,24	2,13
	5	436,8	–	9,5	17,7	320	480	4	0,31	2,18	3,24	2,13
	5	422,8	338,2	8	15	320	480	4	0,39	1,72	2,56	1,68
	5	422,8	338,2	8	15	320	480	4	0,39	1,72	2,56	1,68
	5	470,5	–	12,5	23,5	320	520	4	0,25	2,71	4,04	2,65
	5	470,5	–	12,5	23,5	320	520	4	0,25	2,71	4,04	2,65
	5	458	–	12,5	23,5	320	520	4	0,35	1,92	2,86	1,88
	5	458	–	12,5	23,5	320	520	4	0,35	1,92	2,86	1,88
320	3	406,2	–	9,5	17,7	332,4	427,6	2,5	0,19	3,62	5,39	3,54
	3	406,2	–	9,5	17,7	332,4	427,6	2,5	0,19	3,62	5,39	3,54
	4	433	–	9,5	17,7	334,6	465,4	3	0,22	3,01	4,48	2,94
	4	433	–	9,5	17,7	334,6	465,4	3	0,22	3,01	4,48	2,94
	4	422,3	–	8	15	334,6	465,4	3	0,3	2,23	3,32	2,18
	4	422,3	–	8	15	334,6	465,4	3	0,3	2,23	3,32	2,18
	5	469,3	–	12,5	23,5	340	520	4	0,32	2,13	3,17	2,08
	5	469,3	–	12,5	23,5	340	520	4	0,32	2,13	3,17	2,08
	5	455,5	359	9,5	17,7	340	520	4	0,4	1,69	2,52	1,65
	5	455,5	359	9,5	17,7	340	520	4	0,4	1,69	2,52	1,65
	5	505,1	–	12,5	23,5	340	560	4	0,25	2,71	4,04	2,65
	5	505,1	–	12,5	23,5	340	560	4	0,25	2,71	4,04	2,65
	5	490,4	–	12,5	23,5	340	560	4	0,35	1,91	2,85	1,87
	5	490,4	–	12,5	23,5	340	560	4	0,35	1,91	2,85	1,87

Spherical roller bearings

With cylindrical or tapered bore



Cylindrical bore

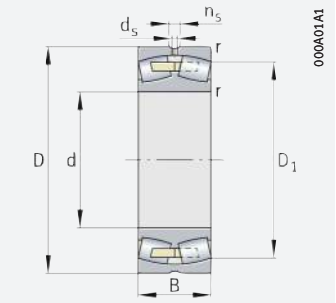


Tapered bore

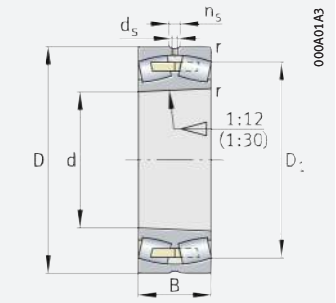
d = 340 – 380 mm

Main dimensions			Basic load ratings		Fatigue limit load	Limiting speed	Speed rating	Mass	Designation
d	D	B	dyn. C_r	stat. C_{0r}	C_{ur}	n_G	$n_{\vartheta r}$	m	➤*681*|*1.12* ➤*683*|*1.13* X-life ➤*671*
			kN	kN	N	min^{-1}	min^{-1}	≈ kg	
340	460	90	1 370	3 000	198 000	1 610	860	42,9	**23968-K-MB**
	460	90	1 370	3 000	198 000	1 610	860	43,7	**23968-MB**
	520	133	2 700	4 400	365 000	1 360	840	101	**23068-BEA-XL-K-MB1**
	520	133	2 700	4 400	365 000	1 360	840	104	**23068-BEA-XL-MB1**
	520	180	3 550	6 200	520 000	1 080	610	136	**24068-BEA-XL-K30-MB1**
	520	180	3 550	6 200	520 000	1 080	610	139	**24068-BEA-XL-MB1**
	580	190	4 350	6 600	465 000	1 090	600	204	**23168-BEA-XL-K-MB1**
	580	190	4 350	6 600	465 000	1 090	600	210	**23168-BEA-XL-MB1**
	580	243	5 400	8 800	620 000	900	370	267	**24168-BE-XL**
	580	243	5 400	8 800	620 000	900	370	263	**24168-BE-XL-K30**
	620	165	4 100	5 600	445 000	1 280	770	217	**22268-BEA-XL-K-MB1**
	620	165	4 100	5 600	445 000	1 280	770	221	**22268-BEA-XL-MB1**
	620	224	5 300	7 900	570 000	1 000	475	292	**23268-BEA-XL-K-MB1**
	620	224	5 300	7 900	570 000	1 000	475	301	**23268-BEA-XL-MB1**
360	480	90	1 440	3 200	210 000	1 540	800	45	**23972-K-MB**
	480	90	1 440	3 200	210 000	1 540	800	46,5	**23972-MB**
	540	134	2 800	4 650	390 000	1 300	790	108	**23072-BEA-XL-MB1**
	540	180	3 650	6 600	550 000	1 040	570	144	**24072-BEA-XL-MB1**
	600	192	4 550	7 100	495 000	1 040	560	222	**23172-BEA-XL-MB1**
	600	243	5 600	9 100	660 000	890	350	277	**24172-BE-XL**
	600	243	5 600	9 100	660 000	890	350	272	**24172-BE-XL-K30**
	650	170	4 450	6 200	485 000	1 190	710	245	**22272-BEA-XL-K-MB1**
	650	170	4 450	6 200	485 000	1 190	710	251	**22272-BEA-XL-MB1**
	650	232	5 700	8 900	610 000	930	430	341	**23272-BEA-XL-MB1**
380	520	106	1 780	4 000	265 000	1 340	750	66,3	**23976-K-MB**
	520	106	1 780	4 000	265 000	1 340	750	69,1	**23976-MB**
	560	135	2 900	5 000	410 000	1 230	740	114	**23076-BEA-XL-MB1**
	560	180	3 750	7 000	590 000	990	530	153	**24076-BEA-XL-MB1**
	620	194	4 700	7 600	530 000	990	530	234	**23176-BEA-XL-MB1**
	620	243	5 800	9 700	710 000	850	325	290	**24176-BE-XL**
	620	243	5 800	9 700	710 000	850	325	285	**24176-BE-XL-K30**
	680	240	6 200	9 600	660 000	890	400	385	**23276-BEA-XL-MB1**

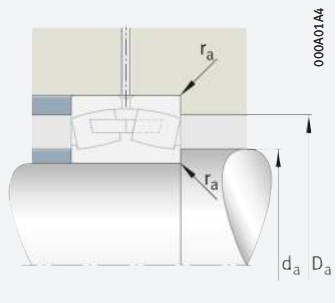
medias ➤ *https://www.schaeffler.de/std/1EDA*



Solid cage, brass or steel; cylindrical bore



Solid cage, brass or steel; tapered bore

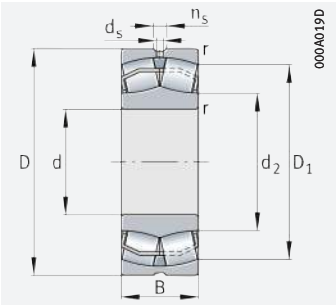


Mounting dimensions

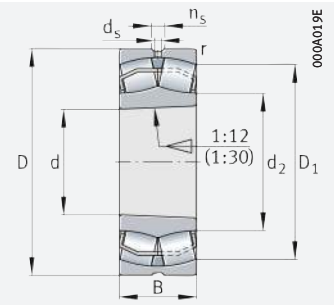
Dimensions						Mounting dimensions			Calculation factors			
d	r min.	D_1 ≈	d_2 ≈	d_s	n_s	d_a min.	D_a max.	r_a max.	e	Y_1	Y_2	Y_0
340	3	426,7	–	9,5	17,7	352,4	447,6	2,5	0,18	3,85	5,73	3,76
	3	426,7	–	9,5	17,7	352,4	447,6	2,5	0,18	3,85	5,73	3,76
	5	467,1	–	12,5	23,5	358	502	4	0,23	2,92	4,35	2,86
	5	467,1	–	12,5	23,5	358	502	4	0,23	2,92	4,35	2,86
	5	456,1	–	9,5	17,7	358	502	4	0,32	2,12	3,15	2,07
	5	456,1	–	9,5	17,7	358	502	4	0,32	2,12	3,15	2,07
	5	502,6	–	12,5	23,5	360	560	4	0,32	2,1	3,13	2,06
	5	502,6	–	12,5	23,5	360	560	4	0,32	2,1	3,13	2,06
	5	484,1	382,8	9,5	17,7	360	560	4	0,42	1,62	2,42	1,59
	5	484,1	382,8	9,5	17,7	360	560	4	0,42	1,62	2,42	1,59
	6	538,3	–	12,5	23,5	366	594	5	0,26	2,62	3,9	2,56
	6	538,3	–	12,5	23,5	366	594	5	0,26	2,62	3,9	2,56
	6	523,5	–	12,5	23,5	366	594	5	0,36	1,85	2,76	1,81
	6	523,5	–	12,5	23,5	366	594	5	0,36	1,85	2,76	1,81
360	3	447,1	–	9,5	17,7	372,4	467,6	2,5	0,17	4,05	6,04	3,96
	3	447,1	–	9,5	17,7	372,4	467,6	2,5	0,17	4,05	6,04	3,96
	5	487,6	–	12,5	23,5	378	522	4	0,22	3,04	4,53	2,97
	5	476,4	–	9,5	17,7	378	522	4	0,3	2,23	3,32	2,18
	5	523,3	–	12,5	23,5	380	580	4	0,31	2,18	3,24	2,13
	5	505,9	399,4	9,5	17,7	380	580	4	0,4	1,69	2,52	1,65
	5	505,9	399,4	9,5	17,7	380	580	4	0,4	1,69	2,52	1,65
	6	566	–	12,5	23,5	386	624	5	0,25	2,69	4	2,63
	6	566	–	12,5	23,5	386	624	5	0,25	2,69	4	2,63
	6	550,8	–	12,5	23,5	386	624	5	0,36	1,9	2,83	1,86
380	4	477,6	–	9,5	17,7	394,6	505,4	3	0,19	3,58	5,33	3,5
	4	477,6	–	9,5	17,7	394,6	505,4	3	0,19	3,58	5,33	3,5
	5	508,1	–	12,5	23,5	398	542	4	0,21	3,17	4,72	3,1
	5	497,9	–	9,5	17,7	398	542	4	0,29	2,33	3,47	2,28
	5	543,6	–	12,5	23,5	400	600	4	0,3	2,25	3,34	2,2
	5	528,4	421	9,5	17,7	400	600	4	0,38	1,76	2,62	1,72
	5	528,4	421	9,5	17,7	400	600	4	0,38	1,76	2,62	1,72
	6	578,1	–	12,5	23,5	406	654	5	0,35	1,92	2,86	1,88

Spherical roller bearings

With cylindrical or tapered bore



Cylindrical bore

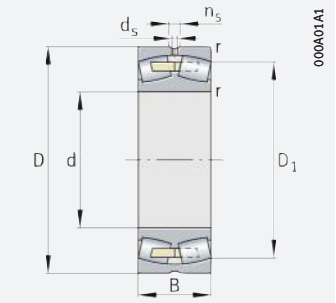


Tapered bore

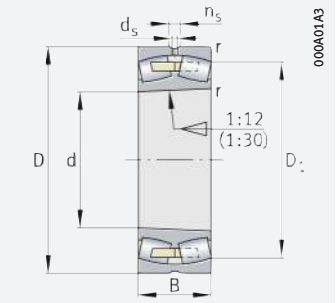
d = 400 – 420 mm

Main dimensions			Basic load ratings		Fatigue limit load	Limiting speed	Speed rating	Mass	Designation
d	D	B	dyn. C_r	stat. C_{0r}	C_{ur}	n_G	$n_{\vartheta r}$	m	➤*681* | *1.12* ➤*683* | *1.13* X-life ➤*671*
			kN	kN	N	min^{-1}	min^{-1}	≈ kg	
400	540	106	1 830	4 150	270 000	1 290	710	68,2	**23980-B-K-MB**
	540	106	1 830	4 150	270 000	1 290	710	72,9	**23980-B-MB**
	600	148	3 400	5 700	465 000	1 150	690	149	**23080-BEA-XL-MB1**
	600	200	4 500	8 100	660 000	920	495	200	**24080-BEA-XL-MB1**
	650	200	5 000	8 100	570 000	950	495	255	**23180-BEA-XL-MB1**
	650	250	6 200	10 600	760 000	800	300	328	**24180-BE-XL**
	650	250	6 200	10 600	760 000	800	300	323	**24180-BE-XL-K30**
	720	256	7 000	10 900	730 000	820	370	464	**23280-BEA-XL-MB1**
420	560	106	1 910	4 450	300 000	1 230	660	72,1	**23984-K-MB**
	560	106	1 910	4 450	300 000	1 230	660	75,5	**23984-MB**
	620	150	3 650	6 300	510 000	1 090	650	153	**23084-BEA-XL-K-MB1**
	620	150	3 650	6 300	510 000	1 090	650	158	**23084-BEA-XL-MB1**
	620	200	4 600	8 500	710 000	890	465	205	**24084-BEA-XL-K30-MB1**
	620	200	4 600	8 500	710 000	890	465	208	**24084-BEA-XL-MB1**
	700	224	6 000	9 600	650 000	860	455	342	**23184-BEA-XL-K-MB1**
	700	224	6 000	9 600	650 000	860	455	353	**23184-BEA-XL-MB1**
	700	280	7 400	12 600	860 000	720	270	437	**24184-BE-XL**
	700	280	7 400	12 600	860 000	720	270	431	**24184-BE-XL-K30**
	760	272	7 800	12 300	800 000	770	340	537	**23284-BEA-XL-K-MB1**
	760	272	7 800	12 300	800 000	770	340	553	**23284-BEA-XL-MB1**

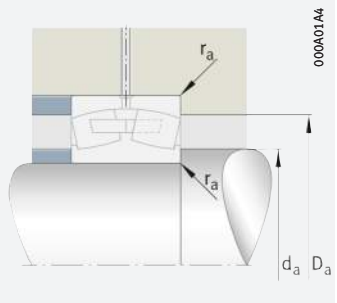
medias ➤ *https://www.schaeffler.de/std/1EDB*



Solid cage, brass or steel; cylindrical bore



Solid cage, brass or steel; tapered bore

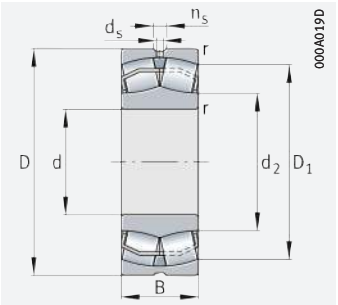


Mounting dimensions

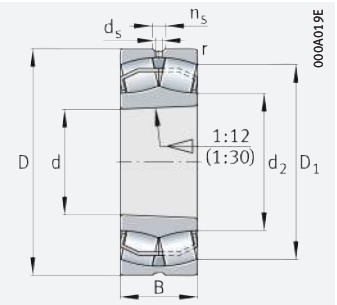
Dimensions						Mounting dimensions			Calculation factors			
d	r min.	D_1 ≈	d_2 ≈	d_s	n_s	d_a min.	D_a max.	r_a max.	e	Y_1	Y_2	Y_0
400	4	499	–	9,5	17,7	414,6	525,4	3	0,18	3,71	5,52	3,63
	4	499	–	9,5	17,7	414,6	525,4	3	0,18	3,71	5,52	3,63
	5	541,9	–	12,5	23,5	418	582	4	0,22	3,07	4,57	3
	5	529,4	–	12,5	23,5	418	582	4	0,3	2,23	3,32	2,18
	6	571,4	–	12,5	23,5	426	624	5	0,29	2,3	3,42	2,25
	6	556,5	448,8	12,5	23,5	426	624	5	0,37	1,82	2,7	1,78
	6	556,5	448,8	12,5	23,5	426	624	5	0,37	1,82	2,7	1,78
	6	610,9	–	12,5	23,5	426	694	5	0,36	1,9	2,83	1,86
420	4	519,5	–	9,5	17,7	434,6	545,4	3	0,18	3,85	5,73	3,76
	4	519,5	–	9,5	17,7	434,6	545,4	3	0,18	3,85	5,73	3,76
	5	560,7	–	12,5	23,5	438	602	4	0,21	3,17	4,72	3,1
	5	560,7	–	12,5	23,5	438	602	4	0,21	3,17	4,72	3,1
	5	551	–	12,5	23,5	438	602	4	0,29	2,32	3,45	2,26
	5	551	–	12,5	23,5	438	602	4	0,29	2,32	3,45	2,26
	6	609,8	–	12,5	23,5	446	674	5	0,31	2,18	3,24	2,13
	6	609,8	–	12,5	23,5	446	674	5	0,31	2,18	3,24	2,13
	6	592,2	472,7	12,5	23,5	446	674	5	0,39	1,72	2,56	1,68
	6	592,2	472,7	12,5	23,5	446	674	5	0,39	1,72	2,56	1,68
	7,5	643,4	–	12,5	23,5	452	728	6	0,36	1,89	2,81	1,84
	7,5	643,4	–	12,5	23,5	452	728	6	0,36	1,89	2,81	1,84

Spherical roller bearings

With cylindrical or tapered bore



Cylindrical bore

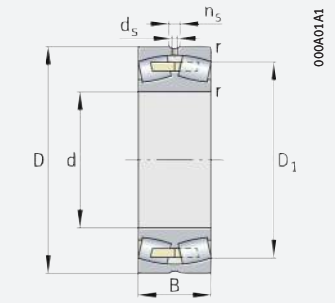


Tapered bore

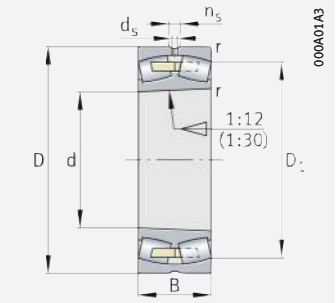
d = 440 – 460 mm

Main dimensions			Basic load ratings		Fatigue limit load	Limiting speed	Speed rating	Mass	Designation
d	D	B	dyn. C_r	stat. C_{0r}	C_{ur}	n_G	$n_{\vartheta r}$	m	➤*681* | *1.12* ➤*683* | *1.13* X-life ➤*671*
			kN	kN	N	min^{-1}	min^{-1}	≈ kg	
440	600	118	2 230	5 200	295 000	1 130	620	98,3	**23988-K-MB**
	600	118	2 230	5 200	295 000	1 130	620	101	**23988-MB**
	650	157	3 950	6 900	550 000	1 030	610	176	**23088-BEA-XL-K-MB1**
	650	157	3 950	6 900	550 000	1 030	610	182	**23088-BEA-XL-MB1**
	650	212	5 100	9 500	760 000	830	435	238	**24088-BEA-XL-K30-MB1**
	650	212	5 100	9 500	760 000	830	435	243	**24088-BEA-XL-MB1**
	720	226	6 200	10 200	680 000	820	430	358	**23188-BEA-XL-K-MB1**
	720	226	6 200	10 200	680 000	820	430	370	**23188-BEA-XL-MB1**
	720	280	7 600	12 900	910 000	710	260	453	**24188-BE-XL**
	720	280	7 600	12 900	910 000	710	260	446	**24188-BE-XL-K30**
	790	280	8 300	13 200	860 000	730	320	592	**23288-BEA-XL-K-MB1**
	790	280	8 300	13 200	860 000	730	320	610	**23288-BEA-XL-MB1**
460	580	118	1 940	5 100	330 000	1 020	325	71	**24892-B-MB**
	620	118	2 270	5 400	370 000	1 080	590	103	**23992-B-K-MB**
	620	118	2 270	5 400	370 000	1 080	590	111	**23992-B-MB**
	680	163	4 300	7 500	590 000	980	580	201	**23092-BEA-XL-K-MB1**
	680	163	4 300	7 500	590 000	980	580	208	**23092-BEA-XL-MB1**
	680	218	5 500	10 200	820 000	800	410	270	**24092-BEA-XL-K30-MB1**
	680	218	5 500	10 200	820 000	800	410	274	**24092-BEA-XL-MB1**
	760	240	6 900	11 500	740 000	770	395	431	**23192-BEA-XL-K-MB1**
	760	240	6 900	11 500	740 000	770	395	445	**23192-BEA-XL-MB1**
	760	300	8 500	14 500	1 000 000	660	241	531	**24192-BEA-XL-K30-MB1**
	760	300	8 500	14 500	1 000 000	660	241	540	**24192-BEA-XL-MB1**
	830	296	9 200	14 700	930 000	690	295	695	**23292-BEA-XL-K-MB1**
	830	296	9 200	14 700	930 000	690	295	716	**23292-BEA-XL-MB1**

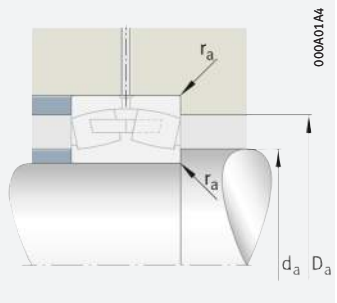
medias ➤ *https://www.schaeffler.de/std/1EDC*



Solid cage, brass or steel; cylindrical bore



Solid cage, brass or steel; tapered bore

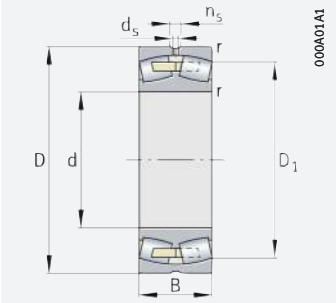


Mounting dimensions

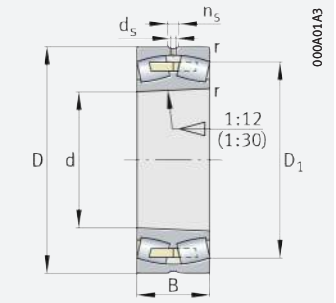
Dimensions						Mounting dimensions			Calculation factors			
d	r min.	D_1 ≈	d_2 ≈	d_s	n_s	d_a min.	D_a max.	r_a max.	e	Y_1	Y_2	Y_0
440	4	552,8	–	12,5	23,5	454,6	585,4	3	0,18	3,66	5,46	3,58
	4	552,8	–	12,5	23,5	454,6	585,4	3	0,18	3,66	5,46	3,58
	6	589,3	–	12,5	23,5	463	627	5	0,21	3,17	4,72	3,1
	6	589,3	–	12,5	23,5	463	627	5	0,21	3,17	4,72	3,1
	6	576,7	–	12,5	23,5	463	627	5	0,29	2,3	3,42	2,25
	6	576,7	–	12,5	23,5	463	627	5	0,29	2,3	3,42	2,25
	6	630,2	–	12,5	23,5	466	694	5	0,3	2,25	3,34	2,2
	6	630,2	–	12,5	23,5	466	694	5	0,3	2,25	3,34	2,2
	6	614,3	614,2	12,5	23,5	466	694	5	0,38	1,78	2,65	1,74
	6	614,3	614,2	12,5	23,5	466	694	5	0,38	1,78	2,65	1,74
	7,5	670,7	–	12,5	23,5	472	758	6	0,35	1,91	2,85	1,87
	7,5	670,7	–	12,5	23,5	472	758	6	0,35	1,91	2,85	1,87
460	3	542,6	–	6,3	12,2	472,4	567,6	2,5	0,18	3,76	5,59	3,67
	4	573,3	–	12,5	23,5	474,6	605,4	3	0,18	3,85	5,73	3,76
	4	573,3	–	12,5	23,5	474,6	605,4	3	0,18	3,85	5,73	3,76
	6	616,7	–	12,5	23,5	483	657	5	0,21	3,17	4,72	3,1
	6	616,7	–	12,5	23,5	483	657	5	0,21	3,17	4,72	3,1
	6	604,5	–	12,5	23,5	483	657	5	0,29	2,33	3,47	2,28
	6	604,5	–	12,5	23,5	483	657	5	0,29	2,33	3,47	2,28
	7,5	663,4	–	12,5	23,5	492	728	6	0,31	2,21	3,29	2,16
	7,5	663,4	–	12,5	23,5	492	728	6	0,31	2,21	3,29	2,16
	7,5	645,4	–	12,5	23,5	492	728	6	0,38	1,76	2,62	1,72
	7,5	645,4	–	12,5	23,5	492	728	6	0,38	1,76	2,62	1,72
	7,5	703,5	–	12,5	23,5	492	798	6	0,36	1,9	2,83	1,86
	7,5	703,5	–	12,5	23,5	492	798	6	0,36	1,9	2,83	1,86

Spherical roller bearings

With cylindrical or tapered bore



Solid cage, brass or steel; cylindrical bore

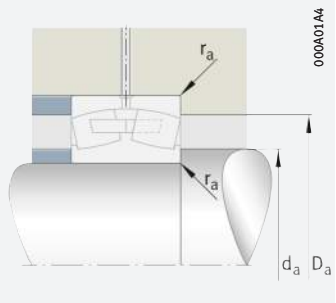


Solid cage, brass or steel; tapered bore

d = 480 – 500 mm

Main dimensions			Basic load ratings		Fatigue limit load	Limiting speed	Speed rating	Mass	Designation
d	D	B	dyn. C_r	stat. C_{0r}	C_{ur}	n_G	$n_{\vartheta r}$	m	➤*681* | *1.12* ➤*683* | *1.13* X-life ➤*671*
			kN	kN	N	min^{-1}	min^{-1}	≈ kg	
480	600	118	2 000	5 400	360 000	980	305	78,4	**24896-MB**
	650	128	2 550	6 000	460 000	1 040	570	121	**23996-B-K-MB**
	650	128	2 550	6 000	460 000	1 040	570	126	**23996-B-MB**
	700	165	4 450	8 000	620 000	950	550	210	**23096-BEA-XL-K-MB1**
	700	165	4 450	8 000	620 000	950	550	217	**23096-BEA-XL-MB1**
	700	218	5 600	10 700	860 000	770	385	279	**24096-BEA-XL-K30-MB1**
	700	218	5 600	10 700	860 000	770	385	284	**24096-BEA-XL-MB1**
	790	248	7 400	12 400	790 000	740	375	479	**23196-BEA-XL-K-MB1**
	790	248	7 400	12 400	790 000	740	375	494	**23196-BEA-XL-MB1**
	790	308	9 000	15 500	1 070 000	640	227	594	**24196-BEA-XL-K30-MB1**
	790	308	9 000	15 500	1 070 000	640	227	603	**24196-BEA-XL-MB1**
	870	310	10 000	16 200	1 010 000	650	275	804	**23296-BEA-XL-K-MB1**
	870	310	10 000	16 200	1 010 000	650	275	829	**23296-BEA-XL-MB1**
500	620	118	2 070	5 700	265 000	930	290	84,3	**248/500-B-MB**
	670	128	2 600	6 300	400 000	990	540	124	**239/500-K-MB**
	670	128	2 600	6 300	400 000	990	540	132	**239/500-MB**
	720	167	4 700	8 700	750 000	890	510	223	**230/500-BEA-XL-K-MB1**
	720	167	4 700	8 700	750 000	890	510	230	**230/500-BEA-XL-MB1**
	720	218	5 700	11 100	900 000	750	370	289	**240/500-BEA-XL-K30-MB1**
	720	218	5 700	11 100	900 000	750	370	294	**240/500-BEA-XL-MB1**
	830	264	8 300	13 900	860 000	690	350	574	**231/500-BEA-XL-K-MB1**
	830	264	8 300	13 900	860 000	690	350	593	**231/500-BEA-XL-MB1**
	830	325	10 000	17 300	1 160 000	600	209	692	**241/500-BEA-XL-K30-MB1**
	830	325	10 000	17 300	1 160 000	600	209	703	**241/500-BEA-XL-MB1**
	920	336	11 300	18 000	1 110 000	610	260	983	**232/500-BEA-XL-K-MB1**
	920	336	11 300	18 000	1 110 000	610	260	1 013	**232/500-BEA-XL-MB1**

medias ➤ *https://www.schaeffler.de/std/1EDD*

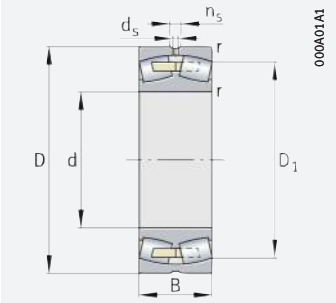


Mounting dimensions

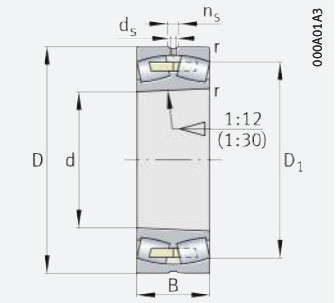
Dimensions					Mounting dimensions			Calculation factors			
d	r min.	D_1 ≈	d_s	n_s	d_a min.	D_a max.	r_a max.	e	Y_1	Y_2	Y_0
480	3	562,8	6,3	12,2	492	588	2,5	0,17	3,9	5,81	3,81
	5	598,8	12,5	23,5	498	632	4	0,18	3,76	5,59	3,67
	5	598,8	12,5	23,5	498	632	4	0,18	3,76	5,59	3,67
	6	636,9	12,5	23,5	503	677	5	0,21	3,27	4,87	3,2
	6	636,9	12,5	23,5	503	677	5	0,21	3,27	4,87	3,2
	6	626,1	12,5	23,5	503	677	5	0,28	2,43	3,61	2,37
	6	626,1	12,5	23,5	503	677	5	0,28	2,43	3,61	2,37
	7,5	690,4	12,5	23,5	512	758	6	0,3	2,23	3,32	2,18
	7,5	690,4	12,5	23,5	512	758	6	0,3	2,23	3,32	2,18
	7,5	673,14	12,5	23,5	512	758	6	0,38	1,79	2,67	1,75
	7,5	673,1	12,5	23,5	512	758	6	0,38	1,79	2,67	1,75
	7,5	737,1	12,5	23,5	512	838	6	0,36	1,9	2,83	1,86
	7,5	737,1	12,5	23,5	512	838	6	0,36	1,9	2,83	1,86
500	3	583,5	6,3	12,2	512,4	607,6	2,5	0,17	4	5,96	3,91
	5	619,3	12,5	23,5	518	652	4	0,17	3,9	5,81	3,81
	5	619,3	12,5	23,5	518	652	4	0,17	3,9	5,81	3,81
	6	657,1	12,5	23,5	523	697	5	0,21	3,24	4,82	3,16
	6	657,1	12,5	23,5	523	697	5	0,21	3,24	4,82	3,16
	6	647,3	12,5	23,5	523	697	5	0,27	2,51	3,74	2,45
	6	647,3	12,5	23,5	523	697	5	0,27	2,51	3,74	2,45
	7,5	723,1	12,5	23,5	532	798	6	0,31	2,2	3,27	2,15
	7,5	723,1	12,5	23,5	532	798	6	0,31	2,2	3,27	2,15
	7,5	705,2	12,5	23,5	532	798	6	0,38	1,78	2,65	1,74
	7,5	705,2	12,5	23,5	532	798	6	0,38	1,78	2,65	1,74
	7,5	774,6	12,5	23,5	532	888	6	0,37	1,83	2,72	1,79
	7,5	774,6	12,5	23,5	532	888	6	0,37	1,83	2,72	1,79

Spherical roller bearings

With cylindrical or tapered bore



Solid cage, brass or steel; cylindrical bore

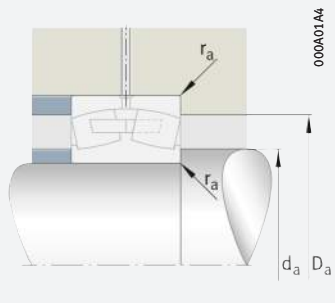


Solid cage, brass or steel; tapered bore

d = 530 – 600 mm

Main dimensions			Basic load ratings		Fatigue limit load	Limiting speed	Speed rating	Mass	Designation
d	D	B	dyn. C_r	stat. C_{0r}	C_{ur}	n_G	$n_{\vartheta r}$	m	➤*681*|*1.12* ➤*683*|*1.13* X-life ➤*671*
			kN	kN	N	min^{-1}	min^{-1}	≈ kg	
530	650	118	2 240	6 400	370 000	880	260	89,7	**248/530-B-MB**
	710	136	2 850	6 900	385 000	930	500	160	**239/530-MB**
	780	185	5 600	10 100	860 000	820	475	312	**230/530-BEA-XL-MB1**
	780	250	7 000	13 500	1 040 000	670	335	403	**240/530-BEA-XL-K30-MB1**
	780	250	7 000	13 500	1 040 000	670	335	410	**240/530-BEA-XL-MB1**
	870	272	8 900	15 000	940 000	660	325	655	**231/530-BEA-XL-MB1**
	870	335	10 700	19 100	1 260 000	560	190	791	**241/530-BEA-XL-MB1**
	980	355	10 900	20 900	1 190 000	570	230	1 202	**232/530-K-MB**
	980	355	10 900	20 900	1 190 000	570	230	1 240	**232/530-MB**
560	680	118	2 210	6 300	390 000	840	250	92,7	**248/560-B-MB**
	750	140	3 100	7 600	520 000	880	465	181	**239/560-B-MB**
	820	195	6 100	11 200	930 000	760	440	361	**230/560-BEA-XL-MB1**
	820	258	7 500	14 600	1 120 000	630	315	459	**240/560-BEA-XL-K30-MB1**
	820	258	7 500	14 600	1 120 000	630	315	466	**240/560-BEA-XL-MB1**
	920	280	9 700	16 400	1 030 000	630	300	754	**231/560-BEA-XL-MB1**
	920	355	12 000	21 000	1 410 000	530	177	929	**241/560-BEA-XL-MB1**
	1 030	365	11 700	22 600	910 000	540	215	1 358	**232/560-K-MB**
	1 030	365	11 700	22 600	910 000	540	215	1 397	**232/560-MB**
600	730	98	1 960	5 300	350 000	980	435	84	**238/600-K-MB**
	730	98	1 960	5 300	350 000	980	435	87	**238/600-MB**
	730	128	2 550	7 300	440 000	780	228	116	**248/600-B-MB**
	800	150	3 450	8 600	630 000	810	430	224	**239/600-B-MB**
	870	200	6 600	12 300	1 020 000	710	405	411	**230/600-BEA-XL-MB1**
	870	272	8 300	16 600	1 240 000	580	285	536	**240/600-BEA-XL-K30-MB1**
	870	272	8 300	16 600	1 240 000	580	285	545	**240/600-BEA-XL-MB1**
	980	300	9 000	19 200	810 000	560	270	929	**231/600-MB**
	980	375	11 600	26 000	1 780 000	480	149	1 180	**241/600-B-MB**
	1 090	388	13 000	25 500	1 720 000	495	196	1 599	**232/600-B-K-MB**
	1 090	388	13 000	25 500	1 720 000	495	196	1 634	**232/600-B-MB**

medias ➤ *https://www.schaeffler.de/std/1EDE*

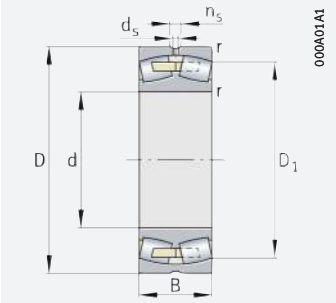


Mounting dimensions

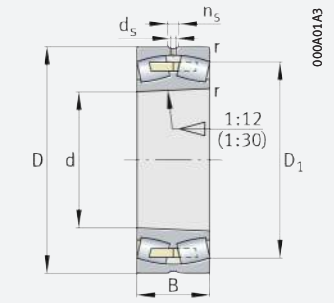
Dimensions					Mounting dimensions			Calculation factors			
d	r min.	D_1 ≈	d_s	n_s	d_a min.	D_a max.	r_a max.	e	Y_1	Y_2	Y_0
530	3	614,1	6,3	12,2	542,4	637,6	2,5	0,16	4,22	6,29	4,13
	5	656,5	12,5	23,5	548	692	4	0,18	3,85	5,73	3,76
	6	708,2	12,5	23,5	553	757	5	0,22	3,1	4,62	3,03
	6	694,2	12,5	23,5	553	757	5	0,29	2,33	3,47	2,28
	6	694,2	12,5	23,5	553	757	5	0,29	2,33	3,47	2,28
	7,5	760,5	12,5	23,5	562	838	6	0,3	2,25	3,34	2,2
	7,5	742,9	12,5	23,5	562	838	6	0,37	1,83	2,72	1,79
	9,5	824,4	12,5	23,5	570	940	8	0,38	1,77	2,64	1,73
	9,5	824,4	12,5	23,5	570	940	8	0,38	1,77	2,64	1,73
560	3	644,6	6,3	12,2	542	638	2,5	0,15	4,47	6,65	4,37
	5	693,4	12,5	23,5	578	732	4	0,17	3,95	5,88	3,86
	6	745	12,5	23,5	583	797	5	0,22	3,1	4,62	3,03
	6	732,1	12,5	23,5	583	797	5	0,28	2,39	3,56	2,34
	6	732,1	12,5	23,5	583	797	5	0,28	2,39	3,56	2,34
	7,5	806,6	12,5	23,5	592	888	6	0,29	2,32	3,45	2,26
	7,5	791,5	12,5	23,5	592	888	6	0,37	1,83	2,72	1,79
	9,5	868,1	12,5	23,5	600	990	8	0,38	1,78	2,65	1,74
	9,5	868,1	12,5	23,5	600	990	8	0,38	1,78	2,65	1,74
600	3	696,3	6,3	12,2	612,4	717,6	2,5	0,12	5,78	8,61	5,65
	3	696,3	6,3	12,2	612,4	717,6	2,5	0,12	5,78	8,61	5,65
	3	691,5	6,3	12,2	612,4	717,6	2,5	0,15	4,4	6,56	4,31
	5	740,5	12,5	23,5	618	782	4	0,17	3,95	5,88	3,86
	6	793,3	12,5	23,5	623	847	5	0,21	3,24	4,82	3,16
	6	778,4	12,5	23,5	623	847	5	0,28	2,41	3,59	2,35
	6	778,4	12,5	23,5	623	847	5	0,28	2,41	3,59	2,35
	7,5	852,6	12,5	23,5	632	948	6	0,31	2,2	3,27	2,15
	7,5	833	12,5	23,5	632	948	6	0,38	1,79	2,67	1,75
	9,5	919,5	12,5	23,5	640	1 050	8	0,37	1,83	2,72	1,79
	9,5	919,5	12,5	23,5	640	1 050	8	0,37	1,83	2,72	1,79

Spherical roller bearings

With cylindrical or tapered bore



Solid cage, brass or steel; cylindrical bore

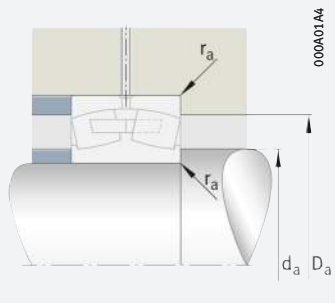


Solid cage, brass or steel; tapered bore

d = 630 – 670 mm

Main dimensions			Basic load ratings		Fatigue limit load	Limiting speed	Speed rating	Mass	Designation
d	D	B	dyn. C_r	stat. C_{0r}	C_{ur}	n_G	$n_{\vartheta r}$	m	➤*681|1.12* ➤*683|1.13* X-life ➤*671*
			kN	kN	N	min^{-1}	min^{-1}	≈ kg	
630	780	112	2 650	6 400	580 000	860	410	120	**238/630-XL-K-MA1**
	780	112	2 650	6 400	580 000	860	410	122	**238/630-XL-MA1**
	780	150	3 200	9 000	560 000	700	209	163	**248/630-MB**
	850	165	4 100	9 900	710 000	740	405	292	**239/630-B-MB**
	920	212	7 400	13 700	1 120 000	670	380	491	**230/630-BEA-XL-MB1**
	920	290	9 400	18 600	1 370 000	550	265	656	**240/630-BEA-XL-MB1**
	1 030	315	9 800	20 700	1 420 000	530	255	1 037	**231/630-B-K-MB**
	1 030	315	9 800	20 700	1 420 000	530	255	1 074	**231/630-B-MB**
	1 030	400	13 100	29 500	1 990 000	440	136	1 393	**241/630-B-MB**
	1 150	412	14 400	28 500	1 350 000	465	181	1 910	**232/630-B-K-MB**
	1 150	412	14 400	28 500	1 350 000	465	181	1 940	**232/630-B-MB**
670	820	112	2 380	6 900	445 000	810	380	124	**238/670-B-K-MB**
	820	112	2 380	6 900	445 000	810	380	129	**238/670-B-MB**
	820	150	3 350	9 700	590 000	670	191	175	**248/670-B-MB**
	900	170	4 300	10 600	750 000	710	375	310	**239/670-B-K-MB**
	900	170	4 300	10 600	750 000	710	375	320	**239/670-B-MB**
	900	230	5 900	14 900	940 000	580	174	429	**249/670-B-K30-MB**
	900	230	5 900	14 900	940 000	580	174	433	**249/670-B-MB**
	980	230	7 200	15 800	1 100 000	630	350	590	**230/670-B-K-MB**
	980	230	7 200	15 800	1 100 000	630	350	600	**230/670-B-MB**
	980	308	9 000	21 500	1 480 000	510	239	794	**240/670-B-K30-MB**
	980	308	9 000	21 500	1 480 000	510	239	813	**240/670-B-MB**
	1 090	336	11 000	23 900	1 560 000	495	230	1 241	**231/670-B-K-MB**
	1 090	336	11 000	23 900	1 560 000	495	230	1 279	**231/670-B-MB**
	1 090	412	14 000	31 500	2 110 000	420	127	1 539	**241/670-B-K30-MB**
	1 090	412	14 000	31 500	2 110 000	420	127	1 544	**241/670-B-MB**
	1 220	438	16 000	32 000	2 130 000	430	165	2 246	**232/670-B-K-MB**
	1 220	438	16 000	32 000	2 130 000	430	165	2 317	**232/670-B-MB**

medias ➤ *https://www.schaeffler.de/std/1EDF*

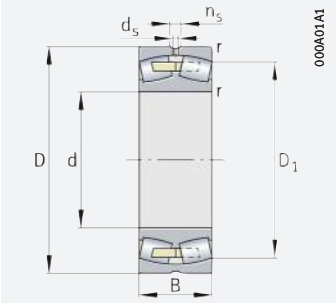


Mounting dimensions

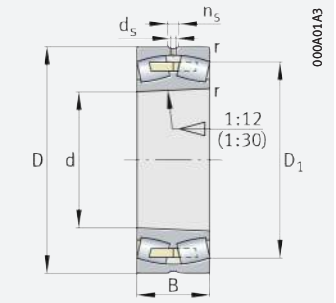
Dimensions					Mounting dimensions			Calculation factors			
d	r min.	D_1 ≈	d_s	n_s	d_a min.	D_a max.	r_a max.	e	Y_1	Y_2	Y_0
630	4	736,8	8	15	644,6	765,4	3	0,12	5,51	8,21	5,39
	4	736,8	8	15	644,6	765,4	3	0,12	5,51	8,21	5,39
	4	734,2	8	15	645	765	3	0,17	3,95	5,88	3,86
	6	784,5	12,5	23,5	653	827	5	0,18	3,8	5,66	3,72
	7,5	837,8	12,5	23,5	658	892	6	0,21	3,24	4,82	3,16
	7,5	821,5	12,5	23,5	658	892	6	0,28	2,39	3,56	2,34
	7,5	896,2	12,5	23,5	662	998	6	0,31	2,21	3,29	2,16
	7,5	896,15	12,5	23,5	662	998	6	0,31	2,21	3,29	2,16
	7,5	872,2	12,5	23,5	662	998	6	0,38	1,78	2,65	1,74
	12	969,2	12,5	23,5	678	1 102	10	0,37	1,8	2,69	1,76
	12	969,2	12,5	23,5	678	1 102	10	0,37	1,8	2,69	1,76
670	4	777,2	8	15	684,6	805,4	3	0,12	5,72	8,51	5,59
	4	777,2	8	15	684,6	805,4	3	0,12	5,72	8,51	5,59
	4	775,2	8	15	684,6	805,4	3	0,16	4,22	6,29	4,13
	6	831,5	12,5	23,5	693	877	5	0,17	3,95	5,88	3,86
	6	831,5	12,5	23,5	693	877	5	0,17	3,95	5,88	3,86
	6	826,5	12,5	23,5	693	877	5	0,24	2,81	4,19	2,75
	6	826,5	12,5	23,5	693	877	5	0,24	2,81	4,19	2,75
	7,5	888,7	12,5	23,5	698	952	6	0,22	3,01	4,48	2,94
	7,5	888,7	12,5	23,5	698	952	6	0,22	3,01	4,48	2,94
	7,5	873,1	12,5	23,5	698	952	6	0,31	2,2	3,27	2,15
	7,5	873,1	12,5	23,5	698	952	6	0,31	2,2	3,27	2,15
	7,5	948,2	12,5	23,5	702	1 058	6	0,31	2,21	3,29	2,16
	7,5	948,15	12,5	23,5	702	1 058	6	0,31	2,21	3,29	2,16
	7,5	929,4	12,5	23,5	702	1 058	6	0,37	1,83	2,72	1,79
	7,5	929,4	12,5	23,5	702	1 058	6	0,37	1,83	2,72	1,79
	12	1 030,7	12,5	23,5	718	1 172	10	0,37	1,82	2,7	1,78
	12	1 030,7	12,5	23,5	718	1 172	10	0,37	1,82	2,7	1,78

Spherical roller bearings

With cylindrical or tapered bore



Solid cage, brass or steel; cylindrical bore

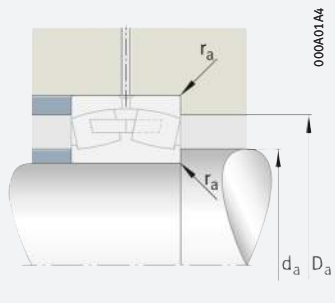


Solid cage, brass or steel; tapered bore

d = 710 – 750 mm

Main dimensions			Basic load ratings		Fatigue limit load	Limiting speed	Speed rating	Mass	Designation
d	D	B	dyn. C_r	stat. C_{0r}	C_{ur}	n_G	$n_{\vartheta r}$	m	➤*681|1.12* ➤*683|1.13*
			kN	kN	N	min^{-1}	min^{-1}	≈ kg	
710	870	118	2 650	7 500	540 000	770	355	148	**238/710-K-MB**
	870	118	2 650	7 500	540 000	770	355	153	**238/710-MB**
	870	160	3 700	11 000	780 000	610	175	215	**248/710-B-MB**
	950	180	4 800	12 100	720 000	670	350	336	**239/710-K-MB**
	950	180	4 800	12 100	720 000	670	350	355	**239/710-MB**
	950	243	6 600	16 900	1 060 000	550	159	488	**249/710-B-K30-MB**
	950	243	6 600	16 900	1 060 000	550	159	494	**249/710-B-MB**
	1 030	236	7 600	16 900	1 150 000	590	325	650	**230/710-B-K-MB**
	1 030	236	7 600	16 900	1 150 000	590	325	678	**230/710-B-MB**
	1 030	315	9 600	23 000	1 560 000	480	223	873	**240/710-B-K30-MB**
	1 030	315	9 600	23 000	1 560 000	480	223	903	**240/710-B-MB**
	1 150	345	12 500	27 000	1 790 000	470	207	1 417	**231/710-B-K-MB**
	1 150	345	12 500	27 000	1 790 000	470	207	1 450	**231/710-B-MB**
	1 150	438	15 600	35 500	2 290 000	395	116	1 791	**241/710-B-K30-MB**
	1 150	438	15 600	35 500	2 290 000	395	116	1 818	**241/710-B-MB**
	1 280	450	17 200	35 500	2 320 000	405	149	2 541	**232/710-B-K-MB**
	1 280	450	17 200	35 500	2 320 000	405	149	2 614	**232/710-B-MB**
750	920	128	3 000	8 700	600 000	720	330	180	**238/750-B-K-MB**
	920	128	3 000	8 700	600 000	720	330	186	**238/750-B-MB**
	920	170	4 150	12 500	740 000	570	160	254	**248/750-B-MB**
	1 000	185	5 200	13 000	790 000	640	325	394	**239/750-K-MB**
	1 000	185	5 200	13 000	790 000	640	325	426	**239/750-MB**
	1 000	250	7 200	18 900	1 170 000	510	143	558	**249/750-B-K30-MB**
	1 000	250	7 200	18 900	1 170 000	510	143	571	**249/750-B-MB**
	1 090	250	8 500	19 100	1 010 000	550	305	786	**230/750-K-MB**
	1 090	250	8 500	19 100	1 010 000	550	305	806	**230/750-MB**
	1 090	335	10 800	26 000	1 740 000	445	204	1 071	**240/750-B-K30-MB**
	1 090	335	10 800	26 000	1 740 000	445	204	1 057	**240/750-B-MB**
	1 220	365	14 100	30 500	1 970 000	445	189	1 700	**231/750-B-K-MB**
	1 220	365	14 100	30 500	1 970 000	445	189	1 754	**231/750-B-MB**
	1 220	475	17 800	41 000	2 600 000	360	104	2 298	**241/750-B-K30-MB**
	1 220	475	17 800	41 000	2 600 000	360	104	2 276	**241/750-B-MB**
	1 360	475	19 300	39 500	2 500 000	380	137	3 087	**232/750-B-K-MB**
	1 360	475	19 300	39 500	2 500 000	380	137	3 136	**232/750-B-MB**

medias ➤ *https://www.schaeffler.de/std/1EE0*

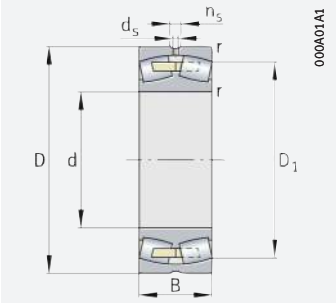


Mounting dimensions

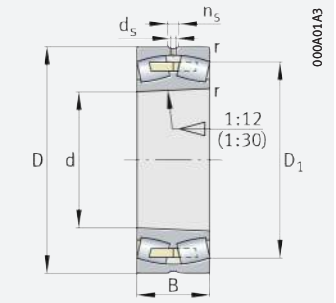
Dimensions					Mounting dimensions			Calculation factors			
d	r min.	D_1 ≈	d_s	n_s	d_a min.	D_a max.	r_a max.	e	Y_1	Y_2	Y_0
710	4	824,9	8	15	724,6	855,4	3	0,12	5,72	8,51	5,59
	4	824,9	8	15	724,6	855,4	3	0,12	5,72	8,51	5,59
	4	821,2	8	15	725	855	3	0,16	4,22	6,29	4,13
	6	877,5	12,5	23,5	733	927	5	0,18	3,85	5,73	3,76
	6	877,5	12,5	23,5	733	927	5	0,18	3,85	5,73	3,76
	6	871,7	12,5	23,5	733	927	5	0,24	2,81	4,19	2,75
	6	871,7	12,5	23,5	733	927	5	0,24	2,81	4,19	2,75
	7,5	938,8	12,5	23,5	738	1 002	6	0,22	3,07	4,57	3
	7,5	938,8	12,5	23,5	738	1 002	6	0,22	3,07	4,57	3
	7,5	921,6	12,5	23,5	738	1 002	6	0,3	2,26	3,37	2,21
	7,5	921,6	12,5	23,5	738	1 002	6	0,3	2,26	3,37	2,21
	9,5	1 006,6	12,5	23,5	750	1 110	8	0,3	2,25	3,34	2,2
	9,5	1 006,55	12,5	23,5	750	1 110	8	0,3	2,25	3,34	2,2
	9,5	980,2	12,5	23,5	750	1 110	8	0,38	1,79	2,67	1,75
	9,5	980,2	12,5	23,5	750	1 110	8	0,38	1,79	2,67	1,75
	12	1 088,4	12,5	23,5	758	1 232	10	0,37	1,83	2,72	1,79
	12	1 088,4	12,5	23,5	758	1 232	10	0,37	1,83	2,72	1,79
750	5	872,1	8	15	768	902	4	0,12	5,61	8,36	5,49
	5	872,1	8	15	768	902	4	0,12	5,61	8,36	5,49
	5	868,2	8	15	768	902	4	0,16	4,11	6,12	4,02
	6	923,2	12,5	23,5	773	977	5	0,17	3,95	5,88	3,86
	6	923,2	12,5	23,5	773	977	5	0,17	3,95	5,88	3,86
	6	921,7	12,5	23,5	773	977	5	0,22	3,1	4,62	3,03
	6	921,7	12,5	23,5	773	977	5	0,22	3,1	4,62	3,03
	7,5	990,9	12,5	23,5	778	1 062	6	0,22	3,01	4,48	2,94
	7,5	990,9	12,5	23,5	778	1 062	6	0,22	3,01	4,48	2,94
	7,5	976,2	12,5	23,5	778	1 062	6	0,3	2,26	3,37	2,21
	7,5	976,2	12,5	23,5	778	1 062	6	0,3	2,26	3,37	2,21
	9,5	1 067,4	12,5	23,5	790	1 180	8	0,29	2,3	3,42	2,25
	9,5	1 067,37	12,5	23,5	790	1 180	8	0,29	2,3	3,42	2,25
	9,5	1 035,8	12,5	23,5	790	1 180	8	0,38	1,76	2,62	1,72
	9,5	1 035,8	12,5	23,5	790	1 180	8	0,38	1,76	2,62	1,72
	15	1 154,1	12,5	23,5	808	1 302	12	0,37	1,83	2,72	1,79
	15	1 154,1	12,5	23,5	808	1 302	12	0,37	1,83	2,72	1,79

Spherical roller bearings

With cylindrical or tapered bore



Solid cage, brass or steel; cylindrical bore

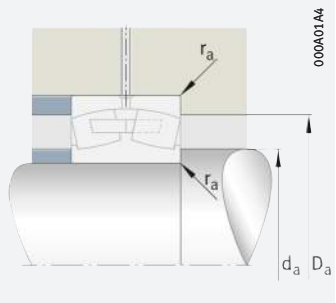


Solid cage, brass or steel; tapered bore

d = 800 – 850 mm

Main dimensions			Basic load ratings		Fatigue limit load	Limiting speed	Speed rating	Mass	Designation
d	D	B	dyn. C_r	stat. C_{0r}	C_{ur}	n_G	$n_{\vartheta r}$	m	➤*681|1.12* ➤*683|1.13*
			kN	kN	N	min^{-1}	min^{-1}	≈ kg	
800	980	136	3 400	9 900	680 000	660	305	216	**238/800-B-K-MB**
	980	136	3 400	9 900	680 000	660	305	223	**238/800-B-MB**
	980	180	4 650	14 000	830 000	540	146	301	**248/800-B-MB**
	1 060	195	5 900	15 100	1 010 000	580	295	490	**239/800-B-K-MB**
	1 060	195	5 900	15 100	1 010 000	580	295	506	**239/800-B-MB**
	1 060	258	7 700	20 300	1 360 000	480	133	639	**249/800-B-K30-MB**
	1 060	258	7 700	20 300	1 360 000	480	133	650	**249/800-B-MB**
	1 150	258	9 300	21 200	1 420 000	530	280	877	**230/800-K-MB**
	1 150	258	9 300	21 200	1 420 000	530	280	899	**230/800-MB**
	1 150	345	11 600	28 500	1 790 000	420	188	1 186	**240/800-B-K30-MB**
	1 150	345	11 600	28 500	1 790 000	420	188	1 199	**240/800-B-MB**
	1 280	375	14 900	33 500	1 660 000	415	175	1 861	**231/800-K-MB**
	1 280	375	14 900	33 500	1 660 000	415	175	1 968	**231/800-MB**
	1 280	475	18 700	43 500	2 430 000	345	96	2 530	**241/800-B-K30-MB**
	1 280	475	18 700	43 500	2 430 000	345	96	2 530	**241/800-B-MB**
	1 420	488	20 000	41 500	1 540 000	365	130	3 325	**232/800-K-MB**
	1 420	488	20 000	41 500	1 540 000	365	130	3 377	**232/800-MB**
850	1 030	136	3 500	10 600	710 000	620	285	228	**238/850-K-MB**
	1 030	136	3 500	10 600	710 000	620	285	236	**238/850-MB**
	1 030	180	4 850	14 900	880 000	510	135	312	**248/850-MB**
	1 120	200	6 300	16 400	960 000	550	275	554	**239/850-K-MB**
	1 120	200	6 300	16 400	960 000	550	275	579	**239/850-MB**
	1 120	272	8 400	22 500	1 370 000	445	123	743	**249/850-B-K30-MB**
	1 120	272	8 400	22 500	1 370 000	445	123	756	**249/850-B-MB**
	1 220	272	10 300	23 800	1 540 000	490	255	1 035	**230/850-B-K-MB**
	1 220	272	10 300	23 800	1 540 000	490	255	1 078	**230/850-B-MB**
	1 220	365	12 800	32 000	2 060 000	390	173	1 415	**240/850-B-K30-MB**
	1 220	365	12 800	32 000	2 060 000	390	173	1 438	**240/850-B-MB**
	1 360	400	16 100	36 000	2 290 000	385	164	2 245	**231/850-B-K-MB**
	1 360	400	16 100	36 000	2 290 000	385	164	2 396	**231/850-B-MB**
	1 360	500	21 200	48 500	3 050 000	330	88	2 836	**241/850-B-K30-MB**
	1 360	500	21 200	48 500	3 050 000	330	88	2 948	**241/850-B-MB**

medias ➤ *https://www.schaeffler.de/std/1EE1*

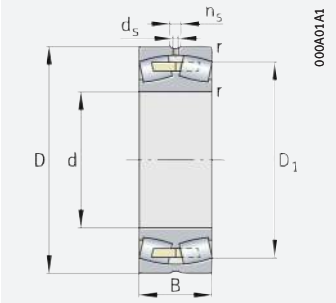


Mounting dimensions

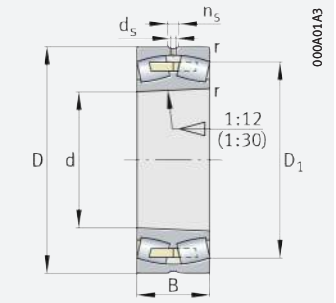
Dimensions					Mounting dimensions			Calculation factors			
d	r min.	D_1 ≈	d_s	n_s	d_a min.	D_a max.	r_a max.	e	Y_1	Y_2	Y_0
800	5	927,6	8	15	818	962	4	0,12	5,72	8,51	5,59
	5	927,6	8	15	818	962	4	0,12	5,72	8,51	5,59
	5	925,4	8	15	818	962	4	0,16	4,11	6,12	4,02
	6	983,7	12,5	23,5	823	1 037	5	0,17	4,05	6,04	3,96
	6	983,7	12,5	23,5	823	1 037	5	0,17	4,05	6,04	3,96
	6	978,6	12,5	23,5	823	1 037	5	0,23	2,98	4,44	2,92
	6	978,6	12,5	23,5	823	1 037	5	0,23	2,98	4,44	2,92
	7,5	1 050,9	12,5	23,5	828	1 122	6	0,22	3,07	4,57	3
	7,5	1 050,9	12,5	23,5	828	1 122	6	0,22	3,07	4,57	3
	7,5	1 034,1	12,5	23,5	828	1 122	6	0,29	2,33	3,47	2,28
	7,5	1 034,1	12,5	23,5	828	1 122	6	0,29	2,33	3,47	2,28
	9,5	1 119,1	12,5	23,5	840	1 240	8	0,29	2,32	3,45	2,26
	9,5	1 119,05	12,5	23,5	840	1 240	8	0,29	2,32	3,45	2,26
	9,5	1 099,5	12,5	23,5	840	1 240	8	0,36	1,86	2,77	1,82
	9,5	1 099,5	12,5	23,5	840	1 240	8	0,36	1,86	2,77	1,82
	15	1 211,4	12,5	23,5	858	1 362	12	0,36	1,87	2,79	1,83
	15	1 211,4	12,5	23,5	858	1 362	12	0,36	1,87	2,79	1,83
850	5	978,1	8	15	868	1 012	4	0,11	6,06	9,02	5,92
	5	978,1	8	15	868	1 012	4	0,11	6,06	9,02	5,92
	5	973,9	8	15	868	1 012	4	0,15	4,4	6,56	4,31
	6	1 039,9	12,5	23,5	873	1 097	5	0,16	4,11	6,12	4,02
	6	1 039,9	12,5	23,5	873	1 097	5	0,16	4,11	6,12	4,02
	6	1 033,9	12,5	23,5	873	1 097	5	0,23	2,98	4,44	2,92
	6	1 033,9	12,5	23,5	873	1 097	5	0,23	2,98	4,44	2,92
	7,5	1 113,5	12,5	23,5	878	1 192	6	0,21	3,24	4,82	3,16
	7,5	1 113,5	12,5	23,5	878	1 192	6	0,21	3,24	4,82	3,16
	7,5	1 092,9	12,5	23,5	878	1 192	6	0,29	2,33	3,47	2,28
	7,5	1 092,9	12,5	23,5	878	1 192	6	0,29	2,33	3,47	2,28
	12	1 197,2	12,5	23,5	898	1 312	10	0,29	2,35	3,5	2,3
	12	1 197,2	12,5	23,5	898	1 312	10	0,29	2,35	3,5	2,3
	12	1 171,7	12,5	23,5	898	1 312	10	0,36	1,89	2,81	1,84
	12	1 171,7	12,5	23,5	898	1 312	10	0,36	1,89	2,81	1,84

Spherical roller bearings

With cylindrical or tapered bore



Solid cage, brass or steel; cylindrical bore

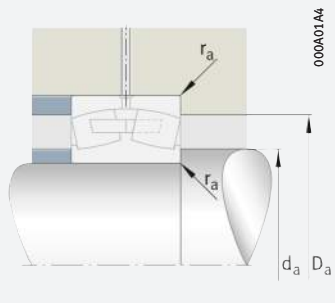


Solid cage, brass or steel; tapered bore

d = 900 – 950 mm

Main dimensions			Basic load ratings		Fatigue limit load	Limiting speed	Speed rating	Mass	Designation
d	D	B	dyn. C_r	stat. C_{0r}	C_{ur}	n_G	$n_{\vartheta r}$	m	➤*681*|*1.12* ➤*683*|*1.13*
			kN	kN	N	min^{-1}	min^{-1}	≈ kg	
900	1 090	140	3 750	11 600	760 000	590	260	262	**238/900-B-K-MB**
	1 090	140	3 750	11 600	760 000	590	260	271	**238/900-B-MB**
	1 090	190	5 200	16 700	960 000	465	124	382	**248/900-B-MB**
	1 180	206	6 500	17 200	1 010 000	520	260	641	**239/900-K-MB**
	1 180	206	6 500	17 200	1 010 000	520	260	653	**239/900-MB**
	1 280	280	11 100	26 500	1 620 000	455	235	1 153	**230/900-B-K-MB**
	1 280	280	11 100	26 500	1 620 000	455	235	1 228	**230/900-B-MB**
	1 280	375	14 200	36 500	2 220 000	365	155	1 569	**240/900-B-K30-MB**
	1 280	375	14 200	36 500	2 220 000	365	155	1 595	**240/900-B-MB**
	1 420	412	18 000	40 500	2 550 000	365	149	2 469	**231/900-B-K-MB**
	1 420	412	18 000	40 500	2 550 000	365	149	2 570	**231/900-B-MB**
	1 420	515	22 300	53 000	2 900 000	310	81	3 130	**241/900-B-FB1**
	1 420	515	22 300	53 000	2 900 000	310	81	3 130	**241/900-B-K30-FB1**
950	1 150	200	5 700	18 500	1 030 000	430	114	431	**248/950-MB**
	1 250	224	7 500	19 900	1 280 000	475	239	747	**239/950-B-K-MB**
	1 250	224	7 500	19 900	1 280 000	475	239	769	**239/950-B-MB**
	1 250	300	10 300	28 500	1 700 000	385	101	1 013	**249/950-B-K30-MB**
	1 250	300	10 300	28 500	1 700 000	385	101	1 031	**249/950-B-MB**
	1 360	300	12 300	29 500	1 800 000	425	218	1 421	**230/950-B-K-MB**
	1 360	300	12 300	29 500	1 800 000	425	218	1 493	**230/950-B-MB**
	1 360	412	16 200	42 000	2 550 000	335	142	1 973	**240/950-B-K30-MB**
	1 360	412	16 200	42 000	2 550 000	335	142	1 993	**240/950-B-MB**
	1 500	545	23 700	54 000	3 100 000	300	81	3 777	**241/950-B-K30-MB**
	1 500	545	23 700	54 000	3 100 000	300	81	3 819	**241/950-B-MB**

medias ➤ *https://www.schaeffler.de/std/1EE2*

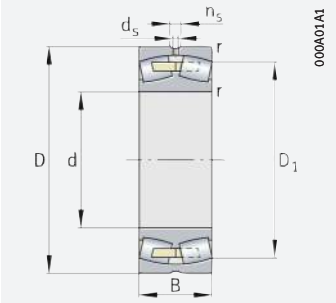


Mounting dimensions

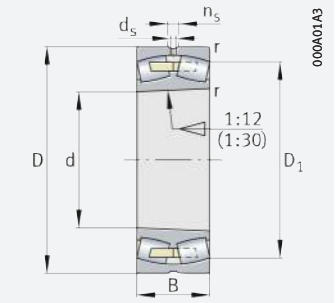
Dimensions					Mounting dimensions			Calculation factors			
d	r min.	D_1 ≈	d_s	n_s	d_a min.	D_a max.	r_a max.	e	Y_1	Y_2	Y_0
900	5	1 036,1	8	15	918	1 072	4	0,11	6,06	9,02	5,92
	5	1 036,1	8	15	918	1 072	4	0,11	6,06	9,02	5,92
	5	1 030,5	8	15	918	1 072	4	0,15	4,4	6,56	4,31
	6	1 098,8	12,5	23,5	923	1 157	5	0,16	4,28	6,37	4,19
	6	1 098,8	12,5	23,5	923	1 157	5	0,16	4,28	6,37	4,19
	7,5	1 171,3	12,5	23,5	928	1 252	6	0,22	3,14	4,67	3,07
	7,5	1 171,3	12,5	23,5	928	1 252	6	0,22	3,14	4,67	3,07
	7,5	1 150,7	12,5	23,5	928	1 252	6	0,28	2,45	3,64	2,39
	7,5	1 150,7	12,5	23,5	928	1 252	6	0,28	2,45	3,64	2,39
	12	1 252,4	12,5	23,5	948	1 372	10	0,29	2,33	3,47	2,28
	12	1 252,35	12,5	23,5	948	1 372	10	0,29	2,33	3,47	2,28
	12	1 230,4	12,5	23,5	948	1 372	10	0,35	1,91	2,85	1,87
	12	1 230,4	12,5	23,5	948	1 372	10	0,35	1,91	2,85	1,87
950	5	1 087,2	8	15	968	1 132	4	0,15	4,4	6,56	4,31
	7,5	1 162,5	12,5	23,5	978	1 222	6	0,16	4,22	6,29	4,13
	7,5	1 162,5	12,5	23,5	978	1 222	6	0,16	4,22	6,29	4,13
	7,5	1 155	12,5	23,5	978	1 222	6	0,22	3,01	4,48	2,94
	7,5	1 155	12,5	23,5	978	1 222	6	0,22	3,01	4,48	2,94
	7,5	1 244,7	12,5	23,5	978	1 332	6	0,22	3,14	4,67	3,07
	7,5	1 244,7	12,5	23,5	978	1 332	6	0,22	3,14	4,67	3,07
	7,5	1 216	12,5	23,5	978	1 332	6	0,28	2,37	3,53	2,32
	7,5	1 216	12,5	23,5	978	1 332	6	0,28	2,37	3,53	2,32
	12	1 306,7	12,5	23,5	998	1 452	10	0,36	1,87	2,79	1,83
	12	1 306,7	12,5	23,5	998	1 452	10	0,36	1,87	2,79	1,83

Spherical roller bearings

With cylindrical or tapered bore



Solid cage, brass or steel; cylindrical bore

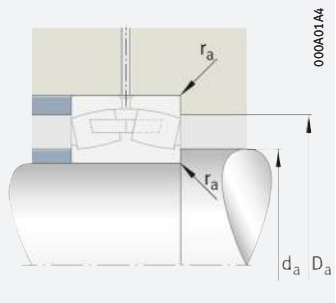


Solid cage, brass or steel; tapered bore

d = 1 000 – 1 120 mm

Main dimensions			Basic load ratings		Fatigue limit load	Limiting speed	Speed rating	Mass	Designation
d	D	B	dyn. C_r	stat. C_{0r}	C_{ur}	n_G	$n_{\vartheta r}$	m	➤*681|1.12* ➤*683|1.13*
			kN	kN	N	min^{-1}	min^{-1}	≈ kg	
1 000	1 220	165	4 900	14 900	960 000	510	231	399	**238/1000-K-MB**
	1 220	165	4 900	14 900	960 000	510	231	413	**238/1000-MB**
	1 220	218	6 700	21 500	1 210 000	405	104	546	**248/1000-B-MB**
	1 320	315	11 400	31 000	1 850 000	370	95	1 192	**249/1000-B-K30-MB**
	1 320	315	11 400	31 000	1 850 000	370	95	1 212	**249/1000-B-MB**
	1 420	308	13 100	31 500	1 580 000	405	206	1 590	**230/1000-K-MB**
	1 420	308	13 100	31 500	1 580 000	405	206	1 590	**230/1000-MB**
	1 420	412	16 400	42 000	2 550 000	330	138	2 073	**240/1000-B-K30-MB**
	1 420	412	16 400	42 000	2 550 000	330	138	2 108	**240/1000-B-MB**
	1 580	462	22 000	51 000	3 150 000	320	126	3 474	**231/1000-B-K-MB**
	1 580	462	22 000	51 000	3 150 000	320	126	3 474	**231/1000-B-MB**
	1 580	580	27 500	64 000	3 950 000	275	70	4 379	**241/1000-B-K30-MB**
	1 580	580	27 500	64 000	3 950 000	275	70	4 429	**241/1000-B-MB**
1 060	1 280	165	5 100	16 100	980 000	480	213	421	**238/1060-B-K-MB**
	1 280	165	5 100	16 100	980 000	480	213	435	**238/1060-B-MB**
	1 280	218	7 000	22 700	1 270 000	385	97	599	**248/1060-B-MB**
	1 400	250	9 900	26 000	1 420 000	420	202	1 060	**239/1060-K-MB1**
	1 400	250	9 900	26 000	1 420 000	420	202	1 081	**239/1060-MB1**
	1 400	335	12 900	36 000	2 240 000	345	84	1 411	**249/1060-B-K30-MB**
	1 400	335	12 900	36 000	2 240 000	345	84	1 436	**249/1060-B-MB**
	1 500	325	13 700	34 000	2 110 000	375	193	1 896	**230/1060-B-MB**
	1 500	438	18 800	49 500	2 950 000	295	122	2 483	**240/1060-B-K30-MB**
	1 500	438	18 800	49 500	2 950 000	295	122	2 524	**240/1060-B-MB**
1 120	1 360	243	8 000	26 000	1 460 000	365	90	791	**248/1120-B-MB**
	1 460	335	12 800	35 500	2 180 000	340	83	1 518	**249/1120-B-K30-MB**
	1 460	335	12 800	35 500	2 180 000	340	83	1 545	**249/1120-B-MB**
	1 580	345	14 900	37 500	2 250 000	350	181	2 210	**230/1120-B-MB**
	1 580	462	20 900	55 000	3 250 000	280	113	2 889	**240/1120-B-K30-MB**
	1 580	462	20 900	55 000	3 250 000	280	113	2 924	**240/1120-B-MB**

medias ➤ *https://www.schaeffler.de/std/1EE3*

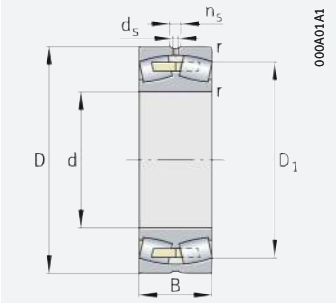


Mounting dimensions

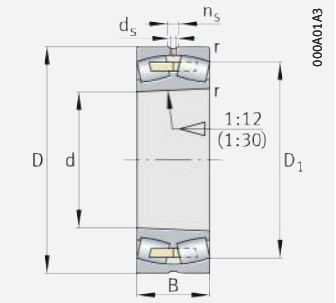
Dimensions					Mounting dimensions			Calculation factors			
d	r min.	D_1 ≈	d_s	n_s	d_a min.	D_a max.	r_a max.	e	Y_1	Y_2	Y_0
1 000	6	1 158	9,5	17,7	1 023	1 197	5	0,12	5,72	8,51	5,59
	6	1 158	9,5	17,7	1 023	1 197	5	0,12	5,72	8,51	5,59
	6	1 151,4	9,5	17,7	1 023	1 197	5	0,16	4,28	6,37	4,19
	7,5	1 218,4	12,5	23,5	1 028	1 292	6	0,22	3,01	4,48	2,94
	7,5	1 218,4	12,5	23,5	1 028	1 292	6	0,22	3,01	4,48	2,94
	7,5	1 300,3	12,5	23,5	1 028	1 392	6	0,21	3,2	4,77	3,13
	7,5	1 300,3	12,5	23,5	1 028	1 392	6	0,21	3,2	4,77	3,13
	7,5	1 278,3	12,5	23,5	1 028	1 392	6	0,28	2,41	3,59	2,35
	7,5	1 278,3	12,5	23,5	1 028	1 392	6	0,28	2,41	3,59	2,35
	12	1 391,8	12,5	23,5	1 048	1 532	10	0,29	2,33	3,47	2,28
	12	1 391,78	12,5	23,5	1 048	1 532	10	0,29	2,33	3,47	2,28
	12	1 372,6	12,5	23,5	1 048	1 532	10	0,35	1,91	2,85	1,87
	12	1 372,6	12,5	23,5	1 048	1 532	10	0,35	1,91	2,85	1,87
1 060	6	1 218,6	9,5	17,7	1 083	1 257	5	0,11	6,18	9,2	6,04
	6	1 218,6	9,5	17,7	1 083	1 257	5	0,11	6,18	9,2	6,04
	6	1 212,7	9,5	17,7	1 083	1 257	5	0,15	4,54	6,75	4,43
	7,5	1 307,6	12,5	23,5	1 088	1 372	6	0,17	4,05	6,04	3,96
	7,5	1 307,6	12,5	23,5	1 088	1 372	6	0,17	4,05	6,04	3,96
	7,5	1 290,7	12,5	23,5	1 088	1 372	6	0,21	3,17	4,72	3,1
	7,5	1 290,7	12,5	23,5	1 088	1 372	6	0,21	3,17	4,72	3,1
	9,5	1 374,6	12,5	23,5	1 094	1 466	8	0,2	3,38	5,03	3,3
	9,5	1 353,5	12,5	23,5	1 094	1 466	8	0,27	2,47	3,67	2,41
	9,5	1 353,5	12,5	23,5	1 094	1 466	8	0,27	2,47	3,67	2,41
1 120	6	1 285	9,5	17,7	1 143	1 337	5	0,15	4,47	6,65	4,37
	7,5	1 352,6	12,5	23,5	1 148	1 432	6	0,21	3,27	4,87	3,2
	7,5	1 352,6	12,5	23,5	1 148	1 432	6	0,21	3,27	4,87	3,2
	9,5	1 445,4	12,5	23,5	1 154	1 546	8	0,2	3,42	5,09	3,34
	9,5	1 429,7	12,5	23,5	1 154	1 546	8	0,28	2,45	3,64	2,39
	9,5	1 429,7	12,5	23,5	1 154	1 546	8	0,28	2,45	3,64	2,39

Spherical roller bearings

With cylindrical or tapered bore



Solid cage, brass or steel; cylindrical bore

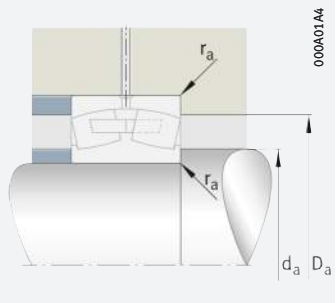


Solid cage, brass or steel; tapered bore

d = 1 180 – 1 800 mm

Main dimensions			Basic load ratings		Fatigue limit load	Limiting speed	Speed rating	Mass	Designation
d	D	B	dyn. C_r	stat. C_{0r}	C_{ur}	n_G	$n_{\vartheta r}$	m	➤*681|1.12* ➤*683|1.13*
			kN	kN	N	min^{-1}	min^{-1}	≈ kg	
1 180	1 420	180	6 000	19 200	1 110 000	430	187	556	**238/1180-B-K-MB**
	1 420	180	6 000	19 200	1 110 000	430	187	576	**238/1180-B-MB**
	1 420	243	8 400	28 000	1 540 000	335	83	790	**248/1180-B-MB**
	1 540	272	11 300	31 000	1 770 000	370	177	1 340	**239/1180-B-K-MB**
	1 540	272	11 300	31 000	1 770 000	370	177	1 385	**239/1180-B-MB**
	1 540	355	14 700	42 000	2 400 000	305	73	1 751	**249/1180-B-K30-MB**
	1 540	355	14 700	42 000	2 400 000	305	73	1 788	**249/1180-B-MB**
	1 660	355	16 600	42 000	2 470 000	330	166	2 513	**230/1180-B-MB**
1 250	1 500	250	9 000	30 500	1 220 000	320	76	918	**248/1250-B-MB**
	1 630	375	16 000	45 500	2 700 000	295	69	2 096	**249/1250-B-K30-MB**
	1 630	375	16 000	45 500	2 700 000	295	69	2 132	**249/1250-B-MB**
	1 750	375	18 100	46 500	2 700 000	310	154	2 923	**230/1250-B-K-MB**
	1 750	375	18 100	46 500	2 700 000	310	154	2 933	**230/1250-B-MB**
1 320	1 600	280	10 300	35 000	1 900 000	295	71	1 235	**248/1320-B-MB**
	1 720	400	17 600	52 000	2 370 000	265	62	2 515	**249/1320-B-K30-MB**
	1 720	400	17 600	52 000	2 370 000	265	62	2 558	**249/1320-B-MB**
1 400	1 700	300	12 100	41 000	2 220 000	270	63	1 470	**248/1400-B-MB**
1 500	1 820	315	13 000	44 500	2 380 000	255	58	1 660	**248/1500-B-MB**
1 600	1 950	345	16 000	54 000	3 000 000	240	51	2 222	**248/1600-B-MB**
1 700	2 060	355	17 100	60 000	2 850 000	218	46	2 573	**248/1700-MB**
1 800	2 180	375	18 700	67 000	3 400 000	201	42	2 992	**248/1800-B-MB**

medias ➤ *https://www.schaeffler.de/std/1EE4*

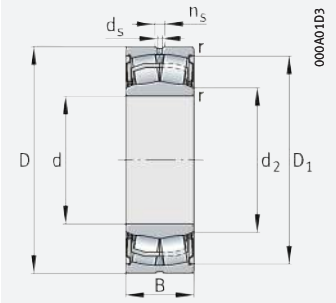


Mounting dimensions

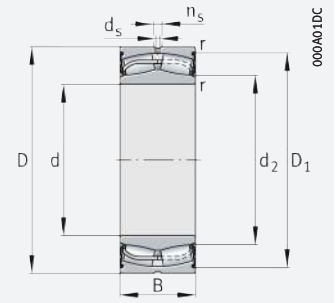
Dimensions					Mounting dimensions			Calculation factors			
d	r min.	D_1 ≈	d_s	n_s	d_a min.	D_a max.	r_a max.	e	Y_1	Y_2	Y_0
1 180	6	1 353,9	9,5	17,7	1 203	1 397	5	0,11	6,18	9,2	6,04
	6	1 353,9	9,5	17,7	1 203	1 397	5	0,11	6,18	9,2	6,04
	6	1 345	9,5	17,7	1 203	1 397	5	0,15	4,54	6,75	4,43
	7,5	1 438,3	12,5	23,5	1 208	1 512	6	0,17	4,05	6,04	3,96
	7,5	1 438,3	12,5	23,5	1 208	1 512	6	0,17	4,05	6,04	3,96
	7,5	1 428,9	12,5	23,5	1 208	1 512	6	0,22	3,14	4,67	3,07
	7,5	1 428,9	12,5	23,5	1 208	1 512	6	0,22	3,14	4,67	3,07
	9,5	1 522,2	12,5	23,5	1 214	1 626	8	0,21	3,27	4,87	3,2
1 250	6	1 423,5	9,5	17,7	1 273	1 477	5	0,14	4,67	6,96	4,57
	7,5	1 510,5	12,5	23,5	1 278	1 602	6	0,21	3,24	4,82	3,16
	7,5	1 510,5	12,5	23,5	1 278	1 602	6	0,21	3,24	4,82	3,16
	9,5	1 607,6	12,5	23,5	1 284	1 716	8	0,2	3,34	4,98	3,27
	9,5	1 607,6	12,5	23,5	1 284	1 716	8	0,2	3,34	4,98	3,27
1 320	7,5	1 512,8	12,5	23,5	1 343	1 577	5	0,15	4,4	6,56	4,31
	7,5	1 595,5	12,5	23,5	1 348	1 640	6	0,22	3,1	4,62	3,03
	7,5	1 595,5	12,5	23,5	1 348	1 640	6	0,22	3,1	4,62	3,03
1 400	7,5	1 606,9	12,5	23,5	1 428	1 672	6	0,16	4,34	6,47	4,25
1 500	7,5	1 722,1	12,5	23,5	1 528	1 792	6	0,15	4,47	6,65	4,37
1 600	7,5	1 846,9	12,5	23,5	1 628	1 922	6	0,15	4,54	6,75	4,43
1 700	7,5	1 946,7	12,5	23,5	1 728	2 032	6	0,15	4,47	6,65	4,37
1 800	9,5	2 060	12,5	23,5	1 834	2 146	8	0,15	4,47	6,65	4,37

Spherical roller bearings

Sealed



D ≦ 160 mm
with seal 2RSR

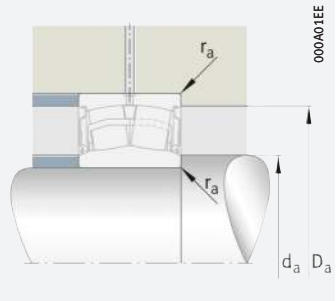


160 mm < D ≦ 320 mm
with seal 2VSR

d = 25 – 140 mm

Main dimensions			Basic load ratings		Fatigue limit load	Limiting speed	Mass	Designation
d	D	B	dyn. C_r	stat. C_{0r}	C_{ur}	n_G	m	➤*681*|*1.12* ➤*683*|*1.13* X-life ➤*671*
			kN	kN	N	min^{-1}	≈ kg	
25	52	23	48,5	42,5	4 800	3 600	0,235	**WS22205-E1-XL-2RSR**
30	62	25	64	57	6 900	3 150	0,4	**WS22206-E1-XL-2RSR**
35	72	28	89	81	9 400	2 700	0,6	**WS22207-E1-XL-2RSR**
40	80	28	101	91	11 800	2 600	0,7	**WS22208-E1-XL-2RSR**
	90	38	156	149	13 100	1 890	1,16	**WS22308-E1-XL-2RSR**
45	85	28	104	99	12 700	2 550	0,67	**WS22209-E1-XL-2RSR**
50	90	28	109	107	14 300	2 440	0,8	**WS22210-E1-XL-2RSR**
55	100	31	129	130	17 300	2 250	1,1	**WS22211-E1-XL-2RSR**
	120	49	265	260	23 900	1 460	2,9	**WS22311-E1-XL-2RSR**
60	110	34	160	155	20 200	2 030	1,5	**WS22212-E1-XL-2RSR**
	130	53	310	310	28 000	1 350	3,4	**WS22312-E1-XL-2RSR**
65	120	38	202	210	25 500	1 740	2	**WS22213-E1-XL-2RSR**
70	125	38	211	226	28 000	1 670	2,1	**WS22214-E1-XL-2RSR**
	150	60	390	390	36 500	1 210	5,4	**WS22314-E1-XL-2RSR**
75	130	38	216	237	29 500	1 630	2,2	**WS22215-E1-XL-2RSR**
80	140	40	250	270	33 500	1 540	2,7	**WS22216-E1-XL-2RSR**
85	150	44	305	325	38 000	1 420	3,4	**WS22217-E1-XL-2RSR**
90	160	48	345	375	42 500	1 300	4,3	**WS22218-E1-XL-2RSR**
100	180	55	430	475	52 000	1 140	6,3	**WS22220-E1-XL-2RSR**
110	180	69	530	750	84 000	830	6,8	**24122-BE-XL-2VSR**
	200	63	550	600	62 000	1 020	9	**WS22222-E1-XL-2RSR**
120	180	60	450	690	84 000	860	5,6	**24024-BE-XL-2VSR**
	200	80	680	950	101 000	740	10,4	**24124-BE-XL-2VSR**
	215	69	640	740	71 000	920	11,3	**WS22224-E1-XL-2RSR**
130	200	69	570	860	100 000	780	8,4	**24026-BE-XL-2VSR**
	210	80	710	1 050	109 000	700	11	**24126-BE-XL-2VSR**
	230	75	760	890	79 000	840	12,8	**WS22226-E1-XL-2RSR**
140	210	69	590	930	108 000	740	8,4	**24028-BE-XL-2VSR**
	225	85	800	1 190	124 000	660	13,8	**24128-BE-XL-2VSR**

medias ➤ *https://www.schaeffler.de/std/1EE5*

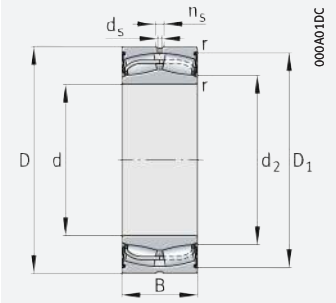


Mounting dimensions

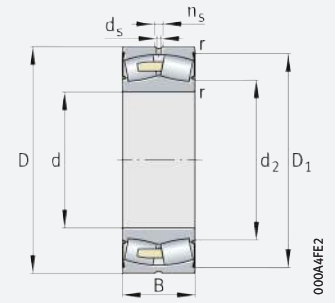
Dimensions						Mounting dimensions			Calculation factors			
d	r min.	D_1 ≈	d_2 ≈	d_s	n_s	d_a min.	D_a max.	r_a max.	e	Y_1	Y_2	Y_0
25	1	46,1	29,8	3,2	4,8	29,8	46,4	1	0,33	2,07	3,09	2,03
30	1	55,5	35	3,2	4,8	35	56,4	1	0,3	2,26	3,37	2,21
35	1,1	64,2	40,1	3,2	4,8	40,1	65	1	0,31	2,21	3,29	2,16
40	1,1	72,6	45,9	3,2	4,8	45,9	73	1	0,27	2,49	3,71	2,43
	1,5	78,1	48,9	3,2	6,5	48,9	81	1,5	0,36	1,86	2,77	1,82
45	1,1	77,8	51,4	3,2	4,8	51,4	78	1	0,25	2,74	4,08	2,68
50	1,1	83,1	56	3,2	4,8	56	83,1	1	0,23	2,95	4,4	2,89
55	1,5	91,9	63,5	3,2	4,8	63,5	91,9	1,5	0,21	3,17	4,72	3,1
	2	104,1	64,8	3,2	6,5	64,8	109	2	0,36	1,89	2,81	1,84
60	1,5	100,7	67,6	3,2	6,5	67,6	101	1,5	0,23	2,98	4,44	2,92
	2,1	110,2	71,4	3,2	6,5	71,4	118	2,1	0,35	1,91	2,85	1,87
65	1,5	110,2	76,2	3,2	6,5	76,2	111	1,5	0,24	2,81	4,19	2,75
70	1,5	113,5	82,5	3,2	6,5	82,5	116	1,5	0,23	2,95	4,4	2,89
	2,1	130,4	80,7	4,8	9,5	80,7	138	2,1	0,34	2	2,98	1,96
75	1,5	120,2	85,6	3,2	6,5	84	121	1,5	0,22	3,1	4,62	3,03
80	2	128,6	91,3	3,2	6,5	91	129	2	0,22	3,14	4,67	3,07
85	2	137,1	96,5	3,2	6,5	96	139	2	0,22	3,04	4,53	2,97
90	2	146,7	101,4	3,2	6,5	101	149	2	0,23	2,9	4,31	2,83
100	2,1	169,1	115	4,8	9,5	112	169,1	2,1	0,24	2,84	4,23	2,78
110	2	167,1	120,8	3,2	6,5	121	169	2	0,34	1,96	2,92	1,92
	2,1	182,6	124,9	4,8	9,5	122	188	2,1	0,25	2,71	4,04	2,65
120	2	170,5	131	3,2	6,5	128,8	171,2	2	0,29	2,33	3,47	2,28
	2	184,5	131,1	3,2	6,5	131	189	2	0,37	1,84	2,74	1,8
	2,1	203,4	136,8	6,3	12,2	132	203,4	2,1	0,25	2,71	4,04	2,65
130	2	187,2	142,1	3,2	6,5	138,8	191,2	2	0,31	2,21	3,29	2,16
	2	196,1	143,1	3,2	6,5	141	199	2	0,34	1,98	2,94	1,93
	3	217,5	146,6	6,3	12,2	144	217,5	2,5	0,26	2,62	3,9	2,56
140	2	198,5	153,3	3,2	6,5	148,8	201,2	2	0,28	2,37	3,53	2,32
	2,1	209,9	153,5	4,8	9,5	152	213	2,1	0,34	1,99	2,96	1,94

Spherical roller bearings

Sealed



160 mm < D ≦ 320 mm
with seal 2VSR

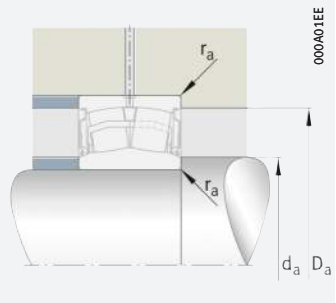


320 mm < D ≦ 620 mm
with seal 2RSR

d = 150 – 380 mm

Main dimensions			Basic load ratings		Fatigue limit load	Limiting speed	Mass	Designation
d	D	B	dyn. C_r	stat. C_{0r}	C_{ur}	n_G	m	➤*681* | *1.12* ➤*683* | *1.13* X-life ➤*671*
			kN	kN	N	min^{-1}	≈ kg	
150	225	75	680	1 090	122 000	690	11,1	**24030-BE-XL-2VSR**
	250	100	1 050	1 520	148 000	590	20,6	**24130-BE-XL-2VSR**
160	240	80	770	1 240	137 000	640	12,7	**24032-BE-XL-2VSR**
	270	109	1 220	1 800	168 000	540	25,4	**24132-BE-XL-2VSR**
170	260	90	940	1 480	158 000	600	17,2	**24034-BE-XL-2VSR**
	280	109	1 260	1 900	179 000	530	26,4	**24134-BE-XL-2VSR**
180	280	100	1 130	1 770	180 000	550	22,7	**24036-BE-XL-2VSR**
	300	118	1 460	2 170	203 000	500	33,2	**24136-BE-XL-2VSR**
190	290	100	1 160	1 860	192 000	540	23,7	**24038-BE-XL-2VSR**
	320	128	1 680	2 550	226 000	460	41,5	**24138-BE-XL-2VSR**
200	340	112	1 620	2 270	188 000	510	41,5	**23140-BE-XL-2RSR**
	310	109	1 350	2 150	215 000	500	30,1	**24040-BE-XL-2VSR**
	340	140	1 880	2 800	250 000	445	49,5	**24140-BE-XL-2VSR**
220	370	120	1 860	2 700	217 000	465	52,2	**23144-BE-XL-2RSR**
	370	150	2 190	3 250	290 000	410	64	**24144-BE-XL-2VSR**
240	400	128	2 140	3 150	249 000	425	64	**23148-BE-XL-2RSR**
260	440	144	2 600	3 900	290 000	375	90	**23152-BE-XL-2RSR**
280	460	146	2 750	4 200	315 000	355	96,3	**23156-BE-XL-2RSR**
300	500	160	3 250	4 950	365 000	325	130	**23160-BEA-XL-2RSR-MB1**
320	540	176	3 800	5 900	415 000	290	165	**23164-BEA-XL-2RSR-MB1**
340	580	190	4 400	6 600	470 000	270	210	**23168-BEA-XL-2RSR-MB1**
360	600	192	4 550	7 100	495 000	260	222	**23172-BEA-XL-2RSR-MB1**
380	620	194	4 750	7 600	530 000	248	234	**23176-BEA-XL-2RSR-MB1**

medias ➤ *https://www.schaeffler.de/std/1EE6*

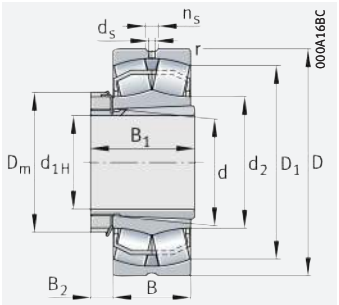


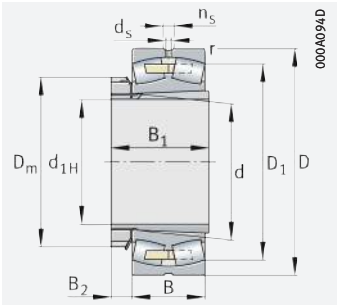
Mounting dimensions

Dimensions						Mounting dimensions			Calculation factors			
d	r min.	D_1 ≈	d_2 ≈	d_s	n_s	d_a min.	D_a max.	r_a max.	e	Y_1	Y_2	Y_0
150	2,1	213,2	164	3,2	6,5	160,2	214,8	2,1	0,29	2,32	3,45	2,26
	2,1	228,9	163,1	4,8	9,5	162	238	2,1	0,37	1,83	2,72	1,79
160	2,1	226,9	174,8	4,8	9,5	170,2	229,8	2,1	0,29	2,32	3,45	2,26
	2,1	245,6	175,5	4,8	9,5	172	258	2,1	0,37	1,8	2,69	1,76
170	2,1	243,3	184,8	4,8	9,5	180,2	249,8	2,1	0,31	2,2	3,27	2,15
	2,1	257,3	186,7	4,8	9,5	182	268	2,1	0,36	1,9	2,83	1,86
180	2,1	259,6	195,6	4,8	9,5	190,2	269,8	2,1	0,32	2,1	3,13	2,06
	3	276,3	196,2	6,3	12,2	194	286	2,5	0,36	1,86	2,77	1,82
190	2,1	271,1	206,2	4,8	9,5	200,2	279,8	2,1	0,31	2,2	3,27	2,15
	3	292,6	208	6,3	12,2	204	306	2,5	0,37	1,82	2,7	1,78
200	3	319	224,6	9,5	17,7	214	326	2,5	0,3	2,25	3,34	2,2
	2,1	287,8	217	6,3	12,2	210,2	299,8	2,1	0,32	2,13	3,17	2,08
	3	309,5	216,2	6,3	12,2	214	326	2,5	0,39	1,71	2,54	1,67
220	4	345	249	9,5	17,7	237	353	3	0,29	2,32	3,45	2,26
	4	338,5	236,2	6,3	12,2	237	353	3	0,39	1,74	2,59	1,7
240	4	374	269	9,5	17,7	257	383	3	0,29	2,35	3,5	2,3
260	4	412	295	9,5	17,7	277	423	3	0,3	2,26	3,37	2,21
280	5	431	315	9,5	17,7	300	440	4	0,28	2,37	3,53	2,32
300	5	460	–	9,5	17,7	320	480	4	0,29	2,3	3,42	2,25
320	5	503	–	12,5	23,5	340	520	4	0,3	2,26	3,37	2,21
340	5	537	–	12,5	23,5	360	560	4	0,3	2,23	3,32	2,18
360	5	560	–	12,5	23,5	380	580	4	0,29	2,3	3,42	2,25
380	5	580	–	12,5	23,5	400	600	4	0,28	2,37	3,53	2,32

Spherical roller bearings

With adapter sleeve



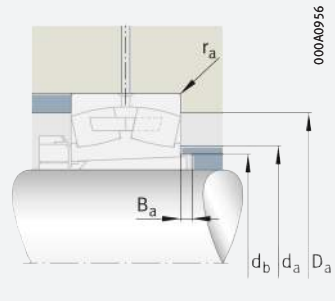


With solid cage, brass or steel

d_{1H} = 20 – 75 mm

Main dimensions				Basic load ratings		Fatigue limit load	Limiting speed	Speed rating	Mass m		Designation ➤*681*|*1.12* ➤*683*|*1.13* X-life ➤*671*	
d_{1H}	d	D	B	dyn. C_r	stat. C_{0r}	C_{ur}	n_G	$n_{\vartheta r}$	Bearing	Adapter sleeve	Bearing	Adapter sleeve
				kN	kN	N	min^{-1}	min^{-1}	≈ kg	≈ kg		
20	25	52	18	48,5	42,5	4 800	14 400	9 200	0,175	0,07	**22205-E1-XL-K**	**H305**
25	30	62	20	64	57	6 900	12 500	7 800	0,275	0,11	**22206-E1-XL-K**	**H306**
30	35	72	23	89	81	9 400	10 700	7 000	0,434	0,153	**22207-E1-XL-K**	**H307**
	35	80	21	83	74	8 100	10 900	6 800	0,496	0,153	**21307-E1-XL-K-TVPB**	**H307**
35	40	80	23	101	91	11 800	10 500	6 200	0,528	0,192	**22208-E1-XL-K**	**H308**
	40	90	23	109	107	14 300	9 800	5 200	0,749	0,192	**21308-E1-XL-K**	**H308**
	40	90	33	156	149	13 100	7 600	5 500	1	0,23	**22308-E1-XL-K**	**H2308**
40	45	85	23	104	99	12 700	10 100	5 600	0,577	0,253	**22209-E1-XL-K**	**H309**
	45	100	25	129	130	17 300	9 000	4 750	0,999	0,253	**21309-E1-XL-K**	**H309**
	45	100	36	187	183	16 000	6 800	5 000	1,4	0,298	**22309-E1-XL-K**	**H2309**
45	50	90	23	109	107	14 300	9 800	5 100	0,608	0,306	**22210-E1-XL-K**	**H310**
	50	110	27	129	130	17 300	9 000	5 400	1,32	0,306	**21310-E1-XL-K**	**H310**
	50	110	40	229	223	20 100	6 300	4 800	1,9	0,36	**22310-E1-XL-K**	**H2310**
50	55	100	25	129	130	17 300	9 000	4 650	0,825	0,358	**22211-E1-XL-K**	**H311**
	55	120	29	160	155	20 200	8 100	5 100	1,28	0,358	**21311-E1-XL-K**	**H311**
	55	120	43	265	260	23 900	5 800	4 500	2,2	0,435	**22311-E1-XL-K**	**H2311**
55	60	110	28	160	155	20 200	8 100	4 550	1,09	0,401	**22212-E1-XL-K**	**H312**
	60	130	31	211	226	28 000	6 700	4 100	1,89	0,401	**21312-E1-XL-K**	**H312**
	60	130	46	310	310	28 000	5 400	4 200	2,8	0,493	**22312-E1-XL-K**	**H2312**
60	65	120	31	202	210	25 500	7 000	4 200	1,52	0,471	**22213-E1-XL-K**	**H313**
	65	140	33	250	270	33 500	6 200	3 600	2,13	0,471	**21313-E1-XL-K**	**H313**
	65	140	48	350	365	32 500	5 000	3 800	3,5	0,57	**22313-E1-XL-K**	**H2313**
	70	125	31	211	226	28 000	6 700	3 950	1,61	0,74	**22214-E1-XL-K**	**H314**
	70	150	35	250	270	33 500	6 200	3 950	3,13	0,74	**21314-E1-XL-K**	**H314**
	70	150	51	390	390	36 500	4 800	3 700	4,1	0,92	**22314-E1-XL-K**	**H2314**
65	75	130	31	216	237	29 500	6 500	3 700	1,68	0,86	**22215-E1-XL-K**	**H315**
	75	160	37	305	325	38 000	5 700	3 750	3,74	0,86	**21315-E1-XL-K**	**H315**
	75	160	55	445	450	40 500	4 500	3 550	5,3	1,06	**22315-E1-XL-K**	**H2315**
70	80	140	33	250	270	33 500	6 200	3 550	2,08	1,06	**22216-E1-XL-K**	**H316**
	80	170	39	305	325	38 000	5 700	4 050	4,54	1,06	**21316-E1-XL-K**	**H316**
	80	170	58	495	510	45 000	4 250	3 400	6,1	1,31	**22316-E1-XL-K**	**H2316**
75	85	150	36	305	325	38 000	5 700	3 450	2,59	1,21	**22217-E1-XL-K**	**H317**
	85	180	41	345	375	42 500	5 200	3 800	5,3	1,21	**21317-E1-XL-K**	**H317**
	85	180	60	540	560	49 500	4 100	3 200	7,1	1,47	**22317-E1-XL-K**	**H2317**

medias ➤ *https://www.schaeffler.de/std/1EE7*

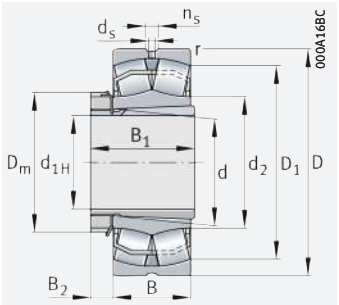


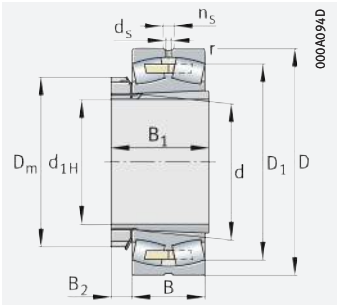
Mounting dimensions

Dimensions									Mounting dimensions					Calculation factors			
d_{1H}	r min.	D_1 ≈	d_2 ≈	d_s	n_s	D_m	B_1	B_2 ≈	d_a max.	D_a max.	d_b min.	B_a min.	r_a max.	e	Y_1	Y_2	Y_0
20	1	44,4	31,5	3,2	4,8	38	29	8,25	30,6	46,4	28	5	1	0,33	2,07	3,09	2,03
25	1	53,7	38,1	3,2	4,8	45	31	8,25	35,6	54,6	33	5	1	0,3	2,26	3,37	2,21
30	1,1	62,5	43,9	3,2	4,8	52	35	9,25	42	65	39	5	1	0,31	2,21	3,29	2,16
	1,5	66,6	47,4	–	–	52	35	9,25	44	71	39	8	1,5	0,26	2,55	3,8	2,5
35	1,1	70,4	48,8	3,2	4,8	58	36	10,25	47	73	44	5	1	0,27	2,49	3,71	2,43
	1,5	80,8	59,9	3,2	4,8	58	36	10,25	49	81	44	5	1,5	0,23	2,95	4,4	2,89
	1,5	76	52,4	3,2	6,5	58	46	10,25	49	81	45	5	1,5	0,36	1,86	2,77	1,82
40	1,1	75,6	55	3,2	4,8	65	39	11,25	52	78	50	8	1	0,25	2,74	4,08	2,68
	1,5	89,8	67,6	3,2	4,8	65	39	11,25	54	91	50	5	1,5	0,21	3,17	4,72	3,1
	1,5	84,7	58,9	3,2	6,5	65	50	11,25	54	91	50	5	1,5	0,36	1,9	2,83	1,86
45	1,1	80,8	59,9	3,2	4,8	70	42	12,25	57	83	55	10	1	0,23	2,95	4,4	2,89
	2	89,8	67,7	3,2	4,8	70	42	12,25	61	99	55	5	2	0,21	3,17	4,72	3,1
	2	92,6	63	3,2	6,5	70	55	12,25	61	99	56	5	2	0,36	1,86	2,77	1,82
50	1,5	89,8	67,6	3,2	4,8	75	45	12,5	64	91	60	10	1,5	0,21	3,17	4,72	3,1
	2	98,3	71,6	3,2	6,5	75	45	12,5	66	109	60	6	2	0,23	2,98	4,44	2,92
	2	101,4	68,9	3,2	6,5	75	59	12,5	66	109	61	6	2	0,36	1,89	2,81	1,84
55	1,5	98,7	71,6	3,2	6,5	80	47	12,5	69	101	65	8	1,5	0,23	2,98	4,44	2,92
	2,1	112,5	84,4	3,2	6,5	80	47	12,5	72	118	65	5	2,1	0,23	2,95	4,4	2,89
	2,1	110,1	74,8	3,2	6,5	80	62	12,5	72	118	66	5	2,1	0,35	1,91	2,85	1,87
60	1,5	107,3	79,1	3,2	6,5	85	50	13,5	74	111	70	8	1,5	0,24	2,81	4,19	2,75
	2,1	126,8	94,9	3,2	6,5	85	50	13,5	77	128	70	5	2,1	0,22	3,14	4,67	3,07
	2,1	119,3	83,2	4,8	9,5	85	65	13,5	77	128	72	5	2,1	0,34	2	2,98	1,96
	1,5	112,5	84,4	3,2	6,5	92	52	13,5	79	116	75	11	1,5	0,23	2,95	4,4	2,89
	2,1	126,2	94,9	3,2	6,5	92	52	13,5	82	138	75	6	2,1	0,22	3,14	4,67	3,07
	2,1	128	86,7	4,8	9,5	92	68	13,5	82	138	77	5	2,1	0,34	2	2,98	1,96
65	1,5	117,7	89,8	3,2	6,5	98	55	14,5	84	121	80	12	1,5	0,22	3,1	4,62	3,03
	2,1	135,2	99,7	3,2	6,5	98	55	14,5	87	148	80	5	2,1	0,22	3,04	4,53	2,97
	2,1	136,3	92,4	4,8	9,5	98	73	14,5	87	148	82	5	2,1	0,34	1,99	2,96	1,94
70	2	126,8	94,9	3,2	6,5	105	59	16,75	91	129	85	12	2	0,22	3,14	4,67	3,07
	2,1	135,4	99,8	3,2	6,5	105	59	16,75	92	158	85	5	2,1	0,22	3,04	4,53	2,97
	2,1	145,1	98,3	4,8	9,5	105	78	16,75	92	158	88	5	2,1	0,34	1,99	2,96	1,94
75	2	135,4	99,7	3,2	6,5	110	63	17,75	96	139	91	12	2	0,22	3,04	4,53	2,97
	3	143,9	106,1	4,8	9,5	110	63	17,75	99	166	91	6	2,5	0,23	2,9	4,31	2,83
	3	154,2	104,4	4,8	9,5	110	82	17,75	99	166	94	6	2,5	0,33	2,04	3,04	2

Spherical roller bearings

With adapter sleeve



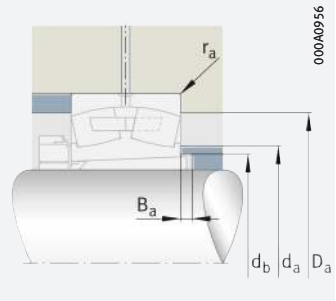


With solid cage, brass or steel

d_{1H} = 80 – 110 mm

Main dimensions				Basic load ratings		Fatigue limit load	Limiting speed	Speed rating	Mass m		Designation ➤681|1.12 ➤683|1.13 X-life ➤671	
d_{1H}	d	D	B	dyn. C_r	stat. C_{0r}	C_{ur}	n_G	$n_{\vartheta r}$	Bearing	Adapter sleeve	Bearing	Adapter sleeve
				kN	kN	N	min^{-1}	min^{-1}	≈ kg	≈ kg		
80	90	160	40	345	375	42 500	5 200	3 400	3,35	1,41	**22218-E1-XL-K**	**H318**
	90	160	52,4	445	520	48 500	4 250	2 650	4,1	1,71	**23218-E1-XL-K-TVPB**	**H2318**
	90	160	52,4	445	520	48 500	4 250	2 650	4,3	1,71	**23218-E1A-XL-K-M**	**H2318**
	90	190	43	380	415	47 000	4 850	3 600	6,26	1,41	**21318-E1-XL-K**	**H318**
	90	190	64	610	630	55 000	3 850	3 000	8,5	1,71	**22318-E1-XL-K**	**H2318**
85	95	170	43	380	415	47 000	4 850	3 300	4,04	1,58	**22219-E1-XL-K**	**H319**
	95	200	45	425	450	47 500	4 600	3 250	6,63	1,58	**21319-E1-XL-K-TVPB**	**H319**
	95	200	67	670	700	59 000	3 700	2 800	9,5	1,95	**22319-E1-XL-K**	**H2319**
90	100	165	52	450	570	52 000	4 000	2 750	4,1	1,81	**23120-E1-XL-K-TVPB**	**H3120**
	100	165	52	450	570	52 000	4 000	2 750	4,2	1,81	**23120-E1A-XL-K-M**	**H3120**
	100	180	46	430	475	52 000	4 550	3 150	4,91	1,76	**22220-E1-XL-K**	**H320**
	100	180	60,3	560	660	60 000	3 750	2 410	6,1	2,2	**23220-E1-XL-K-TVPB**	**H2320**
	100	180	60,3	560	660	60 000	3 750	2 410	6,3	2,2	**23220-E1A-XL-K-M**	**H2320**
	100	215	47	495	530	60 000	4 400	3 050	8,08	1,76	**21320-E1-XL-K-TVPB**	**H320**
	100	215	73	810	920	75 000	3 300	2 380	13	2,2	**22320-E1-XL-K**	**H2320**
100	110	170	45	400	530	53 000	4 200	3 000	3,4	2,25	**23022-E1-XL-K-TVPB**	**H322**
	110	170	45	400	530	53 000	4 200	3 000	3,8	2,25	**23022-E1A-XL-K-M**	**H322**
	110	180	56	530	680	60 000	3 700	2 550	4,9	2,32	**23122-E1-XL-K-TVPB**	**H3122**
	110	180	56	530	680	60 000	3 700	2 550	5,1	2,32	**23122-E1A-XL-K-M**	**H3122**
	110	200	53	550	600	62 000	4 100	3 000	6,99	2,25	**22222-E1-XL-K**	**H322**
	110	200	69,8	710	870	71 000	3 250	2 100	8,8	2,78	**23222-E1-XL-K-TVPB**	**H2322**
	110	200	69,8	710	870	71 000	3 250	2 100	9,3	2,78	**23222-E1A-XL-K-M**	**H2322**
	110	240	50	600	640	69 000	4 000	2 700	10,91	2,25	**21322-E1-XL-K-TVPB**	**H322**
	110	240	80	950	1 070	90 000	3 000	2 130	17,4	2,78	**22322-E1-XL-K**	**H2322**
110	120	180	46	430	580	58 000	3 950	2 800	3,7	2,01	**23024-E1-XL-K-TVPB**	**H3024**
	120	180	46	430	580	58 000	3 950	2 800	4,1	2,01	**23024-E1A-XL-K-M**	**H3024**
	120	200	62	630	800	72 000	3 400	2 290	7,1	2,7	**23124-E1-XL-K-TVPB**	**H3124**
	120	200	62	630	800	72 000	3 400	2 290	7,6	2,7	**23124-E1A-XL-K-M**	**H3124**
	120	215	58	640	740	68 000	3 650	2 700	8,84	2,7	**22224-E1-XL-K**	**H3124**
	120	215	76	820	1 020	80 000	3 000	1 910	11,1	3,24	**23224-E1-XL-K-TVPB**	**H2324**
	120	215	76	820	1 020	80 000	3 000	1 910	11,4	3,24	**23224-E1A-XL-K-M**	**H2324**
	120	260	86	1 080	1 170	102 000	2 850	2 000	22,1	3,24	**22324-E1-XL-K**	**H2324**

medias ➤ *https://www.schaeffler.de/std/1EE8*

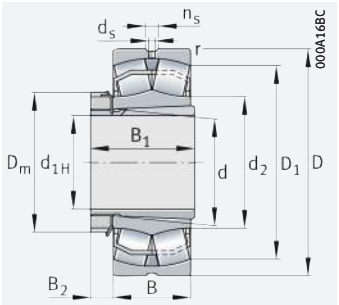


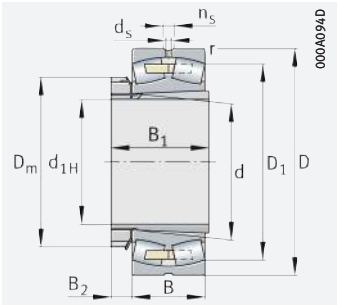
Mounting dimensions

Dimensions									Mounting dimensions					Calculation factors			
d_{1H}	r min.	D_1 ≈	d_2 ≈	d_s	n_s	D_m	B_1	B_2 ≈	d_a max.	D_a max.	d_b min.	B_a min.	r_a max.	e	Y_1	Y_2	Y_0
80	2	143,9	106,1	3,2	6,5	120	65	17,75	101	149	96	10	2	0,23	2,9	4,31	2,83
	2	140	104,1	3,2	6,5	120	86	17,75	101	149	100	18	2	0,31	2,2	3,27	2,15
	2	140	–	3,2	6,5	120	86	17,75	101	149	100	18	2	0,31	2,2	3,27	2,15
	3	152,7	112,6	4,8	9,5	120	65	17,75	104	176	96	6	2,5	0,24	2,87	4,27	2,8
	3	162,5	110,2	6,3	12,2	120	86	17,75	104	176	100	6	2,5	0,33	2,03	3,02	1,98
85	2,1	152,7	112,6	4,8	9,5	125	68	18,75	107	158	102	9	2,1	0,24	2,87	4,27	2,8
	3	169,4	124,3	4,8	9,5	125	68	18,75	109	186	102	7	2,5	0,22	3,04	4,53	2,97
	3	171,2	116	6,3	12,2	125	90	18,75	109	186	105	7	2,5	0,33	2,03	3,02	1,98
90	2	146,3	113,9	3,2	6,5	130	76	19,75	111	154	107	7	2	0,28	2,37	3,53	2,32
	2	146,3	–	3,2	6,5	130	76	19,75	111	154	107	7	2	0,28	2,37	3,53	2,32
	2,1	161,4	119	4,8	9,5	130	71	19,75	112	168	108	8	2,1	0,24	2,84	4,23	2,78
	2,1	156,7	116,7	4,8	9,5	130	97	19,75	112	168	110	19	2,1	0,31	2,15	3,2	2,1
	2,1	156,7	–	4,8	9,5	130	97	19,75	112	168	110	19	2,1	0,31	2,15	3,2	2,1
	3	182	132	4,8	9,5	130	71	19,75	114	201	108	7	2,5	0,22	3,14	4,67	3,07
	3	184,7	130,2	6,3	12,2	130	97	19,75	114	201	110	7	2,5	0,33	2,03	3,02	1,98
100	2	154,6	123,7	3,2	6,5	145	77	20,75	118,8	161,2	118	14	2	0,23	2,9	4,31	2,83
	2	154,6	–	3,2	6,5	145	77	20,75	118,8	161,2	118	14	2	0,23	2,9	4,31	2,83
	2	160	124,6	4,8	9,5	145	81	20,75	121	169	117	7	2	0,28	2,39	3,56	2,34
	2	160	–	4,8	9,5	145	81	20,75	121	169	117	7	2	0,28	2,41	3,59	2,35
	2,1	178,7	129,4	4,8	9,5	145	77	20,75	122	188	118	6	2,1	0,25	2,71	4,04	2,65
	2,1	172,7	129,1	4,8	9,5	145	105	20,75	122	188	121	17	2,1	0,33	2,06	3,06	2,01
	2,1	172,7	–	4,8	9,5	145	105	20,75	122	188	121	17	2,1	0,33	2,06	3,06	2,01
	3	202,5	146,4	6,3	12,2	145	77	20,75	124	226	118	9	2,5	0,21	3,24	4,82	3,16
	3	204,9	143,1	8	15	145	105	20,75	124	226	121	7	2,5	0,33	2,07	3,09	2,03
110	2	164,7	133	3,2	6,5	155	72	22	128,8	171,2	127	7	2	0,22	3,04	4,53	2,97
	2	164,7	–	3,2	6,5	155	72	22	128,8	171,2	127	7	2	0,22	3,04	4,53	2,97
	2	177,4	136,2	4,8	9,5	155	88	22	131	189	128	7	2	0,28	2,39	3,56	2,34
	2	177,4	–	4,8	9,5	155	88	22	131	189	128	7	2	0,28	2,39	3,56	2,34
	2,1	192	141,9	6,3	12,2	155	88	22	132	203	128	11	2,1	0,25	2,71	4,04	2,65
	2,1	185,5	139	4,8	9,5	155	112	22	132	203	131	17	2,1	0,33	2,03	3,02	1,98
	2,1	185,5	–	4,8	9,5	155	112	22	132	203	131	17	2,1	0,33	2,03	3,02	1,98
	3	222,4	150,7	8	15	155	112	22	134	246	131	7	2,5	0,33	2,06	3,06	2,01

Spherical roller bearings

With adapter sleeve



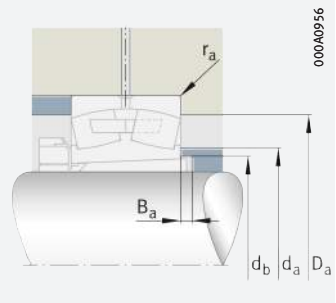


With solid cage, brass or steel

d_{1H} = 115 – 135 mm

Main dimensions				Basic load ratings		Fatigue limit load	Limiting speed	Speed rating	Mass m		Designation ➤*681|1.12* ➤*683|1.13* X-life ➤*671*	
d_{1H}	d	D	B	dyn. C_r	stat. C_{0r}	C_{ur}	n_G	$n_{\vartheta r}$	Bearing	Adapter sleeve	Bearing	Adapter sleeve
				kN	kN	N	min^{-1}	min^{-1}	≈ kg	≈ kg		
115	130	200	52	540	730	69 000	3 600	2 600	5,4	2,96	**23026-E1-XL-K-TVPB**	**H3026**
	130	200	52	540	730	69 000	3 600	2 600	5,7	2,96	**23026-E1A-XL-K-M**	**H3026**
	130	210	64	680	890	78 000	3 200	2 110	7,8	3,74	**23126-E1-XL-K-TVPB**	**H3126**
	130	210	64	680	890	78 000	3 200	2 110	8,1	3,74	**23126-E1A-XL-K-M**	**H3126**
	130	230	64	760	890	79 000	3 350	2 500	10,9	3,74	**22226-E1-XL-K**	**H3126**
	130	230	80	910	1 150	88 000	2 850	1 740	12,6	4,69	**23226-E1-XL-K-TVPB**	**H2326**
	130	230	80	910	1 150	88 000	2 850	1 740	13,6	4,69	**23226-E1A-XL-K-M**	**H2326**
	130	280	93	1 250	1 370	116 000	2 650	1 820	27,4	4,69	**22326-E1-XL-K**	**H2326**
125	140	210	53	570	800	75 000	3 450	2 390	5,8	3,3	**23028-E1-XL-K-TVPB**	**H3028**
	140	210	53	570	800	75 000	3 450	2 390	6	3,3	**23028-E1A-XL-K-M**	**H3028**
	140	225	68	760	1 010	87 000	3 000	1 930	9,5	4,46	**23128-E1-XL-K-TVPB**	**H3128**
	140	225	68	760	1 010	87 000	3 000	1 930	10,2	4,46	**23128-E1A-XL-K-M**	**H3128**
	140	250	68	870	1 040	97 000	3 150	2 250	13,7	4,46	**22228-E1-XL-K**	**H3128**
	140	250	88	1 090	1 400	113 000	2 600	1 550	17,1	5,66	**23228-E1-XL-K-TVPB**	**H2328**
	140	250	88	1 090	1 400	113 000	2 600	1 550	17,6	5,66	**23228-E1A-XL-K-M**	**H2328**
	140	300	102	1 460	1 630	131 000	2 420	1 660	34,4	5,66	**22328-E1-XL-K**	**H2328**
135	150	225	56	630	880	85 000	3 250	2 210	7,3	4,02	**23030-E1-XL-K-TVPB**	**H3030**
	150	225	56	630	880	85 000	3 250	2 210	7,3	4,02	**23030-E1A-XL-K-M**	**H3030**
	150	250	80	1 000	1 330	141 000	2 650	1 720	14,5	5,7	**23130-E1-XL-K-TVPB**	**H3130**
	150	250	80	1 000	1 330	141 000	2 650	1 720	15,8	5,7	**23130-E1A-XL-K-M**	**H3130**
	150	270	73	1 010	1 210	111 000	2 900	2 050	17,8	5,7	**22230-E1-XL-K**	**H3130**
	150	270	96	1 280	1 660	129 000	2 400	1 400	22,3	6,76	**23230-E1-XL-K-TVPB**	**H2330**
	150	270	96	1 280	1 660	129 000	2 400	1 400	22,9	6,76	**23230-E1A-XL-K-M**	**H2330**
	150	320	108	1 640	1 850	147 000	2 290	1 520	40,9	6,76	**22330-E1-XL-K**	**H2330**

medias ➤ *https://www.schaeffler.de/std/1EE9*

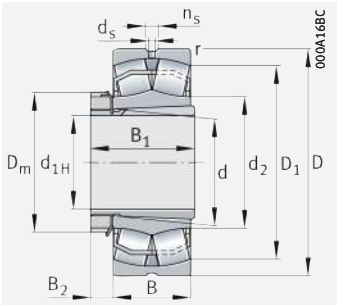


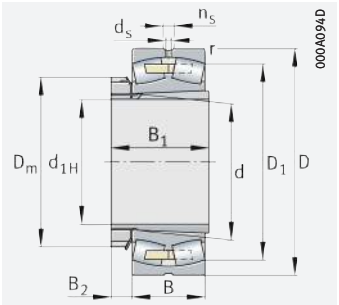
Mounting dimensions

Dimensions									Mounting dimensions					Calculation factors			
d_{1H}	r min.	D_1 ≈	d_2 ≈	d_s	n_s	D_m	B_1	B_2 ≈	d_a max.	D_a max.	d_b min.	B_a min.	r_a max.	e	Y_1	Y_2	Y_0
115	2	182,3	145,9	4,8	9,5	165	80	23	138,8	191,2	137	8	2	0,23	2,95	4,4	2,89
	2	182,3	–	4,8	9,5	165	80	23	138,8	191,2	137	8	2	0,23	2,95	4,4	2,89
	2	187,3	146	4,8	9,5	165	92	23	141	199	138	8	2	0,28	2,45	3,64	2,39
	2	187,3	–	4,8	9,5	165	92	23	141	199	138	8	2	0,28	2,45	3,64	2,39
	3	205	151,7	6,3	12,2	165	92	23	144	216	138	8	2,5	0,26	2,62	3,9	2,56
	3	199,3	150	4,8	9,5	165	121	23	144	216	142	21	2,5	0,33	2,07	3,09	2,03
	3	199,3	–	4,8	9,5	165	121	23	144	216	142	21	2,5	0,33	2,07	3,09	2,03
	4	239,5	162,2	9,5	17,7	165	121	23	147	263	142	8	3	0,33	2,06	3,06	2,01
125	2	192,3	155,4	4,8	9,5	180	82	24	148,8	201,2	147	8	2	0,22	3,07	4,57	3
	2	192,3	–	4,8	9,5	180	82	24	148,8	201,2	147	8	2	0,22	3,07	4,57	3
	2,1	201	157,1	4,8	9,5	180	97	24	152	213	149	8	2,1	0,27	2,49	3,71	2,43
	2,1	201	–	4,8	9,5	180	97	24	152	213	149	8	2,1	0,27	2,49	3,71	2,43
	3	223,1	164,9	6,3	12,2	180	97	24	154	236	149	8	2,5	0,25	2,67	3,97	2,61
	3	216	162	6,3	12,2	180	131	24	154	236	152	22	2,5	0,33	2,04	3,04	2
	3	216	–	6,3	12,2	180	131	24	154	236	152	22	2,5	0,33	2,04	3,04	2
	4	255,7	173,5	9,5	17,7	180	131	24	157	283	152	8	3	0,34	2	2,98	1,96
135	2,1	206,3	166,6	4,8	9,5	195	87	26	160,2	214,8	158	8	2,1	0,22	3,1	4,62	3,03
	2,1	206,3	–	4,8	9,5	195	87	26	160,2	214,8	158	8	2,1	0,22	3,1	4,62	3,03
	2,1	220,8	170,1	6,3	12,2	195	111	26	162	238	160	8	2,1	0,29	2,32	3,45	2,26
	2,1	220,8	–	6,3	12,2	195	111	26	162	238	160	8	2,1	0,29	2,32	3,45	2,26
	3	240,8	177,9	8	15	195	111	26	164	256	160	15	2,5	0,25	2,69	4	2,63
	3	232,6	174	6,3	12,2	195	139	26	164	256	163	20	2,5	0,33	2,02	3	1,97
	3	232,6	–	6,3	12,2	195	139	26	164	256	163	20	2,5	0,33	2,02	3	1,97
	4	273,2	185,3	9,5	17,7	195	139	26	167	303	163	8	3	0,33	2,02	3	1,97

Spherical roller bearings

With adapter sleeve



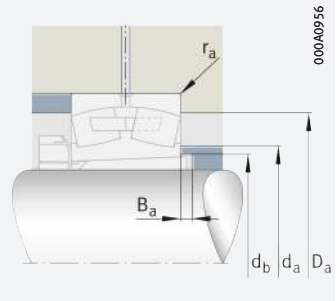


With solid cage, brass or steel

d_{1H} = 140 – 170 mm

Main dimensions				Basic load ratings		Fatigue limit load	Limiting speed	Speed rating	Mass m		Designation ➤681|1.12 ➤683|1.13 X-life ➤671	
d_{1H}	d	D	B	dyn. C_r	stat. C_{0r}	C_{ur}	n_G	$n_{\vartheta r}$	Bearing	Adapter sleeve	Bearing	Adapter sleeve
				kN	kN	N	min^{-1}	min^{-1}	≈ kg	≈ kg		
140	160	240	60	720	1 010	95 000	3 050	2 060	8,7	5,44	**23032-E1-XL-K-TVPB**	**H3032**
	160	240	60	720	1 010	95 000	3 050	2 060	9,4	5,44	**23032-E1A-XL-K-M**	**H3032**
	160	270	86	1 160	1 550	162 000	2 490	1 560	18,5	7,81	**23132-E1-XL-K-TVPB**	**H3132**
	160	270	86	1 160	1 550	162 000	2 490	1 560	18,6	7,81	**23132-E1A-XL-K-M**	**H3132**
	160	290	80	1 150	1 400	125 000	2 650	1 900	22,4	7,81	**22232-E1-XL-K**	**H3132**
	160	290	104	1 460	1 910	146 000	2 210	1 280	27,7	9,32	**23232-E1-XL-K-TVPB**	**H2332**
	160	290	104	1 460	1 910	146 000	2 210	1 280	28,5	9,32	**23232-E1A-XL-K-M**	**H2332**
	160	340	114	1 680	1 990	157 000	2 250	1 420	47,3	9,32	**22332-BE-XL-K**	**H2332**
150	170	260	67	880	1 230	148 000	2 800	1 890	11,9	6,25	**23034-E1-XL-K-TVPB**	**H3034**
	170	260	67	880	1 230	148 000	2 800	1 890	12,5	6,25	**23034-E1A-XL-K-M**	**H3034**
	170	280	88	1 220	1 690	173 000	2 380	1 460	19,9	8,6	**23134-E1-XL-K-TVPB**	**H3134**
	170	280	88	1 220	1 690	173 000	2 380	1 460	19,5	8,6	**23134-E1A-XL-K-M**	**H3134**
	170	310	86	1 320	1 570	140 000	2 550	1 780	27,1	8,6	**22234-E1-XL-K**	**H3134**
	170	310	110	1 640	2 170	163 000	2 090	1 160	33,1	10,4	**23234-E1-XL-K-TVPB**	**H2334**
	170	310	110	1 640	2 170	163 000	2 090	1 160	34,6	10,4	**23234-E1A-XL-K-M**	**H2334**
	170	360	120	1 870	2 220	173 000	2 130	1 320	56,9	10,4	**22334-BE-XL-K**	**H2334**
160	180	250	52	445	840	57 000	3 200	1 850	7,8	6,01	**23936-S-K-MB**	**H3936**
	180	280	74	1 040	1 450	169 000	2 600	1 760	15,6	7,18	**23036-E1-XL-K-TVPB**	**H3036**
	180	280	74	1 040	1 450	169 000	2 600	1 760	16	7,18	**23036-E1A-XL-K-M**	**H3036**
	180	300	96	1 420	1 950	194 000	2 230	1 350	25,9	9,8	**23136-E1-XL-K-TVPB**	**H3136**
	180	300	96	1 420	1 950	194 000	2 230	1 350	25,5	9,8	**23136-E1A-XL-K-M**	**H3136**
	180	320	86	1 360	1 680	148 000	2 470	1 670	28,5	9,8	**22236-E1-XL-K**	**H3136**
	180	320	112	1 720	2 340	173 000	2 010	1 090	36	11,6	**23236-E1-XL-K-TVPB**	**H2336**
	180	320	112	1 720	2 340	173 000	2 010	1 090	37	11,6	**23236-E1A-XL-K-M**	**H2336**
	180	380	126	2 060	2 460	190 000	2 030	1 230	66,6	11,6	**22336-BE-XL-K**	**H2336**
170	190	290	75	1 080	1 550	179 000	2 490	1 660	16,3	7,8	**23038-E1-XL-K-TVPB**	**H3038**
	190	290	75	1 080	1 550	179 000	2 490	1 660	17,7	7,8	**23038-E1A-XL-K-M**	**H3038**
	190	320	104	1 610	2 220	216 000	2 070	1 260	30,3	7,8	**23138-E1-XL-K-TVPB**	**H3138**
	190	320	104	1 610	2 220	216 000	2 070	1 260	32,4	7,8	**23138-E1A-XL-K-M**	**H3138**
	190	340	92	1 360	1 760	159 000	2 480	1 620	36	7,8	**22238-BE-XL-K**	**H3138**
	190	340	120	1 740	2 400	200 000	1 990	1 070	42,6	12,9	**23238-BE-XL-K**	**H2338**
	190	400	132	2 220	2 650	207 000	1 940	1 160	77,2	12,9	**22338-BE-XL-K**	**H2338**

medias ➤ *https://www.schaeffler.de/std/1EEA*

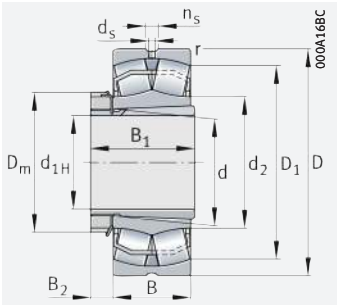


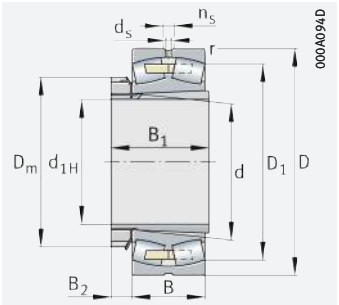
Mounting dimensions

Dimensions									Mounting dimensions					Calculation factors			
d_{1H}	r min.	D_1 ≈	d_2 ≈	d_s	n_s	D_m	B_1	B_2 ≈	d_a max.	D_a max.	d_b min.	B_a min.	r_a max.	e	Y_1	Y_2	Y_0
140	2,1	219,9	177	6,3	12,2	210	93	27,5	170,2	229,8	168	8	2,1	0,22	3,1	4,62	3,03
	2,1	219,9	–	6,3	12,2	210	93	27,5	170,2	229,8	168	8	2,1	0,22	3,1	4,62	3,03
	2,1	238,3	183,2	8	15	210	119	27,5	172	258	170	8	2,1	0,29	2,32	3,45	2,26
	2,1	238,3	–	8	15	210	119	27,5	172	258	170	8	2,1	0,29	2,32	3,45	2,26
	3	258,2	190,9	8	15	210	119	27,5	174	276	170	14	2,5	0,26	2,64	3,93	2,58
	3	249,3	186,7	8	15	210	147	27,5	174	276	174	18	2,5	0,34	2	2,98	1,96
	3	249,3	–	8	15	210	147	27,5	174	276	174	18	2,5	0,34	2	2,98	1,96
	4	286,7	201,2	9,5	17,7	210	147	27,5	177	323	174	8	3	0,35	1,94	2,88	1,89
150	2,1	237,2	189,8	6,3	12,2	220	101	28,5	180,2	249,8	179	8	2,1	0,23	2,98	4,44	2,92
	2,1	237,2	–	6,3	12,2	220	101	28,5	180,2	249,8	179	8	2,1	0,23	2,98	4,44	2,92
	2,1	248,1	193,4	8	15	220	122	28,5	182	268	180	8	2,1	0,28	2,37	3,53	2,32
	2,1	248,1	–	8	15	220	122	28,5	182	268	180	8	2,1	0,28	2,37	3,53	2,32
	4	275,4	199,8	9,5	17,7	220	122	28,5	187	293	180	10	3	0,26	2,6	3,87	2,54
	4	267,4	199,8	8	15	220	154	28,5	187	293	185	18	3	0,33	2,03	3,02	1,98
	4	267,4	–	8	15	220	154	28,5	187	293	185	18	3	0,33	2,03	3,02	1,98
	4	303,9	213,1	9,5	17,7	220	154	28,5	187	343	185	8	3	0,35	1,95	2,9	1,91
160	2	230,9	–	4,8	9,5	230	87	29,5	188,8	241,2	188	8	2	0,2	3,42	5,09	3,34
	2,1	254,3	201,8	8	15	230	109	29,5	190,2	269,8	189	8	2,1	0,23	2,9	4,31	2,83
	2,1	254,3	–	8	15	230	109	29,5	190,2	269,8	189	8	2,1	0,23	2,9	4,31	2,83
	3	264,8	204,1	8	15	230	131	29,5	194	286	191	8	2,5	0,29	2,32	3,45	2,26
	3	264,8	–	8	15	230	131	29,5	194	286	180	8	2,5	0,29	2,32	3,45	2,26
	4	285,9	211,3	9,5	17,7	230	131	29,5	197	303	191	18	3	0,25	2,71	4,04	2,65
	4	277,3	210,6	8	15	230	161	29,5	197	303	195	22	3	0,33	2,07	3,09	2,03
	4	277,3	–	8	15	230	161	29,5	197	303	195	22	3	0,33	2,07	3,09	2,03
	4	320,8	224,9	12,5	23,5	230	161	29,5	197	363	195	8	3	0,34	1,96	2,92	1,92
170	2,1	264,5	211,9	8	15	240	112	30,5	200,2	279,8	199	9	2,1	0,23	2,98	4,44	2,92
	2,1	264,5	–	8	15	240	112	30,5	200,2	279,8	199	9	2,1	0,23	2,98	4,44	2,92
	3	281,6	217	8	15	240	112	30,5	204	306	202	9	2,5	0,3	2,28	3,39	2,23
	3	281,6	–	8	15	240	112	30,5	204	306	202	9	2,5	0,3	2,28	3,39	2,23
	4	295,2	225,2	9,5	17,7	240	112	30,5	207	323	202	21	3	0,26	2,6	3,87	2,54
	4	289	222,4	9,5	17,7	240	169	30,5	207	323	206	21	3	0,34	1,98	2,94	1,93
	5	338,1	236,8	12,5	23,5	240	169	30,5	210	380	206	9	4	0,34	1,96	2,92	1,92

Spherical roller bearings

With adapter sleeve



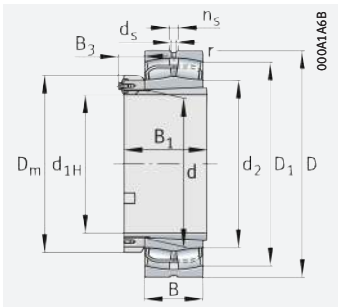


With solid cage, brass or steel

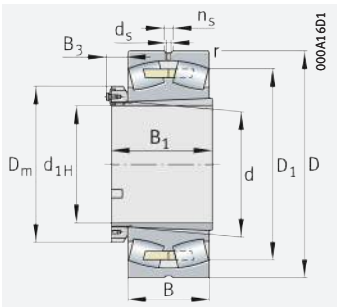
d_{1H} = 180 – 260 mm

Main dimensions				Basic load ratings		Fatigue limit load	Limiting speed	Speed rating	Mass m		Designation ➤681|1.12 ➤683|1.13 X-life ➤671	
d_{1H}	d	D	B	dyn. C_r	stat. C_{0r}	C_{ur}	n_G	$n_{\vartheta r}$	Bearing	Adapter sleeve	Bearing	Adapter sleeve
				kN	kN	N	min^{-1}	min^{-1}	≈ kg	≈ kg		
180	200	280	60	550	1 070	71 000	2 800	1 650	11,5	8,2	**23940-S-K-MB**	**H3940**
	200	310	82	1 270	1 800	202 000	2 330	1 550	20,8	9,5	**23040-E1-XL-K-TVPB**	**H3040**
	200	310	82	1 270	1 800	202 000	2 330	1 550	21,4	9,5	**23040-E1A-XL-K-M**	**H3040**
	200	340	112	1 610	2 270	188 000	2 040	1 230	40,9	12,5	**23140-BE-XL-K**	**H3140**
	200	360	98	1 520	1 990	175 000	2 330	1 510	42,3	12,5	**22240-BE-XL-K**	**H3140**
	200	360	128	1 940	2 700	219 000	1 870	1 000	57,3	14,2	**23240-BE-XL-K**	**H2340**
	200	420	138	2 440	2 950	225 000	1 830	1 080	87,4	14,2	**22340-BE-XL-K**	**H2340**
200	220	300	60	610	1 240	72 000	2 600	1 460	12,3	8,45	**23944-S-K-MB**	**H3944**
	220	340	90	1 260	1 900	177 000	2 230	1 450	28,5	10,5	**23044-BE-XL-K**	**H3044X**
	220	370	120	1 860	2 700	217 000	1 860	1 080	50,5	16	**23144-BE-XL-K**	**H3144X**
	220	400	108	1 840	2 360	210 000	2 140	1 350	58,3	16	**22244-BE-XL-K**	**H3144X**
	220	400	144	2 380	3 300	265 000	1 700	880	75,3	17,8	**23244-BE-XL-K**	**H2344X**
	220	460	145	2 800	3 400	265 000	1 690	950	114	17,8	**22344-BE-XL-K**	**H2344X**
220	240	320	60	640	1 370	93 000	2 440	1 310	13,4	11,3	**23948-K-MB**	**H3948**
	240	360	92	1 350	2 120	194 000	2 080	1 310	31,6	13,7	**23048-BE-XL-K**	**H3048**
	240	400	128	2 130	3 150	248 000	1 700	970	62	18,7	**23148-BE-XL-K**	**H3148X**
	240	440	120	2 230	2 900	247 000	1 900	1 200	81,8	18,7	**22248-BE-XL-K**	**H3148X**
	240	440	160	2 850	4 000	310 000	1 500	770	102	20,9	**23248-BE-XL-K**	**H2348X**
	240	500	155	3 200	4 050	305 000	1 510	830	148	20,9	**22348-BEA-XL-K-MB1**	**H2348X**
240	260	360	75	940	1 940	108 000	2 100	1 190	22,4	13,6	**23952-K-MB**	**H3952**
	260	400	104	1 670	2 600	233 000	1 850	1 170	45,9	16	**23052-BE-XL-K**	**H3052X**
	260	440	144	2 600	3 900	305 000	1 500	860	87,2	23,6	**23152-BE-XL-K**	**H3152X**
	260	480	130	2 600	3 450	290 000	1 720	1 070	104	23,6	**22252-BEA-XL-K-MB1**	**H3152X**
	260	480	174	3 350	4 750	360 000	1 360	690	134	25,8	**23252-BEA-XL-K-MB1**	**H2352X**
	260	540	165	3 650	4 650	350 000	1 390	740	179	25,8	**22352-BEA-XL-K-MB1**	**H2352X**
260	280	380	75	970	2 040	129 000	2 000	1 100	24,7	15,6	**23956-K-MB**	**H3956**
	280	420	106	1 780	2 850	255 000	1 740	1 090	49,3	18,5	**23056-BE-XL-K**	**H3056**
	280	460	146	2 750	4 200	315 000	1 420	790	93,1	26,3	**23156-BE-XL-K**	**H3156X**
	280	500	130	2 750	3 700	310 000	1 650	990	109	26,3	**22256-BEA-XL-K-MB1**	**H3156X**
	280	500	176	3 550	5 200	385 000	1 280	630	143,7	29,8	**23256-BEA-XL-K-MB1**	**H2356X**
	280	580	175	4 150	5 300	395 000	1 280	670	223	29,8	**22356-BEA-XL-K-MB1**	**H2356X**

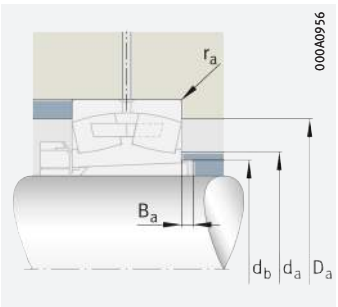
medias ➤ *https://www.schaeffler.de/std/1EEB*



With locknut and retaining bracket



With solid cage, brass or steel; with locknut and retaining bracket

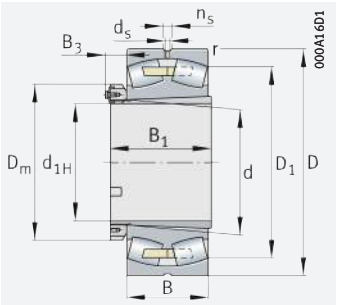


Mounting dimensions

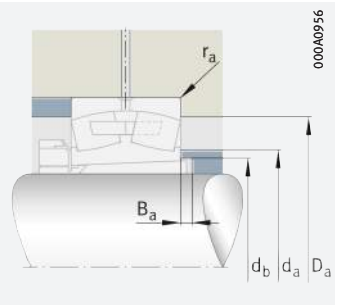
Dimensions										Mounting dimensions					Calculation factors			
d_{1H}	r	D_1	d_2	d_s	n_s	D_m	B_1	B_2	B_3	d_a	D_a	d_b	B_a	r_a	e	Y_1	Y_2	Y_0
	min.	≈	≈					≈	≈	max.	max.	min.	min.	max.				
180	2,1	256,9	–	6,3	12,2	250	98	31,5	–	210,2	269,8	210	9	2,1	0,2	3,42	5,09	3,34
	2,1	281,6	223,4	8	15	250	120	31,5	–	210,2	299,8	210	10	2,1	0,23	2,9	4,31	2,83
	2,1	281,6	–	8	15	250	120	31,5	–	210,2	299,8	210	10	2,1	0,23	2,9	4,31	2,83
	3	295,8	230,4	9,5	17,7	250	150	31,5	–	214	326	212	10	2,5	0,32	2,1	3,13	2,06
	4	310,9	238,2	9,5	17,7	250	150	31,5	–	217	343	212	24	3	0,26	2,57	3,83	2,52
	4	305,3	235	9,5	17,7	250	176	31,5	–	217	343	216	20	3	0,35	1,95	2,9	1,91
	5	355,1	248,8	12,5	23,5	250	176	31,5	–	220	400	216	10	4	0,34	1,98	2,94	1,93
200	2,1	277,4	–	6,3	12,2	260	96	–	39	230,2	289,8	230	9	2,1	0,18	3,76	5,59	3,67
	3	304,5	248,8	8	15	260	126	–	39	232,4	327,6	231	12	2,5	0,24	2,81	4,19	2,75
	4	323	254,8	9,5	17,7	260	161	35	–	237	353	233	10	3	0,31	2,15	3,2	2,1
	4	346,6	260,1	9,5	17,7	260	161	35	–	237	383	233	22	3	0,26	2,57	3,83	2,52
	4	338	255,8	9,5	17,7	260	186	35	–	237	383	236	11	3	0,36	1,9	2,83	1,86
	5	391,1	273,4	12,5	23,5	260	186	35	–	240	440	236	10	4	0,33	2,06	3,06	2,01
220	2,1	297,8	–	6,3	12,2	290	101	–	45	250,2	309,8	250	11	2,1	0,17	4,05	6,04	3,96
	3	324,6	269,5	8	15	290	133	–	45	252,4	347,6	251	11	2,5	0,23	2,98	4,44	2,92
	4	349,9	275,9	9,5	17,7	290	172	37	–	257	383	254	11	3	0,31	2,18	3,24	2,13
	4	380,4	285,6	12,5	23,5	290	172	37	–	257	423	254	19	3	0,26	2,55	3,8	2,5
	4	370,8	280,8	12,5	23,5	290	199	37	–	257	423	257	6	3	0,36	1,87	2,79	1,83
	5	426,4	–	12,5	23,5	290	199	37	–	260	480	257	11	4	0,32	2,12	3,15	2,07
240	2,1	330,5	–	8	15	310	116	–	45	270,2	349,8	270	11	2,1	0,19	3,54	5,27	3,46
	4	358,7	295,5	9,5	17,7	310	145	–	45	274,6	385,4	272	13	3	0,23	2,9	4,31	2,83
	4	382,7	301,7	9,5	17,7	310	190	38	–	277	423	276	11	3	0,32	2,12	3,15	2,07
	5	415,1	–	12,5	23,5	310	190	38	–	280	460	276	25	4	0,26	2,57	3,83	2,52
	5	404,3	–	12,5	23,5	310	211	38	–	280	460	278	2	4	0,36	1,87	2,79	1,83
	6	460,6	–	12,5	23,5	310	211	38	–	286	514	278	11	5	0,31	2,15	3,2	2,1
260	2,1	350	–	8	15	330	121	–	49	290,2	369,8	290	12	2,1	0,18	3,76	5,59	3,67
	4	379,2	314,3	9,5	17,7	330	152	–	49	294,6	405,4	292	12	3	0,22	3,01	4,48	2,94
	5	403,4	321,4	9,5	17,7	330	195	39	–	300	440	296	12	4	0,31	2,21	3,29	2,16
	5	436	–	12,5	23,5	330	195	39	–	300	480	296	28	4	0,25	2,71	4,04	2,65
	5	425,4	–	12,5	23,5	330	224	39	–	300	480	299	11	4	0,34	1,96	2,92	1,92
	6	495,5	–	12,5	23,5	330	224	39	–	306	554	299	12	5	0,31	2,18	3,24	2,13

Spherical roller bearings

With adapter sleeve



With solid cage, brass or steel; with locknut and retaining bracket

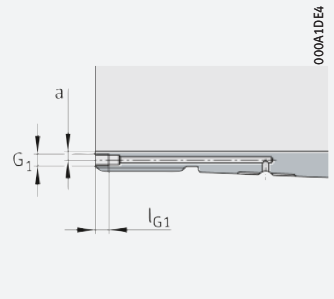


Mounting dimensions

d_{1H} = 280 – 410 mm

Main dimensions				Basic load ratings		Fatigue limit load	Limiting speed	Speed rating	Mass m		Designation ➤681|1.12 ➤683|1.13 X-life ➤671	
d_{1H}	d	D	B	dyn. C_r	stat. C_{0r}	C_{ur}	n_G	$n_{\vartheta r}$	Bearing	Adapter sleeve	Bearing	Adapter sleeve
				kN	kN	N	min^{-1}	min^{-1}	≈ kg	≈ kg		
280	300	420	90	1 270	2 650	165 000	1 780	1 000	39,1	20,9	**23960-B-K-MB**	**H3960**
	300	460	118	2 160	3 450	295 000	1 570	980	68,4	23,7	**23060-BE-XL-K**	**H3060**
	300	500	160	3 250	4 950	365 000	1 300	720	126	31,1	**23160-BEA-XL-K-MB1**	**H3160**
	300	540	140	3 100	4 250	355 000	1 500	900	139	31,1	**22260-BEA-XL-K-MB1**	**H3160**
	300	540	192	4 100	6 100	440 000	1 160	560	187	35,1	**23260-BEA-XL-K-MB1**	**H3260**
300	320	440	90	1 310	2 750	201 000	1 700	930	41	22,1	**23964-K-MB**	**H3964-HG**
	320	480	121	2 300	3 750	320 000	1 480	920	75,6	25,7	**23064-BEA-XL-K-MB1**	**H3064-HG**
	320	540	176	3 800	5 900	415 000	1 170	650	161	36,2	**23164-BEA-XL-K-MB1**	**H3164-HG**
	320	580	150	3 550	4 700	395 000	1 410	830	171	36,2	**22264-BEA-XL-K-MB1**	**H3164-HG**
	320	580	208	4 650	7 000	495 000	1 060	510	229,6	40,6	**23264-BEA-XL-K-MB1**	**H3264-HG**
320	340	520	133	2 700	4 400	365 000	1 360	840	101	30	**23068-BEA-XL-K-MB1**	**H3068-HG**
	340	580	190	4 350	6 600	465 000	1 090	600	204	51,8	**23168-BEA-XL-K-MB1**	**H3168-HG**
	340	620	224	5 300	7 900	570 000	1 000	475	292	57,2	**23268-BEA-XL-K-MB1**	**H3268-HG**
340	360	480	90	1 440	3 200	210 000	1 540	800	45	25,9	**23972-K-MB**	**H3972-HG**
	360	540	134	2 800	4 650	390 000	1 300	790	104	31,6	**23072-BEA-XL-K-MB1**	**H3072-HG**
	360	600	192	4 550	7 100	495 000	1 040	560	215	54,3	**23172-BEA-XL-K-MB1**	**H3172-HG**
	360	650	232	5 700	8 900	610 000	930	430	330,5	63,8	**23272-BEA-XL-K-MB1**	**H3272-HG**
360	380	520	106	1 780	4 000	265 000	1 340	750	66,3	32,1	**23976-K-MB**	**H3976-HG**
	380	560	135	2 900	5 000	410 000	1 230	740	109	36,2	**23076-BEA-XL-K-MB1**	**H3076-HG**
	380	620	194	4 700	7 600	530 000	990	530	227	64,1	**23176-BEA-XL-K-MB1**	**H3176-HG**
	380	680	240	6 200	9 600	660 000	890	400	374	72,4	**23276-BEA-XL-K-MB1**	**H3276-HG**
380	400	540	106	1 830	4 150	270 000	1 290	710	68,2	35,4	**23980-B-K-MB**	**H3980-HG**
	400	600	148	3 400	5 700	465 000	1 150	690	144	41,7	**23080-BEA-XL-K-MB1**	**H3080-HG**
	400	650	200	5 000	8 100	570 000	950	495	246	71,3	**23180-BEA-XL-K-MB1**	**H3180-HG**
	400	720	256	7 000	10 900	730 000	820	370	450	83,7	**23280-BEA-XL-K-MB1**	**H3280-HG**
400	420	560	106	1 910	4 450	300 000	1 230	660	72,1	38,6	**23984-K-MB**	**H3984-HG**
	420	620	150	3 650	6 300	510 000	1 090	650	153	45,7	**23084-BEA-XL-K-MB1**	**H3084X-HG**
	420	700	224	6 000	9 600	650 000	860	455	342	88,4	**23184-BEA-XL-K-MB1**	**H3184-HG**
	420	760	272	7 800	12 300	800 000	770	340	537	98,7	**23284-BEA-XL-K-MB1**	**H3284-HG**
410	440	600	118	2 230	5 200	295 000	1 130	620	98,3	59	**23988-K-MB**	**H3988-HG**
	440	650	157	3 950	6 900	550 000	1 030	610	176	67,7	**23088-BEA-XL-K-MB1**	**H3088-HG**
	440	720	226	6 200	10 200	680 000	820	430	358	108	**23188-BEA-XL-K-MB1**	**H3188-HG**
	440	790	280	8 300	13 200	860 000	730	320	592	123	**23288-BEA-XL-K-MB1**	**H3288-HG**

medias ➤ *https://www.schaeffler.de/std/1EEC*

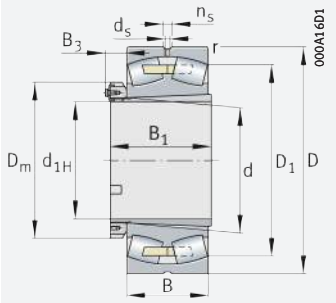


Hydraulic adapter sleeve (..-HG)
Mounting dimensions

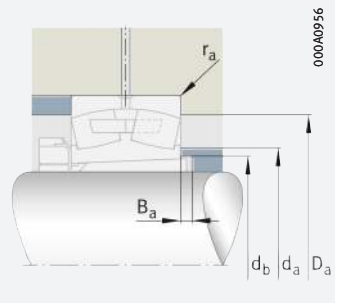
Dimensions									Mounting dimensions								Calculation factors			
d_{1H}	r	D_1	d_2	d_s	n_s	D_m	B_1	B_3	d_a	D_a	d_b	B_a	r_a	G_1	a	l_{G1}	e	Y_1	Y_2	Y_0
	min.	≈	≈					≈	max.	max.	min.	min.	max.							
280	3	384,6	–	9,5	17,7	360	140	53	312,4	407,6	311	12	2,5	–	–	–	0,2	3,42	5,09	3,34
	4	413	340	9,5	17,7	360	168	53	314,6	445,4	313	12	3	–	–	–	0,23	2,92	4,35	2,86
	5	436,8	–	9,5	17,7	360	208	52	320	480	318	12	4	–	–	–	0,31	2,18	3,24	2,13
	5	470,5	–	12,5	23,5	360	208	52	320	520	318	32	4	–	–	–	0,25	2,71	4,04	2,65
	5	458	–	12,5	23,5	360	240	52	320	520	321	12	4	–	–	–	0,35	1,92	2,86	1,88
300	3	406,2	–	9,5	17,7	380	140	54	332,4	427,6	332	12	2,5	M6	3,5	7	0,19	3,62	5,39	3,54
	4	433	–	9,5	17,7	380	171	54	334,6	465,4	334	13	3	M6	3,5	7	0,22	3,01	4,48	2,94
	5	469,3	–	12,5	23,5	380	226	55	340	520	338	13	4	M6	3,5	7	0,32	2,13	3,17	2,08
	5	505,1	–	12,5	23,5	380	226	55	340	560	338	39	4	M6	3,5	7	0,25	2,71	4,04	2,65
	5	490,4	–	12,5	23,5	380	258	55	340	560	343	13	4	M6	3,5	7	0,35	1,91	2,85	1,87
320	5	467,1	–	12,5	23,5	320	187	57	358	502	355	14	4	M6	3,5	7	0,23	2,92	4,35	2,86
	5	502,6	–	12,5	23,5	320	254	70	360	560	360	14	4	M6	3,5	7	0,32	2,1	3,13	2,06
	6	523,5	–	12,5	23,5	320	288	70	366	594	364	14	5	M6	3,5	7	0,36	1,85	2,76	1,81
340	3	447,1	–	9,5	17,7	420	144	57	372,4	467,6	372	14	2,5	M6	3,5	7	0,17	4,05	6,04	3,96
	5	487,6	–	12,5	23,5	420	188	57	378	522	375	14	4	M6	3,5	7	0,22	3,04	4,53	2,97
	5	523,3	–	12,5	23,5	420	259	73	380	580	380	14	4	M6	3,5	7	0,31	2,18	3,24	2,13
	6	550,8	–	12,5	23,5	420	299	73	386	624	385	14	5	M6	3,5	7	0,36	1,9	2,83	1,86
360	4	477,6	–	9,5	17,7	450	164	61	394,6	505,4	393	15	3	M6	3,5	7	0,19	3,58	5,33	3,5
	5	508,1	–	12,5	23,5	450	193	61	398	542	396	15	4	M6	3,5	7	0,21	3,17	4,72	3,1
	5	543,6	–	12,5	23,5	450	264	75	400	600	401	15	4	M6	3,5	7	0,3	2,25	3,34	2,2
	6	578,1	–	12,5	23,5	450	310	75	406	654	405	15	5	M6	3,5	7	0,35	1,92	2,86	1,88
380	4	499	–	9,5	17,7	470	168	65	414,6	525,4	413	15	3	M6	3,5	7	0,18	3,71	5,52	3,63
	5	541,9	–	12,5	23,5	470	210	65	418	582	417	15	4	M6	3,5	7	0,22	3,07	4,57	3
	6	571,4	–	12,5	23,5	470	272	80	426	624	421	15	5	M6	3,5	7	0,29	2,3	3,42	2,25
	6	610,9	–	12,5	23,5	470	328	80	426	694	427	15	5	M6	3,5	7	0,36	1,9	2,83	1,86
400	4	519,5	–	9,5	17,7	490	168	65	434,6	545,4	433	15	3	M6	3,5	7	0,18	3,85	5,73	3,76
	5	560,7	–	12,5	23,5	490	212	65	438	602	437	16	4	M6	3,5	7	0,21	3,17	4,72	3,1
	6	609,8	–	12,5	23,5	490	304	88	446	674	443	16	5	M6	3,5	7	0,31	2,18	3,24	2,13
	7,5	643,4	–	12,5	23,5	490	352	88	452	728	449	16	6	M6	3,5	7	0,36	1,89	2,81	1,84
410	4	552,8	–	12,5	23,5	520	189	75	454,6	585,4	454	17	3	M8	6,5	12	0,18	3,66	5,46	3,58
	6	589,3	–	12,5	23,5	520	228	75	463	627	458	17	5	M8	6,5	12	0,21	3,17	4,72	3,1
	6	630,2	–	12,5	23,5	520	307	88	466	694	463	17	5	M8	6,5	12	0,3	2,25	3,34	2,2
	7,5	670,7	–	12,5	23,5	520	361	88	472	758	469	17	6	M8	6,5	12	0,35	1,91	2,85	1,87

Spherical roller bearings

With adapter sleeve



With solid cage, brass or steel; with locknut and retaining bracket

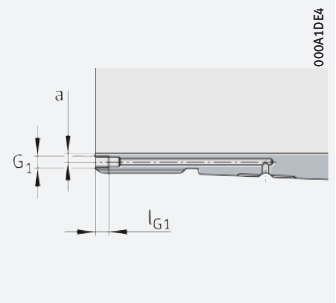


Mounting dimensions

d_{1H} = 430 – 850 mm

Main dimensions				Basic load ratings		Fatigue limit load	Limiting speed	Speed rating	Mass m		Designation ➤681 | 1.12 ➤683 | 1.13 X-life ➤671	
d_{1H}	d	D	B	dyn. C_r	stat. C_{0r}	C_{ur}	n_G	$n_{\vartheta r}$	Bearing	Adapter sleeve	Bearing	Adapter sleeve
				kN	kN	N	min^{-1}	min^{-1}	≈ kg	≈ kg		
430	460	620	118	2 270	5 400	370 000	1 080	590	103	62,4	**23992-B-K-MB**	**H3992-HG**
	460	680	163	4 300	7 500	590 000	980	580	201	71,8	**23092-BEA-XL-K-MB1**	**H3092-HG**
	460	760	240	6 900	11 500	740 000	770	395	431	118	**23192-BEA-XL-K-MB1**	**H3192-HG**
	460	830	296	9 200	14 700	930 000	690	295	695	138,9	**23292-BEA-XL-K-MB1**	**H3292-HG**
450	480	650	128	2 550	6 000	460 000	1 040	570	121	66,8	**23996-B-K-MB**	**H3996-HG**
	480	700	165	4 450	8 000	620 000	950	550	210	76,8	**23096-BEA-XL-K-MB1**	**H3096-HG**
	480	790	248	7 400	12 400	790 000	740	375	479	135	**23196-BEA-XL-K-MB1**	**H3196-HG**
	480	870	310	10 000	16 200	1 010 000	650	275	804	159,2	**23296-BEA-XL-K-MB1**	**H3296-HG**
470	500	670	128	2 600	6 300	400 000	990	540	124	76,1	**239/500-K-MB**	**H39/500-HG**
	500	720	167	4 700	8 700	750 000	890	510	223	85,2	**230/500-BEA-XL-K-MB1**	**H30/500-HG**
	500	830	264	8 300	13 900	860 000	690	350	574	149,9	**231/500-BEA-XL-K-MB1**	**H31/500-HG**
500	530	710	136	2 850	6 900	385 000	930	500	146	91,6	**239/530-K-MB**	**H39/530-HG**
	530	780	185	5 600	10 100	860 000	820	475	302	103	**230/530-BEA-XL-K-MB1**	**H30/530-HG**
	530	870	272	8 900	15 000	940 000	660	325	634	161	**231/530-BEA-XL-K-MB1**	**H31/530-HG**
530	560	750	140	3 100	7 600	520 000	880	465	176	98,5	**239/560-B-K-MB**	**H39/560-HG**
	560	820	195	6 100	11 200	930 000	760	440	350	112	**230/560-BEA-XL-K-MB1**	**H30/560-HG**
	560	920	280	9 700	16 400	1 030 000	630	300	731	184	**231/560-BEA-XL-K-MB1**	**H31/560-HG**
560	600	800	150	3 450	8 600	630 000	810	430	210	132,2	**239/600-B-K-MB**	**H39/600-HG**
	600	870	200	6 600	12 300	1 020 000	710	405	398	152,3	**230/600-BEA-XL-K-MB1**	**H30/600-HG**
	600	980	300	9 000	19 200	810 000	560	270	901	241,8	**231/600-K-MB**	**H31/600-HG**
600	630	850	165	4 100	9 900	710 000	740	405	283	126,3	**239/630-B-K-MB**	**H39/630-HG**
	630	920	212	7 400	13 700	1 120 000	670	380	476	143,1	**230/630-BEA-XL-K-MB1**	**H30/630-HG**
630	670	900	170	4 300	10 600	750 000	710	375	310	166	**239/670-B-K-MB**	**H39/670-HG**
	670	980	230	7 200	15 800	1 100 000	630	350	590	194	**230/670-B-K-MB**	**H30/670-HG**
670	710	950	180	4 800	12 100	720 000	670	350	336	206	**239/710-K-MB**	**H39/710-HG**
	710	1 030	236	7 600	16 900	1 150 000	590	325	650	234,2	**230/710-B-K-MB**	**H30/710-HG**
710	750	1 000	185	5 200	13 000	790 000	640	325	394	219,6	**239/750-K-MB**	**H39/750-HG**
	750	1 090	250	8 500	19 100	1 010 000	550	305	786	248	**230/750-K-MB**	**H30/750-HG**
750	800	1 060	195	5 900	15 100	1 010 000	580	295	490	268,9	**239/800-B-K-MB**	**H39/800-HG**
	800	1 150	258	9 300	21 200	1 420 000	530	280	877	311,6	**230/800-K-MB**	**H30/800-HG**
800	850	1 120	200	6 300	16 400	960 000	550	275	554	298,5	**239/850-K-MB**	**H39/850-HG**
850	900	1 180	206	6 500	17 200	1 010 000	520	260	641	335	**239/900-K-MB**	**H39/900-HG**

medias ➤ *https://www.schaeffler.de/std/1EED*

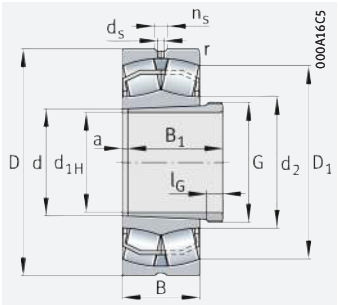


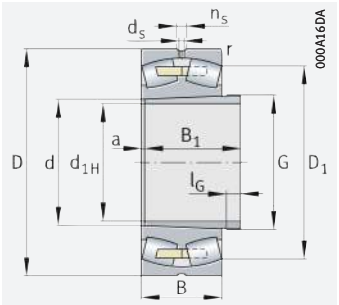
Hydraulic adapter sleeve (..-HG)
Mounting dimensions

Dimensions								Mounting dimensions							Calculation factors			
d_{1H}	r	D_1	d_s	n_s	D_m	B_1	B_3	d_a	D_a	d_b	B_a	r_a	G_1	a	l_{G1}	e	Y_1	Y_2	Y_0
	min.	≈					≈	max.	max.	min.	min.	max.							
430	4	573,3	12,5	23,5	540	189	75	474,6	605,4	474	17	3	M8	6,5	12	0,18	3,85	5,73	3,76
	6	616,7	12,5	23,5	540	234	75	483	657	478	17	5	M8	6,5	12	0,21	3,17	4,72	3,1
	7,5	663,4	12,5	23,5	540	326	93	492	728	484	17	6	M8	6,5	12	0,31	2,21	3,29	2,16
	7,5	703,5	12,5	23,5	540	382	93	492	798	490	17	6	M8	6,5	12	0,36	1,9	2,83	1,86
450	5	598,8	12,5	23,5	560	200	75	498	632	496	18	4	M8	6,5	12	0,18	3,76	5,59	3,67
	6	636,9	12,5	23,5	560	237	75	503	677	499	18	5	M8	6,5	12	0,21	3,27	4,87	3,2
	7,5	690,4	12,5	23,5	560	335	93	512	758	505	18	6	M8	6,5	12	0,3	2,23	3,32	2,18
	7,5	737,1	12,5	23,5	560	397	93	512	838	512	18	6	M8	6,5	12	0,36	1,9	2,83	1,86
470	5	619,3	12,5	23,5	580	208	83	518	652	516	18	4	M8	6,5	12	0,17	3,9	5,81	3,81
	6	657,1	12,5	23,5	580	247	83	523	697	519	18	5	M8	6,5	12	0,21	3,24	4,82	3,16
	7,5	723,1	12,5	23,5	580	356	98	532	798	527	18	6	M8	6,5	12	0,31	2,2	3,27	2,15
500	5	656,5	12,5	23,5	630	216	88	548	692	546	18	4	M8	6	12	0,18	3,85	5,73	3,76
	6	708,2	12,5	23,5	630	265	88	553	757	550	18	5	M8	6	12	0,22	3,1	4,62	3,03
	7,5	760,5	12,5	23,5	630	364	102	562	838	558	18	6	M8	6	12	0,3	2,25	3,34	2,2
530	5	693,4	12,5	23,5	650	227	95	578	732	577	18	4	M8	6	12	0,17	3,95	5,88	3,86
	6	745	12,5	23,5	650	282	95	583	797	581	18	5	M8	6	12	0,22	3,1	4,62	3,03
	7,5	806,6	12,5	23,5	650	377	107	592	888	589	18	6	M8	6	12	0,29	2,32	3,45	2,26
560	5	740,5	12,5	23,5	700	239	95	618	782	618	20	4	$G^1/_8$	8	12	0,17	3,95	5,88	3,86
	6	793,3	12,5	23,5	700	289	95	623	847	622	20	5	$G^1/_8$	8	12	0,21	3,24	4,82	3,16
	7,5	852,6	12,5	23,5	700	399	108	632	948	629	20	6	$G^1/_8$	8	12	0,31	2,2	3,27	2,15
600	6	784,5	12,5	23,5	730	254	95	653	827	649	20	5	M8	6	12	0,18	3,8	5,66	3,72
	7,5	837,8	12,5	23,5	730	301	95	658	892	653	20	6	M8	6	12	0,21	3,24	4,82	3,16
630	6	831,5	12,5	23,5	780	264	101	693	877	689	20	5	$G^1/_8$	8	12	0,17	3,95	5,88	3,86
	7,5	888,7	12,5	23,5	780	324	101	698	952	694	20	6	$G^1/_8$	8	12	0,22	3,01	4,48	2,94
670	6	877,5	12,5	23,5	830	286	110	733	927	730	22	5	$G^1/_8$	8	12	0,18	3,85	5,73	3,76
	7,5	938,8	12,5	23,5	830	342	110	738	1 002	735	23	6	$G^1/_8$	8	12	0,22	3,07	4,57	3
710	6	923,2	12,5	23,5	870	291	110	773	977	771	23	5	$G^1/_8$	8	12	0,17	3,95	5,88	3,86
	7,5	990,9	12,5	23,5	870	356	110	778	1 062	776	23	6	$G^1/_8$	8	12	0,22	3,01	4,48	2,94
750	6	983,7	12,5	23,5	920	303	110	823	1 037	822	25	5	$G^1/_8$	10	12	0,17	4,05	6,04	3,96
	7,5	1 050,9	12,5	23,5	920	366	110	828	1 122	828	25	6	$G^1/_8$	10	12	0,22	3,07	4,57	3
800	6	1 039,9	12,5	23,5	980	308	113	873	1 097	873	25	5	$G^1/_8$	10	12	0,16	4,11	6,12	4,02
850	6	1 098,8	12,5	23,5	1 030	326	122	923	1 157	923	27	5	$G^1/_8$	10	12	0,16	4,28	6,37	4,19

Spherical roller bearings

With withdrawal sleeve





With solid cage, brass or steel

d_{1H} = 35 – 75 mm

Main dimensions				Basic load ratings		Fatigue limit load	Limiting speed	Speed rating	Mass m		Designation ➤681|1.12 ➤683|1.13 X-life ➤671	
d_{1H}	d	D	B	dyn. C_r	stat. C_{0r}	C_{ur}	n_G	$n_{\vartheta r}$	Bearing	Withdrawal sleeve	Bearing	Withdrawal sleeve
				kN	kN	N	min^{-1}	min^{-1}	≈ kg	≈ kg		
35	40	80	23	101	91	11 800	10 500	6 200	0,528	0,09	**22208-E1-XL-K**	**AH308**
	40	90	23	109	107	14 300	9 800	5 200	0,749	0,09	**21308-E1-XL-K**	**AH308**
	40	90	33	156	149	13 100	7 600	5 500	1	0,13	**22308-E1-XL-K**	**AH2308**
40	45	85	23	104	99	12 700	10 100	5 600	0,577	0,11	**22209-E1-XL-K**	**AH309**
	45	100	25	129	130	17 300	9 000	4 750	0,999	0,11	**21309-E1-XL-K**	**AH309**
	45	100	36	187	183	16 000	6 800	5 000	1,4	0,17	**22309-E1-XL-K**	**AH2309**
45	50	90	23	109	107	14 300	9 800	5 100	0,608	0,14	**22210-E1-XL-K**	**AHX310**
	50	110	27	129	130	17 300	9 000	5 400	1,32	0,14	**21310-E1-XL-K**	**AHX310**
	50	110	40	229	223	20 100	6 300	4 800	1,9	0,22	**22310-E1-XL-K**	**AHX2310**
50	55	100	25	129	130	17 300	9 000	4 650	0,825	0,17	**22211-E1-XL-K**	**AHX311**
	55	120	29	160	155	20 200	8 100	5 100	1,28	0,17	**21311-E1-XL-K**	**AHX311**
	55	120	43	265	260	23 900	5 800	4 500	2,2	0,26	**22311-E1-XL-K**	**AHX2311**
55	60	110	28	160	155	20 200	8 100	4 550	1,09	0,2	**22212-E1-XL-K**	**AHX312**
	60	130	31	211	226	28 000	6 700	4 100	1,89	0,2	**21312-E1-XL-K**	**AHX312**
	60	130	46	310	310	28 000	5 400	4 200	2,8	0,32	**22312-E1-XL-K**	**AHX2312**
60	65	120	31	202	210	25 500	7 000	4 200	1,52	0,23	**22213-E1-XL-K**	**AH313G**
	65	140	33	250	270	33 500	6 200	3 600	2,13	0,23	**21313-E1-XL-K**	**AH313G**
	65	140	48	350	365	32 500	5 000	3 800	3,5	0,36	**22313-E1-XL-K**	**AH2313G**
65	70	125	31	211	226	28 000	6 700	3 950	1,61	0,26	**22214-E1-XL-K**	**AH314G**
	70	150	35	250	270	33 500	6 200	3 950	3,13	0,26	**21314-E1-XL-K**	**AH314G**
	70	150	51	390	390	36 500	4 800	3 700	4,1	0,42	**22314-E1-XL-K**	**AHX2314G**
70	75	130	31	216	237	29 500	6 500	3 700	1,68	0,29	**22215-E1-XL-K**	**AH315G**
	75	160	37	305	325	38 000	5 700	3 750	3,74	0,29	**21315-E1-XL-K**	**AH315G**
	75	160	55	445	450	40 500	4 500	3 550	5,3	0,48	**22315-E1-XL-K**	**AHX2315G**
75	80	140	33	250	270	33 500	6 200	3 550	2,08	0,38	**22216-E1-XL-K**	**AH316**
	80	170	39	305	325	38 000	5 700	4 050	4,54	0,38	**21316-E1-XL-K**	**AH316**
	80	170	58	495	510	45 000	4 250	3 400	6,1	0,61	**22316-E1-XL-K**	**AHX2316**

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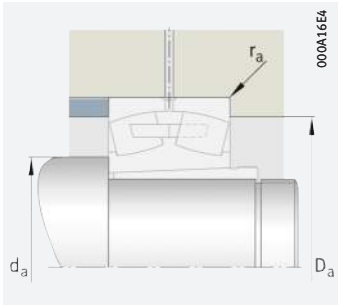
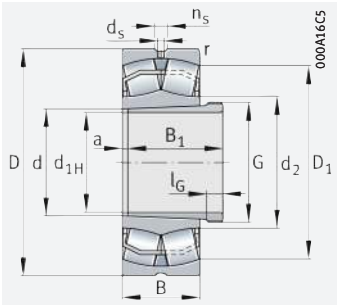


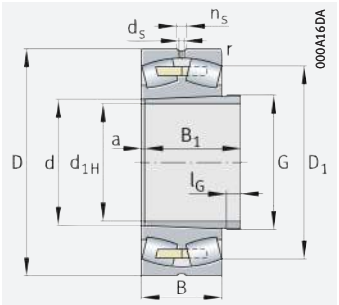
Mounting dimensions

Dimensions										Mounting dimensions			Calculation factors			
d_{1H}	r min.	D_1 ≈	d_2 ≈	d_s	n_s	a ≈	l_G	Thread G	B_1	d_a min.	D_a max.	r_a max.	e	Y_1	Y_2	Y_0
35	1,1	70,4	48,8	3,2	4,8	3	6	M45×1,5	29	47	73	1	0,27	2,49	3,71	2,43
	1,5	80,8	59,9	3,2	4,8	3	6	M45×1,5	29	49	81	1,5	0,23	2,95	4,4	2,89
	1,5	76	52,4	3,2	6,5	3	7	M45×1,5	40	49	81	1,5	0,36	1,86	2,77	1,82
40	1,1	75,6	55	3,2	4,8	3	6	M50×1,5	31	52	78	1	0,25	2,74	4,08	2,68
	1,5	89,8	67,6	3,2	4,8	3	6	M50×1,5	31	54	91	1,5	0,21	3,17	4,72	3,1
	1,5	84,7	58,9	3,2	6,5	3	7	M50×1,5	44	54	91	1,5	0,36	1,9	2,83	1,86
45	1,1	80,8	59,9	3,2	4,8	3	7	M55×2	35	57	83	1	0,23	2,95	4,4	2,89
	2	89,8	67,7	3,2	4,8	3	7	M55×2	35	61	99	2	0,21	3,17	4,72	3,1
	2	92,6	63	3,2	6,5	3	9	M55×2	50	61	99	2	0,36	1,86	2,77	1,82
50	1,5	89,8	67,6	3,2	4,8	3	7	M60×2	37	64	91	1,5	0,21	3,17	4,72	3,1
	2	98,3	71,6	3,2	6,5	3	7	M60×2	37	66	109	2	0,23	2,98	4,44	2,92
	2	101,4	68,9	3,2	6,5	3	10	M60×2	54	66	109	2	0,36	1,89	2,81	1,84
55	1,5	98,7	71,6	3,2	6,5	3	8	M65×2	40	69	101	1,5	0,23	2,98	4,44	2,92
	2,1	112,5	84,4	3,2	6,5	3	8	M65×2	40	72	118	2,1	0,23	2,95	4,4	2,89
	2,1	110,1	74,8	3,2	6,5	3	11	M65×2	58	72	118	2,1	0,35	1,91	2,85	1,87
60	1,5	107,3	79,1	3,2	6,5	3	8	M70×2	42	74	111	1,5	0,24	2,81	4,19	2,75
	2,1	126,8	94,9	3,2	6,5	3	8	M70×2	42	77	128	2,1	0,22	3,14	4,67	3,07
	2,1	119,3	83,2	4,8	9,5	3	12	M70×2	61	77	128	2,1	0,34	2	2,98	1,96
65	1,5	112,5	84,4	3,2	6,5	4	8	M75×2	43	79	116	1,5	0,23	2,95	4,4	2,89
	2,1	126,2	94,9	3,2	6,5	4	8	M75×2	43	82	138	2,1	0,22	3,14	4,67	3,07
	2,1	128	86,7	4,8	9,5	4	12	M75×2	64	82	138	2,1	0,34	2	2,98	1,96
70	1,5	117,7	89,8	3,2	6,5	4	8	M80×2	45	84	121	1,5	0,22	3,1	4,62	3,03
	2,1	135,2	99,7	3,2	6,5	4	8	M80×2	45	87	148	2,1	0,22	3,04	4,53	2,97
	2,1	136,3	92,4	4,8	9,5	4	12	M80×2	68	87	148	2,1	0,34	1,99	2,96	1,94
75	2	126,8	94,9	3,2	6,5	4	8	M90×2	48	91	129	2	0,22	3,14	4,67	3,07
	2,1	135,4	99,8	3,2	6,5	4	8	M90×2	48	92	158	2,1	0,22	3,04	4,53	2,97
	2,1	145,1	98,3	4,8	9,5	4	12	M90×2	71	92	158	2,1	0,34	1,99	2,96	1,94

Spherical roller bearings

With withdrawal sleeve





With solid cage, brass or steel

d_{1H} = 80 – 105 mm

Main dimensions				Basic load ratings		Fatigue limit load	Limiting speed	Speed rating	Mass m		Designation ➤681|1.12 ➤683|1.13 X-life ➤671	
d_{1H}	d	D	B	dyn. C_r	stat. C_{0r}	C_{ur}	n_G	$n_{\vartheta r}$	Bearing	Withdrawal sleeve	Bearing	Withdrawal sleeve
				kN	kN	N	min^{-1}	min^{-1}	≈ kg	≈ kg		
80	85	150	36	305	325	38 000	5 700	3 450	2,59	0,44	**22217-E1-XL-K**	**AHX317**
	85	180	41	345	375	42 500	5 200	3 800	5,3	0,44	**21317-E1-XL-K**	**AHX317**
	85	180	60	540	560	49 500	4 100	3 200	7,1	0,68	**22317-E1-XL-K**	**AHX2317**
85	90	160	40	345	375	42 500	5 200	3 400	3,35	0,48	**22218-E1-XL-K**	**AHX318**
	90	160	52,4	445	520	48 500	4 250	2 650	4,1	0,58	**23218-E1-XL-K-TVPB**	**AHX3218**
	90	160	52,4	445	520	48 500	4 250	2 650	4,3	0,58	**23218-E1A-XL-K-M**	**AHX3218**
	90	190	43	380	415	47 000	4 850	3 600	6,26	0,48	**21318-E1-XL-K**	**AHX318**
	90	190	64	610	630	55 000	3 850	3 000	8,5	0,78	**22318-E1-XL-K**	**AHX2318**
90	95	170	43	380	415	47 000	4 850	3 300	4,04	0,55	**22219-E1-XL-K**	**AHX319**
	95	200	45	425	450	47 500	4 600	3 250	6,63	0,55	**21319-E1-XL-K-TVPB**	**AHX319**
	95	200	67	670	700	59 000	3 700	2 800	9,5	0,91	**22319-E1-XL-K**	**AHX2319**
95	100	165	52	450	570	52 000	4 000	2 750	4,1	0,67	**23120-E1-XL-K-TVPB**	**AHX3120**
	100	165	52	450	570	52 000	4 000	2 750	4,2	0,67	**23120-E1A-XL-K-M**	**AHX3120**
	100	180	46	430	475	52 000	4 550	3 150	4,91	0,6	**22220-E1-XL-K**	**AHX320**
	100	180	60,3	560	660	60 000	3 750	2 410	6,1	0,78	**23220-E1-XL-K-TVPB**	**AHX3220**
	100	180	60,3	560	660	60 000	3 750	2 410	6,3	0,78	**23220-E1A-XL-K-M**	**AHX3220**
	100	215	47	495	530	60 000	4 400	3 050	8,08	0,6	**21320-E1-XL-K-TVPB**	**AHX320**
	100	215	73	810	920	75 000	3 300	2 380	13	1,03	**22320-E1-XL-K**	**AHX2320**
105	110	170	45	400	530	53 000	4 200	3 000	3,4	0,73	**23022-E1-XL-K-TVPB**	**AHX322**
	110	170	45	400	530	53 000	4 200	3 000	3,8	0,73	**23022-E1A-XL-K-M**	**AHX322**
	110	180	56	530	680	60 000	3 700	2 550	4,9	0,79	**23122-E1-XL-K-TVPB**	**AHX3122**
	110	180	56	530	680	60 000	3 700	2 550	5,1	0,79	**23122-E1A-XL-K-M**	**AHX3122**
	110	180	69	530	750	84 000	3 350	1 960	6,7	0,73	**24122-BE-XL-K30**	**AH24122**
	110	200	53	550	600	62 000	4 100	3 000	6,99	0,79	**22222-E1-XL-K**	**AHX3122**
	110	200	69,8	710	870	71 000	3 250	2 100	8,8	0,98	**23222-E1-XL-K-TVPB**	**AHX3222A**
	110	200	69,8	710	870	71 000	3 250	2 100	9,3	0,98	**23222-E1A-XL-K-M**	**AHX3222A**
	110	240	50	600	640	69 000	4 000	2 700	10,91	0,73	**21322-E1-XL-K-TVPB**	**AHX322**
	110	240	80	950	1 070	90 000	3 000	2 130	17,4	1,26	**22322-E1-XL-K**	**AHX2322G**

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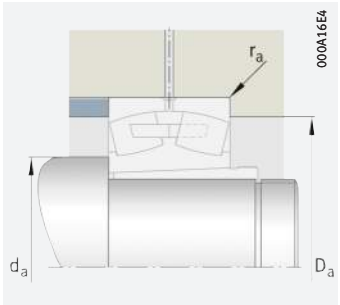
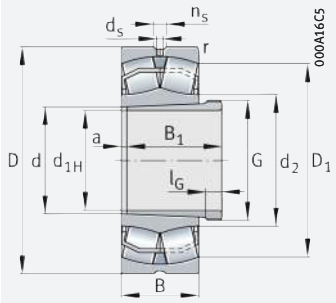


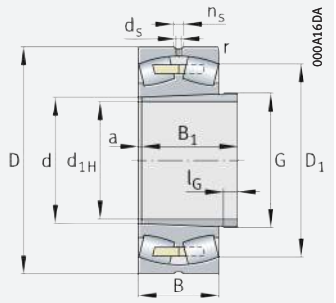
Mounting dimensions

Dimensions										Mounting dimensions			Calculation factors			
d_{1H}	r min.	D_1 ≈	d_2 ≈	d_s	n_s	a ≈	l_G	Thread G	B_1	d_a min.	D_a max.	r_a max.	e	Y_1	Y_2	Y_0
80	2	135,4	99,7	3,2	6,5	4	9	M95×2	52	96	139	2	0,22	3,04	4,53	2,97
	3	143,9	106,1	4,8	9,5	4	9	M95×2	52	99	166	2,5	0,23	2,9	4,31	2,83
	3	154,2	104,4	4,8	9,5	4	13	M95×2	74	99	166	2,5	0,33	2,04	3,04	2
85	2	143,9	106,1	3,2	6,5	4	9	M100×2	53	101	149	2	0,23	2,9	4,31	2,83
	2	140	104,1	3,2	6,5	4	10	M100×2	63	101	149	2	0,31	2,2	3,27	2,15
	2	140	–	3,2	6,5	4	10	M100×2	63	101	149	2	0,31	2,2	3,27	2,15
	3	152,7	112,6	4,8	9,5	4	9	M100×2	53	104	176	2,5	0,24	2,87	4,27	2,8
	3	162,5	110,2	6,3	12,2	4	14	M100×2	79	104	176	2,5	0,33	2,03	3,02	1,98
90	2,1	152,7	112,6	4,8	9,5	4	10	M105×2	57	107	158	2,1	0,24	2,87	4,27	2,8
	3	169,4	124,3	4,8	9,5	4	10	M105×2	57	109	186	2,5	0,22	3,04	4,53	2,97
	3	171,2	116	6,3	12,2	4	16	M105×2	85	109	186	2,5	0,33	2,03	3,02	1,98
95	2	146,3	113,9	3,2	6,5	4	11	M110×2	64	111	154	2	0,28	2,37	3,53	2,32
	2	146,3	–	3,2	6,5	4	11	M110×2	64	111	154	2	0,28	2,37	3,53	2,32
	2,1	161,4	119	4,8	9,5	4	10	M110×2	59	112	168	2,1	0,24	2,84	4,23	2,78
	2,1	156,7	116,7	4,8	9,5	4	11	M110×2	73	112	168	2,1	0,31	2,15	3,2	2,1
	2,1	156,7	–	4,8	9,5	4	11	M110×2	73	112	168	2,1	0,31	2,15	3,2	2,1
	3	182	132	4,8	9,5	4	10	M110×2	59	114	201	2,5	0,22	3,14	4,67	3,07
	3	184,7	130,2	6,3	12,2	4	16	M110×2	90	114	201	2,5	0,33	2,03	3,02	1,98
105	2	154,6	123,7	3,2	6,5	4	12	M120×2	63	118,8	161,2	2	0,23	2,9	4,31	2,83
	2	154,6	–	3,2	6,5	4	12	M120×2	63	118,8	161,2	2	0,23	2,9	4,31	2,83
	2	160	124,6	4,8	9,5	4	11	M120×2	68	121	169	2	0,28	2,39	3,56	2,34
	2	160	–	4,8	9,5	4	11	M120×2	68	121	169	2	0,28	2,41	3,59	2,35
	2	154,9	125,6	3,2	6,5	9	13	M115×2	82	121	169	2	0,34	1,96	2,92	1,92
	2,1	178,7	129,4	4,8	9,5	4	11	M120×2	68	122	188	2,1	0,25	2,71	4,04	2,65
	2,1	172,7	129,1	4,8	9,5	4	11	M120×2	82	122	188	2,1	0,33	2,06	3,06	2,01
	2,1	172,7	–	4,8	9,5	4	11	M120×2	82	122	188	2,1	0,33	2,06	3,06	2,01
	3	202,5	146,4	6,3	12,2	4	12	M120×2	63	124	226	2,5	0,21	3,24	4,82	3,16
	3	204,9	143,1	8	15	4	16	M120×2	98	124	226	2,5	0,33	2,07	3,09	2,03

Spherical roller bearings

With withdrawal sleeve





With solid cage, brass or steel

d_{1H} = 115 – 135 mm

Main dimensions				Basic load ratings		Fatigue limit load	Limiting speed	Speed rating	Mass m		Designation ➤681|1.12 ➤683|1.13 X-life ➤671	
d_{1H}	d	D	B	dyn. C_r	stat. C_{0r}	C_{ur}	n_G	$n_{\vartheta r}$	Bearing	Withdrawal sleeve	Bearing	Withdrawal sleeve
				kN	kN	N	min^{-1}	min^{-1}	≈ kg	≈ kg		
115	120	180	46	430	580	58 000	3 950	2 800	3,7	0,77	**23024-E1-XL-K-TVPB**	**AHX3024**
	120	180	46	430	580	58 000	3 950	2 800	4,1	0,77	**23024-E1A-XL-K-M**	**AHX3024**
	120	180	60	450	690	84 000	3 450	2 360	5,4	0,71	**24024-BE-XL-K30**	**AH24024**
	120	200	62	630	800	72 000	3 400	2 290	7,1	0,97	**23124-E1-XL-K-TVPB**	**AHX3124**
	120	200	62	630	800	72 000	3 400	2 290	7,6	0,97	**23124-E1A-XL-K-M**	**AHX3124**
	120	200	80	680	950	101 000	2 950	1 740	10,2	1,02	**24124-BE-XL-K30**	**AH24124**
	120	215	58	640	740	68 000	3 650	2 700	8,84	0,97	**22224-E1-XL-K**	**AHX3124**
	120	215	76	820	1 020	80 000	3 000	1 910	11,1	1,22	**23224-E1-XL-K-TVPB**	**AHX3224A**
	120	215	76	820	1 020	80 000	3 000	1 910	11,4	1,22	**23224-E1A-XL-K-M**	**AHX3224A**
	120	260	86	1 080	1 170	102 000	2 850	2 000	22,1	1,5	**22324-E1-XL-K**	**AHX2324G**
125	130	200	52	540	730	69 000	3 600	2 600	5,4	0,94	**23026-E1-XL-K-TVPB**	**AHX3026**
	130	200	52	540	730	69 000	3 600	2 600	5,7	0,94	**23026-E1A-XL-K-M**	**AHX3026**
	130	200	69	570	860	100 000	3 100	2 130	8,1	0,89	**24026-BE-XL-K30**	**AH24026**
	130	210	64	680	890	78 000	3 200	2 110	7,8	1,1	**23126-E1-XL-K-TVPB**	**AHX3126**
	130	210	64	680	890	78 000	3 200	2 110	8,1	1,1	**23126-E1A-XL-K-M**	**AHX3126**
	130	210	80	710	1 050	109 000	2 800	1 560	10,8	1,13	**24126-BE-XL-K30**	**AH24126**
	130	230	64	760	890	79 000	3 350	2 500	10,9	1,1	**22226-E1-XL-K**	**AHX3126**
	130	230	80	910	1 150	88 000	2 850	1 740	12,6	1,48	**23226-E1-XL-K-TVPB**	**AHX3226G**
	130	230	80	910	1 150	88 000	2 850	1 740	13,6	1,48	**23226-E1A-XL-K-M**	**AHX3226G**
	130	280	93	1 250	1 370	116 000	2 650	1 820	27,4	1,84	**22326-E1-XL-K**	**AHX2326G**
135	140	210	53	570	800	75 000	3 450	2 390	5,8	1,03	**23028-E1-XL-K-TVPB**	**AHX3028**
	140	210	53	570	800	75 000	3 450	2 390	6	1,03	**23028-E1A-XL-K-M**	**AHX3028**
	140	210	69	590	930	108 000	2 950	1 950	8,1	0,96	**24028-BE-XL-K30**	**AH24028**
	140	225	68	760	1 010	87 000	3 000	1 930	9,5	1,29	**23128-E1-XL-K-TVPB**	**AHX3128**
	140	225	68	760	1 010	87 000	3 000	1 930	10,2	1,29	**23128-E1A-XL-K-M**	**AHX3128**
	140	225	85	800	1 190	124 000	2 650	1 430	13,5	1,29	**24128-BE-XL-K30**	**AH24128**
	140	250	68	870	1 040	97 000	3 150	2 250	13,7	1,29	**22228-E1-XL-K**	**AHX3128**
	140	250	88	1 090	1 400	113 000	2 600	1 550	17,1	1,72	**23228-E1-XL-K-TVPB**	**AHX3228G**
	140	250	88	1 090	1 400	113 000	2 600	1 550	17,6	1,72	**23228-E1A-XL-K-M**	**AHX3228G**
	140	300	102	1 460	1 630	131 000	2 420	1 660	34,4	2,21	**22328-E1-XL-K**	**AHX2328G**

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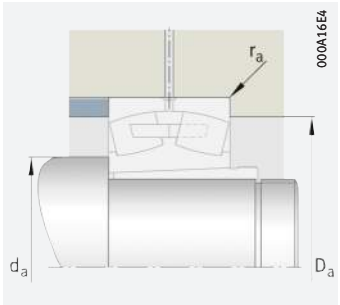
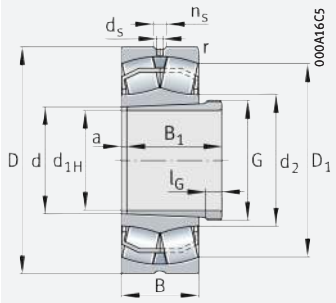


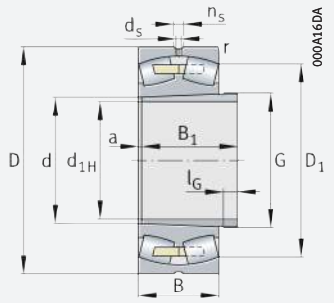
Mounting dimensions

Dimensions										Mounting dimensions			Calculation factors			
d_{1H}	r min.	D_1 ≈	d_2 ≈	d_s	n_s	a ≈	l_G	Thread G	B_1	d_a min.	D_a max.	r_a max.	e	Y_1	Y_2	Y_0
115	2	164,7	133	3,2	6,5	4	13	M130×2	60	128,8	171,2	2	0,22	3,04	4,53	2,97
	2	164,7	–	3,2	6,5	4	13	M130×2	60	128,8	171,2	2	0,22	3,04	4,53	2,97
	2	159,8	134,5	3,2	6,5	9	13	M125×2	73	128,8	171,2	2	0,29	2,33	3,47	2,28
	2	177,4	136,2	4,8	9,5	4	12	M130×2	75	131	189	2	0,28	2,39	3,56	2,34
	2	177,4	–	4,8	9,5	4	12	M130×2	75	131	189	2	0,28	2,39	3,56	2,34
	2	170,3	136,6	3,2	6,5	9	13	M130×2	93	131	189	2	0,37	1,84	2,74	1,8
	2,1	192	141,9	6,3	12,2	4	12	M130×2	75	132	203	2,1	0,25	2,71	4,04	2,65
	2,1	185,5	139	4,8	9,5	4	13	M130×2	90	132	203	2,1	0,33	2,03	3,02	1,98
	2,1	185,5	–	4,8	9,5	4	13	M130×2	90	132	203	2,1	0,33	2,03	3,02	1,98
	3	222,4	150,7	8	15	4	17	M130×2	105	134	246	2,5	0,33	2,06	3,06	2,01
125	2	182,3	145,9	4,8	9,5	4	14	M140×2	67	138,8	191,2	2	0,23	2,95	4,4	2,89
	2	182,3	–	4,8	9,5	4	14	M140×2	67	138,8	191,2	2	0,23	2,95	4,4	2,89
	2	176,1	146,2	3,2	6,5	10	14	M135×2	83	138,8	191,2	2	0,31	2,21	3,29	2,16
	2	187,3	146	4,8	9,5	4	12	M140×2	78	141	199	2	0,28	2,45	3,64	2,39
	2	187,3	–	4,8	9,5	4	12	M140×2	78	141	199	2	0,28	2,45	3,64	2,39
	2	181,2	148,3	3,2	6,5	10	14	M140×2	94	141	199	2	0,34	1,98	2,94	1,93
	3	205	151,7	6,3	12,2	4	12	M140×2	78	144	216	2,5	0,26	2,62	3,9	2,56
	3	199,3	150	4,8	9,5	4	15	M140×2	98	144	216	2,5	0,33	2,07	3,09	2,03
	3	199,3	–	4,8	9,5	4	15	M140×2	98	144	216	2,5	0,33	2,07	3,09	2,03
	4	239,5	162,2	9,5	17,7	4	19	M140×2	115	147	263	3	0,33	2,06	3,06	2,01
135	2	192,3	155,4	4,8	9,5	5	14	M150×2	68	148,8	201,2	2	0,22	3,07	4,57	3
	2	192,3	–	4,8	9,5	5	14	M150×2	68	148,8	201,2	2	0,22	3,07	4,57	3
	2	186,4	157,1	3,2	6,5	10	14	M145×2	83	148,8	201,2	2	0,28	2,37	3,53	2,32
	2,1	201	157,1	4,8	9,5	5	14	M150×2	83	152	213	2,1	0,27	2,49	3,71	2,43
	2,1	201	–	4,8	9,5	5	14	M150×2	83	152	213	2,1	0,27	2,49	3,71	2,43
	2,1	194,4	158,9	4,8	9,5	10	14	M150×2	99	152	213	2,1	0,34	1,99	2,96	1,94
	3	223,1	164,9	6,3	12,2	5	14	M150×2	83	154	236	2,5	0,25	2,67	3,97	2,61
	3	216	162	6,3	12,2	5	15	M150×2	104	154	236	2,5	0,33	2,04	3,04	2
	3	216	–	6,3	12,2	5	15	M150×2	104	154	236	2,5	0,33	2,04	3,04	2
	4	255,7	173,5	9,5	17,7	5	20	M150×2	125	157	283	3	0,34	2	2,98	1,96

Spherical roller bearings

With withdrawal sleeve



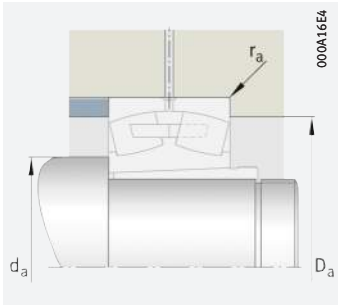


With solid cage, brass or steel

d_{1H} = 145 – 160 mm

Main dimensions				Basic load ratings		Fatigue limit load	Limiting speed	Speed rating	Mass m		Designation ➤681|1.12 ➤683|1.13 X-life ➤671	
d_{1H}	d	D	B	dyn. C_r	stat. C_{0r}	C_{ur}	n_G	$n_{\vartheta r}$	Bearing	Withdrawal sleeve	Bearing	Withdrawal sleeve
				kN	kN	N	min^{-1}	min^{-1}	≈ kg	≈ kg		
145	150	225	56	630	880	85 000	3 250	2 210	7,3	1,18	**23030-E1-XL-K-TVPB**	**AHX3030**
	150	225	56	630	880	85 000	3 250	2 210	7,3	1,18	**23030-E1A-XL-K-M**	**AHX3030**
	150	225	75	680	1 090	122 000	2 750	1 790	10,7	1,12	**24030-BE-XL-K30**	**AH24030**
	150	250	80	1 000	1 330	141 000	2 650	1 720	14,5	1,66	**23130-E1-XL-K-TVPB**	**AHX3130G**
	150	250	80	1 000	1 330	141 000	2 650	1 720	15,8	1,66	**23130-E1A-XL-K-M**	**AHX3130G**
	150	250	100	1 050	1 520	148 000	2 370	1 270	20,2	1,63	**24130-BE-XL-K30**	**AH24130**
	150	270	73	1 010	1 210	111 000	2 900	2 050	17,8	1,66	**22230-E1-XL-K**	**AHX3130G**
	150	270	96	1 280	1 660	129 000	2 400	1 400	22,3	2,09	**23230-E1-XL-K-TVPB**	**AHX3230G**
	150	270	96	1 280	1 660	129 000	2 400	1 400	22,9	2,09	**23230-E1A-XL-K-M**	**AHX3230G**
	150	320	108	1 640	1 850	147 000	2 290	1 520	40,9	2,64	**22330-E1-XL-K**	**AHX2330G**
150	160	240	60	720	1 010	95 000	3 050	2 060	8,7	2,09	**23032-E1-XL-K-TVPB**	**AH3032**
	160	240	60	720	1 010	95 000	3 050	2 060	9,4	2,09	**23032-E1A-XL-K-M**	**AH3032**
	160	240	80	770	1 240	137 000	2 550	1 660	12,2	2,31	**24032-BE-XL-K30**	**AH24032**
	160	270	86	1 160	1 550	162 000	2 490	1 560	18,5	2,9	**23132-E1-XL-K-TVPB**	**AH3132A**
	160	270	86	1 160	1 550	162 000	2 490	1 560	18,6	2,9	**23132-E1A-XL-K-M**	**AH3132A**
	160	270	109	1 220	1 800	168 000	2 180	1 140	24,9	3,04	**24132-BE-XL-K30**	**AH24132**
	160	290	80	1 150	1 400	125 000	2 650	1 900	22,4	2,9	**22232-E1-XL-K**	**AH3132A**
	160	290	104	1 460	1 910	146 000	2 210	1 280	27,7	3,65	**23232-E1-XL-K-TVPB**	**AH3232G**
	160	290	104	1 460	1 910	146 000	2 210	1 280	28,5	3,65	**23232-E1A-XL-K-M**	**AH3232G**
	160	340	114	1 680	1 990	157 000	2 250	1 420	47,3	4,26	**22332-BE-XL-K**	**AH2332G**
160	170	260	67	880	1 230	148 000	2 800	1 890	11,9	2,48	**23034-E1-XL-K-TVPB**	**AH3034**
	170	260	67	880	1 230	148 000	2 800	1 890	12,5	2,48	**23034-E1A-XL-K-M**	**AH3034**
	170	260	90	940	1 480	158 000	2 380	1 540	16,5	2,76	**24034-BE-XL-K30**	**AH24034**
	170	280	88	1 220	1 690	173 000	2 380	1 460	19,9	3,12	**23134-E1-XL-K-TVPB**	**AH3134A**
	170	280	88	1 220	1 690	173 000	2 380	1 460	19,5	3,12	**23134-E1A-XL-K-M**	**AH3134A**
	170	280	109	1 260	1 900	179 000	2 110	1 060	25,9	3,27	**24134-BE-XL-K30**	**AH24134**
	170	310	86	1 320	1 570	140 000	2 550	1 780	27,1	3,12	**22234-E1-XL-K**	**AH3134A**
	170	310	110	1 640	2 170	163 000	2 090	1 160	33,1	4,29	**23234-E1-XL-K-TVPB**	**AH3234G**
	170	310	110	1 640	2 170	163 000	2 090	1 160	34,6	4,29	**23234-E1A-XL-K-M**	**AH3234G**
	170	360	120	1 870	2 220	173 000	2 130	1 320	56,9	4,78	**22334-BE-XL-K**	**AH2334G**

medias ➤ *https://www.schaeffler.de/std/1EF1*

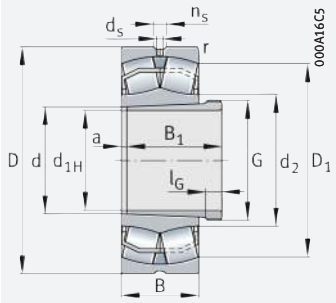


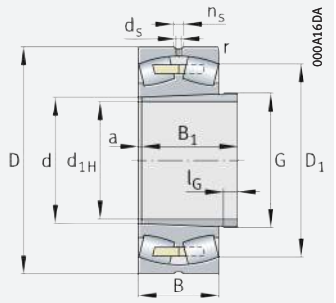
Mounting dimensions

Dimensions										Mounting dimensions			Calculation factors			
d_{1H}	r min.	D_1 ≈	d_2 ≈	d_s	n_s	a ≈	l_G	Thread G	B_1	d_a min.	D_a max.	r_a max.	e	Y_1	Y_2	Y_0
145	2,1	206,3	166,6	4,8	9,5	5	15	M160×3	72	160,2	214,8	2,1	0,22	3,1	4,62	3,03
	2,1	206,3	–	4,8	9,5	5	15	M160×3	72	160,2	214,8	2,1	0,22	3,1	4,62	3,03
	2,1	199,4	168,1	3,2	6,5	11	15	M155×3	90	160,2	214,8	2,1	0,29	2,32	3,45	2,26
	2,1	220,8	170,1	6,3	12,2	5	15	M160×3	96	162	238	2,1	0,29	2,32	3,45	2,26
	2,1	220,8	–	6,3	12,2	5	15	M160×3	96	162	238	2,1	0,29	2,32	3,45	2,26
	2,1	213	170,3	4,8	9,5	11	15	M160×3	115	162	238	2,1	0,37	1,83	2,72	1,79
	3	240,8	177,9	8	15	5	15	M160×3	96	164	256	2,5	0,25	2,69	4	2,63
	3	232,6	174	6,3	12,2	5	17	M160×3	114	164	256	2,5	0,33	2,02	3	1,97
	3	232,6	–	6,3	12,2	5	17	M160×3	114	164	256	2,5	0,33	2,02	3	1,97
	4	273,2	185,3	9,5	17,7	5	24	M160×3	135	167	303	3	0,33	2,02	3	1,97
150	2,1	219,9	177	6,3	12,2	5	16	M170×3	77	170,2	229,8	2,1	0,22	3,1	4,62	3,03
	2,1	219,9	–	6,3	12,2	5	16	M170×3	77	170,2	229,8	2,1	0,22	3,1	4,62	3,03
	2,1	212,5	179,3	4,8	9,5	11	15	M170×3	95	170,2	229,8	2,1	0,29	2,32	3,45	2,26
	2,1	238,3	183,2	8	15	5	16	M170×3	103	172	258	2,1	0,29	2,32	3,45	2,26
	2,1	238,3	–	8	15	5	16	M170×3	103	172	258	2,1	0,29	2,32	3,45	2,26
	2,1	228,9	183,4	4,8	9,5	11	15	M170×3	124	172	258	2,1	0,37	1,8	2,69	1,76
	3	258,2	190,9	8	15	5	16	M170×3	103	174	276	2,5	0,26	2,64	3,93	2,58
	3	249,3	186,7	8	15	6	20	M170×3	124	174	276	2,5	0,34	2	2,98	1,96
	3	249,3	–	8	15	6	20	M170×3	124	174	276	2,5	0,34	2	2,98	1,96
	4	286,7	201,2	9,5	17,7	6	24	M170×3	140	177	323	3	0,35	1,94	2,88	1,89
160	2,1	237,2	189,8	6,3	12,2	5	17	M180×3	85	180,2	249,8	2,1	0,23	2,98	4,44	2,92
	2,1	237,2	–	6,3	12,2	5	17	M180×3	85	180,2	249,8	2,1	0,23	2,98	4,44	2,92
	2,1	228,4	190	4,8	9,5	11	16	M180×3	106	180,2	249,8	2,1	0,31	2,2	3,27	2,15
	2,1	248,1	193,4	8	15	5	16	M180×3	104	182	268	2,1	0,28	2,37	3,53	2,32
	2,1	248,1	–	8	15	5	16	M180×3	104	182	268	2,1	0,28	2,37	3,53	2,32
	2,1	240	194,1	4,8	9,5	11	16	M180×3	125	182	268	2,1	0,36	1,9	2,83	1,86
	4	275,4	199,8	9,5	17,7	5	16	M180×3	104	187	293	3	0,26	2,6	3,87	2,54
	4	267,4	199,8	8	15	6	24	M180×3	134	187	293	3	0,33	2,03	3,02	1,98
	4	267,4	–	8	15	6	24	M180×3	134	187	293	3	0,33	2,03	3,02	1,98
	4	303,9	213,1	9,5	17,7	6	24	M180×3	146	187	343	3	0,35	1,95	2,9	1,91

Spherical roller bearings

With withdrawal sleeve





With solid cage, brass or steel

d_{1H} = 170 – 190 mm

Main dimensions				Basic load ratings		Fatigue limit load	Limiting speed	Speed rating	Mass m		Designation ➤681|1.12 ➤683|1.13 X-life ➤671	
d_{1H}	d	D	B	dyn. C_r	stat. C_{0r}	C_{ur}	n_G	$n_{\vartheta r}$	Bearing	Withdrawal sleeve	Bearing	Withdrawal sleeve
				kN	kN	N	min^{-1}	min^{-1}	≈ kg	≈ kg		
170	180	250	52	445	840	57 000	3 200	1 850	7,8	1,96	**23936-S-K-MB**	**AH3936**
	180	280	74	1 040	1 450	169 000	2 600	1 760	15,6	2,87	**23036-E1-XL-K-TVPB**	**AH3036**
	180	280	74	1 040	1 450	169 000	2 600	1 760	16	2,87	**23036-E1A-XL-K-M**	**AH3036**
	180	280	100	1 130	1 770	180 000	2 200	1 420	21,8	3,21	**24036-BE-XL-K30**	**AH24036**
	180	300	96	1 420	1 950	194 000	2 230	1 350	25,9	3,79	**23136-E1-XL-K-TVPB**	**AH3136A**
	180	300	96	1 420	1 950	194 000	2 230	1 350	25,5	3,79	**23136-E1A-XL-K-M**	**AH3136A**
	180	300	118	1 460	2 170	203 000	2 000	980	32,5	3,74	**24136-BE-XL-K30**	**AH24136**
	180	320	86	1 360	1 680	148 000	2 470	1 670	28,5	3,35	**22236-E1-XL-K**	**AH2236G**
	180	320	112	1 720	2 340	173 000	2 010	1 090	36	4,8	**23236-E1-XL-K-TVPB**	**AH3236G**
	180	320	112	1 720	2 340	173 000	2 010	1 090	37	4,8	**23236-E1A-XL-K-M**	**AH3236G**
	180	380	126	2 060	2 460	190 000	2 030	1 230	66,6	5,42	**22336-BE-XL-K**	**AH2336G**
180	190	290	75	1 080	1 550	179 000	2 490	1 660	16,3	3,19	**23038-E1-XL-K-TVPB**	**AH3038G**
	190	290	75	1 080	1 550	179 000	2 490	1 660	17,7	3,19	**23038-E1A-XL-K-M**	**AH3038G**
	190	290	100	1 160	1 860	192 000	2 140	1 330	22,8	3,48	**24038-BE-XL-K30**	**AH24038**
	190	320	104	1 610	2 220	216 000	2 070	1 260	30,3	4,39	**23138-E1-XL-K-TVPB**	**AH3138G**
	190	320	104	1 610	2 220	216 000	2 070	1 260	32,4	4,39	**23138-E1A-XL-K-M**	**AH3138G**
	190	320	128	1 680	2 550	226 000	1 850	880	40,7	4,37	**24138-BE-XL-K30**	**AH24138**
	190	340	92	1 360	1 760	159 000	2 480	1 620	36	3,83	**22238-BE-XL-K**	**AH2238G**
	190	340	120	1 740	2 400	200 000	1 990	1 070	42,6	5,3	**23238-BE-XL-K**	**AH3238G**
	190	400	132	2 220	2 650	207 000	1 940	1 160	77,2	6,02	**22338-BE-XL-K**	**AH2338G**
190	200	280	60	550	1 070	71 000	2 800	1 650	11,5	2,62	**23940-S-K-MB**	**AH3940**
	200	310	82	1 270	1 800	202 000	2 330	1 550	20,8	3,62	**23040-E1-XL-K-TVPB**	**AH3040G**
	200	310	82	1 270	1 800	202 000	2 330	1 550	21,4	3,62	**23040-E1A-XL-K-M**	**AH3040G**
	200	310	109	1 350	2 150	215 000	2 010	1 240	28,9	3,96	**24040-BE-XL-K30**	**AH24040**
	200	340	112	1 610	2 270	188 000	2 040	1 230	40,9	5,6	**23140-BE-XL-K**	**AH3140**
	200	340	140	1 880	2 800	250 000	1 780	840	48,5	5,02	**24140-BE-XL-K30**	**AH24140**
	200	360	98	1 520	1 990	175 000	2 330	1 510	42,3	4,8	**22240-BE-XL-K**	**AH2240**
	200	360	128	1 940	2 700	219 000	1 870	1 000	57,3	6,61	**23240-BE-XL-K**	**AH3240**
	200	420	138	2 440	2 950	225 000	1 830	1 080	87,4	7,64	**22340-BE-XL-K**	**AH2340**

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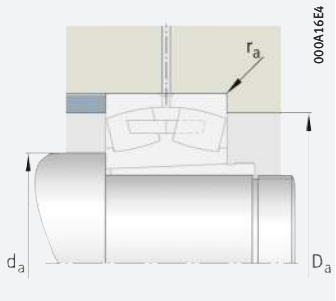
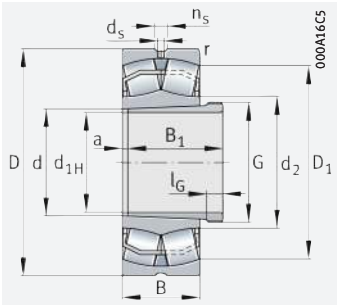


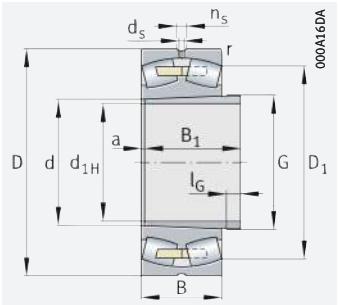
Mounting dimensions

Dimensions										Mounting dimensions			Calculation factors			
d_{1H}	r min.	D_1 ≈	d_2 ≈	d_s	n_s	a ≈	l_G	Thread G	B_1	d_a min.	D_a max.	r_a max.	e	Y_1	Y_2	Y_0
170	2	230,9	–	4,8	9,5	5	13	M190×3	66	188,8	241,2	2	0,2	3,42	5,09	3,34
	2,1	254,3	201,8	8	15	6	17	M190×3	92	190,2	269,8	2,1	0,23	2,9	4,31	2,83
	2,1	254,3	–	8	15	6	17	M190×3	92	190,2	269,8	2,1	0,23	2,9	4,31	2,83
	2,1	244,6	201,7	4,8	9,5	11	16	M190×3	116	190,2	269,8	2,1	0,32	2,1	3,13	2,06
	3	264,8	204,1	8	15	6	19	M190×3	116	194	286	2,5	0,29	2,32	3,45	2,26
	3	264,8	–	8	15	6	19	M190×3	116	194	286	2,5	0,29	2,32	3,45	2,26
	3	255,7	204,8	6,3	12,2	11	16	M190×3	134	194	286	2,5	0,36	1,86	2,77	1,82
	4	285,9	211,3	9,5	17,7	5	17	M190×3	105	197	303	3	0,25	2,71	4,04	2,65
	4	277,3	210,6	8	15	6	25	M190×3	140	197	303	3	0,33	2,07	3,09	2,03
	4	277,3	–	8	15	6	25	M190×3	140	197	303	3	0,33	2,07	3,09	2,03
	4	320,8	224,9	12,5	23,5	6	26	M190×3	154	197	363	3	0,34	1,96	2,92	1,92
180	2,1	264,5	211,9	8	15	6	18	M200×3	96	200,2	279,8	2,1	0,23	2,98	4,44	2,92
	2,1	264,5	–	8	15	6	18	M200×3	96	200,2	279,8	2,1	0,23	2,98	4,44	2,92
	2,1	255	211,9	4,8	9,5	13	18	M200×3	118	200,2	279,8	2,1	0,31	2,2	3,27	2,15
	3	281,6	217	8	15	6	20	M200×3	125	204	306	2,5	0,3	2,28	3,39	2,23
	3	281,6	–	8	15	6	20	M200×3	125	204	306	2,5	0,3	2,28	3,39	2,23
	3	271,6	217,4	6,3	12,2	13	18	M200×3	146	204	306	2,5	0,37	1,82	2,7	1,78
	4	295,2	225,2	9,5	17,7	5	18	M200×3	112	207	323	3	0,26	2,6	3,87	2,54
	4	289	222,4	9,5	17,7	7	25	M200×3	145	207	323	3	0,34	1,98	2,94	1,93
	5	338,1	236,8	12,5	23,5	7	26	M200×3	160	210	380	4	0,34	1,96	2,92	1,92
190	2,1	256,9	–	6,3	12,2	6	16	Tr210×4	77	210,2	269,8	2,1	0,2	3,42	5,09	3,34
	2,1	281,6	223,4	8	15	6	19	Tr210×4	102	210,2	299,8	2,1	0,23	2,9	4,31	2,83
	2,1	281,6	–	8	15	6	19	Tr210×4	102	210,2	299,8	2,1	0,23	2,9	4,31	2,83
	2,1	271,6	223,6	6,3	12,2	13	18	Tr210×4	127	210,2	299,8	2,1	0,32	2,13	3,17	2,08
	3	295,8	230,4	9,5	17,7	6	21	Tr220×4	134	214	326	2,5	0,32	2,1	3,13	2,06
	3	287,9	227,1	6,3	12,2	13	18	Tr210×4	158	214	326	2,5	0,39	1,71	2,54	1,67
	4	310,9	238,2	9,5	17,7	5	19	Tr220×4	118	217	343	3	0,26	2,57	3,83	2,52
	4	305,3	235	9,5	17,7	7	24	Tr220×4	153	217	343	3	0,35	1,95	2,9	1,91
	5	355,1	248,8	12,5	23,5	7	30	Tr220×4	170	220	400	4	0,34	1,98	2,94	1,93

Spherical roller bearings

With withdrawal sleeve





With solid cage, brass or steel

d_{1H} = 200 – 260 mm

Main dimensions				Basic load ratings		Fatigue limit load	Limiting speed	Speed rating	Mass m		Designation ➤681|1.12 ➤683|1.13 X-life ➤671	
d_{1H}	d	D	B	dyn. C_r	stat. C_{0r}	C_{ur}	n_G	$n_{\vartheta r}$	Bearing	Withdrawal sleeve	Bearing	Withdrawal sleeve
				kN	kN	N	min^{-1}	min^{-1}	≈ kg	≈ kg		
200	220	300	60	610	1 240	72 000	2 600	1 460	12,3	4,81	**23944-S-K-MB**	**AH3944**
	220	340	90	1 260	1 900	177 000	2 230	1 450	28,5	7,18	**23044-BE-XL-K**	**AH3044G**
	220	340	118	1 620	2 600	250 000	1 830	1 090	37,7	8,22	**24044-BE-XL-K30**	**AH24044**
	220	370	120	1 860	2 700	217 000	1 860	1 080	50,5	10,4	**23144-BE-XL-K**	**AH3144**
	220	370	150	2 190	3 250	290 000	1 650	750	62,7	10,3	**24144-BE-XL-K30**	**AH24144**
	220	400	108	1 840	2 360	210 000	2 140	1 350	58,3	9,17	**22244-BE-XL-K**	**AH2244**
	220	400	144	2 380	3 300	265 000	1 700	880	75,3	13,6	**23244-BE-XL-K**	**AH2344**
	220	460	145	2 800	3 400	265 000	1 690	950	114	13,6	**22344-BE-XL-K**	**AH2344**
220	240	320	60	640	1 370	93 000	2 440	1 310	13,4	5,26	**23948-K-MB**	**AH3948**
	240	360	92	1 350	2 120	194 000	2 080	1 310	31,6	8,92	**23048-BE-XL-K**	**AH3048**
	240	360	118	1 670	2 850	275 000	1 710	980	42,3	9,03	**24048-BE-XL-K30**	**AH24048**
	240	400	128	2 130	3 150	248 000	1 700	970	62	12,3	**23148-BE-XL-K**	**AH3148**
	240	400	160	2 600	3 900	330 000	1 470	650	81,5	12,6	**24148-BE-XL-K30**	**AH24148**
	240	440	120	2 230	2 900	247 000	1 900	1 200	81,8	11,3	**22248-BE-XL-K**	**AH2248**
	240	440	160	2 850	4 000	310 000	1 500	770	102	15,6	**23248-BE-XL-K**	**AH2348**
	240	500	155	3 200	4 050	305 000	1 510	830	148	15,6	**22348-BEA-XL-K-MB1**	**AH2348**
240	260	360	75	940	1 940	108 000	2 100	1 190	22,4	7,7	**23952-K-MB**	**AH3952G**
	260	400	104	1 670	2 600	233 000	1 850	1 170	45,9	10,8	**23052-BE-XL-K**	**AH3052**
	260	400	140	2 210	3 650	335 000	1 510	880	61,2	11,6	**24052-BE-XL-K30**	**AH24052**
	260	440	144	2 600	3 900	305 000	1 500	860	87,2	15,1	**23152-BE-XL-K**	**AH3152G**
	260	440	180	3 150	4 900	390 000	1 290	560	108	15,5	**24152-BE-XL-K30**	**AH24152**
	260	480	130	2 600	3 450	290 000	1 720	1 070	104	13,3	**22252-BEA-XL-K-MB1**	**AH2252G**
	260	480	174	3 350	4 750	360 000	1 360	690	134	18,7	**23252-BEA-XL-K-MB1**	**AH2352G**
	260	540	165	3 650	4 650	350 000	1 390	740	179	18,7	**22352-BEA-XL-K-MB1**	**AH2352G**
260	280	380	75	970	2 040	129 000	2 000	1 100	24,7	8,3	**23956-K-MB**	**AH3956G**
	280	420	106	1 780	2 850	255 000	1 740	1 090	49,3	12	**23056-BE-XL-K**	**AH3056**
	280	420	140	2 290	3 950	360 000	1 420	800	67,8	12,6	**24056-BE-XL-K30**	**AH24056**
	280	460	146	2 750	4 200	315 000	1 420	790	93,1	16,7	**23156-BE-XL-K**	**AH3156G**
	280	460	180	3 300	5 200	425 000	1 230	520	114	16,7	**24156-BE-XL-K30**	**AH24156**
	280	500	130	2 750	3 700	310 000	1 650	990	109	14,4	**22256-BEA-XL-K-MB1**	**AH2256G**
	280	500	176	3 550	5 200	385 000	1 280	630	143,7	20,9	**23256-BEA-XL-K-MB1**	**AH2356G**
	280	580	175	4 150	5 300	395 000	1 280	670	223	20,9	**22356-BEA-XL-K-MB1**	**AH2356G**

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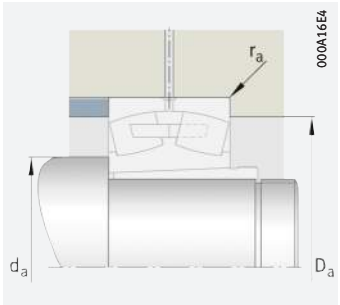
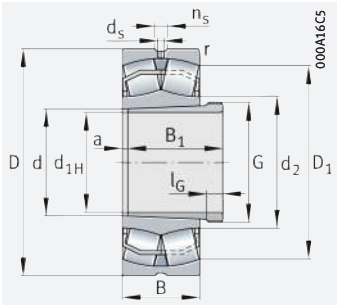


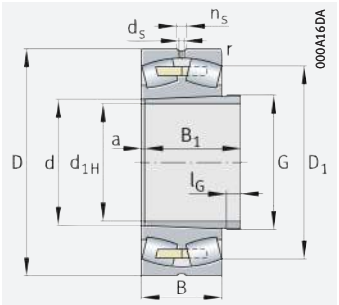
Mounting dimensions

Dimensions										Mounting dimensions			Calculation factors			
d_{1H}	r min.	D_1 ≈	d_2 ≈	d_s	n_s	a ≈	l_G	Thread G	B_1	d_a min.	D_a max.	r_a max.	e	Y_1	Y_2	Y_0
200	2,1	277,4	–	6,3	12,2	6	16	Tr230×4	77	230,2	289,8	2,1	0,18	3,76	5,59	3,67
	3	304,5	248,8	8	15	6	20	Tr230×4	111	232,4	327,6	2,5	0,24	2,81	4,19	2,75
	3	295,7	245	6,3	12,2	14	18	Tr230×4	138	232,4	327,6	2,5	0,32	2,1	3,13	2,06
	4	323	254,8	9,5	17,7	6	23	Tr240×4	145	237	353	3	0,31	2,15	3,2	2,1
	4	314,3	247,6	6,3	12,2	14	20	Tr230×4	170	237	353	3	0,39	1,74	2,59	1,7
	4	346,6	260,1	9,5	17,7	6	20	Tr240×4	130	237	383	3	0,26	2,57	3,83	2,52
	4	338	255,8	9,5	17,7	8	30	Tr240×4	181	237	383	3	0,36	1,9	2,83	1,86
	5	391,1	273,4	12,5	23,5	8	30	Tr240×4	181	240	440	4	0,33	2,06	3,06	2,01
220	2,1	297,8	–	6,3	12,2	6	16	Tr250×4	77	250,2	309,8	2,1	0,17	4,05	6,04	3,96
	3	324,6	269,5	8	15	7	21	Tr260×4	116	252,4	347,6	2,5	0,23	2,98	4,44	2,92
	3	317,2	268,5	6,3	12,2	15	20	Tr250×4	138	252,4	347,6	2,5	0,3	2,28	3,39	2,23
	4	349,9	275,9	9,5	17,7	7	25	Tr260×4	154	257	383	3	0,31	2,18	3,24	2,13
	4	339	267,3	6,3	12,2	15	20	Tr260×4	180	257	383	3	0,39	1,71	2,54	1,67
	4	380,4	285,6	12,5	23,5	6	21	Tr260×4	144	257	423	3	0,26	2,55	3,8	2,5
	4	370,8	280,8	12,5	23,5	8	30	Tr260×4	189	257	423	3	0,36	1,87	2,79	1,83
	5	426,4	–	12,5	23,5	8	30	Tr260×4	189	260	480	4	0,32	2,12	3,15	2,07
240	2,1	330,5	–	8	15	6	18	Tr280×4	94	270,2	349,8	2,1	0,19	3,54	5,27	3,46
	4	358,7	295,5	9,5	17,7	7	23	Tr280×4	128	274,6	385,4	3	0,23	2,9	4,31	2,83
	4	349	288,3	6,3	12,2	16	20	Tr270×4	162	274,6	385,4	3	0,32	2,09	3,11	2,04
	4	382,7	301,7	9,5	17,7	7	26	Tr280×4	172	277	423	3	0,32	2,12	3,15	2,07
	4	370,6	292,2	8	15	16	22	Tr280×4	202	277	423	3	0,4	1,67	2,49	1,63
	5	415,1	–	12,5	23,5	6	23	Tr280×4	155	280	460	4	0,26	2,57	3,83	2,52
	5	404,3	–	12,5	23,5	8	30	Tr280×4	205	280	460	4	0,36	1,87	2,79	1,83
	6	460,6	–	12,5	23,5	8	30	Tr280×4	205	286	514	5	0,31	2,15	3,2	2,1
260	2,1	350	–	8	15	6	18	Tr300×4	94	290,2	369,8	2,1	0,18	3,76	5,59	3,67
	4	379,2	314,3	9,5	17,7	8	24	Tr300×4	131	294,6	405,4	3	0,22	3,01	4,48	2,94
	4	370,5	310,3	6,3	12,2	17	22	Tr290×4	162	294,6	405,4	3	0,3	2,23	3,32	2,18
	5	403,4	321,4	9,5	17,7	8	28	Tr300×4	175	300	440	4	0,31	2,21	3,29	2,16
	5	392,4	312,8	8	15	17	22	Tr300×4	202	300	440	4	0,38	1,76	2,62	1,72
	5	436	–	12,5	23,5	8	24	Tr300×4	155	300	480	4	0,25	2,71	4,04	2,65
	5	425,4	–	12,5	23,5	8	30	Tr300×4	212	300	480	4	0,34	1,96	2,92	1,92
	6	495,5	–	12,5	23,5	8	30	Tr300×4	212	306	554	5	0,31	2,18	3,24	2,13

Spherical roller bearings

With withdrawal sleeve



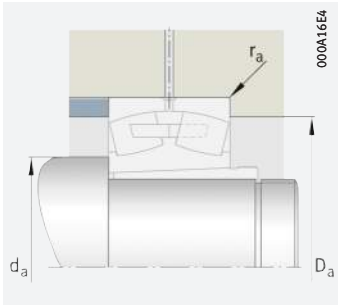


With solid cage, brass or steel

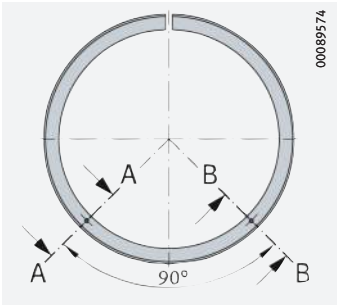
d_{1H} = 280 – 360 mm

Main dimensions				Basic load ratings		Fatigue limit load	Limiting speed	Speed rating	Mass m		Designation ➤681 | 1.12 ➤683 | 1.13 X-life ➤671	
d_{1H}	d	D	B	dyn. C_r	stat. C_{0r}	C_{ur}	n_G	$n_{\vartheta r}$	Bearing	Withdrawal sleeve	Bearing	Withdrawal sleeve
				kN	kN	N	min^{-1}	min^{-1}	≈ kg	≈ kg		
280	300	420	90	1 270	2 650	165 000	1 780	1 000	39,1	10,8	**23960-B-K-MB**	**AH3960G**
	300	460	118	2 160	3 450	295 000	1 570	980	68,4	14,4	**23060-BE-XL-K**	**AH3060**
	300	460	160	2 850	4 900	425 000	1 250	720	97	15,5	**24060-BE-XL-K30**	**AH24060**
	300	500	160	3 250	4 950	365 000	1 300	720	126	20	**23160-BEA-XL-K-MB1**	**AH3160G**
	300	500	200	3 950	6 400	485 000	1 100	450	161	20,1	**24160-BE-XL-K30**	**AH24160**
	300	540	140	3 100	4 250	355 000	1 500	900	139	17,2	**22260-BEA-XL-K-MB1**	**AH2260G**
	300	540	192	4 100	6 100	440 000	1 160	560	187	24,6	**23260-BEA-XL-K-MB1**	**AH3260G-H**
300	320	440	90	1 310	2 750	201 000	1 700	930	41	11,5	**23964-K-MB**	**AH3964G-H**
	320	480	121	2 300	3 750	320 000	1 480	920	75,6	15,9	**23064-BEA-XL-K-MB1**	**AH3064G-H**
	320	480	160	2 950	5 200	455 000	1 200	670	99	16,6	**24064-BEA-XL-K30-MB1**	**AH24064-H**
	320	540	176	3 800	5 900	415 000	1 170	650	161	23,6	**23164-BEA-XL-K-MB1**	**AH3164G-H**
	320	540	218	4 600	7 300	560 000	1 010	415	205	23,4	**24164-BE-XL-K30**	**AH24164-H**
	320	580	150	3 550	4 700	395 000	1 410	830	171	19,6	**22264-BEA-XL-K-MB1**	**AH2264G-H**
	320	580	208	4 650	7 000	495 000	1 060	510	229,6	28,9	**23264-BEA-XL-K-MB1**	**AH3264G-H**
320	340	520	133	2 700	4 400	365 000	1 360	840	101	18,6	**23068-BEA-XL-K-MB1**	**AH3068G-H**
	340	520	180	3 550	6 200	520 000	1 080	610	136	21,1	**24068-BEA-XL-K30-MB1**	**AH24068-H**
	340	580	190	4 350	6 600	465 000	1 090	600	204	27,5	**23168-BEA-XL-K-MB1**	**AH3168G-H**
	340	580	243	5 400	8 800	620 000	900	370	263	28	**24168-BE-XL-K30**	**AH24168-H**
	340	620	224	5 300	7 900	570 000	1 000	475	292	33,6	**23268-BEA-XL-K-MB1**	**AH3268G-H**
340	360	480	90	1 440	3 200	210 000	1 540	800	45	13	**23972-K-MB**	**AH3972G-H**
	360	540	134	2 800	4 650	390 000	1 300	790	104	20,5	**23072-BEA-XL-K-MB1**	**AH3072G-H**
	360	540	180	3 650	6 600	550 000	1 040	570	141	22,3	**24072-BEA-XL-K30-MB1**	**AH24072-H**
	360	600	192	4 550	7 100	495 000	1 040	560	215	29,8	**23172-BEA-XL-K-MB1**	**AH3172G-H**
	360	600	243	5 600	9 100	660 000	890	350	272	29,7	**24172-BE-XL-K30**	**AH24172-H**
	360	650	232	5 700	8 900	610 000	930	430	330,5	37,3	**23272-BEA-XL-K-MB1**	**AH3272G-H**
360	380	520	106	1 780	4 000	265 000	1 340	750	66,3	16,1	**23976-K-MB**	**AH3976G-H**
	380	560	135	2 900	5 000	410 000	1 230	740	109	22,1	**23076-BEA-XL-K-MB1**	**AH3076G-H**
	380	560	180	3 750	7 000	590 000	990	530	151	24	**24076-BEA-XL-K30-MB1**	**AH24076-H**
	380	620	194	4 700	7 600	530 000	990	530	227	32	**23176-BEA-XL-K-MB1**	**AH3176G-H**
	380	620	243	5 800	9 700	710 000	850	325	285	31,8	**24176-BE-XL-K30**	**AH24176-H**
	380	680	240	6 200	9 600	660 000	890	400	374	41,3	**23276-BEA-XL-K-MB1**	**AH3276G-H**

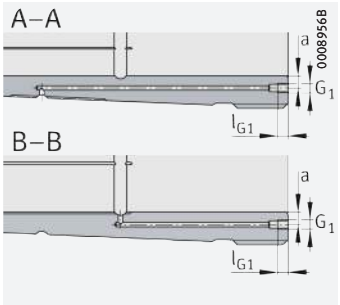
medias ➤ *https://www.schaeffler.de/std/1EF4*



Mounting dimensions



Pump connectors for hydraulic withdrawal sleeve

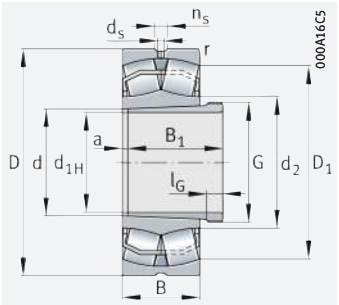


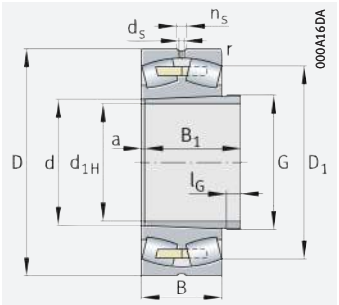
Hydraulic withdrawal sleeve (..-H) Mounting dimensions

Dimensions										Mounting dimensions						Calculation factors			
d_{1H}	r	D_1	d_2	d_s	n_s	a	l_G	Thread G	B_1	d_a	D_a	r_a	G_1	a	l_{G1}	e	Y_1	Y_2	Y_0
	min.	≈	≈			≈				min.	max.	max.							
280	3	384,6	–	9,5	17,7	7	21	Tr320×5	112	312,4	407,6	2,5	–	–	–	0,2	3,42	5,09	3,34
	4	413	340	9,5	17,7	8	26	Tr320×5	145	314,6	445,4	3	–	–	–	0,23	2,92	4,35	2,86
	4	403	334,8	8	15	18	24	Tr310×5	184	314,6	445,4	3	–	–	–	0,32	2,12	3,15	2,07
	5	436,8	–	9,5	17,7	8	30	Tr320×5	192	320	480	4	–	–	–	0,31	2,18	3,24	2,13
	5	422,8	338,2	8	15	18	24	Tr320×5	224	320	480	4	–	–	–	0,39	1,72	2,56	1,68
	5	470,5	–	12,5	23,5	8	26	Tr320×5	170	320	520	4	–	–	–	0,25	2,71	4,04	2,65
	5	458	–	12,5	23,5	8	34	Tr320×5	228	320	520	4	$G^1/_8$	8,5	12	0,35	1,92	2,86	1,88
300	3	406,2	–	9,5	17,7	7	21	Tr340×5	112	332,4	427,6	2,5	M8	8,5	12	0,19	3,62	5,39	3,54
	4	433	–	9,5	17,7	8	27	Tr340×5	149	334,6	465,4	3	$G^1/_8$	8,5	12	0,22	3,01	4,48	2,94
	4	422,3	–	8	15	18	24	Tr330×5	184	334,6	465,4	3	M6	8,5	7	0,3	2,23	3,32	2,18
	5	469,3	–	12,5	23,5	8	31	Tr340×5	209	340	520	4	$G^1/_8$	8,5	12	0,32	2,13	3,17	2,08
	5	455,5	359	9,5	17,7	18	24	Tr340×5	242	340	520	4	$G^1/_8$	8,5	12	0,4	1,69	2,52	1,65
	5	505,1	–	12,5	23,5	10	27	Tr340×5	180	340	560	4	$G^1/_8$	8,5	12	0,25	2,71	4,04	2,65
	5	490,4	–	12,5	23,5	8	36	Tr340×5	246	340	560	4	$G^1/_8$	8,5	12	0,35	1,91	2,85	1,87
320	5	467,1	–	12,5	23,5	9	28	Tr360×5	162	358	502	4	$G^1/_8$	8,5	12	0,23	2,92	4,35	2,86
	5	456,1	–	9,5	17,7	19	26	Tr360×5	206	358	502	4	$G^1/_8$	8,5	12	0,32	2,12	3,15	2,07
	5	502,6	–	12,5	23,5	9	33	Tr360×5	225	360	560	4	$G^1/_8$	8,5	12	0,32	2,1	3,13	2,06
	5	484,1	382,8	9,5	17,7	19	26	Tr360×5	269	360	560	4	$G^1/_8$	8,5	12	0,42	1,62	2,42	1,59
	6	523,5	–	12,5	23,5	9	38	Tr360×5	264	366	594	5	$G^1/_8$	8,5	12	0,36	1,85	2,76	1,81
340	3	447,1	–	9,5	17,7	7	21	Tr380×5	112	372,4	467,6	2,5	M8	8,5	12	0,17	4,05	6,04	3,96
	5	487,6	–	12,5	23,5	9	30	Tr380×5	167	378	522	4	$G^1/_8$	8,5	12	0,22	3,04	4,53	2,97
	5	476,4	–	9,5	17,7	20	26	Tr380×5	206	378	522	4	$G^1/_8$	8,5	12	0,3	2,23	3,32	2,18
	5	523,3	–	12,5	23,5	9	35	Tr380×5	229	380	580	4	$G^1/_8$	8,5	12	0,31	2,18	3,24	2,13
	5	505,9	399,4	9,5	17,7	20	26	Tr380×5	269	380	580	4	$G^1/_8$	8,5	12	0,4	1,69	2,52	1,65
	6	550,8	–	12,5	23,5	9	40	Tr380×5	274	386	624	5	$G^1/_8$	8,5	12	0,36	1,9	2,83	1,86
360	4	477,6	–	9,5	17,7	8	22	Tr400×5	130	394,6	505,4	3	M8	8,5	12	0,19	3,58	5,33	3,5
	5	508,1	–	12,5	23,5	10	31	Tr400×5	170	398	542	4	$G^1/_8$	8,5	12	0,21	3,17	4,72	3,1
	5	497,9	–	9,5	17,7	20	28	Tr400×5	208	398	542	4	$G^1/_8$	8,5	12	0,29	2,33	3,47	2,28
	5	543,6	–	12,5	23,5	10	36	Tr400×5	232	400	600	4	$G^1/_8$	8,5	12	0,3	2,25	3,34	2,2
	5	528,4	421	9,5	17,7	20	28	Tr400×5	271	400	600	4	$G^1/_8$	8,5	12	0,38	1,76	2,62	1,72
	6	578,1	–	12,5	23,5	10	42	Tr400×5	284	406	654	5	$G^1/_8$	8,5	12	0,35	1,92	2,86	1,88

Spherical roller bearings

With withdrawal sleeve



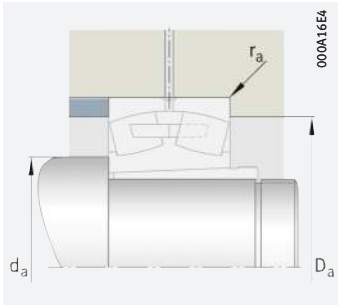


With solid cage, brass or steel

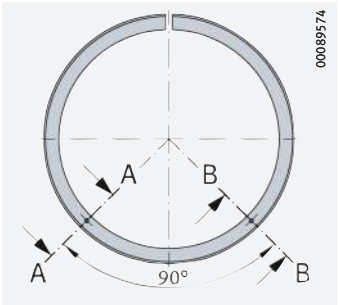
d_{1H} = 380 – 480 mm

Main dimensions				Basic load ratings		Fatigue limit load	Limiting speed	Speed rating	Mass m		Designation ➤681|1.12 ➤683|1.13 X-life ➤671	
d_{1H}	d	D	B	dyn. C_r	stat. C_{0r}	C_{ur}	n_G	$n_{\vartheta r}$	Bearing	Withdrawal sleeve	Bearing	Withdrawal sleeve
				kN	kN	N	min^{-1}	min^{-1}	≈ kg	≈ kg		
380	400	540	106	1 830	4 150	270 000	1 290	710	68,2	17	**23980-B-K-MB**	**AH3980G-H**
	400	600	148	3 400	5 700	465 000	1 150	690	144	25,4	**23080-BEA-XL-K-MB1**	**AH3080G-H**
	400	600	200	4 500	8 100	660 000	920	495	196	27,8	**24080-BEA-XL-K30-MB1**	**AH24080-H**
	400	650	200	5 000	8 100	570 000	950	495	246	35,1	**23180-BEA-XL-K-MB1**	**AH3180G-H**
400	420	560	106	1 910	4 450	300 000	1 230	660	72,1	17,8	**23984-K-MB**	**AH3984G-H**
	420	620	150	3 650	6 300	510 000	1 090	650	153	27,2	**23084-BEA-XL-K-MB1**	**AH3084G-H**
	420	620	200	4 600	8 500	710 000	890	465	205	29,6	**24084-BEA-XL-K30-MB1**	**AH24084-H**
	420	700	224	6 000	9 600	650 000	860	455	342	42	**23184-BEA-XL-K-MB1**	**AH3184G-H**
	420	700	280	7 400	12 600	860 000	720	270	431	41	**24184-BE-XL-K30**	**AH24184-H**
	420	760	272	7 800	12 300	800 000	770	340	537	53,6	**23284-BEA-XL-K-MB1**	**AH3284G-H**
420	440	600	118	2 230	5 200	295 000	1 130	620	98,3	21,2	**23988-K-MB**	**AH3988-H**
	440	650	157	3 950	6 900	550 000	1 030	610	176	30	**23088-BEA-XL-K-MB1**	**AHX3088G-H**
	440	650	212	5 100	9 500	760 000	830	435	238	32,8	**24088-BEA-XL-K30-MB1**	**AH24088-H**
	440	720	226	6 200	10 200	680 000	820	430	358	44,9	**23188-BEA-XL-K-MB1**	**AHX3188G-H**
	440	720	280	7 600	12 900	910 000	710	260	446	42,9	**24188-BE-XL-K30**	**AH24188-H**
	440	790	280	8 300	13 200	860 000	730	320	592	58,2	**23288-BEA-XL-K-MB1**	**AHX3288G-H**
440	460	620	118	2 270	5 400	370 000	1 080	590	103	22,2	**23992-B-K-MB**	**AH3992-H**
	460	680	163	4 300	7 500	590 000	980	580	201	32,9	**23092-BEA-XL-K-MB1**	**AHX3092G-H**
	460	760	240	6 900	11 500	740 000	770	395	431	50,3	**23192-BEA-XL-K-MB1**	**AHX3192G-H**
	460	760	300	8 500	14 500	1 000 000	660	241	531	48,7	**24192-BEA-XL-K30-MB1**	**AH24192-H**
	460	830	296	9 200	14 700	930 000	690	295	695	65,6	**23292-BEA-XL-K-MB1**	**AHX3292G-H**
460	480	650	128	2 550	6 000	460 000	1 040	570	121	25,7	**23996-B-K-MB**	**AH3996-H**
	480	700	165	4 450	8 000	620 000	950	550	210	35	**23096-BEA-XL-K-MB1**	**AHX3096G-H**
	480	700	218	5 600	10 700	860 000	770	385	279	37,2	**24096-BEA-XL-K30-MB1**	**AH24096-H**
	480	790	248	7 400	12 400	790 000	740	375	479	54,8	**23196-BEA-XL-K-MB1**	**AHX3196G-H**
	480	790	308	9 000	15 500	1 070 000	640	227	594	52,9	**24196-BEA-XL-K30-MB1**	**AH24196-H**
	480	870	310	10 000	16 200	1 010 000	650	275	804	72,4	**23296-BEA-XL-K-MB1**	**AHX3296G-H**
480	500	670	128	2 600	6 300	400 000	990	540	124	27,7	**239/500-K-MB**	**AH39/500-H**
	500	720	167	4 700	8 700	750 000	890	510	223	42,5	**230/500-BEA-XL-K-MB1**	**AHX30/500-H**
	500	830	264	8 300	13 900	860 000	690	350	574	70,9	**231/500-BEA-XL-K-MB1**	**AHX31/500-H**
	500	830	325	10 000	17 300	1 160 000	600	209	692	58,8	**241/500-BEA-XL-K30-MB1**	**AH241/500-H**

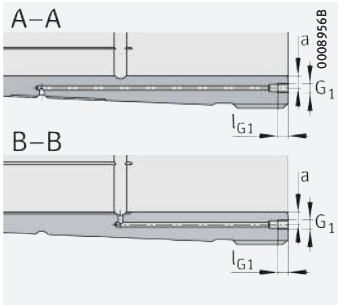
medias ➤ *https://www.schaeffler.de/std/1EF5*



Mounting dimensions



Pump connectors for hydraulic withdrawal sleeve

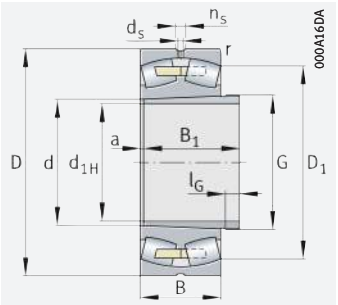


Hydraulic withdrawal sleeve (..-H) Mounting dimensions

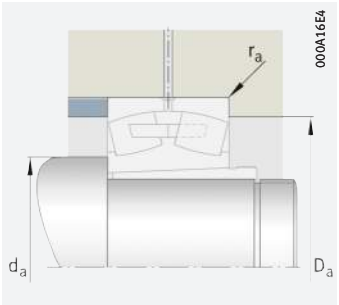
Dimensions										Mounting dimensions						Calculation factors			
d_{1H}	r min.	D_1 ≈	d_2 ≈	d_s	n_s	a ≈	l_G	Thread G	B_1	d_a min.	D_a max.	r_a max.	G_1	a	l_{G1}	e	Y_1	Y_2	Y_0
380	4	499	–	9,5	17,7	8	22	Tr420×5	130	414,6	525,4	3	M8	8,5	12	0,18	3,71	5,52	3,63
	5	541,9	–	12,5	23,5	10	33	Tr420×5	183	418	582	4	$G^1/_8$	8,5	12	0,22	3,07	4,57	3
	5	529,4	–	12,5	23,5	20	28	Tr420×5	228	418	582	4	$G^1/_8$	8,5	12	0,3	2,23	3,32	2,18
	6	571,4	–	12,5	23,5	10	38	Tr420×5	240	426	624	5	$G^1/_8$	8,5	12	0,29	2,3	3,42	2,25
400	4	519,5	–	9,5	17,7	8	22	Tr440×5	130	434,6	545,4	3	M8	8,5	12	0,18	3,85	5,73	3,76
	5	560,7	–	12,5	23,5	10	34	Tr440×5	186	438	602	4	$G^1/_8$	8,5	12	0,21	3,17	4,72	3,1
	5	551	–	12,5	23,5	22	30	Tr440×5	230	438	602	4	$G^1/_8$	8,5	12	0,29	2,32	3,45	2,26
	6	609,8	–	12,5	23,5	10	40	Tr440×5	266	446	674	5	$G^1/_8$	8,5	12	0,31	2,18	3,24	2,13
	6	592,2	472,7	12,5	23,5	22	30	Tr440×5	310	446	674	5	$G^1/_8$	8,5	12	0,39	1,72	2,56	1,68
	7,5	643,4	–	12,5	23,5	10	46	Tr440×5	321	452	728	6	$G^1/_8$	8,5	12	0,36	1,89	2,81	1,84
420	4	552,8	–	12,5	23,5	8	25	Tr460×5	145	454,6	585,4	3	$G^1/_8$	8,5	12	0,18	3,66	5,46	3,58
	6	589,3	–	12,5	23,5	11	35	Tr460×5	194	463	627	5	$G^1/_8$	8,5	12	0,21	3,17	4,72	3,1
	6	576,7	–	12,5	23,5	22	30	Tr460×5	242	463	627	5	$G^1/_8$	8,5	12	0,29	2,3	3,42	2,25
	6	630,2	–	12,5	23,5	11	42	Tr460×5	270	466	694	5	$G^1/_8$	8,5	12	0,3	2,25	3,34	2,2
	6	614,3	614,2	12,5	23,5	22	30	Tr460×5	310	466	694	5	$G^1/_8$	8,5	12	0,38	1,78	2,65	1,74
	7,5	670,7	–	12,5	23,5	11	48	Tr460×5	330	472	758	6	$G^1/_8$	8,5	12	0,35	1,91	2,85	1,87
440	4	573,3	–	12,5	23,5	8	25	Tr480×5	145	474,6	605,4	3	$G^1/_8$	8,5	12	0,18	3,85	5,73	3,76
	6	616,7	–	12,5	23,5	11	37	Tr480×5	202	483	657	5	$G^1/_8$	8,5	12	0,21	3,17	4,72	3,1
	7,5	663,4	–	12,5	23,5	11	43	Tr480×5	285	492	728	6	$G^1/_8$	8,5	12	0,31	2,21	3,29	2,16
	7,5	645,4	–	12,5	23,5	23	32	Tr480×5	332	492	728	6	$G^1/_8$	8,5	12	0,38	1,76	2,62	1,72
	7,5	703,5	–	12,5	23,5	11	50	Tr480×5	349	492	798	6	$G^1/_8$	8,5	12	0,36	1,9	2,83	1,86
460	5	598,8	–	12,5	23,5	9	28	Tr500×5	158	498	632	4	$G^1/_8$	8,5	12	0,18	3,76	5,59	3,67
	6	636,9	–	12,5	23,5	12	38	Tr500×5	205	503	677	5	$G^1/_8$	8,5	12	0,21	3,27	4,87	3,2
	6	626,1	–	12,5	23,5	23	32	Tr500×5	250	503	677	5	$G^1/_8$	8,5	12	0,28	2,43	3,61	2,37
	7,5	690,4	–	12,5	23,5	12	45	Tr500×5	295	512	758	6	$G^1/_8$	8,5	12	0,3	2,23	3,32	2,18
	7,5	673,14	–	12,5	23,5	25	35	Tr500×5	343	512	758	6	$G^1/_8$	8,5	12	0,38	1,79	2,67	1,75
	7,5	737,1	–	12,5	23,5	12	52	Tr500×5	364	512	838	6	$G^1/_8$	8,5	12	0,36	1,9	2,83	1,86
480	5	619,3	–	12,5	23,5	10	32	Tr520×6	162	518	652	4	$G^1/_8$	8,5	12	0,17	3,9	5,81	3,81
	6	657,1	–	12,5	23,5	12	40	Tr540×6	209	523	697	5	$G^1/_8$	8,5	12	0,21	3,24	4,82	3,16
	7,5	723,1	–	12,5	23,5	12	47	Tr550×6	313	532	798	6	$G^1/_8$	8,5	12	0,31	2,2	3,27	2,15
	7,5	705,2	–	12,5	23,5	25	37	Tr520×6	362	532	798	6	$G^1/_8$	8,5	12	0,38	1,78	2,65	1,74

Spherical roller bearings

With withdrawal sleeve



With solid cage, brass or steel

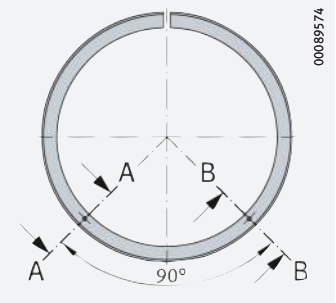


Mounting dimensions

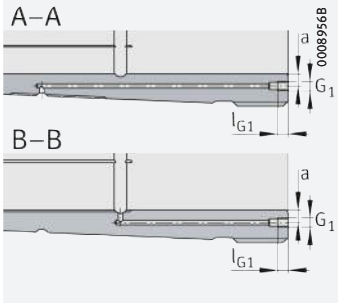
d_{1H} = 500 – 850 mm

Main dimensions				Basic load ratings		Fatigue limit load	Limiting speed	Speed rating	Mass m		Designation ➤681 | 1.12 ➤683 | 1.13 X-life ➤671	
d_{1H}	d	D	B	dyn. C_r	stat. C_{0r}	C_{ur}	n_G	$n_{\vartheta r}$	Bearing	Withdrawal sleeve	Bearing	Withdrawal sleeve
				kN	kN	N	min^{-1}	min^{-1}	≈ kg	≈ kg		
500	530	710	136	2 850	6 900	385 000	930	500	146	43,1	**239/530-K-MB**	**AH39/530-H**
	530	780	185	5 600	10 100	860 000	820	475	302	61,7	**230/530-BEA-XL-K-MB1**	**AH30/530A-H**
	530	870	272	8 900	15 000	940 000	660	325	634	92,3	**231/530-BEA-XL-K-MB1**	**AH31/530A-H**
	530	870	335	10 700	19 100	1 260 000	560	190	778	88,2	**241/530-BEA-XL-K30-MB1**	**AH241/530-H**
530	560	750	140	3 100	7 600	520 000	880	465	176	47	**239/560-B-K-MB**	**AH39/560-H**
	560	820	195	6 100	11 200	930 000	760	440	350	68,4	**230/560-BEA-XL-K-MB1**	**AH30/560A-H**
	560	920	280	9 700	16 400	1 030 000	630	300	731	101	**231/560-BEA-XL-K-MB1**	**AH31/560A-H**
	560	920	355	12 000	21 000	1 410 000	530	177	914	101	**241/560-BEA-XL-K30-MB1**	**AH241/560-H**
570	600	800	150	3 450	8 600	630 000	810	430	210	55,6	**239/600-B-K-MB**	**AH39/600-H**
	600	870	200	6 600	12 300	1 020 000	710	405	398	75	**230/600-BEA-XL-K-MB1**	**AH30/600A-H**
	600	980	300	9 000	19 200	810 000	560	270	901	116	**231/600-K-MB**	**AH31/600A-H**
	600	980	375	11 600	26 000	1 780 000	480	149	1 170	118	**241/600-B-K30-MB**	**AH241/600-H**
600	630	850	165	4 100	9 900	710 000	740	405	283	64,5	**239/630-B-K-MB**	**AH39/630-H**
	630	920	212	7 400	13 700	1 120 000	670	380	476	87,3	**230/630-BEA-XL-K-MB1**	**AH30/630A-H**
	630	920	290	9 400	18 600	1 370 000	550	265	645	95,1	**240/630-BEA-XL-K30-MB1**	**AH240/630-H**
	630	1 030	400	13 100	29 500	1 990 000	440	136	1 360	132	**241/630-B-K30-MB**	**AH241/630-H**
630	670	900	170	4 300	10 600	750 000	710	375	310	87,7	**239/670-B-K-MB**	**AH39/670-H**
	670	980	230	7 200	15 800	1 100 000	630	350	590	124	**230/670-B-K-MB**	**AH30/670A-H**
	670	1 090	412	14 000	31 500	2 110 000	420	127	1 539	183	**241/670-B-K30-MB**	**AH241/670-H**
670	710	950	180	4 800	12 100	720 000	670	350	336	101	**239/710-K-MB**	**AH39/710-H**
	710	1 030	236	7 600	16 900	1 150 000	590	325	650	135	**230/710-B-K-MB**	**AH30/710A-H**
	710	1 030	315	9 600	23 000	1 560 000	480	223	873	151	**240/710-B-K30-MB**	**AH240/710-H**
	710	1 150	438	15 600	35 500	2 290 000	395	116	1 791	209	**241/710-B-K30-MB**	**AH241/710-H**
710	750	1 000	185	5 200	13 000	790 000	640	325	394	110	**239/750-K-MB**	**AH39/750-H**
	750	1 090	250	8 500	19 100	1 010 000	550	305	786	155	**230/750-K-MB**	**AH30/750A-H**
	750	1 090	335	10 800	26 000	1 740 000	445	204	1 071	169	**240/750-B-K30-MB**	**AH240/750-H**
750	800	1 060	195	5 900	15 100	1 010 000	580	295	490	146	**239/800-B-K-MB**	**AH39/800-H**
	800	1 150	258	9 300	21 200	1 420 000	530	280	877	198	**230/800-K-MB**	**AH30/800A-H**
800	850	1 120	200	6 300	16 400	960 000	550	275	554	165	**239/850-K-MB**	**AH39/850-H**
	850	1 220	365	12 800	32 000	2 060 000	390	173	1 415	250	**240/850-B-K30-MB**	**AH240/850-H**
850	900	1 180	206	6 500	17 200	1 010 000	520	260	641	180	**239/900-K-MB**	**AH39/900-H**

medias ➤ *https://www.schaeffler.de/std/1EF6*



Pump connectors for hydraulic withdrawal sleeve

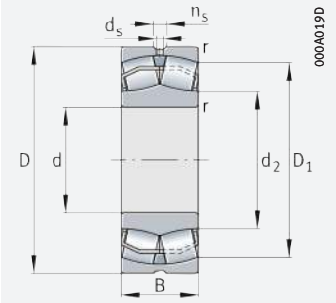


Hydraulic withdrawal sleeve (..-H) Mounting dimensions

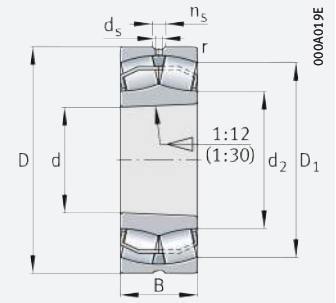
Dimensions									Mounting dimensions						Calculation factors			
d_{1H}	r min.	D_1 ≈	d_s	n_s	a ≈	l_G	Thread G	B_1	d_a min.	D_a max.	r_a max.	G_1	a	l_{G1}	e	Y_1	Y_2	Y_0
500	5	656,5	12,5	23,5	10	37	Tr550×6	175	548	692	4	$G^1/_4$	10	15	0,18	3,85	5,73	3,76
	6	708,2	12,5	23,5	12	45	Tr560×6	230	553	757	5	$G^1/_4$	10	15	0,22	3,1	4,62	3,03
	7,5	760,5	12,5	23,5	12	53	Tr560×6	325	562	838	6	$G^1/_4$	10	15	0,3	2,25	3,34	2,2
	7,5	742,9	12,5	23,5	25	40	Tr550×6	375	562	838	6	$G^1/_4$	10	15	0,37	1,83	2,72	1,79
530	5	693,4	12,5	23,5	10	37	Tr580×6	180	578	732	4	$G^1/_4$	12	15	0,17	3,95	5,88	3,86
	6	745	12,5	23,5	12	45	Tr590×6	240	583	797	5	$G^1/_4$	12	15	0,22	3,1	4,62	3,03
	7,5	806,6	12,5	23,5	12	55	Tr590×6	335	592	888	6	$G^1/_4$	12	15	0,29	2,32	3,45	2,26
	7,5	791,5	12,5	23,5	28	45	Tr580×6	400	592	888	6	$G^1/_4$	12	15	0,37	1,83	2,72	1,79
570	5	740,5	12,5	23,5	10	38	Tr625×6	192	618	782	4	$G^1/_4$	12	15	0,17	3,95	5,88	3,86
	6	793,3	12,5	23,5	14	45	Tr630×6	245	623	847	5	$G^1/_4$	12	15	0,21	3,24	4,82	3,16
	7,5	852,6	12,5	23,5	14	55	Tr630×6	355	632	948	6	$G^1/_4$	12	15	0,31	2,2	3,27	2,15
	7,5	833	12,5	23,5	30	50	Tr625×6	425	632	948	6	$G^1/_4$	12	15	0,38	1,79	2,67	1,75
600	6	784,5	12,5	23,5	12	40	Tr655×6	210	653	827	5	$G^1/_4$	12	15	0,18	3,8	5,66	3,72
	7,5	837,8	12,5	23,5	14	46	Tr670×6	258	658	892	6	$G^1/_4$	12	15	0,21	3,24	4,82	3,16
	7,5	821,5	12,5	23,5	30	45	Tr655×6	335	658	892	6	$G^1/_4$	12	15	0,28	2,39	3,56	2,34
	7,5	872,2	12,5	23,5	30	50	Tr655×6	450	662	998	6	$G^1/_4$	12	15	0,38	1,78	2,65	1,74
630	6	831,5	12,5	23,5	12	41	Tr695×6	216	693	877	5	$G^1/_4$	12	15	0,17	3,95	5,88	3,86
	7,5	888,7	12,5	23,5	14	50	Tr710×7	280	698	952	6	$G^1/_4$	12	15	0,22	3,01	4,48	2,94
	7,5	929,4	12,5	23,5	30	55	Tr695×6	467	702	1 058	6	$G^1/_4$	12	15	0,37	1,83	2,72	1,79
670	6	877,5	12,5	23,5	12	43	Tr740×7	228	733	927	5	$G^1/_4$	15	15	0,18	3,85	5,73	3,76
	7,5	938,8	12,5	23,5	16	50	Tr750×7	286	738	1 002	6	$G^1/_4$	15	15	0,22	3,07	4,57	3
	7,5	921,6	12,5	23,5	33	50	Tr740×7	365	738	1 002	6	$G^1/_4$	15	15	0,3	2,26	3,37	2,21
	9,5	980,2	12,5	23,5	33	55	Tr740×7	493	750	1 110	8	$G^1/_4$	15	15	0,38	1,79	2,67	1,75
710	6	923,2	12,5	23,5	12	44	Tr780×7	234	773	977	5	$G^1/_4$	15	15	0,17	3,95	5,88	3,86
	7,5	990,9	12,5	23,5	16	50	Tr800×7	300	778	1 062	6	$G^1/_4$	15	15	0,22	3,01	4,48	2,94
	7,5	976,2	12,5	23,5	35	50	Tr780×7	385	778	1 062	6	$G^1/_4$	15	15	0,3	2,26	3,37	2,21
750	6	983,7	12,5	23,5	12	45	Tr830×7	245	823	1 037	5	$G^1/_4$	15	15	0,17	4,05	6,04	3,96
	7,5	1 050,9	12,5	23,5	18	50	Tr850×7	308	828	1 122	6	$G^1/_4$	15	15	0,22	3,07	4,57	3
800	6	1 039,9	12,5	23,5	12	50	Tr880×7	258	873	1 097	5	$G^1/_4$	15	15	0,16	4,11	6,12	4,02
	7,5	1 092,9	12,5	23,5	40	53	Tr880×7	418	878	1 192	6	$G^1/_4$	15	15	0,29	2,33	3,47	2,28
850	6	1 098,8	12,5	23,5	12	51	Tr930×8	265	923	1 157	5	$G^1/_4$	15	15	0,16	4,28	6,37	4,19

Spherical roller bearings

For vibratory machinery
Cylindrical or tapered bore



Cylindrical bore

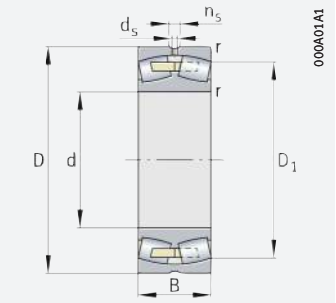


Tapered bore

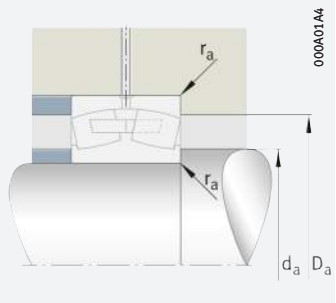
d = 40 – 110 mm

Main dimensions			Basic load ratings		Fatigue limit load	Limiting speed	Speed rating	Mass	Designation
d	D	B	dyn. C_r	stat. C_{0r}	C_{ur}	n_G	$n_{\vartheta r}$	m	➤*681* | *1.12* ➤*683* | *1.13* X-life ➤*671*
			kN	kN	N	min^{-1}	min^{-1}	≈ kg	
40	90	33	156	149	13 100	7 600	5 500	1,05	**22308-E1-XL-T41A**
	90	33	156	149	13 100	7 600	5 500	1	**22308-E1-XL-K-T41A**
45	100	36	187	183	16 000	6 800	5 000	1,39	**22309-E1-XL-T41A**
	100	36	187	183	16 000	6 800	5 000	1,4	**22309-E1-XL-K-T41A**
50	110	40	229	223	20 100	6 300	4 800	1,9	**22310-E1-XL-T41A**
	110	40	229	223	20 100	6 300	4 800	1,9	**22310-E1-XL-K-T41A**
55	120	43	265	260	23 900	5 800	4 500	2,27	**22311-E1-XL-T41A**
	120	43	265	260	23 900	5 800	4 500	2,2	**22311-E1-XL-K-T41A**
60	130	46	310	310	28 000	5 400	4 200	2,97	**22312-E1-XL-T41A**
	130	46	310	310	28 000	5 400	4 200	2,8	**22312-E1-XL-K-T41A**
65	140	48	350	365	32 500	5 000	3 800	3,57	**22313-E1-XL-T41A**
	140	48	350	365	32 500	5 000	3 800	3,5	**22313-E1-XL-K-T41A**
70	150	51	390	390	36 500	4 800	3 700	4,21	**22314-E1-XL-T41A**
	150	51	390	390	36 500	4 800	3 700	4,1	**22314-E1-XL-K-T41A**
75	160	55	445	450	40 500	4 500	3 550	5,38	**22315-E1-XL-T41A**
	160	55	445	450	40 500	4 500	3 550	5,3	**22315-E1-XL-K-T41A**
80	170	58	495	510	45 000	4 250	3 400	6,27	**22316-E1-XL-T41A**
	170	58	495	510	45 000	4 250	3 400	6,1	**22316-E1-XL-K-T41A**
85	180	60	540	560	49 500	4 100	3 200	7,06	**22317-E1-XL-T41D**
	180	60	540	560	49 500	4 100	3 200	7,1	**22317-E1-XL-K-T41A**
90	190	64	610	630	55 000	3 850	3 000	8,69	**22318-E1-XL-T41D**
	190	64	610	630	55 000	3 850	3 000	8,5	**22318-E1-XL-K-T41A**
95	200	67	670	700	59 000	3 700	2 800	9,69	**22319-E1-XL-T41D**
	200	67	670	700	59 000	3 700	2 800	9,5	**22319-E1-XL-K-T41A**
100	215	82,6	680	900	69 000	2 800	–	15,5	**23320-AS-MA-T41A**
	215	73	810	920	75 000	3 300	2 380	13,1	**22320-E1-XL-T41D**
	215	73	810	920	75 000	3 300	2 380	13	**22320-E1-XL-K-T41A**
110	240	92,1	830	1 080	86 000	2 600	–	21,3	**23322-AS-MA-T41A**
	240	80	950	1 070	90 000	3 000	2 130	17,7	**22322-E1-XL-T41D**
	240	80	950	1 070	90 000	3 000	2 130	17,4	**22322-E1-XL-K-T41A**

medias ➤ *https://www.schaeffler.de/std/1EF7*



Solid cage, brass or steel; cylindrical bore

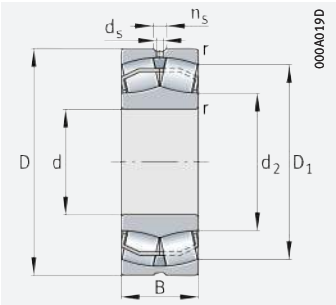


Mounting dimensions

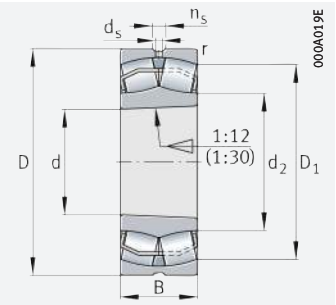
Dimensions						Mounting dimensions			Calculation factors			
d	r	D_1	d_2	d_s	n_s	d_a	D_a	r_a	e	Y_1	Y_2	Y_0
	min.	≈	≈			min.	max.	max.				
40	1,5	76	52,4	3,2	6,5	49	81	1,5	0,36	1,86	2,77	1,82
	1,5	76	52,4	3,2	6,5	49	81	1,5	0,36	1,86	2,77	1,82
45	1,5	84,7	58,9	3,2	6,5	54	91	1,5	0,36	1,9	2,83	1,86
	1,5	84,7	58,9	3,2	6,5	54	91	1,5	0,36	1,9	2,83	1,86
50	2	92,6	63	3,2	6,5	61	99	2	0,36	1,86	2,77	1,82
	2	92,6	63	3,2	6,5	61	99	2	0,36	1,86	2,77	1,82
55	2	101,4	68,9	3,2	6,5	66	109	2	0,36	1,89	2,81	1,84
	2	101,4	68,9	3,2	6,5	66	109	2	0,36	1,89	2,81	1,84
60	2,1	110,1	74,8	3,2	6,5	72	118	2,1	0,35	1,91	2,85	1,87
	2,1	110,1	74,8	3,2	6,5	72	118	2,1	0,35	1,91	2,85	1,87
65	2,1	119,3	83,2	4,8	9,5	77	128	2,1	0,34	2	2,98	1,96
	2,1	119,3	83,2	4,8	9,5	77	128	2,1	0,34	2	2,98	1,96
70	2,1	128	86,7	4,8	9,5	82	138	2,1	0,34	2	2,98	1,96
	2,1	128	86,7	4,8	9,5	82	138	2,1	0,34	2	2,98	1,96
75	2,1	136,3	92,4	4,8	9,5	87	148	2,1	0,34	1,99	2,96	1,94
	2,1	136,3	92,4	4,8	9,5	87	148	2,1	0,34	1,99	2,96	1,94
80	2,1	145,1	98,3	4,8	9,5	92	158	2,1	0,34	1,99	2,96	1,94
	2,1	145,1	98,3	4,8	9,5	92	158	2,1	0,34	1,99	2,96	1,94
85	3	154,2	104,4	4,8	9,5	99	166	2,5	0,33	2,04	3,04	2
	3	154,2	104,4	4,8	9,5	99	166	2,5	0,33	2,04	3,04	2
90	3	162,5	110,2	6,3	12,2	104	176	2,5	0,33	2,03	3,02	1,98
	3	162,5	110,2	6,3	12,2	104	176	2,5	0,33	2,03	3,02	1,98
95	3	171,2	116	6,3	12,2	109	186	2,5	0,33	2,03	3,02	1,98
	3	171,2	116	6,3	12,2	109	186	2,5	0,33	2,03	3,02	1,98
100	3	179,5	–	4,8	9,5	114	201	2,5	0,43	1,57	2,34	1,53
	3	184,7	130,2	6,3	12,2	114	201	2,5	0,33	2,03	3,02	1,98
	3	184,7	130,2	6,3	12,2	114	201	2,5	0,33	2,03	3,02	1,98
110	3	199,6	–	6,3	12,2	124	226	2,5	0,43	1,57	2,34	1,53
	3	204,9	143,1	8	15	124	226	2,5	0,33	2,07	3,09	2,03
	3	204,9	143,1	8	15	124	226	2,5	0,33	2,07	3,09	2,03

Spherical roller bearings

For vibratory machinery
Cylindrical or tapered bore



Cylindrical bore

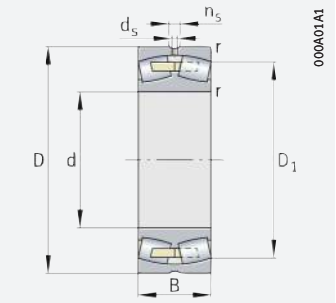


Tapered bore

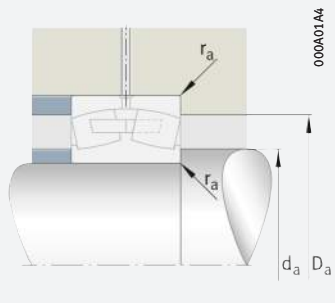
d = 120 – 220 mm

Main dimensions			Basic load ratings		Fatigue limit load	Limiting speed	Speed rating	Mass	Designation
d	D	B	dyn. C_r	stat. C_{0r}	C_{ur}	n_G	$n_{\vartheta r}$	m	➤*681* | *1.12* ➤*683* | *1.13* X-life ➤*671*
			kN	kN	N	min^{-1}	min^{-1}	≈ kg	
120	260	106	1 020	1 430	103 000	2 400	–	29,1	**23324-AS-MA-T41A**
	260	86	1 080	1 170	102 000	2 850	2 000	22,3	**22324-E1-XL-T41D**
	260	86	1 080	1 170	102 000	2 850	2 000	22,1	**22324-E1-XL-K-T41A**
130	280	112	1 160	1 600	108 000	2 200	–	34,2	**23326-AS-MA-T41A**
	280	93	1 250	1 370	116 000	2 650	1 820	28	**22326-E1-XL-T41D**
	280	93	1 250	1 370	116 000	2 650	1 820	27,4	**22326-E1-XL-K-T41A**
140	300	118	1 270	1 800	123 000	2 000	–	40,9	**23328-AS-MA-T41A**
	300	102	1 460	1 630	131 000	2 420	1 660	34,6	**22328-E1-XL-T41D**
	300	102	1 460	1 630	131 000	2 420	1 660	34,4	**22328-E1-XL-K-T41A**
150	320	128	1 500	2 120	135 000	2 000	–	49,8	**23330-A-MA-T41A**
	320	108	1 640	1 850	147 000	2 290	1 520	42,2	**22330-E1-XL-T41D**
	320	108	1 640	1 850	147 000	2 290	1 520	40,9	**22330-E1-XL-K-T41A**
160	340	136	1 660	2 320	152 000	2 000	–	61,3	**23332-A-MA-T41A**
	340	114	1 680	1 990	157 000	2 250	1 420	47,3	**22332-BE-XL-K-JPA-T41A**
	340	114	1 680	1 990	157 000	2 250	1 420	48,4	**22332-BE-XL-JPA-T41A**
170	360	120	1 870	2 220	173 000	2 130	1 320	56,9	**22334-BE-XL-K-JPA-T41A**
	360	120	1 870	2 220	173 000	2 130	1 320	58,2	**22334-BE-XL-JPA-T41A**
180	380	126	2 060	2 460	190 000	2 030	1 230	66,6	**22336-BE-XL-K-JPA-T41A**
	380	126	2 060	2 460	190 000	2 030	1 230	68,1	**22336-BE-XL-JPA-T41A**
190	400	155	2 200	3 200	223 000	1 400	–	97,1	**23338-A-MA-T41A**
	400	132	2 220	2 650	207 000	1 940	1 160	77,2	**22338-BE-XL-K-JPA-T41A**
	400	132	2 220	2 650	207 000	1 940	1 160	78,9	**22338-BE-XL-JPA-T41A**
200	420	165	2 450	3 600	238 000	1 300	–	108	**23340-A-MA-T41A**
	420	138	2 440	2 950	225 000	1 830	1 080	87,4	**22340-BE-XL-K-JPA-T41A**
	420	138	2 440	2 950	225 000	1 830	1 080	89,4	**22340-BE-XL-JPA-T41A**
220	460	145	2 800	3 400	265 000	1 690	950	114	**22344-BE-XL-K-JPA-T41A**
	460	145	2 800	3 400	265 000	1 690	950	117	**22344-BE-XL-JPA-T41A**

medias ➤ *https://www.schaeffler.de/std/1EF8*



Solid cage, brass or steel; cylindrical bore

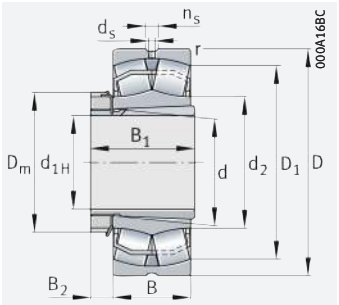


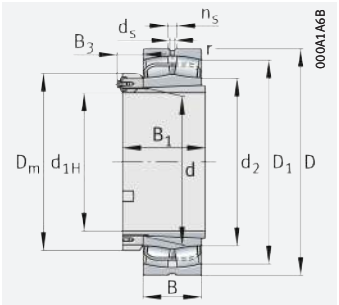
Mounting dimensions

Dimensions						Mounting dimensions			Calculation factors			
d	r min.	D_1 ≈	d_2 ≈	d_s	n_s	d_a min.	D_a max.	r_a max.	e	Y_1	Y_2	Y_0
120	3	213,9	–	6,3	12,2	134	246	2,5	0,45	1,5	2,23	1,46
	3	222,4	150,8	8	15	134	246	2,5	0,33	2,06	3,06	2,01
	3	222,4	150,7	8	15	134	246	2,5	0,33	2,06	3,06	2,01
130	4	232,1	–	6,3	12,2	147	263	3	0,45	1,51	2,25	1,48
	4	239,5	162,2	9,5	17,7	147	263	3	0,33	2,06	3,06	2,01
	4	239,5	162,2	9,5	17,7	147	263	3	0,33	2,06	3,06	2,01
140	4	249,2	–	6,3	12,2	157	283	3	0,43	1,57	2,34	1,53
	4	255,7	173,5	9,5	17,7	157	283	3	0,34	2	2,98	1,96
	4	255,7	173,5	9,5	17,7	157	283	3	0,34	2	2,98	1,96
150	4	264,5	–	8	15	167	303	3	0,44	1,52	2,26	1,49
	4	273,2	185,3	9,5	17,7	167	303	3	0,33	2,02	3	1,97
	4	273,2	185,3	9,5	17,7	167	303	3	0,33	2,02	3	1,97
160	4	280,6	–	9,5	17,7	177	323	3	0,44	1,54	2,3	1,51
	4	286,7	201,2	9,5	17,7	177	323	3	0,35	1,94	2,88	1,89
	4	286,7	201,2	9,5	17,7	177	323	3	0,35	1,94	2,88	1,89
170	4	303,9	213,1	9,5	17,7	187	343	3	0,35	1,95	2,9	1,91
	4	303,9	213,1	9,5	17,7	187	343	3	0,35	1,95	2,9	1,91
180	4	320,8	224,9	12,5	23,5	197	363	3	0,34	1,96	2,92	1,92
	4	320,8	224,9	12,5	23,5	197	363	3	0,34	1,96	2,92	1,92
190	5	331,6	–	9,5	17,7	210	380	4	0,43	1,57	2,34	1,53
	5	338,1	236,8	12,5	23,5	210	380	4	0,34	1,96	2,92	1,92
	5	338,1	236,8	12,5	23,5	210	380	4	0,34	1,96	2,92	1,92
200	5	350,2	–	9,5	17,7	220	400	4	0,43	1,55	2,31	1,52
	5	355,1	248,8	12,5	23,5	220	400	4	0,34	1,98	2,94	1,93
	5	355,1	248,8	12,5	23,5	220	400	4	0,34	1,98	2,94	1,93
220	5	391,1	273,4	12,5	23,5	240	440	4	0,33	2,06	3,06	2,01
	5	391,1	273,4	12,5	23,5	240	440	4	0,33	2,06	3,06	2,01

Spherical roller bearings

For vibratory machinery
With adapter sleeve



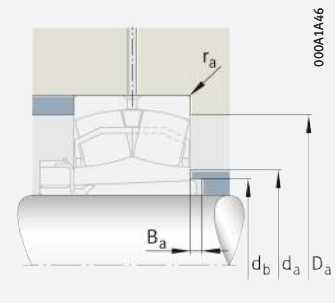


With locknut and retaining bracket

d_{1H} = 35 – 200 mm

Main dimensions				Basic load ratings		Fatigue limit load	Limiting speed	Speed rating	Mass m		Designation ➤681|1.12 ➤683|1.13 X-life ➤671	
d_{1H}	d	D	B	dyn. C_r	stat. C_{0r}	C_{ur}	n_G	$n_{\vartheta r}$	Bearing	Adapter sleeve	Bearing	Adapter sleeve
				kN	kN	N	min^{-1}	min^{-1}	≈ kg	≈ kg		
35	40	90	33	156	149	13 100	7 600	5 500	1	0,23	**22308-E1-XL-K-T41A**	**H2308**
40	45	100	36	187	183	16 000	6 800	5 000	1,4	0,298	**22309-E1-XL-K-T41A**	**H2309**
45	50	110	40	229	223	20 100	6 300	4 800	1,9	0,36	**22310-E1-XL-K-T41A**	**H2310**
50	55	120	43	265	260	23 900	5 800	4 500	2,2	0,435	**22311-E1-XL-K-T41A**	**H2311**
55	60	130	46	310	310	28 000	5 400	4 200	2,8	0,493	**22312-E1-XL-K-T41A**	**H2312**
60	65	140	48	350	365	32 500	5 000	3 800	3,5	0,57	**22313-E1-XL-K-T41A**	**H2313**
	70	150	51	390	390	36 500	4 800	3 700	4,1	0,92	**22314-E1-XL-K-T41A**	**H2314**
65	75	160	55	445	450	40 500	4 500	3 550	5,3	1,06	**22315-E1-XL-K-T41A**	**H2315**
70	80	170	58	495	510	45 000	4 250	3 400	6,1	1,31	**22316-E1-XL-K-T41A**	**H2316**
75	85	180	60	540	560	49 500	4 100	3 200	7,1	1,47	**22317-E1-XL-K-T41A**	**H2317**
80	90	190	64	610	630	55 000	3 850	3 000	8,5	1,71	**22318-E1-XL-K-T41A**	**H2318**
85	95	200	67	670	700	59 000	3 700	2 800	9,5	1,95	**22319-E1-XL-K-T41A**	**H2319**
90	100	215	73	810	920	75 000	3 300	2 380	13	2,2	**22320-E1-XL-K-T41A**	**H2320**
100	110	240	80	950	1 070	90 000	3 000	2 130	17,4	2,78	**22322-E1-XL-K-T41A**	**H2322**
110	120	260	86	1 080	1 170	102 000	2 850	2 000	22,1	3,24	**22324-E1-XL-K-T41A**	**H2324**
115	130	280	93	1 250	1 370	116 000	2 650	1 820	27,4	4,69	**22326-E1-XL-K-T41A**	**H2326**
125	140	300	102	1 460	1 630	131 000	2 420	1 660	34,4	5,66	**22328-E1-XL-K-T41A**	**H2328**
135	150	320	108	1 640	1 850	147 000	2 290	1 520	40,9	6,76	**22330-E1-XL-K-T41A**	**H2330**
140	160	340	114	1 680	1 990	157 000	2 250	1 420	47,3	9,32	**22332-BE-XL-K-JPA-T41A**	**H2332**
150	170	360	120	1 870	2 220	173 000	2 130	1 320	56,9	10,4	**22334-BE-XL-K-JPA-T41A**	**H2334**
160	180	380	126	2 060	2 460	190 000	2 030	1 230	66,6	11,6	**22336-BE-XL-K-JPA-T41A**	**H2336**
170	190	400	132	2 220	2 650	207 000	1 940	1 160	77,2	12,9	**22338-BE-XL-K-JPA-T41A**	**H2338**
180	200	420	138	2 440	2 950	225 000	1 830	1 080	87,4	14,2	**22340-BE-XL-K-JPA-T41A**	**H2340**
200	220	460	145	2 800	3 400	265 000	1 690	950	114	17,8	**22344-BE-XL-K-JPA-T41A**	**H2344X**

medias ➤ *https://www.schaeffler.de/std/1EF9*

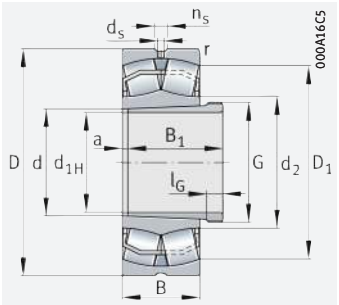


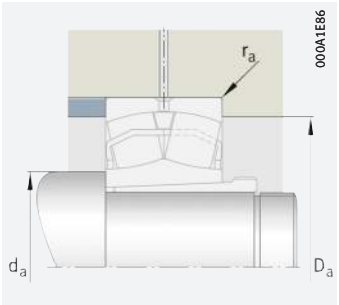
Mounting dimensions

Dimensions									Mounting dimensions					Calculation factors			
d_{1H}	r	D_1	d_2	d_s	n_s	D_m	B_1	B_2	d_a	D_a	d_b	B_a	r_a	e	Y_1	Y_2	Y_0
	min.	≈	≈					≈	max.	max.	min.	min.	max.				
35	1,5	76	52,4	3,2	6,5	58	46	10,25	49	81	45	5	1,5	0,36	1,86	2,77	1,82
40	1,5	84,7	58,9	3,2	6,5	65	50	11,25	54	91	50	5	1,5	0,36	1,9	2,83	1,86
45	2	92,6	63	3,2	6,5	70	55	12,25	61	99	56	5	2	0,36	1,86	2,77	1,82
50	2	101,4	68,9	3,2	6,5	75	59	12,5	66	109	61	6	2	0,36	1,89	2,81	1,84
55	2,1	110,1	74,8	3,2	6,5	80	62	12,5	72	118	66	5	2,1	0,35	1,91	2,85	1,87
60	2,1	119,3	83,2	4,8	9,5	85	65	13,5	77	128	72	5	2,1	0,34	2	2,98	1,96
	2,1	128	86,7	4,8	9,5	92	68	13,5	82	138	77	5	2,1	0,34	2	2,98	1,96
65	2,1	136,3	92,4	4,8	9,5	98	73	14,5	87	148	82	5	2,1	0,34	1,99	2,96	1,94
70	2,1	145,1	98,3	4,8	9,5	105	78	16,75	92	158	88	5	2,1	0,34	1,99	2,96	1,94
75	3	154,2	104,4	4,8	9,5	110	82	17,75	99	166	94	6	2,5	0,33	2,04	3,04	2
80	3	162,5	110,2	6,3	12,2	120	86	17,75	104	176	100	18	2,5	0,33	2,03	3,02	1,98
85	3	171,2	116	6,3	12,2	125	90	18,75	109	186	105	7	2,5	0,33	2,03	3,02	1,98
90	3	184,7	130,2	6,3	12,2	130	97	19,75	114	201	110	19	2,5	0,33	2,03	3,02	1,98
100	3	204,9	143,1	8	15	145	105	20,75	124	226	121	17	2,5	0,33	2,07	3,09	2,03
110	3	222,4	150,7	8	15	155	112	22	134	246	131	17	2,5	0,33	2,06	3,06	2,01
115	4	239,5	162,2	9,5	17,7	165	121	23	147	263	142	21	3	0,33	2,06	3,06	2,01
125	4	255,7	173,5	9,5	17,7	180	131	24	157	283	152	22	3	0,34	2	2,98	1,96
135	4	273,2	185,3	9,5	17,7	195	139	26	167	303	163	20	3	0,33	2,02	3	1,97
140	4	286,7	201,2	9,5	17,7	210	147	27,5	177	323	174	18	3	0,35	1,94	2,88	1,89
150	4	303,9	213,1	9,5	17,7	220	154	28,5	187	343	185	18	3	0,35	1,95	2,9	1,91
160	4	320,8	224,9	12,5	23,5	230	161	29,5	197	363	195	22	3	0,34	1,96	2,92	1,92
170	5	338,1	236,8	12,5	23,5	240	169	30,5	210	380	206	9	4	0,34	1,96	2,92	1,92
180	5	355,1	248,8	12,5	23,5	250	176	31,5	220	400	216	10	4	0,34	1,98	2,94	1,93
200	5	391,1	273,4	12,5	23,5	280	186	35	240	440	236	10	4	0,33	2,06	3,06	2,01

Spherical roller bearings

For vibratory machinery
With withdrawal sleeve





Mounting dimensions

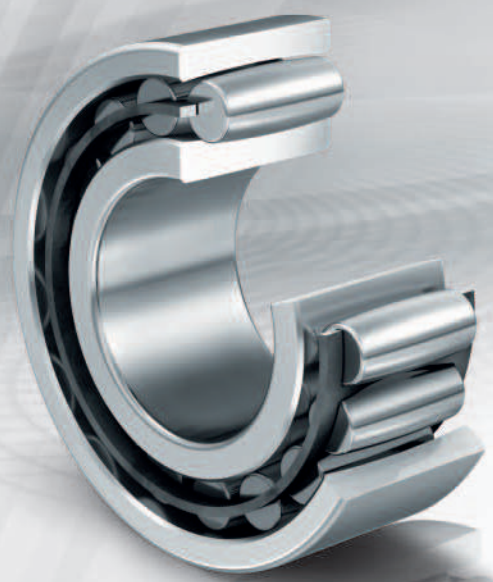
d_{1H} = 35 – 200 mm

Main dimensions				Basic load ratings		Fatigue limit load	Limiting speed	Speed rating	Mass m		Designation ➤681|1.12 ➤683|1.13 X-life ➤671	
d_{1H}	d	D	B	dyn. C_r	stat. C_{0r}	C_{ur}	n_G	$n_{\vartheta r}$	Bearing	Withdrawal sleeve	Bearing	Withdrawal sleeve
				kN	kN	N	min^{-1}	min^{-1}	≈ kg	≈ kg		
35	40	90	33	156	149	13 100	7 600	5 500	1	0,13	**22308-E1-XL-K-T41A**	**AH2308**
40	45	100	36	187	183	16 000	6 800	5 000	1,4	0,17	**22309-E1-XL-K-T41A**	**AH2309**
45	50	110	40	229	223	20 100	6 300	4 800	1,9	0,22	**22310-E1-XL-K-T41A**	**AHX2310**
50	55	120	43	265	260	23 900	5 800	4 500	2,2	0,26	**22311-E1-XL-K-T41A**	**AHX2311**
55	60	130	46	310	310	28 000	5 400	4 200	2,8	0,32	**22312-E1-XL-K-T41A**	**AHX2312**
60	65	140	48	350	365	32 500	5 000	3 800	3,5	0,36	**22313-E1-XL-K-T41A**	**AH2313G**
65	70	150	51	390	390	36 500	4 800	3 700	4,1	0,42	**22314-E1-XL-K-T41A**	**AHX2314G**
70	75	160	55	445	450	40 500	4 500	3 550	5,3	0,48	**22315-E1-XL-K-T41A**	**AHX2315G**
75	80	170	58	495	510	45 000	4 250	3 400	6,1	0,61	**22316-E1-XL-K-T41A**	**AHX2316**
80	85	180	60	540	560	49 500	4 100	3 200	7,1	0,68	**22317-E1-XL-K-T41A**	**AHX2317**
85	90	190	64	610	630	55 000	3 850	3 000	8,5	0,78	**22318-E1-XL-K-T41A**	**AHX2318**
90	95	200	67	670	700	59 000	3 700	2 800	9,5	0,91	**22319-E1-XL-K-T41A**	**AHX2319**
95	100	215	73	810	920	75 000	3 300	2 380	13	1,03	**22320-E1-XL-K-T41A**	**AHX2320**
105	110	240	80	950	1 070	90 000	3 000	2 130	17,4	1,26	**22322-E1-XL-K-T41A**	**AHX2322G**
115	120	260	86	1 080	1 170	102 000	2 850	2 000	22,1	1,5	**22324-E1-XL-K-T41A**	**AHX2324G**
125	130	280	93	1 250	1 370	116 000	2 650	1 820	27,4	1,84	**22326-E1-XL-K-T41A**	**AHX2326G**
135	140	300	102	1 460	1 630	131 000	2 420	1 660	34,4	2,21	**22328-E1-XL-K-T41A**	**AHX2328G**
145	150	320	108	1 640	1 850	147 000	2 290	1 520	40,9	2,64	**22330-E1-XL-K-T41A**	**AHX2330G**
150	160	340	114	1 680	1 990	157 000	2 250	1 420	47,3	4,26	**22332-BE-XL-K-JPA-T41A**	**AH2332G**
160	170	360	120	1 870	2 220	173 000	2 130	1 320	56,9	4,78	**22334-BE-XL-K-JPA-T41A**	**AH2334G**
170	180	380	126	2 060	2 460	190 000	2 030	1 230	66,6	5,42	**22336-BE-XL-K-JPA-T41A**	**AH2336G**
180	190	400	132	2 220	2 650	207 000	1 940	1 160	77,2	6,02	**22338-BE-XL-K-JPA-T41A**	**AH2338G**
190	200	420	138	2 440	2 950	225 000	1 830	1 080	87,4	7,64	**22340-BE-XL-K-JPA-T41A**	**AH2340**
200	220	460	145	2 800	3 400	265 000	1 690	950	114	13,6	**22344-BE-XL-K-JPA-T41A**	**AH2344**

medias ➤ *https://www.schaeffler.de/std/1EFA*

Dimensions										Mounting dimensions			Calculation factors			
d_{1H}	r min.	D_1 ≈	d_2 ≈	d_s	n_s	a ≈	B_1	l_G	Thread G	d_a min.	D_a max.	r_a max.	e	Y_1	Y_2	Y_0
35	1,5	76	52,4	3,2	6,5	3	7	40	M45×1,5	49	81	1,5	0,36	1,86	2,77	1,82
40	1,5	84,7	58,9	3,2	6,5	3	7	44	M50×1,5	54	91	1,5	0,36	1,9	2,83	1,86
45	2	92,6	63	3,2	6,5	3	9	50	M55×2	61	99	2	0,36	1,86	2,77	1,82
50	2	101,4	68,9	3,2	6,5	3	10	54	M60×2	66	109	2	0,36	1,89	2,81	1,84
55	2,1	110,1	74,8	3,2	6,5	3	11	58	M65×2	72	118	2,1	0,35	1,91	2,85	1,87
60	2,1	119,3	83,2	4,8	9,5	3	12	61	M70×2	77	128	2,1	0,34	2	2,98	1,96
65	2,1	128	86,7	4,8	9,5	4	12	64	M75×2	82	138	2,1	0,34	2	2,98	1,96
70	2,1	136,3	92,4	4,8	9,5	4	12	68	M80×2	87	148	2,1	0,34	1,99	2,96	1,94
75	2,1	145,1	98,3	4,8	9,5	4	12	71	M90×2	92	158	2,1	0,34	1,99	2,96	1,94
80	3	154,2	104,4	4,8	9,5	4	13	74	M95×2	99	166	2,5	0,33	2,04	3,04	2
85	3	162,5	110,2	6,3	12,2	4	14	79	M100×2	104	176	2,5	0,33	2,03	3,02	1,98
90	3	171,2	116	6,3	12,2	4	16	85	M105×2	109	186	2,5	0,33	2,03	3,02	1,98
95	3	184,7	130,2	6,3	12,2	4	16	90	M110×2	114	201	2,5	0,33	2,03	3,02	1,98
105	3	204,9	143,1	8	15	4	16	98	M120×2	124	226	2,5	0,33	2,07	3,09	2,03
115	3	222,4	150,7	8	15	4	17	105	M130×2	134	246	2,5	0,33	2,06	3,06	2,01
125	4	239,5	162,2	9,5	17,7	4	19	115	M140×2	147	263	3	0,33	2,06	3,06	2,01
135	4	255,7	173,5	9,5	17,7	5	20	125	M150×2	157	283	3	0,34	2	2,98	1,96
145	4	273,2	185,3	9,5	17,7	5	24	135	M160×3	167	303	3	0,33	2,02	3	1,97
150	4	286,7	201,2	9,5	17,7	6	24	140	M170×3	177	323	3	0,35	1,94	2,88	1,89
160	4	303,9	213,1	9,5	17,7	6	24	146	M180×3	187	343	3	0,35	1,95	2,9	1,91
170	4	320,8	224,9	12,5	23,5	6	26	154	M190×3	197	363	3	0,34	1,96	2,92	1,92
180	5	338,1	236,8	12,5	23,5	7	26	160	M200×3	210	380	4	0,34	1,96	2,92	1,92
190	5	355,1	248,8	12,5	23,5	7	30	170	Tr220×4	220	400	4	0,34	1,98	2,94	1,93
200	5	391,1	273,4	12,5	23,5	8	30	181	Tr240×4	240	440	4	0,33	2,06	3,06	2,01

Toroidal roller bearings



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Matrix for bearing preselection

The matrix gives an overview of the types and design features of toroidal roller bearings.

It can be used to make a preliminary assessment of whether a bearing is fundamentally suitable for the envisaged application.

The additional information provided in the product chapter (see column "detailed information") and in the Technical principles must, however, be observed in addition to this overview in selection of the bearing.

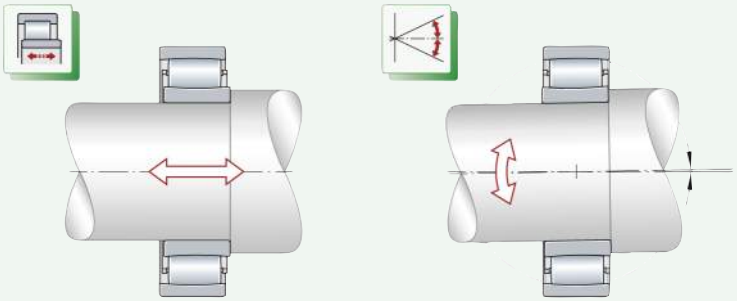
Design features and suitability			Toroidal roller bearings		
+++ extremely suitable ++ highly suitable + suitable (+) suitable with restrictions – not suitable/not applicable ✓ available			with cage	full complement roller set	detailed information ➤ 800
Load carrying capacity	radial		+++	+++	➤805|1.2
	axial, one direction		–	–	➤805|1.2
	axial, both directions		–	–	➤805|1.2
	moments		–	–	➤805|1.2
Compensation of angular misalignments	static		+++	+++	➤805|1.3
	dynamic		++	++	➤805|1.3
Bearing design	cylindrical bore		✓	✓	➤800|1.1
	tapered bore		✓	✓	➤800|1.1
	separable		–	–	➤800|1.1
Lubrication	greased		–	–	➤805|1.4
Sealing	open		✓	✓	➤805|1.5
	non-contact		–	–	➤805|1.5
	contact		–	–	➤805|1.5
Operating temperature in °C		from to	–30 +200	–30 +200	➤806|1.8
Suitability for	high speeds		+	(+)	➤806|1.6
	high running accuracy		++	++	➤808|1.11 ➤114
	low-noise running		+	+	➤806|1.7 ➤27
	high rigidity		++	+++	➤54
	reduced friction		+	(+)	➤56
	length compensation within bearing		+++	+++	➤800|1.1 ➤25
	non-locating bearing arrangement		+++	+++	➤139
	locating bearing arrangement		–	–	➤139
X-life bearings			✓	✓	➤804
Bearing bore d in mm		from to	70 900	60 220	➤832
Product tables		from page ➤	832	832	

1 Toroidal roller bearings

Toroidal roller bearings:
- combine the angular adjustment facility of spherical roller bearings with the unconstrained axial displacement facility of cylindrical roller bearings in one bearing ➤*800*|*1.1*
- have a very high radial load carrying capacity (in the full complement design) ➤*832*|▦
- support radial loads only ➤*805*|*1.2*
- are used solely as non-locating bearings (compensate axial displacements of the shaft relative to the housing)
- compensate misalignments between the shaft and housing ➤*800*|🗀 *1*, ➤*805*|*1.3*
- permit high speeds in spite of line contact ➤*832*|▦
- are available in numerous sizes and designs ➤*832*|▦
- result in particularly compact and economical bearing arrangements.

For an overview of other product-specific features, see the Matrix for bearing preselection ➤*799*.

🗀 **1**
Axial displacement facility and angular adjustment facility in one bearing



1.1 Bearing design

✎ *Design variants*

Toroidal roller bearings are X-life bearings.
The standard product range comprises:
- bearings with cage ➤*801*|🗀 *3*
- full complement bearings ➤*801*|🗀 *3*
- bearings with cylindrical or tapered bore (bearings with cage or full complement bearings) ➤*802*|🗀 *4*.

The bearings described here constitute the basic product range of Schaeffler toroidal roller bearings. These bearings are, however, also available in many other designs and sizes, as well as for specific applications. Related information is available from Schaeffler on request.

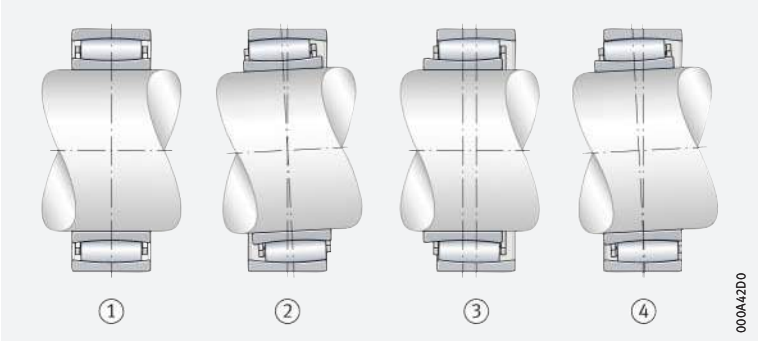
Toroidal roller bearings

✎ *Suitable for misalignments and where axial displacements of the shaft relative to the housing must be compensated without constraint in the bearing*

Toroidal roller bearings are single row radial roller bearings with a low radial section height and very high load carrying capacity, which are part of the group of self-aligning bearings ➤*801*|*2*, ➤*801*|*3* and ➤*802*|*4*. The outer ring has a toroidal raceway, which is concentric relative to the centre of the bearing. Correspondingly, the inner ring raceway is concave. This raceway design allows the bearings to compensate static and dynamic angular misalignments (skewing between the inner and outer ring) within certain limits ➤*805*|*1.3* and ➤*832*|▦. The relatively long and slightly crowned symmetrical rollers have self-aligning characteristics (they are “self-guiding”); i. e. they will always automatically adopt the position at which the load is distributed uniformly over the length of the roller, irrespective of whether the bearing rings are displaced or skewed relative to each other ➤*801*|*2*.
As this “self-guiding” of the rollers improves the load distribution in the bearing, the bearing is able to run with less friction and, as a result, at lower temperatures. This in turn has a positive effect on the operating life of the bearing and lubricant.

2
Operating modes of the inner ring – with tilting and axial displacement

① *Initial position*
② *Inner ring with tilting*
③ *Inner ring with axial displacement*
④ *Inner ring with displacement and tilting*



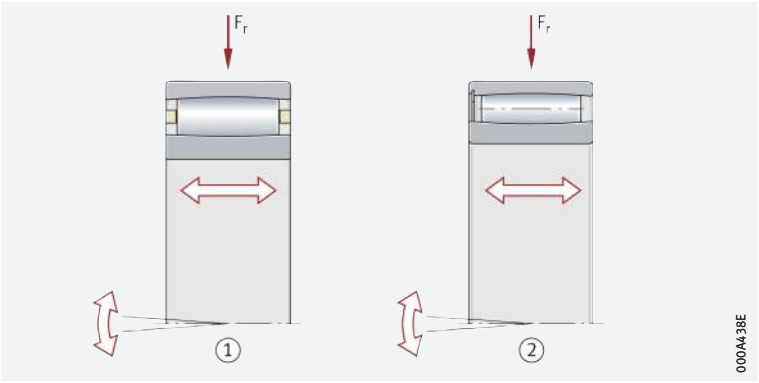
✎ *With cage or full complement cylindrical roller set*

The bearings are available with a sheet steel cage, brass cage (suffix M or M1B) and in a full complement design ➤*801*|*3* and ➤*806*|▦ *1.9*. Full complement bearings have the suffix V.

3
Toroidal roller bearings with cage or full complement cylindrical roller set

F_r = *radial load*

① *Bearing with solid brass cage*
② *Full complement design*



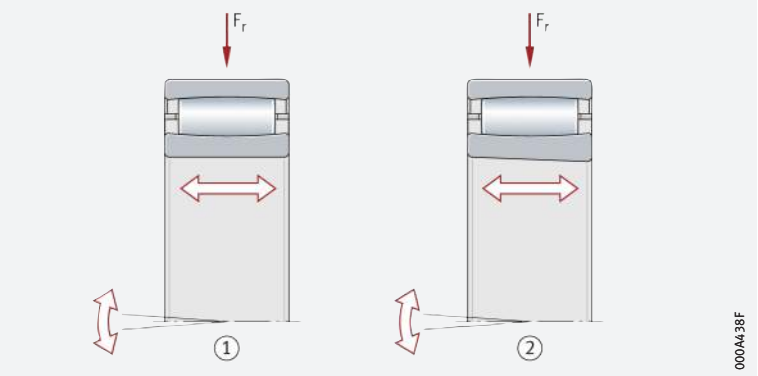
✎ *The bore is cylindrical or tapered*

With only a few exceptions, the bearings are available with a cylindrical bore as well as with a tapered bore ➤*802*|*4*. Bearings with a tapered bore have the bore taper 1:12 (suffix K) and 1:30 (suffix K30) ➤*809*|▦ *4* and ➤*806*|*1.9*.

4
Toroidal roller bearings with cylindrical or tapered bore

F_r = *radial load*

① *Bearing with cylindrical bore*
② *Bearing with tapered bore, taper angle 1:12*

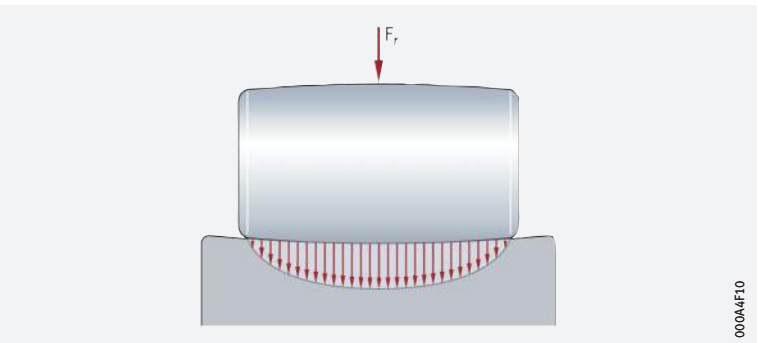


Roller profile design

The stress distribution at the contact points between the rollers and raceways is determined by the contact profile of the rollers. As a result, the roller profile is matched to the raceway profiles. In addition, the rollers exhibit high dimensional and geometrical accuracy. Consequently, the rollers in an individual rolling element set are practically identical in terms of their size and shape. This gives a favourable and even load distribution across all rollers and over the entire length of the roller, thus preventing edge stresses and stress peaks at the ends of the roller ➤*802*| *5*.

5
Uniform load distribution due to optimised roller profile

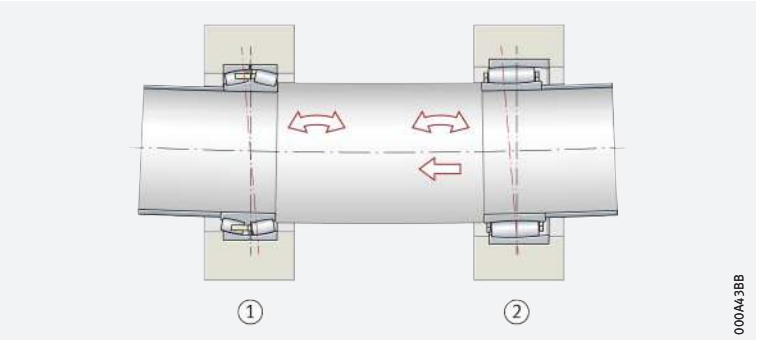
F_r = *radial load*



Length compensation takes place without constraint in the bearing

Bearings with non-locating bearing function

Toroidal roller bearings simplify the design of locating/non-locating bearing arrangements, as they compensate temperature-induced changes in length and skewing between the inner and outer ring with hardly any friction in the bearing ➤*803*| *6*. Axial displacements of the shaft relative to the housing are possible in both directions and within certain limits. Even more considerable axial displacements have no effect on the locating bearing. Length compensation takes place during rotary motion. The constraining forces occurring are so slight that they can be disregarded during operation. The maximum axial displacement distance s_1 and s_2 is given in the product tables ➤*832*|. s_1 is valid for bearings with cages, s_1 and s_2 are valid for full complement bearings.

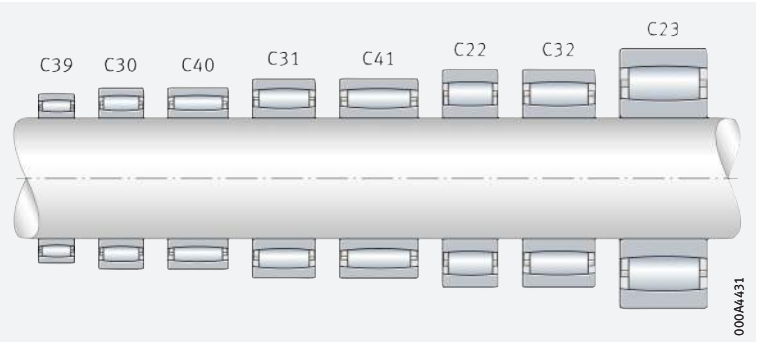


6 *Locating/non-locating bearing arrangement, angular adjustment facility and axial displacement facility*

① *Spherical roller bearing (locating bearing)*
② *Toroidal roller bearing (non-locating bearing)*

Product range

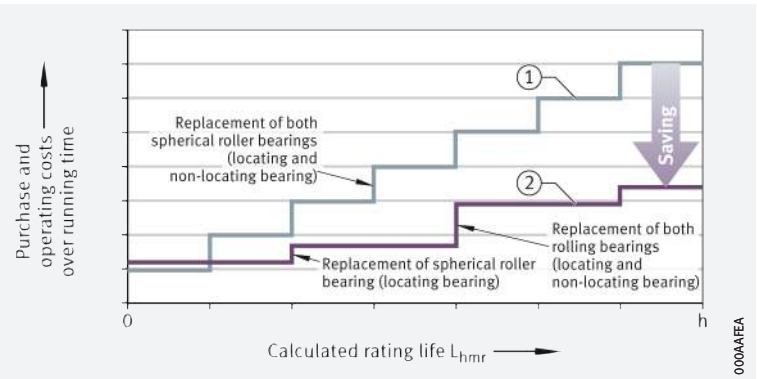
The range of toroidal roller bearings comprises eight series ➤*803*|**7**.



7 *Product range – cross-sectional comparison of available series*

✎ Interchangeable with spherical roller bearings and cylindrical roller bearings

Substituting bearing arrangements composed of two spherical roller bearings for one spherical roller bearing (locating bearing) and one toroidal roller bearing (non-locating bearing) can significantly reduce the overall operating costs of the locating/non-locating system ➤*803*|**6** and ➤*803*|**8**. The interchangeability of the bearings is ensured, as toroidal roller bearings are manufactured as standard in the same ISO dimension series and sizes as spherical roller bearings.



8 *Comparison of the overall operating costs of locating/non-locating bearing systems*

① *Bearing arrangement with two spherical roller bearings*
② *Bearing arrangement with one spherical roller bearing (locating bearing) and one toroidal roller bearing (non-locating bearing)*

X-life premium quality

The toroidal roller bearings described here are X-life bearings. These products exhibit considerably higher performance than toroidal roller bearings that are not X-life. This is achieved, for example, through the optimised contact geometry between the rollers and raceways, as well as through the higher quality of the steel and rolling elements, higher surface quality and appropriate heat treatment.

Advantages

Increased customer benefits due to X-life

The technical enhancements offer a range of advantages, such as:

- a more favourable load distribution in the bearing and thus a higher dynamic load carrying capacity of the bearings (higher basic dynamic load ratings C_r)
- quieter running and higher running accuracy
- running with reduced friction and greater energy efficiency
- lower heat generation in the bearing
- higher possible speeds
- lower lubricant consumption and, consequently, longer maintenance intervals
- significantly reduced maintenance requirements
- a measurably longer operating life ➤*803*|*8*
- high operational security
- compact, environmentally-friendly bearing arrangements.

Lower operating costs, higher machine availability

In conclusion, these advantages improve the overall cost-efficiency of the bearing position significantly and thus bring about a sustainable increase in the efficiency of the machine and equipment.

Suffix XL

X-life toroidal roller bearings include the suffix XL in the designation ➤*800*|*1.1* and ➤*832*|.

Areas of application

Wide application range

Due to their special technical features, X-life toroidal roller bearings are highly suitable for bearing arrangements in:

- paper machinery
- marine propulsion systems
- continuous casting plant
- steelworks and rolling mills
- ventilators, fans and pumps
- conveying equipment and belt installations
- crushers
- gearboxes
- agricultural machinery.

X-life indicates a high product performance density and thus a particularly significant benefit to the customer. Further information on X-life ➤*10*.

1.2 Load carrying capacity

The bearings are radial bearings

Toroidal roller bearings support very high radial forces due to the line contact of the rollers. They may, however, only be subjected to purely radial load ➤*801*|*3*, ➤*802*|*4* and ➤*800*|*1.1*. As non-locating bearings, they cannot guide the shaft axially in either direction. Combining toroidal roller bearings with a spherical roller bearing on the locating bearing side results in bearing arrangements with a smaller design envelope, a lower mass and only low maintenance requirements ➤*803*|*6*.

Full complement bearings have the highest load carrying capacity

Bearings without a cage can accommodate the largest possible number of rolling elements. As a result, the radial load carrying capacity of full complement toroidal roller bearings is higher still than for the designs with a cage. These bearings are therefore highly suitable for bearing arrangements in continuous casting plant.

1.3 Compensation of angular misalignments

Toroidal roller bearings compensate angular misalignments

Toroidal roller bearings can be tilted by an angle of up to 0,5° between the centre axes of the inner ring and outer ring without impairing the function and rating life. This allows the toroidal roller bearing to easily compensate a slight geometrical deviation of the housing bore or a shaft that is not precisely aligned.

Depending on the series and size, skewing of more than 0,5° is possible, but may be associated with a reduction in the rating life. In the case of such applications, please contact our technical advisory service in order to achieve an optimum design of the bearing arrangement.

Roller offset under skewing

Skewing of the bearing rings relative to each other causes a degree of roller offset in the bearing, which can cause the rollers to protrude beyond the rings. In order to prevent this, the axial displacement facility of the rings relative to each other is restricted ➤*822*.

If there is any uncertainty regarding possible skewing in a specific application, please consult Schaeffler.

1.4 Lubrication

Oil or grease lubrication is possible

Open toroidal roller bearings are not greased. They must be lubricated with oil or grease. Lubricant is introduced from one side and exits on the opposing side.

If there is any uncertainty regarding the suitability of the selected lubricant for the application, please consult Schaeffler or the lubricant manufacturer.

1.5 Sealing

Provide seals in the adjacent construction

The bearings are not sealed; i.e. sealing of the bearing position must be carried out in the adjacent construction. This must reliably prevent:

- moisture and contaminants from entering the bearing
- the egress of lubricant from the bearing.

1.6 Speeds

Limiting speeds and reference speeds in the product tables

The product tables give two speeds for most bearings ➤*832*|▦:

- the kinematic limiting speed n_G
- the thermal speed rating $n_{\vartheta r}$.

Limiting speeds

The limiting speed n_G is the kinematically permissible speed of the bearing. Even under favourable mounting and operating conditions, this value should not be exceeded without prior consultation with Schaeffler ➤*64*.

Reference speeds

$n_{\vartheta r}$ is used to calculate n_ϑ

The thermal speed rating $n_{\vartheta r}$ is not an application-oriented speed limit, but is a calculated ancillary value for determining the thermally safe operating speed n_ϑ ➤*64*.

1.7 Noise

Schaeffler Noise Index

The Schaeffler Noise Index (SGI) is not yet available for this bearing type ➤*69*. The data for these bearing series will be introduced and updated in stages.

Further information:

- ***medias*** ➤*https://medias.schaeffler.com*.

1.8 Temperature range

Limiting values

The operating temperature of the bearings is limited by:

- the dimensional stability of the bearing rings and rollers
- the cage
- the lubricant.

Toroidal roller bearings are dimensionally stable up to +200 °C. Possible operating temperatures of bearings ➤*806*|▦ *1*.

▦ ***1***
Permissible temperature ranges

Operating temperature	Toroidal roller bearings	
	with cage	full complement roller set
	–30 °C to +200 °C	–30 °C to +200 °C

In the event of anticipated temperatures which lie outside the stated values, please contact Schaeffler.

1.9 Cages

Sheet steel and brass cages are used as standard

Depending on the series and bearing size, toroidal roller bearings are supplied with the following cages ➤*809*|▦ *4*:

- roller-guided sheet steel cage, single-piece (no suffix)
- roller-guided brass window cage (suffix M)
- brass window cage, guided on inner ring (suffix M1B).

1.10 Internal clearance

Radial internal clearance

✎ *The standard is CN*

Toroidal roller bearings are manufactured as standard with radial internal clearance CN (normal). CN is not stated in the designation. Values for bearings with a cylindrical bore ➤*807*|▦*2*, values for bearings with a tapered bore ➤*808*|▦*3*.

Toroidal roller bearings are also available with the smaller internal clearance C2 and with the larger internal clearance C3, C4 and C5 ➤*807*|▦*2* and ➤*808*|▦*3*.

The values for radial internal clearance correspond to ISO 5753-1:2009 ➤*807*|▦*2* and ➤*808*|▦*3*. They are valid for unmounted bearings which are free from load and measurement forces (without elastic deformation).

Axial displacements of the bearing rings relative to each other will reduce the internal clearance of toroidal roller bearings.
This reduction can be determined by way of calculation ➤*821*|*f* 13.

▦*2*
Radial internal clearance of toroidal roller bearings with cylindrical bore

Nominal bore diameter		Radial internal clearance									
d		C2 (Group 2)		CN (Group N)		C3 (Group 3)		C4 (Group 4)		C5 (Group 5)	
mm		µm		µm		µm		µm		µm	
over	incl.	min.	max.	min.	max.	min.	max.	min.	max.	min.	max.
18	24	15	30	25	40	35	55	50	65	65	85
24	30	15	35	30	50	45	60	60	80	75	95
30	40	20	40	35	55	55	75	70	95	90	120
40	50	25	45	45	65	65	85	85	110	105	140
50	65	30	55	50	80	75	105	100	140	135	175
65	80	40	70	65	100	95	125	120	165	160	210
80	100	50	85	80	120	120	160	155	210	205	260
100	120	60	100	100	145	140	190	185	245	240	310
120	140	75	120	115	170	165	215	215	280	280	350
140	160	85	140	135	195	195	250	250	325	320	400
160	180	95	155	150	220	215	280	280	365	360	450
180	200	105	175	170	240	235	310	305	395	390	495
200	225	115	190	185	265	260	340	335	435	430	545
225	250	125	205	200	285	280	370	365	480	475	605
250	280	135	225	220	310	305	410	405	520	515	655
280	315	150	240	235	330	330	435	430	570	570	715
315	355	160	260	255	360	360	485	480	620	620	790
355	400	175	280	280	395	395	530	525	675	675	850
400	450	190	310	305	435	435	580	575	745	745	930
450	500	205	335	335	475	475	635	630	815	810	1 015
500	560	220	360	360	520	510	690	680	890	890	1 110
560	630	240	400	390	570	560	760	750	980	970	1 220
630	710	260	440	430	620	610	840	830	1 080	1 070	1 340
710	800	300	500	490	680	680	920	920	1 200	1 200	1 480
800	900	320	540	530	760	750	1 020	1 010	1 330	1 320	1 660
900	1 000	370	600	590	830	830	1 120	1 120	1 460	1 460	1 830
1 000	1 120	410	660	660	930	930	1 260	1 260	1 640	1 640	2 040
1 120	1 250	450	720	720	1 020	1 020	1 380	1 380	1 800	1 800	2 240
1 250	1 400	490	800	800	1 130	1 130	1 510	1 540	1 970	1 970	2 460
1 400	1 600	570	890	890	1 250	1 250	1 680	1 680	2 200	2 200	2 740
1 600	1 800	650	1 010	1 010	1 390	1 390	1 870	1 870	2 430	2 430	3 000

3 *Radial internal clearance of toroidal roller bearings with tapered bore*

Nominal bore diameter d mm		Radial internal clearance									
		C2 (Group 2) µm		CN (Group N) µm		C3 (Group 3) µm		C4 (Group 4) µm		C5 (Group 5) µm	
over	incl.	min.	max.	min.	max.	min.	max.	min.	max.	min.	max.
18	24	15	35	30	45	40	55	55	70	65	85
24	30	20	40	35	55	50	65	65	85	80	100
30	40	25	50	45	65	60	80	80	100	100	125
40	50	30	55	50	75	70	95	90	120	115	145
50	65	40	65	60	90	85	115	110	150	145	185
65	80	50	80	75	110	105	140	135	180	175	220
80	100	60	100	95	135	130	175	170	220	215	275
100	120	75	115	115	155	155	205	200	255	255	325
120	140	90	135	135	180	180	235	230	295	290	365
140	160	100	155	155	215	210	270	265	340	335	415
160	180	115	175	170	240	235	305	300	385	380	470
180	200	130	195	190	260	260	330	325	420	415	520
200	225	140	215	210	290	285	365	360	460	460	575
225	250	160	235	235	315	315	405	400	515	510	635
250	280	170	260	255	345	340	445	440	560	555	695
280	315	195	285	280	380	375	485	480	620	615	765
315	355	220	320	315	420	415	545	540	680	675	850
355	400	250	350	350	475	470	600	595	755	755	920
400	450	280	385	380	525	525	655	650	835	835	1 005
450	500	305	435	435	575	575	735	730	915	910	1 115
500	560	330	480	470	640	630	810	800	1 010	1 000	1 230
560	630	380	530	530	710	700	890	880	1 110	1 110	1 350
630	710	420	590	590	780	770	990	980	1 230	1 230	1 490
710	800	480	680	670	860	860	1 100	1 100	1 380	1 380	1 660
800	900	520	740	730	960	950	1 220	1 210	1 530	1 520	1 860
900	1 000	580	820	810	1 040	1 040	1 340	1 340	1 670	1 670	2 050
1 000	1 120	640	900	890	1 170	1 160	1 500	1 490	1 880	1 870	2 280
1 120	1 250	700	980	970	1 280	1 270	1 640	1 630	2 060	2 050	2 500
1 250	1 400	770	1 080	1 080	1 410	1 410	1 790	1 780	2 250	2 250	2 740
1 400	1 600	870	1 200	1 200	1 550	1 550	1 990	1 990	2 500	2 500	3 050
1 600	1 800	950	1 320	1 320	1 690	1 690	2 180	2 180	2 730	2 730	3 310

1.11 Dimensions, tolerances

Dimension standards

The main dimensions of toroidal roller bearings correspond to ISO 15:2017 (DIN 616:2000).

Chamfer dimensions

The limiting dimensions for chamfer dimensions correspond to DIN 620-6:2004. Overview and limiting values ➤*135|7.11*. Nominal value of chamfer dimension ➤*832|*.

Tolerances

The dimensional tolerances of toroidal roller bearings with a cylindrical and tapered bore correspond to the tolerance class Normal in accordance with ISO 492:2014. Tolerance values in accordance with ISO 492 ➤*122|8*.

Running accuracy

The running accuracy of the inner and outer ring corresponds to tolerance class 5 in accordance with ISO 492:2014. Tolerance values in accordance with ISO 492 ➤*126|14*.

1.12 Suffixes

For a description of the suffixes used in this chapter ➤*809*|▦*4* and ***medias*** interchange ➤*https://www.schaeffler.de/std/1D52*.

▦**4**
Suffixes and corresponding descriptions

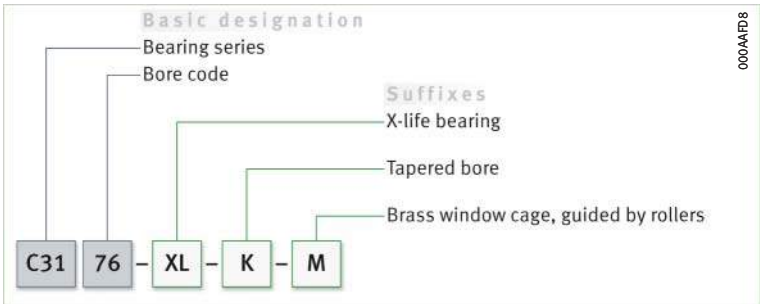
Suffix	Description of suffix	
C2	Radial internal clearance C2 (smaller than normal)	Available by agreement
C3	Radial internal clearance C3 (larger than normal)	
C4	Radial internal clearance C4 (larger than C3)	
C5	Radial internal clearance C5 (larger than C4)	
K	Tapered bore, taper 1:12	Standard
K30	Tapered bore, taper 1:30	
M	Brass window cage, guided by rollers	
M1B	Brass window cage, guided on inner ring	
V	Full complement	
W209B	Inner ring made from case hardening steel	
XL	X-life bearing	

1.13 Structure of bearing designation

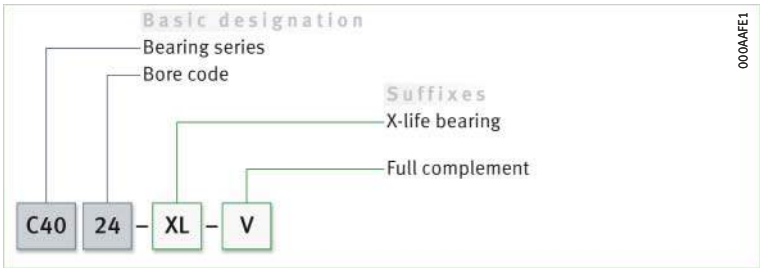
✎*Examples of composition of bearing designation*

The designation of bearings follows a set model. Examples ➤*809*|⧉*9* and ➤*809*|⧉*10*. The composition of designations is subject to DIN 623-1 ➤*102*|⧉*10*.

⧉**9**
Toroidal roller bearing, series 31, with cage, tapered bore: designation structure



⧉**10**
Toroidal roller bearing, series 40, full complement, cylindrical bore: designation structure



1.14 Dimensioning

Equivalent dynamic bearing load

✎ *$P = F_r$ under purely radial load of constant magnitude and direction*

The basic rating life equation $L = (C_r/P)^p$ used in the dimensioning of bearings under dynamic load assumes a load of constant magnitude and direction. In radial bearings, this is a purely radial load F_r.
If this condition is met, the bearing load F_r is used in the rating life equation for P ($P = F_r$) ➤*810| ⎍ 1*.

⎍ 1
Equivalent dynamic load

$$P = F_r$$

Legend

P	N	Equivalent dynamic bearing load
F_r	N	Radial load.

Permissible dynamic bearing load

Maximum values in accordance with ➤*810| ▦ 5* apply to dynamic bearing load P.

▦ 5
Permissible dynamic bearing load

Fundamentally valid for	Valid up to bore diameter d ≦ 200 mm for
P	
$P \leqq 0{,}33\ C_r$	$P \leqq 0{,}18\ C_{0r}$

In applications with very high dynamic loads, the rating life calculation must be carried out in greater detail.
In such cases, please consult Schaeffler.

Equivalent static bearing load

For toroidal bearings subjected to static load ➤*810| ⎍ 2*.

⎍ 2
Equivalent static load

$$P_0 = F_r$$

Legend

P_0	N	Equivalent static bearing load
F_r	N	Largest radial load present (maximum load).

Static load safety factor

✎ *$S_0 = C_0/P_0$*

In addition to the basic rating life L (L_{10h}), it is also always necessary to check the static load safety factor S_0 ➤*810| ⎍ 3*.

⎍ 3
Static load safety factor

$$S_0 = \frac{C_0}{P_0}$$

Legend

S_0	–	Static load safety factor
C_0	N	Basic static load rating
P_0	N	Equivalent static bearing load.

1.15 Minimum load

In order to prevent damage due to slippage, a minimum radial load is required

In order that no slippage occurs between the contact partners, the toroidal roller bearings must be constantly subjected to a sufficiently high radial load. This applies in particular to high speed bearings since, if the radial load is not present, damaging sliding motion may occur between the rolling elements and raceways. Based on experience, a minimum load is thus necessary ➤*811*|*f 4*. In most cases, however, the radial load is already higher than the requisite minimum load $F_{r\,min}$ due to the weight of the supported parts and the external forces.

f 4
Minimum radial load

$$F_{r\,min} = 0{,}0135 \cdot C_0$$

Legend

$F_{r\,min}$	kN	Minimum radial load
C_0	kN	Basic static load rating ➤*832*|

If the minimum radial load $F_{r\,min} \leqq 0{,}0135 \cdot C_0$, please consult Schaeffler.

Minimum radial load with oil lubrication

Values can be determined from a diagram or by calculation

If oil lubrication is used, the requisite minimum load $F_{r\,min}$ is reduced as a function of the bearing type and speed. $F_{r\,min}$ can be determined for this operating condition:

- with the aid of a diagram, whereby $F_{r\,min}$ is read off relative to C_0 ➤*811*|*11*
- by calculation ➤*812*|*f 6* and ➤*812*| *6*.

Determining the minimum radial load with the aid of a diagram

Determining ancillary value k_r

In order to calculate $F_{r\,min}$, the ancillary value k_r must first be determined ➤*811*|*f 5*.

f 5
Ancillary value

$$k_r = k_\delta \cdot d_M$$

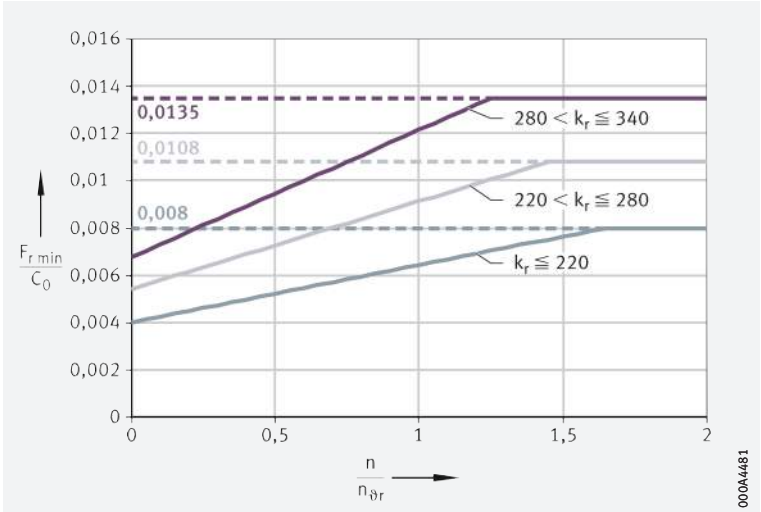
Legend

k_r	–	Ancillary value
k_δ	–	Operating clearance factor ➤*832*|
d_M	mm	Mean bearing diameter (d+D)/2.

Reading off the minimum radial load from a diagram

With the aid of the ancillary value k_r and the speed ratio $n/n_{\vartheta r}$, the requisite minimum load can be read off relative to the basic static load rating C_0 ➤*811*|*11*.

11
Minimum radial load with oil lubrication



$F_{r\,min}$ = *minimum radial load*
C_0 = *basic static load rating* ➤*832*|
n = *operating speed*
$n_{\vartheta r}$ = *speed rating* ➤*832*|
k_r = *ancillary value* ➤*811*|*f 5*

Determining the minimum radial load by calculation

As an alternative to using a diagram, the requisite minimum radial load can also be determined by calculation ➤*812*| ƒ*6* to ➤*812*| ƒ*8*.

ƒ**6** *Factor f_n, if $n < n_K \cdot n_{\vartheta r}$*

$$f_n = 0{,}5 \cdot \left(1 + \frac{n}{n_{\vartheta r} \cdot n_K}\right)$$

ƒ**7** *Factor f_n, if $n \geqq n_K \cdot n_{\vartheta r}$*

$$f_n = 1$$

Legend

f_n	–	Factor for determining the influence of speed. In the case of full complement bearings: $f_n = 1$
n	min^{-1}	Operating speed
$n_{\vartheta r}$	min^{-1}	Speed rating ➤*832*|
n_K	–	Speed parameter ➤*812*| *6*.

ƒ**8** *Minimum radial load*

$$F_{r\,min} = f_F \cdot f_n \cdot C_0$$

Legend

$F_{r\,min}$	kN	Minimum radial load
f_F	–	Factor due to influence of load ➤*812*| *6*
f_n	–	Factor due to influence of speed ➤*812*| ƒ*6* and ➤*812*| ƒ*7*
C_0	kN	Basic static load rating ➤*832*|.

Higher minimum radial loads may also be necessary under certain conditions when starting up at low temperature, when using greases with a high base oil viscosity and where bearings have been regreased.

As a function of k_r, the factors for calculation of the minimum load should be selected as follows ➤*812*\| *6*.

6 *Factors for calculation of minimum radial load*

Ancillary value k_r		Factor due to influence of load f_F	Speed parameter n_K
over	incl.		
–	220	0,0080	1,65
220	280	0,0108	1,45
280	340	0,0135	1,25

Calculation example 1:
Determining the minimum radial load $F_{r\,min}$ with the aid of a diagram

Task

The aim is to determine the minimum radial load $F_{r\,min}$ for toroidal roller bearing C3144-XL-K-C4 using a diagram ➤813| 9 and ➤813| 12. The operating speed n = 260 min^{-1}, the static load carrying capacity of the bearing C_{0r} = 2 900 kN.

9
Ancillary value

$$k_r = k_\delta \cdot d_M$$

Calculation factor ➤832|

$$k_\delta = 0{,}791$$

Mean bearing diameter ➤832|

$$d_M = \frac{220\ mm + 370\ mm}{2} = 295\ mm$$

Ancillary value ➤813| 9

$$k_r = 0{,}791 \cdot 295\ mm = 233{,}345\ mm \approx 233\ mm$$

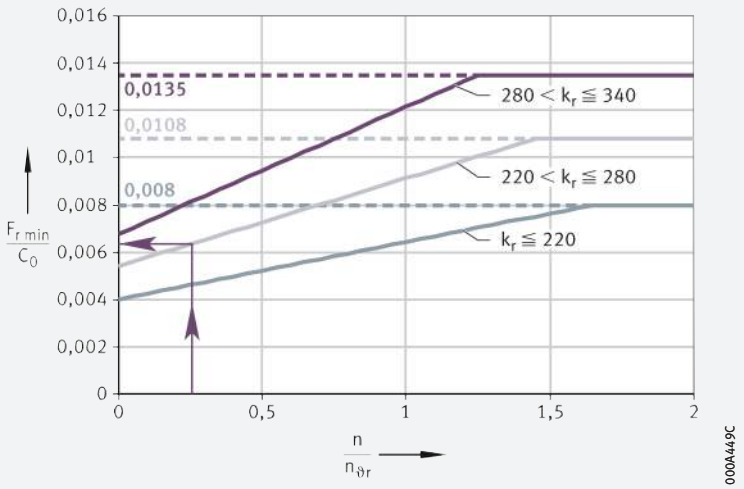
Speed ratio ➤813| 12

$$\frac{n}{n_{\vartheta r}} = \frac{260\ min^{-1}}{960\ min^{-1}} = 0{,}27$$

The middle curve applies

k_r = 233 mm, therefore the middle (grey) curve is selected in the diagram ➤813| 12. $n/n_{\vartheta r}$ = 0,27 for $F_{r\,min}/C_0$ = 0,0064.

12
Minimum radial load with oil lubrication



$F_{r\,min}$ = *minimum radial load*
C_0 = *basic static load rating* ➤832|
n = *operating speed*
$n_{\vartheta r}$ = *speed rating* ➤832|
k_r = *ancillary value* ➤813| 9

$F_{r\,min}$

Calculate the minimum radial load for C3144-XL-K-C4:

$$F_{r\,min} = 0{,}0064 \cdot 2\,900\ kN = 18{,}6\ kN$$

Calculation example 2:
Determining the minimum radial load $F_{r\,min}$ by calculation

Task

The aim is to determine the minimum radial load $F_{r\,min}$ for toroidal roller bearing C3144-XL-K-C4 by calculation ➤*814*| *f⃞ 10*, ➤*814*| *f⃞ 11* and ➤*812*| ▦ *6*. The operating speed n = 260 min^{-1}, the static load carrying capacity of the bearing C_{0r} = 2 900 kN.

If $k_r \approx 233$ mm is taken from Example 1, this gives:

- $n_K = 1{,}45$ ➤*812*| ▦ *6*
- $f_F = 0{,}0108$ ➤*812*| ▦ *6*.

If $n_{\vartheta r} \cdot n_K = 960\ min^{-1} \cdot 1{,}45 = 1\,392\ min^{-1} > 260\ min^{-1}$, this gives ➤*814*| *f⃞ 10* and ➤*814*| *f⃞ 11*.

f⃞ 10
Factor for determining the influence of speed

$$f_n = 0{,}5 \cdot \left(1 + \frac{n}{n_{\vartheta r} \cdot n_K}\right)$$

$$f_n = 0{,}5 \cdot \left(1 + \frac{260\ min^{-1}}{960\ min^{-1} \cdot 1{,}45}\right) = 0{,}593$$

f⃞ 11
Minimum radial load

$$F_{r\,min} = f_F \cdot f_n \cdot C_0$$

$$F_{r\,min} = 0{,}0108 \cdot 0{,}593 \cdot 2\,900\ kN \approx 18{,}6\ kN$$

1.16 Design of bearing arrangements

Support bearing rings over their entire circumference and width

In order to allow full utilisation of the load carrying capacity of the bearings and achieve the requisite rating life, the bearing rings must be rigidly and uniformly supported by means of contact surfaces over their entire circumference and over the entire width of the raceway. Support can be provided by means of a cylindrical or tapered seating surface ➤816|13 to ➤820|16. The seating and contact surfaces should not be interrupted by grooves, holes or other recesses. The accuracy of mating parts must meet specific requirements ➤817|7 to ➤818|9.

Radial location – fit recommendations for bearings with cylindrical bore

For secure radial location, tight fits are necessary

In addition to supporting the rings adequately, the bearings must also be securely located in a radial direction, to prevent creep of the bearing rings on the mating parts under load. This is generally achieved by means of tight fits between the bearing rings and the mating parts. If the rings are not secured adequately or correctly, this can cause severe damage to the bearings and adjacent machine parts. Influencing factors, such as the conditions of rotation, magnitude of the load, internal clearance, temperature conditions, design of the mating parts and the mounting and dismounting options must be taken into consideration in the selection of fits.

If shock type loads occur, tight fits (transition fit or interference fit) are required to prevent the rings from coming loose at any point. Clearance, transition or interference fits ➤150|6 and ➤158|7.

The following information provided in Technical principles must be taken into consideration in the design of bearing arrangements:

- conditions of rotation ➤145
- tolerance classes for cylindrical shaft seats (radial bearings) ➤147|2
- shaft fits ➤150|6
- tolerance classes for bearing seats in housings (radial bearings) ➤148|4
- housing fits ➤158|7
- shaft tolerances for adapter sleeves and withdrawal sleeves ➤166|8.

Axial location – bearings with cylindrical bore

The bearings must also be securely located in an axial direction

As a tight fit alone is not normally sufficient to also locate the bearing rings securely on the shaft and in the housing bore in an axial direction, this must usually be achieved by means of an additional axial location or retention method. The axial location of the bearing rings must be matched to the type of bearing arrangement. Shaft and housing shoulders, housing covers, nuts, spacer rings and retaining rings etc., are fundamentally suitable.

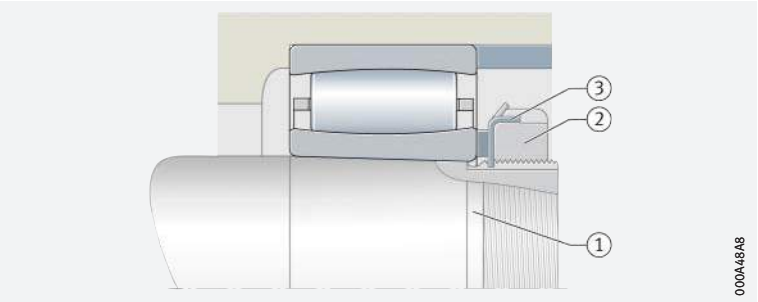
Axial location – bearings with tapered bore

✎ Location by means of locknut and tab washer

If a bearing with a tapered bore is mounted directly on a tapered journal, the bearing can be axially located with ease using a locknut and tab washer ➤*816*|⧉ *13*.

⧉ ***13***
Toroidal roller bearing with tapered bore, mounted directly on the tapered shaft journal

① *Tapered journal with fixing thread*
② *Locknut*
③ *Tab washer*



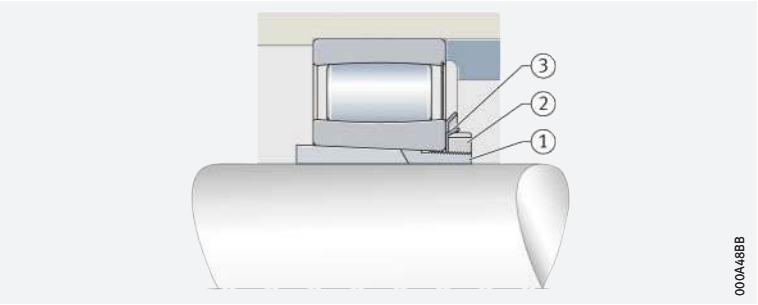
Location of bearings by means of adapter sleeve or withdrawal sleeve

✎ Mounting can be carried out quickly and reliably by means of wrench sets from Schaeffler

Toroidal roller bearings with a tapered bore can be located easily and with operational reliability on smooth or stepped cylindrical shafts by means of an adapter sleeve or withdrawal sleeve ➤*816*|⧉ *14*. The adapter sleeve does not need to be secured on the shaft by any additional means. The bearings can be positioned at any point on smooth shafts.

⧉ ***14***
Toroidal roller bearing with adapter sleeve, located on smooth shaft

① *Adapter sleeve*
② *Locknut*
③ *Tab washer*



Dimensional, geometrical and running accuracy of cylindrical bearing seats

✎A minimum of IT6 should be provided for the shaft seat and a minimum of IT7 for the housing seat

The accuracy of the cylindrical bearing seat on the shaft and in the housing should correspond to the accuracy of the bearing used. For toroidal roller bearings with the tolerance class Normal, the shaft seat should correspond to a minimum of standard tolerance grade IT6 and the housing seat to a minimum of IT7. Guide values for the geometrical and positional tolerances of bearing seating surfaces ➤817|▦ 7, tolerances t_1 to t_3 in accordance with ➤168|◯ 11. Numerical values for IT grades ➤817|▦ 8.

▦ 7
Guide values for the geometrical and positional tolerances of bearing seating surfaces

Bearing tolerance class		Bearing seating surface	Standard tolerance grades to ISO 286-1 (IT grades)			
to ISO 492	to DIN 620		Diameter tolerance	Roundness tolerance t_1	Parallelism tolerance t_2	Total axial runout tolerance of abutment shoulder t_3
Normal	PN (P0)	Shaft	IT6 (IT5)	Circumferential load IT4/2	Circumferential load IT4/2	IT4
				Point load IT5/2	Point load IT5/2	
		Housing	IT7 (IT6)	Circumferential load IT5/2	Circumferential load IT5/2	IT5
				Point load IT6/2	Point load IT6/2	
5	P5	Shaft	IT5	Circumferential load IT2/2	Circumferential load IT2/2	IT2
				Point load IT3/2	Point load IT3/2	
		Housing	IT6	Circumferential load IT3/2	Circumferential load IT3/2	IT3
				Point load IT4/2	Point load IT4/2	

▦ 8
Numerical values for ISO standard tolerances (IT grades) to ISO 286-1:2010

IT grade	Nominal dimension in mm									
	over	**50**	**80**	**120**	**180**	**250**	**315**	**400**	**500**	**630**	**800**
	incl.	**80**	**120**	**180**	**250**	**315**	**400**	**500**	**630**	**800**	**1 000**
	Values in µm										
IT4		8	10	12	14	16	18	20	22	25	28
IT5		13	15	18	20	23	25	27	32	36	40
IT6		19	22	25	29	32	36	40	44	50	56
IT7		30	35	40	46	52	57	63	70	80	90

Roughness of cylindrical bearing seating surfaces

✎ *Ra must not be too high*

The roughness of the bearing seats must be matched to the tolerance class of the bearings. The mean roughness value Ra must not be too high, in order to maintain the interference loss within limits. The shafts must be ground, while the bores must be precision turned. Guide values as a function of the IT grade of bearing seating surfaces ➤*818*|▦ *9*.

▦ ***9***
Roughness values for cylindrical bearing seating surfaces – guide values

Nominal diameter of the bearing seat d (D) mm		Recommended mean roughness value for ground bearing seats Ramax µm			
		Diameter tolerance (IT grade)			
over	incl.	IT7	IT6	IT5	IT4
–	80	1,6	0,8	0,4	0,2
80	500	1,6	1,6	0,8	0,4
500	1 250	3,2[1)]	1,6	1,6	0,8

1) *For the mounting of bearings using the hydraulic method, a value Ra = 1,6 µm must not be exceeded.*

Tolerances for tapered bearing seats

✎ *Specifications for tapered bearing seats*

For bearings located directly on a tapered shaft journal ➤*816*|⧉ *13*, the data are in accordance with ➤*171*|⧉ *12*.

Mounting dimensions for the contact surfaces of bearing rings

✎ *The contact surfaces for the rings must be of sufficient height*

The mounting dimensions of the shaft and housing shoulders, and spacer rings etc., must ensure that the contact surfaces for the bearing rings are of sufficient height. However, they must also reliably prevent rotating parts of the bearing from grazing stationary parts. Proven mounting dimensions for the radii and diameters of the abutment shoulders ➤*832*|▦. These dimensions are limiting dimensions (maximum or minimum dimensions); the actual values should not be higher or lower than specified.

Required axial free space

Calculating minimum values

Toroidal roller bearings can compensate thermally-induced changes in the length of the shaft relative to the housing within the bearing. In order to ensure the function of the bearings, free space must be provided on both end faces of the bearings ➤819| 15.

The minimum values recommended by Schaeffler for the depth of the free space are in accordance with ➤819| 12.

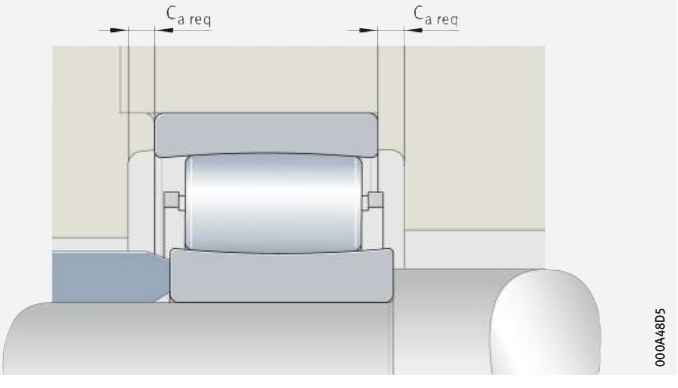
12
Requisite value for the depth of the free space

$$C_{a\,req} = C_a + 0{,}5 \cdot \left(\delta_{ax} + s_\varphi\right)$$

Legend

$C_{a\,req}$	mm	Requisite value for the depth of the free space ➤819| 15
C_a	mm	Minimum value for depth of free space in the case of bearing rings without offset ➤832|
δ_{ax}	mm	Axial displacement from central position
s_φ	mm	Reduction in axial displacement facility as a result of tilting ➤823| 17.

15
Free space in the housing for toroidal roller bearings with a cage



$C_{a\,req}$ = *requisite value for the depth of the free space*

Offset mounting

Suitable for significant changes in length in one direction

In standard mounting, the bearing rings are fitted concentrically in relation to each other. If significant changes in length occur in one direction in the application due to heat, the inner ring can be fitted offset relative to the outer ring in the opposing direction by up to the maximum permissible axial displacement. As a result, there is a significant increase in the possible axial displacement.

Axial fixing elements

Toroidal roller bearings can be axially located by means of shaft nuts KML or KM and tab washers MBL or MB ➤820| 16. For bearings with a bore diameter larger than 200 mm, nuts of series HM30 should be used with retaining bracket MS30.

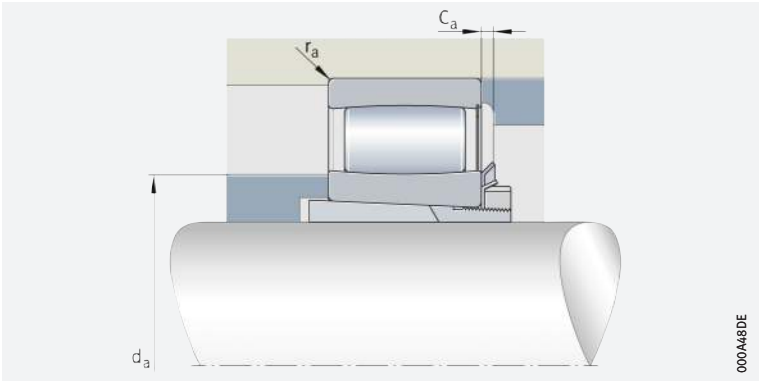
In the axial location of toroidal roller bearings with retaining nuts, it must be ensured that the cage of the bearing does not graze the retaining nut or tab washer if the shaft undergoes axial displacement. The outside diameter of the retaining nut should always be smaller than the stated mounting dimension $d_{a\ max}$. If this is not possible, an intermediate ring can be arranged between the bearing and means of retention and the thread on the shaft can be made correspondingly longer.

16
Toroidal roller bearing on adapter sleeve

C_a = *minimum value for free space in the case of bearings with cage and rings without offset, or required free space with offset bearing rings*

r_a = *maximum chamfer dimension* ➤832|

d_a = *maximum or minimum abutment height for inner ring* ➤832|



Possible axial displacement of the bearing rings relative to each other from the central position

Conditions for s_1 and s_2

Toroidal roller bearings compensate axial displacement of the shaft relative to the housing within the bearing ➤*800*| *1.1*. As a result, they can accommodate thermal expansion or deviations from the required bearing position within certain limits. The maximum displacement distances s_1 and s_2 in the product tables apply only where a sufficiently large operating clearance is present and to untilted bearing rings.

Axial displacement and tilting of the bearing rings changes the position of the rolling element in the bearing and thus also the operating clearance.

In order to ensure that the axial displacement distance is available, the free space on both sides of the bearing must be maintained ➤*819*| *15* and ➤*819*| *12*.

Factors which restrict the axial displacement of the bearing rings

Roller offset and operating clearance restrict the axial displacement of the bearing rings

The possible axial displacement of one bearing ring relative to the other from the central position is limited by:

- the restriction of the roller offset (geometrical restriction)
- the restriction of the operating clearance.

Parameters which must be fulfilled for a reliable function

In order to ensure the function of toroidal roller bearings in operation, the following must always be checked when designing the bearing position:

- The axial displacement of the bearing rings in combination with any tilting lies within the permitted displacement distance s_1 or s_2 ➤*832*| respectively
- Sufficient operating clearance is present under axial displacement, tilting and under axial displacement and tilting (since the axial displacement and tilting of the bearing rings changes the bearing clearance.

Determining the resulting bearing clearance

The resulting bearing clearance can be determined using the following equation:

13
Resulting bearing clearance

$$s_{res} = s_{ini} - k_{\delta} \cdot \left(\delta_{ax} + k_{\varphi} \cdot \varphi\right)^2$$

Legend

s_{res}	µm	Resulting bearing clearance after tilting and axial displacement
s_{ini}	µm	Radial internal clearance after mounting
k_{δ}	–	Operating clearance factor ➤*832*|
δ_{ax}	mm	Axial displacement from central position
k_{φ}	–	Tilting factor ➤*832*|
φ	°	Tilting between inner ring and outer ring (misalignment ± shaft deflection).

Other influences such as differences in temperature between the inner ring and outer ring must also be taken into consideration.

Restriction of the axial displacement facility by the roller offset

The axial displacement facility is reduced here

Tilting causes axial displacement of the rollers from the central position. This means that the axial displacement facility of the bearing rings relative to each other is reduced by s_φ. The reduction in the axial displacement facility due to tilting can be calculated ➤*822*| *f 14*.

f 14
Reduction in the axial displacement facility

$$s_\varphi = k_\varphi \cdot \varphi$$

Legend

s_φ	mm	Reduction in axial displacement facility as a result of tilting
k_φ	–	Tilting factor ➤*832*|
φ	°	Tilting between inner ring and outer ring (misalignment ± shaft deflection).

When tilting occurs at the same time, this gives the maximum possible axial displacement facility ➤*822*| *f 15* and ➤*822*| *f 16*.

f 15
Maximum axial displacement facility

$$s_{red} = s_1 - s_\varphi$$

In the case of full complement bearings, there is an additional effect as follows:

f 16
Maximum axial displacement facility

$$s_{red} = s_2 - s_\varphi$$

Legend

s_{red}	mm	Maximum axial displacement facility under tilting
s_1	mm	Maximum axial displacement facility ➤*832*| in the case of full complement bearings in the opposing direction to the retaining ring
s_φ	mm	Reduction in axial displacement facility as a result of tilting
s_2	mm	Maximum axial displacement facility ➤*832*| in the case of full complement bearings in the direction of the retaining ring.

Restriction of axial displacement due to reduction in radial bearing clearance

Influences on the reduction of the bearing clearance

The bearing clearance is reduced in the following cases:

- axial displacement
- tilting of the bearing from the central position
- axial displacement and tilting of the bearing from the central position.

Depending on the necessary operating clearance, it must be checked whether the required axial displacement is possible under the tilting present.

The reduction in operating clearance is calculated in accordance with ➤*823*| *f 17*.

f 17
Reduction in radial bearing clearance

$$\Delta s = k_\delta \cdot \left(\delta_{ax} + k_\varphi \cdot \varphi\right)^2$$

Legend

Δs	µm	Reduction in radial bearing clearance
k_δ	–	Operating clearance factor ➤*832*|
δ_{ax}	mm	Axial displacement
k_φ	–	Tilting factor ➤*832*|
φ	°	Tilting between inner ring and outer ring (misalignment ± shaft deflection).

Calculation example

Bearing data

The toroidal roller bearing C3144-XL-K-C4 with a tapered bore is supplied with a radial internal clearance of 390 µm. The operating clearance in the central position is only 240 µm due to mounting.

k_φ = 13,67 ➤*832*|
φ = 0,2
s_1 = 22,3 ➤*832*|

Dryer roll application

In the dryer roll, the misalignment is 0,2° and the shaft also undergoes thermal elongation of 6,3 mm.

Questions:

- Is this displacement permissible in addition to the tilting?
- What is the change in the operating clearance?

f 18
Reduction in the axial displacement facility

$$s_\varphi = k_\varphi \cdot \varphi$$

$$s_\varphi = 13{,}67 \cdot 0{,}2 \approx 2{,}73 \text{ mm}$$

Legend

s_φ	mm	Reduction in axial displacement facility as a result of tilting
k_φ	–	Tilting factor ➤*832*|
φ	°	Tilting between inner ring and outer ring (misalignment ± shaft deflection).

f19
Maximum axial displacement

$$s_{red} = s_1 - s_\varphi$$

$$s_{red} = 22{,}30\ \text{mm} - 2{,}73\ \text{mm} = 19{,}57\ \text{mm}$$

The axial displacement by 6,3 mm is in the permissible range of 19,57 mm in combination with tilting by 0,2°. The application must now be checked in relation to the reduction in operating clearance.

k_δ = 0,791 ➤*832*
δ_{ax} = 6,30 mm

f20
Resulting operating clearance

$$s_{res} = s_{ini} - k_\delta \cdot \left(\delta_{ax} + k_\varphi \cdot \varphi\right)^2$$

$$s_{res} = 240\ \mu\text{m} - 0{,}791 \cdot \left(6{,}3 + 2{,}73\right)^2 \approx 175\ \mu\text{m}$$

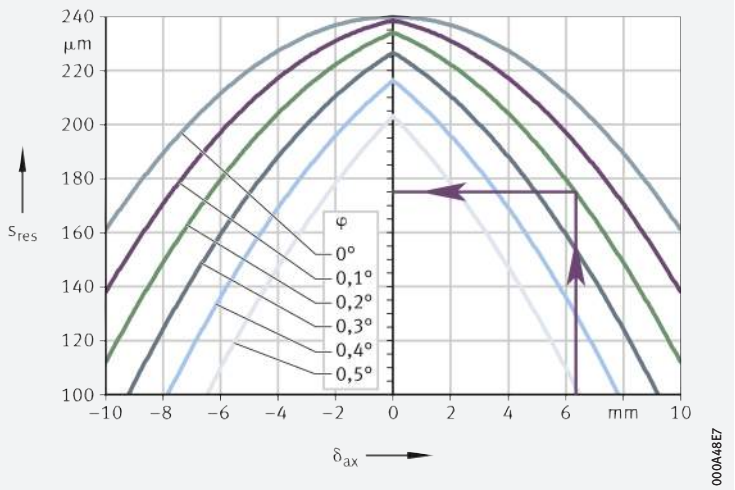
The resulting operating clearance after tilting and axial displacement is 175 µm.

The influence of the difference in temperature between the inner ring and outer ring must also be taken into consideration.

The axial displacement facility for the bearing C3144-XL-K-C4 is shown as an example ➤*824* 17. The actual internal clearance as a function of axial displacement is shown in relation to the bearing width.

17
Resulting operating clearance s_{res}, shown using the example of toroidal roller bearing C3144-XL-K-C4, as a function of tilting and axial displacement

s_{res} = *operating clearance*
δ_{ax} = *axial displacement*
φ = *tilting*



Suitable bearing housings for toroidal roller bearings

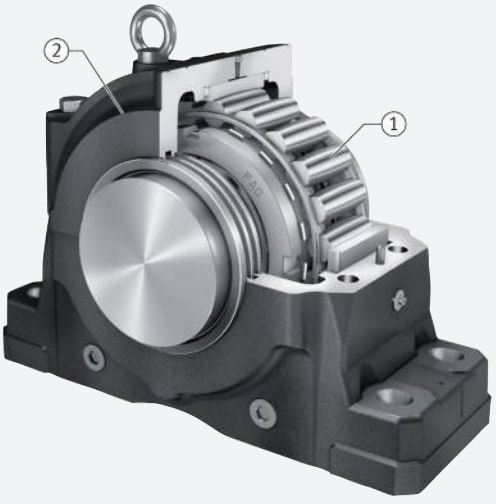
✎A large range of housings is available

For economical, operationally reliable and easily interchangeable bearing arrangement units, toroidal roller bearings can also be combined with Schaeffler bearing housings ➤*825*|*18*. These easy-to-fit units fulfil all of the requirements for modern machine and plant designs with favourable maintenance-related characteristics.

Due to the large number of application areas, an extensive range of bearing housings is available for bearings with cylindrical and tapered bores. These include split and unsplit plummer block housings, take-up housings, flanged housings and housings for specific industrial and railway applications. Detailed information on bearing housings can be found in publication GK 1 ➤*https://www.schaeffler.de/std/1D54*. This book can be ordered from Schaeffler.

18
Bearing housing with toroidal roller bearing

① *Toroidal roller bearing*
② *Bearing housing*



1.17 Mounting and dismounting

The mounting and dismounting options for toroidal roller bearings, by thermal, hydraulic or mechanical methods, must be taken into consideration in the design of the bearing position. The hydraulic method should be used in preference for the mounting and dismounting of larger bearings on a tapered journal and on adapter or withdrawal sleeves.
In cases where a bearing failure may result in a production stoppage and incur high costs, monitoring of rolling bearings is advisable.

Special tool extractor PULLER-SPECIAL-E

The extractor PULLER-SPECIAL-E is a special tool for the dismounting of spherical roller bearings and toroidal roller bearings. The dismounting tool has specially produced fingers that grip behind the end faces of the rollers. The extractor then presses on the shaft by means of a hydraulic cylinder and pulls the bearing out.

Ensure that the bearings are not damaged during mounting

Toroidal roller bearings are not separable. In the mounting of non-separable bearings, the mounting forces must always be applied to the bearing ring with a tight fit.

Mounting on a horizontally aligned shaft

During mounting of the bearings, the bearing rings can become axially displaced from the central position. For this reason, toroidal roller bearings should be mounted on horizontally aligned shafts and in appropriately aligned housing bores. In order that the bearing rings and roller set can achieve concentric alignment during mounting, the inner and outer ring should be rotated a couple of times on assembly.

If the intention is to mount the toroidal roller bearings on a vertically aligned shaft or in a vertically aligned housing bore, it should be noted that the outer and inner ring, complete with roller and cage assembly, will be displaced downwards. This will, in turn, have an effect on the internal clearance. If the user has no experience in the design of such bearing arrangements, please consult Schaeffler.

Mounting of bearings with a tapered bore

Suitable methods for checking the fit strength

Bearings with a tapered bore are mounted with a tight fit on the shaft or on the adapter or withdrawal sleeve. Proven methods for checking the strength of the fit involve measuring:

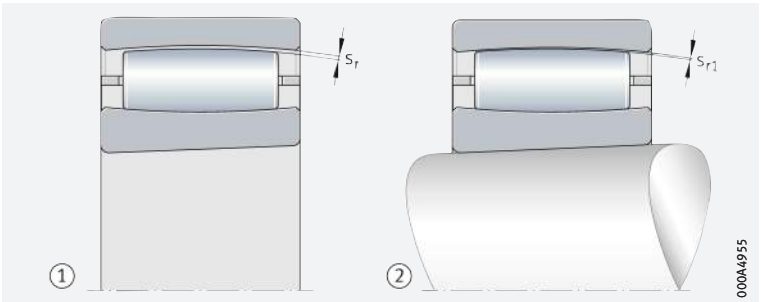
- the reduction in radial internal clearance
- the axial drive-up distance of the inner ring on the tapered bearing seat
- the tightening angle of the fixing nut.

Measuring the reduction in radial internal clearance

Measurement with a feeler gauge

The reduction in radial internal clearance is the difference between the radial internal clearance before mounting and the bearing clearance after mounting of the bearing ➤826| 19 and ➤828| 10. The radial internal clearance must be measured first. During pressing on, the radial clearance (bearing clearance) must be checked until the necessary reduction in the radial internal clearance and thus the required tight fit is achieved ➤828| 10.

19
Reduction in radial internal clearance



s_r = *radial internal clearance before mounting*
s_{r1} = *radial internal clearance after mounting*
$s_r - s_{r1}$ = *reduction in radial internal clearance*

① *Before mounting*
② *After mounting*

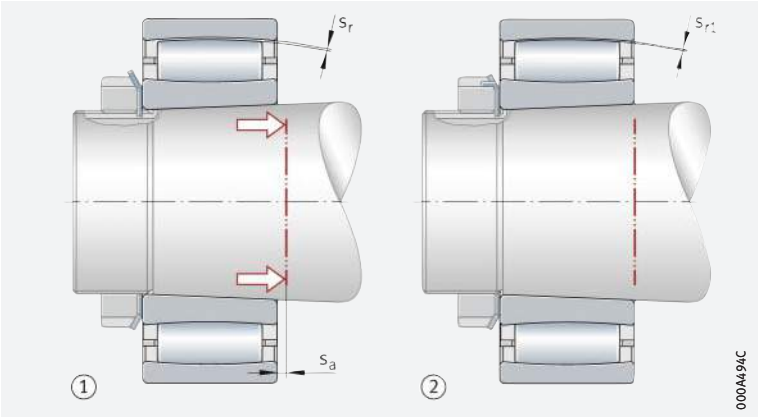
Measuring the axial drive-up distance

The axial drive-up distance can also be measured in place of the reduction in radial internal clearance ➤*383*|*14*.

20
Axial drive-up distance

s_a = *axial press-on distance (axial drive-up distance of the bearing)*
s_r = *radial internal clearance before pressing on*
s_{r1} = *radial internal clearance after pressing on*
$s_r - s_{r1}$ = *reduction in radial internal clearance*

① *Before pressing on*
② *After pressing on*



Example of calculation of the axial drive-up distance

Principal procedure

Toroidal roller bearing C2215-XL-K with adapter sleeve H2316:

- Radial internal clearance before mounting
  – 0,075 mm to 0,110 mm ➤*828*|*10*
- Reduction in radial internal clearance during mounting
  – 0,030 mm to 0,046 mm ➤*828*|*10*
- Control value for radial internal clearance after mounting
  – 0,045 mm ➤*829*|*10*
- Axial drive-up distance, taper angle 1:12
  – 0,55 mm to 0,61 mm ➤*829*|*10*.

The malfunction-free operation of toroidal roller bearings presupposes that these have been mounted correctly. An insufficient operating clearance or inadequately tight fit on the shaft generally leads to bearing damage.

If there is any uncertainty regarding the practical application of the methods, Schaeffler must always be consulted.

✎ *Reduced radial internal clearance in mounting*

Guide values for the reduction in radial internal clearance

When bearings with a tapered bore are mounted, there is a reduction in the radial internal clearance. Adherence to the indicated values ensures that the bearings or sleeve are securely seated on the shaft and prevents the inner ring from creeping on the shaft ➤ *828* | *10*. The setting should not, however, be equated to the later appropriate operating clearance.

10
Reduction in radial internal clearance in mounting of toroidal roller bearings with tapered bore

Nominal bore diameter d mm		Radial internal clearance before mounting in accordance with DIN 620-4:2004 (ISO 5753-1:2009)						Reduction in radial internal clearance during mounting[1]	
		CN (Group N) mm		C3 (Group 3) mm		C4 (Group 4) mm			
over	incl.	min.	max.	min.	max.	min.	max.	min.	max.
24	**30**	0,035	0,055	0,050	0,065	0,065	0,085	0,010	0,017
30	**40**	0,045	0,065	0,060	0,080	0,080	0,100	0,014	0,021
40	**50**	0,050	0,075	0,070	0,095	0,090	0,120	0,018	0,028
50	**65**	0,060	0,090	0,085	0,115	0,110	0,150	0,024	0,035
65	**80**	0,075	0,110	0,105	0,140	0,135	0,180	0,030	0,046
80	**100**	0,095	0,135	0,130	0,175	0,170	0,220	0,040	0,056
100	**120**	0,115	0,155	0,155	0,205	0,200	0,255	0,049	0,069
120	**140**	0,135	0,180	0,180	0,235	0,230	0,295	0,060	0,083
140	**160**	0,155	0,215	0,210	0,270	0,265	0,340	0,072	0,095
160	**180**	0,170	0,240	0,235	0,305	0,300	0,385	0,081	0,107
180	**200**	0,190	0,260	0,260	0,330	0,325	0,420	0,090	0,121
200	**225**	0,210	0,290	0,285	0,365	0,360	0,460	0,101	0,134
225	**250**	0,235	0,315	0,315	0,405	0,400	0,515	0,113	0,151
250	**280**	0,255	0,345	0,340	0,445	0,440	0,560	0,126	0,168
280	**315**	0,280	0,380	0,375	0,485	0,480	0,620	0,142	0,188
315	**355**	0,315	0,420	0,415	0,545	0,540	0,680	0,160	0,211
355	**400**	0,350	0,475	0,470	0,600	0,595	0,755	0,180	0,238
400	**450**	0,380	0,525	0,525	0,655	0,650	0,835	0,203	0,268
450	**500**	0,435	0,575	0,575	0,735	0,730	0,915	0,225	0,300
500	**560**	0,470	0,640	0,630	0,810	0,800	1,010	0,250	0,335
560	**630**	0,530	0,710	0,700	0,890	0,880	1,110	0,285	0,375
630	**710**	0,590	0,780	0,770	0,990	0,980	1,230	0,320	0,420
710	**800**	0,670	0,860	0,860	1,100	1,100	1,380	0,360	0,475
800	**900**	0,730	0,960	0,950	1,220	1,210	1,530	0,405	0,535
900	**1 000**	0,810	1,040	1,040	1,340	1,340	1,670	0,450	0,605
1 000	**1 120**	0,890	1,170	1,160	1,500	1,490	1,880	0,505	0,670
1 120	**1 250**	0,970	1,280	1,270	1,640	1,630	2,060	0,565	0,750
1 250	**1 400**	1,080	1,410	1,410	1,790	1,780	2,250	0,630	0,840
1 400	**1 600**	1,200	1,550	1,550	1,990	1,990	2,500	0,720	0,940
1 600	**1 800**	1,320	1,690	1,690	2,180	2,180	2,730	0,810	1,070

continued ▼

[1] *Valid only for solid steel shafts and hollow shafts with a bore no larger than half the shaft diameter. The following applies: bearings with a radial internal clearance before mounting in the upper half of the tolerance range are mounted using the larger value for the reduction in radial internal clearance or the axial drive-up distance, while bearings in the lower half of the tolerance range are mounted using the smaller value for the reduction in radial internal clearance or the axial drive-up distance.*

10
Axial drive-up distance of the inner ring in mounting of toroidal roller bearings with tapered bore

Nominal bore diameter d		Drive-up distance on taper 1:12[1] Shaft		Drive-up distance on taper 1:30[1] Shaft		Minimum radial internal clearance required after mounting, control value with		
						CN (Group N)	C3 (Group 3)	C4 (Group 4)
mm		mm		mm		mm	mm	mm
over	incl.	min.	max.	min.	max.	min.	min.	min.
24	**30**	0,24	0,29	0,61	0,72	0,025	0,035	0,048
30	**40**	0,30	0,34	0,76	0,84	0,031	0,041	0,059
40	**50**	0,37	0,42	0,91	1,04	0,033	0,046	0,062
50	**65**	0,46	0,50	1,14	1,24	0,036	0,054	0,075
65	**80**	0,55	0,61	1,37	1,53	0,045	0,065	0,090
80	**100**	0,67	0,73	1,68	1,83	0,056	0,080	0,114
100	**120**	0,79	0,89	1,98	2,23	0,066	0,093	0,131
120	**140**	0,91	1,05	2,29	2,62	0,075	0,105	0,147
140	**160**	1,04	1,21	2,59	3,02	0,083	0,123	0,170
160	**180**	1,16	1,36	2,90	3,41	0,089	0,137	0,193
180	**200**	1,28	1,52	3,20	3,81	0,100	0,150	0,204
200	**225**	1,43	1,68	3,58	4,20	0,109	0,162	0,226
225	**250**	1,59	1,88	3,96	4,69	0,123	0,177	0,249
250	**280**	1,77	2,08	4,42	5,19	0,129	0,186	0,273
280	**315**	1,98	2,31	4,95	5,78	0,138	0,203	0,292
315	**355**	2,23	2,59	5,56	6,47	0,155	0,221	0,329
355	**400**	2,50	2,90	6,25	7,26	0,170	0,251	0,357
400	**450**	2,81	3,26	7,01	8,15	0,178	0,279	0,382
450	**500**	3,11	3,66	7,78	9,14	0,210	0,300	0,430
500	**560**	3,48	4,05	8,69	10,13	0,220	0,325	0,465
560	**630**	3,90	4,52	9,76	11,31	0,245	0,355	0,505
630	**710**	4,39	5,08	10,98	12,69	0,270	0,380	0,560
710	**800**	4,94	5,71	12,35	14,27	0,310	0,425	0,625
800	**900**	5,55	6,42	13,88	16,05	0,325	0,460	0,675
900	**1 000**	6,16	7,21	15,40	18,03	0,360	0,490	0,735
1 000	**1 120**	6,89	8,00	17,23	20,00	0,385	0,545	0,820
1 120	**1 250**	7,69	8,95	19,21	22,37	0,410	0,580	0,880
1 250	**1 400**	8,60	9,98	21,50	24,94	0,450	0,640	0,940
1 400	**1 600**	9,82	11,16	24,55	27,90	0,480	0,685	1,050
1 600	**1 800**	11,04	12,74	27,60	31,85	0,510	0,705	1,110

continued ▲

1) *Valid only for solid steel shafts and hollow shafts with a bore no larger than half the shaft diameter. The following applies: bearings with a radial internal clearance before mounting in the upper half of the tolerance range are mounted using the larger value for the reduction in radial internal clearance or the axial drive-up distance, while bearings in the lower half of the tolerance range are mounted using the smaller value for the reduction in radial internal clearance or the axial drive-up distance.*

Schaeffler Mounting Handbook

Rolling bearings must be handled with great care

Rolling bearings are well-proven precision machine elements for the design of economical and reliable bearing arrangements, which offer high operational security. In order that these products can function correctly and achieve the envisaged operating life without detrimental effect, they must be handled with care.

The Schaeffler Mounting Handbook MH 1 gives comprehensive information about the correct storage, mounting, dismounting and maintenance of rotary rolling bearings ➤ *https://www.schaeffler.de/std/1D53*. It also provides information which should be observed by the designer, in relation to the mounting, dismounting and maintenance of bearings, in the original design of the bearing position. This book is available from Schaeffler on request.

1.18 Legal notice regarding data freshness

The further development of products may also result in technical changes to catalogue products

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We therefore reserve the right to make changes to the data and illustrations in this catalogue. This catalogue reflects the status at the time of printing. More recent publications released by us (as printed or digital media) will automatically precede this catalogue if they involve the same subject. Therefore, please always use our electronic product catalogue to check whether more up-to-date information or modification notices exist for your desired product.

Link to electronic product catalogue

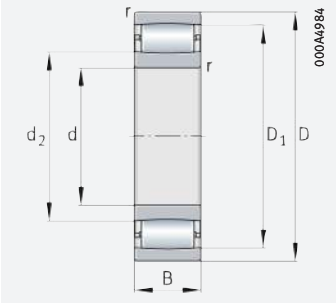
The following link will take you to the Schaeffler electronic product catalogue: ➤ *https://medias.schaeffler.com*.

1.19 Further information

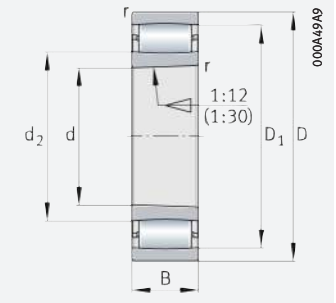
In addition to the data in this chapter, the following chapters in Technical principles must also be observed in the design of bearing arrangements:

- Determining the bearing size ➤*34*
- Rigidity ➤*54*
- Friction and increases in temperature ➤*56*
- Speeds ➤*64*
- Bearing data ➤*97*
- Lubrication ➤*70*
- Sealing ➤*182*
- Design of bearing arrangements ➤*139*
- Mounting and dismounting ➤*191*.

Toroidal roller bearings



Cylindrical bore



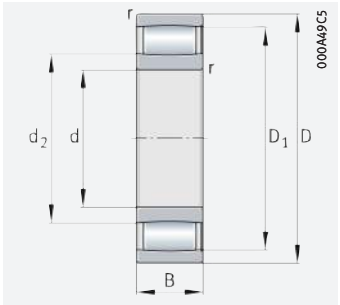
Tapered bore

d = 60 – 85 mm

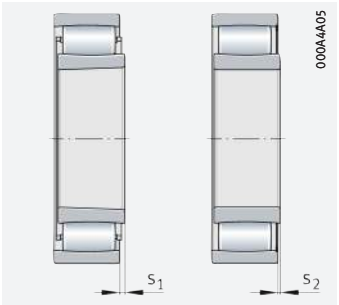
Main dimensions			Basic load ratings		Fatigue limit load	Limiting speed	Speed rating	Mass	Designation ➤*809 | 1.12* ➤*809 | 1.13* X-life ➤*804*
d	D	B	dyn. C_r	stat. C_{0r}	C_{ur}	n_G	$n_{\vartheta r}$	m	
			N	N	N	min^{-1}	min^{-1}	≈ kg	
60	110	28	171 000	195 000	32 500	2 650	–	1,12	**C2212-XL-K-V**
	110	28	171 000	195 000	32 500	2 650	–	1,15	**C2212-XL-V**
65	100	35	197 000	285 000	33 500	3 050	–	0,95	**C4013-XL-K30-V**
	100	35	197 000	285 000	33 500	3 050	–	0,98	**C4013-XL-V**
	120	31	208 000	216 000	36 000	2 340	–	1,48	**C2213-XL-K-V**
	120	31	208 000	216 000	36 000	2 340	–	1,52	**C2213-XL-V**
70	125	31	215 000	229 000	38 000	2 180	–	1,56	**C2214-XL-K-V**
	125	31	215 000	229 000	38 000	2 180	–	1,6	**C2214-XL-V**
	150	51	405 000	440 000	52 000	6 000	3 200	4,33	**C2314-XL**
	150	51	405 000	440 000	52 000	6 000	3 200	4,22	**C2314-XL-K**
75	115	40	209 000	355 000	39 500	2 470	–	1	**C4015-XL-K30-V**
	115	40	209 000	355 000	39 500	2 470	–	1,47	**C4015-XL-V**
	130	31	197 000	207 000	33 000	7 000	3 250	1,69	**C2215-XL**
	130	31	197 000	207 000	33 000	7 000	3 250	1,64	**C2215-XL-K**
	130	31	221 000	241 000	38 500	2 050	–	1,64	**C2215-XL-K-V**
	130	31	221 000	241 000	38 500	2 050	–	1,69	**C2215-XL-V**
	160	55	430 000	470 000	56 000	5 600	3 200	5,3	**C2315-XL**
	160	55	430 000	470 000	56 000	5 600	3 200	5,16	**C2315-XL-K**
80	140	33	224 000	250 000	41 000	6 300	2 900	2,1	**C2216-XL**
	140	33	224 000	250 000	41 000	6 300	2 900	2,05	**C2216-XL-K**
	140	33	260 000	305 000	49 500	1 790	–	2,05	**C2216-XL-K-V**
	140	33	260 000	305 000	49 500	1 790	–	2,1	**C2216-XL-V**
	170	58	510 000	550 000	62 000	5 100	3 050	6,3	**C2316-XL**
	170	58	510 000	550 000	62 000	5 100	3 050	6,1	**C2316-XL-K**
85	150	36	315 000	395 000	59 000	1 640	–	2,65	**C2217-XL-V**
	150	36	315 000	395 000	59 000	1 640	–	2,58	**C2217-XL-K-V**
	150	36	275 000	330 000	49 000	5 900	2 750	2,65	**C2217-XL**
	150	36	275 000	330 000	49 000	5 900	2 750	2,58	**C2217-XL-K**
	180	60	550 000	610 000	68 000	4 800	2 850	7,29	**C2317-XL**
	180	60	550 000	610 000	68 000	4 800	2 850	7,1	**C2317-XL-K**

medias ➤ *https://www.schaeffler.de/std/1E75*

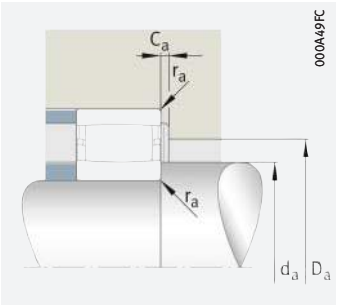
Before ordering, availability for delivery must be checked.



Full complement



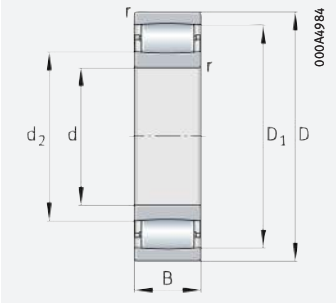
Axial displacement distance



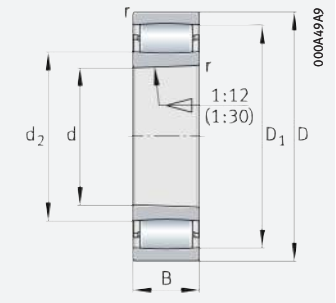
Mounting dimensions

Dimensions						Mounting dimensions						Calculation factors	
d	r	D_1	d_2	s_1	s_2	D_a		d_a		C_a	r_a	k_φ	k_δ
	min.	≈	≈			max.	min.	max.	min.	min.	max.		
60	1,5	98,1	77,1	8,5	5,3	101	–	85	69	–	1,5	3,116	3,713
	1,5	98,1	77,1	8,5	5,3	101	–	85	69	–	1,5	3,116	3,713
65	1,1	88,6	74,7	6	2,8	94	–	82	71	–	1	3,543	3,082
	1,1	88,6	74,7	6	2,8	94	–	82	71	–	1	3,543	3,082
	1,5	106,1	78,9	9,6	5,3	111	–	97	74	–	1,5	3,298	3,505
	1,5	106,1	78,9	9,6	5,3	111	–	97	74	–	1,5	3,298	3,505
70	1,5	111,1	83,6	9,6	5,3	116	–	97	79	–	1,5	3,523	3,265
	1,5	111,1	83,6	9,6	5,3	116	–	97	79	–	1,5	3,523	3,265
	2,1	130,9	92,5	9,1	–	138	121	105	82	1,6	2	5,477	1,941
	2,1	130,9	92,5	9,1	–	138	121	105	82	1,6	2	5,477	1,941
75	1,1	100,2	89,5	9,4	5,1	109	–	97	81	–	1	3,893	2,845
	1,1	100,2	89,5	9,4	5,1	109	–	97	81	–	1	3,893	2,845
	1,5	115,4	88	9,6	–	121	110	96	84	1,11	1,5	3,56	3,268
	1,5	115,4	88	9,6	–	121	110	96	84	1,11	1,5	3,56	3,268
	1,5	115,4	88	9,6	5,3	121	–	102	84	–	1,5	3,56	3,268
	1,5	115,4	88	9,6	5,3	121	–	102	84	–	1,5	3,56	3,268
	2,1	136,5	99	13,1	–	148	127	111	87	1,5	2	5,53	1,941
	2,1	136,5	99	13,1	–	148	127	111	87	1,5	2	5,53	1,941
80	2	125,5	98,2	9,1	–	129	120	106	91	1,1	2	3,889	2,997
	2	125,5	98,2	9,1	–	129	120	106	91	1,1	2	3,889	2,997
	2	125,5	98,2	9,1	4,8	129	–	116	91	–	2	3,889	2,997
	2	125,5	98,2	9,1	4,8	129	–	116	91	–	2	3,889	2,997
	2,1	145,5	103,5	10,1	–	158	135	117	92	1,7	2	6,094	1,745
	2,1	145,5	103,5	10,1	–	158	135	117	92	1,7	2	6,094	1,745
85	2	132,2	104,8	7,1	1,7	139	–	117	96	–	2	4,194	2,763
	2	132,2	104,8	7,1	1,7	139	–	117	96	–	2	4,194	2,763
	2	132,2	104,8	7,1	–	139	126	113	96	1,1	2	4,194	2,763
	2	132,2	104,8	7,1	–	139	126	113	96	1,1	2	4,194	2,763
	3	153,9	111,1	12,1	–	166	143	125	99	1,72	2,5	6,144	1,752
	3	153,9	111,1	12,1	–	166	143	125	99	1,72	2,5	6,144	1,752

Toroidal roller bearings



Cylindrical bore



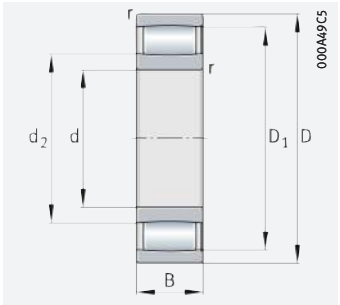
Tapered bore

d = 90 – 110 mm

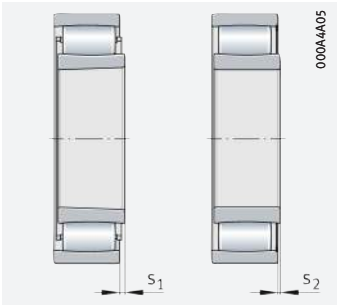
Main dimensions			Basic load ratings		Fatigue limit load	Limiting speed	Speed rating	Mass	Designation ➤*809 | 1.12* ➤*809 | 1.13* X-life ➤*804*
d	D	B	dyn. C_r	stat. C_{0r}	C_{ur}	n_G	$n_{\vartheta r}$	m	
			N	N	N	min^{-1}	min^{-1}	≈ kg	
90	160	40	330 000	380 000	55 000	5 300	2 650	3,29	**C2218-XL-K**
	160	40	330 000	380 000	55 000	5 300	2 650	3,38	**C2218-XL**
	190	64	650 000	740 000	77 000	4 350	2 500	8,4	**C2318-XL-K**
	190	64	650 000	740 000	77 000	4 350	2 500	8,65	**C2318-XL**
95	170	43	370 000	405 000	61 000	5 000	2 750	4,01	**C2219-XL-K**
	170	43	370 000	405 000	61 000	5 000	2 750	4,12	**C2219-XL**
	200	67	660 000	750 000	78 000	4 350	2 600	9,75	**C2319-XL-K**
	200	67	660 000	750 000	78 000	4 350	2 600	10	**C2319-XL**
100	150	50	355 000	530 000	66 000	1 580	–	2,94	**C4020-XL-K30-V**
	150	50	355 000	530 000	66 000	1 580	–	3,02	**C4020-XL-V**
	165	52	490 000	660 000	86 000	1 330	–	4,21	**C3120-XL-K-V**
	165	52	490 000	660 000	86 000	1 330	–	4,32	**C3120-XL-V**
	165	65	530 000	730 000	83 000	1 350	–	5,26	**C4120-XL-K30-V**
	165	65	530 000	730 000	83 000	1 350	–	5,4	**C4120-XL-V**
	180	46	420 000	470 000	68 000	4 700	2 700	4,97	**C2220-XL**
	180	46	420 000	470 000	68 000	4 700	2 700	4,84	**C2220-XL-K**
	215	73	820 000	920 000	97 000	3 850	2 290	12,4	**C2320-XL-K**
	215	73	820 000	920 000	97 000	3 850	2 290	12,8	**C2320-XL**
110	170	45	360 000	480 000	63 000	4 800	2 480	3,65	**C3022-XL**
	170	45	360 000	480 000	63 000	4 800	2 480	3,55	**C3022-XL-K**
	170	60	510 000	800 000	89 000	1 320	–	4,86	**C4022-XL-V**
	170	60	510 000	800 000	89 000	1 320	–	4,74	**C4022-XL-K30-V**
	180	69	680 000	1 000 000	104 000	1 160	–	6,58	**C4122-XL-K30-V**
	180	69	680 000	1 000 000	104 000	1 160	–	6,76	**C4122-XL-V**
	200	53	550 000	650 000	89 000	4 050	2 330	6,95	**C2222-XL-K**
	200	53	550 000	650 000	89 000	4 050	2 330	7,14	**C2222-XL**

medias ➤ *https://www.schaeffler.de/std/1E76*

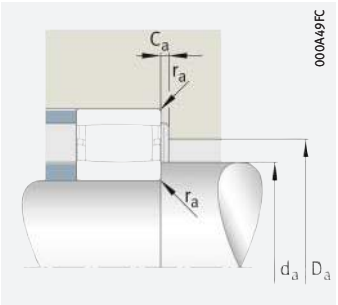
Before ordering, availability for delivery must be checked.



Full complement



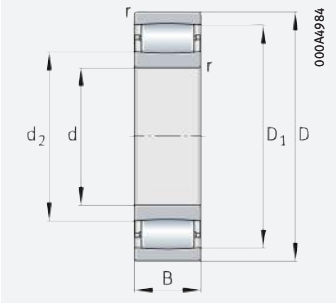
Axial displacement distance



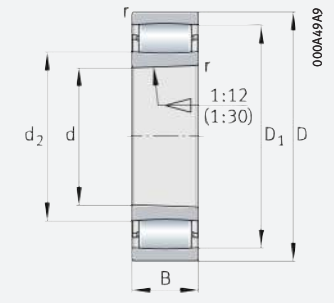
Mounting dimensions

Dimensions						Mounting dimensions						Calculation factors	
d	r	D_1	d_2	s_1	s_2	D_a		d_a		C_a	r_a	k_φ	k_δ
	min.	≈	≈			max.	min.	max.	min.	min.	max.		
90	2	143,9	112,1	9,5	–	149	137	122	101	1,3	2	4,103	2,924
	2	143,9	112,1	9,5	–	149	137	122	101	1,3	2	4,103	2,924
	3	167,4	119,6	9,6	–	176	154	136	104	1,9	2,5	6,754	1,589
	3	167,4	119,6	9,6	–	176	154	136	104	1,9	2,5	6,754	1,589
95	2,1	149,7	112,3	10,5	–	158	140	125	107	1,5	2	4,75	2,42
	2,1	149,7	112,3	10,5	–	158	140	125	107	1,5	2	4,75	2,42
	3	167,6	120,4	12,6	–	186	155	137	109	1,9	2,5	6,758	1,589
	3	167,6	120,4	12,6	–	186	155	137	109	1,9	2,5	6,758	1,589
100	1,5	133,6	113,6	14	9,7	141	–	125	109	–	1,5	4,766	2,365
	1,5	133,6	113,6	14	9,7	141	–	125	109	–	1,5	4,766	2,365
	2	150,7	119,7	10	4,7	154	–	132	111	–	2	6,699	1,582
	2	150,7	119,7	10	4,7	154	–	132	111	–	2	6,699	1,582
	2	147,4	120,6	17,7	5,2	154	–	132	111	–	2	5,69	1,929
	2	147,4	120,6	17,7	5,2	154	–	132	111	–	2	5,69	1,929
	2,1	156,9	118,1	10,1	–	168	147	131	112	1,6	2	4,849	2,393
	2,1	156,9	118,1	10,1	–	168	147	131	112	1,6	2	4,849	2,393
	3	184	129	11,2	–	201	169	148	114	2,2	2,5	8,026	1,312
	3	184	129	11,2	–	201	169	148	114	2,2	2,5	8,026	1,312
110	2	156,2	127,8	9,5	–	161	151	136	119	1,8	2	5,707	1,954
	2	156,2	127,8	9,5	–	161	151	136	119	1,8	2	5,707	1,954
	2	151,2	127,2	12	6,6	160	–	140	120	–	2	6,296	1,717
	2	151,2	127,2	12	6,6	160	–	140	120	–	2	6,296	1,717
	2	163	132,7	11,4	4,6	170	–	145	120	–	2	6,99	1,529
	2	163	132,7	11,4	4,6	170	–	145	120	–	2	6,99	1,529
	2,1	178,5	135,9	11,1	–	188	168	150	122	2	2	5,866	1,941
	2,1	178,5	135,9	11,1	–	188	168	150	122	2	2	5,866	1,941

Toroidal roller bearings



Cylindrical bore



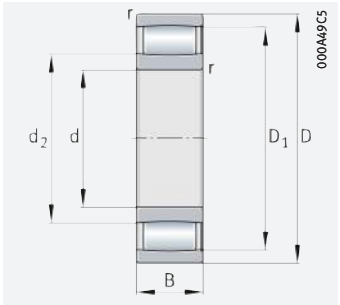
Tapered bore

d = 120 – 140 mm

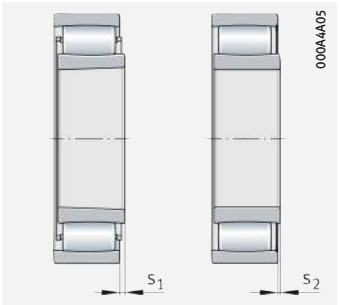
Main dimensions			Basic load ratings		Fatigue limit load	Limiting speed	Speed rating	Mass	Designation ➤809|1.12 ➤809|1.13 X-life ➤804
d	D	B	dyn. C_r	stat. C_{0r}	C_{ur}	n_G	$n_{\vartheta r}$	m	
			N	N	N	min^{-1}	min^{-1}	≈ kg	
120	180	46	435 000	630 000	81 000	1 140	–	4	**C3024-XL-V**
	180	46	435 000	630 000	81 000	1 140	–	3,88	**C3024-XL-K-V**
	180	46	390 000	550 000	70 000	4 450	2 290	4	**C3024-XL**
	180	46	390 000	550 000	70 000	4 450	2 290	3,89	**C3024-XL-K**
	180	60	550 000	890 000	99 000	1 120	–	5,08	**C4024-XL-K30-V**
	180	60	550 000	890 000	99 000	1 120	–	5,2	**C4024-XL-V**
	200	80	780 000	1 140 000	124 000	1 030	–	9,63	**C4124-XL-K30-V**
	200	80	780 000	1 140 000	124 000	1 030	–	9,88	**C4124-XL-V**
	215	58	630 000	740 000	101 000	3 700	2 200	8,91	**C2224-XL**
	215	58	630 000	740 000	101 000	3 700	2 200	8,68	**C2224-XL-K**
	215	76	760 000	1 000 000	92 000	3 700	1 960	11,3	**C3224-XL-K**
	215	76	760 000	1 000 000	92 000	3 700	1 960	11,7	**C3224-XL**
130	200	52	405 000	600 000	74 000	4 000	2 210	5,63	**C3026-XL-K**
	200	52	405 000	600 000	74 000	4 000	2 210	5,8	**C3026-XL**
	200	69	730 000	1 130 000	119 000	990	–	7,49	**C4026-XL-K30-V**
	200	69	730 000	1 130 000	119 000	990	–	7,69	**C4026-XL-V**
	210	80	840 000	1 240 000	129 000	910	–	10,2	**C4126-XL-K30-V**
	210	80	840 000	1 240 000	129 000	910	–	10,5	**C4126-XL-V**
	230	64	760 000	970 000	119 000	3 550	2 040	11,1	**C2226-XL**
	230	64	760 000	970 000	119 000	3 550	2 040	10,8	**C2226-XL-K**
	280	93	1 040 000	1 270 000	135 000	2 800	1 710	27,6	**C2326-XL**
	280	93	1 040 000	1 270 000	135 000	2 800	1 710	26,9	**C2326-XL-K**
140	210	53	495 000	730 000	88 000	3 650	1 940	6,1	**C3028-XL-K**
	210	53	495 000	730 000	88 000	3 650	1 940	6,27	**C3028-XL**
	210	69	760 000	1 220 000	126 000	890	–	8,16	**C4028-XL-V**
	210	69	760 000	1 220 000	126 000	890	–	7,95	**C4028-XL-K30-V**
	225	85	1 020 000	1 590 000	157 000	810	–	12,4	**C4128-XL-K30-V**
	225	85	1 020 000	1 590 000	157 000	810	–	12,7	**C4128-XL-V**
	250	68	830 000	1 080 000	126 000	3 050	1 750	14,1	**C2228-XL**
	250	68	830 000	1 080 000	126 000	3 050	1 750	13,7	**C2228-XL-K**

medias ➤ *https://www.schaeffler.de/std/1E77*

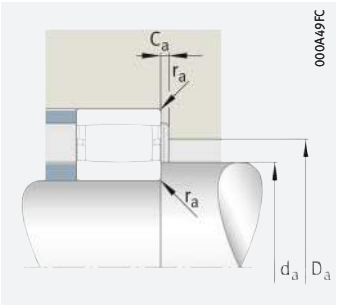
Before ordering, availability for delivery must be checked.



Full complement



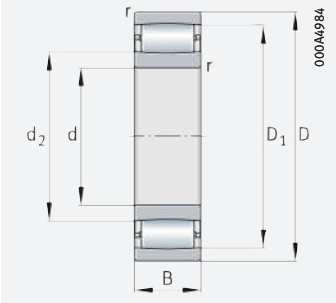
Axial displacement distance



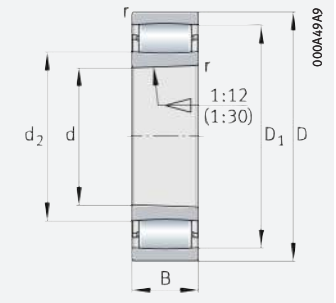
Mounting dimensions

Dimensions						Mounting dimensions						Calculation factors	
d	r	D_1	d_2	s_1	s_2	D_a		d_a		C_a	r_a	k_φ	k_δ
	min.	≈	≈			max.	min.	max.	min.	min.	max.		
120	2	166	138	10,6	3,8	171	–	150	129	–	2	6,176	1,799
	2	166	138	10,6	3,8	171	–	150	129	–	2	6,176	1,799
	2	165,5	137,9	10,6	–	171	161	150	129	1,7	2	6,176	1,799
	2	165,5	137,9	10,6	–	171	161	150	129	1,7	2	6,176	1,799
	2	165,6	141,6	12	5,2	171	–	150	129	–	2	6,421	1,717
	2	165,6	141,6	12	5,2	171	–	150	129	–	2	6,421	1,717
	2	174	142	18	11,2	189	–	160	131	–	2	7,458	1,435
	2	174	142	18	11,2	189	–	160	131	–	2	7,458	1,435
	2,1	190,2	144,8	13	–	203	178	160	132	1,9	2	6,372	1,778
	2,1	190,2	144,8	13	–	203	178	160	132	1,9	2	6,372	1,778
	2,1	190	149	17,1	–	203	180	162	132	1,5	2	7,65	1,423
	2,1	190	149	17,1	–	203	180	162	132	1,5	2	7,65	1,423
130	2	179,9	154,1	16,5	–	191	176	161	139	0,8	2	6,777	1,641
	2	179,9	154,1	16,5	–	191	176	161	139	0,8	2	6,777	1,641
	2	179,8	150,2	11,4	4,6	191	–	165	139	–	2	7,137	1,531
	2	179,8	150,2	11,4	4,6	191	–	165	139	–	2	7,137	1,531
	2	188,4	154,6	18	9,7	199	–	170	141	–	2	7,568	1,437
	2	188,4	154,6	18	9,7	199	–	170	141	–	2	7,568	1,437
	3	199,3	151,7	9,6	–	216	188	167	144	2	2,5	6,983	1,602
	3	199,3	151,7	9,6	–	216	188	167	144	2	2,5	6,983	1,602
	4	236	179	31,2	–	263	–	205	147	2,12	3	9,001	1,216
	4	236	179	31,2	–	263	–	205	147	2,12	3	9,001	1,216
140	2	193,9	163,1	11	–	201	188	172	149	1	2	7,08	1,581
	2	193,9	163,1	11	–	201	188	172	149	1	2	7,08	1,581
	2	191,1	161,5	11,4	5,9	201	–	175	149	–	2	7,235	1,531
	2	191,1	161,5	11,4	5,9	201	–	175	149	–	2	7,235	1,531
	2,1	203,2	166,8	12	5,2	214	–	182	151	–	2	9,241	1,144
	2,1	203,2	166,8	12	5,2	214	–	182	151	–	2	9,241	1,144
	3	221,4	174,6	13,7	–	236	210	190	154	1,9	2,5	7,191	1,598
	3	221,4	174,6	13,7	–	236	210	190	154	1,9	2,5	7,191	1,598

Toroidal roller bearings



Cylindrical bore



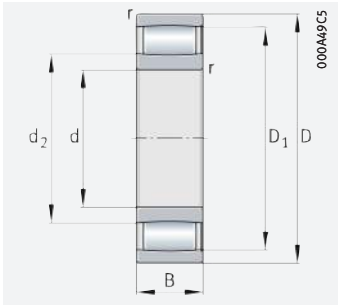
Tapered bore

d = 150 – 170 mm

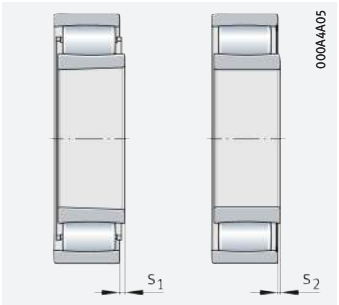
Main dimensions			Basic load ratings		Fatigue limit load	Limiting speed	Speed rating	Mass	Designation ➤809|1.12 ➤809|1.13 X-life ➤804
d	D	B	dyn. C_r	stat. C_{0r}	C_{ur}	n_G	$n_{\vartheta r}$	m	
			N	N	N	min^{-1}	min^{-1}	≈ kg	
150	225	56	600 000	960 000	114 000	810	–	7,6	**C3030-XL-V**
	225	56	540 000	850 000	101 000	3 400	1 790	7,4	**C3030-XL-K-M1B**
	225	56	600 000	960 000	114 000	810	–	7,4	**C3030-XL-K-V**
	225	56	540 000	850 000	101 000	3 400	1 790	7,6	**C3030-XL-M1B**
	225	75	780 000	1 320 000	132 000	810	–	9,91	**C4030-XL-K30-V**
	225	75	780 000	1 320 000	132 000	810	–	10,2	**C4030-XL-V**
	250	80	920 000	1 310 000	139 000	3 000	1 610	15	**C3130-XL-K**
	250	80	920 000	1 310 000	139 000	3 000	1 610	15,4	**C3130-XL**
	250	100	1 240 000	1 880 000	186 000	710	–	18,8	**C4130-XL-K30-V**
	250	100	1 240 000	1 880 000	186 000	710	–	19,3	**C4130-XL-V**
	270	73	1 010 000	1 240 000	152 000	2 850	1 680	17,8	**C2230-XL**
	270	73	1 010 000	1 240 000	152 000	2 850	1 680	17,3	**C2230-XL-K**
160	240	60	610 000	980 000	116 000	3 150	1 640	9,26	**C3032-XL**
	240	60	610 000	980 000	116 000	3 150	1 640	9	**C3032-XL-K**
	240	80	910 000	1 470 000	158 000	740	–	12	**C4032-XL-K30-V**
	240	80	910 000	1 470 000	158 000	740	–	12,4	**C4032-XL-V**
	270	86	1 010 000	1 410 000	147 000	2 800	1 550	19,1	**C3132-XL-K-M1B**
	270	86	1 010 000	1 410 000	147 000	2 800	1 550	19,6	**C3132-XL-M1B**
	270	109	1 470 000	2 200 000	211 000	630	–	24,2	**C4132-XL-K30-V**
	270	109	1 470 000	2 200 000	211 000	630	–	24,9	**C4132-XL-V**
	290	104	1 440 000	1 870 000	224 000	2 550	1 340	29,4	**C3232-XL**
	290	104	1 440 000	1 870 000	224 000	2 550	1 340	28,5	**C3232-XL-K**
170	260	67	770 000	1 200 000	114 000	2 850	1 480	12,5	**C3034-XL**
	260	67	770 000	1 200 000	114 000	2 850	1 480	12,2	**C3034-XL-K**
	260	90	1 140 000	1 880 000	187 000	650	–	16,4	**C4034-XL-K30-V**
	260	90	1 140 000	1 880 000	187 000	650	–	16,8	**C4034-XL-V**
	280	88	1 060 000	1 490 000	154 000	2 650	1 470	20,5	**C3134-XL-K**
	280	88	1 060 000	1 490 000	154 000	2 650	1 470	21	**C3134-XL**
	280	109	1 540 000	2 310 000	223 000	580	–	25,4	**C4134-XL-K30-V**
	280	109	1 540 000	2 310 000	223 000	580	–	26	**C4134-XL-V**
	310	86	1 310 000	1 630 000	202 000	2 340	1 390	27,9	**C2234-XL**
	310	86	1 310 000	1 630 000	202 000	2 340	1 390	27,1	**C2234-XL-K**

medias ➤ *https://www.schaeffler.de/std/1E78*

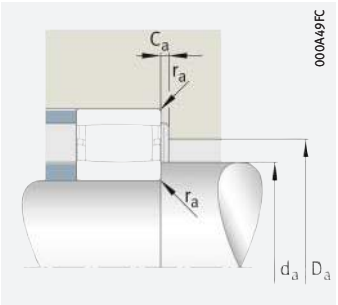
Before ordering, availability for delivery must be checked.



Full complement



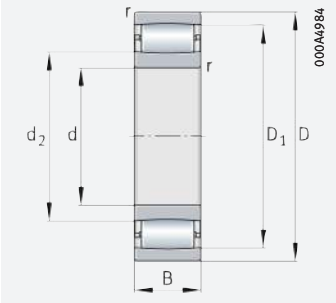
Axial displacement distance



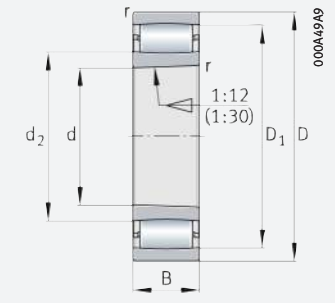
Mounting dimensions

Dimensions						Mounting dimensions						Calculation factors	
d	r	D_1	d_2	s_1	s_2	D_a		d_a		C_a	r_a	k_φ	k_δ
	min.	≈	≈			max.	min.	max.	min.	min.	max.		
150	2,1	204,1	173,9	14,1	7,3	214	–	187	161	–	2	7,535	1,483
	2,1	204,1	173,9	8,7	–	214	199	172,2	161	1,16	2	7,535	1,483
	2,1	204,1	173,9	14,1	7,3	214	–	187	161	–	2	7,535	1,483
	2,1	204,1	173,9	8,7	–	214	199	172,2	161	1,16	2	7,535	1,483
	2,1	202,2	173,8	17,4	10,6	214	–	187	161	–	2	7,338	1,531
	2,1	202,2	173,8	17,4	10,6	214	–	187	161	–	2	7,338	1,531
	2,1	225,5	182,5	13,9	–	238	215	197	162	0,9	2	9,371	1,15
	2,1	225,5	182,5	13,9	–	238	215	197	162	0,9	2	9,371	1,15
	2,1	221,5	179,5	20	10,1	228	–	200	162	–	2	10,222	1,03
	2,1	221,5	179,5	20	10,1	228	–	200	162	–	2	10,222	1,03
	3	235,8	177,2	11,2	–	256	220	197	164	2,4	2,5	8,45	1,313
	3	235,8	177,2	11,2	–	256	220	197	164	2,4	2,5	8,45	1,313
160	2,1	218,1	186,9	15	–	229	212	196	171	0,8	2	8,127	1,373
	2,1	218,1	186,9	15	–	229	212	196	171	0,8	2	8,127	1,373
	2,1	215,7	182,3	18,1	8,2	229	–	200	171	–	2	8,521	1,286
	2,1	215,7	182,3	18,1	8,2	229	–	200	171	–	2	8,521	1,286
	2,1	238,2	191,8	10,3	–	258	227	189	172	1,73	2	9,469	1,15
	2,1	238,2	191,8	10,3	–	258	227	189	172	1,73	2	9,469	1,15
	2,1	239	192	21	11,1	258	–	215	172	–	2	10,886	0,969
	2,1	239	192	21	11,1	258	–	215	172	–	2	10,886	0,969
	3	255,2	194,8	19,3	–	276	239	216	174	2,4	2,5	11,556	0,915
	3	255,2	194,8	19,3	–	276	239	216	174	2,4	2,5	11,556	0,915
170	2,1	236,1	200,9	12,5	–	249	229	211	181	0,9	2	7,129	1,672
	2,1	236,1	200,9	12,5	–	249	229	211	181	0,9	2	7,129	1,672
	2,1	233,7	196,3	17,1	7,2	249	–	222	181	–	2	9,496	1,145
	2,1	233,7	196,3	17,1	7,2	249	–	222	181	–	2	9,496	1,145
	2,1	248	201	21	–	268	237	216	182	1,7	2	8,985	1,243
	2,1	248	201	21	–	268	237	216	182	1,7	2	8,985	1,243
	2,1	250,5	200,5	21	11,1	268	–	225	182	–	2	10,948	0,971
	2,1	250,5	200,5	21	11,1	268	–	225	182	–	2	10,948	0,971
	4	273,8	209,2	16,4	–	293	257	231	187	2,6	3	9,647	1,158
	4	273,8	209,2	16,4	–	293	257	231	187	2,6	3	9,647	1,158

Toroidal roller bearings



Cylindrical bore



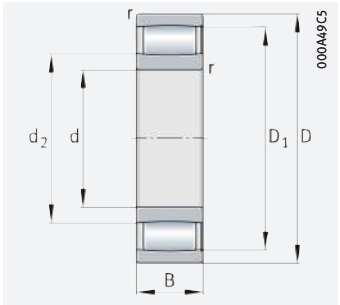
Tapered bore

d = 180 – 200 mm

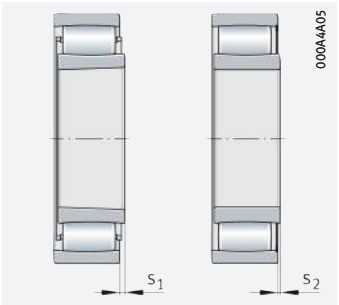
Main dimensions			Basic load ratings		Fatigue limit load	Limiting speed	Speed rating	Mass	Designation ➤809|1.12 ➤809|1.13 X-life ➤804
d	D	B	dyn. C_r	stat. C_{0r}	C_{ur}	n_G	$n_{\vartheta r}$	m	
			N	N	N	min^{-1}	min^{-1}	≈ kg	
180	280	74	900 000	1 360 000	150 000	2 650	1 420	16,4	**C3036-XL**
	280	74	900 000	1 360 000	150 000	2 650	1 420	16	**C3036-XL-K**
	280	100	1 330 000	2 140 000	212 000	600	–	21,6	**C4036-XL-K30-V**
	280	100	1 330 000	2 140 000	212 000	600	–	22,2	**C4036-XL-V**
	300	96	1 300 000	1 780 000	216 000	2 380	1 310	26	**C3136-XL-K**
	300	96	1 300 000	1 780 000	216 000	2 380	1 310	26,7	**C3136-XL**
	300	118	1 780 000	2 700 000	242 000	530	–	31,9	**C4136-XL-K30-V**
	300	118	1 780 000	2 700 000	242 000	530	–	32,8	**C4136-XL-V**
	320	112	1 570 000	2 220 000	255 000	2 200	1 110	36,8	**C3236-XL-K**
	320	112	1 570 000	2 220 000	255 000	2 200	1 110	37,8	**C3236-XL**
190	290	75	940 000	1 480 000	161 000	2 450	1 280	17,4	**C3038-XL**
	290	75	940 000	1 480 000	161 000	2 450	1 280	16,9	**C3038-XL-K**
	290	100	1 370 000	2 330 000	221 000	540	–	22,6	**C4038-XL-K30-V**
	290	100	1 370 000	2 330 000	221 000	540	–	23,2	**C4038-XL-V**
	320	104	1 540 000	2 240 000	205 000	2 220	1 160	32,4	**C3138-XL-K**
	320	104	1 540 000	2 240 000	205 000	2 220	1 160	33,3	**C3138-XL**
	320	128	2 060 000	3 200 000	270 000	485	–	39,9	**C4138-XL-K30-V**
	320	128	2 060 000	3 200 000	270 000	485	–	41	**C4138-XL-V**
	340	92	1 430 000	1 760 000	217 000	2 130	1 310	34,4	**C2238-XL**
	340	92	1 430 000	1 760 000	217 000	2 130	1 310	35,3	**C2238-XL-K**
200	310	82	1 170 000	1 760 000	181 000	2 250	1 180	22,2	**C3040-XL**
	310	82	1 170 000	1 760 000	181 000	2 250	1 180	21,6	**C3040-XL-K**
	310	109	1 650 000	2 650 000	265 000	490	–	28,7	**C4040-XL-K30-V**
	310	109	1 650 000	2 650 000	265 000	490	–	29,5	**C4040-XL-V**
	340	112	1 600 000	2 330 000	265 000	2 060	1 120	39,8	**C3140-XL-K**
	340	112	1 600 000	2 330 000	265 000	2 060	1 120	40,8	**C3140-XL**
	340	140	2 400 000	3 700 000	315 000	435	–	49,7	**C4140-XL-K30-V**
	340	140	2 400 000	3 700 000	365 000	435	–	51,1	**C4140-XL-V**

medias ➤ *https://www.schaeffler.de/std/1E79*

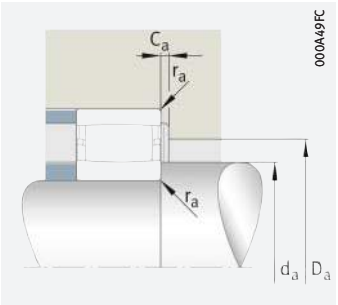
Before ordering, availability for delivery must be checked.



Full complement



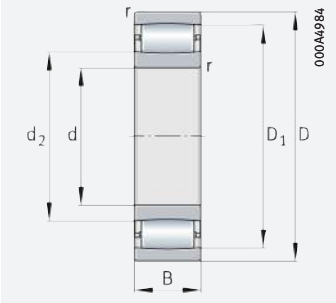
Axial displacement distance



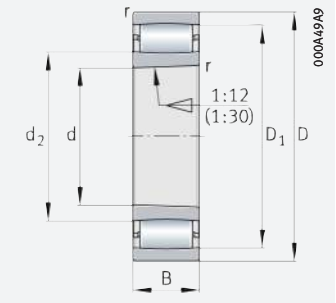
Mounting dimensions

Dimensions						Mounting dimensions						Calculation factors	
d	r	D_1	d_2	s_1	s_2	D_a		d_a		C_a	r_a	k_φ	k_δ
	min.	≈	≈			max.	min.	max.	min.	min.	max.		
180	2,1	251	208,9	15,1	–	269	241	223	191	1,4	2	9,696	1,136
	2,1	251	208,9	15,1	–	269	241	223	191	1,4	2	9,696	1,136
	2,1	246	204	20,1	10,2	269	–	230	191	–	2	10,427	1,03
	2,1	246	204	20,1	10,2	269	–	230	191	–	2	10,427	1,03
	3	270,8	215,2	23,2	–	286	257	234	194	2,1	2,5	9,634	1,162
	3	270,8	215,2	23,2	–	286	257	234	194	2,1	2,5	9,634	1,162
	3	264	212	20	10,1	286	–	248	194	–	2,5	11,41	0,935
	3	264	212	20	10,1	286	–	248	194	–	2,5	11,41	0,935
	4	288	229	27,3	–	303	274	248	197	2,1	3	11,849	0,915
	4	288	229	27,3	–	303	274	248	197	2,1	3	11,849	0,915
190	2,1	266,5	224,5	16,1	–	279	258	237	201	1,4	2	9,831	1,136
	2,1	266,5	224,5	16,1	–	279	258	237	201	1,4	2	9,831	1,136
	2,1	262,5	220,5	20	10,1	279	–	240	201	–	2	10,571	1,03
	2,1	262,5	220,5	20	10,1	279	–	240	201	–	2	10,571	1,03
	3	288,7	228,3	19	–	306	274	248	204	2,3	2,5	11,767	0,918
	3	288,7	228,3	19	–	306	274	249	204	2,3	2,5	11,767	0,918
	3	280,5	225,5	20	10,1	306	–	255	204	–	2,5	12,252	0,868
	3	280,5	225,5	20	10,1	306	–	255	204	–	2,5	12,252	0,868
	4	296	223,2	22,5	–	323	275	250	207	3	3	9,695	1,176
	4	296	223,2	22,5	–	323	275	250	207	3	3	9,695	1,176
200	2,1	285,2	234,8	15,2	–	299	272	252	211	1,6	2	10,083	1,117
	2,1	285,2	234,8	15,2	–	299	272	252	211	1,6	2	10,083	1,117
	2,1	278,6	230,4	21	11,1	299	–	255	211	–	2	11,664	0,924
	2,1	278,6	230,4	21	11,1	299	–	255	211	–	2	11,664	0,924
	3	304,4	245,6	27,3	–	326	290	265	214	2,1	2,5	11,861	0,923
	3	304,4	245,6	27,3	–	326	290	265	214	2,1	2,5	11,861	0,923
	3	300,6	238,4	22	12,1	326	–	270	214	–	2,5	14,02	0,747
	3	300,5	238,5	22	12,1	326	–	270	214	–	2,5	13,961	0,752

Toroidal roller bearings



Cylindrical bore



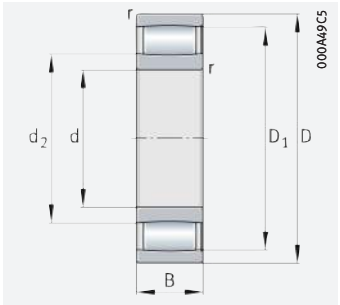
Tapered bore

d = 220 – 300 mm

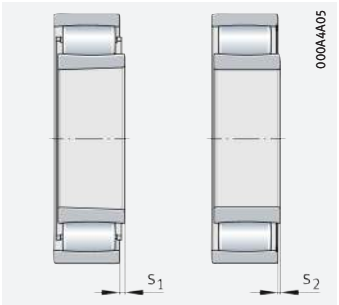
Main dimensions			Basic load ratings		Fatigue limit load	Limiting speed	Speed rating	Mass	Designation ➤809|1.12 ➤809|1.13 X-life ➤804
d	D	B	dyn. C_r	stat. C_{0r}	C_{ur}	n_G	$n_{\vartheta r}$	m	
			N	N	N	min^{-1}	min^{-1}	≈ kg	
220	340	90	1 370 000	2 130 000	221 000	2 030	1 050	28,4	**C3044-XL-K**
	340	90	1 370 000	2 130 000	221 000	2 030	1 050	29,2	**C3044-XL**
	340	118	1 960 000	3 250 000	285 000	425	–	37,3	**C4044-XL-K30-V**
	340	118	1 960 000	3 250 000	285 000	425	–	38,3	**C4044-XL-V**
	370	120	1 930 000	2 900 000	280 000	1 850	960	49,9	**C3144-XL-K**
	370	120	1 930 000	2 900 000	280 000	1 850	960	51,3	**C3144-XL**
	400	108	2 080 000	2 550 000	300 000	1 720	1 050	58,2	**C2244-XL**
	400	108	2 080 000	2 550 000	300 000	1 720	1 050	56,7	**C2244-XL-K**
240	360	92	1 400 000	2 230 000	228 000	1 880	980	31,1	**C3048-XL-K**
	360	92	1 400 000	2 230 000	228 000	1 880	980	32	**C3048-XL**
	400	128	2 380 000	3 500 000	370 000	1 690	870	61,6	**C3148-XL-K**
	400	128	2 380 000	3 500 000	370 000	1 690	870	63,2	**C3148-XL**
260	400	104	1 830 000	2 950 000	280 000	1 650	830	45,2	**C3052-XL-K**
	400	104	1 830 000	2 950 000	280 000	1 650	830	46,4	**C3052-XL**
	440	144	2 750 000	4 250 000	435 000	1 480	740	85,3	**C3152-XL-K**
	440	144	2 750 000	4 250 000	435 000	1 480	740	87,5	**C3152-XL**
280	420	106	1 870 000	3 100 000	290 000	1 530	770	48,8	**C3056-XL-K**
	420	106	1 870 000	3 100 000	290 000	1 530	770	50,1	**C3056-XL**
	460	146	2 850 000	4 500 000	455 000	1 400	700	93,8	**C3156-XL**
	460	146	2 850 000	4 500 000	455 000	1 400	700	91,4	**C3156-XL-K**
300	460	118	2 220 000	3 800 000	330 000	1 400	690	67,4	**C3060-XL-K-M**
	460	118	2 220 000	3 800 000	330 000	1 400	690	69,2	**C3060-XL-M**
	460	160	2 650 000	4 550 000	420 000	1 440	600	91,4	**C4060-XL-K30-M1B**
	460	160	2 650 000	4 550 000	420 000	1 440	600	93,9	**C4060-XL-M1B**
	500	160	3 350 000	5 300 000	510 000	1 280	630	120	**C3160-XL-K**
	500	160	3 350 000	5 300 000	510 000	1 280	630	124	**C3160-XL**
	500	200	4 150 000	6 800 000	670 000	1 280	495	150	**C4160-XL-K30-M1B**
	500	200	4 150 000	6 800 000	670 000	1 280	495	154	**C4160-XL-M1B**

medias ➤ *https://www.schaeffler.de/std/1E7A*

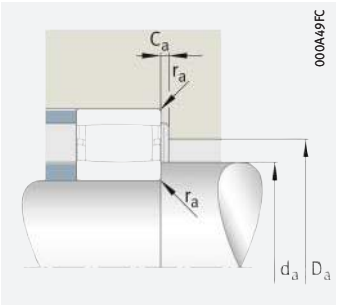
Before ordering, availability for delivery must be checked.



Full complement



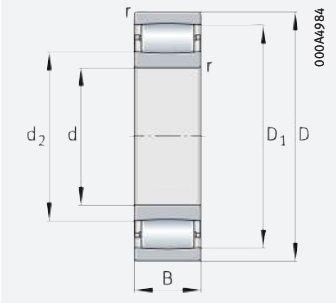
Axial displacement distance



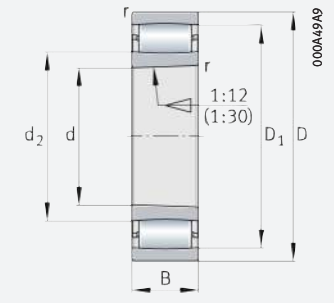
Mounting dimensions

Dimensions						Mounting dimensions						Calculation factors	
d	r	D_1	d_2	s_1	s_2	D_a		d_a		C_a	r_a	k_φ	k_δ
	min.	≈	≈			max.	min.	max.	min.	min.	max.		
220	3	310	256,7	17,2	–	327	297	274	233	1,7	2,5	11,851	0,931
	3	310	256,7	17,2	–	327	297	274	233	1,7	2,5	11,851	0,931
	3	304,1	252,9	20	10,1	327	–	280	233	–	2,5	11,548	0,957
	3	304,1	252,9	20	10,1	327	–	280	233	–	2,5	11,548	0,957
	4	333,1	269,2	22,3	–	353	316	291	237	1,4	3	13,667	0,791
	4	333,1	269,2	22,3	–	353	316	291	237	1,4	3	13,667	0,791
	4	351,1	257,9	20,5	–	383	323	292	237	3,9	3	11,976	0,937
	4	351,1	257,9	20,5	–	383	323	292	237	3,9	3	11,976	0,937
240	3	329,2	275,8	19,2	–	347	316	293	253	1,7	2,5	12,016	0,931
	3	329,2	275,8	19,2	–	347	316	293	253	1,7	2,5	12,016	0,931
	4	365,8	281,2	20,4	–	383	337	307	257	2,9	3	14,559	0,741
	4	356,8	281,2	20,4	–	383	337	307	257	2,9	3	14,559	0,741
260	4	366,1	305,8	19,3	–	385	351	326	275	1,9	3	12,381	0,924
	4	366,1	305,8	19,3	–	385	351	326	275	1,9	3	12,381	0,924
	4	397	318,9	26,4	–	423	377	346	277	1,7	3	16,223	0,667
	4	397	318,9	26,4	–	423	377	346	277	1,7	3	16,223	0,667
280	4	388,5	328,5	21,3	–	405	374	348	295	1,9	3	12,577	0,924
	4	388,5	328,5	21,3	–	405	374	348	295	1,9	3	12,577	0,924
	5	415	337	28,4	–	440	394	364	300	1,7	4	16,385	0,666
	5	415	337	28,4	–	440	394	364	300	1,7	4	16,385	0,666
300	4	416	353	20	–	445	400	369	315	1,6	3	14,109	0,812
	4	416	353	20	–	445	400	369	315	1,6	3	14,109	0,812
	4	404,8	343,2	16	–	445	392	357	315	0,71	3	16,395	0,665
	4	404,8	343,2	16	–	445	392	357	315	0,71	3	16,395	0,665
	5	447,6	362,4	30,5	–	480	426	391	320	1,9	4	17,019	0,647
	5	447,6	362,4	30,5	–	480	426	391	320	1,9	4	17,019	0,647
	5	446,1	355,9	14,9	–	480	425	352	320	4,2	4	27,776	0,359
	5	446,1	355,9	14,9	–	480	425	352	320	4,2	4	27,776	0,359

Toroidal roller bearings



Cylindrical bore



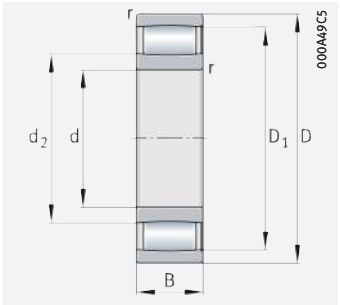
Tapered bore

d = 320 – 420 mm

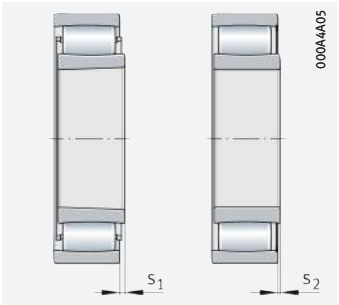
Main dimensions			Basic load ratings		Fatigue limit load	Limiting speed	Speed rating	Mass	Designation ➤809|1.12 ➤809|1.13 X-life ➤804
d	D	B	dyn. C_r	stat. C_{0r}	C_{ur}	n_G	$n_{\vartheta r}$	m	
			N	N	N	min^{-1}	min^{-1}	≈ kg	
320	480	121	2 300 000	4 100 000	365 000	1 310	640	74,7	**C3064-XL-M**
	480	121	2 300 000	4 100 000	365 000	1 310	640	72,8	**C3064-XL-K-M**
	540	176	4 150 000	6 300 000	610 000	1 180	590	157	**C3164-XL-M**
	540	176	4 150 000	6 300 000	610 000	1 180	590	157	**C3164-XL-K-M**
340	520	133	2 950 000	4 950 000	460 000	1 170	560	99,3	**C3068-XL-M**
	520	133	2 950 000	4 950 000	460 000	1 170	560	96,8	**C3068-XL-K-M**
	580	190	4 900 000	7 500 000	710 000	1 060	510	202	**C3168-XL-M**
	580	190	4 900 000	7 500 000	710 000	1 060	510	197	**C3168-XL-K-M**
360	480	90	1 770 000	3 250 000	360 000	1 280	600	42,6	**C3972-XL-K-M**
	480	90	1 770 000	3 250 000	360 000	1 280	600	43,8	**C3972-XL-M**
	540	134	2 950 000	5 000 000	460 000	1 120	550	105	**C3072-XL-M**
	540	134	2 950 000	5 000 000	460 000	1 120	550	102	**C3072-XL-K-M**
	600	192	5 100 000	8 000 000	750 000	1 020	485	213	**C3172-XL-M**
	600	192	5 100 000	8 000 000	750 000	1 020	485	208	**C3172-XL-K-M**
380	520	106	2 130 000	4 000 000	405 000	1 150	550	62,8	**C3976-XL-K-M**
	520	106	2 130 000	4 000 000	405 000	1 150	550	64,4	**C3976-XL-M**
	560	135	3 050 000	5 200 000	475 000	1 090	530	110	**C3076-XL-M**
	560	135	3 050 000	5 200 000	475 000	1 090	530	107	**C3076-XL-K-M**
	620	194	5 000 000	8 500 000	720 000	990	455	225	**C3176-XL-M**
	620	194	5 000 000	8 500 000	720 000	990	455	219	**C3176-XL-K-M**
400	540	106	2 170 000	4 150 000	415 000	1 120	530	65,6	**C3980-XL-K-M**
	540	106	2 170 000	4 150 000	415 000	1 120	530	67,3	**C3980-XL-M**
	600	148	3 750 000	6 200 000	560 000	980	475	143	**C3080-XL-M**
	600	148	3 750 000	6 200 000	560 000	980	475	139	**C3080-XL-K-M**
	650	200	4 800 000	8 300 000	750 000	910	435	253	**C3180-XL-M**
	650	200	4 800 000	8 300 000	750 000	910	435	247	**C3180-XL-K-M**
420	560	106	2 200 000	4 250 000	425 000	1 070	510	68,4	**C3984-XL-K-M**
	560	106	2 200 000	4 250 000	425 000	1 070	510	70,2	**C3984-XL-M**
	620	150	3 800 000	6 400 000	580 000	950	460	151	**C3084-XL-M**
	620	150	3 800 000	6 400 000	580 000	950	460	147	**C3084-XL-K-M**
	700	224	6 000 000	10 600 000	890 000	860	390	339	**C3184-XL-M**
	700	224	6 000 000	10 600 000	890 000	860	390	330	**C3184-XL-K-M**

medias ➤ *https://www.schaeffler.de/std/1E7B*

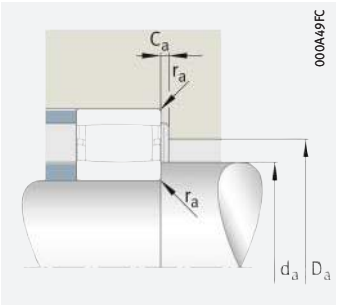
Before ordering, availability for delivery must be checked.



Full complement



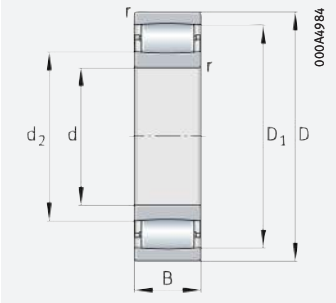
Axial displacement distance



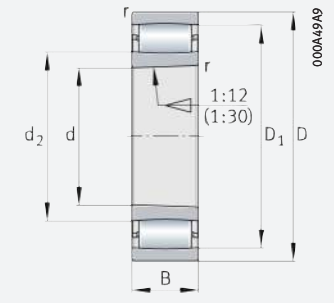
Mounting dimensions

Dimensions						Mounting dimensions						Calculation factors	
d	r	D_1	d_2	s_1	s_2	D_a		d_a		C_a	r_a	k_φ	k_δ
	min.	≈	≈			max.	min.	max.	min.	min.	max.		
320	4	439,4	376,6	23,3	–	465	423	393	335	1,6	3	15,05	0,76
	4	439,4	376,6	23,3	–	465	423	393	335	1,6	3	15,05	0,76
	5	475,9	372,1	26,7	–	520	448	400	340	4	4	19,823	0,542
	5	475,9	372,1	26,7	–	520	448	400	340	4	4	19,823	0,542
340	5	481,7	402,3	25,4	–	502	460	424	358	2,5	4	15,578	0,745
	5	481,7	402,3	25,4	–	502	460	424	358	2,5	4	15,578	0,745
	5	517,6	404,4	25,9	–	560	485	437	360	2,7	4	22,159	0,481
	5	517,6	404,4	25,9	–	560	485	437	360	2,7	4	22,159	0,481
360	3	450,6	393,4	17,2	–	467	437	408	373	2,1	2,5	13,126	0,925
	3	450,6	393,4	17,2	–	467	437	408	373	2,1	2,5	13,126	0,925
	5	496,6	417,4	26,4	–	522	475	439	378	2,5	4	15,709	0,745
	5	496,6	417,4	26,4	–	522	475	439	378	2,5	4	15,709	0,745
	5	542,7	427,2	27,9	–	580	509	461	380	2,7	4	25,896	0,403
	5	542,7	427,2	27,9	–	580	509	461	380	2,7	4	25,896	0,403
380	4	489,1	427,9	21	–	505	474	444	395	2,2	3	14,746	0,813
	4	489,1	427,9	21	–	505	474	444	395	2,2	3	14,746	0,813
	5	510,5	431,5	27	–	542	489	453	398	2,5	4	15,827	0,745
	5	510,5	431,5	27	–	542	489	453	398	2,5	4	15,827	0,745
	5	548,6	448,4	25,4	–	600	523	474	400	2,1	4	20,403	0,544
	5	548,6	448,4	25,4	–	600	523	474	400	2,1	4	20,403	0,544
400	4	500,6	439,4	21	–	525	485	456	415	2,2	3	14,846	0,813
	4	500,6	439,4	21	–	525	485	456	415	2,2	3	14,846	0,813
	5	553	458	30,6	–	582	527	484	418	3	4	17,429	0,671
	5	553	458	30,6	–	582	527	484	418	3	4	17,429	0,671
	6	586,1	490,9	50,7	–	624	563	514	426	1,8	5	20,809	0,542
	6	586,1	490,9	50,7	–	624	563	514	426	1,8	5	20,809	0,542
420	4	518,6	457,4	21,3	–	545	503	474	435	2,2	3	15,003	0,813
	4	518,6	457,4	21,3	–	545	503	474	435	2,2	3	15,003	0,813
	5	569,8	475,2	32,6	–	602	544	501	438	3	4	17,577	0,671
	5	569,8	475,2	32,6	–	602	544	501	438	3	4	17,577	0,671
	6	615,7	510,3	34,8	–	674	587	539	446	1,9	5	24,992	0,435
	6	615,7	510,3	34,8	–	674	587	539	446	1,9	5	24,992	0,435

Toroidal roller bearings



Cylindrical bore



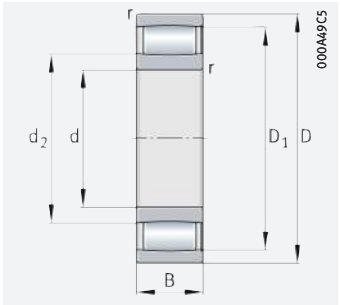
Tapered bore

d = 440 – 500 mm

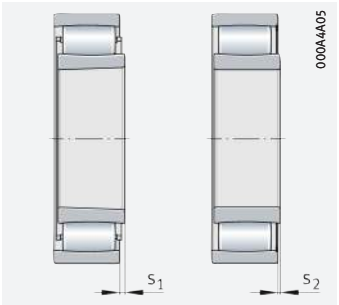
Main dimensions			Basic load ratings		Fatigue limit load	Limiting speed	Speed rating	Mass	Designation ➤809|1.12 ➤809|1.13 X-life ➤804
d	D	B	dyn. C_r	stat. C_{0r}	C_{ur}	n_G	$n_{\vartheta r}$	m	
			N	N	N	min^{-1}	min^{-1}	≈ kg	
440	600	118	2 650 000	5 300 000	490 000	970	445	92,3	**C3988-XL-K-M**
	600	118	2 650 000	5 300 000	490 000	970	445	94,7	**C3988-XL-M**
	650	157	3 750 000	6 500 000	570 000	920	460	169	**C3088-XL-K-M1B**
	650	157	3 750 000	6 500 000	570 000	920	460	173	**C3088-XL-M1B**
	720	226	6 900 000	11 600 000	960 000	810	360	345	**C3188-XL-K-M1B**
	720	226	6 900 000	11 600 000	960 000	810	360	354	**C3188-XL-M1B**
	720	280	7 600 000	12 900 000	1 060 000	820	305	427	**C4188-XL-K30-M1B**
	720	280	7 600 000	12 900 000	1 060 000	820	305	439	**C4188-XL-M1B**
460	620	118	2 750 000	5 600 000	510 000	940	425	95,8	**C3992-XL-K-M**
	620	118	2 750 000	5 600 000	510 000	940	425	98,4	**C3992-XL-M**
	680	163	4 000 000	7 500 000	640 000	850	400	197	**C3092-XL-M**
	680	163	4 000 000	7 500 000	640 000	850	400	192	**C3092-XL-K-M**
	760	240	6 800 000	12 000 000	1 010 000	760	350	424	**C3192-XL-M**
	760	240	6 800 000	12 000 000	1 010 000	760	350	413	**C3192-XL-K-M**
	760	300	8 700 000	14 900 000	1 190 000	770	280	516	**C4192-XL-K30-M1B**
	760	300	8 700 000	14 900 000	1 190 000	770	280	530	**C4192-XL-M1B**
480	650	128	3 300 000	6 200 000	610 000	880	405	116	**C3996-XL-K-M**
	650	128	3 300 000	6 200 000	610 000	880	405	119	**C3996-XL-M**
	700	165	4 100 000	7 800 000	660 000	820	390	207	**C3096-XL-M**
	700	165	4 100 000	7 800 000	660 000	820	390	201	**C3096-XL-K-M**
	790	248	7 100 000	12 600 000	1 050 000	730	335	459	**C3196-XL-K-M1B**
	790	248	7 100 000	12 600 000	1 050 000	730	335	471	**C3196-XL-M1B**
500	670	128	3 350 000	6 500 000	620 000	830	375	120	**C39/500-XL-K-M**
	670	128	3 350 000	6 500 000	620 000	830	375	123	**C39/500-XL-M**
	720	167	4 300 000	8 300 000	700 000	790	370	216	**C30/500-XL-M**
	720	167	4 300 000	8 300 000	700 000	790	370	211	**C30/500-XL-K-M**
	830	264	7 500 000	12 900 000	1 090 000	680	330	545	**C31/500-XL-K-M**
	830	264	7 500 000	12 900 000	1 090 000	680	330	559	**C31/500-XL-M**
	830	325	10 700 000	19 100 000	1 410 000	680	225	670	**C41/500-XL-K30-M1B**
	830	325	10 700 000	19 100 000	1 410 000	680	225	688	**C41/500-XL-M1B**

medias ➤ *https://www.schaeffler.de/std/1E7C*

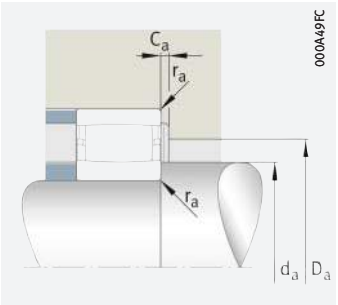
Before ordering, availability for delivery must be checked.



Full complement



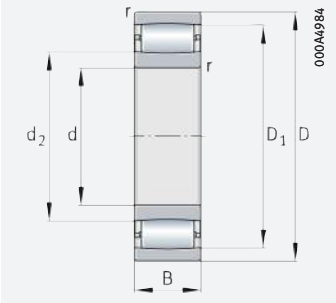
Axial displacement distance



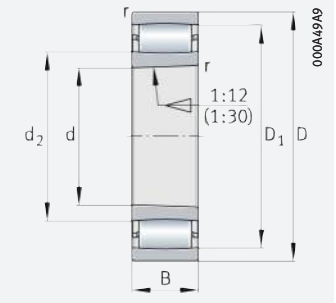
Mounting dimensions

Dimensions						Mounting dimensions						Calculation factors	
d	r	D_1	d_2	s_1	s_2	D_a		d_a		C_a	r_a	k_φ	k_δ
	min.	≈	≈			max.	min.	max.	min.	min.	max.		
440	4	559,5	494,5	20	–	585	545	517	455	1,4	3	16,524	0,732
	4	559,5	494,5	20	–	585	545	517	455	1,4	3	16,524	0,732
	6	583,7	491,9	19,7	–	627	566	489	463	5,5	5	18,096	0,652
	6	583,7	494,3	19,7	–	627	566	489	463	5,5	5	18,096	0,652
	6	646,2	521,1	16	–	694	615	518	466	6,3	5	25,092	0,347
	6	646,2	521,1	16	–	694	615	518	466	6,3	5	25,092	0,347
	6	634,4	512,6	27,8	–	694	608	506	466	6,5	5	29,46	0,357
	6	634,4	512,6	27,8	–	694	608	506	466	6,5	5	29,46	0,357
460	4	574	509	20	–	605	561	504	467	1,4	3	16,651	0,732
	4	574	509	20	–	605	561	504	467	1,4	3	16,651	0,732
	6	623,7	539,2	33,5	–	654	603	560	486	2,2	5	18,559	0,647
	6	623,7	539,2	33,5	–	654	603	560	486	2,2	5	18,559	0,647
	7,5	679,2	558,8	51	–	728	649	589	492	2,1	6	25,204	0,441
	7,5	679,2	558,8	51	–	728	649	589	492	2,1	6	25,204	0,441
	7,5	668,3	539,6	23,3	–	728	634	588	477	6,9	6	32,219	0,324
	7,5	668,3	539,6	23,3	–	728	634	588	477	6,9	6	32,219	0,324
480	5	607,6	525,4	20,4	–	632	588	555	498	3,1	4	19,501	0,6
	5	607,6	525,4	20,4	–	632	588	555	498	3,1	4	19,501	0,6
	6	639,5	555,5	35,5	–	677	619	576	503	2,2	5	18,699	0,647
	6	639,5	555,5	35,5	–	677	619	576	503	2,2	5	18,699	0,647
	7,5	697,4	577,1	35,1	–	758	676	574	512	6,1	6	25,47	0,439
	7,5	697,4	577,1	35,1	–	758	676	574	512	6,1	6	25,47	0,439
500	5	634,6	552,4	20,4	–	652	615	573	518	3,1	4	19,736	0,6
	5	634,6	552,4	20,4	–	652	615	573	518	3,1	4	19,736	0,6
	6	655,8	572,2	37,5	–	697	635	593	523	2,1	5	18,843	0,647
	6	655,8	572,2	37,5	–	697	635	593	523	2,1	5	18,843	0,647
	7,5	734,2	608,8	75,3	–	798	702	641	532	4,4	6	25,64	0,441
	7,5	734,2	608,8	75,3	–	798	702	641	532	4,4	6	25,64	0,441
	7,5	739,2	598,7	15	–	798	708	594	532	7,5	6	36,213	0,287
	7,5	739,2	598,7	15	–	798	708	594	532	7,5	6	36,213	0,287

Toroidal roller bearings



Cylindrical bore



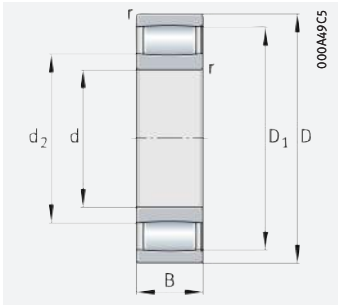
Tapered bore

d = 530 – 670 mm

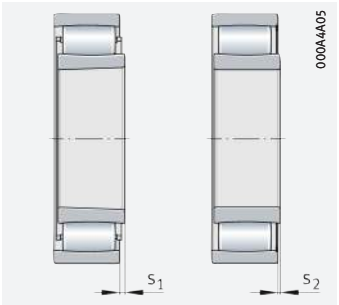
Main dimensions			Basic load ratings		Fatigue limit load	Limiting speed	Speed rating	Mass	Designation ➤809|1.12 ➤809|1.13 X-life ➤804
d	D	B	dyn. C_r	stat. C_{0r}	C_{ur}	n_G	$n_{\vartheta r}$	m	
			N	N	N	min^{-1}	min^{-1}	≈ kg	
530	710	136	3 550 000	7 100 000	670 000	790	365	143	**C39/530-XL-K-M**
	710	136	3 550 000	7 100 000	670 000	790	365	146	**C39/530-XL-M**
	780	185	5 200 000	9 700 000	790 000	730	340	292	**C30/530-XL-M**
	780	185	5 200 000	9 700 000	790 000	730	340	285	**C30/530-XL-K-M**
	870	272	9 100 000	16 100 000	1 310 000	640	280	625	**C31/530-XL-M**
	870	272	9 100 000	16 100 000	1 310 000	640	280	609	**C31/530-XL-K-M**
560	750	140	3 650 000	7 500 000	700 000	730	335	164	**C39/560-XL-K-M**
	750	140	3 650 000	7 500 000	700 000	730	335	168	**C39/560-XL-M**
	820	195	5 700 000	11 200 000	890 000	660	295	338	**C30/560-XL-M**
	820	195	5 700 000	11 200 000	890 000	660	295	329	**C30/560-XL-K-M**
	920	280	9 600 000	17 400 000	1 350 000	610	265	701	**C31/560-XL-K-M1B**
	920	280	9 600 000	17 400 000	1 350 000	610	265	720	**C31/560-XL-M1B**
600	800	150	4 100 000	8 800 000	790 000	680	305	197	**C39/600-XL-K-M**
	800	150	4 100 000	8 800 000	790 000	680	305	203	**C39/600-XL-M**
	870	200	6 300 000	12 200 000	970 000	620	275	383	**C30/600-XL-M**
	870	200	6 300 000	12 200 000	970 000	620	275	373	**C30/600-XL-K-M**
	980	300	11 100 000	19 100 000	1 490 000	550	247	847	**C31/600-XL-K-M1B**
	980	300	11 100 000	19 100 000	1 490 000	550	247	869	**C31/600-XL-M1B**
	980	375	13 600 000	24 500 000	1 780 000	560	186	1 058	**C41/600-XL-K30-M1B**
	980	375	13 600 000	24 500 000	1 780 000	560	186	1 086	**C41/600-XL-M1B**
630	850	165	5 000 000	10 100 000	890 000	630	285	253	**C39/630-XL-K-M**
	850	165	5 000 000	10 100 000	890 000	630	285	259	**C39/630-XL-M**
	920	212	6 900 000	12 900 000	1 050 000	580	270	460	**C30/630-XL-M**
	920	212	6 900 000	12 900 000	1 050 000	580	270	448	**C30/630-XL-K-M**
	1 030	315	12 200 000	22 000 000	1 660 000	520	222	983	**C31/630-XL-K-M1B**
	1 030	315	12 200 000	22 000 000	1 660 000	520	222	1 009	**C31/630-XL-M1B**
670	900	170	5 700 000	12 300 000	1 020 000	570	237	289	**C39/670-XL-K-M**
	900	170	5 700 000	12 300 000	1 020 000	570	237	296	**C39/670-XL-M**
	980	230	8 300 000	16 500 000	1 250 000	530	226	568	**C30/670-XL-M**
	980	230	8 300 000	16 500 000	1 250 000	530	226	553	**C30/670-XL-K-M**
	1 090	336	12 600 000	22 300 000	1 740 000	490	220	1 167	**C31/670-XL-K-M1B**
	1 090	336	12 600 000	22 300 000	1 740 000	490	220	1 198	**C31/670-XL-M1B**

medias ➤ *https://www.schaeffler.de/std/1E7D*

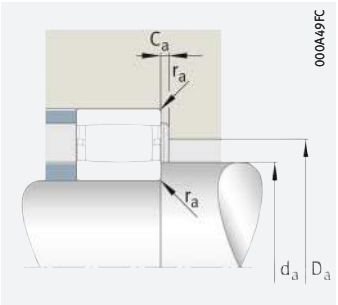
Before ordering, availability for delivery must be checked.



Full complement



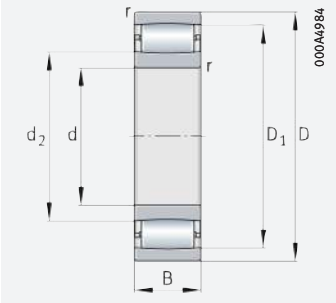
Axial displacement distance



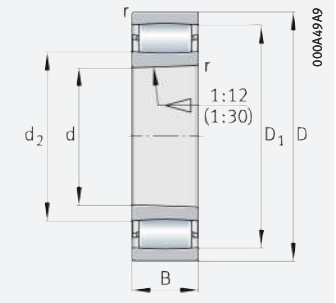
Mounting dimensions

Dimensions						Mounting dimensions						Calculation factors	
d	r	D_1	d_2	s_1	s_2	D_a		d_a		C_a	r_a	k_φ	k_δ
	min.	≈	≈			max.	min.	max.	min.	min.	max.		
530	5	658	577	28,4	–	692	639	606	548	2,9	4	19,946	0,6
	5	658	577	28,4	–	692	639	606	548	2,9	4	19,946	0,6
	6	702,9	602,1	35,7	–	757	677	628	553	2,5	5	21,626	0,548
	6	702,9	602,1	35,7	–	757	677	628	553	2,5	5	21,626	0,548
	7,5	779,2	636,8	44,4	–	838	738	678	562	3	6	30,734	0,356
	7,5	779,2	636,8	44,4	–	838	738	678	562	3	6	30,734	0,356
560	5	701,7	621,3	32,4	–	732	683	650	578	2,9	4	20,33	0,6
	5	701,7	621,3	32,4	–	732	683	650	578	2,9	4	20,33	0,6
	6	758,9	662,1	45,7	–	793	735	686	583	2,4	5	22,141	0,548
	6	758,9	662,1	45,7	–	793	735	686	583	2,4	5	22,141	0,548
	7,5	805,2	663,4	28	–	888	778	660	592	7,3	6	30,983	0,355
	7,5	805,2	663,4	28	–	888	778	660	592	7,3	6	30,983	0,355
600	5	745,3	664,7	32,4	–	782	726	685	618	1,7	4	21,712	0,561
	5	745,3	664,7	32,4	–	782	726	685	618	1,7	4	21,712	0,561
	6	805,6	691,4	35,9	–	847	773	724	623	2	5	28,196	0,403
	6	805,6	691,4	35,9	–	847	773	724	623	2	5	28,196	0,403
	7,5	869,9	702,9	26,1	–	948	837	699	632	8,8	6	30,953	0,363
	7,5	869,9	702,9	26,1	–	948	837	699	632	8,8	6	30,953	0,363
	7,5	864,7	701,2	24,6	–	948	828	695	632	9	6	40,44	0,26
	7,5	864,7	701,2	24,6	–	948	828	695	632	9	6	40,44	0,26
630	6	790,8	693,2	35,5	–	827	766	729	653	3,6	5	22,766	0,536
	6	790,8	693,2	35,5	–	827	766	729	653	3,6	5	22,766	0,536
	7,5	841,7	715,2	48,1	–	892	809	748	658	3,9	6	29,154	0,39
	7,5	841,7	715,2	48,1	–	892	809	748	658	3,9	6	29,154	0,39
	7,5	910,9	743,4	23,8	–	998	878	739	662	8,8	6	34,168	0,324
	7,5	910,9	743,4	23,8	–	998	878	739	662	8,8	6	34,168	0,324
670	6	852,8	756,2	24,9	–	877	833	749	693	2,1	5	24,732	0,493
	6	852,8	756,2	24,9	–	877	833	749	693	2,1	5	24,732	0,493
	7,5	902,3	776,7	41,1	–	952	870	809	698	3,1	6	27,163	0,44
	7,5	902,3	776,7	41,1	–	952	870	809	698	3,1	6	27,163	0,44
	7,5	963,7	786	41	–	1 058	930	782	702	12	6	34,543	0,325
	7,5	963,7	786	41	–	1 058	930	782	702	12	6	34,543	0,325

Toroidal roller bearings



Cylindrical bore



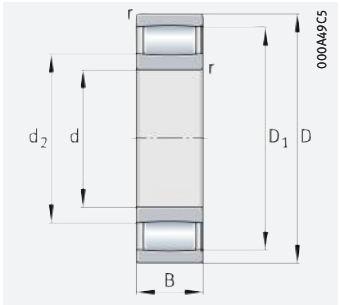
Tapered bore

d = 710 – 900 mm

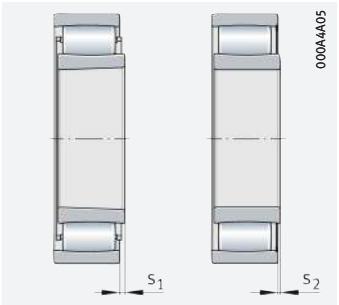
Main dimensions			Basic load ratings		Fatigue limit load	Limiting speed	Speed rating	Mass	Designation ➤*809|1.12* ➤*809|1.13* X-life ➤*804*
d	D	B	dyn. C_r	stat. C_{0r}	C_{ur}	n_G	$n_{\vartheta r}$	m	
			N	N	N	min^{-1}	min^{-1}	≈ kg	
710	950	180	6 100 000	12 900 000	1 040 000	550	237	337	**C39/710-XL-K-M**
	950	180	6 100 000	12 900 000	1 040 000	550	237	346	**C39/710-XL-M**
	1 030	236	9 000 000	17 600 000	1 360 000	500	214	634	**C30/710-XL-M**
	1 030	236	9 000 000	17 600 000	1 360 000	500	214	618	**C30/710-XL-K-M**
	1 030	315	10 300 000	21 100 000	1 560 000	510	176	824	**C40/710-XL-K30-M1B**
	1 030	315	10 300 000	21 100 000	1 560 000	510	176	846	**C40/710-XL-M1B**
	1 150	345	12 700 000	24 200 000	1 810 000	465	203	1 327	**C31/710-XL-K-M1B**
	1 150	345	12 700 000	24 200 000	1 810 000	465	203	1 362	**C31/710-XL-M1B**
750	1 000	185	6 400 000	14 000 000	1 120 000	510	216	380	**C39/750-XL-K-M**
	1 000	185	6 400 000	14 000 000	1 120 000	510	216	391	**C39/750-XL-M**
	1 090	250	9 500 000	19 300 000	1 430 000	475	201	735	**C30/750-XL-K-M1B**
	1 090	250	9 500 000	19 300 000	1 430 000	475	201	755	**C30/750-XL-M1B**
800	1 060	195	6 600 000	14 800 000	1 160 000	475	205	443	**C39/800-XL-K-M**
	1 060	195	6 600 000	14 800 000	1 160 000	475	205	455	**C39/800-XL-M**
	1 150	258	9 600 000	20 100 000	1 470 000	445	191	828	**C30/800-XL-K-M1B**
	1 150	258	9 600 000	20 100 000	1 470 000	445	191	828	**C30/800-XL-M1B**
850	1 120	200	7 800 000	17 000 000	1 390 000	440	182	500	**C39/850-XL-K-M**
	1 120	200	7 800 000	17 000 000	1 390 000	440	182	513	**C39/850-XL-M**
900	1 180	206	9 000 000	20 300 000	1 570 000	410	159	564	**C39/900-XL-K-M**
	1 180	206	9 000 000	20 300 000	1 570 000	410	159	579	**C39/900-XL-M**

medias ➤ *https://www.schaeffler.de/std/1E7E*

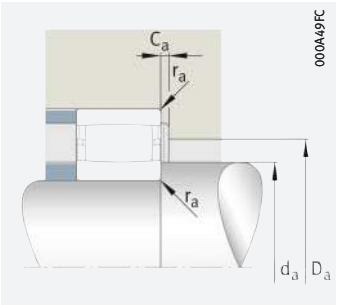
Before ordering, availability for delivery must be checked.



Full complement



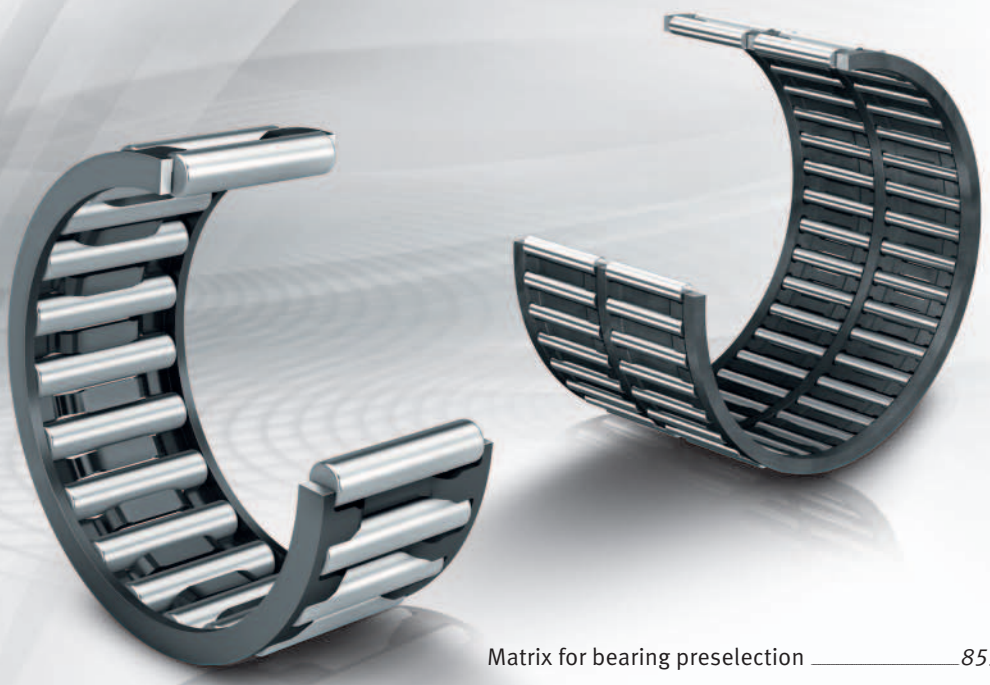
Axial displacement distance



Mounting dimensions

Dimensions						Mounting dimensions						Calculation factors	
d	r	D_1	d_2	s_1	s_2	D_a		d_a		C_a	r_a	k_φ	k_δ
	min.	≈	≈			max.	min.	max.	min.	min.	max.		
710	6	877,4	772,6	30,7	–	927	849	802	733	6,5	5	25,417	0,479
	6	877,4	772,6	30,7	–	927	849	802	733	6,5	5	25,417	0,479
	7,5	943,3	808,7	47,3	–	1 002	906	846	738	4,3	6	27,717	0,435
	7,5	943,3	808,7	47,3	–	1 002	906	846	738	4,3	6	27,717	0,435
	7,5	931,2	806,8	31,5	–	1 002	899	841	738	1,3	6	34,772	0,321
	7,5	931,2	806,8	31,5	–	1 002	899	841	738	1,3	6	34,772	0,321
	9,5	1 005,3	843,3	47,8	–	1 100	976	839	750	8,7	8	35,044	0,324
	9,5	1 005,3	843,3	47,8	–	1 100	976	839	750	8,7	8	35,044	0,324
750	6	933,5	829,5	35,7	–	977	906	869	773	3,8	5	25,91	0,479
	6	933,5	829,5	35,7	–	977	906	869	773	3,8	5	25,91	0,479
	7,5	991,7	856,3	25	–	1 062	965	852	778	6,9	6	29,669	0,404
	7,5	991,7	856,3	25	–	1 062	965	852	778	6,9	6	29,669	0,404
800	6	990,6	888,4	45,7	–	1 037	970	879	823	3,6	5	26,416	0,479
	6	990,6	888,4	45,7	–	1 037	970	879	823	3,6	5	26,416	0,479
	7,5	1 045,4	911,5	25	–	1 122	1 020	906	828	6,9	6	30,144	0,404
	7,5	1 045,4	911,5	25	–	1 122	1 020	906	828	6,9	6	30,144	0,404
850	6	1 056,9	936,1	35,9	–	1 097	1 027	981	873	4,5	5	30,626	0,398
	6	1 056,9	936,1	35,9	–	1 097	1 027	981	873	4,5	5	30,626	0,398
900	6	1 114,6	987,4	20	–	1 157	1 087	981	923	3	5	32,311	0,377
	6	1 114,6	987,4	20	–	1 157	1 087	981	923	3	5	32,311	0,377

Needle roller and cage assemblies

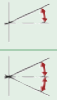


Matrix for bearing preselection

The matrix gives an overview of the types and design features of needle roller and cage assemblies.

It can be used to make a preliminary assessment of whether a bearing is fundamentally suitable for the envisaged application.

The additional information provided in the product chapter (see column "detailed information") and in the Technical principles must, however, be observed in addition to this overview in selection of the bearing.

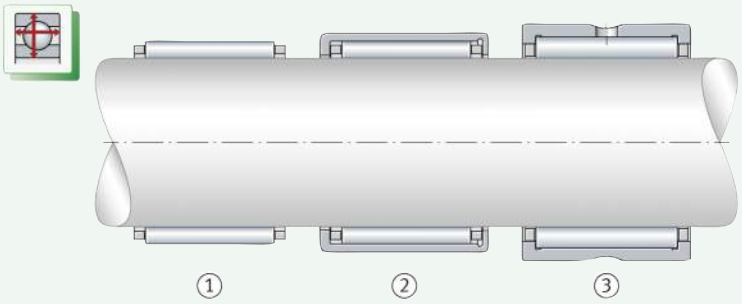
Design features and suitability			Needle roller and cage assemblies	
+++ extremely suitable ++ highly suitable + suitable (+) suitable with restrictions – not suitable/not applicable ✓ available			single or double row	detailed information ➤ 856
Load carrying capacity	radial		+++	➤ 861 | 1.2
	axial, one direction		–	➤ 861 | 1.2
	axial, both directions		–	➤ 861 | 1.2
	moments		–	➤ 861 | 1.2
Compensation of angular misalignments	static		–	➤ 861 | 1.3
	dynamic		–	➤ 861 | 1.3
Bearing design	cylindrical bore		–	➤ 856 | 1.1
	tapered bore		–	➤ 856 | 1.1
	separable		–	➤ 869 | 1.17
Lubrication	greased		–	➤ 862 | 1.4
Sealing	open		✓	➤ 862 | 1.5
	non-contact		–	➤ 862 | 1.5
	contact		–	➤ 862 | 1.5
Operating temperature in °C	from to		–30 +140[1]	➤ 863 | 1.8
Suitability for	high speeds		+++	➤ 862 | 1.6
	high running accuracy		++	➤ 864 | 1.11 ➤ 114
	low-noise running		+	➤ 862 | 1.7 ➤ 27
	high rigidity		++	➤ 54
	reduced friction		+	➤ 56
	length compensation within bearing		–	
	non-locating bearing arrangement		++	➤ 139
	locating bearing arrangement		–	➤ 139
X-life bearings		X-life	–	
Enveloping circle diameter F_w in mm	from to		3 265	➤ 872
Product tables	from page ➤		872	

[1] Data valid for needle roller and cage assemblies with sheet steel cage and with cages made from copper-zinc alloy

1 Needle roller and cage assemblies

Radial needle roller and cage assemblies:
- are suitable for applications with a very small radial design envelope, where the raceways on the shaft and in the housing are designed as rolling bearing raceways (direct bearing arrangement)
- can support high radial loads
- allow high speeds
- combine the load carrying capacity advantages of full complement needle roller bearing arrangements with the speed advantages of a cage bearing
- have a high running accuracy
- result in rigid bearing arrangements
- are easy to mount
- permit technically straightforward, economical and cost-effective designs.

For an overview of other product-specific features, see the Matrix for bearing preselection ➤*855*.



1
Radial needle roller and cage assembly – comparison of radial design envelope with drawn cup needle roller bearing with open ends and machined needle roller bearing

① *Radial needle roller and cage assembly*
② *Drawn cup needle roller bearing with open ends*
③ *Machined needle roller bearing*

1.1 Bearing designs

✎ *Design variants*

Radial needle roller and cage assemblies:
- are available in the basic design (K) ➤*857*| *2* and ➤*858*| *3*
- are available for centrifugal forces and high acceleration forces (KZK, KBK) ➤*859*| *4*
- can be customised from profiled strip (K) ➤*860*| *6*.

Needle roller and cage assemblies of basic design

Bearings with a very small radial section height

Needle roller and cage assemblies are part of the group of radial needle roller bearings. These ready-to-fit bearing arrangement elements comprise needle cages, which are fitted with needle rollers ➤857| 2 and ➤858| 1. They are rolling bearings with a very small radial section height and, apart from full complement needle roller bearing arrangements, are the simplest design of radial needle roller bearing. However, while the design envelope is completely filled with loose needle rollers in full complement needle roller bearing arrangements and, depending on the position, the rolling elements are therefore in contact with each other, these are guided in the cage pockets in needle roller and cage assemblies. The pockets, which are separated from each other by bars and are uniformly distributed around the circumference of the cage, maintain the spacing of the rolling elements relative to each other. The cage and rolling elements thus create a ready-to-fit unit.

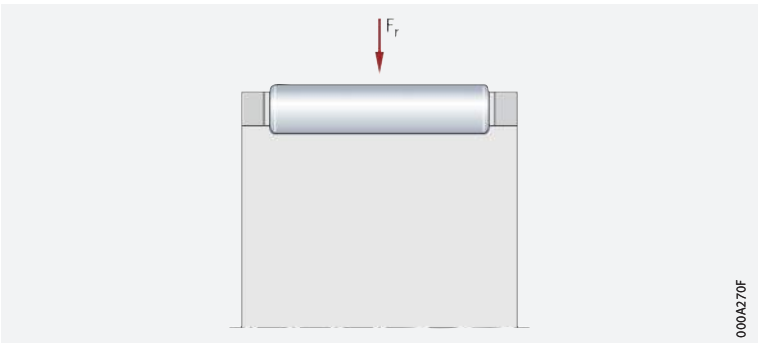
The needle rollers are guided parallel to the axis

In addition, the bars prevent sliding friction between adjacent rolling elements and guide the rolling elements parallel to the bearing axis in the load-free zone. Guidance parallel to the axis prevents skewing of the needle rollers in the load-free zone. Compared with full complement needle roller bearing arrangements, needle roller and cage assemblies are suitable for higher speeds. As a result, the cage compensates for the disadvantages of a full complement needle roller bearing arrangement.

For bearing arrangements with a particularly small radial design envelope

Standard needle roller sorts are used as needle rollers ➤858| 1. Due to the absence of an inner and outer ring, the radial section height of the bearings is only equivalent to the diameter of the needle rollers. As a result, needle roller and cage assemblies are particularly suitable for applications requiring only a very small radial design envelope. The majority of the bearings are of a single row design ➤857| 2. This variant has the prefix K.

Needle roller and cage assemblies are only functional once they have been fitted between the housing and shaft. In this case, the raceways must be designed as rolling bearing raceways ➤866| 1.16.



2
Single row needle roller and cage assembly

F_r = *radial load*

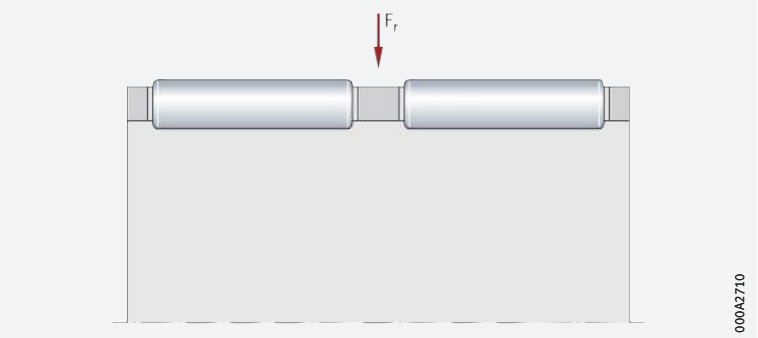
Double row needle roller and cage assemblies

Particularly high radial load carrying capacity

Double row needle roller and cage assemblies have a higher load carrying capacity than single row designs, but are correspondingly wider ➤858| 3. These bearings have the prefix K and the suffix ZW and are only available in particular enveloping circle diameters F_w ➤864| 1.12 and ➤872|.

3
Double row needle roller and cage assembly

F_r = *radial load*



Needle rollers

Standard needle roller sorts are used as needle rollers

Needle roller and cage assemblies are supplied with standard needle roller sorts of grade G2 in accordance with the table ➤*858*| ▦ *1*. In all cases, needle rollers of only one sort are used in any one needle roller and cage assembly. The sort is printed on the packaging and colour coded ➤*858*| ▦ *1*. The sorts are designated by the upper and lower deviations (in µm), the diameter tolerance is a maximum of 2 µm. In each case, two neighbouring needle roller sorts are matched as sort pairs.

1
Dimensional and geometrical accuracy of needle rollers of grade G2

Grade	Deviations and tolerances for diameter D_w [1]							Length tolerance
	Deviation	Variation of needle roller diameter within a single sort	Sort pair colour code	Sorts		Roundness	Roughness	
		V_{DwL}				t_{Dw}	Ra	
	µm	µm		µm		µm	µm	
		max.				max.	max.	
G2	0 – 7	2	red	0 –2	–1 –3	1	0,1	h13
			blue	–2 –4	–3 –5			
			white (grey)	–4 –6	–5 –7			

[1] *The tolerance values apply to the centre point of the needle roller.*

Needle roller and cage assemblies for centrifugal forces and high acceleration forces (KZK, KBK)

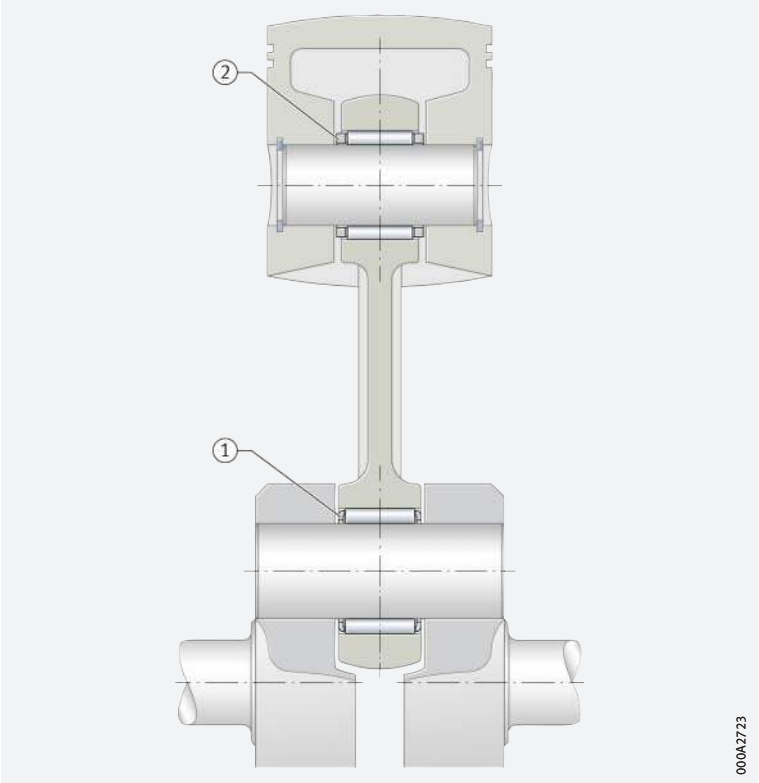
Needle roller and cage assemblies for connecting rod bearing arrangements

Designed for piston pin and crank pin bearing arrangements

Needle roller and cage assemblies for connecting rod bearing arrangements are used in the crank mechanisms of 2 and 4 stroke combustion engines as well as in compressors, for supporting crank pins and piston pins ➤*859*| ⧉ *4*. These cages support high centrifugal and acceleration forces and are suitable for high speeds.

For piston pin bearing arrangements, only needle roller and cage assemblies with the designation KZK and KBK may be used ➤ 🕮 *TPI 94*. As catalogue needle roller and cage assemblies of type K are not designed to accommodate loads generated by centrifugal forces and high acceleration forces, non-compliance may result in failures.

The needle roller and cage assemblies for piston pin and crank pin bearing arrangements are described in detail in Technical Product Information TPI 94. This publication can be requested from Schaeffler.



4
Crank pin and piston pin bearing arrangement

① *Needle roller and cage assembly for crank pins, externally guided*
② *Needle roller and cage assembly for piston pins, internally guided*

Needle roller and cage assemblies for crank pins (KZK)

Needle roller and cage assemblies for crank pins (series KZK) are externally guided, which means that the connecting rod bore guides the cage radially with little clearance ➤*859*|4. The radial movement of the cage in relation to the connecting rod bore and the rolling elements is as small as possible. The cages are made from quenched and tempered steel, have good wear resistance, high strength and large guidance surfaces which are designed for optimum lubrication.

Needle roller and cage assemblies for piston pins (KBK)

The needle roller and cage assemblies for piston pins (series KBK) are internally guided, which means that the piston pin guides the cage radially with little clearance ➤*859*|4. Due to the small radial internal clearance, tilting of the connecting rod is reduced to a minimum. The bearings support high-frequency oscillating loads and are available for the majority of piston pin diameters in various widths, in accordance with the spacing between the piston centres. The low-wear steel cages are case hardened or quenched and tempered and have high strength.

Needle roller and cage assemblies for planetary gear bearing arrangements (KZK)

Needle roller and cage assemblies for planetary gear bearing arrangements

Needle roller and cage assemblies are also used for applications in planetary gear bearing arrangements, such as automatic gearboxes ➤*860*|5. As very high speeds, as well as centrifugal and acceleration forces, can occur in planetary gear bearing arrangements and the cage is therefore subject to high demands, the responsible Application Engineering and Design functions should select or design a suitable needle roller and cage assembly. In such cases, please consult Schaeffler.

5
Planetary gear bearing arrangement

Needle roller and cage assemblies customised from profiled strip (K)

Customised radial needle roller and cage assemblies for specific requirements

These radial needle roller and cage assemblies are produced by bending flat cages BF and fitted with needle rollers after forming ➤*860*| *6*. As a result, it is possible to achieve simple designs of clearance-free bearing arrangements with high running accuracy, load carrying capacity and speed suitability, in combination with very small radial and axial section height. Due to their high radial runout accuracy, the bearings are also suitable for precision applications. Since the needle roller and cage assemblies are not tied to defined dimension series but can be precisely produced to a wide range of diameter values in accordance with the specific application (shaft diameter of 105 mm to 1000 mm), they are an economical alternative to catalogue standard bearings. They are normally supplied bent into their final shape but can also be formed by the customer from BF flat cages. After forming, there is an open joint ➤*860*| *6*. As a result, radial needle roller and cage assemblies can be easily mounted in recessed raceways. The function of the cages is not impaired by the opening.

BF flat cages and radial needle roller and cage assemblies produced from BF flat cages are described in detail in Technical Product Information TPI 203. This publication can be requested from Schaeffler.

6
Radial needle roller and cage assembly produced by bending from a flat cage BF

① *Open joint*

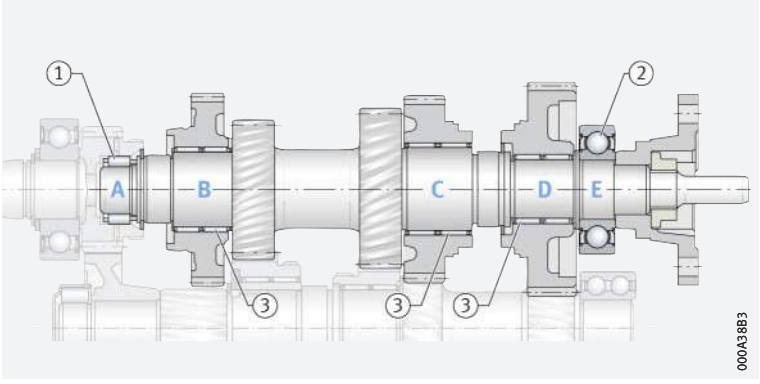
1.2 Load carrying capacity

Capable of supporting high radial loads, but not axial loads

Due to the line contact of the needle rollers, needle roller and cage assemblies are suitable for supporting high radial loads. In contrast to the ball, the needle has a larger contact area perpendicular to its axis. As a result, it can transmit higher forces, has greater rigidity and can support the same loads with smaller rolling element diameters. Due to the needle roller set, double row bearings have a particularly high radial load carrying capacity. They are used when the load carrying capacity of single row bearings is no longer sufficient.

Needle roller and cage assemblies cannot support axial forces ➤*865*|*1.14*. For axial loads, they can be combined with a bearing which is capable of supporting axial load, such as a deep groove ball bearing or a cylindrical roller bearing with axial load carrying capacity. In such cases, the axial bearing is arranged adjacent to the needle roller and cage assembly ➤*861*|⧉ *7*.

⧉ **7**
Passenger car gearbox: bearing arrangement of main shaft



A – E = *bearing positions*

① *Cylindrical roller bearing and cage assembly as pilot bearing (non-locating bearing)*

② *Deep groove ball bearing (locating bearing, capable of supporting axial loads)*

③ *Needle roller and cage assemblies (non-locating bearing, capable of supporting radial loads only)*

1.3 Compensation of angular misalignments

The bearings are not suitable for the compensation of shaft misalignments relative to the housing bore

Needle roller and cage assemblies are not suitable for the compensation of angular misalignments. The extent to which a misalignment of the shaft can be tolerated relative to the housing bore is dependent on factors such as the design of the bearing arrangement, the size of the bearing, the operating clearance and the load. As a result, no guide value can be specified here for a possible misalignment.

In all cases, misalignments cause increased running noise, place increased strain on the cages and have a harmful influence on the operating life of the bearings.

1.4 Lubrication

Oil or grease lubrication is possible

Needle roller and cage assemblies are not greased. In order to prevent direct metallic contact between rolling elements, raceways and cages, they must be lubricated. Oil or grease lubrication is suitable.
The lubricant reduces the wear and also protects the surfaces against corrosion. The choice of lubricant is essentially dependent on the operating temperatures and speeds, but is also influenced by other factors.

The use of oil lubrication is preferred

For most applications involving needle roller and cage assemblies, oil should be used in preference as the lubricant.

Compatibility with plastic cages

When using bearings with plastic cages, compatibility between the lubricant and the cage material must be ensured if synthetic oils, lubricating greases with a synthetic oil base or lubricants containing a high proportion of EP additives are used.

Observe oil change intervals

Aged oil and additives in the oil can impair the operating life of plastics at high temperatures. As a result, stipulated oil change intervals must be strictly observed.

If there is any uncertainty regarding the suitability of the selected lubricant for the application, please consult Schaeffler or the lubricant manufacturer.

1.5 Sealing

The bearings are of an open design

Needle roller and cage assemblies are supplied without seals. As a result, sealing of the bearing position must be carried out in the adjacent construction. This must reliably prevent:

- moisture and contaminants from entering the bearing
- the egress of lubricant from the bearing position.

1.6 Speeds

Limiting speeds and reference speeds in the product tables

The product tables give two speeds for the bearings ➤*872*:

- the kinematic limiting speed n_G
- the thermal speed rating $n_{\vartheta r}$.

The limiting speed n_G is the kinematically permissible speed of a bearing. Even under favourable mounting and operating conditions, this value should not be exceeded without prior consultation with Schaeffler ➤*64*.
The values in the product tables are valid for oil lubrication.

Values for grease lubrication

For grease lubrication, 60% of the value stated in the product tables is permissible in each case.

Reference speeds

$n_{\vartheta r}$ is used to calculate n_ϑ

The thermal speed rating $n_{\vartheta r}$ is not an application-oriented speed limit, but is a calculated ancillary value for determining the thermally safe operating speed n_ϑ ➤*64*.

1.7 Noise

Schaeffler Noise Index

The Schaeffler Noise Index (SGI) is not yet available for this bearing type ➤*69*. The data for these bearing series will be introduced and updated in stages.

Further information:

- ***medias*** ➤ *https://medias.schaeffler.com*.

1.8 Temperature range

✎ *Limiting values*

The operating temperature of the bearings is limited by:

- the dimensional stability of the rolling elements
- the cage
- the lubricant.

Possible operating temperatures of needle roller and cage assemblies ➤*863*| ▦ *2*.

▦ **2**
Permissible temperature ranges

Operating temperature	Needle roller and cage assemblies	
	with plastic cage	with sheet steel cage and with cages made from copper-zinc alloy
	–20 °C to +120 °C	–30 °C to +140 °C

In the event of anticipated temperatures which lie outside the stated values, please contact Schaeffler.

1.9 Cages

✎ *The standard cages are made from sheet steel*

The standard cages are made from sheet steel and, with an enveloping circle diameter $F_w \geqq 195$ mm, from a copper-zinc alloy. Bearings with a plastic cage are only available in particular sizes and have the suffix TV ➤*864*| ▦ *3* and ➤*872*| ▦. Other cages are available by agreement. With such cages, however, suitability for high speeds and temperatures as well as the basic load ratings may differ from the values for the bearings with standard cages.

For high continuous temperatures and applications with difficult operating conditions, bearings with sheet steel cages should be used. If there is any uncertainty regarding cage suitability, please consult Schaeffler.

1.10 Internal clearance

Radial internal clearance

✎ *Influencing factors on the radial internal clearance*

The radial internal clearance can be influenced by the needle roller sort as well as by the shaft and housing tolerances. When standard needle roller sorts are used, a radial internal clearance of C2 to CN is achieved (radial internal clearance for needle and cylindrical roller bearings to DIN 620-4), if the shaft and housing tolerances are observed ➤*866*| ▦ *4* and normal operating conditions are present. If the actual dimensions have a plus tolerance, a radial internal clearance of 0 can be achieved.

Checking the enveloping circle diameter

✎ *F_w can only be checked in a mounted condition*

The outer and inner enveloping circle diameters E_w and F_w cannot be measured in an unmounted condition. As a result, the function of the bearings is checked using plug gauges and locating rings in accordance with the methods indicated in DIN 620-1/ISO 1132-2. In order to carry out the check, the needle roller and cage assemblies are placed in a locating ring, which corresponds to the specific nominal dimension E_w of the needle roller and cage assembly. The function of the needle roller and cage assembly is ensured if the plug gauge, which corresponds to the nominal dimension F_w, can be inserted and rotated without jamming.

1.11 Dimensions, tolerances

Dimension standards

The main dimensions of single row needler roller and cage assemblies correspond to DIN 5405-1:2016 and ISO 3030:2011, where standardised.

Tolerances

✎ *Needle rollers*

The needle rollers correspond to DIN 5402-3:2012 and ISO 3096:1996. The diameters of all needle rollers in a needle roller and cage assembly lie within the tolerance of 2 µm ➤*863*|▦ *2*.

✎ *Width B_c*

The deviations for cage width B_c are as follows for all needle roller and cage assemblies: B_c –0,2/–0,8 ➤*872*|▦.

1.12 Suffixes

For a description of the suffixes used in this chapter ➤*864*|▦ *3* and ***medias*** interchange ➤ *https://www.schaeffler.de/std/1D52*.

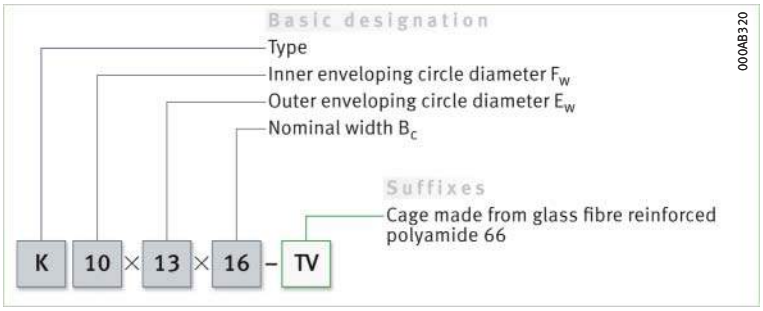
▦ *3*
Suffixes and corresponding descriptions

Suffix	Description of suffix	
TV	Cage made from glass fibre reinforced polyamide PA66	Standard
ZW	Double row design (only available in certain enveloping circle diameters)	

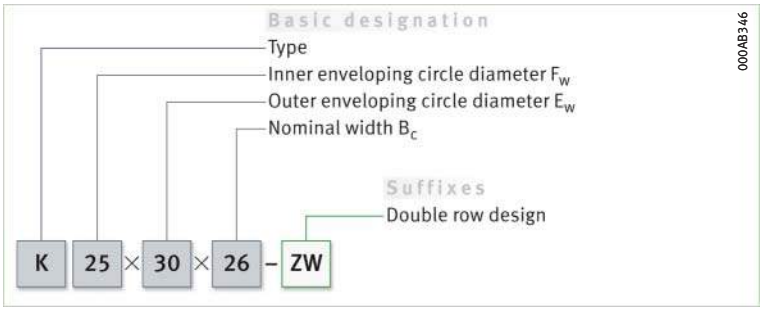
1.13 Structure of bearing designation

The designation of bearings follows a set model. Examples ➤*864*|🗀 *8* and ➤*864*|🗀 *9*. The composition of designations is subject to DIN 623-1 ➤*102*|🗀 *10*.

🗀 *8*
Single row needle roller and cage assembly: designation structure



🗀 *9*
Double row needle roller and cage assembly: designation structure



1.14 Dimensioning

Equivalent dynamic bearing load

✎ *$P = F_r$ under purely radial load of constant magnitude and direction*

The basic rating life equation $L = (C_r/P)^p$ used in the dimensioning of bearings under dynamic load assumes a load of constant magnitude and direction. In radial bearings, this is a purely radial load F_r. If this condition is met, the bearing load F_r is used in the rating life equation for P ($P = F_r$).

Needle roller and cage assemblies can only support radial loads. Thus, for these bearings ➤*865*| *1*.

1
Equivalent dynamic load

$$P = F_r$$

Legend

P	N	Equivalent dynamic bearing load
F_r	N	Radial load.

Equivalent static bearing load

For needle roller and cage assemblies subjected to static load ➤*865*| *2*.

2
Equivalent static load

$$P_0 = F_{0r}$$

Legend

P_0	N	Equivalent static bearing load
F_{0r}	N	Largest radial load present (maximum load).

Static load safety factor

✎ *$S_0 = C_0/P_0$*

In addition to the basic rating life L (L_{10h}), it is also always necessary to check the static load safety factor S_0 ➤*865*| *3*.

3
Static load safety factor

$$S_0 = \frac{C_0}{P_0}$$

Legend

S_0	–	Static load safety factor
C_0	N	Basic static load rating
P_0	N	Equivalent static bearing load.

1.15 Minimum load

✎ *In order to prevent damage due to slippage, a minimum radial load of $P > C_{0r}/60$ is required*

In order that no slippage occurs between the contact partners, the needle roller and cage assemblies must be constantly subjected to a sufficiently high load. Based on experience, a minimum radial load of the order of $P > C_{0r}/60$ is thus necessary. In most cases, however, the radial load is already higher than the requisite minimum load due to the weight of the supported parts and the external forces.

If the minimum radial load is lower than indicated above, please consult Schaeffler.

1.16 Design of bearing arrangements

The shaft and housing design and the lateral restriction (axial location) of the bearing position is crucial to the correct function of needle roller and cage assemblies ➤866| 4, ➤867| 10 and ➤867| 11.

Raceways for bearings without bearing rings (direct bearing arrangement)

Produce the raceway as a rolling bearing raceway

If the needle roller and cage assemblies run directly on the shaft and/or in the housing bore (so-called direct bearing arrangement), then the raceway for the rolling elements on the shaft and in the housing must be produced as a rolling bearing raceway (hardened and ground). Design of raceways ➤866| 4. The surface hardness of the raceways must be 670 HV to 840 HV, the hardening depth CHD or SHD must be sufficiently large. The values in the table refer to commonly encountered application examples. If the shaft cannot be produced as a raceway, the needle roller and cage assemblies can be combined with Schaeffler bearing rings. However, the section height of the bearings will then be increased by the thickness of the rings.

4 *Tolerance classes and surface design of raceways for needle roller and cage assemblies (direct bearing arrangement)*

Shaft diameter		Bore tolerance[1]	Shaft tolerance[1]			Design of raceway		
						Recommended mean roughness value	Roundness tolerance	Parallelism tolerance
Nominal dimension			Operating clearance			Ramax (Rzmax)		
mm								
over	incl.		small	normal	large	µm	max.	max.
–	80	G6	j5	h5	g6	0,2 (1)	IT3	IT3
		H6	h5	g5	f6			
80	120	G6	h5	g5	f6	0,3 (1,6)		
120	–	G6	h5	g5	f6	0,4 (2,5)		
		H6	–	f5	e6			

[1] *The envelope requirement Ⓔ applies.*

Raceway width for direct bearing arrangement and axial running surfaces

Mounting dimensions for needle roller and cage assemblies and surface quality of the running surfaces

The raceway width must be at least equal to the nominal width B_c (B_c is produced with a (–) tolerance); values for B_c ➤872| and ➤867| 10. The spacing between the axial running surfaces of the cage must be sufficiently large. The spacing dimension for running surfaces is given as B_c H12 Ⓔ, in order to avoid jamming of the needle roller and cage assemblies (H12 in accordance with ISO 286-2).
The lateral running surfaces for the needle roller and cage assemblies must be designed as precision machined (Ramax 2 recommended) and wear-resistant ➤867| 10. Interruptions in the running surfaces should be avoided.

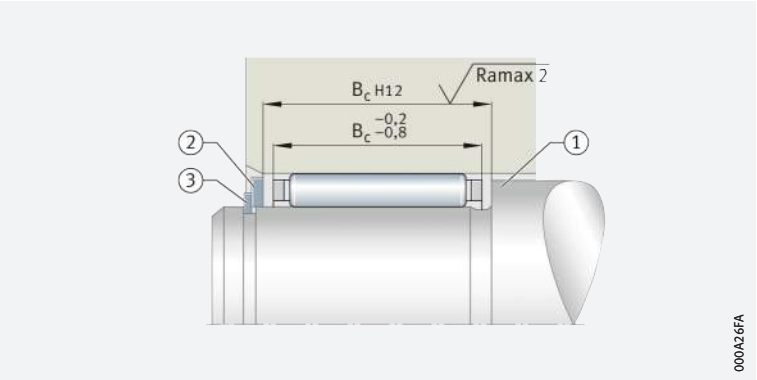
Example

For a design envelope of B_c = 10 mm, a needle roller and cage assembly with the nominal width B_c = 10 mm is suitable, as the maximum cage width is 9,8 (0/–0,6) mm.

10
Raceway width and axial running surfaces for needle roller and cage assemblies

B_c H12 = *nominal width*
B_c –0,2/–0,8 = *cage width*
Ramax = *maximum roughness of running surfaces*

① *Location by means of shaft shoulder, axial washer and snap ring*
② *Axial washer*
③ *Snap ring*

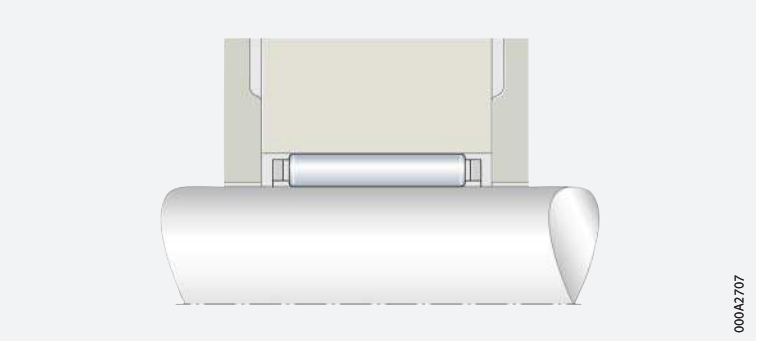


Guidance can be provided by the shaft or on the housing

Axial guidance and location of needle roller and cage assemblies

Needle roller and cage assemblies must be axially guided and located. Guidance can be provided by the shaft or on the housing ➤*867*| *10* and ➤*867*| *11*. Snap rings or an appropriately designed adjacent construction are suitable for this purpose. If location is by means of snap rings or retaining rings, a washer must be arranged in front of the rings ➤*867*| *10*. The overlap between the ring and washer must be sufficiently large.

11
Axial location by means of housing parts (lateral guidance on housing)



Steels for the raceway (direct bearing arrangement)

Through hardening steels

Through hardening steels in accordance with ISO 683-17 (e.g. 100Cr6) are suitable as materials for rolling bearing raceways in direct bearing arrangements. These steels can also be surface layer hardened.

Case hardening steels

Case hardening steels must correspond to DIN EN ISO 683-17 (e.g. 17MnCr5, 18CrNiMo7-6) or EN 10084 (e.g. 16MnCr5).

Steels for inductive surface layer hardening

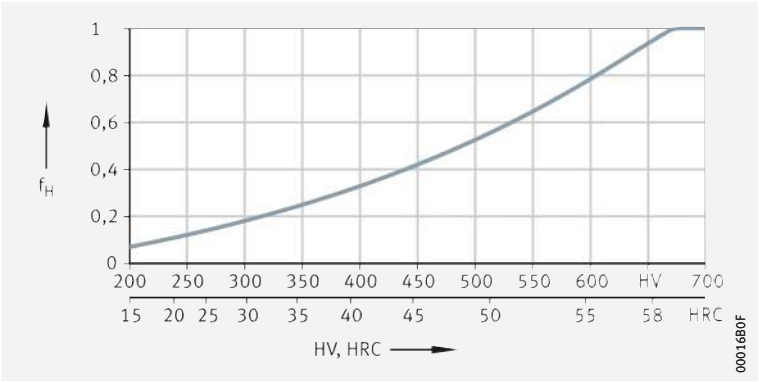
For flame and induction hardening, steels in accordance with DIN EN ISO 683-17 (e.g. C56E2, 43CrMo4) or DIN 17212 (e.g. Cf53) should be used.

Raceway hardness of less than 670 HV

If the raceway fulfils the requirements for rolling bearing materials but the raceway hardness is less than 670 HV, the load on the bearing arrangement cannot be as high as the full load carrying capacity of the bearing. In order to determine the dynamic and static load carrying capacity of the bearing arrangement, the basic dynamic load rating C of the bearings must be multiplied by the reduction factor f_H (dynamic hardness factor) and the basic static load rating C_{0r} by the reduction factor f_{H0} (static hardness factor) ➤868| 12 and ➤868| 13.

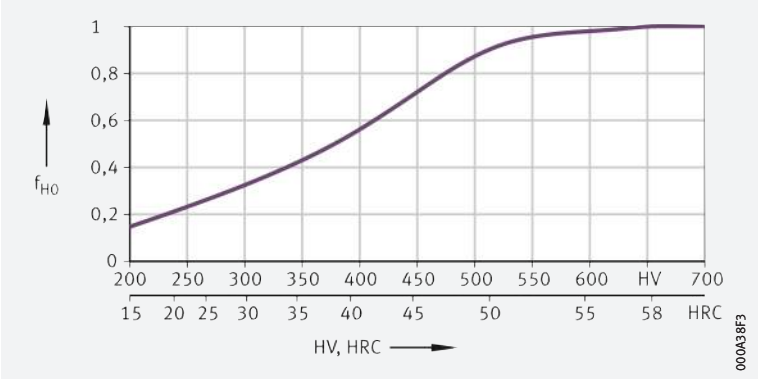
12
Dynamic hardness factor at reduced hardness of raceways/rolling elements

f_H = *dynamic hardness factor*
HV, HRC = *surface hardness*



13
Static hardness factor at reduced hardness of raceways/rolling elements

f_{H0} = *static hardness factor*
HV, HRC = *surface hardness*



Determining the case hardening depth

✎Approximation value for case hardening depth

An approximation value for determining the minimum hardness depth is given in ➤868| 4. The reference value for the load present is the equivalent stress in accordance with the distortion energy hypothesis (DEH) as a function of the rolling element diameter D_w and the magnitude of the load.

4
Case hardening depth

$$CHD \geqq 0{,}052 \cdot D_w$$

Legend

CHD	mm	Case hardening depth
D_w	mm	Rolling element diameter.

The local hardness must always be above the local requisite hardness, which can be calculated from the equivalent stress.

Determining the surface hardening depth

In these surface hardening methods, the load and contact geometry must be taken into consideration when determining the requisite hardening depth.

For calculation of the surface hardening depth SHD ➤*869*| *f 5*.

f 5
Surface hardening depth

$$SHD \geqq 140 \cdot D_w / R_{p0,2}$$

Legend

SHD	mm	Surface hardening depth
D_w	mm	Rolling element diameter
$R_{p0,2}$	N/mm²	Yield point of base material.

Paired arrangement of needle roller and cage assemblies

✎ The needle rollers must correspond to the same tolerance sort

If two needle roller and cage assemblies are arranged immediately adjacent to each other, it must be ensured that the bearings are loaded uniformly. In this case, the needle rollers used in these needle roller and cage assemblies must belong to the same diameter sort (tolerance sort). The dimensions of the needle rollers fitted in the bearings must be indicated on the specific bearing packaging.

1.17 Mounting and dismounting

✎ Ensure that the bearings are not damaged during mounting

Needle roller and cage assemblies are either slid onto the shaft and then inserted in the housing or are mounted in the housing and the shaft is then inserted. Mounting is carried out without load and using a screwdriver type motion.

Schaeffler Mounting Handbook

✎ Rolling bearings must be handled with great care

Rolling bearings are well-proven precision machine elements for the design of economical and reliable bearing arrangements, which offer high operational security. In order that these products can function correctly and achieve the envisaged operating life without detrimental effect, they must be handled with care.

The Schaeffler Mounting Handbook MH 1 gives comprehensive information about the correct storage, mounting, dismounting and maintenance of rotary rolling bearings ➤*https://www.schaeffler.de/std/1D53*. It also provides information which should be observed by the designer, in relation to the mounting, dismounting and maintenance of bearings, in the original design of the bearing position. This book is available from Schaeffler on request.

1.18 Legal notice regarding data freshness

✎ The further development of products may also result in technical changes to catalogue products

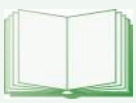
Of central interest to Schaeffler is the further development and optimisation of its products and the satisfaction of its customers. In order that you, as the customer, can keep yourself optimally informed about the progress that is being made here and with regard to the current technical status of the products, we publish any product changes which differ from the printed version in our electronic product catalogue.

§ We therefore reserve the right to make changes to the data and illustrations in this catalogue. This catalogue reflects the status at the time of printing. More recent publications released by us (as printed or digital media) will automatically precede this catalogue if they involve the same subject. Therefore, please always use our electronic product catalogue to check whether more up-to-date information or modification notices exist for your desired product.

Link to electronic product catalogue

The following link will take you to the Schaeffler electronic product catalogue: ➤ *https://medias.schaeffler.com*.

1.19 Further information

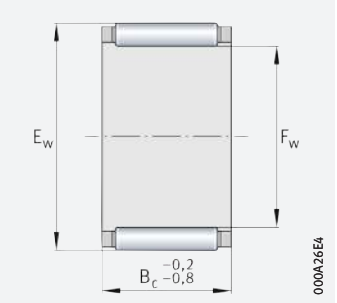


In addition to the data in this chapter, the following chapters in Technical principles must also be observed in the design of bearing arrangements:

- Determining the bearing size ➤*34*
- Rigidity ➤*54*
- Friction and increases in temperature ➤*56*
- Speeds ➤*64*
- Bearing data ➤*97*
- Lubrication ➤*70*
- Sealing ➤*182*
- Design of bearing arrangements ➤*139*
- Mounting and dismounting ➤*191*.

Needle roller and cage assemblies

Single row



Single row

F_w = 3 – 19 mm

Main dimensions			Basic load ratings		Fatigue limit load	Limiting speed	Speed rating	Mass	Designation
F_w	E_w	B_c	dyn. C_r	stat. C_{0r}	C_{ur}	n_G	$n_{\vartheta r}$	m	➤*864*|*1.12* ➤*864*|*1.13*
			N	N	N	min^{-1}	min^{-1}	≈ g	
3	5	7	1 540	1 290	152	50 000	78 000	0,3	**K3×5×7-TV**
	5	9	1 710	1 480	188	50 000	80 000	0,4	**K3×5×9-TV**
	6	7	1 430	970	109	47 000	75 000	0,4	**K3×6×7-TV**
4	7	10	2 330	1 840	236	42 500	59 000	0,7	**K4×7×10-TV**
	7	7	1 740	1 270	145	42 500	59 000	0,5	**K4×7×7-TV**
5	8	10	3 000	2 650	350	39 000	47 000	0,9	**K5×8×10-TV**
	8	8	2 350	1 920	237	39 000	48 000	0,7	**K5×8×8-TV**
6	10	13	3 800	3 100	395	35 500	40 000	1,9	**K6×10×13-TV**
	9	10	3 350	3 150	420	36 500	40 000	1,1	**K6×9×10-TV**
	9	8	2 600	2 280	285	36 500	41 000	0,8	**K6×9×8-TV**
7	10	10	3 650	3 600	485	34 500	35 000	1	**K7×10×10-TV**
	10	8	2 850	2 650	330	34 500	36 000	0,9	**K7×10×8-TV**
	9	7	1 680	1 700	203	35 500	40 500	0,6	**K7×9×7-TV**
8	11	10	3 950	4 100	560	32 500	31 000	1,2	**K8×11×10-TV**
	11	13	5 100	5 800	790	32 500	30 500	1,7	**K8×11×13-TV**
	11	8	3 100	3 000	375	32 500	32 000	1	**K8×11×8-TV**
	12	10	5 000	4 700	560	31 500	29 000	2	**K8×12×10-TV**
9	12	10	4 500	5 000	680	31 000	27 500	1,5	**K9×12×10-TV**
	12	13	5 900	7 100	970	31 000	27 000	2,1	**K9×12×13-TV**
10	13	10	4 750	5 500	750	29 500	24 900	1,6	**K10×13×10-TV**
	13	13	6 200	7 800	1 060	29 500	24 400	2,3	**K10×13×13-TV**
	13	16	7 100	9 300	1 310	29 500	24 600	2,9	**K10×13×16-TV**
	14	10	5 800	6 000	720	29 000	23 500	2,5	**K10×14×10-TV**
	14	13	7 500	8 400	1 020	29 000	23 000	4,6	**K10×14×13-TV**
	16	12	8 100	7 200	1 000	27 500	21 800	5,5	**K10×16×12-TV**
12	15	10	4 900	6 100	830	27 000	21 500	2,9	**K12×15×10-TV**
	15	13	6 400	8 500	1 170	27 000	21 100	2,3	**K12×15×13-TV**
	16	13	8 000	9 400	1 150	26 500	19 900	3,6	**K12×16×13-TV**
	17	13	9 600	10 400	1 330	26 500	18 800	4,9	**K12×17×13-TV**
	18	12	10 000	9 900	1 400	26 000	18 100	6	**K12×18×12-TV**

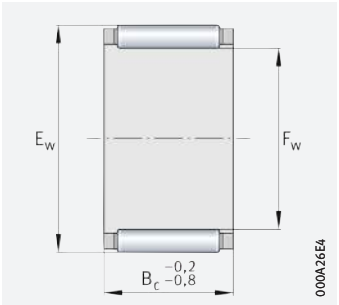
medias ➤ *https://www.schaeffler.de/std/1DF2*

Main dimensions			Basic load ratings		Fatigue limit load	Limiting speed	Speed rating	Mass	Designation
F_w	E_w	B_c	dyn. C_r	stat. C_{0r}	C_{ur}	n_G	$n_{\vartheta r}$	m	➤*864*|*1.12* ➤*864*|*1.13*
			N	N	N	min^{-1}	min^{-1}	≈ g	
14	18	10	7 100	8 500	1 060	25 000	17 300	4	**K14×18×10**
	18	13	8 200	10 100	1 320	25 000	17 700	6,5	**K14×18×13**
	18	15	9 500	12 300	1 540	25 000	17 400	5	**K14×18×15-TV**
	18	17	10 800	14 400	1 890	25 000	17 300	8	**K14×18×17**
	20	12	10 300	10 600	1 490	24 300	16 200	8,5	**K14×20×12**
15	18	17	8 000	12 100	1 730	24 600	17 700	4,6	**K15×18×17-TV**
	19	10	7 500	9 200	1 140	24 300	16 200	5	**K15×19×10**
	19	13	8 500	10 900	1 420	24 300	16 600	7	**K15×19×13**
	19	17	11 300	15 600	2 040	24 300	16 200	9,5	**K15×19×17**
	20	13	9 900	11 500	1 430	23 900	15 900	7	**K15×20×13**
	21	15	14 300	16 400	2 210	23 600	14 700	11	**K15×21×15**
	21	21	19 400	24 300	3 300	23 600	14 400	17	**K15×21×21**
16	20	10	7 800	9 900	1 230	23 600	15 200	5,5	**K16×20×10**
	20	13	8 900	11 800	1 530	23 600	15 600	7,5	**K16×20×13**
	20	17	11 700	16 800	2 190	23 600	15 200	10	**K16×20×17**
	22	12	11 500	12 500	1 780	22 900	14 300	10	**K16×22×12**
	22	16	14 800	17 500	2 390	22 900	14 100	12	**K16×22×16**
	22	20	18 300	22 800	3 050	22 900	14 000	17	**K16×22×20**
	24	20	21 400	23 500	2 950	22 400	13 200	22	**K16×24×20**
17	21	10	8 100	10 600	1 310	22 900	14 400	5,5	**K17×21×10**
	21	13	10 400	14 600	1 810	22 900	14 100	6,5	**K17×21×13**
	21	17	12 200	17 900	2 350	22 900	14 400	9,5	**K17×21×17**
18	22	10	8 400	11 300	1 400	22 400	13 600	6	**K18×22×10**
	22	13	9 200	12 700	1 650	22 400	14 200	8	**K18×22×13**
	22	17	12 100	18 000	2 360	22 400	13 900	11	**K18×22×17**
	24	12	12 800	14 900	2 120	21 800	12 700	12	**K18×24×12**
	24	13	13 100	15 300	1 990	21 800	12 900	13	**K18×24×13**
	24	20	20 200	27 000	3 550	21 800	12 400	18	**K18×24×20**
	25	22	23 100	29 000	3 750	21 600	12 200	23	**K18×25×22**
19	23	13	9 500	13 500	1 750	21 800	13 500	8	**K19×23×13**
	23	17	12 500	19 200	2 500	21 800	13 200	11	**K19×23×17**

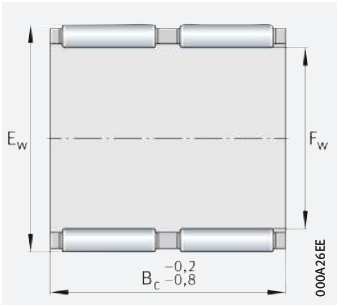
medias ➤ *https://www.schaeffler.de/std/1DF3*

Needle roller and cage assemblies

Single row
Double row



Single row



Double row (K..-ZW)

F_w = 20 – 30 mm

Main dimensions			Basic load ratings		Fatigue limit load	Limiting speed	Speed rating	Mass	Designation
F_w	E_w	B_c	dyn. C_r	stat. C_{0r}	C_{ur}	n_G	$n_{\vartheta r}$	m	➤*864|1.12* ➤*864|1.13*
			N	N	N	min^{-1}	min^{-1}	≈ g	
20	24	10	8 900	12 600	1 570	21 300	12 400	6,5	**K20×24×10**
	24	13	9 800	14 300	1 860	21 300	12 800	9	**K20×24×13**
	24	17	12 900	20 400	2 650	21 300	12 500	12	**K20×24×17**
	26	12	13 400	16 200	2 310	20 900	11 700	11	**K20×26×12**
	26	13	14 400	17 900	2 330	20 900	11 600	12	**K20×26×13**
	26	17	19 200	26 000	3 300	20 900	11 200	16	**K20×26×17**
	26	20	21 100	29 000	3 900	20 900	11 400	19	**K20×26×20**
	28	16	19 800	22 400	3 000	20 400	11 100	20	**K20×28×16**
	28	20	23 900	28 500	3 600	20 400	11 100	27	**K20×28×20**
	28	25	30 500	39 000	5 300	20 400	10 800	32	**K20×28×25**
	30	30	35 500	41 500	5 500	19 600	10 800	49	**K20×30×30**
21	25	13	10 100	15 100	1 970	20 900	12 300	9	**K21×25×13**
22	26	10	9 100	13 400	1 670	20 400	11 500	7,5	**K22×26×10**
	26	13	10 400	15 900	2 080	20 400	11 800	9,5	**K22×26×13**
	26	17	13 700	22 700	3 000	20 400	11 500	12	**K22×26×17**
	28	17	19 400	27 000	3 450	19 600	10 500	18	**K22×28×17**
	29	16	20 000	25 500	3 350	19 200	10 300	16	**K22×29×16**
	30	15	20 100	23 400	3 050	18 800	10 200	18	**K22×30×15-TV**
	32	24	34 000	40 000	4 900	18 100	9 700	43	**K22×32×24**
23	35	16	24 500	23 900	2 950	16 900	9 500	29	**K23×35×16-TV**
24	28	10	9 600	14 800	1 840	18 800	10 600	8,5	**K24×28×10**
	28	13	11 000	17 600	2 290	18 800	10 800	10	**K24×28×13**
	28	17	14 500	25 000	3 300	18 800	10 600	13	**K24×28×17**
	30	17	19 500	27 500	3 500	18 100	10 000	19	**K24×30×17**
	30	31	27 500	43 500	5 800	18 100	10 400	32	**K24×30×31-ZW**

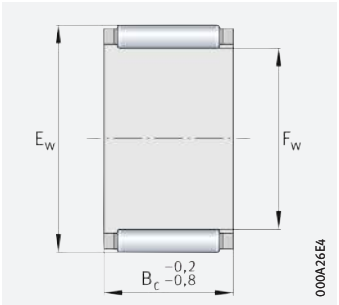
medias ➤ *https://www.schaeffler.de/std/1DF4*

Main dimensions			Basic load ratings		Fatigue limit load	Limiting speed	Speed rating	Mass	Designation
F_w	E_w	B_c	dyn. C_r	stat. C_{0r}	C_{ur}	n_G	$n_{\vartheta r}$	m	➤*864*|*1.12* ➤*864*|*1.13*
			N	N	N	min^{-1}	min^{-1}	≈ g	
25	29	10	9 900	15 400	1 930	18 100	10 200	8,5	**K25×29×10**
	29	13	11 300	18 400	2 400	18 100	10 400	11	**K25×29×13**
	29	17	14 900	26 000	3 450	18 100	10 200	14	**K25×29×17**
	30	13	14 600	21 800	2 800	17 800	9 800	12	**K25×30×13**
	30	17	18 700	30 000	3 850	17 800	9 600	16	**K25×30×17**
	30	20	21 700	36 500	4 850	17 800	9 500	18	**K25×30×20**
	30	26	21 400	35 500	4 500	17 800	10 400	19	**K25×30×26-ZW**
	31	17	19 600	28 500	3 600	17 500	9 600	19	**K25×31×17**
	31	21	24 700	38 000	5 100	17 500	9 400	20	**K25×31×21**
	32	16	20 800	27 500	3 650	17 200	9 400	21	**K25×32×16**
	33	20	28 500	38 000	4 850	16 900	9 000	33	**K25×33×20**
	33	24	34 000	47 000	6 300	16 900	8 900	39	**K25×33×24**
	35	30	47 000	62 000	8 300	16 300	8 500	65	**K25×35×30**
26	30	13	11 600	19 200	2 500	17 500	10 100	11	**K26×30×13**
	30	17	15 200	27 500	3 600	17 500	9 800	15	**K26×30×17**
	30	22	15 700	28 500	3 550	17 500	10 400	12	**K26×30×22-ZW**
28	33	13	15 300	24 200	3 100	16 100	8 900	13	**K28×33×13**
	33	17	19 700	33 500	4 250	16 100	8 700	17	**K28×33×17**
	34	17	21 800	33 500	4 300	15 800	8 600	24	**K28×34×17**
	35	16	21 500	29 500	3 950	15 600	8 700	24	**K28×35×16**
	35	18	24 000	34 000	4 700	15 600	8 600	27	**K28×35×18**
	40	25	45 500	55 000	6 600	14 400	7 700	70	**K28×40×25**
30	34	13	12 300	21 700	2 850	15 300	8 900	14	**K30×34×13**
	35	13	15 600	25 500	3 250	15 100	8 400	14	**K30×35×13**
	35	17	19 600	34 000	4 300	15 100	8 300	19	**K30×35×17**
	35	27	30 500	59 000	8 500	15 100	8 100	30	**K30×35×27**
	37	16	23 100	33 500	4 450	14 600	8 000	27	**K30×37×16**
	37	18	26 000	38 500	5 300	14 600	8 000	30	**K30×37×18**
	40	18	32 000	40 000	5 000	14 000	7 600	48	**K30×40×18**
	40	30	49 000	69 000	9 200	14 000	7 500	73	**K30×40×30**

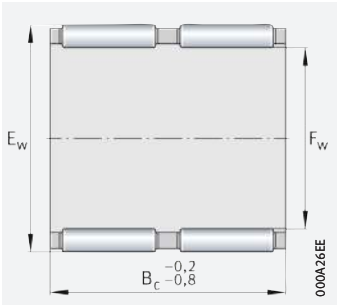
medias ➤ *https://www.schaeffler.de/std/1DF5*

Needle roller and cage assemblies

Single row
Double row



Single row



Double row (K..-ZW)

F_w = 32 – 47 mm

Main dimensions			Basic load ratings		Fatigue limit load	Limiting speed	Speed rating	Mass	Designation
F_w	E_w	B_c	dyn. C_r	stat. C_{0r}	C_{ur}	n_G	$n_{\vartheta r}$	m	➤*864|1.12* ➤*864|1.13*
			N	N	N	min^{-1}	min^{-1}	≈ g	
32	37	13	15 500	25 500	3 300	14 200	8 100	18	**K32×37×13**
	37	17	19 900	35 500	4 500	14 200	7 900	19	**K32×37×17**
	37	27	30 000	60 000	8 500	14 200	7 800	30	**K32×37×27**
	38	20	26 500	45 000	6 000	14 000	7 700	30	**K32×38×20**
	39	16	23 800	35 500	4 700	13 800	7 600	37	**K32×39×16**
	39	18	26 500	41 000	5 600	13 800	7 500	31	**K32×39×18**
	40	25	37 500	58 000	7 900	13 600	7 400	49	**K32×40×25**
	40	42	50 000	84 000	10 500	13 600	7 800	77	**K32×40×42-ZW-TV**
	46	32	66 000	84 000	11 100	12 600	6 700	119	**K32×46×32**
35	40	13	16 200	28 000	3 600	13 100	7 500	19	**K35×40×13**
	40	17	20 800	38 500	4 900	13 100	7 400	21	**K35×40×17**
	40	25	29 500	60 000	8 400	13 100	7 200	31	**K35×40×25**
	40	27	25 000	48 500	6 700	13 100	7 900	39	**K35×40×27-TV**
	42	16	24 400	37 500	5 000	12 700	7 100	34	**K35×42×16**
	42	18	27 500	43 000	6 000	12 700	7 100	34	**K35×42×18**
	42	20	30 000	49 000	6 200	12 700	7 000	37	**K35×42×20**
	42	30	39 000	68 000	9 400	12 700	7 200	67	**K35×42×30**
	45	20	37 000	50 000	6 500	12 300	6 800	56	**K35×45×20**
	45	30	53 000	79 000	10 500	12 300	6 700	80	**K35×45×30**
37	42	17	22 400	43 000	5 500	12 400	6 900	22	**K37×42×17**
38	43	17	20 500	38 500	4 850	12 100	7 000	29	**K38×43×17**
	43	27	31 500	68 000	9 600	12 100	6 800	43	**K38×43×27**
	46	20	35 500	57 000	7 200	11 700	6 300	47	**K38×46×20**
	46	32	55 000	99 000	14 200	11 700	6 200	76	**K38×46×32**
39	44	26	27 500	56 000	7 100	11 800	7 000	45	**K39×44×26-ZW**

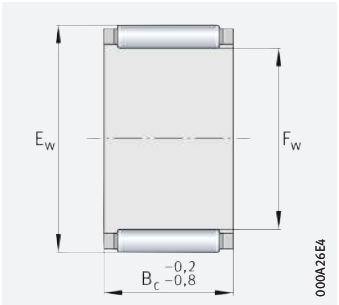
medias ➤ *https://www.schaeffler.de/std/1DF6*

Main dimensions			Basic load ratings		Fatigue limit load	Limiting speed	Speed rating	Mass	Designation
F_w	E_w	B_c	dyn. C_r	stat. C_{0r}	C_{ur}	n_G	$n_{\vartheta r}$	m	➤*864*|*1.12* ➤*864*|*1.13*
			N	N	N	min^{-1}	min^{-1}	≈ g	
40	45	13	17 600	32 500	4 200	11 500	6 600	22	**K40×45×13**
	45	17	21 400	41 500	5 200	11 500	6 700	31	**K40×45×17**
	45	27	33 000	73 000	10 300	11 500	6 500	46	**K40×45×27**
	47	18	29 500	50 000	6 900	11 300	6 300	39	**K40×47×18**
	47	20	32 500	57 000	7 200	11 300	6 200	42	**K40×47×20**
	48	20	36 000	59 000	7 500	11 100	6 100	49	**K40×48×20**
42	47	13	17 800	33 500	4 350	11 000	6 400	18	**K42×47×13**
	47	17	21 700	43 000	5 400	11 000	6 400	32	**K42×47×17**
	47	30	33 500	76 000	10 000	11 000	6 400	54	**K42×47×30-ZW**
	50	20	35 000	57 000	7 300	10 700	6 000	53	**K42×50×20**
43	48	17	21 600	43 000	5 400	10 800	6 300	30	**K43×48×17**
	48	27	33 500	75 000	10 700	10 800	6 200	50	**K43×48×27**
45	50	17	22 500	46 000	5 800	10 300	6 100	34	**K45×50×17**
	50	27	34 500	80 000	11 400	10 300	5 900	51	**K45×50×27**
	52	18	31 500	57 000	7 900	10 100	5 700	42	**K45×52×18**
	53	20	39 000	67 000	8 700	10 000	5 500	55	**K45×53×20**
	53	21	38 500	67 000	8 600	10 000	5 600	60	**K45×53×21**
	53	28	52 000	98 000	13 700	10 000	5 400	81	**K45×53×28**
	59	18	44 500	54 000	6 900	9 400	5 400	72	**K45×59×18-TV**
	59	32	73 000	103 000	13 800	9 400	5 300	148	**K45×59×32**
47	52	17	23 300	49 000	6 100	9 900	5 800	35	**K47×52×17**
	52	27	35 000	83 000	11 800	9 900	5 700	51	**K47×52×27**

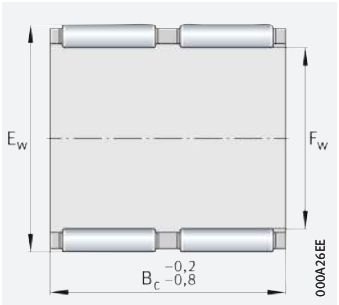
medias ➤ *https://www.schaeffler.de/std/1DF7*

Needle roller and cage assemblies

Single row
Double row



Single row



Double row (K..-ZW)

F_w = 50 – 95 mm

Main dimensions			Basic load ratings		Fatigue limit load	Limiting speed	Speed rating	Mass	Designation
F_w	E_w	B_c	dyn. C_r	stat. C_{0r}	C_{ur}	n_G	$n_{\vartheta r}$	m	➤*864|1.12* ➤*864|1.13*
			N	N	N	min^{-1}	min^{-1}	≈ g	
50	55	13,5	18 200	36 500	4 600	9 300	5 700	30	**K50×55×13,5**
	55	17	26 000	57 000	7 300	9 300	5 300	35	**K50×55×17**
	55	20	26 500	60 000	7 800	9 300	5 500	43	**K50×55×20**
	55	30	39 000	97 000	13 900	9 300	5 400	65	**K50×55×30**
	57	18	33 500	63 000	8 800	9 200	5 200	47	**K50×57×18**
	58	20	35 500	62 000	8 800	9 100	5 400	75	**K50×58×20**
	58	25	44 000	81 000	10 800	9 100	5 300	90	**K50×58×25**
52	57	12	18 000	36 500	4 600	9 000	5 400	24	**K52×57×12**
55	60	20	28 500	66 000	8 600	8 500	5 100	40	**K55×60×20**
	60	27	38 000	97 000	13 600	8 500	4 950	60	**K55×60×27**
	60	30	41 000	108 000	15 400	8 500	4 950	71	**K55×60×30**
	62	18	35 500	70 000	9 800	8 400	4 750	52	**K55×62×18**
	63	20	40 000	74 000	9 500	8 300	4 800	67	**K55×63×20**
	63	25	50 000	100 000	13 700	8 300	4 700	80	**K55×63×25**
	63	32	62 000	130 000	18 600	8 300	4 650	102	**K55×63×32**
58	65	18	35 000	70 000	9 800	8 000	4 650	52	**K58×65×18**
	65	36	49 000	107 000	14 600	8 000	5 100	127	**K58×65×36-ZW**
60	65	20	29 500	72 000	9 300	7 800	4 750	52	**K60×65×20**
	65	30	42 500	116 000	16 600	7 800	4 650	77	**K60×65×30**
	66	33	46 000	112 000	15 100	7 800	4 800	104	**K60×66×33-ZW**
	66	40	58 000	151 000	19 900	7 800	4 650	116	**K60×66×40-ZW**
	68	20	43 500	85 000	11 000	7 700	4 400	71	**K60×68×20**
	68	23	49 500	101 000	13 500	7 700	4 350	94	**K60×68×23**
	68	25	53 000	111 000	15 200	7 700	4 350	89	**K60×68×25**
	68	30	44 500	88 000	11 300	7 700	4 950	129	**K60×68×30-ZW**
	75	42	118 000	199 000	27 000	7 300	4 050	240	**K60×75×42**
62	70	40	66 000	146 000	20 500	7 400	4 550	174	**K62×70×40-ZW**
64	70	16	28 000	60 000	8 100	7 300	4 500	53	**K64×70×16**

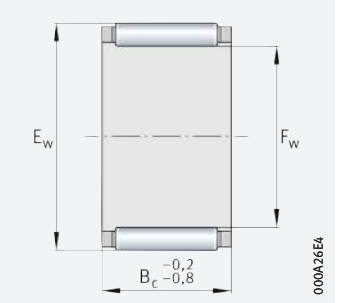
medias ➤ *https://www.schaeffler.de/std/1DF8*

Main dimensions			Basic load ratings		Fatigue limit load	Limiting speed	Speed rating	Mass	Designation
F_w	E_w	B_c	dyn. C_r	stat. C_{0r}	C_{ur}	n_G	$n_{\vartheta r}$	m	➤*864|1.12* ➤*864|1.13*
			N	N	N	min^{-1}	min^{-1}	≈ g	
65	70	20	30 500	77 000	10 000	7 300	4 450	56	**K65×70×20**
	70	30	44 000	124 000	17 800	7 300	4 350	83	**K65×70×30**
	73	23	46 000	94 000	12 200	7 100	4 300	108	**K65×73×23**
	73	30	57 000	123 000	17 100	7 100	4 300	141	**K65×73×30**
68	74	20	35 500	84 000	11 000	6 900	4 200	71	**K68×74×20**
	74	30	46 500	118 000	16 900	6 900	4 300	100	**K68×74×30**
	74	35	48 500	125 000	17 200	6 900	4 450	120	**K68×74×35-ZW**
70	76	20	36 000	86 000	11 300	6 700	4 100	71	**K70×76×20**
	76	30	52 000	139 000	20 100	6 700	4 000	110	**K70×76×30**
	78	30	60 000	135 000	18 800	6 600	4 000	148	**K70×78×30**
72	80	20	41 500	85 000	11 900	6 400	4 000	98	**K72×80×20**
73	79	20	37 000	90 000	11 800	6 400	4 000	75	**K73×79×20**
75	81	20	37 500	94 000	12 300	6 300	3 850	79	**K75×81×20**
	81	30	52 000	143 000	20 400	6 300	3 850	114	**K75×81×30**
	83	23	50 000	109 000	14 200	6 200	3 800	124	**K75×83×23**
	83	30	62 000	143 000	20 000	6 200	3 800	147	**K75×83×30**
	83	35	63 000	147 000	19 900	6 200	3 950	182	**K75×83×35-ZW**
	83	40	73 000	177 000	25 000	6 200	3 900	211	**K75×83×40-ZW**
80	86	20	38 500	98 000	12 900	5 900	3 700	60	**K80×86×20**
	88	30	71 000	176 000	25 000	5 800	3 400	138	**K80×88×30**
	88	40	76 000	192 000	27 000	5 800	3 700	227	**K80×88×40-ZW**
	88	46	88 000	231 000	30 000	5 800	3 650	260	**K80×88×46-ZW**
85	92	20	44 500	108 000	15 100	5 500	3 450	102	**K85×92×20**
90	97	20	45 000	113 000	15 800	5 200	3 300	109	**K90×97×20**
	98	27	61 000	150 000	20 300	5 200	3 300	150	**K90×98×27**
	98	30	68 000	172 000	24 000	5 200	3 300	172	**K90×98×30**
95	103	30	69 000	180 000	25 000	4 950	3 150	165	**K95×103×30**
	103	40	83 000	228 000	32 500	4 950	3 200	266	**K95×103×40-ZW**

medias ➤ *https://www.schaeffler.de/std/1DF9*

Needle roller and cage assemblies

Single row



Single row

F_w = 100 – 265 mm

Main dimensions			Basic load ratings		Fatigue limit load	Limiting speed	Speed rating	Mass	Designation
F_w	E_w	B_c	dyn. C_r	stat. C_{0r}	C_{ur}	n_G	$n_{\vartheta r}$	m	➤*864*|*1.12* ➤*864*|*1.13*
			N	N	N	min^{-1}	min^{-1}	≈ g	
100	107	21	48 000	127 000	17 600	4 750	3 100	120	**K100×107×21**
	108	27	57 000	143 000	18 900	4 700	3 200	185	**K100×108×27**
	108	30	71 000	188 000	26 000	4 700	3 050	180	**K100×108×30**
105	112	21	47 500	127 000	17 400	4 500	3 000	129	**K105×112×21**
110	117	24	56 000	158 000	19 800	4 300	2 850	172	**K110×117×24**
	118	30	78 000	219 000	29 500	4 300	2 750	217	**K110×118×30**
115	123	27	63 000	170 000	21 600	4 100	2 850	200	**K115×123×27**
120	127	24	59 000	174 000	21 400	3 950	2 650	165	**K120×127×24**
125	133	35	86 000	260 000	34 500	3 800	2 600	275	**K125×133×35**
130	137	24	61 000	186 000	22 300	3 650	2 500	170	**K130×137×24**
135	143	35	91 000	290 000	37 500	3 550	2 390	300	**K135×143×35**
145	153	26	74 000	225 000	27 000	3 300	2 280	262	**K145×153×26**
150	160	46	147 000	470 000	60 000	3 150	2 100	570	**K150×160×46**
155	163	26	75 000	236 000	28 000	3 100	2 180	265	**K155×163×26**
160	170	46	152 000	510 000	63 000	2 950	1 970	550	**K160×170×46**
165	173	26	81 000	265 000	30 500	2 900	2 030	320	**K165×173×26**
175	183	32	99 000	350 000	41 500	2 750	1 930	400	**K175×183×32**
185	195	37	128 000	425 000	48 500	2 600	1 840	607	**K185×195×37**
195	205	37	133 000	450 000	51 000	2 450	1 760	620	**K195×205×37**
210	220	42	154 000	560 000	63 000	2 280	1 590	740	**K210×220×42**
220	230	42	158 000	590 000	66 000	2 180	1 510	790	**K220×230×42**
240	250	42	164 000	630 000	69 000	2 000	1 390	850	**K240×250×42**
265	280	50	255 000	860 000	91 000	1 800	1 160	1 810	**K265×280×50**

medias ➤ *https://www.schaeffler.de/std/1DFA*

Drawn cup needle roller bearings

Matrix for bearing preselection

The matrix gives an overview of the types and design features of drawn cup needle roller bearings.

It can be used to make a preliminary assessment of whether a bearing is fundamentally suitable for the envisaged application.

The additional information provided in the product chapter (see column "detailed information") and in the Technical principles must, however, be observed in addition to this overview in selection of the bearing.

Design features and suitability			Drawn cup needle roller bearings			
+++ extremely suitable ++ highly suitable + suitable (+) suitable with restrictions – not suitable/not applicable ✓ available			open	sealed	full complement, open	detailed information ➤ 886
Load carrying capacity	radial		+++	+++	+++	➤ 889 | 1.2
	axial, one direction		–	–	–	➤ 889 | 1.2
	axial, both directions		–	–	–	➤ 889 | 1.2
	moments		–	–	–	
Compensation of angular misalignments	static		–	–	–	➤ 889 | 1.3
	dynamic		–	–	–	➤ 889 | 1.3
Bearing design	cylindrical bore		✓	✓	✓	➤ 886 | 1.1
	tapered bore		–	–	–	
	separable		–	–	–	➤ 898 | 1.17
Lubrication	greased		–	✓	–[1]	➤ 889 | 1.4
Sealing	open		✓	–	✓	➤ 890 | 1.5
	non-contact		–	–	–	➤ 890 | 1.5
	contact		–	✓	–	➤ 890 | 1.5
Operating temperature in °C	from to		–30 +140[2]	–20 +100	–30 +140	➤ 891 | 1.8
Suitability for	high speeds		+++	+++	+	➤ 891 | 1.6
	high running accuracy		++	++	++	➤ 893 | 1.11 ➤ 114
	low-noise running		+	+	+	➤ 891 | 1.7 ➤ 27
	high rigidity		++	++	++	➤ 54
	reduced friction		+	+	+	➤ 56
	length compensation within bearing		–	–	–	
	non-locating bearing arrangement		++	++	++	➤ 139
	locating bearing arrangement		–	–	–	➤ 139
X-life bearings		X-life	–	–	–	
Enveloping circle diameter F_w in mm	from to		2 60	8 50	8 50	➤ 900
Product tables	from page ➤		900	906	908	

1) Delivery with special grease for mounting only, bearings must be relubricated

2) Valid for open, ungreased bearings with sheet steel cage. With polyamide cage –20 °C to +120 °C

1 Drawn cup needle roller bearings

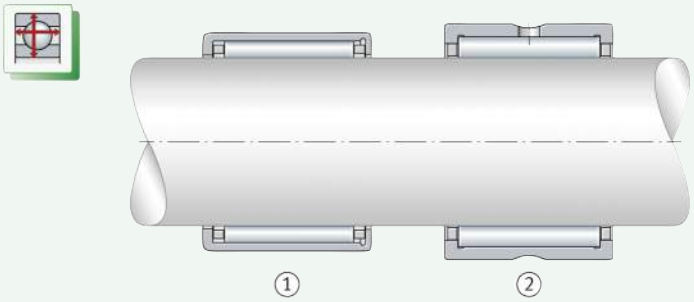
The bearings:

- are particularly suitable for applications with a very small radial section height on account of their very low cross-sectional height ➤*886*|*1*
- are used if the housing bore is not suitable as a raceway for needle roller and cage assemblies
- can support high radial loads (are pure radial bearings) ➤*887*|*3*, ➤*888*|*4*, ➤*888*|*5*, ➤*888*|*6*
- require a considerably smaller radial design envelope than machined needle roller bearings ➤*886*|*1*
- usually run directly on the shaft (no inner ring) ➤*886*|*1*, ➤*889*|*7*
- permit relatively high speeds
- are easy to mount ➤*898*|*1.17*
- require no additional means of axial retention (as a result of which the housing bore is easy to produce) ➤*895*|*1.16*
- can be readily used to close off the shaft ends of bearing positions (drawn cup needle roller bearings with closed end) ➤*888*|*6*
- result in particularly compact, cost-effective and economical bearing arrangements.

For an overview of other product-specific features, see the Matrix for bearing preselection ➤*885*.

1
Comparison of radial design envelope

① *Drawn cup needle roller bearing with open ends and cage*
② *Needle roller bearing with cage*



1.1 Bearing design

✎ *Design variants*

Drawn cup needle roller bearings with open ends are available as:

- standard drawn cup needle roller bearings with open ends and cage ➤*887*|*3* and ➤*888*|*4*
- full complement drawn cup needle roller bearings with open ends ➤*888*|*5*
- special bearings ➤*888* and ➤*890*.

Drawn cup needle roller bearings with closed end are available as:

- standard drawn cup needle roller bearings with closed end ➤888|⊡6
- special bearings ➤888 and ➤890
- universal joint bearings ➤888.

Drawn cup needle roller bearings

✎ The outer cups are thin-walled and produced by forming methods

Drawn cup needle roller bearings are part of the group of radial needle roller bearings. These ready-to-fit bearing arrangement elements are rolling bearings with a very small radial section height. They comprise thin-walled, drawn outer cups and needle roller and cage assemblies which together form a complete unit ➤887|⊡2, ➤887|⊡3, ➤888|⊡5, ➤888|⊡6. The cage guides the needle rollers parallel to the axis in pockets.

✎ For bearing arrangements with a very small radial design envelope

Due to the thin-walled outer cup and the absence of an inner ring, the bearings have a very low cross-sectional height ➤886|⊡1. As a result, they are particularly suitable for applications with a very small radial design envelope. The majority of the bearings are of a single row design and do not have a lubrication hole.

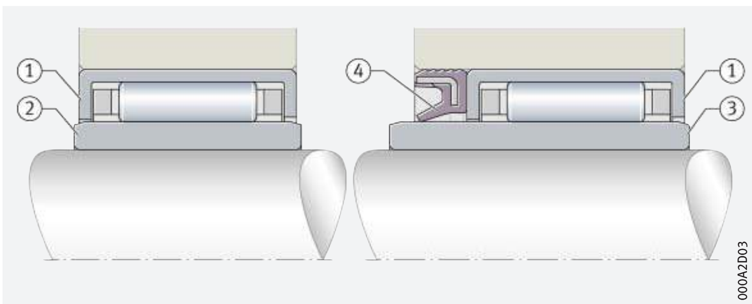
✎ Drawn cup needle roller bearings can also be combined with inner rings IR or LR

Due to the absence of an inner ring, drawn cup needle roller bearings require a hardened and ground bearing raceway on the shaft ➤895|1.16. If the shaft cannot be produced as a rolling bearing raceway, the bearings can be combined with inner rings IR or LR ➤887|⊡2. If wider inner rings are used, these can also serve as the running surface for sealing rings G and SD ➤887|⊡2.

⊡2

Drawn cup needle roller bearings with open ends and inner ring

① Drawn cup needle roller bearing with open ends
② Standard inner ring
③ Wider inner ring
④ Sealing ring G



Standard drawn cup needle roller bearings with open ends and cage

✎ In contrast to drawn cup needle roller bearings with closed end, the bearings are open

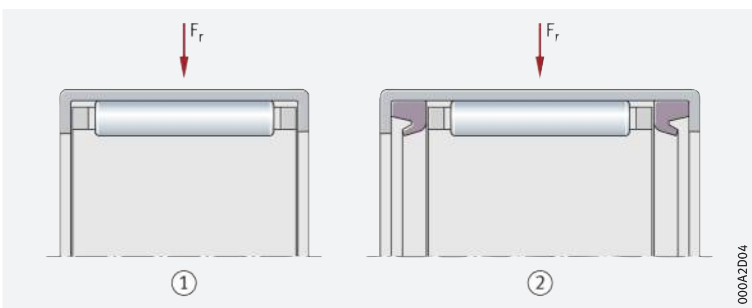
Drawn cup needle roller bearings of this design are open at both ends and have the basic designation HK ➤887|⊡3 and ➤893|1.12. They are supplied with needle roller and cage assemblies. Bearings with needle roller and cage assemblies allow higher speeds than the full complement designs. The bearings are available in open and sealed versions ➤887|⊡3 and ➤890|1.5. Double row designs have a lubrication hole in the outer cup and the suffix ZW ➤888|⊡4.

⊡3

Single row drawn cup needle roller bearings with open ends

F_r *= radial load*

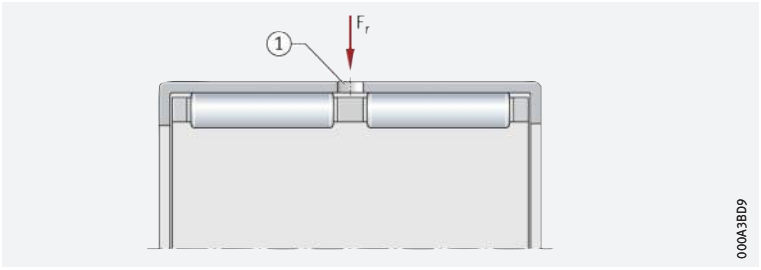
① Single row drawn cup needle roller bearing with open ends, open version
② Single row drawn cup needle roller bearing with open ends, sealed on both sides



4
Double row drawn cup needle roller bearing with open ends

F_r = *radial load*

① *Lubrication hole*



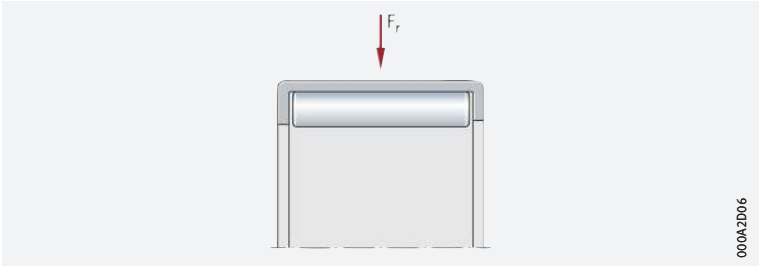
Full complement drawn cup needle roller bearings with open ends

✎ Particularly high load carrying capacity within a very small radial design envelope

Full complement drawn cup needle roller bearings with open ends have the basic designation HN ➤*888*|*5*. As these bearings have the maximum number of needle rollers, they offer extremely high load carrying capacity. However, they do not permit the speeds that are possible when drawn cup needle roller bearings with open ends are used in conjunction with rolling elements retained by a cage.

5
Full complement drawn cup needle roller bearing with open ends

F_r = *radial load*



Drawn cup needle roller bearings with closed end

✎ In contrast to drawn cup needle roller bearings with open ends, the bearings are closed at one end

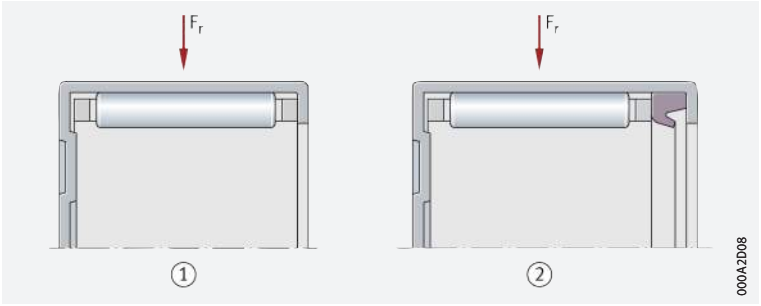
Drawn cup needle roller bearings of this design are closed at one end ➤*888*|*6*. They are thus suitable for closing off the shaft ends of bearing positions. This gives protection against injury by rotating shafts and protects the bearings against contamination and moisture. Depending on the size, the base is either smooth or lock-beaded (stiffened). The profiled base can also support small axial guidance forces. Drawn cup needle roller bearings with closed end are available in open and sealed versions ➤*888*|*6* and ➤*890*|*1.5*.

6
Drawn cup needle roller bearings with closed end

F_r = *radial load*

① *Drawn cup needle roller bearing with closed end, open version*

② *Drawn cup needle roller bearing with closed end, sealed version*



Special bearings

In addition to the standard catalogue range, special designs are available by agreement:

- with enveloping circle F_w from 2 mm to 100 mm
- for special noise requirements (bearings with special noise testing).

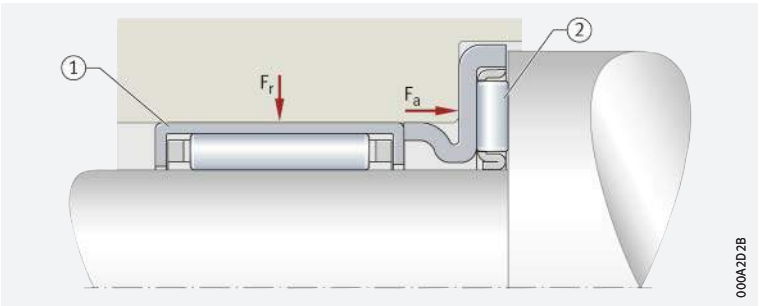
Universal joint bearings

For universal joints, universal joint bearings of series BU and BBU are available by agreement.

1.2 Load carrying capacity

The bearings are pure radial bearings

Drawn cup needle roller bearings can support high radial forces, but may only be subjected to radial load. If the bearing position is also required to support axial forces, the bearings can, for example, be combined with axial needle roller bearings AXW ➤889|7.



7
Drawn cup needle roller bearing with open ends combined with axial needle roller bearing

F_r = *radial load*
F_a = *axial load*

① *Drawn cup needle roller bearing with open ends HK (for supporting radial loads)*
② *Axial needle roller bearing AXW (for supporting axial loads)*

1.3 Compensation of angular misalignments

The bearings are not suitable for the compensation of shaft misalignments relative to the housing

Drawn cup needle roller bearings are not suitable for the compensation of angular misalignments. The extent to which a misalignment of the shaft can be tolerated relative to the housing bore is dependent on factors such as the design of the bearing position, the size of the bearing, the operating clearance and the load. For this reason, it is not possible to give a guide value for misalignment.

In all cases, misalignments cause increased running noise, place increased strain on the cages and have a harmful influence on the operating life of the bearings.

1.4 Lubrication

Greased bearings

Sealed bearings are greased with a lithium complex soap grease to GA08. The grease filling is measured so that it is sufficient for the entire operating life of the bearing. As a result, the bearings are maintenance-free.

Greased bearings should not be washed out or heated to temperatures of > +80 °C prior to mounting.

Ungreased bearings

Ungreased bearings must be lubricated with oil or grease. The majority of single row bearings do not have a lubrication hole.

Compatibility with plastic cages

When using bearings with plastic cages, compatibility between the lubricant and the cage material must be ensured if synthetic oils, lubricating greases with a synthetic oil base or lubricants containing a high proportion of EP additives are used.

Observe oil change intervals

Aged oil and additives in the oil can impair the operating life of plastics at high temperatures. As a result, stipulated oil change intervals must be strictly observed.

Lubrication of full complement drawn cup needle roller bearings with open ends

The needle rollers are retained by a special grease

Since the needle rollers in full complement bearings are not retained by mechanical means (no cage is present), they are retained for transport and fitting by means of a special grease (DIN 51825-K1/2K-30). However, this grease does not have an adequate long term lubrication capacity. Relubrication is therefore recommended after fitting.

If there is any uncertainty regarding relubrication, please consult Schaeffler.

Bearings of special design

The following special designs are available by agreement:

- unsealed bearings, greased using a lithium complex soap grease to GA08 (suffix GA08)
- bearings with a lubrication hole for sizes from HK0609 (suffix AS1).

1.5 Sealing

The bearings are open or sealed

Drawn cup needle roller bearings are available in an open design in accordance with DIN 618:2008 (ISO 3245:2015) and a sealed design in accordance with DIN 618:2008.

Sealed bearings

Integrated seals are particularly space-saving

Under normal operating conditions, contact seals give protection against contamination, spray water and the loss of lubricant. The integration of such seals into the bearing provides a compact, reliable, proven and economical sealing solution.

Unsealed bearings

Provide seals in the adjacent construction

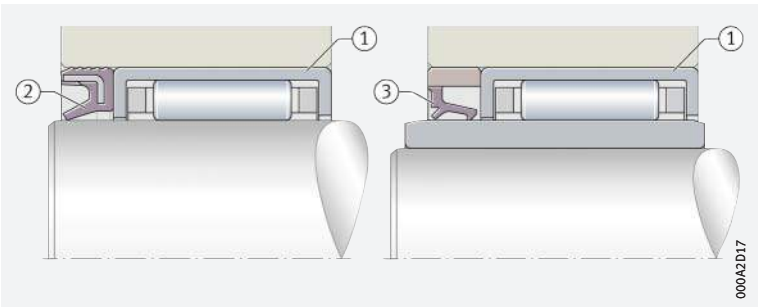
In the case of unsealed bearings, sealing of the bearing position must be carried out in the adjacent construction. This must reliably prevent:

- moisture and contaminants from entering the bearing
- the egress of lubricant from the bearing.

Sealing of the bearing position with sealing rings G or SD

Effective sealing elements for use in sealing open bearings

Bearing positions with open drawn cup needle roller bearings can be sealed economically using sealing rings G or SD. The sealing rings are designed as contact seals and are arranged in front of the bearing ➤887|2, ➤890|8. They are suitable for circumferential velocities at the running surface of up to 10 m/s and protect the bearing position reliably against contamination, spray water and excessive loss of lubricant. The sealing rings are matched to the low radial dimensions of drawn cup needle roller bearings with open ends. They are very easy to fit, since they are simply pressed into the housing bore.



8
Sealing of the bearing position with sealing rings G or SD

① *Drawn cup needle roller bearing with open ends, open version*
② *Sealing ring G*
③ *Sealing ring SD*

1.6 Speeds

Limiting speeds and reference speeds in the product tables

Two speeds are generally indicated in the product tables ➤*900*|▦:

- the kinematic limiting speed n_G
- the thermal speed rating $n_{\vartheta r}$.

Limiting speed

The limiting speed n_G is the kinematically permissible speed of a bearing. Even under favourable mounting and operating conditions, this value should not be exceeded without prior consultation with Schaeffler ➤*64*. The values in the product tables are valid for oil lubrication.

Values for grease lubrication

For the grease lubrication of open cage bearings, 60% of the value stated in the product tables is permissible in each case.

Speeds for full complement bearings

Due to the bearing kinematics and higher temperatures within the bearing, the speeds for full complement bearings are lower than for bearings with a cage.

Reference speeds

$n_{\vartheta r}$ is used to calculate n_ϑ

The thermal speed rating $n_{\vartheta r}$ is not an application-oriented speed limit, but is a calculated ancillary value for determining the thermally safe operating speed n_ϑ ➤*64*.

Bearings with contact seals

For bearings with contact seals, no reference speeds are defined in accordance with DIN ISO 15312:2004. As a result, only the limiting speed n_G is given in the product tables for these bearings.

1.7 Noise

Schaeffler Noise Index

The Schaeffler Noise Index (SGI) is not yet available for this bearing type ➤*69*. The data for these bearing series will be introduced and updated in stages.

Further information:

- ***medias*** ➤*https://medias.schaeffler.com*.

1.8 Temperature range

Limiting values

The operating temperature of the bearings is limited by:

- the dimensional stability of the bearing rings and rolling elements
- the cage
- the lubricant
- the seals.

Possible operating temperatures of drawn cup needle roller bearings ➤*891*|▦ *1*.

▦ **1**
Permissible temperature ranges

Operating temperature	Open drawn cup needle roller bearings		Sealed drawn cup needle roller bearings
	with sheet steel cage or full complement	with polyamide cage PA66	
	–30 °C to +140 °C	–20 °C to +120 °C	–20 °C to +100 °C, limited by the lubricant and seal material

In the event of anticipated temperatures which lie outside the stated values, please contact Schaeffler.

1.9 Cages

Sheet steel cages are used as standard

With only a few exceptions, the cages are made from sheet steel. Bearings with a plastic cage have the suffix TV. Other cage designs are available by agreement. With such cages, however, suitability for high speeds and temperatures as well as the basic load ratings may differ from the values for the bearings with standard cages.

For high continuous temperatures and applications with difficult operating conditions, bearings with sheet steel cages should be used. If there is any uncertainty regarding cage suitability, please consult Schaeffler.

1.10 Internal clearance

The enveloping circle diameter F_w applies instead of the radial internal clearance

In the case of bearings without an inner ring, the dimension for the inner enveloping circle diameter F_w is used instead of the radial internal clearance. The enveloping circle is the inner inscribed circle of the needle rollers in clearance-free contact with the outer raceway. Once the bearings are mounted, the inner enveloping circle diameter F_w is approximately in tolerance class F8. The precondition for this is that the bore tolerances are observed for bearings without an inner ring ➤*895*|*1.16*, ➤*896*|▦*6* and ➤*895*|▦*4*.

Checking the enveloping circle diameter F_w

F_w can only be checked in a mounted condition

In the case of drawn cup needle roller bearings, the inner enveloping circle diameter F_w can only be checked once the bearings are mounted. In order to carry out the check, the bearing is pressed into a steel ring gauge, which has a cylindrical bore with the nominal dimension D and lower deviation of tolerance class N6 (in accordance with ISO 286-2). The ring gauge must have a minimum wall thickness of 20 mm, the minimum width must correspond to the width of the bearing. A plug gauge to ISO 1132-2 is used for checking purposes. The tolerance class of the enveloping circle is within the range of values defined in the table ➤*893*|▦*2*.

Example

Example of checking of F_w

For drawn cup needle roller bearing with open ends HK1010 (F_w = 10 mm), F_w must be between 10,013 mm and 10,031 mm, the ring gauge bore must be 13,980 mm (lower deviation = +13 µm, upper deviation = +31 µm) ➤*893*|▦*2*.

Bearings intended for enveloping circle measurements should not be repeatedly pushed in and out of the gauge. Bearings that have been checked in the ring gauge should not be used again.

2
Ring gauge bore and enveloping circle deviations (to DIN 618:2008)

Enveloping circle F_w mm	Outside diameter D mm	Ring gauge bore mm	Enveloping circle deviation Upper µm	Lower µm
2	4,6	4,587	+24	+6
3	6,5	6,484	+24	+6
4	8	7,984	+28	+10
5	9	8,984	+28	+10
6	10	9,984	+28	+10
7	11	10,980	+31	+13
8	12	11,980	+31	+13
9	13	12,980	+31	+13
10	14	13,980	+31	+13
12	16	15,980	+34	+16
12	18	17,980	+34	+16
13	19	18,976	+34	+16
14	20	19,976	+34	+16
15	21	20,976	+34	+16
16	22	21,976	+34	+16
17	23	22,976	+34	+16
18	24	23,976	+34	+16
20	26	25,976	+41	+20
22	28	27,976	+41	+20
25	32	31,972	+41	+20
28	35	34,972	+41	+20
30	37	36,972	+41	+20
32	39	38,972	+50	+25
35	42	41,972	+50	+25
40	47	46,972	+50	+25
45	52	51,967	+50	+25
50	58	57,967	+50	+25
55	63	62,967	+60	+30
60	68	67,967	+60	+30

1.11 Dimensions, tolerances

Dimension standards

The main dimensions of the bearings correspond to DIN 618:2008 and ISO 3245:2015, where standardised. Nominal dimensions of bearings ➤*900*.

Tolerances

The tolerances correspond to DIN 618:2008 (ISO 3245:2015), where standardised. The inner enveloping circle diameter F_w is approximately in tolerance class F8 ➤*892*|*1.10*.

1.12 Suffixes

For a description of the suffixes used in this chapter ➤*893*|*3* and ***medias*** interchange ➤*https://www.schaeffler.de/std/1D52*.

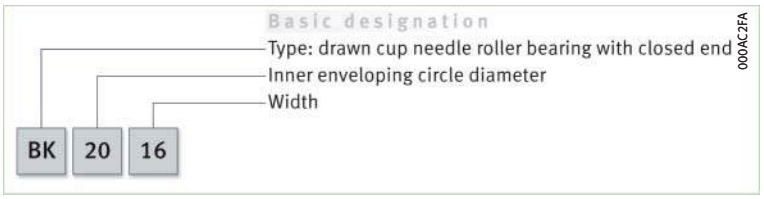
3
Suffixes and corresponding descriptions

Suffix	Description of suffix	
AS1	With lubrication hole from HK0609	Special design, available by agreement
GA08	Unsealed, greased bearings for operating temperatures from –20 °C to +140 °C	
RS	Contact seal on one side	Standard
TV	Cage made from glass fibre reinforced polyamide PA66	
ZW	Double row design, with lubrication hole	
2RS	Contact seal on both sides	

1.13 Structure of bearing designation

The designation of bearings follows a set model.
Examples ➤894| 9 and ➤894| 10. The composition of designations is subject to DIN 623-1 ➤102| 10.

9
Drawn cup needle roller bearing with closed end, open version: designation structure



10
Drawn cup needle roller bearing with open ends, sealed on both sides: designation structure

1.14 Dimensioning

Equivalent dynamic bearing load

✎ *$P = F_r$ under purely radial load of constant magnitude and direction*

The basic rating life equation $L = (C_r/P)^p$ used in the dimensioning of bearings under dynamic load assumes a load of constant magnitude and direction. In radial bearings, this is a purely radial load F_r ➤889| 1.2. The bearing load F_r is therefore used in the rating life equation for P ($P = F_r$) ➤894| 1.

1
Equivalent dynamic load

$$P = F_r$$

Legend

P	N	Equivalent dynamic bearing load
F_r	N	Radial load.

Equivalent static bearing load

For drawn cup needle roller bearings subjected to static load ➤894| 2.

2
Equivalent static load

$$P_0 = F_{0r}$$

Legend

P_0	N	Equivalent static bearing load
F_{0r}	N	Largest radial load present (maximum load).

Static load safety factor

✎ *$S_0 = C_0/P_0$*

In addition to the basic rating life L (L_{10h}), it is also always necessary to check the static load safety factor S_0 ➤894| 3. For drawn cup needle roller bearings, $S_0 \geqq 3$ is necessary.

3
Static load safety factor

$$S_0 = \frac{C_0}{P_0}$$

Legend

S_0	–	Static load safety factor
C_0	N	Basic static load rating
P_0	N	Equivalent static bearing load.

1.15 Minimum load

In order to prevent damage due to slippage, a minimum radial load of $P > C_{0r}/60$ is required

In order that no slippage occurs between the contact partners, the drawn cup needle roller bearings must be constantly subjected to a sufficiently high load. Based on experience, a minimum radial load of the order of $P > C_{0r}/60$ is thus necessary. In most cases, however, the radial load is already higher than the requisite minimum load due to the weight of the supported parts and the external forces.

If the minimum radial load is lower than indicated above, please consult Schaeffler.

1.16 Design of bearing arrangements

Radial location of bearings

Support outer cup/ inner ring over entire circumference and width

In order to allow full utilisation of the load carrying capacity of the bearings and achieve the requisite rating life, sufficient rigid support must be provided for the thin-walled outer cups in the housing. Due to the thin-walled outside surface, the bearings only adopt their precise geometry once they have a tight fit. The support for the outer cup in the housing bore can be produced as a cylindrical seating surface. The seating surfaces for the outer cup and the raceway for the rolling elements or inner ring (if the bearing arrangement is not produced as a direct bearing arrangement) should not be interrupted by grooves, holes or other recesses. The accuracy of the mating parts must meet specific requirements, the bore tolerances for the housing bore (recommended tolerance classes) are dependent on the housing material ➤*895*|▦ *4*. If the housings are not rigid, tests must be carried out to determine which shaft tolerance the desired operating clearance will be achieved with. Numerical values for IT grades ➤*895*|▦ *5*. For the bearings to be mounted without damage, the shaft must have a lead chamfer of 10° to 15°.

▦ **4** *Tolerance classes and surface design for housings, as a function of the material*

Housing material	Bore tolerance to ISO 286-2	Roundness tolerance max.	Parallelism tolerance max.	Recommended mean roughness value Ramax (Rzmax) µm
Steel or cast iron	N6 Ⓔ	IT5/2	IT5/2	0,8 (4)
Aluminium (Al)	R6 Ⓔ			
Magnesium (Mg)	S6 Ⓔ			

▦ **5** *Numerical values for ISO standard tolerances (IT grades) to ISO 286-1:2010*

IT grade	Nominal dimension in mm						
	over –	**3**	**6**	**10**	**18**	**30**	**50**
	incl. **3**	**6**	**10**	**18**	**30**	**50**	**80**
	Values in µm						
IT3	2	2,5	2,5	3	4	4	5
IT4	3	4	4	5	6	7	8
IT5	4	5	6	8	9	11	13

Axial location of bearings

A tight fit is usually sufficient for axial location

If axial locating elements such as shoulders and snap rings are not used, the housing bore can be produced easily and particularly economically. This also gives simplified mounting of the bearings.

Raceway for bearing arrangements without an inner ring (direct bearing arrangement)

✎ *Produce the raceway as a rolling bearing raceway*

Where drawn cup needle roller bearings run directly on the shaft (without an inner ring), the raceway for the rolling elements must be produced as a rolling bearing raceway (hardened and ground). Design of raceways ➤*896*| ▦ *6*. The values in the table refer to commonly encountered application examples. If the shaft cannot be produced as a raceway, the bearings can be combined with Schaeffler bearing rings. However, the section height of the bearings will then be increased by the thickness of the rings.

▦ ***6***
Tolerance class and surface design for the shaft (direct bearing arrangement)

Shaft tolerance to ISO 286-2	Roundness tolerance max.	Parallelism tolerance max.	Recommended mean roughness value Ramax (Rzmax) µm
h6 Ⓔ	IT3	IT3	0,2 (1)

Steels for the raceway (direct bearing arrangement)

Through hardening steels

Through hardening steels in accordance with ISO 683-17 (e.g. 100Cr6) are suitable as materials for rolling bearing raceways in direct bearing arrangements. These steels can also be surface layer hardened.

Case hardening steels

Case hardening steels normally correspond to ISO 683-17 (such as 17MnCr5, 18CrNiMo7-6) or EN 10084 (such as 16MnCr5).

Steels for inductive surface layer hardening

For flame and induction hardening, steels in accordance with ISO 683-17 (such as C56E2, 43CrMo4) or DIN 17212 (such as Cf53) should be used.

Surface hardness and hardening depth

✎ *Nominal surface hardness: ≧ 670 HV*

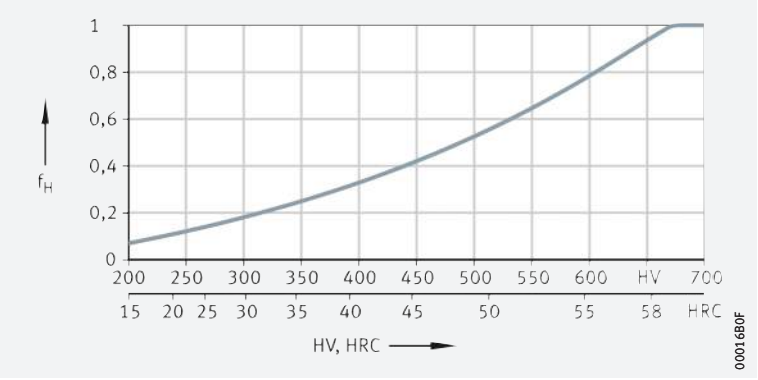
The requisite minimum surface hardness of 670 HV is valid for raceways, axial washers and shaft shoulders. Steels hardened by means of case, flame or induction hardening must have a surface hardness of 670 HV to 840 HV and an adequate hardening depth CHD or SHD.

Raceway softer than 670 HV

If the raceway fulfils the requirements for rolling bearing materials but is softer than 670 HV, the load on the bearing arrangement cannot be as high as the full load carrying capacity of the bearing. In order to determine the dynamic and static load carrying capacity of the bearing arrangement, the basic dynamic load rating C of the bearings must be multiplied by the reduction factor f_H (dynamic hardness factor) and the basic static load rating C_{0r} by the reduction factor f_{H0} (static hardness factor) ➤*896*| 🗀 *11* and ➤*897*| 🗀 *12*.

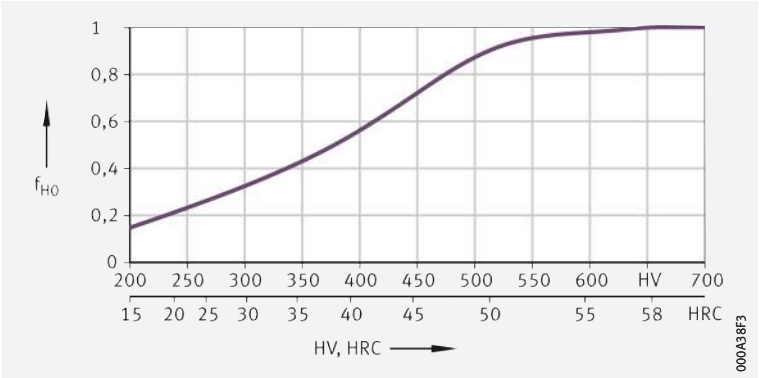
🗀 ***11***
Dynamic hardness factor at reduced hardness of raceways/rolling elements

f_H = *dynamic hardness factor*
HV, HRC = *surface hardness*



12
Static hardness factor at reduced hardness of raceways/rolling elements

f_{H0} = *static hardness factor*
HV, HRC = *surface hardness*



Determining the case hardening depth

Approximation value for case hardening depth

In order to obtain an approximation value for defining the minimum hardening depth, the relationship in accordance with ➤*180*| *5* can be used as a basis. The reference value for the load present is the equivalent stress in accordance with the distortion energy hypothesis (DEH) as a function of the rolling element diameter D_w and the magnitude of the load.

4
Case hardening depth

$$CHD \geqq 0{,}052 \cdot D_w$$

Legend

CHD	mm	Case hardening depth
D_w	mm	Rolling element diameter.

The local hardness must always be above the local requisite hardness, which can be calculated from the equivalent stress.

Determining the surface hardening depth

In these surface hardening methods, the load and contact geometry must be taken into consideration when determining the requisite hardening depth.

Determining the surface hardening depth

The rule of thumb for calculating the surface hardening depth SHD is the relationship in accordance with ➤*181*| *6*.

5
Surface hardening depth

$$SHD \geqq 140 \cdot D_w / R_{p0,2}$$

Legend

SHD	mm	Surface hardening depth
D_w	mm	Rolling element diameter
$R_{p0,2}$	N/mm²	Yield point of base material.

1.17 Mounting and dismounting

Ensure that the bearings are not damaged during mounting

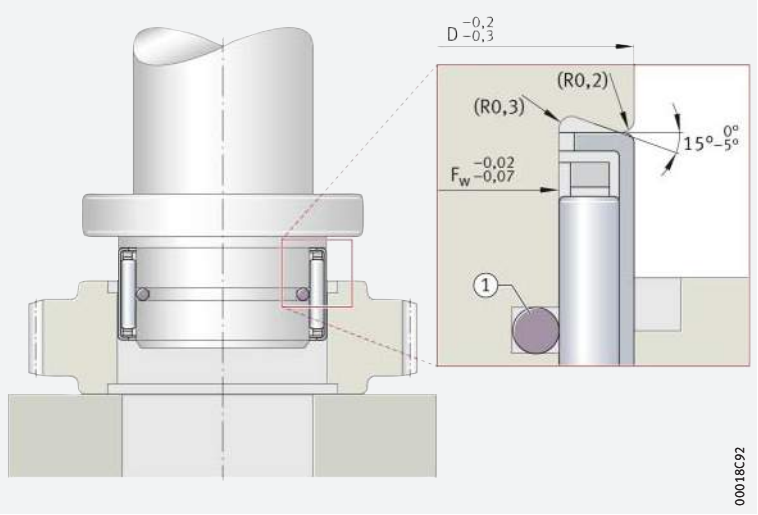
The bearings are self-retaining (not separable). They are mounted using a special fitting mandrel ➤898| 13. The shoulder of the fitting mandrel must rest against the marked end face (designation) of the bearing. A toroidal ring should be used to retain the bearing. The length and oversize of the ring must be matched by the customer to the dimensions and mass of the bearing. The press-in forces occurring during mounting are dependent on several factors. Mounting must be carried out so that the bearing rib on the end face is not deformed. If the application requires a mounting procedure different from the one described, mounting trials must be carried out in order to ensure that the bearings can be mounted correctly and without causing damage.

Drawn cup needle roller bearings must not be tilted during pressing-in, as this may damage the bearing. If grease lubrication is to be used, the bearings should be lubricated with grease before mounting.

13
Mounting of a drawn cup needle roller bearing with open ends using a fitting mandrel: design of the fitting mandrel

General tolerances to ISO 2768-1

F_w = *inner enveloping circle diameter*
D = *bearing outside diameter*
R = *radii of fitting mandrel*
① *Toroidal ring*



Schaeffler Mounting Handbook

Rolling bearings must be handled with great care

Rolling bearings are well-proven precision machine elements for the design of economical and reliable bearing arrangements, which offer high operational security. In order that these products can function correctly and achieve the envisaged operating life without detrimental effect, they must be handled with care.

The Schaeffler Mounting Handbook MH 1 gives comprehensive information about the correct storage, mounting, dismounting and maintenance of rotary rolling bearings ➤ *https://www.schaeffler.de/std/1D53*. It also provides information which should be observed by the designer, in relation to the mounting, dismounting and maintenance of bearings, in the original design of the bearing position. This book is available from Schaeffler on request.

1.18 Legal notice regarding data freshness

✎ The further development of products may also result in technical changes to catalogue products

Of central interest to Schaeffler is the further development and optimisation of its products and the satisfaction of its customers. In order that you, as the customer, can keep yourself optimally informed about the progress that is being made here and with regard to the current technical status of the products, we publish any product changes which differ from the printed version in our electronic product catalogue.

§ We therefore reserve the right to make changes to the data and illustrations in this catalogue. This catalogue reflects the status at the time of printing. More recent publications released by us (as printed or digital media) will automatically precede this catalogue if they involve the same subject. Therefore, please always use our electronic product catalogue to check whether more up-to-date information or modification notices exist for your desired product.

Link to electronic product catalogue

The following link will take you to the Schaeffler electronic product catalogue: ➤ *https://medias.schaeffler.com*.

1.19 Further information

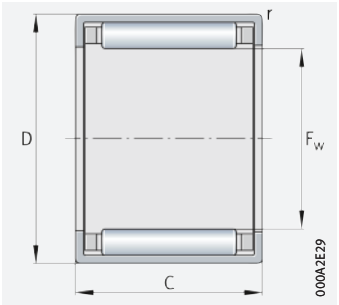
In addition to the data in this chapter, the following chapters in Technical principles must also be observed in the design of bearing arrangements:

- Determining the bearing size ➤ *34*
- Rigidity ➤ *54*
- Friction and increases in temperature ➤ *56*
- Speeds ➤ *64*
- Bearing data ➤ *97*
- Lubrication ➤ *70*
- Sealing ➤ *182*
- Design of bearing arrangements ➤ *139*
- Mounting and dismounting ➤ *191*.

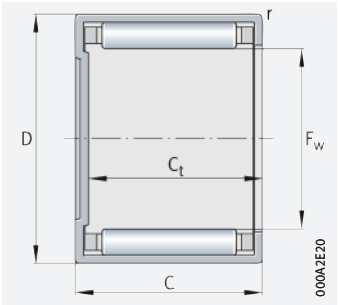
Drawn cup needle roller bearings with open ends

Drawn cup needle roller bearings with closed end

Unsealed



HK



BK

F_w = 2 – 16 mm

Main dimensions			Basic load ratings		Fatigue limit load	Limiting speed	Speed rating	Drawn cup needle roller bearings with open ends		Drawn cup needle roller bearings with closed end	
F_w	D	C	dyn. C_r	stat. C_{0r}	C_{ur}	n_G	$n_{\vartheta r}$	Mass m	Designation ➤*893 | 1.12* ➤*894 | 1.13*	Mass m	Designation ➤*893 | 1.12* ➤*894 | 1.13*
		–0,3	N	N	N	min^{-1}	min^{-1}	≈ g		≈ g	
2	4,6	5	465	265	28,5	58 000	93 000	0,3	**HK0205-TV**[1]	–	–
3	6,5	6	1 230	840	85	48 000	57 000	1	**HK0306-TV**[1]	1	**BK0306-TV**[1]
4	8	8	1 780	1 310	144	42 500	44 500	1,5	**HK0408**[1]	1,6	**BK0408**[1]
5	9	9	2 400	1 990	239	39 000	36 500	2	**HK0509**[1]	2,1	**BK0509**[1]
6	10	6	1 610	1 220	167	36 500	31 500	1,5	**HK0606**[1]	–	–
	10	8	2 030	1 650	184	36 500	31 500	2,1	**HK0608**[1]	–	–
	10	9	2 850	2 600	310	36 500	30 500	2,5	**HK0609**	2,6	**BK0609**
7	11	9	3 100	2 950	355	33 000	26 500	2,6	**HK0709**	2,9	**BK0709**
8	12	8	2 750	2 600	290	29 500	23 800	2,7	**HK0808**	3	**BK0808**
	12	10	3 800	3 950	500	29 500	23 200	3	**HK0810**	3,4	**BK0810**
9	13	8	3 550	3 750	440	26 500	20 600	3	**HK0908**	–	–
	13	10	4 250	4 650	600	26 500	20 600	4	**HK0910**	4,3	**BK0910**
	13	12	5 300	6 300	860	26 500	20 200	4,6	**HK0912**	4,9	**BK0912**
10	14	10	4 400	5 100	650	24 300	18 700	4,1	**HK1010**	4,3	**BK1010**
	14	12	5 500	6 800	930	24 300	18 400	4,8	**HK1012**	5	**BK1012**
	14	15	6 800	8 800	1 210	24 300	18 200	6	**HK1015**	6,2	**BK1015**
12	16	10	4 950	6 200	800	20 700	15 700	4,6	**HK1210**	5,2	**BK1210**
	18	12	6 500	7 300	860	20 000	15 500	9	**HK1212**	10	**BK1212**
	18	16	9 300	11 500	1 420	20 000	15 100	13	**HK1216**	–	–
13	19	12	6 800	7 900	940	18 700	14 400	10	**HK1312**	11	**BK1312**
14	20	12	7 100	8 500	1 010	17 500	13 500	10,5	**HK1412**	12	**BK1412**
15	21	12	7 900	9 400	1 150	16 300	12 300	11	**HK1512**	13	**BK1512**
	21	16	10 500	14 400	1 780	16 500	12 300	15	**HK1516**	17	**BK1516**
	21	22	13 400	19 500	2 380	16 500	12 300	20	**HK1522-ZW**	–	–
16	22	12	7 600	9 700	1 160	15 600	11 900	12	**HK1612**	14	**BK1612**
	22	16	10 900	15 300	1 900	15 600	11 600	16	**HK1616**	18	**BK1616**
	22	22	13 100	19 400	2 310	15 600	11 700	22	**HK1622-ZW**	24	**BK1622-ZW**

medias ➤ *https://www.schaeffler.de/std/1F15*

[1] Not available with lubrication hole.

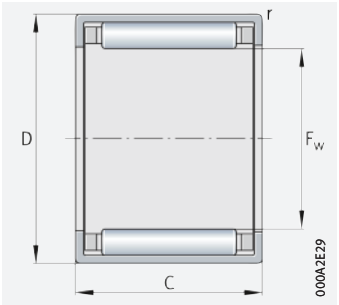
[2] For unsealed drawn cup needle roller bearings, dimensionally matched sealing rings of series G or SD can be used to provide protection against contamination.

Dimensions			Suitable inner rings ➤*992*		Suitable sealing rings[2] ➤*1026*	
F_w	C_t min.	r min.	LR designation	IR designation		
2		0,3	–	–	–	–
3	5,2	0,3	–	–	–	–
4	6,4	0,3	–	–	**GR4×8×2**	–
5	7,4	0,4	–	–	**GR5×9×2**	–
6	–	0,4	–	–	**GR6×10×2**	–
	–	0,4	–	–	**GR6×10×2**	–
	7,4	0,4	–	–	**GR6×10×2**	–
7	7,4	0,4	–	–	**GR7×11×2**	–
8	6,4	0,4	–	–	–	**G8×12×3**
	8,4	0,4	–	**IR5×8×12-XL**	–	**G8×12×3**
9	–	0,4	–	–	**GR9×13×3**	**G9×13×3**
	8,4	0,4	–	–	**GR9×13×3**	**G9×13×3**
	10,4	0,4	–	**IR6×9×12-XL**	**GR9×13×3**	**G9×13×3**
10	8,4	0,4	**LR7×10×10,5**	**IR7×10×10,5-XL**	**GR10×14×3**	**G10×14×3**
	10,4	0,4	–	**IR7×10×12-XL**	**GR10×14×3**	**G10×14×3**
	13,4	0,4	–	**IR7×10×16-XL**	**GR10×14×3**	**G10×14×3**
12	8,4	0,4	**LR8×12×10,5**	**IR8×12×10,5-XL**	**SD12×18×3**	**G12×18×3**
	9,3	0,8	**LR8×12×12,5**	**IR8×12×12,5-XL**	**SD12×18×3**	**G12×18×3**
	–	0,8	–	**IR9×12×16-XL**	**SD12×18×3**	**G12×18×3**
13	9,3	0,8	**LR10×13×12,5**	**IR10×13×12,5-XL**	–	**G13×19×3**
14	9,3	0,8	–	**IR10×14×13-XL**	**SD14×20×3**	**G14×20×3**
15	9,3	0,8	**LR12×15×12,5**	**IR12×15×12-XL**	**SD15×21×3**	**G15×21×3**
	13,3	0,8	**LR12×15×16,5**	**IR12×15×16-XL**	**SD15×21×3**	**G15×21×3**
	–	0,8	**LR12×15×22,5**	**IR12×15×22,5-XL**	**SD15×21×3**	**G15×21×3**
16	9,3	0,8	–	**IR12×16×13-XL**	**SD16×22×3**	**G16×22×3**
	13,3	0,8	–	**IR12×16×16-XL**	**SD16×22×3**	**G16×22×3**
	19,3	0,8	–	**IR12×16×22-XL**	**SD16×22×3**	**G16×22×3**

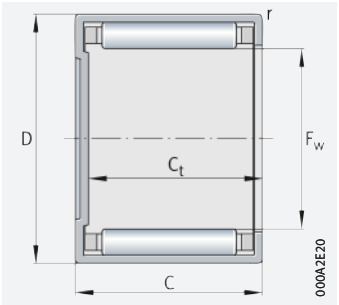
Drawn cup needle roller bearings with open ends

Drawn cup needle roller bearings with closed end

Unsealed



HK



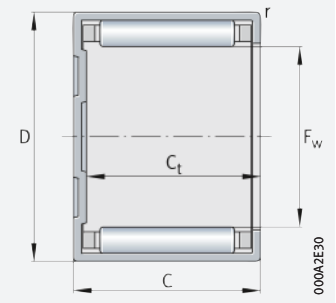
BK with $F_w < 25$ mm

F_w = 17 – 30 mm

Main dimensions			Basic load ratings		Fatigue limit load	Limiting speed	Speed rating	Drawn cup needle roller bearings with open ends		Drawn cup needle roller bearings with closed end	
F_w	D	C	dyn. C_r	stat. C_{0r}	C_{ur}	n_G	$n_{\vartheta r}$	Mass m	Designation ➤*893 | 1.12* ➤*894 | 1.13*	Mass m	Designation ➤*893 | 1.12* ➤*894 | 1.13*
		–0,3	N	N	N	min^{-1}	min^{-1}	≈ g		≈ g	
17	23	12	7 900	10 300	1 230	14 700	11 200	12	**HK1712**	–	–
18	24	12	8 100	10 900	1 300	14 000	10 700	13	**HK1812**	15	**BK1812**
	24	16	11 600	17 300	2 140	14 000	10 400	18	**HK1816**	20	**BK1816**
20	26	10	6 300	8 100	1 010	12 700	10 000	12	**HK2010**	–	–
	26	12	8 600	12 100	1 450	12 700	9 700	14	**HK2012**	–	–
	26	16	12 700	20 100	2 500	12 700	9 300	19	**HK2016**	22	**BK2016**
	26	20	15 700	26 000	3 500	12 700	9 300	24	**HK2020**	27	**BK2020**
	26	30	21 800	40 000	5 000	12 700	9 200	35	**HK2030-ZW**	–	–
22	28	10	7 500	10 500	1 360	11 700	9 000	13	**HK2210**	–	–
	28	12	9 100	13 400	1 600	11 700	8 900	15	**HK2212**	18	**BK2212**
	28	16	13 400	22 100	2 800	11 700	8 500	21	**HK2216**	24	**BK2216**
	28	20	16 500	29 000	3 850	11 700	8 500	26	**HK2220**	–	–
25	32	12	11 000	15 200	1 990	10 200	7 800	20	**HK2512**	–	–
	32	16	15 600	24 000	3 150	10 200	7 500	27	**HK2516**	32	**BK2516**
	32	20	19 900	33 000	4 200	10 200	7 400	33	**HK2520**	38	**BK2520**
	32	26	25 500	45 000	6 200	10 200	7 300	44	**HK2526**	48	**BK2526**
	32	38	34 000	66 000	8 400	10 200	7 300	64	**HK2538-ZW**	68	**BK2538-ZW**
28	35	16	16 400	26 500	3 450	9 200	6 800	29	**HK2816**	–	–
	35	20	20 900	36 000	4 650	9 200	6 700	36	**HK2820**	–	–
30	37	12	12 100	18 200	2 390	8 600	6 600	23	**HK3012**	28	**BK3012**
	37	16	17 200	29 000	3 750	8 600	6 400	31	**HK3016**	38	**BK3016**
	37	20	22 000	39 500	5 100	8 600	6 300	39	**HK3020**	47	**BK3020**
	37	22	24 800	46 000	6 100	8 600	6 200	42	**HK3022**	–	–
	37	26	28 000	54 000	7 400	8 600	6 200	51	**HK3026**	58	**BK3026**
	37	38	37 500	79 000	10 100	8 600	6 200	76	**HK3038-ZW**	84	**BK3038-ZW**

medias ➤ *https://www.schaeffler.de/std/1F16*

[1] For unsealed drawn cup needle roller bearings, dimensionally matched sealing rings of series G or SD can be used to provide protection against contamination.



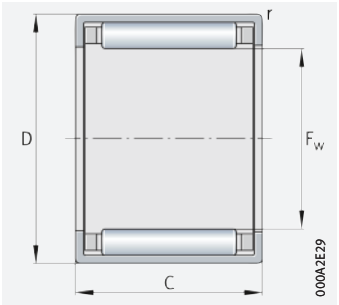
BK with F_w ≧ 25 mm

Dimensions			Suitable inner rings ➤*992*		Suitable sealing rings[1] ➤*1026*	
F_w	C_t min.	r min.	LR designation	IR designation		
17	–	0,8	–	–	**SD17×23×3**	**G17×23×3**
18	9,3	0,8	**LR15×18×12,5**	–	**SD18×24×3**	**G18×24×3**
	13,3	0,8	**LR15×18×16,5**	**IR15×18×16-XL**	**SD18×24×3**	**G18×24×3**
20	–	0,8	–	–	**SD20×26×4**	**G20×26×4**
	–	0,8	–	**IR15×20×13-XL**	**SD20×26×4**	**G20×26×4**
	13,3	0,8	**LR17×20×16,5**	**IR17×20×16-XL**	**SD20×26×4**	**G20×26×4**
	17,3	0,8	**LR17×20×20,5**	**IR17×20×20-XL**	**SD20×26×4**	**G20×26×4**
	–	0,8	**LR17×20×30,5**	**IR17×20×30,5-XL**	**SD20×26×4**	**G20×26×4**
22	–	0,8	–	–	**SD22×28×4**	**G22×28×4**
	9,3	0,8	–	**IR17×22×13-XL**	**SD22×28×4**	**G22×28×4**
	13,3	0,8	–	**IR17×22×16-XL**	**SD22×28×4**	**G22×28×4**
	–	0,8	–	**IR17×22×23-XL**	**SD22×28×4**	**G22×28×4**
25	–	0,8	**LR20×25×12,5**	–	**SD25×32×4**	**G25×32×4**
	13,3	0,8	**LR20×25×16,5**	**IR20×25×17-XL**	**SD25×32×4**	**G25×32×4**
	17,3	0,8	**LR20×25×20,5**	**IR20×25×20-XL**	**SD25×32×4**	**G25×32×4**
	23,3	0,8	**LR20×25×26,5**	**IR20×25×26,5-XL**	**SD25×32×4**	**G25×32×4**
	35,3	0,8	**LR20×25×38,5**	**IR20×25×38,5-XL**	**SD25×32×4**	**G25×32×4**
28	–	0,8	–	**IR22×28×17-XL**	**SD28×35×4**	**G28×35×4**
	–	0,8	**LR22×28×20,5**	**IR22×28×20-XL**	**SD28×35×4**	**G28×35×4**
30	9,3	0,8	**LR25×30×12,5**	–	**SD30×37×4**	**G30×37×4**
	13,3	0,8	**LR25×30×16,5**	**IR25×30×17-XL**	**SD30×37×4**	**G30×37×4**
	17,3	0,8	**LR25×30×20,5**	**IR25×30×20-XL**	**SD30×37×4**	**G30×37×4**
	–	0,8	–	–	**SD30×37×4**	**G30×37×4**
	23,3	0,8	**LR25×30×26,5**	**IR25×30×26,5-XL**	**SD30×37×4**	**G30×37×4**
	35,3	0,8	**LR25×30×38,5**	**IR25×30×38,5-XL**	**SD30×37×4**	**G30×37×4**

Drawn cup needle roller bearings with open ends

Drawn cup needle roller bearings with closed end

Unsealed



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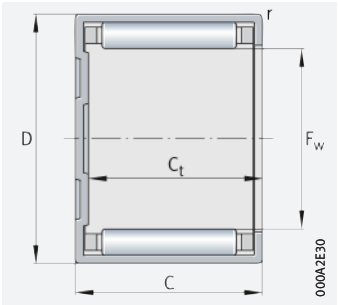


BK

F_w = 32 – 60 mm

Main dimensions			Basic load ratings		Fatigue limit load	Limiting speed	Speed rating	Drawn cup needle roller bearings with open ends		Drawn cup needle roller bearings with closed end	
F_w	D	C	dyn. C_r	stat. C_{0r}	C_{ur}	n_G	$n_{\vartheta r}$	Mass m	Designation ➤*893|1.12* ➤*894|1.13*	Mass m	Designation ➤*893|1.12* ➤*894|1.13*
		–0,3	N	N	N	min^{-1}	min^{-1}	≈ g		≈ g	
32	39	20	23 000	42 500	5 500	8 100	5 900	40,6	**HK3220**	–	–
	39	24	27 500	54 000	7 300	8 100	5 900	49	**HK3224**	–	–
35	42	12	13 100	21 300	2 800	7 500	5 800	27	**HK3512**	–	–
	42	16	18 700	33 500	4 400	7 500	5 600	36	**HK3516**	–	–
	42	20	23 800	46 000	5 900	7 500	5 500	44	**HK3520**	53	**BK3520**
40	47	12	14 000	24 300	3 200	6 600	5 200	30	**HK4012**	–	–
	47	16	20 000	38 500	5 000	6 600	5 000	39	**HK4016**	–	–
	47	20	25 500	52 000	6 800	6 600	4 900	54	**HK4020**	62	**BK4020**
45	52	12	14 900	27 500	3 600	5 900	4 650	33	**HK4512**	–	–
	52	16	21 300	43 000	5 700	5 900	4 550	46	**HK4516**	–	–
	52	20	27 000	59 000	7 600	5 900	4 450	56	**HK4520**	72	**BK4520**
50	58	20	31 000	63 000	8 200	5 300	4 050	70	**HK5020**	–	–
	58	25	38 500	84 000	11 700	5 300	4 000	90	**HK5025**	109	**BK5025**
55	63	20	31 500	67 000	8 700	4 850	3 800	74	**HK5520**	–	–
	63	28	44 000	103 000	14 700	4 850	3 700	105	**HK5528**	–	–
60	68	12	17 400	32 000	4 250	4 450	3 750	49	**HK6012**	–	–
	68	20	33 500	75 000	9 800	4 450	3 500	81	**HK6020**	–	–
	68	32	53 000	135 000	19 700	4 450	3 400	136	**HK6032**	–	–

medias ➤ *https://www.schaeffler.de/std/1F17*

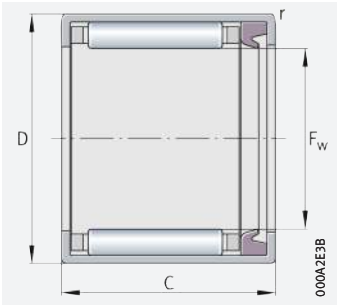
[1] For unsealed drawn cup needle roller bearings, dimensionally matched sealing rings of series G or SD can be used to provide protection against contamination.

Dimensions			Suitable inner rings ➤*992*		Suitable sealing rings[1] ➤*1026*	
F_w	C_t min.	r min.	LR designation	IR designation		
32	–	0,8	–	**IR28×32×20-XL**	–	–
	–	0,8	–	–	–	–
35	–	0,8	**LR30×35×12,5**	**IR30×35×13-XL**	**SD35×42×4**	**G35×42×4**
	–	0,8	**LR30×35×16,5**	**IR30×35×16-XL**	**SD35×42×4**	**G35×42×4**
	17,3	0,8	**LR30×35×20,5**	**IR30×35×20-XL**	**SD35×42×4**	**G35×42×4**
40	–	0,8	**LR35×40×12,5**	–	**SD40×47×4**	**G40×47×4**
	–	0,8	**LR35×40×16,5**	**IR35×40×17-XL**	**SD40×47×4**	**G40×47×4**
	17,3	0,8	**LR35×40×20,5**	**IR35×40×20-XL**	**SD40×47×4**	**G40×47×4**
45	–	0,8	–	–	**SD45×52×4**	**G45×52×4**
	–	0,8	**LR40×45×16,5**	**IR40×45×17-XL**	**SD45×52×4**	**G45×52×4**
	17,3	0,8	**LR40×45×20,5**	**IR40×45×20-XL**	**SD45×52×4**	**G45×52×4**
50	–	0,8	**LR45×50×20,5**	–	**SD50×58×4**	**G50×58×4**
	22,3	0,8	–	**IR45×50×25-XL**	**SD50×58×4**	**G50×58×4**
55	–	0,8	**LR50×55×20,5**	–	**SD55×63×5**	**G55×63×5**
	–	0,8	–	–	**SD55×63×5**	**G55×63×5**
60	–	0,8	–	–	–	–
	–	0,8	–	–	–	–
	–	0,8	–	–	–	–

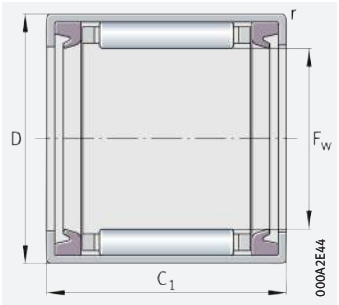
Drawn cup needle roller bearings with open ends

Drawn cup needle roller bearings with closed end

Sealed



HK..-RS

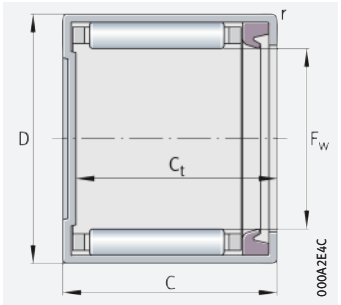


HK..-2RS

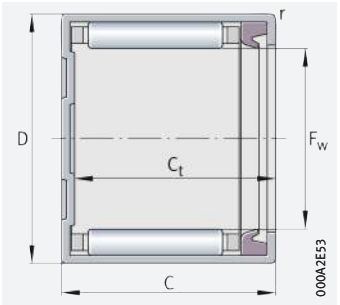
F_w = 8 – 50 mm

Main dimensions				Basic load ratings		Fatigue limit load	Limiting speed	Drawn cup needle roller bearings with open ends			
								Sealed on one side		Sealed on both sides	
F_w	D	C	C_1	dyn. C_r	stat. C_{0r}	C_{ur}	n_G grease	Mass m	Designation ➤*893|1.12* ➤*894|1.13*	Mass m	Designation ➤*893|1.12* ➤*894|1.13*
		–0,3	–0,3	N	N	N	min^{-1}	≈ g		≈ g	
8	12	10	10	2 180	1 930	265	17 700	–	–	3,2	**HK0810-2RS**
	12	12	12	2 750	2 600	290	17 700	3	**HK0810-RS**	3,3	**HK0812-2RS**
	12	12	–	3 800	3 950	500	17 700	3,1	**HK0812-RS**	–	–
10	14	10	10	2 410	2 330	320	14 600	–	–	4	**HK1010-2RS**
	14	12	12	3 200	3 350	380	14 600	–	–	4,3	**HK1012-2RS**
	14	14	14	4 400	5 100	650	14 600	4,2	**HK1012-RS**	4,6	**HK1014-2RS**
12	16	14	14	4 950	6 200	800	12 400	–	–	11	**HK1214-2RS**
	18	16	16	6 500	7 300	860	12 000	10	**HK1214-RS**	11	**HK1216-2RS**
14	20	16	16	7 100	8 500	1 010	10 500	12	**HK1414-RS**	13	**HK1416-2RS**
15	21	16	16	7 800	9 800	1 190	9 900	12	**HK1514-RS**	15	**HK1516-2RS**
	21	20	20	10 500	14 400	1 780	9 900	16	**HK1518-RS**	18	**HK1520-2RS**
16	22	16	16	7 600	9 700	1 160	9 300	13	**HK1614-RS**	14	**HK1616-2RS**
	22	20	20	10 900	15 300	1 900	9 300	–	–	18	**HK1620-2RS**
18	24	16	16	8 100	10 900	1 300	8 400	14	**HK1814-RS**	15	**HK1816-2RS**
20	26	16	16	8 600	12 100	1 450	7 600	–	–	18	**HK2016-2RS**
	26	20	20	12 700	20 100	2 500	7 600	21	**HK2018-RS**	23	**HK2020-2RS**
22	28	16	16	9 100	13 400	1 600	7 000	16	**HK2214-RS**	18	**HK2216-2RS**
	28	20	20	13 400	22 100	2 800	7 000	24	**HK2218-RS**	26	**HK2220-2RS**
25	32	16	16	11 000	15 200	1 990	6 100		–	27	**HK2516-2RS**
	32	20	20	15 600	24 000	3 150	6 100	29	**HK2518-RS**	31	**HK2520-2RS**
	32	24	24	19 900	33 000	4 200	6 100	–	–	40	**HK2524-2RS**
	32	30	30	25 500	45 000	6 200	6 100	–	–	47	**HK2530-2RS**
28	35	20	20	16 400	26 500	3 450	5 500	31	**HK2818-RS**	34	**HK2820-2RS**
30	37	16	16	12 100	18 200	2 390	5 200	–	–	31	**HK3016-2RS**
	37	20	20	17 200	29 000	3 750	5 200	37	**HK3018-RS**	36	**HK3020-2RS**
	37	24	24	22 000	39 500	5 100	5 200	–	–	44	**HK3024-2RS**
35	42	16	16	13 100	21 300	2 800	4 500	–	–	32	**HK3516-2RS**
	42	20	20	18 700	33 500	4 400	4 500	39	**HK3518-RS**	41	**HK3520-2RS**
40	47	16	16	14 000	24 300	3 200	3 950	–	–	37	**HK4016-2RS**
	47	20	20	20 000	38 500	5 000	3 950	45	**HK4018-RS**	48	**HK4020-2RS**
45	52	20	20	21 300	43 000	5 700	3 550	50	**HK4518-RS**	54	**HK4520-2RS**
50	58	24	24	31 000	63 000	8 200	3 150	76	**HK5022-RS**	81	**HK5024-2RS**

medias ➤ *https://www.schaeffler.de/std/1F18*



BK..-RS with F_w < 25 mm

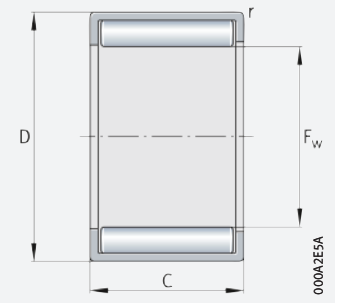


BK..-RS with F_w ≧ 25 mm

	Drawn cup needle roller bearings with closed end		Dimensions		Suitable inner rings ➤*992*		
	Sealed				for HK..-RS and HK..-2RS		for BK..-RS
F_w	Mass m ≈ g	Designation ➤*893* | *1.12* ➤*894* | *1.13*	C_t min.	r min.	LR designation	IR designation	Designation
8	–	–	–	0,4	**–**	**–**	–
	–	–	–	0,4	**–**	**IR5×8×12-XL**	–
	–	–	–	0,4	**–**	**IR5×8×12-XL**	–
10	–	–	–	0,4	**LR7×10×10,5**	**IR7×10×10,5-XL**	–
	4,3	**BK1012-RS**	10,4	0,4	**–**	**IR7×10×12-XL**	–
	–	–	–	0,4	**–**	**–**	–
12	–	–	–	0,8	**–**	**–**	–
	–	–	–	0,8	**–**	**IR9×12×16-XL**	–
14	13	**BK1414-RS**	11,3	0,8	**–**	**–**	–
15	14	**BK1514-RS**	11,3	0,8	**LR12×15×16,5**	**IR12×15×16-XL**	–
	–	–	–	0,8	**–**	**–**	–
16	15	**BK1614-RS**	11,3	0,8	**–**	**IR12×16×16-XL**	**IR12×16×13-XL**
	–	–	–	0,8	**–**	**IR12×16×20-XL**	–
18	–	–	–	0,8	**LR15×18×16,5**	**IR15×18×16-XL**	–
20	–	–	–	0,8	**LR17×20×16,5**	**IR17×20×16-XL**	–
	24	**BK2018-RS**	15,3	0,8	**LR17×20×20,5**	**IR17×20×20-XL**	–
22	–	–	–	0,8	**–**	**IR17×22×16-XL**	–
	–	–	–	0,8	**–**	**IR17×22×23-XL**	–
25	–	–	–	0,8	**LR20×25×16,5**	**IR20×25×17-XL**	–
	34	**BK2518-RS**	15,3	0,8	**LR20×25×20,5**	**IR20×25×20-XL**	**LR20×25×20,5**
	–	–	–	0,8	**–**	**–**	–
	–	–	–	0,8	**–**	**IR20×25×30-XL**	–
28	–	–	–	0,8	**LR22×28×20,5**	**IR22×28×20-XL**	–
30	–	–	–	0,8	**LR25×30×16,5**	**IR25×30×17-XL**	–
	–	–	–	0,8	**LR25×30×20,5**	**IR25×30×20-XL**	–
	–	–	–	0,8	**–**	**–**	–
35	–	–	–	0,8	**LR30×35×16,5**	**IR30×35×16-XL**	–
	–	–	–	0,8	**LR30×35×20,5**	**IR30×35×20-XL**	–
40	–	–	–	0,8	**LR35×40×16,5**	**IR35×40×17-XL**	–
	–	–	–	0,8	**LR35×40×20,5**	**IR35×40×20-XL**	–
45	–	–	–	0,8	**LR40×45×20,5**	**IR40×45×20-XL**	–
50	–	–	–	0,8	**–**	**IR45×50×25-XL**	–

Drawn cup needle roller bearings with open ends

Full complement
Unsealed



HN

F_w = 8 – 50 mm

Main dimensions			Basic load ratings		Fatigue limit load	Limiting speed	Speed rating	Mass	Designation ➤*893*|*1.12* ➤*894*|*1.13*
F_w	D	C	dyn. C_r	stat. C_{0r}	C_{ur}	n_G grease	$n_{\vartheta r}$	m	
			N	N	N	min^{-1}	min^{-1}	≈ g	
8	12	8	5 000	6 700	870	12 700	18 000	3	**HN0808**
12	16	10	8 000	13 400	1 850	8 900	11 900	5,3	**HN1210**
	18	12	10 200	15 200	1 950	8 600	12 000	10,5	**HN1212**
14	20	12	11 000	17 500	2 260	7 500	10 400	12	**HN1412**
15	21	16	15 400	27 500	3 600	7 100	9 600	14	**HN1516**
16	22	12	12 000	20 300	2 600	6 700	9 200	13	**HN1612**
18	24	16	17 000	32 500	4 250	6 000	8 000	20	**HN1816**
20	26	20	22 400	48 000	6 600	5 400	7 200	29,5	**HN2020**
25	32	20	28 000	59 000	7 900	4 350	5 800	39,6	**HN2520**
28	35	20	30 000	67 000	9 000	3 950	5 200	44	**HN2820**
35	42	20	33 500	83 000	11 100	3 200	4 250	54	**HN3520**
40	47	20	36 000	95 000	12 700	2 800	3 750	60,5	**HN4020**
45	52	20	38 500	108 000	14 500	2 500	3 400	66	**HN4520**
	52	25	47 000	139 000	19 500	2 500	3 350	85	**HN4525**
50	58	20	44 500	119 000	16 200	2 260	3 100	85,3	**HN5020**
	58	25	54 000	152 000	21 700	2 260	3 050	107	**HN5025**

medias ➤ *https://www.schaeffler.de/std/1F19*

Dimensions		Suitable inner rings ➤*992*	
F_w	r min.	LR designation	IR designation
8	0,4	–	–
12	0,4	**LR8×12×10,5**	**IR8×12×10,5-XL**
	0,8	**LR8×12×12,5**	**IR8×12×12,5-XL**
14	0,8	–	**IR10×14×13-XL**
15	0,8	**LR12×15×16,5**	**IR12×15×16-XL**
16	0,8	–	**IR12×16×13-XL**
18	0,8	**LR15×18×16,5**	**IR15×18×16-XL**
20	0,8	**LR17×20×20,5**	**IR17×20×20-XL**
25	0,8	**LR20×25×20,5**	**IR20×25×20-XL**
28	0,8	**LR22×28×20,5**	**IR20×28×20-XL**
35	0,8	**LR30×35×20,5**	**IR30×35×20-XL**
40	0,8	**LR35×40×20,5**	**IR32×40×20-XL**
45	0,8	**LR40×45×20,5**	**IR40×45×20-XL**
	0,8	–	–
50	0,8	**LR45×50×20,5**	–
	0,8	**LR45×50×25,5**	**IR45×50×25-XL**

Needle roller bearings

Matrix for bearing preselection

The matrix gives an overview of the types and design features of needle roller bearings.

It can be used to make a preliminary assessment of whether a bearing is fundamentally suitable for the envisaged application.

The additional information provided in the product chapter (see column "detailed information") and in the Technical principles must, however, be observed in addition to this overview in selection of the bearing.

Design features and suitability			Machined needle roller bearings		
+++ extremely suitable ++ highly suitable + suitable (+) suitable with restrictions – not suitable/not applicable ✓ available			with ribs, with or without inner ring	without ribs, with or without inner ring	detailed information ➤ 914
Load carrying capacity	radial		+++	+++	➤ 921|1.2
	axial, one direction		–	–	➤ 921|1.2
	axial, both directions		–	–	➤ 921|1.2
	moments		–	–	
Compensation of angular misalignments	static		–	–	➤ 921|1.3
	dynamic		–	–	➤ 921|1.3
Bearing design	cylindrical bore		✓	✓	➤ 914|1.1
	tapered bore		–	–	
	separable		✓[1]	✓	➤ 914|1.1
Lubrication	greased		✓[3]	–	➤ 922|1.4
Sealing	open		✓	✓	➤ 922|1.5
	non-contact		–	–	➤ 922|1.5
	contact		✓	–	➤ 922|1.5
Operating temperature in °C	from to		–30[6] +120	–30[6] +120	➤ 924|1.8
Suitability for	high speeds		+++	+++	➤ 923|1.6
	high running accuracy		++	++	➤ 926|1.11 ➤ 114
	low-noise running		+	+	➤ 923|1.7 ➤ 27
	high rigidity		+++	+++	➤ 54
	reduced friction		++	++	➤ 56
	length compensation within bearing		+++	+++	➤ 914|1.1 ➤ 25
	non-locating bearing arrangement		+++	+++	➤ 139
	locating bearing arrangement		–	–	➤ 139
X-life bearings		X-life	✓	✓	➤ 920
Inside diameter d and F_w in mm	from to		5 415	5 100	➤ 936
Product tables	from page ➤		936	956	

1) Only the inner rings can be mounted separately
2) Valid for axial component only in bearings without an end cap
3) Sealed bearings only
4) NKX..-Z is greased
5) NKXR..-Z is greased
6) Valid for bearings with sheet steel cage. With plastic cage: –20 °C to +120 °C
7) For mounting in pairs
8) Valid for NKIB only

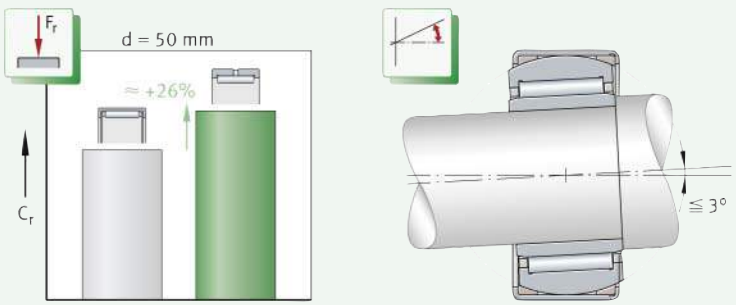
	Aligning needle roller bearings		Combined needle roller bearings				
	with or without inner ring	detailed information ➤ 914	needle roller/ axial deep groove ball bearings	needle roller/ axial cylindrical roller bearings	needle roller/ angular contact ball bearings	detailed information ➤ 964	
	+++	➤ 921 | 1.2	+++	+++	+++	➤ 968 | 2.2	F_r
	–	➤ 921 | 1.2	++	+++	+	➤ 968 | 2.2	F_a
	–	➤ 921 | 1.2	–	–	++ 8)	➤ 968 | 2.2	F_a
	–		–	–	–		M
	++	➤ 921 | 1.3	–	–	–	➤ 970 | 2.3	
	–	➤ 921 | 1.3	–	–	–	➤ 970 | 2.3	
	✓	➤ 914 | 1.1	✓	✓	✓	➤ 964 | 2.1	
	–		–	–	–		
	✓ 1)	➤ 914 | 1.1	✓ 2)	✓ 2)	✓ 1)	➤ 964 | 2.1	
	–	➤ 922 | 1.4	– 4)	– 5)	–	➤ 971 | 2.4	
	✓	➤ 922 | 1.5	✓	✓	✓	➤ 972 | 2.5	
	–	➤ 922 | 1.5	–	–	–	➤ 972 | 2.5	
	–	➤ 922 | 1.5	–	–	–	➤ 972 | 2.5	
	–20 +100	➤ 924 | 1.8	–30 +120	–30 +120	–30 +120	➤ 973 | 2.8	
	++	➤ 923 | 1.6	+++	++	+++	➤ 972 | 2.6	n
	+	➤ 926 | 1.11 ➤ 114	++	++	++	➤ 974 | 2.11 ➤ 114	
	(+)	➤ 923 | 1.7 ➤ 27	(+)	(+)	(+)	➤ 973 | 2.7 ➤ 27	
	+	➤ 54	+++	+++	+++	➤ 54	
	++	➤ 56	++	++	++	➤ 56	
	+++	➤ 914 | 1.1 ➤ 25	(+)	(+)	(+)	➤ 25	
	+++	➤ 139	–	–	–	➤ 139	
	–	➤ 139	(+) 7)	(+) 7)	+	➤ 139	
	✓	➤ 920	✓	✓	✓	➤ 968	X-life
	12 45	➤ 962	7 70	15 50	12 70	➤ 984	
	962		984	988	990		

1 Needle roller bearings, aligning needle roller bearings

The bearings:

- can support high to very high radial forces
- are used when the load carrying capacity or accuracy of drawn cup needle roller bearings with open ends is no longer sufficient and the high load capacity of cylindrical roller bearings is not yet required
- can only support radial loads and, as a result, are highly suitable for use as non-locating bearings (they permit axial displacement of the shaft relative to the housing in the bearing)
- permit high speeds in spite of line contact
- compensate misalignments between the shaft and housing (aligning needle roller bearings)
- require only a very small radial design envelope, particularly if the bearing arrangement is designed without an inner ring
- are available in numerous sizes and designs
- result in particularly compact, cost-effective and economical bearing arrangements.

For an overview of other product-specific features, see the Matrix for bearing preselection ➤*912*.



1
Needle roller bearing in X-life quality: comparison of load carrying capacity with drawn cup needle roller bearing (open ends) of almost identical dimensions; angular adjustment facility of aligning needle roller bearings (permissible adjustment angle)

C_r = *basic dynamic load rating*

1.1 Bearing design

Design variants

Needle roller bearings are available as:

- needle roller bearings with ribs on the outer ring ➤*915*|*2* to ➤*917*|*5*
- needle roller bearings without ribs on the outer ring ➤*918*|*6* and ➤*918*|*7*
- aligning needle roller bearings ➤*919*|*8* and ➤*919*|*9*
- combined needle roller bearings ➤*964*.

Needle roller bearings are X-life bearings ➤*920*.
In addition to the bearings described in this chapter, needle roller bearings are also available in other series, designs and sizes, as well as for specific applications, by agreement.

Needle roller bearings

✎ *Needle roller bearings are non-locating bearings*

Needle roller bearings are rolling bearings with a low radial section height and high load carrying capacity, which are used as non-locating bearings and are part of the group of radial needle roller bearings. These bearings comprise machined outer rings, needle roller and cage assemblies and removable inner rings, i.e. they can be supplied with or without an inner ring in accordance with the application ➤*915*|*2* to ➤*919*|*8*.
In contrast to the outer cups of drawn cup needle roller bearings, which are produced by forming methods, the bearing rings are machined.
Due to their non-locating bearing function, the bearings cannot guide the shaft axially in any direction.

Needle roller bearings with ribs on the outer ring

✎ *The needle roller and cage assembly is guided by the ribs*

Needle roller bearings with ribs are ready-to-fit units. The outer ring and needle roller and cage assembly form a self-retaining unit. The needle roller and cage assembly is guided by the ribs on the outer ring. The outer ring has a lubrication groove and at least one lubrication hole. There is no relubrication facility in types NK with $F_w \leqq 10$ mm and NKI with $d \leqq 7$ mm.
The bearings are predominantly of a single row design, type RNA69 is of a double row design above an enveloping circle diameter $F_w = 40$ mm and is therefore fitted with two needle roller and cage assemblies.
The bearings are available:

- with or without an inner ring ➤*915*|*2* and ➤*916*|*4*
- in a single or double row design ➤*915*|*2* and ➤*916*|*4*
- as open or sealed versions ➤*916*|*3*, ➤*916*|*4*, ➤*922*|*1.5*.

Needle roller bearings with ribs on the outer ring, without inner ring

✎ *Available types*

Needle roller bearings with ribs on the outer ring and without an inner ring are available in the following types and dimension series:

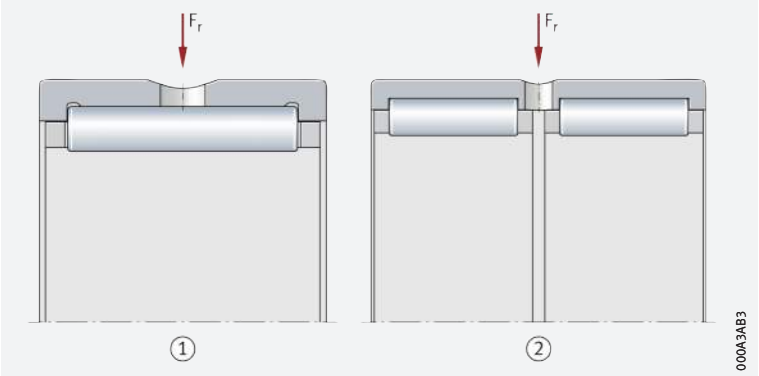
- NK, NKS, RNA48, RNA49, RNA69 (single row) ➤*915*|*2*
- RNA69..-ZW (double row) ➤*915*|*2*
- RNA49..-RSR, RNA49..-2RSR (sealed on one or both sides) ➤*916*|*3* and ➤*922*|*1.5*.

✎ *For bearing arrangements with particularly compact radial dimensions*

Bearings without an inner ring are highly suitable for bearing arrangements with particularly compact radial dimensions, if the shaft raceway can be hardened and ground ➤*928*|*1.16*. If no inner ring is used, the shaft can be designed to a greater thickness and thus with increased rigidity.

✎ *Length compensation (axial displacement facility)*

Radial needle roller bearings are used as non-locating bearings, i.e. when the shaft must allow axial length compensation relative to the housing. For bearings without an inner ring, the axial displacement facility of the shaft is dependent on the width of the shaft raceway.



2
Needle roller bearings with ribs on the outer ring, without inner ring, open

F_r = *radial load*

① *Single row needle roller bearing*

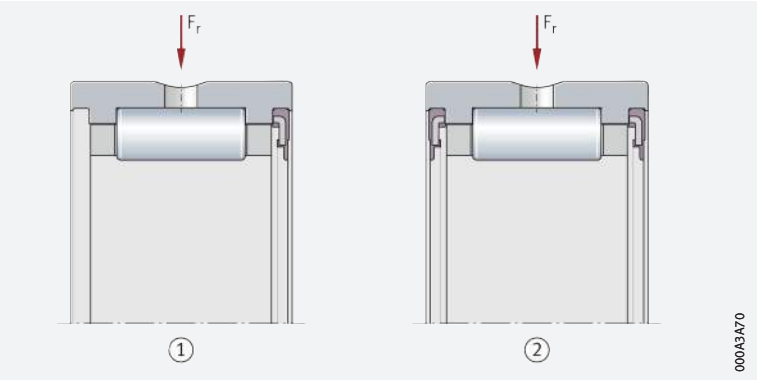
② *Double row needle roller bearing*

3
Needle roller bearings with ribs on the outer ring, without inner ring, sealed on one or both sides

F_r = *radial load*

① *Single row needle roller bearing, contact seal on one side*

② *Single row needle roller bearing, contact seal on both sides*



Needle roller bearings with ribs on the outer ring, with inner ring

Available types

Needle roller bearings with ribs on the outer ring and with an inner ring are available in the following types and dimension series:

- NKI, NKIS, NA48, NA49, NA69 (single row) ➤*916*|*4*
- NA69..-ZW (double row) ➤*916*|*4*
- NA49..-RSR, NA49..-2RSR (sealed on one or both sides) ➤*917*|*5* and ➤*922*|*1.5*.

Bearings with an inner ring are used if the shaft cannot be configured as a rolling bearing raceway. The bearings are of a single row design, NA69 is of a double row design from d ≧ 32 mm.

Axial displacement of the inner ring

For bearings with an inner ring, the axial displacement of the shaft relative to the housing occurs during rotational motion, without constraint in the bearing, between the needle rollers and the inner ring raceway without ribs. The maximum axial displacement s is given in the product tables. Where larger displacements occur, the standard ring can be replaced by a wider inner ring IR. Inner rings ➤*992*.

Replacement of inner rings

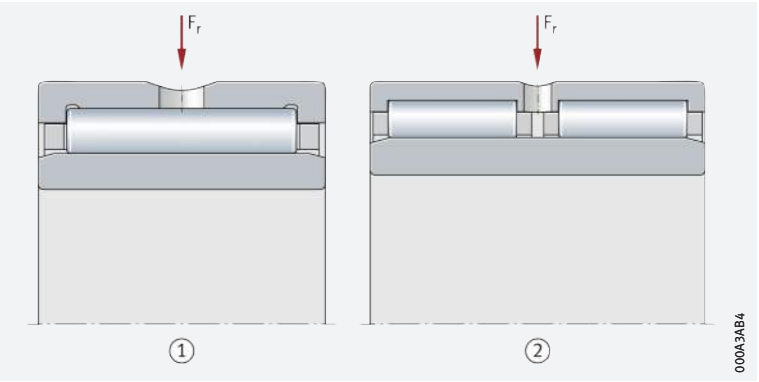
In the case of the standard bearings, the inner rings are matched to the enveloping circle tolerance F6 and can be interchanged with each other (mixed use) within the same accuracy class.

4
Needle roller bearings with ribs on the outer ring, with inner ring, open

F_r = *radial load*

① *Single row needle roller bearing*

② *Double row needle roller bearing*

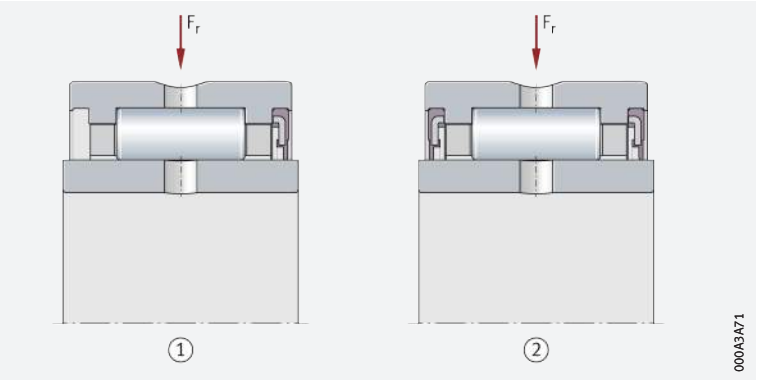


5
Needle roller bearings with ribs on the outer ring, with inner ring, sealed on one or both sides

F_r = *radial load*

① *Single row needle roller bearing, contact seal on one side*

② *Single row needle roller bearing, contact seal on both sides*



Needle roller bearings without ribs on the outer ring

The bearing components can be mounted independently of each other

Needle roller bearings without ribs on the outer ring are ready-to-fit units. The bearings are not self-retaining. This means that the outer ring, needle roller and cage assembly and inner ring can be fitted independently of each other. The needle roller and cage assembly can be mounted in different ways: it can be fitted together with the shaft, the outer ring or the inner ring, or it can be subsequently inserted between the outer ring and shaft or inner ring. The needle roller and cage assembly and outer ring must not, however, be interchanged with identical components from other bearings during mounting, but should always be fitted as supplied. The majority of the bearings are of a single row design. Double row bearings comprise two single row needle roller and cage assemblies arranged adjacent to each other. They have a lubrication groove in the circumference of the outer ring, at least one lubrication hole in the outer ring and the suffix ZW-ASR1 ➤*926*|*1.12*. Bearings are also available with a lubrication hole in the inner ring; these have the suffix IS1 ➤*926*|*1.12*.

Needle roller bearings without ribs on the outer ring are available:

- with and without an inner ring ➤*918*|*6* and ➤*918*|*7*
- in a single or double row design ➤*916*|*3* and ➤*917*|*5*.

Needle roller bearings without ribs on the outer ring, without inner ring

Available types

Needle roller bearings without ribs on the outer ring and without an inner ring are available in the following types:

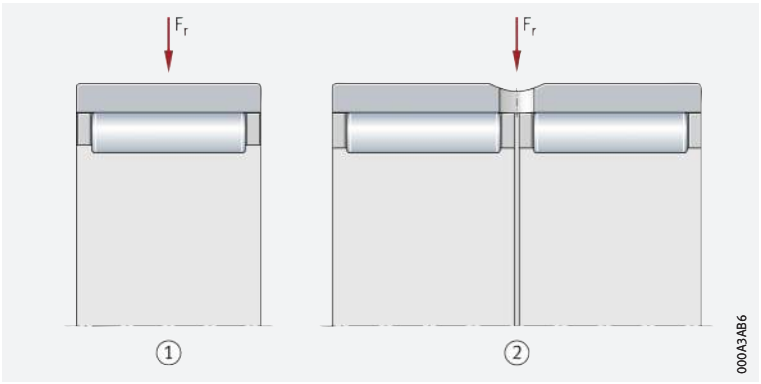
- RNAO (single row) ➤*918*|*6*
- RNAO..-ZW-ASR1 (double row) ➤*918*|*6*.

For bearing arrangements with particularly compact radial dimensions

Bearings without an inner ring are highly suitable for bearing arrangements with particularly compact radial dimensions, if the shaft raceway can be hardened and ground ➤*928*|*1.16*. If no inner ring is used, the shaft can be designed to a greater thickness and thus with increased rigidity. If the shaft raceway is produced to the appropriate dimensional and geometrical accuracy, bearing arrangements with increased running accuracy can be achieved.

Length compensation (axial displacement facility)

Radial needle roller bearings are used as non-locating bearings, i. e. when the shaft must allow axial length compensation relative to the housing. For bearings without an inner ring, the axial displacement facility of the shaft is dependent on the width of the shaft raceway.



6
Needle roller bearings without ribs on the outer ring, without inner ring, open

F_r = *radial load*

① *Single row needle roller bearing*

② *Double row needle roller bearing*

Needle roller bearings without ribs on the outer ring, with inner ring

Available types

Needle roller bearings without ribs on the outer ring and with an inner ring are available in the following types:

- NAO (single row) ➤*918*|*7*
- NAO..-ZW-ASR1 (double row) ➤*918*|*7*.

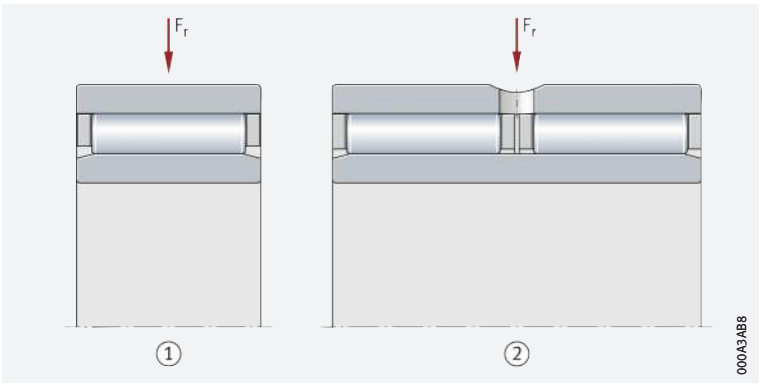
Bearings with an inner ring are used if the shaft cannot be configured as a rolling bearing raceway.

Axial displacement of the inner ring

For bearings with an inner ring, the axial displacement of the shaft relative to the housing occurs during rotational motion, without constraint in the bearing, between the needle rollers and the inner ring raceway without ribs. The maximum axial displacement s is given in the product tables ➤*960*|. Where larger displacements occur, the standard ring can be replaced by a wider inner ring IR. Inner rings ➤*992*.

Replacement of inner rings

The outer ring and the needle roller and cage assembly are matched to each other and must not be interchanged during mounting with components from other bearings of the same size. In the case of the standard bearings, the inner rings are matched to the enveloping circle tolerance F6 and can be interchanged with each other (mixed use) within the same accuracy class.



7
Needle roller bearings without ribs on the outer ring, with inner ring, open

F_r = *radial load*

① *Single row needle roller bearing*

② *Double row needle roller bearing*

Aligning needle roller bearings

Suitable for the compensation of angular misalignments

Aligning needle roller bearings comprise drawn outer cups, plastic support rings with a concave inner profile, outer rings with a spherical outside surface, needle roller and cage assemblies and removable inner rings ➤*919*|*8*. As a result of their design, these bearings can compensate misalignments, since the outer ring, with its spherical outside surface, is able to move in the concave plastic support ring ➤*921*|*1.3*. Due to their non-locating bearing function, the bearings cannot guide the shaft axially in any direction.

Aligning needle roller bearings without inner ring

Available types

Aligning needle roller bearings are available in type RPNA ➤*919*|*8*.

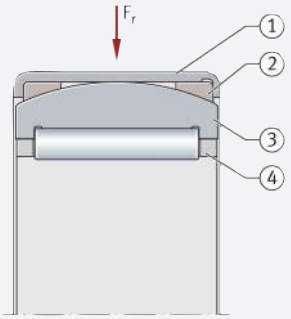
For bearing arrangements with particularly compact radial dimensions

Bearings without an inner ring are highly suitable for bearing arrangements with low section height and particularly compact dimensions, if the shaft raceway can be hardened and ground ➤*928*|*1.16*. If no inner ring is used, the shaft can be designed to a greater thickness and thus with increased rigidity.

8
Aligning needle roller bearing without inner ring

F_r = *radial load*

① *Drawn outer cup*
② *Plastic support rings with concave inner profile*
③ *Outer ring with spherical outside surface*
④ *Needle roller and cage assembly*



Aligning needle roller bearings with inner ring

Available types

Aligning needle roller bearings are available in type PNA ➤*919*|*9*.

Bearings with an inner ring are used if the shaft cannot be configured as a rolling bearing raceway.

Axial displacement of the inner ring

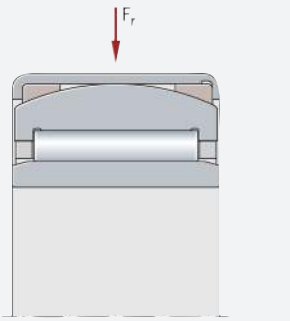
For bearings with an inner ring, the axial displacement of the shaft relative to the housing occurs during rotational motion, without constraint in the bearing, between the needle rollers and the inner ring raceway without ribs. The maximum axial displacement s is given in the product tables ➤*962*|. Where larger displacements occur, the standard ring can be replaced by a wider inner ring of series IR. Inner rings ➤*992*.

Replacement of inner rings

In the case of the standard bearings, the inner rings are matched to the enveloping circle tolerance F6 and can be interchanged with each other (mixed use) within the same accuracy class.

9
Aligning needle roller bearing with inner ring

F_r = *radial load*



X-life premium quality

The radial needle roller bearings described here are X-life bearings. These bearings are characterised by a very high load carrying capacity and long rating life. This is achieved, for example, through the modified internal construction and optimised contact geometry between the needle rollers and raceways, as well as through the higher quality of the steel and rolling elements, higher surface quality and appropriate heat treatment and/or coating.

Advantages

Increased customer benefits due to X-life

The technical enhancements offer a range of advantages, such as:

- a more favourable load distribution in the bearing and thus a higher dynamic load carrying capacity of the bearings
- quieter running
- running with reduced friction and greater energy efficiency
- lower heat generation in the bearing
- higher possible speeds
- lower lubricant consumption and, consequently, longer maintenance intervals
- a measurably longer operating life
- high operational security
- compact, environmentally-friendly bearing arrangements.

Lower operating costs, higher machine availability

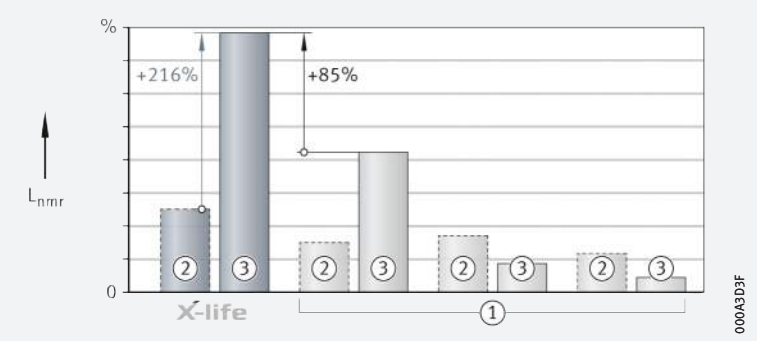
In conclusion, these advantages improve the overall cost-efficiency of the bearing position significantly and thus bring about a sustainable increase in the efficiency of the machine and equipment.

Suffix XL

X-life radial needle roller bearings include the suffix XL in the designation ➤*920*| *10*, ➤*927*| *14* and ➤*936*|.

10

Calculated rating life and rating life verified in tests – comparison between X-life needle roller bearing and bearings without X-life quality



L_{nmr} = *adjusted reference rating life*

① *Bearing without X-life quality*
② *Calculated rating life*
③ *Rating life verified in tests*

Areas of application

Wide application range

Due to their special technical features, X-life needle roller bearings are highly suitable for bearing arrangements in:

- printing machinery
- the food and packaging industry
- compressors
- fluid and hydraulic pumps
- automotive chassis and gearboxes
- gearboxes for industrial, rail and wind turbine applications
- agricultural vehicles and equipment.

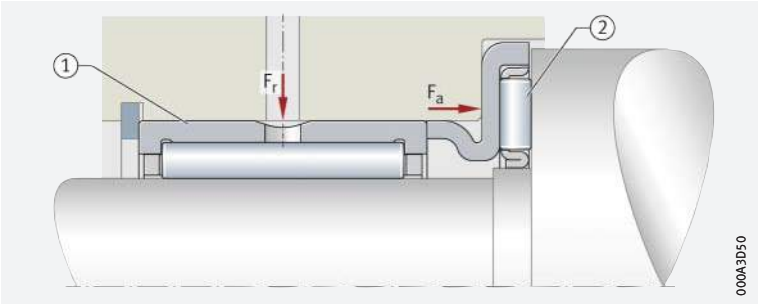
X-life indicates a high product performance density and thus a particularly significant benefit to the customer. Further information on X-life ➤*10*.

1.2 Load carrying capacity

The bearings are pure radial bearings

Radial needle roller bearings support very high radial forces due to the presence of line contact, but may only be subjected to purely radial load. If the bearing position is also required to support axial forces, the needle roller bearings can, for example, be combined with axial needle roller bearings AXW ➤921|11. An extensive range of combined needle roller bearings is also available for combined loads ➤964.

If the surface of the shaft raceway is produced to DIN 617, the basic load ratings C_r in the product tables must be reduced by 15%.



11 *Radial needle roller bearing combined with axial needle roller bearing*

F_r = *radial load*
F_a = *axial load*

① *Needle roller bearing NK*
② *Axial needle roller bearing AXW*

1.3 Compensation of angular misalignments

The bearings are not suitable for the compensation of shaft misalignments relative to the housing.

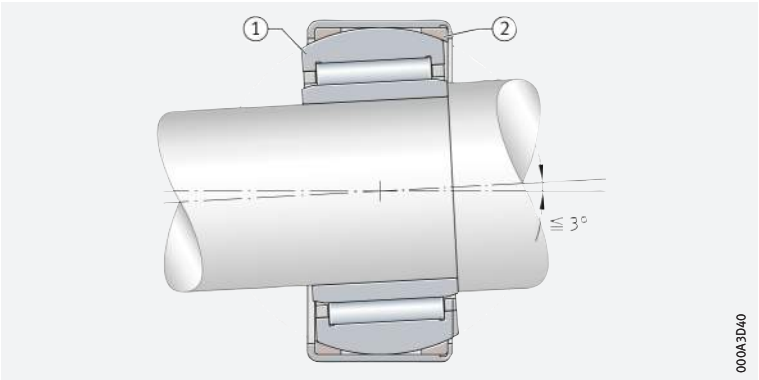
Needle roller bearings with or without ribs on the outer ring are not suitable for the compensation of angular misalignments. The extent to which a misalignment of the shaft can be tolerated relative to the housing bore is dependent on factors such as the design of the bearing arrangement, the size of the bearing, the operating clearance and the load. As a result, no guide value can be specified here for a possible misalignment. If angular misalignments occur, aligning needle roller bearings can be used ➤921|12.

In all cases, misalignments cause increased running noise, place increased strain on the cages and have a harmful influence on the operating life of the bearings.

Aligning needle roller bearings

Aligning needle roller bearings can compensate static misalignment

Due to the spherical outer ring and the concave support ring, aligning bearings can compensate static misalignments between the shaft and housing of up to 3° ➤921|12 and ➤914|1.1. The bearings must not, however, be used to support swivel or tumbling motion. During adjustment motion between the outer cup and the ring, a breakaway torque occurs. In order that adjustment motion can take place, the tolerances for the housing bore must be observed ➤930|5.



12 *Compensation of misalignments*

① *Spherical outer ring*
② *Concave support ring*

1.4 Lubrication

Needle roller bearings with or without ribs on the outer ring

Greased bearings

The sealed bearings are greased with a high quality lithium complex soap grease to GA08. Arcanol LOAD150 is suitable for relubrication.
For this purpose, the outer ring has a lubrication groove and a lubrication hole ➤914|1.1.

Do not wash greased bearings out prior to mounting. If mounting is carried out using thermal tools, the bearings should not be heated to a temperature in excess of +80 °C, taking account of the grease filling and seal material. If higher heating temperatures are required, it must be ensured that the permissible upper temperature limits for grease and seals are not exceeded. Schaeffler recommends the use of induction heating devices for heating purposes ➤231.

Ungreased bearings

Open bearings are not greased. They must be lubricated with oil or grease.

Compatibility with plastic cages

When using bearings with plastic cages, compatibility between the lubricant and the cage material must be ensured if synthetic oils, lubricating greases with a synthetic oil base or lubricants containing a high proportion of EP additives are used.

Observe oil change intervals

Aged oil and additives in the oil can impair the operating life of plastics at high temperatures. As a result, stipulated oil change intervals must be strictly observed.

If there is any uncertainty regarding the suitability of the selected lubricant for the application, please consult Schaeffler or the lubricant manufacturer.

1.5 Sealing

The bearings are open or sealed

Needle roller bearings are available in an unsealed design in accordance with DIN 617:2008 and ISO 3245:2015 and a sealed design in accordance with DIN 617:2008.

Sealed bearings

Integrated seals are particularly space-saving

Under normal operating conditions, contact seals give protection against contamination, spray water and the loss of lubricant. The integration of such seals into the bearing provides a compact, reliable, proven and economical sealing solution ➤916|3 and ➤917|5.
The sealing material used is the oil-resistant and wear-resistant elastomer material NBR. The seal lips are in contact with a defined contact pressure against the sliding surface.

Unsealed bearings

Provide seals in the adjacent construction

In the case of unsealed bearings, sealing of the bearing position must be carried out in the adjacent construction. This must reliably prevent:

- moisture and contaminants from entering the bearing
- the egress of lubricant from the bearing.

Sealing rings must not be used as running surfaces for the cage, as these will be damaged as a result and no longer able to fulfil their sealing function.

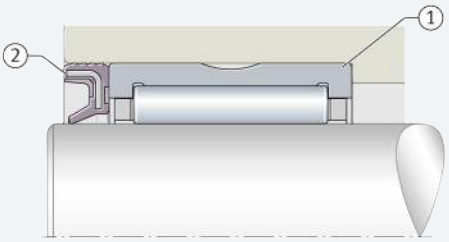
Sealing of the bearing position with a sealing ring G

✎ *Effective sealing elements for use in sealing open bearings*

Bearing positions with open needle roller bearings can be sealed cost-effectively with sealing rings G. The sealing rings are designed as contact seals and are arranged in front of the bearing ➤*923*|🗀 *13*.
They are suitable for circumferential velocities at the running surface of up to 10 m/s and protect the bearing position reliably against contamination, spray water and the excessive loss of lubricant. The sealing rings are matched to the low radial dimensions of needle roller bearings. They are very easy to fit, since they are simply pressed into the housing bore.

🗀 ***13***
Sealing of the bearing position with a sealing ring G

① *Needle roller bearing with ribs on the outer ring, open*
② *Sealing ring G*



1.6 Speeds

✎ *Limiting speeds and reference speeds in the product tables*

The product tables generally give two speeds for the bearings ➤*936*|▦:
- the kinematic limiting speed n_G
- the thermal speed rating $n_{\vartheta r}$.

Limiting speeds

The limiting speed n_G is the kinematically permissible speed of the bearing. Even under favourable mounting and operating conditions, this value should not be exceeded without prior consultation with Schaeffler ➤*64*.

The values given in the product tables are valid for oil lubrication in the case of bearings without seals and for grease lubrication where bearings are supplied greased and with seals.

✎ *Values for grease lubrication*

For grease lubrication, 60% of the value stated in the product tables is permissible in the case of aligning needle roller bearings.

Reference speeds

✎ *$n_{\vartheta r}$ is used to calculate n_ϑ*

The thermal speed rating $n_{\vartheta r}$ is not an application-oriented speed limit, but is a calculated ancillary value for determining the thermally safe operating speed n_ϑ ➤*64*.

✎ *Bearings with contact seals*

For bearings with contact seals, no reference speeds are defined in accordance with DIN ISO 15312:2004. As a result, only the limiting speed n_G is given in the product tables for these bearings.

1.7 Noise

Schaeffler Noise Index

The Schaeffler Noise Index (SGI) is not yet available for this bearing type ➤*69*. The data for these bearing series will be introduced and updated in stages.

Further information:
- ***medias*** ➤*https://medias.schaeffler.com*.

1.8 Temperature range

✎ *Limiting values*

The operating temperature of the bearings is limited by:

- the dimensional stability of the bearing rings and rolling elements
- the cage
- the lubricant
- the seals.

Possible operating temperatures of needle roller bearings with ribs ➤*924*|▦ *1*.

▦ **1** *Permissible temperature ranges*

Operating temperature	Needle roller bearings with or without ribs, aligning needle roller bearings		
	open bearings	sealed bearings, aligning needle roller bearings	with plastic cage
	–30 °C to +120 °C	–20 °C to +100 °C limited by the lubricant, seal material and the plastic support ring	–20 °C to +120 °C

In the event of anticipated temperatures which lie outside the stated values, please contact Schaeffler.

1.9 Cages

✎ *Solid cages made from polyamide PA66 and sheet steel are used as standard*

The standard cages are made from sheet steel or plastic (polyamide PA66). Bearings with a plastic cage have the suffix TV. Aligning needle roller bearings are fitted with sheet steel cages.

1.10 Internal clearance

Radial internal clearance

✎ *The standard is CN*

Needle roller bearings with an inner ring are manufactured as standard with radial internal clearance CN (normal) ➤*924*|▦ *2*. CN is not stated in the designation.

For bearings with ribs on the outer ring, certain sizes are also available by agreement with the larger internal clearance C3.

The values for radial internal clearance in bearings with an inner ring correspond to DIN 620-4:2004 (ISO 5753-1:2009) ➤*924*|▦ *2*. They are valid for bearings which are free from load and measurement forces (without elastic deformation).

Bearings with inner ring

▦ **2** *Radial internal clearance of needle roller bearings with inner ring*

Nominal bore diameter d mm		Radial internal clearance			
		CN (Group N) µm		C3 (Group 3) µm	
over	incl.	min.	max.	min.	max.
–	24	20	45	35	60
24	30	20	45	35	60
30	40	25	50	45	70
40	50	30	60	50	80
50	65	40	70	60	90
65	80	40	75	65	100
80	100	50	85	75	110
100	120	50	90	85	125
120	140	60	105	100	145

continued ▼

2 *Radial internal clearance of needle roller bearings with inner ring*

Nominal bore diameter d mm		Radial internal clearance CN (Group N) µm		C3 (Group 3) µm	
over	incl.	min.	max.	min.	max.
140	160	70	120	115	165
160	180	75	125	120	170
180	200	90	145	140	195
200	225	105	165	160	220
225	250	110	175	170	235
250	280	125	195	190	260
280	315	130	205	200	275
315	355	145	225	225	305
355	400	190	280	280	370
400	450	210	310	310	410
450	500	220	330	330	440

continued ▲

Enveloping circle diameter F_w for bearings without an inner ring

In the case of bearings without an inner ring, the enveloping circle diameter is used

In the case of bearings without inner ring, the dimension for the enveloping circle diameter F_w is used instead of the radial internal clearance. The enveloping circle is the inner inscribed circle of the needle rollers in clearance-free contact with the outer raceway. For bearings before fitting, the enveloping circle F_w is in the tolerance class F6. Deviations ➤*925*|**3**.

3 *Deviations for the enveloping circle diameter*

Enveloping circle diameter F_w mm		Tolerance class F6		Tolerance class F8	
		Tolerance for enveloping circle diameter F_w			
		upper deviation	lower deviation	upper deviation	lower deviation
over	incl.	µm	µm	µm	µm
3	6	+18	+10	+28	+10
6	10	+22	+13	+35	+13
10	18	+27	+16	+43	+16
18	30	+33	+20	+53	+20
30	50	+41	+25	+64	+25
50	80	+49	+30	+76	+30
80	120	+58	+36	+90	+36
120	180	+68	+43	+106	+43
180	250	+79	+50	+122	+50
250	315	+88	+56	+137	+56
315	400	+98	+62	+151	+62
400	500	+108	+68	+165	+68

Bearings without ribs on the outer ring

If the enveloping circle is to be in tolerance class F6, the outer ring/needle roller cage assembly as a matched pair (as delivered) must not be interchanged with parts from other matched pairs during mounting of the bearings.

1.11 Dimensions, tolerances

Dimension standards

The main dimensions of needle roller bearings correspond to ISO 15:2017. The main dimensions of types RNA48, NA48, RNA49, NA49, RNA69, NA69 correspond to DIN 617:2008 and ISO 1206:2001.

Nominal dimensions of needle roller bearings with ribs ➤*936*|▦.

Chamfer dimensions

The limiting dimensions for chamfer dimensions correspond to DIN 620-6:2004. The maximum chamfer dimensions for the inner rings to DIN 620-6:2004 must be taken into consideration. Overview and limiting values ➤*135*|*7.11*. Nominal value of chamfer dimension ➤*936*|▦.

Tolerances

The tolerances for the dimensional and running accuracy of needle roller bearings correspond to ISO 492:2014. This excludes the types RNA48, NA48, RNA49, NA49, RNA69, NA69 and aligning needle roller bearings; the dimensional and running tolerances of these bearings correspond to ISO 1206:2001. Needle roller bearings with ribs are available by agreement with increased dimensional, geometrical and running accuracy (suffix P5). This excludes the outside diameter and the width of the outer cup in aligning needle roller bearings. The width has a tolerance of ±0,5 mm.

1.12 Suffixes

For a description of the suffixes used in this chapter ➤*926*|▦*4* and ***medias*** interchange ➤*https://www.schaeffler.de/std/1D52*.

▦**4**
Suffixes and corresponding descriptions

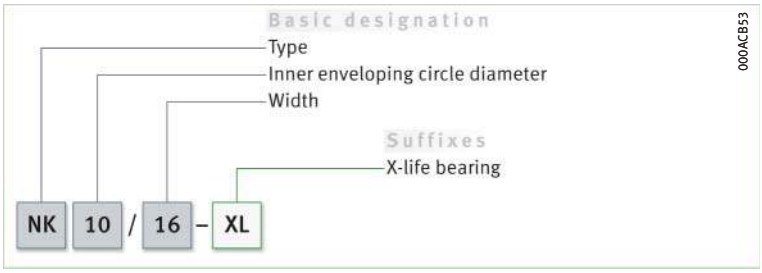
Suffix	Description of suffix	
ASR1	Lubrication hole and lubrication groove in the outer ring, dependent on the size	Standard
C3	Radial internal clearance C3 (larger than normal)	Special design, available by agreement
D	Bearing with improved steel cage for downsizing option	Standard
IS1	Lubrication hole in the inner ring, dependent on the size	
P5	Bearing with high dimensional, geometrical and running accuracy	Special design, available by agreement
RSR	Contact seal on one side (lip seal)	Standard
TV	Bearing with cage made from glass fibre reinforced polyamide PA66	
TW	Bearing with cage made from glass fibre reinforced polyamide PA66 and two short needle rollers per cage pocket	Available by agreement
XL	X-life bearing	Standard
ZW	Double row design, dependent on the size	
2RSR	Contact seal on both sides (lip seal)	

1.13 Structure of bearing designation

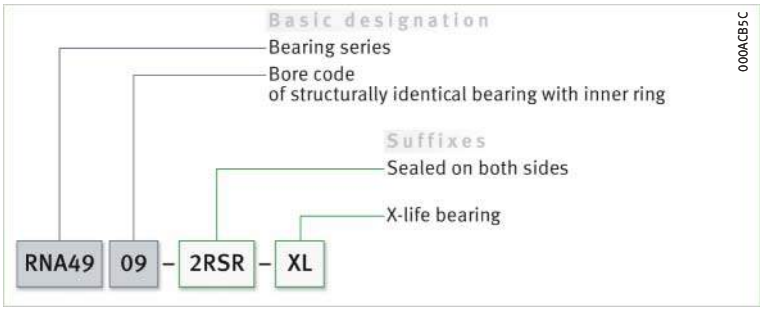
Examples of composition of bearing designation

The designation of bearings follows a set model. Examples ➤*927*|*14* to ➤*927*|*17*. The composition of designations is subject in part to DIN 623-1 ➤*102*|*10*.

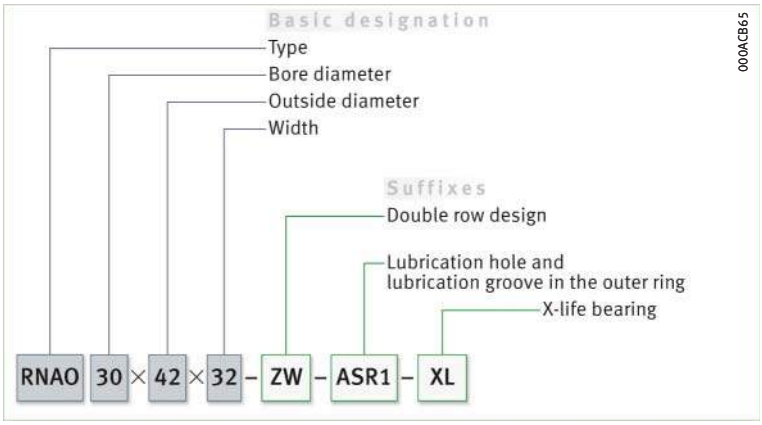
14
Single row needle roller bearing with ribs on the outer ring, without inner ring, open: designation structure



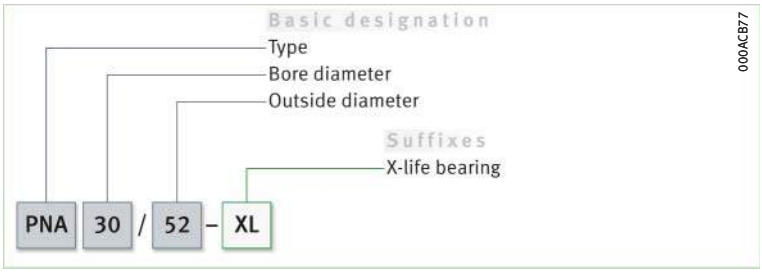
15
Single row needle roller bearing with ribs on the outer ring, without inner ring, sealed on both sides: designation structure



16
Double row needle roller bearing without ribs on the outer ring, without inner ring, open: designation structure



17
Aligning needle roller bearing with inner ring: designation structure



1.14 Dimensioning

Equivalent dynamic bearing load

✎ *$P = F_r$ under purely radial load of constant magnitude and direction*

The basic rating life equation $L = (C_r/P)^p$ used in the dimensioning of bearings under dynamic load assumes a load of constant magnitude and direction. In radial bearings, this is a purely radial load F_r. If this condition is met, the bearing load F_r is used in the rating life equation for P ($P = F_r$) ➤*928*| *1*.

Needle roller bearings and aligning needle roller bearings are non-locating bearings and may only be subjected to radial load.

1
Equivalent dynamic load

$$P = F_r$$

Legend

P	N	Equivalent dynamic bearing load
F_r	N	Radial load.

Equivalent static bearing load

For needle roller bearings subjected to static load ➤*928*| *2*.

2
Equivalent static load

$$P_0 = F_{0r}$$

Legend

P_0	N	Equivalent static bearing load
F_{0r}	N	Largest radial load present (maximum load).

Static load safety factor

✎ *$S_0 = C_0/P_0$*

In addition to the basic rating life L (L_{10h}), it is also always necessary to check the static load safety factor S_0 ➤*928*| *3*.

3
Static load safety factor

$$S_0 = \frac{C_0}{P_0}$$

Legend

S_0	–	Static load safety factor
C_0	N	Basic static load rating
P_0	N	Equivalent static bearing load.

1.15 Minimum load

✎ *In order to prevent damage due to slippage, a minimum radial load of $P > C_{0r}/60$ is required*

In order that no slippage occurs between the contact partners, the needle roller bearings must be constantly subjected to a sufficiently high load. Based on experience, a minimum radial load of the order of $P > C_{0r}/60$ is thus necessary. In most cases, however, the radial load is already higher than the requisite minimum load due to the weight of the supported parts and the external forces.

If the minimum radial load is lower than indicated above, please consult Schaeffler.

1.16 Design of bearing arrangements

✎ *Support bearing rings over their entire circumference and width*

In order to allow full utilisation of the load carrying capacity of the bearings and achieve the requisite rating life, the bearing rings must be rigidly and uniformly supported by means of contact surfaces over their entire circumference and over the entire width of the raceway. Support can be provided by means of a cylindrical seating surface. The seating and contact surfaces should not be interrupted by grooves, holes or other recesses. The accuracy of mating parts must meet specific requirements ➤*930*| *6* and ➤*931*| *7*.

Radial location

For secure radial location, tight fits are necessary

Needle roller bearings with an inner ring are radially located by means of fits on the shaft and in the housing. In addition to supporting the rings adequately, the bearings must also be securely located in a radial direction, to prevent creep of the bearing rings on the mating parts under load. This is generally achieved by means of tight fits between the bearing rings and the mating parts. If the rings are not secured adequately or correctly, this can cause severe damage to the bearings and adjacent machine parts. Influencing factors, such as the conditions of rotation, magnitude of the load, internal clearance, temperature conditions, design of the mating parts, mounting and dismounting options etc., must be taken into consideration in the selection of fits.

If shock type loads occur, tight fits (transition fit or interference fit) are required to prevent the rings from coming loose at any point. Clearance, transition or interference fits ➤*150*|▦ *6* and ➤*158*|▦ *7*.

The following information provided in Technical principles must be taken into consideration in the design of bearing arrangements:

- conditions of rotation ➤*145*
- tolerance classes for cylindrical shaft seats (radial bearings) ➤*147*|▦ *2*
- shaft fits ➤*150*|▦ *6*
- tolerance classes for bearing seats in housings (radial bearings) ➤*148*|▦ *4*
- housing fits ➤*158*|▦ *7*.

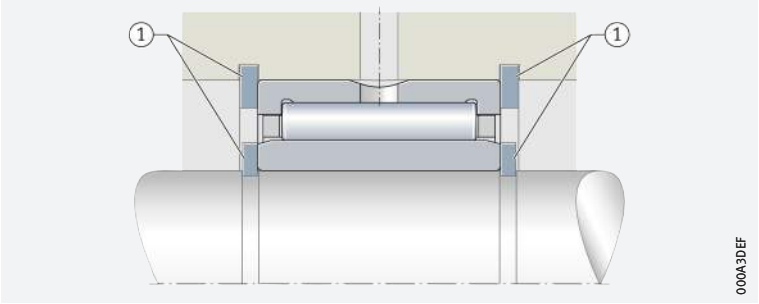
Axial location – location methods

The bearings must also be securely located in an axial direction

As a tight fit alone is not normally sufficient to also locate the bearing rings securely on the shaft and in the housing bore in an axial direction, this must usually be achieved by means of an additional axial location or retention method. The axial location of the bearing rings must be matched to the type of bearing arrangement. Shaft and housing shoulders, housing covers, nuts, spacer rings and retaining rings etc., are fundamentally suitable ➤*929*|⧉ *18* and ➤*929*|⧉ *19*.

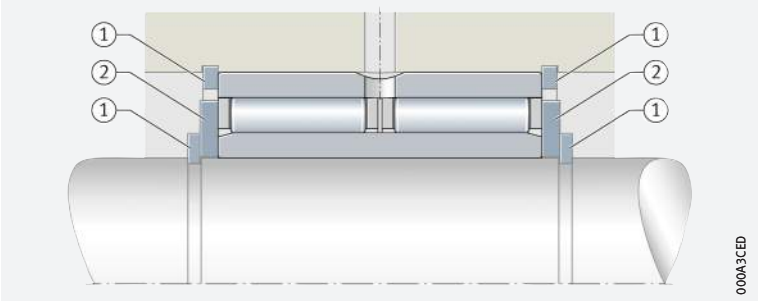
⧉ 18
Axial location of the bearing rings in bearings with ribs on the outer ring

① *Retaining ring*



⧉ 19
Axial location of the bearing rings in bearings without ribs on the outer ring

① *Retaining ring*
② *Axial washer*



Axial guidance of the needle roller and cage assemblies in bearings without ribs on the outer ring

The needle roller and cage assemblies must be axially guided on lateral, burr-free running surfaces. The running surfaces for the cage must be precision machined (Ra 2) and resistant to wear. The product tables give the maximum value of the radius r_a, the diameters of the abutment shoulders d_a, D_a and the dimension d_b, D_b for axial guidance of the needle roller and cage assembly. Mounting dimensions ➤956.

Tolerances of the housing bore for aligning needle roller bearings

5 *Tolerance classes and surface design for housings, as a function of the material – for aligning needle roller bearings*

Housing material	Bore tolerance to ISO 286-2	Roundness tolerance max.	Parallelism tolerance max.	Recommended mean roughness value Ramax (Rzmax) µm
Steel or cast iron	N6 Ⓔ	IT5/2	IT5/2	0,8 (4)
Light metal	R6 Ⓔ			

Dimensional, geometrical and running accuracy of cylindrical bearing seats

A minimum of IT6 should be provided for the shaft seat and a minimum of IT7 for the housing seat

The accuracy of the cylindrical bearing seat on the shaft and in the housing should correspond to the accuracy of the bearing used. For needle roller bearings with ribs with the tolerance class Normal, the shaft seat should correspond to a minimum of standard tolerance grade IT6 and the housing seat to a minimum of IT7. Guide values for the geometrical and positional tolerances of the bearing seating surfaces ➤930 6, tolerances t_1 to t_3 in accordance with ➤168 11. Numerical values for IT grades ➤931 7.

6 *Guide values for the geometrical and positional tolerances of bearing seating surfaces*

Bearing tolerance class		Bearing seating surface	Standard tolerance grades to ISO 286-1 (IT grades)			
to ISO 492	to DIN 620		Diameter tolerance	Roundness tolerance t_1	Parallelism tolerance t_2	Total axial runout tolerance of abutment shoulder t_3
Normal	PN (P0)	Shaft	IT6 (IT5)	Circumferential load IT4/2	Circumferential load IT4/2	IT4
				Point load IT5/2	Point load IT5/2	
		Housing	IT7 (IT6)	Circumferential load IT5/2	Circumferential load IT5/2	IT5
				Point load IT6/2	Point load IT6/2	
–	P5	Shaft	IT5	Circumferential load IT2/2	Circumferential load IT2/2	IT2
				Point load IT3/2	Point load IT3/2	
		Housing	IT6	Circumferential load IT3/2	Circumferential load IT3/2	IT3
				Point load IT4/2	Point load IT4/2	

7
Numerical values for ISO standard tolerances (IT grades) to ISO 286-1:2010

IT grade	Nominal dimension in mm											
	over	3	6	10	18	30	50	80	120	180	250	315	400
	incl.	6	10	18	30	50	80	120	180	250	315	400	500
	Values in µm												
IT2		1,5	1,5	2	2,5	2,5	3	4	5	7	8	9	10
IT3		2,5	2,5	3	4	4	5	6	8	10	12	13	15
IT4		4	4	5	6	7	8	10	12	14	16	18	20
IT5		5	6	8	9	11	13	15	18	20	23	25	27
IT6		8	9	11	13	16	19	22	25	29	32	36	40
IT7		12	15	18	21	25	30	35	40	46	52	57	63

Roughness of cylindrical bearing seating surfaces

Ra must not be too high

The roughness of the bearing seats must be matched to the tolerance class of the bearings. The mean roughness value Ra must not be too high, in order to maintain the interference loss within limits. The shafts must be ground, while the bores must be precision turned. Guide values as a function of the IT grade of bearing seating surfaces ➤*931*|▦*8*.

8
Roughness values for cylindrical bearing seating surfaces – guide values

Nominal diameter of the bearing seat d (D) mm		Recommended mean roughness value for ground bearing seats Ramax µm			
		Diameter tolerance (IT grade)			
over	incl.	IT7	IT6	IT5	IT4
–	80	1,6	0,8	0,4	0,2
80	500	1,6	1,6	0,8	0,4

Mounting dimensions

The contact surfaces for the rings must be of sufficient height

The mounting dimensions of the shaft and housing shoulders, and spacer rings etc., must ensure that the contact surfaces for the bearing rings are of sufficient height. However, they must also reliably prevent rotating parts of the bearing from grazing stationary parts. The abutment shoulders (shaft, housing) should be perpendicular to the bearing axis.

The transition from the bearing seat to the abutment shoulder must be designed with rounding to DIN 5418 or an undercut to DIN 509.

Chamfer dimensions

The chamfer dimensions r are given in the product tables. These dimensions are limiting dimensions (minimum dimensions); the actual values should not be lower than specified. The overlap between the snap rings and the end faces of the bearing rings must be sufficiently large.

Raceway for bearings without an inner ring (direct bearing arrangement)

The raceway must be suitable as a rolling bearing raceway

In the case of needle roller bearings without an inner ring, the rolling element raceway on the shaft must be hardened and ground. Tolerances and surface designs are shown in ➤*932*|▦*9*. The surface hardness of the raceway must be 670 HV to 840 HV, the hardening depth CHD or SHD must be sufficiently large.

The values in the tables are valid for housing tolerances up to K7 Ⓔ. For tighter bores, the operating clearance should be checked by either calculation or measurement.

9 *Tolerance classes and surface design of raceways for needle roller bearings without an inner ring*

Shaft diameter Nominal dimension mm		Shaft tolerance[1] Operating clearance			Design of raceway		
					Roundness tolerance	Parallelism tolerance	Recommended mean roughness value Ramax (Rzmax)
over	incl.	small	normal	large	max.	max.	µm
–	65	k5	h5	g6	IT3	IT3	0,1 (0,4)
65	80	k5	h5	f6			
80	120	k5	g5	f6			0,15 (0,63)
120	160	k5	g5	f6			0,2 (1)
160	180	k5	g5	e6			
180	200	j5	g5	e6			
200	250	j5	f6	e6			
250	315	h5	f6	e6			
315	415	g5	f6	d6			

1) *The envelope requirement Ⓔ applies.*

Shaft raceway to DIN 617

If the surface of the shaft raceway is produced to DIN 617, the basic load ratings C_r in the product tables must be reduced by 15% ➤*921|1.2*.

Steels for the raceway

Through hardening steels

Through hardening steels in accordance with ISO 683-17 (e.g. 100Cr6) are suitable as materials for rolling bearing raceways in direct bearing arrangements. These steels can also be surface layer hardened.

Case hardening steels

Case hardening steels must correspond to DIN EN ISO 683-17 (e.g. 17MnCr5, 18CrNiMo7-6) or EN 10084 (e.g. 16MnCr5).

Steels for inductive surface layer hardening

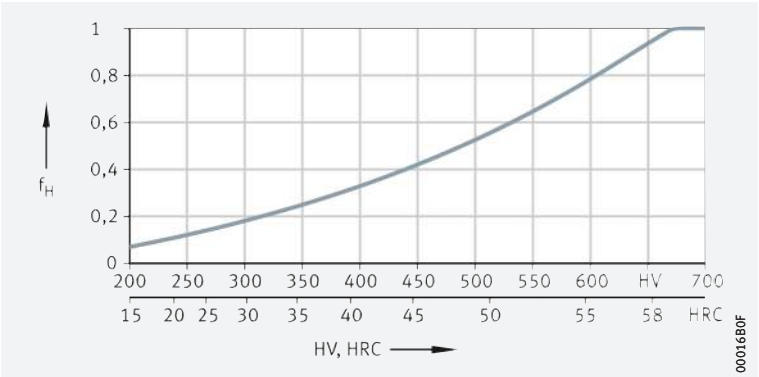
For flame and induction hardening, steels in accordance with DIN EN ISO 683-17 (e.g. C56E2, 43CrMo4) or DIN 17212 (e.g. Cf53) should be used.

Raceway hardness of less than 670 HV

If the raceway fulfils the requirements for rolling bearing materials but the raceway hardness is less than 670 HV, the load on the bearing arrangement cannot be as high as the full load carrying capacity of the bearing. In order to determine the dynamic and static load carrying capacity of the bearing arrangement, the basic dynamic load rating C of the bearings must be multiplied by the reduction factor f_H (dynamic hardness factor) and the basic static load rating C_{0r} by the reduction factor f_{H0} (static hardness factor) ➤*932|20* and ➤*933|21*.

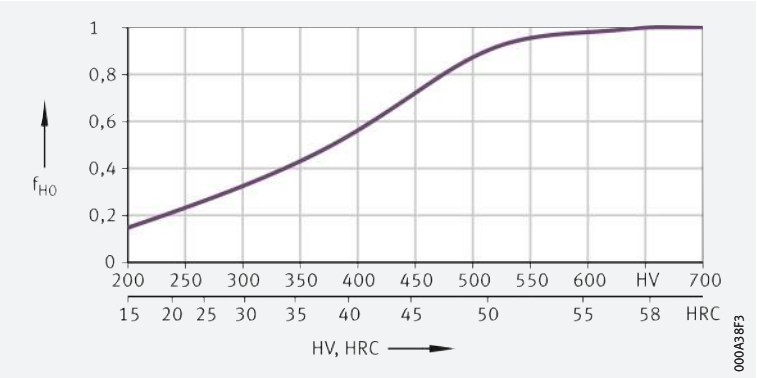
20 *Dynamic hardness factor at reduced hardness of raceways/rolling elements*

f_H = *dynamic hardness factor*
HV, HRC = *surface hardness*



21
Static hardness factor at reduced hardness of raceways/rolling elements

f_{H0} = *static hardness factor*
HV, HRC = *surface hardness*



Determining the case hardening depth

Approximation value for case hardening depth

An approximation value for determining the minimum hardness depth is given in ➤*868*| *f 4*. The reference value for the load present is the equivalent stress in accordance with the distortion energy hypothesis (DEH) as a function of the rolling element diameter D_w and the magnitude of the load.

f 4
Case hardening depth

$$CHD \geqq 0{,}052 \cdot D_w$$

Legend

CHD	mm	Case hardening depth
D_w	mm	Rolling element diameter.

The local hardness must always be above the local requisite hardness, which can be calculated from the equivalent stress.

Determining the surface hardening depth

In these surface hardening methods, the load and contact geometry must be taken into consideration when determining the requisite hardening depth.

For calculation of the surface hardening depth SHD ➤*869*| *f 5*:

f 5
Surface hardening depth

$$SHD \geqq 140 \cdot D_w / R_{p0,2}$$

Legend

SHD	mm	Surface hardening depth
D_w	mm	Rolling element diameter
$R_{p0,2}$	N/mm²	Yield point of base material.

1.17 Mounting and dismounting

The mounting and dismounting options for needle roller bearings with ribs, by thermal, hydraulic or mechanical methods, must be taken into consideration in the design of the bearing position.

Aligning needle roller bearings

Mounting using pressing mandrel

Due to the drawn outer cup, the bearings must be mounted using a special pressing mandrel ➤*898*. The marked side of the bearing should be in contact with the flange of the mandrel. A toroidal ring on the mandrel holds the bearing securely on the mandrel.

Schaeffler Mounting Handbook

Rolling bearings must be handled with great care

Rolling bearings are well-proven precision machine elements for the design of economical and reliable bearing arrangements, which offer high operational security. In order that these products can function correctly and achieve the envisaged operating life without detrimental effect, they must be handled with care.

The Schaeffler Mounting Handbook MH 1 gives comprehensive information about the correct storage, mounting, dismounting and maintenance of rotary rolling bearings ➤ *https://www.schaeffler.de/std/1D53*. It also provides information which should be observed by the designer, in relation to the mounting, dismounting and maintenance of bearings, in the original design of the bearing position. This book is available from Schaeffler on request.

1.18 Legal notice regarding data freshness

✎ The further development of products may also result in technical changes to catalogue products

Of central interest to Schaeffler is the further development and optimisation of its products and the satisfaction of its customers. In order that you, as the customer, can keep yourself optimally informed about the progress that is being made here and with regard to the current technical status of the products, we publish any product changes which differ from the printed version in our electronic product catalogue.

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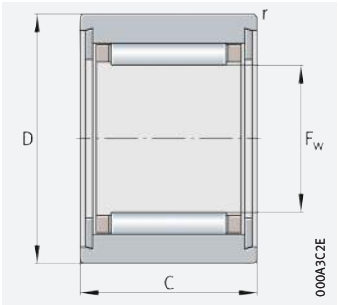
1.19 Further information

In addition to the data in this chapter, the following chapters in Technical principles must also be observed in the design of bearing arrangements:

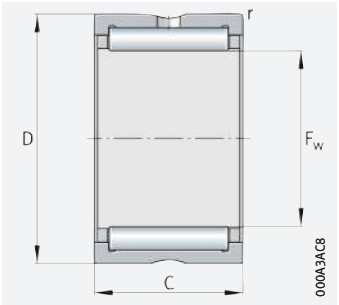
- Determining the bearing size ➤ *34*
- Rigidity ➤ *54*
- Friction and increases in temperature ➤ *56*
- Speeds ➤ *64*
- Bearing data ➤ *97*
- Lubrication ➤ *70*
- Sealing ➤ *182*
- Design of bearing arrangements ➤ *139*
- Mounting and dismounting ➤ *191*.

Needle roller bearings with ribs

Without inner ring
Open



NK (F_w ≦ 10 mm)



NK (F_w ≧ 12 mm), RNA49, RNA69

F_w = 5 – 19 mm

Main dimensions			Basic load ratings		Fatigue limit load	Limiting speed	Speed rating	Mass	Designation
F_w	D	C	dyn. C_r	stat. C_{0r}	C_{ur}	n_G	$n_{\vartheta r}$	m	➤*926* | *1.12* ➤*927* | *1.13* X-life ➤*920*
			N	N	N	min^{-1}	min^{-1}	≈ g	
5	10	10	2 650	1 920	295	39 000	55 000	3,1	**NK5/10-TV-XL**[2]
	10	12	3 400	2 650	435	39 000	54 000	3,7	**NK5/12-TV-XL**[2]
6	12	10	2 950	2 280	355	36 500	48 500	4,7	**NK6/10-TV-XL**[2]
	12	12	3 800	3 150	520	36 500	47 500	5,7	**NK6/12-TV-XL**[2]
7	14	10	3 250	2 650	410	34 500	43 000	6,9	**NK7/10-TV-XL**[2]
	14	12	4 150	3 600	600	34 500	42 000	8,2	**NK7/12-TV-XL**[2]
8	15	12	4 450	4 100	690	32 500	37 000	8,7	**NK8/12-TV-XL**[2]
	15	16	5 800	5 800	970	32 500	36 500	12	**NK8/16-TV-XL**[2]
9	16	12	5 100	5 000	840	31 000	32 000	10,3	**NK9/12-TV-XL**[2]
	16	16	6 600	7 100	1 190	31 000	32 000	12,8	**NK9/16-TV-XL**[2]
10	17	12	5 300	5 500	930	29 500	29 000	10,1	**NK10/12-TV-XL**[2]
	17	16	7 000	7 800	1 310	29 500	28 500	13,3	**NK10/16-TV-XL**[2]
12	19	12	7 200	7 100	1 280	26 500	22 400	12,1	**NK12/12-XL**
	19	16	10 100	11 000	1 920	26 500	21 600	15,9	**NK12/16-XL**
14	22	16	15 400	17 100	2 850	24 600	16 800	21,4	**NK14/16-D-XL**
	22	16	11 400	11 500	2 100	24 600	18 600	20,7	**NK14/16-XL**
	22	20	14 500	15 600	2 700	24 600	18 300	25,5	**NK14/20-XL**
	22	13	9 600	9 200	1 630	24 600	17 800	16,5	**RNA4900-XL**
15	23	16	12 100	12 700	2 320	23 900	17 300	21,8	**NK15/16-XL**
	23	20	15 400	17 200	3 000	23 900	17 000	26,6	**NK15/20-XL**
16	24	16	12 800	13 900	2 550	23 200	16 200	22,4	**NK16/16-XL**
	24	20	16 300	18 800	3 250	23 200	15 900	28,4	**NK16/20-XL**
	24	13	10 600	10 900	1 940	23 200	15 300	17,4	**RNA4901-XL**
	24	22	18 100	21 600	3 800	23 200	14 300	31	**RNA6901-XL**
17	25	16	13 500	15 000	2 750	22 600	15 300	23,7	**NK17/16-XL**
	25	20	17 100	20 400	3 550	22 600	15 000	29,8	**NK17/20-XL**
18	26	16	14 100	16 200	3 000	22 100	14 400	24,9	**NK18/16-XL**
	26	20	17 900	22 000	3 850	22 100	14 100	31,4	**NK18/20-XL**
19	27	16	14 700	17 400	3 200	21 600	13 700	26,1	**NK19/16-XL**
	27	20	18 700	23 600	4 150	21 600	13 400	32,2	**NK19/20-XL**

medias ➤ *https://www.schaeffler.de/std/1E00*

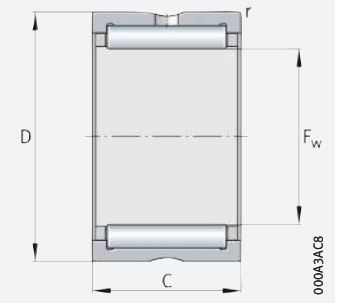
[1] For unsealed needle roller bearings, dimensionally matched sealing rings of series G or SD can be used to provide protection against contamination.

[2] With closing rings, without lubrication hole and groove.

Dimensions		Suitable sealing rings[1]	
		➤ *1026*	
F_W	r min.		
5	0,15	**GR5×10×2**	–
	0,15	**GR5×10×2**	–
6	0,15	**GR6×12×2**	–
	0,15	**GR6×12×2**	–
7	0,3	**GR7×14×2**	–
	0,3	**GR7×14×2**	–
8	0,3	**G8×15×3**	**SD8×15×3**
	0,3	**G5×15×3**	**SD8×15×3**
9	0,3	**G9×16×3**	–
	0,3	**G9×16×3**	–
10	0,3	**G10×17×3**	**SD10×17×3**
	0,3	**G10×17×3**	**SD10×17×3**
12	0,3	**G12×19×3**	**SD12×19×3**
	0,3	**G12×19×3**	**SD12×19×3**
14	0,3	**G14×22×3**	**SD14×22×3**
	0,3	**G14×22×3**	**SD14×22×3**
	0,3	**G14×22×3**	**SD14×22×3**
	0,3	**G14×22×3**	**SD14×22×3**
15	0,3	**G15×23×3**	**SD15×23×3**
	0,3	**G15×23×3**	**SD15×23×3**
16	0,3	**G16×24×3**	**SD16×24×3**
	0,3	**G16×24×3**	**SD16×24×3**
	0,3	**G16×24×3**	**SD16×24×3**
	0,3	**G16×24×3**	**SD16×24×3**
17	0,3	**G17×25×3**	**SD17×25×3**
	0,3	**G17×25×3**	**SD17×25×3**
18	0,3	**G18×26×4**	**SD18×26×4**
	0,3	**G18×26×4**	**SD18×26×4**
19	0,3	**G19×27×4**	**SD19×27×4**
	0,3	**G19×27×4**	**SD19×27×4**

Needle roller bearings with ribs

Without inner ring
Open



NK, NKS, RNA49, RNA69

F_w = 20 – 29 mm

Main dimensions			Basic load ratings		Fatigue limit load	Limiting speed	Speed rating	Mass	Designation
F_w	D	C	dyn. C_r	stat. C_{0r}	C_{ur}	n_G	$n_{\vartheta r}$	m	➤*926|1.12* ➤*927|1.13* X-life ➤*920*
			N	N	N	min^{-1}	min^{-1}	≈ g	
20	28	16	18 500	23 900	4 050	21 100	12 100	28,4	**NK20/16-D-XL**
	28	16	14 600	17 500	3 200	21 100	13 200	27	**NK20/16-XL**
	28	20	18 600	23 800	4 150	21 100	12 900	33,9	**NK20/20-XL**
	28	13	12 000	13 600	2 430	21 100	12 000	21,7	**RNA4902-XL**
	28	23	19 500	25 500	4 450	21 100	11 700	39,7	**RNA6902-XL**
	32	20	26 000	25 000	4 400	20 000	11 800	48,7	**NKS20-XL**
21	29	16	15 200	18 700	3 450	20 600	12 600	28,1	**NK21/16-XL**
	29	20	19 300	25 500	4 450	20 600	12 300	35,2	**NK21/20-XL**
22	30	16	15 800	19 900	3 650	20 000	12 000	30	**NK22/16-XL**
	30	20	20 000	27 000	4 700	20 000	11 700	37	**NK22/20-XL**
	30	13	12 400	14 600	2 600	20 000	10 900	22,2	**RNA4903-XL**
	30	23	21 100	29 000	5 100	20 000	10 500	42,4	**RNA6903-XL**
	35	20	27 500	28 000	4 900	18 500	10 900	61,5	**NKS22-XL**
24	32	16	16 900	22 300	4 100	18 500	11 000	31,9	**NK24/16-XL**
	32	20	21 400	30 500	5 300	18 500	10 700	40	**NK24/20-XL**
	37	20	29 500	31 000	5 400	17 200	10 100	65,5	**NKS24-XL**
25	33	16	16 800	22 400	4 150	17 800	10 700	32,6	**NK25/16-XL**
	33	20	21 300	30 500	5 300	17 800	10 400	42	**NK25/20-XL**
	37	17	23 700	25 500	4 600	16 900	9 900	52,3	**RNA4904-XL**
	37	30	40 500	51 000	9 100	16 900	9 500	100	**RNA6904-XL**
	38	20	31 000	33 500	5 800	16 600	9 700	68,1	**NKS25-XL**
26	34	16	17 300	23 600	4 350	17 200	10 300	34	**NK26/16-XL**
	34	20	22 000	32 000	5 600	17 200	10 100	42	**NK26/20-XL**
28	37	20	29 000	41 500	7 400	15 800	8 800	58	**NK28/20-D-XL**
	37	20	24 800	34 000	5 900	15 800	9 300	52,2	**NK28/20-XL**
	37	30	37 000	57 000	10 500	15 800	9 000	82	**NK28/30-XL**
	39	17	26 000	29 500	5 300	15 300	8 600	50,2	**RNA49/22-XL**
	39	30	42 000	55 000	9 900	15 300	8 400	98	**RNA69/22-XL**
	42	20	32 500	36 500	6 400	15 100	8 900	83,6	**NKS28-XL**
29	38	20	27 500	39 000	6 900	15 300	8 700	50	**NK29/20-TV-XL**
	38	30	37 000	57 000	10 600	15 300	8 800	84,3	**NK29/30-XL**

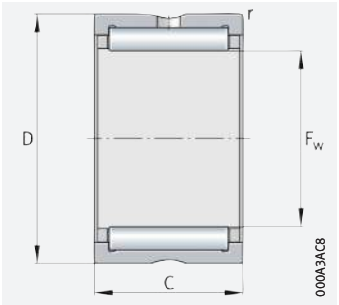
medias ➤ *https://www.schaeffler.de/std/1E01*

[1] For unsealed needle roller bearings, dimensionally matched sealing rings of series G or SD can be used to provide protection against contamination.

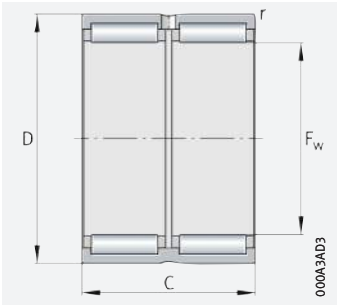
Dimensions		Suitable sealing rings[1)]	
F_w	r min.	➤ *1026*	
20	0,3	**G20×28×4**	**SD20×28×4**
	0,3	**G20×28×4**	**SD20×28×4**
	0,3	**G20×28×4**	**SD20×28×4**
	0,3	**G20×28×4**	**SD20×28×4**
	0,3	**G20×28×4**	**SD20×28×4**
	0,6	–	–
21	0,3	**G21×29×4**	–
	0,3	**G21×29×4**	–
22	0,3	**G22×30×4**	**SD22×30×4**
	0,3	**G22×30×4**	**SD22×30×4**
	0,3	**G22×30×4**	**SD22×30×4**
	0,3	**G22×30×4**	**SD22×30×4**
	0,6	–	–
24	0,3	**G24×32×4**	–
	0,3	**G24×32×4**	–
	0,6	–	–
25	0,3	**G25×33×4**	**SD25×33×4**
	0,3	**G25×33×4**	**SD25×33×4**
	0,3	–	–
	0,3	–	–
	0,6	–	–
26	0,3	**G26×34×4**	**SD26×34×4**
	0,3	**G26×34×4**	**SD26×34×4**
28	0,3	**G28×37×4**	–
	0,3	**G28×37×4**	–
	0,3	**G28×37×4**	–
	0,3	–	–
	0,3	–	–
	0,6	–	–
29	0,3	**G29×38×4**	–
	0,3	**G29×38×4**	–

Needle roller bearings with ribs

Without inner ring
Open



NK, NKS, RNA49, RNA69



RNA69..-ZW

F_w = 30 – 42 mm

Main dimensions			Basic load ratings		Fatigue limit load	Limiting speed	Speed rating	Mass	Designation
F_w	D	C	dyn. C_r	stat. C_{0r}	C_{ur}	n_G	$n_{\vartheta r}$	m	➤*926*|*1.12* ➤*927*|*1.13* X-life ➤*920*
			N	N	N	min^{-1}	min^{-1}	≈ g	
30	40	20	27 500	35 500	7 300	14 800	9 600	61	**NK30/20-TW-XL**
	40	20	28 000	41 000	7 200	14 800	8 500	61	**NK30/20-TV-XL**
	40	30	42 000	69 000	12 700	14 800	8 200	92,4	**NK30/30-TV-XL**
	42	17	26 500	31 500	5 700	14 400	8 100	61	**RNA4905-XL**
	42	30	44 000	59 000	10 600	14 400	7 900	112	**RNA6905-XL**
	45	22	36 500	40 000	6 900	14 000	8 500	104	**NKS30-XL**
32	42	20	29 500	44 500	7 800	14 000	8 000	64	**NK32/20-TV-XL**
	42	30	39 000	63 000	11 700	14 000	8 200	102	**NK32/30-XL**
	45	17	27 500	33 500	6 100	13 600	7 600	73,2	**RNA49/28-XL**
	45	30	45 500	63 000	11 400	13 600	7 400	135	**RNA69/28-XL**
	47	22	38 000	43 500	7 400	13 200	8 000	110	**NKS32-XL**
35	45	20	31 000	48 500	8 500	12 900	7 400	69,4	**NK35/20-TV-XL**
	45	30	46 000	81 000	15 000	12 900	7 100	106	**NK35/30-TV-XL**
	47	17	28 500	35 500	6 400	12 600	6 900	69,4	**RNA4906-XL**
	47	30	49 000	71 000	12 800	12 600	6 600	126	**RNA6906-XL**
	50	22	39 500	47 000	8 000	12 300	7 400	118	**NKS35-XL**
37	47	20	34 000	56 000	9 900	12 300	6 800	83	**NK37/20-D-XL**
	47	20	28 000	43 500	7 600	12 300	7 400	77	**NK37/20-XL**
	47	30	42 000	73 000	13 500	12 300	7 200	113	**NK37/30-XL**
	52	22	41 500	50 000	8 600	11 700	7 100	123	**NKS37-XL**
38	48	20	29 000	45 000	7 900	12 000	7 200	79,4	**NK38/20-XL**
	48	30	43 000	76 000	14 000	12 000	7 000	116	**NK38/30-XL**
40	50	20	33 500	56 000	9 800	11 400	6 500	78	**NK40/20-TV-XL**
	50	30	44 000	79 000	14 600	11 400	6 700	125	**NK40/30-XL**
	52	20	34 500	47 500	8 900	11 100	6 400	89,1	**RNA49/32-XL**
	52	36	53 000	82 000	15 100	11 100	6 500	162	**RNA69/32-ZW-XL**
	55	22	42 500	54 000	9 200	10 900	6 600	129	**NKS40-XL**
42	52	20	30 000	49 000	8 600	10 900	6 600	85,8	**NK42/20-XL**
	52	30	44 500	82 000	15 200	10 900	6 400	130	**NK42/30-XL**
	55	20	35 500	50 000	9 400	10 700	6 100	107	**RNA4907-XL**
	55	36	54 000	86 000	15 900	10 700	6 200	193	**RNA6907-ZW-XL**

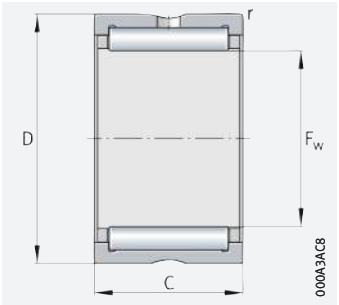
medias ➤ *https://www.schaeffler.de/std/1E02*

[1] For unsealed needle roller bearings, dimensionally matched sealing rings of series G or SD can be used to provide protection against contamination.

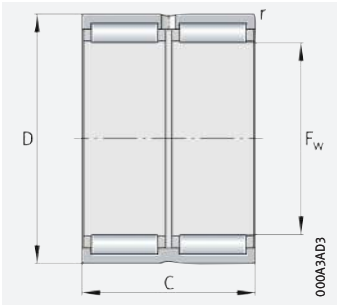
Dimensions		Suitable sealing rings[1)]	
F_w	r min.	➤ *1026*	
30	0,3	**G30×40×4**	**SD30×40×4**
	0,3	**G30×40×4**	**SD30×40×4**
	0,3	**G30×40×4**	**SD30×40×4**
	0,3	–	–
	0,3	–	–
	0,6	–	–
32	0,3	**G32×42×4**	**SD32×42×4**
	0,3	**G32×42×4**	**SD32×42×4**
	0,3	**G32×45×4**	–
	0,3	**G32×45×4**	–
	0,6	–	–
35	0,3	**G35×45×4**	**SD35×45×4**
	0,3	**G35×45×4**	**SD35×45×4**
	0,3	–	–
	0,3	–	–
	0,6	–	–
37	0,3	**G37×47×4**	**SD37×47×4**
	0,3	**G37×47×4**	**SD37×47×4**
	0,3	**G37×47×4**	**SD37×47×4**
	0,6	–	–
38	0,3	**G38×48×4**	**SD38×48×4**
	0,3	**G38×48×4**	**SD38×48×4**
40	0,3	**G40×50×4**	**SD40×50×4**
	0,3	**G40×50×4**	**SD40×50×4**
	0,6	**G40×52×5**	**SD40×52×5**
	0,6	**G40×52×5**	**SD40×52×5**
	0,6	–	–
42	0,3	**G42×52×4**	**SD42×52×4**
	0,3	**G42×52×4**	**SD42×52×4**
	0,6	–	–
	0,6	–	–

Needle roller bearings with ribs

Without inner ring
Open



NK, NKS, RNA49



RNA69..-ZW

F_w = 43 – 65 mm

Main dimensions			Basic load ratings		Fatigue limit load	Limiting speed	Speed rating	Mass	Designation
F_w	D	C	dyn. C_r	stat. C_{0r}	C_{ur}	n_G	$n_{\vartheta r}$	m	➤*926|1.12* ➤*927|1.13* X-life ➤*920*
			N	N	N	min^{-1}	min^{-1}	≈ g	
43	53	20	30 500	51 000	8 900	10 700	6 500	86	**NK43/20-XL**
	53	30	45 500	85 000	15 800	10 700	6 300	133	**NK43/30-XL**
	58	22	44 000	57 000	9 800	10 200	6 200	139	**NKS43-XL**
45	55	20	35 000	62 000	10 800	10 200	5 900	85,3	**NK45/20-TV-XL**
	55	30	52 000	103 000	19 100	10 200	5 700	132	**NK45/30-TV-XL**
	60	22	45 500	60 000	10 400	9 800	6 000	145	**NKS45-XL**
47	57	20	32 500	56 000	9 900	9 800	6 000	94,5	**NK47/20-XL**
	57	30	48 500	94 000	17 500	9 800	5 800	142	**NK47/30-XL**
48	62	22	48 500	67 000	11 500	9 200	5 300	140	**RNA4908-XL**
	62	40	74 000	116 000	19 400	9 200	5 400	256	**RNA6908-ZW-XL**
50	62	25	48 500	87 000	14 800	9 200	5 400	146	**NK50/25-TV-XL**
	62	35	67 000	132 000	23 900	9 200	5 200	207	**NK50/35-TV-XL**
	65	22	48 000	67 000	11 500	8 900	5 500	157	**NKS50-XL**
52	68	22	51 000	73 000	12 600	8 600	4 900	182	**RNA4909-XL**
	68	40	79 000	127 000	21 400	8 600	4 950	338	**RNA6909-ZW-XL**
55	68	25	57 000	111 000	19 400	8 400	4 700	195	**NK55/25-D-XL**
	68	25	45 500	82 000	14 000	8 400	5 200	180	**NK55/25-XL**
	68	35	60 000	118 000	21 300	8 400	5 200	250	**NK55/35-XL**
	72	22	51 000	74 000	12 700	8 200	5 100	221	**NKS55-XL**
58	72	22	53 000	80 000	13 800	7 800	4 350	163	**RNA4910-XL**
	72	40	82 000	139 000	23 400	7 800	4 400	310	**RNA6910-ZW-XL**
60	72	25	53 000	103 000	17 500	7 700	4 600	170	**NK60/25-TV-XL**
	72	35	63 000	130 000	23 500	7 700	4 800	258	**NK60/35-XL**
	80	28	71 000	98 000	17 300	7 400	4 750	335	**NKS60-XL**
63	80	25	65 000	100 000	17 300	7 200	4 150	255	**RNA4911-XL**
	80	45	102 000	176 000	30 000	7 200	4 200	470	**RNA6911-ZW-XL**
65	78	25	50 000	98 000	16 700	7 200	4 500	221	**NK65/25-XL**
	78	35	66 000	142 000	25 500	7 200	4 450	310	**NK65/35-XL**
	85	28	75 000	108 000	19 100	6 900	4 400	356	**NKS65-XL**

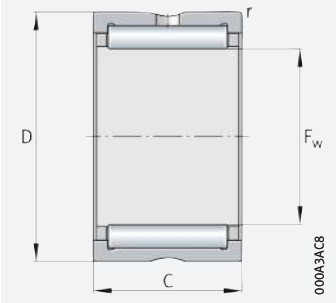
medias ➤*https://www.schaeffler.de/std/1E03*

[1] For unsealed needle roller bearings, dimensionally matched sealing rings of series G or SD can be used to provide protection against contamination.

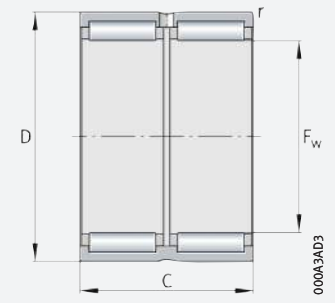
Dimensions		Suitable sealing rings[1)]	
F_w	r min.	➤ *1026*	
43	0,3	**G43×53×4**	–
	0,3	**G43×53×4**	–
	0,6	–	–
45	0,3	**G45×55×4**	**SD45×55×4**
	0,3	**G45×55×4**	**SD45×55×4**
	0,6	–	–
47	0,3	–	–
	0,3	–	–
48	0,6	–	–
	0,6	–	–
50	0,6	**G50×62×5**	**SD50×62×5**
	0,6	**G50×62×5**	**SD50×62×5**
	1	–	–
52	0,6	–	–
	0,6	–	–
55	0,6	–	–
	0,6	–	–
	0,6	–	–
	1	–	–
58	0,6	–	–
	0,6	–	–
60	0,6	–	–
	0,6	–	–
	1,1	–	–
63	1	–	–
	1	–	–
65	0,6	–	–
	0,6	–	–
	1,1	–	–

Needle roller bearings with ribs

Without inner ring
Open



NK, NKS, RNA48, RNA49



RNA69..-ZW

F_w = 68 – 240 mm

Main dimensions			Basic load ratings		Fatigue limit load	Limiting speed	Speed rating	Mass	Designation	Dimensions
F_w	D	C	dyn. C_r	stat. C_{0r}	C_{ur}	n_G	$n_{\vartheta r}$	m	➤*926* | *1.12* ➤*927* | *1.13* X-life ➤*920*	r
			N	N	N	min^{-1}	min^{-1}	≈ g		min.
68	82	25	49 500	89 000	15 200	6 800	4 500	241	**NK68/25-XL**	0,6
	82	35	70 000	139 000	25 500	6 800	4 350	338	**NK68/35-XL**	0,6
	85	25	68 000	108 000	18 800	6 700	3 850	275	**RNA4912-XL**	1
	85	45	106 000	191 000	32 500	6 700	3 850	488	**RNA6912-ZW-XL**	1
70	85	25	50 000	92 000	15 700	6 600	4 450	260	**NK70/25-XL**	0,6
	85	35	71 000	144 000	26 500	6 600	4 300	370	**NK70/35-XL**	0,6
	90	28	77 000	113 000	20 000	6 400	4 200	380	**NKS70-XL**	1,1
72	90	25	69 000	112 000	19 500	6 300	3 650	312	**RNA4913-XL**	1
	90	45	108 000	198 000	33 500	6 300	3 650	580	**RNA6913-ZW-XL**	1
73	90	25	60 000	100 000	17 500	6 300	4 150	302	**NK73/25-XL**	1
	90	35	85 000	156 000	27 000	6 300	4 050	428	**NK73/35-XL**	1
75	92	25	61 000	104 000	18 200	6 100	4 050	315	**NK75/25-XL**	1
	92	35	87 000	162 000	28 000	6 100	3 950	445	**NK75/35-XL**	1
	95	28	81 000	123 000	21 900	6 000	3 950	402	**NKS75-XL**	1,1
80	95	25	63 000	119 000	19 700	5 800	3 750	301	**NK80/25-XL**	1
	95	35	89 000	184 000	32 500	5 800	3 650	425	**NK80/35-XL**	1
	100	30	95 000	156 000	27 500	5 700	3 400	460	**RNA4914-XL**	1
	100	54	145 000	265 000	47 500	5 700	3 450	857	**RNA6914-ZW-XL**	1
85	105	25	78 000	123 000	21 700	5 400	3 550	425	**NK85/25-XL**	1
	105	35	111 000	193 000	34 500	5 400	3 450	600	**NK85/35-XL**	1
	105	30	97 000	162 000	28 500	5 400	3 200	489	**RNA4915-XL**	1
	105	54	147 000	275 000	49 500	5 400	3 250	935	**RNA6915-ZW-XL**	1
90	110	25	81 000	132 000	23 300	5 100	3 400	450	**NK90/25-XL**	1
	110	35	116 000	208 000	37 000	5 100	3 250	630	**NK90/35-XL**	1
	110	30	101 000	174 000	30 500	5 100	3 000	516	**RNA4916-XL**	1
	110	54	153 000	300 000	53 000	5 100	3 050	987	**RNA6916-ZW-XL**	1
95	115	26	83 000	137 000	24 000	4 850	3 300	490	**NK95/26-XL**	1
	115	36	121 000	223 000	39 500	4 850	3 150	680	**NK95/36-XL**	1

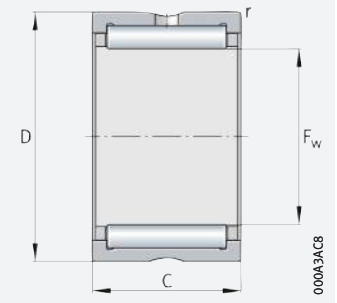
medias ➤ *https://www.schaeffler.de/std/1E04*

Main dimensions			Basic load ratings		Fatigue limit load	Limiting speed	Speed rating	Mass	Designation	Dimensions
F_w	D	C	dyn. C_r	stat. C_{0r}	C_{ur}	n_G	$n_{\vartheta r}$	m	➤926|1.12 ➤927|1.13 X-life ➤920	r
			N	N	N	min^{-1}	min^{-1}	≈ g		min.
100	120	26	86 000	146 000	25 000	4 600	3 150	515	**NK100/26-XL**	1
	120	36	125 000	237 000	41 500	4 600	3 000	715	**NK100/36-XL**	1
	120	35	125 000	237 000	41 500	4 600	2 800	657	**RNA4917-XL**	1,1
	120	63	188 000	400 000	71 000	4 600	2 850	1 200	**RNA6917-ZW-XL**	1,1
105	125	26	89 000	155 000	26 500	4 400	3 050	540	**NK105/26-XL**	1
	125	36	129 000	250 000	43 500	4 400	2 850	713	**NK105/36-XL**	1
	125	35	129 000	250 000	43 500	4 400	2 650	745	**RNA4918-XL**	1,1
	125	63	195 000	425 000	74 000	4 400	2 700	1 330	**RNA6918-ZW-XL**	1,1
110	130	30	111 000	210 000	35 500	4 200	2 800	650	**NK110/30-XL**	1,1
	130	40	143 000	290 000	50 000	4 200	2 750	830	**NK110/40-XL**	1,1
	130	35	131 000	260 000	44 500	4 200	2 500	719	**RNA4919-XL**	1,1
	130	63	197 000	440 000	76 000	4 200	2 550	1 460	**RNA6919-ZW-XL**	1,1
115	140	40	144 000	270 000	45 500	4 000	2 650	1 150	**RNA4920-XL**	1,1
120	140	30	106 000	216 000	36 000	3 900	2 340	670	**RNA4822-XL**	1
125	150	40	149 000	290 000	47 500	3 700	2 430	1 240	**RNA4922-XL**	1,1
130	150	30	112 000	239 000	39 000	3 600	2 120	730	**RNA4824-XL**	1
135	165	45	205 000	390 000	64 000	3 400	2 250	1 860	**RNA4924-XL**	1,1
145	165	35	134 000	310 000	48 500	3 250	2 000	990	**RNA4826-XL**	1,1
150	180	50	229 000	470 000	74 000	3 100	2 080	2 210	**RNA4926-XL**	1,5
155	175	35	136 000	325 000	50 000	3 050	1 870	1 050	**RNA4828-XL**	1,1
160	190	50	237 000	500 000	78 000	2 900	1 910	2 350	**RNA4928-XL**	1,5
165	190	40	172 000	400 000	62 000	2 850	1 830	1 600	**RNA4830-XL**	1,1
175	200	40	181 000	435 000	66 000	2 700	1 700	1 700	**RNA4832-XL**	1,1
185	215	45	209 000	510 000	75 000	2 550	1 640	2 540	**RNA4834-XL**	1,1
195	225	45	219 000	550 000	80 000	2 420	1 510	2 680	**RNA4836-XL**	1,1
210	240	50	255 000	690 000	100 000	2 250	1 360	3 210	**RNA4838-XL**	1,5
220	250	50	260 000	720 000	102 000	2 150	1 280	3 350	**RNA4840-XL**	1,5
240	270	50	275 000	790 000	110 000	1 980	1 130	3 620	**RNA4844-XL**	1,5

medias ➤ *https://www.schaeffler.de/std/1E05*

Needle roller bearings with ribs

Without inner ring
Open



RNA48

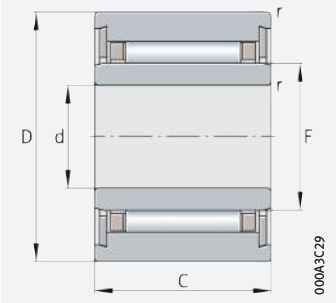
F_w = 265 – 415 mm

Main dimensions			Basic load ratings		Fatigue limit load	Limiting speed	Speed rating	Mass	Designation	Dimensions
F_w	D	C	dyn. C_r	stat. C_{0r}	C_{ur}	n_G	$n_{\vartheta r}$	m	➤*926* | *1.12* ➤*927* | *1.13* X-life ➤*920*	r
			N	N	N	min^{-1}	min^{-1}	≈ g		min.
265	300	60	400 000	1 080 000	150 000	1 780	980	5 400	**RNA4848-XL**	2
285	320	60	415 000	1 160 000	158 000	1 660	890	5 800	**RNA4852-XL**	2
305	350	69	510 000	1 300 000	175 000	1 540	850	9 300	**RNA4856-XL**	2
330	380	80	700 000	1 770 000	235 000	1 420	740	12 700	**RNA4860-XL**	2,1
350	400	80	710 000	1 850 000	242 000	1 340	680	13 400	**RNA4864-XL**	2,1
370	420	80	730 000	1 940 000	249 000	1 270	640	14 000	**RNA4868-XL**	2,1
390	440	80	740 000	2 020 000	255 000	1 210	600	14 800	**RNA4872-XL**	2,1
415	480	100	1 130 000	2 900 000	370 000	1 130	520	26 000	**RNA4876-XL**	2,1

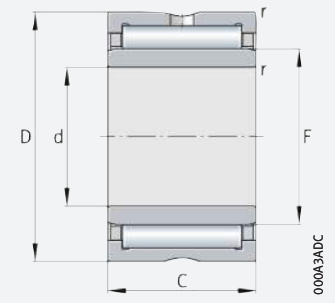
medias ➤ *https://www.schaeffler.de/std/1E06*

Needle roller bearings with ribs

With inner ring
Open



NKI (d ≦ 7 mm)



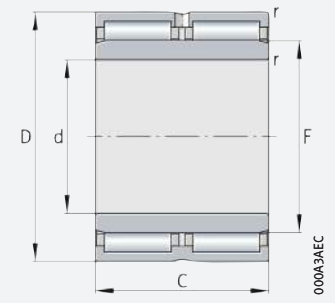
NKI (d ≧ 9 mm), NKIS, NA49, NA69 (d ≦ 30 mm)

d = 5 – 35 mm

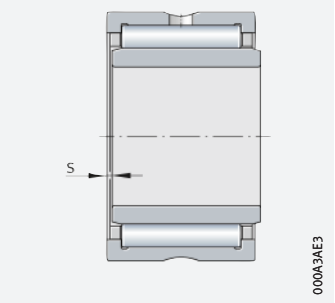
Main dimensions			Basic load ratings		Fatigue limit load	Limiting speed	Speed rating	Mass	Designation	Dimensions		
d	D	B	dyn. C_r	stat. C_{0r}	C_{ur}	n_G	$n_{\vartheta r}$	m	➤*926|1.12* ➤*927|1.13* X-life ➤*920*	F	r	s
			N	N	N	min^{-1}	min^{-1}	≈ g			min.	
5	15	12	4 450	4 100	690	32 500	32 500	11,5	**NKI5/12-TV-XL**[1]	8	0,3	1,5
	15	16	5 800	5 800	970	32 500	32 000	15,3	**NKI5/16-TV-XL**[1]	8	0,3	2
6	16	12	5 100	5 000	840	31 000	28 500	13,5	**NKI6/12-TV-XL**[1]	9	0,3	1,5
	16	16	6 600	7 100	1 190	31 000	28 000	17,4	**NKI6/16-TV-XL**[1]	9	0,3	2
7	17	12	5 300	5 500	930	29 500	26 000	13,7	**NKI7/12-TV-XL**[1]	10	0,3	1,5
	17	16	7 000	7 800	1 310	29 500	25 500	18,2	**NKI7/16-TV-XL**[1]	10	0,3	2
9	19	12	7 200	7 100	1 280	26 500	20 200	16,6	**NKI9/12-XL**	12	0,3	1,5
	19	16	10 100	11 000	1 920	26 500	19 500	21,9	**NKI9/16-XL**	12	0,3	2
10	22	16	11 400	11 500	2 100	24 600	16 400	29,4	**NKI10/16-XL**	14	0,3	0,5
	22	20	14 500	15 600	2 700	24 600	16 100	37,1	**NKI10/20-XL**	14	0,3	0,5
	22	13	9 600	9 200	1 630	24 600	16 400	23	**NA4900-XL**	14	0,3	0,5
12	24	16	12 800	13 900	2 550	23 200	14 500	33,3	**NKI12/16-XL**	16	0,3	0,5
	24	20	16 300	18 800	3 250	23 200	14 200	41,9	**NKI12/20-XL**	16	0,3	0,5
	24	13	10 600	10 900	1 940	23 200	14 200	26	**NA4901-XL**	16	0,3	0,5
	24	22	18 100	21 600	3 800	23 200	13 300	46	**NA6901-XL**	16	0,3	1
15	27	16	14 700	17 400	3 200	21 600	12 400	38,8	**NKI15/16-XL**	19	0,3	0,5
	27	20	18 700	23 600	4 150	21 600	12 100	48,7	**NKI15/20-XL**	19	0,3	0,5
	28	13	12 000	13 600	2 430	21 100	11 200	34	**NA4902-XL**	20	0,3	0,5
	28	23	19 500	25 500	4 450	21 100	10 900	63,6	**NA6902-XL**	20	0,3	1
	35	20	27 500	28 000	4 900	18 500	9 400	92	**NKIS15-XL**	22	0,6	0,5
17	29	16	15 200	18 700	3 450	20 600	11 400	42,4	**NKI17/16-XL**	21	0,3	0,5
	29	20	19 300	25 500	4 450	20 600	11 200	53,4	**NKI17/20-XL**	21	0,3	0,5
	30	13	12 400	14 600	2 600	20 000	10 200	37	**NA4903-XL**	22	0,3	0,5
	30	23	21 100	29 000	5 100	20 000	9 800	72	**NA6903-XL**	22	0,3	1
	37	20	29 500	31 000	5 400	17 200	8 800	98	**NKIS17-XL**	24	0,6	0,5
20	32	16	16 900	22 300	4 100	18 500	10 100	49	**NKI20/16-XL**	24	0,3	0,5
	32	20	21 400	30 500	5 300	18 500	9 900	61	**NKI20/20-XL**	24	0,3	0,5
	37	17	23 700	25 500	4 600	16 900	9 400	75,2	**NA4904-XL**	25	0,3	0,8
	37	30	40 500	51 000	9 100	16 900	8 900	141	**NA6904-XL**	25	0,3	1
	42	20	32 500	36 500	6 400	15 100	7 700	129	**NKIS20-XL**	28	0,6	0,5

medias ➤ *https://www.schaeffler.de/std/1E07*

[1] With closing rings, without lubrication hole and groove.



NA69..-ZW



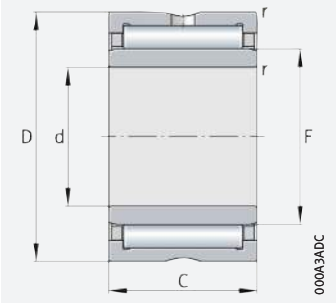
Axial displacement “s”

Main dimensions			Basic load ratings		Fatigue limit load	Limiting speed	Speed rating	Mass	Designation	Dimensions		
d	D	B	dyn. C_r	stat. C_{0r}	C_{ur}	n_G	$n_{\vartheta r}$	m	➤*926* | *1.12* ➤*927* | *1.13* X-life ➤*920*	F	r	s
			N	N	N	min^{-1}	min^{-1}	≈ g			min.	
22	34	16	17 300	23 600	4 350	17 200	9 500	52	**NKI22/16-XL**	26	0,3	0,5
	34	20	22 000	32 000	5 600	17 200	9 300	65,4	**NKI22/20-XL**	26	0,3	0,5
	39	17	26 000	29 500	5 300	15 300	8 100	80	**NA49/22-XL**	28	0,3	0,8
	39	30	42 000	55 000	9 900	15 300	7 900	150	**NA69/22-XL**	28	0,3	0,5
25	38	20	27 500	39 000	6 900	15 300	8 100	75,8	**NKI25/20-TV-XL**	29	0,3	1
	38	30	37 000	57 000	10 600	15 300	8 200	124	**NKI25/30-XL**	29	0,3	1,5
	42	17	26 500	31 500	5 700	14 400	7 700	88	**NA4905-XL**	30	0,3	0,8
	42	30	44 000	59 000	10 600	14 400	7 500	161	**NA6905-XL**	30	0,3	1
	47	22	38 000	43 500	7 400	13 200	7 100	162	**NKIS25-XL**	32	0,6	1
28	42	20	29 500	44 500	7 800	14 000	7 500	92,4	**NKI28/20-TV-XL**	32	0,3	1
	42	30	39 000	63 000	11 700	14 000	7 600	146	**NKI28/30-XL**	32	0,3	1,5
	45	17	27 500	33 500	6 100	13 600	7 400	97,7	**NA49/28-XL**	32	0,3	0,8
	45	30	45 500	63 000	11 400	13 600	7 100	182	**NA69/28-XL**	32	0,3	1
30	45	20	31 000	48 500	8 500	12 900	6 800	108	**NKI30/20-TV-XL**	35	0,3	0,5
	45	30	46 000	81 000	15 000	12 900	6 600	165	**NKI30/30-TV-XL**	35	0,3	1
	47	17	28 500	35 500	6 400	12 600	6 600	101	**NA4906-XL**	35	0,3	0,8
	47	30	49 000	71 000	12 800	12 600	6 300	192	**NA6906-XL**	35	0,3	1
	52	22	41 500	50 000	8 600	11 700	6 400	184	**NKIS30-XL**	37	0,6	1
32	47	20	28 000	43 500	7 600	12 300	6 900	118	**NKI32/20-XL**	37	0,3	0,5
	47	30	42 000	73 000	13 500	12 300	6 600	180	**NKI32/30-XL**	37	0,3	1
	52	20	34 500	47 500	8 900	11 100	6 000	158	**NA49/32-XL**	40	0,6	0,8
	52	36	53 000	82 000	15 100	11 100	6 100	288	**NA69/32-ZW-XL**	40	0,6	0,5
35	50	20	32 500	48 500	9 900	11 400	6 900	122	**NKI35/20-TW-XL**	40	0,3	0,5
	50	20	33 500	56 000	9 800	11 400	6 100	122	**NKI35/20-TV-XL**	40	0,3	0,5
	50	30	44 000	79 000	14 600	11 400	6 200	193	**NKI35/30-XL**	40	0,3	1
	55	20	35 500	50 000	9 400	10 700	5 800	170	**NA4907-XL**	42	0,6	0,8
	55	36	54 000	86 000	15 900	10 700	5 900	310	**NA6907-ZW-XL**	42	0,6	0,5
	58	22	44 000	57 000	9 800	10 200	5 600	220	**NKIS35-XL**	43	0,6	0,5

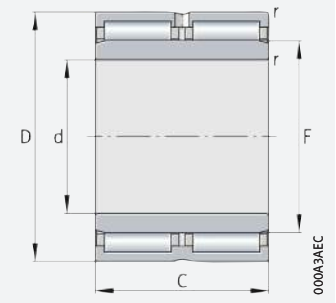
medias ➤ *https://www.schaeffler.de/std/1E08*

Needle roller bearings with ribs

With inner ring
Open



NKI, NKIS, NA49

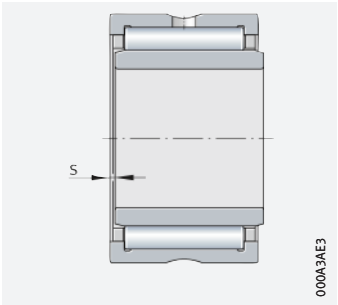


NA69..-ZW

d = 38 – 95 mm

Main dimensions			Basic load ratings		Fatigue limit load	Limiting speed	Speed rating	Mass	Designation	Dimensions		
d	D	B	dyn. C_r	stat. C_{0r}	C_{ur}	n_G	$n_{\vartheta r}$	m	➤926|1.12 ➤927|1.13 X-life ➤920	F	r	s
			N	N	N	min^{-1}	min^{-1}	≈ g			min.	
38	53	20	30 500	51 000	8 900	10 700	6 000	136	**NKI38/20-XL**	43	0,3	0,5
	53	30	45 500	85 000	15 800	10 700	5 900	207	**NKI38/30-XL**	43	0,3	1
40	55	20	35 000	62 000	10 800	10 200	5 600	136	**NKI40/20-TV-XL**	45	0,3	0,5
	55	30	54 000	97 000	18 200	10 200	5 900	216	**NKI40/30-TW-XL**	45	0,3	1
	55	30	52 000	103 000	19 100	10 200	5 400	216	**NKI40/30-TV-XL**	45	0,3	1
	62	22	48 500	67 000	11 500	9 200	5 000	230	**NA4908-XL**	48	0,6	1
	62	40	74 000	116 000	19 400	9 200	5 100	430	**NA6908-ZW-XL**	48	0,6	0,5
	65	22	48 000	67 000	11 500	8 900	4 850	281	**NKIS40-XL**	50	1	0,5
42	57	20	32 500	56 000	9 900	9 800	5 600	148	**NKI42/20-XL**	47	0,3	0,5
	57	30	48 500	94 000	17 500	9 800	5 400	222	**NKI42/30-XL**	47	0,3	1
45	62	25	48 500	87 000	14 800	9 200	5 100	217	**NKI45/25-TV-XL**	50	0,6	1,5
	62	35	67 000	132 000	23 900	9 200	4 950	308	**NKI45/35-TV-XL**	50	0,6	2
	68	22	51 000	73 000	12 600	8 600	4 700	271	**NA4909-XL**	52	0,6	1
	68	40	79 000	127 000	21 400	8 600	4 750	495	**NA6909-ZW-XL**	52	0,6	0,5
	72	22	51 000	74 000	12 700	8 200	4 600	336	**NKIS45-XL**	55	1	0,5
50	68	25	45 500	82 000	14 000	8 400	4 950	270	**NKI50/25-XL**	55	0,6	1,5
	68	35	60 000	118 000	21 300	8 400	4 900	379	**NKI50/35-XL**	55	0,6	2
	72	22	53 000	80 000	13 800	7 800	4 150	274	**NA4910-XL**	58	0,6	1
	72	40	82 000	139 000	23 400	7 800	4 200	515	**NA6910-ZW-XL**	58	0,6	0,5
	80	28	71 000	98 000	17 300	7 400	4 250	518	**NKIS50-XL**	60	1,1	2
55	72	25	52 000	92 000	17 000	7 700	4 900	255	**NKI55/25-TW-XL**	60	0,6	1,5
	72	25	53 000	103 000	17 500	7 700	4 400	255	**NKI55/25-TV-XL**	60	0,6	1,5
	72	35	63 000	130 000	23 500	7 700	4 550	379	**NKI55/35-XL**	60	0,6	2
	80	25	65 000	100 000	17 300	7 200	4 000	393	**NA4911-XL**	63	1	1,5
	80	45	102 000	176 000	30 000	7 200	4 000	780	**NA6911-ZW-XL**	63	1	1,5
	85	28	75 000	108 000	19 100	6 900	4 000	558	**NKIS55-XL**	65	1,1	2
60	82	25	49 500	89 000	15 200	6 800	4 200	394	**NKI60/25-XL**	68	0,6	1
	82	35	70 000	139 000	25 500	6 800	4 050	553	**NKI60/35-XL**	68	0,6	1
	85	25	68 000	108 000	18 800	6 700	3 700	426	**NA4912-XL**	68	1	1,5
	85	45	106 000	191 000	32 500	6 700	3 700	808	**NA6912-ZW-XL**	68	1	1,5
	90	28	77 000	113 000	20 000	6 400	3 800	560	**NKIS60-XL**	70	1,1	2

medias ➤ *https://www.schaeffler.de/std/1E09*



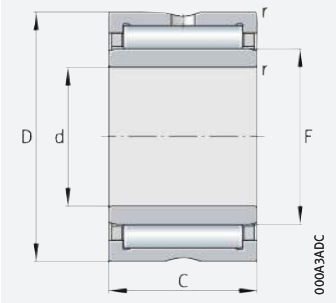
Axial displacement "s"

Main dimensions			Basic load ratings		Fatigue limit load	Limiting speed	Speed rating	Mass	Designation	Dimensions		
d	D	B	dyn. C_r	stat. C_{0r}	C_{ur}	n_G	$n_{\vartheta r}$	m	➤*926* | *1.12* ➤*927* | *1.13* X-life ➤*920*	F	r	s
			N	N	N	min^{-1}	min^{-1}	≈ g			min.	
65	90	25	60 000	100 000	17 500	6 300	3 900	467	**NKI65/25-XL**	73	1	1
	90	35	85 000	156 000	27 000	6 300	3 750	659	**NKI65/35-XL**	73	1	1
	90	25	69 000	112 000	19 500	6 300	3 500	456	**NA4913-XL**	72	1	1,5
	90	45	108 000	198 000	33 500	6 300	3 550	833	**NA6913-ZW-XL**	72	1	1,5
	95	28	81 000	123 000	21 900	6 000	3 600	641	**NKIS65-XL**	75	1,1	2
70	95	25	63 000	119 000	19 700	5 800	3 500	521	**NKI70/25-XL**	80	1	0,8
	95	35	89 000	184 000	32 500	5 800	3 350	737	**NKI70/35-XL**	80	1	0,8
	100	30	95 000	156 000	27 500	5 700	3 250	728	**NA4914-XL**	80	1	1,5
	100	54	145 000	265 000	47 500	5 700	3 300	1 340	**NA6914-ZW-XL**	80	1	1
75	105	25	78 000	123 000	21 700	5 400	3 300	641	**NKI75/25-XL**	85	1	1
	105	35	111 000	193 000	34 500	5 400	3 200	908	**NKI75/35-XL**	85	1	1
	105	30	97 000	162 000	28 500	5 400	3 100	775	**NA4915-XL**	85	1	1,5
	105	54	147 000	275 000	49 500	5 400	3 150	1 450	**NA6915-ZW-XL**	85	1	1
80	110	25	81 000	132 000	23 300	5 100	3 150	677	**NKI80/25-XL**	90	1	1
	110	35	116 000	208 000	37 000	5 100	3 050	959	**NKI80/35-XL**	90	1	1
	110	30	101 000	174 000	30 500	5 100	2 900	878	**NA4916-XL**	90	1	1,5
	110	54	153 000	300 000	53 000	5 100	2 900	1 522	**NA6916-ZW-XL**	90	1	1
85	115	26	83 000	137 000	24 000	4 850	3 100	743	**NKI85/26-XL**	95	1	1,5
	115	36	121 000	223 000	39 500	4 850	2 950	1 040	**NKI85/36-XL**	95	1	1,5
	120	35	125 000	237 000	41 500	4 600	2 650	1 250	**NA4917-XL**	100	1,1	1
	120	63	188 000	400 000	71 000	4 600	2 700	2 200	**NA6917-ZW-XL**	100	1,1	1
90	120	26	86 000	146 000	25 000	4 600	2 950	778	**NKI90/26-XL**	100	1	1,5
	120	36	125 000	237 000	41 500	4 600	2 800	1 090	**NKI90/36-XL**	100	1	1,5
	125	35	129 000	250 000	43 500	4 400	2 500	1 312	**NA4918-XL**	105	1,1	1
	125	63	195 000	425 000	74 000	4 400	2 550	2 310	**NA6918-ZW-XL**	105	1,1	1
95	125	26	89 000	155 000	26 500	4 400	2 850	816	**NKI95/26-XL**	105	1	1,5
	125	36	129 000	250 000	43 500	4 400	2 700	1 145	**NKI95/36-XL**	105	1	1,5
	130	35	131 000	260 000	44 500	4 200	2 400	1 371	**NA4919-XL**	110	1,1	1
	130	63	197 000	440 000	76 000	4 200	2 440	2 500	**NA6919-ZW-XL**	110	1,1	1

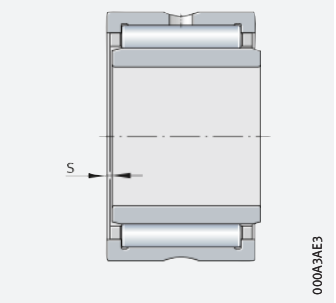
medias ➤ *https://www.schaeffler.de/std/1E0A*

Needle roller bearings with ribs

With inner ring
Open



NKI, NA49, NA48



Axial displacement "s"

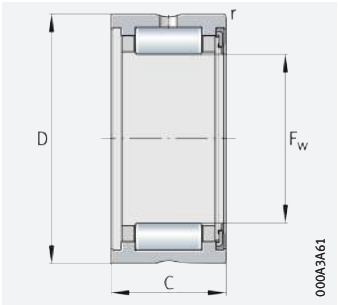
d = 100 – 380 mm

Main dimensions			Basic load ratings		Fatigue limit load	Limiting speed	Speed rating	Mass	Designation	Dimensions		
d	D	B	dyn. C_r	stat. C_{0r}	C_{ur}	n_G	$n_{\vartheta r}$	m	➤926|1.12 ➤927|1.13 X-life ➤920	F	r	s
			N	N	N	min^{-1}	min^{-1}	≈ g			min.	
100	130	30	111 000	210 000	35 500	4 200	2 650	990	**NKI100/30-XL**	110	1,1	1,5
	130	40	143 000	290 000	50 000	4 200	2 600	1 330	**NKI100/40-XL**	110	1,1	2
	140	40	144 000	270 000	45 500	4 000	2 550	1 900	**NA4920-XL**	115	1,1	2
110	150	40	149 000	290 000	47 500	3 700	2 330	2 070	**NA4922-XL**	125	1,1	2
	140	30	106 000	216 000	36 000	3 900	2 270	1 080	**NA4822-XL**	120	1	0,8
120	165	45	205 000	390 000	64 000	3 400	2 160	2 860	**NA4924-XL**	135	1,1	2
	150	30	112 000	239 000	39 000	3 600	2 070	1 170	**NA4824-XL**	130	1	0,8
130	180	50	229 000	470 000	74 000	3 100	2 000	3 900	**NA4926-XL**	150	1,5	1,5
	165	35	134 000	310 000	48 500	3 250	1 930	1 810	**NA4826-XL**	145	1,1	1
140	190	50	237 000	500 000	78 000	2 900	1 860	4 150	**NA4928-XL**	160	1,5	1,5
	175	35	136 000	325 000	50 000	3 050	1 810	1 920	**NA4828-XL**	155	1,1	1
150	190	40	172 000	400 000	62 000	2 850	1 780	2 720	**NA4830-XL**	165	1,1	1,5
160	200	40	181 000	435 000	66 000	2 700	1 650	2 890	**NA4832-XL**	175	1,1	1,5
170	215	45	209 000	510 000	75 000	2 550	1 610	3 960	**NA4834-XL**	185	1,1	1,5
180	225	45	219 000	550 000	80 000	2 420	1 490	4 200	**NA4836-XL**	195	1,1	1,5
190	240	50	255 000	690 000	100 000	2 250	1 330	5 610	**NA4838-XL**	210	1,5	1,5
200	250	50	260 000	720 000	102 000	2 150	1 250	5 840	**NA4840-XL**	220	1,5	1,5
220	270	50	275 000	790 000	110 000	1 980	1 110	6 380	**NA4844-XL**	240	1,5	1,5
240	300	60	400 000	1 080 000	150 000	1 780	960	10 000	**NA4848-XL**	265	2	2
260	320	60	415 000	1 160 000	158 000	1 660	870	10 600	**NA4852-XL**	285	2	2
280	350	69	510 000	1 300 000	175 000	1 540	840	15 300	**NA4856-XL**	305	2	2,5
300	380	80	700 000	1 770 000	235 000	1 420	720	21 800	**NA4860-XL**	330	2,1	2
320	400	80	710 000	1 850 000	242 000	1 340	670	23 000	**NA4864-XL**	350	2,1	2
340	420	80	730 000	1 940 000	249 000	1 270	620	24 200	**NA4868-XL**	370	2,1	2
360	440	80	740 000	2 020 000	255 000	1 210	590	25 600	**NA4872-XL**	390	2,1	2
380	480	100	1 130 000	2 900 000	370 000	1 130	510	42 600	**NA4876-XL**	415	2,1	2

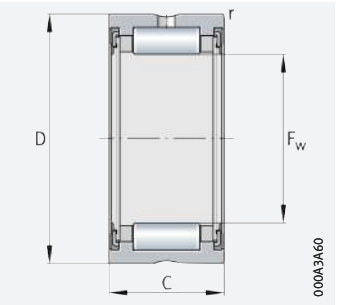
medias ➤ *https://www.schaeffler.de/std/1E0B*

Needle roller bearings with ribs

Without inner ring
Sealed



Sealed on one side (-RSR)



Sealed on both sides (-2RSR)

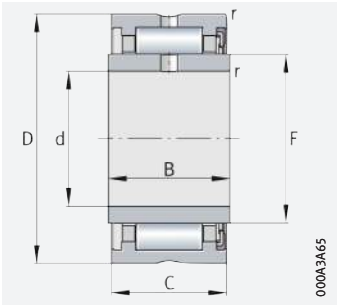
F_w = 14 – 58 mm

Main dimensions			Basic load ratings		Fatigue limit load	Limiting speed	Mass	Designation		Dimensions
F_w	D	C	dyn. C_r	stat. C_{0r}	C_{ur}	n_G grease	m	➤*926* | *1.12* ➤*927* | *1.13* X-life ➤*920*		r
			N	N	N	min^{-1}	≈ g			min.
14	22	13	7 700	6 900	1 360	14 800	16	**RNA4900-RSR-XL**	**RNA4900-2RSR-XL**	0,3
16	24	13	8 600	8 300	1 630	13 900	18	**RNA4901-RSR-XL**	**RNA4901-2RSR-XL**	0,3
20	28	13	9 700	10 300	2 040	12 600	21,5	**RNA4902-RSR-XL**	**RNA4902-2RSR-XL**	0,3
22	30	13	10 000	11 000	2 180	12 000	23	**RNA4903-RSR-XL**	**RNA4903-2RSR-XL**	0,3
25	37	17	19 500	19 900	3 750	10 100	56	**RNA4904-RSR-XL**	**RNA4904-2RSR-XL**	0,3
30	42	17	21 800	24 200	4 550	8 600	60	**RNA4905-RSR-XL**	**RNA4905-2RSR-XL**	0,3
35	47	17	23 900	28 500	5 400	7 500	69	**RNA4906-RSR-XL**	**RNA4906-2RSR-XL**	0,3
42	55	20	29 500	39 500	7 200	6 400	107	**RNA4907-RSR-XL**	**RNA4907-2RSR-XL**	0,6
48	62	22	41 000	53 000	8 800	5 500	154	**RNA4908-RSR-XL**	**RNA4908-2RSR-XL**	0,6
52	68	22	43 000	59 000	9 700	5 200	157	**RNA4909-RSR-XL**	**RNA4909-2RSR-XL**	0,6
58	72	22	45 000	64 000	10 600	4 650	160	**RNA4910-RSR-XL**	**RNA4910-2RSR-XL**	0,6

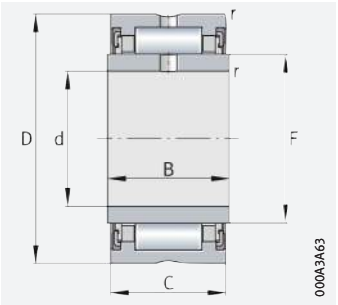
medias ➤ *https://www.schaeffler.de/std/1E0C*

Needle roller bearings with ribs

With inner ring
Sealed



Sealed on one side (-RSR)



Sealed on both sides (-2RSR)

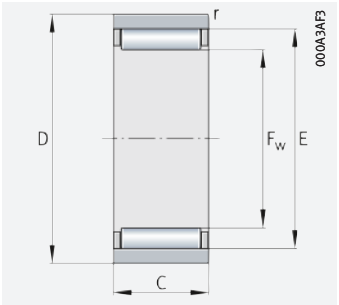
d = 10 – 50 mm

Main dimensions			Basic load ratings		Fatigue limit load	Limiting speed	Mass	Designation		Dimensions		
d	D	B	dyn. C_r	stat. C_{0r}	C_{ur}	n_G grease	m	➤*926* | *1.12* ➤*927* | *1.13* X-life ➤*920*		F	C	r
			N	N	N	min^{-1}	≈ g					min.
10	22	14	7 700	6 900	1 360	14 800	24,5	**NA4900-RSR-XL**	**NA4900-2RSR-XL**	14	13	0,3
12	24	14	8 600	8 300	1 630	13 900	27,5	**NA4901-RSR-XL**	**NA4901-2RSR-XL**	16	13	0,3
15	28	14	9 700	10 300	2 040	12 600	37	**NA4902-RSR-XL**	**NA4902-2RSR-XL**	20	13	0,3
17	30	14	10 000	11 000	2 180	12 000	40	**NA4903-RSR-XL**	**NA4903-2RSR-XL**	22	13	0,3
20	37	18	19 500	19 900	3 750	10 100	80	**NA4904-RSR-XL**	**NA4904-2RSR-XL**	25	17	0,3
25	42	18	21 800	24 200	4 550	8 600	89,5	**NA4905-RSR-XL**	**NA4905-2RSR-XL**	30	17	0,3
30	47	18	23 900	28 500	5 400	7 500	104	**NA4906-RSR-XL**	**NA4906-2RSR-XL**	35	17	0,3
35	55	21	29 500	39 500	7 200	6 400	175	**NA4907-RSR-XL**	**NA4907-2RSR-XL**	42	20	0,6
40	62	23	41 000	53 000	8 800	5 500	252	**NA4908-RSR-XL**	**NA4908-2RSR-XL**	48	22	0,6
45	68	23	43 000	59 000	9 700	5 200	290	**NA4909-RSR-XL**	**NA4909-2RSR-XL**	52	22	0,6
50	72	23	45 000	64 000	10 600	4 650	295	**NA4910-RSR-XL**	**NA4910-2RSR-XL**	58	22	0,6

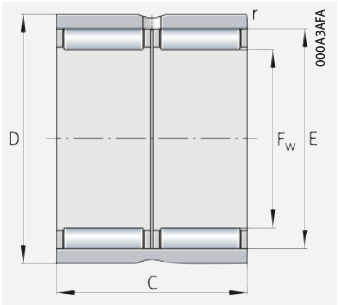
medias ➤ *https://www.schaeffler.de/std/1E0D*

Needle roller bearings without ribs

Without inner ring
Open



RNAO

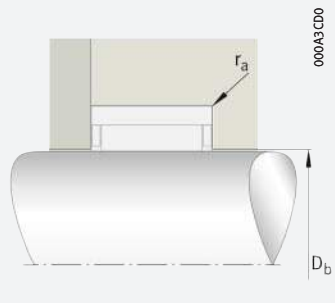


RNAO..-ZW-ASR1

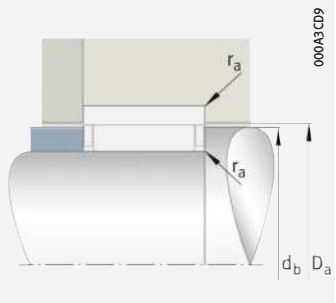
F_w = 5 – 35 mm

Main dimensions			Basic load ratings		Fatigue limit load	Limiting speed	Speed rating	Mass	Designation
F_w	D	C	dyn. C_r	stat. C_{0r}	C_{ur}	n_G	$n_{\vartheta r}$	m	➤*926*|*1.12* ➤*927*|*1.13* X-life ➤*920*
			N	N	N	min^{-1}	min^{-1}	≈ g	
5	10	8	2 650	1 920	295	39 000	53 000	3	**RNAO5×10×8-TV-XL**
6	13	8	2 950	2 280	355	36 500	48 500	6	**RNAO6×13×8-TV-XL**
7	14	8	3 250	2 650	410	34 500	41 500	6	**RNAO7×14×8-TV-XL**
8	15	10	4 450	4 100	690	32 500	35 500	8	**RNAO8×15×10-TV-XL**
10	17	10	5 300	5 500	930	29 500	28 000	10	**RNAO10×17×10-TV-XL**
12	22	12	11 300	9 900	1 740	26 000	19 700	19	**RNAO12×22×12-TV-XL**
15	23	13	9 700	10 900	1 760	24 300	17 900	20	**RNAO15×23×13-XL**
16	24	13	10 100	11 800	1 890	23 600	16 800	21	**RNAO16×24×13-XL**
	28	12	13 000	12 500	2 210	22 900	15 900	32	**RNAO16×28×12-XL**
17	25	13	11 700	14 600	2 240	22 900	15 200	22	**RNAO17×25×13-XL**
18	30	24	24 800	30 000	5 300	21 800	14 000	69	**RNAO18×30×24-ZW-ASR1-XL**
20	28	13	11 100	14 300	2 310	21 300	13 700	25	**RNAO20×28×13-XL**
	28	26	19 000	28 500	4 600	21 300	13 700	50	**RNAO20×28×26-ZW-ASR1-XL**
	32	12	15 100	16 200	2 850	20 900	12 700	38	**RNAO20×32×12-XL**
22	30	13	11 800	15 900	2 550	20 400	12 400	27	**RNAO22×30×13-XL**
	35	16	22 600	25 500	4 200	19 200	11 200	59	**RNAO22×35×16-XL**
25	35	17	16 800	26 000	4 250	18 100	11 000	53	**RNAO25×35×17-XL**
	35	26	21 900	37 000	5 900	18 100	11 200	76	**RNAO25×35×26-ZW-ASR1-XL**
	37	16	23 500	27 500	4 550	17 200	10 000	60	**RNAO25×37×16-XL**
30	40	17	22 100	34 000	5 300	15 100	8 800	60	**RNAO30×40×17-XL**
	42	16	26 000	33 500	5 500	14 600	8 500	59	**RNAO30×42×16-XL**
	42	32	45 000	67 000	11 000	14 600	8 500	137	**RNAO30×42×32-ZW-ASR1-XL**
35	45	13	18 300	28 000	4 450	13 100	7 800	53	**RNAO35×45×13-XL**
	45	17	23 500	38 500	6 100	13 100	7 700	69	**RNAO35×45×17-XL**
	45	26	31 500	56 000	8 900	13 100	7 800	91	**RNAO35×45×26-ZW-ASR1-XL**
	47	16	27 500	37 500	6 200	12 700	7 500	78	**RNAO35×47×16-XL**
	47	18	31 000	43 000	7 400	12 700	7 400	89	**RNAO35×47×18-XL**
	47	32	47 500	75 000	12 400	12 700	7 500	156	**RNAO35×47×32-ZW-ASR1-XL**

medias ➤ *https://www.schaeffler.de/std/1E0E*



Axial guidance of needle roller and cage assembly in housing

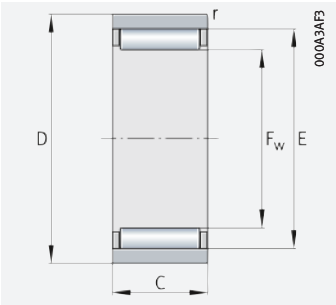


Axial guidance of needle roller and cage assembly on shaft

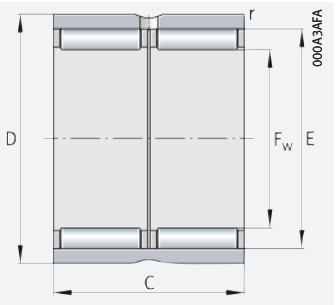
Dimensions			Mounting dimensions			
F_w	E	r min.	D_b	d_b	D_a	r_a max.
5	8	0,15	5,3	7,7	8,3	0,1
6	9	0,3	6,3	8,7	9,3	0,3
7	10	0,3	7,3	9,7	10,3	0,3
8	11	0,3	8,3	10,7	11,3	0,3
10	13	0,3	10,3	12,7	13,3	0,3
12	18	0,3	12,3	17,6	18,3	0,3
15	19	0,3	15,4	18,6	19,3	0,3
16	20	0,3	16,4	19,6	20,3	0,3
	22	0,3	16,4	21,6	22,3	0,3
17	21	0,3	17,4	20,6	21,3	0,3
18	24	0,3	18,4	23,6	24,5	0,3
20	24	0,3	20,4	23,6	24,3	0,3
	24	0,3	20,4	23,6	24,3	0,3
	26	0,3	20,4	25,6	26,5	0,3
22	26	0,3	22,4	25,6	26,3	0,3
	29	0,3	22,4	28,4	29,5	0,3
25	29	0,3	25,6	28,4	29,5	0,3
	29	0,3	25,6	28,4	29,5	0,3
	32	0,3	25,6	31,4	32,5	0,3
30	35	0,3	30,6	34,4	35,5	0,3
	37	0,3	30,6	36,4	37,5	0,3
	37	0,3	30,6	36,4	37,5	0,3
35	40	0,3	35,6	39,4	40,5	0,3
	40	0,3	35,6	39,4	40,5	0,3
	40	0,3	35,6	39,4	40,5	0,3
	42	0,3	35,6	41,4	42,5	0,3
	42	0,3	35,6	41,4	42,5	0,3
	42	0,3	35,6	41,4	42,5	0,3

Needle roller bearings without ribs

Without inner ring
Open



RNAO

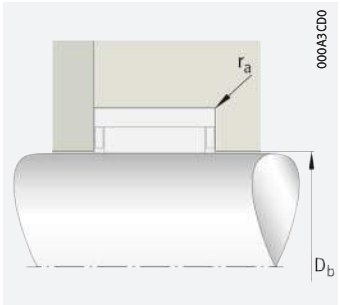


RNAO..-ZW-ASR1

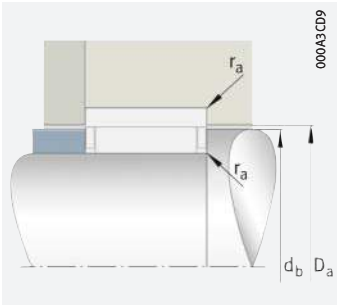
F_w = 40 – 100 mm

Main dimensions			Basic load ratings		Fatigue limit load	Limiting speed	Speed rating	Mass	Designation
F_w	D	C	dyn. C_r	stat. C_{0r}	C_{ur}	n_G	$n_{\vartheta r}$	m	➤*926*|*1.12* ➤*927*|*1.13* X-life ➤*920*
			N	N	N	min^{-1}	min^{-1}	≈ g	
40	50	17	24 200	41 500	6 400	11 500	7 000	74	**RNAO40×50×17-XL**
	50	34	41 500	83 000	12 900	11 500	7 000	152	**RNAO40×50×34-ZW-ASR1-XL**
	55	20	37 000	57 000	8 900	11 300	6 600	145	**RNAO40×55×20-XL**
	55	40	70 000	118 000	18 700	11 100	6 500	275	**RNAO40×55×40-ZW-ASR1-XL**
45	55	17	25 500	46 000	7 100	10 300	6 300	83	**RNAO45×55×17-XL**
	62	40	76 000	135 000	21 500	10 000	5 900	377	**RNAO45×62×40-ZW-ASR1-XL**
50	62	20	30 000	60 000	9 600	9 300	5 800	140	**RNAO50×62×20-XL**
	65	20	40 500	62 000	10 800	9 100	5 600	168	**RNAO50×65×20-XL**
	65	40	69 000	124 000	21 700	9 100	5 600	355	**RNAO50×65×40-ZW-ASR1-XL**
55	68	20	32 000	66 000	10 700	8 500	5 400	166	**RNAO55×68×20-XL**
60	78	20	49 500	85 000	13 600	7 700	4 650	255	**RNAO60×78×20-XL**
	78	40	85 000	171 000	27 500	7 700	4 650	435	**RNAO60×78×40-ZW-ASR1-XL**
65	85	30	64 000	123 000	21 100	7 100	4 550	464	**RNAO65×85×30-XL**
70	90	30	68 000	135 000	23 200	6 600	4 250	499	**RNAO70×90×30-XL**
80	100	30	80 000	176 000	31 000	5 800	3 600	580	**RNAO80×100×30-XL**
90	105	26	69 000	150 000	25 000	5 200	3 350	373	**RNAO90×105×26-XL**
	110	30	76 000	172 000	29 500	5 200	3 450	610	**RNAO90×110×30-XL**
100	120	30	80 000	188 000	32 000	4 700	3 150	694	**RNAO100×120×30-XL**

medias ➤ *https://www.schaeffler.de/std/1E0F*



Axial guidance of needle roller and cage assembly in housing

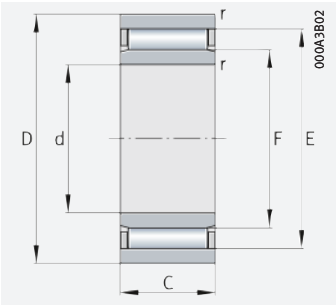


Axial guidance of needle roller and cage assembly on shaft

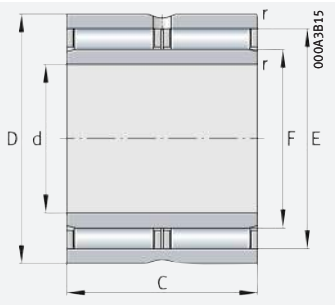
Dimensions			Mounting dimensions			
F_w	E	r min.	D_b	d_b	D_a	r_a max.
40	45	0,3	40,6	44,4	45,5	0,3
	45	0,3	40,6	44,4	45,5	0,3
	47	0,3	40,6	46,2	47,5	0,3
	48	0,3	40,6	47,2	47,5	0,3
45	50	0,3	45,6	49,2	50,5	0,3
	53	0,3	45,6	52,2	53,5	0,3
50	55	0,3	50,6	54,2	55,8	0,3
	58	0,3	50,6	57,2	58,5	0,3
	58	0,6	50,6	57,2	58,5	0,6
55	60	0,6	55,8	59,4	60,8	0,6
60	68	1	60,8	67,2	68,8	1
	68	1	60,8	67,2	68,8	1
65	73	1	66	72,2	73,8	1
70	78	1	71	77,2	78,8	1
80	88	1	81	87,2	89	1
90	98	1	91	97,2	99	1
	98	1	91	97,2	99	1
100	108	1	101	107,2	109	1

Needle roller bearings without ribs

With inner ring
Open



NAO, NAO..-IS1
(with lubrication hole in inner ring)

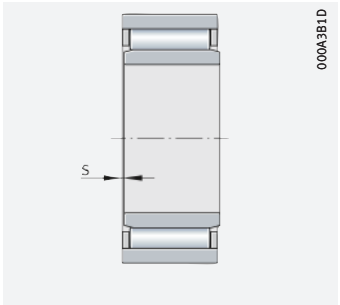


NAO..-ZW-ASR1

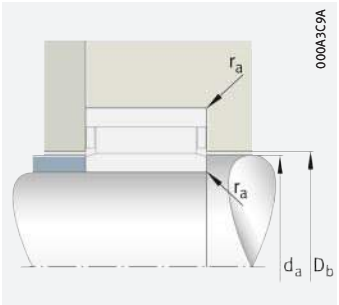
d = 6 – 90 mm

Main dimensions			Basic load ratings		Fatigue limit load	Limiting speed	Speed rating	Mass	Designation
d	D	B	dyn. C_r	stat. C_{0r}	C_{ur}	n_G	$n_{\vartheta r}$	m	➤*926* | *1.12* ➤*927* | *1.13* X-life ➤*920*
			N	N	N	min^{-1}	min^{-1}	≈ g	
6	17	10	5 300	5 500	930	29 500	23 800	14	**NAO6×17×10-TV-IS1-XL**
9	22	12	11 300	9 900	1 740	26 000	17 900	23,5	**NAO9×22×12-TV-XL**
12	24	13	10 100	11 800	1 890	23 600	15 000	30	**NAO12×24×13-XL**
	28	12	13 000	12 500	2 210	22 900	14 300	40	**NAO12×28×12-IS1-XL**
15	28	13	11 100	14 300	2 310	21 300	12 100	29	**NAO15×28×13-XL**
	32	12	15 100	16 200	2 850	20 900	11 400	50	**NAO15×32×12-IS1-XL**
17	30	13	11 800	15 900	2 550	20 400	11 100	42	**NAO17×30×13-XL**
	35	16	22 600	25 500	4 200	19 200	10 100	78	**NAO17×35×16-XL**
20	35	17	16 800	26 000	4 250	18 100	10 000	76	**NAO20×35×17-XL**
	37	16	23 500	27 500	4 550	17 200	9 100	82	**NAO20×37×16-XL**
25	40	17	22 100	34 000	5 300	15 100	8 100	88	**NAO25×40×17-XL**
	42	16	26 000	33 500	5 500	14 600	7 800	86	**NAO25×42×16-IS1-XL**
	42	32	45 000	67 000	11 000	14 600	7 800	190	**NAO25×42×32-ZW-ASR1-XL**
30	45	17	23 500	38 500	6 100	13 100	7 100	102	**NAO30×45×17-XL**
	45	26	31 500	56 000	8 900	13 100	7 200	157	**NAO30×45×26-ZW-ASR1-XL**
	47	16	27 500	37 500	6 200	12 700	6 900	109	**NAO30×47×16-XL**
	47	18	31 000	43 000	7 400	12 700	6 900	119	**NAO30×47×18-XL**
35	50	17	24 200	41 500	6 400	11 500	6 500	113	**NAO35×50×17-XL**
	55	20	37 000	57 000	8 900	11 300	6 200	190	**NAO35×55×20-XL**
40	55	17	25 500	46 000	7 100	10 300	5 900	127	**NAO40×55×17-XL**
50	68	20	32 000	66 000	10 700	8 500	5 100	230	**NAO50×68×20-IS1-XL**
70	100	30	80 000	176 000	31 000	5 800	3 350	850	**NAO70×100×30-XL**
80	110	30	76 000	172 000	29 500	5 200	3 200	920	**NAO80×110×30-XL**
90	120	30	80 000	188 000	32 000	4 700	2 950	1 044	**NAO90×120×30-XL**

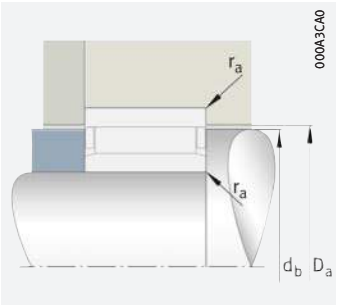
medias ➤ *https://www.schaeffler.de/std/1E10*



Axial displacement "s"



Axial guidance of needle roller and cage assembly in housing

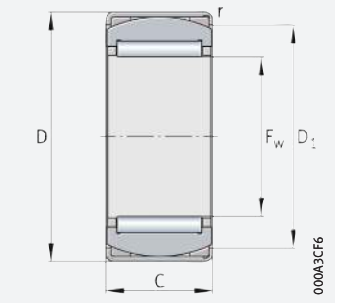


Axial guidance of needle roller and cage assembly on shaft

Dimensions					Mounting dimensions				
d	F	E	r min.	s	d_a	D_b	d_b	D_a	r_a max.
6	10	13	0,3	0,5	9,7	10,3	12,7	13,3	0,3
9	12	18	0,3	0,5	11,7	12,3	17,6	18,3	0,3
12	16	20	0,3	0,5	15,7	16,4	19,6	20,3	0,3
	16	22	0,3	0,5	15,7	16,4	21,6	22,3	0,3
15	20	24	0,3	0,5	19,7	20,4	23,6	24,3	0,3
	20	26	0,3	0,5	19,7	20,4	25,6	26,5	0,3
17	22	26	0,3	0,5	21,5	22,4	25,6	26,3	0,3
	22	29	0,3	0,5	21,5	22,4	28,4	29,5	0,3
20	25	29	0,3	0,5	24,5	25,6	28,4	29,5	0,3
	25	32	0,3	0,5	24,5	25,6	31,4	32,5	0,3
25	30	35	0,3	0,8	29,5	30,6	34,4	35,5	0,3
	30	37	0,3	0,8	29,5	30,6	36,4	37,5	0,3
	30	37	0,3	0,8	29,5	30,6	36,4	37,5	0,3
30	35	40	0,3	0,8	34,5	35,6	39,4	40,5	0,3
	35	40	0,3	0,8	34,5	35,6	39,4	40,5	0,3
	35	42	0,3	0,8	34,5	35,6	41,4	42,5	0,3
	35	42	0,3	0,8	34,5	35,6	41,4	42,5	0,3
35	40	45	0,3	0,8	39,5	40,6	44,4	45,5	0,3
	40	47	0,3	0,8	39,5	40,6	46,2	47,5	0,3
40	45	50	0,3	0,8	44,5	45,6	49,2	50,5	0,3
50	55	60	0,6	1	54,5	55,8	59,2	60,8	0,6
70	80	88	1	1	79,3	81	87,2	89	1
80	90	98	1	1	89,3	91	97,2	99	1
90	100	108	1	1	99,3	101	107,2	109	1

Aligning needle roller bearings

Without inner ring



RPNA

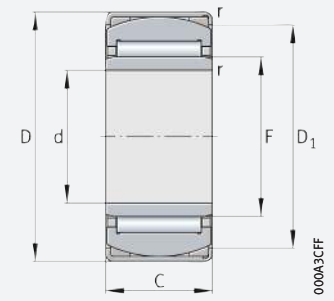
F_w = 15 – 45 mm

Main dimensions			Basic load ratings		Fatigue limit load	Limiting speed	Mass	Designation	Dimensions	
F_w	D	C	dyn. C_r	stat. C_{0r}	C_{ur}	n_G	m	➤*926* | *1.12* ➤*927* | *1.13* X-life ➤*920*	D_1	r
		±0,5	N	N	N	min^{-1}	≈ g			min.
15	28	12	7 800	7 900	1 430	24 100	32	**RPNA15/28-XL**	24,5	0,8
18	32	16	14 100	16 200	3 000	22 100	52	**RPNA18/32-XL**	27	0,8
20	35	16	14 600	17 500	3 200	21 100	62	**RPNA20/35-XL**	30,5	0,8
25	42	20	21 300	30 500	5 300	17 800	109	**RPNA25/42-XL**	36,5	0,8
28	44	20	24 800	34 000	5 900	15 800	112	**RPNA28/44-XL**	38,5	0,8
30	47	20	25 500	36 000	6 300	14 800	125	**RPNA30/47-XL**	42	0,8
35	52	20	27 500	41 500	7 300	12 900	131	**RPNA35/52-XL**	47,5	0,8
40	55	20	29 500	47 000	8 300	11 400	141	**RPNA40/55-XL**	50,5	0,8
45	62	20	31 000	53 000	9 300	10 200	176	**RPNA45/62-XL**	58	0,8

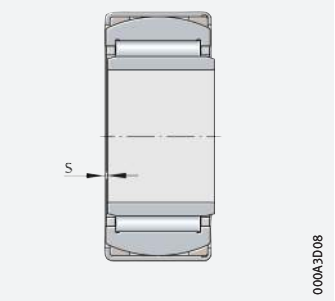
medias ➤ *https://www.schaeffler.de/std/1E11*

Aligning needle roller bearings

With inner ring



PNA



Axial displacement “s”

d = 12 – 40 mm

Main dimensions			Basic load ratings		Fatigue limit load	Limiting speed	Mass	Designation	Dimensions					
d	D	C	dyn. C_r	stat. C_{0r}	C_{ur}	n_G	m	➤*926*|*1.12* ➤*927*|*1.13* X-life ➤*920*	F	B	D_1	r	r_1	s
		±0,5	N	N	N	min^{-1}	≈ g					min.	min.	min.
12	28	12	7 800	7 900	1 430	24 100	37	**PNA12/28-XL**	15	12	24,5	0,8	0,3	0,5
15	32	16	14 100	16 200	3 000	22 100	62	**PNA15/32-XL**	18	16	27	0,8	0,3	0,5
17	35	16	14 600	17 500	3 200	21 100	73	**PNA17/35-XL**	20	16	30,5	0,8	0,3	0,5
20	42	20	21 300	30 500	5 300	17 800	136	**PNA20/42-XL**	25	20	36,5	0,8	0,3	0,5
22	44	20	24 800	34 000	5 900	15 800	145	**PNA22/44-XL**	28	20	38,5	0,8	0,3	0,5
25	47	20	25 500	36 000	6 300	14 800	157	**PNA25/47-XL**	30	20	42	0,8	0,3	0,5
30	52	20	27 500	41 500	7 300	12 900	181	**PNA30/52-XL**	35	20	47,5	0,8	0,3	0,5
35	55	20	29 500	47 000	8 300	11 400	177	**PNA35/55-XL**	40	20	50,5	0,8	0,3	0,5
40	62	20	31 000	53 000	9 300	10 200	227	**PNA40/62-XL**	45	20	58	0,8	0,3	0,5

medias ➤ *https://www.schaeffler.de/std/1E12*

2 Combined needle roller bearings

The bearings:

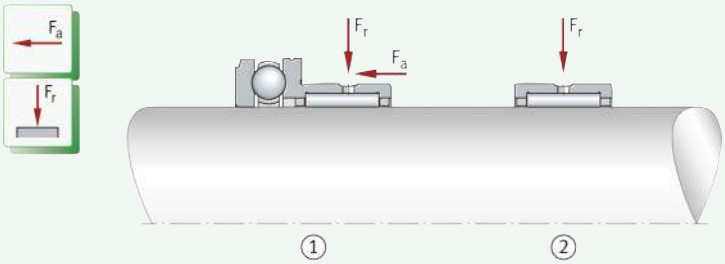
- can support high radial loads and moderate axial loads by means of a single bearing position ➤*964*|🗀 *1*
- are suitable for applications with a very small radial design envelope, where the raceway on the shaft is designed as a rolling bearing raceway (direct bearing arrangement)
- permit relatively high speeds, if the rolling element set in the axial bearing component is not full complement but guided by a cage
- have a high running accuracy
- permit locating bearing arrangements with only a very small radial design envelope
- result in axially rigid bearing arrangements
- are easy to mount as they are not self-retaining in many cases
- permit technically straightforward, economical and cost-effective designs.

For an overview of other product-specific features, see the Matrix for bearing preselection ➤*912*.

🗀 **1**
Combined needle roller bearing / needle roller bearing: comparison of load direction

F_r = *radial load*
F_a = *axial load*

① *Needle roller/axial deep groove ball bearing NKX*
② *Needle roller bearing NK*



2.1 Bearing design

✎ *Design variants*

The standard product range of combined needle roller bearings comprises:

- needle roller/axial deep groove ball bearings ➤*965*|🗀 *3* to ➤*966*|🗀 *5*
- needle roller/axial cylindrical roller bearings ➤*967*|🗀 *6* and ➤*967*|🗀 *7*
- needle roller/angular contact ball bearings ➤*967*|🗀 *8* and ➤*968*|🗀 *9*.

The majority of these needle roller bearings are X-life bearings ➤*968*.

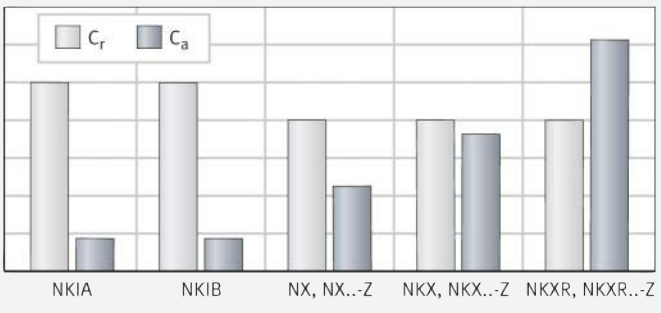
Combined needle roller bearings

✎ *The bearings comprise a radial component and an axial component*

Combined needle roller bearings comprise a radial needle roller bearing, which is combined with an axial bearing component ➤*965*|🗋*3*, ➤*966*|🗋*5* and ➤*967*|🗋*6*. These bearings can support radial as well as axial loads with just one bearing and permit locating bearing arrangements with only a small radial design envelope ➤*965*|🗋*2* and ➤*968*|*2.2*. They are suitable, for example, where radial and axial loads are present and simple axial contact washers are no longer able to support the axial loads on account of their size, high speeds or inadequate lubrication, and other locating bearings require too much installation space.

🗋*2*
Combined needle roller bearings, radial and axial dynamic load carrying capacity

C_r = *radial basic dynamic load rating*
C_a = *basic axial dynamic load rating*



Needle roller/axial deep groove ball bearings

✎ *Suitable for compact direct bearing arrangements on the shaft*

Needle roller/axial deep groove ball bearings do not have an inner ring and are therefore particularly compact in a radial direction ➤*965*|🗋*3*. However, they require a shaft raceway that is hardened and ground ➤*977*|*2.16*. If the shaft cannot be used as a rolling bearing raceway, inner rings IR can be used instead ➤*966*|🗋*4*. The suitable inner rings are given in the product tables and must be ordered in addition to the bearing ➤*984*|▦. For lubrication, the outer ring of the radial bearing component has a lubrication groove and lubrication holes.

Type NX, NX..-Z

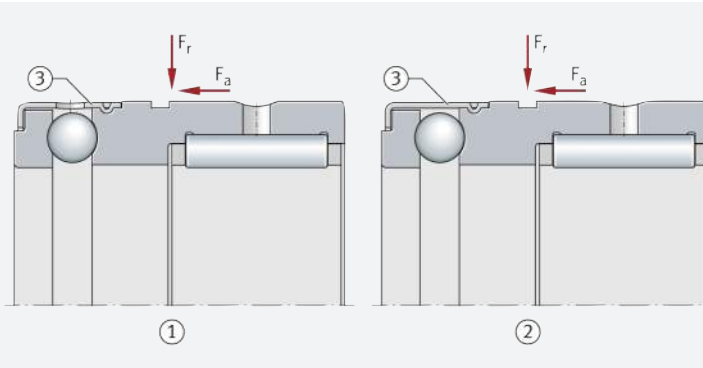
✎ *The rolling element set for the axial bearing component is a full complement ball system*

Needle roller/axial deep groove ball bearings NX and NX..-Z have a full complement ball rolling element set and an extremely low radial section height ➤*965*|🗋*3*. Due to the compact radial dimensions, bearing arrangements can be achieved with very small shaft centre distances, such as those that may be present in multi-spindle drilling machines. A sheet steel end cap secured to the radial bearing component grips the shaft locating washing of the axial bearing and holds the axial bearing component together ➤*965*|🗋*3*. As a result, the bearings are self-retaining. The sheet metal caps for bearings NX have lubrication holes for oil lubrication ➤*965*|🗋*3* and ➤*971*|*2.4*.

🗋*3*
Needle roller/axial deep groove ball bearing NX without inner ring

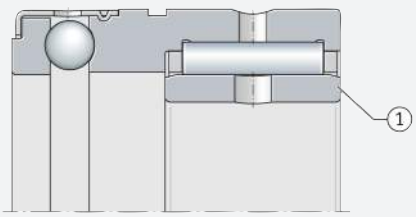
F_r = *radial load*
F_a = *axial load*

① *NX, full complement axial ball bearing component, with end cap, lubrication holes in the cap*
② *NX..-Z, full complement axial ball bearing component, with end cap, no lubrication holes in the cap*
③ *End cap*



4
Needle roller/axial deep groove ball bearing NX..-Z with inner ring

① *Inner ring IR*



Type NKX, NKX..-Z

The rolling element set for the axial bearing component is guided by a cage

In bearings NKX and NKX..-Z, the rolling element set is not a full complement ball system, as is present in bearings NX, but is retained by a cage ➤*966*| 5. The ball and cage assembly corresponds to an axial deep groove ball bearing of series 511. As a result of the cage, these bearings are suitable for higher speeds than bearings of the full complement design ➤*984*|.

Type NKX

Bearings NKX are not self-retaining, i. e radial needle roller bearing, axial ball and cage assembly and shaft locating washer can be fitted independently of each other ➤*966*| 5.

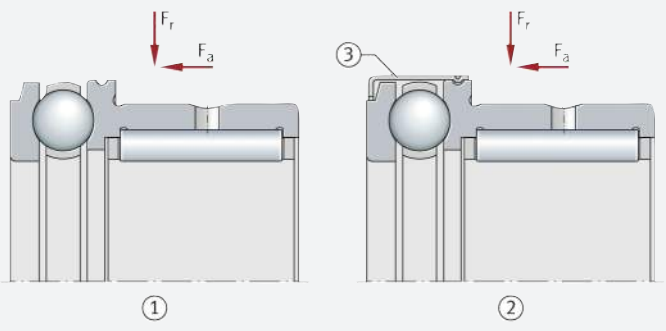
Type NKX..-Z

Type NKX..-Z has a sheet steel end cap, which holds the axial bearing component together, i. e. the bearings are self-retaining.
The cap is designed without lubrication holes and is rigidly connected to the housing locating washer of the radial bearing component ➤*966*| 5.

5
Needle roller/axial deep groove ball bearings without inner ring

F_r = *radial load*
F_a = *axial load*

① *NKX, axial bearing component with ball and cage assembly, without end cap*
② *NKX..-Z, axial bearing component with ball and cage assembly, with end cap, no lubrication holes in the cap*
③ *End cap*



Needle roller/axial cylindrical roller bearings

Type NKXR, NKXR..-Z

The rolling element set for the axial bearing component is guided by a cage

These bearings comprise a radial needle roller bearing and an axial cylindrical roller bearing of series 811 with a plastic cage. They do not have an inner ring and require a shaft raceway that is hardened and ground ➤*967*| 6 and ➤*977*| *2.16*. If the shaft cannot be used as a rolling bearing raceway, inner rings IR can be used instead ➤*967*| 7. The suitable inner rings are given in the product tables and must be ordered in addition to the bearing ➤*988*|. For lubrication, the outer ring of the radial bearing component has a lubrication groove and lubrication holes.

Type NKXR

Type NKXR is not self-retaining, i. e. the radial needle roller bearing, axial cylindrical roller bearing and shaft locating washer can be fitted independently of each other ➤*967*| 6.

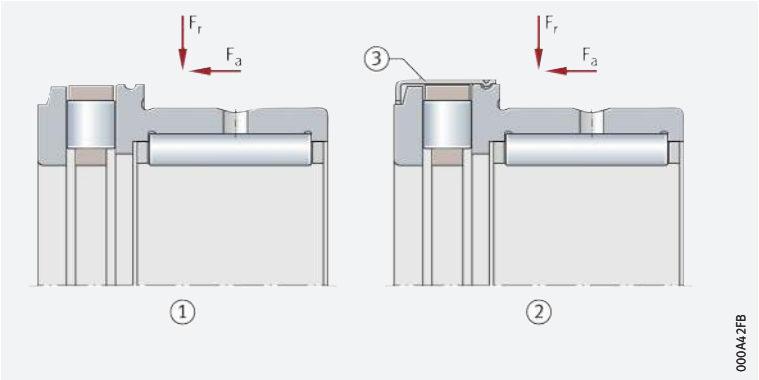
Type NKXR..-Z

A sheet steel end cap secured to the radial bearing component grips the shaft locating washing of the axial cylindrical roller bearing and holds the axial bearing component together. As a result, these bearings are self-retaining ➤*967*| 6.

6
Needle roller/axial cylindrical roller bearings without inner ring

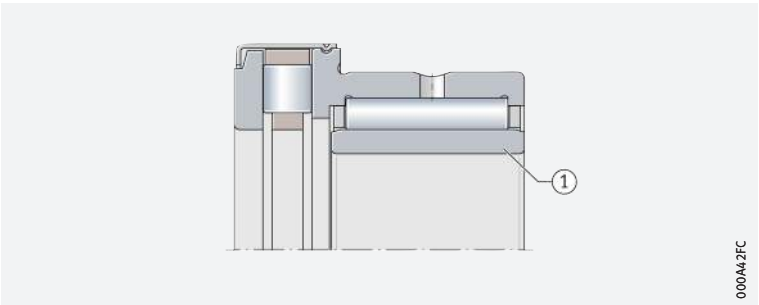
F_r = *radial load*
F_a = *axial load*

① *NKXR, axial bearing component with roller and cage assembly, without end cap*
② *NKXR..-Z, axial bearing component with roller and cage assembly, with end cap, no lubrication holes in the cap*
③ *End cap*



7
Needle roller/axial cylindrical roller bearing NKXR with inner ring

① *Inner ring IR*



Needle roller/angular contact ball bearings

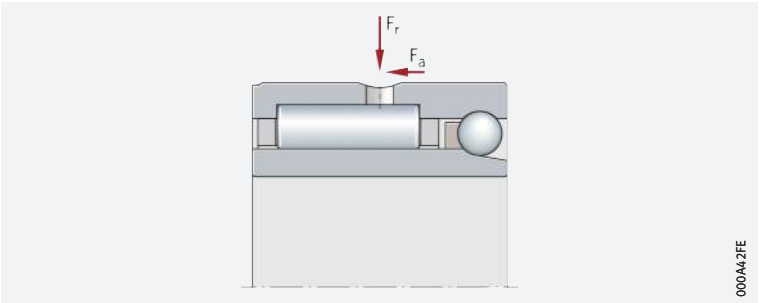
Type NKIA, NKIB

The rolling element set for the axial bearing component is guided by a cage

Needle roller/angular contact ball bearings comprise a radial needle roller bearing, an angular contact ball bearing as the axial component and an inner ring ➤*967*| *8*and ➤*968*| *9*. In the case of type NKIA the inner ring is of a single-piece design, whereas design NKIB has one narrow and one wide inner ring. The ball cage of the axial bearing component is made from plastic ➤*967*| *8* and ➤*968*| *9* and ➤*973*| *2.9*. The bearings have a low radial section height and are suitable for high speeds ➤*990*|. As needle roller/angular contact ball bearings are not self-retaining, the inner ring can be mounted independently of the outer ring and needle roller and ball set. During fitting it must, however, be ensured that the bearing rings are not interchanged with rings from other bearings, but are always mounted in the delivered matched pair.

8
Needle roller/angular contact ball bearing NKIA

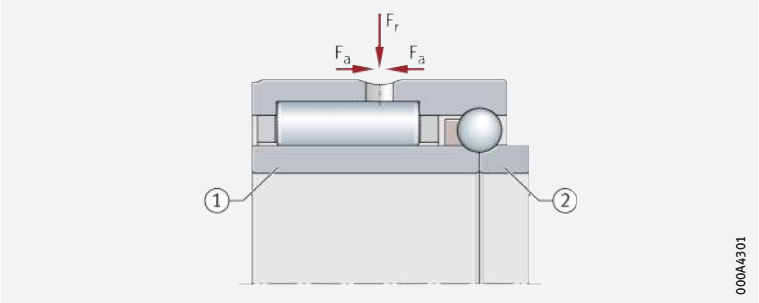
F_r = *radial load*
F_a = *axial load*



9
Needle roller/angular contact ball bearing NKIB

F_r = *radial load*
F_a = *axial load*

① *Wide inner ring*
② *Narrow inner ring*



X-life premium quality

The combined needle roller bearings described here are X-life bearings. They are characterised by a very high load carrying capacity and long rating life. This is achieved, for example, through the modified internal construction and optimised contact geometry between the rolling elements and raceways, as well as through the higher quality of the steel and rolling elements, higher surface quality and appropriate heat treatment.

✎ Increased customer benefits due to X-life

Advantages

The technical enhancements offer a range of advantages, such as:

- a more favourable load distribution in the bearing and thus a higher dynamic load carrying capacity of the bearings
- quieter running
- running with reduced friction and greater energy efficiency
- lower heat generation in the bearing
- higher possible speeds
- lower lubricant consumption and, consequently, longer maintenance intervals
- a measurably longer operating life of the bearings
- high operational security
- compact, environmentally-friendly bearing arrangements.

✎ Lower operating costs, higher machine availability

In conclusion, these advantages improve the overall cost-efficiency of the bearing position significantly and thus bring about a sustainable increase in the efficiency of the machine and equipment.

✎ Suffix XL

Combined needle roller bearings in X-life quality include the suffix XL in the designation ➤*972*|*13* to ➤*975*|*15* and ➤*984*|.

X-life indicates a high product performance density and thus a particularly significant benefit to the customer. Further information on X-life ➤*10*.

2.2 Load carrying capacity

Needle roller/axial deep groove ball bearings NX, NX..-Z, NKX, NKX..-Z

✎ Suitable for moderate axial loads

Needle roller/axial deep groove ball bearings support high radial loads and moderate axial loads in one direction ➤*965*|*3* to ➤*966*|*5*. Bearings with a full complement ball set have a higher axial load carrying capacity than bearings with a cage-guided axial component ➤*965*|*2*.

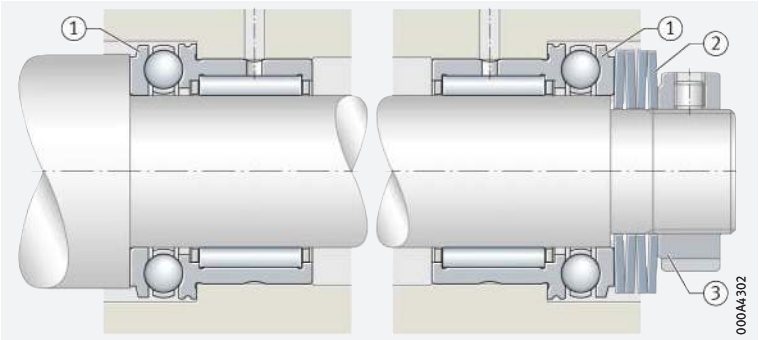
Bearing arrangement for supporting axial loads in both directions

✎ Mounting of two needle roller/axial deep groove ball bearings in a mirror image arrangement

Needle roller/axial deep groove ball bearings can support axial loads in one direction only. If no temperature-induced changes in length occur during operation in an arrangement of short shafts, two bearings can also be used to support axial loads in both directions, which are then mounted in a mirror image arrangement ➤*969*|*10*. The bearing parts should, however, be elastically preloaded in an axial direction, for example by means of disc springs ➤*969*|*10*. The elastic preload ensures that the unloaded axial bearing component runs without slippage ➤*977*|*2.15*. The preload also improves the operating behaviour of axial ball bearings and reduces running noise.

10
Two needle roller/axial deep groove ball bearings NKX mounted in a mirror image arrangement and axially preloaded with disc springs

① *Needle roller/axial deep groove ball bearing NKX*
② *Disc spring set*
③ *Shaft nut for preloading*



Needle roller/axial cylindrical roller bearings NKXR, NKXR..-Z

Suitable for high axial loads

Needle roller/axial cylindrical roller bearings support high radial loads and also, due to the line contact of the cylindrical rollers, high axial loads in one direction ➤*965*| *2*, ➤*967*| *8* and ➤*968*| *9*.

Bearing arrangement for supporting axial loads in both directions

Mounting of two needle roller/axial cylindrical roller bearings in a mirror image arrangement

Needle roller/axial cylindrical roller bearings can support axial loads in one direction only. If no temperature-induced changes in length occur during operation in an arrangement of short shafts, two bearings can also be used to support axial loads in both directions, which are then mounted in a mirror image arrangement. The bearing parts should, however, be elastically preloaded in an axial direction, for example by means of disc springs ➤*969*| *10*. The elastic preload ensures that the unloaded axial bearing component runs without slippage. The preload also improves the operating behaviour of needle roller/axial cylindrical roller bearings and reduces running noise.

Needle roller/angular contact ball bearings NKIA, NKIB

NKIA for axial forces in one direction, NKIB for alternating axial forces

The radial bearing supports high radial loads, the angular contact ball bearing supports smaller axial forces. NKIA can support axial loads from one direction only ➤*967*| *8*. NKIB has one narrow and one wide inner ring ➤*968*| *9*. At the point where the inner rings join, there is a shoulder on both sides for guidance of the ball and cage assembly. As a result, these bearings are also suitable for supporting axial forces alternating in direction, i. e. as locating bearings, they can guide the shaft axially in both directions. The shaft is guided axially with an axial clearance of 0,08 mm to 0,25 mm.

Replacement of inner rings

In standard bearings of series NKIA and NKIB, the inner rings are matched to the enveloping circle tolerance F6 and can be interchanged with each other (mixed use) within the same accuracy class.

When mounting bearings NKIB, both inner ring parts must be located axially clearance-free against each other. The narrow inner ring has a larger bore diameter. This results in an interference fit if a shaft tolerance k6 is used.

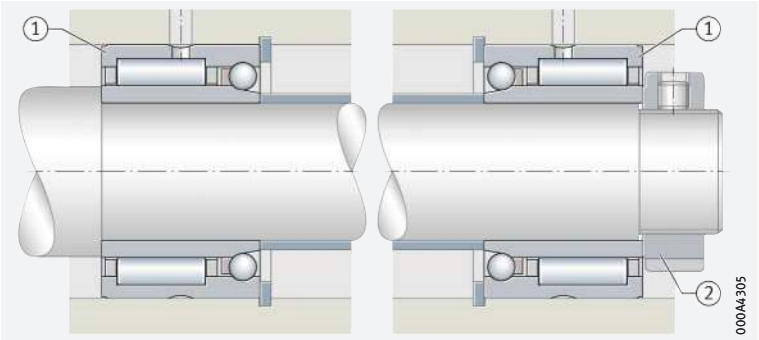
Bearing arrangement for supporting axial loads in both directions with bearings NKIA

Mounting of two needle roller/angular contact ball bearings in a mirror image arrangement

Needle roller/angular contact ball bearings NKIA support axial loads in one direction. In order to support axial loads in both directions, two bearings NKIA can also be used, which are then mounted in a mirror image arrangement ➤*970*| *11*.

11
Two needle roller/angular contact ball bearings NKIA mounted in a mirror image arrangement

① *Needle roller/angular contact ball bearing NKIA*
② *Shaft nut for preloading*



Support of axial forces

Preloading of the axial bearing component

The axial bearing component must be preloaded to 1% of the axial basic static load rating C_{0a} (for example using disc springs). The basic load ratings C_{0a} are stated in the product tables.

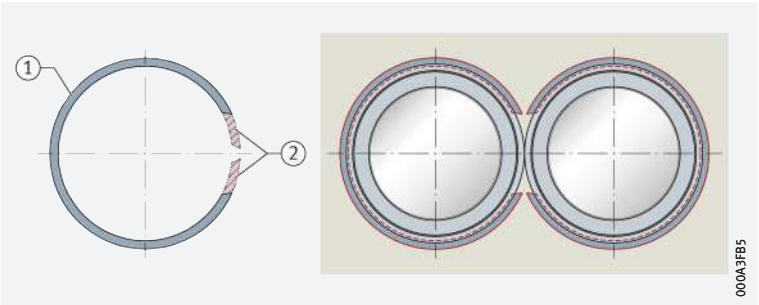
Needle roller/axial deep groove ball bearings and needle roller/axial cylindrical roller bearings

Shortening of the retaining rings where there is little distance between the shafts

In order to support axial forces, the bearings must be abutted by means of snap rings on the outer ring or a housing shoulder. If there is little distance between the shaft centres, the snap rings should be shortened ➤*970*|*12*. Snap rings WR and SW are available from trade outlets. If the bearings are to support axial forces from alternating directions, two bearings must be fitted opposed to each other. The unloaded bearing must then be axially preloaded, for example by means of disc springs ➤*969*|*10*. This allows compensation of thermal expansion.

12
Bearing arrangement with shortened snap rings

① *Snap ring*
② *Shortened area*



Shaft raceway designed in accordance with DIN 617

If the surface of the shaft raceway is produced to DIN 617, the basic load ratings C_r in the product tables must be reduced by 15%.

2.3 Compensation of angular misalignments

The bearings are not suitable for the compensation of shaft misalignments relative to the housing

Combined needle roller bearings are not suitable for the compensation of angular misalignments. The extent to which a misalignment of the shaft can be tolerated relative to the housing bore is dependent on factors such as the design of the bearing arrangement, the size of the bearing, the operating clearance and the load etc. As a result, no guide value can be specified here for a possible misalignment. If angular misalignments occur, aligning needle roller bearings can, for example, be used in combination with an axial bearing, depending on the application.

In all cases, misalignments cause increased running noise, place increased strain on the cages and have a harmful influence on the operating life of the bearings.

2.4 Lubrication

✎ *Greasing of the radial bearing component prior to initial operation*

In bearings with grease lubrication, the radial bearing component should be greased before initial operation using a grease of similar quality to that used in the axial bearing component.

✎ *Determining the relubrication interval*

In order to determine the relubrication interval, values must be calculated separately for the axial and radial bearing components and the lower values should be used.

✎ *Compatibility with plastic cages*

When using bearings with plastic cages, compatibility between the lubricant and the cage material must be ensured if synthetic oils, lubricating greases with a synthetic oil base or lubricants containing a high proportion of EP additives are used.

Needle roller/axial deep groove ball bearings

Type NX, NKX

✎ *NX, NKX for oil lubrication, NX..-Z, NKX..-Z for grease lubrication*

NX and NKX are intended for oil lubrication, therefore the bearings are not greased. Oil lubrication is carried out via the lubrication holes in the end cap ➤*966*|*5*. If grease lubrication is intended, bearings of type NX..-Z or NXK..-Z should be used. In the case of these bearings, the axial bearing component is greased using a lithium complex soap grease to GA08. The end caps do not have lubrication holes.

Type NKX, NKX..-Z

✎ *Type NKX*

Type NKX does not have a cap which holds the axial bearing component together ➤*966*|*5*. As a result, these bearings are not self-retaining. They should be used with oil lubrication in preference, as the lubricating grease can only be retained with difficulty in the axial bearing component.

✎ *Type NKX..-Z*

The bearings have an end cap without lubrication holes and are intended for grease lubrication ➤*964*|*2.1* and ➤*966*|*5*. The axial bearing component is greased using a lithium complex soap grease to GA08.

Needle roller/axial cylindrical roller bearings

Type NKXR, NKXR..-Z

✎ *Type NKXR*

As the bearings do not have an end cap, the lubricating grease can only be retained with difficulty in the axial bearing component ➤*967*|*6*. They should therefore be lubricated using oil in preference.

✎ *Type NKXR..-Z*

Bearings of this type have an end cap without lubrication holes and are intended for grease lubrication ➤*967*|*6*. The axial bearing component is greased using a lithium complex soap grease to GA08.

Needle roller/angular contact ball bearings

✎ *Type NKIA, NKIB*

Needle roller/angular contact ball bearings can be lubricated with oil or grease. For lubrication, the outer ring has a lubrication groove and a lubrication hole ➤*967*|*8* and ➤*968*|*9*. If grease lubrication is used, the radial and axial bearing components must be lubricated with the same grease prior to mounting the bearings.

2.5 Sealing

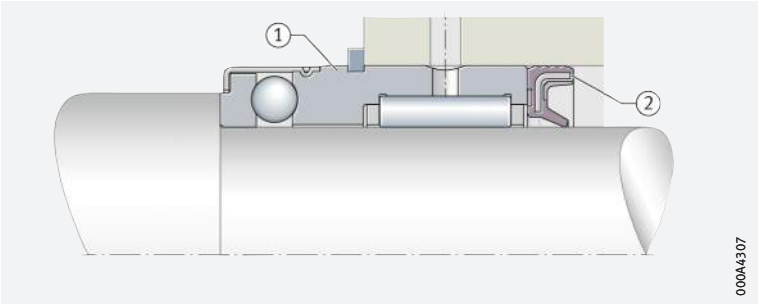
Provide seals in the adjacent construction

Combined needle roller bearings are not sealed. In the case of unsealed bearings, sealing of the bearing position must be carried out in the adjacent construction. This must reliably prevent:

- moisture and contaminants from entering the bearing
- the egress of lubricant from the bearing.

13
Sealing of the bearing position in the adjacent construction – example

① *Needle roller/axial deep groove ball bearing NX..-Z*
② *Sealing of the bearing with rotary shaft seal G*



Bearings with end cap

End caps without lubrication holes are suitable for grease lubrication

Bearings of design Z have an end cap, which grips the axial bearing component ➤*964*|*2.1* and ➤*965*|*3*, ➤*966*|*5* and ➤*967*|*6*. End caps without lubrication holes form a gap seal and retain the lubricating grease in the axial bearing component (applies to types NX..-Z, NKX..-Z, NKXR..-Z).

2.6 Speeds

Limiting speeds and reference speeds in the product tables

The product tables generally give two speeds for the bearings ➤*984*|:

- the kinematic limiting speed n_G
- the thermal speed rating $n_{\vartheta r}$.

Limiting speeds

The limiting speed n_G is the kinematically permissible speed of a bearing. Even under favourable mounting and operating conditions, this value should not be exceeded without prior consultation with Schaeffler ➤*64*. The values in the product tables are valid for oil lubrication.

Values for grease lubrication

For grease lubrication, 60% of the value stated in the product tables is permissible in each case.

Reference speeds

$n_{\vartheta r}$ is used to calculate n_ϑ

The thermal speed rating $n_{\vartheta r}$ is not an application-oriented speed limit, but is a calculated ancillary value for determining the thermally safe operating speed n_ϑ ➤*64*.

The thermally safe speed rating $n_{\vartheta r}$ for NKXR, NKXR..-Z, NKIA and NKIB is given in the product tables. The speed rating $n_{\vartheta r}$ to DIN ISO 15312:2004 is not defined for bearings NX and NKX and therefore only the limiting speed n_G is given.

In order to calculate the thermally safe operating speed n_ϑ, NKXR(..-Z) must be regarded as axial bearings and NKIA, NKIB as radial bearings.

2.7 Noise

Schaeffler Noise Index

The Schaeffler Noise Index (SGI) is not yet available for this bearing type ➤69. The data for these bearing series will be introduced and updated in stages.

Further information:

- ***medias*** ➤ *https://medias.schaeffler.com*.

2.8 Temperature range

✎ *Limiting values*

The operating temperature of the bearings is limited by:

- the dimensional stability of the bearing rings and rolling elements
- the cage
- the lubricant.

Possible operating temperatures of combined needler roller bearings ➤422|▦3.

▦ **1**
Permissible temperature ranges

Operating temperature	Combined needle roller bearings Full complement ball type bearings, bearings with a sheet steel cage or polyamide cage PA66
	–30 °C to +120 °C

In the event of anticipated temperatures which lie outside the stated values, please contact Schaeffler.

2.9 Cages

✎ *Sheet steel or plastic cages are used as standard*

The cages of radial bearings are made from sheet steel or plastic and are closed on both sides ➤984|▦. Bearings with a polyamide cage PA66 have the suffix TV. The cages for the axial bearing component are closed on both sides or open on one side. Sheet steel or glass fibre reinforced polyamide PA66 are used here as standard, depending on the bearing type.

For high continuous temperatures and applications with difficult operating conditions, bearings with sheet steel cages should be used. If there is any uncertainty regarding cage suitability, please consult Schaeffler.

2.10 Internal clearance

Radial internal clearance of bearings with inner ring

✎ *The standard is CN*

As standard, combined needler roller bearings with inner ring have the radial internal clearance CN (normal) ➤974|▦2. CN is not stated in the designation.

The values for radial internal clearance in bearings with an inner ring correspond to DIN 620-4:2004 (ISO 5753-1:2009) ➤974|▦2. These are valid for bearings which are free from load and measurement forces (without elastic deformation).

For delivery options of bearings with a radial internal clearance value other than CN (for example C2, C3, C4) please consult Schaeffler.

Bearings with inner ring

Radial internal clearance of combined needle roller bearings with inner ring

Nominal bore diameter d mm		Radial internal clearance CN µm	
over	incl.	min.	max.
–	24	20	45
24	30	20	45
30	40	25	50
40	50	30	60
50	65	40	70
65	80	40	75
80	100	50	85

Enveloping circle diameter F_w for bearings without an inner ring

For bearings without an inner ring, the enveloping circle diameter F_w is used

In the case of bearings without inner ring, the dimension for the enveloping circle diameter F_w is used instead of the radial internal clearance. The enveloping circle is the inner inscribed circle of the needle rollers in clearance-free contact with the outer raceway. Once the bearings are mounted, the enveloping circle diameter F_w is in the tolerance class F6. The precondition for this is that the bore tolerances are observed for bearings without an inner ring ➤*977|2.16* and ➤*978|* ▦ *6*. Deviations for the tolerance class F6 ➤*974|* ▦ *3*.

Deviations for the enveloping circle diameter

Enveloping circle diameter F_w mm		Tolerance class F6 Tolerance for enveloping circle diameter F_w	
		upper deviation	lower deviation
over	incl.	µm	µm
3	6	+18	+10
6	10	+22	+13
10	18	+27	+16
18	30	+33	+20
30	50	+41	+25
50	80	+49	+30
80	120	+58	+36
120	180	+68	+43
180	250	+79	+50
250	315	+88	+56
315	400	+98	+62
400	500	+108	+68

2.11 Dimensions, tolerances

Dimension standards

The main dimensions of combined needle roller bearings correspond to ISO 15:2017 (DIN 616:2000 and DIN 5429-1:2005).
This excludes needle roller/axial deep groove ball bearings of the types NX and NX..-Z, which are not standardised.

Chamfer dimensions

The limiting dimensions for chamfer dimensions correspond to DIN 620-6:2004. Overview and limiting values ➤*135|7.11*.
Nominal value of chamfer dimension ➤*984|* ▦.

Tolerances

The dimensional, geometrical and running tolerances of the bearings correspond to tolerance class Normal:

- Radial bearing component in accordance with ISO 492:2014 and DIN 620-2:1988. Tolerance values in accordance with ISO 492 ➤122|⊞8
- Axial bearing component in accordance with ISO 199:2014 and DIN 620-3:1982. Tolerance values in accordance with ISO 199 ➤133|⊞25.

This excludes:

- NKIB, in this instance the bore d_1 of the narrow inner ring and the width (–0,3 mm) over both inner rings
- NKX and NKXR, in this instance the diameters D_1, D_2.

2.12 Suffixes

For a description of the suffixes used in this chapter ➤975|⊞4 and ***medias*** interchange ➤*https://www.schaeffler.de/std/1D52*.

⊞**4** *Suffixes and corresponding descriptions*

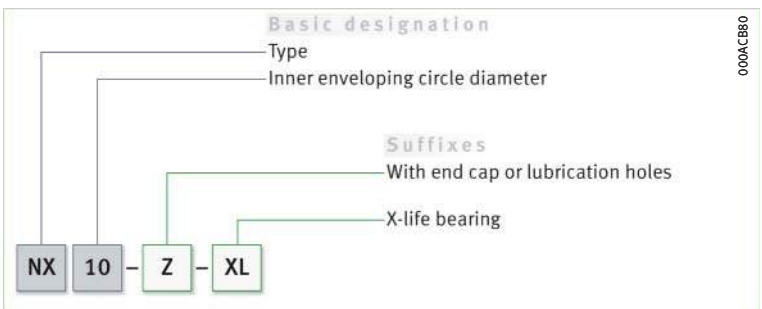
Suffix	Description of suffix	
TV	Bearing with radial cage made from glass fibre reinforced polyamide 66	Standard
XL	X-life bearing	
Z	Bearing with end cap, axial bearing component greased with lithium complex soap grease to GA08	

2.13 Structure of bearing designation

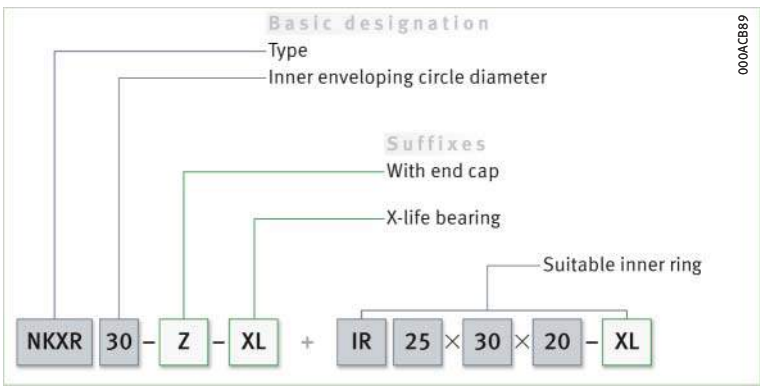
✎*Examples of composition of bearing designation*

The designation of bearings follows a set model. Examples ➤975|⧉14 to ➤976|⧉16. The composition of designations is subject in part to DIN 623-1 ➤102|⧉10.

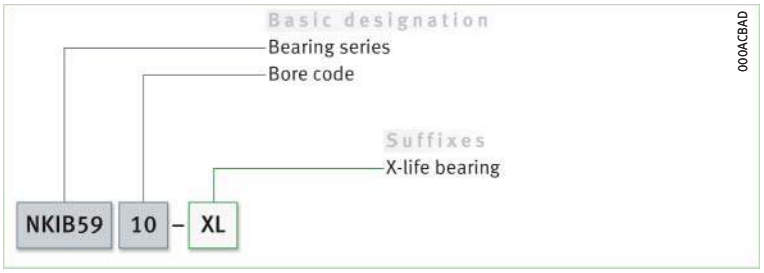
⧉**14** *Needle roller/axial deep groove ball bearing without inner ring, for grease lubrication: designation structure*



⧉**15** *Needler roller/axial cylindrical roller bearing, with end cap, with recommended inner ring: designation structure*



16
Needle roller/angular contact ball bearing, double direction, with standard inner ring: designation structure



2.14 Dimensioning

Equivalent dynamic bearing load

Separate calculation of the rating life for radial and axial bearing components

In the case of combined needle roller bearings, the rating life of the radial bearing and axial bearing component must always be calculated separately ➤976| 1 and ➤976| 2. The lower value then applies in each case to the bearing position.

$P = F_r$ and F_a respectively under purely radial load and purely axial load of constant magnitude and direction

The basic rating life equation $L = (C/P)^p$ used in the dimensioning of bearings under dynamic load assumes a concentrically acting load of constant magnitude and direction. In the case of radial bearings, this is a purely radial load F_r, while in the case of axial bearings it is a purely axial load F_a. In order to calculate the fatigue rating life for combined needle roller bearings, the bearing load F_r or F_a ($P_r = F_r$ or $P_a = F_a$) is therefore used in the rating life equation for P ➤976| 1 and ➤976| 2.

Radial bearings

The radial component of the combined needle roller bearing may only be subjected to radial load. For the calculation of P_r ➤976| 1.

1
Equivalent dynamic load

$$P_r = F_r$$

Legend

P_r	N	Equivalent dynamic bearing load for the radial bearing
F_r	N	Radial load.

Axial bearing component

The axial bearing can only be subjected to axial load. For the calculation of P_a under a concentrically acting axial load ➤976| 2.
For needle roller/angular contact ball bearings, the axial load F_a must not exceed $0{,}25 \cdot F_r$.

2
Equivalent dynamic load

$$P_a = F_a$$

Legend

P_a	N	Equivalent dynamic bearing load for the axial bearing component
F_a	N	Axial load.

Equivalent static bearing load

The equivalent static bearing load must be calculated for both the radial bearing and the axial bearing component ➤976| 3 and ➤976| 4.

3
Equivalent static load

$$P_{0r} = F_{0r}$$

4
Equivalent static load

$$P_{0a} = F_{0a}$$

Legend

P_{0r}	N	Equivalent static bearing load for the radial bearing
F_{0r}	N	Largest radial load present (maximum load)
P_{0a}	N	Equivalent static bearing load for the axial bearing component
F_{0a}	N	Largest axial load present (maximum load).

Static load safety factor

✎ *S_{0a} for needle roller/ angular contact ball bearings*

In addition to the basic rating life L (L_{10h}), it is also always necessary to check the static load safety factor S_0 ➤*977* *5*. The calculation must be carried out for both the radial bearing (S_{0r}) and the axial bearing component (S_{0a}). The axial static load safety factor S_{0a} must be > 1,5.

5
Static load safety factor

$$S_0 = \frac{C_0}{P_0}$$

Legend

S_{0r}, S_{0a}	–	Static load safety factor
C_{0r}, C_{0a}	N	Basic static load rating
P_{0r}, P_{0a}	N	Equivalent static bearing load.

2.15 Minimum load

Minimum radial load

✎ *In order to prevent damage due to slippage, a minimum radial load of $P > C_{0r}/60$ is required*

In order that no slippage occurs between the contact partners, the radial bearing component must be constantly subjected to a sufficiently high load. For continuous operation, experience shows that a minimum radial load of the order of $P > C_{0r}/60$ is necessary. In most cases, however, the radial load is already higher than the requisite minimum load due to the weight of the supported parts and the external forces.

If the minimum radial load is lower than indicated above, please consult Schaeffler.

Minimum axial load

The axial component of the bearing arrangement must be preloaded to 1% of the axial basic static load rating C_{0a}. Basic load ratings C_{0a} ➤*984*.

2.16 Design of bearing arrangements

✎ *Support bearing rings over their entire circumference and width*

In order to allow full utilisation of the load carrying capacity of the bearings and achieve the requisite rating life, the bearing rings must be rigidly and uniformly supported by means of contact surfaces over their entire circumference and over the entire width of the raceway. Support can be provided by means of a cylindrical seating surface. The seating and contact surfaces should not be interrupted by grooves, holes or other recesses. The accuracy of mating parts must meet specific requirements ➤*930* *6* to ➤*931* *7*.

Radial location

✎ *For secure radial location, tight fits are necessary*

In addition to supporting the rings adequately, the bearings must also be securely located in a radial direction, to prevent creep of the bearing rings on the mating parts (shaft and housing bore) under load. This is generally achieved by means of tight fits between the bearing rings and the mating parts. If the rings are not secured adequately or correctly, this can cause severe damage to the bearings and adjacent machine parts.
Influencing factors, such as the conditions of rotation, magnitude of the load, internal clearance, temperature conditions, design of the mating parts, mounting and dismounting options etc., must be taken into consideration in the selection of fits.

The following information provided in Technical principles must be taken into consideration in the design of bearing arrangements:

- conditions of rotation ➤*145*
- tolerance classes for cylindrical shaft seats (radial bearings) ➤*147* *2*
- shaft fits ➤*150* *6*
- tolerance classes for bearing seats in housings (radial bearings) ➤*148* *4*
- housing fits ➤*158* *7*.

Axial location

The bearings must also be securely located in an axial direction

As a tight fit alone is not normally sufficient to also locate the bearing rings securely on the shaft and in the housing bore in an axial direction, this must usually be achieved by means of an additional axial location or retention method. The axial location of the bearing rings must be matched to the type of bearing arrangement. Shaft and housing shoulders, retaining rings etc., are fundamentally suitable ➤969| 10, ➤970| 11 and ➤979| 18. For locating bearings and for bearings with a split inner ring (type NKIB), axial abutment of the bearing rings on both sides is particularly important.

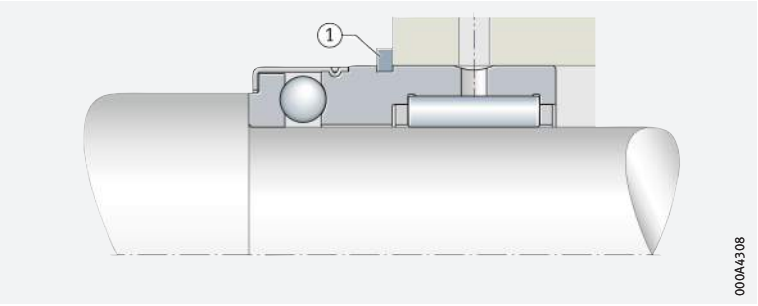
Types NX and NX..-Z

Axial location by snap ring

With types NX and NX..-Z, the retaining ring is inserted in the annular slot in the bearing outer ring ➤978| 17. Snap rings which are inserted in the slot are a particularly compact and cost-effective way of locating the bearings axially in the housing. Suitable snap rings ➤984|. The snap rings must be ordered in addition to the bearing.

17
Combined needle roller bearing NX with a retaining ring located axially in the housing

① *Annular slot with retaining ring*



Type NKX, NKX..-Z

The axial location of these bearings in one direction can take place by means of the needle roller bearing with integrated housing locating washer.

Dimensional, geometrical and running accuracy of cylindrical bearing seats (bearings with inner ring)

Tolerance classes and surface designs for the shaft and the housing bore ➤978| 5 and ➤978| 6.

5
Tolerance classes and surface design for the shaft – bearings with inner ring

Series	Shaft tolerance	Roundness tolerance max.	Parallelism tolerance max.
NKIA, NKIB	k6 Ⓔ	IT4/2	IT4
NX, NKX, NKXR			

6
Tolerance classes and surface design for the housing bore

Series	Bore tolerance to ISO 286-2	Roundness tolerance max.	Parallelism tolerance max.
NKIA, NKIB	M6 Ⓔ	IT5/2	IT4
NX, NKX, NKXR	K6 Ⓔ, M6 Ⓔ (for rigid bearing arrangements)		

7
Numerical values for ISO standard tolerances (IT grades) to ISO 286-1:2010

IT grade	Nominal dimension in mm				
	over **6**	**10**	**18**	**30**	**50**
	incl. **10**	**18**	**30**	**50**	**80**
	Values in µm				
IT4	4	5	6	7	8
IT5	6	8	9	11	13
IT6	9	11	13	16	19
IT7	15	18	21	25	30

Roughness of cylindrical bearing seating surfaces

Ra must not be too high

The roughness of the bearing seats must be matched to the tolerance class of the bearings. The mean roughness value Ra must not be too high, in order to maintain the interference loss within limits. The shafts must be ground, while the bores must be precision turned. Guide values as a function of the IT grade of bearing seating surfaces ➤*979*|▦ *8*.

▦ **8**
Roughness values for cylindrical bearing seating surfaces – guide values

Nominal diameter of the bearing seat d (D) mm		Recommended mean roughness value for ground bearing seats Ramax µm			
		Diameter tolerance (IT grade)			
over	incl.	IT7	IT6	IT5	IT4
–	80	1,6	0,8	0,4	0,2

Mounting dimensions

The contact surfaces for the rings must be of sufficient height

The mounting dimensions of the shaft and housing shoulders, spacer rings and retaining rings etc., must ensure that the contact surfaces for the bearing rings are of sufficient height. Proven mounting dimensions for the radii and diameters of abutment shoulders are given in the product tables ➤*984*|▦. These dimensions are limiting dimensions (maximum or minimum dimensions); the actual values should not be higher or lower than specified.

DIN ISO

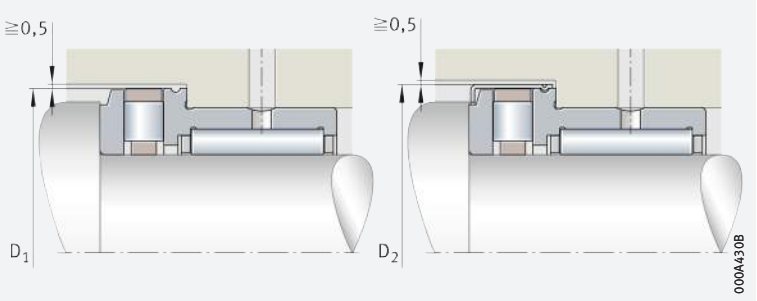
The transition from the bearing seat to the abutment shoulder must be designed with rounding to DIN 5418 or an undercut to DIN 509. The maximum chamfer dimensions for the inner rings in accordance with DIN 620-6 must be taken into consideration.

For NKX and NKXR, the axial bearing component seat must be free in the housing

In order to avoid double fits, the diameter of the contact surface for the housing locating washer in the adjacent construction must be at least +0,5 mm larger than dimension D_1 and D_2 of the bearing washer in bearings NKX and NKXR ➤*979*|▭ *18*. Values for diameters D_1 and D_2 ➤*984*|▦.

▭ **18**
Free housing locating washer in the adjacent construction for NKX and NKXR

D_1 = *dimension of housing locating washer without end cap*
D_2 = *dimension of housing locating washer with end cap*



Raceway for bearings without an inner ring (direct bearing arrangement)

Produce the raceway as a rolling bearing raceway

Where needle roller bearings without an inner ring are used (so-called direct bearing arrangements), the rolling elements run directly on the shaft. In these bearings, the raceway for the rolling elements on the shaft must be produced as a rolling bearing raceway (hardened and ground). Tolerances and surface designs are shown in ➤*979*|▦ *9*. The surface hardness of the raceway must be 670 HV to 840 HV, the hardening depth CHD or SHD must be sufficiently large. If the shaft cannot be produced as a raceway, the bearings can be combined with inner rings IR ➤*964*|*2.1* and ➤*984*|▦.

▦ **9**
Tolerance classes and surface design for the shaft (direct bearing arrangement) – without inner ring

Series	Shaft tolerance	Roundness tolerance max.	Parallelism tolerance max.	Recommended mean roughness value Ramax (Rzmax) µm
NX, NKX, NKXR	k6 Ⓔ	IT3	IT3	0,1 (0,4)

Shaft raceway designed in accordance with DIN 617

If the surface of the shaft raceway is produced to DIN 617, the basic load ratings C_r in the product tables must be reduced by 15%.

Steels for the raceway

Through hardening steels

Through hardening steels in accordance with ISO 683-17 (e.g. 100Cr6) are suitable as materials for rolling bearing raceways in direct bearing arrangements. These steels can also be surface layer hardened.

Case hardening steels

Case hardening steels must correspond to DIN EN ISO 683-17 (e.g. 17MnCr5, 18CrNiMo7-6) or EN 10084 (e.g. 16MnCr5).

Steels for inductive surface layer hardening

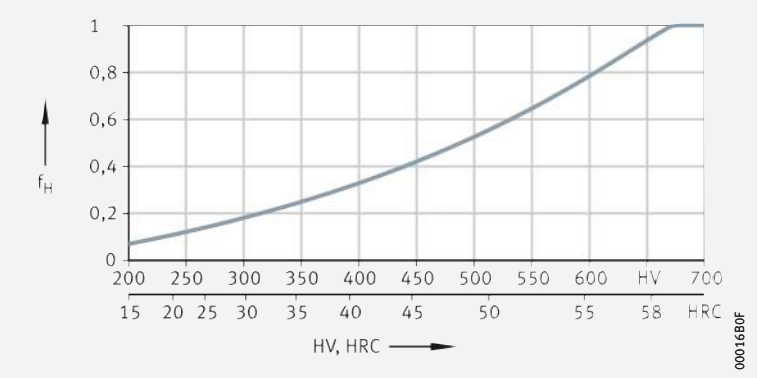
For flame and induction hardening, steels in accordance with DIN EN ISO 683-17 (e.g. C56E2, 43CrMo4) or DIN 17212 (e.g. Cf53) should be used.

Raceway hardness of less than 670 HV

If the raceway fulfils the requirements for rolling bearing materials but the raceway hardness is less than 670 HV, the load on the bearing arrangement cannot be as high as the full load carrying capacity of the bearing. In order to determine the dynamic and static load carrying capacity of the bearing arrangement, the basic dynamic load rating C of the bearings must be multiplied by the reduction factor f_H (dynamic hardness factor) and the basic static load rating C_{0r} by the reduction factor f_{H0} (static hardness factor) ➤980| 19 and ➤980| 20.

19
Dynamic hardness factor at reduced hardness of raceways/rolling elements

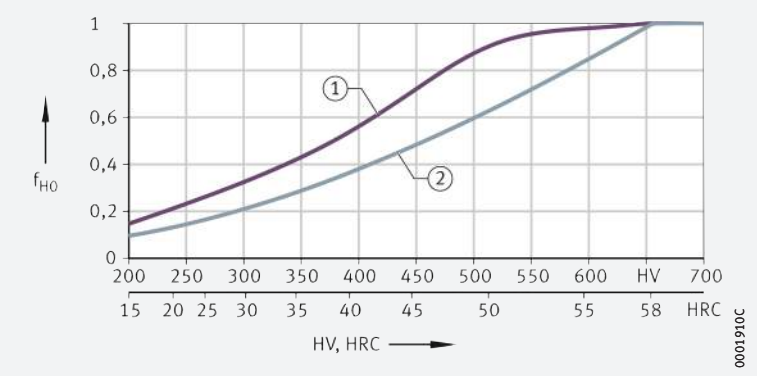
f_H = *dynamic hardness factor*
HV, HRC = *surface hardness*



20
Static hardness factor at reduced hardness of raceways/rolling elements

f_{H0} = *static hardness factor*
HV, HRC = *surface hardness*

① *Roller*
② *Ball*



Determining the case hardening depth

Approximation value for case hardening depth

An approximation value for determining the minimum hardness depth is given in ➤*981*|*f 6*. The reference value for the load present is the equivalent stress in accordance with the distortion energy hypothesis (DEH) as a function of the rolling element diameter D_w and the magnitude of the load.

f 6
Case hardening depth

$$CHD \geqq 0{,}052 \cdot D_w$$

Legend

CHD	mm	Case hardening depth
D_w	mm	Rolling element diameter.

The local hardness must always be above the local requisite hardness, which can be calculated from the equivalent stress.

Determining the surface hardening depth

In these surface hardening methods, the load and contact geometry must be taken into consideration when determining the requisite hardening depth.

For calculation of the surface hardening depth SHD ➤*981*|*f 7*:

f 7
Surface hardening depth

$$SHD \geqq 140 \cdot D_w / R_{p0,2}$$

Legend

SHD	mm	Surface hardening depth
D_w	mm	Rolling element diameter
$R_{p0,2}$	N/mm^2	Yield point of base material.

2.17 Mounting and dismounting

The mounting and dismounting options for combined needle roller bearings, by thermal, hydraulic or mechanical methods, must be taken into consideration in the design of the bearing position.

As the bearings are not self-retaining, they are easy to mount

Combined needle roller bearings without an end cap are not self-retaining. As a result, the bearing parts can be mounted separately from each other ➤*964*|*2.1*. This gives simplified mounting of the bearings, especially when the two bearing rings have a tight fit.

Schaeffler Mounting Handbook

Rolling bearings must be handled with great care

Rolling bearings are well-proven precision machine elements for the design of economical and reliable bearing arrangements, which offer high operational security. In order that these products can function correctly and achieve the envisaged operating life without detrimental effect, they must be handled with care.

The Schaeffler Mounting Handbook MH 1 gives comprehensive information about the correct storage, mounting, dismounting and maintenance of rotary rolling bearings ➤*https://www.schaeffler.de/std/1D53*. It also provides information which should be observed by the designer, in relation to the mounting, dismounting and maintenance of bearings, in the original design of the bearing position. This book is available from Schaeffler on request.

2.18 Legal notice regarding data freshness

✎ The further development of products may also result in technical changes to catalogue products

Of central interest to Schaeffler is the further development and optimisation of its products and the satisfaction of its customers. In order that you, as the customer, can keep yourself optimally informed about the progress that is being made here and with regard to the current technical status of the products, we publish any product changes which differ from the printed version in our electronic product catalogue.

§ We therefore reserve the right to make changes to the data and illustrations in this catalogue. This catalogue reflects the status at the time of printing. More recent publications released by us (as printed or digital media) will automatically precede this catalogue if they involve the same subject. Therefore, please always use our electronic product catalogue to check whether more up-to-date information or modification notices exist for your desired product.

Link to electronic product catalogue

The following link will take you to the Schaeffler electronic product catalogue: ➤ *https://medias.schaeffler.com*.

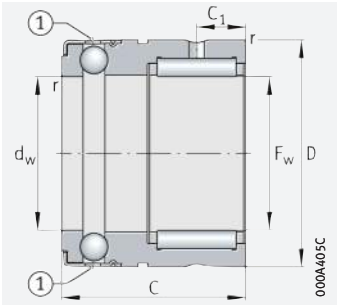
2.19 Further information

In addition to the data in this chapter, the following chapters in Technical principles must also be observed in the design of bearing arrangements:

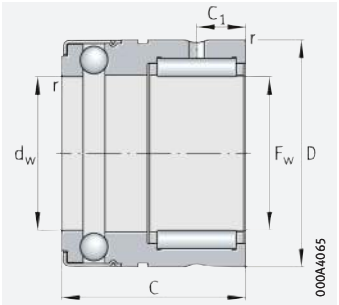
- Determining the bearing size ➤*34*
- Rigidity ➤*54*
- Friction and increases in temperature ➤*56*
- Speeds ➤*64*
- Bearing data ➤*97*
- Lubrication ➤*70*
- Sealing ➤*182*
- Design of bearing arrangements ➤*139*
- Mounting and dismounting ➤*191*.

Needle roller/axial deep groove ball bearings

Without inner ring



NX



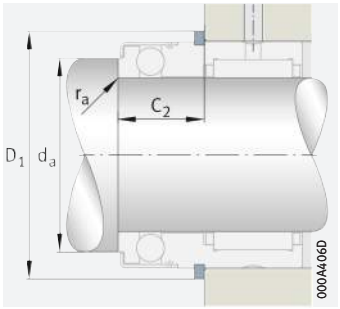
NX..-Z

F_w = 7 – 35 mm

Main dimensions			Basic load ratings				Fatigue limit load		Limiting speed	Mass	Designation ➤975|2.12 ➤975|2.13 X-life ➤968	
F_w	D	C	radial		axial		C_{ur}	C_{ua}	n_G	m	For oil lubrication	For grease lubrication
		–0,25	dyn. C_r N	stat. C_{0r} N	dyn. C_a N	stat. C_{0a} N	N	N	min^{-1}	≈ g		
7	14	18	3 250	2 650	3 150	4 300	410	190	15 000	14	**NX7-TV-XL**	**NX7-Z-TV-XL**
10	19	18	5 000	3 700	4 600	7 200	720	320	11 000	25	**NX10-XL**	**NX10-Z-XL**
12	21	18	5 400	4 300	4 850	8 200	830	365	9 500	28	**NX12-XL**	**NX12-Z-XL**
15	24	28	12 100	12 700	5 600	10 400	2 320	460	8 000	48	**NX15-XL**	**NX15-Z-XL**
17	26	28	13 500	15 000	5 800	11 500	2 750	510	7 500	53	**NX17-XL**	**NX17-Z-XL**
20	30	28	14 600	17 500	7 000	14 700	3 200	650	6 500	68	**NX20-XL**	**NX20-Z-XL**
25	37	30	16 800	22 400	11 100	24 300	4 150	1 080	4 900	115	**NX25-XL**	**NX25-Z-XL**
30	42	30	25 500	36 000	11 700	28 000	6 300	1 230	4 300	130	**NX30-XL**	**NX30-Z-XL**
35	47	30	27 500	41 500	12 400	32 500	7 300	1 440	3 700	160	**NX35-XL**	**NX35-Z-XL**

medias ➤ *https://www.schaeffler.de/std/1E3F*

① Holes for lubricating oil

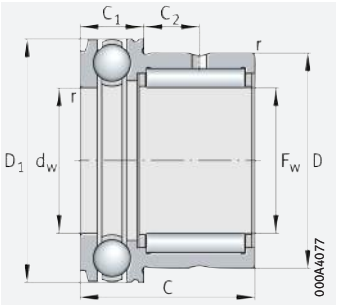


Mounting dimensions
Snap ring in outer ring

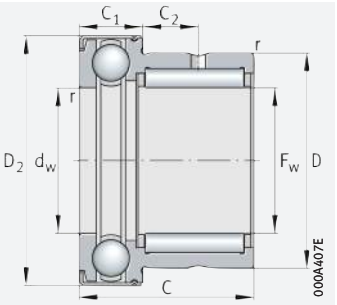
Dimensions				Mounting dimensions				Designation	
F_w	C_1	d_w E8	r min.	C_2	D_1	d_a	r_a max.	Recommended inner rings ➤*992*	Suitable snap rings
7	4,7	7	0,3	10	16,5	9,6	0,3	–	**WR14, SW14**
10	4,7	10	0,3	10	21,9	14,6	0,3	**IR6×10×10-IS1-XL**	**WR19, SW19**
12	4,7	12	0,3	10	23,7	16,6	0,3	**IR8×12×10-IS1-XL**	**WR21, SW21**
15	8	15	0,3	12,2	26,5	19	0,3	**IR12×15×16-XL**	**WR24, SW24**
17	8	17	0,3	12,2	28,5	21	0,3	**IR14×17×17-XL**	**WR26, SW26**
20	8	20	0,3	12,2	33,6	25	0,3	**IR17×20×16-XL**	**WR30, SW30**
25	8	25	0,3	14,2	40,4	31,6	0,3	**IR20×25×16-IS1-XL**	**WR37, SW37**
30	10	30	0,3	14,2	45,1	36,5	0,3	**IR25×30×20-XL**	**WR42, SW42**
35	10	35	0,3	14,2	50,1	40,5	0,3	**IR30×35×20-XL**	**WR47, SW47**

Needle roller/axial deep groove ball bearings

Without inner ring
With or without end cap



NKX

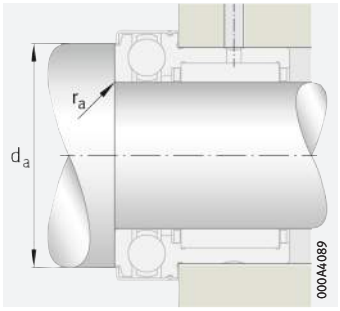


NKX..-Z

F_w = 10 – 70 mm

Main dimensions			Basic load ratings				Fatigue limit load		Limiting speed	Mass		Designation ➤975|2.12 ➤975|2.13 X-life ➤968	
			radial		axial					Without end cap	With end cap		
F_w	D	C	dyn. C_r	stat. C_{0r}	dyn. C_a	stat. C_{0a}	C_{ur}	C_{ua}	n_G	m	m		
		–0,25	N	N	N	N	N	N	min^{-1}	≈ g	≈ g		
10	19	23	7 000	7 800	10 000	14 000	1 310	670	12 400	34	36	**NKX10-TV-XL**	**NKX10-Z-TV-XL**
12	21	23	10 100	11 000	10 300	15 400	1 920	740	11 000	38	40	**NKX12-XL**	**NKX12-Z-XL**
15	24	23	12 100	12 700	10 500	16 800	2 320	810	9 500	44	47	**NKX15-XL**	**NKX15-Z-XL**
17	26	25	13 500	15 000	10 800	18 200	2 750	870	8 500	53	55	**NKX17-XL**	**NKX17-Z-XL**
20	30	30	18 600	23 800	14 200	24 700	4 150	1 190	7 500	83	90	**NKX20-XL**	**NKX20-Z-XL**
25	37	30	21 300	30 500	19 600	37 500	5 300	1 790	6 000	125	132	**NKX25-XL**	**NKX25-Z-XL**
30	42	30	25 500	36 000	20 400	42 000	6 300	2 030	5 000	141	148	**NKX30-XL**	**NKX30-Z-XL**
35	47	30	27 500	41 500	21 200	47 000	7 300	2 270	4 600	163	168	**NKX35-XL**	**NKX35-Z-XL**
40	52	32	29 500	47 000	27 000	63 000	8 300	3 000	4 000	200	208	**NKX40-XL**	**NKX40-Z-XL**
45	58	32	31 000	53 000	28 000	69 000	9 300	3 350	3 600	252	265	**NKX45-XL**	**NKX45-Z-XL**
50	62	35	43 000	74 000	29 000	75 000	12 700	3 650	3 300	280	300	**NKX50-XL**	**NKX50-Z-XL**
60	72	40	47 500	90 000	41 500	113 000	15 400	5 400	2 800	360	380	**NKX60-XL**	**NKX60-Z-XL**
70	85	40	50 000	92 000	43 000	127 000	15 700	6 100	2 400	500	520	**NKX70-XL**	**NKX70-Z-XL**

medias ➤ *https://www.schaeffler.de/std/1E40*

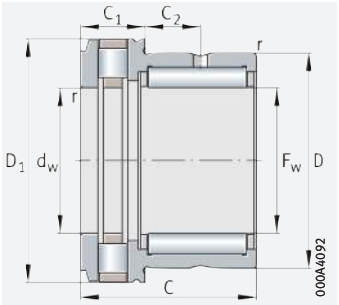


Mounting dimensions

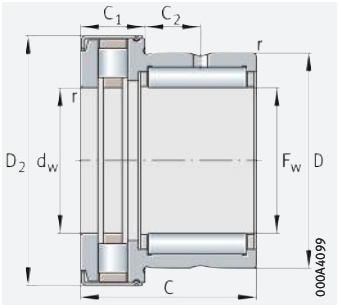
Dimensions							Mounting dimensions		Designation
									Recommended inner rings ➤*992*
F_w	D_1 max.	D_2 max.	C_1 –0,2	C_2	d_w E8	r min.	d_a	r_a max.	
10	24,1	25,2	9	6,5	10	0,3	19,7	0,3	**IR7×10×16-XL**
12	26,1	27,2	9	6,5	12	0,3	21,7	0,3	**IR9×12×16-XL**
15	28,1	29,2	9	6,5	15	0,3	23,7	0,3	**IR12×15×16-XL**
17	30,1	31,2	9	8	17	0,3	25,7	0,3	**IR14×17×17-XL**
20	35,1	36,2	10	10,5	20	0,3	30,7	0,3	**IR17×20×20-XL**
25	42,1	43,2	11	9,5	25	0,6	37,7	0,6	**IR20×25×20-XL**
30	47,1	48,2	11	9,5	30	0,6	42,7	0,6	**IR25×30×20-XL**
35	52,1	53,2	12	9	35	0,6	47,7	0,6	**IR30×35×20-XL**
40	60,1	61,2	13	10	40	0,6	55,7	0,6	**IR35×40×20-XL**
45	65,2	66,5	14	9	45	0,6	60,5	0,6	**IR40×45×20-XL**
50	70,2	71,5	14	10	50	0,6	65,5	0,6	**IR45×50×25-XL**
60	85,2	86,5	17	12	60	1	80,5	1	**IR50×60×25-XL**
70	95,2	96,5	18	11	70	1	90,5	1	**IR60×70×25-XL**

Needle roller/axial cylindrical roller bearings

Without inner ring
With or without end cap



NKXR

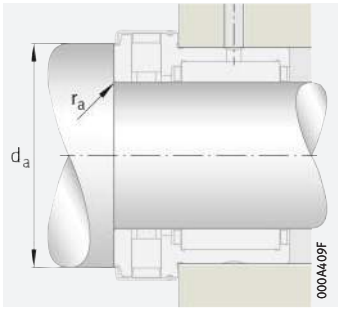


NKXR..-Z

F_w = 15 – 50 mm

Main dimensions			Basic load ratings				Limiting speed	Speed rating	Mass		Designation ➤975|2.12 ➤975|2.13 X-life ➤968	
			radial		axial				Without end cap	With end cap	Without end cap	With end cap
F_w	D	C	dyn. C_r	stat. C_{0r}	dyn. C_a	stat. C_{0a}	n_G	$n_{\vartheta r}$	m	m		
		–0,25	N	N	N	N	min^{-1}	min^{-1}	≈ g	≈ g		
15	24	23	12 100	12 700	14 400	28 500	13 000	6 500	42	45	**NKXR15-XL**	**NKXR15-Z-XL**
17	26	25	13 500	15 000	16 000	33 500	12 000	5 500	50	53	**NKXR17-XL**	**NKXR17-Z-XL**
20	30	30	18 600	23 800	25 000	53 000	10 000	4 200	80	84	**NKXR20-XL**	**NKXR20-Z-XL**
25	37	30	21 300	30 500	33 500	76 000	8 500	3 400	120	125	**NKXR25-XL**	**NKXR25-Z-XL**
30	42	30	25 500	36 000	35 500	86 000	7 500	2 900	135	141	**NKXR30-XL**	**NKXR30-Z-XL**
35	47	30	27 500	41 500	39 000	101 000	6 500	2 500	157	165	**NKXR35-XL**	**NKXR35-Z-XL**
40	52	32	29 500	47 000	56 000	148 000	6 000	2 000	204	214	**NKXR40-XL**	**NKXR40-Z-XL**
45	58	32	31 000	53 000	59 000	163 000	5 000	1 900	244	260	**NKXR45-XL**	**NKXR45-Z-XL**
50	62	35	43 000	74 000	62 000	177 000	4 800	1 700	268	288	**NKXR50-XL**	**NKXR50-Z-XL**

medias ➤ *https://www.schaeffler.de/std/1E41*

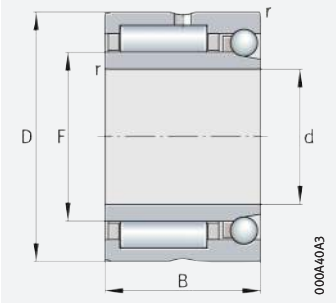


Mounting dimensions

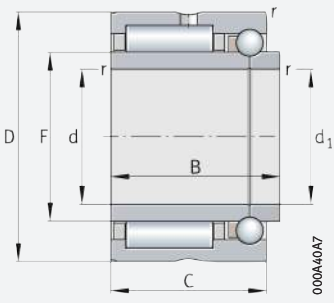
	Fatigue limit load		Dimensions						Mounting dimensions		Designation
											Recommended inner rings ➤*992*
F_w	C_{ur}	C_{ua}	D_1	D_2	C_1	C_2	d_w	r	d_a	r_a	
	N	N	max.	max.	–0,2		E8	min.		max.	
15	2 320	4 000	28,1	29,2	9	6,5	15	0,3	23,7	0,3	**IR12×15×16-XL**
17	2 750	4 650	30,1	31,2	9	8	17	0,3	25,7	0,3	**IR14×17×17-XL**
20	4 150	7 300	35,1	36,2	10	10,5	20	0,3	30,7	0,3	**IR17×20×20-XL**
25	5 300	7 100	42,1	43,2	11	9,5	25	0,6	37,7	0,6	**IR20×25×20-XL**
30	6 300	8 000	47,1	48,2	11	9,5	30	0,6	42,7	0,6	**IR25×30×20-XL**
35	7 300	9 500	52,1	53,2	12	9	35	0,6	47,7	0,6	**IR30×35×20-XL**
40	8 300	14 500	60,1	61,2	13	10	40	0,6	55,7	0,6	**IR35×40×20-XL**
45	9 300	16 000	65,2	66,5	14	9	45	0,6	60,6	0,6	**IR40×45×20-XL**
50	12 700	17 400	70,2	71,5	14	10	50	0,6	65,5	0,6	**IR45×50×25-XL**

Needle roller/angular contact ball bearings

With inner ring



NKIA
Single direction



NKIB
Double direction

d = 12 – 70 mm

Main dimensions			Basic load ratings				Fatigue limit load		Limiting speed	Speed rating	Mass	Designation ➤975|2.12 ➤975|2.13 X-life ➤968
d	D	B	radial		axial		C_{ur}	C_{ua}	n_G	$n_{\vartheta r}$	m	
			dyn. C_r	stat. C_{0r}	dyn. C_a	stat. C_{0a}						
			N	N	N	N	N	N	min^{-1}	min^{-1}	≈ g	
12	24	16	8 600	8 300	2 700	3 450	1 630	152	23 600	21 000	40	**NKIA5901-XL**
	24	17,5	8 600	8 300	2 700	3 450	1 630	152	23 600	21 000	43	**NKIB5901-XL**
15	28	18	12 000	13 600	2 900	4 200	2 430	186	21 600	17 000	50	**NKIA5902-XL**
	28	20	12 000	13 600	2 900	4 200	2 430	186	21 600	17 000	52	**NKIB5902-XL**
17	30	18	12 400	14 600	3 150	4 900	2 600	216	20 600	15 000	56	**NKIA5903-XL**
	30	20	12 400	14 600	3 150	4 900	2 600	216	20 600	15 000	58	**NKIB5903-XL**
20	37	23	23 700	25 500	4 900	7 400	4 600	330	17 200	14 000	103	**NKIA5904-XL**
	37	25	23 700	25 500	4 900	7 400	4 600	330	17 200	14 000	107	**NKIB5904-XL**
22	39	23	26 000	29 500	5 300	8 600	5 300	380	16 100	12 000	118	**NKIA59/22-XL**
	39	25	26 000	29 500	5 300	8 600	5 300	380	16 100	12 000	122	**NKIB59/22-XL**
25	42	23	26 500	31 500	5 400	9 300	5 700	410	14 600	12 000	130	**NKIA5905-XL**
	42	25	26 500	31 500	5 400	9 300	5 700	410	14 600	12 000	134	**NKIB5905-XL**
30	47	23	28 500	35 500	5 900	11 200	6 400	495	12 700	10 000	147	**NKIA5906-XL**
	47	25	28 500	35 500	5 900	11 200	6 400	495	12 700	10 000	151	**NKIB5906-XL**
35	55	27	35 500	50 000	7 400	14 900	9 400	660	10 900	9 000	243	**NKIA5907-XL**
	55	30	35 500	50 000	7 400	14 900	9 400	660	10 900	9 000	247	**NKIB5907-XL**
40	62	30	48 500	67 000	9 200	19 400	11 500	860	9 600	7 500	315	**NKIA5908-XL**
	62	34	48 500	67 000	9 200	19 400	11 500	860	9 600	7 500	320	**NKIB5908-XL**
45	68	30	51 000	73 000	9 600	21 400	12 600	950	8 700	7 000	375	**NKIA5909-XL**
	68	34	51 000	73 000	9 600	21 400	12 600	950	8 700	7 000	380	**NKIB5909-XL**
50	72	30	53 000	80 000	10 100	24 300	13 800	1 080	8 000	6 500	380	**NKIA5910-XL**
	72	34	53 000	80 000	10 100	24 300	13 800	1 080	8 000	6 500	385	**NKIB5910-XL**
55	80	34	65 000	100 000	12 100	29 500	17 300	1 300	7 300	6 000	550	**NKIA5911-XL**
	80	38	65 000	100 000	12 100	29 500	17 300	1 300	7 300	6 000	555	**NKIB5911-XL**
60	85	34	68 000	108 000	12 400	32 000	18 800	1 410	6 800	5 500	590	**NKIA5912-XL**
	85	38	68 000	108 000	12 400	32 000	18 800	1 410	6 800	5 500	595	**NKIB5912-XL**
65	90	34	69 000	112 000	12 800	34 000	19 500	1 510	6 300	5 500	635	**NKIA5913-XL**
	90	38	69 000	112 000	12 800	34 000	19 500	1 510	6 300	5 500	640	**NKIB5913-XL**
70	100	40	95 000	156 000	16 800	44 500	27 500	1 970	5 800	4 900	980	**NKIA5914-XL**
	100	45	95 000	156 000	16 800	44 500	27 500	1 970	5 800	4 900	985	**NKIB5914-XL**

medias ➤ *https://www.schaeffler.de/std/1E42*

	Dimensions			
	d	F	C	r min.
	12	16	–	0,3
		16	16	0,3
	15	20	–	0,3
		20	18	0,3
	17	22	–	0,3
		22	18	0,3
	20	25	–	0,3
		25	23	0,3
	22	28	–	0,3
		28	23	0,3
	25	30	–	0,3
		30	23	0,3
	30	35	–	0,3
		35	23	0,3
	35	42	–	0,6
		42	27	0,6
	40	48	–	0,6
		48	30	0,6
	45	52	–	0,6
		52	30	0,6
	50	58	–	0,6
		58	30	0,6
	55	63	–	1
		63	34	1
	60	68	–	1
		68	34	1
	65	72	–	1
		72	34	1
	70	80	–	1
		80	40	1

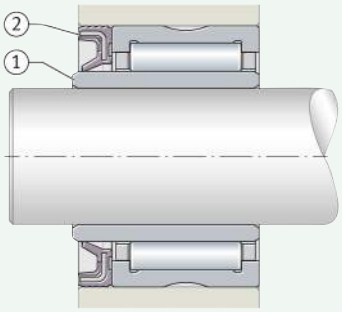
3 Inner rings

Inner rings are used where:

- the shaft cannot be used as a rolling bearing raceway for needle roller and cage assemblies, drawn cup needle roller bearings with open ends, drawn cup needle roller bearings with closed end and needle roller bearings (it cannot be hardened and ground)
- needle roller bearings must be combined with wider inner rings in order to allow larger axial displacements of the shaft in relation to the housing (e.g. in bearings with a non-locating bearing function)
- optimum running surfaces are required for seal lips ➤*992*|*1* and ➤*994*|*4*.

1
Wider inner ring, outside surface used as raceway for seal lip

① *Inner ring IR*
② *Sealing ring G*



3.1 Product design

Design variants

The bearing components are available as:

- inner ring IR ➤*992*|*2*
- inner ring LR ➤*993*|*3*.

Inner rings IR

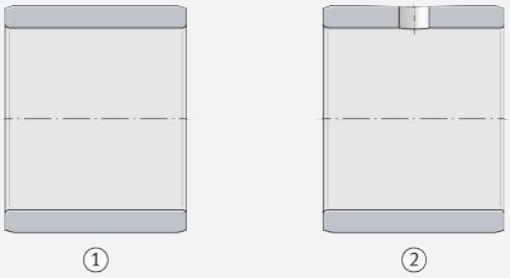
The raceway is precision machined

Inner rings IR are made from hardened rolling bearing steel and have precision machined raceways ➤*992*|*2*. Chamfers on the end faces facilitate the matching of the rings with the needle roller and cage assembly or of the bearing ring with the needle roller set and prevent damage to the seal lips of the bearings. Inner rings are available with and without a lubrication hole ➤*992*|*2*. Rings with a lubrication hole have the suffix IS1 ➤*995*|*3.5*, ➤*998*|▦.

Inner rings are also available by agreement with several lubrication holes.

2
Inner rings IR

① *Inner ring without lubrication hole*
② *Inner ring with lubrication hole*



X-life premium quality

Inner rings IR are supplied in the X-life design. The quality of the inner rings corresponds to the quality of X-life needle roller bearings. X-life inner rings include the suffix XL in the designation ➤*996*|🗀*6*.

X-life indicates a high product performance density and thus a particularly significant benefit to the customer. Further information on X-life ➤*10*.

Inner rings with the machining allowance “z” (special design)

✎*z = a material allowance for finish grinding of the rings after fitting, where there are high demands on running accuracy*

Inner rings are also available as a special design with a machining allowance “z” on the raceway. These inner rings have the suffix VGS ➤*995*|*3.5*. The size of the machining allowance is dependent on the diameter of the inner ring raceway ➤*993*|▦*1*. The raceway is finish ground once the rings have been fitted, if high demands are placed on the running accuracy of the bearings.

▦ **1**
Machining allowance

Raceway diameter F mm		Machining allowance z mm	Preground raceway diameter F_{VGS}
over	incl.		
–	50	0,1	$F_{VGS} = F + z$ (tolerance h7 Ⓔ)
50	80	0,15	
80	180	0,2	
180	250	0,25	
250	315	0,3	
315	400	0,35	
400	500	0,4	

Inner rings LR

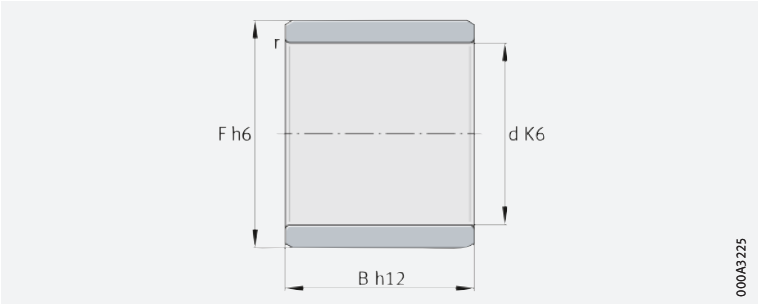
✎*The raceway is ground*

Inner rings LR are produced from rolling bearing steel and are hardened ➤*993*|🗀*3*. The bore and running surface are ground. The end faces are not ground (turned) and the edges are broken. These rings have larger tolerances than the inner rings IR. As a result, they are particularly suitable for applications that allow larger width tolerances and less demanding requirements for axial runout. It is here that they give particularly economical bearing arrangements.

Catalogue HR 1 does not contain separate product tables for inner rings LR. Available inner rings LR are listed in the product tables for drawn cup needle roller bearings with open ends and with closed end ➤*900*|▦.

For other available dimensions, please consult Schaeffler.

🗀 **3**
Inner ring LR



d = *bore diameter*
F = *raceway diameter*
B = *width*

Wider inner rings

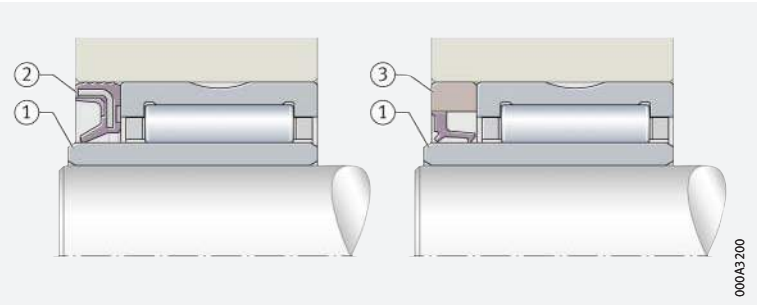
✎ *Advantages of wider inner rings*

The inner rings are available in several widths within the respective bore diameters ➤*998*|▦. Wider inner rings:

- permit larger axial displacements of the shaft in relation to the housing
- can be used as the running surface for the lips of contact seals, for example when using sealing rings G, GR and SD ➤*994*|⧉ *4*.

⧉ **4**
Wider inner ring, also used as running surface for sealing rings

① *Wider inner ring IR*
② *Sealing ring G*
③ *Sealing ring SD*



3.2 Temperature range

✎ *Limiting values*

The operating temperature of the inner rings is limited by the dimensional stability of the ring material ➤*994*|▦ *2*.

▦ **2**
Permissible temperature ranges

Operating temperature	Inner rings
	–30 °C to +120 °C

In the event of anticipated temperatures which lie outside the stated values, please contact Schaeffler.

3.3 Internal clearance

✎ *CN for the combination of needler roller bearing/inner ring*

The radial internal clearance is dependent on the bearing design used in combination with the inner ring. When combined with Schaeffler needle roller bearings, inner rings have a radial internal clearance of CN ➤*994*|▦ *3*.

✎ *C2 to C3 for the combination of drawn cup needle roller bearing with open ends or closed end/inner ring*

When combined with Schaeffler drawn cup needle roller bearings with open ends or closed end, inner rings have an internal clearance of C2 to C3, depending on the raceway diameter ➤*994*|▦ *3*.

DIN ISO

The values for radial internal clearance correspond to DIN 620-4:2004 (ISO 5753-1:2009). These are valid for bearings which are free from load and measurement forces (without elastic deformation).

▦ **3**
Radial internal clearance

Nominal bore diameter d mm		Radial internal clearance							
		C2 (Group 2) µm		CN (Group N) µm		C3 (Group 3) µm		C4 (Group 4) µm	
over	incl.	min.	max.	min.	max.	min.	max.	min.	max.
–	24	0	25	20	45	35	60	50	75
24	30	0	25	20	45	35	60	50	75
30	40	5	30	25	50	45	70	60	85
40	50	5	35	30	60	50	80	70	100

continued ▼

3 *Radial internal clearance*

Nominal bore diameter d mm		Radial internal clearance							
		C2 (Group 2) µm		CN (Group N) µm		C3 (Group 3) µm		C4 (Group 4) µm	
over	incl.	min.	max.	min.	max.	min.	max.	min.	max.
50	65	10	40	40	70	60	90	80	110
65	80	10	45	40	75	65	100	90	125
80	100	15	50	50	85	75	110	105	140
100	120	15	55	50	90	85	125	125	165
120	140	15	60	60	105	100	145	145	190
140	160	20	70	70	120	115	165	165	215
160	180	25	75	75	125	120	170	170	220
180	200	35	90	90	145	140	195	195	250
200	225	45	105	105	165	160	220	220	280
225	250	45	110	110	175	170	235	235	300
250	280	55	125	125	195	190	260	260	330
280	315	55	130	130	205	200	275	275	350
315	355	65	145	145	225	225	305	305	385
355	400	100	190	190	280	280	370	370	460
400	450	110	210	210	310	310	410	410	510

continued ▲

3.4 Tolerances

The tolerances for the dimensional and running accuracy of inner rings IR correspond to tolerance class Normal in accordance with ISO 492:2014. Tolerance values in accordance with ISO 492 ➤*122*|▦*8*.

3.5 Suffixes

For a description of the suffixes used in this chapter ➤*995*|▦*4* and ***medias*** interchange ➤*https://www.schaeffler.de/std/1D52*.

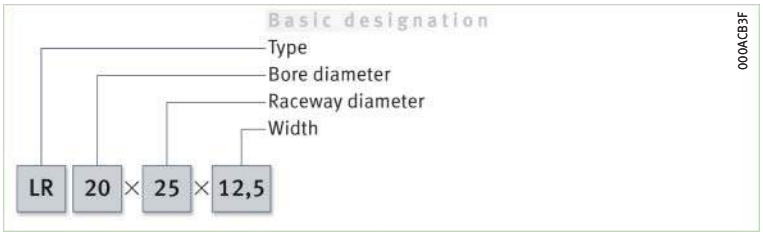
4 *Suffixes and corresponding descriptions*

Suffix	Description of suffix	
C2	Radial internal clearance C2 (smaller than normal)	Standard or special design, depending on the rolling bearing used
C3	Radial internal clearance C3 (larger than normal)	
C4	Radial internal clearance C4 (larger than C3)	
EGS	Surface ground free from spiral marks for rotary shaft seals to DIN 3760 and DIN 3761	Special design, available by agreement
IS1	With lubrication hole	Standard for IR inner rings within certain limits
VGS	Machining allowance “z” on raceway ➤*993*|▦*1*	Special design, available by agreement

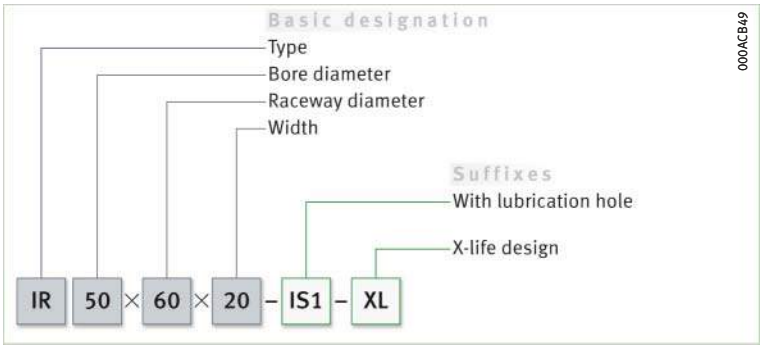
3.6 Structure of bearing designation

The designation of inner rings follows a set model. Examples ➤996|5 and ➤996|6.

5
Inner ring LR: designation structure



6
Inner ring IR with lubrication hole: designation structure



3.7 Design of bearing arrangements

Axial location of inner rings

✎ *Always locate inner rings axially on both sides*

The bearing rings must not be allowed to undergo lateral creep. In order to reliably prevent axial displacements of the inner rings on the shaft where a tight or loose fit is present, these must be located axially on both sides. On one side, the rings can be abutted against a shaft shoulder and, for location on the opposing side, retaining rings, spacer rings or shaft nuts are suitable ➤996|7.

✎ *Design of adjacent parts*

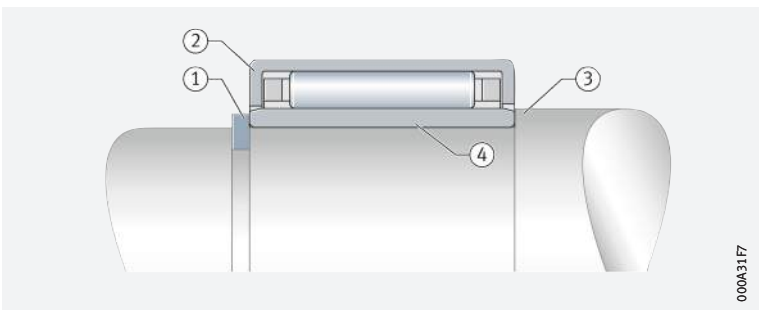
The abutment shoulders for the rings should be sufficiently high and perpendicular to the bearing axis. The transition from the bearing seat to the abutment shoulder must be designed with rounding to DIN 5418 or an undercut to DIN 509. In this instance, the minimum values for the chamfer dimensions in the product tables must be observed ➤998|.

The overlap between the retaining rings and the end faces of the bearing rings must be sufficiently large ➤996|7.

DIN ISO

The maximum chamfer dimensions for the inner rings in accordance with DIN 620-6 must be taken into consideration.

7
Inner ring axially located on both sides



① *Retaining ring*
② *Drawn cup needle roller bearing with open ends HK*
③ *Shaft shoulder*
④ *Inner ring IR*

3.8 Mounting and dismounting

Schaeffler Mounting Handbook

✎ Rolling bearings must be handled with great care

Rolling bearings are well-proven precision machine elements for the design of economical and reliable bearing arrangements, which offer high operational security. In order that these products can function correctly and achieve the envisaged operating life without detrimental effect, they must be handled with care.

The Schaeffler Mounting Handbook MH 1 gives comprehensive information about the correct storage, mounting, dismounting and maintenance of rotary rolling bearings ➤ *https://www.schaeffler.de/std/1D53*. It also provides information which should be observed by the designer, in relation to the mounting, dismounting and maintenance of bearings, in the original design of the bearing position. This book is available from Schaeffler on request.

3.9 Legal notice regarding data freshness

✎ The further development of products may also result in technical changes to catalogue products

Of central interest to Schaeffler is the further development and optimisation of its products and the satisfaction of its customers. In order that you, as the customer, can keep yourself optimally informed about the progress that is being made here and with regard to the current technical status of the products, we publish any product changes which differ from the printed version in our electronic product catalogue.

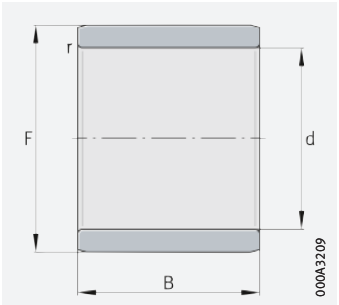
§ We therefore reserve the right to make changes to the data and illustrations in this catalogue. This catalogue reflects the status at the time of printing. More recent publications released by us (as printed or digital media) will automatically precede this catalogue if they involve the same subject. Therefore, please always use our electronic product catalogue to check whether more up-to-date information or modification notices exist for your desired product.

Link to electronic product catalogue

The following link will take you to the Schaeffler electronic product catalogue: ➤ *https://medias.schaeffler.com*.

Inner rings

Without lubrication hole



IR

d = 5 – 25 mm

Main dimensions				Mass	Designation ➤*995*|*3.5* ➤*996*|*3.6* X-life ➤*993*	Deviations for raceway F	
d	F	B	r	m		upper	lower
			min.	≈ g		µm	µm
5	8	12	0,3	2,8	**IR5×8×12-XL**	−7	−23
	8	16	0,3	3,7	**IR5×8×16-XL**	−7	−23
6	9	12	0,3	3	**IR6×9×12-XL**	−7	−23
	9	16	0,3	4,3	**IR6×9×16-XL**	−7	−23
7	10	10,5	0,3	3,1	**IR7×10×10,5-XL**	−7	−23
	10	12	0,3	3,6	**IR7×10×12-XL**	−7	−23
	10	16	0,3	4,9	**IR7×10×16-XL**	−7	−23
8	12	10,5	0,3	5	**IR8×12×10,5-XL**	−4	−18
	12	12,5	0,3	5,9	**IR8×12×12,5-XL**	−4	−18
9	12	12	0,3	4,4	**IR9×12×12-XL**	−4	−18
	12	16	0,3	6	**IR9×12×16-XL**	−4	−18
10	13	12,5	0,3	5,2	**IR10×13×12,5-XL**	−4	−18
	14	13	0,3	7,4	**IR10×14×13-XL**	−4	−18
	14	16	0,3	9,2	**IR10×14×16-XL**	−4	−18
	14	20	0,3	11,5	**IR10×14×20-XL**	−4	−18
12	15	12	0,3	5,7	**IR12×15×12-XL**	−4	−18
	15	12,5	0,3	6,1	**IR12×15×12,5-XL**	−4	−18
	15	16	0,3	7,6	**IR12×15×16-XL**	−4	−18
	15	16,5	0,3	8,1	**IR12×15×16,5-XL**	−4	−18
	15	22,5	0,3	10,9	**IR12×15×22,5-XL**	−4	−18
	16	13	0,3	8,5	**IR12×16×13-XL**	−4	−18
	16	16	0,3	10,7	**IR12×16×16-XL**	−4	−18
	16	20	0,3	13,5	**IR12×16×20-XL**	−4	−18
	16	22	0,3	14,9	**IR12×16×22-XL**	−4	−18
14	17	17	0,3	9,5	**IR14×17×17-XL**	−4	−18
15	18	16	0,3	9,4	**IR15×18×16-XL**	−4	−18
	18	16,5	0,3	9,8	**IR15×18×16,5-XL**	−4	−18
	19	16	0,3	12,9	**IR15×19×16-XL**	0	−12
	19	20	0,3	16,3	**IR15×19×20-XL**	0	−12
	20	13	0,3	13,5	**IR15×20×13-XL**	0	−12
	20	23	0,3	24,4	**IR15×20×23-XL**	0	−12

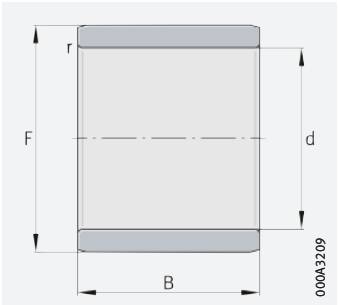
medias ➤ *https://www.schaeffler.de/std/1E7F*

Main dimensions				Mass	Designation ➤995|3.5 ➤996|3.6 X-life ➤993	Deviations for raceway F	
d	F	B	r min.	m ≈ g		upper µm	lower µm
17	20	16	0,3	10,6	**IR17×20×16-XL**	0	–12
	20	16,5	0,3	11,1	**IR17×20×16,5-XL**	0	–12
	20	20	0,3	13,5	**IR17×20×20-XL**	0	–12
	20	20,5	0,3	13,8	**IR17×20×20,5-XL**	0	–12
	20	30,5	0,3	20,6	**IR17×20×30,5-XL**	0	–12
	21	16	0,3	15	**IR17×21×16-XL**	0	–12
	21	20	0,3	18	**IR17×21×20-XL**	0	–12
	22	13	0,3	14,9	**IR17×22×13-XL**	0	–12
	22	16	0,3	18,4	**IR17×22×16-XL**	0	–12
	22	23	0,3	27,1	**IR17×22×23-XL**	0	–12
	24	20	0,6	33,8	**IR17×24×20-XL**	0	–12
20	24	16	0,3	15	**IR20×24×16-XL**	0	–12
	24	20	0,3	21,3	**IR20×24×20-XL**	0	–12
	25	17	0,3	25	**IR20×25×17-XL**	0	–12
	25	20	0,3	27,5	**IR20×25×20-XL**	0	–12
	25	20,5	0,3	27,4	**IR20×25×20,5-XL**	0	–12
	25	26,5	0,3	38	**IR20×25×26,5-XL**	0	–12
	25	30	0,3	40,4	**IR20×25×30-XL**	0	–12
	25	38,5	0,3	52,5	**IR20×25×38,5-XL**	0	–12
	28	20	0,6	45,2	**IR20×28×20-XL**	0	–12
22	26	16	0,3	18,2	**IR22×26×16-XL**	0	–12
	28	17	0,3	29,5	**IR22×28×17-XL**	0	–12
	26	20	0,3	23	**IR22×26×20-XL**	0	–12
	28	20	0,3	35	**IR22×28×20-XL**	0	–12
	28	20,5	0,3	36	**IR22×28×20,5-XL**	0	–12
	28	30	0,3	54,4	**IR22×28×30-XL**	0	–12
25	29	20	0,3	25,9	**IR25×29×20-XL**	0	–12
	29	30	0,3	39,3	**IR25×29×30-XL**	0	–12
	30	17	0,3	27,4	**IR25×30×17-XL**	0	–12
	30	20	0,3	32,8	**IR25×30×20-XL**	0	–12
	30	20,5	0,3	33,4	**IR25×30×20,5-XL**	0	–12
	30	26,5	0,3	46	**IR25×30×26,5-XL**	0	–12
	30	30	0,3	53	**IR25×30×30-XL**	0	–12
	30	32	0,3	56	**IR25×30×32-XL**	0	–12
	30	38,5	0,3	64,5	**IR25×30×38,5-XL**	0	–12
	32	22	0,6	52,5	**IR25×32×22-XL**	+5	–4

medias ➤ *https://www.schaeffler.de/std/1E80*

Inner rings

Without lubrication hole



IR

d = 28 – 70 mm

Main dimensions				Mass	Designation ➤*995*|*3.5* ➤*996*|*3.6* X-life ➤*993*	Deviations for raceway F	
d	F	B	r	m		upper	lower
			min.	≈ g		µm	µm
28	32	17	0,3	24,5	**IR28×32×17-XL**	+5	−4
	32	20	0,3	28,5	**IR28×32×20-XL**	+5	−4
	32	30	0,3	43,5	**IR28×32×30-XL**	+5	−4
30	35	13	0,3	25	**IR30×35×13-XL**	+5	−4
	35	16	0,3	34	**IR30×35×16-XL**	+5	−4
	35	17	0,3	36	**IR30×35×17-XL**	+5	−4
	35	20	0,3	39	**IR30×35×20-XL**	+5	−4
	35	20,5	0,3	39,7	**IR30×35×20,5-XL**	+5	−4
	35	26	0,3	50,4	**IR30×35×26-XL**	+5	−4
	35	30	0,3	58,5	**IR30×35×30-XL**	+5	−4
	37	18	0,6	50	**IR30×37×18-XL**	+5	−4
	37	22	0,6	61,6	**IR30×37×22-XL**	+5	−4
32	37	20	0,3	42	**IR32×37×20-XL**	0	−9
	37	30	0,3	62	**IR32×37×30-XL**	0	−9
	40	20	0,6	68	**IR32×40×20-XL**	0	−9
	40	36	0,6	124	**IR32×40×36-XL**	0	−9
33	37	13	0,3	21,9	**IR33×37×13-XL**	0	−9
35	40	17	0,3	37,8	**IR35×40×17-XL**	0	−9
	40	20	0,3	44,2	**IR35×40×20-XL**	0	−9
	40	20,5	0,3	46,1	**IR35×40×20,5-XL**	0	−9
	40	30	0,3	67,1	**IR35×40×30-XL**	0	−9
	42	36	0,6	117,2	**IR35×42×36-XL**	0	−9
	43	22	0,6	82	**IR35×43×22-XL**	0	−9
38	43	20	0,3	48,1	**IR38×43×20-XL**	0	−9
	43	30	0,3	73,6	**IR38×43×30-XL**	0	−9
40	45	17	0,3	42,5	**IR40×45×17-XL**	0	−9
	45	20	0,3	50,8	**IR40×45×20-XL**	0	−9
	45	20,5	0,3	51,8	**IR40×45×20,5-XL**	0	−9
	45	30	0,3	84	**IR40×45×30-XL**	0	−9
	48	22	0,6	91,6	**IR40×48×22-XL**	0	−9
	48	40	0,6	170	**IR40×48×40-XL**	0	−9
	50	22	1	118	**IR40×50×22-XL**	0	−9
42	47	20	0,3	52,8	**IR42×47×20-XL**	−5	−19
	47	30	0,3	81	**IR42×47×30-XL**	−5	−19

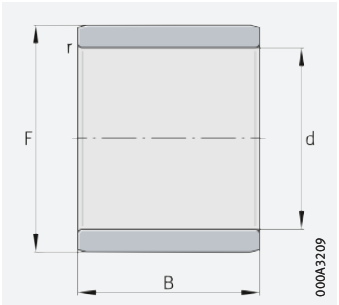
medias ➤ *https://www.schaeffler.de/std/1E81*

Main dimensions				Mass	Designation ➤995|3.5 ➤996|3.6 X-life ➤993	Deviations for raceway F	
d	F	B	r	m		upper	lower
			min.	≈ g		µm	µm
45	50	25	0,6	70,8	**IR45×50×25-XL**	–5	–19
	50	25,5	0,3	75,1	**IR45×50×25,5-XL**	–5	–19
	50	35	0,6	101	**IR45×50×35-XL**	–5	–19
	52	22	0,6	89	**IR45×52×22-XL**	0	–11
	52	40	0,6	164	**IR45×52×40-XL**	0	–11
	55	22	1	129	**IR45×55×22-XL**	0	–11
50	55	25	0,6	78	**IR50×55×25-XL**	0	–11
	55	35	0,6	112	**IR50×55×35-XL**	0	–11
	58	22	0,6	115	**IR50×58×22-XL**	0	–11
	58	40	0,6	208	**IR50×58×40-XL**	0	–11
	60	25	1	162	**IR50×60×25-XL**	0	–11
	60	28	1,1	181	**IR50×60×28-XL**	0	–11
55	60	25	0,6	85,5	**IR55×60×25-XL**	–10	–21
	60	35	0,6	121	**IR55×60×35-XL**	–10	–21
	63	25	1	141	**IR55×63×25-XL**	–10	–21
	63	45	1	256	**IR55×63×45-XL**	–10	–21
	65	28	1,1	198	**IR55×65×28-XL**	–10	–21
60	68	25	1	152	**IR60×68×25-XL**	–10	–21
	68	35	0,6	213	**IR60×68×35-XL**	–10	–21
	68	45	1	276	**IR60×68×45-XL**	–10	–21
	70	25	1	195	**IR60×70×25-XL**	–10	–21
	70	28	1,1	215	**IR60×70×28-XL**	–10	–21
65	72	25	1	141	**IR65×72×25-XL**	–10	–21
	72	45	1	259	**IR65×72×45-XL**	–10	–21
	73	25	1	164	**IR65×73×25-XL**	–10	–21
	73	35	1	231	**IR65×73×35-XL**	–10	–21
	75	28	1,1	229	**IR65×75×28-XL**	–10	–21
70	80	25	1	221	**IR70×80×25-XL**	–10	–26
	80	30	1	267	**IR70×80×30-XL**	–10	–26
	80	35	1	312	**IR70×80×35-XL**	–10	–26
	80	54	1	488	**IR70×80×54-XL**	–10	–26

medias ➤ *https://www.schaeffler.de/std/1E82*

Inner rings

Without lubrication hole



IR

d = 75 – 380 mm

Main dimensions				Mass	Designation ➤*995*|*3.5* ➤*996*|*3.6* X-life ➤*993*	Deviations for raceway F	
d	F	B	r	m		upper	lower
			min.	≈ g		µm	µm
75	85	25	1	238	**IR75×85×25-XL**	–4	–17
	85	30	1	287	**IR75×85×30-XL**	–4	–17
	85	35	1	336	**IR75×85×35-XL**	–4	–17
	85	54	1	520	**IR75×85×54-XL**	–4	–17
80	90	25	1	253	**IR80×90×25-XL**	–4	–17
	90	30	1	304	**IR80×90×30-XL**	–4	–17
	90	35	1	355	**IR80×90×35-XL**	–4	–17
	90	54	1	556	**IR80×90×54-XL**	–4	–17
85	95	26	1	277	**IR85×95×26-XL**	–14	–27
	95	36	1	388	**IR85×95×36-XL**	–14	–27
	100	35	1,1	582	**IR85×100×35-XL**	–14	–27
	100	63	1,1	1 054	**IR85×100×63-XL**	–14	–27
90	100	26	1	294	**IR90×100×26-XL**	–14	–27
	100	30	1	340	**IR90×100×30-XL**	–14	–27
	100	36	1	406	**IR90×100×36-XL**	–14	–27
	105	35	1,1	610	**IR90×105×35-XL**	–14	–27
	105	63	1,1	1 110	**IR90×105×63-XL**	–14	–27
95	105	26	1	313	**IR95×105×26-XL**	–14	–27
	105	36	1	431	**IR95×105×36-XL**	–14	–27
	110	35	1,1	657	**IR95×110×35-XL**	–14	–27
	110	63	1,1	1 170	**IR95×110×63-XL**	–14	–27
100	110	30	1,1	350	**IR100×110×30-XL**	–14	–27
	110	40	1,1	505	**IR100×110×40-XL**	–14	–27
	115	40	1,1	797	**IR100×115×40-XL**	–14	–27
110	120	30	1	409	**IR110×120×30-XL**	–14	–32
	125	40	1,1	840	**IR110×125×40-XL**	–7	–22
120	130	30	1	442	**IR120×130×30-XL**	–7	–22
	135	45	1,1	1 044	**IR120×135×45-XL**	–7	–22
130	145	35	1,1	855	**IR130×145×35-XL**	–17	–37
	150	50	1,5	1 690	**IR130×150×50-XL**	–17	–37
140	155	35	1,1	917	**IR140×155×35-XL**	–17	–37
	160	50	1,5	1 800	**IR140×160×50-XL**	–17	–37

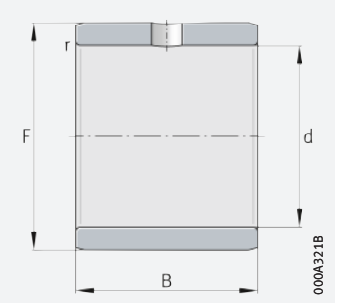
medias ➤ *https://www.schaeffler.de/std/1E83*

Main dimensions				Mass	Designation ➤*995*|*3.5* ➤*996*|*3.6* X-life ➤*993*	Deviations for raceway F	
d	F	B	r min.	m ≈ g		upper µm	lower µm
150	165	40	1,1	1 122	**IR150×165×40-XL**	–27	–52
160	175	40	1,1	1 200	**IR160×175×40-XL**	–27	–52
170	185	45	1,1	1 441	**IR170×185×45-XL**	–25	–46
180	195	45	1,1	1 510	**IR180×195×45-XL**	–25	–46
190	210	50	1,5	2 410	**IR190×210×50-XL**	–40	–66
200	220	50	1,5	2 518	**IR200×220×50-XL**	–40	–66
220	240	50	1,5	2 753	**IR220×240×50-XL**	–55	–86
240	265	60	2	4 600	**IR240×265×60-XL**	–55	–86
260	285	60	2	4 980	**IR260×285×60-XL**	–69	–107
280	305	69	2	6 100	**IR280×305×69-XL**	–69	–107
300	330	80	2,1	9 200	**IR300×330×80-XL**	–69	–107
320	350	80	2,1	9 800	**IR320×350×80-XL**	–83	–127
340	370	80	2,1	10 200	**IR340×370×80-XL**	–83	–127
360	390	80	2,1	10 900	**IR360×390×80-XL**	–128	–182
380	415	100	2,1	16 700	**IR380×415×100-XL**	–122	–172

medias ➤ *https://www.schaeffler.de/std/1E84*

Inner rings

With lubrication hole



IR..-IS1

d = 6 – 50 mm

Main dimensions				Mass	Designation ➤*995*|*3.5* ➤*996*|*3.6* X-life ➤*993*	Deviations for raceway F	
d	F	B	r	m		upper	lower
			min.	≈ g		µm	µm
6	10	10	0,3	3,7	**IR6×10×10-IS1-XL**	−7	−23
8	12	10	0,3	4,8	**IR8×12×10-IS1-XL**	−4	−18
10	14	12	0,3	7,3	**IR10×14×12-IS1-XL**	−4	−18
12	16	12	0,3	7,9	**IR12×16×12-IS1-XL**	−4	−18
15	20	12	0,3	12,2	**IR15×20×12-IS1-XL**	0	−12
20	25	16	0,3	24	**IR20×25×16-IS1-XL**	0	−12
25	30	16	0,3	25,7	**IR25×30×16-IS1-XL**	0	−12
30	38	20	0,6	77	**IR30×38×20-IS1-XL**	+5	−4
35	42	20	0,6	63,9	**IR35×42×20-IS1-XL**	0	−9
40	50	20	1	106	**IR40×50×20-IS1-XL**	0	−9
45	55	20	1	117	**IR45×55×20-IS1-XL**	0	−11
50	55	20	0,6	62,5	**IR50×55×20-IS1-XL**	0	−11
	60	20	1	128	**IR50×60×20-IS1-XL**	0	−11

medias ➤ *https://www.schaeffler.de/std/1E85*

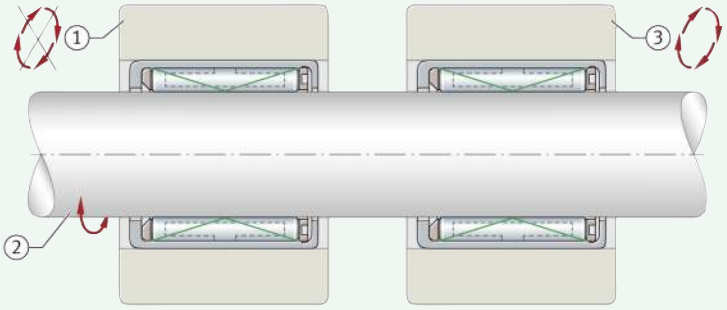
Drawn cup roller clutches

1 Drawn cup roller clutches

Drawn cup roller clutches:
- are one-way clutches, which transmit torques in one direction ➤*1008*|🗀*1*
- are available with or without an integrated bearing arrangement ➤*1009*|🗀*2*, ➤*1010*|🗀*3* and ➤*1010*|🗀*4*
- give very precise indexing
- allow high indexing frequencies
- have a low overrunning frictional torque
- are available with or without greasing
- are particularly compact in a radial direction and therefore permit extremely compact designs
- are suitable for housing materials made from steel, light metal or plastic
- can be combined with drawn cup needle roller bearings with open ends HK and drawn cup needle roller bearings with closed end BK
- have an extensive range of applications, for example as indexing clutches, back-stopping clutches and overrunning clutches ➤*1008*|🗀*1*.

🗀*1*
Drawn cup roller clutches in tandem arrangement in an indexing system

① *Stationary component*
② *Component performs a swivel motion*
③ *Component performs a gradual rotational motion*



1.1 Product design

✎ *Design variants*

Drawn cup roller clutches are available:
- without bearing arrangement ➤*1009*|🗀*2*
- with bearing arrangement (rolling or plain bearing) ➤*1010*|🗀*3* and ➤*1010*|🗀*4*.

Drawn cup roller clutches

✎ *Drawn cup roller clutches are one-way clutches*

These drawn cup roller clutches comprise thin-walled, drawn outer cups with a series of ramps on the inside diameter, plastic cages and needle rollers, which serve as clamping elements. Steel or plastic springs hold the needle rollers in their clamped position. Drawn cup roller clutches can transmit high torques in one direction and are particularly compact in a radial direction. The roller clutches are available with and without support bearing arrangements.

✎ *Suitable for applications with high indexing frequencies*

Drawn cup roller clutches give very precise indexing, since the individual spring loading of the needle rollers ensures continuous contact between the shaft, needle rollers and ramps. They allow high indexing frequencies due to their low mass and the resulting low moment of inertia of the clamping elements. They also have a low overrunning frictional torque.

✎ *Preferred areas of application*

Drawn cup roller clutches can be used in various applications such as indexing clutches, back-stopping clutches and overrunning clutches. In these cases, the drawn cup roller clutch performs an overrunning or locking function.

Drawn cup roller clutches should not be used if a malfunction could lead to personal injury. New applications, especially those involving extreme conditions, should first be verified by tests. Correct functioning can only be guaranteed if the concentricity error between the support bearing and the shaft can be kept to a low value.

Drawn cup roller clutches without bearing arrangement

✎ *Suitable for supporting torques only*

Roller clutches HF do not have a bearing arrangement, i. e. they transmit torques only and, as a result, are unable to support any radial forces ➤*1009*|*2*. In the case of these roller clutches, concentricity to the shaft axis must be secured by additional rolling bearings or drawn cup roller clutches with a bearing arrangement must be used. The drawn cup roller clutches are available with and without knurling.

✎ *Drawn cup roller clutches without knurling*

Drawn cup roller clutches without knurling are available with steel or plastic pressure springs ➤*1009*|*2*. Bearings with plastic springs have the suffix KF ➤*1014*|*1.12*.

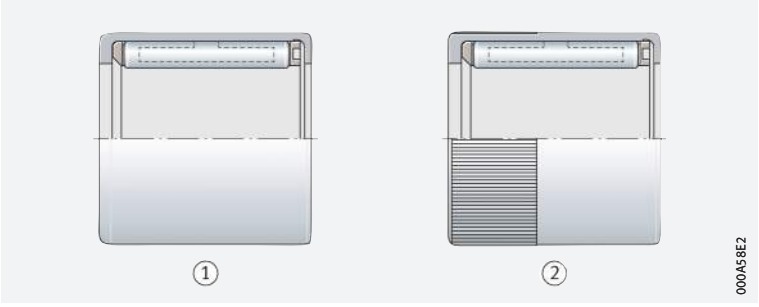
✎ *Drawn cup roller clutches with knurling*

For improved torque transmission in plastic housings, drawn cup roller clutches are available with a knurled outside surface. These drawn cup roller clutches have the suffix R ➤*1014*|*1.12*. The knurling can be applied to part of the drawn cup or over its entire length. The drawn cup roller clutches are also available with steel or plastic pressure springs. Roller clutches with plastic springs have the suffix KF ➤*1014*|*1.12*.

2

Drawn cup roller clutches without bearing arrangement, with and without knurling

① *Without knurling*
② *With knurling*



Drawn cup roller clutches with bearing arrangement

✎ *Also suitable for supporting radial forces*

Due to the integrated plain or rolling bearing, roller clutches HFL can also support radial forces in addition to torques ➤*1010*|*3* and ➤*1010*|*4*. The drawn cup roller clutches are available with and without knurling.

✎ *Drawn cup roller clutches without knurling*

Drawn cup roller clutches without knurling are available with steel or plastic pressure springs ➤*1010*|*3* and ➤*1010*|*4*. Drawn cup roller clutches with plastic springs have the suffix KF ➤*1014*|*1.12*.

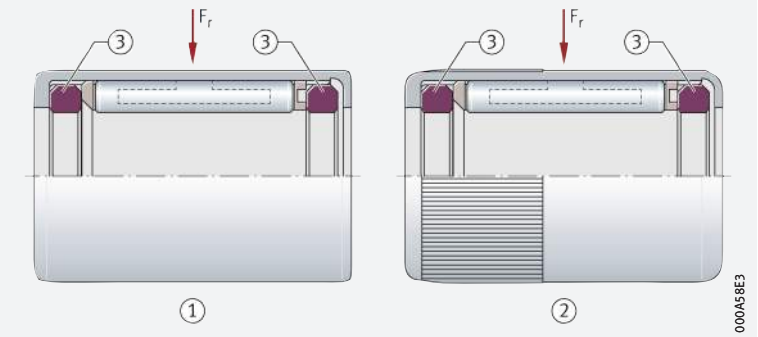
✎ *Drawn cup roller clutches with knurling*

For improved torque transmission in plastic housings, drawn cup roller clutches are available with a knurled outside surface. These drawn cup roller clutches have the suffix R ➤*1014*|*1.12*. The knurling can be applied to part of the drawn cup or over its entire length. These drawn cup roller clutches are also available with steel or plastic pressure springs. Roller clutches with plastic springs have the suffix KF ➤*1014*|*1.12*.

3
Drawn cup roller clutches with plain bearing arrangement, with and without knurling

F_r = *radial load*

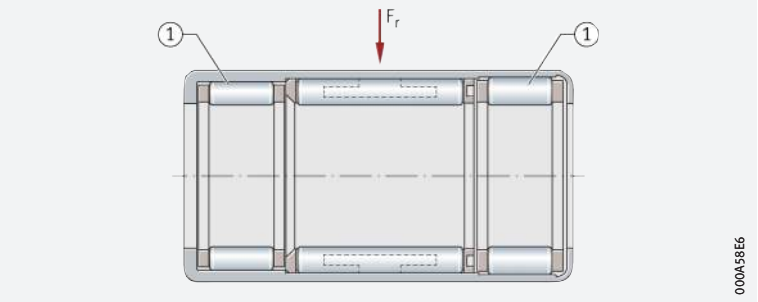
① *Without knurling*
② *With knurling*
③ *Plain bearing*



4
Drawn cup roller clutch with rolling bearing arrangement, without knurling

F_r = *radial load*

① *Rolling bearing*



Clamping direction of the drawn cup roller clutch

An arrow on the end face of the drawn cup indicates the clamping direction of the drawn cup roller clutch. The roller clutch clamps when the drawn cup is rotated in the direction of the arrow.

1.2 Load carrying capacity

✎ Roller clutches with a support bearing arrangement accommodate radial forces

Depending on the design (with or without bearing arrangement), drawn cup roller clutches can either transmit torques only or additional radial loads ➤*1008*|*1.1*, ➤*1010*|*3* and ➤*1010*|*4*.
For roller clutches without bearing arrangement, radial forces must be supported by additional bearings.

Transmissible torque

✎ The rigidity of the housing determines the transmissible torque

Transmission of torque requires a rigid housing. The transmissible torque is therefore dependent on the shaft and housing material, the shaft hardness, the wall thickness of the housing and the shaft and housing tolerances. When calculating the torque, the maximum drive torque and the moment of inertia of the masses during acceleration must be taken into consideration.

Limiting load

✎ Do not exceed the limiting load

In the case of drawn cup roller clutches with plain bearings, the product calculated from the actual speed n and radial load F_R must not exceed the value stated for the limiting load $(F_r \cdot n)_{max}$. The operating limits are determined by the limiting speeds stated in the product tables and the permissible radial load.

Indexing accuracy and indexing frequency

The roller clutch must not be overloaded

In order not to overload the clutch, the inertia of the entire system must be taken into consideration. The high indexing accuracy is due to the individual spring loading of the needle rollers, which ensures continuous contact between the shaft, needle rollers and clamping surface.
The indexing accuracy is influenced by the indexing frequency, lubrication, fitting tolerances, adjacent construction, elastic deformation of the adjacent parts and the drive method, either through the shaft or the housing. Optimum accuracy is achieved if the drive is via the shaft.

High indexing frequencies due to low mass

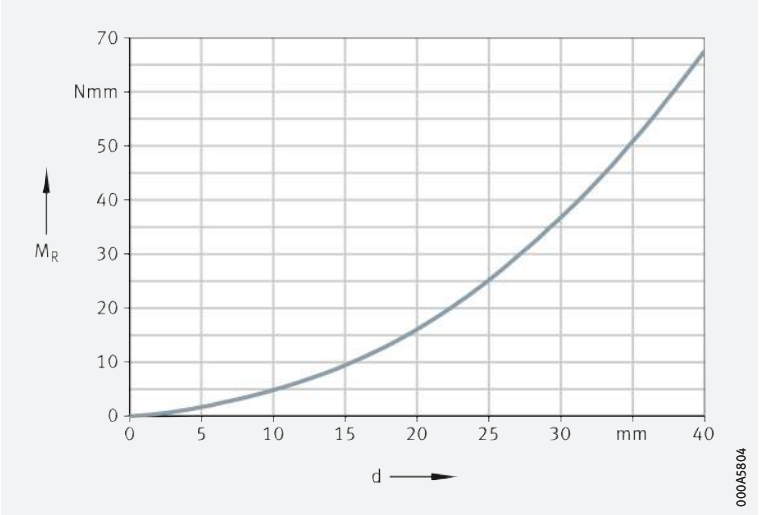
High indexing frequencies are due to the low mass and the resulting low moment of inertia of the clamping elements.

Frictional torque and frictional energy

For pattern of frictional torque ➤ *1011* | 5. The overrunning frictional energy at idle is dependent on whether the shaft or the outer ring is rotating ➤ *1011* | 6.

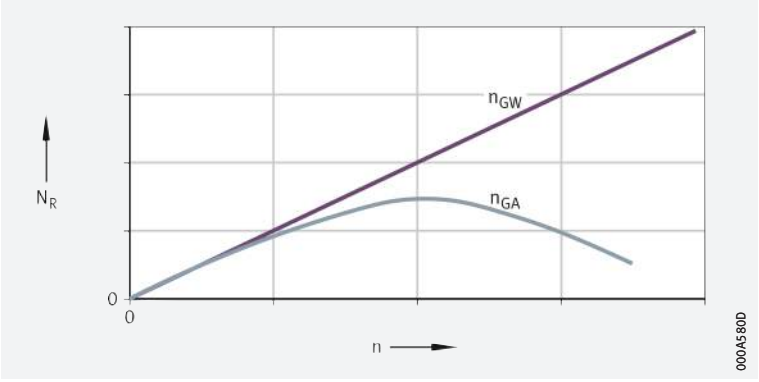
5
Overrunning frictional torque, as a function of shaft diameter

M_R = *overrunning frictional torque*
d = *shaft diameter*



6
Overrunning frictional energy, as a function of speed

N_R = *overrunning frictional energy*
n = *speed*
n_{GA} = *limiting speed with rotating outer ring*
n_{GW} = *limiting speed with rotating shaft*



Rotating outer ring

Due to the centrifugal force, the needle rollers may lift off the shaft

If the outer ring rotates, the frictional energy increases with speed at first but then, due to the centrifugal force of the needle rollers, it decreases gradually towards zero. At this speed, there is no longer any frictional contact between the needle rollers and the shaft. Due to the increasing centrifugal force, the needle rollers lift off the shaft.

1.3 Compensation of angular misalignments

Concentricity is an essential precondition for correct functioning of the roller clutch. Correct functioning can only be guaranteed if the concentricity error between the support bearing and the shaft can be kept to a low value.

1.4 Lubrication

A grease to GA26 is used for initial greasing

The roller clutches are greased using a lithium soap grease to GA26. In many cases, the initial greasing is sufficient to last the operating life of the bearings. For applications with oil lubrication, roller clutches are available without greasing. These roller clutches are coated with a preservative. For general applications (mixed operation involving locking and overrunning), the Schaeffler initial greasing has proved effective. In order to ensure optimum function, it may be necessary to use different lubricants. The suitability of the lubricant must then be verified by means of tests.

For applications in which one operating condition (overrunning or locking) is heavily predominant, a special greasing should be used. In this case, please consult Schaeffler.

A grease operating life cannot be calculated

It is not possible to calculate the grease operating life or lubrication interval for drawn cup roller clutches. If relubrication is carried out, oil should used for lubrication or a changeover to oil lubrication should generally be made. At temperatures < -10 °C and speeds $> 0{,}7\ n_G$, recommendations on lubrication should be requested. At temperatures over +70 °C, oil lubrication should be used. The oil level should be such that, when the drawn cup roller clutch is stationary and the axis is horizontal, it is immersed approx. $^1/_3$ in the oil bath.

Suitable lubricating oils

Suitable oils are CL and CLP to DIN 51517 or HL and HLP to DIN 51524. Viscosity classes ➤*1012*|▦ *1*.

Compatibility with plastic cages

When using bearings with plastic cages, compatibility between the lubricant and the cage material must be ensured if synthetic oils, lubricating greases with a synthetic oil base or lubricants containing a high proportion of EP additives are used.

▦ **1**
Viscosity classes

Operating temperature °C		Viscosity class
from	to	
+15	+30	ISO VG 10
+15	+90	ISO VG 32
+60	+120	ISO VG 100

1.5 Sealing

Drawn cup roller clutches (with and without bearing arrangement) are supplied without seals. Contaminants (dust, dirt and moisture) can impair the function and operating life of roller clutches.

Sealing of the bearing position with sealing rings G or SD

Effective sealing elements for use in sealing open drawn cup roller clutches with a risk of contamination

If there is a risk of contamination, sealing rings of economical series G or SD should be fitted ➤*1026*. The sealing rings are designed as contact seals and are arranged in front of the roller clutch. They protect the bearing position reliably against contamination, spray water and excessive loss of grease. The sealing rings are matched to the small radial dimensions of the drawn cup roller clutches and can be combined with wider inner rings of series IR. They are very easy to fit, since they are simply pressed into the housing bore.

1.6 Speeds

✎ *Speeds for rotating shaft or rotating outer ring*

The limiting speeds n_{GW} and n_{GA} in the product tables are valid for oil and grease lubrication. The limiting speed n_{GW} is valid for a rotating shaft, while n_{GA} is valid for a rotating outer ring.

1.7 Noise

Schaeffler Noise Index

The Schaeffler Noise Index (SGI) is not yet available for this bearing type ➤*69*. The data for these bearing series will be introduced and updated in stages.

Further information:

- ***medias*** ➤*https://medias.schaeffler.com*.

1.8 Temperature range

Possible operating temperatures of drawn cup roller clutches ➤*1013*|▦*2*.

▦**2**
Permissible temperature ranges

Operating temperature	Drawn cup roller clutches
	–10 °C to +70 °C, limited by the lubricant

In the event of anticipated temperatures which lie outside the stated values, please contact Schaeffler.

1.9 Cages

Plastic cages are used in the guidance of rolling elements for roller clutches and for integrated support bearing arrangements supported by rolling elements.

1.10 Internal clearance

✎ *The enveloping circle diameter F_w applies instead of the radial internal clearance*

In the case of bearings without inner ring, the dimension for the enveloping circle diameter F_w is used instead of the radial internal clearance. The enveloping circle is the inner inscribed circle of the needle rollers in clearance-free contact with the outer raceway. In drawn cup roller clutches with a rolling bearing arrangement, the enveloping circle diameter F_w of the bearings once fitted (in the solid section ring gauge) is approximately in tolerance class F8. Upper and lower deviations of enveloping circle diameter for tolerance class F8 ➤*1013*|▦*3*.

▦**3**
Deviations of enveloping circle diameter for drawn cup roller clutches supported by rolling bearings

Enveloping circle diameter F_w mm		Tolerance class F8 Tolerance for enveloping circle diameter F_w	
		upper deviation	lower deviation
over	incl.	µm	µm
3	6	+28	+10
6	10	+35	+13
10	18	+43	+16
18	30	+53	+20
30	50	+64	+25

1.11 Dimensions, tolerances

Dimensions and tolerances of drawn cup roller clutches are not standardised. The thin-walled outer cups adopt the dimensional and geometrical accuracy of the housing bore.

1.12 Suffixes

For a description of the suffixes used in this chapter ➤ *1014*|▦ *4* and ***medias*** interchange ➤ *https://www.schaeffler.de/std/1D52*.

▦ **4**
Suffixes and corresponding descriptions

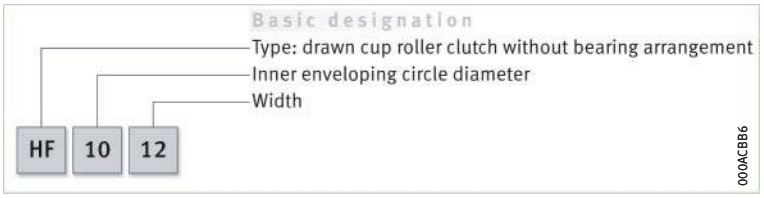
Suffix	Description of suffix	
–	Steel springs	Standard
KF	Plastic pressure springs	
R	Knurled outside surface	
RR	Drawn cup roller clutch with Corrotect coating	Special design, available by agreement

1.13 Structure of the product designation

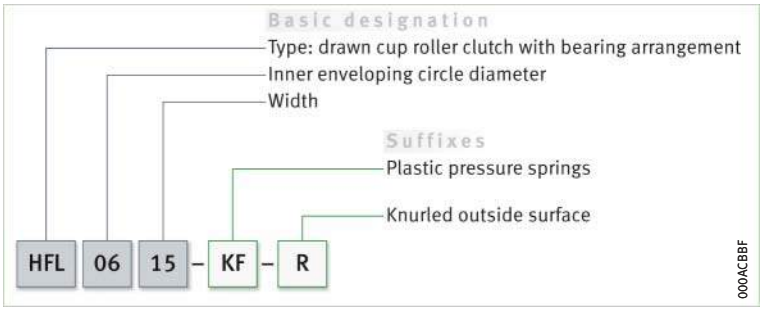
✎ *Examples of composition of product designation*

The designation of drawn cup roller clutches follows a set model. Examples ➤ *1014*|⧉ *7* and ➤ *1014*|⧉ *8*.

⧉ **7**
Drawn cup roller clutch without bearing arrangement, without knurling: designation structure



⧉ **8**
Drawn cup roller clutch with bearing arrangement, plastic pressure springs, with knurling: designation structure



1.14 Dimensioning

The size is determined on the basis of the load carrying capacity of the drawn cup roller clutch relative to the loads and the requirements for rating life and operational reliability ➤ *1015*|*1.15*.

1.15 Design of the adjacent construction

Design of housing bore

✎ Support outer cup over entire circumference and width

Suitable housing materials are steel, light metal or plastic. In order to allow full utilisation of the performance capability of drawn cup roller clutches and achieve the requisite rating life, sufficient rigid support must be provided for the outer cups in the housing. The support for the outer cup in the housing bore can be produced as a cylindrical seating surface. The seating surfaces for the outer cup and the raceway for the rolling elements or inner ring (if the bearing arrangement is not produced as a direct bearing arrangement) should not be interrupted by grooves, holes or other recesses. The accuracy of the mating parts must meet specific requirements, the bore tolerances for the housing bore (recommended tolerance classes) are dependent on the housing material ➤*1015*| 5 and ➤*1016*| 6. The surface quality of the housing bore should be Ramax 0,8. The cylindricity tolerance of the housing bore in metal housings should be within the tolerance grade IT5/2.

Due to the thin-walled outside surface, the roller clutches only adopt their precise geometry once they have a tight fit. As a result, the accuracy of the locating bore essentially determines the geometrical accuracy of the drawn cup and thus the functioning of the clutch.

✎ Provide lead chamfer on the housing bore

For the drawn cup roller clutches to be mounted without damage, the housing bore must have a lead chamfer of 15°.

5 *Design of housing bore*

Series	Springs	Bore Housing material		
		Steel Cast iron	Light metal	Max. bore in plastic[2]
HF, HFL	Steel	N6 Ⓔ (N7 Ⓔ)[1]	R6 Ⓔ (R7 Ⓔ)[1]	–
HF..-KF, HFL..-KF	Plastic	N7 Ⓔ	R7 Ⓔ	–
HF..-R, HFL..-R	Steel	–	–	0 D –0,05
HF..-KF-R, HFL..-KF-R	Plastic	–	–	0 D –0,05
HFL0606-KF-R, HFL0806-KF-R	Plastic	–	–	0 D –0,05

1) *The values in brackets can be used if the actual torque is no more than 50% of the permissible torque $M_{d\ per}$ in accordance with the product table.*

2) *Guide values as a function of the plastic used. Outside diameter D* ➤*1021*|.

Minimum wall thickness for metal housings

Maximum transmissible torque

For metal housings, the maximum transmissible torque $M_{d\ per\ max}$ is determined as a function of the diameter ratio Q_A to ➤*1016*| *9* (steel housing) or to ➤*1017*| *10* (aluminium housing), see calculation examples.

Guide values for $Q_{A\ max}$ with steel and aluminium as housing materials ➤*1016*| *6*.

6
Guide values

Housing material	Diameter ratio $Q_{A\ max}$
Steel	0,8
Aluminium	0,6

The comparative stress σ_v must not exceed the yield stress of the housing material.

Steel housing

Calculation example

For drawn cup roller clutches HF0612, the maximum transmissible torque $M_{d\ per\ max}$ should be determined ➤*1016*| *9*:

Drawn cup roller clutch	HF0612
Housing	Steel
Housing bore tolerance	N6 Ⓔ ➤*1015*| *5*
Permissible housing stress ($R_{p0,2}$) σ_v	450 N/mm²
Diameter ratio Q_A of housing	0,9
Permissible torque $M_{d\ per}$	in accordance with product table

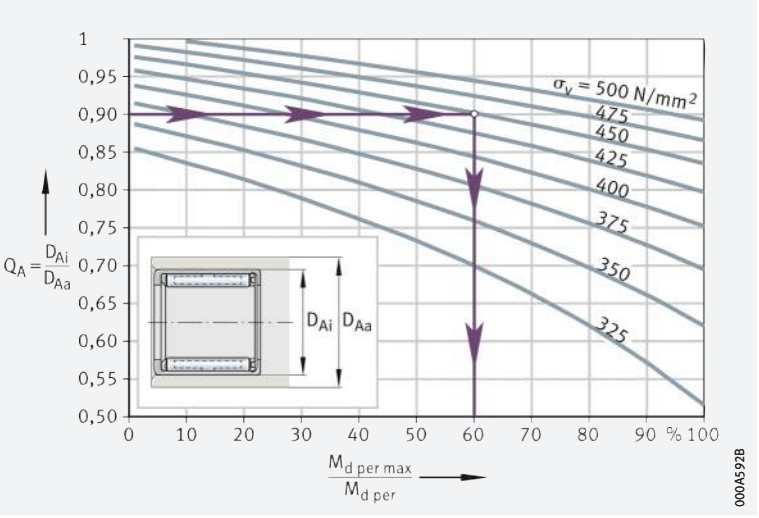
Calculation

$$M_{d\ per\ max} = 60\%\ M_{d\ per}$$
$$= 0{,}6 \cdot 1{,}76\ Nm$$
$$= 1{,}056\ Nm$$

9
Steel housing

Modulus of elasticity
E = 210 000 N/mm²

Q_A = *diameter ratio of housing*
D_{Ai} = *housing bore*
D_{Aa} = *housing outside diameter*
$M_{d\ per}$ = *permissible torque*
$M_{d\ per\ max}$ = *maximum transmissible torque*
σ_v = *comparative stress*



Aluminium housing

Calculation example

For drawn cup roller clutch HF1616, the diameter ratio Q_A of the housing should be determined ➤*1017*|*10*:

Drawn cup roller clutch	HF1616
Housing	Aluminium
Housing bore tolerance	R6 Ⓔ ➤*1015*|*5*
Permissible housing stress ($R_{p0,2}$) σ_v	250 N/mm²
Maximum transmissible torque $M_{d\ per\ max}$	10 Nm
Permissible torque $M_{d\ per}$ giving $M_{d\ per\ max}/M_{d\ per}$	in accordance with product table 50%

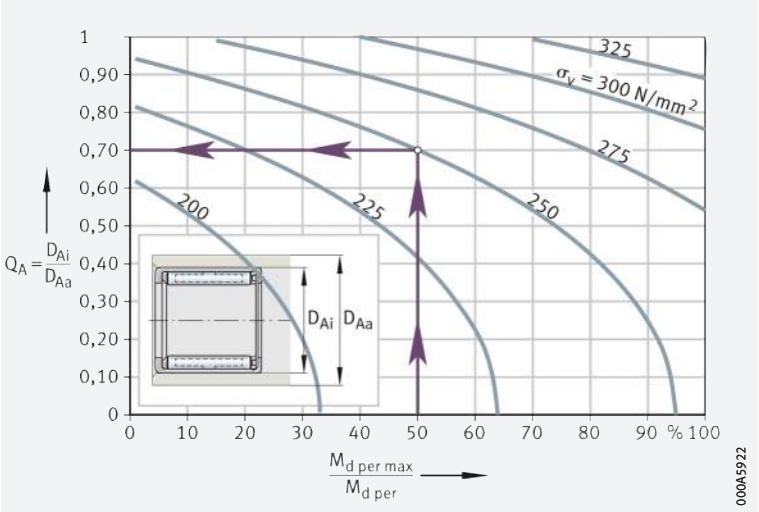
Calculation

$Q_A = D_{Ai}/D_{Aa} \leqq 0{,}7$

$D_{Aa} \geqq D_{Ai}/0{,}7 = 22\ mm/0{,}7$

$= 31{,}5\ mm$

10
Aluminium housing



Modulus of elasticity
E = 70 000 N/mm²

Q_A = *diameter ratio of housing*
D_{Ai} = *housing bore*
D_{Aa} = *housing outside diameter*
$M_{d\ per}$ = *permissible torque*
$M_{d\ per\ max}$ = *maximum transmissible torque*
σ_v = *comparative stress*

Minimum wall thickness for plastic housings

For plastic housings, drawn cup roller clutches with a partially or fully knurled outside surface should be used (suffix R).

The guide value for the minimum wall thickness of plastic housings is:

f 1

$$s_{min} \geqq D - F_w$$

Legend

s_{min}	mm	Minimum wall thickness
D	mm	Outside diameter of roller clutch
F_w	mm	Enveloping circle.

Axial location

A tight fit is usually sufficient for axial location

Drawn cup roller clutches give very easy mounting and permit simple adjacent constructions. The drawn cup roller clutches are pressed into the housing bore and require no further axial location.
The precondition for this is, however, that the specifications in accordance with ➤ *1015* | ▦ *5* are observed.

Design of the shaft/raceway

Produce the raceway as a rolling bearing raceway

Drawn cup roller clutches HF/HFL are usually used without an inner ring. In order to guarantee correct functioning of the drawn cup roller clutches, the raceway for the rolling elements on the shaft must be produced as a rolling bearing raceway (hardened and ground). The surface hardness of the raceways must be 670 HV to 840 HV, the case hardening depth CHD must be sufficiently large (CHD ≧ 0,3 mm). Design of raceways ➤ *1018* | ▦ *7*. If the shaft cannot be produced as a raceway, the bearings can be combined with inner rings IR or LR.

Provide lead chamfer on the shaft

For the bearings to be mounted without damage, the shaft must have a lead chamfer of 10° to 15° with a width of approx. 1 mm.

▦ 7
Design of shaft

Series	Springs	Shaft			
		Tolerance class[1]	Roundness tolerance max.	Parallelism tolerance max.	Recommended mean roughness value Ramax (Rzmax) µm
HF, HFL	Steel	h5 (h6)[2]	IT3	IT3	0,4 (2)
HF..-KF, HFL..-KF	Plastic	h8			
HF..-R, HFL..-R	Steel	h5 (h6)[2]			
HF..-KF-R, HFL..-KF-R	Plastic	h8			
HFL0606-KF-R, HFL0806-KF-R	Plastic	h9			

1) *The envelope requirement Ⓔ applies.*

2) *The values in brackets can be used if the actual torque is no more than 50% of the permissible torque $M_{d\,per}$.*

1.16 Mounting and dismounting

Protect drawn cup roller clutches against dust, dirt and moisture; contaminants can impair the function and operating life of roller clutches. Pressing-in forces must never be directed through the rolling elements. Drawn cup roller clutches must not be tilted during pressing-in, as this may damage the needle rollers and raceways.

Retention for transport

Drawn cup roller clutches are normally packed individually in the case of small quantities. Where larger quantities are involved, drawn cup roller clutches are placed in a specific orientation in blister packaging and delivered in this form. The blister packaging then serves to retain the parts in position during transport.

Removing the drawn cup roller clutches from the packaging

Drawn cup roller clutches should only be removed from their original packaging immediately before assembly. If roller clutches are removed from a batch packaged with dry preservative, the package must be closed again immediately. The protective vapour phase can be maintained only in the closed package. Ungreased drawn cup roller clutches are coated with a preservative. Lubrication with oil must take place after pressing-in, in accordance with the specifications.

Storage

Drawn cup roller clutches should be stored:

- in dry, clean rooms with the room temperature as constant as possible
- at a relative humidity of max. 65%.

Storage period

The storage period for greased drawn cup roller clutches is limited by the shelf life of the lubricating grease.

Mounting using a fitting mandrel

Drawn cup roller clutches should only be pressed into the locating bore using a special fitting mandrel. Attention must be paid to the clamping direction of the roller clutch. The clamping direction is indicated by an arrow on the end face of the drawn cup.

The drawn cup roller clutch clamps if it is rotated in the direction of the arrow.

Functional inspection

Clutches without knurling

The function of these roller clutches is checked in a housing with the minimum wall thickness determined according to ➤*1016*|*9* or thicker. The housing bore and shaft tolerances must be observed ➤*1015*|*5* and ➤*1018*|*7*.

Clutches with knurling

The function of these clutches is checked before they are pressed in. In this case, the inspection criteria are the clamping effect and idling.

For any questions relating to the mounting of drawn cup roller clutches, please consult Schaeffler.

Schaeffler Mounting Handbook

Drawn cup roller clutches must be handled with great care

In order that drawn cup roller clutches can function correctly and achieve the envisaged operating life without detrimental effect, they must be handled with care.

The Schaeffler Mounting Handbook MH 1 gives comprehensive information about the correct storage, mounting, dismounting and maintenance of rotary rolling bearings ➤*https://www.schaeffler.de/std/1D53*. It also provides information which should be observed by the designer, in relation to the mounting, dismounting and maintenance of bearings, in the original design of the bearing position. This book is available from Schaeffler on request.

1.17 Legal notice regarding data freshness

✎ The further development of products may also result in technical changes to catalogue products

Of central interest to Schaeffler is the further development and optimisation of its products and the satisfaction of its customers. In order that you, as the customer, can keep yourself optimally informed about the progress that is being made here and with regard to the current technical status of the products, we publish any product changes which differ from the printed version in our electronic product catalogue.

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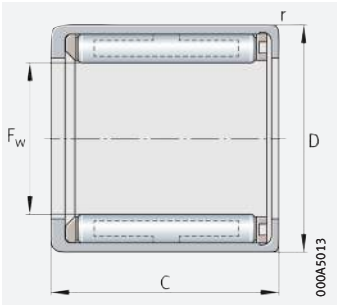
Link to electronic product catalogue

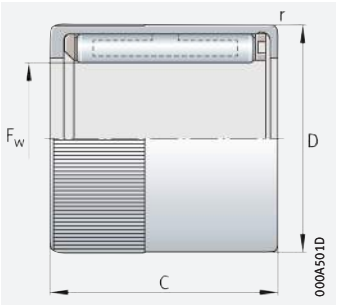
The following link will take you to the Schaeffler electronic product catalogue: ➤ *https://medias.schaeffler.com*.

Drawn cup roller clutches

Without bearing arrangement
With or without knurling



HF, HF..-KF
Without knurling



HF..-R, HF..-KF-R
With knurling

F_w = 3 – 35 mm

Main dimensions				Permissible torque	Limiting speeds		Mass	Designation ➤*1014|1.12* ➤*1014|1.13* Drawn cup roller clutch with		Suitable drawn cup needle roller bearings for radial support ➤*886*
F_w	D	C –0,3	r min.	$M_{d\ per}$ Nm	n_{GW}[1] min^{-1}	n_{GA}[2] min^{-1}	m ≈ g	plastic springs	steel springs	
3	6,5	6	0,3	0,18	45 000	8 000	1	**HF0306-KF**	–	HK0306-TV
	6,5	6	0,3	0,06	45 000	8 000	1	**HF0306-KF-R**	–	HK0306-TV
4	8	6	0,3	0,34	34 000	8 000	1	**HF0406-KF**	–	HK0408
	8	6	0,3	0,1	34 000	8 000	1	**HF0406-KF-R**	–	HK0408
6	10	12	0,3	1,76	23 000	13 000	3	**HF0612-KF**	**HF0612**	HK0608
	10	12	0,3	0,6	23 000	13 000	3	**HF0612-KF-R**	**HF0612-R**	HK0608
8	12	12	0,3	3,15	17 000	12 000	3,5	**HF0812-KF**	**HF0812**	HK0808
	12	12	0,3	1	17 000	12 000	3,5	**HF0812-KF-R**	**HF0812-R**	HK0808
10	14	12	0,3	5,3	14 000	11 000	4	**HF1012-KF**	**HF1012**	HK1010
12	18	16	0,3	12,2	11 000	8 000	11	–	**HF1216**	HK1212
14	20	16	0,3	17,3	9 500	8 000	13	–	**HF1416**	HK1412
16	22	16	0,3	20,5	8 500	7 500	14	–	**HF1616**	HK1612
18	24	16	0,3	24,1	7 500	7 500	16	–	**HF1816**	HK1812
20	26	16	0,3	28,5	7 000	6 500	17	–	**HF2016**	HK2010
25	32	20	0,3	66	5 500	5 500	30	–	**HF2520**	HK2512
30	37	20	0,3	90	4 500	4 500	36	–	**HF3020**	HK3012
35	42	20	0,3	121	3 900	3 900	40	–	**HF3520**	HK3512

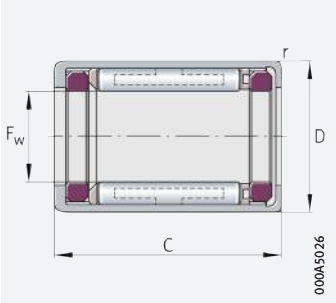
medias ➤ *https://www.schaeffler.de/std/1E86*

[1] Limiting speed for rotating shaft.

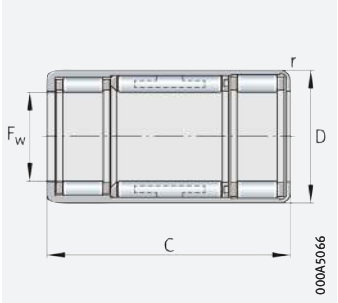
[2] Limiting speed for rotating outer ring.

Drawn cup roller clutches

With bearing arrangement
With or without knurling



HFL, HFL..-KF, plain bearing arrangement (HFL0308-KF, HFL0408-KF, HFL0615-KF, HFL0615)



HFL, HFL..-KF, rolling bearing arrangement ($F_w \geqq 8$ mm and $C \geqq 22$ mm), HFL0822-KF-R, HFL0822-R

F_w = 3 – 35 mm

Main dimensions				Basic load ratings[1]		Fatigue limit load	Permissible torque	Limiting speeds		Mass
F_w	D	C	r	dyn. C_r	stat. C_{0r}	C_{ur}	$M_{d\,per}$	n_{GW}[3]	n_{GA}[4]	m
		–0,3	min.	N	N	N	Nm	min^{-1}	min^{-1}	≈ g
3	6,5	8	0,3	–	–	–	0,18	45 000	8 000	1,4
	6,5	8	0,3	–	–	–	0,06	45 000	8 000	1,4
4	8	8	0,3	–	–	–	0,34	34 000	8 000	1,6
	8	8	0,3	–	–	–	0,1	34 000	8 000	1,6
6	10	6	0,3	–	–	–	0,5	23 000	13 000	1
	10	15	0,3	–	–	–	1,76	23 000	13 000	4
	10	15	0,3	–	–	–	0,6	23 000	13 000	4
8	12	6	0,3	–	–	–	0,7	17 000	12 000	2
	12	22	0,3	3 650	3 950	550	3,15	17 000	12 000	7
	12	22	0,3	3 650	3 950	550	1	17 000	12 000	7
10	14	22	0,3	3 950	4 500	630	5,3	14 000	11 000	8
12	18	26	0,3	6 300	6 700	920	12,2	11 000	8 000	18
14	20	26	0,3	6 800	7 800	1 080	17,3	9 500	8 000	20
16	22	26	0,3	7 400	9 000	1 250	20,5	8 500	7 500	22
18	24	26	0,3	8 000	10 200	1 420	24,1	7 500	7 500	25
20	26	26	0,3	8 500	11 400	1 590	28,5	7 000	6 500	27
25	32	30	0,3	10 600	14 000	1 900	66	5 500	5 500	44
30	37	30	0,3	11 600	16 900	2 290	90	4 500	4 500	51
35	42	30	0,3	12 200	18 800	2 550	121	3 900	3 900	58

medias ➤ *https://www.schaeffler.de/std/1E87*

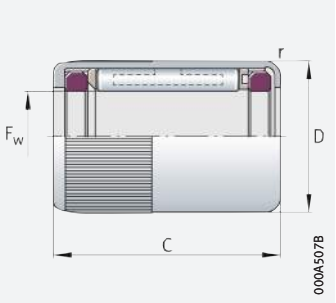
1) Drawn cup roller clutches with rolling bearing arrangement.

2) Drawn cup roller clutches with plain bearing arrangement: during operation, the product calculated from the actual speed n and radial load F_r must not exceed the value stated for the limiting load $(F_r \cdot n)_{max}$. The operating limits are determined by the limiting speeds stated and the permissible radial load.

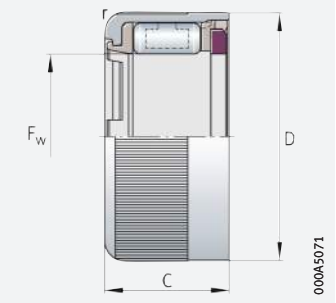
3) Limiting speed for rotating shaft.

4) Limiting speed for rotating outer ring.

5) No arrow on end face.



HFL0308-KF-R, HFL0408-KF-R, HFL0615-R, HFL0615-KF-R, plain bearing arrangement, with knurling



HFL0606-KF-R[5], HFL0806-KF-R[5], plain bearing arrangement, with knurling

	Designation ➤*1014|1.12* ➤*1014|1.13*		Permissible radial load[2]	Limiting load $(F_r \cdot n)_{max}$[2]
F_w	Drawn cup roller clutch with		$F_{r\,max}$	
	plastic springs	steel springs	N	N/min
3	**HFL0308-KF**	–	60	16 000
	HFL0308-KF-R	–	60	16 000
4	**HFL0408-KF**	–	80	16 000
	HFL0408-KF-R	–	80	16 000
6	**HFL0606-KF-R**	–	40	4 200
	HFL0615-KF	**HFL0615**	110	18 000
	HFL0615-KF-R	**HFL0615-R**	110	18 000
8	**HFL0806-KF-R**	–	54	4 200
	HFL0822-KF	**HFL0822**	–	–
	HFL0822-KF-R	**HFL0822-R**	–	–
10	–	**HFL1022**	–	–
12	–	**HFL1226**	–	–
14	–	**HFL1426**	–	–
16	–	**HFL1626**	–	–
18	–	**HFL1826**	–	–
20	–	**HFL2026**	–	–
25	–	**HFL2530**	–	–
30	–	**HFL3030**	–	–
35	–	**HFL3530**	–	–

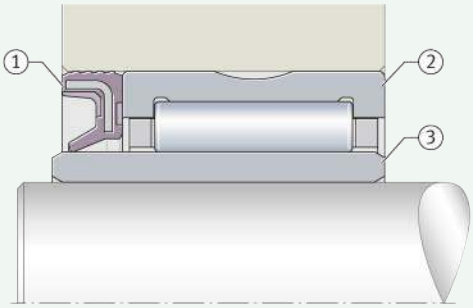
Sealing rings

1 Sealing rings

The sealing rings:

- are of a single lip or double lip design ➤*1027*|🗀*2*, ➤*1027*|🗀*3*, ➤*1028*|🗀*4*
- are used as contact type sealing elements for sealing of the bearing position in the adjacent construction ➤*1026*|🗀*1*
- are also suitable as wipers where purely axial motion is present
- protect the bearings against contamination, spray water and the loss of grease
- are resistant to undoped lubricants with a mineral oil base
- allow circumferential speeds at the seal lip of up to 10 m/s, depending on the surface quality of the shaft
- are matched to the radial dimensions of Schaeffler drawn cup needle roller bearings and needle roller bearings ➤*1026*|🗀*1*
- are easy to fit, since they are simply pressed into the housing bore.

🗀*1*
Sealing of the bearing position by a Schaeffler sealing ring



① *Single lip sealing ring G*
② *Needle roller bearing NK*
③ *Inner ring LR*

1.1 Product design

✎ *Design variants*

Sealing rings are available as:

- a single lip variant (sealing ring GR and G) ➤*1027*|🗀*2* and ➤*1027*|🗀*3*
- a double lip design (sealing ring SD) ➤*1028*|🗀*4*.

✎ *Sealing of the bearing position has a decisive influence on the function and operating life of a bearing*

The quality of a bearing arrangement is decisively influenced by the components – shaft, housing, seal – that are directly adjacent to the bearing. Seals play a decisive role in protecting bearings against contamination. If inadequate seals are used, contaminants can penetrate the bearing or an unacceptably large quantity of lubricant may escape from the bearing. Solid contaminants lead to wear and/or fatigue of the raceways and rolling elements. Bearings that are contaminated or running dry will fail long before they reach their fatigue rating life. In the design of bearing arrangements, the use of the correct seals is therefore decisive in determining the operating life of the bearings and the cost-effectiveness of the bearing arrangement.

✎ *Schaeffler sealing rings G, GR, SD*

Schaeffler sealing rings were developed as seals for needle roller bearings and have been available in the market for decades. During this time, they have proved extremely effective in automotive and engine construction as well as machine and equipment building.

Fundamental information on sealing rings and the principles of sealing ring technology as well as examples of applications are given in Technical Product Information TPI 128. This publication can be requested from Schaeffler.

Single lip sealing rings

With external steel reinforcement or rubber encased reinforcing ring

Single lip sealing rings are available in the designs GR and G ➤*1027*|*2*, ➤*1027*|*3* and ➤*1028*|*1*. The sealing rings comprise a high quality synthetic NBR elastomer material, which is coloured green.
Due to an active filler material, the sealing rings have particularly good resistance to wear and heat.

Sealing rings GR

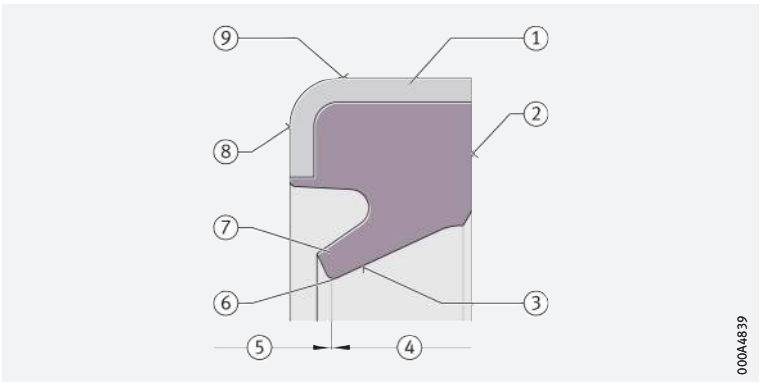
Sealing rings GR suitable for shaft diameters up to 7 mm as standard and have external steel reinforcement for stiffening purposes ➤*1027*|*2* and ➤*1028*|*1*.

Sealing rings G

Sealing rings G are designed for shaft diameters over 8 mm and have a rubber encased steel reinforcement with a rubber wave profile for stiffening purposes ➤*1027*|*3* and ➤*1028*|*1*. This provides good sealing on the outside diameter. At the same time, it also reduces the forces required for fitting.

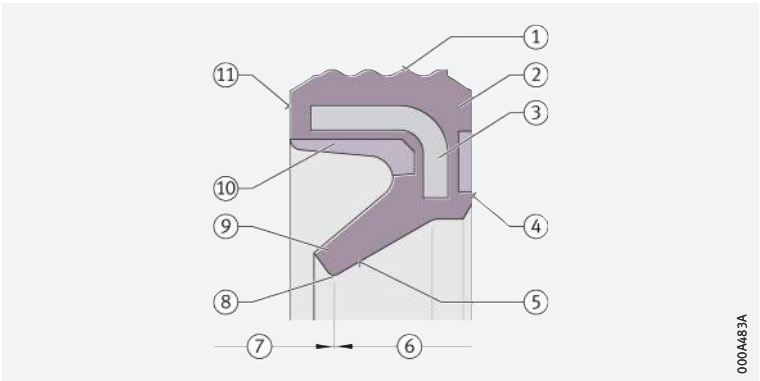
The angled reinforcing rings are made from formed sheet steel in accordance with DIN 1623 or DIN 1624 respectively.

2
Single lip sealing ring GR



① *Angled reinforcing ring*
② *Back surface (with marking)*
③ *Contact surface*
④ *Back face*
⑤ *End face*
⑥ *Seal edge*
⑦ *Seal lip*
⑧ *End surface*
⑨ *Outside surface*

3
Single lip sealing ring G



① *Outside surface*
② *Rubber casing*
③ *Angled reinforcing ring*
④ *Back surface (with marking)*
⑤ *Contact surface*
⑥ *Back face*
⑦ *End face*
⑧ *Seal edge*
⑨ *Seal lip*
⑩ *Locating recess*
⑪ *End surface*

Double lip sealing rings

With contact lip and non-contact dust shield

Double lip sealing rings are available in the design SD ➤*1028*|*4* and ➤*1028*|*1*:

- A contact seal lip essentially prevents the escape of lubricant and unpressurised oil from the bearing arrangement.
- A protective lip in contact with the shaft (marked side) also acts as a gap seal against the ingress of contamination.

The space between the seal lip and protective lip must be filled with grease.

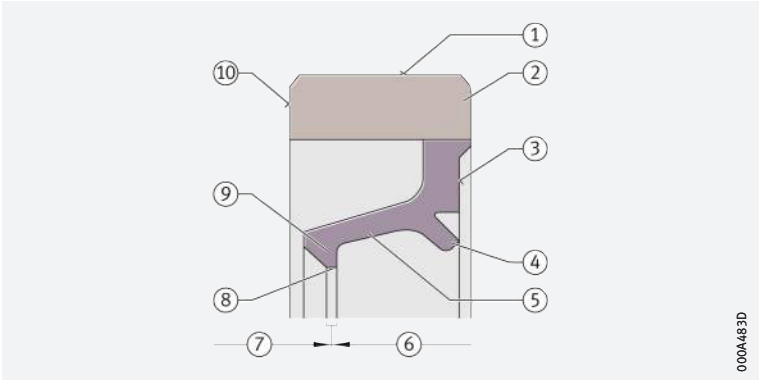
Carrier and lip area made from different materials

The sealing rings comprise two plastic components: the carrier is made from glass fibre reinforced polyamide PA66-GF, while the seal lip area is made from thermoplastic PU elastomer (coloured green).

Also suitable as wipers on shaft with axial motion

Sealing rings SD can also be used as wipers on shafts with axial motion. Since these sealing rings are made from a harder and stiffer lip material than the sealing rings G and also have an additional protective lip, they are particularly suitable for axial motions. Stroke velocities up to 3 m/s are possible, depending on the surface quality of the shaft.

4
Double lip sealing ring SD



① *Outside surface*
② *Carrier*
③ *Back surface (with marking)*
④ *Protective lip*
⑤ *Membrane*
⑥ *Back face*
⑦ *End face*
⑧ *Seal contact surface*
⑨ *Seal lip*
⑩ *End surface*

1
Characteristics and areas of application of sealing rings

Criteria	Sealing ring		
	Single lip		Double lip
	GR	G	SD
Resistance			
Mineral oils and greases	Normally resistant	Normally resistant	Normally resistant
Highly blended, synthetic lubricants	Conditionally resistant	Conditionally resistant	Conditionally resistant
Aggressive media	Consultation necessary	Consultation necessary	Not resistant
Weather			
Light, air	Moderate	Moderate	Good
Humidity	Good	Good	Good
Contamination resistance (lip facing outwards)	Good	Good	Very good
Application: shaft			
Sealing integrity	Good	Good	Good
Maximum circumferential velocity	10 m/s	10 m/s	10 m/s
Application: rod			
Maximum stroke velocity	3 m/s	3 m/s	3 m/s
Application: housing			
Sealing integrity	Satisfactory	Very good	Good
Tight fit	Very good	Good	Good
Press-in force	Medium	Slight	High
Soft housing material	Conditionally suitable	Highly suitable	Suitable
High thermal expansion	Conditionally suitable	Suitable	Suitable
Split housing	Conditionally suitable	Suitable	Conditionally suitable

Operating behaviour

Normally used with rotating shaft

Sealing rings GR, G and SD are generally used in applications with a rotating shaft.

Static sealing of the housing bore

Sealing action is achieved by means of interference fit on the outside surface

The outside surface of the sealing rings gives static sealing of the housing bore. The sealing action is achieved when the sealing ring is pressed into the housing bore with an interference fit.

The firm seating and sealing action are decisively influenced:

- by the design and accuracy of the housing bore
- by the outside surface of the sealing ring
- by correct fitting of the sealing rings.

Sealing rings G are suitable for fluid media

The rubber encased sealing rings G adapt particularly well to the surface of the housing bore. The application and usage for sealing against fluid media must be validated in each specific case.

Static/dynamic sealing of the shaft

The diameter of the seal lip in the fitted seal is smaller than the shaft diameter. As a result, the seal lip in the unfitted seal has interference of the radial force F_R (contact force). The radial force is the sum of all the component forces from the seal edge of the sealing ring that act towards the centre point of the shaft.

Factors influencing the contact force

It is dependent on:

- the deformation values of the seal lip – e.g. compression set, material hardness
- the geometry of the seal lip
- the operating temperature.

Static sealing

With a stationary shaft, the seal integrity is primarily determined by the radial force.

Dynamic sealing

With a rotating shaft, the seal integrity is additionally influenced by:

- the surface of the shaft
- the geometrical and positional tolerances – e.g. coaxiality, runout, perpendicularity
- tribology – lubrication, friction, wear
- the speed
- the temperature
- contamination.

Resistance and leakage

The sealing action is aided by a grease collar

The sealing rings are resistant to undoped lubricants with a mineral oil base. For other media, resistance must be checked. In leakage, the medium escapes from the area to be sealed, especially at the seal edge. Slight leakage cannot be completely prevented with contact seals due to the sealing mechanism (grease or fluid film) even if the sealing ring is fully functional. Leakage can occur in the form of gas or vapour, droplets or drops. In droplet or drop leakage, a thin film of fluid is formed on the shaft. The sealing action is aided by a grease collar.

Sealing on shaft with axial motion

The sealing ring performs a dual function as a wiper

With pure axial motion, the sealing ring acts as a wiper. As in the case of rotating shafts, it performs a dual function here. The sealing element:

- retains the lubricant in the area to be sealed
- prevents contaminants from penetrating the area to be sealed.

The sealing action is dependent on the interference

The interference of the shaft/rod and seal lip diameter determines the sealing action. On the entry stroke of the rod, the sealing ring wipes away the lubricant and contaminant particles. The seal lip slides on the remaining lubricant film. On the counterstroke, lubricant is drawn out through the seal gap. This increases the lubricant film on the rod again.

Friction

Factors influencing the frictional torque

The friction is influenced by:

- the material pair (elastomer/steel)
- the surface of the shaft
- the interference (radial force F_R)
- the lubrication of the contact surface (shaft/seal edge or rod/seal edge).

With a rotating shaft or motion of the rod, the adhesive friction present during standstill is converted to sliding friction. If lubricant is supplied, mixed friction occurs. The frictional power of the sealing rings increases with the diameter and the speed of the shaft. When the shaft starts to move, the frictional torque is higher than in normal operation, especially after a long period of standstill. If there is a lack of lubricant, the seal lip is not lubricated. The displacement forces increase as a result of dry running. Furthermore, the seal lip is damaged.

Wear

Causes of wear

The following type of wear can occur at the seal edge:

- adhesive wear, e.g. if the seal lip sticks to the shaft after a long period of standstill
- if the seal edge slides on the contact surface
- under dry running
- if there are contaminant particles between the seal edge and the contact surface.

The sealing function is impaired by deposits

After an extended running time, deposits may build up on the shaft/seal edge contact surface – e.g. comprising carbon and additive residues. These deposits can influence the sealing function and lead to leakage.

Wear grooves may occur on the shaft, especially if a soft shaft material is used or there is a heavy stream of contaminant particles.

Wear behaviour is influenced by the shaft material

The wear can be reduced by using a hardened shaft material or coated shafts. The abrasion resistance of NBR, FPM and HNBR elastomer is good, while that of TPU is very good.

Storage

Storage location

Sealing rings should be stored in dry, dust-free rooms – at a maximum relative humidity of 65%, moderate ventilation and free from draughts. Observe the storage room requirements in accordance with DIN 7716.

Protect sealing rings from:

- direct sunlight
- UV light
- ozone (e.g. produced by electrical equipment)
- intense thermal radiation.

If these conditions are not maintained, this may cause unfavourable changes in the physical characteristics of the sealing rings (e.g. hardening).

Do not remove sealing rings from their original packaging until immediately before fitting.

Maximum storage time

The maximum storage time from manufacture to fitting is:

- 5 years for NBR
- 10 years for FPM/HNBR.

Operating life

Factors influencing the operating life

Physical, chemical and mechanical influences determine the operating life of sealing rings.

These include:

- ageing; the elastomer structure may undergo thermo-oxidative degradation, further crosslinking or embrittlement, depending on the environment and medium
- medium; media (fluids) may be dispersed within the structure or dissolve elastomer components. The elastomer may swell or contract as a result. If several media are affecting the seal at the same time, volume changes can be superimposed on each other and may be difficult to detect by optical means
- temperature; high temperatures and/or aggressive media can accelerate the decomposition and ageing processes
- wear and contamination.

Empirical values for operating life

The interaction of these influences is very complex. As a result, it is not possible to calculate the operating life of sealing rings; only values based on practical experience can be given. Under normal operating conditions, seals can achieve a maximum operating life of:

- 10 000 operating hours in continuous operation or 3 years to 5 years.

The data given in ➤*1028*|▦ *1* are guide values. They cannot be applied without restriction to all operating conditions. In case of doubt, please consult Schaeffler.

1.2 Lubrication

The seal edge must always be lubricated

Sealing rings only function reliably if the seal edge is continually lubricated. Heat is generated at the seal edge. This is mainly dissipated to the shaft by the moving lubricant. Since elastomer gives only poor conduction of heat, heat cracks and wear can occur at the seal edge under inadequate lubrication. With grease lubrication, a grease collar protects the edge from excessive heating.

1.3 Temperature range

Excessively high temperatures can lead to loss of integrity at the seal edge

The permissible operating temperature is dependent on the interaction between the medium, the temperature and its effect on the sealing ring material ➤*1028*|▦ *1*. With increasing circumferential velocity, the temperature at the contact surface increases as a result of the increasing shear forces in the lubricant and the low thermal conductivity of the elastomer. If the temperature of the seal edge increases too much, wear and heat cracks may occur that impair the seal integrity.
The suitability of the sealing rings should be checked by tests as extremes of temperature are reached.

Possible operating temperatures of sealing rings ➤*1031*|▦ *2*.

▦ **2**
Permissible temperature ranges

Operating temperature	Sealing rings G and GR in standard design	Sealing rings SD
	–30 °C to +110 °C depending on the medium acting on the sealing ring	–30 °C to +100 °C depending on the medium acting on the sealing ring

In the event of anticipated temperatures which lie outside the stated values, please contact Schaeffler.

1.4 Suffixes

For a description of the suffixes used in this chapter ➤*1032*|▦*3*.

▦*3*
Suffixes and corresponding descriptions

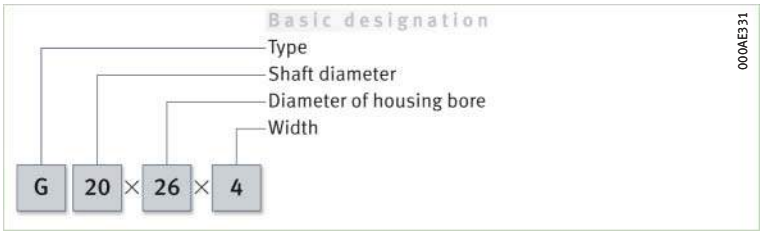
Suffix	Description of suffix	
FPM	Sealing rings G and GR for temperatures of –20 °C to +160 °C or circumferential velocities of up to 16 m/s	Special design, available by agreement only
HNBR	Sealing rings G and GR for temperatures of –30 °C to +140 °C or circumferential velocities of up to 12 m/s	

1.5 Structure of the product designation

✎*Example of composition of product designation*

The designation of sealing rings follows a set model.
Example ➤*1032*|⧉*5*.

⧉*5*
Sealing ring G: designation structure



1.6 Design of bearing arrangements

Design of housing bore

✎*The fit has a considerable influence on the seating of sealing rings*

For a tight fit of the sealing rings in the housing bore, the values should be in accordance with ➤*1033*|▦*5*. If the housing and sealing ring materials have considerably different coefficients of thermal expansion, the tight fit of the sealing ring may change under hot or cold conditions.

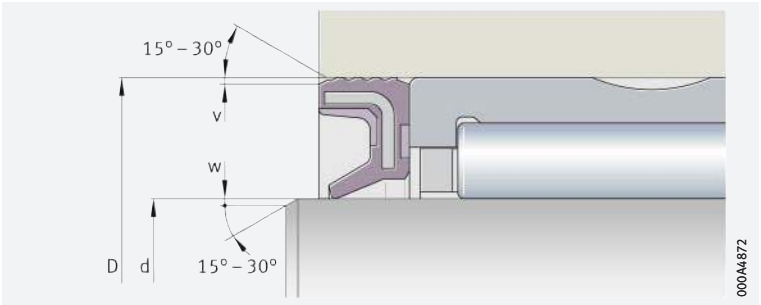
✎*Chamfers on the housing bore*

The housing bore should be chamfered in order to protect the sealing ring during fitting ➤*1032*|⧉*6* and ➤*1032*|▦*4*. The remaining seating length must be at least the nominal width of the sealing rings.

DIN ISO

The design of the chamfer on the housing bore should be in accordance with the data in DIN 3760.

⧉*6*
Chamfers on end of shaft and housing bore



▦*4*
Chamfer dimensions

Chamfer	D ≦ 30 mm	D > 30 mm	d ≦ 30 mm	d > 30 mm
v_{min}	0,3	1% of D	–	–
w_{min}	–	–	0,3	0,5

Design of shaft

The surface hardness of the seal running surfaces should be ≧ 55 HRC

For a tight fit of the sealing rings on the shaft and seal running surfaces proven in practice, the values should be in accordance with ➤*1033*|▦ *5*. Where there are special requirements for sealing integrity, the values must be adjusted as necessary. Hard contaminant particles on the seal can lead to wear of the seal running surface. For this reason, only materials with a hardness of ≧ 55 HRC can be recommended for use as a seal running surface ➤*1033*|▦ *5*. The steels normally used in machine building are suitable. The sliding surface for the seal lips must not have any surface imperfections in accordance with ISO 8785. The design of seal running surfaces in accordance with the requirements in DIN 3760 is recommended.

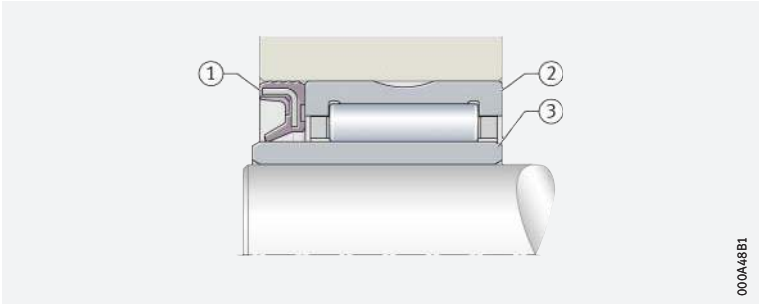
Hardened and ground bearing rings used as raceway

For bearing positions with heavy contamination impact, the use of hardened rings ground free from spiral marks – such as inner rings LR – as a raceway for the seal lip is advisable, since these can be replaced if wear occurs ➤*1033*|⧉ *7*.

If increased wear is expected, the running surface can be coated. In this case, please consult Schaeffler.

⧉ *7*
Ring hardened and ground free from spiral marks – inner ring LR

① *Single lip sealing ring G*
② *Needle roller bearing NK*
③ *Inner ring LR*



In order to protect the seal lips during fitting, the ends of shafts should be chamfered in accordance with DIN 3760 ➤*1032*|⧉ *6* and ➤*1032*|▦ *4*.

▦ *5*
Design of the shaft and housing bore

Sealing ring	Motion of shaft	Tolerance class of bore	Shaft		
			Tolerance class	Roughness	Hardness
G, GR, SD	Rotation only	G7 Ⓔ to R7 Ⓔ	g7 Ⓔ to k7 Ⓔ	0,2 ≦ Ramax ≦ 0,8	55 HRC or 600 HV
SD	Axial motion			Ramax 0,3	

1.7 Mounting and dismounting

Sealing rings must be handled and fitted correctly. This is the only way to ensure that they fulfil their sealing function correctly for a long period without problems.

Sealing lip orientation

Pay attention to the orientation of the seal lip:

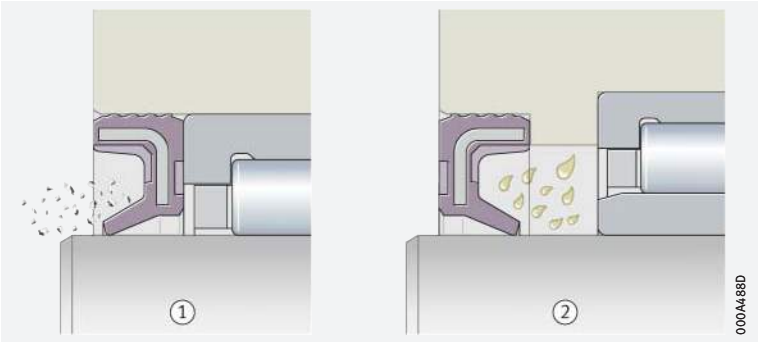
- A seal lip facing outwards protects the bearing against the ingress of dust and contamination ➤*1034*|⧉ *8*.
- A seal lip facing inwards prevents the egress of lubricant from the bearing ➤*1034*|⧉ *8*.

Sealing rings SD

In the case of sealing rings SD, the side with the protective lip is the marked side. If it should be relubricated from inside, the protective lip must face outwards.

8
Seal lip orientation

① *Seal lip facing outwards*
② *Sealing lip facing inwards*



✎ *Mounting guidelines*

The running surface on the shaft and seal lip must be oiled or greased. This reduces the frictional energy during initial movement. In the case of sealing rings with an elastomer encased reinforcing ring – sealing ring G – the outside surface should be oiled before pressing in. This makes it easier to fit the seal in the housing.

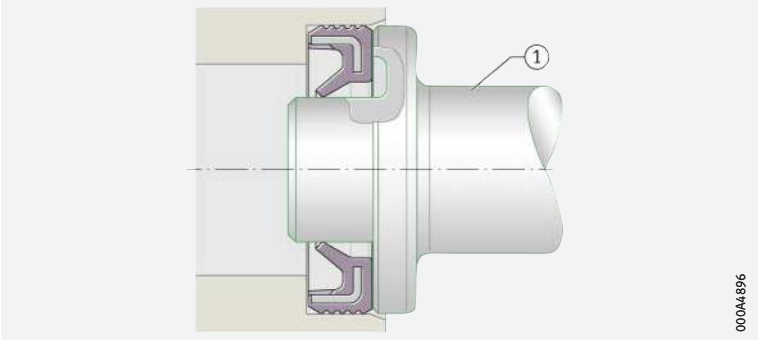
✎ *Fitting tools*

Press sealing rings carefully into the housing bore using a pressing device and a suitable pressing tool ➤ *1034* | *9* and ➤ *1034* | *10*.

Ensure that the seal lip is not damaged. Cover any sharp-edged shaft ends, slots, teeth or threads by means of fitting sleeves. Fit sealing rings in such a way that the pressing-in force is applied as close as possible to the outside diameter.

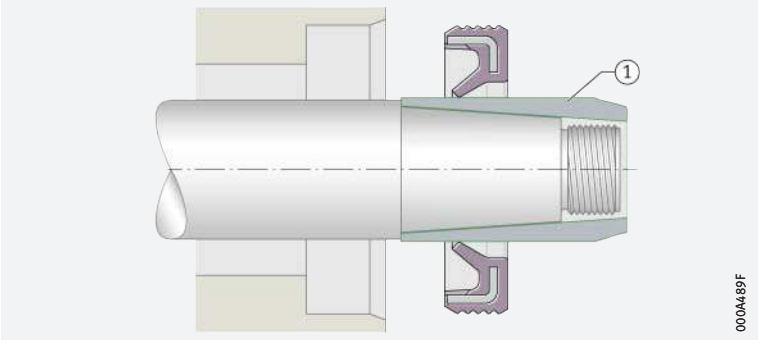
9
Fitting using a pressing tool

① *Pressing tool (fitting mandrel)*



10
Fitting using a fitting sleeve

① *Fitting sleeve*



✎ *Pay attention to the perpendicular orientation of sealing rings*

Fit sealing rings perpendicular to the shaft axis and the housing bore. Do not exceed the maximum deviation in perpendicularity between the sealing ring and the shaft axis once fitted ➤ *1034* | *6*. Larger deviations will influence the sealing action.

6
Maximum perpendicularity deviation

Shaft diameter d mm	Maximum deviation mm
d < 25	0,1
d ≧ 25	0,2

✎ *Sealing ring SD*

In the case of sealing rings SD, the space between the seal lip and protective lip must be filled with grease.

✎ *Checking of function*

After fitting, allow the sealing rings to run in and check the sealing function. Slight leakage (forming a grease or liquid film) is desirable in order to lubricate the contact surface for the seal lips. The sealing action is aided by a grease collar.

✎ *Relubrication*

During relubrication, increase the pressure only slowly.

1.8 Legal notice regarding data freshness

✎ *The further development of products may also result in technical changes to catalogue products*

Of central interest to Schaeffler is the further development and optimisation of its products and the satisfaction of its customers. In order that you, as the customer, can keep yourself optimally informed about the progress that is being made here and with regard to the current technical status of the products, we publish any product changes which differ from the printed version in our electronic product catalogue.

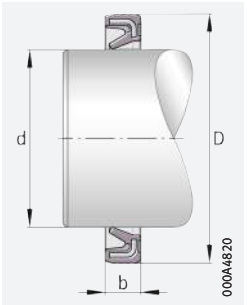
We therefore reserve the right to make changes to the data and illustrations in this catalogue. This catalogue reflects the status at the time of printing. More recent publications released by us (as printed or digital media) will automatically precede this catalogue if they involve the same subject. Therefore, please always use our electronic product catalogue to check whether more up-to-date information or modification notices exist for your desired product.

Link to electronic product catalogue

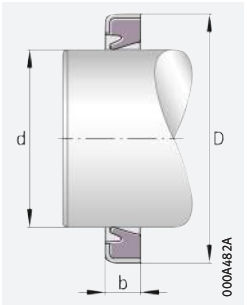
The following link will take you to the Schaeffler electronic product catalogue: ➤ *https://medias.schaeffler.com*.

Sealing rings

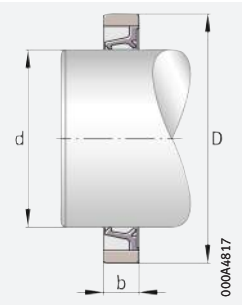
Single lip or double lip



G
Single lip



GR
Single lip



SD
Double lip

d = 4 – 80 mm

Sealing ring			Designation ➤*1032|1.4* ➤*1032|1.5*			Mass m Sealing ring		
G	GR	SD	d×	D×	b[1]	G ≈ g	GR ≈ g	SD ≈ g
	GR[2]		**4**	**8**	**2**		0,2	
	GR[2]		**5**	**9**	**2**		0,2	
	GR[2]		**5**	**10**	**2**		0,2	
	GR[2]		**6**	**10**	**2**		0,2	
	GR[2]		**6**	**12**	**2**		0,4	
	GR[2]		**7**	**11**	**2**		0,3	
	GR[2]		**7**	**14**	**2**		0,5	
G[2]	4)	4)	**8**	**12**	**3**	0,4		
G[2]	4)	**SD**[2]	**8**	**15**	**3**	0,7		0,3
G[2]	**GR**[2]	4)	**9**	**13**	**3**	0,5	0,5	
G[2]	4)	4)	**9**	**16**	**3**	0,7		
G[2]	**GR**[2]	4)	**10**	**14**	**3**	0,5	0,5	
G[2]	4)	**SD**[2]	**10**	**17**	**3**	0,9		0,4
G[2]	**GR**[2]	4)	**12**	**16**	**3**	0,6	0,6	
G[2]	4)	**SD**[2]	**12**	**18**	**3**	0,9		0,4
G[2]	**GR**[2]	**SD**[2]	**12**	**19**	**3**	1	1	0,5
G[2]	4)	4)	**13**	**19**	**3**	0,9		
G[2]	3)	**SD**[2]	**14**	**20**	**3**	1		0,5
G[2]	4)	4)	**14**	**21**	**3**	1,1		
G[2]	3)	**SD**[2]	**14**	**22**	**3**	1,3		0,7
G[2]	3)	**SD**[2]	**15**	**21**	**3**	1		0,5
G[2]	3)	**SD**[2]	**15**	**23**	**3**	1,3		0,7
G[2]	3)	**SD**[2]	**16**	**22**	**3**	1,3		0,6
G[2]	3)	**SD**[2]	**16**	**24**	**3**	1,3		0,7
G[2]	4)	4)	**16**	**25**	**3**	1,6		
G[2]	3)	**SD**[2]	**17**	**23**	**3**	1,3		0,6
G[2]	4)	**SD**[2]	**17**	**25**	**3**	1,5		0,8
G[2]	4)	**SD**[2]	**18**	**24**	**3**	1,2		0,6
G[2]	4)	**SD**[2]	**18**	**26**	**4**	1,8		1,1
G[2]	4)	**SD**[2]	**19**	**27**	**4**	2		1,1
G[2]	3)	**SD**[2]	**20**	**26**	**4**	1,8		0,8
G[2]	3)	**SD**[2]	**20**	**28**	**4**	2,1		1,1
G[2]	4)	4)	**21**	**29**	**4**	2,2		
G[2]	3)	**SD**[2]	**22**	**28**	**4**	1,8		0,9
G[2]	3)	**SD**[2]	**22**	**30**	**4**	2,2		1,3
G[2]	3)	4)	**24**	**32**	**4**	2,5		
G[2]	3)	**SD**[2]	**25**	**32**	**4**	2,3		1,3
G[2]	4)	**SD**[2]	**25**	**33**	**4**	2,5		1,3
G[2]	3)	**SD**[2]	**25**	**35**	**4**	2,6		1,9
G[2]	4)	**SD**[2]	**26**	**34**	**4**	2,6		1,4
G[2]	3)	**SD**[2]	**28**	**35**	**4**	2,4		1,3
G[2]	3)	4)	**28**	**37**	**4**	3,1		
G[2]	4)	4)	**29**	**38**	**4**	3,2		
G[2]	3)	**SD**[2]	**30**	**37**	**4**	2,7		1,3
G[2]	3)	**SD**[2]	**30**	**40**	**4**	3,6		2,1
G[2]	4)	**SD**[2]	**32**	**42**	**4**	3,7		2,4
G[2]	4)	4)	**32**	**45**	**4**	5,1		
G[2]	3)	**SD**[2]	**35**	**42**	**4**	3		1,5
G[2]	4)	**SD**[2]	**35**	**45**	**4**	4,1		2,5
G[2]	4)	**SD**[2]	**37**	**47**	**4**	4		2,7
G[2]	4)	**SD**[2]	**38**	**48**	**4**	4,4		2,8
G[2]	4)	**SD**[2]	**40**	**47**	**4**	3,3		1,7
G[2]	3)	**SD**[2]	**40**	**50**	**4**	4,6		2,9
G[2]	3)	**SD**[2]	**40**	**52**	**5**	4,8		4,5
G[2]	3)	**SD**[2]	**42**	**52**	**4**	4,7		3
G[2]	4)	4)	**43**	**53**	**4**	4,8		
G[2]	3)	**SD**[2]	**45**	**52**	**4**	3,8		1,9
G[2]	3)	**SD**[2]	**45**	**55**	**4**	5,2		3,2
G[2]	3)	**SD**[2]	**50**	**58**	**4**	4,5		2,4
G[2]	3)	**SD**[2]	**50**	**62**	**5**	10,4		5,5
G[2]	3)		**55**	**63**	**5**	7,1		
G[2]	3)		**70**	**78**	**5**	9		
G[2]	4)		**80**	**90**	**5**	13,8		

medias ➤ *https://www.schaeffler.de/std/1D8C*

Special designs, available by agreement.

1) Width tolerance ±0,2.

2) **Standard range.**

3) Please request information on delivery capability.

4) Available by agreement for economically viable batch sizes.

Axial deep groove ball bearings

Matrix for bearing preselection

The matrix gives an overview of the types and design features of axial deep groove ball bearings.

It can be used to make a preliminary assessment of whether a bearing is fundamentally suitable for the envisaged application.

The additional information provided in the product chapter (see column "detailed information") and in the Technical principles must, however, be observed in addition to this overview in selection of the bearing.

Design features and suitability			Axial deep groove ball bearings		
+++ extremely suitable ++ highly suitable + suitable (+) suitable with restrictions – not suitable/not applicable ✓ available			single direction	double direction	detailed information ➤ **1042**
Load carrying capacity	radial		–	–	➤ *1044|1.2*
	axial, one direction		++	++	➤ *1044|1.2*
	axial, both directions		–	++	➤ *1044|1.2*
	moments		–	–	➤ *1044|1.2*
Compensation of angular misalignments	static		(+)[1]	(+)[1]	➤ *1044|1.3*
	dynamic		–	–	➤ *1044|1.3*
Bearing design	cylindrical bore		✓	✓	➤ *1042|1.1*
	tapered bore		–	–	➤ *1042|1.1*
	separable		✓	✓	➤ *1050|1.17*
Lubrication	greased		–	–	➤ *1044|1.4*
Sealing	open		✓	✓	➤ *1045|1.5*
	non-contact		–	–	–
	contact		–	–	–
Operating temperature in °C		from to	–30 +150[1]	–30 +150[1]	➤ *1046|1.8*
Suitability for	high speeds		+	+	➤ *1045|1.6*
	high running accuracy		+	+	➤ *1047|1.11* ➤ *114*
	low-noise running		(+)	(+)	➤ *1045|1.7* ➤ *27*
	high rigidity		++	++	➤ *54*
	reduced friction		+	+	➤ *56*
	length compensation within bearing		–	–	–
	non-locating bearing arrangement		–	–	➤ *139*
	locating bearing arrangement		+++	+++	➤ *139*
X-life bearings			–	–	–
Bearing bore d in mm		from to	10 260[2]	10 190	➤ *1052* ➤ *1064*
Product tables		from page ➤	**1052**	**1064**	

1) Valid for bearings with spherical housing locating washer

2) Larger catalogue bearings ➤ 🕮 *GL 1*

1 Axial deep groove ball bearings

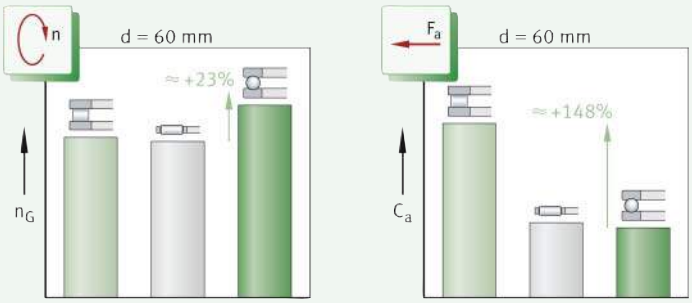
Axial deep groove ball bearings:

- are standardised, ready-to-fit units with high axial load carrying capacity ➤*1043*|🗀 *2* and ➤*1043*|🗀 *3*
- are suitable exclusively for the support of predominantly axial loads ➤*1044*|*1.2*
- are particularly suitable where the bearing position is subjected to high axial loads from one or both sides, but the requirements for axial load carrying capacity of the bearings are not so high that axial cylindrical roller bearings with even higher load carrying capacity must be used
- permit higher speeds than roller or needle roller and cage assemblies ➤*1042*|🗀 *1*
- compensate, in conjunction with a spherical housing locating washer, static misalignments between the shaft and housing ➤*1044*|*1.3*.

For an overview of other product-specific features, see the Matrix for bearing preselection ➤*1041*.

🗀 ***1***
Axial deep groove ball bearing: comparison of speed and load carrying capacity with axial cylindrical roller bearing and axial needle roller and cage assembly

n_G = *limiting speed*
F_a = *axial load*
C_a = *basic axial dynamic load rating*



1.1 Bearing design

✎ *Design variants*

Axial deep groove ball bearings are available as:

- single direction bearings ➤*1043*|🗀 *2*
- double direction bearings ➤*1043*|🗀 *3*.

Basic bearing design

✎ *Non-self-retaining, easy-to-fit bearing units*

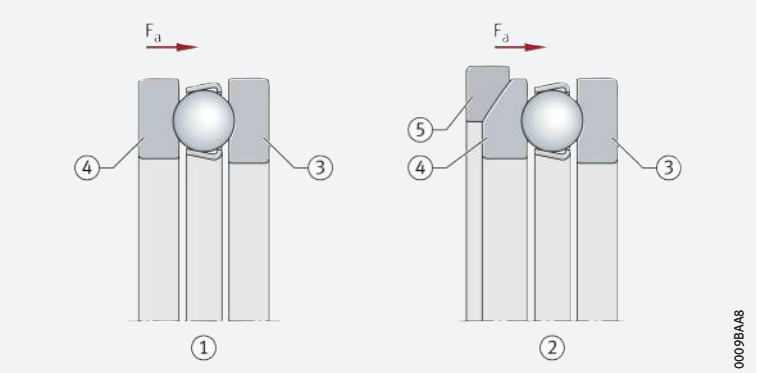
Axial deep groove ball bearings are part of the group of axial ball bearings. The bearings are of a multi-piece construction and, due to their design, are not self-retaining. As a result, it is possible to mount the bearing parts (shaft locating washer, housing locating washer, ball and cage assembly, support washer) separately from each other. In order to guide the balls, the shaft and housing locating washer have raceway grooves (formed rolling element raceways) with a defined osculation, in which the rolling elements circulate. The ball set is retained by a sheet steel cage or a solid brass cage ➤*1046*|▦ *2*. When using these bearings, the designer does not need to produce the bearing parts for his bearing arrangement and match these to each other himself, but can instead use a standarised, ready-to-fit unit.

Single direction axial deep groove ball bearings

✎ Ready-to-fit bearing unit for compact axial designs

These axial deep groove ball bearings comprise a shaft locating washer, a housing locating washer and a ball and cage assembly ➤*1043*|*2*. In order to ensure centring of the washers with a precise fit, the bore of the shaft locating washer (d) is ground. In contrast, the bore of the housing locating washer (D_1) is more generously dimensioned and is turned. The housing locating washer can be flat or spherical and can be configured with or without a support washer. The support washers U2 and U3 must be ordered in addition to the bearing. Load carrying capacity of single direction bearings ➤*1044*|*1.2*.

2
Axial deep groove ball bearings, single direction



F_a = *axial load*

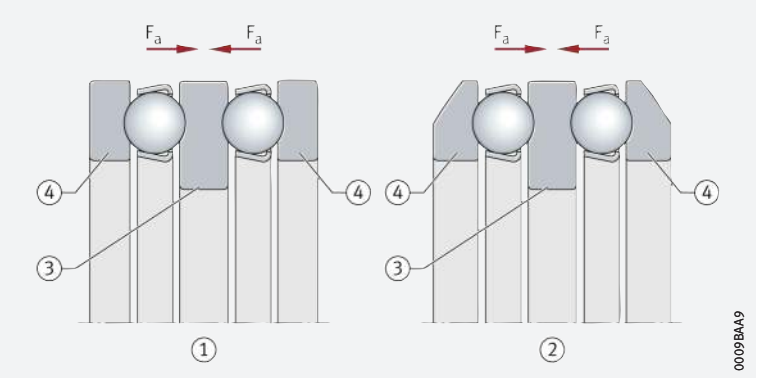
① *Axial deep groove ball bearing with flat housing locating washer*
② *Axial deep groove ball bearing with spherical housing locating washer and support washer*
③ *Shaft locating washer*
④ *Housing locating washer*
⑤ *Support washer (flat or spherical)*

Double direction axial deep groove ball bearings

✎ Ready-to-fit bearing unit, suitable for combination with support washers

Double direction bearings comprise a shaft locating washer, two housing locating washers and two ball and cage assemblies ➤*1043*|*3*. They can also be combined with support washers U2 and U3. The housing locating washers and ball sets correspond to the designs of the single direction bearings. Load carrying capacity of double direction bearings ➤*1044*|*1.2*.

3
Axial deep groove ball bearings, double direction



F_a = *axial load*

① *Axial deep groove ball bearing with flat housing locating washers*
② *Axial deep groove ball bearing with spherical housing locating washers, without support washer*
③ *Shaft locating washer*
④ *Housing locating washer (flat or spherical)*

1.2 Load carrying capacity

Axial deep groove ball bearings are suitable for the support of predominantly axial loads. They must not be subjected to predominantly radial loads.

✎ *Single direction bearings*

Single direction axial deep groove ball bearings can support axial forces in one direction and support the shaft on one side ➤ *1043* | *2*.

✎ *Double direction bearings*

Double direction axial deep groove ball bearings support axial forces in both directions and can guide the shaft on both sides ➤ *1043* | *3*.

1.3 Compensation of angular misalignments

Axial deep groove ball bearings react with high sensitivity to angular misalignments. In cases where the contact face for the housing locating washer is not vertical (perpendicular) to the bearing axis, the angular misalignment can be compensated by means of bearings with a spherical housing locating washer and support washer ➤ *1043* | *2*.

Single direction bearings

✎ *Series 511, 512, 513, 514 do not permit angular adjustment*

Bearings of series 511, 512, 513 and 514 have a flat housing locating washer. As a result, they do not permit angular misalignment or skewing between the shaft and housing.

✎ *Series 532, 533 permit angular adjustment*

Bearings of series 532 and 533 have a spherical housing locating washer. With an appropriate housing design and in conjunction with support washers U2 and U3, they are variable in angle as a result and can therefore tolerate static misalignments of the shaft relative to the housing within certain limits.

Double direction bearings

✎ *Series 522, 523 do not permit angular adjustment*

Bearings of series 522 and 523 have two flat housing locating washers and do not permit angular adjustment.

✎ *Series 542, 543 permit angular adjustment*

Bearings of series 542 and 543 have spherical housing locating washers. With an appropriate housing design and in conjunction with support washers U2 and U3, they are variable in angle as a result and can therefore tolerate static misalignments of the shaft relative to the housing within certain limits.

1.4 Lubrication

✎ *Oil or grease lubrication is possible*

The bearings are not greased. In order to prevent direct metallic contact between rolling elements, raceways and cages, they must be lubricated. Oil or grease lubrication is suitable. The lubricant reduces the wear and also protects the surfaces against corrosion. The choice of lubricant is essentially dependent on the operating temperatures and the speeds; it is also influenced, however, by the load, mounting position, osculations etc.

If there is any uncertainty regarding the suitability of the selected lubricant for the application, please consult Schaeffler or the lubricant manufacturer.

1.5 Sealing

The bearings are of an open design

Axial deep groove ball bearings are supplied without seals. As a result, sealing of the bearing position must be carried out in the adjacent construction. This must reliably prevent:

- moisture and contaminants from entering the bearing
- the egress of lubricant from the bearing.

1.6 Speeds

Limiting speeds and reference speeds in the product tables

Two speeds are generally indicated in the product tables ➤*1052*:

- the kinematic limiting speed n_G
- the thermal speed rating $n_{\vartheta r}$.

Limiting speed

The limiting speed n_G is the kinematically permissible speed of a bearing. Even under favourable mounting and operating conditions, this value should not be exceeded without prior consultation with Schaeffler ➤*64*. The values in the product tables are valid for oil lubrication.

Values for grease lubrication

For grease lubrication, 75% of the value stated in the product tables is permissible in each case.

Reference speeds

$n_{\vartheta r}$ is used to calculate n_{ϑ}

The thermal speed rating $n_{\vartheta r}$ is not an application-oriented speed limit, but is a calculated ancillary value for determining the thermally safe operating speed n_{ϑ} ➤*64*.

1.7 Noise

Schaeffler Noise Index

The Schaeffler Noise Index (SGI) is not yet available for this bearing type ➤*69*. The data for these bearing series will be introduced and updated in stages.

Further information:

- ***medias*** ➤ *https://medias.schaeffler.com*.

1.8 Temperature range

Limiting values

The operating temperature of the bearings is limited by:

- the dimensional stability of the bearing washers and rolling elements
- the support washers
- the cage
- the lubricant.

–30 °C to +150 °C

Possible operating temperatures for axial deep groove ball bearings ➤*1046*| ▦ *1*. The support washers are made from rolling bearing steel and are suitable for the same temperatures as the bearing washers and rolling elements. The temperature limit values of the lubricant must be observed.

▦ **1**
Permissible temperature ranges

Operating temperature	Axial deep groove ball bearings with sheet steel or brass cages
	–30 °C to +150 °C

In the event of anticipated temperatures which lie outside the stated values, please contact Schaeffler.

1.9 Cages

Sheet steel cages or solid brass cages are used as standard

Standard cages for axial deep groove ball bearings ➤*1046*| ▦ *2*. Other cage designs are available by agreement. With such cages, however, suitability for high speeds and temperatures as well as the basic load ratings may differ from the values for the bearings with standard cages. Bearings with sheet steel cages do not have a cage suffix ➤*1046*| ▦ *2*.

If there is any uncertainty regarding cage suitability for a specific application, please consult Schaeffler.

▦ **2**
Cage, cage suffix, bore code

Bearing series	Sheet steel cage –	Solid brass cage MP
	Bore code	
511	up to 28	from 30
512	up to 28	from 30
513	up to 20	from 22
514	up to 11	from 12
522	up to 28	from 30
523	up to 20	from 22
524	06 to 11	–
532	up to 28	from 30
533	up to 20	from 22
534	06 to 11	–
542	up to 28	from 30
543	up to 20	22, 24
544	06 to 11	–

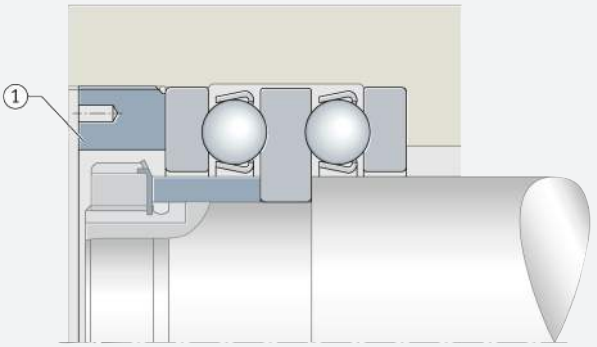
1.10 Internal clearance

✎ Axial clearance and preload is determined by the application

In the case of axial deep groove ball bearings, the internal clearance (axial clearance) is only achieved when the bearings are mounted. The requisite axial clearance of the bearing arrangement is dependent on the application and must take account of the conditions in the bearing arrangement while warm from operation and subjected to load. If axial deep groove ball bearings are subjected to vibrations while under predominantly static load for example, they must be lightly preloaded. Preload can be applied, for example, using housing nuts ➤*1047*|⧉ *4*. Other suitable means include shaft nuts, disc springs, calibrated sheets (shims) etc. It must always be ensured that no slippage occurs in operation between the rolling elements and raceways ➤*1049*|*1.15*. It must also be ensured that the preload does not exceed the optimum value, otherwise there will be an increase in friction and therefore in heat generation in the bearing. These will both have a negative effect on the operating life of the bearings.

If there is any uncertainty regarding the setting of the axial clearance, Schaeffler must always be consulted.

⧉ **4**
Setting the axial clearance of a double direction axial deep groove ball bearing by means of a housing nut



① *Housing nut*

1.11 Dimensions, tolerances

Dimension standards

Bearings with a flat locating surface on the housing locating washer correspond to ISO 104:2015 or DIN 616:2000 and DIN 711:2010 as well as DIN 715:2011.

Bearings with a spherical locating surface on the housing locating washer correspond to ISO 20516:2007 and DIN 711:2010 as well as DIN 715:2011.

Chamfer dimensions

The limiting dimensions for chamfer dimensions correspond to DIN 620-6:2004. Overview and limiting values ➤*138*. Nominal value of chamfer dimension ➤*1052*|▦.

Tolerances

The tolerances for the dimensional and running accuracy of axial deep groove ball bearings correspond to tolerance class Normal in accordance with ISO 199:2014. Tolerance values in accordance with ISO 199 ➤*133*|▦ *25* to ➤*135*|▦ *28*.

1.12 Suffixes

For a description of the suffixes used in this chapter ➤*1048*|▦*3* and ***medias*** interchange ➤*https://www.schaeffler.de/std/1D52*.

▦*3*
Suffixes and corresponding descriptions

Suffix	Description of suffix	
MP	Solid brass cage, ball-guided	Standard
P5	Bearing in tolerance class 5	Special design, available by agreement
P6	Bearing in tolerance class 6	

1.13 Structure of bearing designation

✎*Examples of composition of bearing designation*

The designation of bearings follows a set model.
Examples ➤*1048*|⧉*5* and ➤*1048*|⧉*6*.
The composition of designations is subject to DIN 623-1 ➤*102*|⧉*10*.

⧉*5*
Axial deep groove ball bearing, single direction, with spherical housing locating washer and support washer: designation structure

⧉*6*
Axial deep groove ball bearing, double direction, with spherical housing locating washers: designation structure

1.14 Dimensioning

Equivalent dynamic bearing load

✎$P = F_a$

Axial deep groove ball bearings can only support axial forces ➤*1044*|*1.2*.
As a result, $P = F_a$ ➤*1048*|𝑓*1*.

𝑓*1*
Equivalent dynamic load

$$P = F_a$$

Legend

P	N	Equivalent dynamic bearing load
F_a	N	Axial load.

Equivalent static bearing load

✎$P_0 = F_{0a}$

Since the bearings can only support axial loads, $P_0 = F_{0a}$ ➤*1048*|𝑓*2*.

𝑓*2*
Equivalent static load

$$P_0 = F_{0a}$$

Legend

P_0	N	Equivalent static bearing load
F_{0a}	N	Largest axial load present (maximum load).

Static load safety factor

✎ $S_0 = C_0/P_0$

In addition to the basic rating life L (L_{10h}), it is also always necessary to check the static load safety factor S_0 ➤227|ƒ5.

ƒ3 *Static load safety factor*

$$S_0 = \frac{C_0}{P_0}$$

Legend

S_0	–	Static load safety factor
C_0	N	Basic static load rating
P_0	N	Equivalent static bearing load.

1.15 Minimum load

✎ *In order to prevent damage due to slippage, a minimum axial load of $F_{a\,min}$ is required*

Under axial load, the balls are guided under favourable rolling conditions at the base of the groove. This deteriorates, however, if the centrifugal force occurring at higher speeds and very low loads presses the balls outwards. In this case, detrimental sliding motions can occur between the rolling elements and the raceways due to centrifugal forces and gyroscopic moments. In order to prevent these sliding motions, the bearings must be subjected to the minimum axial load $F_{a\,min}$ ➤1049|ƒ4.
This can also be achieved by means of preloading, for example using springs. The minimum load factor A is given in the product tables.
For n_{max}, the maximum operating speed must be used.

ƒ4 *Minimum axial load*

$$F_{a\,min} = 1000 \cdot A \cdot \left(\frac{n_{max}}{1000}\right)^2$$

Legend

$F_{a\,min}$	N	Minimum axial load
A	–	Minimum load factor ➤1052|▦
n_{max}	min^{-1}	Maximum operating speed.

1.16 Design of bearing arrangements

✎ *In the case of misalignments: use spherical support washers or produce the locating surface in the housing to a spherical design*

Bearings with spherical housing locating washers can compensate, in conjunction with a spherical bearing seating surface, misalignments between the locating surface in the housing and on the shaft ➤1044|1.3. These bearings can be mounted together with support washers also of a spherical design or directly in the housing. In this case, however, the locating surface in the housing must also be of a spherical design.

✎ *Shaft tolerances*

Single direction bearings should have the shaft tolerance j6 Ⓔ, while k6 Ⓔ should be selected for double direction bearings.

✎ *Tolerances for the housing bore*

The tolerance of the locating bore is dependent on the running accuracy to be achieved. For normal running accuracy, it should be in the tolerance class E8 Ⓔ, for high running accuracy, it should be in the tolerance class H6 Ⓔ.

Mounting dimensions for the contact surfaces of bearing rings

✎ *The contact surfaces for the washers must be of sufficient height*

The shoulders on the adjacent construction (shaft and housing) must be sufficiently high that the shaft and housing locating washers are supported over at least half their height. The abutment shoulders should be rigid, flat and perpendicular to the axis of rotation. Proven mounting dimensions for the radii and diameters of abutment shoulders are given in the product tables ➤1052|▦. These dimensions are limiting dimensions (maximum or minimum dimensions); the actual values should not be higher or lower than specified.

1.17 Mounting and dismounting

Do not transpose the shaft and housing locating washer

In the case of single direction bearings, it must be ensured that the shaft and housing locating washer are not exchanged with each other but are mounted in the correct position.

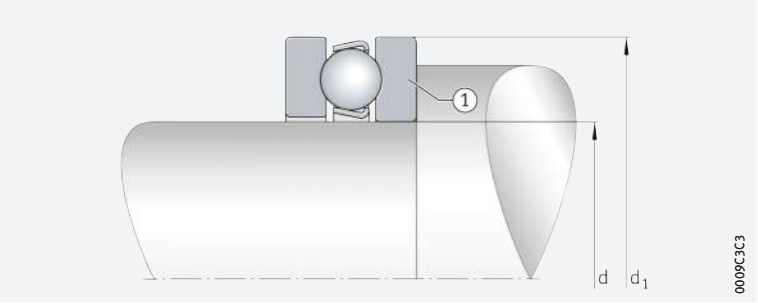
On the shaft locating washer, the bore d is ground and the outside diameter d_1 is not ground ➤*1050*|*7*. For reliable operation, the shaft locating washer should always abut a shoulder of corresponding dimensions or a support ring securely located on the shaft.

As the bearings are not self-retaining, they are easy to mount

Axial deep groove ball bearings are not self-retaining. As a result, the bearing washers and the ball and cage assembly can be mounted separately from each other ➤*1042*|*1.1*. This gives simplified mounting of the bearings.

7
Axial deep groove ball bearing, single direction

① *Shaft locating washer, bore d ground, outside diameter d_1 not ground*



Schaeffler Mounting Handbook

Rolling bearings must be handled with great care

Rolling bearings are well-proven precision machine elements for the design of economical and reliable bearing arrangements, which offer high operational security. In order that these products can function correctly and achieve the envisaged operating life without detrimental effect, they must be handled with care.

The Schaeffler Mounting Handbook MH 1 gives comprehensive information about the correct storage, mounting, dismounting and maintenance of rotary rolling bearings ➤*https://www.schaeffler.de/std/1D53*. It also provides information which should be observed by the designer, in relation to the mounting, dismounting and maintenance of bearings, in the original design of the bearing position. This book is available from Schaeffler on request.

1.18 Legal notice regarding data freshness

The further development of products may also result in technical changes to catalogue products

Of central interest to Schaeffler is the further development and optimisation of its products and the satisfaction of its customers. In order that you, as the customer, can keep yourself optimally informed about the progress that is being made here and with regard to the current technical status of the products, we publish any product changes which differ from the printed version in our electronic product catalogue.

We therefore reserve the right to make changes to the data and illustrations in this catalogue. This catalogue reflects the status at the time of printing. More recent publications released by us (as printed or digital media) will automatically precede this catalogue if they involve the same subject. Therefore, please always use our electronic product catalogue to check whether more up-to-date information or modification notices exist for your desired product.

Link to electronic product catalogue

The following link will take you to the Schaeffler electronic product catalogue: ➤*https://medias.schaeffler.com*.

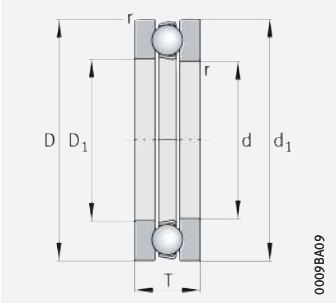
1.19 Further information

In addition to the data in this chapter, the following chapters in Technical principles must also be observed in the design of bearing arrangements:

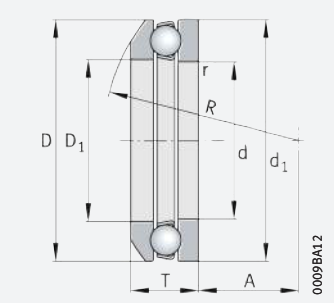
- Determining the bearing size ➤*34*
- Rigidity ➤*54*
- Friction and increases in temperature ➤*56*
- Speeds ➤*64*
- Bearing data ➤*97*
- Lubrication ➤*70*
- Sealing ➤*182*
- Design of bearing arrangements ➤*139*
- Mounting and dismounting ➤*191*.

Axial deep groove ball bearings

Single direction



511, 512, 513, 514

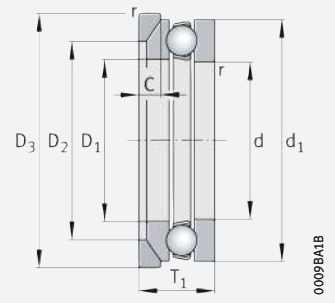


532, 533
Spherical housing locating washer

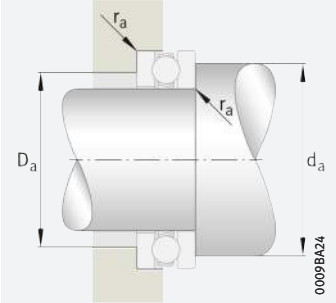
d = 10 – 30 mm

Main dimensions			Basic load ratings		Fatigue limit load	Minimum load factor	Limiting speed	Speed rating	Mass m		Designation ➤1048|1.12 ➤1048|1.13	
d	D	T	dyn. C_a	stat. C_{0a}	C_{ua}	A	n_G	$n_{\vartheta r}$	Bearing	Support washer	Bearing	Support washer
			N	N	N		min^{-1}	min^{-1}	≈ kg	≈ kg		
10	24	9	10 000	14 000	620	0,001	12 700	19 200	0,018	–	**51100**	**–**
	26	11	12 700	17 100	760	0,002	10 900	19 100	0,03	–	**51200**	**–**
	26	11,6	12 700	17 100	760	0,002	10 900	19 100	0,028	0,008	**53200**	**U200**
12	26	9	10 300	15 400	690	0,001	13 100	16 900	0,021	–	**51101**	**–**
	28	11	13 200	19 000	840	0,002	11 300	16 900	0,03	–	**51201**	**–**
	28	11,4	13 200	19 000	840	0,002	11 300	16 900	0,03	0,009	**53201**	**U201**
15	28	9	10 500	16 800	750	0,002	13 100	14 000	0,027	–	**51102**	**–**
	32	12	16 600	24 800	1 100	0,003	9 800	14 300	0,049	–	**51202**	**–**
	32	13,3	16 600	24 800	1 100	0,003	9 800	14 300	0,048	0,013	**53202**	**U202**
17	30	9	11 300	19 600	870	0,002	12 900	12 500	0,028	–	**51103**	**–**
	35	12	17 200	27 500	1 210	0,004	9 700	13 200	0,052	–	**51203**	**–**
	35	13,2	17 200	27 500	1 210	0,004	9 700	13 200	0,055	0,015	**53203**	**U203**
20	35	10	15 000	26 500	1 180	0,004	10 900	11 100	0,04	–	**51104**	**–**
	40	14	21 100	37 500	1 660	0,007	8 500	11 600	0,082	–	**51204**	**–**
	40	14,7	21 100	37 500	1 660	0,007	8 500	11 600	0,081	0,02	**53204**	**U204**
25	42	11	18 100	35 500	1 570	0,006	9 700	9 500	0,055	–	**51105**	**–**
	47	15	26 500	50 000	2 220	0,013	7 500	9 800	0,114	–	**51205**	**–**
	47	16,7	26 500	50 000	2 220	0,013	7 500	9 800	0,121	0,031	**53205**	**U205**
	52	18	34 500	55 000	2 450	0,019	6 000	10 400	0,154	–	**51305**	**–**
	52	19,8	34 500	55 000	2 450	0,019	6 000	10 400	0,203	0,043	**53305**	**U305**
	60	24	43 000	66 000	2 950	0,032	4 700	10 900	0,295	–	**51405**	**–**
30	47	11	18 800	40 000	1 770	0,008	9 300	8 100	0,063	–	**51106**	**–**
	52	16	23 900	46 000	2 040	0,014	7 300	8 600	0,136	–	**51206**	**–**
	52	17,8	23 900	46 000	2 040	0,014	7 300	8 600	0,147	0,032	**53206**	**U206**
	60	21	35 500	65 000	2 850	0,028	5 700	9 300	0,244	–	**51306**	**–**
	60	22,6	35 500	65 000	2 850	0,028	5 700	9 300	0,303	0,055	**53306**	**U306**
	70	28	70 000	112 000	5 000	0,077	3 850	9 100	0,49	–	**51406**	**–**

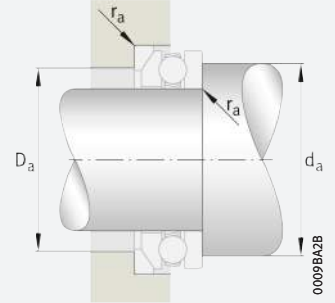
medias ➤ *https://www.schaeffler.de/std/1E13*



532, 533
Spherical housing locating washer
Support washer U2, U3



Mounting dimensions

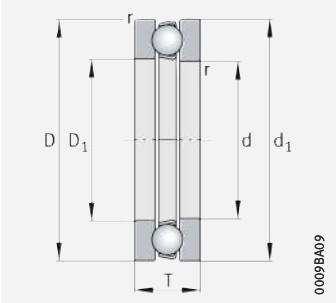


Mounting dimensions

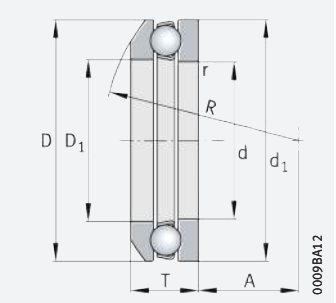
Dimensions										Mounting dimensions		
d	D_1	d_1	r min.	R	A	D_2	D_3	C	T_1	d_a min.	D_a max.	r_a max.
10	11	24	0,3	–	–	–	–	–	–	18	16	0,3
	12	26	0,6	–	–	–	–	–	–	20	16	0,6
	12	26	0,6	22	8,5	18	28	3,5	13	20	18	0,6
12	13	26	0,3	–	–	–	–	–	–	20	18	0,3
	14	28	0,6	–	–	–	–	–	–	22	18	0,6
	14	28	0,6	25	11,5	20	30	3,5	13	22	20	0,6
15	16	28	0,3	–	–	–	–	–	–	23	20	0,3
	17	32	0,6	–	–	–	–	–	–	25	22	0,6
	17	32	0,6	28	12	24	35	4	15	25	24	0,6
17	18	30	0,3	–	–	–	–	–	–	25	22	0,3
	19	35	0,6	–	–	–	–	–	–	28	24	0,6
	19	35	0,6	32	16	26	38	4	15	28	26	0,6
20	21	35	0,3	–	–	–	–	–	–	29	26	0,3
	22	40	0,6	–	–	–	–	–	–	32	28	0,6
	22	40	0,6	36	18	30	42	5	17	32	30	0,6
25	26	42	0,6	–	–	–	–	–	–	35	32	0,6
	27	47	0,6	–	–	–	–	–	–	38	34	0,6
	27	47	0,6	40	19	36	50	5,5	19	38	36	0,6
	27	52	1	–	–	–	–	–	–	41	36	1
	27	52	1	45	21	38	55	6	22	41	38	1
	27	60	1	–	–	–	–	–	–	46	39	1
30	32	47	0,6	–	–	–	–	–	–	40	37	0,6
	32	52	0,6	–	–	–	–	–	–	43	39	0,6
	32	52	0,6	45	22	42	55	5,5	20	43	42	0,6
	32	60	1	–	–	–	–	–	–	48	42	1
	32	60	1	50	22	45	62	7	25	48	45	1
	32	70	1	–	–	–	–	–	–	54	46	1

Axial deep groove ball bearings

Single direction



511, 512, 513, 514

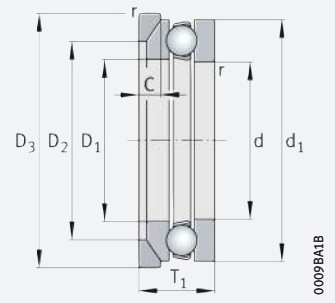


532, 533
Spherical housing locating washer

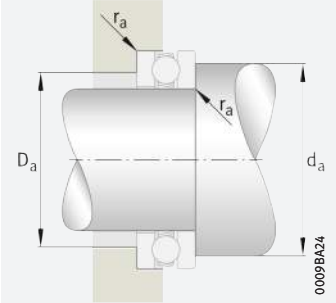
d = 35 – 55 mm

Main dimensions			Basic load ratings		Fatigue limit load	Minimum load factor	Limiting speed	Speed rating	Mass m		Designation ➤*1048* | *1.12* ➤*1048* | *1.13*	
d	D	T	dyn. C_a	stat. C_{0a}	C_{ua}	A	n_G	$n_{\vartheta r}$	Bearing	Support washer	Bearing	Support washer
			N	N	N		min^{-1}	min^{-1}	≈ kg	≈ kg		
35	52	12	20 000	46 500	2 060	0,011	8 800	6 800	0,089	–	**51107**	**–**
	62	18	35 500	67 000	3 000	0,028	6 000	8 000	0,198	–	**51207**	**–**
	62	19,9	35 500	67 000	3 000	0,028	6 000	8 000	0,265	0,057	**53207**	**U207**
	68	24	50 000	89 000	3 900	0,05	4 850	8 200	0,351	–	**51307**	**–**
	68	25,6	50 000	89 000	3 900	0,05	4 850	8 200	0,437	0,082	**53307**	**U307**
	80	32	76 000	126 000	5 600	0,11	3 600	8 500	0,709	–	**51407**	**–**
40	60	13	25 500	62 000	2 750	0,02	7 400	6 400	0,114	–	**51108**	**–**
	68	19	44 000	97 000	4 300	0,05	5 500	6 900	0,257	–	**51208**	**–**
	68	20,3	44 000	97 000	4 300	0,05	5 500	6 900	0,259	0,07	**53208**	**U208**
	78	26	61 000	112 000	5 000	0,081	4 250	7 600	0,536	–	**51308**	**–**
	78	28,5	61 000	112 000	5 000	0,081	4 250	7 600	0,561	0,114	**53308**	**U308**
	90	36	96 000	170 000	7 500	0,18	3 250	7 600	1,03	–	**51408**	**–**
45	65	14	26 500	69 000	3 050	0,025	7 100	5 800	0,087	–	**51109**	**–**
	73	20	39 000	80 000	3 550	0,043	5 500	6 600	0,279	–	**51209**	**–**
	73	21,3	39 000	80 000	3 550	0,043	5 500	6 600	0,278	0,087	**53209**	**U209**
	85	28	75 000	140 000	6 300	0,12	3 800	6 800	0,612	–	**51309**	**–**
	85	30,1	75 000	140 000	6 300	0,12	3 800	6 800	0,783	0,171	**53309**	**U309**
	100	39	123 000	222 000	9 800	0,29	2 850	6 900	1,36	–	**51409**	**–**
50	70	14	27 000	75 000	3 300	0,029	6 800	5 200	0,151	–	**51110**	**–**
	78	22	50 000	106 000	4 700	0,069	4 950	5 700	0,346	–	**51210**	**–**
	78	23,5	50 000	106 000	4 700	0,069	4 950	5 700	0,341	0,098	**53210**	**U210**
	95	31	82 000	169 000	7 500	0,18	3 550	6 400	0,932	–	**51310**	**–**
	95	34,3	82 000	169 000	7 500	0,18	3 550	6 400	0,97	0,22	**53310**	**U310**
	110	43	138 000	255 000	11 400	0,4	2 650	6 500	1,81	–	**51410**	**–**
55	78	16	30 500	75 000	3 300	0,036	6 100	5 200	0,208	–	**51111**	**–**
	90	25	58 000	133 000	5 900	0,11	4 350	5 700	0,382	–	**51211**	**–**
	90	27,3	58 000	133 000	5 900	0,11	4 350	5 700	0,609	0,152	**53211**	**U211**
	105	35	102 000	207 000	9 200	0,26	3 200	6 000	1,3	–	**51311**	**–**
	105	39,3	102 000	207 000	9 200	0,26	3 200	6 000	1,38	0,27	**53311**	**U311**
	120	48	167 000	315 000	14 000	0,59	2 340	6 000	2,83	–	**51411**	**–**

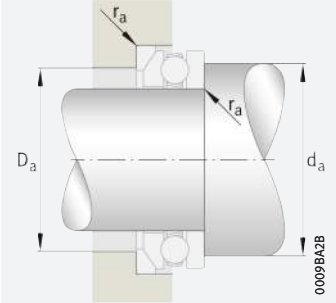
medias ➤ *https://www.schaeffler.de/std/1E14*



532, 533
Spherical housing locating washer
Support washer U2, U3



Mounting dimensions

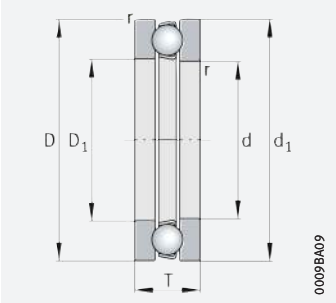


Mounting dimensions

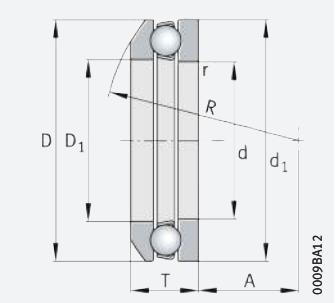
Dimensions										Mounting dimensions		
d	D_1	d_1	r min.	R	A	D_2	D_3	C	T_1	d_a min.	D_a max.	r_a max.
35	37	52	0,6	–	–	–	–	–	–	45	42	0,6
	37	62	1	–	–	–	–	–	–	51	46	1
	37	62	1	50	24	48	65	7	22	51	48	1
	37	68	1	–	–	–	–	–	–	55	48	1
	37	68	1	56	24	52	72	7,5	28	55	52	1
	37	80	1,1	–	–	–	–	–	–	62	53	1
40	42	60	0,6	–	–	–	–	–	–	52	48	0,6
	42	68	1	–	–	–	–	–	–	57	51	1
	42	68	1	56	28,5	55	72	7	23	57	55	1
	42	78	1	–	–	–	–	–	–	63	55	1
	42	78	1	64	28	60	82	8,5	31	63	60	1
	42	90	1,1	–	–	–	–	–	–	70	60	1
45	47	65	0,6	–	–	–	–	–	–	57	53	0,6
	47	73	1	–	–	–	–	–	–	62	56	1
	47	73	1	56	26	60	78	7,5	24	62	60	1
	47	85	1	–	–	–	–	–	–	69	61	1
	47	85	1	64	25	65	90	10	33	69	65	1
	47	100	1,1	–	–	–	–	–	–	78	67	1
50	52	70	0,6	–	–	–	–	–	–	62	58	0,6
	52	78	1	–	–	–	–	–	–	67	61	1
	52	78	1	64	32,5	62	82	7,5	26	67	62	1
	52	95	1,1	–	–	–	–	–	–	77	68	1
	52	95	1,1	72	28	72	100	11	37	77	72	1
	52	110	1,5	–	–	–	–	–	–	86	74	1,5
55	57	78	0,6	–	–	–	–	–	–	69	64	0,6
	57	90	1	–	–	–	–	–	–	76	69	1
	57	90	1	72	35	72	95	9	30	76	72	1
	57	105	1,1	–	–	–	–	–	–	85	75	1
	57	105	1,1	80	30	80	110	11,5	42	85	80	1
	57	120	1,5	–	–	–	–	–	–	94	81	1,5

Axial deep groove ball bearings

Single direction



511, 512, 513, 514

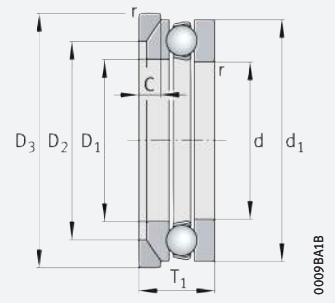


532, 533
Spherical housing locating washer

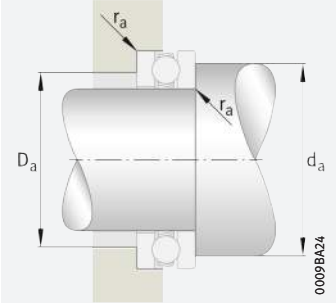
d = 60 – 80 mm

Main dimensions			Basic load ratings		Fatigue limit load	Minimum load factor	Limiting speed	Speed rating	Mass m		Designation ➤1048|1.12 ➤1048|1.13	
d	D	T	dyn. C_a	stat. C_{0a}	C_{ua}	A	n_G	$n_{\vartheta r}$	Bearing	Support washer	Bearing	Support washer
			N	N	N		min^{-1}	min^{-1}	≈ kg	≈ kg		
60	85	17	41 500	113 000	5 000	0,065	5 500	4 650	0,278	–	**51112**	**–**
	95	26	62 000	139 000	6 200	0,12	4 200	5 300	0,649	–	**51212**	**–**
	95	28	62 000	139 000	6 200	0,12	4 200	5 300	0,655	0,163	**53212**	**U212**
	110	35	101 000	207 000	9 200	0,28	3 150	5 700	1,36	–	**51312**	**–**
	110	38,3	101 000	207 000	9 200	0,28	3 150	5 700	1,41	0,31	**53312**	**U312**
	130	51	201 000	395 000	17 700	0,87	2 190	5 500	3,57	–	**51412-MP**	**–**
65	90	18	38 500	100 000	4 400	0,063	5 300	4 450	0,3	–	**51113**	**–**
	100	27	64 000	149 000	6 600	0,14	4 100	4 900	0,684	–	**51213**	**–**
	100	28,7	64 000	149 000	6 600	0,14	4 100	4 900	0,855	0,183	**53213**	**U213**
	115	36	105 000	220 000	9 700	0,32	3 050	5 300	1,39	–	**51313**	**–**
	115	39,4	105 000	220 000	9 700	0,32	3 050	5 300	1,78	0,34	**53313**	**U313**
	140	56	217 000	450 000	19 900	1,1	2 050	5 200	4,47	–	**51413-MP**	**–**
70	95	18	40 000	110 000	4 850	0,074	5 100	4 100	0,352	–	**51114**	**–**
	105	27	66 000	159 000	7 000	0,16	4 000	4 550	0,727	–	**51214**	**–**
	105	28,8	66 000	159 000	7 000	0,16	4 000	4 550	0,903	0,185	**53214**	**U214**
	125	40	134 000	290 000	12 900	0,51	2 750	4 950	1,9	–	**51314**	**–**
	125	44,2	134 000	290 000	12 900	0,51	2 750	4 950	2,09	0,4	**53314**	**U314**
	150	60	222 000	500 000	21 100	1,4	1 920	5 000	5,49	–	**51414-MP**	**–**
75	100	19	44 500	123 000	5 500	0,093	4 800	3 800	0,365	–	**51115**	**–**
	110	27	67 000	169 000	7 500	0,18	3 950	4 300	0,825	–	**51215**	**–**
	110	28,3	67 000	169 000	7 500	0,18	3 950	4 300	1,01	0,21	**53215**	**U215**
	135	44	163 000	360 000	15 400	0,75	2 480	4 650	2,59	–	**51315**	**–**
	135	48,1	163 000	360 000	15 400	0,75	2 480	4 650	3,19	0,54	**53315**	**U315**
	160	65	238 000	560 000	22 700	1,8	1 810	4 750	6,82	–	**51415-MP**	**–**
80	105	19	45 000	129 000	5 700	0,1	4 650	3 600	0,384	–	**51116**	**–**
	115	28	75 000	191 000	8 500	0,23	3 700	3 950	0,908	–	**51216**	**–**
	115	29,5	75 000	191 000	8 500	0,23	3 700	3 950	0,903	0,22	**53216**	**U216**
	140	44	160 000	360 000	15 100	0,79	2 460	4 450	2,69	–	**51316**	**–**
	140	47,6	160 000	360 000	15 100	0,79	2 460	4 450	2,75	0,56	**53316**	**U316**
	170	68	270 000	620 000	24 600	2,2	1 710	4 550	7,97	–	**51416-MP**	**–**

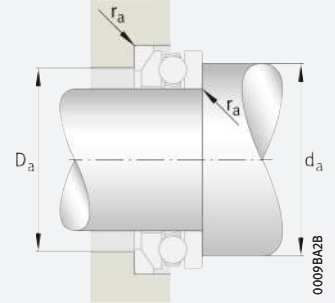
medias ➤ *https://www.schaeffler.de/std/1E15*



532, 533
Spherical housing locating washer
Support washer U2, U3



Mounting dimensions

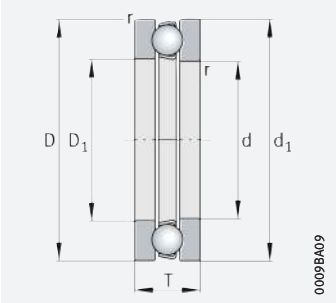


Mounting dimensions

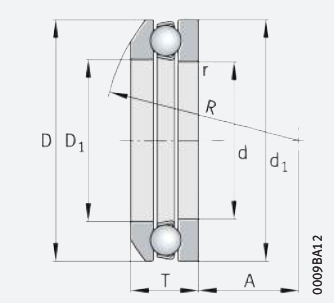
Dimensions										Mounting dimensions		
d	D_1	d_1	r min.	R	A	D_2	D_3	C	T_1	d_a min.	D_a max.	r_a max.
60	62	85	1	–	–	–	–	–	–	75	70	1
	62	95	1	–	–	–	–	–	–	81	74	1
	62	95	1	72	32,5	78	100	9	31	81	78	1
	62	110	1,1	–	–	–	–	–	–	90	80	1
	62	110	1,1	90	41	85	115	11,5	42	90	85	1
	62	130	1,5	–	–	–	–	–	–	102	88	1,5
65	67	90	1	–	–	–	–	–	–	80	75	1
	67	100	1	–	–	–	–	–	–	86	79	1
	67	100	1	80	40	82	105	9	32	86	82	1
	67	115	1,1	–	–	–	–	–	–	95	85	1
	67	115	1,1	90	38,5	90	120	12,5	43	95	90	1
	68	140	2	–	–	–	–	–	–	110	95	2
70	72	95	1	–	–	–	–	–	–	85	80	1
	72	105	1	–	–	–	–	–	–	91	84	1
	72	105	1	80	38	88	110	9	32	91	88	1
	72	125	1,1	–	–	–	–	–	–	103	92	1
	72	125	1,1	100	43	98	130	13	48	103	98	1
	73	150	2	–	–	–	–	–	–	118	102	2
75	77	100	1	–	–	–	–	–	–	90	85	1
	77	110	1	–	–	–	–	–	–	96	89	1
	77	110	1	90	49	92	115	9,5	32	96	92	1
	77	135	1,5	–	–	–	–	–	–	111	99	1,5
	77	135	1,5	100	37	105	140	15	52	111	105	1,5
	78	160	2	–	–	–	–	–	–	126	109	2
80	82	105	1	–	–	–	–	–	–	95	90	1
	82	115	1	–	–	–	–	–	–	101	94	1
	82	115	1	90	46	98	120	10	33	101	98	1
	82	140	1,5	–	–	–	–	–	–	116	104	1,5
	82	140	1,5	112	50	110	145	15	52	116	110	1,5
	83	170	2,1	–	–	–	–	–	–	134	116	2,1

Axial deep groove ball bearings

Single direction



511, 512, 513, 514

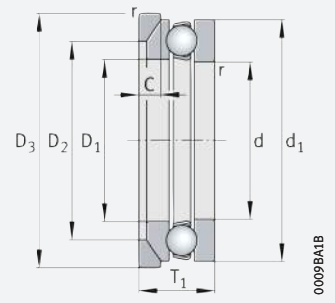


532, 533
Spherical housing locating washer

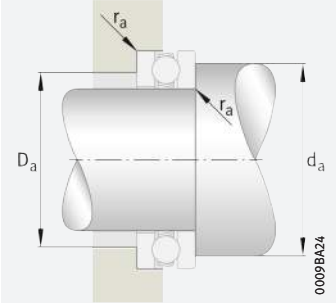
d = 85 – 120 mm

Main dimensions			Basic load ratings		Fatigue limit load	Minimum load factor	Limiting speed	Speed rating	Mass m		Designation ➤1048|1.12 ➤1048|1.13	
d	D	T	dyn. C_a N	stat. C_{0a} N	C_{ua} N	A	n_G min^{-1}	$n_{\vartheta r}$ min^{-1}	Bearing ≈ kg	Support washer ≈ kg	Bearing	Support washer
85	110	19	45 500	134 000	6 000	0,11	4 500	3 400	0,404	–	**51117**	**–**
	125	31	98 000	250 000	10 900	0,37	3 250	3 850	1,21	–	**51217**	**–**
	125	33,1	98 000	250 000	10 900	0,37	3 250	3 850	1,22	0,29	**53217**	**U217**
	150	49	186 000	420 000	17 200	1,1	2 260	4 250	3,48	–	**51317**	**–**
	150	53,1	186 000	420 000	17 200	1,1	2 260	4 250	3,51	0,8	**53317**	**U317**
	180	72	305 000	750 000	29 000	3	1 620	4 250	9,3	–	**51417-MP**	**–**
90	120	22	45 500	140 000	6 100	0,12	4 300	3 500	0,617	–	**51118**	**–**
	135	35	119 000	300 000	12 600	0,54	2 900	3 750	1,66	–	**51218**	**–**
	135	38,5	119 000	300 000	12 600	0,54	2 900	3 750	1,7	0,42	**53218**	**U218**
	155	50	193 000	455 000	18 300	1,2	2 240	4 050	3,75	–	**51318**	**–**
	155	54,6	193 000	455 000	18 300	1,2	2 240	4 050	3,81	0,82	**53318**	**U318**
	190	77	325 000	830 000	31 000	3,7	1 540	4 100	11,2	–	**51418-MP**	**–**
100	135	25	85 000	270 000	10 900	0,36	3 500	3 100	0,992	–	**51120**	**–**
	150	38	119 000	325 000	12 900	0,68	2 700	3 600	2,21	–	**51220**	**–**
	150	40,9	119 000	325 000	12 900	0,68	2 700	3 600	2,23	0,5	**53220**	**U220**
	170	55	238 000	580 000	22 600	1,9	1 970	3 650	4,94	–	**51320**	**–**
	170	59,2	238 000	580 000	22 600	1,9	1 970	3 650	4,99	0,93	**53320**	**U320**
	210	85	375 000	1 060 000	37 500	6	1 350	3 650	15	–	**51420-MP**	**–**
110	145	25	87 000	290 000	11 300	0,42	3 350	2 800	1,08	–	**51122**	**–**
	160	38	126 000	365 000	14 000	0,83	2 650	3 250	2,28	–	**51222**	**–**
	160	40,2	126 000	365 000	14 000	0,83	2 650	3 250	2,24	0,56	**53222**	**U222**
	190	63	280 000	740 000	27 000	3	1 790	3 400	7,85	–	**51322-MP**	**–**
	190	67,2	280 000	740 000	27 000	3	1 790	3 400	7,85	1,26	**53322-MP**	**U322**
	230	95	405 000	1 130 000	38 500	7,1	1 300	3 400	20,02	–	**51422-MP**	**–**
120	155	25	89 000	310 000	11 600	0,49	3 200	2 600	1,16	–	**51124**	**–**
	170	39	128 000	385 000	14 200	0,94	2 550	3 000	2,66	–	**51224**	**–**
	170	40,8	128 000	385 000	14 200	0,94	2 550	3 000	2,58	0,65	**53224**	**U224**
	210	70	325 000	910 000	31 500	4,4	1 610	3 200	10,7	–	**51324-MP**	**–**
	210	74,1	325 000	910 000	31 500	4,4	1 610	3 200	10,6	2,01	**53324-MP**	**U324**
	250	102	455 000	1 340 000	43 500	10	1 180	3 050	25,4	–	**51424-MP**	**–**

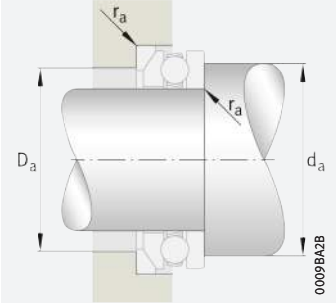
medias ➤ *https://www.schaeffler.de/std/1E16*



532, 533
Spherical housing locating washer
Support washer U2, U3



Mounting dimensions

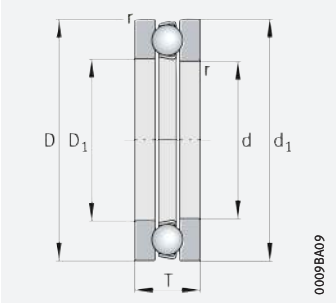


Mounting dimensions

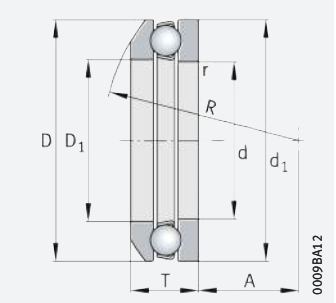
Dimensions										Mounting dimensions		
d	D_1	d_1	r min.	R	A	D_2	D_3	C	T_1	d_a min.	D_a max.	r_a max.
85	87	110	1	–	–	–	–	–	–	100	95	1
	88	125	1	–	–	–	–	–	–	109	101	1
	88	125	1	100	52	105	130	11	37	109	105	1
	88	150	1,5	–	–	–	–	–	–	124	111	1,5
	88	150	1,5	112	43	115	155	17,5	58	124	115	1,5
	88	177	2,1	–	–	–	–	–	–	142	123	2,1
90	92	120	1	–	–	–	–	–	–	108	102	1
	93	135	1,1	–	–	–	–	–	–	117	108	1
	93	135	1,1	100	45	110	140	13,5	42	117	110	1
	93	155	1,5	–	–	–	–	–	–	129	116	1,5
	93	155	1,5	112	40	120	160	18	59	129	120	1,5
	93	187	2,1	–	–	–	–	–	–	150	130	2,1
100	102	135	1	–	–	–	–	–	–	121	114	1
	103	150	1,1	–	–	–	–	–	–	130	120	1
	103	150	1,1	112	52	125	155	14	45	130	125	1
	103	170	1,5	–	–	–	–	–	–	142	128	1,5
	103	170	1,5	125	46	135	175	18	64	142	135	1,5
	103	205	3	–	–	–	–	–	–	166	144	2,5
110	112	145	1	–	–	–	–	–	–	131	124	1
	113	160	1,1	–	–	–	–	–	–	140	130	1
	113	160	1,1	125	65	135	165	14	45	140	135	1
	113	187	2	–	–	–	–	–	–	158	142	2
	113	187	2	140	51	150	195	20,5	72	158	150	2
	113	225	3	–	–	–	–	–	–	182	158	2,5
120	122	155	1	–	–	–	–	–	–	141	134	1
	123	170	1,1	–	–	–	–	–	–	150	140	1
	123	170	1,1	125	61	145	175	15	46	150	145	1
	123	205	2,1	–	–	–	–	–	–	174	156	2,1
	123	205	2,1	160	63	165	220	22	80	174	165	2,1
	123	245	4	–	–	–	–	–	–	198	172	3

Axial deep groove ball bearings

Single direction



511, 512, 513, 514

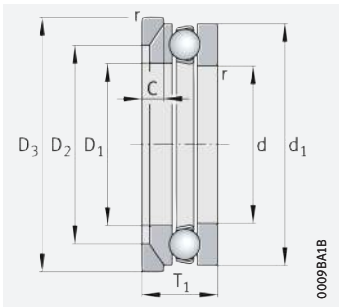


532, 533
Spherical housing locating washer

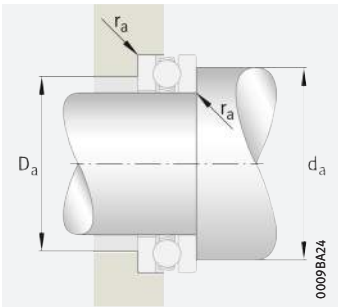
d = 130 – 180 mm

Main dimensions			Basic load ratings		Fatigue limit load	Minimum load factor	Limiting speed	Speed rating	Mass m		Designation ➤1048|1.12 ➤1048|1.13	
d	D	T	dyn. C_a	stat. C_{0a}	C_{ua}	A	n_G	$n_{\vartheta r}$	Bearing	Support washer	Bearing	Support washer
			N	N	N		min^{-1}	min^{-1}	≈ kg	≈ kg		
130	170	30	111 000	390 000	14 200	0,76	2 850	2 490	1,75	–	**51126**	**–**
	190	45	184 000	540 000	18 900	1,7	2 210	2 850	3,96	–	**51226**	**–**
	190	47,9	184 000	540 000	18 900	1,7	2 210	2 850	3,9	0,9	**53226**	**U226**
	225	75	360 000	1 050 000	35 000	5,9	1 490	2 950	13	–	**51326-MP**	**–**
	270	110	560 000	1 750 000	55 000	16	1 030	2 650	32,02	–	**51426-MP**	**–**
140	180	31	111 000	400 000	14 200	0,83	2 750	2 330	1,9	–	**51128**	**–**
	200	46	191 000	570 000	19 200	1,9	2 110	2 700	4,3	–	**51228**	**–**
	200	48,6	191 000	570 000	19 200	1,9	2 110	2 700	4,25	1,22	**53228**	**U228**
	240	80	385 000	1 240 000	40 000	8,2	1 360	2 700	15,6	–	**51328-MP**	**–**
	240	84,9	385 000	1 240 000	40 000	8,2	1 360	2 700	15,548	2,92	**53328-MP**	**U328**
150	190	31	109 000	400 000	13 800	0,89	2 650	2 200	2,17	–	**51130-MP**	**–**
	215	50	236 000	730 000	24 200	2,9	1 950	2 500	6,08	–	**51230-MP**	**–**
	215	53,3	236 000	730 000	24 200	2,9	1 950	2 500	5,95	1,69	**53230-MP**	**U230**
	250	80	395 000	1 330 000	41 500	9,3	1 340	2 480	16,2	–	**51330-MP**	**–**
	250	83,7	395 000	1 330 000	41 500	9,3	1 340	2 480	12,8	3,11	**53330-MP**	**U330**
160	200	31	112 000	425 000	14 200	1	2 550	2 060	2,29	–	**51132-MP**	**–**
	225	51	240 000	770 000	24 700	3,2	1 900	2 350	6,53	–	**51232-MP**	**–**
	225	54,7	240 000	770 000	24 700	3,2	1 900	2 350	6,45	1,8	**53232-MP**	**U232**
	270	87	445 000	1 560 000	47 000	13	1 230	2 280	21,2	–	**51332-MP**	**–**
	270	91,7	445 000	1 560 000	47 000	13	1 230	2 280	20,814	4	**53332-MP**	**U332**
170	215	34	127 000	510 000	16 200	1,4	2 330	2 010	3,02	–	**51134-MP**	**–**
	240	55	285 000	930 000	28 500	4,5	1 740	2 230	8,12	–	**51234-MP**	**–**
	240	58,7	285 000	930 000	28 500	4,5	1 740	2 230	7,91	2,14	**53234-MP**	**U234**
	280	87	440 000	1 560 000	46 000	13	1 220	2 170	22,2	–	**51334-MP**	**–**
	280	91,3	440 000	1 560 000	46 000	13	1 220	2 170	21,584	4,42	**53334-MP**	**U334**
180	225	34	127 000	520 000	16 300	1,5	2 250	1 910	3,06	–	**51136-MP**	**–**
	250	56	305 000	1 030 000	31 500	5,4	1 670	2 080	8,56	–	**51236-MP**	**–**
	250	58,2	305 000	1 030 000	31 500	5,4	1 670	2 080	8,19	2,33	**53236-MP**	**U236**
	300	95	520 000	1 830 000	52 000	18	1 130	2 000	24,8	–	**51336-MP**	**–**
	300	99,3	520 000	1 830 000	52 000	18	1 130	2 000	24,065	5,32	**53336-MP**	**U336**

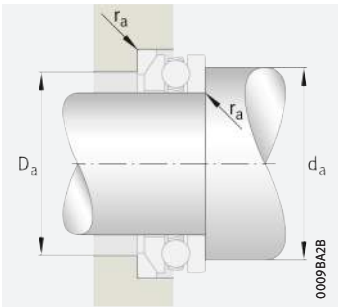
medias ➤ *https://www.schaeffler.de/std/1E17*



532, 533
Spherical housing locating washer
Support washer U2, U3



Mounting dimensions

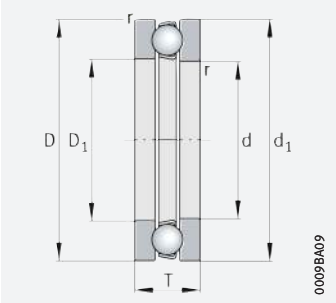


Mounting dimensions

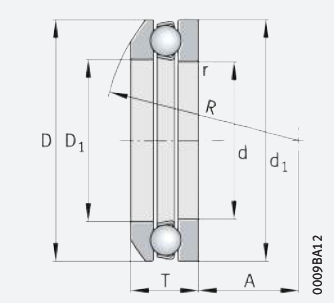
Dimensions										Mounting dimensions		
d	D_1	d_1	r min.	R	A	D_2	D_3	C	T_1	d_a min.	D_a max.	r_a max.
130	132	170	1	–	–	–	–	–	–	154	146	1
	133	187	1,5	–	–	–	–	–	–	166	154	1,5
	133	187	1,5	140	67	160	195	17	53	166	160	1,5
	134	220	2,1	–	–	–	–	–	–	187	168	2,1
	134	265	4	–	–	–	–	–	–	214	186	3
140	142	178	1	–	–	–	–	–	–	164	156	1
	143	197	1,5	–	–	–	–	–	–	176	164	1,5
	143	197	1,5	160	87	170	210	17	55	176	170	1,5
	144	235	2,1	–	–	–	–	–	–	200	180	2,1
	144	235	2,1	180	68	190	250	26	92	200	190	2,1
150	152	188	1	–	–	–	–	–	–	174	166	1
	153	212	1,5	–	–	–	–	–	–	189	176	1,5
	153	212	1,5	160	79	180	225	20,5	60	189	180	1,5
	154	245	2,1	–	–	–	–	–	–	210	190	2,1
	154	245	2,1	200	89,5	200	260	26	92	210	200	2,1
160	162	198	1	–	–	–	–	–	–	184	176	1
	163	222	1,5	–	–	–	–	–	–	199	186	1,5
	163	222	1,5	160	74	190	235	21	61	199	190	1,5
	164	265	3	–	–	–	–	–	–	226	204	2,5
	164	265	3	200	77	215	280	29	100	226	215	2,5
170	172	213	1,1	–	–	–	–	–	–	197	188	1
	173	237	1,5	–	–	–	–	–	–	212	198	1,5
	173	237	1,5	180	91	200	250	21,5	65	212	200	1,5
	174	275	3	–	–	–	–	–	–	236	214	2,5
	174	275	3	225	105	220	290	29	100	236	220	2,5
180	183	222	1,1	–	–	–	–	–	–	207	198	1
	183	245	1,5	–	–	–	–	–	–	222	208	1,5
	183	245	1,5	200	112	210	260	21,5	66	222	210	1,5
	184	295	3	–	–	–	–	–	–	252	228	2,5
	184	295	3	225	91	240	310	32	109	252	240	2,5

Axial deep groove ball bearings

Single direction



511, 512, 513

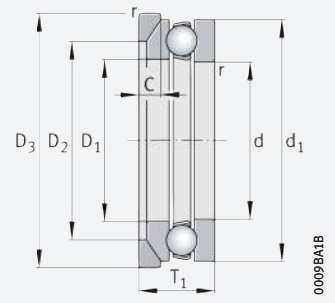


532, 533
Spherical housing locating washer

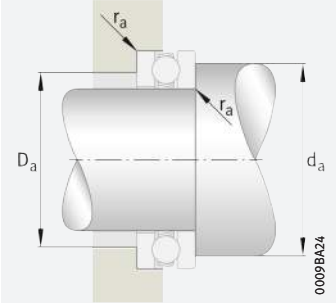
d = 190 – 260 mm

Main dimensions			Basic load ratings		Fatigue limit load	Minimum load factor	Limiting speed	Speed rating	Mass m		Designation ➤1048|1.12 ➤1048|1.13	
d	D	T	dyn. C_a	stat. C_{0a}	C_{ua}	A	n_G	$n_{\vartheta r}$	Bearing	Support washer	Bearing	Support washer
			N	N	N		min^{-1}	min^{-1}	≈ kg	≈ kg		
190	240	37	161 000	650 000	19 700	2,3	2 040	1 850	4,06	–	**51138-MP**	**–**
	270	62	335 000	1 170 000	34 500	7,2	1 540	2 010	11,6	–	**51238-MP**	**–**
	270	65,7	335 000	1 170 000	34 500	7,2	1 540	2 010	11,5	2,63	**53238-MP**	**U238**
	320	105	590 000	2 170 000	61 000	24	1 040	1 840	36,736	–	**51338-MP**	**–**
	320	111	590 000	2 170 000	61 000	24	1 040	1 840	36,479	6,16	**53338-MP**	**U338**
200	250	37	162 000	670 000	19 800	2,5	1 980	1 760	4,12	–	**51140-MP**	**–**
	280	62	340 000	1 220 000	35 000	7,8	1 510	1 890	12	–	**51240-MP**	**–**
	280	65,3	340 000	1 220 000	35 000	7,8	1 510	1 890	11,819	2,79	**53240-MP**	**U240**
220	270	37	168 000	730 000	20 700	3	1 870	1 600	4,54	–	**51144-MP**	**–**
	300	63	335 000	1 330 000	36 500	9,6	1 420	1 690	13,1	–	**51244-MP**	**–**
	300	65,6	335 000	1 330 000	36 500	9,6	1 420	1 690	13,114	3,31	**53244-MP**	**U244**
240	300	45	237 000	990 000	27 000	5,2	1 640	1 540	7,41	–	**51148-MP**	**–**
260	320	45	245 000	1 070 000	28 000	6,1	1 560	1 390	7,89	–	**51152-MP**	**–**

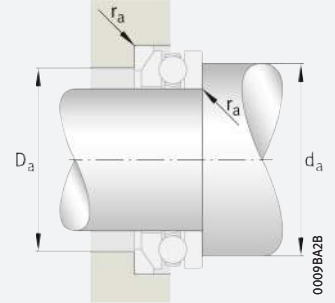
medias ➤ *https://www.schaeffler.de/std/1E18*



532, 533
Spherical housing locating washer
Support washer U2, U3



Mounting dimensions

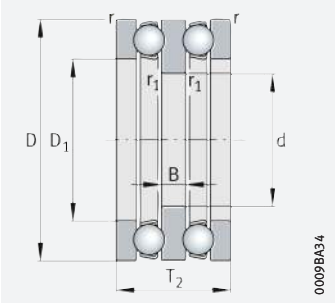


Mounting dimensions

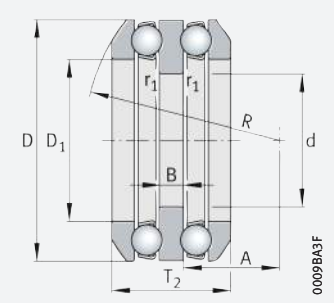
Dimensions										Mounting dimensions		
d	D_1	d_1	r min.	R	A	D_2	D_3	C	T_1	d_a min.	D_a max.	r_a max.
190	193	237	1,1	–	–	–	–	–	–	220	210	1
	194	265	2	–	–	–	–	–	–	238	222	2
	195	265	2	200	98	230	280	23	73	238	230	2
	195	315	4	–	–	–	–	–	–	268	242	3
	195	315	4	250	104	255	330	33	121	268	255	3
200	203	247	1,1	–	–	–	–	–	–	230	220	1
	204	275	2	–	–	–	–	–	–	248	232	2
	204	275	2	225	125	240	290	23	74	248	240	2
220	223	267	1,1	–	–	–	–	–	–	250	240	1
	224	295	2	–	–	–	–	–	–	268	252	2
	224	295	2	225	118	260	310	25	75	268	260	2
240	243	297	1,5	–	–	–	–	–	–	276	264	1,5
260	263	317	1,5	–	–	–	–	–	–	296	284	1,5

Axial deep groove ball bearings

Double direction



522, 523

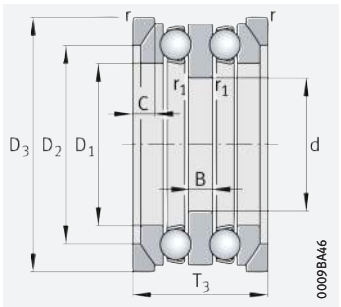


542, 543
Spherical housing locating washers

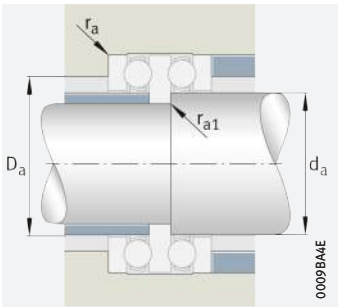
d = 10 – 40 mm

Main dimensions			Basic load ratings		Fatigue limit load	Minimum load factor	Limiting speed	Speed rating	Mass m		Designation ➤1048|1.12 ➤1048|1.13	
d	D	T_2	dyn. C_a	stat. C_{0a}	C_{ua}	A	n_G	$n_{\vartheta r}$	Bearing	Support washer	Bearing	Support washer
			N	N	N		min^{-1}	min^{-1}	≈ kg	≈ kg		
10	32	22	16 600	24 800	1 100	0,003	9 800	13 700	0,085	–	**52202**	**–**
15	40	26	21 100	37 500	1 660	0,007	8 500	11 100	0,15	–	**52204**	**–**
20	47	28	26 500	50 000	2 220	0,013	7 500	9 400	0,23	–	**52205**	**–**
	47	31,4	26 500	50 000	2 220	0,013	7 500	9 400	0,221	0,031	**54205**	**U205**
	52	34	34 500	55 000	2 450	0,019	6 000	9 700	0,29	–	**52305**	**–**
	52	37,6	34 500	55 000	2 450	0,019	6 000	9 700	0,303	0,043	**54305**	**U305**
	70	52	70 000	112 000	5 000	0,077	3 850	8 700	0,912	–	**52406**	**–**
25	52	29	23 900	46 000	2 040	0,014	7 300	8 200	0,249	–	**52206**	**–**
	52	32,6	23 900	46 000	2 040	0,014	7 300	8 200	0,269	0,032	**54206**	**U206**
	60	38	35 500	65 000	2 850	0,028	5 700	8 600	0,435	–	**52306**	**–**
	60	41,2	35 500	65 000	2 850	0,028	5 700	8 600	0,553	0,055	**54306**	**U306**
	80	59	76 000	126 000	5 600	0,11	3 600	8 000	1,44	–	**52407**	**–**
30	62	34	35 500	67 000	3 000	0,028	6 000	7 500	0,405	–	**52207**	**–**
	62	37,8	35 500	67 000	3 000	0,028	6 000	7 500	0,423	0,082	**54207**	**U207**
	68	36	44 000	97 000	4 300	0,05	5 500	6 900	0,54	–	**52208**	**–**
	68	44	50 000	89 000	3 900	0,05	4 850	7 600	0,63	–	**52307**	**–**
	68	38,6	44 000	97 000	4 300	0,05	5 500	6 900	0,513	0,07	**54208**	**U208**
	68	47,2	50 000	89 000	3 900	0,05	4 850	7 600	0,683	0,082	**54307**	**U307**
	78	49	61 000	112 000	5 000	0,081	4 250	7 200	1,02	–	**52308**	**–**
	78	54	61 000	112 000	5 000	0,081	4 250	7 200	1,1	0,114	**54308**	**U308**
	90	65	96 000	170 000	7 500	0,18	3 250	7 100	2,03	–	**52408**	**–**
35	73	37	39 000	80 000	3 550	0,043	5 500	6 500	0,58	–	**52209**	**–**
	73	39,6	39 000	80 000	3 550	0,043	5 500	6 500	0,537	0,087	**54209**	**U209**
	85	52	75 000	140 000	6 300	0,12	3 800	6 500	1,236	–	**52309**	**–**
	85	56,2	75 000	140 000	6 300	0,12	3 800	6 500	1,28	0,171	**54309**	**U309**
	100	72	123 000	222 000	9 800	0,29	2 850	6 500	2,71	–	**52409**	**–**
40	78	39	50 000	106 000	4 700	0,069	4 950	5 800	0,684	–	**52210**	**–**
	78	42	50 000	106 000	4 700	0,069	4 950	5 800	0,625	0,098	**54210**	**U210**
	95	58	82 000	169 000	7 500	0,18	3 550	6 100	1,76	–	**52310**	**–**
	95	64,6	82 000	169 000	7 500	0,18	3 550	6 100	1,84	0,22	**54310**	**U310**
	110	78	138 000	255 000	11 400	0,4	2 650	6 000	3,56	–	**52410**	**–**

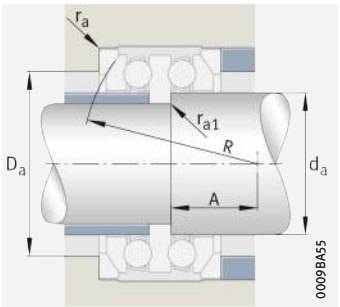
medias ➤ *https://www.schaeffler.de/std/1E19*



542, 543
Spherical housing locating washers
Support washers U2, U3



Mounting dimensions

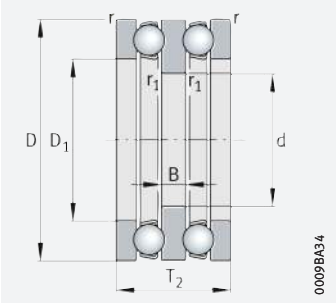


Mounting dimensions

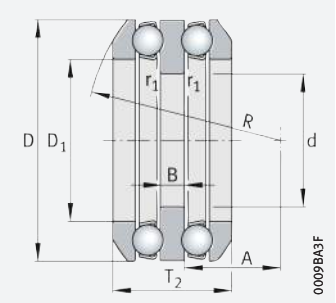
Dimensions											Mounting dimensions			
d	D_1	B	r min.	r_1 min.	R	A	D_2	D_3	C	T_3	d_a	D_a max.	r_a max.	r_{a1} max.
10	17	5	0,6	0,3	–	–	–	–	–	–	15	22	0,6	0,3
15	22	6	0,6	0,3	–	–	–	–	–	–	20	28	0,6	0,3
20	27	7	0,6	0,3	–	–	–	–	–	–	25	34	0,6	0,3
	27	7	0,6	0,3	40	16,5	36	50	5,5	36	25	36	0,6	0,3
	27	8	1	0,3	–	–	–	–	–	–	25	36	1	0,3
	27	8	1	0,3	45	18	42	55	6	38	25	38	1	0,3
	32	12	1	0,6	–	–	–	–	–	–	30	46	1	0,6
25	32	7	0,6	0,3	–	–	–	–	–	–	30	39	0,6	0,3
	32	7	0,6	0,3	45	20	37	55	5,5	42	30	42	0,6	0,3
	32	9	1	0,3	–	–	–	–	–	–	30	42	1	0,3
	32	9	1	0,3	50	19,5	46	62	7	45	30	45	1	0,3
	37	14	1,1	0,6	–	–	–	–	–	–	35	53	1	0,6
30	37	8	1	0,3	–	–	–	–	–	–	35	46	1	0,3
	37	8	1	0,3	50	21	42	72	7,5	52	35	48	1	0,3
	42	9	1	0,6	–	–	–	–	–	–	40	51	1	0,6
	37	10	1	0,3	–	–	–	–	–	–	35	48	1	0,3
	42	9	1	0,6	56	25	44	72	7	55	40	55	1	0,6
	37	10	1	0,3	56	21	52	72	7,5	52	35	52	1	0,3
	42	12	1	0,6	–	–	–	–	–	–	40	55	1	0,6
	42	12	1	0,6	64	23,5	59	82	8,5	60	40	60	1	0,6
	42	15	1,1	0,6	–	–	–	–	–	–	40	60	1	0,6
35	47	9	1	0,6	–	–	–	–	–	–	45	56	1	0,6
	47	9	1	0,6	56	23	45	78	7,5	60	45	60	1	0,6
	47	12	1	0,6	–	–	–	–	–	–	45	61	1	0,6
	47	12	1	0,6	64	21	62	90	10	65	45	65	1	0,6
	47	17	1,1	0,6	–	–	–	–	–	–	45	67	1	0,6
40	52	9	1	0,6	–	–	–	–	–	–	50	61	1	0,6
	52	9	1	0,6	64	30,5	47	82	7,5	62	50	62	1	0,6
	52	14	1,1	0,6	–	–	–	–	–	–	50	68	1	0,6
	52	14	1,1	0,6	72	23	70	100	11	72	50	72	1	0,6
	52	18	1,5	0,6	–	–	–	–	–	–	50	74	1,5	0,6

Axial deep groove ball bearings

Double direction



522, 523

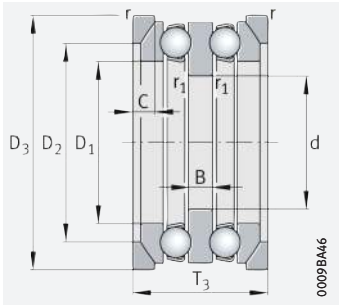


542, 543
Spherical housing locating washers

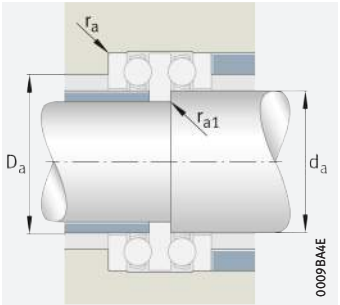
d = 45 – 70 mm

Main dimensions			Basic load ratings		Fatigue limit load	Minimum load factor	Limiting speed	Speed rating	Mass m		Designation ➤1048|1.12 ➤1048|1.13	
d	D	T_2	dyn. C_a	stat. C_{0a}	C_{ua}	A	n_G	$n_{\vartheta r}$	Bearing	Support washer	Bearing	Support washer
			N	N	N		min^{-1}	min^{-1}	≈ kg	≈ kg		
45	90	45	58 000	133 000	5 900	0,11	4 350	5 600	1,054	–	**52211**	**–**
	90	49,6	58 000	133 000	5 900	0,11	4 350	5 600	1,02	0,152	**54211**	**U211**
	105	64	102 000	207 000	9 200	0,26	3 200	5 700	2,37	–	**52311**	**–**
	105	72,6	102 000	207 000	9 200	0,26	3 200	5 700	2,53	0,27	**54311**	**U311**
	120	87	167 000	315 000	14 000	0,59	2 340	5 600	4,7	–	**52411**	**–**
50	95	46	62 000	139 000	6 200	0,12	4 200	5 200	1,1	–	**52212**	**–**
	95	50	62 000	139 000	6 200	0,12	4 200	5 200	1,17	0,163	**54212**	**U212**
	110	64	101 000	207 000	9 200	0,28	3 150	5 400	2,49	–	**52312**	**–**
	110	70,6	101 000	207 000	9 200	0,28	3 150	5 400	2,59	0,31	**54312**	**U312**
	115	70,6	101 000	207 000	9 200	0,28	3 150	5 800	2,98	0,34	**54313**	**U313**
55	100	47	64 000	149 000	6 600	0,14	4 100	4 800	1,281	–	**52213**	**–**
	100	50,4	64 000	149 000	6 600	0,14	4 100	4 800	1,53	0,183	**54213**	**U213**
	105	47	66 000	159 000	7 000	0,16	4 000	4 750	1,401	–	**52214**	**–**
	105	50,6	66 000	159 000	7 000	0,16	4 000	4 750	1,46	0,185	**54214**	**U214**
	115	65	105 000	220 000	9 700	0,32	3 050	5 000	2,68	–	**52313**	**–**
	125	72	134 000	290 000	12 900	0,51	2 750	4 800	3,55	–	**52314**	**–**
	125	80,4	134 000	290 000	12 900	0,51	2 750	4 800	3,77	0,4	**54314**	**U314**
60	110	47	67 000	169 000	7 500	0,18	3 950	4 450	1,45	–	**52215**	**–**
	110	49,6	67 000	169 000	7 500	0,18	3 950	4 450	1,87	0,21	**54215**	**U215**
	135	79	163 000	360 000	15 400	0,75	2 480	4 500	4,72	–	**52315**	**–**
	135	87,2	163 000	360 000	15 400	0,75	2 480	4 500	4,98	0,54	**54315**	**U315**
65	115	48	75 000	191 000	8 500	0,23	3 700	4 150	1,55	–	**52216**	**–**
	115	51	75 000	191 000	8 500	0,23	3 700	4 150	1,6	0,22	**54216**	**U216**
	140	79	160 000	360 000	15 100	0,79	2 460	4 350	4,82	–	**52316**	**–**
	140	86,2	160 000	360 000	15 100	0,79	2 460	4 350	5,22	0,56	**54316**	**U316**
70	125	55	98 000	250 000	10 900	0,37	3 250	3 950	2,23	–	**52217**	**–**
	125	59,2	98 000	250 000	10 900	0,37	3 250	3 950	2,25	0,29	**54217**	**U217**
	150	87	186 000	420 000	17 200	1,1	2 260	4 150	6,2	–	**52317**	**–**
	150	95,2	186 000	420 000	17 200	1,1	2 260	4 150	6,41	0,8	**54317**	**U317**

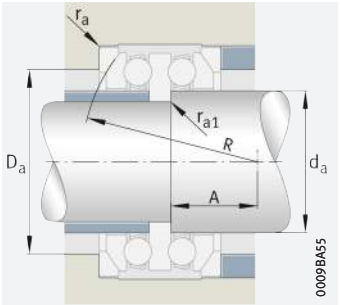
medias ➤ *https://www.schaeffler.de/std/1E1A*



542, 543
Spherical housing locating washers
Support washers U2, U3



Mounting dimensions

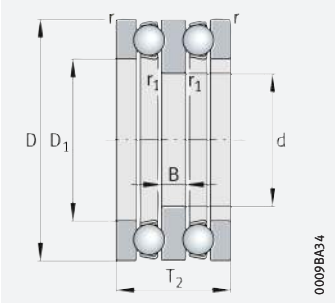


Mounting dimensions

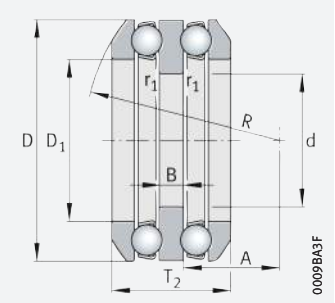
Dimensions											Mounting dimensions			
d	D_1	B	r min.	r_1 min.	R	A	D_2	D_3	C	T_3	d_a	D_a max.	r_a max.	r_{a1} max.
45	57	10	1	0,6	–	–	–	–	–	–	55	69	1	0,6
	57	10	1	0,6	72	32,5	55	95	9	72	55	72	1	0,6
	57	15	1,1	0,6	–	–	–	–	–	–	55	75	1	0,6
	57	15	1,1	0,6	80	25,5	78	110	11,5	80	55	80	1	0,6
	57	20	1,5	0,6	–	–	–	–	–	–	55	81	1,5	0,6
50	62	10	1	0,6	–	–	–	–	–	–	60	74	1	0,6
	62	10	1	0,6	72	30,5	56	100	9	78	60	78	1	0,6
	62	15	1,1	0,6	–	–	–	–	–	–	60	80	1	0,6
	62	15	1,1	0,6	90	36,5	78	115	11,5	85	60	85	1	0,6
	67	15	1,1	0,6	90	34,5	79	120	12,5	90	60	85	1	0,6
55	67	10	1	0,6	–	–	–	–	–	–	65	79	1	0,6
	67	10	1	0,6	80	38,5	57	105	9	82	65	82	1	0,6
	72	10	1	1	–	–	–	–	–	–	70	84	1	1
	72	10	1	1	80	36,5	57	110	9	88	70	88	1	1
	67	15	1,1	0,6	–	–	–	–	–	–	65	85	1	0,6
	72	16	1,1	1	–	–	–	–	–	–	70	92	1	1
	72	16	1,1	1	100	39	88	130	13	98	70	98	1	1
60	77	10	1	1	–	–	–	–	–	–	75	89	1	1
	77	10	1	1	90	47,5	57	115	9,5	92	75	92	1	1
	77	18	1,5	1	–	–	–	–	–	–	75	99	1,5	1
	77	18	1,5	1	100	32,5	95	140	15	105	75	105	1,5	1
65	82	10	1	1	–	–	–	–	–	–	80	94	1	1
	82	10	1	1	90	45	58	120	10	98	80	98	1	1
	82	18	1,5	1	–	–	–	–	–	–	80	104	1,5	1
	82	18	1,5	1	112	45,5	95	145	15	110	80	110	1,5	1
70	88	12	1	1	–	–	–	–	–	–	85	101	1	1
	88	12	1	1	100	49,5	67	130	11	105	85	105	1	1
	88	19	1,5	1	–	–	–	–	–	–	85	111	1,5	1
	88	19	1,5	1	112	39	105	155	17,5	115	85	115	1,5	1

Axial deep groove ball bearings

Double direction



522, 523

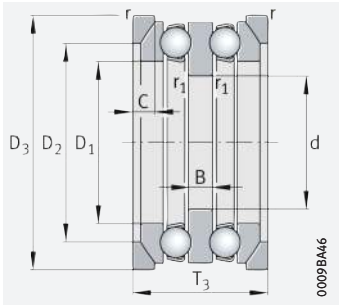


542, 543
Spherical housing locating washers

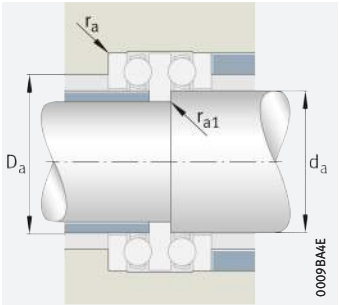
d = 75 – 130 mm

Main dimensions			Basic load ratings		Fatigue limit load	Minimum load factor	Limiting speed	Speed rating	Mass m		Designation ➤1048|1.12 ➤1048|1.13	
d	D	T_2	dyn. C_a N	stat. C_{0a} N	C_{ua} N	A	n_G min^{-1}	$n_{\vartheta r}$ min^{-1}	Bearing ≈ kg	Support washer ≈ kg	Bearing	Support washer
75	135	62	119 000	300 000	12 600	0,54	2 900	3 800	3,05	–	**52218**	**–**
	135	69	119 000	300 000	12 600	0,54	2 900	3 800	3,11	0,42	**54218**	**U218**
	155	88	193 000	455 000	18 300	1,2	2 240	3 900	6,62	–	**52318**	**–**
	155	97,2	193 000	455 000	18 300	1,2	2 240	3 900	6,76	0,82	**54318**	**U318**
85	150	67	119 000	325 000	12 900	0,68	2 700	3 550	3,945	–	**52220**	**–**
	150	72,8	119 000	325 000	12 900	0,68	2 700	3 550	3,87	0,5	**54220**	**U220**
	170	97	238 000	580 000	22 600	1,9	1 970	3 550	8,71	–	**52320**	**–**
	170	105,4	238 000	580 000	22 600	1,9	1 970	3 550	8,93	0,93	**54320**	**U320**
95	160	67	126 000	365 000	14 000	0,83	2 650	3 250	4,06	–	**52222**	**–**
	160	71,4	126 000	365 000	14 000	0,83	2 650	3 250	4,55	0,56	**54222**	**U222**
	190	110	280 000	740 000	27 000	3	1 790	3 300	14	–	**52322-MP**	**–**
	190	118,4	280 000	740 000	27 000	3	1 790	3 300	13,7	1,26	**54322-MP**	**U322**
100	170	68	128 000	385 000	14 200	0,94	2 550	3 100	4,82	–	**52224**	**–**
	170	71,6	128 000	385 000	14 200	0,94	2 550	3 100	4,658	0,65	**54224**	**U224**
	210	123	325 000	910 000	31 500	4,4	1 610	3 100	19,3	–	**52324-MP**	**–**
	210	131,2	325 000	910 000	31 500	4,4	1 610	3 100	18,8	2,01	**54324-MP**	**U324**
110	190	80	184 000	540 000	18 900	1,7	2 210	2 950	7,26	–	**52226**	**–**
	190	85,8	184 000	540 000	18 900	1,7	2 210	2 950	7,51	0,9	**54226**	**U226**
120	200	81	191 000	570 000	19 200	1,9	2 110	2 750	7,9	–	**52228**	**–**
	200	86,2	191 000	570 000	19 200	1,9	2 110	2 750	16,91	1,22	**54228**	**U228**
	240	140	385 000	1 240 000	40 000	8,2	1 360	2 550	28,3	–	**52328-MP**	**–**
130	215	89	236 000	730 000	24 200	2,9	1 950	2 550	11,46	–	**52230-MP**	**–**
	215	95,6	236 000	730 000	24 200	2,9	1 950	2 550	10,41	1,69	**54230-MP**	**U230**
	250	140	395 000	1 330 000	41 500	9,3	1 340	2 360	29,4	–	**52330-MP**	**–**

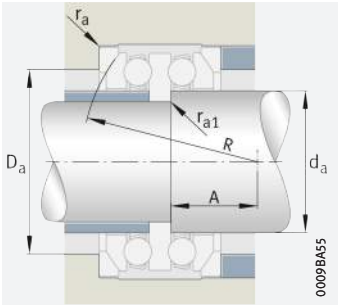
medias ➤ *https://www.schaeffler.de/std/1E1B*



542, 543
Spherical housing locating washers
Support washers U2, U3



Mounting dimensions

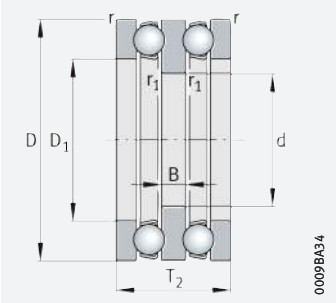


Mounting dimensions

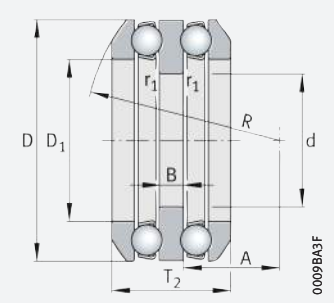
Dimensions											Mounting dimensions			
d	D_1	B	r min.	r_1 min.	R	A	D_2	D_3	C	T_3	d_a	D_a max.	r_a max.	r_{a1} max.
75	93	14	1,1	1	–	–	–	–	–	–	90	108	1	1
	93	14	1,1	1	100	42	76	140	13,5	110	90	110	1	1
	93	19	1,5	1	–	–	–	–	–	–	90	116	1,5	1
	93	19	1,5	1	112	36,5	106	160	18	120	90	120	1,5	1
85	103	15	1,1	1	–	–	–	–	–	–	100	120	1	1
	103	15	1,1	1	112	49	81	155	14	125	100	125	1	1
	103	21	1,5	1	–	–	–	–	–	–	100	128	1,5	1
	103	21	1,5	1	125	42	115	175	18	135	100	135	1,5	1
95	113	15	1,1	1	–	–	–	–	–	–	110	130	1	1
	113	15	1,1	1	125	62	81	165	14	135	110	135	1	1
	113	24	2	1	–	–	–	–	–	–	110	142	2	1
	113	24	2	1	140	47	128	195	20,5	150	110	150	2	1
100	123	15	1,1	1,1	–	–	–	–	–	–	120	140	1	1
	123	15	1,1	1,1	125	58,5	82	175	15	145	120	145	1	1
	123	27	2,1	1,1	–	–	–	–	–	–	120	156	2,1	1
	123	27	2,1	1,1	160	58	143	220	22	165	120	165	2,1	1
110	133	18	1,5	1,1	–	–	–	–	–	–	130	154	1,5	1
	133	18	1,5	1,1	140	63	96	195	17	160	130	160	1,5	1
120	143	18	1,5	1,1	–	–	–	–	–	–	140	164	1,5	1
	143	18	1,5	1,1	160	83,5	99	210	17	170	140	170	1,5	1
	144	31	2,1	1,1	–	–	–	–	–	–	140	180	2,1	1
130	153	20	1,5	1,1	–	–	–	–	–	–	150	176	1,5	1
	153	20	1,5	1,1	160	74,5	109	225	20,5	180	150	180	1,5	1
	154	31	2,1	1,1	–	–	–	–	–	–	150	190	2,1	1

Axial deep groove ball bearings

Double direction



522, 523

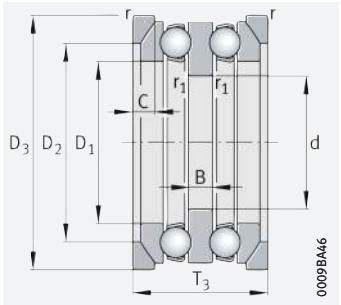


542
Spherical housing locating washers

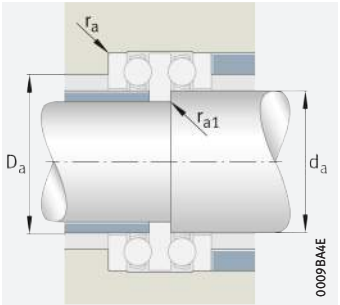
d = 140 – 190 mm

Main dimensions			Basic load ratings		Fatigue limit load	Minimum load factor	Limiting speed	Speed rating	Mass m		Designation ➤1048|1.12 ➤1048|1.13	
d	D	T_2	dyn. C_a	stat. C_{0a}	C_{ua}	A	n_G	$n_{\vartheta r}$	Bearing	Support washer	Bearing	Support washer
			N	N	N		min^{-1}	min^{-1}	≈ kg	≈ kg		
140	225	90	240 000	770 000	24 700	3,2	1 900	2 400	12,2	–	**52232-MP**	**–**
	225	97,4	240 000	770 000	24 700	3,2	1 900	2 400	11,19	1,8	**54232-MP**	**U232**
	270	153	445 000	1 560 000	47 000	13	1 230	2 160	38,2	–	**52332-MP**	**–**
150	240	97	285 000	930 000	28 500	4,5	1 740	2 210	14	–	**52234-MP**	**–**
	240	104,4	285 000	930 000	28 500	4,5	1 740	2 210	13,59	2,14	**54234-MP**	**U234**
	250	98	305 000	1 030 000	31 500	5,4	1 670	2 120	16,2	–	**52236-MP**	**–**
	250	102,4	305 000	1 030 000	31 500	5,4	1 670	2 120	15,53	2,33	**54236-MP**	**U236**
	280	153	440 000	1 560 000	46 000	13	1 220	2 060	39,9	–	**52334-MP**	**–**
160	270	109	335 000	1 170 000	34 500	7,2	1 540	1 990	21,9	–	**52238-MP**	**–**
	270	116,4	335 000	1 170 000	34 500	7,2	1 540	1 990	20	2,63	**54238-MP**	**U238**
	320	183	590 000	2 170 000	61 000	24	1 040	1 770	66,4	–	**52338-MP**	**–**
170	280	109	340 000	1 220 000	35 000	7,8	1 510	1 880	23,2	–	**52240-MP**	**–**
	280	115,6	340 000	1 220 000	35 000	7,8	1 510	1 880	20,97	2,79	**54240-MP**	**U240**
190	300	110	335 000	1 330 000	36 500	9,6	1 420	1 680	25,2	–	**52244-MP**	**–**
	300	115,2	335 000	1 330 000	36 500	9,6	1 420	1 680	23	3,31	**54244-MP**	**U244**

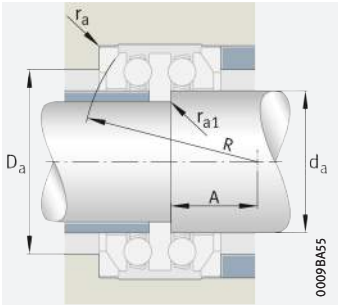
medias ➤ *https://www.schaeffler.de/std/1E1C*



542
Spherical housing locating washers
Support washers U2



Mounting dimensions



Mounting dimensions

Dimensions											Mounting dimensions			
d	D_1	B	r min.	r_1 min.	R	A	D_2	D_3	C	T_3	d_a	D_a max.	r_a max.	r_{a1} max.
140	163	20	1,5	1,1	–	–	–	–	–	–	160	186	1,5	1
	163	20	1,5	1,1	160	70	110	235	21	190	160	190	1,5	1
	164	33	3	1,1	–	–	–	–	–	–	160	204	2,5	1
150	173	21	1,5	1,1	–	–	–	–	–	–	170	198	1,5	1
	173	21	1,5	1,1	180	87	117	250	21,5	200	170	200	1,5	1
	183	21	1,5	2	–	–	–	–	–	–	180	208	1,5	1
	183	21	1,5	2	200	108,5	118	260	21,5	210	180	210	1,5	1
	174	33	3	1,1	–	–	–	–	–	–	170	214	2,5	1
160	194	24	2	2	–	–	–	–	–	–	190	222	2	2
	194,7	24	2	2	200	93,5	131	280	23	230	190	230	2	2
	195	40	4	2	–	–	–	–	–	–	190	242	3	2
170	204	24	2	2	–	–	–	–	–	–	200	232	2	2
	204	24	2	2	225	120,5	133	290	23	240	200	240	2	2
190	224	24	2	2	–	–	–	–	–	–	220	252	2	2
	224	24	2	2	225	114	134	310	25	260	220	260	2	2

Axial cylindrical roller bearings

Matrix for bearing preselection

The matrix gives an overview of the types and design features of axial cylindrical roller bearings.

It can be used to make a preliminary assessment of whether a bearing is fundamentally suitable for the envisaged application.

The additional information provided in the product chapter (see column "detailed information") and in the Technical principles must, however, be observed in addition to this overview in selection of the bearing.

Design features and suitability			Axial cylindrical roller bearings	
+++ extremely suitable ++ highly suitable + suitable (+) suitable with restrictions – not suitable/not applicable ✓ available				detailed information ➤ 1076
Load carrying capacity	radial		–	➤ 1079|1.2
	axial, one direction		++	➤ 1079|1.2
	axial, both directions		–	➤ 1079|1.2
	moments		–	
Compensation of angular misalignments	static		–	➤ 1079|1.3
	dynamic		–	➤ 1079|1.3
Bearing design	cylindrical bore		✓	➤ 1076|1.1
	tapered bore		–	
	separable		✓	➤ 1085|1.17
Lubrication	greased		–	➤ 1079|1.4
Sealing	open		✓	➤ 1079|1.5
	non-contact		–	1079
	contact		–	➤ 1079|1.5
Operating temperature in °C		from to	–20 +120	➤ 1080|1.8
Suitability for	high speeds		(+)	➤ 1080|1.6
	high running accuracy		++	➤ 1082|1.11 ➤ 114
	low-noise running		(+)	➤ 1080|1.7 ➤ 27
	high rigidity		++	➤ 54
	reduced friction		(+)	➤ 56
	length compensation within bearing		–	
	non-locating bearing arrangement		–	
	locating bearing arrangement		++	➤ 139
X-life bearings			–	
Bearing bore d in mm		from to	15 320[1]	➤ 1088
Product tables		from page ➤		1088

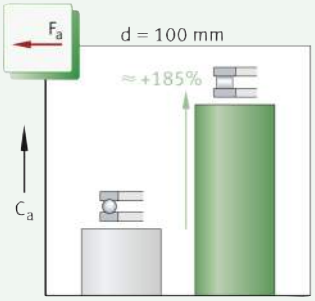
[1] Larger catalogue bearings ➤ 🕮 GL 1

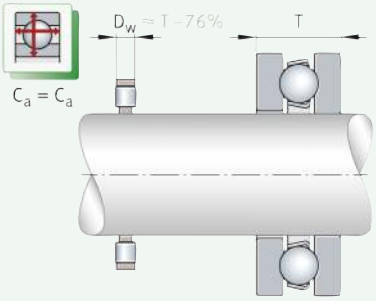
1 Axial cylindrical roller bearings

Single and double row axial cylindrical roller bearings are particularly suitable where:

- high axial and shock loads occur in one direction but no radial loads are present ➤*1076*|*1* and ➤*1079*|*1.2*
- the load carrying capacity of the corresponding axial deep groove ball bearings is no longer adequate (in this case, bearings of series 811 and 812 are especially suitable) ➤*1076*|*1*
- the bearing arrangement must have very high axial rigidity
- the axial space available is very small ➤*1076*|*1* and ➤*1088*|
- the bearing arrangement can be configured, where the axial space is very small, as a direct bearing arrangement ➤*1076*|*1.1*
- the bearing parts can or must be mounted separately
- the bearing arrangement is not configured in itself but, for cost reasons, ready-to-fit standard bearings are to be used.

For an overview of other product-specific features, see the Matrix for bearing preselection ➤*1075*.





1
Axial cylindrical roller bearing and axial ball bearing – comparison of load carrying capacity and design envelope

F_a = *axial load*
C_a = *basic dynamic load rating*
D_w = *roller diameter*
T = *axial section height of axial deep groove ball bearing*

1.1 Bearing design

✎ *Design variants*

Axial cylindrical roller bearings are available as:

- single and double row bearings
- individual bearing parts for combination, comprising
  - axial cylindrical roller and cage assembly (prefix K)
  - housing locating washer (prefix GS)
  - shaft locating washer (prefix WS)
  - bearing washers (prefix LS, alternatively for shaft and housing locating washer).

Larger catalogue bearings and other bearing designs ➤ 🕮 *GL 1*.

Axial cylindrical roller bearings

Designed for bearing arrangements with very small axial space

Axial cylindrical roller bearings are part of the group of axial roller bearings. In contrast to the ball, the roller has a larger contact area perpendicular to the roller axis. As a result, it can transmit higher forces, has greater rigidity and allows smaller rolling element diameters under the same load. The single and double row bearings comprise flat, ribless washers (housing and shaft locating washers) between which axial cylindrical roller and cage assemblies are arranged ➤*1077*| 2 and ➤*1078*| 5. Their axial section height T corresponds only to the diameter of the rollers plus the thickness of the washers. Due to this design, the bearings are particularly small in axial height ➤*1088*|. The axial cages are made from brass or plastic and are fitted with one or two rows of cylindrical rollers. Since sliding occurs towards the ends of the rollers during rolling of the rolling elements and this increases with the length of the roller, bearings with a wide cross-section have several short rollers arranged adjacent to each other, e.g. double row designs ➤*1077*| 2.

Rollers with profiled ends increase the operating life of the bearings

The cylindrical rollers have profiled ends, i.e. they have a slight lateral curvature towards the ends. This modified line contact between the rollers and raceways prevents damaging edge stresses ➤*1077*| 3. This in turn has a positive effect on the operating life of the bearings.

The use of complete axial cylindrical roller bearings (shaft locating washer, axial cylindrical roller and cage assembly and housing locating washer) is then advisable if, for example, high speeds occur and the bearing washers must therefore be centred precisely.

Roller and cage assembly and bearing washers are also available individually

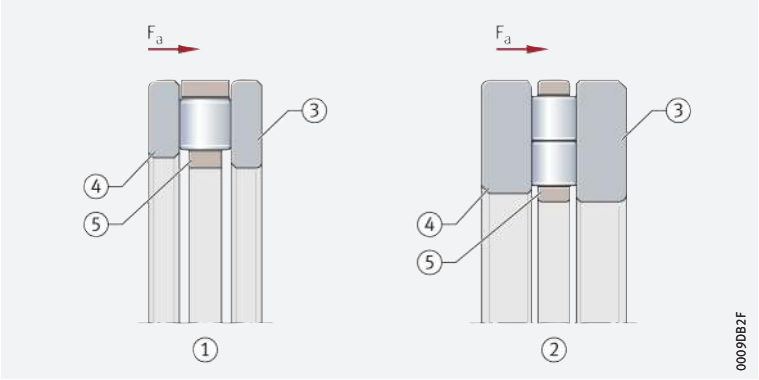
The bearing parts for axial cylindrical roller bearings are also available individually ➤*1078*| 4 and ➤*1078*| 5. Axial cylindrical roller and cage assemblies (without shaft and housing locating washers) are suitable, for example, for bearing arrangements with very small axial design space.

Cylindrical roller bearings 811 and 812 are of a single row design and correspond to DIN 722:2005 and ISO 104:2015. The bearings 893 and 894 are of a double row design and are configured in accordance with DIN 616:2000 and ISO 104:2015.

2 *Axial cylindrical roller bearings*

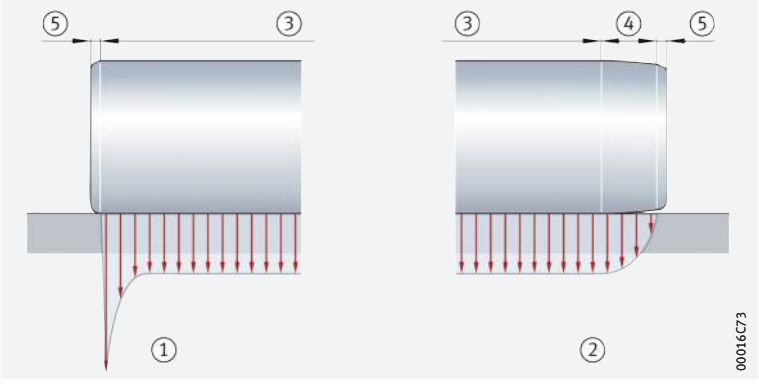
F_a = *axial load*

① *Single row bearing*
② *Double row bearing*
③ *Shaft locating washer*
④ *Housing locating washer*
⑤ *Axial cylindrical roller and cage assembly*



3 *Roller profile and stress distribution*

① *Cylindrical roller profile (high stress peaks)*
② *Roller with profiled ends (no stress peak)*
③ *Cylindrical outside surface region*
④ *Region of logarithmic tapering*
⑤ *Rounding of edge*



Axial cylindrical roller and cage assemblies

Very high axial load carrying capacity with low section height

The cage assemblies comprise axial cages and one or two rows of cylindrical rollers ➤*1078*|*4*. They have a particularly small axial section height and high axial load carrying capacity. The cages are made from polyamide or brass and are guided on the shaft.

For direct bearing arrangements, running surfaces must be produced as a rolling bearing raceway

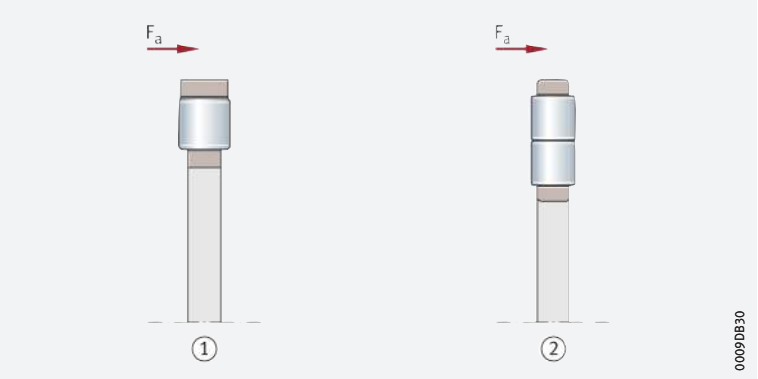
Axial cylindrical roller and cage assemblies are generally combined with one housing locating washer and one shaft locating washer. If they are to be used directly – i. e. without axial bearing washers – in the adjacent construction, the raceway for the rollers must be produced as a rolling bearing raceway ➤*1084*|*1.16*. It is also possible to use two shaft locating washers or two housing locating washers in combination with one axial cylindrical roller and cage assembly.

The diameter series 1, 2, 3, 4 of the axial cylindrical roller and cage assemblies correspond to DIN 616:2000 and ISO 104:2015.

4
Axial cylindrical roller and cage assemblies

F_a = *axial load*

① *Single row*
② *Double row*



Axial bearing washers

Housing and shaft locating washers

Housing locating washers are externally centred, shaft locating washers are internally centred ➤*1078*|*5* and ➤*1084*|*1.16*. They must be used if the adjacent construction cannot be used as a raceway for the rolling elements. The washers are made from through hardening rolling bearing steel. The bore and outside diameter are precision machined, the raceways are ground to high accuracy.

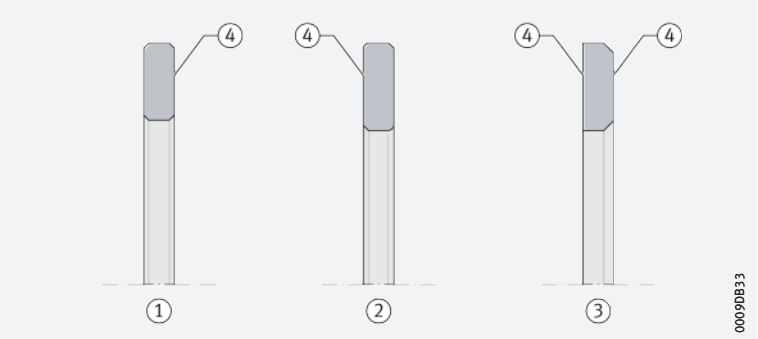
The diameter series 1, 2, 3, 4 of the axial bearing washers correspond to DIN 616:2000 and ISO 104:2015.

Bearing washers

Bearing washers are suitable for use as a housing or shaft locating washer. They are used in applications that do not require precise centring of the axial bearing washers. The raceway of the bearing washers is hardened and ground. The bearing washers are suitable for axial cylindrical roller and cage assemblies K811 and axial needle roller and cage assemblies AXK.

5
Axial bearing washers

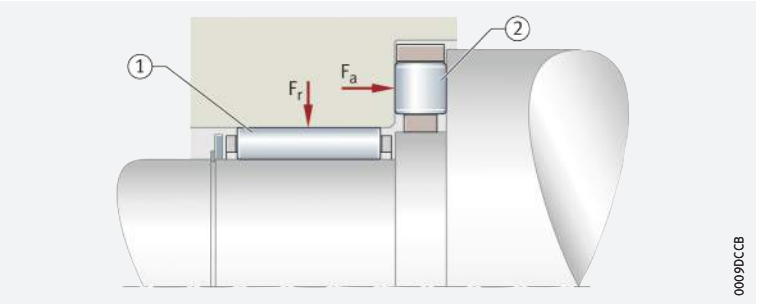
① *Housing locating washer, externally centred*
② *Shaft locating washer, internally centred*
③ *Bearing washer*
④ *Raceway*



1.2 Load carrying capacity

For very high axial loads acting in one direction

Single and double row axial cylindrical roller bearings can support high axial loads as well as axial shock loads in one direction, but must not be subjected to radial load ➤*1083*|*1.14*. If radial loads do occur, these forces must be supported by an additional bearing (e.g. by a needle roller and cage assembly) ➤*1079*|🗀*6*.



🗀**6**
Axial and radial loads

F_r = *radial load*
F_a = *axial load*

① *Needle roller and cage assembly as radial bearing (direct bearing arrangement)*

② *Axial cylindrical roller and cage assembly as axial bearing (direct bearing arrangement)*

1.3 Compensation of angular misalignments

The bearings do not permit any skewing between the shaft and the housing. If angular misalignments occur between the locating surfaces on the shaft and in the housing, this will cause damage to the bearing and considerably reduce its operating life.

1.4 Lubrication

Oil or grease lubrication is possible

Axial cylindrical roller bearings are not greased. The bearings must be lubricated with oil or grease.

Compatibility with plastic cages

When using bearings with plastic cages, compatibility between the lubricant and the cage material must be ensured if synthetic oils, lubricating greases with a synthetic oil base or lubricants containing a high proportion of EP additives are used.

If there is any uncertainty regarding the suitability of the selected lubricant for the application, please consult Schaeffler or the lubricant manufacturer.

Observe oil change intervals

Aged oil and additives in the oil can impair the operating life of plastics at high temperatures. As a result, stipulated oil change intervals must be strictly observed.

1.5 Sealing

Provide seals in the adjacent construction

The bearings are not sealed; i.e. sealing of the bearing position must be carried out in the adjacent construction. This must reliably prevent:

- moisture and contaminants from entering the bearing
- the egress of lubricant from the bearing position.

1.6 Speeds

Limiting speeds and reference speeds in the product tables

Two speeds are generally indicated in the product tables ➤*304*|▦:

- the kinematic limiting speed n_G
- the thermal speed rating $n_{\vartheta r}$.

Limiting speed

The limiting speed n_G is the kinematically permissible speed of a bearing. Even under favourable mounting and operating conditions, this value should not be exceeded without prior consultation with Schaeffler ➤*64*. The values in the product tables are valid for oil lubrication.

Values for grease lubrication

For grease lubrication, 25% of the value stated in the product tables is permissible in each case.

Reference speeds

$n_{\vartheta r}$ is used to calculate n_ϑ

The thermal speed rating $n_{\vartheta r}$ is not an application-oriented speed limit, but is a calculated ancillary value for determining the thermally safe operating speed n_ϑ ➤*64*.

1.7 Noise

Schaeffler Noise Index

The Schaeffler Noise Index (SGI) is not yet available for this bearing type ➤*69*. The data for these bearing series will be introduced and updated in stages.

Further information:

- ***medias*** ➤*https://medias.schaeffler.com*.

1.8 Temperature range

Limiting values

The operating temperature of the bearings is limited by:

- the dimensional stability of the bearing washers and cylindrical rollers
- the cage
- the lubricant.

Possible operating temperatures of axial cylindrical roller bearings ➤*1080*|▦ *1*.

▦ ***1***
Permissible temperature range

Operating temperature	Axial cylindrical roller bearings with brass or polyamide cage PA66
	–20 °C to +120 °C

In the event of anticipated temperatures which lie outside the stated values, please contact Schaeffler.

1.9 Cages

Solid cages made from brass and polyamide PA66 are used as standard

Standard cages ➤*1081*|▦ *2*. The cage design is dependent on the bearing series and the bearing size. Other cage designs are available by agreement. With such cages, however, suitability for high speeds and temperatures as well as the basic load ratings may differ from the values for the bearings with standard cages.

For high continuous temperatures and applications with difficult operating conditions, bearings with brass cages should be used. If there is any uncertainty regarding cage suitability, please consult Schaeffler.

▦ *2*
Cage, cage suffix, bore code

Bearing series	Solid cage made from polyamide PA66 TV standard	Solid brass cage M standard
	Bore code	
811, K811	up to 34	from 36
812, K812	06 to 26	from 28
893, K893	06 to 16	17 to 30
894, K894	12 to 14	from 15

1.10 Internal clearance

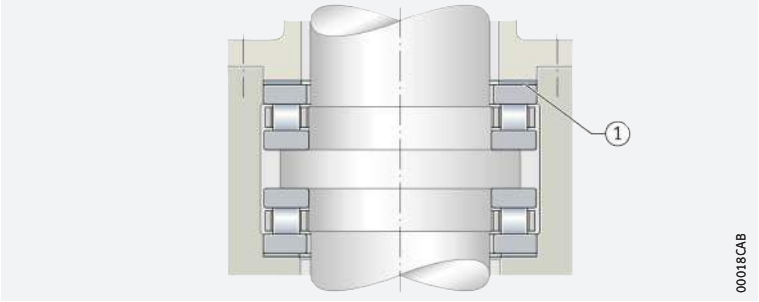
Axial clearance and preload are determined by the application

In the case of axial cylindrical roller bearings, the internal clearance (axial clearance) is only achieved when the bearings are mounted. The requisite axial clearance of the bearing arrangement is dependent on the application and must take account of the conditions in the bearing arrangement while warm from operation and subjected to load.
If axial cylindrical roller bearings are subjected to vibrations while under predominantly static load, for example, they must be lightly preloaded. Preload can be applied, for example, using calibrated sheets (shims) ➤*1081*|⧉ *7*. Other suitable means include shaft nuts, disc springs, etc. ➤*1084*|*1.15*. It must always be ensured that no slippage occurs in operation between the rolling elements and raceways ➤*1084*|*1.15*. It must also be ensured that the preload does not exceed the optimum value, otherwise there will be an increase in friction and therefore in heat generation in the bearing. These will both have a negative effect on the operating life of the bearings.

If there is any uncertainty regarding correct setting, please consult Schaeffler.

⧉ *7*
Setting the axial clearance by means of shims

① *Calibrated sheet (shim)*



1.11 Dimensions, tolerances

Dimension standards

The main dimensions of axial cylindrical roller bearings correspond to ISO 104:2015.

Chamfer dimensions

The limiting dimensions for chamfer dimensions correspond to DIN 620-6:2004. Overview and limiting values ➤ *138*. Nominal value of chamfer dimension ➤ *1088*.

Tolerances

The dimensional and running tolerances of axial bearing washers GS and WS correspond to the tolerance class Normal in accordance with ISO 199:2014 ➤ *133* | *25* to ➤ *135* | *28*.

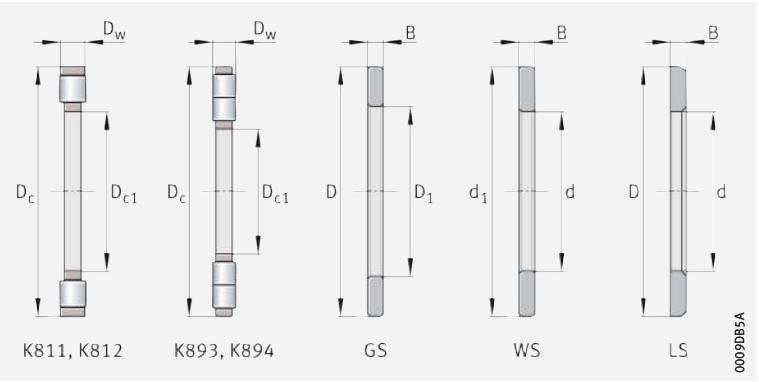
Tolerances of the bore and outside diameter as well as of the width of the bearing parts ➤ *1082* | *3* and ➤ *1082* | *8*.

3 *Dimensions and tolerances of bearing parts*

Bearing component	Dimension	Tolerance
Axial cylindrical roller and cage assembly K	D_{c1}	E11[1)]
	D_c	a13[1)]
	D_w	to DIN 5402-1
Housing locating washer GS	D_1	–
	D	to ISO 199
	B	h11
Shaft locating washer WS	d	to ISO 199
	d_1	–
	B	h11
Bearing washer LS	d	E12[1)]
	D	a12[1)]
	B	h11

1) *Deviation of the bore diameter Δ_{dmp} and deviation of the outside diameter Δ_{Dmp}* ➤ *138*.

8 *Bearing parts – axial cylindrical roller and cage assemblies and bearing washers*



1.12 Suffixes

For a description of the suffixes used in this chapter ➤ *1082* | *4* and ***medias*** interchange ➤ *https://www.schaeffler.de/std/1D52*.

4 *Suffixes and corresponding descriptions*

Suffix	Description of suffix	
M	Solid brass cage	Standard, dependent on bore code
TV	Solid cage made from glass fibre reinforced polyamide PA66	
P5	High dimensional, geometrical and running accuracy	Special design for axial bearing washers GS, WS; available by agreement

1.13 Structure of bearing designation

✎ *Examples of composition of bearing designation*

The designation of bearings follows a set model. Examples ➤*1083*|*9* and ➤*1083*|*10*. The composition of the designation is subject to DIN 623-1 ➤*102*|*10*.

9
Single row axial cylindrical roller bearing, comprising axial roller and cage assembly, shaft locating washer and housing locating washer: designation structure

10
Double row axial cylindrical roller bearing, comprising axial roller and cage assembly, shaft locating washer and housing locating washer: designation structure

1.14 Dimensioning

Equivalent dynamic bearing load

Axial cylindrical roller bearings can only support axial forces ➤*1079*|*1.2*. In the rating life equation, P is therefore substituted by the value for F_a ➤*1083*|*f1*.

f1
Equivalent dynamic load

$$P = F_a$$

Legend

P	N	Equivalent dynamic bearing load
F_a	N	Axial load.

Equivalent static bearing load

✎ *Combined loads are not possible*

In relation to the direction of load, the same conditions apply as for the equivalent dynamic bearing load, i. e. combined loads are not permissible. In the rating life equation, P_0 is therefore substituted by the value for F_{0a} ➤*1083*|*f2*.

f2
Equivalent static load

$$P_0 = F_{0a}$$

Legend

P_0	N	Equivalent static bearing load
F_{0a}	N	Largest axial load present (maximum load).

Static load safety factor

✎ $S_0 = C_0/P_0$

In addition to the basic rating life L (L_{10h}), it is also always necessary to check the static load safety factor S_0 ➤*1083*|*f3*.

f3
Static load safety factor

$$S_0 = \frac{C_0}{P_0}$$

Legend

S_0	–	Static load safety factor
C_0	N	Basic static load rating
P_0	N	Equivalent static bearing load.

1.15 Minimum load

Rolling bearings under low loads are particularly prone to slippage

In order to prevent slippage damage, the bearing must be subjected to a minimum axial load $F_{a\,min}$ ➤*1084*| *4* and ➤*1084*| *5*.
In vertical bearing arrangements in particular, the requisite minimum axial load $F_{a\,min}$ is normally achieved, however, simply by the weight of the bearing parts and the external forces. If this is not the case, the bearing arrangement must be preloaded, for example by means of springs or a housing nut.

4
Minimum axial load

$$F_{a\,min} = 0{,}0005 \cdot C_{0a} + k_a \left(\frac{C_{0a} \cdot n}{10^8} \right)^2$$

Legend

$F_{a\,min}$	N	Minimum axial load
C_{0a}	N	Basic static load rating ➤*1088*|
k_a	–	Factor for determining the minimum axial load ➤*1084*| *5*
n	min^{-1}	Speed.

5
Factor k_a for calculating the minimum axial load

Series	Factor k_a
K811	1,4
K812	0,9
K893	0,7
K894	0,5

1.16 Design of bearing arrangements

Design of adjacent parts

Axial cylindrical roller bearings cannot tolerate angular misalignments ➤*1079*| *1.3*. The locating surfaces for the bearing parts on the shaft and in the housing must therefore be vertical to the shaft axis, while the adjacent parts must be rigid and flat. They must be configured such that the bearing washers are supported as far as possible over the whole circumference and over the whole raceway width; values ➤*1088*|. The radial cage guidance surfaces must be precision machined and wear-resistant (Ramax 0,8 (Rzmax 4)).

Mounting diameter on the shaft and in the housing

For the mounting dimensions, the following values apply ➤*1088*|:

- mounting diameter on the shaft ≧ d_a
- mounting diameter in the housing ≦ D_a.

Tolerances for shaft and housing bore

Proven tolerances are given in ➤*1084*| *6*. If the data are observed, this will give correct radial guidance of the bearing elements.

6
Tolerances for shafts and housing bores

Bearing component		Tolerance class[1] for	
		Shaft	Bore
Axial cylindrical roller bearings	Shaft guided	h8	–
Housing locating washers	–	–	H9
Shaft locating washers	–	h8	–
Bearing washers	Externally centred as housing locating washer	Shaft released	H9
	Internally centred as shaft locating washer	h8	Bore released

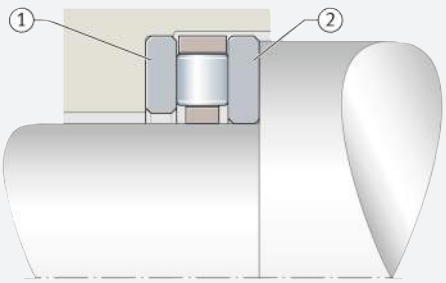
[1] *The envelope requirement Ⓔ applies.*

Guidance of bearing parts

Release of shaft and housing locating washers, as a function of centring

If the bearing washers are centred on the shaft, they must have radial clearance in the housing bore while, if they are centred in the housing, there must be radial clearance between the washer bore and the shaft ➤1085|11.

11
Guidance and release of shaft and housing locating washers



① *Housing locating washer (guidance in the housing), radial clearance on the shaft*
② *Shaft locating washer (guidance on the shaft), radial clearance in the housing*

Guidance of axial roller and cage assemblies

In order to achieve the lowest possible sliding speeds on the guidance surfaces, the axial cylindrical roller and cage assemblies are generally guided on the shaft. This is particularly important in the case of high speeds.

For a direct bearing arrangement of roller and cage assemblies: harden and grind the raceways for the rollers

If the axial design space is particularly small, axial cylindrical roller and cage assemblies can also run directly (without axial bearing washers) on the adjacent construction. In this case – and if the load carrying capacity of the axial cylindrical roller and cage assemblies is to be fully utilised – the raceways on the shaft and in the housing must be produced as a rolling bearing raceway or must correspond to the quality and hardness of axial bearing washers. The surface hardness of the raceway must be 670 HV to 840 HV, the hardening depth CHD or SHD must be sufficiently large ➤180. The surface roughness Ra must be $\leqq$ 0,2 µm. At a mean roughness value of Ra $>$ 0,2 µm, it is no longer possible to utilise the full load carrying capacity of the bearings. When designing the raceway on the shaft and in the housing, the raceway dimensions E_a and E_b must be observed ➤1088|▦. If the values are observed, this will ensure that the raceways for the cylindrical rollers – taking account of any possible axial offset of the roller and cage assembly – are adequately dimensioned.

1.17 Mounting and dismounting

The mounting and dismounting options for the bearings must be taken into consideration in the design of the bearing position.

As the bearings are not self-retaining, they are easy to mount

Axial cylindrical roller bearings are not self-retaining. As a result, the bearing parts (shaft locating washer, housing locating washer and axial cylindrical roller and cage assembly) can be mounted separately from each other. This gives simplified mounting of the bearings.

Mounting position of the bearing washers

The correct mounting position has a considerable influence on the function of the bearing arrangement. Axial bearing washers must always be mounted with the raceway side facing the rolling elements.

Shaft locating washers

On shaft locating washers, the raceway side is indicated by the smaller chamfer on the bore diameter of the washer.

Housing locating washers

On housing locating washers, the raceway side is indicated by the smaller chamfer on the outside diameter of the washer.

Schaeffler Mounting Handbook

Rolling bearings must be handled with great care

Rolling bearings are well-proven precision machine elements for the design of economical and reliable bearing arrangements, which offer high operational security. In order that these products can function correctly and achieve the envisaged operating life without detrimental effect, they must be handled with care.

The Schaeffler Mounting Handbook MH 1 gives comprehensive information about the correct storage, mounting, dismounting and maintenance of rotary rolling bearings ➤ *https://www.schaeffler.de/std/1D53*. It also provides information which should be observed by the designer, in relation to the mounting, dismounting and maintenance of bearings, in the original design of the bearing position. This book is available from Schaeffler on request.

1.18 Legal notice regarding data freshness

The further development of products may also result in technical changes to catalogue products

Of central interest to Schaeffler is the further development and optimisation of its products and the satisfaction of its customers. In order that you, as the customer, can keep yourself optimally informed about the progress that is being made here and with regard to the current technical status of the products, we publish any product changes which differ from the printed version in our electronic product catalogue.

We therefore reserve the right to make changes to the data and illustrations in this catalogue. This catalogue reflects the status at the time of printing. More recent publications released by us (as printed or digital media) will automatically precede this catalogue if they involve the same subject. Therefore, please always use our electronic product catalogue to check whether more up-to-date information or modification notices exist for your desired product.

Link to electronic product catalogue

The following link will take you to the Schaeffler electronic product catalogue: ➤ *https://medias.schaeffler.com*.

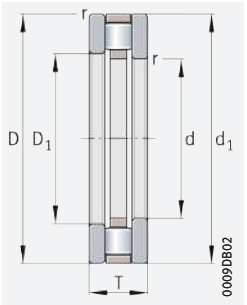
1.19 Further information

In addition to the data in this chapter, the following chapters in Technical principles must also be observed in the design of bearing arrangements:

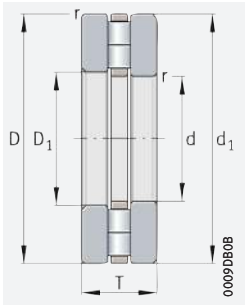
- Determining the bearing size ➤ *34*
- Rigidity ➤ *54*
- Friction and increases in temperature ➤ *56*
- Speeds ➤ *64*
- Bearing data ➤ *97*
- Lubrication ➤ *70*
- Sealing ➤ *182*
- Design of bearing arrangements ➤ *139*
- Mounting and dismounting ➤ *191*.

Axial cylindrical roller bearings

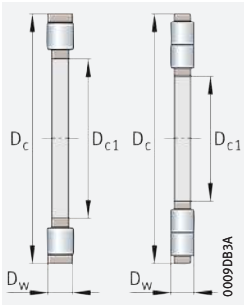
Axial cylindrical roller and cage assemblies
Axial bearing washers



811, 812



893, 894

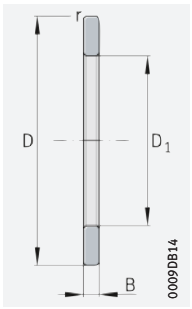


Single row: K811, K812
Double row: K893, K894

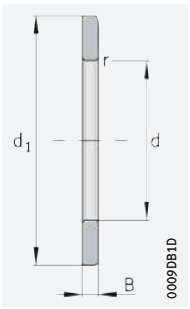
d = 15 – 60 mm

Main dimensions			Basic load ratings		Fatigue limit load	Limiting speed	Speed rating	Axial cylindrical roller bearings		Axial cylindrical roller and cage assemblies	
								Mass	Designation ➤*1082|1.12* ➤*1083|1.13*	Mass	Designation ➤*1082|1.12* ➤*1083|1.13*
d D_{c1}	D D_c	T	dyn. C_a	stat. C_{0a}	C_{ua}	n_G	$n_{\vartheta r}$	m		m	
			N	N	N	min^{-1}	min^{-1}	≈ kg		≈ kg	
15	28	9	14 400	28 500	4 000	13 600	6 400	0,024	**81102-TV**	0,006	**K81102-TV**
17	30	9	16 000	33 500	4 650	12 800	5 800	0,027	**81103-TV**	0,009	**K81103-TV**
20	35	10	25 000	53 000	7 300	10 800	4 500	0,037	**81104-TV**	0,013	**K81104-TV**
25	42	11	33 500	76 000	7 100	8 900	3 650	0,053	**81105-TV**	0,015	**K81105-TV**
30	47	11	35 500	86 000	8 000	7 700	3 150	0,057	**81106-TV**	0,017	**K81106-TV**
	52	16	64 000	141 000	14 100	7 200	2 700	0,123	**81206-TV**	0,033	**K81206-TV**
	60	18	69 000	197 000	18 900	6 400	2 650	0,24	**89306-TV**	0,04	**K89306-TV**
35	52	12	39 000	101 000	9 500	6 800	2 700	0,073	**81107-TV**	0,019	**K81107-TV**
	62	18	80 000	199 000	20 000	6 000	2 360	0,195	**81207-TV**	0,043	**K81207-TV**
	68	20	80 000	237 000	23 200	5 700	2 420	0,34	**89307-TV**	0,053	**K89307-TV**
40	60	13	56 000	148 000	14 500	5 900	2 240	0,105	**81108-TV**	0,031	**K81108-TV**
	68	19	107 000	265 000	23 300	5 200	1 820	0,249	**81208-TV**	0,081	**K81208-TV**
	78	22	123 000	385 000	39 000	4 850	1 770	0,484	**89308-TV**	0,098	**K89308-TV**
45	65	14	59 000	163 000	16 000	5 300	2 020	0,13	**81109-TV**	0,035	**K81109-TV**
	73	20	105 000	265 000	23 300	4 950	1 840	0,287	**81209-TV**	0,085	**K81209-TV**
	85	24	139 000	445 000	44 500	4 400	1 600	0,615	**89309-TV**	0,121	**K89309-TV**
50	70	14	62 000	177 000	17 400	4 900	1 840	0,14	**81110-TV**	0,038	**K81110-TV**
	78	22	118 000	315 000	27 500	4 550	1 570	0,356	**81210-TV**	0,098	**K81210-TV**
	95	27	168 000	560 000	58 000	3 950	1 450	0,887	**89310-TV**	0,175	**K89310-TV**
55	78	16	90 000	300 000	31 000	4 350	1 350	0,218	**81111-TV**	0,045	**K81111-TV**
	90	25	155 000	405 000	38 500	4 050	1 540	0,568	**81211-TV**	0,166	**K81211-TV**
	105	30	184 000	600 000	52 000	3 600	1 500	1,18	**89311-TV**	0,195	**K89311-TV**
60	85	17	103 000	315 000	32 000	4 000	1 360	0,266	**81112-TV**	0,082	**K81112-TV**
	95	26	172 000	480 000	45 500	3 700	1 290	0,642	**81212-TV**	0,176	**K81212-TV**
	110	30	197 000	670 000	58 000	3 400	1 350	1,26	**89312-TV**	0,21	**K89312-TV**
	130	42	390 000	1 220 000	129 000	3 050	1 080	2,818	**89412-TV**	0,538	**K89412-TV**

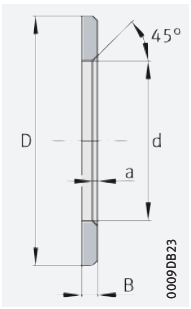
medias ➤ *https://www.schaeffler.de/std/1DCC*



GS



WS



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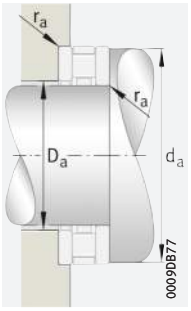
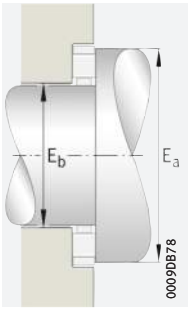


Mounting dimensions

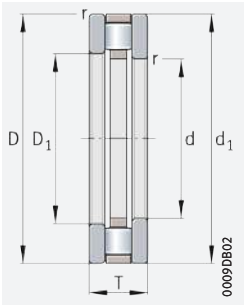


Mounting dimensions, direct bearing arrangement

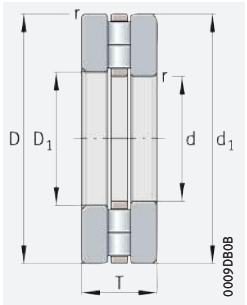
	Axial bearing washers				Dimensions					Mounting dimensions			Raceway dimensions	
	Mass	Designation ➤1082|1.12 ➤1083|1.13												
d D_{c1}	m ≈ kg	Housing locating washer	Shaft locating washer	Bearing washer	D_1	d_1	D_w	B	a r min.	d_a	D_a	r_a	E_b	E_a
15	0,008	**GS81102**	**WS81102**	**LS1528**	16	28	3,5	2,75	0,3	27	16	0,3	16	27
17	0,009	**GS81103**	**WS81103**	**LS1730**	18	30	3,5	2,75	0,3	29	18	0,3	18	29
20	0,011	**GS81104**	**WS81104**	**LS2035**	21	35	4,5	2,75	0,3	34	21	0,3	21	34
25	0,019	**GS81105**	**WS81105**	**LS2542**	26	42	5	3	0,6	41	26	0,6	26	41
30	0,02	**GS81106**	**WS81106**	**LS3047**	32	47	5	3	0,6	46	31	0,6	31	46
	0,045	**GS81206**	**WS81206**	–	32	52	7,5	4,25	0,6	50	31	0,6	31	50
	0,095	**GS89306**	**WS89306**	–	32	60	5,5	6,25	1	59	33	1	33	59
35	0,027	**GS81107**	**WS81107**	**LS3552**	37	52	5	3,5	0,6	51	36	0,6	36	51
	0,076	**GS81207**	**WS81207**	–	37	62	7,5	5,25	1	58	39	1	39	58
	0,134	**GS89307**	**WS89307**	–	37	68	6	7	1	67	38	1	38	67
40	0,037	**GS81108**	**WS81108**	**LS4060**	42	60	6	3,5	0,6	58	42	0,6	42	58
	0,084	**GS81208**	**WS81208**	–	42	68	9	5	1	66	43	1	43	66
	0,193	**GS89308**	**WS89308**	–	42	78	7	7,5	1	77	44	1	44	77
45	0,047	**GS81109**	**WS81109**	**LS4565**	47	65	6	4	0,6	63	47	0,6	47	63
	0,101	**GS81209**	**WS81209**	–	47	73	9	5,5	1	70	48	1	48	70
	0,247	**GS89309**	**WS89309**	–	47	85	7,5	8,25	1	83	49	1	49	83
50	0,051	**GS81110**	**WS81110**	**LS5070**	52	70	6	4	0,6	68	52	0,6	52	68
	0,129	**GS81210**	**WS81210**	–	52	78	9	6,5	1	75	53	1	53	75
	0,356	**GS89310**	**WS89310**	–	52	95	8	9,5	1,1	92	56	1,1	56	92
55	0,082	**GS81111**	**WS81111**	**LS5578**	57	78	6	5	0,6	77	56	0,6	57	77
	0,201	**GS81211**	**WS81211**	–	57	90	11	7	1	85	59	1	59	85
	0,485	**GS89311**	**WS89311**	–	57	105	9	10,5	1,1	103	61	1,1	61	103
60	0,092	**GS81112**	**WS81112**	**LS6085**	62	85	7,5	4,75	1	82	62	1	62	82
	0,233	**GS81212**	**WS81212**	–	62	95	11	7,5	1	91	64	1	64	91
	0,55	**GS89312**	**WS89312**	–	62	110	9	10,5	1,1	108	66	1,1	66	108
	1,115	**GS89412**	**WS89412**	–	62	130	14	14	1,5	126	65	1,5	65	126

Axial cylindrical roller bearings

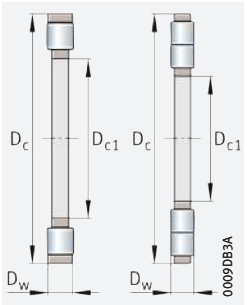
Axial cylindrical roller and cage assemblies
Axial bearing washers



811, 812



893, 894

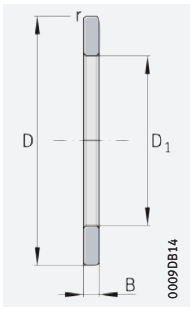


Single row: K811, K812
Double row: K893, K894

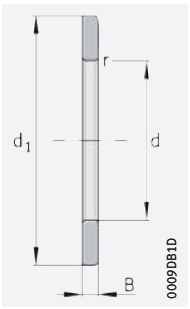
d = 65 – 100 mm

Main dimensions			Basic load ratings		Fatigue limit load	Limiting speed	Speed rating	Axial cylindrical roller bearings		Axial cylindrical roller and cage assemblies	
								Mass	Designation ➤*1082|1.12* ➤*1083|1.13*	Mass	Designation ➤*1082|1.12* ➤*1083|1.13*
d D_{c1}	D D_c	T	dyn. C_a	stat. C_{0a}	C_{ua}	n_G	$n_{\vartheta r}$	m		m	
			N	N	N	min^{-1}	min^{-1}	≈ kg		≈ kg	
65	90	18	107 000	340 000	34 000	3 700	1 260	0,31	**81113-TV**	0,09	**K81113-TV**
	100	27	177 000	500 000	48 000	3 550	1 250	0,721	**81213-TV**	0,185	**K81213-TV**
	115	30	194 000	670 000	58 000	3 200	1 330	1,33	**89313-TV**	0,21	**K89313-TV**
	140	45	445 000	1 410 000	148 000	2 850	1 010	3,52	**89413-TV**	0,72	**K89413-TV**
70	95	18	111 000	365 000	36 500	3 500	1 170	0,332	**81114-TV**	0,092	**K81114-TV**
	105	27	187 000	550 000	53 000	3 250	1 120	0,768	**81214-TV**	0,212	**K81214-TV**
	125	34	239 000	830 000	75 000	2 950	1 200	1,82	**89314-TV**	0,29	**K89314-TV**
	150	48	475 000	1 500 000	158 000	2 650	1 010	4,18	**89414-TV**	0,76	**K89414-TV**
75	100	19	107 000	350 000	35 500	3 300	1 190	0,393	**81115-TV**	0,096	**K81115-TV**
	110	27	173 000	500 000	48 000	3 150	1 220	0,8	**81215-TV**	0,195	**K81215-TV**
	135	36	290 000	1 010 000	92 000	2 750	1 090	2,23	**89315-TV**	0,375	**K89315-TV**
	160	51	500 000	1 580 000	160 000	2 440	1 000	5,96	**89415-M**	1,78	**K89415-M**
80	105	19	106 000	350 000	35 500	3 150	1 180	0,4	**81116-TV**	0,095	**K81116-TV**
	115	28	201 000	630 000	60 000	2 900	980	0,9	**81216-TV**	0,234	**K81216-TV**
	140	36	305 000	1 110 000	100 000	2 650	1 000	2,37	**89316-TV**	0,42	**K89316-TV**
	170	54	560 000	1 770 000	180 000	2 280	940	7,04	**89416-M**	2,04	**K89416-M**
85	110	19	113 000	385 000	39 000	3 000	1 090	0,42	**81117-TV**	0,118	**K81117-TV**
	125	31	217 000	660 000	65 000	2 800	1 080	1,26	**81217-TV**	0,28	**K81217-TV**
	150	39	325 000	1 140 000	104 000	2 450	1 030	3,39	**89317-M**	0,93	**K89317-M**
	180	58	620 000	1 980 000	199 000	2 160	890	8,65	**89417-M**	2,71	**K89417-M**
90	120	22	141 000	465 000	40 000	2 750	1 070	0,62	**81118-TV**	0,15	**K81118-TV**
	135	35	290 000	890 000	94 000	2 550	910	1,77	**81218-TV**	0,54	**K81218-TV**
	155	39	335 000	1 200 000	109 000	2 350	980	3,63	**89318-M**	0,97	**K89318-M**
	190	60	680 000	2 200 000	221 000	2 040	840	9,94	**89418-M**	3,04	**K89418-M**
100	135	25	199 000	650 000	60 000	2 480	930	0,95	**81120-TV**	0,25	**K81120-TV**
	150	38	340 000	1 080 000	111 000	2 300	840	2,2	**81220-TV**	0,6	**K81220-TV**
	170	42	380 000	1 400 000	123 000	2 130	910	4,56	**89320-M**	1,18	**K89320-M**
	210	67	850 000	2 850 000	280 000	1 830	710	13,42	**89420-M**	3,92	**K89420-M**

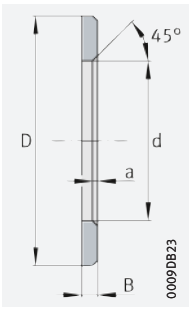
medias ➤ *https://www.schaeffler.de/std/1DCD*



GS



WS



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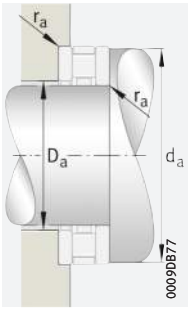
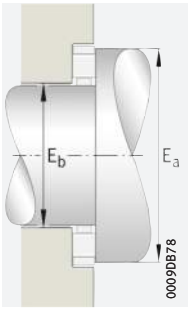


Mounting dimensions

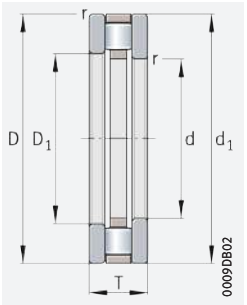


Mounting dimensions, direct bearing arrangement

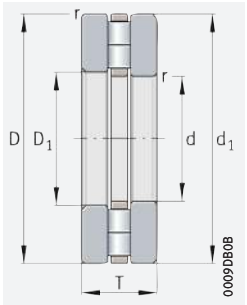
	Axial bearing washers				Dimensions					Mounting dimensions			Raceway dimensions	
	Mass	Designation ➤1082|1.12 ➤1083|1.13												
d D_{c1}	m ≈ kg	Housing locating washer	Shaft locating washer	Bearing washer	D_1	d_1	D_w	B	a r min.	d_a	D_a	r_a	E_b	E_a
65	0,11	**GS81113**	**WS81113**	**LS6590**	67	90	7,5	5,25	1	87	67	1	67	87
	0,268	**GS81213**	**WS81213**	**–**	67	100	11	8	1	96	69	1	69	96
	0,535	**GS89313**	**WS89313**	**–**	67	115	9	10,5	1,1	113	71	1,1	71	113
	1,4	**GS89413**	**WS89413**	**–**	68	140	15	15	2	135	70	2	70	135
70	0,12	**GS81114**	**WS81114**	**LS7095**	72	95	7,5	5,25	1	92	72	1	72	92
	0,278	**GS81214**	**WS81214**	**–**	72	105	11	8	1	102	74	1	74	102
	0,8	**GS89314**	**WS89314**	**–**	72	125	10	12	1,1	123	76	1,1	76	123
	1,73	**GS89414**	**WS89414**	**–**	73	150	16	16	2	147	76	2	76	147
75	0,136	**GS81115**	**WS81115**	**LS75100**	77	100	7,5	5,75	1	97	78	1	78	97
	0,293	**GS81215**	**WS81215**	**–**	77	110	11	8	1	106	79	1	79	106
	0,97	**GS89315**	**WS89315**	**–**	77	135	11	12,5	1,5	132	81	1,5	81	132
	2,09	**GS89415**	**WS89415**	**–**	78	160	17	17	2	156	82	2	82	156
80	0,144	**GS81116**	**WS81116**	**LS80105**	82	105	7,5	5,75	1	102	83	1	83	102
	0,333	**GS81216**	**WS81216**	**–**	82	115	11	8,5	1	112	84	1	84	112
	1,02	**GS89316**	**WS89316**	**–**	82	140	11	12,5	1,5	137	86	1,5	86	137
	2,5	**GS89416**	**WS89416**	**–**	83	170	18	18	2,1	165	88	2,1	88	165
85	0,151	**GS81117**	**WS81117**	**LS85110**	87	110	7,5	5,75	1	108	87	1	87	108
	0,49	**GS81217**	**WS81217**	**–**	88	125	12	9,5	1	119	90	1	90	119
	1,23	**GS89317**	**WS89317**	**–**	88	150	12	13,5	1,5	147	93	1,5	93	146
	2,97	**GS89417**	**WS89417**	**–**	88	180	19	19,5	2,1	175	93	2,1	93	175
90	0,225	**GS81118**	**WS81118**	**LS90120**	92	120	9	6,5	1	117	93	1	93	117
	0,614	**GS81218**	**WS81218**	**–**	93	135	14	10,5	1,1	129	95	1,1	95	129
	1,33	**GS89318**	**WS89318**	**–**	93	155	12	13,5	1,5	152	98	1,5	98	151
	3,45	**GS89418**	**WS89418**	**–**	93	190	20	20	2,1	185	99	2,1	99	185
100	0,35	**GS81120**	**WS81120**	**LS100135**	102	135	11	7	1	131	104	1	104	131
	0,8	**GS81220**	**WS81220**	**–**	103	150	15	11,5	1,1	142	107	1,1	107	142
	1,69	**GS89320**	**WS89320**	**–**	103	170	13	14,5	1,5	167	107	1,5	109	166
	4,75	**GS89420**	**WS89420**	**–**	103	210	22	22,5	3	205	111	3	111	205

Axial cylindrical roller bearings

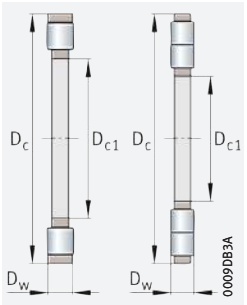
Axial cylindrical roller and cage assemblies
Axial bearing washers



811, 812



893, 894

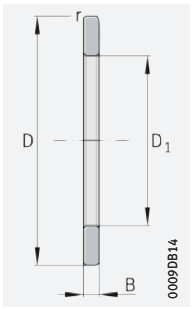


Single row: K811, K812
Double row: K893, K894

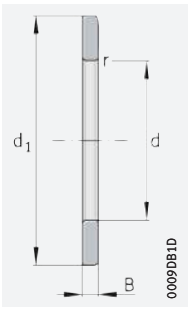
d = 110 – 170 mm

Main dimensions			Basic load ratings		Fatigue limit load	Limiting speed	Speed rating	Axial cylindrical roller bearings		Axial cylindrical roller and cage assemblies	
								Mass	Designation ➤*1082|1.12* ➤*1083|1.13*	Mass	Designation ➤*1082|1.12* ➤*1083|1.13*
d D_{c1}	D D_c	T	dyn. C_a	stat. C_{0a}	C_{ua}	n_G	$n_{\vartheta r}$	m		m	
			N	N	N	min^{-1}	min^{-1}	≈ kg		≈ kg	
110	145	25	207 000	700 000	63 000	2 280	860	1,04	**81122-TV**	0,27	**K81122-TV**
	160	38	325 000	1 030 000	104 000	2 150	870	2,29	**81222-TV**	0,53	**K81222-TV**
	190	48	500 000	1 870 000	177 000	1 900	780	6,7	**89322-M**	1,83	**K89322-M**
	230	73	1 010 000	3 400 000	330 000	1 680	640	17,41	**89422-M**	5,11	**K89422-M**
120	155	25	214 000	760 000	66 000	2 110	790	1,12	**81124-TV**	0,29	**K81124-TV**
	170	39	340 000	1 120 000	111 000	2 000	800	2,54	**81224-TV**	0,58	**K81224-TV**
	210	54	640 000	2 420 000	224 000	1 730	690	9,44	**89324-M**	2,64	**K89324-M**
	250	78	1 170 000	4 000 000	385 000	1 540	570	21,9	**89424-M**	6,37	**K89424-M**
130	170	30	255 000	900 000	79 000	1 940	770	1,67	**81126-TV**	0,38	**K81126-TV**
	190	45	480 000	1 520 000	151 000	1 820	720	3,98	**81226-TV**	0,92	**K81226-TV**
	225	58	720 000	2 700 000	250 000	1 620	650	11,2	**89326-M**	2,09	**K89326-M**
	270	85	1 330 000	4 600 000	430 000	1 420	520	27,1	**89426-M**	7,96	**K89426-M**
140	180	31	260 000	960 000	83 000	1 820	720	1,9	**81128-TV**	0,4	**K81128-TV**
	200	46	455 000	1 450 000	141 000	1 690	730	5,07	**81228-M**	1,8	**K81228-M**
	240	60	820 000	3 200 000	290 000	1 520	570	13,2	**89328-M**	2,57	**K89328-M**
	280	85	1 390 000	4 950 000	455 000	1 350	480	29,8	**89428-M**	8,53	**K89428-M**
150	190	31	270 000	1 020 000	86 000	1 710	670	2,2	**81130-TV**	0,43	**K81130-TV**
	215	50	590 000	1 940 000	188 000	1 580	610	7,17	**81230-M**	2,81	**K81230-M**
	250	60	840 000	3 350 000	300 000	1 440	540	13,9	**89330-M**	3,75	**K89330-M**
	300	90	1 580 000	5 700 000	520 000	1 250	440	35,4	**89430-M**	10,4	**K89430-M**
160	200	31	270 000	1 050 000	87 000	1 610	640	2,12	**81132-TV**	0,44	**K81132-TV**
	225	51	600 000	2 030 000	194 000	1 500	580	7,6	**81232-M**	3,01	**K81232-M**
	320	95	1 780 000	6 500 000	590 000	1 170	400	42	**89432-M**	12,4	**K89432-M**
170	215	34	360 000	1 380 000	124 000	1 510	570	2,41	**81134-TV**	0,66	**K81134-TV**
	240	55	680 000	2 340 000	222 000	1 400	540	9,3	**81234-M**	3,5	**K81234-M**
	340	103	1 990 000	7 400 000	660 000	1 100	365	51,9	**89434-M**	14,9	**K89434-M**

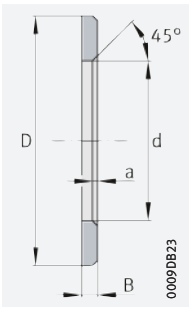
medias ➤ *https://www.schaeffler.de/std/1DCE*



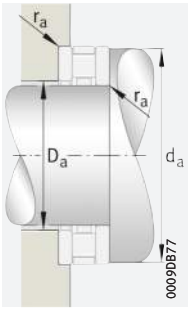
GS



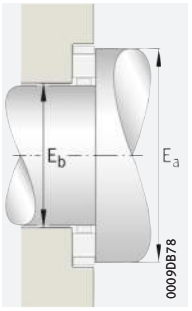
WS



LS



Mounting dimensions

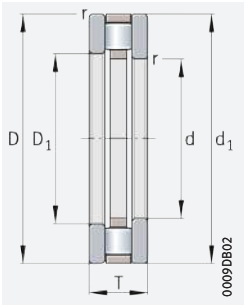


Mounting dimensions, direct bearing arrangement

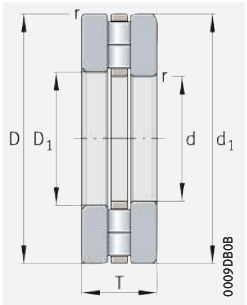
	Axial bearing washers				Dimensions					Mounting dimensions			Raceway dimensions	
	Mass	Designation ➤1082|1.12 ➤1083|1.13												
d D_{c1}	m ≈ kg	Housing locating washer	Shaft locating washer	Bearing washer	D_1	d_1	D_w	B	a r min.	d_a	D_a	r_a	E_b	E_a
110	0,385	**GS81122**	**WS81122**	**LS110145**	112	145	11	7	1	141	114	1	114	141
	0,88	**GS81222**	**WS81222**	–	113	160	15	11,5	1,1	152	117	1,1	117	152
	2,44	**GS89322**	**WS89322**	–	113	190	15	16,5	2	186	120	2	120	185
	6,15	**GS89422**	**WS89422**	–	113	230	24	24,5	3	223	121	3	121	223
120	0,415	**GS81124**	**WS81124**	**LS120155**	122	155	11	7	1	151	124	1	124	151
	0,98	**GS81224**	**WS81224**	–	123	170	15	12	1,1	162	127	1,1	127	162
	3,4	**GS89324**	**WS89324**	–	123	210	17	18,5	2,1	206	130	2,1	132	205
	7,7	**GS89424**	**WS89424**	–	123	250	26	26	4	243	133	4	133	243
130	0,643	**GS81126**	**WS81126**	**LS130170**	132	170	12	9	1	165	135	1	135	165
	1,53	**GS81226**	**WS81226**	–	133	187	19	13	1,5	181	137	1,5	137	181
	4,045	**GS89326**	**WS89326**	–	134	225	18	20	2,1	220	141	2,1	141	219
	9,5	**GS89426**	**WS89426**	–	134	270	28	28,5	4	263	145	4	145	263
140	0,749	**GS81128**	**WS81128**	**LS140180**	142	178	12	9,5	1	175	145	1	145	175
	1,635	**GS81228**	**WS81228**	–	143	197	19	13,5	1,5	191	147	1,5	151	195
	4,8	**GS89328**	**WS89328**	–	144	240	19	20,5	2,1	235	152	2,1	152	234
	10,6	**GS89428**	**WS89428**	–	144	280	28	28,5	4	273	155	4	155	273
150	0,796	**GS81130**	**WS81130**	**LS150190**	152	188	12	9,5	1	185	155	1	155	185
	2,18	**GS81230**	**WS81230**	–	153	212	21	14,5	1,5	211	158	1,5	162	210
	5,06	**GS89330**	**WS89330**	–	154	250	19	20,5	2,1	245	162	2,1	162	244
	12,5	**GS89430**	**WS89430**	–	154	300	30	30	4	293	167	4	167	293
160	0,842	**GS81132**	**WS81132**	**LS160200**	162	198	12	9,5	1	195	165	1	165	195
	2,3	**GS81232**	**WS81232**	–	163	222	21	15	1,5	220	168	1,5	171	219
	14,8	**GS89432**	**WS89432**	–	164	320	32	31,5	5	313	179	5	179	313
170	1,1	**GS81134**	**WS81134**	–	172	213	14	10	1,1	209	176	1,1	176	209
	2,9	**GS81234**	**WS81234**	–	173	237	22	16,5	1,5	235	180	1,5	184	233
	18,5	**GS89434**	**WS89434**	–	174	340	34	34,5	5	333	191	5	191	333

Axial cylindrical roller bearings

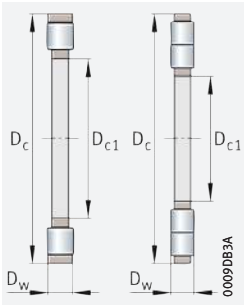
Axial cylindrical roller and cage assemblies
Axial bearing washers



811, 812



893, 894

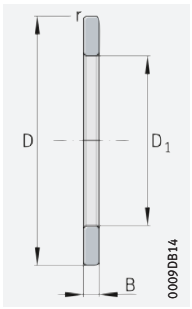


Single row: K811, K812
Double row: K893, K894

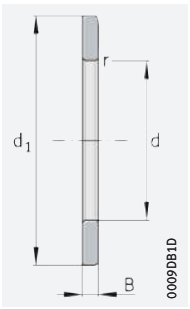
d = 180 – 320 mm

Main dimensions			Basic load ratings		Fatigue limit load	Limiting speed	Speed rating	Axial cylindrical roller bearings		Axial cylindrical roller and cage assemblies	
								Mass	Designation ➤1082|1.12 ➤1083|1.13	Mass	Designation ➤1082|1.12 ➤1083|1.13
d D_{c1}	D D_c	T	dyn. C_a	stat. C_{0a}	C_{ua}	n_G	$n_{\vartheta r}$	m		m	
			N	N	N	min^{-1}	min^{-1}	≈ kg		≈ kg	
180	225	34	340 000	1 300 000	115 000	1 430	590	3,3	**81136-M**	1,46	**K81136-M**
	250	56	700 000	2 440 000	228 000	1 340	520	9,9	**81236-M**	3,67	**K81236-M**
	360	109	2 210 000	8 200 000	720 000	1 050	345	60	**89436-M**	17,6	**K89436-M**
190	240	37	390 000	1 500 000	131 000	1 340	570	4,74	**81138-M**	1,84	**K81138-M**
	270	62	880 000	3 000 000	285 000	1 250	475	12,8	**81238-M**	5,17	**K81238-M**
	380	115	2 460 000	9 200 000	800 000	1 010	330	72,1	**89438-M**	20,9	**K89438-M**
200	250	37	395 000	1 550 000	134 000	1 290	550	4,95	**81140-M**	1,93	**K81140-M**
	280	62	900 000	3 150 000	295 000	1 190	450	14,2	**81240-M**	5,4	**K81240-M**
	400	122	2 700 000	10 200 000	880 000	960	305	82,6	**89440-M**	24	**K89440-M**
220	270	37	420 000	1 730 000	146 000	1 180	490	5,22	**81144-M**	2,04	**K81144-M**
	300	63	950 000	3 450 000	310 000	1 100	405	15,3	**81244-M**	5,8	**K81244-M**
	420	122	2 900 000	11 500 000	980 000	880	265	90,1	**89444-M**	25,7	**K89444-M**
240	300	45	600 000	2 500 000	212 000	1 070	420	8,45	**81148-M**	3,32	**K81148-M**
	340	78	1 370 000	5 000 000	445 000	970	330	26,2	**81248-M**	9,94	**K81248-M**
	440	122	3 000 000	12 200 000	1 030 000	850	250	95,9	**89448-M**	27,3	**K89448-M**
260	320	45	620 000	2 650 000	219 000	990	390	9,08	**81152-M**	3,55	**K81152-M**
	360	79	1 440 000	5 400 000	475 000	910	305	28,6	**81252-M**	10,8	**K81252-M**
	480	132	3 600 000	14 700 000	1 200 000	780	224	125	**89452-M**	36,8	**K89452-M**
280	350	53	870 000	3 650 000	305 000	910	330	12,6	**81156-M**	5,31	**K81156-M**
	380	80	1 460 000	5 600 000	485 000	860	290	31	**81256-M**	11,5	**K81256-M**
	520	145	4 250 000	17 600 000	1 420 000	700	195	159	**89456-M**	48,5	**K89456-M**
300	380	62	1 070 000	4 500 000	370 000	840	295	19,4	**81160-M**	7,6	**K81160-M**
	420	95	1 930 000	7 300 000	620 000	780	255	48,25	**81260-M**	17,8	**K81260-M**
	540	145	4 350 000	18 500 000	1 480 000	670	184	170	**89460-M**	49,8	**K89460-M**
320	400	63	1 100 000	4 750 000	385 000	800	280	20,7	**81164-M**	8,04	**K81164-M**
	580	155	5 500 000	19 900 000	1 460 000	640	184	203	**89464-M**	80,3	**K89464-M**

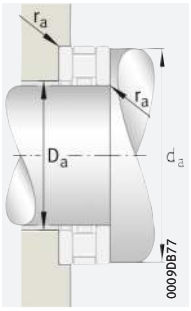
medias ➤ *https://www.schaeffler.de/std/1DCF*



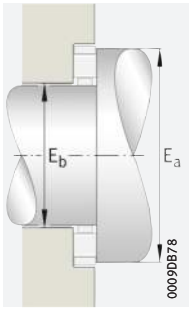
GS



WS



Mounting dimensions



Mounting dimensions, direct bearing arrangement

	Axial bearing washers			Dimensions					Mounting dimensions			Raceway dimensions	
	Mass	Designation ➤1082|1.12 ➤1083|1.13											
d D_{c1}	m ≈ kg	Housing locating washer	Shaft locating washer	D_1	d_1	D_w	B	a r min.	d_a	D_a	r_a	E_b	E_a
180	1,12	**GS81136**	**WS81136**	183	222	14	10	1,1	219	185	1,1	186	220
	3,13	**GS81236**	**WS81236**	183	247	22	17	1,5	245	190	1,5	194	243
	21,3	**GS89436**	**WS89436**	184	360	36	36,5	5	351	200	5	200	351
190	1,45	**GS81138**	**WS81138**	193	237	15	11	1,1	233	197	1,1	198	234
	3,835	**GS81238**	**WS81238**	194	267	26	18	2	265	200	2	205	263
	25,6	**GS89438**	**WS89438**	195	380	38	38,5	5	373	214	5	212	371
200	1,51	**GS81140**	**WS81140**	203	247	15	11	1,1	243	206	1,1	208	244
	4,41	**GS81240**	**WS81240**	204	277	26	18	2	275	210	2	215	273
	29,3	**GS89440**	**WS89440**	205	400	40	41	5	393	226	5	224	391
220	1,59	**GS81144**	**WS81144**	223	267	15	11	1,1	263	226	1,1	228	264
	4,75	**GS81244**	**WS81244**	224	297	26	18,5	2	296	230	2	236	294
	32,2	**GS89444**	**WS89444**	225	420	40	41	6	411	244	6	244	411
240	2,57	**GS81148**	**WS81148**	243	297	18	13,5	1,5	296	248	1,5	253	294
	8,15	**GS81248**	**WS81248**	244	335	32	23	2,1	335	261	2,1	263	333
	34,3	**GS89448**	**WS89448**	245	440	40	41	6	433	266	6	264	431
260	2,765	**GS81152**	**WS81152**	263	317	18	13,5	1,5	316	268	1,5	272	314
	8,9	**GS81252**	**WS81252**	264	355	32	23,5	2,1	353	280	2,1	281	351
	44,25	**GS89452**	**WS89452**	265	480	44	44	6	472	288	6	286	468
280	3,65	**GS81156**	**WS81156**	283	347	22	15,5	1,5	346	288	1,5	294	344
	9,75	**GS81256**	**WS81256**	284	375	32	24	2,1	373	300	2,1	301	371
	55,6	**GS89456**	**WS89456**	285	520	48	48,5	6	512	311	6	309	508
300	5,92	**GS81160**	**WS81160**	304	376	25	18,5	2	373	315	2	316	372
	15,2	**GS81260**	**WS81260**	304	415	38	28,5	3	413	328	3	329	412
	60,15	**GS89460**	**WS89460**	305	540	48	48,5	6	533	331	6	329	528
320	6,35	**GS81164**	**WS81164**	324	396	25	19	2	394	334	2	336	392
	61,5	**GS89464**	**WS89464**	325	575	68	43,5	6	573	340	6	343	566

Axial needle roller bearings

Matrix for bearing preselection

The matrix gives an overview of the types and design features of axial needle roller bearings.

It can be used to make a preliminary assessment of whether a bearing is fundamentally suitable for the envisaged application.

The additional information provided in the product chapter (see column "detailed information") and in the Technical principles must, however, be observed in addition to this overview in selection of the bearing.

Design features and suitability			Axial needle roller bearings	
+++ extremely suitable ++ highly suitable + suitable (+) suitable with restrictions – not suitable/not applicable ✓ available				detailed information ➤ **1100**
Load carrying capacity	radial		–	➤ *1103|1.2*
	axial, one direction		++	➤ *1103|1.2*
	axial, both directions		–	
	moments		–	
Compensation of angular misalignments	static		–	➤ *1103|1.3*
	dynamic		–	➤ *1103|1.3*
Bearing design	cylindrical bore		✓	➤ *1100|1.1*
	tapered bore		–	
	separable		✓	➤ *1100|1.1*
Lubrication	greased		–	➤ *1103|1.4*
Sealing	open		✓	➤ *1103|1.5*
	non-contact		–	
	contact		–	
Operating temperature in °C	from to		–20 +120	➤ *1104|1.8*
Suitability for	high speeds		++	➤ *1103|1.6*
	high running accuracy		–	➤ *1105|1.11* ➤ *114*
	low-noise running		+	➤ *1104|1.7* ➤ *27*
	high rigidity		+++	➤ *54*
	reduced friction		+++	➤ *56*
	length compensation within bearing		(+)	
	non-locating bearing arrangement		–	
	locating bearing arrangement		–	
X-life bearings		X-life	–	
Inner cage diameter D_{c1} in mm	from to		4 160	➤ *1110* ➤ *1112*
Product tables	from page ➤		**1110**	

1 Axial needle roller bearings

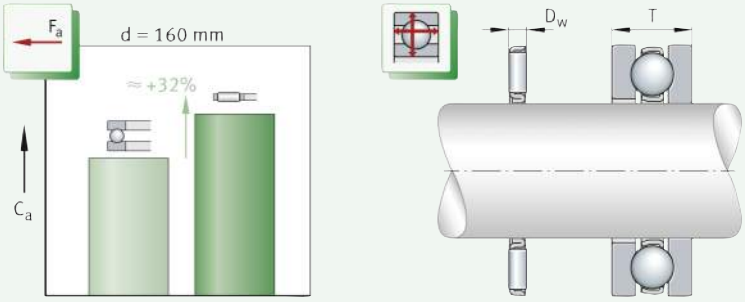
Axial needle roller bearings are particularly suitable where:

- high axial forces occur in one direction but no radial loads are present (the bearings may only be subjected to axial load ➤*1103*|*1.2*)
- the load carrying capacity of comparable axial deep groove ball bearings is no longer adequate and the very high axial load carrying capacity of axial cylindrical roller bearings is not yet necessary ➤*1100*|🗀 *1*
- higher speeds occur in addition to high axial loads
- the bearing arrangement must have very high axial rigidity
- the axial space available is extremely small ➤*1100*|🗀 *1*
- the bearing parts can or must be mounted separately
- the bearing arrangement is not configured but, for cost reasons, ready-to-fit standard bearings are to be used.

For an overview of other product-specific features, see the Matrix for bearing preselection ➤*1099*.

🗀 **1**
Axial needle roller bearing and axial deep groove ball bearing – comparison of load carrying capacity and design envelope

F_a = *axial load*
C_a = *basic dynamic load rating*
D_w = *diameter of needle roller*
T = *axial section height of axial deep groove ball bearing*



1.1 Bearing design

✎ *Design variants*

Axial needle roller bearings are available as:

- complete axial needle roller bearings (comprising a needle roller and cage assembly and axial bearing washers) ➤*1101*|🗀 *2*
- individual bearing parts for combination, comprising:
  - axial needle roller and cage assembly (prefix AXK)
  - axial bearing washers (prefix AS) ➤*1102*|🗀 *3*
- bearings with centring spigot (prefix AXW) ➤*1102*|🗀 *4* and ➤*1102*|🗀 *5*.

Furthermore, Schaeffler supplies axial needle roller bearings by agreement for specific applications, for example with tabs to prevent rotation. Such bearings are used, due to their low axial section height, in applications such as automotive manual gearshift transmissions.

Axial needle roller bearings

Ready-to-fit bearing units with very small axial space

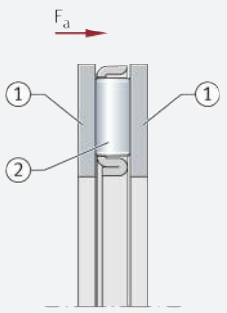
Axial needle roller bearings are part of the group of axial roller bearings. In contrast to the ball, the roller has a larger contact area perpendicular to the roller axis. As a result, it can transmit higher forces, has greater rigidity and allows smaller rolling element diameters under the same load. The single row, ready-to-fit bearings comprise flat, ribless axial bearing washers between which axial needle roller and cage assemblies are arranged ➤*1101*|*2*. Their axial section height corresponds only to the diameter of the needle rollers plus the thickness of the washers. Due to this design, the bearings are extremely small in axial height ➤*1112*|. The rolling elements are retained and guided by axial cages. The needle rollers are made from through hardened rolling bearing steel 100Cr6. They have a hardness of at least 670 HV and profiled ends, i.e. they have a slight lateral curvature towards the ends. The modified line contact between the needle rollers and raceways prevents damaging edge stresses. This in turn has a positive effect on the operating life of the bearings.

Due to the extensive possible combinations, the bearing parts for axial needle roller bearings are always supplied individually, i.e. the corresponding axial needle roller and cage assemblies and axial bearing washers in the product tables must always be ordered together ➤*1101*|*2*, ➤*1102*|*3*, ➤*1106*|*1.13* and ➤*1112*|.

2
Axial needle roller bearing

F_a = *axial load*

① *Axial bearing washers*
② *Axial needle roller and cage assembly*



Axial needle roller and cage assemblies

The axial section height corresponds to the needle roller diameter

Axial needle roller and cage assemblies AXK comprise geometrically stable plastic or metal cages fitted with a large number of needle rollers ➤*1101*|*2*. Due to the high uniformity of diameter (the needle rollers are sorted to very small diameter tolerances) of the needle rollers with each other, this gives very uniform loading of the rolling elements ➤*1105*|*3*. Since the axial section height of the cage assemblies is determined purely by the needle roller diameter, the bearings require only an extremely small axial design space.

Suitable as a direct bearing arrangement or in conjunction with axial bearing washers

The axial needle roller and cage assemblies are generally combined with axial bearing washers ➤*1101*|*2* and ➤*1102*|*3*. If they are to be used directly – i.e. without these washers – in the adjacent construction, the raceway for the needle rollers must be produced as a rolling bearing raceway ➤*1107*|*1.16*.

Axial bearing washers

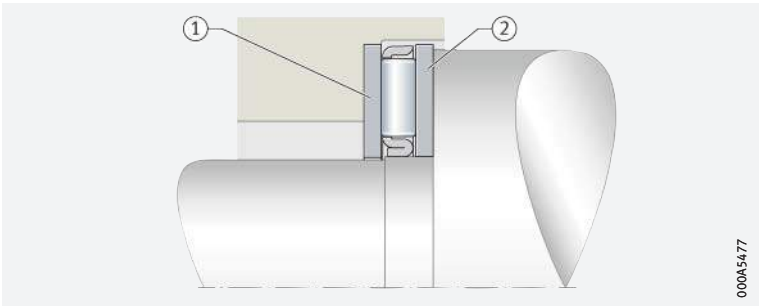
Suitable as shaft or housing locating washers

Axial bearing washers AS are suitable for axial needle roller and cage assemblies AXK. They are punched, through hardened, polished and suitable for use as shaft or housing locating washers. Housing locating washers are externally centred, shaft locating washers are internally centred ➤*1102*|*3* and ➤*1107*|*1.16*. They are used if the adjacent machine parts cannot be used as a raceway for the rolling elements but are sufficiently rigid and geometrically precise.

The use of complete axial needle roller bearings (axial cylindrical roller and cage assembly AXK with axial bearing washers AS) is only appropriate, for example, if high speeds occur and the bearing washers must therefore be precisely centred or the running surfaces for the rolling elements cannot be configured as a rolling bearing raceway.

3
Axial bearing washers

① *Axial needle roller bearing, housing locating washer externally centred*
② *Axial needle roller bearing, shaft locating washer internally centred*



Axial bearings with centring spigot

The centring spigot gives simplified mounting of the bearings

Axial needle roller bearings AXW comprise a housing locating washer with a centring spigot into which an axial needle roller and cage assembly AXK is inserted. With the aid of the centring spigot, the housing locating washer can be precisely centred in the housing bore. This gives easier mounting of the bearings. The running surface for the needle roller and cage assembly must be produced as a rolling bearing raceway, i. e. it must be hardened and ground.

Suitable for the support of axial loads only

Axial bearings with a centring spigot can only support axial loads in one direction. In order to support combined radial/axial loads, however, these bearings can be combined with the following radial needle roller bearings:

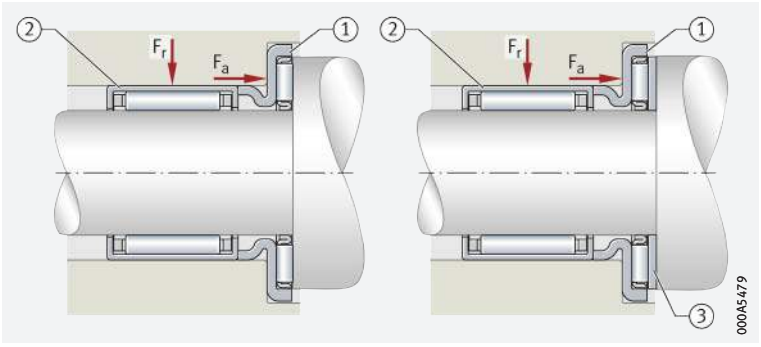
- drawn cup needle roller bearings with open ends and with closed end (direct bearing arrangement) ➤ *1102* | *4*
- needle roller bearings with or without inner ring ➤ *1102* | *5*.

Such combinations give very compact and economical bearing arrangements.

4
Needle roller axial bearings with centring spigot, combined with drawn cup needle roller bearings with open ends

F_a = *axial load*
F_r = *radial load*

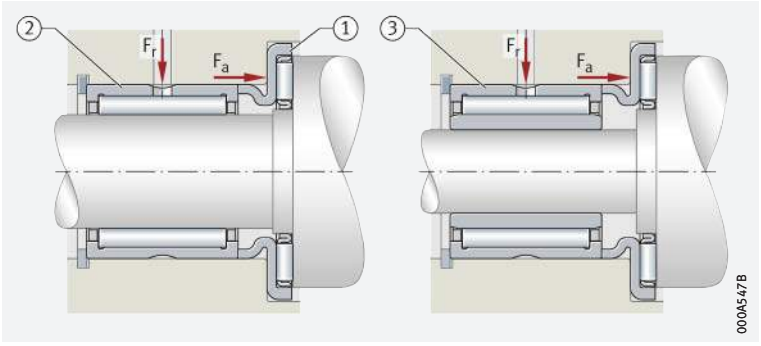
① *Needle roller axial bearing AXW*
② *Drawn cup needle roller bearing with open ends HK (radial bearing)*
③ *Axial bearing washer AS*



5
Needle roller axial bearings with centring spigot, combined with needle roller bearings

F_a = *axial load*
F_r = *radial load*

① *Needle roller axial bearing AXW*
② *Needle roller bearing without inner ring (radial bearing)*
③ *Needle roller bearing with inner ring (radial bearing)*



1.2 Load carrying capacity

✎ *For high axial loads acting in one direction*

Single row axial needle roller bearings can support high axial loads as well as axial shock loads in one direction, but must not be subjected to radial load ➤ *1106|1.14*. Radial loads must be supported by means of an additional bearing ➤ *1102|4* and ➤ *1102|5*.

1.3 Compensation of angular misalignments

The bearings do not permit any skewing between the shaft and housing. If angular misalignments occur between the locating surfaces on the shaft and in the housing, this will cause damage to the bearing and a reduction in its operating life.

1.4 Lubrication

✎ *Oil or grease lubrication is possible*

Axial needle roller bearings and axial needle roller and cage assemblies are not greased. The bearings must be lubricated with oil or grease.

✎ *Compatibility with plastic cages*

When using bearings with plastic cages, compatibility between the lubricant and the cage material must be ensured if synthetic oils, lubricating greases with a synthetic oil base or lubricants containing a high proportion of EP additives are used.

If there is any uncertainty regarding the suitability of the selected lubricant for the application, please consult Schaeffler or the lubricant manufacturer.

✎ *Observe oil change intervals*

Aged oil and additives in the oil can impair the operating life of plastics at high temperatures. As a result, stipulated oil change intervals must be strictly observed.

1.5 Sealing

✎ *Provide seals in the adjacent construction*

The bearings are not sealed; i.e. sealing of the bearing position must be carried out in the adjacent construction. This must reliably prevent:

- moisture and contaminants from entering the bearing
- the egress of lubricant from the bearing position.

1.6 Speeds

✎ *Limiting speeds and reference speeds in the product tables*

The product tables give two speeds for the bearings ➤ *1110|▦*:

- the kinematic limiting speed n_G
- the thermal speed rating $n_{\vartheta r}$.

Limiting speed

The limiting speed n_G is the kinematically permissible speed of a bearing. Even under favourable mounting and operating conditions, this value should not be exceeded without prior consultation with Schaeffler ➤ *64*. The values in the product tables are valid for oil lubrication.

✎ *Values for grease lubrication*

For grease lubrication, 25% of the value stated in the product tables is permissible in each case.

Reference speeds

✎ *$n_{\vartheta r}$ is used to calculate n_ϑ*

The thermal speed rating $n_{\vartheta r}$ is not an application-oriented speed limit, but is a calculated ancillary value for determining the thermally safe operating speed n_ϑ ➤ *64*.

1.7 Noise

Schaeffler Noise Index

The Schaeffler Noise Index (SGI) is not yet available for this bearing type ➤*69*. The data for these bearing series will be introduced and updated in stages.

Further information:

- ***medias*** ➤ *https://medias.schaeffler.com*.

1.8 Temperature range

✎ *Limiting values*

The operating temperature of the bearings is limited by:

- the dimensional stability of the bearing washers and needle rollers
- the cage
- the lubricant.

Possible operating temperatures of axial needle roller bearings ➤*1104*|▦ *1*.

▦ ***1***
Permissible temperature ranges

Operating temperature	Corrosion-resistant design (with Corrotect coating) or polyamide PA66	Bearings with sheet steel cage
	–20 °C to +120 °C	–20 °C to +120 °C

In the event of anticipated temperatures which lie outside the stated values, please contact Schaeffler.

1.9 Cages

✎ *The standard cages are made from sheet steel*

Standard cages ➤*1104*|▦ *2*. Other cage designs are available by agreement. With such cages, however, suitability for high speeds and temperatures as well as the basic load ratings may differ from the values for the bearings with standard cages.

For high continuous temperatures and applications with difficult operating conditions, bearings with sheet metal cages should be used. If there is any uncertainty regarding cage suitability, please consult Schaeffler.

▦ ***2***
Cage, cage suffix, inner cage diameter

Bearing series	Solid cage made from polyamide PA66 TV	Sheet steel cage	Corrosion-resistant design (with Corrotect coating) RR
	Inner cage diameter		
AXK	up to 8	from 10	Available by agreement
AXW	–	from 10	Available by agreement

1.10 Internal clearance

✎ *Axial clearance and preload are determined by the application*

In the case of axial needle roller bearings, the internal clearance (axial clearance) is only achieved when the bearings are mounted. The requisite axial clearance of the bearing arrangement is dependent on the application and must take account of the conditions in the bearing arrangement while warm from operation and subjected to load. If axial needle roller bearings are subjected to vibrations while under predominantly static load, for example, they must be lightly preloaded. Preload can be applied, for example, using calibrated sheets (shims). Other suitable means include shaft nuts, disc springs etc. ➤*1107*|*1.15*. It must always be ensured that no slippage occurs in operation between the rolling elements and raceways ➤*1107*|*1.15*.

If there is any uncertainty regarding correct setting, please consult Schaeffler.

1.11 Dimensions, tolerances

Dimension standards

The main dimensions of axial needle roller bearings correspond to ISO 104:2015. The main dimensions of axial needle roller and cage assemblies correspond to DIN 5405-2:2016, while those of axial bearing washers correspond to DIN 5405-3:2016. Axial needle roller bearings with centring spigot are not standardised.

Tolerances

Axial bearing washers adapt to the accuracy of the abutment surface. They are flat under a minimum concentric load of 200 N.

Tolerances for the bore and outside diameter as well as for the width of the bearing parts ➤*1105*|▦*3* and ➤*1105*|⧉*6*.

The sort tolerances and sort intervals of the needle roller diameters correspond to ISO 3096:1996 or DIN 5402-3:2012, grade G2.

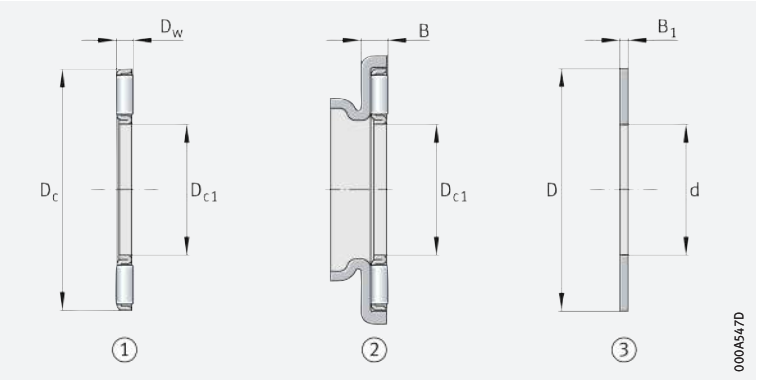
The diameter sort tolerance of the needle rollers in the axial needle roller and cage assemblies AXW is 2 µm.

▦*3*
Tolerances of bearing parts

Series	Bore		Outside diameter		Height	
		Tolerance class		Tolerance class		Deviations mm
AXK	D_{c1}	E11	D_c	c12	D_w	0 −0,01
AXW	D_{c1}	E12	–	–	B	0 −0,2
AS	d	E12	D	e12	B_1	±0,05

⧉*6*
Bearing parts

① *Axial needle roller and cage assembly AXK*
② *Axial needle roller bearing AXW*
③ *Axial bearing washer AS*



1.12 Suffixes

For a description of the suffixes used in this chapter ➤*1105*|▦*4* and ***medias*** interchange ➤*https://www.schaeffler.de/std/1D52*.

▦*4*
Suffixes and corresponding descriptions

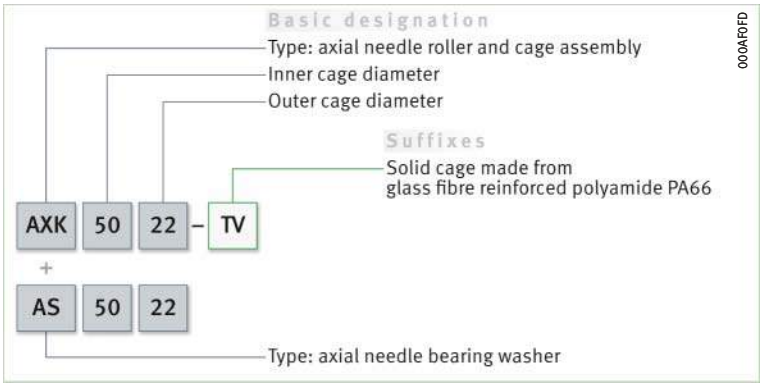
Suffix	Description of suffix	
RR	Corrosion-resistant design, with Corrotect coating	Special design, available by agreement
TV	Plastic cage made from glass fibre reinforced polyamide PA66	Standard

1.13 Structure of bearing designation

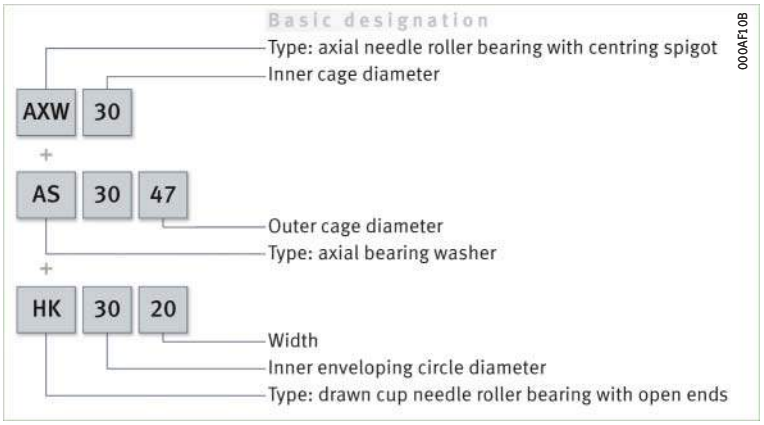
✎ *Examples of composition of bearing designation*

The designation of bearings follows a set model. Examples ➤*1106*|🗀*7* and ➤*1106*|🗀*8*. The composition of designations for axial needle roller and cage assemblies and axial bearing washers is subject to DIN 623-1 ➤*102*|🗀*10*.

🗀**7**
Axial needle roller bearing, comprising axial needle roller and cage assembly and axial bearing washers



🗀**8**
Axial needle roller bearing with centring spigot, combined with axial bearing washer and drawn cup needle roller bearing with open ends



1.14 Dimensioning

Equivalent dynamic bearing load

Axial cylindrical roller bearings can only support axial forces ➤*1103*|*1.2*. In the rating life equation, P is therefore substituted by the value for F_a ➤*1106*|*ƒ1*.

ƒ1
Equivalent dynamic load

$$P = F_a$$

Legend

P	N	Equivalent dynamic bearing load
F_a	N	Axial load.

Equivalent static bearing load

✎ *Combined loads are not possible*

In relation to the direction of load, the same conditions apply as for the equivalent dynamic bearing load, i. e. combined loads are not permissible. In the rating life equation, P_0 is therefore substituted by the value for F_{0a} ➤*1106*|*ƒ2*.

ƒ2
Equivalent static load

$$P_0 = F_{0a}$$

Legend

P_0	N	Equivalent static bearing load
F_{0a}	N	Largest axial load present (maximum load).

Static load safety factor

✎ $S_0 = C_0/P_0$

In addition to the basic rating life L (L_{10h}), it is also always necessary to check the static load safety factor S_0 ➤1107|ƒ3.

ƒ3 *Static load safety factor*

$$S_0 = \frac{C_0}{P_0}$$

Legend

S_0	–	Static load safety factor
C_0	N	Basic static load rating
P_0	N	Equivalent static bearing load.

1.15 Minimum load

✎ *Rolling bearings under low loads are particularly prone to slippage*

In order to prevent slippage damage, the bearing must be subjected to a minimum axial load $F_{a\,min}$ ➤1107|ƒ4. In vertical bearing arrangements in particular, the requisite minimum axial load $F_{a\,min}$ is normally achieved, however, simply by the weight of the bearing parts and the external forces. If this is not the case, the bearing arrangement must be preloaded, for example by means of springs or a shaft nut ➤1104|1.10.

ƒ4 *Minimum axial load*

$$F_{a\,min} = 0{,}0005 \cdot C_{0a} + k_a \left(\frac{C_{0a} \cdot n}{10^8} \right)^2$$

Legend

$F_{a\,min}$	N	Minimum axial load
C_{0a}	N	Basic static load rating, axial
k_a	–	Factor for determining the minimum load; $k_a = 3$
n	min^{-1}	Speed.

1.16 Design of bearing arrangements

Design of adjacent parts

Axial needle roller bearings cannot tolerate angular misalignments ➤1103|1.3. The locating surfaces for the bearing parts on the shaft and in the housing must therefore be vertical to the shaft axis, while the adjacent parts must be rigid and flat. They must be configured such that the bearing washers are supported as far as possible over the whole circumference and over the whole raceway width.

Running surfaces of rolling elements in direct bearing arrangements with needle roller and cage assemblies

✎ *Produce the running surfaces as a rolling bearing raceway*

For the very smallest axial design space, axial needle roller and cage assemblies can also run directly (i.e. without axial bearing washers) on the adjacent construction. In this case – and if the load carrying capacity of the axial needle roller and cage assemblies is to be fully utilised – the raceways on the shaft and in the housing must be produced as a rolling bearing raceway or must correspond to the quality and hardness of axial bearing washers. When designing the raceway on the shaft and in the housing, the raceway dimensions E_a and E_b of axial needle roller and cage assemblies must be observed ➤1110|▦. If the values are observed, this will ensure that the raceways for the needle rollers – taking account of any possible axial offset of the needle roller and cage assembly – are adequately dimensioned.

Raceway design

Design of running surfaces:

- raceway hardness 670 HV to 840 HV
- radial cage guidance surfaces Ramax 0,8 (Rzmax 4)
- surface hardening depth SHD ≧ 140 · $D_w/R_{p0,2}$
  - SHD = surface hardening depth in mm
  - D_w = rolling element diameter in mm
  - $R_{p0,2}$ = proof stress in N/mm²
- roughness Ramax 0,2 (Rzmax 1)
- raceway dimensions E_a and E_b according to the product tables must be observed
- total axial runout tolerances to ISO tolerance grade IT5 (for special requirements IT4) relative to the inside diameter of the axial needle roller and cage assemblies D_{c1} must be observed.

Tolerances for shaft and housing bore

Proven tolerances are given in ➤*1108*|▦*5*. If the data are observed, this will give correct radial guidance of the bearing elements.

▦ **5**
Tolerances for shafts and housing bores

Bearing component		Tolerance class[1] for	
		Shaft	Bore
AXK	Shaft guided	h8	–
AS	Externally centred as housing locating washer	Shaft released	H9
	Internally centred as shaft locating washer	h8	Bore released

[1] *The envelope requirement Ⓔ applies.*

Tolerances for the centring spigot in the housing bore

Where axial needle roller bearings AXW are to be combined with drawn cup needle roller bearings with open ends or closed end, or with needle roller bearings, the bore tolerances selected for the bore of the centring spigot in the housing must be the same as for the radial bearings ➤*1100*|*1.1*, ➤*1102*|⧉*4* and ➤*1102*|⧉*5*.

Release and guidance of bearing parts

Release of shaft and housing locating washers

If the bearing washers are centred on the shaft, they must have radial clearance in the housing bore while, if they are centred in the housing, there must be radial clearance between the washer bore and the shaft ➤*1108*|▦*5*.

Guidance of axial needle roller and cage assemblies

In order to achieve the lowest possible sliding speeds on the guidance surfaces, the axial needle roller and cage assemblies are generally guided on the shaft. This is particularly important in the case of high speeds.

1.17 Mounting and dismounting

The mounting and dismounting options for the bearings must be taken into consideration in the design of the bearing position.

As the bearings are not self-retaining, they are easy to mount

Axial needle roller bearings are not self-retaining. As a result, the bearing parts can be mounted separately from each other. This gives simplified mounting of the bearings.

Mounting position of bearing washers

The axial bearing washers AS must be suitable as a raceway on both sides, i.e. either side of the washer can face towards the needle rollers.

Schaeffler Mounting Handbook

Rolling bearings must be handled with great care

Rolling bearings are well-proven precision machine elements for the design of economical and reliable bearing arrangements, which offer high operational security. In order that these products can function correctly and achieve the envisaged operating life without detrimental effect, they must be handled with care.

The Schaeffler Mounting Handbook MH 1 gives comprehensive information about the correct storage, mounting, dismounting and maintenance of rotary rolling bearings ➤ *https://www.schaeffler.de/std/1D53*. It also provides information which should be observed by the designer, in relation to the mounting, dismounting and maintenance of bearings, in the original design of the bearing position. This book is available from Schaeffler on request.

1.18 Legal notice regarding data freshness

The further development of products may also result in technical changes to catalogue products

Of central interest to Schaeffler is the further development and optimisation of its products and the satisfaction of its customers. In order that you, as the customer, can keep yourself optimally informed about the progress that is being made here and with regard to the current technical status of the products, we publish any product changes which differ from the printed version in our electronic product catalogue.

We therefore reserve the right to make changes to the data and illustrations in this catalogue. This catalogue reflects the status at the time of printing. More recent publications released by us (as printed or digital media) will automatically precede this catalogue if they involve the same subject. Therefore, please always use our electronic product catalogue to check whether more up-to-date information or modification notices exist for your desired product.

Link to electronic product catalogue

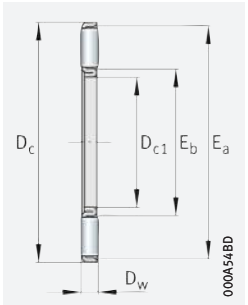
The following link will take you to the Schaeffler electronic product catalogue: ➤ *https://medias.schaeffler.com*.

1.19 Further information

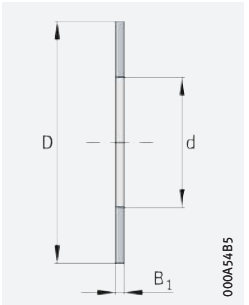
In addition to the data in this chapter, the following chapters in Technical principles must also be observed in the design of bearing arrangements:

- Determining the bearing size ➤ *34*
- Rigidity ➤ *54*
- Friction and increases in temperature ➤ *56*
- Speeds ➤ *64*
- Bearing data ➤ *97*
- Lubrication ➤ *70*
- Sealing ➤ *182*
- Design of bearing arrangements ➤ *139*
- Mounting and dismounting ➤ *191*.

Axial needle roller and cage assemblies
Axial bearing washers



AXK

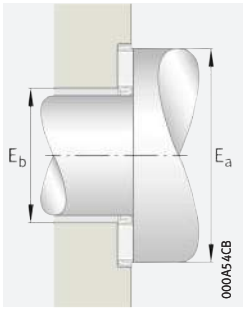


AS

D_{c1} = 4 – 160 mm

Main dimensions				Basic load ratings		Fatigue limit load	Limiting speed	Speed rating
D_{c1} d	D_c D	D_w	B_1	dyn. C_a N	stat. C_{0a} N	C_{ua} N	n_G min^{-1}	$n_{\vartheta r}$ min^{-1}
4	14	2	1	4 400	8 000	940	21 500	15 100
5	15	2	1	4 750	9 200	1 070	20 600	13 100
6	19	2	1	6 800	15 500	1 580	18 900	11 000
8	21	2	1	7 800	19 400	1 970	17 800	8 900
10	24	2	1	9 200	25 500	2 500	16 900	7 400
12	26	2	1	9 900	29 000	2 850	15 200	6 500
15	28	2	1	11 300	36 000	3 600	13 200	4 950
17	30	2	1	11 900	39 500	3 950	12 100	4 500
20	35	2	1	13 100	46 500	4 750	10 500	4 350
25	42	2	1	14 700	58 000	5 900	8 400	3 700
30	47	2	1	16 300	70 000	7 100	7 300	3 100
35	52	2	1	17 800	81 000	8 300	6 500	2 700
40	60	3	1	28 000	114 000	11 800	5 600	2 340
45	65	3	1	30 000	128 000	13 300	5 100	2 100
50	70	3	1	32 000	143 000	14 800	4 700	1 890
55	78	3	1	38 000	186 000	20 300	4 250	1 730
60	85	3	1	44 500	234 000	26 500	3 900	1 550
65	90	3	1	46 500	255 000	28 500	3 650	1 430
70	95	4	1	54 000	255 000	26 500	3 450	1 400
75	100	4	1	55 000	265 000	28 000	3 250	1 340
80	105	4	1	56 000	280 000	29 500	3 100	1 260
85	110	4	1	58 000	290 000	30 500	2 950	1 200
90	120	4	1	73 000	405 000	44 500	2 700	1 100
100	135	4	1	91 000	560 000	58 000	2 420	970
110	145	4	1	97 000	620 000	63 000	2 230	880
120	155	4	1	102 000	680 000	68 000	2 070	800
130	170	5	1	133 000	840 000	75 000	1 900	750
140	180	5	1	138 000	900 000	79 000	1 780	700
150	190	5	1	143 000	960 000	82 000	1 680	660
160	200	5	1	148 000	1 020 000	86 000	1 590	620

medias ➤ *https://www.schaeffler.de/std/1D9C*

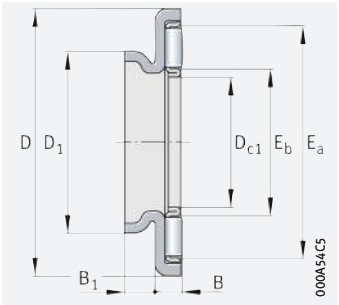


Mounting dimensions/raceway dimensions for direct bearing arrangement

	Axial needle roller and cage assemblies		Axial bearing washers		Raceway dimensions	
	Mass	Designation ➤*1105|1.12* ➤*1106|1.13*	Mass	Designation ➤*1105|1.12* ➤*1106|1.13*		
d D_{c1}	m ≈ g		m ≈ g		E_b	E_a
4	0,7	**AXK0414-TV**	1	**AS0414**	5	13
5	0,8	**AXK0515-TV**	1	**AS0515**	6	14
6	1	**AXK0619-TV**	2	**AS0619**	7	18
8	2	**AXK0821-TV**	2	**AS0821**	9	20
10	3	**AXK1024**	3	**AS1024**	12	23
12	3	**AXK1226**	3	**AS1226**	14	25
15	4	**AXK1528**	3	**AS1528**	17	27
17	4	**AXK1730**	4	**AS1730**	19	29
20	5	**AXK2035**	5	**AS2035**	22	34
25	7	**AXK2542**	7	**AS2542**	29	41
30	8	**AXK3047**	8	**AS3047**	34	46
35	10	**AXK3552**	9	**AS3552**	39	51
40	16	**AXK4060**	12	**AS4060**	45	58
45	18	**AXK4565**	13	**AS4565**	50	63
50	20	**AXK5070**	14	**AS5070**	55	68
55	28	**AXK5578**	18	**AS5578**	60	76
60	33	**AXK6085**	22	**AS6085**	65	83
65	35	**AXK6590**	24	**AS6590**	70	88
70	60	**AXK7095**	25	**AS7095**	74	93
75	61	**AXK75100**	27	**AS75100**	79	98
80	63	**AXK80105**	28	**AS80105**	84	103
85	67	**AXK85110**	29	**AS85110**	89	108
90	86	**AXK90120**	39	**AS90120**	94	118
100	104	**AXK100135**	50	**AS100135**	105	133
110	122	**AXK110145**	55	**AS110145**	115	143
120	131	**AXK120155**	59	**AS120155**	125	153
130	205	**AXK130170**	65	**AS130170**	136	167
140	219	**AXK140180**	79	**AS140180**	146	177
150	232	**AXK150190**	84	**AS150190**	156	187
160	246	**AXK160200**	89	**AS160200**	166	197

Axial needle roller bearings

With centring spigot



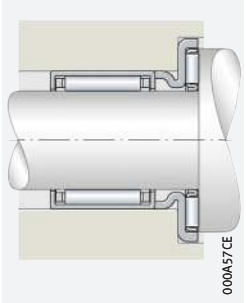
AXW

D_{c1} = 10 – 50 mm

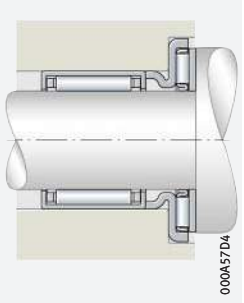
Main dimensions			Basic load ratings		Fatigue limit load	Limiting speed	Speed rating	Mass	Designation
D_{c1}	D	B	dyn. C_a	stat. C_{0a}	C_{ua}	n_G	$n_{\vartheta r}$	m	➤*1105*|*1.12* ➤*1106*|*1.13*
			N	N	N	min^{-1}	min^{-1}	≈ g	
10	27	3,2	9 200	25 500	2 500	16 900	9 300	8,3	**AXW10**
12	29	3,2	9 900	29 000	2 850	15 200	8 100	9,1	**AXW12**
15	31	3,2	11 300	36 000	3 600	13 200	6 200	10	**AXW15**
17	33	3,2	11 900	39 500	3 950	12 100	5 600	11	**AXW17**
20	38	3,2	13 100	46 500	4 750	10 500	5 300	14	**AXW20**
25	45	3,2	14 700	58 000	5 900	8 400	4 350	20	**AXW25**
30	50	3,2	16 300	70 000	7 100	7 300	3 650	22	**AXW30**
35	55	3,2	17 800	81 000	8 300	6 500	3 150	27	**AXW35**
40	63	4,2	28 000	114 000	11 800	5 600	2 700	39	**AXW40**
45	68	4,2	30 000	128 000	13 300	5 100	2 400	43	**AXW45**
50	73	4,2	32 000	143 000	14 800	4 700	2 160	49	**AXW50**

medias ➤ *https://www.schaeffler.de/std/1D9D*

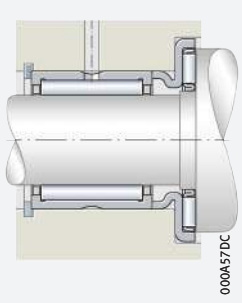
Combination with radial needle roller bearings, drawn cup needle roller bearings with open ends, drawn cup needle roller bearings with closed end



AXW with HK



AXW with AS and HK



AXW with NK, NKS, RNA49, RNA69

Dimensions			Raceway dimensions		Axial bearing washers ➤*1110*	Drawn cup needle roller bearings with open ends ➤*886*		Drawn cup needle roller bearings with closed end ➤*886*	Needle roller bearings ➤*914*	
D_{c1}	D_1	B_1	E_b	E_a	AS	HK	HK..-RS	BK	NK, NKS, RNA49, RNA69	NKI, NKIS, NA49, NA69
10	14	3	12	23	AS1024	HK1010 HK1012 HK1015	–	BK1010 BK1012 BK1015	NK7/10-TV NK7/12-TV	–
12	16	3	14	25	AS1226	HK1210	–	BK1210	NK9/12-TV NK9/16-TV	NKI6/12-TV NKI6/16-TV
15	21	3,5	17	27	AS1528	HK1512 HK1516 HK1522-ZW	HK1514-RS	BK1512 BK1516	–	–
17	23	3,5	19	29	AS1730	HK1712	–	–	NK15/16 NK15/20	–
20	26	3,5	22	34	AS2035	HK2012 HK2016 HK2020 HK2030-ZW	HK2018-RS	BK2016 BK2020	NK18/16 NK18/20	–
25	32	4	29	41	AS2542	HK2512 HK2516 HK2520 HK2526 HK2538-ZW	HK2518-RS	BK2520 BK2526 BK2538-ZW	NK24/16 NK24/20 NKS20	NKI20/16 NKI20/20
30	37	4	34	46	AS3047	HK3012 HK3016 HK3020 HK3026 HK3038-ZW	HK3018-RS	BK3012 BK3016 BK3020 BK3026 BK3038-ZW	NK28/20 NK28/30 NKS24 RNA4904 RNA6904	NA4904 NA6904
35	42	4	39	51	AS3552	HK3512 HK3516 HK3520	HK3518-RS	BK3520	NK32/20-TV NK32/30 NKS28 RNA4905 RNA6905	NKIS20 NA4905 NA6905 NKI28/20-TV NKI28/30
40	47	4	45	58	AS4060	HK4012 HK4016 HK4020	HK4018-RS	BK4020	NK37/20 NK37/30 NKS32 RNA4906 RNA6906	NKIS25 NA4906 NA6906 NKI32/20 NKI32/30
45	52	4	50	63	AS4565	HK4516 HK4520	HK4518-RS	BK4520	NK42/20 NK42/30 NKS37 RNA49/32 RNA69/32-ZW	NKIS30 NA49/32 NA69/32-ZW
50	58	4,5	55	68	AS5070	HK5020 HK5025	HK5022-RS	–	NKS43	NKIS35

Axial spherical roller bearings

FAG

Matrix for bearing preselection

The matrix gives an overview of the types and design features of axial spherical roller bearings.

It can be used to make a preliminary assessment of whether a bearing is fundamentally suitable for the envisaged application.

The additional information provided in the product chapter (see column "detailed information") and in the Technical principles must, however, be observed in addition to this overview in selection of the bearing.

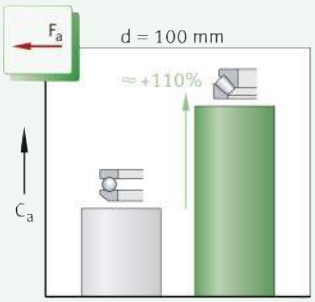
Design features and suitability			Axial spherical roller bearings	
+++ extremely suitable ++ highly suitable + suitable (+) suitable with restrictions – not suitable/not applicable ✓ available				detailed information ➤ 1118
Load carrying capacity	radial		+	➤ 1120|1.2
	axial, one direction		+++	➤ 1120|1.2
	axial, both directions		–	➤ 1120|1.2
	moments		–	
Compensation of angular misalignments	static		+++	➤ 1121|1.3
	dynamic		+	➤ 1121|1.3
Bearing design	cylindrical bore		✓	➤ 1118|1.1
	tapered bore		–	
	separable		✓	➤ 1128|1.17
Lubrication	greased		–	➤ 1121|1.4
Sealing	open		✓	➤ 1122|1.5
	non-contact		–	➤ 1122|1.5
	contact		–	➤ 1122|1.5
Operating temperature in °C	from to		–30 +200	➤ 1123|1.8
Suitability for	high speeds		+	➤ 1122|1.6
	high running accuracy		+	➤ 1123|1.11 ➤ 114
	low-noise running		(+)	➤ 1122|1.7 ➤ 27
	high rigidity		++	➤ 54
	reduced friction		++	➤ 56
	length compensation within bearing		–	
	non-locating bearing arrangement		–	
	locating bearing arrangement		(+)	➤ 139
X-life bearings		X-life	✓	➤ 1119
Bearing bore d in mm	from to		60 1600	➤ 1130
Product tables	from page ➤		1130	

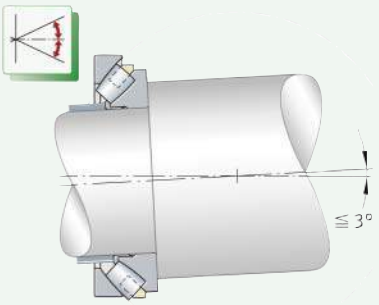
1 Axial spherical roller bearings

Axial spherical roller bearings are suitable where:

- bearing arrangements are subjected to high and very high axial loads ➤*1120*|*1.2*
- dynamic or static misalignments of the shaft relative to the housing, or deflections of the shaft, must be compensated by the bearing under axial loads ➤*1121*|*1.3*
- radial loads occur in addition to axial forces (maximum 55% of F_a) ➤*1120*|*1.2*
- a relatively high speed suitability is required in addition to a high load carrying capacity ➤*1122*|*1.6*
- high shock type loads must be supported
- bearing parts are to be mounted separately (the bearings are not self-retaining) ➤*1118*|*1.1*.

For an overview of other product-specific features, see the Matrix for bearing preselection ➤*1117*.





1 *Axial spherical roller bearing: comparison of load carrying capacity with axial deep groove ball bearing, compensation of misalignments*

F_a = *axial load*
C_a = *basic axial dynamic load rating*

1.1 Bearing design

Design variants

Axial spherical roller bearings are available in the basic design as:

- an increased capacity design with sheet steel cage or solid brass cage ➤*1119*|*2*.

X-life bearings

The bearings are available in the majority of sizes as X-life bearings ➤*1119*|*3*.

The bearing design is dependent on the bearing series and the bearing size. It essentially differs in the configuration and guidance of the cage ➤*1123*|*1.9*.

Bearings of basic design

The raceway in the housing locating washer has a curved form

Axial spherical roller bearings are part of the group of axial roller bearings. These single row, non-self-retaining rolling bearings comprise solid shaft and housing locating washers with raceways for the rolling elements. Cages guide the large number of asymmetrical barrel rollers ➤*1123*|*1.9*. The cage, roller and cage assembly, and shaft locating washer form a self-retaining unit. The raceways are arranged oblique to the bearing axis, the raceway in the housing locating washer is of a concave design. This design allows these bearings to combine a range of characteristics, which are essential to many applications, in one bearing, such as angular adjustability for example ➤*1121*|*1.3*.

Roller contact design

The stress distribution at the contact points between the rollers and raceways is determined by the contact surface of the rollers. As a result, the roller geometry is matched to the raceway. This gives a favourable load distribution over the entire length of the roller and thus prevents both edge stresses and stress peaks at the ends of the roller.

Increased capacity design with sheet steel cage or solid brass cage

Bearings with sheet steel cage

Bearings without a cage suffix have coated sheet steel cages, which are guided by rollers ➤*1119*|*2* and ➤*1123*|*1.9*. These designs are available as X-life bearings ➤*1119*.

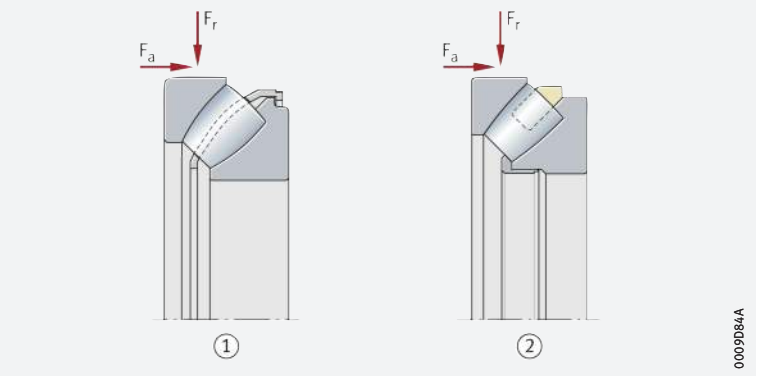
Bearings with solid brass cage

Bearings with the cage suffix MB have solid brass cages that are guided on the shaft locating washer or by the rollers ➤*1119*|*2* and ➤*1123*|*1.9*. The MB design is also available in numerous sizes as X-life bearings ➤*1119*.

2
Axial spherical roller bearings of basic design

F_r = *radial load*
F_a = *axial load*

① *Increased capacity design, with sheet steel cage*
② *Increased capacity design, with solid brass cage*



X-life premium quality

X-life bearings exhibit considerably higher performance than conventional axial spherical roller bearings. This is achieved, for example, through the modified internal construction, the optimised contact geometry between the rollers and raceways, the new cage design, a higher steel quality, better surface quality and optimised roller guidance and lubricant film formation.

3
Axial spherical roller bearing in X-life design

① *Cage*
② *Barrel roller*
③ *Housing locating washer*
④ *Shaft locating washer*

Advantages

Increased customer benefits due to X-life

These technical enhancements offer a range of advantages, such as:

- a more favourable load distribution in the bearing and thus a higher dynamic load carrying capacity of the bearings
- downsizing possible, increased performance density
- a higher fatigue limit load
- a higher running accuracy and smooth running
- running with reduced friction and greater energy efficiency
- lower heat generation in the bearing
- higher possible speeds
- lower lubricant consumption and therefore longer maintenance intervals if relubrication is carried out
- a measurably longer operating life of the bearings
- high operational security
- compact, environmentally-friendly bearing arrangements.

Lower operating costs, higher machine availability

In conclusion, these advantages improve the overall cost-efficiency of the bearing position significantly and thus bring about a sustainable increase in the efficiency of the machine and equipment.

Suffix XL

X-life axial spherical roller bearings include the suffix XL in the designation ➤*1124*|*1.12* and ➤*1130*|▦.

Areas of application

Wide application range

Due to their special technical features, X-life axial spherical roller bearings are highly suitable for bearing arrangements in:

- refiners and worm extruders in the pulp and paper industry
- drilling rigs and roll pressers in the cement industry, mining and raw material processing
- work rolls and back-up rolls in cold rolling mills
- extruder gearboxes in chemical plant and refineries
- air preheaters in thermal power stations
- POD and azimuth drives in marine propulsion systems.

X-life indicates a high product performance density and thus a particularly significant benefit to the customer. Further information on X-life ➤*10*.

1.2 Load carrying capacity

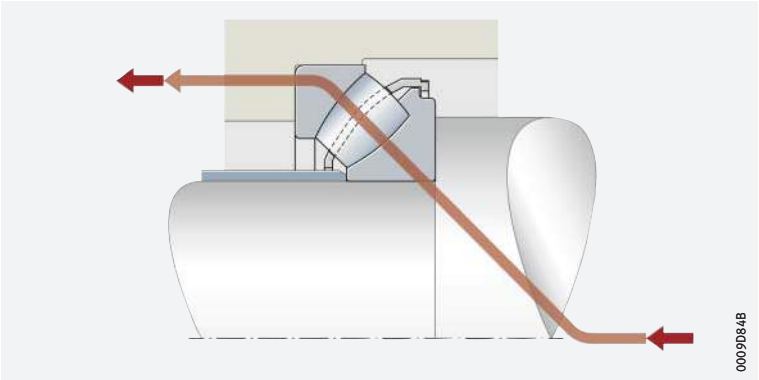
Designed for very high axial loads and high radial loads

Axial spherical roller bearings can support very high axial loads in one direction and – since the raceways are inclined relative to the bearing axis – radial loads acting simultaneously. They are designed for very high load carrying capacity and, since they have the maximum possible number of large and long barrel rollers, are also suitable for the heaviest loads. As a result of the inclined raceways, the load is transmitted from one raceway to the other oblique to the bearing axis ➤*1121*|⧉*4*. Due to the optimised osculation conditions between the rollers and raceways, uniform stress distribution is achieved in the bearing.

The radial load (F_r, F_{0r}) must not exceed 55% of the axial load ➤*1125*|*f1* and ➤*1125*|*f2*.

4
Force flow under axial load

The load is transmitted from one raceway to the other oblique to the bearing axis.



1.3 Compensation of angular misalignments

Axial spherical roller bearings compensate dynamic and static angular misalignments

Due to the concave rolling element raceway in the housing locating washer, axial spherical roller bearings are capable of angular adjustment. As a result, they permit skewing between the shaft locating washer and housing locating washer within certain limits, without causing damage to the bearings or impairing their function. In this way, they can compensate misalignment, shaft deflection and housing deformation ➤*1121*|▦ *1*. The extent to which these table values can be used in practice is, however, essentially dependent on the design of the bearing arrangement, the type of seal and other factors.

Permissible adjustment angle

The adjustment angles given in the table are permissible under the following conditions:

- P or $P_0 \leqq 0{,}05 \cdot C_{0a}$.
- The angular deviation is constant (static angular misalignment).
- The rotating component is the shaft locating washer.

1
Permissible skewing under static misalignment

D = *bearing outside diameter*

Bearing series	Permissible skewing	
	D < 320 mm	D ≧ 320 mm
292..-E1	1,5°	1°
293..-E1	2,5°	1,5°
294..-E1	3°	2°

If the rotating component is the housing locating washer or the shaft locating washer undergoes tumbling motion, the angular adjustment facility is smaller. In such cases, please consult Schaeffler.

1.4 Lubrication

Oil lubrication is predominantly used

Axial spherical roller bearings are not greased. They are generally lubricated using oil. In some cases, lubrication with greases containing EP additives is also possible. In this instance, however, it must be ensured that the contact points between the rollers and the guidance rib are always adequately supplied with grease. This is best achieved if the bearing is completely filled with grease and regularly relubricated.

Pay attention to the pumping action in bearings with oil lubrication

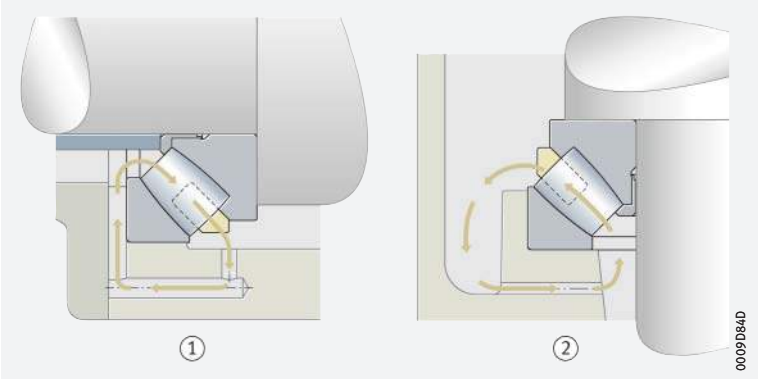
Due to their internal construction, a pumping action occurs in bearings with an asymmetrical cross-section. This pumping action, which is heavily dependent on the circumferential speed, can be used under certain conditions to generate oil recirculation in the bearing ➤*1122*|🗗 *5*. The pumping action is present in bearing arrangements with a horizontal and vertical shaft and must be taken into account when selecting the lubrication and sealing method.

The volume flow generated by the bearings can easily reach a throughput of > 50 l/min. In order to give appropriate possibilities for compensation, ducts for the purposes of oil return must therefore be included in the housing ➤*1122*|5.

If there is any uncertainty regarding the suitability of the selected lubricant for the application, please consult Schaeffler or the lubricant manufacturer.

5
Oil recirculation by means of pumping action, ducts for the purposes of oil return

① *Bearing arrangement with horizontal shaft*
② *Bearing arrangement with vertical shaft*



1.5 Sealing

The bearings are of an open design; provide seals in the adjacent construction

Axial spherical roller bearings are supplied without seals. In the case of unsealed bearings, sealing of the bearing position must be carried out in the adjacent construction. The sealing system should reliably prevent:

- moisture and contaminants from entering the bearing
- the egress of lubricant from the bearing position.

1.6 Speeds

Speeds in the product tables

The achievable operating speed is dependent on the application, the associated loads and the lubrication. The product tables generally give two speeds for the bearings ➤*1130*|:

- the kinematic limiting speed n_G
- the thermal speed rating $n_{\vartheta r}$.

Limiting speeds

The limiting speed n_G is the kinematically permissible speed of the bearing. Even under favourable mounting and operating conditions, this value should not be exceeded without prior consultation with Schaeffler ➤*64*.

Reference speeds

$n_{\vartheta r}$ is used to calculate n_ϑ

The thermal speed rating $n_{\vartheta r}$ is not an application-oriented speed limit, but is a calculated ancillary value for determining the thermally safe operating speed n_ϑ ➤*64*.

1.7 Noise

Schaeffler Noise Index

The Schaeffler Noise Index (SGI) is not yet available for this bearing type ➤*69*. The data for these bearing series will be introduced and updated in stages.

Further information:

- ***medias*** ➤ *https://medias.schaeffler.com*.

1.8 Temperature range

Limiting values

The operating temperature of the bearings is limited by:

- the dimensional stability of the bearing rings and rolling elements
- the cage
- the lubricant.

Possible operating temperatures of axial spherical roller bearings ➤*1123*|▦ *2*.

▦ **2** *Permissible temperature ranges*

Operating temperature	Axial spherical roller bearings with sheet steel or brass cage
	–30 °C to +200 °C, limited by the lubricant

In the event of anticipated temperatures which lie outside the stated values, please contact Schaeffler.

1.9 Cages

Sheet steel cages or solid brass cages are used as standard

Axial spherical roller bearings essentially differ in terms of their cage design ➤*1119*|⧉ *2*. The design is dependent on the bearing series and the bearing size ➤*1123*|▦ *3*. Sheet steel cages do not have a cage suffix in the designation ➤*1123*|▦ *3*. The cages have a high strength. They are suitable for high temperatures and all conventional lubricants.

If there is any uncertainty regarding cage suitability for a specific application, please consult Schaeffler.

▦ **3** *Cage, cage suffix, bore code*

Bearing series	Sheet steel cage	Solid brass cage MB
	Bore code	
292..-E1	–	30 to /1180
293..-E1-XL	17 to 64	68 to /800
293..-E1	–	/850 to /1600
294..-E1-XL	12 to 68	72 to /710
294..-E1	–	/750 to /1060

1.10 Internal clearance

The possible preload is determined by the application

In the case of axial spherical roller bearings, the axial preload is achieved when the bearings are mounted. The requisite preload is dependent on the application and must take account of the conditions in the bearing arrangement while warm from operation and subjected to load. It must always be ensured that no slippage occurs in operation between the rolling elements and raceways. A specific minimum axial load $F_{a\,min}$ must be acting on axial spherical roller bearings at all times ➤*1126*|*1.15*.

If there is any uncertainty regarding preload, please consult Schaeffler.

1.11 Dimensions, tolerances

Dimension standards

The main dimensions of axial spherical roller bearings correspond to ISO 104:2015 and DIN 728:1991.

Chamfer dimensions

The limiting dimensions for chamfer dimensions correspond to DIN 620-6:2004. Overview and limiting values ➤*138*. Nominal value of chamfer dimension ➤*1130*|▦.

Tolerances

The dimensional and running tolerances of shaft and housing locating washers correspond to the tolerance class Normal in accordance with ISO 199:2014 ➤*133*|▦*25* to ➤*135*|▦*28*.

✎ *Restricted section height tolerance*

The tolerances for section height T are considerably restricted for all axial spherical roller bearings compared to the standard values ➤*1124*|▦*4* and ➤*1130*|▦.

▦**4**
Tolerances for bearing section height

Nominal bore diameter mm		Deviation of bearing section height T µm	
over	incl.	upper	lower
50	80	0	−100
80	120	0	−100
120	180	0	−125
180	250	0	−125
250	315	0	−150
315	400	0	−200
400	500	0	−420
500	630	0	−500
630	800	0	−630
800	1 000	0	−800
1 000	1 250	0	−1 000
1 250	1 600	0	−1 200

1.12 Suffixes

For a description of the suffixes used in this chapter ➤*1124*|▦*5* and ***medias*** interchange ➤*https://www.schaeffler.de/std/1D52*.

▦**5**
Suffixes and corresponding descriptions

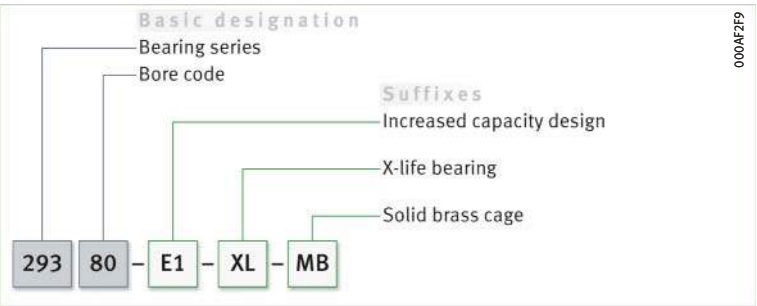
Suffix	Description of suffix	
E1	Increased capacity design	Standard
MB	Solid brass cage	
N1	One retaining slot in the housing locating washer	
N2	Two retaining slots offset by 180° in the housing locating washer	
THI	3 uniformly distributed threaded holes in one end face of the shaft locating washer	
THIE	3 uniformly distributed threaded holes in one end face of the shaft locating washer, incl. suitable eye bolts	
THO	3 uniformly distributed threaded holes in one end face of the housing locating washer	
THOE	3 uniformly distributed threaded holes in one end face of the housing locating washer, incl. suitable eye bolts	
XL	X-life bearing	

1.13 Structure of bearing designation

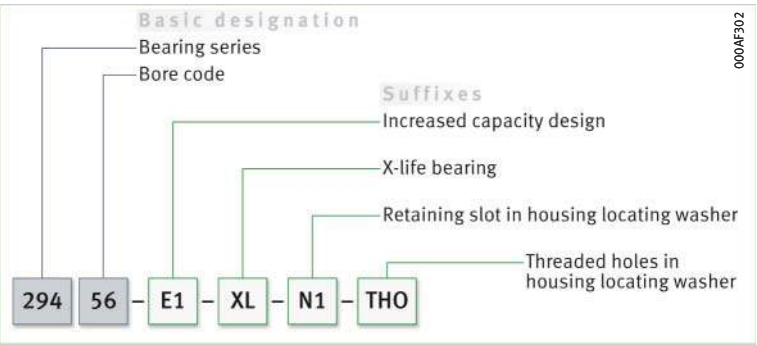
Examples of composition of bearing designation

The designation of bearings follows a set model. Examples ➤*1125*|🗐*6* and ➤*1125*|🗐*7*. The composition of designations is subject to DIN 623-1 ➤*102*|🗐*10*.

🗐**6**
Axial spherical roller bearing, X-life design: designation structure



🗐**7**
Axial spherical roller bearing, X-life design, with retaining slot and threaded holes: designation structure



1.14 Dimensioning

P = a substitute force for combined load and various load cases

Equivalent dynamic bearing load

The basic rating life equation $L = (C/P)^p$ used in the dimensioning of bearings under dynamic load assumes a load of constant magnitude and direction. In axial bearings, this is a purely axial and concentrically acting load. If this condition is not met, an equivalent dynamic bearing load P must be determined for the rating life calculation. In the case of axial bearings, this is a concentrically acting axial load of constant magnitude and direction, which has the same effect on the rating life as the load occurring in practice. Calculation ➤*1125*|*f1*.

f1
Equivalent dynamic load

$$P = F_a + 1{,}2 \cdot F_r$$

Legend

P	N	Equivalent dynamic bearing load
F_r	N	Radial load
F_a	N	Axial load.

The radial bearing load F_r must not exceed 55% of the axial load F_a:
$F_r \leqq 0{,}55 \cdot F_a$

Equivalent static bearing load

For axial spherical roller bearings subjected to static load ➤*1125*|*f2*.

f2
Equivalent static load

$$P_0 = F_{0a} + 2{,}7 \cdot F_{0r}$$

Legend

P_0	N	Equivalent static bearing load
F_{0r}, F_{0a}	N	Largest radial or axial load present (maximum load).

The radial bearing load F_{0r} must not exceed 55% of the axial load F_{0a}:
$F_{0r} \leqq 0{,}55 \cdot F_{0a}$

Static load safety factor

In addition to the basic rating life $L(L_{10h})$, it is also always necessary to check the static load safety factor S_0. The following values must be observed here ➤*1126*|▦*6*. Calculation of S_0 ➤*1126*|ƒ*3*.

ƒ*3*
Static load safety factor

$$S_0 = \frac{C_0}{P_0}$$

Legend

S_0	–	Static load safety factor
C_0	N	Basic static load rating
P_0	N	Equivalent static bearing load.

▦*6*
Values for static load safety factor

Static load safety factor S_0	Conditions
$S_0 \geqq 8$	Axial support by the abutment shoulders in accordance with the product tables (d_a and D_a) ➤*1130*|▦
$S_0 \geqq 6$	Full axial support of the housing and shaft locating washers by the entire mating surface, dimensions D_1 and d_1 ➤*1130*|▦
$S_0 \geqq 4$	Full axial support, dimensions D_1 and d_1 ➤*1130*|▦ together with good radial support of the housing locating washer (housing tolerance K7)

1.15 Minimum load

✎Rolling bearings under low loads are particularly prone to slippage

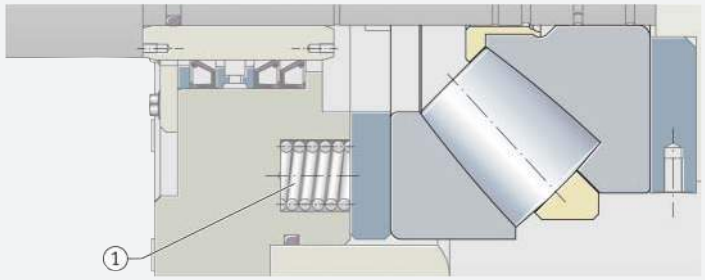
If the lubricant film is interrupted between the rolling elements and raceways as a result of slippage, the contact partners will come into contact at high relative velocity and the wear in the bearing will increase abruptly. The risk of slippage is particularly high where bearings are subjected to low loads. In order to prevent slippage damage and guarantee kinematics, a minimum axial load $F_{a\,min}$ must therefore be applied to the bearing ➤*1126*|ƒ*4* and ➤*1127*|▦*7*.

✎Preload the bearings, if the minimum axial load is not achieved

In vertical bearing arrangements in particular, the requisite minimum axial load $F_{a\,min}$ is normally already achieved by the weight of the supported parts and the external forces. If this is not the case, the bearing arrangement must be preloaded, for example by means of springs or a shaft nut ➤*1126*|⧉*8* and ➤*1123*|*1.10*. The minimum axial load must be ensured in all operating modes.

⧉*8*
Minimum axial load applied to an axial spherical roller bearing by means of spring preload

① *Pressure springs distributed uniformly around the circumference of the housing locating washer*



ƒ*4*
Minimum axial load

$$F_{a\,min} = 0{,}0005 \cdot C_{0a} + k_a \left(\frac{C_{0a} \cdot n}{10^8} \right)^2$$

Legend

$F_{a\,min}$	N	Minimum axial load
C_{0a}	N	Basic static load rating ➤*1130*|▦
k_a	–	Factor for determining the minimum load ➤*1127*|▦*7*
n	min^{-1}	Speed.

7 *Factor k_a for calculating the minimum axial load*

Bearing series	Factor k_a
292..-E1	0,6
293..-E1	0,9
294..-E1	0,7

1.16 Design of bearing arrangements

Design of adjacent parts

Support bearing washers over the circumference and width

The adjacent parts to the shaft and housing locating washers must be rigid, flat and perpendicular to the axis of rotation. They must be configured such that the bearing washers are supported over the whole circumference and over the whole raceway width; in particular, this must be observed under high loads. The axial runout tolerances of the contact surfaces for axial spherical roller bearings should be designed to IT5 or better ➤1127|8.

The housing bore must have a recess with a diameter $D_{b\ min}$ above the housing locating washer, otherwise the rollers may graze the housing in the event of shaft misalignments ➤1127|9. Dimensions for $D_{b\ min}$ ➤1130|.

E1 = bearings with new internal construction

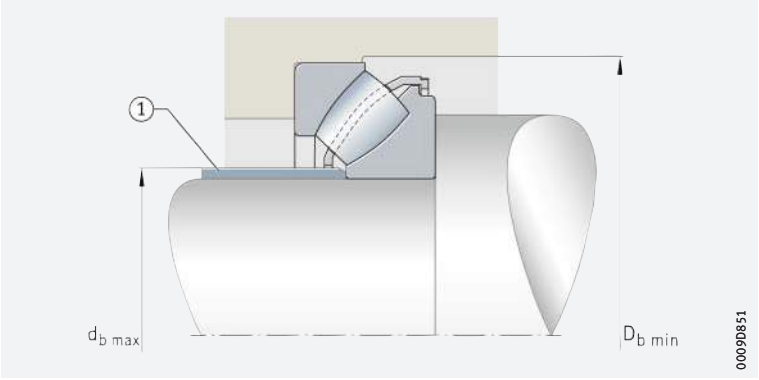
Due to the new internal construction of the E1 bearings, attention must be paid to the mounting dimensions. This also applies to the configuration of the spacer sleeve on the shaft locating washer (dimensions d_b, d_{b1}) ➤1130|.

9 *Release in the housing and maximum height of spacer sleeve*

$D_{b\ min}$ = *minimum dimension of recess in the housing*

d_{max} = *maximum height of spacer sleeve*

① *Spacer sleeve*



8 *Numerical values for ISO standard tolerances (IT grades) to ISO 286-1:2010*

IT grade	Nominal dimension in mm					
	over	50	80	120	180	250	315
	incl.	80	120	180	250	315	400
	Values in µm						
IT5		13	15	18	20	23	25

continued ▼

8 *Numerical values for ISO standard tolerances (IT grades) to ISO 286-1:2010*

IT grade	Nominal dimension in mm					
	over	400	500	630	800	1000	1250
	incl.	500	630	800	1000	1250	1600
	Values in µm						
IT5		27	32	36	40	47	55

continued ▲

Tolerances for shaft and housing bore

Observe point or circumferential load of bearing washers

Fits for the bearing rings of axial spherical roller bearings, as a function of the condition of rotation ➤*1128*| ▦ *9*. The conditions of rotation for shaft and housing locating washers must be taken into consideration when defining the fits (point or circumferential load).

▦ **9**
Conditions of rotation and fits

Adjacent part	Type of load	Operating conditions	Tolerance class[1)]
Shaft	Combined load	Point load for shaft locating washer	j6
		Circumferential load for shaft locating washer, shaft diameter up to 200 mm	j6 (k6)
		Circumferential load for shaft locating washer, shaft diameter from 200 mm	k6 (m6)
Housing	Axial load	Normal load	E8
		High load	G7
	Combined load	Point load for housing locating washer	H7
		Circumferential load for housing locating washer	K7

1) *The envelope requirement Ⓔ applies.*

If there is any uncertainty regarding the design of adjacent parts, please consult Schaeffler.

1.17 Mounting and dismounting

The mounting and dismounting options for the bearings must be taken into consideration in the design of the bearing position.

As the bearings are not self-retaining, they are easy to mount

Axial spherical roller bearings are not self-retaining. As a result, the bearing parts can be mounted separately from each other. This gives simplified mounting of the bearings.

Schaeffler Mounting Handbook

Rolling bearings must be handled with great care

Rolling bearings are well-proven precision machine elements for the design of economical and reliable bearing arrangements, which offer high operational security. In order that these products can function correctly and achieve the envisaged operating life without detrimental effect, they must be handled with care.

The Schaeffler Mounting Handbook MH 1 gives comprehensive information about the correct storage, mounting, dismounting and maintenance of rotary rolling bearings ➤*https://www.schaeffler.de/std/1D53*. It also provides information which should be observed by the designer, in relation to the mounting, dismounting and maintenance of bearings, in the original design of the bearing position. This book is available from Schaeffler on request.

1.18 Legal notice regarding data freshness

✎ The further development of products may also result in technical changes to catalogue products

Of central interest to Schaeffler is the further development and optimisation of its products and the satisfaction of its customers. In order that you, as the customer, can keep yourself optimally informed about the progress that is being made here and with regard to the current technical status of the products, we publish any product changes which differ from the printed version in our electronic product catalogue.

§ We therefore reserve the right to make changes to the data and illustrations in this catalogue. This catalogue reflects the status at the time of printing. More recent publications released by us (as printed or digital media) will automatically precede this catalogue if they involve the same subject. Therefore, please always use our electronic product catalogue to check whether more up-to-date information or modification notices exist for your desired product.

Link to electronic product catalogue

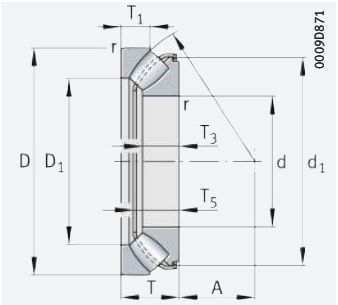
The following link will take you to the Schaeffler electronic product catalogue: ➤ *https://medias.schaeffler.com*.

1.19 Further information

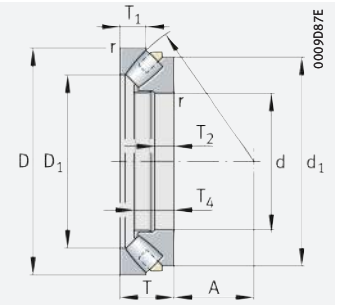
In addition to the data in this chapter, the following chapters in Technical principles must also be observed in the design of bearing arrangements:

- Determining the bearing size ➤ *34*
- Rigidity ➤ *54*
- Friction and increases in temperature ➤ *56*
- Speeds ➤ *64*
- Bearing data ➤ *97*
- Lubrication ➤ *70*
- Sealing ➤ *182*
- Design of bearing arrangements ➤ *139*
- Mounting and dismounting ➤ *191*.

Axial spherical roller bearings



With sheet steel cage

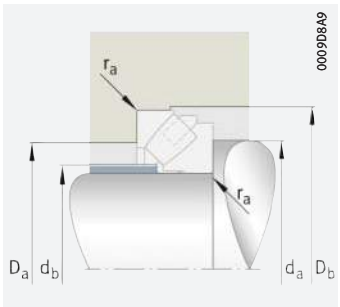


With solid brass cage

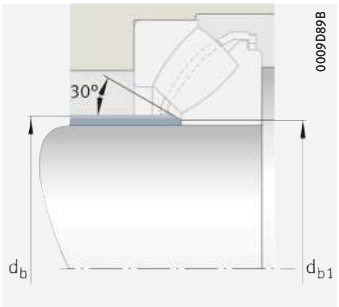
d = 60 – 190 mm

Main dimensions			Basic load ratings		Fatigue limit load	Limiting speed	Speed rating	Mass	Designation
d	D	T	dyn. C_a	stat. C_{0a}	C_{ua}	n_G	$n_{\vartheta r}$	m	➤*1124*|*1.12* ➤*1125*|*1.13* X-life ➤*1119*
			N	N	N	min^{-1}	min^{-1}	≈ kg	
60	130	42	410 000	940 000	114 000	6 000	2 850	2,5	**29412-E1-XL**
65	140	45	495 000	1 160 000	135 000	5 500	2 600	3,1	**29413-E1-XL**
70	150	48	550 000	1 290 000	150 000	5 000	2 430	3,8	**29414-E1-XL**
75	160	51	650 000	1 540 000	174 000	4 700	2 260	4,6	**29415-E1-XL**
80	170	54	720 000	1 720 000	194 000	4 350	2 140	5,5	**29416-E1-XL**
85	150	39	420 000	1 110 000	154 000	4 850	2 260	2,7	**29317-E1-XL**
	180	58	800 000	1 910 000	218 000	4 100	2 010	6,5	**29417-E1-XL**
90	155	39	420 000	1 130 000	160 000	4 650	2 140	2,8	**29318-E1-XL**
	190	60	880 000	2 130 000	238 000	3 850	1 920	7,5	**29418-E1-XL**
100	170	42	495 000	1 340 000	189 000	4 200	1 960	3,6	**29320-E1-XL**
	210	67	1 060 000	2 600 000	285 000	3 400	1 740	10,1	**29420-E1-XL**
110	190	48	620 000	1 760 000	229 000	3 750	1 830	5,2	**29322-E1-XL**
	230	73	1 260 000	3 150 000	340 000	3 100	1 600	12,8	**29422-E1-XL**
120	210	54	800 000	2 210 000	285 000	3 350	1 700	7,2	**29324-E1-XL**
	250	78	1 470 000	3 700 000	390 000	2 800	1 460	15,9	**29424-E1-XL**
130	225	58	900 000	2 600 000	320 000	3 100	1 590	8,8	**29326-E1-XL**
	270	85	1 700 000	4 350 000	445 000	2 600	1 360	21	**29426-E1-XL**
140	240	60	1 010 000	2 900 000	355 000	2 900	1 490	10,3	**29328-E1-XL**
	280	85	1 720 000	4 500 000	480 000	2 460	1 290	22,1	**29428-E1-XL**
150	215	39	425 000	1 720 000	202 000	3 150	1 540	4,4	**29230-E1-MB**
	250	60	1 020 000	2 900 000	375 000	2 750	1 400	10,5	**29330-E1-XL**
	300	90	2 000 000	5 300 000	550 000	2 290	1 180	27,2	**29430-E1-XL**
160	225	39	420 000	1 720 000	212 000	3 000	1 450	4,7	**29232-E1-MB**
	270	67	1 220 000	3 550 000	435 000	2 500	1 320	14	**29332-E1-XL**
	320	95	2 240 000	6 000 000	620 000	2 120	1 090	32,1	**29432-E1-XL**
170	240	42	470 000	1 940 000	237 000	2 800	1 390	5,8	**29234-E1-MB**
	280	67	1 230 000	3 500 000	445 000	2 390	1 260	14,2	**29334-E1-XL**
	340	103	2 550 000	6 900 000	680 000	1 990	1 020	39,6	**29434-E1-XL**
180	250	42	485 000	2 070 000	250 000	2 650	1 350	6,1	**29236-E1-MB**
	300	73	1 460 000	4 300 000	510 000	2 240	1 170	18,4	**29336-E1-XL**
	360	109	2 850 000	7 700 000	750 000	1 860	940	47,6	**29436-E1-XL**
190	270	48	600 000	2 500 000	295 000	2 440	1 300	8,5	**29238-E1-MB**
	320	78	1 680 000	4 850 000	590 000	2 070	1 090	22,3	**29338-E1-XL**
	380	115	3 100 000	8 500 000	850 000	1 750	910	54,6	**29438-E1-XL**

medias ➤ *https://www.schaeffler.de/std/1E95*



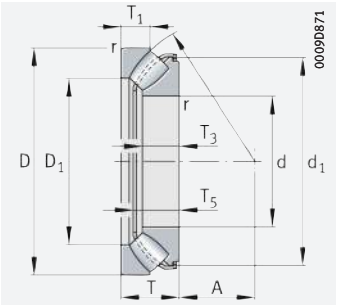
Mounting dimensions



With sheet steel cage
Mounting dimensions

Dimensions										Mounting dimensions					
d	D_1	d_1	r	T_1	T_2	T_3	T_4	T_5	A	d_a	D_a	D_b	d_b	d_{b1}	r_a
			min.					≈		min.	max.	min.	max.	max.	max.
60	85,5	116,5	1,5	21	–	27	–	37,5	38	95	107	133	67	–	1,5
65	91,5	125,2	2	22	–	29,5	–	40,5	42	100	115	143	72	–	2
70	99	133,8	2	23,8	–	31	–	42,5	44,8	110	124	153	78,5	–	2
75	105,5	142,3	2	24,5	–	33,5	–	46	47	115	132	163	82,5	–	2
80	112,5	150,9	2,1	26,5	–	35	–	48,5	50	125	141	173	88	–	2,1
85	109,5	138,5	1,5	20	–	24,5	–	34,5	50	120	129	153	92	–	1,5
	121	159,3	2,1	28	–	37	–	51	54	130	150	183	94	–	2,1
90	115	142,3	1,5	19,5	–	24,5	–	34,5	52	125	135	158	97	–	1,5
	127,5	167,7	2,1	28,5	–	39	–	54	56	135	158	193	99,5	–	2,1
100	127,5	156	1,5	20,5	–	26,2	–	37,5	58	135	148	173	107	–	1,5
	141,5	184,5	3	32	–	43	–	59,5	62	150	175	214	110,5	–	2,5
110	140	175,6	2	24,8	–	30,3	–	42	64	150	165	193	120	–	2
	155,5	201,9	3	34,7	–	47	–	64,5	69	165	192	234	129	121	2,5
120	154	192,6	2,1	27	–	34	–	48	70	165	182	213	129	–	2,1
	171	218,8	4	36,5	–	50,5	–	70	74	180	210	254	142	132	3
130	165,5	207,9	2,1	30,1	–	36,7	–	50,5	76	180	195	228	143	139	2,1
	184,5	240	4	40,9	–	54	–	75	81	195	227	275	153	143	3
140	177	220,6	2,1	30	–	38,5	–	53,5	82	190	208	244	154	149	2,1
	194,5	251,1	4	41	–	54	–	74,5	86	205	237	285	162	154	3
150	176	200	1,5	20,5	14	25	37	–	82	185	193	219	157	–	1,5
	190	228,4	2,1	28	–	38	–	54,5	87	195	220	254	163	159	2,1
	207,5	267,4	4	43,4	–	58	–	80,5	92	220	253	306	175	164	3
160	188	210	1,5	20	14	25	37	–	87	195	204	229	168	–	1,5
	203	248	3	33	–	42	–	59,5	92	215	236	274	176	170	2,5
	223,5	283,5	5	45,5	–	60,5	–	84,5	99	235	271	326	189	176	4
170	201	225	1,5	22	15	26	40	–	93	205	218	244	180	–	1,5
	215	255,7	3	30,5	–	42,2	–	60,5	96	220	247	284	188	180	2,5
	236	305	5	50	–	65,5	–	89,5	104	250	288	346	199	186	4
180	208	235	1,5	22	15	26	40	–	97	215	226	254	190	–	1,5
	227	274,5	3	35,5	–	46	–	64,5	103	235	263	304	195	190	2,5
	250	315,5	5	53	–	69,5	–	96	110	265	305	366	210	197	4
190	226	255	2	25,5	17	29	45	–	103	230	243	274	203	–	2
	243,5	290,1	4	36	–	49	–	70	110	250	281	325	211	201	3
	264,5	340	5	55,5	–	73	–	100,9	117	280	322	386	223	209	4

Axial spherical roller bearings

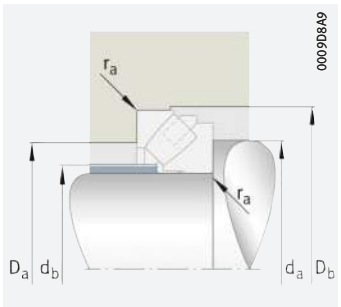


With sheet steel cage *With solid brass cage*

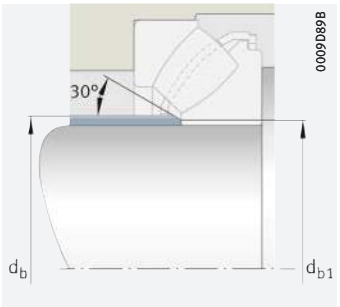
d = 200 – 380 mm

Main dimensions			Basic load ratings		Fatigue limit load	Limiting speed	Speed rating	Mass	Designation
d	D	T	dyn. C_a	stat. C_{0a}	C_{ua}	n_G	$n_{\vartheta r}$	m	➤*1124*|*1.12* ➤*1125*|*1.13* X-life ➤*1119*
			N	N	N	min^{-1}	min^{-1}	≈ kg	
200	280	48	650 000	2 650 000	315 000	2 340	1 280	9	**29240-E1-MB**
	340	85	1 900 000	5 600 000	650 000	1 940	1 030	27,3	**29340-E1-XL**
	400	122	3 450 000	9 500 000	920 000	1 660	860	63,7	**29440-E1-XL**
220	300	48	690 000	3 000 000	350 000	2 170	1 160	9,8	**29244-E1-MB**
	360	85	1 990 000	6 200 000	710 000	1 820	950	30,6	**29344-E1-XL**
	420	122	3 500 000	10 000 000	990 000	1 560	790	69	**29444-E1-XL**
240	340	60	1 010 000	4 150 000	460 000	1 890	1 060	16,9	**29248-E1-MB**
	380	85	2 040 000	6 500 000	750 000	1 710	880	32,8	**29348-E1-XL**
	440	122	3 600 000	10 500 000	1 060 000	1 470	740	74,1	**29448-E1-XL**
260	360	60	1 040 000	4 550 000	495 000	1 780	970	17,6	**29252-E1-MB**
	420	95	2 550 000	8 300 000	910 000	1 540	790	45,8	**29352-E1-XL**
	480	132	4 400 000	13 200 000	1 280 000	1 350	660	96,6	**29452-E1-XL**
280	380	60	1 020 000	4 700 000	520 000	1 670	900	19	**29256-E1-MB**
	440	95	2 650 000	8 800 000	960 000	1 460	740	49,1	**29356-E1-XL**
	520	145	5 200 000	15 800 000	1 470 000	1 230	600	126	**29456-E1-XL**
300	420	73	1 400 000	6 200 000	650 000	1 500	830	29,9	**29260-E1-MB**
	480	109	3 200 000	10 500 000	1 130 000	1 320	680	65,1	**29360-E1-XL**
	540	145	5 200 000	16 200 000	1 510 000	1 180	570	130	**29460-E1-XL**
320	440	73	1 410 000	6 500 000	680 000	1 420	780	31,6	**29264-E1-MB**
	500	109	3 350 000	11 000 000	1 180 000	1 260	650	72,4	**29364-E1-XL**
	580	155	6 000 000	19 100 000	1 750 000	1 090	530	163	**29464-E1-XL**
340	460	73	1 410 000	6 600 000	710 000	1 350	740	33,3	**29268-E1-MB**
	540	122	3 750 000	12 600 000	1 320 000	1 150	600	101	**29368-E1-XL-MB**
	620	170	7 200 000	23 100 000	2 040 000	1 020	475	208	**29468-E1-XL**
360	500	85	1 870 000	8 500 000	870 000	1 230	690	49	**29272-E1-MB**
	560	122	3 750 000	13 000 000	1 310 000	1 110	570	105	**29372-E1-XL-MB**
	640	170	6 800 000	21 900 000	2 010 000	970	470	230	**29472-E1-XL-MB**
380	520	85	2 000 000	9 000 000	920 000	1 180	660	50,3	**29276-E1-MB**
	600	132	4 500 000	15 400 000	1 540 000	1 030	530	136	**29376-E1-XL-MB**
	670	175	7 200 000	24 200 000	2 140 000	930	445	260	**29476-E1-XL-MB**

medias ➤ *https://www.schaeffler.de/std/1E96*



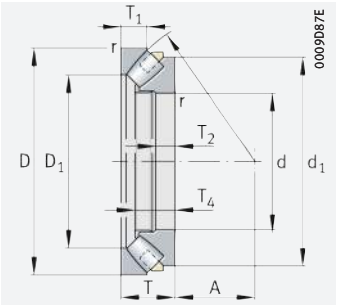
Mounting dimensions



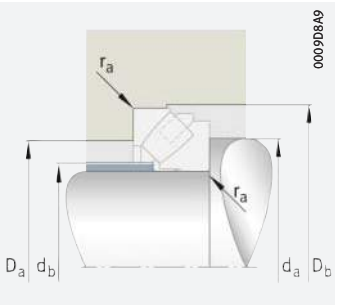
With sheet steel cage
Mounting dimensions

Dimensions										Mounting dimensions					
d	D_1	d_1	r min.	T_1	T_2	T_3	T_4	T_5 ≈	A	d_a min.	D_a max.	D_b min.	d_b max.	d_{b1} max.	r_a max.
200	232,5	265	2	24	17	30	45	–	108	240	258	284	209	–	2
	257	308,8	4	40	–	53,5	–	75,5	116	265	298	348	224	213	3
	277,5	360	5	59,4	–	77	–	106,9	122	295	338	406	234	220	4
220	251,5	285	2	24,5	17	30	45	–	117	260	277	304	229	–	2
	275,5	331,8	4	41	–	55	–	75,8	125	285	316	368	240	231	3
	300	379,8	6	58,5	–	77	–	107,5	132	315	360	428	254	241	5
240	283	320	2,1	30	22	37	57	–	130	290	311	344	250	–	2,1
	295,5	350,6	4	40,5	–	54	–	76,1	135	305	337	390	259	252	3
	322	400	6	59	–	76	–	106,9	142	335	381	448	276	261	5
260	302	340	2,1	30	22	38	57	–	139	310	331	365	271	–	2
	324	387,7	5	46	–	61	–	85,2	148	340	372	430	286	275	4
	346	435	6	63	–	86	–	118,9	154	365	419	488	296	280	5
280	323	360	2,1	30	22	38	57	–	150	330	351	385	293	–	2
	343	406,5	5	45,5	–	62	–	86,1	158	355	394	450	305	293	4
	372	473,1	6	70	–	95	–	130,5	166	395	446	530	320	302	5
300	353	395	3	38	26	44	69	–	162	360	386	426	315	–	2,5
	372	439,6	5	51	–	70	–	97,9	168	385	429	490	329	318	4
	392	490	6	70	–	95	–	129,5	175	420	471	550	340	324	5
320	372	415	3	38	26	44,5	69	–	172	380	406	450	336	–	2,5
	391	460	5	53	–	68	–	96,6	180	405	449	510	347	333	4
	422	534,4	7,5	74,5	–	102	–	139,7	191	445	507	590	367	346	6
340	395	435	3	37	26	45	69	–	183	400	427	470	356	–	2,5
	428	500	5	59,5	44	75	117	–	192	440	484	550	365	–	4
	445	564,9	7,5	84	–	112	–	151,3	201	480	541	630	386	364	6
360	423	470	4	44	31	51	81	–	194,5	430	461	510	379	–	3
	448	520	5	59,5	44	75	117	–	202	455	504	572	385	–	4
	474	585	7,5	83,5	63	110	164	–	210	500	560	650	388	–	6
380	441	490	4	42	31	51,5	81	–	202	445	480	530	394	–	3
	477	555	6	63,5	48	83	127	–	216	485	538	612	404	–	5
	494	615	7,5	87,5	67	115	168	–	222	530	587	682	413	–	6

Axial spherical roller bearings



With solid brass cage



Mounting dimensions

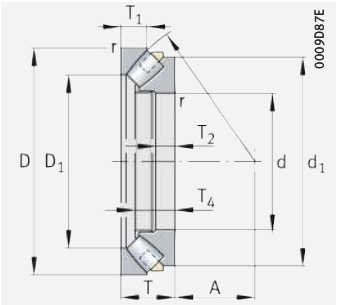
d = 400 – 670 mm

Main dimensions			Basic load ratings		Fatigue limit load	Limiting speed	Speed rating	Mass	Designation
d	D	T	dyn. C_a	stat. C_{0a}	C_{ua}	n_G	$n_{\vartheta r}$	m	➤*1124* | *1.12* ➤*1125* | *1.13* X-life ➤*1119*
			N	N	N	min^{-1}	min^{-1}	≈ kg	
400	540	85	2 040 000	9 600 000	970 000	1 130	620	52,6	**29280-E1-MB**
	620	132	4 550 000	16 300 000	1 640 000	990	500	142	**29380-E1-XL-MB**
	710	185	8 200 000	26 500 000	2 390 000	870	425	308	**29480-E1-XL-MB**
420	580	95	2 460 000	11 100 000	1 110 000	1 040	600	70,3	**29284-E1-MB**
	650	140	5 000 000	17 500 000	1 650 000	940	480	163	**29384-E1-XL-MB**
	730	185	8 200 000	28 500 000	2 490 000	840	395	325	**29484-E1-XL-MB**
440	600	95	2 500 000	12 400 000	1 170 000	1 010	560	77,1	**29288-E1-MB**
	680	145	5 200 000	18 300 000	1 660 000	890	470	185	**29388-E1-XL-MB**
	780	206	9 700 000	32 500 000	2 850 000	780	375	418	**29488-E1-XL-MB**
460	620	95	2 550 000	12 200 000	1 210 000	970	540	77,6	**29292-E1-MB**
	710	150	5 900 000	21 400 000	2 060 000	850	430	207	**29392-E1-XL-MB**
	800	206	9 800 000	33 500 000	2 950 000	760	360	435	**29492-E1-XL-MB**
480	650	103	2 650 000	13 700 000	1 300 000	920	520	97,5	**29296-E1-MB**
	730	150	5 800 000	21 400 000	1 940 000	820	415	219	**29396-E1-XL-MB**
	850	224	11 700 000	39 500 000	3 350 000	710	335	531	**29496-E1-XL-MB**
500	670	103	2 750 000	14 700 000	1 370 000	890	495	102	**292/500-E1-MB**
	750	150	5 900 000	22 000 000	1 950 000	800	400	228	**293/500-E1-XL-MB**
	870	224	11 600 000	40 000 000	3 450 000	690	325	551	**294/500-E1-XL-MB**
530	710	109	3 000 000	15 400 000	1 480 000	830	475	120	**292/530-E1-MB**
	800	160	6 800 000	25 500 000	2 280 000	740	375	274	**293/530-E1-XL-MB**
	920	236	12 700 000	44 500 000	3 750 000	650	305	653	**294/530-E1-XL-MB**
560	750	115	3 450 000	18 100 000	1 670 000	790	440	142	**292/560-E1-MB**
	980	250	14 600 000	51 000 000	4 200 000	610	285	783	**294/560-E1-XL-MB**
600	800	122	3 650 000	19 400 000	1 810 000	730	415	167	**292/600-E1-MB**
	900	180	8 700 000	34 000 000	2 950 000	660	325	392	**293/600-E1-XL-MB**
	1 030	258	15 200 000	56 000 000	4 550 000	580	265	889	**294/600-E1-XL-MB**
630	850	132	4 650 000	23 600 000	2 140 000	690	390	208	**292/630-E1-MB**
	950	190	9 700 000	37 500 000	3 250 000	620	305	462	**293/630-E1-XL-MB**
	1 090	280	17 300 000	62 000 000	5 100 000	540	250	1 073	**294/630-E1-XL-MB**
670	900	140	4 750 000	24 900 000	2 250 000	640	370	247	**292/670-E1-MB**
	1 000	200	10 600 000	41 000 000	3 350 000	580	285	526	**293/670-E1-XL-MB**
	1 150	290	18 400 000	66 000 000	5 400 000	510	241	1 214	**294/670-E1-XL-MB**

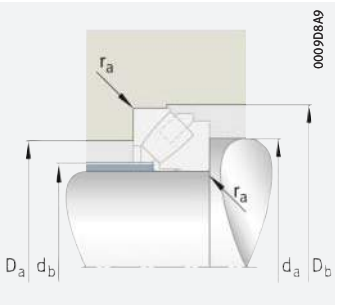
medias ➤ *https://www.schaeffler.de/std/1E97*

Dimensions									Mounting dimensions				
d	D_1	d_1	r min.	T_1	T_2	T_3	T_4	A	d_a min.	D_a max.	D_b min.	d_b max.	r_a max.
400	460	510	4	42	31	53,5	81	212	465	500	550	414	3
	494	575	6	64	48	83	127	225	510	557	634	429	5
	525	650	7,5	89,5	69	120	178	234	555	622	722	434	6
420	489	545	5	46	34	58,5	91	225	495	534	590	439	4
	520	600	6	67,5	50	85	135	235	530	585	664	449	5
	545	670	7,5	90,5	70	124	178	244	580	643	742	457	6
440	508	570	5	49	34	61	91	235	520	554	610	458	4
	540	631,5	6	70,5	52	87	140	245	555	614	695	473	5
	577	715	9,5	101	77	134	199	257	610	684	794	477	8
460	530	585	5	46	34	59	91	245	535	575	632	479	4
	567	660	6	72,5	54	94,5	144	257	585	638	726	491	5
	596	735	9,5	101,5	77	135	199	268	630	704	815	497	8
480	556	620	5	55	37	62	99	259	565	603	662	507	4
	591	680	6	73,5	54	94	144	270	605	660	746	511	5
	625	780	9,5	108	88	147	216	280	660	744	865	516	8
500	574	640	5	55	37	65	99	268	585	622	682	524	4
	611	700	6	74	54	92	144	280	625	683	768	534	5
	648	800	9,5	110	86,6	147	216	290	685	765	886	539	8
530	608	675	5	57	39	64	105	285	620	661	722	561	4
	648	745	7,5	76	58	101,5	154	295	660	724	818	564	6
	686	845	9,5	116	89	156	228	308	725	810	937	570	8
560	644	715	5	60	41	71	111	302	655	697	762	587	4
	727	900	12	122	99	168	241	328	770	860	997	602	10
600	688	760	5	65	44	71,5	117	321	700	744	814	634	4
	720	840	7,5	89	65	113,5	174	335	745	815	920	634	6
	769	950	12	128	99	172	249	349	820	900	1 055	649	10
630	723	805	6	67	48	80	127	338	735	789	864	658	5
	761	885,5	9,5	92	68	122	183	345	785	856	970	666	8
	815	1 000	12	137	107	183	270	365	860	960	1 115	678	10
670	773	855	6	74	50	81	135	361	785	836	915	707	5
	809	930	9,5	96	72	126	193	372	825	906	1 020	703	8
	864	1 060	15	141	110	191	280	387	910	1 015	1 175	723	12

Axial spherical roller bearings



With solid brass cage



Mounting dimensions

d = 710 – 1 600 mm

Main dimensions			Basic load ratings		Fatigue limit load	Limiting speed	Speed rating	Mass	Designation
d	D	T	dyn. C_a	stat. C_{0a}	C_{ua}	n_G	$n_{\vartheta r}$	m	➤*1124* | *1.12* ➤*1125* | *1.13* X-life ➤*1119*
			N	N	N	min^{-1}	min^{-1}	≈ kg	
710	950	145	5 500 000	29 500 000	2 550 000	610	335	281	**292/710-E1-MB**
	1 060	212	11 800 000	46 000 000	3 700 000	550	265	635	**293/710-E1-XL-MB**
	1 220	308	21 000 000	76 000 000	6 100 000	475	220	1 469	**294/710-E1-XL-MB**
750	1 000	150	5 700 000	31 500 000	2 750 000	570	320	326	**292/750-E1-MB**
	1 120	224	12 700 000	50 000 000	3 850 000	510	250	735	**293/750-E1-XL-MB**
	1 280	315	19 000 000	84 000 000	6 600 000	455	206	1 654	**294/750-E1-MB**
800	1 060	155	6 400 000	35 500 000	3 050 000	540	300	365	**292/800-E1-MB**
	1 180	230	13 500 000	54 000 000	4 050 000	485	237	824	**293/800-E1-XL-MB**
	1 360	335	20 600 000	93 000 000	7 400 000	425	191	1 964	**294/800-E1-MB**
850	1 120	160	7 100 000	40 500 000	3 400 000	510	275	422	**292/850-E1-MB**
	1 250	243	12 900 000	62 000 000	4 600 000	455	218	972	**293/850-E1-MB**
	1 440	354	24 000 000	110 000 000	8 400 000	400	174	2 348	**294/850-E1-MB**
900	1 180	170	7 700 000	42 000 000	3 250 000	475	265	478	**292/900-E1-MB**
	1 520	372	25 500 000	120 000 000	8 900 000	375	166	2 744	**294/900-E1-MB**
950	1 250	180	8 800 000	48 500 000	3 900 000	445	248	577	**292/950-E1-MB**
	1 600	390	28 500 000	132 000 000	9 900 000	355	155	3 170	**294/950-E1-MB**
1 000	1 320	190	9 600 000	55 000 000	4 450 000	420	233	689	**292/1000-E1-MB**
	1 670	402	30 500 000	146 000 000	10 600 000	340	145	3 575	**294/1000-E1-MB**
1 060	1 400	206	10 700 000	62 000 000	4 850 000	395	219	852	**292/1060-E1-MB**
	1 770	426	33 000 000	155 000 000	11 600 000	315	139	4 201	**294/1060-E1-MB**
1 120	1 460	206	10 700 000	64 000 000	4 650 000	375	207	896	**292/1120-E1-MB**
1 180	1 520	206	10 700 000	67 000 000	4 750 000	360	196	945	**292/1180-E1-MB**
1 250	1 800	330	23 700 000	125 000 000	8 100 000	305	142	2 654	**293/1250-E1-MB**
1 600	2 280	408	36 000 000	192 000 000	10 900 000	233	107	5 137	**293/1600-E1-MB**

medias ➤ *https://www.schaeffler.de/std/1E98*

Dimensions									Mounting dimensions				
d	D_1	d_1	r min.	T_1	T_2	T_3	T_4	A	d_a min.	D_a max.	D_b min.	d_b max.	r_a max.
710	815	900	6	75	52	88	140	380	825	882	966	741	5
	855	985	9,5	103	76	132,5	205	394	875	962	1 082	746	8
	917	1 120	15	149	117	202	298	415	960	1 073	1 250	762	12
750	858	950	6	81	54	89	144	409	875	930	1 017	789	5
	910	1 040	9,5	109	81	140	216	415	925	1 015	1 142	790	8
	964	1 180	15	153	121	210	305	436	1 015	1 130	1 310	811	12
800	911	1 010	7,5	81	56	94	149	434	925	987	1 078	837	6
	965	1 100	9,5	111	83	145,5	222	440	980	1 070	1 202	840	8
	1 034	1 255	15	165	123	219	324	462	1 085	1 200	1 390	870	12
850	967	1 070	7,5	82	58	101,5	154	455	985	1 043	1 138	886	6
	1 021	1 165	12	118	87	152	235	468	1 045	1 137	1 273	896	10
	1 077	1 325	15	172	142,9	239	342	490	1 145	1 275	1 470	915	12
900	1 023	1 120	7,5	84	61	102,5	167	477	1 025	1 089	1 198	933	6
	1 137	1 405	15	186	147	251	360	518	1 215	1 345	1 555	969	12
950	1 081	1 190	7,5	90	65	110	174	507	1 090	1 147	1 268	985	6
	1 209	1 475	15	191	153	260	377	546	1 275	1 372	1 635	1 020	12
1 000	1 139	1 255	9,5	98	68	117,5	182	540	1 155	1 216	1 340	1 042	8
	1 250	1 540	15	200	160	277	390	581	1 340	1 435	1 705	1 071	12
1 060	1 211	1 336,3	9,5	108	74	124	199	566	1 225	1 290	1 422	1 106	8
	1 349	1 630	15	207	192	280	412	610	1 410	1 521	1 815	1 141	12
1 120	1 272	1 395	9,5	108	74	125	199	601	1 285	1 350	1 482	1 168	8
1 180	1 331	1 455	9,5	108	74	125	199	625	1 345	1 415	1 542	1 227	8
1 250	1 465	1 690,5	15	161	119	208	319	690	1 515	1 640	1 823	1 315	12
1 600	1 885	2 135,5	19	195	147	255	395	894	1 915	2 090	2 303	1 675	15

Crossed roller bearings

Matrix for bearing preselection

The matrix gives an overview of the types and design features of crossed roller bearings.

It can be used to make a preliminary assessment of whether a bearing is fundamentally suitable for the envisaged application.

The additional information provided in the product chapter (see column "detailed information") and in the Technical principles must, however, be observed in addition to this overview in selection of the bearing.

Design features and suitability			Crossed roller bearings	
+++ extremely suitable ++ highly suitable + suitable (+) suitable with restrictions – not suitable/not applicable ✓ available				detailed information ➤ **1142**
Load carrying capacity	radial		++	➤ *1143|1.2*
	axial, one direction		+++	➤ *1143|1.2*
	axial, both directions		+++	➤ *1143|1.2*
	moments		++	➤ *1143|1.2*
Compensation of angular misalignments	static		–	➤ *1144|1.3*
	dynamic		–	➤ *1144|1.3*
Bearing design	cylindrical bore		–	➤ *1142|1.1*
	tapered bore		–	
	separable		–	➤ *1163|1.17*
Lubrication	greased		✓	➤ *1144|1.4*
Sealing	open		✓	➤ *1145|1.5*
	non-contact		–	➤ *1145|1.5*
	contact		–	➤ *1145|1.5*
Operating temperature in °C	from to		–30 +100	➤ *1146|1.8*
Suitability for	high speeds		(+)	➤ *1146|1.6*
	high running accuracy		++	➤ *1150* ➤ *1147|1.11*
	low-noise running		+	➤ *1146|1.7*
	high rigidity		+	➤ *1150*
	reduced friction		+	➤ *56*
	length compensation within bearing		–	
	non-locating bearing arrangement		–	➤ *139*
	locating bearing arrangement		+	➤ *139*
X-life bearings		X-life	–	
Bearing bore d_i in mm	from to		70 500	➤ *1168*
Product tables	from page ➤		**1168**	

1 Crossed roller bearings

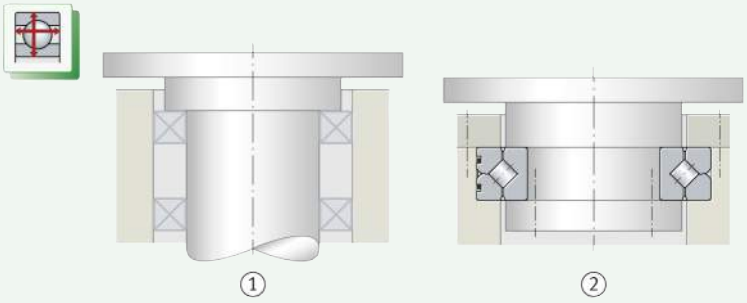
Crossed roller bearings SX:

- are suitable, due to their high running accuracy, as bearings for high precision applications (such as those in robots, machine tools, handling systems, precision mechanical and medical devices, vehicle components)
- correspond in their main dimensions to the ISO dimension series 18 with very small section height
- can support axial forces in both directions, radial loads, tilting moments and any combination of loads ➤*1143*|*1.2*
- usually allow designs with two bearing positions to be replaced by one bearing position ➤*1142*|🗀 *1*
- are very rigid (they can be supplied with normal clearance, clearance-free or preloaded) ➤*1168*|▦
- are suitable for compressive and suspended arrangements
- are always a good choice for a technically and economically leading bearing solution if compact and easy-to-fit rolling bearings with high tilting moment carrying capacity and rigidity, with uniform running free from stick-slip, low rotational resistance as well as high axial and radial runout accuracy are required in only one bearing position.

For an overview of other product-specific features, see the Matrix for bearing preselection ➤*1141*.

🗀 ***1***
Comparison: bearing arrangement with two bearing positions/ bearing arrangement with a crossed roller bearing SX

① *Bearing arrangement with two bearing positions*
② *Bearing arrangement with one crossed roller bearing SX*



1.1 Bearing design

✎ *Crossed roller bearings SX are compact locating bearings with high axial rigidity*

Crossed roller bearings SX are bearings for high precision applications, whose main dimensions correspond to the ISO dimension series 18 with very small section height in accordance with DIN 616. They comprise outer rings, inner rings, rolling elements and plastic spacers.
The outer ring is split in the circumferential direction and is held together by three sheet metal retaining rings ➤*1143*|🗀 *2*. The cylindrical rollers correspond to DIN 5402 and are in an X arrangement with each other on the raceways. The bearings are very rigid, have high running accuracy and are supplied with normal clearance, low clearance or preload. Bearings with preload have the suffix VSP, while bearings with low clearance have the suffix RL0 ➤*1147*|▦ *3*. The bearing outer rings are easily fixed to the adjacent construction using clamping rings ➤*1159*.

✎ *Also available in a corrosion-resistant design*

For applications requiring high corrosion protection, the bearings are also available in a corrosion-resistant design with the special coating Corrotect ➤*109*.

2
Crossed roller bearing SX

① *Split outer ring*
② *Sheet metal retaining ring*
③ *Lubrication hole (3 lubrication holes distributed over the circumference)*
④ *Plastic spacers*

Permissible circumferential velocities

✎ *Influencing factors*

The possible circumferential velocity is dependent on the bearing (normal clearance or preloaded) and on the lubrication (grease or oil) ➤*1143*| ▦ *1*.

1
Permissible circumferential velocities

D_M = *rolling element pitch circle diameter* ➤*1168*| ▦

Normal clearance	Preload	Circumferential velocity
Oil lubrication	–	up to 8 m/s ($n \cdot D_M$ = 152 800)
Grease lubrication	–	up to 4 m/s ($n \cdot D_M$ = 76 400)
–	Oil lubrication	up to 4 m/s ($n \cdot D_M$ = 76 400)
–	Grease lubrication	up to 2 m/s ($n \cdot D_M$ = 38 200)

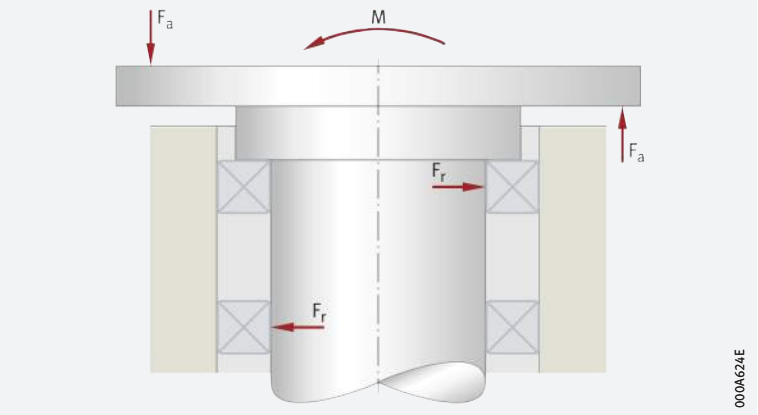
1.2 Load carrying capacity

✎ *Suitable for axial loads in both directions, radial loads and tilting moment loads*

Due to the X arrangement of the cylindrical rollers, the bearings can support axial forces in both directions, radial loads, tilting moment loads and any combination of loads by means of a single bearing position ➤*1144*| ⧉ *4*. As a result, it is generally possible to reduce conventional bearing arrangements comprising two bearing positions (bearing arrangement with one radial and one axial bearing) to one bearing position ➤*1144*| ⧉ *3* and ➤*1144*| ⧉ *4*. This reduces the work required and the costs for the design of the adjacent construction (only one bearing position is processed) and considerably reduces the mounting of the bearings (there is no requirement for the matching of two bearings to each other).

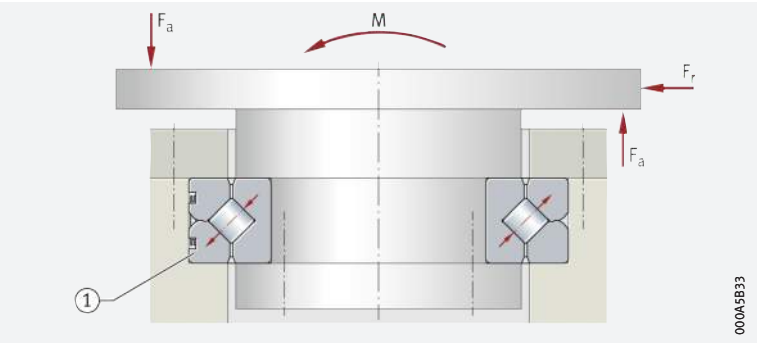
3
Conventional bearing arrangement with two bearing positions

F_r = *radial load*
F_a = *axial load*
M = *tilting moment load*



4
Optimised bearing arrangement with one crossed roller bearing

F_r = *radial load*
F_a = *axial load*
M = *tilting moment load*
① *Crossed roller bearing SX*



1.3 Angular adjustment facility

Crossed roller bearings SX cannot be used for the compensation of misalignments. These bearings are precision bearings for high precision applications. In order to ensure their correct function, it is essential that the specifications for design of the adjacent construction are observed ➤*1158|1.16*. Skewing of the bearing rings increases the running noise, places increased strain on the plastic spacers, has a negative effect on the running accuracy and a highly detrimental influence on the operating life of the bearings.

1.4 Lubrication

✎ *Grease or oil lubrication is possible*

The bearings are greased as standard but can alternatively be lubricated with oil. The decisive factors in determining the type of lubrication and the requisite lubricant quantity are:

- the size of the bearing
- the design of the bearing environment
- the lubricant feeds
- the operating conditions.

If there is any uncertainty as to whether the lubricant or type of lubrication is suitable for a particular application, please consult Schaeffler or the lubricant manufacturer respectively.

Grease lubrication

✎ *Suitable greases*

If the bearing is to be lubricated with grease, a high quality lithium soap grease to DIN 51825–KP2N–20 is suitable, for example Arcanol LOAD150 or LOAD220.

Lubrication intervals

Influences on the lubrication interval

The lubrication intervals are essentially dependent on:

- the operating conditions
- the environmental influences such as contamination, water, etc.
- the type of bearings.

Precise lubrication intervals can only be determined by means of tests under the specific application conditions. The observation period selected must be sufficiently long and the condition of the grease must be checked at regular intervals.

Grease operating life

If relubrication is not possible, the grease operating life becomes the decisive factor. Based on experience, the guide value for the grease operating life in the majority of applications is higher by a factor of 2 than the guide value for the lubrication interval. At operating temperatures above +70 °C, the lubrication interval and therefore the grease operating life are reduced. In order to ensure operational reliability, the grease operating life should not exceed 3 years.

Oil lubrication

Selection of the oil

A lubricant film which is capable of supporting loads must form in the contact zones between the rolling elements and the raceway. Depending on the operating speed, the oil at operating temperature must have at least the nominal viscosity ν_1. The guide value for ν_1 is dependent on the mean bearing diameter d_M and the speed.

Influence of temperature on viscosity

As the temperature increases, the viscosity of the oil decreases. When selecting the viscosity, the lower operating temperature must also be taken into consideration. With increasing viscosity, the flowability of the lubricant is reduced. As a result, the level of power losses will increase.

Suitable oils

For oil lubrication, suitable oils are type CLP to DIN 1517 or HLP to DIN 51524 of the viscosity classes ISO VG 10 to 100.

With oil lubrication, oil change intervals must be observed

At higher temperatures, aged oil and additives in the oil can impair the operating life of the plastic used for the spacers. Stipulated oil change intervals must therefore be observed.

1.5 Sealing

Provide seals in the adjacent construction

Crossed roller bearings SX are not sealed. As a result, sealing of the bearing position must be carried out in the adjacent construction. This must reliably prevent:

- moisture and contaminants from entering the bearing
- the egress of lubricant from the bearing.

Schaeffler seal profiles

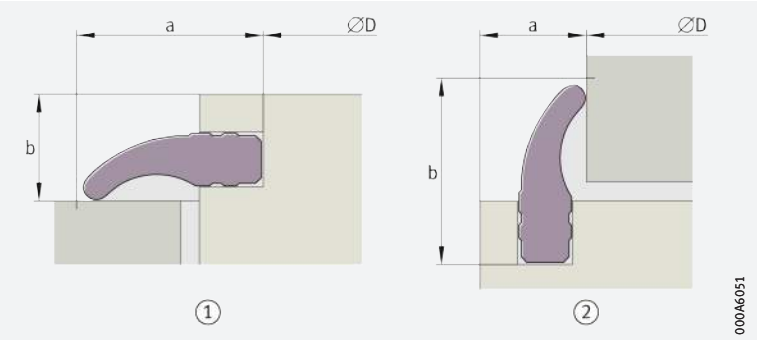
Material by the metre for radial and/or axial sealing of the bearing position

For sealing of the bearing position in the adjacent construction, Schaeffler supplies various seal profiles by the metre ➤ *1146* | *5*. These profiles are intended for axial and/or radial sealing and – depending on the seal profile – fulfil a wide range of requirements (for example: under normal requirements for sealing, under heavy contamination, for low frictional torque, if only limited space is available, for sealing of fluids, at low speeds or under swivel operation). In addition to the seal profiles with a radial or axial sealing effect respectively, double direction profiles (with both axial and radial sealing effect) are also available. Mounting drawings can be requested for the individual seal profiles.

The seal profiles are not suitable for applications that require leakage-free operation; this applies not only to oil but also to grease lubrication. If leakage losses are unacceptable, measures such as rotary shaft seals can be used. The area around the bearing seal must be designed such that the seal profiles are not damaged during operation.

5
Seal profiles – example

① *Axial sealing*
② *Radial sealing*



Seal profile material

The standard material for the profiles is the synthetic elastomer NBR 70. This material has good resistance to oil and grease as well as good wear resistance. Operating temperature of seal profiles ➤*1146*|▦*2*.
For further information on the seal profiles, please contact Schaeffler.

1.6 Speeds

✎*Limiting speeds in the product tables*

Rolling bearings cannot rotate at unspecified high speeds, but are generally restricted by the operating temperature that is permissible in relation to the lubricant and the material of the bearing parts ➤*1146*|*1.8*.
The product tables give the kinematic limiting speeds n_G oil and n_G grease for the bearings ➤*1168*|▦.

The limiting speeds n_G oil and n_G grease are the kinematically permissible speeds for a bearing and apply to oil and grease lubrication respectively. Even under favourable mounting and operating conditions, these speeds must not be exceeded without prior consultation with Schaeffler.

1.7 Noise

Schaeffler Noise Index

The Schaeffler Noise Index (SGI) is not yet available for this bearing type ➤*69*. The data for these bearing series will be introduced and updated in stages.

Further information:

- ***medias*** ➤*https://medias.schaeffler.com*.

1.8 Temperature range

✎*Limiting values*

The operating temperature of the bearings is limited by:

- the dimensional stability of the bearing rings and cylindrical rollers
- the material of the plastic spacers
- the lubricant
- the seal material in the adjacent construction.

Possible operating temperatures of the bearings ➤*1146*|▦*2*.

▦2
Permissible temperature ranges

Operating temperature	Crossed roller bearings	Schaeffler seal profiles
	–30 °C to +100 °C	–40 °C to +80 °C

In the event of anticipated temperatures which lie outside the stated values, please contact Schaeffler.

1.9 Cages

The rollers are guided by plastic spacers

In the crossed roller bearings SX, the rolling elements are separated from each other and guided not by typical rolling bearing cages but by plastic spacers ➤*1143*|*2*. The plastic selected and the design of the running surfaces for the cylindrical rollers give low-friction running of the bearings.

1.10 Internal clearance

The crossed roller bearings are available:

- with normal clearance (radial and axial clearance ➤*1168*|)
- with low clearance (radial clearance/preload ➤*1168*|)
- with preload VSP (preload min. and max. ➤*1168*|).

1.11 Dimensions, tolerances

Dimension standards

The main dimensions of crossed roller bearings correspond to dimension series 18 in accordance with DIN 616.

Tolerances

The dimensional and running tolerances are based on DIN 620-2 and DIN 620-3 and are in the range P6 and P5.

1.12 Suffixes

For a description of the suffixes used in this chapter ➤*1147*|*3* and ***medias*** interchange ➤*https://www.schaeffler.de/std/1D52*.

3
Suffixes and corresponding descriptions

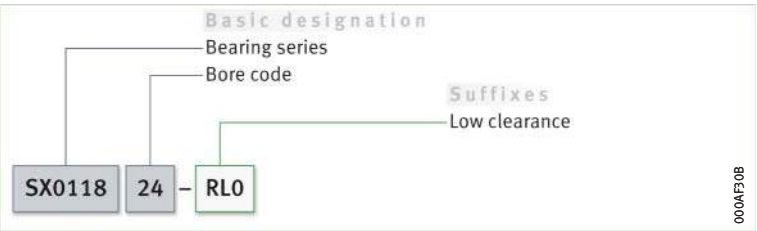
Suffix	Description of suffix	
RR	Corrosion-resistant design, with Corrotect coating	Special design, available by agreement
RL0	Low clearance	Standard
VSP	Preloaded	Special design, available by agreement
VSP+PRL50	Preloaded, axial and radial runout tolerance restricted by 50%	Special design, available by agreement

1.13 Structure of bearing designation

Example of composition of bearing designation

6
Crossed roller bearing SX, preloaded, corrosion-resistant (with Corrotect coating): designation structure

The designation of bearings follows a set model. Example ➤*1147*|*6*.



1.14 Dimensioning

Static load carrying capacity

For bearings under static loading, the static load carrying capacity applies

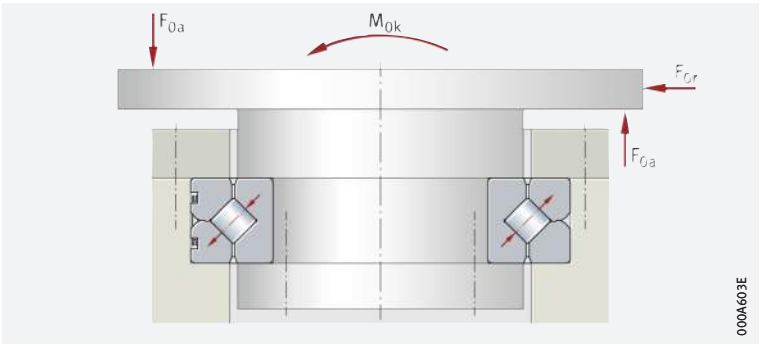
Crossed roller bearings that undergo rotary motion only infrequently, undergo slow swivel motion, rotate only slowly or are subjected to load while stationary are dimensioned on the basis of their static load carrying capacity. The size of a statically loaded bearing can therefore be checked in approximate terms using the basic static load ratings C_0 and the static limiting load diagrams.

Checking the static load carrying capacity

It can be checked in approximate terms if the correct load arrangement is present and all the requirements relating to clamping rings, location, mounting and lubrication are fulfilled ➤1148|7.

Where load arrangements are more complex or there are variations from the conditions, please contact us.

7 *Load arrangement*



F_{0a} = *axial static bearing load*
F_{0r} = *radial static bearing load*
M_{0k} = *static tilting moment load*

In order to check the static load carrying capacity, the following equivalent static operating values must be determined:

- the equivalent static bearing load F_{0q}
- the equivalent static tilting moment load M_{0q}.

Checking is possible for applications with or without radial load.

Determining the equivalent static bearing load without radial load

In the presence of axial and tilting moment loads only ➤1148|1 and ➤1148|2:

1 *Equivalent axial bearing load (static)*

$$F_{0q} \triangleq F_{0a} \cdot f_A \cdot f_S$$

2 *Equivalent tilting moment load (static)*

$$M_{0q} \triangleq M_{0k} \cdot f_A \cdot f_S$$

Legend

F_{0q}	kN	Equivalent axial bearing load (static)
F_{0a}	kN	Axial static bearing load
f_A	–	Application factor ➤1150|4
f_S	–	Factor for additional safety ➤1150
M_{0q}	kNm	Equivalent tilting moment load (static)
M_{0k}	kNm	Static tilting moment load.

The values for F_{0q} and M_{0q} are used to determine the load point in the static limiting load diagram for the raceway ➤1168|.

In addition to the raceway, the dimensioning of the fixing screws must also be checked.

The static limiting load diagrams for the raceway and the fixing screws are indicated in the product tables.

The load point must lie under the raceway curve, otherwise the bearing is not adequately dimensioned.

Determining the equivalent static bearing load with radial load

Radial loads can only be taken into consideration if the radial load F_{0r} is smaller than the basic static radial load rating C_{0r} ➤*1168*.

The equivalent static bearing load with radial load is determined as follows:

- Calculate the parameter for the load eccentricity ϵ according to ➤*1149* *f 3*
- Determine the static radial load factor f_{0r}. In this case:
  - determine the ratio F_{0r}/F_{0a} in ➤*1149* *8* or ➤*1150* *9* respectively
  - based on the ratio F_{0r}/F_{0a} and ϵ, determine the static radial load factor f_{0r} from ➤*1149* *8* or ➤*1150* *9* respectively
- Determine the application factor f_A ➤*1150* *4* and, where necessary, the safety factor f_S
- Calculate the equivalent axial bearing load F_{0q} and the equivalent tilting moment load M_{0q} using the equations ➤*1149* *f 4* and ➤*1149* *f 5*
- Using the values for F_{0q} and M_{0q}, determine the load point in the static limiting load diagram for the raceway ➤*1168*.

The load point must lie under the raceway curve, otherwise the bearing is not adequately dimensioned.

f 3
Load eccentricity parameter

$$\epsilon = \frac{2\,000 \cdot M_{0k}}{F_{0a} \cdot D_M}$$

f 4
Equivalent bearing load (static)

$$F_{0q} = F_{0a} \cdot f_A \cdot f_S \cdot f_{0r}$$

f 5
Equivalent tilting moment load (static)

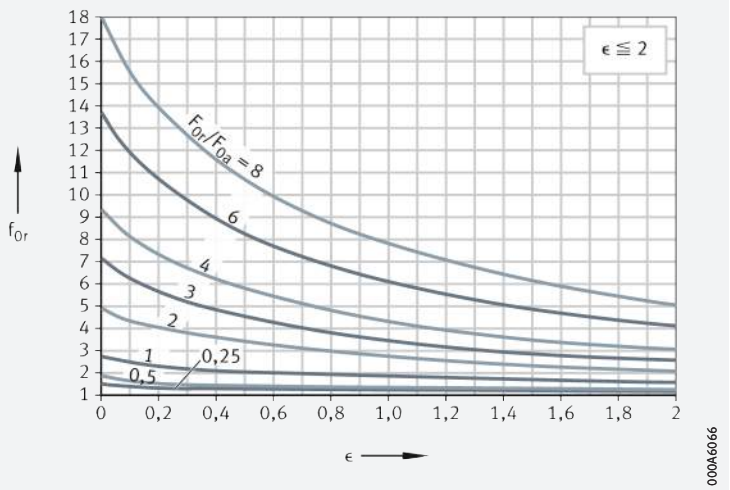
$$M_{0q} = M_{0k} \cdot f_A \cdot f_S \cdot f_{0r}$$

Legend

ϵ	–	Load eccentricity parameter
M_{0k}	kNm	Static tilting moment load
F_{0a}	kN	Axial static bearing load
D_M	mm	Rolling element pitch circle diameter ➤*1168*
F_{0q}	kN	Equivalent bearing load (static)
f_A	–	Application factor ➤*1150* *4*
f_S	–	Factor for additional safety ➤*1150*
f_{0r}	–	Static radial load factor ➤*1149* *8* or ➤*1150* *9*
M_{0q}	kNm	Equivalent tilting moment load (static).

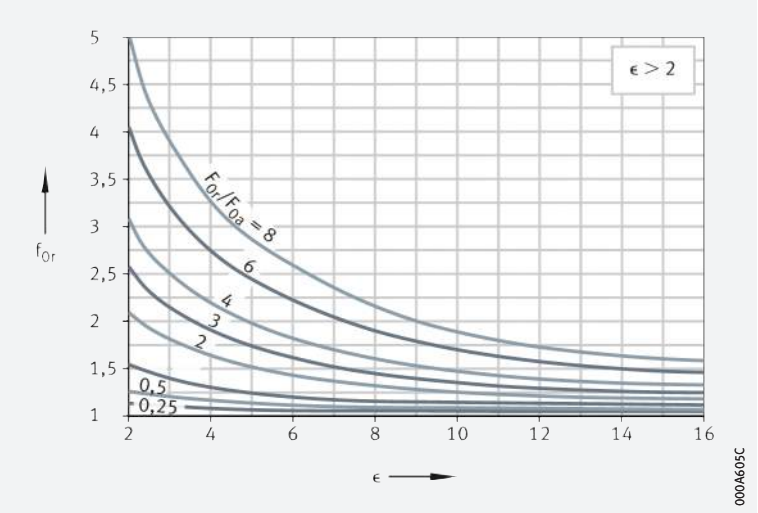
8
Static radial load factor

f_{0r} = *static radial load factor*
ϵ = *load eccentricity parameter; $\epsilon \leqq 2$*
F_{0a} = *axial static bearing load*
F_{0r} = *radial static bearing load*



9
Static radial load factor

f_{0r} = *static radial load factor*
ϵ = *load eccentricity parameter;* $\epsilon > 2$
F_{0a} = *axial static bearing load*
F_{0r} = *radial static bearing load*



Application factors

The application factors f_A are empirical values obtained in practice ➤*1150*| ▦ *4*. They take account of the most important requirements, such as the type and severity of operation, rigidity and running accuracy. If the precise requirements of an application are known, the values may be altered accordingly.

Application factors < 1 must not be used.

A large proportion of applications can be statically calculated using the factor 1, for example in the case of bearings for gearboxes and rotary tables.

In addition to static calculation, the rating life should also always be checked ➤*1152*.

▦ **4**
Application factors f_A

Application	Operating and requirement criteria	Application factor f_A
Robots	Rigidity	1,25
Antennae	Accuracy	1,5
Machine tools	Accuracy	1,5
Metrology	Smooth running	2
Medical equipment	Smooth running	1,5

Safety factors

The factor for additional safety f_S is 1.

It is not normally necessary to factor in any additional safety in calculation. In special cases, such as approval specifications, internal specifications, requirements stipulated by inspection bodies etc., the appropriate safety factors must be applied.

Calculation example

The static load carrying capacity of the crossed roller bearing SX011860 is to be checked.

✎ *Given*	Static bearing load (axial)	F_{0a} = 70 kN
	Static bearing load (radial)	F_{0r} = 17,5 kN
	Static tilting moment load	M_{0k} = 22,5 kNm
	Rolling element pitch circle diameter	D_M = 340 mm
	Application factor	f_A = 1,25
	Safety factor	f_S = 1
✎ *Required*	Static load carrying capacity of the bearing	

Solution

*f*6 *Load eccentricity parameter*

$$\epsilon = \frac{2\,000 \cdot M_{0k}}{F_{0a} \cdot D_M}$$

$$\epsilon = \frac{2000 \cdot 22{,}5}{70 \cdot 340} = 1{,}89$$

$$\frac{F_{0r}}{F_{0a}} = \frac{17{,}5}{70} = 0{,}25$$

$$f_{0r} = 1{,}2$$

Legend

ϵ	–	Load eccentricity parameter
M_{0k}	kNm	Static tilting moment load
F_{0a}	kN	Static bearing load (axial)
D_M	mm	Rolling element pitch circle diameter
F_{0r}	kN	Static bearing load (radial)
f_{0r}	–	Static radial load factor ➤*1149*|*8* or ➤*1150*|*9*.

*f*7 *Equivalent bearing load (static)*

$$F_{0q} = F_{0a} \cdot f_A \cdot f_S \cdot f_{0r}$$

$$F_{0q} = 70 \cdot 1{,}25 \cdot 1 \cdot 1{,}2 = 105\,\text{kN}$$

Legend

F_{0q}	kN	Equivalent bearing load (static)
F_{0a}	kN	Static bearing load (axial)
f_A	–	Application factor
f_S	–	Factor for additional safety.

*f*8 *Equivalent tilting moment load (static)*

$$M_{0q} = M_{0k} \cdot f_A \cdot f_S \cdot f_{0r}$$

$$M_{0q} = 22{,}5 \cdot 1{,}25 \cdot 1 \cdot 1{,}2 = 33{,}75\,\text{kNm}$$

Legend

M_{0q}	kNm	Equivalent tilting moment load (static)
M_{0k}	kNm	Static tilting moment load
f_A	–	Application factor
f_S	–	Factor for additional safety.

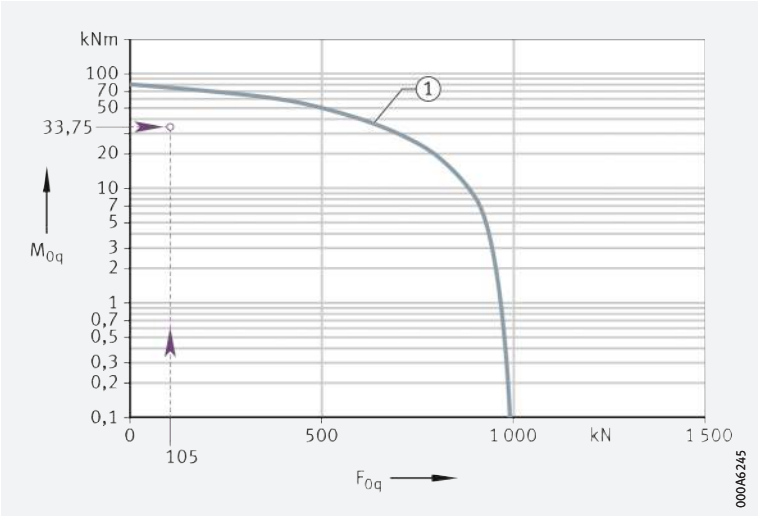
Determining the load point in the static limiting load diagram – checking the static load carrying capacity

Using the values for F_{0q} and M_{0q}, the load point in the static limiting load diagrams for the raceway and fixing screws is determined ➤*1152*\|*10* and ➤*1152*\|*11*.

The load point is below the raceway and screw curves. The bearing is adequately dimensioned and thus suitable for the application.

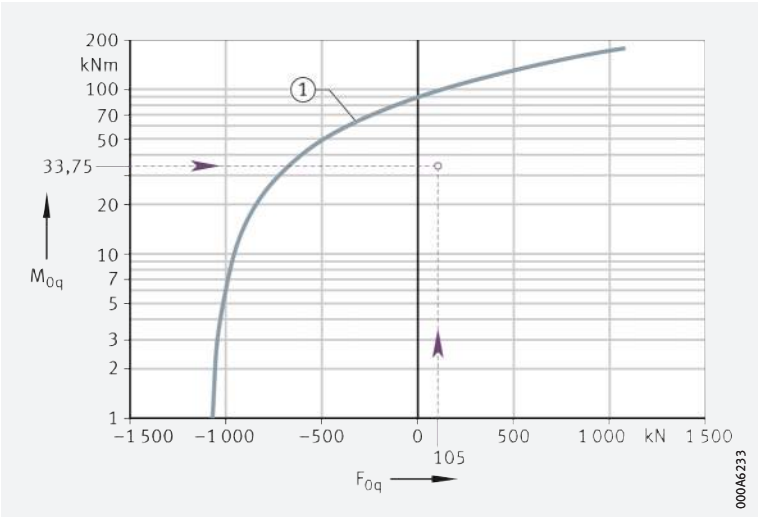
10
Static limiting load diagram for raceway – compressive load

M_{0q} = *equivalent tilting moment load*
F_{0q} = *equivalent bearing load*
① *Raceway curve*



11
Static limiting load diagram for fixing screws – compressive load

M_{0q} = *equivalent tilting moment load*
F_{0q} = *equivalent bearing load*
① *Screw curve*



Dynamic load carrying capacity

✎ For bearings under dynamic loading, the dynamic load carrying capacity applies

Dynamically loaded crossed roller bearings, i. e. bearings that undergo predominantly rotary motion, are dimensioned in accordance with their dynamic load carrying capacity. The size of a dynamically loaded bearing can therefore be checked in approximate terms using the basic dynamic load ratings C and the basic rating life L or L_h.

Determining the basic rating life

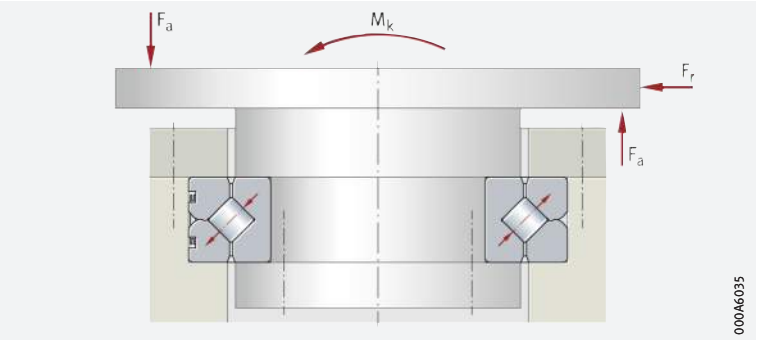
The life formulae for L and L_h are only valid:

- with a load arrangement according to ➤*1153*| *12*
- if all the requirements are fulfilled in relation to location (the bearing rings must be rigid or firmly connected to the adjacent construction), mounting, lubrication and sealing
- if the load and speed can be regarded as constant during operation. If the load and speed are not constant, equivalent operating values can be determined that will result in the same fatigue conditions as the actual loads
- if the load ratio is $F_r/F_a \leqq 8$.

For more complex load arrangements, if a ratio $F_r/F_a > 8$ is present or there are variations from the specified conditions, please contact us.

12
Load arrangement

F_a = *axial dynamic bearing load*
F_r = *radial dynamic bearing load*
M_k = *dynamic tilting moment load*



Determining the basic rating life for bearings subjected to combined loads

For bearings subjected to combined loads, in other words bearings with axial, radial and tilting moment loads, the rating life L or L_h is determined as follows:

- Determine the ratio of the radial dynamic bearing load F_r to the axial dynamic bearing load F_a (F_r/F_a)
- Calculate the load eccentricity parameter ϵ ➤*1153*| *9*
- Using the values for ϵ and the ratio F_r/F_a, determine the dynamic load factor k_F ➤*1154*| *13*
- Calculate the equivalent dynamic axial bearing load $P_a = k_F \cdot F_a$ ➤*1153*| *10*
- Enter the equivalent dynamic axial bearing load P_a and the basic dynamic axial load rating C_a in the rating life equations L or L_h respectively and calculate the rating life ➤*1153*| *11* and ➤*1153*| *12*

  If swivel operation is present, enter the operating speed n determined in the rating life equation L_h ➤*1153*| *13*.

9
Load eccentricity parameter

$$\epsilon = \frac{2\,000 \cdot M_k}{F_a \cdot D_M}$$

10
Equivalent dynamic axial bearing load

$$P_a = k_F \cdot F_a$$

11
Basic rating life in millions of revolutions

$$L_{10} = \left(\frac{C_a}{P_a}\right)^p$$

12
Basic rating life in operating hours

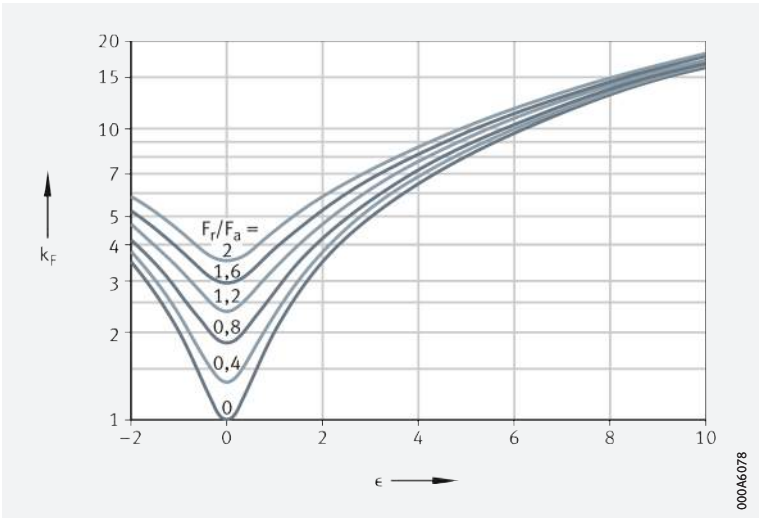
$$L_{10h} = \frac{16666}{n} \cdot \left(\frac{C_a}{P_a}\right)^p$$

13
Operating speed

$$n = n_{osc} \cdot \frac{\gamma}{90°}$$

13
Dynamic load factor

k_F = *dynamic load factor*
ϵ = *load eccentricity parameter*
F_a = *axial dynamic bearing load*
F_r = *radial dynamic bearing load*



Determining the basic rating life for bearings subjected to radial loads only

For slewing rings subjected to radial loads only, the following values are entered in the rating life formulae L and L_h:

- $P_r = F_r$
- the basic dynamic radial load rating C_r.

f 14
Basic rating life in millions of revolutions

$$L_{10} = \left(\frac{C_r}{P_r}\right)^p$$

f 15
Basic rating life in operating hours

$$L_{10h} = \frac{16666}{n} \cdot \left(\frac{C_r}{P_r}\right)^p$$

Legend

ϵ	–	Load eccentricity parameter
M_k	kNm	Dynamic tilting moment load
F_a	kN	Axial dynamic bearing load
D_M	mm	Rolling element pitch circle diameter ➤*1168*
P_a	kN	Equivalent dynamic axial bearing load. For bearings subjected to radial load only, enter P_r
k_F	–	Dynamic load factor ➤*1154* 13
L_{10}	10^6	Basic rating life in millions of revolutions
C_a, C_r	kN	Basic axial or radial dynamic load rating ➤*1168*. For bearings subjected to radial load only, enter C_r
p	–	Life exponent for crossed roller bearings: $p = 10/3$
L_{10h}	h	Basic rating life in operating hours
n	min^{-1}	Operating speed
n_{osc}	min^{-1}	Frequency of oscillating motion
γ	°	Half of swivel angle
P_r	kN	Equivalent dynamic radial bearing load
F_r	kN	Radial dynamic bearing load.

Calculation example

For the crossed roller bearing SX011820, the basic rating life L in millions of revolutions is to be checked.

Given	Crossed roller bearing	SX011820
	Rolling element pitch circle diameter ➤*1168*	D_M = 112 mm
	Basic dynamic load rating (axial) ➤*1168*	C_a = 28 kN
	Life exponent for crossed roller bearings	p = $^{10}/_{3}$
	Dynamic bearing load (axial)	F_a = 20 kN
	Dynamic bearing load (radial)	F_r = 4 kN
	Dynamic tilting moment load	M_k = 1 kNm
Required	Basic rating life L_{10} in millions of revolutions	

Solution

f **16** *Load eccentricity parameter*

$$\epsilon = \frac{2\,000 \cdot M_k}{F_a \cdot D_M}$$

$$\epsilon = \frac{2\,000 \cdot 1}{20 \cdot 112} = 0{,}89$$

$$\frac{F_r}{F_a} = \frac{4}{20} = 0{,}2$$

$$k_F = 2{,}1$$

Legend

ϵ	–	Load eccentricity parameter
M_k	kNm	Dynamic tilting moment load
F_a	kN	Axial dynamic bearing load
D_M	mm	Rolling element pitch circle diameter ➤*1168*
F_r	kN	Radial dynamic bearing load
k_F	–	Dynamic load factor ➤*1154* 13.

f **17** *Equivalent bearing load (static)*

$$P_a = k_F \cdot F_a$$

$$P_a = 2{,}1 \cdot 20\ \text{kN} = 42\ \text{kN}$$

Legend

P_a	kN	Equivalent dynamic axial bearing load. For bearings subjected to radial load only, enter P_r
k_F	–	Dynamic load factor ➤*1154* 13
F_a	kN	Axial dynamic bearing load.

f **18** *Basic rating life in million revolutions*

$$L_{10} = \left(\frac{C_a}{P_a}\right)^p$$

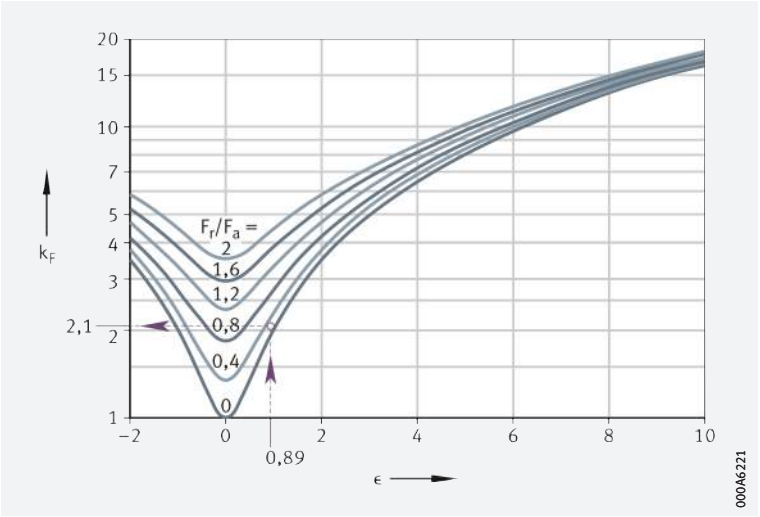
$$L_{10} = \left(\frac{28}{42}\right)^{\frac{10}{3}} = 0{,}26 \cdot 10^6\ \text{revolutions}$$

Legend

L_{10}	10^6	Basic rating life in millions of revolutions For bearings subjected to radial load only, enter P_r
C_a, C_r	kN	Basic axial or radial dynamic load rating ➤*1168*
P_a	kN	Equivalent dynamic axial bearing load. For bearings subjected to radial load only, enter P_r
p	–	Life exponent for crossed roller bearings: p = $^{10}/_{3}$.

14
Dynamic load factor k_F for crossed roller bearings

k_F = *dynamic load factor*
ϵ = *load eccentricity parameter*
F_a = *axial dynamic bearing load*
F_r = *radial dynamic bearing load*



Determining the load carrying capacity of the fixing screws

In addition to the raceway, the load carrying capacity of the fixing screws must also be checked. This is based on the information in ➤*1148*.

The load carrying capacity of the fixing screws can be checked if the following conditions are fulfilled:

- the criteria according to ➤*1148*
  - the screws are tightened as specified using a torque wrench
    screw tightening factor $\alpha_A = 1,6$
    tightening torques ➤*1161*|▦*8* to ➤*1162*|▦*9*
- the permissible contact pressure is not exceeded
- screws of the recommended size, quantity and grade are used.

Indicator of load carrying capacity

The load carrying capacity of the screws is described by:

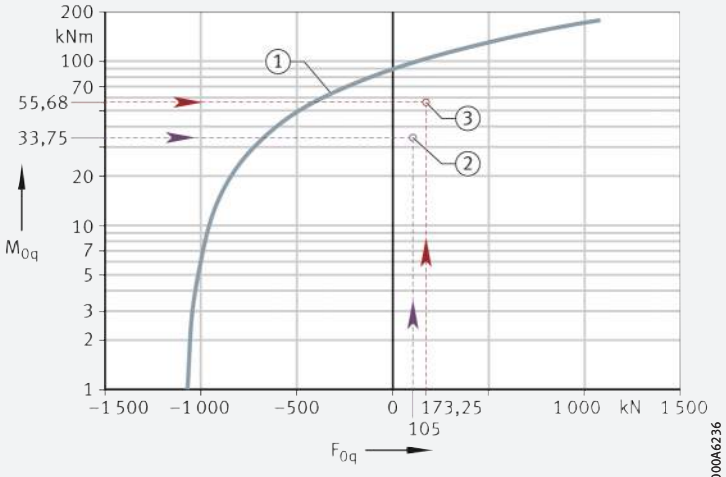
- the curves in the static limiting load diagrams for fixing screws in the product tables
- the maximum permissible radial load $F_{r\,per}$ (friction locking).

The screw curves are shown in the static limiting load diagrams for fixing screws. The curves are based on screws of grade 10.9, tightened to 90% of their proof stress, including the torsion content.

If screws of grade 8.8 or 12.9 are used, the equivalent static loads F_{0q} and M_{0q}, ➤*1148*, must be converted using the following factors:

- grade 8.8 ($F_{0q} \cdot 1,65$, $M_{0q} \cdot 1,65$)
- grade 12.9 ($F_{0q} \cdot 0,8$, $M_{0q} \cdot 0,8$).

Static limiting load diagram for fixing screws – example



15
Static limiting load diagram for fixing screws – example for crossed roller bearing SX011860

M_{0q} = *equivalent tilting moment load (static)*

F_{0q} = *equivalent axial bearing load (static)*

① *Screw curve*
② *Load point for screws of normal grade (10.9)*
③ *Load point for screws of grade 8.8*

Checking the static load carrying capacity of the screws

The static load carrying capacity of the screw is limited by its proof stress.

For applications with and without radial load

The equivalent static bearing loads F_{0q} and M_{0q} must be determined.

Using the values F_{0q} and M_{0q}, the load point is then determined in the static limiting load diagram for fixing screws, see diagrams in product tables ➤ *1170*.

The load point must be below the appropriate screw curve.

Radial load and static load carrying capacity of the screws

If radial loads occur in uncentred bearing rings, the screw connections must prevent displacement of the bearing rings on the adjacent construction.

In order to check this:

- multiply the radial bearing load by an application factor f_A ➤ *1150* *4*
- compare the values determined with the maximum permissible radial load $F_{r\,per}$.

The maximum radial load $F_{r\,per}$ on the fixing screws is dependent on their friction locking and not on the radial load carrying capacity of the bearing.

If the radial load on the bearing is higher than the friction locking of the fixing screws or very high radial loads are present ($F_r/F_a > 4$), please contact us.

Checking the dynamic load carrying capacity of the screws

The dynamic load carrying capacity of the screws corresponds to the fatigue strength of the screw.

Dynamic load carrying capacity

Based on the dynamic loads present, the equivalent loads F_{0q} and M_{0q} are determined.

Instead of the application factor f_A, the operating load must always be increased by the following factor:

- grade 8.8 (factor 1,8),
  grade 10.9 (factor 1,6),
  grade 12.9 (factor 1,5).

The load carrying capacity must then be checked in the static limiting load diagram for the fixing screws ➤ *1168*.

The load point must be below the appropriate screw curve.

1.15 Minimum load

In order to prevent damage due to slippage, a minimum load is required

In order that no slippage occurs between the contact partners, the crossed roller bearings must be constantly subjected to a sufficiently high load. In most cases, however, the load is already sufficiently high due to the weight of the supported parts and the external forces.

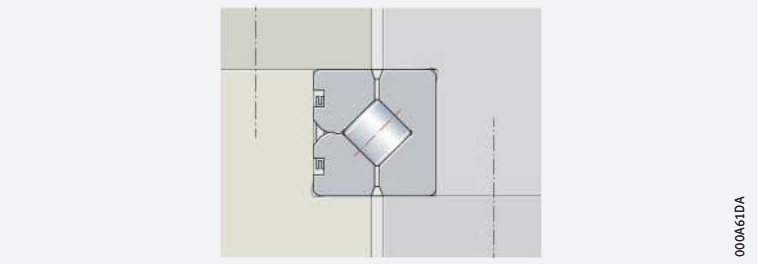
1.16 Design of bearing arrangements

The design of the adjacent construction has a considerable influence on the function of the bearings

Crossed roller bearings SX can support high loads. Due to the X arrangement of the cylindrical rollers, these bearings can support axial forces in both directions, radial loads, tilting moment loads and any combinations of loads. In order that these advantages can be utilised comprehensively, the adjacent construction must be designed so that it is appropriately rigid. The bearing rings must always be rigidly and uniformly supported over the circumference and width of the rings ➤*1158*|*16*.

The adjacent construction must be designed only in accordance with the information in this section. Any deviations from the specifications, material strength and adjacent components will considerably reduce the load carrying capacity and operating life of the bearings.

16
Uniform support of the bearing rings by the adjacent construction



Shaft and housing tolerances

For normal applications, the tolerance class K7 Ⓔ for the housing and h7 Ⓔ for the shaft are sufficient ➤*1158*|*5* and ➤*1159*|*6*.

In precision applications, the bearing seat in the housing should be designed to tolerance class K6 Ⓔ and on the shaft to h6 Ⓔ ➤*1158*|*5* and ➤*1159*|*6*.

5
Mounting tolerances for the shaft

Nominal dimension d_i mm		Tolerance classes			
>	≦	h6		h7	
		Upper deviation µm	Lower deviation µm	Upper deviation µm	Lower deviation µm
65	80	0	−19	0	−30
80	100	0	−22	0	−35
100	120	0	−22	0	−35
120	140	0	−25	0	−40
140	160	0	−25	0	−40
160	180	0	−25	0	−40

continued ▼

5 *Mounting tolerances for the shaft*

Nominal dimension d_i mm		Tolerance classes			
>	≦	h6		h7	
		Upper deviation µm	Lower deviation µm	Upper deviation µm	Lower deviation µm
180	200	0	−29	0	−46
200	225	0	−29	0	−46
225	250	0	−29	0	−46
250	280	0	−32	0	−52
280	315	0	−32	0	−52
315	355	0	−36	0	−57
355	400	0	−36	0	−57
400	450	0	−40	0	−63
450	500	0	−40	0	−63

continued ▲

6 *Mounting tolerances for the housing bore*

Nominal dimension D_a mm		Tolerance classes			
>	≦	K6		K7	
		Upper deviation µm	Lower deviation µm	Upper deviation µm	Lower deviation µm
80	100	+4	−18	+10	−25
100	120	+4	−18	+10	−25
120	140	+4	−21	+12	−28
140	160	+4	−21	+12	−28
160	180	+4	−21	+12	−28
180	200	+5	−24	+13	−33
200	225	+5	−24	+13	−33
225	250	+5	−24	+13	−33
250	280	+5	−27	+16	−36
280	315	+5	−27	+16	−36
315	355	+7	−29	+17	−40
355	400	+7	−29	+17	−40
400	450	+8	−32	+18	−45
450	500	+8	−32	+18	−45
500	560	0	−44	0	−70
560	630	0	−44	0	−70

Location using clamping rings

For the location of crossed roller bearings SX, clamping rings have proved effective ➤ *1161* | *17*.

The bearing rings must always be rigidly and uniformly supported over the circumference and width of the rings.

The thickness of the clamping rings and mounting flanges must not be less than the minimum thickness s.

Counterbores to DIN 74, type J, for screws to DIN 6912 are permissible. For deeper counterbores, the thickness of the clamping ring s must be increased by the additional counterbore depth.

Mounting dimensions ➤ *1160* | *7* and ➤ *1161* | *17*. Minimum strength of clamping rings ➤ *1160*.

Bearing seat depth

In order that the clamping rings retain the bearing securely, the bearing seat depth t must be in accordance with the specification ➤*1160*| ▦ *7* and ➤*1161*| ⧉ *17*.

The depth of the bearing seat influences the bearing clearance and the rotational resistance.

Bearings with preload (suffix VSP) have a considerably higher rotational resistance.

If particular requirements for rotational resistance apply, the depth t must be produced to match the relevant height of the bearing ring. It has proved effective to tolerance the depth t to deviations that are the same as or further restricted compared to the dimension h in the product tables. For safety, internal tests should in any case be carried out.

Minimum strength of clamping rings

For screws of grade 10.9, the minimum strength under the screw heads or nuts must be 500 N/mm^2. Seating washers are not necessary for these screws.

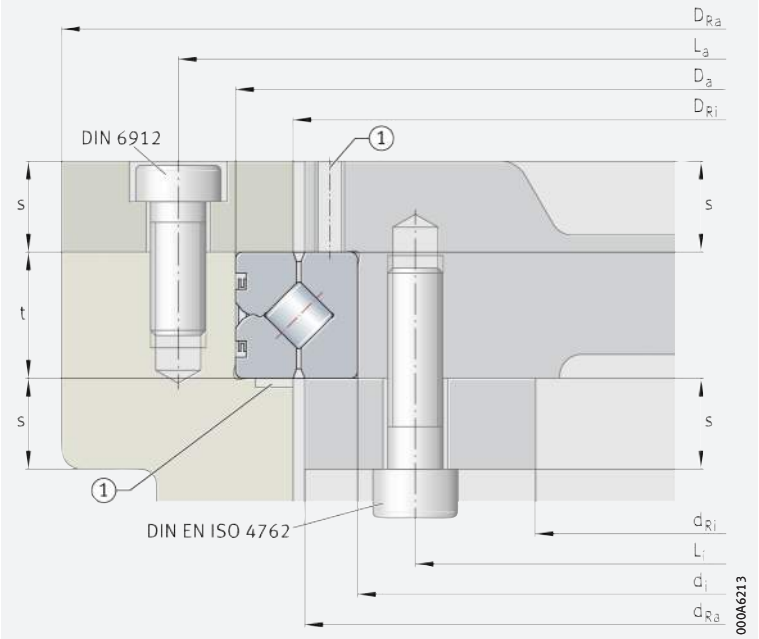
For fixing screws of grade 12.9, the minimum strength must not be less than 850 N/mm^2, otherwise quenched and tempered seating washers under the screw heads or quenched and tempered nuts must be used.

▦ *7*
Mounting dimensions

Designation	Mounting dimensions in mm									
	d_i h7 (h6)	D_a K7 (K6)	t	s min.	d_{Ra}	d_{Ri}	D_{Ri}	D_{Ra}	L_i max.	L_a min.
SX011814	70	90	10 –0,005 –0,015	8	78	42	82	118	60	100
SX011818	90	115	13 –0,005 –0,020	10	100	61	104	144	80	125
SX011820	100	125	13 –0,005 –0,020	10	110	71	114	154	90	135
SX011824	120	150	16 –0,005 –0,025	12	132	84	138	186	108	162
SX011828	140	175	18 –0,005 –0,030	14	154	94	160	221	124	191
SX011832	160	200	20 –0,02 –0,05	15	177	111	183	249	144	216
SX011836	180	225	22 –0,02 –0,05	17	199	121	205	284	160	245
SX011840	200	250	24 –0,02 –0,06	18	221	139	229	311	180	270
SX011848	240	300	28 –0,02 –0,06	21	269	166	274	374	216	324
SX011860	300	380	38 –0,04 –0,10	29	335	201	345	479	268	412
SX011868	340	420	38 –0,04 –0,10	29	375	241	385	519	308	452
SX011880	400	500	46 –0,04 –0,10	35	445	275	455	625	360	540
SX0118/500	500	620	56 –0,04 –0,10	42	554	350	566	700	452	668

17
Clamping rings, bearing seat depth, mounting dimensions

① *Slots, threaded extraction hole or similar for dismounting purposes*



Fixing screws

For the location of the bearing rings or clamping rings, screws of grade 10.9 are suitable ➤*1161*|▦*8*.

Any deviations from the recommended size, grade and quantity of screws will considerably reduce the load carrying capacity and operating life of the bearings.

For screws of grade 12.9, the minimum strength of the clamping rings must be achieved or quenched and tempered seating washers must be used.

8
Fixing screws

Crossed roller bearings	Fixing screws Grade 10.9		Tightening torque
	Dimension	Quantity	M_A Nm
SX011814	M5	18	7
SX011818	M5	24	7
SX011820	M5	24	7
SX011824	M6	24	11,7
SX011828	M8	24	27,8
SX011832	M8	24	27,8
SX011836	M10	24	55,6
SX011840	M10	24	55,6
SX011848	M12	24	98,4
SX011860	M16	24	247
SX011868	M16	24	247
SX011880	M20	24	481
SX0118/500	M24	24	831

Securing of screws

Normally, the screws are adequately secured by the correct preload ➤*1162*|▦*9* and ➤*1162*|▦*10*. If regular shock loads or vibrations occur, however, additional securing of the screws may be necessary.

Not every method of securing screws is suitable for crossed roller bearings. Never use spring washers or split washers.

General information on securing of screws is given in DIN 25201-4:2004. If these are to be used, please consult the relevant companies.

▦**9**
Tightening torques M_A for the torque-controlled tightening of socket headless screws

Fixing screw	Clamping cross-section A_S mm²	Core cross-section A_{d3} mm²	Tightening torque M_A[1] in Nm for grade		
			8.8	10.9	12.9
M4	8,78	7,75	2,25	3,31	3,87
M5	14,2	12,7	4,61	6,77	7,92
M6	20,1	17,9	7,8	11,5	13,4
M8	36,6	32,8	19,1	28	32,8
M10	58	52,3	38	55,8	65,3
M12	84,3	76,2	66,5	97,7	114
M14	115	105	107	156	183
M16	157	144	168	246	288
M18	192	175	229	336	394
M20	245	225	327	481	562
M22	303	282	450	661	773
M24	353	324	565	830	972

1) *M_A in accordance with guideline VDI 2230 (February 2003) for $\mu_K = 0,08$ and $\mu_G = 0,12$.*

▦**10**
Assembly preload forces F_M for the torque-controlled tightening of socket headless screws

Fixing screw	Clamping cross-section A_S mm²	Core cross-section A_{d3} mm²	Mounting preload force F_M[1] in kN for grade		
			8.8	10.9	12.9
M4	8,78	7,75	4,05	5,95	6,96
M5	14,2	12,7	6,63	9,74	11,4
M6	20,1	17,9	9,36	13,7	16,1
M8	36,6	32,8	17,2	25,2	29,5
M10	58	52,3	27,3	40,2	47
M12	84,3	76,2	39,9	58,5	68,5
M14	115	105	54,7	80,4	94,1
M16	157	144	75,3	111	129
M18	192	175	91,6	134	157
M20	245	225	118	173	202
M22	303	282	147	216	253
M24	353	324	169	249	291

1) *F_M in accordance with guideline VDI 2230 (February 2003) for $\mu_G = 0,12$.*

1.17 Mounting and dismounting

Mounting of crossed roller bearings

The bores and edges of the adjacent components must be free from burrs. The support surfaces for the bearing rings must be clean.

The seating and locating surfaces for the bearing rings on the adjacent construction must be lightly oiled or greased.

Lightly oil the thread of the fixing screws in order to prevent varying friction factors (do not oil or grease screws that will be secured by means of adhesive).

Ensure that all adjacent components and lubrication ducts are free from cleaning agents, solvents and washing emulsions. The bearing seat surfaces can rust or the raceway system can become contaminated.

Mounting forces must only be applied to the bearing ring to be mounted; forces must never be directed through the rolling elements or seals. Avoid direct blows on the bearing rings in all cases.

Locate the bearing rings consecutively and without application of any external load.

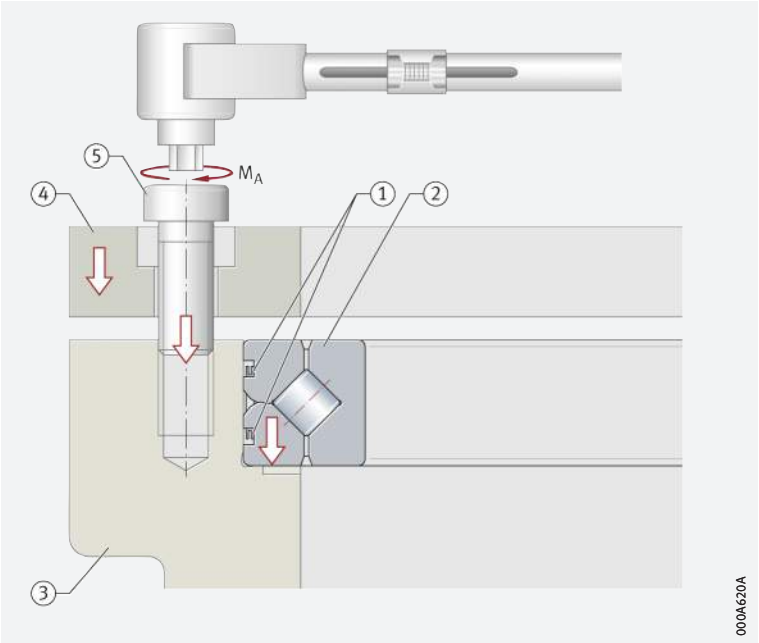
The outer ring is split and is held together by three retaining rings ① ➤ *1163* | *18*. Never apply tensile loads to the retaining rings.

Locating the outer bearing ring

Mounting of the ring ➤ *1163* | *18*:

- Insert or press the bearing ② into the external adjacent construction ③ with the outer ring first
- Position the external clamping ring ④
- Insert the fixing screws ⑤ in the clamping ring and tighten in steps up to the specified tightening torque M_A
  - tighten the screws in a crosswise sequence in order to prevent unacceptable fluctuations in the screw tensioning forces
  - tightening torques M_A for fixing screws ➤ *1162* | *9*.

18
Locating the outer bearing ring

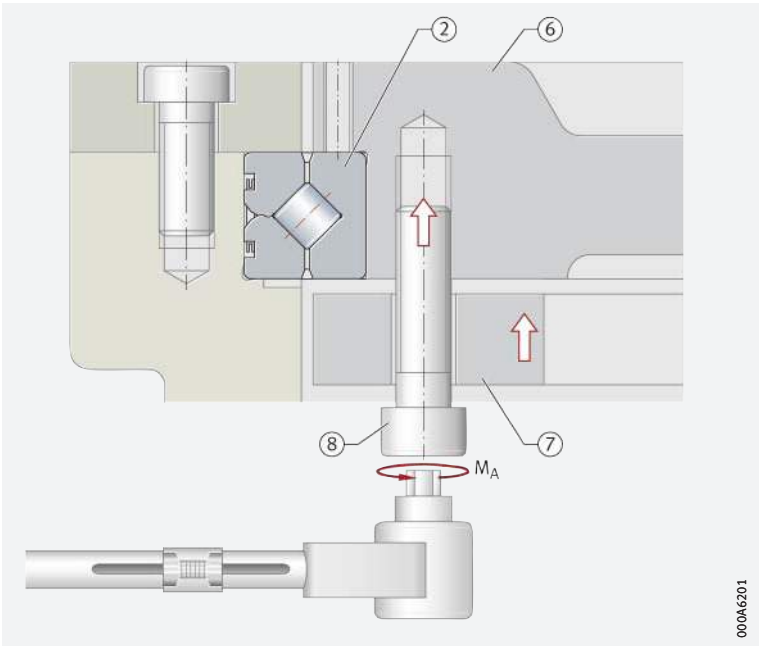


Locating the inner bearing ring

Mounting of the ring ➤*1164*| *19*:

- Insert the bearing ② into the internal adjacent construction ⑥
- Position the internal clamping ring ⑦
- Insert the fixing screws ⑧ in the clamping ring and tighten in steps up to the specified tightening torque M_A
  – tighten the screws in a crosswise sequence in order to prevent unacceptable fluctuations in the screw tensioning forces.

19
Locating the inner bearing ring



Checking the function

Once mounting is complete, the operation of the mounted crossed roller bearing must be checked. If the bearing runs irregularly or roughly, or the temperature in the bearing shows an unusual increase, the bearing must be dismounted, checked and mounted again in accordance with the mounting guidelines described.

Checking the running accuracy

✎ Possible causes of deviations in values

The running accuracy must be checked by means of a dial gauge. The corresponding values are taken from the mounting drawing or the product tables. Deviations from the values may be the result of:

- inaccuracies in the adjacent construction
- braced bearings due to incorrectly tightened clamping rings, fixing screws or locknuts.

Checking the rotational resistance

✎ Factors influencing the rotational resistance

The rotational resistance is essentially determined by:

- the rolling resistance of the rolling elements
- the internal clearance or bearing preload
- the friction of the spacers
- the friction of the seals
- the grease
- a deformed or defective adjacent construction
- errors during mounting.

Preload, rotational resistance, bearing temperature

Due to the preload in the rolling element system, the rotational resistance is higher than in a bearing with clearance. At higher speeds, a high preload can lead to generation of significant heat in the bearing.
In such applications, tests must be carried out if necessary with bearings preloaded to various values.

Checking the bearing temperature

Possible causes of high temperatures

After commissioning, the temperature in the bearing can increase; in the case of grease lubrication, this may continue until the grease is evenly distributed in the bearing. A further increase or unusually high temperatures may be caused by one of the following:

- The bearing is lubricated using an unsuitable grease
- There is too much lubricant in the bearing
- The bearing load is too high
- The bearing is mounted unevenly
- The adjacent construction deviates from the specifications.

Schaeffler Mounting Handbook

Rolling bearings must be handled with great care

Rolling bearings are well-proven precision machine elements for the design of economical and reliable bearing arrangements, which offer high operational security. In order that these products can function correctly and achieve the envisaged operating life without detrimental effect, they must be handled with care.

The Schaeffler Mounting Handbook MH 1 gives comprehensive information about the correct storage, mounting, dismounting and maintenance of rotary rolling bearings ➤ *https://www.schaeffler.de/std/1D53*. It also provides information which should be observed by the designer, in relation to the mounting, dismounting and maintenance of bearings, in the original design of the bearing position. This book is available from Schaeffler on request.

1.18 Legal notice regarding data freshness

✎ The further development of products may also result in technical changes to catalogue products

Of central interest to Schaeffler is the further development and optimisation of its products and the satisfaction of its customers. In order that you, as the customer, can keep yourself optimally informed about the progress that is being made here and with regard to the current technical status of the products, we publish any product changes which differ from the printed version in our electronic product catalogue.

§ We therefore reserve the right to make changes to the data and illustrations in this catalogue. This catalogue reflects the status at the time of printing. More recent publications released by us (as printed or digital media) will automatically precede this catalogue if they involve the same subject. Therefore, please always use our electronic product catalogue to check whether more up-to-date information or modification notices exist for your desired product.

Link to electronic product catalogue

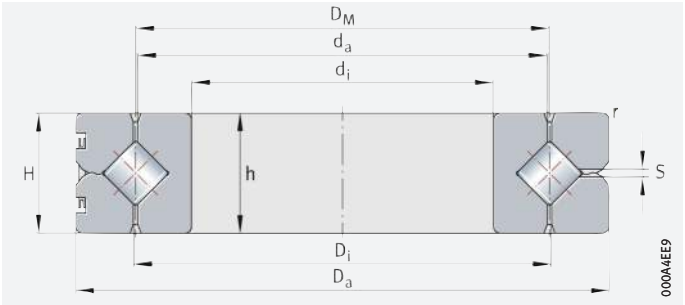
The following link will take you to the Schaeffler electronic product catalogue: ➤ *https://medias.schaeffler.com*.

1.19 Further information

In addition to the data in this chapter, the following chapters in Technical principles must also be observed in the design of bearing arrangements:

- Determining the bearing size ➤*34*
- Rigidity ➤*54*
- Friction and increases in temperature ➤*56*
- Speeds ➤*64*
- Bearing data ➤*97*
- Lubrication ➤*70*
- Sealing ➤*182*
- Design of bearing arrangements ➤*139*
- Mounting and dismounting ➤*191*.

Crossed roller bearings



SX

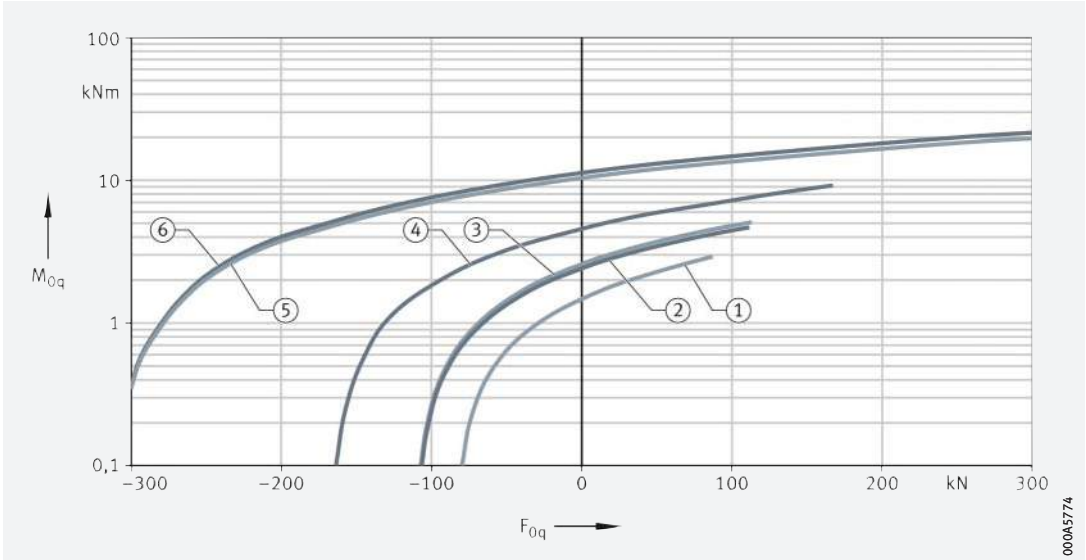
d_i = 70 – 160 mm

Main dimensions			Basic load ratings				Limiting speeds				Mass	Designation	Dimensions identical to deep groove ball bearing 618
d_i	D_a	H[1]	axial		radial[2]		with standard clearance		with preload		m	➤*1147|1.12* ➤*1147|1.13*	
			dyn. C_a	stat. C_{0a}	dyn. C_r	stat. C_{0r}	n_G oil	n_G grease	n_G oil	n_G grease			
K6	h6		kN	kN	kN	kN	min^{-1}	min^{-1}	min^{-1}	min^{-1}	≈ kg		
70 +0,004 −0,015	90 0 −0,022	10 +0,06 −0,06	16,6	52	11,8	25,5	1 910	955	955	475	0,3	**SX011814**	61814
90 +0,004 −0,018	115 0 −0,022	13 +0,06 −0,06	26,5	87	18,9	43	1 500	750	750	375	0,4	**SX011818**	61818
100 +0,004 −0,018	125 0 −0,025	13 +0,06 −0,06	28	97	20	47,5	1 360	680	680	340	0,5	**SX011820**	61820
120 +0,004 −0,018	150 0 −0,025	16 +0,06 −0,06	39,5	140	28	69	1 130	565	565	280	0,8	**SX011824**	61824
140 +0,004 −0,021	175 0 −0,025	18 +0,06 −0,06	64	223	45,5	109	975	485	485	240	1,1	**SX011828**	61828
160 +0,004 −0,021	200 0 −0,029	20 +0,10 −0,10	69	255	49	126	850	425	425	210	1,7	**SX011832**	61832

medias ➤ *https://www.schaeffler.de/std/1E26*

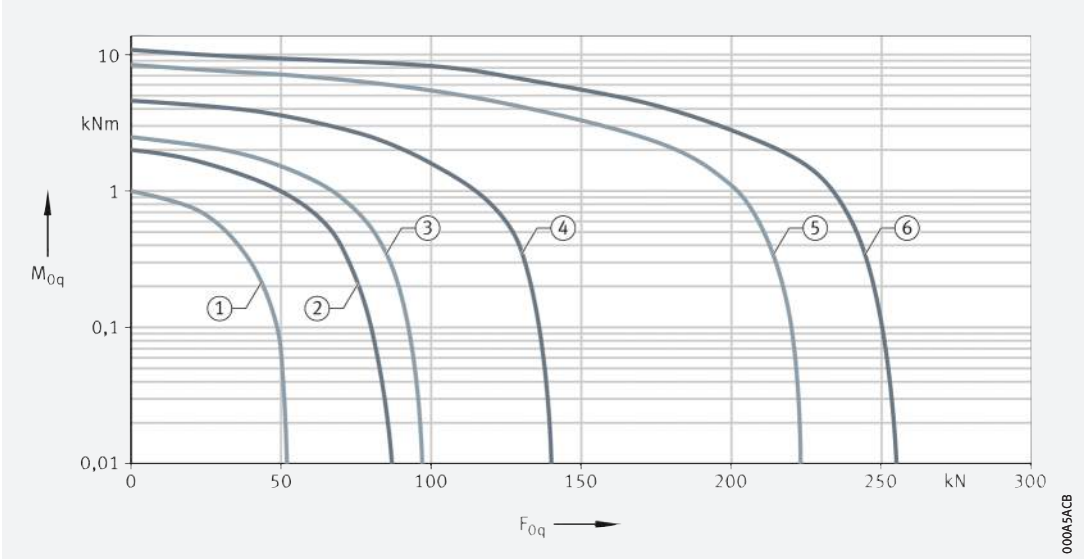
[1] H = section height of bearing, h = height of individual ring.

[2] Basic load ratings, radial: for radial loads only.



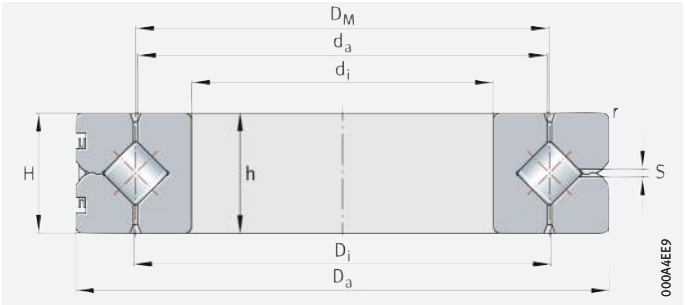
Static limiting load diagrams for fixing screws – compressive load

Dimensions							Running accuracy		Normal clearance				Low clearance RL0		Preload VSP		Position: see diagram
d_i	D_M	$h^{1)}$	d_a	D_i	r	S	radial	axial	Radial clearance		Axial tilting clearance		Radial clearance	Preload			
					min.				min.	max.	min.	max.	max.	max.	min.	max.	
70	80	10 0 −0,01	79,5	80,5	0,6	1,2	0,01	0,01	0,003	0,015	0,006	0,03	0,003	0,006	0,003	0,015	①
90	102	13 0 −0,01	101,5	102,5	1	1,2	0,01	0,01	0,003	0,015	0,006	0,03	0,003	0,006	0,003	0,015	②
100	112	13 0 −0,01	111,5	112,5	1	1,2	0,01	0,01	0,005	0,02	0,01	0,04	0,004	0,008	0,005	0,02	③
120	135	16 0 −0,01	134,4	135,6	1	1,5	0,01	0,01	0,005	0,02	0,01	0,04	0,004	0,008	0,005	0,02	④
140	157	18 0 −0,01	156,3	157,7	1,1	1,5	0,015	0,01	0,005	0,02	0,01	0,04	0,004	0,008	0,005	0,02	⑤
160	180	20 0 −0,025	179,2	180,8	1,1	1,5	0,015	0,01	0,005	0,02	0,01	0,04	0,004	0,008	0,005	0,02	⑥



Static limiting load diagrams for raceway – compressive load

Crossed roller bearings



SX

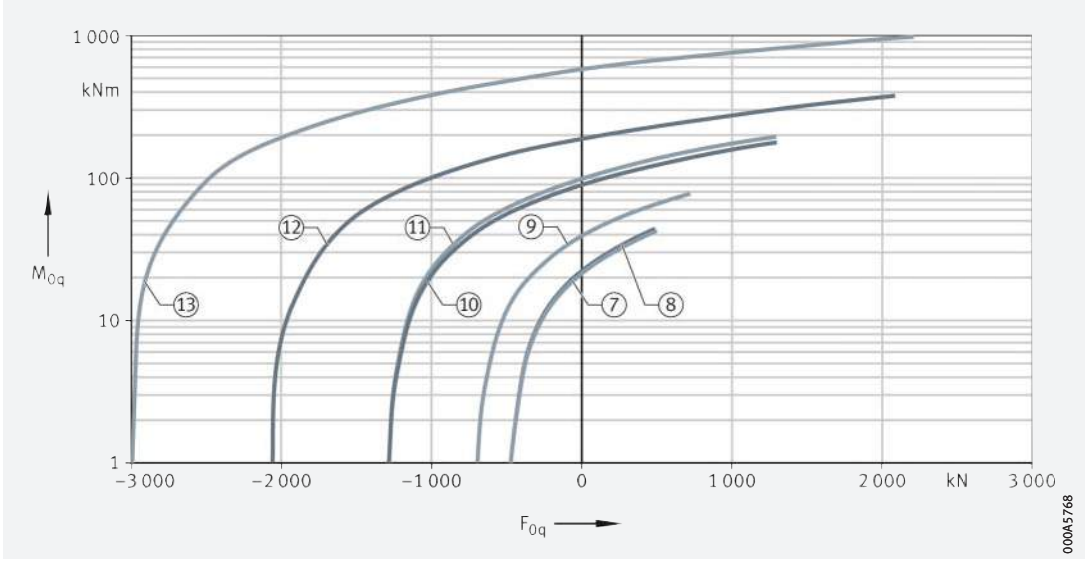
d_i = 180 – 500 mm

Main dimensions			Basic load ratings				Limiting speeds				Mass	Designation	Dimensions identical to deep groove ball bearing 618
d_i	D_a	H[1]	axial		radial[2]		with standard clearance		with preload		m	➤*1147|1.12* ➤*1147|1.13*	
			dyn. C_a	stat. C_{0a}	dyn. C_r	stat. C_{0r}	n_G oil	n_G grease	n_G oil	n_G grease			
K6	h6		kN	kN	kN	kN	min^{-1}	min^{-1}	min^{-1}	min^{-1}	≈ kg		
180 +0,004 −0,021	225 0 −0,029	22 +0,10 −0,10	98	360	70	177	755	375	375	185	2,3	**SX011836**	61836
200 +0,004 −0,024	250 0 −0,029	24 +0,10 −0,10	104	400	74	197	680	340	340	170	3,1	**SX011840**	61840
240 +0,005 −0,024	300 0 −0,032	28 +0,10 −0,10	149	600	106	295	565	280	280	140	5,3	**SX011848**	61848
300 +0,005 −0,027	380 0 −0,036	38 +0,14 −0,14	245	990	174	485	450	225	225	110	12	**SX011860**	61860
340 +0,007 −0,029	420 0 −0,04	38 +0,14 −0,14	265	1 130	187	550	400	200	200	100	13,5	**SX011868**	61868
400 +0,007 −0,029	500 0 −0,04	46 +0,15 −0,15	385	1 660	275	810	340	170	170	85	24	**SX011880**	61880
500 +0,008 −0,032	620 0 −0,044	56 +0,16 −0,16	560	2 550	395	1 250	275	135	135	65	44	**SX0118/500**	618/500

medias ➤ *https://www.schaeffler.de/std/1E27*

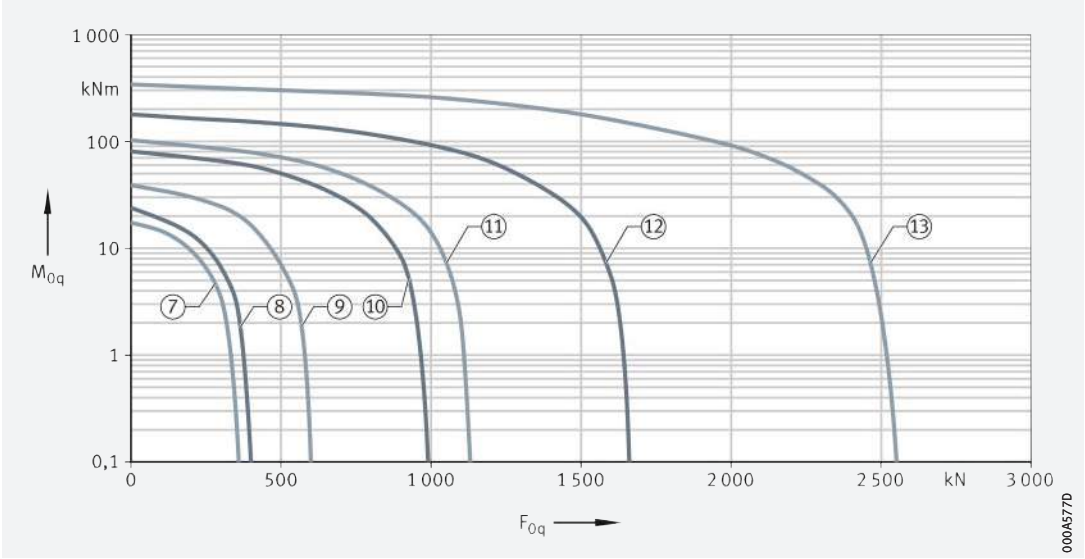
[1] H = section height of bearing, h = height of individual ring.

[2] Basic load ratings, radial: for radial loads only.



Static limiting load diagrams for fixing screws – compressive load

Dimensions							Running accuracy		Normal clearance				Low clearance RL0		Preload VSP		Position: see diagram
d_i	D_M	$h^{1)}$	d_a	D_i	r	S	radial	axial	Radial clearance		Axial tilting clearance		Radial clearance	Preload			
					min.				min.	max.	min.	max.	max.	max.	min.	max.	
180	202	22 0 −0,025	201,2	202,8	1,1	2	0,015	0,01	0,005	0,025	0,01	0,05	0,005	0,01	0,005	0,025	⑦
200	225	24 0 −0,025	224,2	225,8	1,5	2	0,015	0,01	0,005	0,025	0,01	0,05	0,005	0,01	0,005	0,025	⑧
240	270	28 0 −0,025	269,2	270,8	2	2	0,02	0,01	0,01	0,03	0,02	0,06	0,005	0,01	0,005	0,025	⑨
300	340	38 0 −0,05	339,2	340,8	2,1	2,5	0,02	0,01	0,01	0,04	0,02	0,08	0,005	0,01	0,005	0,025	⑩
340	380	38 0 −0,05	379,2	380,8	2,1	2,5	0,025	0,01	0,01	0,04	0,02	0,08	0,005	0,01	0,005	0,025	⑪
400	450	46 0 −0,05	449	451	2,1	2,5	0,03	0,01	0,01	0,05	0,02	0,1	0,005	0,01	0,005	0,025	⑫
500	560	56 0 −0,05	558,8	561,2	3	2,5	0,04	0,01	0,015	0,06	0,03	0,12	0,006	0,012	0,005	0,03	⑬



Static limiting load diagrams for raceway – compressive load

Super precision bearings

1 Bearings for main spindles

1.1 General features

✎ *Design variants*

Bearings for main spindles are available as:

- super precision angular contact ball bearings ➤*1175*| 1
  - single row, as single bearings or in sets
  - contact angle 15°, 25°
  - with large or small balls
  - rolling elements made from rolling bearing steel or ceramic
  - rings made from rolling bearing steel or Cronidur
  - Direct Lube bearings
- super precision cylindrical roller bearings ➤*1175*| 2
  - single row
  - double row
  - rolling elements made from rolling bearing steel or ceramic
  - cages made from brass, polyamide or PEEK
- super precision axial bearings, i.e. super precision axial angular contact ball bearings 2344 ➤*1176*| 3, super precision angular contact ball bearings BAX ➤*1177*| 4
  - double direction
  - contact angle 30°, 40°, 60°
  - rolling elements made from rolling bearing steel
  - rings made from rolling bearing steel
  - cages made from brass, laminated fabric.

Product catalogue

The standard range of these bearings is described in detail in Spindle Bearing Catalogue ➤ *SP 1* and in our electronic product catalogue ***medias*** *professional*.

✎ *Printed catalogue*

The Spindle Bearing Catalogue SP 1 can be requested from Schaeffler. Download and ordering at ➤*https://www.schaeffler.de/std/1D58*.

✎ ***medias***

The following link will take you to the Schaeffler electronic product selection and information system: ➤*https://medias.schaeffler.com*.

✎ *App for services*

The app “PrecisionDesk” offers extensive services for rotary and linear bearings of a super precision design and assists fitters and engineers in the selection and mounting of bearings. Further information on PrecisionDesk ➤*1374*, download ➤*https://www.schaeffler.de/std/1D59*.

1.2 Super precision angular contact ball bearings

FAG super precision angular contact ball bearings are single row angular contact ball bearings with solid outer and inner rings, and ball and cage assemblies with solid window cages ➤*1175*| 1. The dimensions are standardised.

✎ *Suitable for applications with very high guidance accuracy*

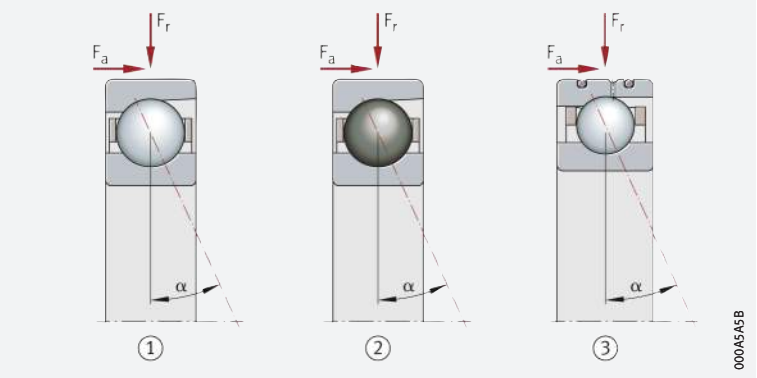
Due to their very narrow tolerances, the bearings are particularly suitable for applications involving the highest requirements for guidance accuracy, rigidity and speed suitability, such as bearing arrangements for main spindles in machine tools.

The product range of super precision angular contact ball bearings is presented in the product tables ➤*1178*|. In addition to the products listed therein, further designs are available by agreement.

1
Universal super precision angular contact ball bearings (universal spindle bearings)

α = *nominal contact angle*
F_a = *axial load*
F_r = *radial load*

① *Spindle bearing with balls made from rolling bearing steel*
② *Spindle bearing with balls made from ceramic*
③ *Direct Lube spindle bearing*



Extensive range for main spindle bearing arrangements, primarily in machine tools

This extensive product range gives the designer all possible scope for designing technically innovative, operationally secure and economical bearing arrangements. This results in significant performance improvements and cost savings as standard in machine tools. However, other machines, such as turbochargers for example, can benefit from these bearings.

Increased performance

In new designs, this can allow the machine manufacturer to achieve a unique position in the market. In existing designs too, refitting with FAG spindle bearings can still give further increases in the performance and profitability of machines.

1.3 Super precision cylindrical roller bearings

Features

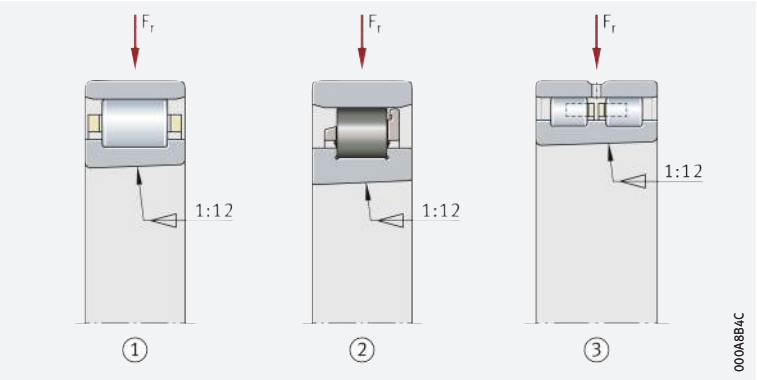
FAG super precision cylindrical roller bearings comprise solid outer rings, solid inner rings with a tapered bore (taper 1:12) and cylindrical roller and cage assemblies with cages made from polyamide, brass or PEEK (polyetheretherketone) ➤*1175*|*2*. The outer ring is removable and can thus be mounted separately from the rest of the bearing package. The inner ring is only removable in the case of series NNU49.

FAG super precision cylindrical roller bearings are also available by agreement with a cylindrical bore.

2
Super precision cylindrical roller bearings

F_r = *radial load*

① *Single row, tapered bore, N10*
② *Single row, tapered bore, ceramic rolling elements: HCN10*
③ *Double row, tapered bore, NN30, NNU49*



Areas of application

The single and double row bearings are used when the very highest precision is required under very high radial load. Typical areas of application include machine tools and printing machinery. The bearings facilitate bearing arrangements with very high precision, high radial rigidity and very high load carrying capacity. In machine tool building, they provide radial support for the main spindle.

Ideal non-locating bearings

Since variations in length during rotary motion can be compensated between the rollers and the ribless raceway without constraining forces, the cylindrical roller bearings are highly suitable as non-locating bearings. Axial forces are supported by axial bearings, such as double direction axial angular contact ball bearings or super precision angular contact ball bearings BAX. The standard series N10, HCN10 (single row) and NN30, NNU49 (double row) are an established part of the FAG super precision range ➤*1248*.

Diameter ranges not shown in the catalogue are available by agreement.

X-life premium quality

The super precision cylindrical roller bearings N10 and NN30 in the X-life design have a higher load carrying capacity and thus a significantly increased bearing rating life. A newly developed plastic cage gives lower friction than the previous standard design with brass cage.

Increased customer benefits due to X-life

The advantages of this bearing design include:

- limiting speeds up to 35% higher
- running temperatures up to 12 K lower
- lower noise level
- lower lubricant demand
- longer grease operating life
- higher basic load ratings
- longer operating life of the bearings.

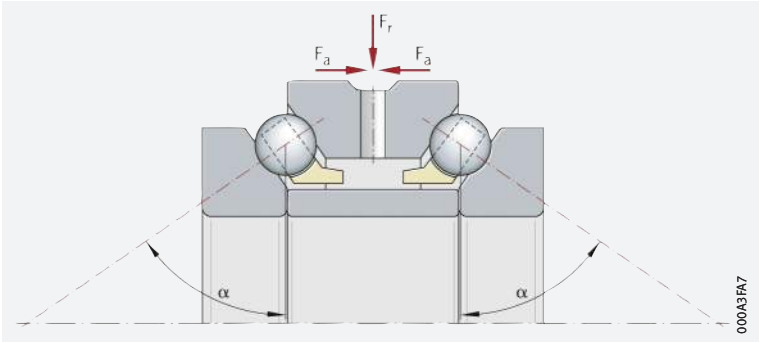
The basic dynamic load ratings C are up to approx. 20% higher than those of the previous bearing designs and the basic bearing rating life L_{10} is up to 65% longer than the previous standard. As a result of the increase in the basic bearing rating life L_{10}, this gives a longer operating life of the bearings under the same operating conditions. If the rating life values are maintained, alternatively, higher loads can be applied to the bearing arrangement.

1.4 Super precision axial bearings

Super precision axial angular contact ball bearings 2344

Suitable for applications with very high precision and high axial loads

Double direction axial angular contact ball bearings of series 2344 in particular are very axially rigid super precision bearings preloaded clearance-free with restricted tolerances to class SP. The bearings are used when very high precision is required under high axial load.



3 *Axial angular contact ball bearing 2344, double direction*

α = *nominal contact angle*
F_r = *radial load*
F_a = *axial load*

Features

These bearings without self-retention comprise solid shaft locating washers, a spacer ring, a housing locating washer and ball and cage assemblies with solid cages ➤*1176* **3**. The bearing parts are matched to each other and can be fitted separately, but must not be interchanged with parts from other bearings. Available designs of series 2344 ➤*1262*.

Contact angle

Due to the contact angle of 60°, they can support high axial loads from both sides.

Super precision angular contact ball bearings BAX

Suitable for applications with high speeds and axial loads

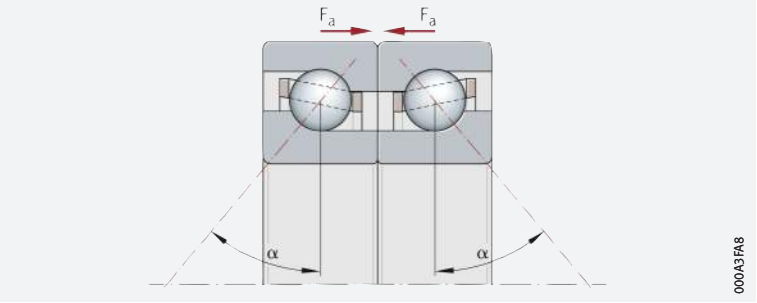
Increased load carrying capacity normally brings with it a reduction in the maximum speed. Through the use of angular contact ball bearings BAX, it is possible to unify both requirements. Angular contact ball bearings BAX:

- can support high axial loads
- have similarly high limiting speeds to X-life cylindrical roller bearings
- have high rigidity
- can support axial loads only.

The super precision angular contact ball bearings BAX conform to the accuracy class P4S and are generally supplied as ready-to-fit sets in the arrangement DB ➤1177 4. Available designs ➤1264.

4
Angular contact ball bearing BAX, ready-to-fit set in O arrangement

α = *nominal contact angle*
F_a = *axial load*

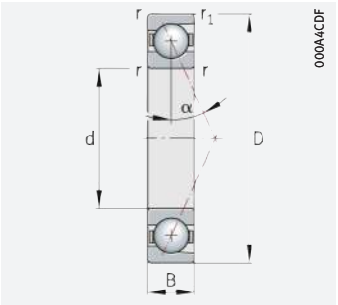


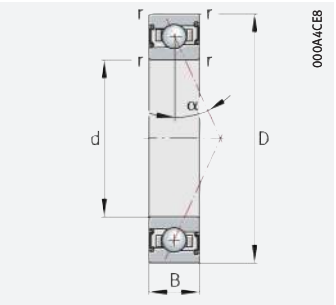
Contact angle

Super precision angular contact ball bearings BAX are available with a contact angle of 30° for high speed requirements or, for even higher rigidities, also with a contact angle of 40°. As a bearing set, they can support high axial loads from both sides.

Super precision angular contact ball bearings

With large or small balls
Steel or ceramic balls
Steel or Cronidur rings
Open or sealed





d = 10 – 10 mm

Main dimensions			Basic load ratings		Fatigue limit load	Limiting speeds[1]		Dimensions		Contact angle	Mass	Designation[2] [3]
d	D	B	dyn. C_r	stat. C_{0r}	C_{ur}	n_G grease	n_G oil[5]	r	r_1	α	m	
			kN	kN	N	min^{-1}	min^{-1}	min.	min.	°	≈ kg	
10	22	6	2,9	1,02	105	70 000	110 000	0,3	0,3	25	0,01	**B71900-E-T-P4S**
	22	6	3	1,07	110	75 000	120 000	0,3	0,3	15	0,01	**B71900-C-T-P4S**
	22	6	2,9	0,98	75	95 000	150 000	0,3	0,3	25	0,009	**HCB71900-E-T-P4S**
	22	6	1,7	0,62	64	95 000	140 000	0,3	0,3	25	0,01	**HS71900-E-T-P4S**
	22	6	1,79	0,65	67	100 000	160 000	0,3	0,3	15	0,01	**HS71900-C-T-P4S**
	22	6	3	1,02	78	110 000	160 000	0,3	0,3	15	0,009	**HCB71900-C-T-P4S**
	22	6	1,7	0,6	45,5	120 000	180 000	0,3	0,3	25	0,01	**HC71900-E-T-P4S**
	22	6	2,6	0,6	45,5	130 000	200 000	0,3	0,3	25	0,01	**XC71900-E-T-P4S**
	26	8	3,95	1,41	145	60 000	95 000	0,3	0,3	25	0,02	**B7000-E-T-P4S**
	26	8	4,1	1,47	151	67 000	100 000	0,3	0,3	15	0,02	**B7000-C-T-P4S**
	26	8	3,95	1,35	102	85 000	130 000	0,3	0,3	25	0,018	**HCB7000-E-T-P4S**
	26	8	2,35	0,89	92	85 000	130 000	0,3	0,3	25	0,021	**HS7000-E-T-P4S**
	26	8	2,47	0,94	97	90 000	140 000	0,3	0,3	15	0,021	**HS7000-C-T-P4S**
	26	8	4,1	1,4	107	95 000	140 000	0,3	0,3	15	0,018	**HCB7000-C-T-P4S**
	26	8	2,35	0,86	65	110 000	160 000	0,3	0,3	25	0,021	**HC7000-E-T-P4S**
	26	8	3,6	0,86	65	120 000	180 000	0,3	0,3	25	0,021	**XC7000-E-T-P4S**
	30	9	6,6	2,8	295	50 000	75 000	0,6	0,6	25	0,032	**B7200-E-T-P4S**
	30	9	6,9	2,95	305	56 000	85 000	0,6	0,6	15	0,032	**B7200-C-T-P4S**
	30	9	6,6	2,7	208	60 000	90 000	0,6	0,6	25	0,029	**HCB7200-E-T-P4S**
	30	9	6,9	2,8	217	67 000	100 000	0,6	0,6	15	0,029	**HCB7200-C-T-P4S**

medias ➤ *https://www.schaeffler.de/std/1DB6*

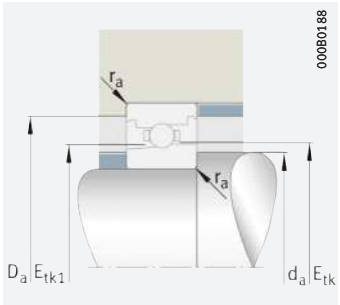
1) The limiting speeds are based on elastically preloaded single bearings.

2) Explanation of designations ➤ 🕮 *SP 1*.

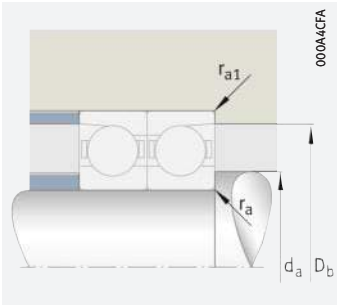
3) The bearings are also available with gap seals (type HSS, HCS, XCS or suffix 2RSD). Ordering examples: B7000-C-2RSD-T-P4S-UL and HSS7000-E-T-P4S-UL.

4) L = light preload; M = moderate preload; H = high preload.

5) Minimal quantity oil lubrication.



Mounting dimensions

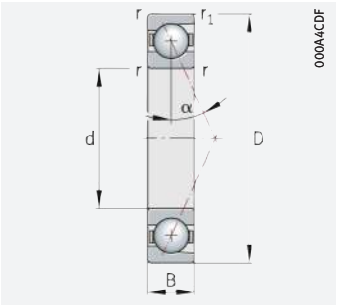


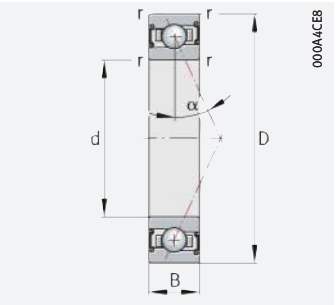
Mounting dimensions

d	Mounting dimensions							Preload force[4] F_V			Lift-off force[4] K_{aE}			Axial rigidity[4] c_a		
	d_a h12	D_a H12	r_a max.	r_{a1} max.	E_{tk} min.	E_{tk1} min.	E_{tk} E_{tk1} max.	L N	M N	H N	L N	M N	H N	L N/µm	M N/µm	H N/µm
10	13	19,5	0,3	0,1	14,4	14,4	15	17	74	163	50	226	521	27,1	47,7	67
	13	19,5	0,3	0,1	14,4	14,4	15	10	41	87	31	141	320	11	21,1	31,2
	13	19,5	0,3	0,1	14,4	14,4	15	5	35	85	16	104	260	20,4	39,9	56,5
	13	19,5	0,3	0,1	14,6	13,7	15	11	32	64	31	96	196	21,7	32,7	43
	13	19,5	0,3	0,1	14,6	13,7	15	7	20	39	20	63	132	8,8	14,1	19,6
	13	19,5	0,3	0,1	14,4	14,4	15	6	25	54	17	79	185	9,8	18,2	26,5
	13	19,5	0,3	0,1	14,6	13,7	15	7	22	45	21	65	133	21,6	32	41,7
	13	19,5	0,3	0,1	14,6	13,7	15	7	22	45	21	65	133	21,6	32	41,7
	14	22	0,3	0,1	15,7	15,7	16,8	21	99	223	61	298	698	27,6	49,2	69,1
	14	22	0,3	0,1	15,7	15,7	16,8	18	65	136	54	220	490	12,7	23	33,5
	14	22	0,3	0,1	15,7	15,7	16,8	12	57	130	33	167	392	25,1	44,6	61,6
	14	22	0,3	0,1	16,4	15,3	16,9	15	45	90	43	133	273	26,8	40,3	53
	14	22	0,3	0,1	16,4	15,3	16,9	9	28	55	28	89	185	10,9	17,4	24,1
	14	22	0,3	0,1	15,7	15,7	16,8	7	33	74	21	104	248	9,9	18,5	26,9
	14	22	0,3	0,1	16,4	15,3	16,9	10	31	62	30	91	185	26,6	39,5	51,4
	14	22	0,3	0,1	16,4	15,3	16,9	10	31	62	30	91	185	26,6	39,5	51,4
	14,5	25,5	0,6	0,3	18	18	19,2	32	141	314	94	429	995	35,8	63,2	88,8
	14,5	25,5	0,6	0,3	18	18	19,2	25	91	185	79	311	684	16,4	29,8	43,5
	14,5	25,5	0,6	0,3	18	18	19,2	18	82	185	52	243	564	32,8	57,2	78,9
	14,5	25,5	0,6	0,3	18	18	19,2	11	47	103	32	150	352	12,9	23,9	34,9

Super precision angular contact ball bearings

With large or small balls
Steel or ceramic balls
Steel or Cronidur rings
Open or sealed





d = 12 – 12 mm

Main dimensions			Basic load ratings		Fatigue limit load	Limiting speeds[1]		Dimensions		Contact angle	Mass	Designation[2] [3]
d	D	B	dyn. C_r	stat. C_{0r}	C_{ur}	n_G grease	n_G oil[5]	r	r_1	α	m	
			kN	kN	N	min^{-1}	min^{-1}	min.	min.	°	≈ kg	
12	24	6	3,25	1,25	128	60 000	95 000	0,3	0,3	25	0,011	**B71901-E-T-P4S**
	24	6	3,4	1,31	135	67 000	100 000	0,3	0,3	15	0,011	**B71901-C-T-P4S**
	24	6	1,76	0,69	71	85 000	130 000	0,3	0,3	25	0,011	**HS71901-E-T-P4S**
	24	6	3,25	1,19	91	85 000	130 000	0,3	0,3	25	0,01	**HCB71901-E-T-P4S**
	24	6	1,85	0,72	74	90 000	140 000	0,3	0,3	15	0,011	**HS71901-C-T-P4S**
	24	6	3,4	1,25	95	95 000	140 000	0,3	0,3	15	0,01	**HCB71901-C-T-P4S**
	24	6	1,76	0,66	50	110 000	160 000	0,3	0,3	25	0,011	**HC71901-E-T-P4S**
	24	6	2,7	0,66	50	120 000	180 000	0,3	0,3	25	0,011	**XC71901-E-T-P4S**
	28	8	4,45	1,75	180	53 000	85 000	0,3	0,3	25	0,023	**B7001-E-T-P4S**
	28	8	4,65	1,83	188	60 000	90 000	0,3	0,3	15	0,023	**B7001-C-T-P4S**
	28	8	2,32	0,91	94	75 000	110 000	0,3	0,3	25	0,024	**HS7001-E-T-P4S**
	28	8	4,45	1,67	128	75 000	120 000	0,3	0,3	25	0,02	**HCB7001-E-T-P4S**
	28	8	2,45	0,96	99	80 000	130 000	0,3	0,3	15	0,024	**HS7001-C-T-P4S**
	28	8	4,65	1,75	133	85 000	130 000	0,3	0,3	15	0,02	**HCB7001-C-T-P4S**
	28	8	2,32	0,87	67	95 000	140 000	0,3	0,3	25	0,023	**HC7001-E-T-P4S**
	28	8	3,55	0,87	67	100 000	160 000	0,3	0,3	25	0,023	**XC7001-E-T-P4S**
	32	10	8,8	3,75	385	45 000	67 000	0,6	0,6	25	0,037	**B7201-E-T-P4S**
	32	10	9,1	3,9	400	50 000	75 000	0,6	0,6	15	0,037	**B7201-C-T-P4S**
	32	10	8,8	3,6	275	56 000	85 000	0,6	0,6	25	0,032	**HCB7201-E-T-P4S**
	32	10	9,1	3,7	285	63 000	95 000	0,6	0,6	15	0,032	**HCB7201-C-T-P4S**

medias ➤ *https://www.schaeffler.de/std/1DB7*

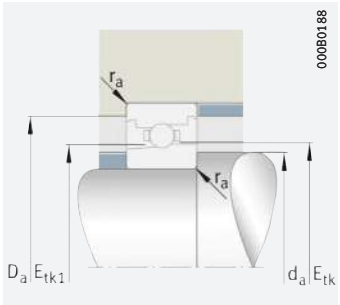
1) The limiting speeds are based on elastically preloaded single bearings.

2) Explanation of designations ➤ 🕮 *SP 1*.

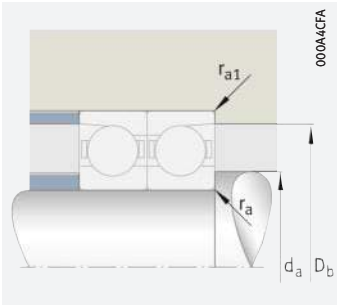
3) The bearings are also available with gap seals (type HSS, HCS, XCS or suffix 2RSD). Ordering examples: B7000-C-2RSD-T-P4S-UL and HSS7000-E-T-P4S-UL.

4) L = light preload; M = moderate preload; H = high preload.

5) Minimal quantity oil lubrication.



Mounting dimensions

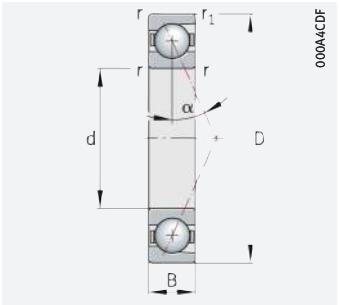


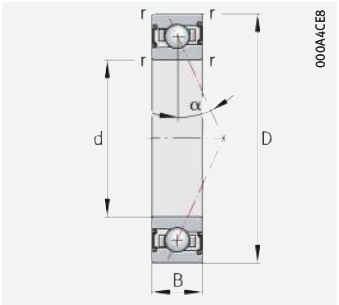
Mounting dimensions

	Mounting dimensions							Preload force[4] F_V			Lift-off force[4] K_{aE}			Axial rigidity[4] c_a		
d	d_a h12	D_a H12	r_a max.	r_{a1} max.	E_{tk} min.	E_{tk1} min.	E_{tk} E_{tk1} max.	L N	M N	H N	L N	M N	H N	L N/µm	M N/µm	H N/µm
12	15	21,5	0,3	0,1	16,4	16,4	17,2	18	80	179	53	245	567	30,8	54,4	76,5
	15	21,5	0,3	0,1	16,4	16,4	17,2	11	46	97	34	155	355	12,6	24,1	35,7
	15	21,5	0,3	0,1	16,6	15,7	17	11	33	67	32	99	203	23,1	34,7	45,6
	15	21,5	0,3	0,1	16,4	16,4	17,2	5	38	92	16	111	281	22,7	45,5	64,5
	15	21,5	0,3	0,1	16,6	15,7	17	7	21	41	21	66	137	9,4	15	20,8
	15	21,5	0,3	0,1	16,4	16,4	17,2	6	27	60	18	87	205	11,2	20,8	30,3
	15	21,5	0,3	0,1	16,6	15,7	17	8	23	46	22	68	138	22,9	34,1	44,3
	15	21,5	0,3	0,1	16,6	15,7	17	8	23	46	22	68	138	22,9	34,1	44,3
	16,5	24,5	0,3	0,1	17,9	17,9	18,8	23	109	248	66	328	775	31,8	57,2	80,3
	16,5	24,5	0,3	0,1	17,9	17,9	18,8	19	73	152	59	242	543	14,6	26,5	38,7
	16,5	24,5	0,3	0,1	18,4	17,3	18,9	15	44	88	43	131	268	26,7	40	52,6
	16,5	24,5	0,3	0,1	17,9	17,9	18,8	12	63	145	35	184	436	29	51,9	71,7
	16,5	24,5	0,3	0,1	18,4	17,3	18,9	9	27	54	27	87	181	10,8	17,3	23,9
	16,5	24,5	0,3	0,1	17,9	17,9	18,8	8	36	82	22	114	274	11,3	21,4	31,1
	16,5	24,5	0,3	0,1	18,4	17,3	18,9	10	30	61	29	89	181	26,4	39,2	50,9
	16,5	24,5	0,3	0,1	18,4	17,3	18,9	10	30	61	29	89	181	26,4	39,2	50,9
	16,5	27,5	0,6	0,3	19,6	19,6	21,1	47	193	423	137	588	1 342	42,8	73,9	103
	16,5	27,5	0,6	0,3	19,6	19,6	21,1	35	123	248	109	420	916	19,3	34,6	50,3
	16,5	27,5	0,6	0,3	19,6	19,6	21,1	26	112	248	76	332	757	39,2	66,8	91,6
	16,5	27,5	0,6	0,3	19,6	19,6	21,1	16	65	142	47	210	483	15,6	28,2	40,9

Super precision angular contact ball bearings

With large or small balls
Steel or ceramic balls
Steel or Cronidur rings
Open or sealed





d = 15 – 15 mm

Main dimensions			Basic load ratings		Fatigue limit load	Limiting speeds[1]		Dimensions		Contact angle	Mass	Designation[2] [3]
d	D	B	dyn. C_r	stat. C_{0r}	C_{ur}	n_G grease	n_G oil[5]	r	r_1	α	m	
			kN	kN	N	min^{-1}	min^{-1}	min.	min.	°	≈ kg	
15	28	7	4,85	1,94	200	50 000	75 000	0,3	0,3	25	0,016	**B71902-E-T-P4S**
	28	7	5,1	2,03	209	56 000	85 000	0,3	0,3	15	0,016	**B71902-C-T-P4S**
	28	7	2,41	0,99	102	67 000	100 000	0,3	0,3	25	0,017	**HS71902-E-T-P4S**
	28	7	2,55	1,04	107	75 000	110 000	0,3	0,3	15	0,017	**HS71902-C-T-P4S**
	28	7	4,85	1,86	141	70 000	110 000	0,3	0,3	25	0,014	**HCB71902-E-T-P4S**
	28	7	5,1	1,94	148	75 000	120 000	0,3	0,3	15	0,014	**HCB71902-C-T-P4S**
	28	7	2,41	0,95	72	85 000	130 000	0,3	0,3	25	0,016	**HC71902-E-T-P4S**
	28	7	3,7	0,95	72	95 000	150 000	0,3	0,3	25	0,016	**XC71902-E-T-P4S**
	32	9	5,9	2,31	237	45 000	70 000	0,3	0,3	25	0,03	**B7002-E-T-P4S**
	32	9	6,1	2,41	248	53 000	80 000	0,3	0,3	15	0,03	**B7002-C-T-P4S**
	32	9	3,25	1,41	145	63 000	95 000	0,3	0,3	25	0,033	**HS7002-E-T-P4S**
	32	9	5,9	2,21	168	63 000	100 000	0,3	0,3	25	0,027	**HCB7002-E-T-P4S**
	32	9	3,45	1,48	152	70 000	110 000	0,3	0,3	15	0,033	**HS7002-C-T-P4S**
	32	9	6,1	2,31	176	70 000	110 000	0,3	0,3	15	0,027	**HCB7002-C-T-P4S**
	32	9	3,25	1,35	103	80 000	120 000	0,3	0,3	25	0,031	**HC7002-E-T-P4S**
	32	9	5	1,35	103	90 000	140 000	0,3	0,3	25	0,031	**XC7002-E-T-P4S**
	35	11	11,1	4,85	510	40 000	60 000	0,6	0,6	25	0,044	**B7202-E-T-P4S**
	35	11	11,6	5	520	45 000	67 000	0,6	0,6	15	0,044	**B7202-C-T-P4S**
	35	11	11,1	4,65	360	48 000	70 000	0,6	0,6	25	0,038	**HCB7202-E-T-P4S**
	35	11	11,6	4,8	370	56 000	85 000	0,6	0,6	15	0,038	**HCB7202-C-T-P4S**

medias ➤ *https://www.schaeffler.de/std/1DB8*

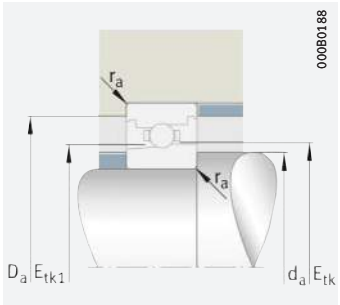
1) The limiting speeds are based on elastically preloaded single bearings.

2) Explanation of designations ➤ 🕮 *SP 1*.

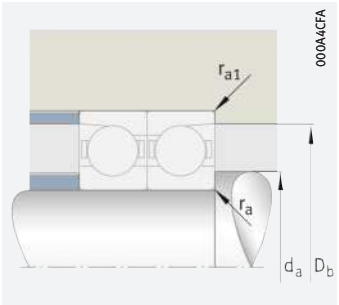
3) The bearings are also available with gap seals (type HSS, HCS, XCS or suffix 2RSD). Ordering examples: B7000-C-2RSD-T-P4S-UL and HSS7000-E-T-P4S-UL.

4) L = light preload; M = moderate preload; H = high preload.

5) Minimal quantity oil lubrication.



Mounting dimensions

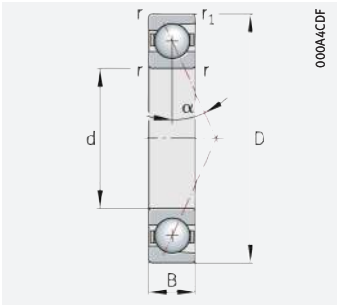


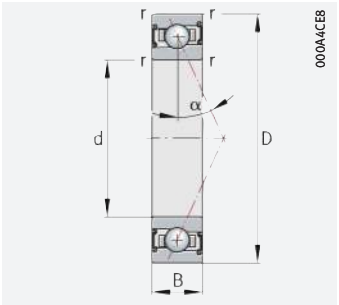
Mounting dimensions

	Mounting dimensions							Preload force[4] F_V			Lift-off force[4] K_{aE}			Axial rigidity[4] c_a		
d	d_a h12	D_a H12	r_a max.	r_{a1} max.	E_{tk} min.	E_{tk1} min.	E_{tk} E_{tk1} max.	L N	M N	H N	L N	M N	H N	L N/µm	M N/µm	H N/µm
15	18	25,5	0,3	0,1	19,9	19,9	20,9	22	111	255	64	336	805	35	64,7	91,9
	18	25,5	0,3	0,1	19,9	19,9	20,9	19	73	153	59	249	559	16,4	30,5	44,9
	18	25,5	0,3	0,1	19,9	18,8	20,4	15	46	91	44	136	278	28,3	42,4	55,6
	18	25,5	0,3	0,1	19,9	18,8	20,4	9	28	56	28	90	188	11,4	18,2	25,2
	18	25,5	0,3	0,1	19,9	19,9	20,9	12	64	150	34	190	457	31,9	58,7	82
	18	25,5	0,3	0,1	19,9	19,9	20,9	7	37	84	21	117	285	12,5	24,4	35,9
	18	25,5	0,3	0,1	19,9	18,8	20,4	11	32	63	30	92	188	28	41,5	53,9
	18	25,5	0,3	0,1	19,9	18,8	20,4	11	32	63	30	92	188	28	41,5	53,9
	19	29	0,3	0,1	21,1	21,1	22,3	36	154	341	104	464	1 066	37,2	64,6	89,8
	19	29	0,3	0,1	21,1	21,1	22,3	27	99	204	84	332	733	16,6	29,7	43
	19	29	0,3	0,1	21,6	20,4	22,4	20	61	122	59	182	372	34	50,9	66,8
	19	29	0,3	0,1	21,1	21,1	22,3	20	88	199	57	260	600	34,1	58,6	80,2
	19	29	0,3	0,1	21,6	20,4	22,4	13	38	75	38	120	251	13,7	21,8	30,2
	19	29	0,3	0,1	21,1	21,1	22,3	12	52	114	35	164	381	13,4	24,3	35,1
	19	29	0,3	0,1	21,6	20,4	22,4	14	42	85	41	124	252	33,7	49,9	64,8
	19	29	0,3	0,1	21,6	20,4	22,4	14	42	85	41	124	252	33,7	49,9	64,8
	19,5	30,5	0,6	0,3	21,7	21,7	23,4	64	252	546	187	768	1 732	49,7	84,4	117
	19,5	30,5	0,6	0,3	21,7	21,7	23,4	46	158	319	144	543	1 177	22,1	39,3	57
	19,5	30,5	0,6	0,3	21,7	21,7	23,4	24	126	291	70	371	884	39,7	72	100
	19,5	30,5	0,6	0,3	21,7	21,7	23,4	22	86	183	65	275	626	18,1	32,3	46,5

Super precision angular contact ball bearings

With large or small balls
Steel or ceramic balls
Steel or Cronidur rings
Open or sealed





d = 17 – 17 mm

Main dimensions			Basic load ratings		Fatigue limit load	Limiting speeds[1]		Dimensions		Contact angle	Mass	Designation[2] [3]
d	D	B	dyn. C_r	stat. C_{0r}	C_{ur}	n_G grease	n_G oil[5]	r	r_1	α	m	
			kN	kN	N	min^{-1}	min^{-1}	min.	min.	°	≈ kg	
17	30	7	5,1	2,12	219	45 000	70 000	0,3	0,3	25	0,018	**B71903-E-T-P4S**
	30	7	5,3	2,23	229	50 000	80 000	0,3	0,3	15	0,018	**B71903-C-T-P4S**
	30	7	2,48	1,07	110	63 000	95 000	0,3	0,3	25	0,019	**HS71903-E-T-P4S**
	30	7	5,1	2,03	155	63 000	100 000	0,3	0,3	25	0,015	**HCB71903-E-T-P4S**
	30	7	2,6	1,13	116	70 000	110 000	0,3	0,3	15	0,019	**HS71903-C-T-P4S**
	30	7	5,3	2,13	162	70 000	110 000	0,3	0,3	15	0,015	**HCB71903-C-T-P4S**
	30	7	2,48	1,03	78	80 000	120 000	0,3	0,3	25	0,018	**HC71903-E-T-P4S**
	30	7	3,8	1,03	78	90 000	140 000	0,3	0,3	25	0,017	**XC71903-E-T-P4S**
	35	10	8,2	3,35	345	43 000	63 000	0,3	0,3	25	0,039	**B7003-E-T-P4S**
	35	10	8,6	3,5	360	45 000	70 000	0,3	0,3	15	0,039	**B7003-C-T-P4S**
	35	10	3,35	1,52	157	56 000	85 000	0,3	0,3	25	0,04	**HS7003-E-T-P4S**
	35	10	8,2	3,25	246	56 000	90 000	0,3	0,3	25	0,033	**HCB7003-E-T-P4S**
	35	10	3,55	1,6	165	63 000	95 000	0,3	0,3	15	0,04	**HS7003-C-T-P4S**
	35	10	8,6	3,35	255	63 000	100 000	0,3	0,3	15	0,033	**HCB7003-C-T-P4S**
	35	10	3,35	1,46	111	75 000	110 000	0,3	0,3	25	0,038	**HC7003-E-T-P4S**
	35	10	5,1	1,46	111	80 000	120 000	0,3	0,3	25	0,038	**XC7003-E-T-P4S**
	40	12	12,4	5,6	580	36 000	53 000	0,6	0,6	25	0,062	**B7203-E-T-P4S**
	40	12	13	5,8	600	38 000	56 000	0,6	0,6	15	0,063	**B7203-C-T-P4S**
	40	12	12,4	5,4	410	43 000	63 000	0,6	0,6	25	0,055	**HCB7203-E-T-P4S**
	40	12	13	5,6	425	50 000	75 000	0,6	0,6	15	0,056	**HCB7203-C-T-P4S**

medias ➤ *https://www.schaeffler.de/std/1DB9*

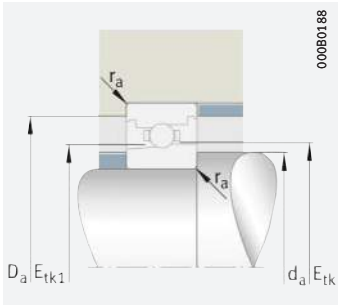
1) The limiting speeds are based on elastically preloaded single bearings.

2) Explanation of designations ➤ 🕮 *SP 1*.

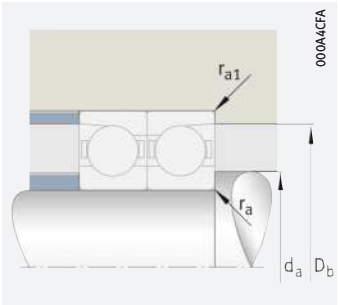
3) The bearings are also available with gap seals (type HSS, HCS, XCS or suffix 2RSD). Ordering examples: B7000-C-2RSD-T-P4S-UL and HSS7000-E-T-P4S-UL.

4) L = light preload; M = moderate preload; H = high preload.

5) Minimal quantity oil lubrication.



Mounting dimensions

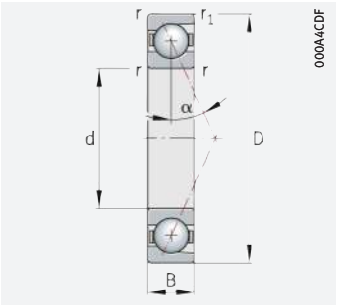


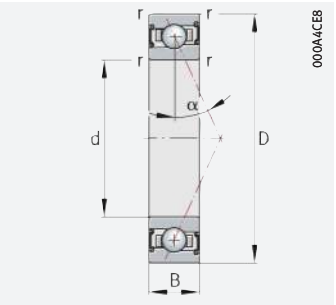
Mounting dimensions

	Mounting dimensions							Preload force[4] F_V			Lift-off force[4] K_{aE}			Axial rigidity[4] c_a		
d	d_a h12	D_a H12	r_a max.	r_{a1} max.	E_{tk} min.	E_{tk1} min.	E_{tk} E_{tk1} max.	L N	M N	H N	L N	M N	H N	L N/µm	M N/µm	H N/µm
17	20	27,5	0,3	0,1	21,4	21,4	22,3	22	115	265	65	346	833	36,9	68,5	97,3
	20	27,5	0,3	0,1	21,4	21,4	22,3	20	78	162	62	263	592	17,5	32,6	47,9
	20	27,5	0,3	0,1	21,9	20,8	22,4	16	47	93	45	138	283	29,6	44,4	58,3
	20	27,5	0,3	0,1	21,4	21,4	22,3	12	65	154	34	193	466	33,4	61,9	86,4
	20	27,5	0,3	0,1	21,9	20,8	22,4	10	29	58	29	93	194	12	19,2	26,5
	20	27,5	0,3	0,1	21,4	21,4	22,3	8	39	89	22	123	300	13,3	26	38,3
	20	27,5	0,3	0,1	21,9	20,8	22,4	11	33	66	31	96	195	29,6	43,9	56,9
	20	27,5	0,3	0,1	21,9	20,8	22,4	11	33	66	31	96	195	29,6	43,9	56,9
	21	32	0,3	0,1	23,3	23,3	24,5	54	220	483	156	663	1 504	47,6	81	112
	21	32	0,3	0,1	23,3	23,3	24,5	40	142	291	124	474	1 042	21,1	37,1	53,6
	21	32	0,3	0,1	24,1	22,9	24,8	21	63	126	61	187	382	35,7	53,4	70
	21	32	0,3	0,1	23,3	23,3	24,5	30	126	279	85	370	840	43,5	73,4	99,7
	21	32	0,3	0,1	24,1	22,9	24,8	13	38	76	38	121	253	14,3	22,7	31,3
	21	32	0,3	0,1	23,3	23,3	24,5	18	75	164	54	237	546	17,3	30,7	43,9
	21	32	0,3	0,1	24,1	22,9	24,8	14	43	86	41	126	256	35,3	52,2	67,7
	21	32	0,3	0,1	24,1	22,9	24,8	14	43	86	41	126	256	35,3	52,2	67,7
	22,5	34,5	0,6	0,3	25	25	26,7	74	286	616	216	871	1 954	53,3	89,9	125
	22,5	34,5	0,6	0,3	25	25	26,7	53	179	360	165	614	1 327	23,6	41,8	60,6
	22,5	34,5	0,6	0,3	25	25	26,7	29	145	332	84	428	1 011	43,2	77,2	107
	22,5	34,5	0,6	0,3	25	25	26,7	25	97	208	75	313	708	19,5	34,4	49,5

Super precision angular contact ball bearings

With large or small balls
Steel or ceramic balls
Steel or Cronidur rings
Open or sealed





d = 20 – 20 mm

Main dimensions			Basic load ratings		Fatigue limit load	Limiting speeds[1]		Dimensions		Contact angle	Mass	Designation[2] [3]
d	D	B	dyn. C_r	stat. C_{0r}	C_{ur}	n_G grease	n_G oil[5]	r	r_1	α	m	
			kN	kN	N	min^{-1}	min^{-1}	min.	min.	°	≈ kg	
20	37	9	7	3,05	315	38 000	60 000	0,3	0,3	25	0,037	**B71904-E-T-P4S**
	37	9	7,4	3,2	330	43 000	63 000	0,3	0,3	15	0,037	**B71904-C-T-P4S**
	37	9	3,4	1,63	168	53 000	80 000	0,3	0,3	25	0,04	**HS71904-E-T-P4S**
	37	9	7	2,95	223	53 000	80 000	0,3	0,3	25	0,033	**HCB71904-E-T-P4S**
	37	9	3,6	1,73	178	56 000	90 000	0,3	0,3	15	0,04	**HS71904-C-T-P4S**
	37	9	7,4	3,1	234	60 000	90 000	0,3	0,3	15	0,033	**HCB71904-C-T-P4S**
	37	9	3,4	1,56	119	67 000	100 000	0,3	0,3	25	0,039	**HC71904-E-T-P4S**
	37	9	5,2	1,56	119	75 000	110 000	0,3	0,3	25	0,038	**XC71904-E-T-P4S**
	42	12	9,8	4,05	415	34 000	53 000	0,6	0,6	25	0,067	**B7004-E-T-P4S**
	42	12	10,3	4,25	435	38 000	60 000	0,6	0,6	15	0,067	**B7004-C-T-P4S**
	42	12	5,4	2,6	265	48 000	75 000	0,6	0,6	25	0,077	**HS7004-E-T-P4S**
	42	12	9,8	3,9	295	48 000	75 000	0,6	0,6	25	0,061	**HCB7004-E-T-P4S**
	42	12	5,7	2,7	280	53 000	80 000	0,6	0,6	15	0,077	**HS7004-C-T-P4S**
	42	12	10,3	4,05	310	53 000	80 000	0,6	0,6	15	0,061	**HCB7004-C-T-P4S**
	42	12	5,4	2,47	188	60 000	95 000	0,6	0,6	25	0,073	**HC7004-E-T-P4S**
	42	12	8,3	2,47	188	67 000	100 000	0,6	0,6	25	0,073	**XC7004-E-T-P4S**
	47	14	16,5	7,7	790	30 000	45 000	1	1	25	0,103	**B7204-E-T-P4S**
	47	14	17,2	8	820	32 000	48 000	1	1	15	0,103	**B7204-C-T-P4S**
	47	14	16,5	7,3	560	36 000	53 000	1	1	25	0,091	**HCB7204-E-T-P4S**
	47	14	17,2	7,6	580	40 000	60 000	1	1	15	0,092	**HCB7204-C-T-P4S**

medias ➤ *https://www.schaeffler.de/std/1DBA*

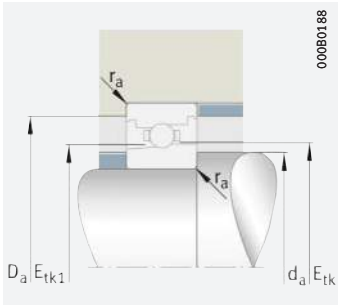
[1] The limiting speeds are based on elastically preloaded single bearings.

[2] Explanation of designations ➤ 🕮 *SP 1*.

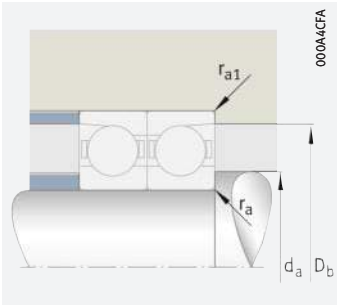
[3] The bearings are also available with gap seals (type HSS, HCS, XCS or suffix 2RSD). Ordering examples: B7000-C-2RSD-T-P4S-UL and HSS7000-E-T-P4S-UL.

[4] L = light preload; M = moderate preload; H = high preload.

[5] Minimal quantity oil lubrication.



Mounting dimensions

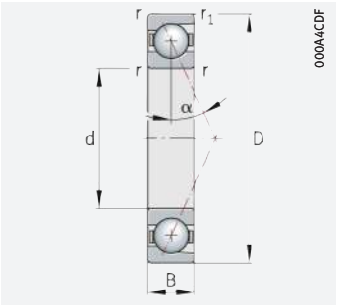


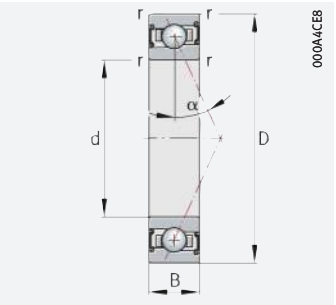
Mounting dimensions

	Mounting dimensions							Preload force[4] F_V			Lift-off force[4] K_{aE}			Axial rigidity[4] c_a		
d	d_a h12	D_a H12	r_a max.	r_{a1} max.	E_{tk} min.	E_{tk1} min.	E_{tk} E_{tk1} max.	L N	M N	H N	L N	M N	H N	L N/µm	M N/µm	H N/µm
20	24	33,5	0,3	0,15	26	26	27,1	37	170	384	108	516	1 208	46,7	83,3	117
	24	33,5	0,3	0,15	26	26	27,1	31	113	233	95	384	851	21,6	39,3	57,4
	24	33,5	0,3	0,15	26,6	25,4	27,2	22	65	129	62	191	392	37,4	55,9	73,2
	24	33,5	0,3	0,15	26	26	27,1	20	98	223	58	289	678	42,5	75,3	104
	24	33,5	0,3	0,15	26,6	25,4	27,2	13	39	78	39	124	259	15	23,7	32,7
	24	33,5	0,3	0,15	26	26	27,1	12	57	128	37	182	431	16,8	31,5	46
	24	33,5	0,3	0,15	26,6	25,4	27,2	15	44	88	42	128	261	36,9	54,6	70,7
	24	33,5	0,3	0,15	26,6	25,4	27,2	15	44	88	42	128	261	36,9	54,6	70,7
	25	37	0,6	0,3	27,8	27,8	29,3	71	275	595	205	829	1 857	51,6	86,3	119
	25	37	0,6	0,3	27,8	27,8	29,3	51	175	356	157	586	1 276	22,6	39,4	56,8
	25	37	0,6	0,3	28,6	27,1	29,7	34	101	202	97	299	611	49,1	73,6	96,4
	25	37	0,6	0,3	27,8	27,8	29,3	28	140	321	80	410	966	42	74,7	103
	25	37	0,6	0,3	28,6	27,1	29,7	21	62	125	63	198	413	19,8	31,5	43,5
	25	37	0,6	0,3	27,8	27,8	29,3	24	94	202	72	297	673	18,7	32,7	46,6
	25	37	0,6	0,3	28,6	27,1	29,7	23	70	140	67	204	415	48,8	72,3	93,7
	25	37	0,6	0,3	28,6	27,1	29,7	23	70	140	67	204	415	48,8	72,3	93,7
	26,5	40,5	1	0,3	29,6	29,6	31,7	107	398	848	313	1 212	2 686	63,7	106	146
	26,5	40,5	1	0,3	29,6	29,6	31,7	75	248	496	234	851	1 828	28,1	49,3	71,1
	26,5	40,5	1	0,3	29,6	29,6	31,7	46	205	460	131	606	1 400	53	91,6	126
	26,5	40,5	1	0,3	29,6	29,6	31,7	36	135	284	109	432	967	23,3	40,5	57,9

Super precision angular contact ball bearings

With large or small balls
Steel or ceramic balls
Steel or Cronidur rings
Open or sealed





d = 25 – 25 mm

Main dimensions			Basic load ratings		Fatigue limit load	Limiting speeds[1]		Dimensions		Contact angle	Mass	Designation[2) 3)]
d	D	B	dyn. C_r	stat. C_{0r}	C_{ur}	n_G grease	n_G oil[5)]	r	r_1	α	m	
			kN	kN	N	min^{-1}	min^{-1}	min.	min.	°	≈ kg	
25	42	9	7,6	3,6	370	32 000	50 000	0,3	0,3	25	0,043	**B71905-E-T-P4S**
	42	9	8	3,8	390	36 000	56 000	0,3	0,3	15	0,043	**B71905-C-T-P4S**
	42	9	3,65	1,95	201	43 000	67 000	0,3	0,3	25	0,046	**HS71905-E-T-P4S**
	42	9	7,6	3,45	265	45 000	67 000	0,3	0,3	25	0,039	**HCB71905-E-T-P4S**
	42	9	3,9	2,06	212	48 000	75 000	0,3	0,3	15	0,046	**HS71905-C-T-P4S**
	42	9	8	3,65	275	50 000	75 000	0,3	0,3	15	0,039	**HCB71905-C-T-P4S**
	42	9	3,65	1,87	142	56 000	85 000	0,3	0,3	25	0,045	**HC71905-E-T-P4S**
	42	9	5,6	1,87	142	63 000	95 000	0,3	0,3	25	0,044	**XC71905-E-T-P4S**
	47	12	13,1	5,6	580	30 000	45 000	0,6	0,6	25	0,077	**B7005-E-T-P4S**
	47	12	13,7	5,9	610	34 000	50 000	0,6	0,6	15	0,077	**B7005-C-T-P4S**
	47	12	13,1	5,4	410	40 000	63 000	0,6	0,6	25	0,065	**HCB7005-E-T-P4S**
	47	12	5,5	2,8	285	40 000	63 000	0,6	0,6	25	0,087	**HS7005-E-T-P4S**
	47	12	13,7	5,6	430	45 000	70 000	0,6	0,6	15	0,065	**HCB7005-C-T-P4S**
	47	12	5,8	2,95	305	45 000	70 000	0,6	0,6	15	0,087	**HS7005-C-T-P4S**
	47	12	5,5	2,65	203	53 000	80 000	0,6	0,6	25	0,084	**HC7005-E-T-P4S**
	47	12	8,4	2,65	203	56 000	90 000	0,6	0,6	25	0,084	**XC7005-E-T-P4S**
	52	15	14,2	5,8	600	26 000	40 000	1	1	25	0,127	**B7205-E-T-P4S**
	52	15	14,8	6,1	630	28 000	43 000	1	1	15	0,127	**B7205-C-T-P4S**
	52	15	14,2	5,6	425	32 000	48 000	1	1	25	0,114	**HCB7205-E-T-P4S**
	52	15	14,8	5,8	445	36 000	53 000	1	1	15	0,114	**HCB7205-C-T-P4S**

medias ➤ *https://www.schaeffler.de/std/1DBB*

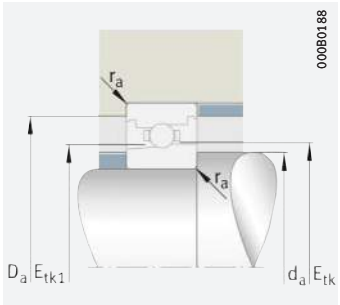
1) The limiting speeds are based on elastically preloaded single bearings.

2) Explanation of designations ➤ 🕮 *SP 1*.

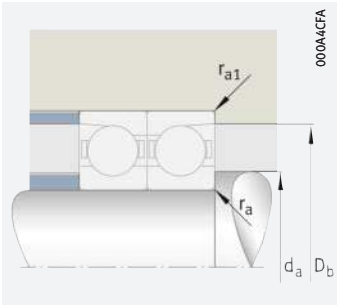
3) The bearings are also available with gap seals (type HSS, HCS, XCS or suffix 2RSD). Ordering examples: B7000-C-2RSD-T-P4S-UL and HSS7000-E-T-P4S-UL.

4) L = light preload; M = moderate preload; H = high preload.

5) Minimal quantity oil lubrication.



Mounting dimensions

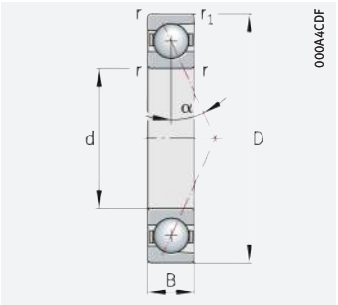


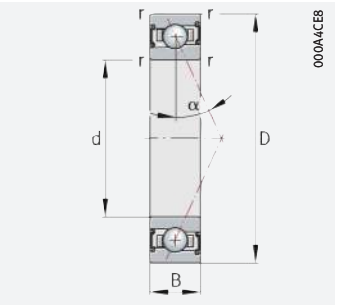
Mounting dimensions

d	Mounting dimensions							Preload force[4] F_V			Lift-off force[4] K_{aE}			Axial rigidity[4] c_a		
	d_a h12	D_a H12	r_a max.	r_{a1} max.	E_{tk} min.	E_{tk1} min.	E_{tk} E_{tk1} max.	L N	M N	H N	L N	M N	H N	L N/µm	M N/µm	H N/µm
25	29	38,5	0,3	0,15	31	31	32	41	191	432	115	566	1 335	54,1	97,3	137
	29	38,5	0,3	0,15	31	31	32	34	127	265	102	418	934	24,9	45,4	66,3
	29	38,5	0,3	0,15	31,6	30,4	32,2	23	69	138	66	204	416	42,2	63,1	82,4
	29	38,5	0,3	0,15	31	31	32	22	107	246	60	310	735	48,7	87,4	121
	29	38,5	0,3	0,15	31,6	30,4	32,2	14	43	85	43	135	282	17	26,8	36,9
	29	38,5	0,3	0,15	31	31	32	14	65	145	39	199	475	19,4	36,6	53,4
	29	38,5	0,3	0,15	31,6	30,4	32,2	16	47	95	45	138	281	41,8	61,9	80,1
	29	38,5	0,3	0,15	31,6	30,4	32,2	16	47	95	45	138	281	41,8	61,9	80,1
	30	42	0,6	0,3	32,5	32,5	34,1	99	381	820	290	1 150	2 560	67,2	112	153
	30	42	0,6	0,3	32,5	32,5	34,1	73	248	502	226	831	1 807	29,6	51,2	73,5
	30	42	0,6	0,3	32,5	32,5	34,1	40	194	443	117	573	1 338	55,4	96,9	133
	30	42	0,6	0,3	33,6	32,2	34,5	35	104	207	100	306	626	51,2	76,7	100
	30	42	0,6	0,3	32,5	32,5	34,1	35	132	283	104	419	944	24,6	42,5	60,2
	30	42	0,6	0,3	33,6	32,2	34,5	21	63	127	64	201	419	20,6	32,7	45
	30	42	0,6	0,3	33,6	32,2	34,5	23	70	140	67	204	415	50,4	74,7	96,7
	30	42	0,6	0,3	33,6	32,2	34,5	23	70	140	67	204	415	50,4	74,7	96,7
	31,5	45,5	1	0,3	34,4	34,4	36,5	116	429	914	333	1 293	2 868	69,2	115	159
	31,5	45,5	1	0,3	34,4	34,4	36,5	81	269	542	248	906	1 949	30,4	53,4	77
	31,5	45,5	1	0,3	34,4	34,4	36,5	50	223	500	140	650	1 504	57,6	99,8	137
	31,5	45,5	1	0,3	34,4	34,4	36,5	40	147	311	117	465	1 042	25,3	44,1	63,1

Super precision angular contact ball bearings

With large or small balls
Steel or ceramic balls
Steel or Cronidur rings
Open or sealed





d = 30 – 30 mm

Main dimensions			Basic load ratings		Fatigue limit load	Limiting speeds[1]		Dimensions		Contact angle	Mass	Designation[2] [3]
d	D	B	dyn. C_r	stat. C_{0r}	C_{ur}	n_G grease	n_G oil[5]	r	r_1	α	m	
			kN	kN	N	min^{-1}	min^{-1}	min.	min.	°	≈ kg	
30	47	9	8,1	4,15	425	28 000	43 000	0,3	0,3	25	0,05	**B71906-E-T-P4S**
	47	9	8,5	4,35	450	30 000	48 000	0,3	0,3	15	0,05	**B71906-C-T-P4S**
	47	9	8,1	3,95	300	38 000	60 000	0,3	0,3	25	0,045	**HCB71906-E-T-P4S**
	47	9	5,6	2,95	305	38 000	60 000	0,3	0,3	25	0,05	**HS71906-E-T-P4S**
	47	9	8,5	4,2	320	43 000	67 000	0,3	0,3	15	0,045	**HCB71906-C-T-P4S**
	47	9	5,9	3,1	320	43 000	63 000	0,3	0,3	15	0,05	**HS71906-C-T-P4S**
	47	9	5,6	2,85	215	48 000	75 000	0,3	0,3	25	0,046	**HC71906-E-T-P4S**
	47	9	8,5	2,85	215	53 000	85 000	0,3	0,3	25	0,046	**XC71906-E-T-P4S**
	55	13	13,7	6,4	660	24 000	38 000	1	1	25	0,114	**B7006-E-T-P4S**
	55	13	14,4	6,7	690	28 000	43 000	1	1	15	0,114	**B7006-C-T-P4S**
	55	13	13,7	6,1	465	34 000	53 000	1	1	25	0,101	**HCB7006-E-T-P4S**
	55	13	7,8	4,05	415	34 000	53 000	1	1	25	0,124	**HS7006-E-T-P4S**
	55	13	14,4	6,4	485	38 000	60 000	1	1	15	0,101	**HCB7006-C-T-P4S**
	55	13	8,2	4,25	435	38 000	56 000	1	1	15	0,124	**HS7006-C-T-P4S**
	55	13	7,8	3,85	295	43 000	67 000	1	1	25	0,119	**HC7006-E-T-P4S**
	55	13	12	3,85	295	48 000	75 000	1	1	25	0,119	**XC7006-E-T-P4S**
	62	16	22,1	9,9	1 020	22 000	36 000	1	1	25	0,197	**B7206-E-T-P4S**
	62	16	23,1	10,4	1 070	24 000	38 000	1	1	15	0,197	**B7206-C-T-P4S**
	62	16	22,1	9,5	720	26 000	40 000	1	1	25	0,172	**HCB7206-E-T-P4S**
	62	16	23,1	9,9	760	30 000	45 000	1	1	15	0,172	**HCB7206-C-T-P4S**

medias ➤ *https://www.schaeffler.de/std/1DBC*

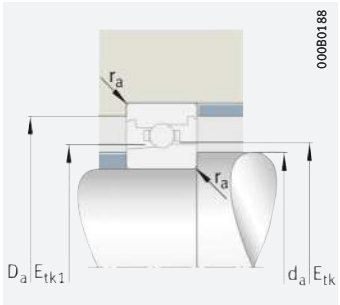
1) The limiting speeds are based on elastically preloaded single bearings.

2) Explanation of designations ➤ 🕮 *SP 1*.

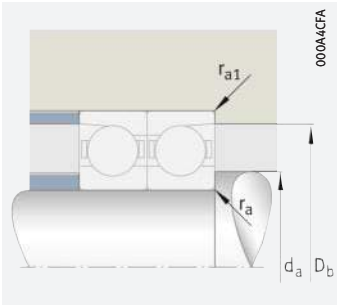
3) The bearings are also available with gap seals (type HSS, HCS, XCS or suffix 2RSD). Ordering examples: B7000-C-2RSD-T-P4S-UL and HSS7000-E-T-P4S-UL.

4) L = light preload; M = moderate preload; H = high preload.

5) Minimal quantity oil lubrication.



Mounting dimensions

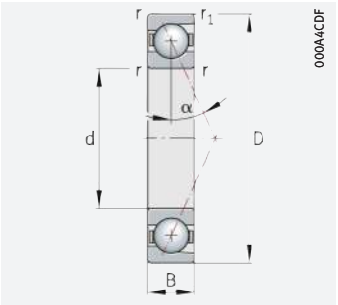


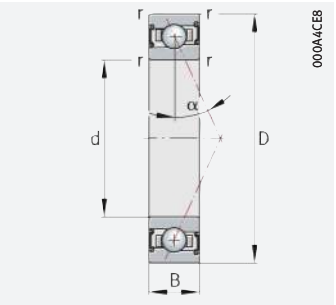
Mounting dimensions

	Mounting dimensions							Preload force[4] F_V			Lift-off force[4] K_{aE}			Axial rigidity[4] c_a		
d	d_a h12	D_a H12	r_a max.	r_{a1} max.	E_{tk} min.	E_{tk1} min.	E_{tk} E_{tk1} max.	L N	M N	H N	L N	M N	H N	L N/µm	M N/µm	H N/µm
30	34	43,5	0,3	0,15	36	36	37	41	197	448	114	580	1 377	58	105	148
	34	43,5	0,3	0,15	36	36	37	36	134	281	106	439	985	27	49,3	72,1
	34	43,5	0,3	0,15	36	36	37	22	112	258	60	322	768	52,5	95,1	132
	34	43,5	0,3	0,15	36,1	34,7	37	35	104	207	100	306	625	52,9	79,1	103
	34	43,5	0,3	0,15	36	36	37	14	68	155	40	210	504	21,1	40	58,3
	34	43,5	0,3	0,15	36,1	34,7	37	21	64	129	65	204	425	21,3	33,8	46,5
	34	43,5	0,3	0,15	36,1	34,7	37	24	72	143	69	209	425	52,5	77,7	101
	34	43,5	0,3	0,15	36,1	34,7	37	24	72	143	69	209	425	52,5	77,7	101
	36	49	1	0,3	39,4	39,4	40,6	102	396	854	294	1 188	2 661	73,5	123	170
	36	49	1	0,3	39,4	39,4	40,6	74	254	516	228	848	1 844	32,4	56,7	81,8
	36	49	1	0,3	39,4	39,4	40,6	42	203	465	117	592	1 395	60,1	107	147
	36	49	1	0,3	39,7	37,9	40,9	48	143	286	138	423	865	60,6	90,6	119
	36	49	1	0,3	39,4	39,4	40,6	35	137	293	104	431	976	26,9	47	67,1
	36	49	1	0,3	39,7	37,9	40,9	29	88	177	89	280	584	24,4	38,7	53,2
	36	49	1	0,3	39,7	37,9	40,9	33	98	197	94	287	583	60	88,8	115
	36	49	1	0,3	39,7	37,9	40,9	33	98	197	94	287	583	60	88,8	115
	37,5	54,5	1	0,3	41,2	41,2	43,7	177	641	1 355	518	1 946	4 271	90,4	148	203
	37,5	54,5	1	0,3	41,2	41,2	43,7	123	404	806	385	1 375	2 945	39,6	68,8	98,9
	37,5	54,5	1	0,3	41,2	41,2	43,7	80	339	749	231	1 001	2 273	76,8	130	177
	37,5	54,5	1	0,3	41,2	41,2	43,7	62	222	465	185	711	1 576	33,3	57,1	81,1

Super precision angular contact ball bearings

With large or small balls
Steel or ceramic balls
Steel or Cronidur rings
Open or sealed





d = 35 – 35 mm

Main dimensions			Basic load ratings		Fatigue limit load	Limiting speeds[1]		Dimensions		Contact angle	Mass	Designation[2) 3)]
d	D	B	dyn. C_r	stat. C_{0r}	C_{ur}	n_G grease	n_G oil[5)]	r	r_1	α	m	
			kN	kN	N	min^{-1}	min^{-1}	min.	min.	°	≈ kg	
35	55	10	11,5	6,5	660	24 000	36 000	0,6	0,6	25	0,077	**B71907-E-T-P4S**
	55	10	12,1	6,8	700	26 000	40 000	0,6	0,6	15	0,077	**B71907-C-T-P4S**
	55	10	6,1	3,6	370	32 000	50 000	0,6	0,6	25	0,081	**HS71907-E-T-P4S**
	55	10	11,5	6,2	470	32 000	50 000	0,6	0,6	25	0,067	**HCB71907-E-T-P4S**
	55	10	6,4	3,8	390	36 000	56 000	0,6	0,6	15	0,081	**HS71907-C-T-P4S**
	55	10	12,1	6,5	495	36 000	56 000	0,6	0,6	15	0,067	**HCB71907-C-T-P4S**
	55	10	6,1	3,45	260	40 000	63 000	0,6	0,6	25	0,076	**HC71907-E-T-P4S**
	55	10	9,3	3,45	260	45 000	70 000	0,6	0,6	25	0,076	**XC71907-E-T-P4S**
	62	14	18,4	9,2	940	22 000	34 000	1	1	25	0,154	**B7007-E-T-P4S**
	62	14	19,3	9,6	990	24 000	38 000	1	1	15	0,154	**B7007-C-T-P4S**
	62	14	8,4	4,7	485	30 000	45 000	1	1	25	0,169	**HS7007-E-T-P4S**
	62	14	18,4	8,8	670	30 000	45 000	1	1	25	0,135	**HCB7007-E-T-P4S**
	62	14	8,9	5	510	34 000	50 000	1	1	15	0,169	**HS7007-C-T-P4S**
	62	14	19,3	9,2	700	34 000	53 000	1	1	15	0,135	**HCB7007-C-T-P4S**
	62	14	8,4	4,5	345	38 000	60 000	1	1	25	0,163	**HC7007-E-T-P4S**
	62	14	12,8	4,5	345	43 000	67 000	1	1	25	0,163	**XC7007-E-T-P4S**
	72	17	24,5	12,1	1 240	19 000	32 000	1,1	1,1	25	0,3	**B7207-E-T-P4S**
	72	17	25,5	12,6	1 300	20 000	34 000	1,1	1,1	15	0,301	**B7207-C-T-P4S**
	72	17	24,5	11,6	880	22 000	36 000	1,1	1,1	25	0,264	**HCB7207-E-T-P4S**
	72	17	25,5	12,1	920	26 000	40 000	1,1	1,1	15	0,265	**HCB7207-C-T-P4S**

medias ➤ *https://www.schaeffler.de/std/1DBD*

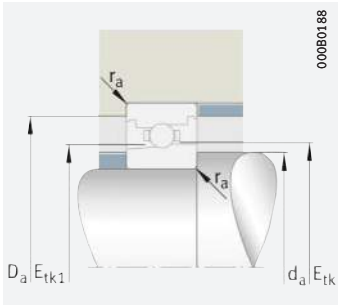
1) The limiting speeds are based on elastically preloaded single bearings.

2) Explanation of designations ➤ 🕮 *SP 1*.

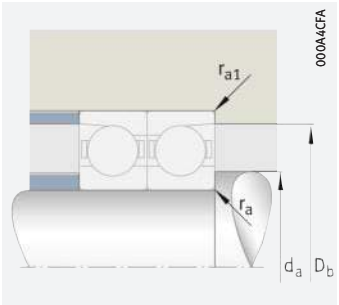
3) The bearings are also available with gap seals (type HSS, HCS, XCS or suffix 2RSD). Ordering examples: B7000-C-2RSD-T-P4S-UL and HSS7000-E-T-P4S-UL.

4) L = light preload; M = moderate preload; H = high preload.

5) Minimal quantity oil lubrication.



Mounting dimensions

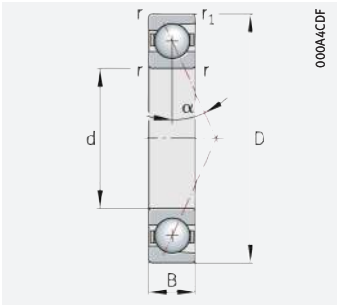


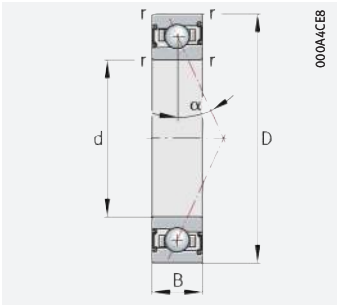
Mounting dimensions

	Mounting dimensions							Preload force[4] F_V			Lift-off force[4] K_{aE}			Axial rigidity[4] c_a		
d	d_a h12	D_a H12	r_a max.	r_{a1} max.	E_{tk} min.	E_{tk1} min.	E_{tk} E_{tk1} max.	L N	M N	H N	L N	M N	H N	L N/µm	M N/µm	H N/µm
35	40	51,5	0,6	0,15	42,6	42,6	44	60	273	613	174	820	1 910	72,9	129	179
	40	51,5	0,6	0,15	42,6	42,6	44	50	185	384	155	619	1 377	33,5	60,2	87,5
	40	51,5	0,6	0,15	42,6	41,2	43,4	38	113	226	109	333	680	61	91,1	119
	40	51,5	0,6	0,15	42,6	42,6	44	33	158	359	95	463	1 081	66,7	117	161
	40	51,5	0,6	0,15	42,6	41,2	43,4	23	70	140	70	220	459	24,5	38,6	53
	40	51,5	0,6	0,15	42,6	42,6	44	21	96	213	63	301	709	26,7	49,1	71
	40	51,5	0,6	0,15	42,6	41,2	43,4	26	78	155	74	226	459	60,5	89,4	116
	40	51,5	0,6	0,15	42,6	41,2	43,4	26	78	155	74	226	459	60,5	89,4	116
	41	56	1	0,3	44,5	44,5	46,3	134	511	1 097	394	1 551	3 446	87,9	146	200
	41	56	1	0,3	44,5	44,5	46,3	95	321	649	296	1 087	2 357	38,3	66,6	95,8
	41	56	1	0,3	45,7	43,9	46,8	51	152	304	146	448	915	67,7	101	132
	41	56	1	0,3	44,5	44,5	46,3	54	257	585	157	761	1 771	72,1	126	173
	41	56	1	0,3	45,7	43,9	46,8	31	93	187	94	295	614	27,1	42,8	58,8
	41	56	1	0,3	44,5	44,5	46,3	46	175	372	138	558	1 255	32	55,5	78,9
	41	56	1	0,3	45,7	43,9	46,8	35	105	210	101	307	623	67,3	99,5	129
	41	56	1	0,3	45,7	43,9	46,8	35	105	210	101	307	623	67,3	99,5	129
	44	63	1	0,3	47,8	47,8	51	195	710	1 504	570	2 152	4 730	103	169	232
	44	63	1	0,3	47,8	47,8	51	134	443	887	418	1 500	3 223	44,8	77,8	112
	44	63	1	0,3	47,8	47,8	51	84	363	806	242	1 069	2 438	86,2	146	200
	44	63	1	0,3	47,8	47,8	51	67	243	510	200	774	1 720	37,7	64,7	91,8

Super precision angular contact ball bearings

With large or small balls
Steel or ceramic balls
Steel or Cronidur rings
Open or sealed





d = 40 – 40 mm

Main dimensions			Basic load ratings		Fatigue limit load	Limiting speeds[1]		Dimensions		Contact angle	Mass	Designation[2) 3)]
d	D	B	dyn. C_r	stat. C_{0r}	C_{ur}	n_G grease	n_G oil[5)]	r	r_1	α	m	
			kN	kN	N	min^{-1}	min^{-1}	min.	min.	°	≈ kg	
40	62	12	17,1	9,4	970	20 000	32 000	0,6	0,6	25	0,109	**B71908-E-T-P4S**
	62	12	18	9,9	1 020	24 000	36 000	0,6	0,6	15	0,109	**B71908-C-T-P4S**
	62	12	6,4	4,05	420	28 000	43 000	0,6	0,6	25	0,125	**HS71908-E-T-P4S**
	62	12	17,1	9	680	28 000	45 000	0,6	0,6	25	0,092	**HCB71908-E-T-P4S**
	62	12	6,8	4,3	445	32 000	48 000	0,6	0,6	15	0,125	**HS71908-C-T-P4S**
	62	12	18	9,4	720	32 000	50 000	0,6	0,6	15	0,092	**HCB71908-C-T-P4S**
	62	12	6,4	3,9	295	36 000	56 000	0,6	0,6	25	0,119	**HC71908-E-T-P4S**
	62	12	9,7	3,9	295	40 000	63 000	0,6	0,6	25	0,119	**XC71908-E-T-P4S**
	68	15	19,9	10,6	1 100	20 000	30 000	1	1	25	0,189	**B7008-E-T-P4S**
	68	15	20,9	11,2	1 150	22 000	34 000	1	1	15	0,189	**B7008-C-T-P4S**
	68	15	8,9	5,4	560	26 000	40 000	1	1	25	0,211	**HS7008-E-T-P4S**
	68	15	19,9	10,2	780	28 000	43 000	1	1	25	0,166	**HCB7008-E-T-P4S**
	68	15	9,4	5,7	590	30 000	45 000	1	1	15	0,211	**HS7008-C-T-P4S**
	68	15	20,9	10,7	820	30 000	45 000	1	1	15	0,166	**HCB7008-C-T-P4S**
	68	15	8,9	5,2	395	34 000	53 000	1	1	25	0,204	**HC7008-E-T-P4S**
	68	15	13,7	5,2	395	38 000	60 000	1	1	25	0,204	**XC7008-E-T-P4S**
	80	18	31	15,4	1 580	17 000	28 000	1,1	1,1	25	0,371	**B7208-E-T-P4S**
	80	18	32,5	16,1	1 660	18 000	30 000	1,1	1,1	15	0,372	**B7208-C-T-P4S**
	80	18	31	14,7	1 120	20 000	34 000	1,1	1,1	25	0,321	**HCB7208-E-T-P4S**
	80	18	32,5	15,4	1 170	24 000	38 000	1,1	1,1	15	0,322	**HCB7208-C-T-P4S**

medias ➤ *https://www.schaeffler.de/std/1DBE*

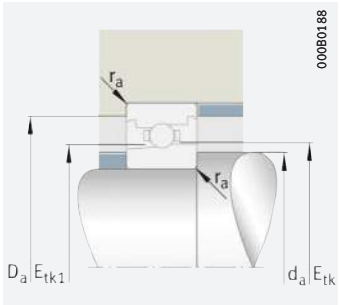
1) The limiting speeds are based on elastically preloaded single bearings.

2) Explanation of designations ➤ 🕮 *SP 1*.

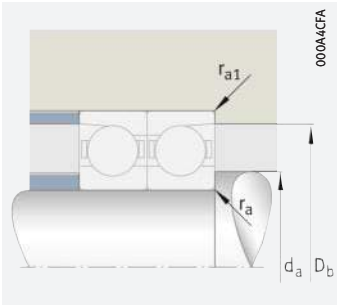
3) The bearings are also available with gap seals (type HSS, HCS, XCS or suffix 2RSD). Ordering examples: B7000-C-2RSD-T-P4S-UL and HSS7000-E-T-P4S-UL.

4) L = light preload; M = moderate preload; H = high preload.

5) Minimal quantity oil lubrication.



Mounting dimensions

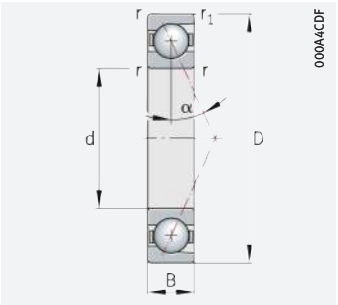


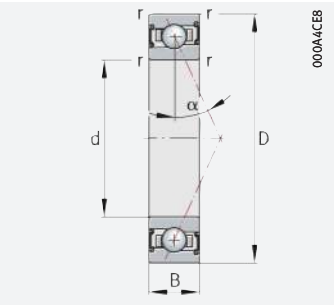
Mounting dimensions

	Mounting dimensions							Preload force[4] F_V			Lift-off force[4] K_{aE}			Axial rigidity[4] c_a		
d	d_a h12	D_a H12	r_a max.	r_{a1} max.	E_{tk} min.	E_{tk1} min.	E_{tk} E_{tk1} max.	L N	M N	H N	L N	M N	H N	L N/µm	M N/µm	H N/µm
40	45	58,5	0,6	0,15	47,3	47,3	49,1	111	447	974	324	1 348	3 043	91,3	155	213
	45	58,5	0,6	0,15	47,3	47,3	49,1	84	292	594	259	979	2 140	40,7	71,6	103
	45	58,5	0,6	0,15	48,6	47,2	49,3	39	117	235	113	345	704	66,6	99,2	129
	45	58,5	0,6	0,15	47,3	47,3	49,1	41	220	514	117	645	1 548	72,4	132	183
	45	58,5	0,6	0,15	48,6	47,2	49,3	24	72	145	72	227	473	26,6	41,8	57,2
	45	58,5	0,6	0,15	47,3	47,3	49,1	39	156	337	116	494	1 127	33,5	59,2	84,7
	45	58,5	0,6	0,15	48,6	47,2	49,3	27	82	164	78	238	484	66,4	98	127
	45	58,5	0,6	0,15	48,6	47,2	49,3	27	82	164	78	238	484	66,4	98	127
	46	62	1	0,3	49,3	49,3	51,8	141	543	1 170	410	1 640	3 663	98,6	165	227
	46	62	1	0,3	49,3	49,3	51,8	101	344	698	312	1 157	2 515	43,2	75,6	109
	46	62	1	0,3	51,2	49,4	52,3	53	160	321	154	472	964	74,7	111	145
	46	62	1	0,3	49,3	49,3	51,8	55	271	622	159	797	1 875	80	142	195
	46	62	1	0,3	51,2	49,4	52,3	34	101	201	100	316	659	30,1	47,4	64,9
	46	62	1	0,3	49,3	49,3	51,8	49	188	402	146	597	1 350	36,1	63,1	89,9
	46	62	1	0,3	51,2	49,4	52,3	37	110	221	106	321	652	74,2	110	142
	46	62	1	0,3	51,2	49,4	52,3	37	110	221	106	321	652	74,2	110	142
	48	72	1	0,6	53,4	53,4	57,2	257	906	1 903	750	2 748	5 985	114	184	252
	48	72	1	0,6	53,4	53,4	57,2	175	566	1 128	544	1 920	4 102	49,2	84,7	122
	48	72	1	0,6	53,4	53,4	57,2	121	485	1 059	347	1 432	3 208	97,6	162	220
	48	72	1	0,6	53,4	53,4	57,2	89	312	650	266	996	2 193	41,6	70,6	99,8

Super precision angular contact ball bearings

With large or small balls
Steel or ceramic balls
Steel or Cronidur rings
Open or sealed





d = 45 – 45 mm

Main dimensions			Basic load ratings		Fatigue limit load	Limiting speeds[1]		Dimensions		Contact angle	Mass	Designation[2] [3]
d	D	B	dyn. C_r	stat. C_{0r}	C_{ur}	n_G grease	n_G oil[5]	r	r_1	α	m	
			kN	kN	N	min^{-1}	min^{-1}	min.	min.	°	≈ kg	
45	68	12	18,2	10,6	1 090	19 000	28 000	0,6	0,6	25	0,127	**B71909-E-T-P4S**
	68	12	19,1	11,2	1 150	20 000	32 000	0,6	0,6	15	0,127	**B71909-C-T-P4S**
	68	12	9,1	5,6	580	26 000	40 000	0,6	0,6	25	0,136	**HS71909-E-T-P4S**
	68	12	18,2	10,2	770	26 000	40 000	0,6	0,6	25	0,108	**HCB71909-E-T-P4S**
	68	12	9,6	6	610	28 000	43 000	0,6	0,6	15	0,136	**HS71909-C-T-P4S**
	68	12	19,1	10,7	820	28 000	45 000	0,6	0,6	15	0,108	**HCB71909-C-T-P4S**
	68	12	9,1	5,4	410	32 000	50 000	0,6	0,6	25	0,129	**HC71909-E-T-P4S**
	68	12	13,9	5,4	410	36 000	56 000	0,6	0,6	25	0,129	**XC71909-E-T-P4S**
	75	16	26,5	14,2	1 460	17 000	26 000	1	1	25	0,232	**B7009-E-T-P4S**
	75	16	28	14,9	1 530	19 000	30 000	1	1	15	0,232	**B7009-C-T-P4S**
	75	16	11,6	7,1	730	24 000	36 000	1	1	25	0,261	**HS7009-E-T-P4S**
	75	16	26,5	13,6	1 030	24 000	38 000	1	1	25	0,191	**HCB7009-E-T-P4S**
	75	16	12,3	7,5	770	26 000	40 000	1	1	15	0,262	**HS7009-C-T-P4S**
	75	16	28	14,3	1 090	26 000	40 000	1	1	15	0,191	**HCB7009-C-T-P4S**
	75	16	11,6	6,8	520	30 000	48 000	1	1	25	0,248	**HC7009-E-T-P4S**
	75	16	17,8	6,8	520	34 000	53 000	1	1	25	0,248	**XC7009-E-T-P4S**
	85	19	32,5	16,9	1 740	15 000	24 000	1,1	1,1	25	0,422	**B7209-E-T-P4S**
	85	19	34	17,7	1 820	17 000	28 000	1,1	1,1	15	0,423	**B7209-C-T-P4S**
	85	19	32,5	16,2	1 230	18 000	30 000	1,1	1,1	25	0,369	**HCB7209-E-T-P4S**
	85	19	34	17	1 290	22 000	36 000	1,1	1,1	15	0,37	**HCB7209-C-T-P4S**

medias ➤ *https://www.schaeffler.de/std/1DBF*

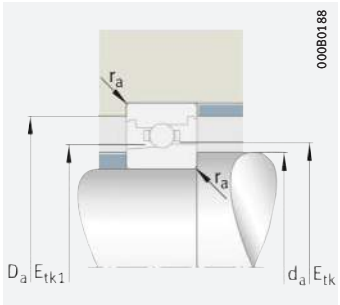
[1] The limiting speeds are based on elastically preloaded single bearings.

[2] Explanation of designations ➤ 🕮 *SP 1*.

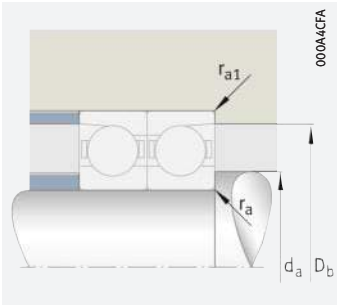
[3] The bearings are also available with gap seals (type HSS, HCS, XCS or suffix 2RSD). Ordering examples: B7000-C-2RSD-T-P4S-UL and HSS7000-E-T-P4S-UL.

[4] L = light preload; M = moderate preload; H = high preload.

[5] Minimal quantity oil lubrication.



Mounting dimensions

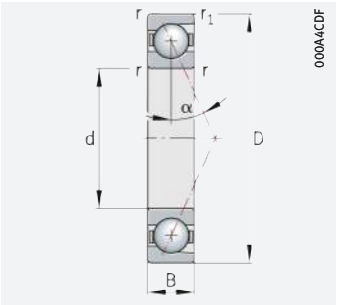


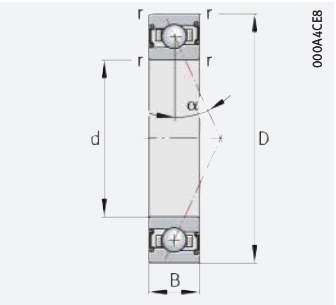
Mounting dimensions

	Mounting dimensions							Preload force[4] F_V			Lift-off force[4] K_{aE}			Axial rigidity[4] c_a		
d	d_a h12	D_a H12	r_a max.	r_{a1} max.	E_{tk} min.	E_{tk1} min.	E_{tk} E_{tk1} max.	L N	M N	H N	L N	M N	H N	L N/µm	M N/µm	H N/µm
45	50	63,5	0,6	0,15	52,3	52,3	54,5	116	470	1 028	336	1 415	3 203	99	168	232
	50	63,5	0,6	0,15	52,3	52,3	54,5	88	307	628	270	1 027	2 251	44	77,5	112
	50	63,5	0,6	0,15	53,7	51,9	54,7	55	164	328	158	482	984	77,2	115	150
	50	63,5	0,6	0,15	52,3	52,3	54,5	42	233	547	121	682	1 643	78,5	144	200
	50	63,5	0,6	0,15	53,7	51,9	54,7	34	101	201	100	316	657	30,8	48,4	66,2
	50	63,5	0,6	0,15	52,3	52,3	54,5	40	164	355	120	516	1 182	36,2	64,1	91,7
	50	63,5	0,6	0,15	53,7	51,9	54,7	38	113	226	108	329	667	76,6	113	146
	50	63,5	0,6	0,15	53,7	51,9	54,7	38	113	226	108	329	667	76,6	113	146
	51	69	1	0,3	54,3	54,3	57,3	208	763	1 622	606	2 308	5 082	115	189	259
	51	69	1	0,3	54,3	54,3	57,3	144	476	958	445	1 606	3 461	49,8	86,3	124
	51	69	1	0,3	56,7	54,6	58,2	70	210	421	203	621	1 269	85,4	128	167
	51	69	1	0,3	54,3	54,3	57,3	89	389	869	254	1 145	2 622	95,8	163	223
	51	69	1	0,3	56,7	54,6	58,2	43	130	259	130	409	853	34,3	54,1	74,3
	51	69	1	0,3	54,3	54,3	57,3	71	261	549	212	827	1 843	41,9	71,9	102
	51	69	1	0,3	56,7	54,6	58,2	48	143	286	137	417	848	84,4	125	161
	51	69	1	0,3	56,7	54,6	58,2	48	143	286	137	417	848	84,4	125	161
	52,5	78	1	0,6	58,5	58,5	62,2	268	948	1 994	782	2 873	6 261	121	196	268
	52,5	78	1	0,6	58,5	58,5	62,2	182	592	1 182	567	2 003	4 286	52,2	90	129
	52,5	78	1	0,6	58,5	58,5	62,2	123	500	1 095	354	1 475	3 312	103	172	233
	52,5	78	1	0,6	58,5	58,5	62,2	93	329	685	279	1 047	2 307	44,4	75,3	106

Super precision angular contact ball bearings

With large or small balls
Steel or ceramic balls
Steel or Cronidur rings
Open or sealed





d = 50 – 50 mm

Main dimensions			Basic load ratings		Fatigue limit load	Limiting speeds[1]		Dimensions		Contact angle	Mass	Designation[2] [3]
d	D	B	dyn. C_r	stat. C_{0r}	C_{ur}	n_G grease	n_G oil[5]	r	r_1	α	m	
			kN	kN	N	min^{-1}	min^{-1}	min.	min.	°	≈ kg	
50	72	12	18,6	11,3	1 160	17 000	26 000	0,6	0,6	25	0,128	**B71910-E-T-P4S**
	72	12	19,6	11,9	1 230	19 000	30 000	0,6	0,6	15	0,128	**B71910-C-T-P4S**
	72	12	9,4	6,1	630	24 000	36 000	0,6	0,6	25	0,138	**HS71910-E-T-P4S**
	72	12	18,6	10,8	820	24 000	36 000	0,6	0,6	25	0,109	**HCB71910-E-T-P4S**
	72	12	9,9	6,5	670	26 000	40 000	0,6	0,6	15	0,138	**HS71910-C-T-P4S**
	72	12	19,6	11,4	870	26 000	40 000	0,6	0,6	15	0,109	**HCB71910-C-T-P4S**
	72	12	9,4	5,8	445	30 000	48 000	0,6	0,6	25	0,131	**HC71910-E-T-P4S**
	72	12	14,3	5,8	445	34 000	53 000	0,6	0,6	25	0,131	**XC71910-E-T-P4S**
	80	16	27,5	15,3	1 580	16 000	24 000	1	1	25	0,25	**B7010-E-T-P4S**
	80	16	29	16,1	1 660	18 000	28 000	1	1	15	0,25	**B7010-C-T-P4S**
	80	16	12,1	7,7	790	22 000	34 000	1	1	25	0,282	**HS7010-E-T-P4S**
	80	16	27,5	14,7	1 120	22 000	34 000	1	1	25	0,213	**HCB7010-E-T-P4S**
	80	16	12,8	8,2	840	24 000	38 000	1	1	15	0,283	**HS7010-C-T-P4S**
	80	16	29	15,4	1 170	24 000	38 000	1	1	15	0,213	**HCB7010-C-T-P4S**
	80	16	12,1	7,4	560	28 000	43 000	1	1	25	0,269	**HC7010-E-T-P4S**
	80	16	18,4	7,4	560	32 000	48 000	1	1	25	0,269	**XC7010-E-T-P4S**
	90	20	41	21,4	2 200	14 000	22 000	1,1	1,1	25	0,446	**B7210-E-T-P4S**
	90	20	43	22,4	2 300	16 000	26 000	1,1	1,1	15	0,448	**B7210-C-T-P4S**
	90	20	41	20,4	1 560	17 000	28 000	1,1	1,1	25	0,382	**HCB7210-E-T-P4S**
	90	20	43	21,4	1 630	20 000	34 000	1,1	1,1	15	0,384	**HCB7210-C-T-P4S**

medias ➤ *https://www.schaeffler.de/std/1DC0*

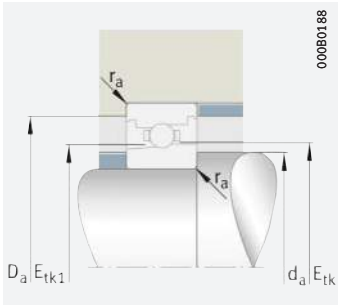
1) The limiting speeds are based on elastically preloaded single bearings.

2) Explanation of designations ➤ 🕮 *SP 1*.

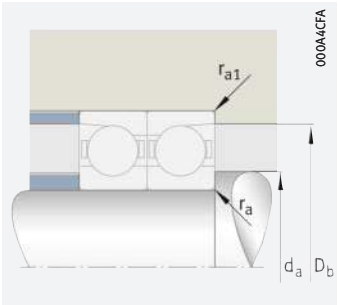
3) The bearings are also available with gap seals (type HSS, HCS, XCS or suffix 2RSD). Ordering examples: B7000-C-2RSD-T-P4S-UL and HSS7000-E-T-P4S-UL.

4) L = light preload; M = moderate preload; H = high preload.

5) Minimal quantity oil lubrication.



Mounting dimensions

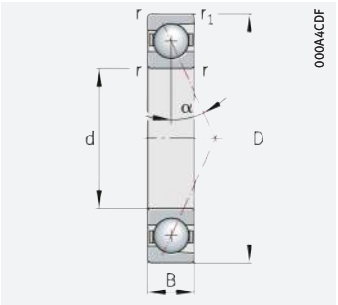


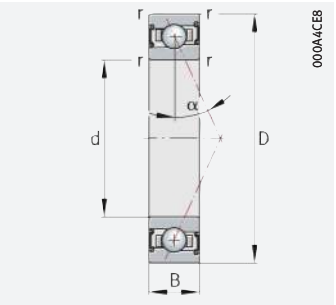
Mounting dimensions

	Mounting dimensions							Preload force[4] F_V			Lift-off force[4] K_{aE}			Axial rigidity[4] c_a		
d	d_a h12	D_a H12	r_a max.	r_{a1} max.	E_{tk} min.	E_{tk1} min.	E_{tk} E_{tk1} max.	L N	M N	H N	L N	M N	H N	L N/µm	M N/µm	H N/µm
50	55	67,5	0,6	0,15	56,8	56,8	58,9	117	479	1 049	340	1 439	3 263	103	174	241
	55	67,5	0,6	0,15	56,8	56,8	58,9	89	313	642	274	1 044	2 293	45,6	80,2	116
	55	67,5	0,6	0,15	58,2	56,4	59,1	56	169	338	163	497	1 014	81,7	122	159
	55	67,5	0,6	0,15	56,8	56,8	58,9	40	229	542	115	671	1 626	79,7	148	205
	55	67,5	0,6	0,15	58,2	56,4	59,1	35	105	209	104	328	682	32,6	51,2	70
	55	67,5	0,6	0,15	56,8	56,8	58,9	41	167	362	121	525	1 205	37,5	66,4	95
	55	67,5	0,6	0,15	58,2	56,4	59,1	39	116	231	110	336	682	80,9	119	154
	55	67,5	0,6	0,15	58,2	56,4	59,1	39	116	231	110	336	682	80,9	119	154
	56	74	1	0,3	59,3	59,3	62,3	209	774	1 648	610	2 336	5 151	120	197	270
	56	74	1	0,3	59,3	59,3	62,3	148	493	994	459	1 659	3 579	52,3	90,5	130
	56	74	1	0,3	61,7	59,6	63	72	216	431	208	635	1 297	90,6	135	176
	56	74	1	0,3	59,3	59,3	62,3	90	400	895	259	1 175	2 697	100	171	234
	56	74	1	0,3	61,7	59,6	63	45	135	269	135	424	884	36,4	57,4	78,8
	56	74	1	0,3	59,3	59,3	62,3	73	268	566	217	848	1 894	43,9	75,3	107
	56	74	1	0,3	61,7	59,6	63	50	149	298	143	435	883	90	133	172
	56	74	1	0,3	61,7	59,6	63	50	149	298	143	435	883	90	133	172
	57	83	1	0,6	62,4	62,4	66,8	352	1 221	2 553	1 027	3 697	8 006	138	223	303
	57	83	1	0,6	62,4	62,4	66,8	240	771	1 534	746	2 606	5 556	59,9	103	147
	57	83	1	0,6	62,4	62,4	66,8	168	656	1 420	484	1 933	4 292	120	197	265
	57	83	1	0,6	62,4	62,4	66,8	126	434	898	377	1 383	3 027	51,4	86,5	122

Super precision angular contact ball bearings

With large or small balls
Steel or ceramic balls
Steel or Cronidur rings
Open or sealed





d = 55 – 55 mm

Main dimensions			Basic load ratings		Fatigue limit load	Limiting speeds[1]		Dimensions		Contact angle	Mass	Designation[2] [3]
d	D	B	dyn. C_r	stat. C_{0r}	C_{ur}	n_G grease	n_G oil[5]	r	r_1	α	m	
			kN	kN	N	min^{-1}	min^{-1}	min.	min.	°	≈ kg	
55	80	13	22,2	13,7	1 410	15 000	24 000	1	1	25	0,174	**B71911-E-T-P4S**
	80	13	23,5	14,4	1 490	17 000	26 000	1	1	15	0,174	**B71911-C-T-P4S**
	80	13	12,3	8	830	22 000	32 000	1	1	25	0,186	**HS71911-E-T-P4S**
	80	13	22,2	13,1	1 000	22 000	32 000	1	1	25	0,148	**HCB71911-E-T-P4S**
	80	13	13	8,5	870	24 000	36 000	1	1	15	0,186	**HS71911-C-T-P4S**
	80	13	23,5	13,8	1 050	24 000	36 000	1	1	15	0,148	**HCB71911-C-T-P4S**
	80	13	12,3	7,7	590	28 000	43 000	1	1	25	0,172	**HC71911-E-T-P4S**
	80	13	18,8	7,7	590	30 000	48 000	1	1	25	0,172	**XC71911-E-T-P4S**
	90	18	37	21	2 160	14 000	22 000	1,1	1,1	25	0,371	**B7011-E-T-P4S**
	90	18	38,5	22,1	2 270	16 000	24 000	1,1	1,1	15	0,371	**B7011-C-T-P4S**
	90	18	16,9	10,9	1 120	20 000	30 000	1,1	1,1	25	0,404	**HS7011-E-T-P4S**
	90	18	37	20,1	1 530	20 000	30 000	1,1	1,1	25	0,311	**HCB7011-E-T-P4S**
	90	18	17,9	11,5	1 180	22 000	34 000	1,1	1,1	15	0,405	**HS7011-C-T-P4S**
	90	18	38,5	21,2	1 610	22 000	34 000	1,1	1,1	15	0,31	**HCB7011-C-T-P4S**
	90	18	16,9	10,4	790	26 000	40 000	1,1	1,1	25	0,386	**HC7011-E-T-P4S**
	90	18	26	10,4	790	28 000	43 000	1,1	1,1	25	0,386	**XC7011-E-T-P4S**
	100	21	45	25	2 600	13 000	20 000	1,5	1,5	25	0,617	**B7211-E-T-P4S**
	100	21	47	26,5	2 700	14 000	22 000	1,5	1,5	15	0,619	**B7211-C-T-P4S**
	100	21	45	24	1 820	15 000	24 000	1,5	1,5	25	0,544	**HCB7211-E-T-P4S**
	100	21	47	25	1 910	18 000	30 000	1,5	1,5	15	0,546	**HCB7211-C-T-P4S**

medias ➤ *https://www.schaeffler.de/std/1DC1*

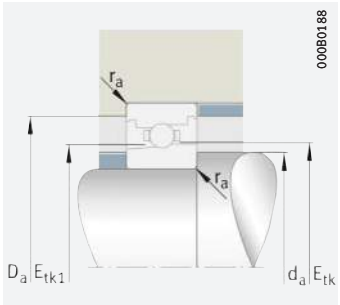
[1] The limiting speeds are based on elastically preloaded single bearings.

[2] Explanation of designations ➤ 🕮 *SP 1*.

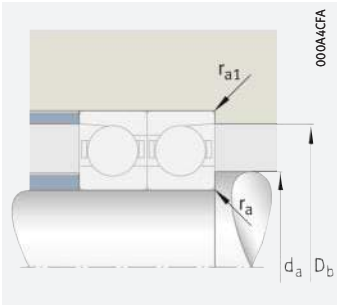
[3] The bearings are also available with gap seals (type HSS, HCS, XCS or suffix 2RSD). Ordering examples: B7000-C-2RSD-T-P4S-UL and HSS7000-E-T-P4S-UL.

[4] L = light preload; M = moderate preload; H = high preload.

[5] Minimal quantity oil lubrication.



Mounting dimensions

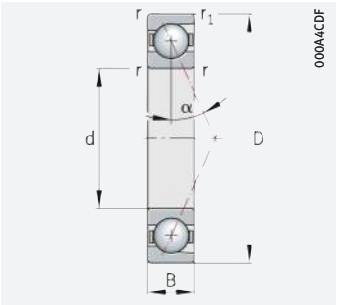


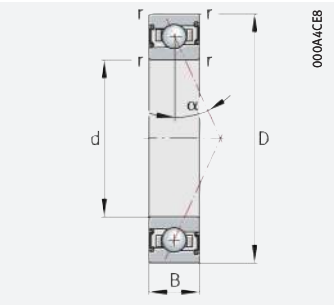
Mounting dimensions

	Mounting dimensions							Preload force[4] F_V			Lift-off force[4] K_{aE}			Axial rigidity[4] c_a		
d	d_a h12	D_a H12	r_a max.	r_{a1} max.	E_{tk} min.	E_{tk1} min.	E_{tk} E_{tk1} max.	L N	M N	H N	L N	M N	H N	L N/µm	M N/µm	H N/µm
55	60	75,5	0,6	0,3	62,8	62,8	65,1	149	588	1 278	431	1 768	3 973	115	193	266
	60	75,5	0,6	0,3	62,8	62,8	65,1	111	382	780	340	1 274	2 784	50,8	88,6	128
	60	75,5	0,6	0,3	64,2	62,1	65,4	73	219	438	211	645	1 317	93,2	139	181
	60	75,5	0,6	0,3	62,8	62,8	65,1	57	296	686	164	867	2 058	93	167	230
	60	75,5	0,6	0,3	64,2	62,1	65,4	45	135	269	135	424	882	37,3	58,6	80,3
	60	75,5	0,6	0,3	62,8	62,8	65,1	53	208	447	157	654	1 487	42,4	74,1	106
	60	75,5	0,6	0,3	64,2	62,1	65,4	51	152	304	145	442	897	92,7	137	177
	60	75,5	0,6	0,3	64,2	62,1	65,4	51	152	304	145	442	897	92,7	137	177
	62	83	1	0,6	65,9	65,9	69,6	296	1 059	2 234	862	3 197	6 983	142	230	314
	62	83	1	0,6	65,9	65,9	69,6	205	670	1 344	635	2 253	4 837	61,4	106	151
	62	83	1	0,6	68,5	65,9	70,3	101	304	607	292	895	1 826	106	157	206
	62	83	1	0,6	65,9	65,9	69,6	136	562	1 236	390	1 653	3 728	121	203	275
	62	83	1	0,6	68,5	65,9	70,3	62	187	374	187	588	1 225	42,2	66,5	91,1
	62	83	1	0,6	65,9	65,9	69,6	102	366	765	305	1 158	2 559	51,9	87,9	124
	62	83	1	0,6	68,5	65,9	70,3	70	210	421	201	613	1 244	105	155	201
	62	83	1	0,6	68,5	65,9	70,3	70	210	421	201	613	1 244	105	155	201
	63	92	1,5	0,6	69,9	69,9	74,3	378	1 321	2 767	1 103	3 991	8 652	155	249	339
	63	92	1,5	0,6	69,9	69,9	74,3	258	832	1 662	800	2 800	5 985	66,7	114	163
	63	92	1,5	0,6	69,9	69,9	74,3	180	709	1 540	518	2 088	4 646	134	220	297
	63	92	1,5	0,6	69,9	69,9	74,3	132	460	956	395	1 460	3 203	56,9	95,6	135

Super precision angular contact ball bearings

With large or small balls
Steel or ceramic balls
Steel or Cronidur rings
Open or sealed





d = 60 – 60 mm

Main dimensions			Basic load ratings		Fatigue limit load	Limiting speeds[1]		Dimensions		Contact angle	Mass	Designation[2] [3]
d	D	B	dyn. C_r	stat. C_{0r}	C_{ur}	n_G grease	n_G oil[5]	r	r_1	α	m	
			kN	kN	N	min^{-1}	min^{-1}	min.	min.	°	≈ kg	
60	85	13	23,4	15,2	1 560	14 000	22 000	1	1	25	0,188	**B71912-E-T-P4S**
	85	13	24,7	16	1 650	16 000	24 000	1	1	15	0,188	**B71912-C-T-P4S**
	85	13	12,6	8,7	890	20 000	30 000	1	1	25	0,2	**HS71912-E-T-P4S**
	85	13	23,4	14,5	1 100	20 000	30 000	1	1	25	0,159	**HCB71912-E-T-P4S**
	85	13	13,4	9,2	940	22 000	34 000	1	1	15	0,2	**HS71912-C-T-P4S**
	85	13	24,7	15,3	1 170	22 000	34 000	1	1	15	0,159	**HCB71912-C-T-P4S**
	85	13	12,6	8,3	630	26 000	40 000	1	1	25	0,185	**HC71912-E-T-P4S**
	85	13	19,4	8,3	630	28 000	43 000	1	1	25	0,184	**XC71912-E-T-P4S**
	95	18	38	22,6	2 320	13 000	20 000	1,1	1,1	25	0,396	**B7012-E-T-P4S**
	95	18	40	23,8	2 440	15 000	22 000	1,1	1,1	15	0,395	**B7012-C-T-P4S**
	95	18	17,6	11,8	1 210	18 000	28 000	1,1	1,1	25	0,433	**HS7012-E-T-P4S**
	95	18	38	21,6	1 650	19 000	28 000	1,1	1,1	25	0,335	**HCB7012-E-T-P4S**
	95	18	18,6	12,5	1 280	20 000	32 000	1,1	1,1	15	0,433	**HS7012-C-T-P4S**
	95	18	40	22,7	1 730	20 000	32 000	1,1	1,1	15	0,335	**HCB7012-C-T-P4S**
	95	18	17,6	11,3	860	24 000	36 000	1,1	1,1	25	0,413	**HC7012-E-T-P4S**
	95	18	27	11,3	860	26 000	40 000	1,1	1,1	25	0,413	**XC7012-E-T-P4S**
	110	22	53	29,5	3 050	12 000	19 000	1,5	1,5	25	0,793	**B7212-E-T-P4S**
	110	22	56	31	3 200	13 000	20 000	1,5	1,5	15	0,795	**B7212-C-T-P4S**
	110	22	53	28,5	2 150	14 000	22 000	1,5	1,5	25	0,685	**HCB7212-E-T-P4S**
	110	22	56	29,5	2 260	16 000	26 000	1,5	1,5	15	0,687	**HCB7212-C-T-P4S**

medias ➤ *https://www.schaeffler.de/std/1DC2*

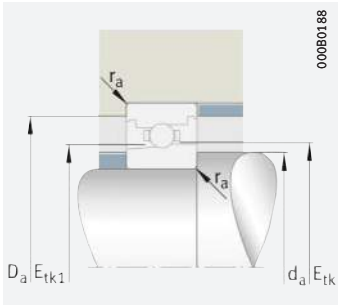
[1] The limiting speeds are based on elastically preloaded single bearings.

[2] Explanation of designations ➤ 🕮 *SP 1*.

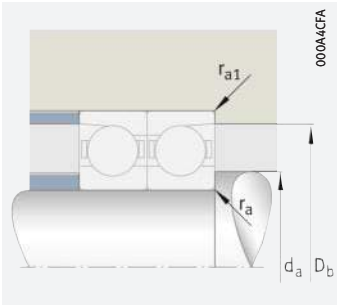
[3] The bearings are also available with gap seals (type HSS, HCS, XCS or suffix 2RSD). Ordering examples: B7000-C-2RSD-T-P4S-UL and HSS7000-E-T-P4S-UL.

[4] L = light preload; M = moderate preload; H = high preload.

[5] Minimal quantity oil lubrication.



Mounting dimensions

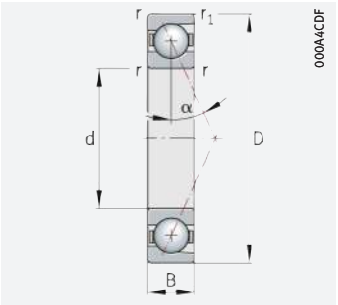


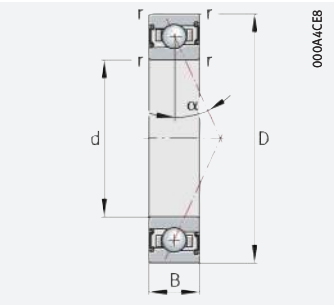
Mounting dimensions

	Mounting dimensions							Preload force[4] F_V			Lift-off force[4] K_{aE}			Axial rigidity[4] c_a		
d	d_a h12	D_a H12	r_a max.	r_{a1} max.	E_{tk} min.	E_{tk1} min.	E_{tk} E_{tk1} max.	L N	M N	H N	L N	M N	H N	L N/µm	M N/µm	H N/µm
60	65	80,5	0,6	0,3	67,8	67,8	70,1	155	617	1 344	448	1 853	4 171	124	208	286
	65	80,5	0,6	0,3	67,8	67,8	70,1	116	401	822	354	1 333	2 919	54,5	95,1	137
	65	80,5	0,6	0,3	69,2	67,1	70,4	76	228	455	219	670	1 368	98,8	147	192
	65	80,5	0,6	0,3	67,8	67,8	70,1	57	303	707	163	887	2 118	98,5	179	246
	65	80,5	0,6	0,3	69,2	67,1	70,4	47	141	281	140	442	920	39,5	62,1	85
	65	80,5	0,6	0,3	67,8	67,8	70,1	54	214	462	159	671	1 530	45,1	79	112
	65	80,5	0,6	0,3	69,2	67,1	70,4	52	155	311	148	452	917	97,7	144	186
	65	80,5	0,6	0,3	69,2	67,1	70,4	52	155	311	148	452	917	97,7	144	186
	67	88	1	0,6	70,9	70,9	74,5	297	1 069	2 259	864	3 221	7 045	147	239	326
	67	88	1	0,6	70,9	70,9	74,5	209	687	1 381	647	2 304	4 952	64	110	157
	67	88	1	0,6	73,5	70,9	75,3	105	316	631	304	929	1 896	112	167	218
	67	88	1	0,6	70,9	70,9	74,5	136	569	1 256	391	1 673	3 782	126	211	286
	67	88	1	0,6	73,5	70,9	75,3	65	194	388	194	609	1 269	44,8	70,5	96,4
	67	88	1	0,6	70,9	70,9	74,5	106	379	794	315	1 198	2 651	54,4	92,2	130
	67	88	1	0,6	73,5	70,9	75,3	73	219	438	209	638	1 294	112	165	213
	67	88	1	0,6	73,5	70,9	75,3	73	219	438	209	638	1 294	112	165	213
	69,5	101,5	1,5	0,6	77	77	81,9	463	1 586	3 304	1 351	4 794	10 334	165	264	358
	69,5	101,5	1,5	0,6	77	77	81,9	312	996	1 982	968	3 352	7 140	70,9	121	172
	69,5	101,5	1,5	0,6	77	77	81,9	226	859	1 847	651	2 531	5 576	144	234	315
	69,5	101,5	1,5	0,6	77	77	81,9	163	557	1 149	488	1 767	3 852	60,9	102	143

Super precision angular contact ball bearings

With large or small balls
Steel or ceramic balls
Steel or Cronidur rings
Open or sealed





d = 65 – 65 mm

Main dimensions			Basic load ratings		Fatigue limit load	Limiting speeds[1]		Dimensions		Contact angle	Mass	Designation[2] [3]
d	D	B	dyn. C_r	stat. C_{0r}	C_{ur}	n_G grease	n_G oil[5]	r	r_1	α	m	
			kN	kN	N	min^{-1}	min^{-1}	min.	min.	°	≈ kg	
65	90	13	23,7	16	1 640	13 000	20 000	1	1	25	0,2	**B71913-E-T-P4S**
	90	13	25	16,9	1 740	15 000	22 000	1	1	15	0,2	**B71913-C-T-P4S**
	90	13	13	9,3	960	18 000	28 000	1	1	25	0,214	**HS71913-E-T-P4S**
	90	13	23,7	15,3	1 160	19 000	28 000	1	1	25	0,17	**HCB71913-E-T-P4S**
	90	13	13,8	9,9	1 010	20 000	32 000	1	1	15	0,214	**HS71913-C-T-P4S**
	90	13	25	16,1	1 230	20 000	32 000	1	1	15	0,17	**HCB71913-C-T-P4S**
	90	13	13	8,9	680	24 000	36 000	1	1	25	0,198	**HC71913-E-T-P4S**
	90	13	19,9	8,9	680	26 000	40 000	1	1	25	0,197	**XC71913-E-T-P4S**
	100	18	39	24,1	2 480	13 000	19 000	1,1	1,1	25	0,42	**B7013-E-T-P4S**
	100	18	41,5	25,5	2 600	14 000	22 000	1,1	1,1	15	0,42	**B7013-C-T-P4S**
	100	18	18,2	12,7	1 310	17 000	26 000	1,1	1,1	25	0,461	**HS7013-E-T-P4S**
	100	18	39	23,1	1 760	17 000	26 000	1,1	1,1	25	0,356	**HCB7013-E-T-P4S**
	100	18	19,3	13,4	1 380	19 000	30 000	1,1	1,1	15	0,461	**HS7013-C-T-P4S**
	100	18	41,5	24,3	1 850	19 000	30 000	1,1	1,1	15	0,356	**HCB7013-C-T-P4S**
	100	18	18,2	12,2	930	22 000	34 000	1,1	1,1	25	0,44	**HC7013-E-T-P4S**
	100	18	28	12,2	930	24 000	38 000	1,1	1,1	25	0,44	**XC7013-E-T-P4S**
	120	23	65	36,5	3 750	11 000	18 000	1,5	1,5	25	0,998	**B7213-E-T-P4S**
	120	23	68	38,5	3 950	12 000	19 000	1,5	1,5	15	1	**B7213-C-T-P4S**
	120	23	65	35	2 650	13 000	20 000	1,5	1,5	25	0,863	**HCB7213-E-T-P4S**
	120	23	68	36,5	2 800	15 000	24 000	1,5	1,5	15	0,866	**HCB7213-C-T-P4S**

medias ➤ *https://www.schaeffler.de/std/1DC3*

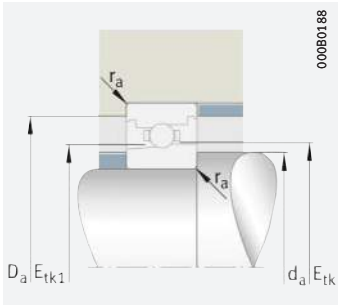
[1] The limiting speeds are based on elastically preloaded single bearings.

[2] Explanation of designations ➤ 🕮 *SP 1*.

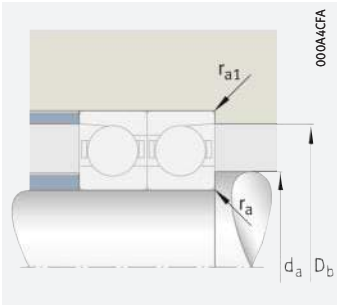
[3] The bearings are also available with gap seals (type HSS, HCS, XCS or suffix 2RSD). Ordering examples: B7000-C-2RSD-T-P4S-UL and HSS7000-E-T-P4S-UL.

[4] L = light preload; M = moderate preload; H = high preload.

[5] Minimal quantity oil lubrication.



Mounting dimensions

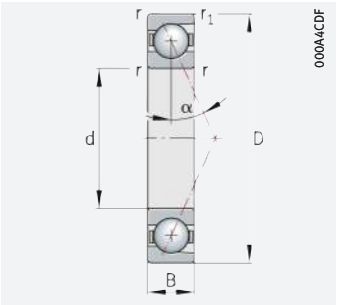


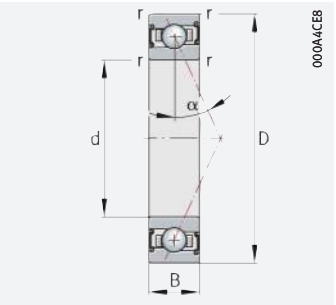
Mounting dimensions

d	Mounting dimensions							Preload force[4] F_V			Lift-off force[4] K_{aE}			Axial rigidity[4] c_a		
	d_a h12	D_a H12	r_a max.	r_{a1} max.	E_{tk} min.	E_{tk1} min.	E_{tk} E_{tk1} max.	L N	M N	H N	L N	M N	H N	L N/µm	M N/µm	H N/µm
65	70	85,5	0,6	0,3	72,8	72,8	75,1	152	613	1 339	440	1 837	4 145	126	213	293
	70	85,5	0,6	0,3	72,8	72,8	75,1	117	409	839	360	1 356	2 973	56,2	98,1	141
	70	85,5	0,6	0,3	74,2	72,1	75,3	77	231	462	222	680	1 386	104	154	201
	70	85,5	0,6	0,3	72,8	72,8	75,1	58	309	723	165	904	2 165	102	185	255
	70	85,5	0,6	0,3	74,2	72,1	75,3	48	144	287	143	450	937	41,5	65	88,8
	70	85,5	0,6	0,3	72,8	72,8	75,1	55	219	473	161	684	1 562	46,6	81,7	116
	70	85,5	0,6	0,3	74,2	72,1	75,3	53	160	321	153	466	946	103	152	196
	70	85,5	0,6	0,3	74,2	72,1	75,3	53	160	321	153	466	946	103	152	196
	72	93	1	0,6	75,9	75,9	79,5	308	1 111	2 350	896	3 347	7 323	154	251	342
	72	93	1	0,6	75,9	75,9	79,5	214	704	1 417	660	2 354	5 068	66,7	114	164
	72	93	1	0,6	78,5	75,9	80,2	109	328	656	315	964	1 967	119	177	231
	72	93	1	0,6	75,9	75,9	79,5	137	577	1 276	392	1 694	3 836	131	219	297
	72	93	1	0,6	78,5	75,9	80,2	67	201	402	200	630	1 312	47,4	74,4	102
	72	93	1	0,6	75,9	75,9	79,5	107	385	808	318	1 213	2 688	56,4	95,6	135
	72	93	1	0,6	78,5	75,9	80,2	74	223	445	213	647	1 313	118	173	224
	72	93	1	0,6	78,5	75,9	80,2	74	223	445	213	647	1 313	118	173	224
	75,5	109,5	1,5	0,6	83	83	88,6	585	1 977	4 100	1 709	5 978	12 828	185	295	399
	75,5	109,5	1,5	0,6	83	83	88,6	386	1 224	2 431	1 198	4 118	8 752	78,9	134	191
	75,5	109,5	1,5	0,6	83	83	88,6	290	1 071	2 286	834	3 157	6 901	162	261	350
	75,5	109,5	1,5	0,6	83	83	88,6	205	690	1 419	614	2 192	4 757	68,2	113	159

Super precision angular contact ball bearings

With large or small balls
Steel or ceramic balls
Steel or Cronidur rings
Open or sealed





d = 70 – 70 mm

Main dimensions			Basic load ratings		Fatigue limit load	Limiting speeds[1]		Dimensions		Contact angle	Mass	Designation[2] [3]
d	D	B	dyn. C_r	stat. C_{0r}	C_{ur}	n_G grease	n_G oil[5]	r	r_1	α	m	
			kN	kN	N	min^{-1}	min^{-1}	min.	min.	°	≈ kg	
70	100	16	32,5	21,8	2 240	12 000	19 000	1	1	25	0,33	**B71914-E-T-P4S**
	100	16	34,5	23	2 360	14 000	20 000	1	1	15	0,33	**B71914-C-T-P4S**
	100	16	16,8	12,2	1 250	17 000	26 000	1	1	25	0,353	**HS71914-E-T-P4S**
	100	16	32,5	20,8	1 580	17 000	26 000	1	1	25	0,28	**HCB71914-E-T-P4S**
	100	16	17,8	12,9	1 330	19 000	28 000	1	1	15	0,354	**HS71914-C-T-P4S**
	100	16	34,5	22	1 670	19 000	28 000	1	1	15	0,28	**HCB71914-C-T-P4S**
	100	16	16,8	11,7	890	22 000	34 000	1	1	25	0,334	**HC71914-E-T-P4S**
	100	16	25,5	11,7	890	24 000	36 000	1	1	25	0,334	**XC71914-E-T-P4S**
	110	20	48	29	3 000	11 000	18 000	1,1	1,1	25	0,59	**B7014-E-T-P4S**
	110	20	50	30,5	3 150	13 000	20 000	1,1	1,1	15	0,59	**B7014-C-T-P4S**
	110	20	23,6	16,3	1 670	16 000	24 000	1,1	1,1	25	0,643	**HS7014-E-T-P4S**
	110	20	48	28	2 120	16 000	24 000	1,1	1,1	25	0,495	**HCB7014-E-T-P4S**
	110	20	25	17,2	1 770	18 000	28 000	1,1	1,1	15	0,644	**HS7014-C-T-P4S**
	110	20	50	29,5	2 230	18 000	28 000	1,1	1,1	15	0,495	**HCB7014-C-T-P4S**
	110	20	23,6	15,6	1 190	20 000	32 000	1,1	1,1	25	0,611	**HC7014-E-T-P4S**
	110	20	36	15,6	1 190	22 000	34 000	1,1	1,1	25	0,611	**XC7014-E-T-P4S**
	125	24	67	39,5	4 050	10 000	17 000	1,5	1,5	25	1,09	**B7214-E-T-P4S**
	125	24	71	41,5	4 250	11 000	18 000	1,5	1,5	15	1,1	**B7214-C-T-P4S**
	125	24	67	38	2 900	12 000	19 000	1,5	1,5	25	0,951	**HCB7214-E-T-P4S**
	125	24	71	39,5	3 000	14 000	22 000	1,5	1,5	15	0,954	**HCB7214-C-T-P4S**

medias ➤ *https://www.schaeffler.de/std/1DC4*

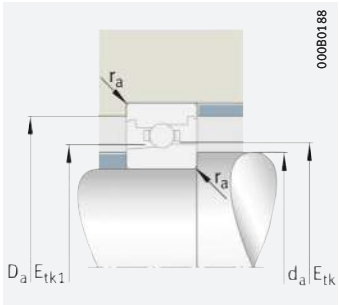
1) The limiting speeds are based on elastically preloaded single bearings.

2) Explanation of designations ➤ 🕮 *SP 1*.

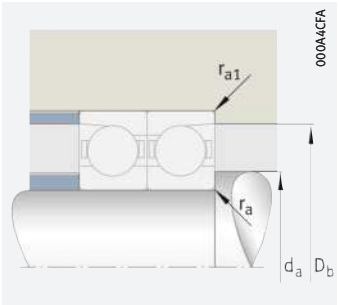
3) The bearings are also available with gap seals (type HSS, HCS, XCS or suffix 2RSD). Ordering examples: B7000-C-2RSD-T-P4S-UL and HSS7000-E-T-P4S-UL.

4) L = light preload; M = moderate preload; H = high preload.

5) Minimal quantity oil lubrication.



Mounting dimensions

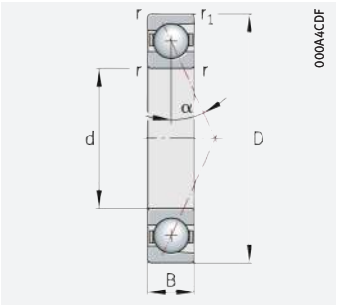


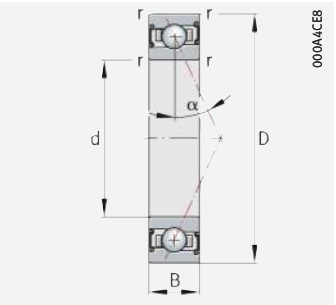
Mounting dimensions

d	Mounting dimensions							Preload force[4] F_V			Lift-off force[4] K_{aE}			Axial rigidity[4] c_a		
	d_a h12	D_a H12	r_a max.	r_{a1} max.	E_{tk} min.	E_{tk1} min.	E_{tk} E_{tk1} max.	L N	M N	H N	L N	M N	H N	L N/µm	M N/µm	H N/µm
70	76	94,5	0,6	0,3	79,3	79,3	82,2	233	886	1 902	677	2 658	5 898	151	249	341
	76	94,5	0,6	0,3	79,3	79,3	82,2	170	576	1 171	523	1 912	4 155	66	114	163
	76	94,5	0,6	0,3	81,2	78,8	82,6	99	298	597	287	877	1 789	118	176	229
	76	94,5	0,6	0,3	79,3	79,3	82,2	98	459	1 040	281	1 343	3 118	126	218	298
	76	94,5	0,6	0,3	81,2	78,8	82,6	61	184	368	183	576	1 198	47	73,7	101
	76	94,5	0,6	0,3	79,3	79,3	82,2	83	312	665	245	980	2 200	55,5	95,3	135
	76	94,5	0,6	0,3	81,2	78,8	82,6	69	207	414	198	602	1 221	117	173	223
	76	94,5	0,6	0,3	81,2	78,8	82,6	69	207	414	198	602	1 221	117	173	223
	77	102	1	0,6	82,4	82,4	86,7	395	1 388	2 915	1 149	4 183	9 083	169	273	371
	77	102	1	0,6	82,4	82,4	86,7	276	894	1 790	853	2 995	6 414	73,5	125	179
	77	102	1	0,6	85,2	82,3	87,5	141	423	845	406	1 243	2 536	131	194	253
	77	102	1	0,6	82,4	82,4	86,7	188	749	1 633	540	2 203	4 915	147	242	326
	77	102	1	0,6	85,2	82,3	87,5	87	261	523	261	820	1 706	52,2	81,9	112
	77	102	1	0,6	82,4	82,4	86,7	139	487	1 014	414	1 538	3 380	62,3	105	147
	77	102	1	0,6	85,2	82,3	87,5	98	293	587	280	853	1 731	130	192	248
	77	102	1	0,6	85,2	82,3	87,5	98	293	587	280	853	1 731	130	192	248
	80	115	1,5	0,6	88	88	93,6	595	2 017	4 189	1 736	6 090	13 077	194	309	418
	80	115	1,5	0,6	88	88	93,6	399	1 269	2 524	1 238	4 260	9 062	83,1	141	201
	80	115	1,5	0,6	88	88	93,6	297	1 103	2 359	854	3 249	7 111	171	275	368
	80	115	1,5	0,6	88	88	93,6	211	711	1 464	630	2 253	4 894	71,6	119	166

Super precision angular contact ball bearings

With large or small balls
Steel or ceramic balls
Steel or Cronidur rings
Open or sealed





d = 75 – 75 mm

Main dimensions			Basic load ratings		Fatigue limit load	Limiting speeds[1]		Dimensions		Contact angle	Mass	Designation[2] [3]
d	D	B	dyn. C_r	stat. C_{0r}	C_{ur}	n_G grease	n_G oil[5]	r	r_1	α	m	
			kN	kN	N	min^{-1}	min^{-1}	min.	min.	°	≈ kg	
75	105	16	33	22,9	2 360	11 000	18 000	1	1	25	0,347	**B71915-E-T-P4S**
	105	16	35	24,2	2 490	13 000	20 000	1	1	15	0,347	**B71915-C-T-P4S**
	105	16	33	21,9	1 670	16 000	24 000	1	1	25	0,285	**HCB71915-E-T-P4S**
	105	16	17,2	13	1 340	16 000	24 000	1	1	25	0,373	**HS71915-E-T-P4S**
	105	16	35	23,1	1 760	18 000	28 000	1	1	15	0,285	**HCB71915-C-T-P4S**
	105	16	18,3	13,8	1 420	18 000	28 000	1	1	15	0,374	**HS71915-C-T-P4S**
	105	16	17,2	12,5	950	20 000	32 000	1	1	25	0,353	**HC71915-E-T-P4S**
	105	16	26,5	12,5	950	22 000	34 000	1	1	25	0,353	**XC71915-E-T-P4S**
	115	20	49,5	31	3 200	11 000	17 000	1,1	1,1	25	0,62	**B7015-E-T-P4S**
	115	20	52	32,5	3 350	12 000	19 000	1,1	1,1	15	0,62	**B7015-C-T-P4S**
	115	20	49,5	29,5	2 260	15 000	24 000	1,1	1,1	25	0,52	**HCB7015-E-T-P4S**
	115	20	23,9	17	1 740	15 000	24 000	1,1	1,1	25	0,678	**HS7015-E-T-P4S**
	115	20	25,5	17,9	1 850	17 000	26 000	1,1	1,1	15	0,679	**HS7015-C-T-P4S**
	115	20	52	31,5	2 380	17 000	26 000	1,1	1,1	15	0,52	**HCB7015-C-T-P4S**
	115	20	23,9	16,2	1 240	19 000	30 000	1,1	1,1	25	0,644	**HC7015-E-T-P4S**
	115	20	36,5	16,2	1 240	22 000	32 000	1,1	1,1	25	0,644	**XC7015-E-T-P4S**
	130	25	70	42,5	4 300	9 500	16 000	1,5	1,5	25	1,2	**B7215-E-T-P4S**
	130	25	73	44,5	4 550	11 000	18 000	1,5	1,5	15	1,2	**B7215-C-T-P4S**
	130	25	70	40,5	3 050	12 000	19 000	1,5	1,5	25	1,04	**HCB7215-E-T-P4S**
	130	25	73	42,5	3 200	14 000	22 000	1,5	1,5	15	1,05	**HCB7215-C-T-P4S**

medias ➤ *https://www.schaeffler.de/std/1DC5*

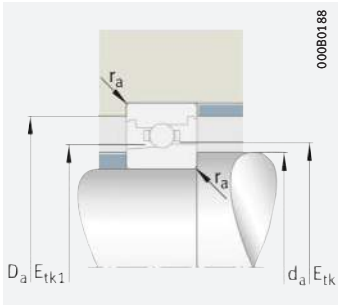
[1] The limiting speeds are based on elastically preloaded single bearings.

[2] Explanation of designations ➤ 🕮 *SP 1*.

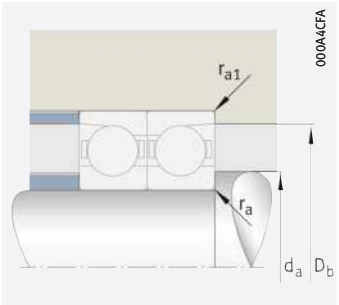
[3] The bearings are also available with gap seals (type HSS, HCS, XCS or suffix 2RSD). Ordering examples: B7000-C-2RSD-T-P4S-UL and HSS7000-E-T-P4S-UL.

[4] L = light preload; M = moderate preload; H = high preload.

[5] Minimal quantity oil lubrication.



Mounting dimensions

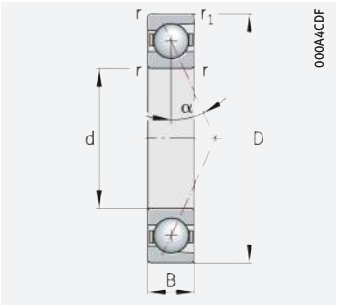


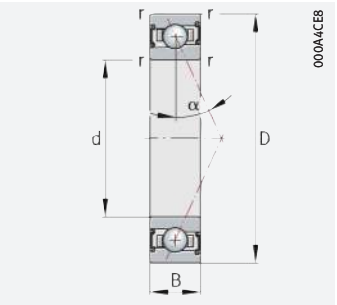
Mounting dimensions

	Mounting dimensions							Preload force[4] F_V			Lift-off force[4] K_{aE}			Axial rigidity[4] c_a		
d	d_a h12	D_a H12	r_a max.	r_{a1} max.	E_{tk} min.	E_{tk1} min.	E_{tk} E_{tk1} max.	L N	M N	H N	L N	M N	H N	L N/µm	M N/µm	H N/µm
75	81	99,5	0,6	0,3	84,3	84,3	87,2	235	897	1 928	682	2 688	5 970	156	257	351
	81	99,5	0,6	0,3	84,3	84,3	87,2	172	584	1 189	527	1 933	4 206	68	117	168
	81	99,5	0,6	0,3	84,3	84,3	87,2	95	454	1 034	273	1 328	3 094	128	223	305
	81	99,5	0,6	0,3	86,2	83,9	87,5	101	304	607	292	891	1 817	123	183	239
	81	99,5	0,6	0,3	84,3	84,3	87,2	83	317	676	247	991	2 229	57,1	98,2	139
	81	99,5	0,6	0,3	86,2	83,9	87,5	64	191	382	190	597	1 242	49,5	77,5	106
	81	99,5	0,6	0,3	86,2	83,9	87,5	70	210	421	201	611	1 240	123	181	233
	81	99,5	0,6	0,3	86,2	83,9	87,5	70	210	421	201	611	1 240	123	181	233
	82	107	1	0,6	87,4	87,4	91,7	405	1 430	3 005	1 180	4 305	9 353	177	285	387
	82	107	1	0,6	87,4	87,4	91,7	280	911	1 827	865	3 043	6 525	76,3	130	186
	82	107	1	0,6	87,4	87,4	91,7	192	769	1 679	551	2 260	5 050	153	253	341
	82	107	1	0,6	90,2	87,3	92,4	144	431	863	415	1 268	2 587	135	200	261
	82	107	1	0,6	90,2	87,3	92,4	89	266	533	265	835	1 737	53,7	84,3	115
	82	107	1	0,6	87,4	87,4	91,7	145	508	1 059	431	1 603	3 524	65,4	110	154
	82	107	1	0,6	90,2	87,3	92,4	99	298	597	285	868	1 761	134	197	255
	82	107	1	0,6	90,2	87,3	92,4	99	298	597	285	868	1 761	134	197	255
	85	120	1,5	0,6	93	93	98,5	615	2 091	4 345	1 794	6 306	13 546	204	325	439
	85	120	1,5	0,6	93	93	98,5	413	1 314	2 617	1 278	4 401	9 371	87,2	148	210
	85	120	1,5	0,6	93	93	98,5	308	1 149	2 459	887	3 383	7 409	180	290	388
	85	120	1,5	0,6	93	93	98,5	219	740	1 524	653	2 341	5 087	75,4	125	175

Super precision angular contact ball bearings

With large or small balls
Steel or ceramic balls
Steel or Cronidur rings
Open or sealed





d = 80 – 80 mm

Main dimensions			Basic load ratings		Fatigue limit load	Limiting speeds[1]		Dimensions		Contact angle	Mass	Designation[2] [3]
d	D	B	dyn. C_r	stat. C_{0r}	C_{ur}	n_G grease	n_G oil[5]	r	r_1	α	m	
			kN	kN	N	min^{-1}	min^{-1}	min.	min.	°	≈ kg	
80	110	16	33,5	24	2 470	11 000	17 000	1	1	25	0,366	**B71916-E-T-P4S**
	110	16	35,5	25,5	2 600	12 000	19 000	1	1	15	0,366	**B71916-C-T-P4S**
	110	16	33,5	23	1 750	15 000	24 000	1	1	25	0,31	**HCB71916-E-T-P4S**
	110	16	19,2	14,6	1 500	15 000	24 000	1	1	25	0,379	**HS71916-E-T-P4S**
	110	16	20,3	15,5	1 590	17 000	26 000	1	1	15	0,379	**HS71916-C-T-P4S**
	110	16	35,5	24,3	1 850	17 000	26 000	1	1	15	0,309	**HCB71916-C-T-P4S**
	110	16	19,2	14	1 060	19 000	30 000	1	1	25	0,355	**HC71916-E-T-P4S**
	110	16	29,5	14	1 060	22 000	32 000	1	1	25	0,355	**XC71916-E-T-P4S**
	125	22	61	39	3 950	10 000	15 000	1,1	1,1	25	0,84	**B7016-E-T-P4S**
	125	22	64	41	4 150	11 000	17 000	1,1	1,1	15	0,84	**B7016-C-T-P4S**
	125	22	28,5	20,6	2 100	14 000	22 000	1,1	1,1	25	0,925	**HS7016-E-T-P4S**
	125	22	61	37,5	2 800	14 000	22 000	1,1	1,1	25	0,7	**HCB7016-E-T-P4S**
	125	22	30,5	21,8	2 220	15 000	24 000	1,1	1,1	15	0,927	**HS7016-C-T-P4S**
	125	22	64	39	2 950	15 000	24 000	1,1	1,1	15	0,7	**HCB7016-C-T-P4S**
	125	22	28,5	19,7	1 480	18 000	28 000	1,1	1,1	25	0,87	**HC7016-E-T-P4S**
	125	22	44	19,7	1 480	20 000	30 000	1,1	1,1	25	0,87	**XC7016-E-T-P4S**
	140	26	89	52	5 100	9 000	15 000	2	2	25	1,42	**B7216-E-T-P4S**
	140	26	94	55	5 400	10 000	17 000	2	2	15	1,43	**B7216-C-T-P4S**
	140	26	89	50	3 600	11 000	18 000	2	2	25	1,18	**HCB7216-E-T-P4S**
	140	26	94	52	3 800	12 000	19 000	2	2	15	1,18	**HCB7216-C-T-P4S**

medias ➤ *https://www.schaeffler.de/std/1DC6*

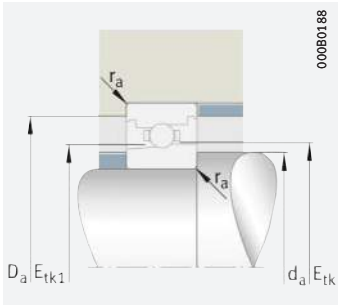
[1] The limiting speeds are based on elastically preloaded single bearings.

[2] Explanation of designations ➤ 🕮 *SP 1*.

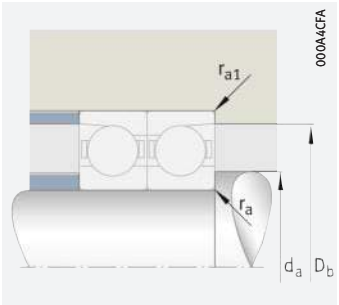
[3] The bearings are also available with gap seals (type HSS, HCS, XCS or suffix 2RSD). Ordering examples: B7000-C-2RSD-T-P4S-UL and HSS7000-E-T-P4S-UL.

[4] L = light preload; M = moderate preload; H = high preload.

[5] Minimal quantity oil lubrication.



Mounting dimensions

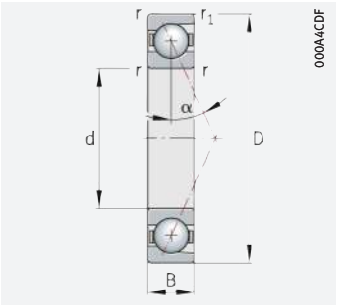


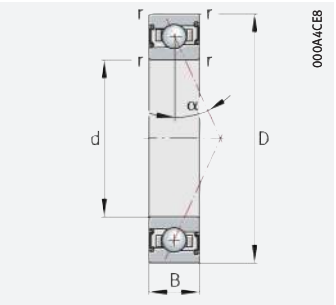
Mounting dimensions

	Mounting dimensions							Preload force[4] F_V			Lift-off force[4] K_{aE}			Axial rigidity[4] c_a		
d	d_a h12	D_a H12	r_a max.	r_{a1} max.	E_{tk} min.	E_{tk1} min.	E_{tk} E_{tk1} max.	L N	M N	H N	L N	M N	H N	L N/µm	M N/µm	H N/µm
80	86	104	0,6	0,3	89,3	89,3	92,2	237	908	1 955	686	2 718	6 043	160	265	362
	86	104	0,6	0,3	89,3	89,3	92,2	174	591	1 206	532	1 954	4 257	69,9	121	173
	86	104	0,6	0,3	89,3	89,3	92,2	95	459	1 049	273	1 344	3 137	132	230	315
	86	104	0,6	0,3	91	88,5	92,5	113	338	676	325	992	2 023	130	194	252
	86	104	0,6	0,3	91	88,5	92,5	71	213	426	212	666	1 385	52,3	81,9	112
	86	104	0,6	0,3	89,3	89,3	92,2	84	321	686	249	1 004	2 259	58,8	101	143
	86	104	0,6	0,3	91	88,5	92,5	79	236	473	226	686	1 392	130	192	248
	86	104	0,6	0,3	91	88,5	92,5	79	236	473	226	686	1 392	130	192	248
	88	117	1	0,6	94	94	98,8	525	1 816	3 796	1 528	5 469	11 813	201	321	435
	88	117	1	0,6	94	94	98,8	354	1 138	2 277	1 091	3 797	8 119	85,7	145	207
	88	117	1	0,6	97,3	94	99,7	173	518	1 035	497	1 521	3 103	148	220	286
	88	117	1	0,6	94	94	98,8	252	977	2 113	726	2 872	6 354	175	284	383
	88	117	1	0,6	97,3	94	99,7	106	317	633	315	991	2 063	58,7	92	126
	88	117	1	0,6	94	94	98,8	186	640	1 327	554	2 020	4 415	74	123	173
	88	117	1	0,6	97,3	94	99,7	117	352	704	336	1 023	2 075	146	215	278
	88	117	1	0,6	97,3	94	99,7	117	352	704	336	1 023	2 075	146	215	278
	91	129	2	1	100,5	100,5	105,3	833	2 764	5 699	2 433	8 347	17 799	221	349	472
	91	129	2	1	100,5	100,5	105,3	549	1 721	3 412	1 701	5 781	12 250	94,1	159	226
	91	129	2	1	100,5	100,5	105,3	428	1 527	3 225	1 232	4 498	9 728	196	312	416
	91	129	2	1	100,5	100,5	105,3	293	968	1 979	876	3 068	6 618	81,5	134	187

Super precision angular contact ball bearings

With large or small balls
Steel or ceramic balls
Steel or Cronidur rings
Open or sealed





d = 85 – 85 mm

Main dimensions			Basic load ratings		Fatigue limit load	Limiting speeds[1]		Dimensions		Contact angle	Mass	Designation[2] [3]
d	D	B	dyn. C_r	stat. C_{0r}	C_{ur}	n_G grease	n_G oil[5]	r	r_1	α	m	
			kN	kN	N	min^{-1}	min^{-1}	min.	min.	°	≈ kg	
85	120	18	44,5	31,5	3 200	10 000	15 000	1,1	1,1	25	0,53	**B71917-E-T-P4S**
	120	18	47	33,5	3 400	11 000	17 000	1,1	1,1	15	0,53	**B71917-C-T-P4S**
	120	18	20	16	1 630	14 000	22 000	1,1	1,1	25	0,571	**HS71917-E-T-P4S**
	120	18	44,5	30	2 270	14 000	22 000	1,1	1,1	25	0,44	**HCB71917-E-T-P4S**
	120	18	21,2	17	1 720	15 000	24 000	1,1	1,1	15	0,572	**HS71917-C-T-P4S**
	120	18	47	32	2 400	15 000	24 000	1,1	1,1	15	0,44	**HCB71917-C-T-P4S**
	120	18	20	15,3	1 150	18 000	28 000	1,1	1,1	25	0,545	**HC71917-E-T-P4S**
	120	18	30,5	15,3	1 150	20 000	30 000	1,1	1,1	25	0,545	**XC71917-E-T-P4S**
	130	22	63	41,5	4 100	9 500	15 000	1,1	1,1	25	0,88	**B7017-E-T-P4S**
	130	22	66	43,5	4 300	11 000	16 000	1,1	1,1	15	0,88	**B7017-C-T-P4S**
	130	22	29	21,4	2 130	13 000	20 000	1,1	1,1	25	0,969	**HS7017-E-T-P4S**
	130	22	63	39,5	2 900	13 000	20 000	1,1	1,1	25	0,74	**HCB7017-E-T-P4S**
	130	22	30,5	22,7	2 250	15 000	22 000	1,1	1,1	15	0,97	**HS7017-C-T-P4S**
	130	22	66	41,5	3 050	15 000	22 000	1,1	1,1	15	0,74	**HCB7017-C-T-P4S**
	130	22	29	20,5	1 510	17 000	26 000	1,1	1,1	25	0,913	**HC7017-E-T-P4S**
	130	22	44,5	20,5	1 510	19 000	30 000	1,1	1,1	25	0,913	**XC7017-E-T-P4S**
	150	28	93	57	5 400	8 000	13 000	2	2	25	1,81	**B7217-E-T-P4S**
	150	28	97	59	5 600	9 000	15 000	2	2	15	1,82	**B7217-C-T-P4S**
	150	28	93	54	3 800	10 000	17 000	2	2	25	1,55	**HCB7217-E-T-P4S**
	150	28	97	57	4 000	11 000	18 000	2	2	15	1,55	**HCB7217-C-T-P4S**

medias ➤ *https://www.schaeffler.de/std/1DC7*

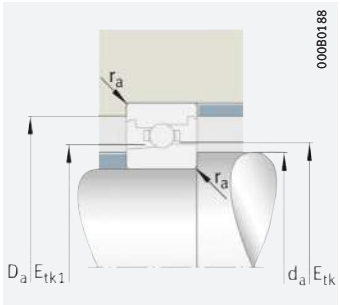
[1] The limiting speeds are based on elastically preloaded single bearings.

[2] Explanation of designations ➤ 🕮 *SP 1*.

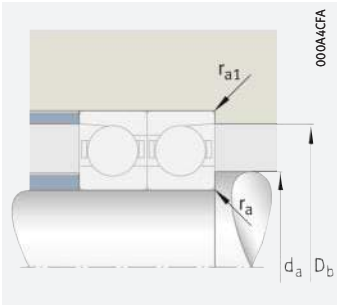
[3] The series 719 and 70 are also available with gap seals (type HSS, HCS, XCS or suffix 2RSD).
Ordering examples: B7000-C-2RSD-T-P4S-UL and HSS7000-E-T-P4S-UL.

[4] L = light preload; M = moderate preload; H = high preload.

[5] Minimal quantity oil lubrication.



Mounting dimensions

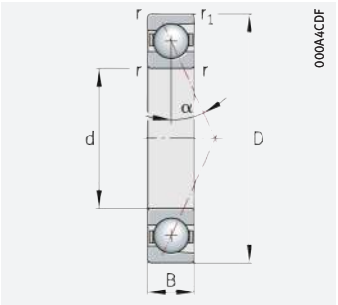


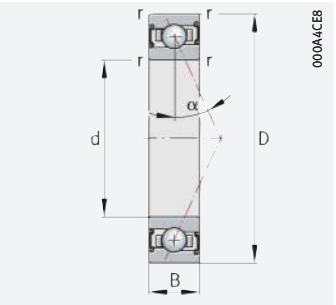
Mounting dimensions

d	Mounting dimensions							Preload force[4] F_V			Lift-off force[4] K_{aE}			Axial rigidity[4] c_a		
	d_a h12	D_a H12	r_a max.	r_{a1} max.	E_{tk} min.	E_{tk1} min.	E_{tk} E_{tk1} max.	L N	M N	H N	L N	M N	H N	L N/µm	M N/µm	H N/µm
85	92	114	0,6	0,6	95,9	95,9	99,3	333	1 226	2 609	968	3 675	8 074	184	301	409
	92	114	0,6	0,6	95,9	95,9	99,3	237	788	1 597	726	2 609	5 644	79,7	136	195
	92	114	0,6	0,6	98,5	96	99,9	117	352	704	338	1 032	2 102	140	208	270
	92	114	0,6	0,6	95,9	95,9	99,3	143	627	1 403	409	1 837	4 197	154	262	356
	92	114	0,6	0,6	98,5	96	99,9	74	221	442	220	689	1 433	55,9	87,4	119
	92	114	0,6	0,6	95,9	95,9	99,3	117	428	906	346	1 341	2 985	67,4	114	161
	92	114	0,6	0,6	98,5	96	99,9	82	247	493	236	716	1 452	140	206	265
	92	114	0,6	0,6	98,5	96	99,9	82	247	493	236	716	1 452	140	206	265
	93	122	1	0,6	99	99	103,8	540	1 874	3 919	1 573	5 639	12 184	209	336	454
	93	122	1	0,6	99	99	103,8	367	1 183	2 368	1 132	3 942	8 434	89,7	152	217
	93	122	1	0,6	102,3	99	104,7	173	518	1 035	497	1 520	3 099	151	224	292
	93	122	1	0,6	99	99	103,8	256	997	2 159	736	2 927	6 484	181	296	398
	93	122	1	0,6	102,3	99	104,7	107	322	643	320	1 006	2 093	60,3	94,4	129
	93	122	1	0,6	99	99	103,8	189	653	1 356	562	2 058	4 501	76,9	128	179
	93	122	1	0,6	102,3	99	104,7	120	359	718	343	1 042	2 115	150	221	286
	93	122	1	0,6	102,3	99	104,7	120	359	718	343	1 042	2 115	150	221	286
	98	138	2	1	106,6	106,6	113,2	864	2 869	5 921	2 520	8 657	18 466	233	369	497
	98	138	2	1	106,6	106,6	113,2	568	1 786	3 544	1 759	5 983	12 688	99,1	167	238
	98	138	2	1	106,6	106,6	113,2	438	1 572	3 325	1 262	4 626	10 015	206	328	438
	98	138	2	1	106,6	106,6	113,2	306	1 012	2 071	915	3 205	6 915	86,2	142	198

Super precision angular contact ball bearings

With large or small balls
Steel or ceramic balls
Steel or Cronidur rings
Open or sealed





d = 90 – 90 mm

Main dimensions			Basic load ratings		Fatigue limit load	Limiting speeds[1]		Dimensions		Contact angle	Mass	Designation[2] [3]
d	D	B	dyn. C_r	stat. C_{0r}	C_{ur}	n_G grease	n_G oil[5]	r	r_1	α	m	
			kN	kN	N	min^{-1}	min^{-1}	min.	min.	°	≈ kg	
90	125	18	45	33	3 300	9 500	15 000	1,1	1,1	25	0,55	**B71918-E-T-P4S**
	125	18	48	35	3 450	11 000	16 000	1,1	1,1	15	0,55	**B71918-C-T-P4S**
	125	18	21,9	17,7	1 750	13 000	20 000	1,1	1,1	25	0,579	**HS71918-E-T-P4S**
	125	18	45	31,5	2 330	13 000	20 000	1,1	1,1	25	0,462	**HCB71918-E-T-P4S**
	125	18	23,2	18,7	1 860	15 000	22 000	1,1	1,1	15	0,58	**HS71918-C-T-P4S**
	125	18	48	33,5	2 460	15 000	22 000	1,1	1,1	15	0,461	**HCB71918-C-T-P4S**
	125	18	21,9	16,9	1 240	17 000	26 000	1,1	1,1	25	0,564	**HC71918-E-T-P4S**
	125	18	33,5	16,9	1 240	19 000	30 000	1,1	1,1	25	0,564	**XC71918-E-T-P4S**
	140	24	74	48,5	4 650	9 000	14 000	1,5	1,5	25	1,14	**B7018-E-T-P4S**
	140	24	78	51	4 900	10 000	15 000	1,5	1,5	15	1,14	**B7018-C-T-P4S**
	140	24	34	25	2 410	12 000	19 000	1,5	1,5	25	1,27	**HS7018-E-T-P4S**
	140	24	74	46,5	3 300	12 000	19 000	1,5	1,5	25	0,95	**HCB7018-E-T-P4S**
	140	24	36	26,5	2 550	14 000	22 000	1,5	1,5	15	1,27	**HS7018-C-T-P4S**
	140	24	78	49	3 450	14 000	22 000	1,5	1,5	15	0,95	**HCB7018-C-T-P4S**
	140	24	34	24	1 710	16 000	24 000	1,5	1,5	25	1,19	**HC7018-E-T-P4S**
	140	24	52	24	1 710	18 000	28 000	1,5	1,5	25	1,19	**XC7018-E-T-P4S**
	160	30	119	72	6 600	7 500	12 000	2	2	25	2,19	**B7218-E-T-P4S**
	160	30	125	75	6 900	8 500	14 000	2	2	15	2,2	**B7218-C-T-P4S**
	160	30	119	69	4 650	9 000	15 000	2	2	25	1,79	**HCB7218-E-T-P4S**
	160	30	125	72	4 900	11 000	18 000	2	2	15	1,8	**HCB7218-C-T-P4S**

medias ➤ *https://www.schaeffler.de/std/1DC8*

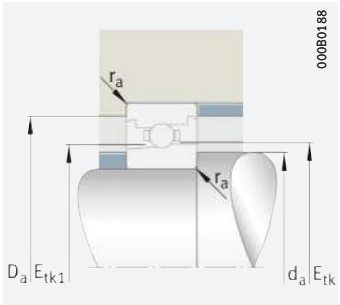
[1] The limiting speeds are based on elastically preloaded single bearings.

[2] Explanation of designations ➤ 🕮 *SP 1*.

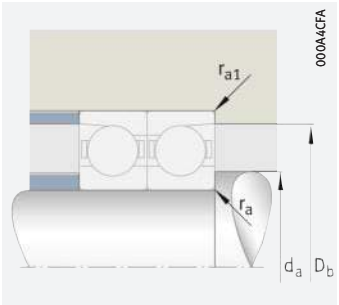
[3] The series 719 and 70 are also available with gap seals (type HSS, HCS, XCS or suffix 2RSD).
Ordering examples: B7000-C-2RSD-T-P4S-UL and HSS7000-E-T-P4S-UL.

[4] L = light preload; M = moderate preload; H = high preload.

[5] Minimal quantity oil lubrication.



Mounting dimensions

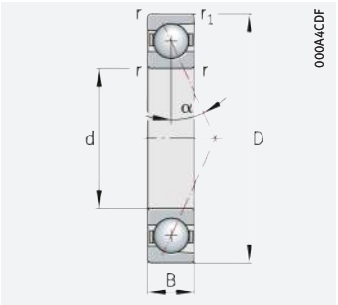


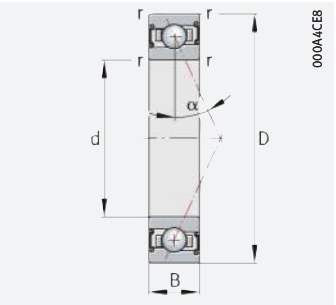
Mounting dimensions

	Mounting dimensions							Preload force[4] F_V			Lift-off force[4] K_{aE}			Axial rigidity[4] c_a		
d	d_a h12	D_a H12	r_a max.	r_{a1} max.	E_{tk} min.	E_{tk1} min.	E_{tk} E_{tk1} max.	L N	M N	H N	L N	M N	H N	L N/µm	M N/µm	H N/µm
90	97	119	0,6	0,6	100,9	100,9	104,3	334	1 236	2 634	970	3 701	8 140	189	309	420
	97	119	0,6	0,6	100,9	100,9	104,3	238	796	1 615	729	2 628	5 691	81,8	140	200
	97	119	0,6	0,6	103,2	100,6	104,8	129	386	773	371	1 133	2 309	144	214	279
	97	119	0,6	0,6	100,9	100,9	104,3	147	648	1 450	421	1 897	4 337	160	272	369
	97	119	0,6	0,6	103,2	100,6	104,8	79	237	474	235	739	1 536	57,2	89,4	122
	97	119	0,6	0,6	100,9	100,9	104,3	118	434	919	349	1 357	3 023	69,4	118	165
	97	119	0,6	0,6	103,2	100,6	104,8	90	269	538	257	781	1 584	144	212	273
	97	119	0,6	0,6	103,2	100,6	104,8	90	269	538	257	781	1 584	144	212	273
	100	131	1,5	0,6	105,5	105,5	110,9	646	2 205	4 590	1 880	6 636	14 269	223	355	479
	100	131	1,5	0,6	105,5	105,5	110,9	437	1 395	2 785	1 347	4 651	9 920	95,2	161	229
	100	131	1,5	0,6	109,3	105,7	111,9	204	612	1 225	588	1 799	3 667	164	244	318
	100	131	1,5	0,6	105,5	105,5	110,9	319	1 201	2 577	916	3 528	7 745	195	316	423
	100	131	1,5	0,6	109,3	105,7	111,9	126	377	754	375	1 178	2 451	65,4	102	140
	100	131	1,5	0,6	105,5	105,5	110,9	230	781	1 613	685	2 464	5 361	82,3	136	191
	100	131	1,5	0,6	109,3	105,7	111,9	141	423	845	404	1 228	2 490	163	241	310
	100	131	1,5	0,6	109,3	105,7	111,9	141	423	845	404	1 228	2 490	163	241	310
	104	147	2	1	112,1	112,1	120	1 127	3 689	7 575	3 291	11 132	23 627	257	404	545
	104	147	2	1	112,1	112,1	120	732	2 280	4 513	2 267	7 640	16 156	109	183	260
	104	147	2	1	112,1	112,1	120	586	2 042	4 283	1 688	6 013	12 905	230	361	481
	104	147	2	1	112,1	112,1	120	400	1 303	2 655	1 197	4 129	8 866	95,2	156	217

Super precision angular contact ball bearings

With large or small balls
Steel or ceramic balls
Steel or Cronidur rings
Open or sealed





d = 95 – 95 mm

Main dimensions			Basic load ratings		Fatigue limit load	Limiting speeds[1]		Dimensions		Contact angle	Mass	Designation[2] [3]
d	D	B	dyn. C_r	stat. C_{0r}	C_{ur}	n_G grease	n_G oil[5]	r	r_1	α	m	
			kN	kN	N	min^{-1}	min^{-1}	min.	min.	°	≈ kg	
95	130	18	46	34,5	3 350	9 000	14 000	1,1	1,1	25	0,58	**B71919-E-T-P4S**
	130	18	48,5	36,5	3 550	10 000	16 000	1,1	1,1	15	0,58	**B71919-C-T-P4S**
	130	18	22,5	18,7	1 820	13 000	19 000	1,1	1,1	25	0,605	**HS71919-E-T-P4S**
	130	18	46	33	2 380	13 000	19 000	1,1	1,1	25	0,483	**HCB71919-E-T-P4S**
	130	18	23,9	19,9	1 930	14 000	22 000	1,1	1,1	15	0,606	**HS71919-C-T-P4S**
	130	18	48,5	35	2 500	14 000	22 000	1,1	1,1	15	0,482	**HCB71919-C-T-P4S**
	130	18	22,5	17,9	1 290	16 000	24 000	1,1	1,1	25	0,59	**HC71919-E-T-P4S**
	130	18	34,5	17,9	1 290	18 000	28 000	1,1	1,1	25	0,59	**XC71919-E-T-P4S**
	145	24	77	52	4 850	8 500	13 000	1,5	1,5	25	1,19	**B7019-E-T-P4S**
	145	24	81	54	5 100	9 500	15 000	1,5	1,5	15	1,19	**B7019-C-T-P4S**
	145	24	34	26	2 450	12 000	18 000	1,5	1,5	25	1,32	**HS7019-E-T-P4S**
	145	24	77	49,5	3 450	12 000	18 000	1,5	1,5	25	1	**HCB7019-E-T-P4S**
	145	24	36,5	27,5	2 600	13 000	20 000	1,5	1,5	15	1,32	**HS7019-C-T-P4S**
	145	24	81	52	3 600	13 000	20 000	1,5	1,5	15	1	**HCB7019-C-T-P4S**
	145	24	34	25	1 730	15 000	24 000	1,5	1,5	25	1,24	**HC7019-E-T-P4S**
	145	24	52	25	1 730	17 000	26 000	1,5	1,5	25	1,24	**XC7019-E-T-P4S**
	170	32	124	78	6 900	7 000	11 000	2,1	2,1	25	2,72	**B7219-E-T-P4S**
	170	32	130	81	7 300	8 000	13 000	2,1	2,1	15	2,73	**B7219-C-T-P4S**
	170	32	124	74	4 900	8 500	14 000	2,1	2,1	25	2,29	**HCB7219-E-T-P4S**
	170	32	130	78	5 200	10 000	17 000	2,1	2,1	15	2,3	**HCB7219-C-T-P4S**

medias ➤ *https://www.schaeffler.de/std/1DC9*

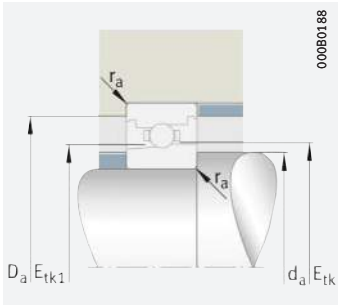
[1] The limiting speeds are based on elastically preloaded single bearings.

[2] Explanation of designations ➤ 🕮 *SP 1*.

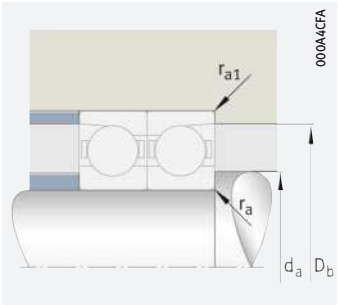
[3] The series 719 and 70 are also available with gap seals (type HSS, HCS, XCS or suffix 2RSD).
Ordering examples: B7000-C-2RSD-T-P4S-UL and HSS7000-E-T-P4S-UL.

[4] L = light preload; M = moderate preload; H = high preload.

[5] Minimal quantity oil lubrication.



Mounting dimensions

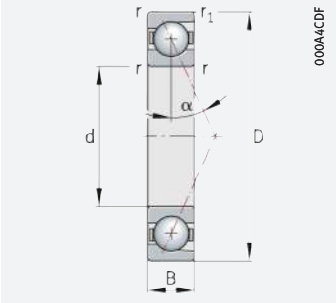


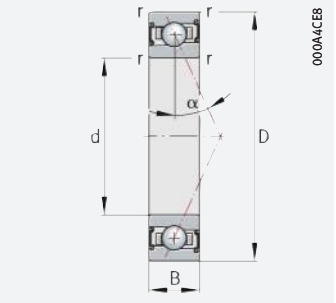
Mounting dimensions

	Mounting dimensions							Preload force[4] F_V			Lift-off force[4] K_{aE}			Axial rigidity[4] c_a		
d	d_a h12	D_a H12	r_a max.	r_{a1} max.	E_{tk} min.	E_{tk1} min.	E_{tk} E_{tk1} max.	L N	M N	H N	L N	M N	H N	L N/µm	M N/µm	H N/µm
95	102	124	0,6	0,6	105,9	105,9	109,2	341	1 262	2 693	988	3 777	8 313	196	319	434
	102	124	0,6	0,6	105,9	105,9	109,2	243	813	1 651	743	2 679	5 806	84,4	144	206
	102	124	0,6	0,6	108,2	105,6	109,7	131	393	787	377	1 153	2 347	150	223	290
	102	124	0,6	0,6	105,9	105,9	109,2	148	656	1 470	423	1 918	4 393	164	280	380
	102	124	0,6	0,6	108,2	105,6	109,7	82	246	492	244	766	1 593	60	93,7	127
	102	124	0,6	0,6	105,9	105,9	109,2	119	440	932	352	1 373	3 061	71,3	121	170
	102	124	0,6	0,6	108,2	105,6	109,7	92	276	552	263	801	1 623	150	221	285
	102	124	0,6	0,6	108,2	105,6	109,7	92	276	552	263	801	1 623	150	221	285
	105	136	1,5	0,6	110,5	110,5	115,8	671	2 295	4 780	1 955	6 904	14 849	233	372	502
	105	136	1,5	0,6	110,5	110,5	115,8	444	1 421	2 842	1 367	4 726	10 091	98,8	167	237
	105	136	1,5	0,6	114,3	110,7	116,8	204	612	1 225	588	1 797	3 663	168	249	324
	105	136	1,5	0,6	110,5	110,5	115,8	322	1 220	2 622	924	3 581	7 871	203	328	439
	105	136	1,5	0,6	114,3	110,7	116,8	127	382	764	380	1 192	2 480	67	105	143
	105	136	1,5	0,6	110,5	110,5	115,8	233	794	1 643	693	2 499	5 442	85,3	141	197
	105	136	1,5	0,6	114,3	110,7	116,8	141	423	845	404	1 227	2 488	167	246	317
	105	136	1,5	0,6	114,3	110,7	116,8	141	423	845	404	1 227	2 488	167	246	317
	110,5	154	2,1	1	119,1	119,1	126,9	1 184	3 876	7 964	3 454	11 693	24 820	273	429	577
	110,5	154	2,1	1	119,1	119,1	126,9	760	2 373	4 703	2 353	7 935	16 792	115	193	273
	110,5	154	2,1	1	119,1	119,1	126,9	605	2 113	4 437	1 741	6 219	13 355	242	381	507
	110,5	154	2,1	1	119,1	119,1	126,9	413	1 348	2 748	1 234	4 261	9 153	100	164	228

Super precision angular contact ball bearings

With large or small balls
Steel or ceramic balls
Steel or Cronidur rings
Open or sealed





d = 100 – 100 mm

Main dimensions			Basic load ratings		Fatigue limit load	Limiting speeds[1]		Dimensions		Contact angle	Mass	Designation[2] [3]
d	D	B	dyn. C_r	stat. C_{0r}	C_{ur}	n_G grease	n_G oil[5]	r	r_1	α	m	
			kN	kN	N	min^{-1}	min^{-1}	min.	min.	°	≈ kg	
100	140	20	57	42,5	3 950	8 500	13 000	1,1	1,1	25	0,78	**B71920-E-T-P4S**
	140	20	60	45	4 200	9 500	14 000	1,1	1,1	15	0,78	**B71920-C-T-P4S**
	140	20	27	22,1	2 080	12 000	18 000	1,1	1,1	25	0,86	**HS71920-E-T-P4S**
	140	20	57	40,5	2 800	12 000	18 000	1,1	1,1	25	0,65	**HCB71920-E-T-P4S**
	140	20	28,5	23,5	2 200	13 000	20 000	1,1	1,1	15	0,86	**HS71920-C-T-P4S**
	140	20	60	43	2 950	13 000	20 000	1,1	1,1	15	0,65	**HCB71920-C-T-P4S**
	140	20	27	21,2	1 470	15 000	24 000	1,1	1,1	25	0,81	**HC71920-E-T-P4S**
	140	20	41	21,2	1 470	17 000	26 000	1,1	1,1	25	0,81	**XC71920-E-T-P4S**
	150	24	79	55	5 000	8 000	13 000	1,5	1,5	25	1,24	**B7020-E-T-P4S**
	150	24	83	57	5 300	9 000	14 000	1,5	1,5	15	1,24	**B7020-C-T-P4S**
	150	24	34,5	27	2 490	11 000	17 000	1,5	1,5	25	1,38	**HS7020-E-T-P4S**
	150	24	79	52	3 550	11 000	17 000	1,5	1,5	25	1,03	**HCB7020-E-T-P4S**
	150	24	36,5	28,5	2 650	13 000	19 000	1,5	1,5	15	1,38	**HS7020-C-T-P4S**
	150	24	83	55	3 750	13 000	19 000	1,5	1,5	15	1,03	**HCB7020-C-T-P4S**
	150	24	34,5	26	1 760	15 000	22 000	1,5	1,5	25	1,29	**HC7020-E-T-P4S**
	150	24	53	26	1 760	16 000	24 000	1,5	1,5	25	1,29	**XC7020-E-T-P4S**
	180	34	129	84	7 300	6 700	10 000	2,1	2,1	25	3,34	**B7220-E-T-P4S**
	180	34	135	88	7 600	7 500	12 000	2,1	2,1	15	3,35	**B7220-C-T-P4S**
	180	34	129	80	5 100	8 000	13 000	2,1	2,1	25	2,88	**HCB7220-E-T-P4S**
	180	34	135	84	5 400	9 500	16 000	2,1	2,1	15	2,89	**HCB7220-C-T-P4S**

medias ➤ *https://www.schaeffler.de/std/1DCA*

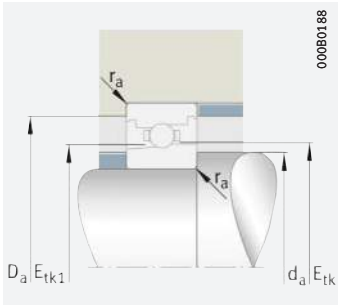
[1] The limiting speeds are based on elastically preloaded single bearings.

[2] Explanation of designations ➤ 🕮 *SP 1*.

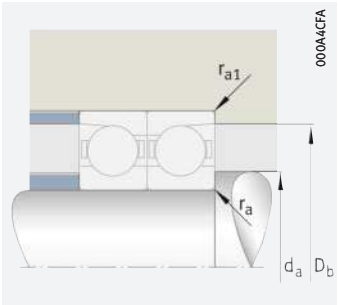
[3] The series 719 and 70 are also available with gap seals (type HSS, HCS, XCS or suffix 2RSD). Ordering examples: B7000-C-2RSD-T-P4S-UL and HSS7000-E-T-P4S-UL.

[4] L = light preload; M = moderate preload; H = high preload.

[5] Minimal quantity oil lubrication.



Mounting dimensions

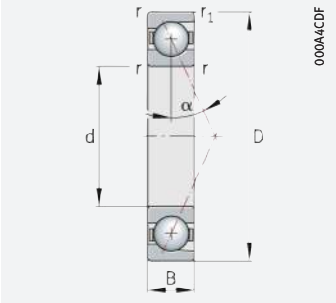


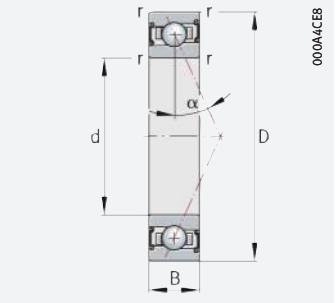
Mounting dimensions

	Mounting dimensions							Preload force[4] F_V			Lift-off force[4] K_{aE}			Axial rigidity[4] c_a		
d	d_a h12	D_a H12	r_a	r_{a1}	E_{tk}	E_{tk1}	E_{tk} E_{tk1}	L	M	H	L	M	H	L	M	H
			max.	max.	min.	min.	max.	N	N	N	N	N	N	N/µm	N/µm	N/µm
100	107	133	0,6	0,6	113,4	113,4	117,5	450	1 616	3 417	1 305	4 839	10 556	219	353	479
	107	133	0,6	0,6	113,4	113,4	117,5	316	1 040	2 101	968	3 432	7 399	94,1	160	228
	107	133	0,6	0,6	115,2	112,3	116,9	158	474	949	455	1 390	2 832	163	242	314
	107	133	0,6	0,6	113,4	113,4	117,5	204	850	1 876	584	2 489	5 611	187	311	421
	107	133	0,6	0,6	115,2	112,3	116,9	97	291	583	289	906	1 883	64,6	101	137
	107	133	0,6	0,6	113,4	113,4	117,5	160	572	1 201	473	1 789	3 950	80,4	135	189
	107	133	0,6	0,6	115,2	112,3	116,9	109	328	656	313	951	1 927	162	239	307
	107	133	0,6	0,6	115,2	112,3	116,9	109	328	656	313	951	1 927	162	239	307
	110	141	1,5	0,6	115,5	115,5	120,8	681	2 336	4 869	1 982	7 018	15 103	242	385	521
	110	141	1,5	0,6	115,5	115,5	120,8	464	1 484	2 970	1 427	4 935	10 539	104	175	248
	110	141	1,5	0,6	119,3	115,7	121,8	207	621	1 242	596	1 822	3 713	172	256	333
	110	141	1,5	0,6	115,5	115,5	120,8	333	1 266	2 723	957	3 715	8 170	212	343	459
	110	141	1,5	0,6	119,3	115,7	121,8	127	382	764	379	1 190	2 476	68,3	107	145
	110	141	1,5	0,6	115,5	115,5	120,8	241	823	1 703	717	2 587	5 636	89,1	148	206
	110	141	1,5	0,6	119,3	115,7	121,8	144	431	863	412	1 252	2 539	171	253	326
	110	141	1,5	0,6	119,3	115,7	121,8	144	431	863	412	1 252	2 539	171	253	326
	114,5	165,5	2,1	1	126,6	126,6	134,4	1 208	3 964	8 152	3 521	11 940	25 355	285	449	604
	114,5	165,5	2,1	1	126,6	126,6	134,4	789	2 466	4 892	2 439	8 230	17 428	121	203	287
	114,5	165,5	2,1	1	126,6	126,6	134,4	627	2 198	4 619	1 806	6 466	13 894	255	402	535
	114,5	165,5	2,1	1	126,6	126,6	134,4	428	1 400	2 856	1 279	4 420	9 498	106	172	240

Super precision angular contact ball bearings

With large or small balls
Steel or ceramic balls
Steel or Cronidur rings
Open or sealed





d = 105 – 105 mm

Main dimensions			Basic load ratings		Fatigue limit load	Limiting speeds[1]		Dimensions		Contact angle	Mass	Designation[2] [3]
d	D	B	dyn. C_r	stat. C_{0r}	C_{ur}	n_G grease	n_G oil[5]	r	r_1	α	m	
			kN	kN	N	min^{-1}	min^{-1}	min.	min.	°	≈ kg	
105	145	20	57	42,5	3 900	8 000	13 000	1,1	1,1	25	0,81	**B71921-E-T-P4S**
	145	20	60	45	4 150	9 000	14 000	1,1	1,1	15	0,81	**B71921-C-T-P4S**
	145	20	27,5	23,4	2 150	11 000	17 000	1,1	1,1	25	0,89	**HS71921-E-T-P4S**
	145	20	57	41	2 800	11 000	17 000	1,1	1,1	25	0,69	**HCB71921-E-T-P4S**
	145	20	29	24,8	2 280	13 000	19 000	1,1	1,1	15	0,89	**HS71921-C-T-P4S**
	145	20	60	43	2 950	13 000	19 000	1,1	1,1	15	0,69	**HCB71921-C-T-P4S**
	145	20	27,5	22,4	1 530	15 000	22 000	1,1	1,1	25	0,83	**HC71921-E-T-P4S**
	145	20	42	22,4	1 530	16 000	24 000	1,1	1,1	25	0,83	**XC71921-E-T-P4S**
	160	26	80	58	5 200	7 500	12 000	2	2	25	1,6	**B7021-E-T-P4S**
	160	26	85	61	5 400	8 500	13 000	2	2	15	1,6	**B7021-C-T-P4S**
	160	26	45	34,5	3 050	11 000	16 000	2	2	25	1,7	**HS7021-E-T-P4S**
	160	26	80	55	3 650	11 000	16 000	2	2	25	1,39	**HCB7021-E-T-P4S**
	160	26	47,5	36,5	3 250	12 000	18 000	2	2	15	1,7	**HS7021-C-T-P4S**
	160	26	85	58	3 850	12 000	18 000	2	2	15	1,39	**HCB7021-C-T-P4S**
	160	26	45	33	2 180	14 000	22 000	2	2	25	1,59	**HC7021-E-T-P4S**
	160	26	69	33	2 180	15 000	24 000	2	2	25	1,59	**XC7021-E-T-P4S**
	190	36	156	99	8 400	6 300	9 500	2,1	2,1	25	3,88	**B7221-E-T-P4S**
	190	36	164	104	8 800	7 000	11 000	2,1	2,1	15	3,89	**B7221-C-T-P4S**
	190	36	156	95	5 900	7 500	12 000	2,1	2,1	25	3,25	**HCB7221-E-T-P4S**
	190	36	164	99	6 200	9 000	15 000	2,1	2,1	15	3,26	**HCB7221-C-T-P4S**

medias ➤ *https://www.schaeffler.de/std/1D66*

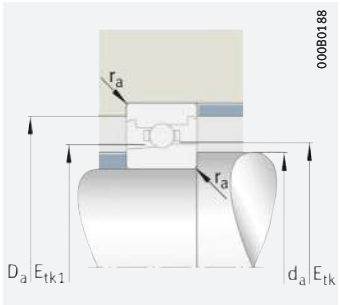
[1] The limiting speeds are based on elastically preloaded single bearings.

[2] Explanation of designations ➤ 🕮 *SP 1*.

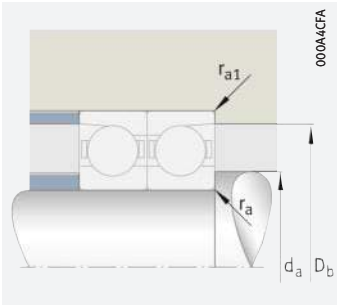
[3] The series 719 and 70 are also available with gap seals (type HSS, HCS, XCS or suffix 2RSD). Ordering examples: B7000-C-2RSD-T-P4S-UL and HSS7000-E-T-P4S-UL.

[4] L = light preload; M = moderate preload; H = high preload.

[5] Minimal quantity oil lubrication.



Mounting dimensions

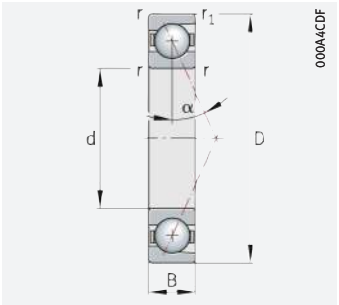


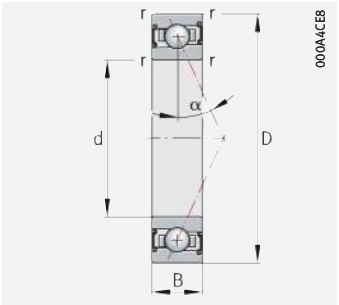
Mounting dimensions

	Mounting dimensions							Preload force[4] F_V			Lift-off force[4] K_{aE}			Axial rigidity[4] c_a		
d	d_a h12	D_a H12	r_a	r_{a1}	E_{tk}	E_{tk1}	E_{tk} E_{tk1}	L	M	H	L	M	H	L	M	H
			max.	max.	min.	min.	max.	N	N	N	N	N	N	N/µm	N/µm	N/µm
105	112	138	0,6	0,6	117,4	117,4	121,4	450	1 616	3 417	1 305	4 839	10 556	219	353	479
	112	138	0,6	0,6	117,4	117,4	121,4	316	1 040	2 101	968	3 432	7 399	94,1	160	228
	112	138	0,6	0,6	120,2	117,3	121,9	161	483	966	463	1 414	2 880	170	252	327
	112	138	0,6	0,6	117,4	117,4	121,4	204	850	1 876	584	2 489	5 611	187	311	421
	112	138	0,6	0,6	120,2	117,3	121,9	101	302	603	299	937	1 946	67,6	105	143
	112	138	0,6	0,6	117,4	117,4	121,4	157	564	1 185	466	1 763	3 895	80	134	188
	112	138	0,6	0,6	120,2	117,3	121,9	113	338	676	323	980	1 987	170	250	321
	112	138	0,6	0,6	120,2	117,3	121,9	113	338	676	323	980	1 987	170	250	321
	116	150	2	1	123	123	128,3	691	2 377	4 959	2 010	7 133	15 359	251	399	539
	116	150	2	1	123	123	128,3	471	1 511	3 027	1 447	5 010	10 710	107	181	257
	116	150	2	1	125,8	121,7	129	267	802	1 604	770	2 354	4 797	189	281	365
	116	150	2	1	123	123	128,3	336	1 285	2 768	966	3 768	8 297	219	355	476
	116	150	2	1	125,8	121,7	129	164	492	985	489	1 536	3 194	75	117	160
	116	150	2	1	123	123	128,3	244	836	1 732	725	2 623	5 718	92,1	153	213
	116	150	2	1	125,8	121,7	129	184	552	1 104	527	1 602	3 250	188	277	357
	116	150	2	1	125,8	121,7	129	184	552	1 104	527	1 602	3 250	188	277	357
	120,5	174,5	2,1	1	132,2	132,2	141,2	1 545	5 006	10 249	4 508	15 092	31 918	312	488	656
	120,5	174,5	2,1	1	132,2	132,2	141,2	989	3 069	6 072	3 060	10 252	21 655	131	219	311
	120,5	174,5	2,1	1	132,2	132,2	141,2	800	2 742	5 723	2 303	8 067	17 220	278	434	577
	120,5	174,5	2,1	1	132,2	132,2	141,2	536	1 733	3 524	1 603	5 476	11 721	114	186	258

Super precision angular contact ball bearings

With large or small balls
Steel or ceramic balls
Steel or Cronidur rings
Open or sealed





d = 110 – 110 mm

Main dimensions			Basic load ratings		Fatigue limit load	Limiting speeds[1]		Dimensions		Contact angle	Mass	Designation[2] [3]
d	D	B	dyn. C_r	stat. C_{0r}	C_{ur}	n_G grease	n_G oil[5]	r	r_1	α	m	
			kN	kN	N	min^{-1}	min^{-1}	min.	min.	°	≈ kg	
110	150	20	58	44,5	4 000	8 000	12 000	1,1	1,1	25	0,85	**B71922-E-T-P4S**
	150	20	61	47	4 250	8 500	13 000	1,1	1,1	15	0,85	**B71922-C-T-P4S**
	150	20	32	27	2 430	11 000	17 000	1,1	1,1	25	0,91	**HS71922-E-T-P4S**
	150	20	58	42,5	2 850	11 000	17 000	1,1	1,1	25	0,71	**HCB71922-E-T-P4S**
	150	20	34	28,5	2 550	12 000	19 000	1,1	1,1	15	0,91	**HS71922-C-T-P4S**
	150	20	61	45	3 000	12 000	19 000	1,1	1,1	15	0,71	**HCB71922-C-T-P4S**
	150	20	32	26	1 720	14 000	22 000	1,1	1,1	25	0,84	**HC71922-E-T-P4S**
	150	20	49	26	1 720	16 000	24 000	1,1	1,1	25	0,84	**XC71922-E-T-P4S**
	170	28	106	73	6 400	7 500	12 000	2	2	25	1,95	**B7022-E-T-P4S**
	170	28	112	77	6 700	8 000	12 000	2	2	15	1,95	**B7022-C-T-P4S**
	170	28	45,5	35,5	3 100	11 000	16 000	2	2	25	2,17	**HS7022-E-T-P4S**
	170	28	106	70	4 500	11 000	16 000	2	2	25	1,62	**HCB7022-E-T-P4S**
	170	28	48	38	3 300	12 000	18 000	2	2	15	2,17	**HS7022-C-T-P4S**
	170	28	112	74	4 750	12 000	18 000	2	2	15	1,62	**HCB7022-C-T-P4S**
	170	28	45,5	34	2 200	13 000	20 000	2	2	25	2,05	**HC7022-E-T-P4S**
	170	28	69	34	2 200	14 000	22 000	2	2	25	2,05	**XC7022-E-T-P4S**
	200	38	156	100	8 300	6 000	9 000	2,1	2,1	25	4,59	**B7222-E-T-P4S**
	200	38	164	105	8 700	6 700	10 000	2,1	2,1	15	4,6	**B7222-C-T-P4S**
	200	38	156	96	5 900	7 000	10 000	2,1	2,1	25	3,96	**HCB7222-E-T-P4S**
	200	38	164	101	6 200	8 500	14 000	2,1	2,1	15	3,97	**HCB7222-C-T-P4S**

medias ➤ *https://www.schaeffler.de/std/1D67*

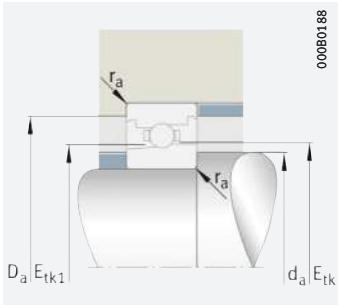
[1] The limiting speeds are based on elastically preloaded single bearings.

[2] Explanation of designations ➤ 🕮 *SP 1*.

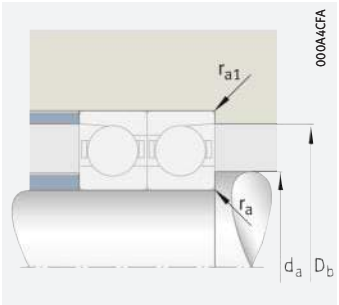
[3] The series 719 and 70 are also available with gap seals (type HSS, HCS, XCS or suffix 2RSD). Ordering examples: B7000-C-2RSD-T-P4S-UL and HSS7000-E-T-P4S-UL.

[4] L = light preload; M = moderate preload; H = high preload.

[5] Minimal quantity oil lubrication.



Mounting dimensions

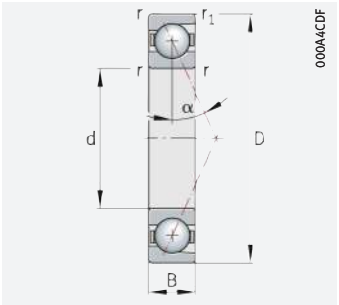


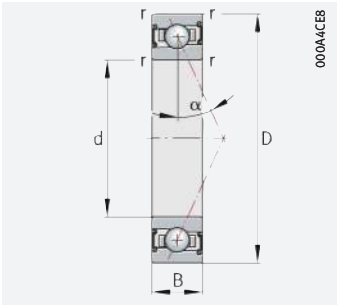
Mounting dimensions

	Mounting dimensions							Preload force[4] F_V			Lift-off force[4] K_{aE}			Axial rigidity[4] c_a		
d	d_a h12	D_a H12	r_a	r_{a1}	E_{tk}	E_{tk1}	E_{tk} E_{tk1}	L	M	H	L	M	H	L	M	H
			max.	max.	min.	min.	max.	N	N	N	N	N	N	N/µm	N/µm	N/µm
110	117	143	0,6	0,6	122,4	122,4	126,4	455	1 642	3 475	1 321	4 913	10 722	225	364	493
	117	143	0,6	0,6	122,4	122,4	126,4	314	1 038	2 102	961	3 415	7 373	96,1	163	232
	117	143	0,6	0,6	124,8	121,5	126,9	187	561	1 121	538	1 642	3 344	178	264	343
	117	143	0,6	0,6	122,4	122,4	126,4	208	871	1 923	596	2 547	5 747	193	322	435
	117	143	0,6	0,6	124,8	121,5	126,9	116	347	693	344	1 077	2 238	70,6	110	149
	117	143	0,6	0,6	122,4	122,4	126,4	158	570	1 199	468	1 777	3 931	82,1	138	193
	117	143	0,6	0,6	124,8	121,5	126,9	131	393	787	375	1 141	2 312	178	262	337
	117	143	0,6	0,6	124,8	121,5	126,9	131	393	787	375	1 141	2 312	178	262	337
	121	159	2	1	128,6	128,6	135,1	968	3 242	6 709	2 820	9 745	20 814	280	443	596
	121	159	2	1	128,6	128,6	135,1	643	2 033	4 052	1 981	6 757	14 370	119	200	283
	121	159	2	1	133,3	129,2	136,5	267	802	1 604	770	2 352	4 792	193	287	373
	121	159	2	1	128,6	128,6	135,1	490	1 779	3 778	1 409	5 224	11 341	248	395	527
	121	159	2	1	133,3	129,2	136,5	168	503	1 005	499	1 566	3 257	77,2	121	164
	121	159	2	1	128,6	128,6	135,1	337	1 126	2 314	1 004	3 540	7 655	103	169	234
	121	159	2	1	133,3	129,2	136,5	187	561	1 121	535	1 627	3 299	193	284	366
	121	159	2	1	133,3	129,2	136,5	187	561	1 121	535	1 627	3 299	193	284	366
	126,5	183,5	2,1	1	139,7	139,7	148,7	1 512	4 905	10 048	4 410	14 777	31 257	309	484	650
	126,5	183,5	2,1	1	139,7	139,7	148,7	989	3 069	6 072	3 060	10 252	21 655	131	219	311
	126,5	183,5	2,1	1	139,7	139,7	148,7	800	2 742	5 723	2 303	8 067	17 220	278	434	577
	126,5	183,5	2,1	1	139,7	139,7	148,7	536	1 733	3 524	1 603	5 476	11 721	114	186	258

Super precision angular contact ball bearings

With large or small balls
Steel or ceramic balls
Steel or Cronidur rings
Open or sealed





d = 120 – 120 mm

Main dimensions			Basic load ratings		Fatigue limit load	Limiting speeds[1]		Dimensions		Contact angle	Mass	Designation[2] [3]
d	D	B	dyn. C_r	stat. C_{0r}	C_{ur}	n_G grease	n_G oil[5]	r	r_1	α	m	
			kN	kN	N	min^{-1}	min^{-1}	min.	min.	°	≈ kg	
120	165	22	72	56	4 850	7 000	11 000	1,1	1,1	25	1,16	**B71924-E-T-P4S**
	165	22	76	59	5 100	8 000	12 000	1,1	1,1	15	1,16	**B71924-C-T-P4S**
	165	22	33,5	30	2 600	10 000	15 000	1,1	1,1	25	1,29	**HS71924-E-T-P4S**
	165	22	72	54	3 450	10 000	15 000	1,1	1,1	25	0,97	**HCB71924-E-T-P4S**
	165	22	35,5	32	2 750	11 000	17 000	1,1	1,1	15	1,29	**HS71924-C-T-P4S**
	165	22	76	57	3 600	11 000	17 000	1,1	1,1	15	0,97	**HCB71924-C-T-P4S**
	165	22	33,5	29	1 830	13 000	20 000	1,1	1,1	25	1,21	**HC71924-E-T-P4S**
	165	22	51	29	1 830	14 000	22 000	1,1	1,1	25	1,21	**XC71924-E-T-P4S**
	180	28	109	78	6 500	6 700	10 000	2	2	25	2,07	**B7024-E-T-P4S**
	180	28	115	82	6 900	7 500	12 000	2	2	15	2,08	**B7024-C-T-P4S**
	180	28	46,5	38,5	3 200	9 500	14 000	2	2	25	2,32	**HS7024-E-T-P4S**
	180	28	109	75	4 650	9 500	14 000	2	2	25	1,73	**HCB7024-E-T-P4S**
	180	28	49,5	40,5	3 400	10 000	16 000	2	2	15	2,33	**HS7024-C-T-P4S**
	180	28	115	78	4 900	10 000	16 000	2	2	15	1,74	**HCB7024-C-T-P4S**
	180	28	46,5	36,5	2 280	12 000	19 000	2	2	25	2,2	**HC7024-E-T-P4S**
	180	28	71	36,5	2 280	13 000	20 000	2	2	25	2,2	**XC7024-E-T-P4S**
	215	40	196	132	10 500	5 300	8 000	2,1	2,1	25	5,28	**B7224-E-T-P4S**
	215	40	205	138	11 000	6 000	9 000	2,1	2,1	15	5,3	**B7224-C-T-P4S**
	215	40	196	126	7 400	6 700	9 500	2,1	2,1	25	4,18	**HCB7224-E-T-P4S**
	215	40	205	132	7 800	7 500	12 000	2,1	2,1	15	4,2	**HCB7224-C-T-P4S**

medias ➤ *https://www.schaeffler.de/std/1D68*

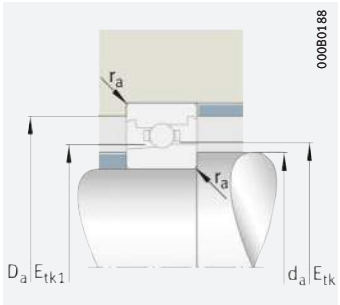
[1] The limiting speeds are based on elastically preloaded single bearings.

[2] Explanation of designations ➤ 🕮 *SP 1*.

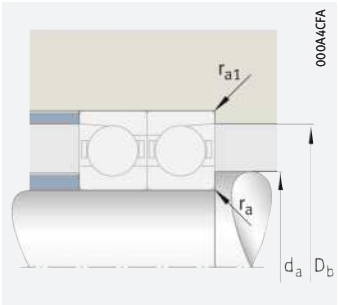
[3] The series 719 and 70 are also available with gap seals (type HSS, HCS, XCS or suffix 2RSD). Ordering examples: B7000-C-2RSD-T-P4S-UL and HSS7000-E-T-P4S-UL.

[4] L = light preload; M = moderate preload; H = high preload.

[5] Minimal quantity oil lubrication.



Mounting dimensions

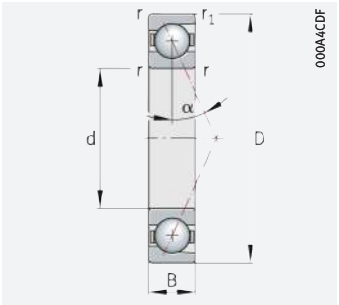


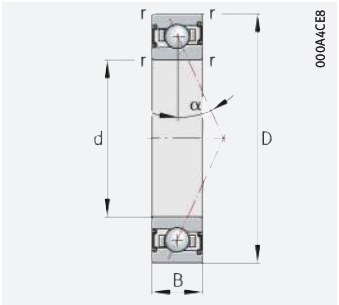
Mounting dimensions

	Mounting dimensions							Preload force[4] F_V			Lift-off force[4] K_{aE}			Axial rigidity[4] c_a		
d	d_a h12	D_a H12	r_a	r_{a1}	E_{tk}	E_{tk1}	E_{tk} E_{tk1}	L	M	H	L	M	H	L	M	H
			max.	max.	min.	min.	max.	N	N	N	N	N	N	N/µm	N/µm	N/µm
120	128	157	0,6	0,6	134	134	138,5	587	2 073	4 361	1 705	6 203	13 450	255	409	553
	128	157	0,6	0,6	134	134	138,5	405	1 321	2 665	1 239	4 349	9 350	109	184	261
	128	157	0,6	0,6	137,3	134	139,2	196	587	1 173	562	1 716	3 492	193	286	371
	128	157	0,6	0,6	134	134	138,5	274	1 101	2 407	785	3 223	7 191	220	362	487
	128	157	0,6	0,6	137,3	134	139,2	122	367	734	363	1 137	2 362	76,8	119	162
	128	157	0,6	0,6	134	134	138,5	208	732	1 530	616	2 286	5 019	93,7	156	218
	128	157	0,6	0,6	137,3	134	139,2	136	407	814	388	1 179	2 389	192	283	364
	128	157	0,6	0,6	137,3	134	139,2	136	407	814	388	1 179	2 389	192	283	364
	131	169	2	1	138,6	138,6	145,1	983	3 298	6 830	2 860	9 902	21 158	290	459	618
	131	169	2	1	138,6	138,6	145,1	653	2 069	4 129	2 008	6 858	14 599	123	206	293
	131	169	2	1	143,3	139,2	146,4	276	828	1 656	795	2 426	4 942	203	302	392
	131	169	2	1	138,6	138,6	145,1	496	1 810	3 849	1 427	5 313	11 543	257	410	547
	131	169	2	1	143,3	139,2	146,4	171	513	1 025	508	1 594	3 313	80,8	126	171
	131	169	2	1	138,6	138,6	145,1	350	1 170	2 406	1 042	3 677	7 953	107	176	245
	131	169	2	1	143,3	139,2	146,4	193	578	1 156	552	1 676	3 398	203	299	385
	131	169	2	1	143,3	139,2	146,4	193	578	1 156	552	1 676	3 398	203	299	385
	140	195	2,1	1	148,4	148,4	159,7	1 989	6 365	12 984	5 797	19 139	40 275	333	518	694
	140	195	2,1	1	148,4	148,4	159,7	1 259	3 882	7 683	3 878	12 884	27 179	139	231	326
	140	195	2,1	1	148,4	148,4	159,7	1 055	3 535	7 327	3 037	10 386	21 994	300	465	615
	140	195	2,1	1	148,4	148,4	159,7	688	2 196	4 452	2 051	6 906	14 713	122	197	272

Super precision angular contact ball bearings

With large or small balls
Steel or ceramic balls
Steel or Cronidur rings
Open or sealed





d = 130 – 130 mm

Main dimensions			Basic load ratings		Fatigue limit load	Limiting speeds[1]		Dimensions		Contact angle	Mass	Designation[2] [3]
d	D	B	dyn. C_r	stat. C_{0r}	C_{ur}	n_G grease	n_G oil[5]	r	r_1	α	m	
			kN	kN	N	min^{-1}	min^{-1}	min.	min.	°	≈ kg	
130	180	24	85	67	5 500	6 700	10 000	1,5	1,5	25	1,52	**B71926-E-T-P4S**
	180	24	90	71	5 900	7 000	11 000	1,5	1,5	15	1,52	**B71926-C-T-P4S**
	180	24	38,5	34,5	2 850	9 000	14 000	1,5	1,5	25	1,71	**HS71926-E-T-P4S**
	180	24	85	64	3 950	9 000	14 000	1,5	1,5	25	1,34	**HCB71926-E-T-P4S**
	180	24	40,5	36,5	3 000	10 000	16 000	1,5	1,5	15	1,71	**HS71926-C-T-P4S**
	180	24	90	68	4 150	10 000	15 000	1,5	1,5	15	1,34	**HCB71926-C-T-P4S**
	180	24	38,5	33	2 010	12 000	18 000	1,5	1,5	25	1,61	**HC71926-E-T-P4S**
	180	24	59	33	2 010	13 000	20 000	1,5	1,5	25	1,61	**XC71926-E-T-P4S**
	200	33	60	48	2 850	11 000	17 000	2	2	25	3,36	**HC7026-E-T-P4S**
	200	33	92	48	2 850	12 000	19 000	2	2	25	3,36	**XC7026-E-T-P4S**
	200	33	141	102	8 100	6 000	9 500	2	2	25	3,15	**B7026-E-T-P4S**
	200	33	149	107	8 600	6 700	10 000	2	2	15	3,16	**B7026-C-T-P4S**
	200	33	60	50	4 000	8 500	13 000	2	2	25	3,51	**HS7026-E-T-P4S**
	200	33	141	97	5 800	8 500	13 000	2	2	25	2,61	**HCB7026-E-T-P4S**
	200	33	64	53	4 250	9 500	15 000	2	2	15	3,52	**HS7026-C-T-P4S**
	200	33	149	102	6 100	9 500	14 000	2	2	15	2,63	**HCB7026-C-T-P4S**
	230	40	205	144	11 000	5 000	7 500	3	3	25	6,09	**B7226-E-T-P4S**
	230	40	215	151	11 600	5 600	8 500	3	3	15	6,11	**B7226-C-T-P4S**
	230	40	205	138	7 800	6 000	9 000	3	3	25	4,92	**HCB7226-E-T-P4S**
	230	40	215	144	8 200	7 000	11 000	3	3	15	4,94	**HCB7226-C-T-P4S**

medias ➤ *https://www.schaeffler.de/std/1D69*

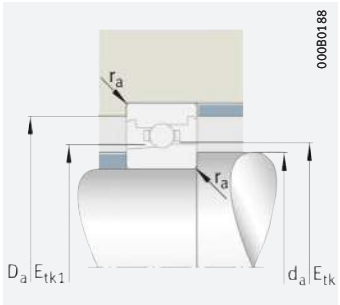
[1] The limiting speeds are based on elastically preloaded single bearings.

[2] Explanation of designations ➤ 🕮 *SP 1*.

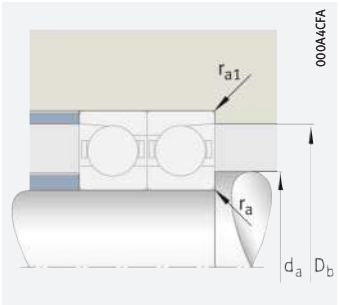
[3] The series 719 and 70 are also available with gap seals (type HSS, HCS, XCS or suffix 2RSD). Ordering examples: B7000-C-2RSD-T-P4S-UL and HSS7000-E-T-P4S-UL.

[4] L = light preload; M = moderate preload; H = high preload.

[5] Minimal quantity oil lubrication.



Mounting dimensions

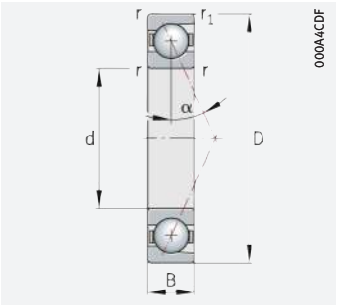


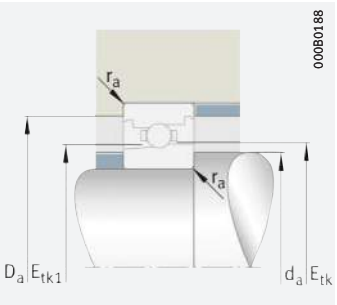
Mounting dimensions

	Mounting dimensions							Preload force[4] F_V			Lift-off force[4] K_{aE}			Axial rigidity[4] c_a		
d	d_a h12	D_a H12	r_a	r_{a1}	E_{tk}	E_{tk1}	E_{tk} E_{tk1}	L	M	H	L	M	H	L	M	H
			max.	max.	min.	min.	max.	N	N	N	N	N	N	N/µm	N/µm	N/µm
130	139	171	0,6	0,6	145,5	145,5	150,7	711	2 466	5 161	2 064	7 379	15 916	275	438	590
	139	171	0,6	0,6	145,5	145,5	150,7	486	1 571	3 160	1 488	5 171	11 084	117	197	279
	139	171	0,6	0,6	149,3	145,8	151,4	224	673	1 346	645	1 968	4 004	205	303	393
	139	171	0,6	0,6	145,5	145,5	150,7	346	1 342	2 904	993	3 929	8 680	240	391	524
	139	171	0,6	0,6	149,3	145,8	151,4	139	417	834	413	1 291	2 682	81,1	126	171
	139	171	0,6	0,6	145,5	145,5	150,7	253	875	1 819	750	2 732	5 967	101	167	233
	139	171	0,6	0,6	149,3	145,8	151,4	155	466	932	444	1 349	2 732	204	300	385
	139	171	0,6	0,6	149,3	145,8	151,4	155	466	932	444	1 349	2 732	204	300	385
	142	189	2	1	157,4	152,6	161,2	244	733	1 466	700	2 126	4 308	230	338	435
	142	189	2	1	157,4	152,6	161,2	244	733	1 466	700	2 126	4 308	230	338	435
	142	189	2	1	151,6	151,6	159,3	1 312	4 328	8 915	3 820	13 001	27 627	326	512	689
	142	189	2	1	151,6	151,6	159,3	850	2 669	5 314	2 616	8 846	18 773	137	229	324
	142	189	2	1	157,4	152,6	161,2	357	1 070	2 139	1 026	3 133	6 381	231	344	446
	142	189	2	1	151,6	151,6	159,3	679	2 399	5 054	1 953	7 044	15 161	291	459	611
	142	189	2	1	157,4	152,6	161,2	219	658	1 317	653	2 046	4 251	91,8	143	194
	142	189	2	1	151,6	151,6	159,3	464	1 524	3 119	1 381	4 791	10 306	120	196	272
	148	211,5	2,5	1	160,9	160,9	172	2 065	6 617	13 506	6 015	19 876	41 831	353	549	735
	148	211,5	2,5	1	160,9	160,9	172	1 306	4 034	7 993	4 018	13 354	28 189	147	244	344
	148	211,5	2,5	1	160,9	160,9	172	1 098	3 687	7 648	3 160	10 826	22 934	318	493	652
	148	211,5	2,5	1	160,9	160,9	172	716	2 288	4 642	2 132	7 184	15 307	129	208	288

Super precision angular contact ball bearings

With large or small balls
Steel or ceramic balls
Steel or Cronidur rings
Open or sealed





Mounting dimensions

d = 140 – 150 mm

Main dimensions			Basic load ratings		Fatigue limit load	Limiting speeds[1]		Dimensions		Contact angle	Mass	Designation[2]
d	D	B	dyn. C_r	stat. C_{0r}	C_{ur}	n_G grease	n_G oil[4]	r	r_1	α	m	
			kN	kN	N	min^{-1}	min^{-1}	min.	min.	°	≈ kg	
140	190	24	89	73	5 900	6 000	9 500	1,5	1,5	25	1,62	**B71928-E-T-P4S**[5]
	190	24	94	77	6 200	6 700	10 000	1,5	1,5	15	1,62	**B71928-C-T-P4S**[5]
	190	24	89	70	4 150	8 500	13 000	1,5	1,5	25	1,42	**HCB71928-E-T-P4S**[5]
	190	24	94	74	4 400	9 500	14 000	1,5	1,5	15	1,42	**HCB71928-C-T-P4S**[5]
	210	33	145	108	8 400	5 600	9 000	2	2	25	3,34	**B7028-E-T-P4S**[5]
	210	33	153	114	8 800	6 300	10 000	2	2	15	3,35	**B7028-C-T-P4S**[5]
	210	33	145	103	5 900	8 000	12 000	2	2	25	2,78	**HCB7028-E-T-P4S**[5]
	210	33	153	109	6 300	9 000	14 000	2	2	15	2,79	**HCB7028-C-T-P4S**[5]
	250	42	213	157	11 500	4 500	6 700	3	3	25	7,86	**B7228-E-T-P4S**
	250	42	224	164	12 100	5 000	7 500	3	3	15	7,88	**B7228-C-T-P4S**
	250	42	213	150	8 200	5 300	8 000	3	3	25	6,6	**HCB7228-E-T-P4S**
	250	42	224	157	8 600	6 300	9 500	3	3	15	6,62	**HCB7228-C-T-P4S**
150	210	28	119	95	7 300	5 600	8 500	2	1	25	2,49	**B71930-E-T-P4S**
	210	28	125	101	7 700	6 300	9 500	2	1	15	2,49	**B71930-C-T-P4S**
	210	28	119	91	5 200	7 500	12 000	2	1	25	2,09	**HCB71930-E-T-P4S**
	210	28	125	96	5 500	8 500	13 000	2	1	15	2,09	**HCB71930-C-T-P4S**
	225	35	178	130	9 800	5 300	8 000	2,1	2,1	25	4,03	**B7030-E-T-P4S**
	225	35	187	137	10 300	6 000	9 000	2,1	2,1	15	4,04	**B7030-C-T-P4S**
	225	35	178	125	6 900	7 500	11 000	2,1	2,1	25	3,24	**HCB7030-E-T-P4S**
	225	35	187	131	7 300	8 000	13 000	2,1	2,1	15	3,25	**HCB7030-C-T-P4S**
	270	45	221	169	12 000	4 000	6 000	3	3	25	10,1	**B7230-E-T-P4S**
	270	45	232	178	12 600	4 500	6 700	3	3	15	10,1	**B7230-C-T-P4S**
	270	45	221	162	8 500	5 000	7 500	3	3	25	8,79	**HCB7230-E-T-P4S**
	270	45	232	170	8 900	6 000	8 500	3	3	15	8,82	**HCB7230-C-T-P4S**

medias ➤ *https://www.schaeffler.de/std/1D6A*

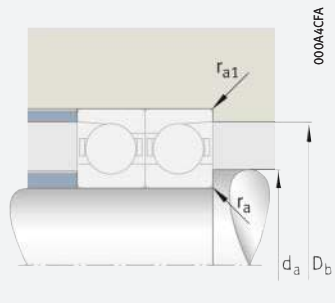
1) The limiting speeds are based on elastically preloaded single bearings.

2) Explanation of designations ➤ 🕮 *SP 1*.

3) L = light preload; M = moderate preload; H = high preload.

4) Minimal quantity oil lubrication.

5) The series 719 and 70 are also available with gap seals (type HSS, HCS, XCS or suffix 2RSD).
Ordering examples: B7000-C-2RSD-T-P4S-UL and HSS7000-E-T-P4S-UL.

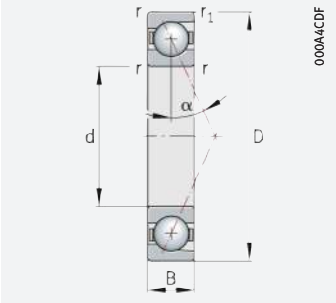


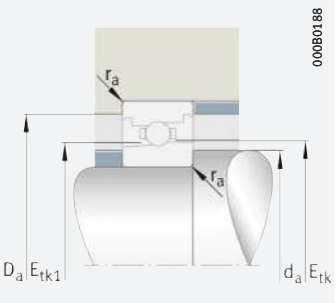
Mounting dimensions

	Mounting dimensions							Preload force[3] F_V			Lift-off force[3] K_{aE}			Axial rigidity[3] c_a		
d	d_a h12	D_a H12	r_a	r_{a1}	E_{tk}	E_{tk1}	E_{tk} E_{tk1}	L	M	H	L	M	H	L	M	H
			max.	max.	min.	min.	max.	N	N	N	N	N	N	N/µm	N/µm	N/µm
140	149	181	0,6	0,6	155,5	155,5	160,6	736	2 564	5 373	2 136	7 663	16 542	292	466	628
	149	181	0,6	0,6	155,5	155,5	160,6	504	1 632	3 289	1 539	5 357	11 496	124	208	295
	149	181	0,6	0,6	155,5	155,5	160,6	348	1 367	2 967	999	3 997	8 852	253	413	554
	149	181	0,6	0,6	155,5	155,5	160,6	259	901	1 876	767	2 806	6 135	107	177	246
	152	199	2	1	161,6	161,6	169,2	1 336	4 416	9 103	3 888	13 252	28 168	339	532	714
	152	199	2	1	161,6	161,6	169,2	866	2 724	5 429	2 661	9 007	19 129	142	237	335
	152	199	2	1	161,6	161,6	169,2	685	2 429	5 123	1 968	7 126	15 352	302	476	633
	152	199	2	1	161,6	161,6	169,2	471	1 553	3 179	1 402	4 871	10 483	125	203	282
	163	226,5	2,5	2,5	175,9	175,9	187	2 141	6 870	14 029	6 233	20 615	43 390	373	579	775
	163	226,5	2,5	2,5	175,9	175,9	187	1 353	4 185	8 302	4 158	13 825	29 200	155	257	362
	163	226,5	2,5	2,5	175,9	175,9	187	1 141	3 839	7 968	3 284	11 267	23 876	336	521	689
	163	226,5	2,5	2,5	175,9	175,9	187	749	2 397	4 864	2 230	7 516	16 017	137	220	304
150	160	199	1	1	168,6	168,6	174,9	1 040	3 522	7 317	3 021	10 536	22 549	331	524	704
	160	199	1	1	168,6	168,6	174,9	706	2 249	4 507	2 161	7 402	15 795	141	235	333
	160	199	1	1	168,6	168,6	174,9	527	1 950	4 164	1 513	5 709	12 445	294	470	627
	160	199	1	1	168,6	168,6	174,9	376	1 268	2 617	1 117	3 963	8 587	123	201	279
	163	213	2,1	1	172,2	172,2	181	1 691	5 520	11 332	4 923	16 566	35 067	371	580	778
	163	213	2,1	1	172,2	172,2	181	1 104	3 443	6 843	3 394	11 397	24 140	156	260	367
	163	213	2,1	1	172,2	172,2	181	889	3 079	6 448	2 556	9 036	19 329	333	522	692
	163	213	2,1	1	172,2	172,2	181	602	1 958	3 992	1 793	6 146	13 171	137	222	308
	178	241,5	2,5	2,5	190,9	190,9	201,9	2 173	6 987	14 280	6 322	20 936	44 075	390	605	808
	178	241,5	2,5	2,5	190,9	190,9	201,9	1 401	4 337	8 611	4 299	14 296	30 211	163	269	380
	178	241,5	2,5	2,5	190,9	190,9	201,9	1 167	3 935	8 175	3 355	11 539	24 467	352	546	722
	178	241,5	2,5	2,5	190,9	190,9	201,9	761	2 440	4 958	2 262	7 633	16 272	143	230	317

Super precision angular contact ball bearings

With large or small balls
Steel or ceramic balls
Steel or Cronidur rings
Open or sealed





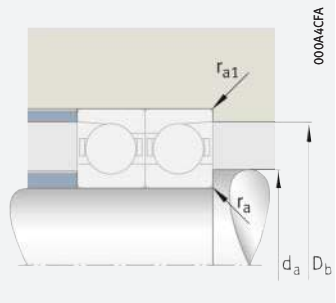
Mounting dimensions

d = 160 – 180 mm

Main dimensions			Basic load ratings		Fatigue limit load	Limiting speeds[1]		Dimensions		Contact angle	Mass	Designation[2]
d	D	B	dyn. C_r	stat. C_{0r}	C_{ur}	n_G grease	n_G oil[4]	r	r_1	α	m	
			kN	kN	N	min^{-1}	min^{-1}	min.	min.	°	≈ kg	
160	220	28	121	100	7 500	5 300	8 000	2	1	25	2,62	**B71932-E-T-P4S**
	220	28	128	106	7 900	6 000	9 000	2	1	15	2,63	**B71932-C-T-P4S**
	220	28	121	96	5 300	7 500	11 000	2	1	25	2,2	**HCB71932-E-T-P4S**
	220	28	128	101	5 600	8 000	12 000	2	1	15	2,21	**HCB71932-C-T-P4S**
	240	38	182	138	10 100	5 000	7 500	2,1	2,1	25	5,01	**B7032-E-T-P4S**
	240	38	192	146	10 600	5 600	8 500	2,1	2,1	15	5,04	**B7032-C-T-P4S**
	240	38	182	132	7 100	7 000	11 000	2,1	2,1	25	4,18	**HCB7032-E-T-P4S**
	240	38	192	140	7 500	7 500	12 000	2,1	2,1	15	4,2	**HCB7032-C-T-P4S**
	290	48	236	192	13 200	3 800	5 600	3	3	25	12,9	**B7232-E-T-P4S**
	290	48	249	202	13 800	4 300	6 300	3	3	15	12,9	**B7232-C-T-P4S**
	290	48	236	184	9 300	4 500	6 700	3	3	25	11,4	**HCB7232-E-T-P4S**
	290	48	249	193	9 800	5 300	8 000	3	3	15	11,4	**HCB7232-C-T-P4S**
170	230	28	126	108	7 900	5 000	7 500	2	1	25	2,78	**B71934-E-T-P4S**
	230	28	133	115	8 300	5 600	8 500	2	1	15	2,79	**B71934-C-T-P4S**
	230	28	126	104	5 600	7 000	11 000	2	1	25	2,32	**HCB71934-E-T-P4S**
	230	28	133	110	5 900	7 500	12 000	2	1	15	2,33	**HCB71934-C-T-P4S**
	260	42	229	180	12 600	4 500	7 000	2,1	2,1	25	6,49	**B7034-E-T-P4S**
	260	42	241	189	13 300	5 300	8 000	2,1	2,1	15	6,52	**B7034-C-T-P4S**
	310	52	285	241	16 000	3 600	5 300	4	4	25	15,6	**B7234-E-T-P4S**
	310	52	300	255	16 800	3 800	5 600	4	4	15	15,7	**B7234-C-T-P4S**
180	250	33	162	138	9 700	4 500	7 000	2	1	25	4,12	**B71936-E-T-P4S**
	250	33	171	146	10 200	5 300	8 000	2	1	15	4,14	**B71936-C-T-P4S**
	250	33	162	132	6 900	6 300	10 000	2	1	25	3,43	**HCB71936-E-T-P4S**
	250	33	171	139	7 200	7 000	11 000	2	1	15	3,45	**HCB71936-C-T-P4S**
	280	46	236	193	13 100	4 300	6 700	2,1	2,1	25	8,76	**B7036-E-T-P4S**
	280	46	248	203	13 800	4 800	7 500	2,1	2,1	15	8,79	**B7036-C-T-P4S**
	320	52	295	260	16 800	3 400	5 000	4	4	25	16,3	**B7236-E-T-P4S**
	320	52	310	270	17 600	3 800	5 600	4	4	15	16,4	**B7236-C-T-P4S**

medias ➤ *https://www.schaeffler.de/std/1D6B*

[1] The limiting speeds are based on elastically preloaded single bearings.
[2] Explanation of designations ➤ 🕮 *SP 1*.
[3] L = light preload; M = moderate preload; H = high preload.
[4] Minimal quantity oil lubrication.

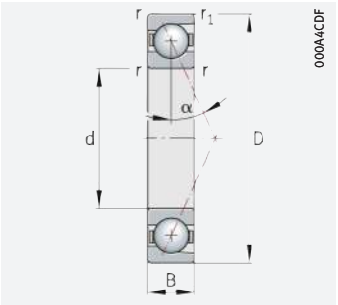


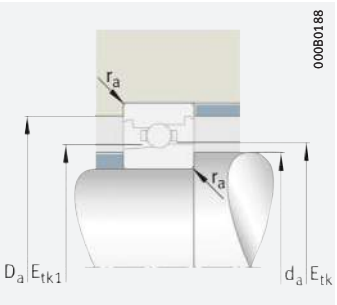
Mounting dimensions

	Mounting dimensions							Preload force[3] F_V			Lift-off force[3] K_{aE}			Axial rigidity[3] c_a		
d	d_a h12	D_a H12	r_a	r_{a1}	E_{tk}	E_{tk1}	E_{tk} E_{tk1}	L	M	H	L	M	H	L	M	H
			max.	max.	min.	min.	max.	N	N	N	N	N	N	N/µm	N/µm	N/µm
160	170	209	1	1	179,5	179,5	184,7	1 055	3 579	7 439	3 062	10 696	22 899	341	539	725
	170	209	1	1	179,5	179,5	184,7	722	2 304	4 619	2 209	7 572	16 164	145	243	344
	170	209	1	1	179,5	179,5	184,7	521	1 940	4 152	1 495	5 676	12 392	301	481	642
	170	209	1	1	179,5	179,5	184,7	374	1 265	2 614	1 108	3 944	8 551	126	206	285
	174	228	2,1	1	184,7	184,7	193,4	1 715	5 606	11 519	4 988	16 807	35 587	385	601	806
	174	228	2,1	1	184,7	184,7	193,4	1 145	3 574	7 107	3 520	11 821	25 044	163	271	384
	174	228	2,1	1	184,7	184,7	193,4	898	3 121	6 545	2 581	9 154	19 595	345	541	717
	174	228	2,1	1	184,7	184,7	193,4	609	1 986	4 053	1 812	6 221	13 337	142	230	318
	191	259	2,5	2,5	205,9	205,9	216,9	2 326	7 493	15 324	6 760	22 418	47 204	429	665	888
	191	259	2,5	2,5	205,9	205,9	216,9	1 502	4 659	9 263	4 601	15 309	32 375	179	295	416
	191	259	2,5	2,5	205,9	205,9	216,9	1 235	4 183	8 703	3 550	12 254	26 003	387	599	792
	191	259	2,5	2,5	205,9	205,9	216,9	827	2 657	5 402	2 457	8 298	17 692	158	254	350
170	180	219	1	1	188,6	188,6	194,7	1 105	3 757	7 816	3 206	11 221	24 031	364	575	773
	180	219	1	1	188,6	188,6	194,7	742	2 375	4 770	2 266	7 779	16 624	154	256	362
	180	219	1	1	188,6	188,6	194,7	534	2 004	4 295	1 533	5 856	12 804	318	510	681
	180	219	1	1	188,6	188,6	194,7	385	1 306	2 703	1 138	4 063	8 815	133	217	301
	185	246	2,1	1	195,9	195,9	206,9	2 250	7 240	14 802	6 541	21 677	45 639	409	635	848
	185	246	2,1	1	195,9	195,9	206,9	1 448	4 488	8 919	4 439	14 768	31 222	171	282	397
	205	275	3	3	217,1	217,1	230,4	2 860	9 126	18 610	8 307	27 255	57 164	452	699	930
	205	275	3	3	217,1	217,1	230,4	1 864	5 749	11 422	5 698	18 828	39 747	189	311	436
180	192	238	1	1	201,6	201,6	209	1 468	4 890	10 108	4 263	14 618	31 112	402	630	845
	192	238	1	1	201,6	201,6	209	960	3 036	6 076	2 933	9 953	21 191	168	279	394
	192	238	1	1	201,6	201,6	209	731	2 635	5 587	2 098	7 710	16 669	354	561	746
	192	238	1	1	201,6	201,6	209	519	1 726	3 546	1 540	5 380	11 597	148	240	332
	196	264	2,1	1	210,9	210,9	221,9	2 326	7 493	15 324	6 760	22 418	47 204	429	665	888
	196	264	2,1	1	210,9	210,9	221,9	1 502	4 659	9 263	4 601	15 309	32 375	179	295	416
	213,5	286,5	3	3	227,1	227,1	240,4	2 957	9 444	19 266	8 585	28 184	59 117	475	733	976
	213,5	286,5	3	3	227,1	227,1	240,4	1 891	5 843	11 625	5 771	19 076	40 296	197	323	453

Super precision angular contact ball bearings

With large or small balls
Steel or ceramic balls
Steel or Cronidur rings
Open or sealed





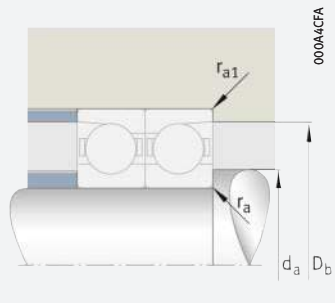
Mounting dimensions

d = 190 – 220 mm

Main dimensions			Basic load ratings		Fatigue limit load	Limiting speeds[1]		Dimensions		Contact angle	Mass	Designation[2]
d	D	B	dyn. C_r	stat. C_{0r}	C_{ur}	n_G grease	n_G oil[4]	r	r_1	α	m	
			kN	kN	N	min^{-1}	min^{-1}	min.	min.	°	≈ kg	
190	260	33	164	144	9 900	4 500	6 700	2	1	25	4,31	**B71938-E-T-P4S**
	260	33	174	152	10 400	5 000	7 500	2	1	15	4,33	**B71938-C-T-P4S**
	260	33	164	138	7 000	6 000	9 500	2	1	25	3,58	**HCB71938-E-T-P4S**
	260	33	174	146	7 400	6 700	10 000	2	1	15	3,6	**HCB71938-C-T-P4S**
	290	46	243	204	13 600	4 000	6 300	2,1	2,1	25	9,16	**B7038-E-T-P4S**
	290	46	255	215	14 300	4 500	7 000	2,1	2,1	15	9,2	**B7038-C-T-P4S**
	340	55	305	275	17 400	3 200	4 800	4	4	25	20	**B7238-E-T-P4S**
	340	55	320	290	18 300	3 400	5 000	4	4	15	20	**B7238-C-T-P4S**
200	280	38	199	170	11 300	4 000	6 300	2,1	1,1	25	6,03	**B71940-E-T-P4S**
	280	38	210	179	11 900	4 500	7 000	2,1	1,1	15	6,05	**B71940-C-T-P4S**
	280	38	199	162	8 000	5 600	9 000	2,1	1,1	25	5,04	**HCB71940-E-T-P4S**
	280	38	210	171	8 400	6 300	10 000	2,1	1,1	15	5,07	**HCB71940-C-T-P4S**
	310	51	295	260	16 700	3 800	6 000	2,1	2,1	25	11,6	**B7040-E-T-P4S**
	310	51	310	270	17 500	4 300	6 700	2,1	2,1	15	11,6	**B7040-C-T-P4S**
	360	58	315	295	18 000	3 000	4 500	4	4	25	24,2	**B7240-E-T-P4S**
	360	58	330	310	19 000	3 200	4 800	4	4	15	24,2	**B7240-C-T-P4S**
220	300	38	212	192	12 200	3 800	6 000	2,1	1,1	25	6,58	**B71944-E-T-P4S**
	300	38	224	203	12 900	4 300	6 700	2,1	1,1	15	6,6	**B71944-C-T-P4S**
	300	38	212	184	8 700	5 300	8 000	2,1	1,1	25	5,47	**HCB71944-E-T-P4S**
	300	38	224	194	9 200	6 000	9 000	2,1	1,1	15	5,49	**HCB71944-C-T-P4S**
	340	56	315	295	18 000	3 600	5 300	3	3	25	15,7	**B7044-E-T-P4S**
	340	56	330	310	19 000	4 000	6 000	3	3	15	15,7	**B7044-C-T-P4S**
	400	65	385	380	22 100	2 600	4 000	4	4	25	33,1	**B7244-E-T-P4S**
	400	65	405	400	23 200	2 800	4 300	4	4	15	33,1	**B7244-C-T-P4S**

medias ➤ *https://www.schaeffler.de/std/1D6C*

1) The limiting speeds are based on elastically preloaded single bearings.
2) Explanation of designations ➤ 🕮 *SP 1*.
3) L = light preload; M = moderate preload; H = high preload.
4) Minimal quantity oil lubrication.

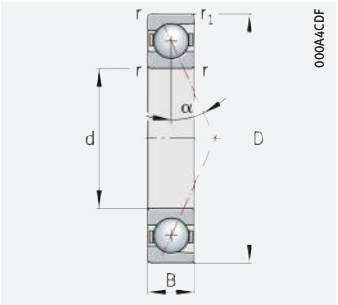


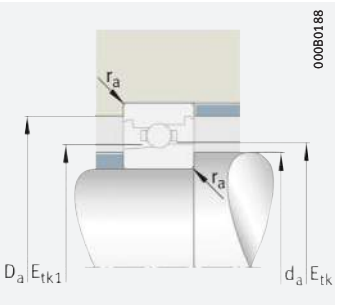
Mounting dimensions

	Mounting dimensions							Preload force[3] F_V			Lift-off force[3] K_{aE}			Axial rigidity[3] c_a		
d	d_a h12	D_a H12	r_a	r_{a1}	E_{tk}	E_{tk1}	E_{tk} E_{tk1}	L	M	H	L	M	H	L	M	H
			max.	max.	min.	min.	max.	N	N	N	N	N	N	N/µm	N/µm	N/µm
190	202	247	1	1	211,6	211,6	218,9	1 250	4 547	9 653	3 619	13 545	29 595	388	627	847
	202	247	1	1	211,6	211,6	218,9	888	2 947	5 992	2 700	9 612	20 790	166	281	398
	202	247	1	1	211,6	211,6	218,9	557	2 383	5 290	1 596	6 951	15 738	331	554	747
	202	247	1	1	211,6	211,6	218,9	450	1 629	3 436	1 328	5 053	11 178	143	239	334
	206	274	2,1	1	220,9	220,9	231,8	2 128	7 254	15 104	6 172	21 646	46 379	429	678	910
	206	274	2,1	1	220,9	220,9	231,8	1 436	4 599	9 248	4 377	15 038	32 154	181	302	426
	223,5	306,5	3	3	242,1	242,1	255,3	2 797	9 366	19 397	8 105	27 894	59 391	482	755	1 010
	223,5	306,5	3	3	242,1	242,1	255,3	1 846	5 864	11 779	5 614	19 073	40 669	201	333	468
200	214	266	1	1	224,7	224,7	233,1	1 635	5 765	12 127	4 737	17 199	37 246	423	676	911
	214	266	1	1	224,7	224,7	233,1	1 127	3 678	7 439	3 433	12 027	25 875	180	302	427
	214	266	1	1	224,7	224,7	233,1	768	3 083	6 732	2 202	9 005	20 060	366	601	806
	214	266	1	1	224,7	224,7	233,1	571	2 012	4 211	1 688	6 249	13 711	154	256	355
	217	293	2,1	1	232,1	232,1	245,4	2 711	9 065	18 765	7 860	27 018	57 509	460	722	965
	217	293	2,1	1	232,1	232,1	245,4	1 791	5 681	11 402	5 451	18 508	39 448	192	318	448
	238,5	321,5	3	3	257,1	257,1	270,1	2 882	9 666	20 030	8 349	28 771	61 275	503	789	1 055
	238,5	321,5	3	3	257,1	257,1	270,1	1 902	6 047	12 156	5 777	19 638	41 892	210	347	488
220	234	286	1	1	244,7	244,7	253,1	1 705	6 060	12 777	4 937	18 042	39 132	461	739	995
	234	286	1	1	244,7	244,7	253,1	1 185	3 886	7 879	3 600	12 649	27 258	196	329	465
	234	286	1	1	244,7	244,7	253,1	779	3 184	6 985	2 232	9 284	20 766	396	653	877
	234	286	1	1	244,7	244,7	253,1	606	2 147	4 503	1 788	6 651	14 612	169	280	390
	239	321	2,5	1	257,1	257,1	270,1	2 882	9 666	20 030	8 349	28 771	61 275	503	789	1 055
	239	321	2,5	1	257,1	257,1	270,1	1 902	6 047	12 156	5 777	19 638	41 892	210	347	488
	264	356	3	3	282,3	282,3	298,2	3 642	12 021	24 787	10 546	35 720	75 626	540	840	1 119
	264	356	3	3	282,3	282,3	298,2	2 387	7 527	15 105	7 238	24 345	51 776	224	368	515

Super precision angular contact ball bearings

With large or small balls
Steel or ceramic balls
Steel or Cronidur rings
Open or sealed





Mounting dimensions

d = 240 – 300 mm

Main dimensions			Basic load ratings		Fatigue limit load	Limiting speeds[1]		Dimensions		Contact angle	Mass	Designation[2]
d	D	B	dyn. C_r	stat. C_{0r}	C_{ur}	n_G grease	n_G oil[4]	r	r_1	α	m	
			kN	kN	N	min^{-1}	min^{-1}	min.	min.	°	≈ kg	
240	320	38	218	208	12 800	3 600	5 300	2,1	1,1	25	7,08	**B71948-E-T-P4S**
	320	38	231	220	13 500	4 000	6 000	2,1	1,1	15	7,1	**B71948-C-T-P4S**
	360	56	320	310	18 500	3 200	5 000	3	3	25	16,7	**B7048-E-T-P4S**
	360	56	340	330	19 500	3 600	5 600	3	3	15	16,8	**B7048-C-T-P4S**
260	360	46	295	290	17 100	3 600	5 300	2,1	1,1	15	12	**B71952-C-T-P4S**
280	380	46	305	320	18 000	3 200	5 000	2,1	1,1	15	12,9	**B71956-C-T-P4S**
300	420	56	370	405	21 800	3 000	4 500	3	1,1	15	20	**B71960-C-T-P4S**

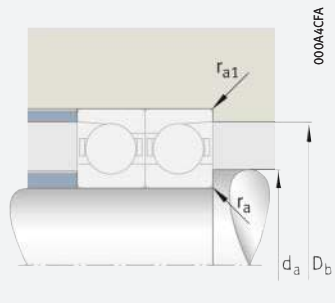
medias ➤ *https://www.schaeffler.de/std/1D6D*

[1] The limiting speeds are based on elastically preloaded single bearings.

[2] Explanation of designations ➤ 🕮 *SP 1*.

[3] L = light preload; M = moderate preload; H = high preload.

[4] Minimal quantity oil lubrication.

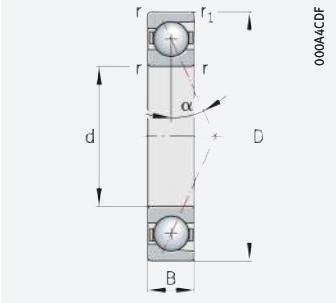


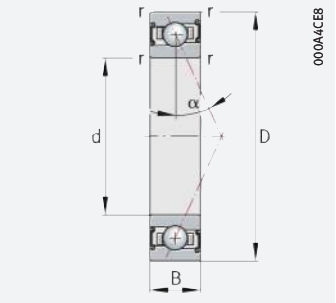
Mounting dimensions

	Mounting dimensions							Preload force[3] F_V			Lift-off force[3] K_{aE}			Axial rigidity[3] c_a		
d	d_a h12	D_a H12	r_a max.	r_{a1} max.	E_{tk} min.	E_{tk1} min.	E_{tk} E_{tk1} max.	L N	M N	H N	L N	M N	H N	L N/µm	M N/µm	H N/µm
240	254	307	1	1	264,7	264,7	272,9	1 760	6 279	13 255	5 092	18 673	40 536	488	781	1 052
	254	307	1	1	264,7	264,7	272,9	1 224	4 024	8 171	3 712	13 066	28 181	207	347	490
	260	341	2,5	1	277,1	277,1	290	2 914	9 801	20 327	8 437	29 140	62 090	521	817	1 092
	260	341	2,5	1	277,1	277,1	290	1 957	6 231	12 533	5 940	20 205	43 114	219	361	507
260	278	342	1	1	290,9	290,9	301,4	1 615	5 221	10 556	4 894	16 900	36 243	222	368	518
280	298	362	1	1	310,9	310,9	321,2	1 696	5 491	11 113	5 134	17 744	38 073	236	392	551
300	322	398	1	1	337,1	337,1	349,7	2 084	6 676	13 480	6 297	21 485	45 930	249	409	574

Super precision angular contact ball bearings

With large or small balls
Ceramic balls
Steel rings
Design DLR



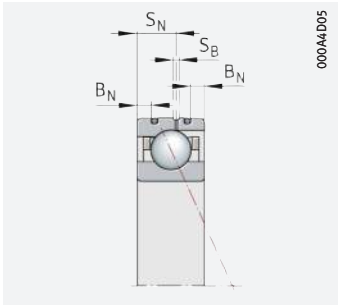


d = 20 – 35 mm

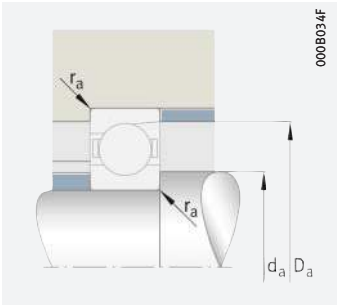
Main dimensions			Basic load ratings		Fatigue limit load	Limiting speeds[1]		Dimensions		Mass	Designation[2]
d	D	B	dyn. C_r	stat. C_{0r}	C_{ur}	n_G grease	n_G oil[4]	r	r_1	m	
			kN	kN	N	min^{-1}	min^{-1}	min.	min.	≈ kg	
20	42	12	9,8	3,9	295	48 000	75 000	0,6	0,6	0,06	**HCB7004-EDLR-T-P4S**
	42	12	10,3	4,05	310	53 000	80 000	0,6	0,6	0,06	**HCB7004-CDLR-T-P4S**
	42	12	5,4	2,47	188	60 000	95 000	0,6	0,6	0,072	**HC7004-EDLR-T-P4S**
	42	12	8,3	2,47	188	67 000	100 000	0,6	0,6	0,072	**XC7004-EDLR-T-P4S**
25	47	12	13,1	5,4	410	40 000	63 000	0,6	0,6	0,064	**HCB7005-EDLR-T-P4S**
	47	12	13,7	5,6	430	45 000	70 000	0,6	0,6	0,064	**HCB7005-CDLR-T-P4S**
	47	12	5,5	2,65	203	53 000	80 000	0,6	0,6	0,083	**HC7005-EDLR-T-P4S**
	47	12	8,4	2,65	203	56 000	90 000	0,6	0,6	0,083	**XC7005-EDLR-T-P4S**
30	47	9	8,1	3,95	300	38 000	60 000	0,3	0,3	0,043	**HCB71906-EDLR-T-P4S**
	47	9	8,5	4,2	320	43 000	67 000	0,3	0,3	0,043	**HCB71906-CDLR-T-P4S**
	47	9	5,6	2,85	215	48 000	75 000	0,3	0,3	0,044	**HC71906-EDLR-T-P4S**
	47	9	8,5	2,85	215	53 000	85 000	0,3	0,3	0,044	**XC71906-EDLR-T-P4S**
	55	13	13,7	6,1	465	34 000	53 000	1	1	0,1	**HCB7006-EDLR-T-P4S**
	55	13	14,4	6,4	485	38 000	60 000	1	1	0,1	**HCB7006-CDLR-T-P4S**
	55	13	7,8	3,85	295	43 000	67 000	1	1	0,118	**HC7006-EDLR-T-P4S**
	55	13	12	3,85	295	48 000	75 000	1	1	0,118	**XC7006-EDLR-T-P4S**
35	55	10	11,5	6,2	470	32 000	50 000	0,6	0,6	0,065	**HCB71907-EDLR-T-P4S**
	55	10	12,1	6,5	495	36 000	56 000	0,6	0,6	0,065	**HCB71907-CDLR-T-P4S**
	55	10	6,1	3,45	260	40 000	63 000	0,6	0,6	0,074	**HC71907-EDLR-T-P4S**
	55	10	9,3	3,45	260	45 000	70 000	0,6	0,6	0,076	**XC71907-EDLR-T-P4S**
	62	14	18,4	8,8	670	30 000	45 000	1	1	0,134	**HCB7007-EDLR-T-P4S**
	62	14	19,3	9,2	700	34 000	53 000	1	1	0,134	**HCB7007-CDLR-T-P4S**
	62	14	8,4	4,5	345	38 000	60 000	1	1	0,162	**HC7007-EDLR-T-P4S**
	62	14	12,8	4,5	345	43 000	67 000	1	1	0,162	**XC7007-EDLR-T-P4S**

medias ➤ *https://www.schaeffler.de/std/1D6E*

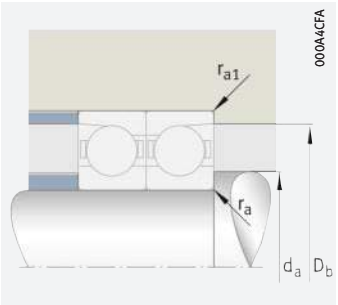
1) The limiting speeds are based on elastically preloaded single bearings.
2) Explanation of designations ➤ 🕮 *SP 1*.
3) L = light preload; M = moderate preload; H = high preload.
4) Minimal quantity oil lubrication.



Design DLR



Mounting dimensions

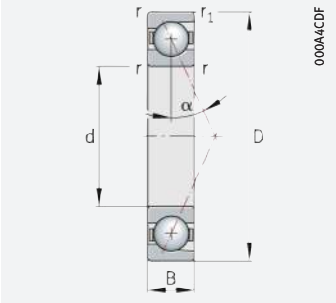


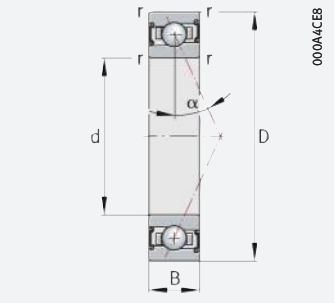
Mounting dimensions

Dimensions				Contact angle	Mounting dimensions				Preload force[3] F_V			Lift-off force[3] K_{aE}			Axial rigidity[3] c_a		
d	B_N	S_N	S_B	α	d_a h12	D_a H12	r_a	r_{a1}	L	M	H	L	M	H	L	M	H
				°			max.	max.	N	N	N	N	N	N	N/µm	N/µm	N/µm
20	2,2	6,6	1,4	25	25	37	0,6	0,3	28	140	321	80	410	966	42	74,7	103
	2,2	6,6	1,4	15	25	37	0,6	0,3	24	94	202	72	297	673	18,7	32,7	46,6
	2,2	6,6	1,4	25	25	37	0,6	0,3	23	70	140	67	204	415	48,8	72,3	93,7
	2,2	6,6	1,4	25	25	37	0,6	0,3	23	70	140	67	204	415	48,8	72,3	93,7
25	2,2	6,6	1,4	25	30	42	0,6	0,3	40	194	443	117	573	1 338	55,4	96,9	133
	2,2	6,6	1,4	15	30	42	0,6	0,3	35	132	283	104	419	944	24,6	42,5	60,2
	2,2	6,6	1,4	25	30	42	0,6	0,3	23	70	140	67	204	415	50,4	74,7	96,7
	2,2	6,6	1,4	25	30	42	0,6	0,3	23	70	140	67	204	415	50,4	74,7	96,7
30	1,1	5,3	1,4	25	34	43,5	0,3	0,15	22	112	258	60	322	768	52,5	95,1	132
	1,1	5,3	1,4	15	34	43,5	0,3	0,15	14	68	155	40	210	504	21,1	40	58,3
	1,1	5,3	1,4	25	34	43,5	0,3	0,15	24	72	143	69	209	425	52,5	77,7	101
	1,1	5,3	1,4	25	34	43,5	0,3	0,15	24	72	143	69	209	425	52,5	77,7	101
	2,8	7,2	1,4	25	36	49	1	0,3	42	203	465	117	592	1 395	60,1	107	147
	2,8	7,2	1,4	15	36	49	1	0,3	35	137	293	104	431	976	26,9	47	67,1
	2,8	7,2	1,4	25	36	49	1	0,3	33	98	197	94	287	583	60	88,8	115
	2,8	7,2	1,4	25	36	49	1	0,3	33	98	197	94	287	583	60	88,8	115
35	1,6	5,8	1,4	25	40	51,5	0,6	0,15	33	158	359	95	463	1 081	66,7	117	161
	1,6	5,8	1,4	15	40	51,5	0,6	0,15	21	96	213	63	301	709	26,7	49,1	71
	1,6	5,8	1,4	25	40	51,5	0,6	0,15	26	78	155	74	226	459	60,5	89,4	116
	1,6	5,8	1,4	25	40	51,5	0,6	0,15	26	78	155	74	226	459	60,5	89,4	116
	2,8	8	1,4	25	41	56	1	0,3	54	257	585	157	761	1 771	72,1	126	173
	2,8	8	1,4	15	41	56	1	0,3	46	175	372	138	558	1 255	32	55,5	78,9
	2,8	8	1,4	25	41	56	1	0,3	35	105	210	101	307	623	67,3	99,5	129
	2,8	8	1,4	25	41	56	1	0,3	35	105	210	101	307	623	67,3	99,5	129

Super precision angular contact ball bearings

With large or small balls
Ceramic balls
Steel rings
Design DLR



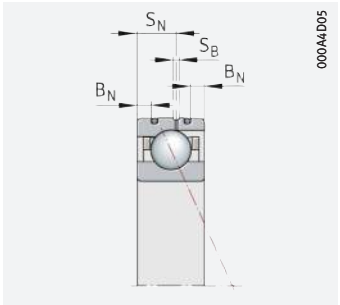


d = 40 – 50 mm

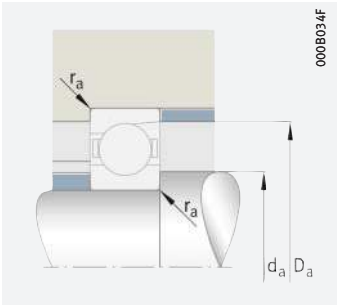
Main dimensions			Basic load ratings		Fatigue limit load	Limiting speeds[1]		Dimensions		Mass	Designation[2]
d	D	B	dyn. C_r	stat. C_{0r}	C_{ur}	n_G grease	n_G oil[4]	r	r_1	m	
			kN	kN	N	min^{-1}	min^{-1}	min.	min.	≈ kg	
40	62	12	17,1	9	680	28 000	45 000	0,6	0,6	0,086	**HCB71908-EDLR-T-P4S**
	62	12	18	9,4	720	32 000	50 000	0,6	0,6	0,086	**HCB71908-CDLR-T-P4S**
	62	12	6,4	3,9	295	36 000	56 000	0,6	0,6	0,119	**HC71908-EDLR-T-P4S**
	62	12	9,7	3,9	295	40 000	63 000	0,6	0,6	0,119	**XC71908-EDLR-T-P4S**
	68	15	19,9	10,2	780	28 000	43 000	1	1	0,164	**HCB7008-EDLR-T-P4S**
	68	15	20,9	10,7	820	30 000	45 000	1	1	0,164	**HCB7008-CDLR-T-P4S**
	68	15	8,9	5,2	395	34 000	53 000	1	1	0,202	**HC7008-EDLR-T-P4S**
	68	15	13,7	5,2	395	38 000	60 000	1	1	0,202	**XC7008-EDLR-T-P4S**
45	68	12	18,2	10,2	770	26 000	40 000	0,6	0,6	0,107	**HCB71909-EDLR-T-P4S**
	68	12	19,1	10,7	820	28 000	45 000	0,6	0,6	0,107	**HCB71909-CDLR-T-P4S**
	68	12	9,1	5,4	410	32 000	50 000	0,6	0,6	0,129	**HC71909-EDLR-T-P4S**
	68	12	13,9	5,4	410	36 000	56 000	0,6	0,6	0,129	**XC71909-EDLR-T-P4S**
	75	16	26,5	13,6	1 030	24 000	38 000	1	1	0,191	**HCB7009-EDLR-T-P4S**
	75	16	28	14,3	1 090	26 000	40 000	1	1	0,191	**HCB7009-CDLR-T-P4S**
	75	16	11,6	6,8	520	30 000	48 000	1	1	0,248	**HC7009-EDLR-T-P4S**
	75	16	17,8	6,8	520	34 000	53 000	1	1	0,248	**XC7009-EDLR-T-P4S**
50	72	12	18,6	10,8	820	24 000	36 000	0,6	0,6	0,102	**HCB71910-EDLR-T-P4S**
	72	12	19,6	11,4	870	26 000	40 000	0,6	0,6	0,102	**HCB71910-CDLR-T-P4S**
	72	12	9,4	5,8	445	30 000	48 000	0,6	0,6	0,13	**HC71910-EDLR-T-P4S**
	72	12	14,3	5,8	445	34 000	53 000	0,6	0,6	0,13	**XC71910-EDLR-T-P4S**
	80	16	27,5	14,7	1 120	22 000	34 000	1	1	0,206	**HCB7010-EDLR-T-P4S**
	80	16	29	15,4	1 170	24 000	38 000	1	1	0,205	**HCB7010-CDLR-T-P4S**
	80	16	12,1	7,4	560	28 000	43 000	1	1	0,262	**HC7010-EDLR-T-P4S**
	80	16	18,4	7,4	560	32 000	48 000	1	1	0,262	**XC7010-EDLR-T-P4S**

medias ➤ *https://www.schaeffler.de/std/1D6F*

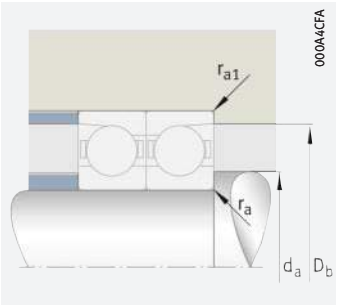
1) The limiting speeds are based on elastically preloaded single bearings.
2) Explanation of designations ➤ 🕮 *SP 1*.
3) L = light preload; M = moderate preload; H = high preload.
4) Minimal quantity oil lubrication.



Design DLR



Mounting dimensions

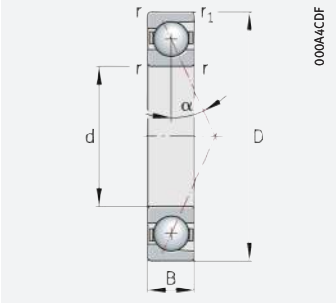


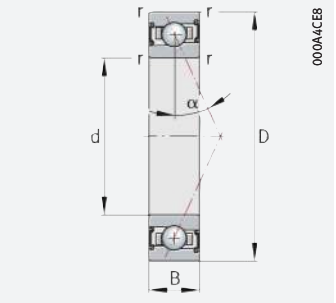
Mounting dimensions

Dimensions				Contact angle	Mounting dimensions				Preload force[3] F_V			Lift-off force[3] K_{aE}			Axial rigidity[3] c_a		
d	B_N	S_N	S_B	α	d_a h12	D_a H12	r_a	r_{a1}	L	M	H	L	M	H	L	M	H
				°			max.	max.	N	N	N	N	N	N	N/µm	N/µm	N/µm
40	2,2	6,6	1,4	25	45	58,5	0,6	0,15	41	220	514	117	645	1 548	72,4	132	183
	2,2	6,6	1,4	15	45	58,5	0,6	0,15	39	156	337	116	494	1 127	33,5	59,2	84,7
	2,2	6,6	1,4	25	45	58,5	0,6	0,15	27	82	164	78	238	484	66,4	98	127
	2,2	6,6	1,4	25	45	58,5	0,6	0,15	27	82	164	78	238	484	66,4	98	127
	2,8	8,5	1,4	25	46	62	1	0,3	55	271	622	159	797	1 875	80	142	195
	2,8	8,5	1,4	15	46	62	1	0,3	49	188	402	146	597	1 350	36,1	63,1	89,9
	2,8	8,5	1,4	25	46	62	1	0,3	37	110	221	106	321	652	74,2	110	142
	2,8	8,5	1,4	25	46	62	1	0,3	37	110	221	106	321	652	74,2	110	142
45	2,2	6,6	1,4	25	50	63,5	0,6	0,15	42	233	547	121	682	1 643	78,5	144	200
	2,2	6,6	1,4	15	50	63,5	0,6	0,15	40	164	355	120	516	1 182	36,2	64,1	91,7
	2,2	6,6	1,4	25	50	63,5	0,6	0,15	38	113	226	108	329	667	76,6	113	146
	2,2	6,6	1,4	25	50	63,5	0,6	0,15	38	113	226	108	329	667	76,6	113	146
	3,4	9,3	1,4	25	51	69	1	0,3	89	389	869	254	1 145	2 622	95,8	163	223
	3,4	9,3	1,4	15	51	69	1	0,3	71	261	549	212	827	1 843	41,9	71,9	102
	3,4	9,3	1,4	25	51	69	1	0,3	48	143	286	137	417	848	84,4	125	161
	3,4	9,3	1,4	25	51	69	1	0,3	48	143	286	137	417	848	84,4	125	161
50	2,2	6,6	1,4	25	55	67,5	0,6	0,15	40	229	542	115	671	1 626	79,7	148	205
	2,2	6,6	1,4	15	55	67,5	0,6	0,15	41	167	362	121	525	1 205	37,5	66,4	95
	2,2	6,6	1,4	25	55	67,5	0,6	0,15	39	116	231	110	336	682	80,9	119	154
	2,2	6,6	1,4	25	55	67,5	0,6	0,15	39	116	231	110	336	682	80,9	119	154
	3,4	9,3	1,4	25	56	74	1	0,3	90	400	895	259	1 175	2 697	100	171	234
	3,4	9,3	1,4	15	56	74	1	0,3	73	268	566	217	848	1 894	43,9	75,3	107
	3,4	9,3	1,4	25	56	74	1	0,3	50	149	298	143	435	883	90	133	172
	3,4	9,3	1,4	25	56	74	1	0,3	50	149	298	143	435	883	90	133	172

Super precision angular contact ball bearings

With large or small balls
Ceramic balls
Steel rings
Design DLR





d = 55 – 65 mm

Main dimensions			Basic load ratings		Fatigue limit load	Limiting speeds[1]		Dimensions		Mass	Designation[2]
d	D	B	dyn. C_r	stat. C_{0r}	C_{ur}	n_G grease	n_G oil[4]	r	r_1	m	
			kN	kN	N	min^{-1}	min^{-1}	min.	min.	≈ kg	
55	80	13	22,2	13,1	1 000	22 000	32 000	1	1	0,14	**HCB71911-EDLR-T-P4S**
	80	13	23,5	13,8	1 050	24 000	36 000	1	1	0,14	**HCB71911-CDLR-T-P4S**
	80	13	12,3	7,7	590	28 000	43 000	1	1	0,166	**HC71911-EDLR-T-P4S**
	80	13	18,8	7,7	590	30 000	48 000	1	1	0,166	**XC71911-EDLR-T-P4S**
	90	18	37	20,1	1 530	20 000	30 000	1,1	1,1	0,302	**HCB7011-EDLR-T-P4S**
	90	18	38,5	21,2	1 610	22 000	34 000	1,1	1,1	0,302	**HCB7011-CDLR-T-P4S**
	90	18	16,9	10,4	790	26 000	40 000	1,1	1,1	0,378	**HC7011-EDLR-T-P4S**
	90	18	26	10,4	790	28 000	43 000	1,1	1,1	0,378	**XC7011-EDLR-T-P4S**
60	85	13	23,4	14,5	1 100	20 000	30 000	1	1	0,151^	**HCB71912-EDLR-T-P4S**
	85	13	24,7	15,3	1 170	22 000	34 000	1	1	0,151	**HCB71912-CDLR-T-P4S**
	85	13	12,6	8,3	630	26 000	40 000	1	1	0,18	**HC71912-EDLR-T-P4S**
	85	13	19,4	8,3	630	28 000	43 000	1	1	0,179	**XC71912-EDLR-T-P4S**
	95	18	38	21,6	1 650	19 000	28 000	1,1	1,1	0,326	**HCB7012-EDLR-T-P4S**
	95	18	40	22,7	1 730	20 000	32 000	1,1	1,1	0,326	**HCB7012-CDLR-T-P4S**
	95	18	17,6	11,3	860	24 000	36 000	1,1	1,1	0,404	**HC7012-EDLR-T-P4S**
	95	18	27	11,3	860	26 000	40 000	1,1	1,1	0,404	**XC7012-EDLR-T-P4S**
65	90	13	23,7	15,3	1 160	19 000	28 000	1	1	0,161	**HCB71913-EDLR-T-P4S**
	90	13	25	16,1	1 230	20 000	32 000	1	1	0,161	**HCB71913-CDLR-T-P4S**
	90	13	13	8,9	680	24 000	36 000	1	1	0,19	**HC71913-EDLR-T-P4S**
	90	13	19,9	8,9	680	26 000	40 000	1	1	0,19	**XC71913-EDLR-T-P4S**
	100	18	39	23,1	1 760	17 000	26 000	1,1	1,1	0,344	**HCB7013-EDLR-T-P4S**
	100	18	41,5	24,3	1 850	19 000	30 000	1,1	1,1	0,343	**HCB7013-CDLR-T-P4S**
	100	18	18,2	12,2	930	22 000	34 000	1,1	1,1	0,427	**HC7013-EDLR-T-P4S**
	100	18	28	12,2	930	24 000	38 000	1,1	1,1	0,427	**XC7013-EDLR-T-P4S**

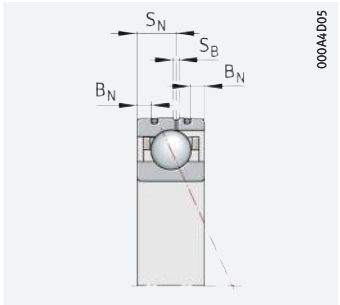
medias ➤ *https://www.schaeffler.de/std/1D70*

[1] The limiting speeds are based on elastically preloaded single bearings.

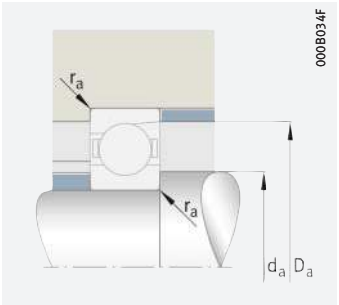
[2] Explanation of designations ➤ 🕮 *SP 1*.

[3] L = light preload; M = moderate preload; H = high preload.

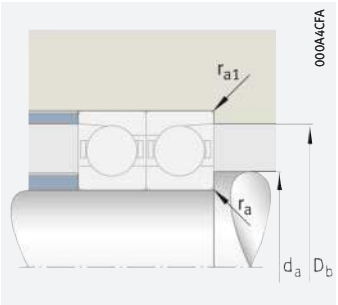
[4] Minimal quantity oil lubrication.



Design DLR



Mounting dimensions

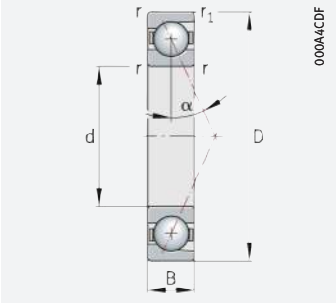


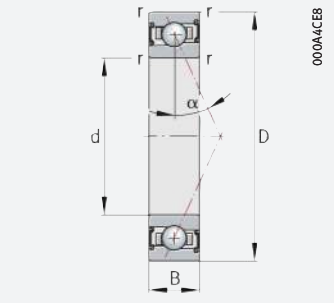
Mounting dimensions

Dimensions				Contact angle	Mounting dimensions				Preload force[3] F_V			Lift-off force[3] K_{aE}			Axial rigidity[3] c_a		
d	B_N	S_N	S_B	α	d_a h12	D_a H12	r_a	r_{a1}	L	M	H	L	M	H	L	M	H
				°			max.	max.	N	N	N	N	N	N	N/µm	N/µm	N/µm
55	2,8	7,2	1,4	25	60	75,5	0,6	0,3	57	296	686	164	867	2 058	93	167	230
	2,8	7,2	1,4	15	60	75,5	0,6	0,3	53	208	447	157	654	1 487	42,4	74,1	106
	2,8	7,2	1,4	25	60	75,5	0,6	0,3	51	152	304	145	442	897	92,7	137	177
	2,8	7,2	1,4	25	60	75,5	0,6	0,3	51	152	304	145	442	897	92,7	137	177
	4,3	9,7	1,4	25	62	83	1	0,6	136	562	1 236	390	1 653	3 728	121	203	275
	4,3	9,7	1,4	15	62	83	1	0,6	102	366	765	305	1 158	2 559	51,9	87,9	124
	4,3	9,7	1,4	25	62	83	1	0,6	70	210	421	201	613	1 244	105	155	201
	4,3	9,7	1,4	25	62	83	1	0,6	70	210	421	201	613	1 244	105	155	201
60	2,8	7,2	1,4	25	65	80,5	0,6	0,3	57	303	707	163	887	2 118	98,5	179	246
	2,8	7,2	1,4	15	65	80,5	0,6	0,3	54	214	462	159	671	1 530	45,1	79	112
	2,8	7,2	1,4	25	65	80,5	0,6	0,3	52	155	311	148	452	917	97,7	144	186
	2,8	7,2	1,4	25	65	80,5	0,6	0,3	52	155	311	148	452	917	97,7	144	186
	4,3	9,7	1,4	25	67	88	1	0,6	136	569	1 256	391	1 673	3 782	126	211	286
	4,3	9,7	1,4	15	67	88	1	0,6	106	379	794	315	1 198	2 651	54,4	92,2	130
	4,3	9,7	1,4	25	67	88	1	0,6	73	219	438	209	638	1 294	112	165	213
	4,3	9,7	1,4	25	67	88	1	0,6	73	219	438	209	638	1 294	112	165	213
65	2,8	7,2	1,4	25	70	85,5	0,6	0,3	58	309	723	165	904	2 165	102	185	255
	2,8	7,2	1,4	15	70	85,5	0,6	0,3	55	219	473	161	684	1 562	46,6	81,7	116
	2,8	7,2	1,4	25	70	85,5	0,6	0,3	53	160	321	153	466	946	103	152	196
	2,8	7,2	1,4	25	70	85,5	0,6	0,3	53	160	321	153	466	946	103	152	196
	4	10,4	1,4	25	72	93	1	0,6	137	577	1 276	392	1 694	3 836	131	219	297
	4	10,4	1,4	15	72	93	1	0,6	107	385	808	318	1 213	2 688	56,4	95,6	135
	4	10,4	1,4	25	72	93	1	0,6	74	223	445	213	647	1 313	118	173	224
	4	10,4	1,4	25	72	93	1	0,6	74	223	445	213	647	1 313	118	173	224

Super precision angular contact ball bearings

With large or small balls
Ceramic balls
Steel rings
Design DLR





d = 70 – 80 mm

Main dimensions			Basic load ratings		Fatigue limit load	Limiting speeds[1]		Dimensions		Mass	Designation[2]
d	D	B	dyn. C_r	stat. C_{0r}	C_{ur}	n_G grease	n_G oil[4]	r	r_1	m	
			kN	kN	N	min^{-1}	min^{-1}	min.	min.	≈ kg	
70	100	16	32,5	20,8	1 580	17 000	26 000	1	1	0,268	**HCB71914-EDLR-T-P4S**
	100	16	34,5	22	1 670	19 000	28 000	1	1	0,268	**HCB71914-CDLR-T-P4S**
	100	16	16,8	11,7	890	22 000	34 000	1	1	0,322	**HC71914-EDLR-T-P4S**
	100	16	25,5	11,7	890	24 000	36 000	1	1	0,322	**XC71914-EDLR-T-P4S**
	110	20	48	28	2 120	16 000	24 000	1,1	1,1	0,48	**HCB7014-EDLR-T-P4S**
	110	20	50	29,5	2 230	18 000	28 000	1,1	1,1	0,48	**HCB7014-CDLR-T-P4S**
	110	20	23,6	15,6	1 190	20 000	32 000	1,1	1,1	0,596	**HC7014-EDLR-T-P4S**
	110	20	36	15,6	1 190	22 000	34 000	1,1	1,1	0,596	**XC7014-EDLR-T-P4S**
75	105	16	33	21,9	1 670	16 000	24 000	1	1	0,277	**HCB71915-EDLR-T-P4S**
	105	16	35	23,1	1 760	18 000	28 000	1	1	0,277	**HCB71915-CDLR-T-P4S**
	105	16	17,2	12,5	950	20 000	32 000	1	1	0,345	**HC71915-EDLR-T-P4S**
	105	16	26,5	12,5	950	22 000	34 000	1	1	0,345	**XC71915-EDLR-T-P4S**
	115	20	49,5	29,5	2 260	15 000	24 000	1,1	1,1	0,5	**HCB7015-EDLR-T-P4S**
	115	20	52	31,5	2 380	17 000	26 000	1,1	1,1	0,5	**HCB7015-CDLR-T-P4S**
	115	20	23,9	16,2	1 240	19 000	30 000	1,1	1,1	0,624	**HC7015-EDLR-T-P4S**
	115	20	36,5	16,2	1 240	22 000	32 000	1,1	1,1	0,624	**XC7015-EDLR-T-P4S**
80	110	16	33,5	23	1 750	15 000	24 000	1	1	0,295	**HCB71916-EDLR-T-P4S**
	110	16	35,5	24,3	1 850	17 000	26 000	1	1	0,295	**HCB71916-CDLR-T-P4S**
	110	16	19,2	14	1 060	19 000	30 000	1	1	0,342	**HC71916-EDLR-T-P4S**
	110	16	29,5	14	1 060	22 000	32 000	1	1	0,342	**XC71916-EDLR-T-P4S**
	125	22	61	37,5	2 800	14 000	22 000	1,1	1,1	0,69	**HCB7016-EDLR-T-P4S**
	125	22	64	39	2 950	15 000	24 000	1,1	1,1	0,69	**HCB7016-CDLR-T-P4S**
	125	22	28,5	19,7	1 480	18 000	28 000	1,1	1,1	0,86	**HC7016-EDLR-T-P4S**
	125	22	44	19,7	1 480	20 000	30 000	1,1	1,1	0,86	**XC7016-EDLR-T-P4S**

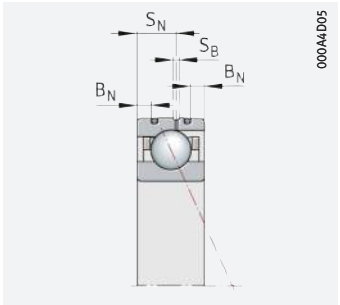
medias ➤ *https://www.schaeffler.de/std/1D71*

[1] The limiting speeds are based on elastically preloaded single bearings.

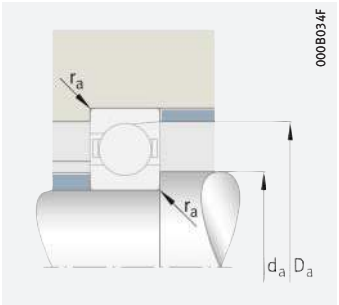
[2] Explanation of designations ➤ 🕮 *SP 1*.

[3] L = light preload; M = moderate preload; H = high preload.

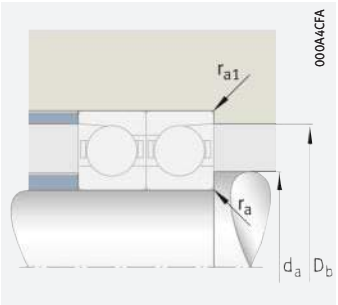
[4] Minimal quantity oil lubrication.



Design DLR



Mounting dimensions

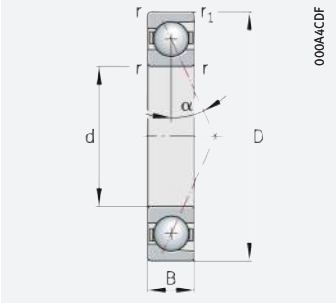


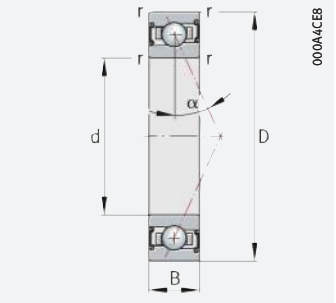
Mounting dimensions

Dimensions				Contact angle	Mounting dimensions				Preload force[3] F_V			Lift-off force[3] K_{aE}			Axial rigidity[3] c_a		
d	B_N	S_N	S_B	α	d_a h12	D_a H12	r_a	r_{a1}	L	M	H	L	M	H	L	M	H
				°			max.	max.	N	N	N	N	N	N	N/µm	N/µm	N/µm
70	3,1	9,3	1,4	25	76	94,5	0,6	0,3	98	459	1 040	281	1 343	3 118	126	218	298
	3,1	9,3	1,4	15	76	94,5	0,6	0,3	83	312	665	245	980	2 200	55,5	95,3	135
	3,1	9,3	1,4	25	76	94,5	0,6	0,3	69	207	414	198	602	1 221	117	173	223
	3,1	9,3	1,4	25	76	94,5	0,6	0,3	69	207	414	198	602	1 221	117	173	223
	4	11,6	1,4	25	77	102	1	0,6	188	749	1 633	540	2 203	4 915	147	242	326
	4	11,6	1,4	15	77	102	1	0,6	139	487	1 014	414	1 538	3 380	62,3	105	147
	4	11,6	1,4	25	77	102	1	0,6	98	293	587	280	853	1 731	130	192	248
	4	11,6	1,4	25	77	102	1	0,6	98	293	587	280	853	1 731	130	192	248
75	3,1	9,3	1,4	25	81	99,5	0,6	0,3	95	454	1 034	273	1 328	3 094	128	223	305
	3,1	9,3	1,4	15	81	99,5	0,6	0,3	83	317	676	247	991	2 229	57,1	98,2	139
	3,1	9,3	1,4	25	81	99,5	0,6	0,3	70	210	421	201	611	1 240	123	181	233
	3,1	9,3	1,4	25	81	99,5	0,6	0,3	70	210	421	201	611	1 240	123	181	233
	4	11,6	1,4	25	82	107	1	0,6	192	769	1 679	551	2 260	5 050	153	253	341
	4	11,6	1,4	15	82	107	1	0,6	145	508	1 059	431	1 603	3 524	65,4	110	154
	4	11,6	1,4	25	82	107	1	0,6	99	298	597	285	868	1 761	134	197	255
	4	11,6	1,4	25	82	107	1	0,6	99	298	597	285	868	1 761	134	197	255
80	3,1	9,3	1,4	25	86	104	0,6	0,3	95	459	1 049	273	1 344	3 137	132	230	315
	3,1	9,3	1,4	15	86	104	0,6	0,3	84	321	686	249	1 004	2 259	58,8	101	143
	3,1	9,3	1,4	25	86	104	0,6	0,3	79	236	473	226	686	1 392	130	192	248
	3,1	9,3	1,4	25	86	104	0,6	0,3	79	236	473	226	686	1 392	130	192	248
	4,7	12,2	2,2	25	88	117	1	0,6	252	977	2 113	726	2 872	6 354	175	284	383
	4,7	12,2	2,2	15	88	117	1	0,6	186	640	1 327	554	2 020	4 415	74	123	173
	4,7	12,2	2,2	25	88	117	1	0,6	117	352	704	336	1 023	2 075	146	215	278
	4,7	12,2	2,2	25	88	117	1	0,6	117	352	704	336	1 023	2 075	146	215	278

Super precision angular contact ball bearings

With large or small balls
Ceramic balls
Steel rings
Design DLR





d = 85 – 95 mm

Main dimensions			Basic load ratings		Fatigue limit load	Limiting speeds[1]		Dimensions		Mass	Designation[2]
d	D	B	dyn. C_r	stat. C_{0r}	C_{ur}	n_G grease	n_G oil[4]	r	r_1	m	
			kN	kN	N	min^{-1}	min^{-1}	min.	min.	≈ kg	
85	120	18	44,5	30	2 270	14 000	22 000	1,1	1,1	0,43	**HCB71917-EDLR-T-P4S**
	120	18	47	32	2 400	15 000	24 000	1,1	1,1	0,43	**HCB71917-CDLR-T-P4S**
	120	18	20	15,3	1 150	18 000	28 000	1,1	1,1	0,535	**HC71917-EDLR-T-P4S**
	120	18	30,5	15,3	1 150	20 000	30 000	1,1	1,1	0,535	**XC71917-EDLR-T-P4S**
	130	22	63	39,5	2 900	13 000	20 000	1,1	1,1	0,72	**HCB7017-EDLR-T-P4S**
	130	22	66	41,5	3 050	15 000	22 000	1,1	1,1	0,72	**HCB7017-CDLR-T-P4S**
	130	22	29	20,5	1 510	17 000	26 000	1,1	1,1	0,893	**HC7017-EDLR-T-P4S**
	130	22	44,5	20,5	1 510	19 000	30 000	1,1	1,1	0,893	**XC7017-EDLR-T-P4S**
90	125	18	45	31,5	2 330	13 000	20 000	1,1	1,1	0,445	**HCB71918-EDLR-T-P4S**
	125	18	48	33,5	2 460	15 000	22 000	1,1	1,1	0,445	**HCB71918-CDLR-T-P4S**
	125	18	21,9	16,9	1 240	17 000	26 000	1,1	1,1	0,55	**HC71918-EDLR-T-P4S**
	125	18	33,5	16,9	1 240	19 000	30 000	1,1	1,1	0,55	**XC71918-EDLR-T-P4S**
	140	24	74	46,5	3 300	12 000	19 000	1,5	1,5	0,93	**HCB7018-EDLR-T-P4S**
	140	24	78	49	3 450	14 000	22 000	1,5	1,5	0,93	**HCB7018-CDLR-T-P4S**
	140	24	34	24	1 710	16 000	24 000	1,5	1,5	1,17	**HC7018-EDLR-T-P4S**
	140	24	52	24	1 710	18 000	28 000	1,5	1,5	1,17	**XC7018-EDLR-T-P4S**
95	130	18	46	33	2 380	13 000	19 000	1,1	1,1	0,463	**HCB71919-EDLR-T-P4S**
	130	18	48,5	35	2 500	14 000	22 000	1,1	1,1	0,462	**HCB71919-CDLR-T-P4S**
	130	18	22,5	17,9	1 290	16 000	24 000	1,1	1,1	0,57	**HC71919-EDLR-T-P4S**
	130	18	34,5	17,9	1 290	18 000	28 000	1,1	1,1	0,57	**XC71919-EDLR-T-P4S**
	145	24	77	49,5	3 450	12 000	18 000	1,5	1,5	0,98	**HCB7019-EDLR-T-P4S**
	145	24	81	52	3 600	13 000	20 000	1,5	1,5	0,98	**HCB7019-CDLR-T-P4S**
	145	24	34	25	1 730	15 000	24 000	1,5	1,5	1,22	**HC7019-EDLR-T-P4S**
	145	24	52	25	1 730	17 000	26 000	1,5	1,5	1,22	**XC7019-EDLR-T-P4S**

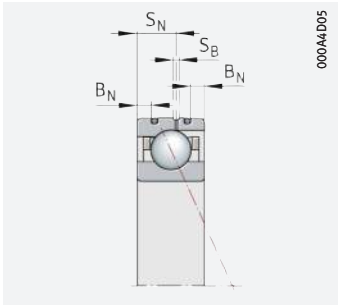
medias ➤ *https://www.schaeffler.de/std/1D72*

[1] The limiting speeds are based on elastically preloaded single bearings.

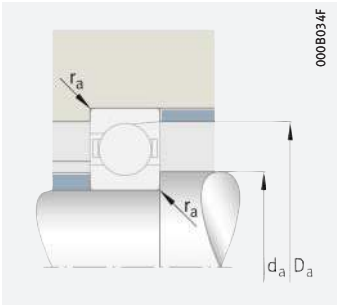
[2] Explanation of designations ➤ 🕮 *SP 1*.

[3] L = light preload; M = moderate preload; H = high preload.

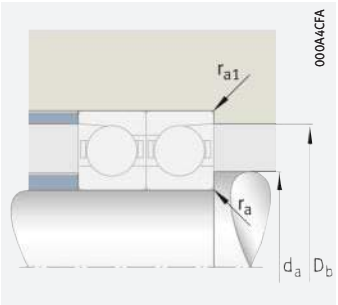
[4] Minimal quantity oil lubrication.



Design DLR



Mounting dimensions

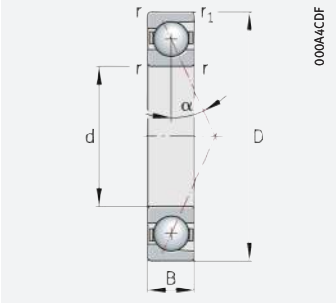


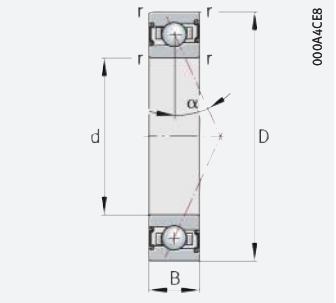
Mounting dimensions

Dimensions				Contact angle	Mounting dimensions				Preload force[3] F_V			Lift-off force[3] K_{aE}			Axial rigidity[3] c_a		
d	B_N	S_N	S_B	α	d_a h12	D_a H12	r_a	r_{a1}	L	M	H	L	M	H	L	M	H
				°			max.	max.	N	N	N	N	N	N	N/µm	N/µm	N/µm
85	4	10,4	2,2	25	92	114	0,6	0,6	143	627	1 403	409	1 837	4 197	154	262	356
	4	10,4	2,2	15	92	114	0,6	0,6	117	428	906	346	1 341	2 985	67,4	114	161
	4	10,4	2,2	25	92	114	0,6	0,6	82	247	493	236	716	1 452	140	206	265
	4	10,4	2,2	25	92	114	0,6	0,6	82	247	493	236	716	1 452	140	206	265
	4,7	12,2	2,2	25	93	122	1	0,6	256	997	2 159	736	2 927	6 484	181	296	398
	4,7	12,2	2,2	15	93	122	1	0,6	189	653	1 356	562	2 058	4 501	76,9	128	179
	4,7	12,2	2,2	25	93	122	1	0,6	120	359	718	343	1 042	2 115	150	221	286
	4,7	12,2	2,2	25	93	122	1	0,6	120	359	718	343	1 042	2 115	150	221	286
90	4	10,4	2,2	25	97	119	0,6	0,6	147	648	1 450	421	1 897	4 337	160	272	369
	4	10,4	2,2	15	97	119	0,6	0,6	118	434	919	349	1 357	3 023	69,4	118	165
	4	10,4	2,2	25	97	119	0,6	0,6	90	269	538	257	781	1 584	144	212	273
	4	10,4	2,2	25	97	119	0,6	0,6	90	269	538	257	781	1 584	144	212	273
	5,5	14,5	2,2	25	100	131	1,5	0,6	319	1 201	2 577	916	3 528	7 745	195	316	423
	5,5	14,5	2,2	15	100	131	1,5	0,6	230	781	1 613	685	2 464	5 361	82,3	136	191
	5,5	14,5	2,2	25	100	131	1,5	0,6	141	423	845	404	1 228	2 490	163	241	310
	5,5	14,5	2,2	25	100	131	1,5	0,6	141	423	845	404	1 228	2 490	163	241	310
95	4	10,4	2,2	25	102	124	0,6	0,6	148	656	1 470	423	1 918	4 393	164	280	380
	4	10,4	2,2	15	102	124	0,6	0,6	119	440	932	352	1 373	3 061	71,3	121	170
	4	10,4	2,2	25	102	124	0,6	0,6	92	276	552	263	801	1 623	150	221	285
	4	10,4	2,2	25	102	124	0,6	0,6	92	276	552	263	801	1 623	150	221	285
	5,5	14,5	2,2	25	105	136	1,5	0,6	322	1 220	2 622	924	3 581	7 871	203	328	439
	5,5	14,5	2,2	15	105	136	1,5	0,6	233	794	1 643	693	2 499	5 442	85,3	141	197
	5,5	14,5	2,2	25	105	136	1,5	0,6	141	423	845	404	1 227	2 488	167	246	317
	5,5	14,5	2,2	25	105	136	1,5	0,6	141	423	845	404	1 227	2 488	167	246	317

Super precision angular contact ball bearings

With large or small balls
Ceramic balls
Steel rings
Design DLR



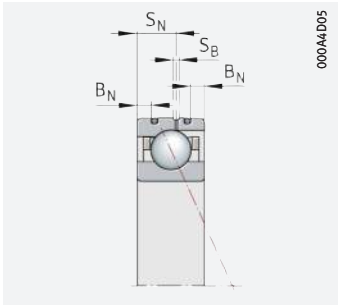


d = 100 – 110 mm

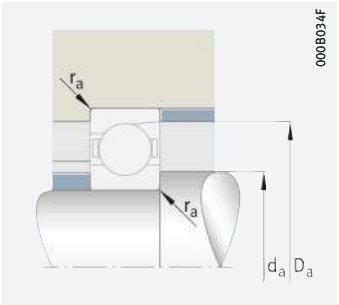
Main dimensions			Basic load ratings		Fatigue limit load	Limiting speeds[1]		Dimensions		Mass	Designation[2]
d	D	B	dyn. C_r	stat. C_{0r}	C_{ur}	n_G grease	n_G oil[4]	r	r_1	m	
			kN	kN	N	min^{-1}	min^{-1}	min.	min.	≈ kg	
100	140	20	57	40,5	2 800	12 000	18 000	1,1	1,1	0,64	**HCB71920-EDLR-T-P4S**
	140	20	60	43	2 950	13 000	20 000	1,1	1,1	0,64	**HCB71920-CDLR-T-P4S**
	140	20	27	21,2	1 470	15 000	24 000	1,1	1,1	0,8	**HC71920-EDLR-T-P4S**
	140	20	41	21,2	1 470	17 000	26 000	1,1	1,1	0,8	**XC71920-EDLR-T-P4S**
	150	24	79	52	3 550	11 000	17 000	1,5	1,5	1,01	**HCB7020-EDLR-T-P4S**
	150	24	83	55	3 750	13 000	19 000	1,5	1,5	1,01	**HCB7020-CDLR-T-P4S**
	150	24	34,5	26	1 760	15 000	22 000	1,5	1,5	1,27	**HC7020-EDLR-T-P4S**
	150	24	53	26	1 760	16 000	24 000	1,5	1,5	1,27	**XC7020-EDLR-T-P4S**
105	145	20	57	41	2 800	11 000	17 000	1,1	1,1	0,68	**HCB71921-EDLR-T-P4S**
	145	20	60	43	2 950	13 000	19 000	1,1	1,1	0,68	**HCB71921-CDLR-T-P4S**
	145	20	27,5	22,4	1 530	15 000	22 000	1,1	1,1	0,82	**HC71921-EDLR-T-P4S**
	145	20	42	22,4	1 530	16 000	24 000	1,1	1,1	0,82	**XC71921-EDLR-T-P4S**
	160	26	80	55	3 650	11 000	16 000	2	2	1,36	**HCB7021-EDLR-T-P4S**
	160	26	85	58	3 850	12 000	18 000	2	2	1,36	**HCB7021-CDLR-T-P4S**
	160	26	45	33	2 180	14 000	22 000	2	2	1,56	**HC7021-EDLR-T-P4S**
	160	26	69	33	2 180	15 000	24 000	2	2	1,56	**XC7021-EDLR-T-P4S**
110	150	20	58	42,5	2 850	11 000	17 000	1,1	1,1	0,69	**HCB71922-EDLR-T-P4S**
	150	20	61	45	3 000	12 000	19 000	1,1	1,1	0,69	**HCB71922-CDLR-T-P4S**
	150	20	32	26	1 720	14 000	22 000	1,1	1,1	0,82	**HC71922-EDLR-T-P4S**
	150	20	49	26	1 720	16 000	24 000	1,1	1,1	0,82	**XC71922-EDLR-T-P4S**
	170	28	106	70	4 500	11 000	16 000	2	2	1,59	**HCB7022-EDLR-T-P4S**
	170	28	112	74	4 750	12 000	18 000	2	2	1,59	**HCB7022-CDLR-T-P4S**
	170	28	45,5	34	2 200	13 000	20 000	2	2	2,02	**HC7022-EDLR-T-P4S**
	170	28	69	34	2 200	14 000	22 000	2	2	2,02	**XC7022-EDLR-T-P4S**

medias ➤ *https://www.schaeffler.de/std/1D73*

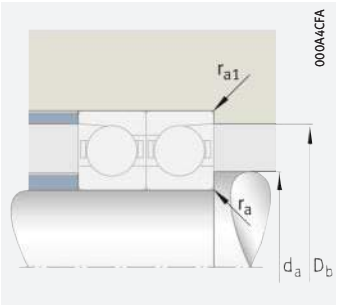
1) The limiting speeds are based on elastically preloaded single bearings.
2) Explanation of designations ➤ 🕮 *SP 1*.
3) L = light preload; M = moderate preload; H = high preload.
4) Minimal quantity oil lubrication.



Design DLR



Mounting dimensions

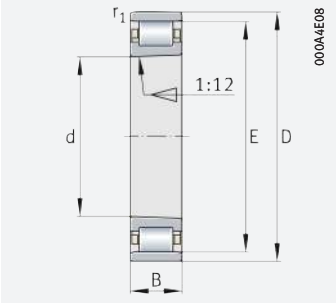


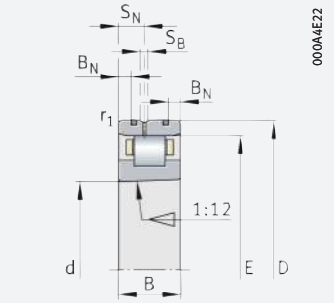
Mounting dimensions

Dimensions				Contact angle	Mounting dimensions				Preload force[3] F_V			Lift-off force[3] K_{aE}			Axial rigidity[3] c_a		
d	B_N	S_N	S_B	α	d_a h12	D_a H12	r_a	r_{a1}	L	M	H	L	M	H	L	M	H
				°			max.	max.	N	N	N	N	N	N	N/µm	N/µm	N/µm
100	4	12	2,2	25	107	133	0,6	0,6	204	850	1 876	584	2 489	5 611	187	311	421
	4	12	2,2	15	107	133	0,6	0,6	160	572	1 201	473	1 789	3 950	80,4	135	189
	4	12	2,2	25	107	133	0,6	0,6	109	328	656	313	951	1 927	162	239	307
	4	12	2,2	25	107	133	0,6	0,6	109	328	656	313	951	1 927	162	239	307
	5,5	14,5	2,2	25	110	141	1,5	0,6	333	1 266	2 723	957	3 715	8 170	212	343	459
	5,5	14,5	2,2	15	110	141	1,5	0,6	241	823	1 703	717	2 587	5 636	89,1	148	206
	5,5	14,5	2,2	25	110	141	1,5	0,6	144	431	863	412	1 252	2 539	171	253	326
	5,5	14,5	2,2	25	110	141	1,5	0,6	144	431	863	412	1 252	2 539	171	253	326
105	4	12	2,2	25	112	138	0,6	0,6	204	850	1 876	584	2 489	5 611	187	311	421
	4	12	2,2	15	112	138	0,6	0,6	157	564	1 185	466	1 763	3 895	80	134	188
	4	12	2,2	25	112	138	0,6	0,6	113	338	676	323	980	1 987	170	250	321
	4	12	2,2	25	112	138	0,6	0,6	113	338	676	323	980	1 987	170	250	321
	5,5	15,5	2,2	25	116	150	2	1	336	1 285	2 768	966	3 768	8 297	219	355	476
	5,5	15,5	2,2	15	116	150	2	1	244	836	1 732	725	2 623	5 718	92,1	153	213
	5,5	15,5	2,2	25	116	150	2	1	184	552	1 104	527	1 602	3 250	188	277	357
	5,5	15,5	2,2	25	116	150	2	1	184	552	1 104	527	1 602	3 250	188	277	357
110	4	12	2,2	25	117	143	0,6	0,6	208	871	1 923	596	2 547	5 747	193	322	435
	4	12	2,2	15	117	143	0,6	0,6	158	570	1 199	468	1 777	3 931	82,1	138	193
	4	12	2,2	25	117	143	0,6	0,6	131	393	787	375	1 141	2 312	178	262	337
	4	12	2,2	25	117	143	0,6	0,6	131	393	787	375	1 141	2 312	178	262	337
	6	16,2	2,2	25	121	159	2	1	490	1 779	3 778	1 409	5 224	11 341	248	395	527
	6	16,2	2,2	15	121	159	2	1	337	1 126	2 314	1 004	3 540	7 655	103	169	234
	6	16,2	2,2	25	121	159	2	1	187	561	1 121	535	1 627	3 299	193	284	366
	6	16,2	2,2	25	121	159	2	1	187	561	1 121	535	1 627	3 299	193	284	366

Super precision cylindrical roller bearings

Single row
Steel or ceramic rollers





Direct Lube

d = 30 – 55 mm

Main dimensions			Basic load ratings		Fatigue limit load	Limiting speeds		Mass	Designation[1]
d	D	B	dyn. C_r	stat. C_{0r}	C_{ur}	n_G grease	n_G oil[2]	m	X-life ➤ *1176*
			N	N	N	min^{-1}	min^{-1}	≈ kg	
30	55	13	17 500	15 600	2 230	21 700	25 500	0,12	**N1006-D-K-TVP-SP-XL**
	55	13	20 200	20 400	2 600	33 500	39 500	0,12	**N1006-K-PVPA1-SP**
	55	13	20 200	19 200	1 830	36 500	43 000	0,11	**HCN1006-K-PVPA1-SP**
35	62	14	23 600	20 900	3 300	18 700	22 000	0,16	**N1007-D-K-TVP-SP-XL**
	62	14	19 900	20 900	2 650	30 000	35 000	0,16	**N1007-C-K-PVPA1-SP**
	62	14	19 900	19 600	1 890	32 500	38 500	0,14	**HCN1007-C-K-PVPA1-SP**
40	68	15	27 000	26 000	4 100	17 100	20 100	0,2	**N1008-D-K-TVP-SP-XL**
	68	15	27 500	29 000	3 600	26 500	31 000	0,19	**N1008-K-PVPA1-SP**
	68	15	27 500	27 000	2 600	29 000	34 000	0,16	**HCN1008-K-PVPA1-SP**
45	75	16	34 500	32 500	5 000	15 200	17 800	0,24	**N1009-D-K-TVP-SP-XL**
	75	16	29 000	32 500	4 050	24 400	28 500	0,24	**N1009-C-K-PVPA1-SP**
	75	16	29 000	31 000	2 950	26 500	31 000	0,22	**HCN1009-C-K-PVPA1-SP**
50	80	16	36 500	36 500	5 600	14 200	16 800	0,27	**N1010-D-K-TVP-SP-XL**
	80	16	31 000	36 500	4 500	22 800	27 000	0,27	**N1010-C-K-PVPA1-SP**
	80	16	31 000	34 000	3 300	24 900	29 500	0,23	**HCN1010-C-K-PVPA1-SP**
55	90	18	48 000	48 500	7 700	12 600	14 800	0,4	**N1011-D-K-TVP-SP-XL**
	90	18	40 500	48 000	6 300	20 200	23 800	0,4	**N1011-K-PVPA1-SP**
	90	18	40 500	45 500	4 550	22 100	26 000	0,34	**HCN1011-K-PVPA1-SP**

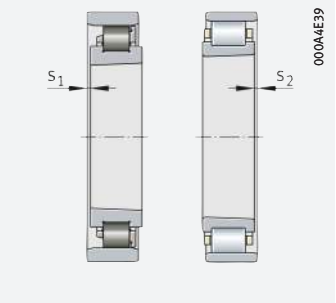
medias ➤ *https://www.schaeffler.de/std/1D74*

[1] The bearings are also available by agreement in the following designs:
- With cylindrical bore (without suffix K), ordering example: N1006-D-TVP-SP-XL
- As Direct Lube design (suffix DLR), ordering example: N1006-K-DLR-PVPA1-SP.

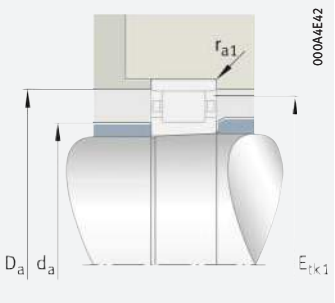
Series HCN10 is available by agreement in the following design from d = 30 mm to d = 120 mm:
- With half the number of rollers for higher limiting speeds (suffix H193), ordering example: HCN1024-K-PVPA1-SP-H193.

[2] Minimal quantity oil lubrication.

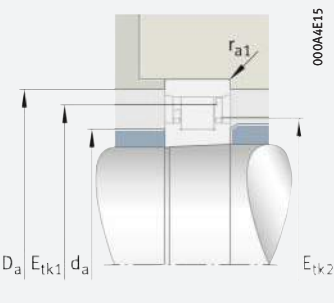
[3] Axial displacement of outer ring from central position.



Axial displacement



Mounting dimensions

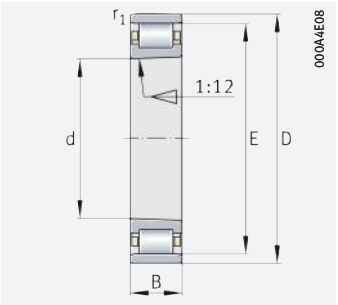


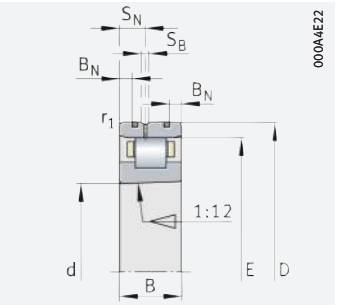
Mounting dimensions for bearings with PVPA1 cage

Dimensions								Mounting dimensions				
d	r_1 min.	E	B_N	S_N	S_B	s_1 [3]	s_2 [3]	d_a h12	D_a H12	E_{tk1} nom.	E_{tk2} nom.	r_{a1} max.
30	0,6	48,5	2,8	7,2	1,4	2,8	2,8	38,5	49,5	47,5	–	0,6
	0,6	48,5	2,8	7,2	1,4	0,85	2,2	36,5	49,4	47	39,7	0,6
	0,6	48,5	2,8	7,2	1,4	0,85	2,2	36,5	49,4	47	39,7	0,6
35	0,6	55	2,8	8	1,4	2,8	2,8	43	56	53,9	–	0,6
	0,6	55	2,8	8	1,4	0,9	2,4	43	56,1	53,4	45,8	0,6
	0,6	55	2,8	8	1,4	0,9	2,4	43	56,1	53,4	45,8	0,6
40	0,6	61	2,8	8,5	1,4	3,1	3,1	49	62,1	59,8	–	0,6
	0,6	61	2,8	8,5	1,4	0,95	2,5	47	62,1	59,3	50,8	0,6
	0,6	61	2,8	8,5	1,4	0,95	2,5	47	62,1	59,3	50,8	0,6
45	0,6	67,5	3,4	9,3	1,4	3,1	3,1	53,5	68,6	66,2	–	0,6
	0,6	67,5	3,4	9,3	1,4	1,2	2,5	53,5	68,7	65,6	56,9	0,6
	0,6	67,5	3,4	9,3	1,4	1,2	2,5	53,5	68,7	65,6	56,9	0,6
50	0,6	72,5	3,4	9,3	1,4	3,1	3,1	58,5	73,6	71,2	–	0,6
	0,6	72,5	3,4	9,3	1,4	1,15	2,7	58,5	73,7	70,6	61,9	0,6
	0,6	72,5	3,4	9,3	1,4	1,15	2,7	58,5	73,7	70,6	61,9	0,6
55	1	81	4,3	9,7	1,4	3,4	3,4	65	82,2	79,3	–	1
	1	80,5	4,3	9,7	1,4	1,4	3	64,5	81,8	78,5	68,8	1
	1	80,5	4,3	9,7	1,4	1,4	3	64,5	81,8	78,5	68,8	1

Super precision cylindrical roller bearings

Single row
Steel or ceramic rollers





Direct Lube

d = 60 – 85 mm

Main dimensions			Basic load ratings		Fatigue limit load	Limiting speeds		Mass	Designation[1]
d	D	B	dyn. C_r	stat. C_{0r}	C_{ur}	n_G grease	n_G oil[2]	m	X-life ➤ *1176*
			N	N	N	min^{-1}	min^{-1}	≈ kg	
60	95	18	51 000	53 000	8 500	11 900	14 000	0,43	**N1012-D-K-TVP-SP-XL**
	95	18	43 000	53 000	6 900	19 200	22 600	0,42	**N1012-K-PVPA1-SP**
	95	18	43 000	50 000	5 000	21 000	24 700	0,37	**HCN1012-K-PVPA1-SP**
65	100	18	53 000	58 000	9 300	11 400	13 400	0,45	**N1013-D-K-TVP-SP-XL**
	100	18	45 000	58 000	7 600	18 200	21 400	0,45	**N1013-C-K-PVPA1-SP**
	100	18	45 000	54 000	5 500	19 900	23 400	0,4	**HCN1013-C-K-PVPA1-SP**
70	110	20	66 000	72 000	10 400	10 200	12 000	0,64	**N1014-D-K-TVP-SP-XL**
	110	20	63 000	77 000	9 200	16 000	18 800	0,61	**N1014-K-PVPA1-SP**
	110	20	61 000	70 000	7 400	17 500	20 600	0,52	**HCN1014-K-PVPA1-SP**
75	115	20	65 000	73 000	10 500	9 800	11 500	0,67	**N1015-D-K-TVP-SP-XL**
	115	20	66 000	85 000	10 200	15 300	18 000	0,65	**N1015-K-PVPA1-SP**
	115	20	65 000	77 000	8 100	16 800	19 700	0,56	**HCN1015-K-PVPA1-SP**
80	125	22	81 000	91 000	13 700	9 000	10 600	0,9	**N1016-D-K-TVP-SP-XL**
	125	22	77 000	99 000	12 700	14 000	16 500	0,88	**N1016-K-PVPA1-SP**
	125	22	77 000	93 000	10 100	15 300	18 100	0,76	**HCN1016-K-PVPA1-SP**
85	130	22	80 000	91 000	13 500	8 700	10 200	0,95	**N1017-D-K-TVP-SP-XL**
	130	22	76 000	99 000	12 600	13 500	15 900	1	**N1017-K-PVPA1-SP**
	130	22	76 000	93 000	10 000	14 800	17 400	0,89	**HCN1017-K-PVPA1-SP**

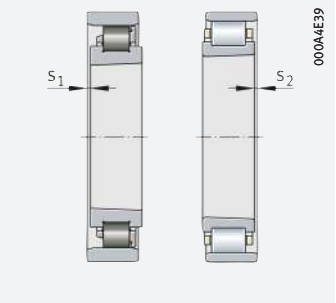
medias ➤ *https://www.schaeffler.de/std/1D75*

[1] The bearings are also available by agreement in the following designs:
- With cylindrical bore (without suffix K), ordering example: N1006-D-TVP-SP-XL
- As Direct Lube design (suffix DLR), ordering example: N1006-K-DLR-PVPA1-SP.

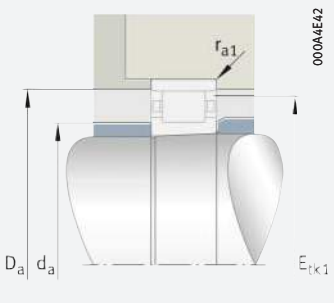
Series HCN10 is available by agreement in the following design from d = 30 mm to d = 120 mm:
- With half the number of rollers for higher limiting speeds (suffix H193), ordering example: HCN1024-K-PVPA1-SP-H193.

[2] Minimal quantity oil lubrication.

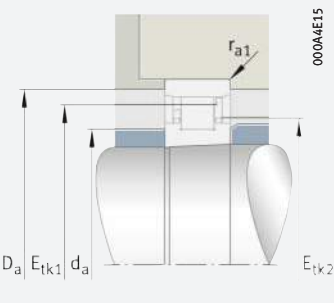
[3] Axial displacement of outer ring from central position.



Axial displacement



Mounting dimensions

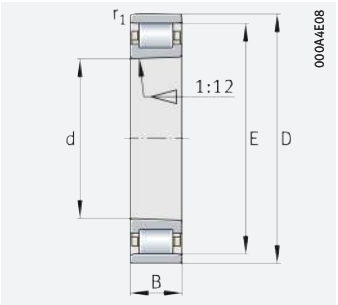


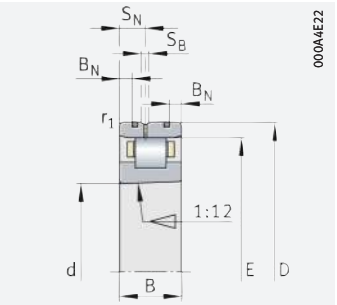
Mounting dimensions for bearings with PVPA1 cage

Dimensions								Mounting dimensions				
d	r_1 min.	E	B_N	S_N	S_B	s_1 [3]	s_2 [3]	d_a h12	D_a H12	E_{tk1} nom.	E_{tk2} nom.	r_{a1} max.
60	1	86,1	4,3	9,7	1,4	3,4	3,4	70,1	87,3	84,4	–	1
	1	85,5	4,3	9,7	1,4	1,25	3	69,5	86,8	83,5	73,8	1
	1	85,5	4,3	9,7	1,4	1,25	3	69,5	86,8	83,5	73,8	1
65	1	91	4	10,4	1,4	3,4	3,4	75	92,2	89,3	–	1
	1	91	4	10,4	1,4	1,4	2,5	75	92,3	88,5	78,7	1
	1	91	4	10,4	1,4	1,4	2,5	75	92,3	88,5	78,7	1
70	1	100	4	11,6	1,4	3,8	3,8	82	101,3	98,2	–	1
	1	100	4	11,6	1,4	1,25	3,3	80	101,3	97,5	85,4	1
	1	100	4	11,6	1,4	1,25	3,3	80	101,3	97,5	85,4	1
75	1	105	4	11,6	1,4	3,8	3,8	87	106,3	103,2	–	1
	1	105	4	11,6	1,4	1	3	85	106,3	102,5	90,4	1
	1	105	4	11,6	1,4	1	3	85	106,3	102,5	90,4	1
80	1	113	4,7	12,2	2,2	4,1	4,1	93	114,4	111,4	–	1
	1	113,5	4,7	12,2	2,2	1,1	3,5	91,5	115	110,8	97,4	1
	1	113,5	4,7	12,2	2,2	1,1	3,5	91,5	115	110,8	97,4	1
85	1	118	4,7	12,2	2,2	4,1	4,1	98	119,4	116,3	–	1
	1	118,5	4,7	12,2	2,2	1,5	2,7	96,5	120	115,8	102,4	1
	1	118,5	4,7	12,2	2,2	1,5	2,7	96,5	120	115,8	102,4	1

Super precision cylindrical roller bearings

Single row
Steel or ceramic rollers





Direct Lube

d = 90 – 120 mm

Main dimensions			Basic load ratings		Fatigue limit load	Limiting speeds		Mass	Designation[1]
d	D	B	dyn. C_r	stat. C_{0r}	C_{ur}	n_G grease	n_G oil[2]	m	X-life ➤ *1176*
			N	N	N	min^{-1}	min^{-1}	≈ kg	
90	140	24	95 000	108 000	16 500	8 000	9 400	1,23	**N1018-D-K-TVP-SP-XL**
	140	24	91 000	119 000	15 200	12 500	14 700	1,2	**N1018-K-PVPA1-SP**
	140	24	91 000	112 000	12 000	13 700	16 100	1,06	**HCN1018-K-PVPA1-SP**
95	145	24	99 000	117 000	17 700	7 700	9 100	1,29	**N1019-D-K-TVP-SP-XL**
	145	24	96 000	130 000	16 400	12 100	14 200	1,26	**N1019-K-PVPA1-SP**
	145	24	96 000	122 000	12 900	13 200	15 600	1,2	**HCN1019-K-PVPA1-SP**
100	150	24	99 000	118 000	17 500	7 500	8 800	1,34	**N1020-D-K-TVP-SP-XL**
	150	24	95 000	130 000	16 200	11 700	13 800	1,29	**N1020-K-PVPA1-SP**
	150	24	95 000	123 000	12 800	12 800	15 100	1,2	**HCN1020-K-PVPA1-SP**
105	160	26	132 000	154 000	24 000	6 800	8 000	1,67	**N1021-D-K-TVP-SP-XL**
	160	26	112 000	154 000	19 400	10 900	12 900	1,66	**N1021-K-PVPA1-SP**
	160	26	111 000	144 000	14 400	11 900	14 100	1,6	**HCN1021-K-PVPA1-SP**
110	170	28	153 000	180 000	28 000	6 400	7 500	2,06	**N1022-D-K-TVP-SP-XL**
	170	28	141 000	191 000	24 400	10 000	11 800	2,02	**N1022-K-PVPA1-SP**
	170	28	141 000	180 000	18 000	11 000	12 900	1,9	**HCN1022-K-PVPA1-SP**
120	180	28	160 000	196 000	30 000	6 000	7 100	2,22	**N1024-D-K-TVP-SP-XL**
	180	28	148 000	208 000	26 000	9 500	11 200	2,18	**N1024-K-PVPA1-SP**
	180	28	147 000	195 000	19 300	10 400	12 200	2,05	**HCN1024-K-PVPA1-SP**

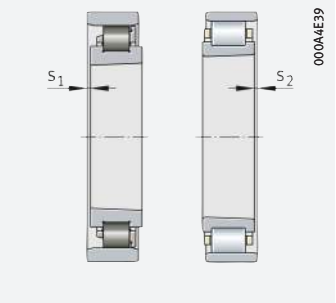
medias ➤ *https://www.schaeffler.de/std/1D76*

[1] The bearings are also available by agreement in the following designs:
- With cylindrical bore (without suffix K), ordering example: N1006-D-TVP-SP-XL
- As Direct Lube design (suffix DLR), ordering example: N1006-K-DLR-PVPA1-SP.

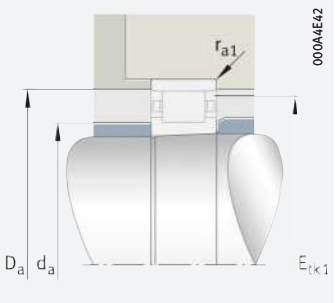
Series HCN10 is available by agreement in the following design from d = 30 mm to d = 120 mm:
- With half the number of rollers for higher limiting speeds (suffix H193), ordering example: HCN1024-K-PVPA1-SP-H193.

[2] Minimal quantity oil lubrication.

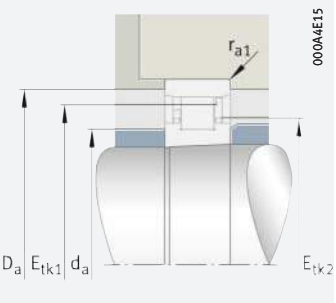
[3] Axial displacement of outer ring from central position.



Axial displacement



Mounting dimensions

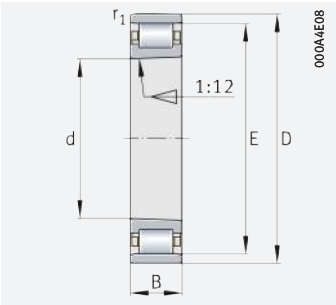


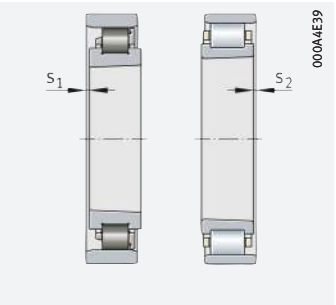
Mounting dimensions for bearings with PVPA1 cage

Dimensions								Mounting dimensions				
d	r_1 min.	E	B_N	S_N	S_B	s_1 [3]	s_2 [3]	d_a h12	D_a H12	E_{tk1} nom.	E_{tk2} nom.	r_{a1} max.
90	1,1	127	5,5	14,5	2,2	4,4	4,4	105	128,5	124,9	–	1
	1,1	127	5,5	14,5	2,2	1,2	3,7	103	128,6	124	109,4	1
	1,1	127	5,5	14,5	2,2	1,2	3,7	103	128,6	124	109,4	1
95	1,1	132	5,5	14,5	2,2	4,4	4,4	110	133,5	129,8	–	1
	1,1	132	5,5	14,5	2,2	1,2	3,7	108	133,6	129	114,4	1
	1,1	132	5,5	14,5	2,2	1,2	3,7	108	133,6	129	114,4	1
100	1,1	137	5,5	14,5	2,2	4,4	4,4	115	138,5	134,8	–	1
	1,1	137	5,5	14,5	2,2	1,1	3,5	113	138,6	134	119,4	1
	1,1	137	5,5	14,5	2,2	1,1	3,5	113	138,6	134	119,4	1
105	1,1	146	6	15,2	2,2	4,5	4,5	120	147,5	143,5	–	1
	1,1	145,5	6	15,2	2,2	0,6	3,2	119,5	147,2	142,3	126,5	1
	1,1	145,5	6	15,2	2,2	0,6	3,2	119,5	147,2	142,3	126,5	1
110	1,1	155	6	16,2	2,2	4,8	4,8	127	156,6	152,4	–	1
	1,1	155	6	16,2	2,2	1	4	125	156,7	151,3	133,1	1
	1,1	155	6	16,2	2,2	1	4	125	156,7	151,3	133,1	1
120	1,1	165	6	16,2	2,2	4,8	4,8	137	166,6	162,4	–	1
	1,1	165	6	16,2	2,2	1	4	135	166,7	161,3	143,1	1
	1,1	165	6	16,2	2,2	1	4	135	166,7	161,3	143,1	1

Super precision cylindrical roller bearings

Single row
Steel rollers





Axial displacement

d = 130 – 200 mm

Main dimensions			Basic load ratings		Fatigue limit load	Limiting speeds		Mass	Designation[1)2)]
d	D	B	dyn. C_r	stat. C_{0r}	C_{ur}	n_G grease	n_G oil[3)]	m	X-life ➤ *1176*
			N	N	N	min^{-1}	min^{-1}	≈ kg	
130	200	33	179 000	250 000	31 500	4 800	5 600	3,72	**N1026-K-M1-SP**
140	210	33	183 000	265 000	32 500	4 550	5 400	3,85	**N1028-K-M1-SP**
150	225	35	210 000	310 000	38 000	4 250	5 000	4,81	**N1030-K-M1-SP**
160	240	38	245 000	355 000	43 500	3 900	4 600	5,76	**N1032-K-M1-SP**
170	260	42	295 000	435 000	52 000	3 600	4 250	7,77	**N1034-K-M1-SP**
180	280	46	360 000	520 000	63 000	3 300	3 850	10,2	**N1036-K-M1-SP**
190	290	46	370 000	550 000	66 000	3 200	3 750	10,6	**N1038-K-M1-SP**
200	310	51	395 000	600 000	71 000	3 000	3 500	13,7	**N1040-K-M1-SP**

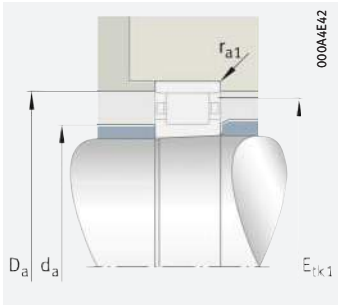
medias ➤ *https://www.schaeffler.de/std/1D77*

1) The bearings are also available by agreement in the following designs:
- With cylindrical bore (without suffix K), ordering example: N1026-M1-SP.

2) Bearings with a larger diameter are available by agreement.

3) Minimal quantity oil lubrication.

4) Axial displacement of outer ring from central position.

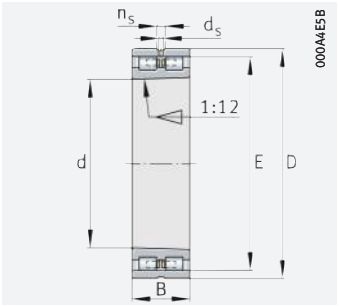


Mounting dimensions

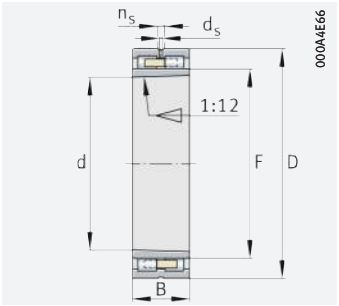
Dimensions					Mounting dimensions			
d	r_1 min.	E	s_1 [4]	s_2 [4]	d_a h12	D_a H12	E_{tk1} nom.	r_{a1} max.
130	1,1	182	4,2	4,2	148	184,1	177,8	1
140	1,1	192	4,2	4,2	158	194,1	187,8	1
150	1,5	205,5	4,4	4,4	169,5	207,8	201	1,5
160	1,5	220	4,6	4,6	180	222,4	215	1,5
170	2,1	237	5	5	193	239,7	231,5	2,1
180	2,1	255	5,6	5,6	205	257,8	248,8	2,1
190	2,1	265	5,6	5,6	215	267,8	258,8	2,1
200	2,1	281	6,4	6,4	229	284,3	274,5	2,1

Super precision cylindrical roller bearings

Double row
Non-locating bearings



NN30



NNU49

d = 30 – 120 mm

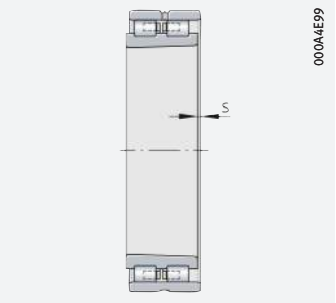
Main dimensions			Basic load ratings		Fatigue limit load	Limiting speeds		Mass	Designation[1]
d	D	B	dyn. C_r	stat. C_{0r}	C_{ur}	n_G grease	n_G oil[2]	m	X-life ➤ *1176*
			N	N	N	min^{-1}	min^{-1}	≈ kg	
30	55	19	30 000	31 000	4 450	20 600	24 200	0,18	**NN3006-D-K-TVP-SP-XL**
35	62	20	40 500	41 500	6 600	17 800	20 900	0,24	**NN3007-D-K-TVP-SP-XL**
40	68	21	46 500	52 000	8 200	16 200	19 100	0,28	**NN3008-D-K-TVP-SP-XL**
45	75	23	59 000	65 000	10 000	14 400	16 900	0,36	**NN3009-D-K-TVP-SP-XL**
50	80	23	63 000	73 000	11 100	13 500	15 900	0,39	**NN3010-D-K-TVP-SP-XL**
55	90	26	82 000	97 000	15 500	11 900	14 100	0,59	**NN3011-D-K-TVP-SP-XL**
60	95	26	87 000	106 000	17 100	11 300	13 300	0,63	**NN3012-D-K-TVP-SP-XL**
65	100	26	91 000	116 000	18 600	10 800	12 700	0,67	**NN3013-D-K-TVP-SP-XL**
70	110	30	113 000	145 000	20 900	9 700	11 400	0,98	**NN3014-D-K-TVP-SP-XL**
75	115	30	112 000	146 000	21 000	9 300	11 000	1,02	**NN3015-D-K-TVP-SP-XL**
80	125	34	139 000	182 000	27 500	8 500	10 000	1,42	**NN3016-D-K-TVP-SP-XL**
85	130	34	138 000	183 000	27 000	8 200	9 700	1,48	**NN3017-D-K-TVP-SP-XL**
90	140	37	162 000	216 000	33 000	7 600	8 900	1,93	**NN3018-D-K-TVP-SP-XL**
95	145	37	170 000	234 000	35 500	7 300	8 600	2,03	**NN3019-D-K-TVP-SP-XL**
100	140	40	128 000	255 000	33 000	5 700	6 700	1,88	**NNU4920-S-K-M-SP**
	150	37	169 000	235 000	35 000	7 100	8 300	2,09	**NN3020-D-K-TVP-SP-XL**
105	145	40	130 000	260 000	34 000	5 500	6 500	1,93	**NNU4921-S-K-M-SP**
	160	41	226 000	310 000	48 000	6 500	7 600	2,68	**NN3021-D-K-TVP-SP-XL**
110	150	40	132 000	270 000	34 500	5 400	6 300	2,01	**NNU4922-S-K-M-SP**
	170	45	260 000	360 000	56 000	6 000	7 100	3,41	**NN3022-D-K-TVP-SP-XL**
120	165	45	175 000	340 000	40 500	4 750	5 600	2,78	**NNU4924-S-K-M-SP**
	180	46	275 000	390 000	60 000	5 700	6 700	3,72	**NN3024-D-K-TVP-SP-XL**

medias ➤ *https://www.schaeffler.de/std/1D78*

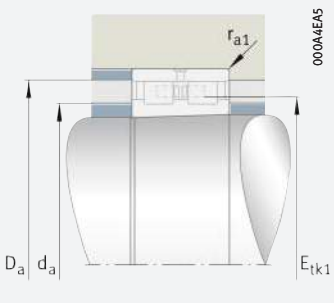
[1] The bearings are also available with a cylindrical bore (without suffix K), ordering example: NN3006-D-TVP-SP-XL.

[2] Minimal quantity oil lubrication.

[3] Axial displacement of outer ring from central position.



Axial displacement

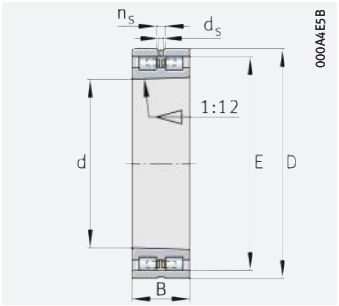


Mounting dimensions

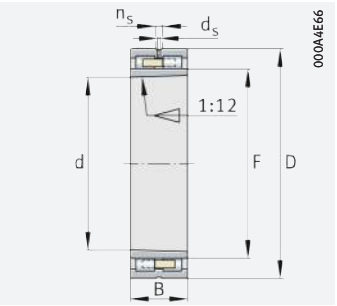
Dimensions							Mounting dimensions		
d	r_1 min.	$s^{3)}$	E	F	n_s	d_s	d_a h12	D_a H12	r_{a1} max.
30	1	1,7	48,5	–	–	–	38,5	50	1
35	1	1,4	55	–	–	–	43	56,5	1
40	1	1,7	61	–	–	–	49	62,6	1
45	1	1,7	67,5	–	–	–	53,5	69,2	1
50	1	1,7	72,5	–	–	–	58,5	74,2	1
55	1,1	1,9	81	–	–	–	65	82,9	1
60	1,1	1,9	86,1	–	–	–	70,1	88	1
65	1,1	1,9	91	–	–	–	75	92,9	1
70	1,1	2,3	100	–	–	–	82	102,3	1
75	1,1	2,3	105	–	–	–	87	107,3	1
80	1,1	2,5	113	–	–	–	93	115,6	1
85	1,1	2,5	118	–	–	–	98	120,6	1
90	1,5	2,5	127	–	–	–	105	129,8	1,5
95	1,5	2,5	132	–	–	–	110	134,8	1,5
100	1,1	2	–	113	3,2	6,5	112	129	1
	1,5	2,5	137	–	–	–	115	139,8	1,5
105	1,1	2	–	118	3,2	6,5	117	134	1
	2	2,6	146	–	–	–	120	149	2
110	1,1	2	–	123	3,2	6,5	122	139	1
	2	2,9	155	–	–	–	127	158,3	2
120	1,1	2,3	–	134,5	3,2	6,5	133,4	154,5	1
	2	3,1	165	–	–	–	137	168,4	2

Super precision cylindrical roller bearings

Double row
Non-locating bearings



NN30



NNU49

d = 130 – 300 mm

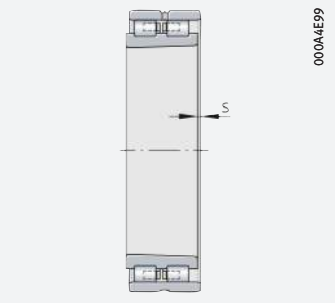
Main dimensions			Basic load ratings		Fatigue limit load	Limiting speeds		Mass	Designation[1]
d	D	B	dyn. C_r	stat. C_{0r}	C_{ur}	n_G grease	n_G oil[2]	m	
			N	N	N	min^{-1}	min^{-1}	≈ kg	
130	180	50	188 000	385 000	45 000	4 450	5 300	3,81	**NNU4926-S-K-M-SP**
	200	52	295 000	500 000	62 000	4 100	4 800	5,84	**NN3026-AS-K-M-SP**
140	190	50	190 000	400 000	45 500	4 250	5 000	4,04	**NNU4928-S-K-M-SP**
	210	53	300 000	520 000	63 000	3 900	4 600	6,22	**NN3028-AS-K-M-SP**
150	210	60	330 000	650 000	81 000	3 550	4 200	6,1	**NNU4930-S-K-M-SP**
	225	56	335 000	590 000	72 000	3 650	4 250	7,59	**NN3030-AS-K-M-SP**
160	220	60	335 000	680 000	83 000	3 400	4 000	6,46	**NNU4932-S-K-M-SP**
	240	60	375 000	670 000	80 000	3 400	4 000	9,23	**NN3032-AS-K-M-SP**
170	230	60	340 000	700 000	84 000	3 300	3 850	6,9	**NNU4934-S-K-M-SP**
	260	67	450 000	800 000	96 000	3 100	3 650	12,5	**NN3034-AS-K-M-SP**
180	250	69	405 000	860 000	102 000	3 000	3 550	9,96	**NNU4936-S-K-M-SP**
	280	74	570 000	1 000 000	117 000	2 850	3 300	16,4	**NN3036-AS-K-M-SP**
190	260	69	410 000	880 000	104 000	2 900	3 450	10,6	**NNU4938-S-K-M-SP**
	290	75	580 000	1 040 000	120 000	2 750	3 200	17,3	**NN3038-AS-K-M-SP**
200	280	80	490 000	1 040 000	123 000	2 700	3 200	14,7	**NNU4940-S-K-M-SP**
	310	82	660 000	1 190 000	140 000	2 550	3 000	22,2	**NN3040-AS-K-M-SP**
220	300	80	510 000	1 140 000	131 000	2 550	3 000	16,3	**NNU4944-S-K-M-SP**
	340	90	810 000	1 450 000	163 000	2 290	2 700	29,1	**NN3044-AS-K-M-SP**
240	320	80	530 000	1 210 000	136 000	2 400	2 800	17,1	**NNU4948-S-K-M-SP**
	360	92	840 000	1 580 000	174 000	2 170	2 550	31,5	**NN3048-AS-K-M-SP**
260	360	100	750 000	1 690 000	187 000	2 070	2 430	30,4	**NNU4952-S-K-M-SP**
	400	104	1 070 000	2 010 000	219 000	1 930	2 280	46,2	**NN3052-AS-K-M-SP**
280	380	100	770 000	1 790 000	195 000	1 970	2 320	32,5	**NNU4956-S-K-M-SP**
	420	106	1 090 000	2 090 000	225 000	1 850	2 170	49,7	**NN3056-AS-K-M-SP**
300	420	118	1 040 000	2 380 000	260 000	1 740	2 040	48,6	**NNU4960-S-K-M-SP**
	460	118	1 270 000	2 400 000	255 000	1 670	1 970	68,5	**NN3060-AS-K-M-SP**

medias ➤ *https://www.schaeffler.de/std/1D79*

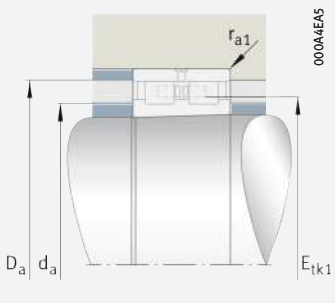
1) The bearings are also available with a cylindrical bore (without suffix K), ordering example: NN3006-D-TVP-SP-XL.

2) Minimal quantity oil lubrication.

3) Axial displacement of outer ring from central position.



Axial displacement

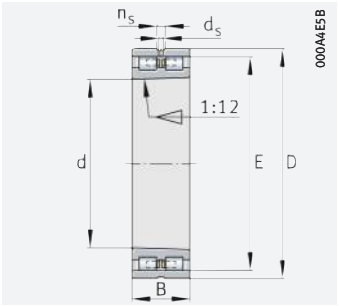


Mounting dimensions

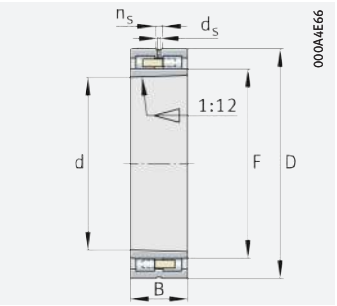
Dimensions							Mounting dimensions		
d	r_1 min.	$s^{3)}$	E	F	n_s	d_s	d_a h12	D_a H12	r_{a1} max.
130	1,5	2,7	–	146	3,2	6,5	144,7	166	1,5
	2	3,1	182	–	4,8	9,5	150	186	2
140	1,5	2,7	–	156	3,2	6,5	155,1	176	1,5
	2	3,4	192	–	4,8	9,5	160	196	2
150	2	2,7	–	168,5	3,2	6,5	167,2	196,5	2
	2,1	3,8	206	–	4,8	9,5	172	210	2,1
160	2	2,7	–	178,5	3,2	6,5	177,2	206,5	2
	2,1	4,3	219	–	4,8	9,5	183	224	2,1
170	2	2,7	–	188,5	3,2	6,5	187,2	216,5	2
	2,1	4,6	236	–	4,8	9,5	196	241	2,1
180	2	3,2	–	202	4,8	9,5	200,5	232	2
	2,1	4,8	255	–	6,3	12,2	209	260	2,1
190	2	3,2	–	212	4,8	9,5	210,5	242	2
	2,1	4,8	265	–	6,3	12,2	219	271	2,1
200	2,1	4,3	–	225	6,3	12,2	223	259	2,1
	2,1	5,7	282	–	6,3	12,2	232	288	2,1
220	2,1	4,3	–	245	6,3	12,2	243	279	2,1
	3	5,7	310	–	8	15	254	317	2,5
240	2,1	4,3	–	265	6,3	12,2	263	299	2,1
	3	6,1	330	–	8	15	274	337	2,5
260	2,1	5,4	–	292	8	15	289,4	334	2,1
	4	6,6	364	–	8	15	300	372	3
280	2,1	5,4	–	312	8	15	309,4	354	2,1
	4	6,9	384	–	8	15	320	392	3
300	3	6,3	–	339	9,5	17,7	336	389	2,5
	4	7,5	418	–	9,5	17,7	346	427	3

Super precision cylindrical roller bearings

Double row
Non-locating bearings



NN30



NNU49

d = 320 – 500 mm

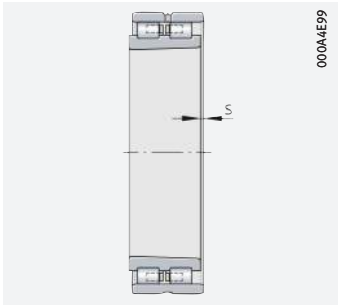
Main dimensions			Basic load ratings		Fatigue limit load	Limiting speeds		Mass	Designation[1]
d	D	B	dyn. C_r	stat. C_{0r}	C_{ur}	n_G grease	n_G oil[2]	m	
			N	N	N	min^{-1}	min^{-1}	≈ kg	
320	440	118	1 070 000	2 550 000	275 000	1 670	1 960	52,5	**NNU4964-S-K-M-SP**
	480	121	1 330 000	2 600 000	270 000	1 610	1 890	73,8	**NN3064-AS-K-M-SP**
340	460	118	1 100 000	2 650 000	285 000	1 600	1 890	55,7	**NNU4968-S-K-M-SP**
	520	133	1 640 000	3 250 000	335 000	1 470	1 730	99,3	**NN3068-AS-K-M-SP**
360	480	118	1 130 000	2 800 000	295 000	1 540	1 820	57,3	**NNU4972-S-K-M-SP**
	540	134	1 670 000	3 350 000	345 000	1 420	1 670	104	**NN3072-AS-K-M-SP**
380	520	140	1 440 000	3 600 000	370 000	1 380	1 620	86,9	**NNU4976-S-K-M-SP**
	560	135	1 700 000	3 500 000	350 000	1 370	1 620	110	**NN3076-AS-K-M-SP**
400	540	140	1 490 000	3 800 000	385 000	1 330	1 570	91	**NNU4980-S-K-M-SP**
	600	148	2 150 000	4 450 000	435 000	1 260	1 480	143	**NN3080-AS-K-M-SP**
420	560	140	1 530 000	4 000 000	400 000	1 290	1 520	94,4	**NNU4984-S-K-M-SP**
	620	150	2 140 000	4 450 000	435 000	1 220	1 440	150	**NN3084-AS-K-M-SP**
440	600	160	2 040 000	5 200 000	520 000	1 150	1 360	130	**NNU4988-S-K-M-SP**
	650	157	2 430 000	5 100 000	490 000	1 160	1 360	172	**NN3088-AS-K-M-SP**
460	620	160	2 110 000	5 500 000	550 000	1 120	1 320	134	**NNU4992-S-K-M-SP**
	680	163	2 600 000	5 400 000	495 000	1 100	1 300	197	**NN3092-AS-K-M-SP**
480	650	170	2 350 000	6 100 000	600 000	1 060	1 250	158	**NNU4996-S-K-M-SP**
	700	165	2 700 000	5 800 000	530 000	1 070	1 260	208	**NN3096-AS-K-M-SP**
500	670	170	2 330 000	6 100 000	590 000	1 030	1 220	163	**NNU49/500-S-K-M-SP**
	720	167	2 700 000	5 800 000	520 000	1 050	1 230	214	**NN30/500-AS-K-M-SP**

medias ➤ *https://www.schaeffler.de/std/1D7A*

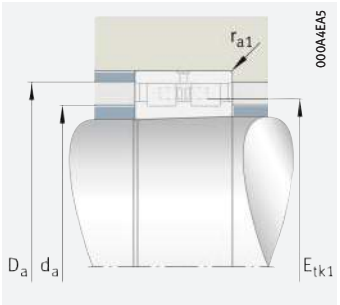
[1] The bearings are also available with a cylindrical bore (without suffix K), ordering example: NN3006-D-TVP-SP-XL.

[2] Minimal quantity oil lubrication.

[3] Axial displacement of outer ring from central position.



Axial displacement

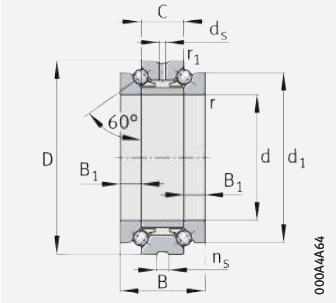


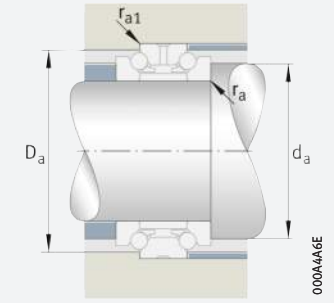
Mounting dimensions

Dimensions							Mounting dimensions		
d	r_1 min.	$s^{3)}$	E	F	n_s	d_s	d_a h12	D_a H12	r_{a1} max.
320	3	6,3	–	359	9,5	17,7	356	409	2,5
	4	8	438	–	9,5	17,7	366	447	3
340	3	6,3	–	379	9,5	17,7	376	429	2,5
	5	8,8	473	–	9,5	17,7	393	483	4
360	3	6,3	–	399	9,5	17,7	396	449	2,5
	5	8,8	493	–	9,5	17,7	413	503	4
380	4	7,2	–	426	9,5	17,7	422,6	482	3
	5	9,1	513	–	9,5	17,7	433	523	4
400	4	7,2	–	446	9,5	17,7	442,6	502	3
	5	9,5	549	–	9,5	17,7	459	560	4
420	4	7,2	–	466	9,5	17,7	462,6	522	3
	5	10	569	–	9,5	17,7	479	580	4
440	4	6,8	–	490	9,5	17,7	486,8	558	3
	6	10,2	597	–	12,5	23,5	501	609	5
460	4	6,8	–	510	9,5	17,7	506,8	578	3
	6	10,9	624	–	12,5	23,5	524	636	5
480	5	7,2	–	534	9,5	17,7	530,6	606	4
	6	11,2	644	–	12,5	23,5	544	656	5
500	5	7,2	–	554	9,5	17,7	550,6	626	4
	6	11,7	664	–	12,5	23,5	564	677	5

Super precision axial angular contact ball bearings 2344

Double direction





Mounting dimensions

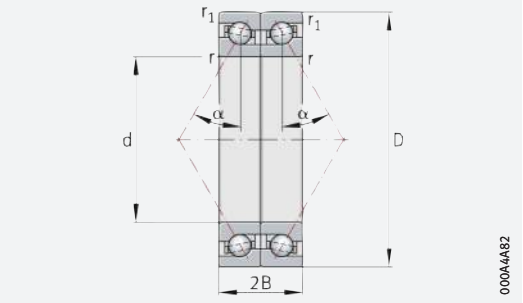
d = 30 – 280 mm

Main dimensions				Basic load ratings		Fatigue limit load	Limiting speeds		Mass	Designation
d	D	B	C	dyn. C_a	stat. C_{0a}	C_{ua}	n_G grease	n_G oil	m	
				N	N	N	min^{-1}	min^{-1}	≈ kg	
30	55	32	16	15 300	36 000	3 250	11 000	16 000	0,29	**234406-M-SP**
35	62	34	17	18 900	47 000	4 250	9 500	14 000	0,38	**234407-M-SP**
40	68	36	18	22 900	59 000	5 300	8 500	12 000	0,463	**234408-M-SP**
45	75	38	19	25 000	67 000	6 000	7 500	10 000	0,579	**234409-M-SP**
50	80	38	19	26 000	72 000	6 500	7 000	9 500	0,629	**234410-M-SP**
55	90	44	22	36 500	99 000	8 900	6 300	8 500	0,944	**234411-M-SP**
60	95	44	22	36 000	98 000	8 900	6 000	8 000	1,01	**234412-M-SP**
65	100	44	22	38 500	111 000	10 000	5 600	7 500	1,08	**234413-M-SP**
70	110	48	24	46 000	134 000	12 100	5 300	7 000	1,49	**234414-M-SP**
75	115	48	24	47 500	144 000	12 900	5 000	6 700	1,57	**234415-M-SP**
80	125	54	27	56 000	175 000	15 500	4 500	6 000	2,16	**234416-M-SP**
85	130	54	27	57 000	181 000	15 600	4 500	6 000	2,25	**234417-M-SP**
90	140	60	30	66 000	213 000	17 700	4 000	5 300	2,92	**234418-M-SP**
95	145	60	30	66 000	219 000	17 900	4 000	5 300	3,04	**234419-M-SP**
100	150	60	30	67 000	226 000	18 100	3 800	5 000	3,17	**234420-M-SP**
105	160	66	33	74 000	250 000	19 500	3 600	4 800	4,07	**234421-M-SP**
110	170	72	36	98 000	325 000	24 400	3 400	4 500	5,19	**234422-M-SP**
120	180	72	36	101 000	345 000	25 000	3 200	4 300	5,56	**234424-M-SP**
130	200	84	42	128 000	440 000	30 500	2 800	3 800	8,28	**234426-M-SP**
140	210	84	42	132 000	470 000	31 500	2 600	3 600	8,78	**234428-M-SP**
150	225	90	45	142 000	520 000	34 000	2 600	3 600	10,8	**234430-M-SP**
160	240	96	48	168 000	600 000	38 000	2 400	3 400	12,9	**234432-M-SP**
170	260	108	54	207 000	740 000	45 500	2 200	3 200	17,7	**234434-M-SP**
180	280	120	60	235 000	840 000	49 500	2 000	3 000	23,4	**234436-M-SP**
190	290	120	60	244 000	900 000	52 000	1 900	2 800	24,7	**234438-M-SP**
200	310	132	66	285 000	1 060 000	59 000	1 800	2 600	31,5	**234440-M-SP**
220	340	144	72	340 000	1 330 000	71 000	1 600	2 200	41,7	**234444-M-SP**
240	360	144	72	350 000	1 420 000	73 000	1 500	2 000	43,8	**234448-M-SP**
260	400	164	82	400 000	1 680 000	83 000	1 400	1 900	64,5	**234452-M-SP**
280	420	164	82	415 000	1 790 000	86 000	1 300	1 800	69	**234456-M-SP**

medias ➤ *https://www.schaeffler.de/std/1D7B*

Dimensions							Mounting dimensions			
d	d_1	B_1	r min.	r_1 min.	d_s	n_s	d_a h12	D_a H12	r_a max.	r_{a1} max.
30	47	8	1	0,15	3,2	4,8	40,5	50,5	1	0,15
35	53	8,5	1	0,15	3,2	4,8	46,5	57	1	0,15
40	58,5	9	1	0,15	3,2	4,8	51,5	63,5	1	0,15
45	65	9,5	1	0,15	3,2	4,8	57,5	70	1	0,15
50	70	9,5	1	0,15	3,2	4,8	62,5	75	1	0,15
55	78	11	1,1	0,3	3,2	6,5	69	84,5	1,1	0,3
60	83	11	1,1	0,3	3,2	6,5	74	89,5	1,1	0,3
65	88	11	1,1	0,3	3,2	6,5	79	94,5	1,1	0,3
70	97	12	1,1	0,3	3,2	6,5	86,5	103,5	1,1	0,3
75	102	12	1,1	0,3	3,2	6,5	91,5	108,5	1,1	0,3
80	110	13,5	1,1	0,3	3,2	6,5	98,5	117	1,1	0,3
85	115	13,5	1,1	0,3	4,8	9,5	103,5	122	1,1	0,3
90	123	15	1,5	0,3	4,8	9,5	110,5	130,5	1,5	0,3
95	128	15	1,5	0,3	4,8	9,5	115,5	135,5	1,5	0,3
100	133	15	1,5	0,3	4,8	9,5	120,5	140,5	1,5	0,3
105	142	16,5	2	0,6	4,8	9,5	128	150	2	0,6
110	150	18	2	0,6	4,8	9,5	134,5	160	2	0,6
120	160	18	2	0,6	4,8	9,5	144,5	170	2	0,6
130	177	21	2	0,6	6,3	12,2	159	188	2	0,6
140	187	21	2,1	0,6	6,3	12,2	169	198	2,1	0,6
150	200	22,5	2,1	0,6	8	15	181	211,5	2,1	0,6
160	212	24	2,1	0,6	8	15	192,5	226	2,1	0,6
170	230	27	2,1	0,6	8	15	206,5	245	2,1	0,6
180	248	30	2,1	0,6	8	15	221	263	2,1	0,6
190	258	30	2,1	0,6	8	15	231	273	2,1	0,6
200	274	33	2,1	0,6	8	15	245	291,5	2,1	0,6
220	304	36	3	1,1	9,5	17,7	269	318	3	1
240	322	36	3	1,1	9,5	17,7	289	338	3	1
260	354	41	4	1,5	9,5	17,7	317,5	374,5	4	1,5
280	374	41	4	1,5	9,5	17,7	337,5	394,5	4	1,5

Super precision angular contact ball bearings BAX



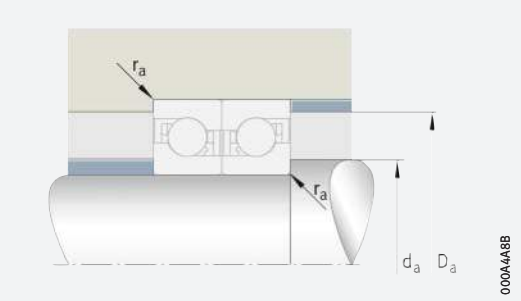
d = 50 – 110 mm

Main dimensions			Basic load ratings		Fatigue limit load	Limiting speeds		Mass	Designation
d	D	2B	dyn. C_a	stat. C_{0a}	C_{ua}	n_G grease	n_G oil	m	
			N	N	N	min^{-1}	min^{-1}	≈ kg	
50	80	28,5	20 300	38 000	3 400	13 000	18 000	0,5	**BAX50-F-T-P4S-DBL**
	80	28,5	25 000	49 500	4 450	11 000	15 000	0,5	**BAX50-H-T-P4S-DBL**
55	90	33	24 200	46 000	4 150	11 000	16 000	0,74	**BAX55-F-T-P4S-DBL**
	90	33	30 000	61 000	5 400	9 500	14 000	0,74	**BAX55-H-T-P4S-DBL**
60	95	33	24 700	49 000	4 400	11 000	15 000	0,8	**BAX60-F-T-P4S-DBL**
	95	33	30 500	64 000	5 800	9 000	13 000	0,8	**BAX60-H-T-P4S-DBL**
65	100	33	26 000	54 000	4 850	10 000	14 000	0,84	**BAX65-F-T-P4S-DBL**
	100	33	32 000	70 000	6 300	8 500	12 000	0,84	**BAX65-H-T-P4S-DBL**
70	110	36	30 000	64 000	5 700	9 000	13 000	1,18	**BAX70-F-T-P4S-DBL**
	110	36	37 000	83 000	7 500	7 500	11 000	1,18	**BAX70-H-T-P4S-DBL**
75	115	36	30 500	67 000	6 000	8 500	12 000	1,24	**BAX75-F-T-P4S-DBL**
	115	36	37 500	87 000	7 800	7 500	10 000	1,24	**BAX75-H-T-P4S-DBL**
80	125	40,5	40 000	88 000	7 800	8 000	11 000	1,68	**BAX80-F-T-P4S-DBL**
	125	40,5	49 500	115 000	10 200	6 700	9 500	1,68	**BAX80-H-T-P4S-DBL**
85	130	40,5	41 000	92 000	8 000	7 500	11 000	1,98	**BAX85-F-T-P4S-DBL**
	130	40,5	50 000	120 000	10 400	6 300	9 000	1,98	**BAX85-H-T-P4S-DBL**
90	140	45	49 500	108 000	9 000	7 000	10 000	2,3	**BAX90-F-T-P4S-DBL**
	140	45	61 000	141 000	11 800	6 000	8 500	2,3	**BAX90-H-T-P4S-DBL**
95	145	45	51 000	113 000	9 300	6 700	9 500	2,4	**BAX95-F-T-P4S-DBL**
	145	45	62 000	147 000	12 100	5 600	8 000	2,4	**BAX95-H-T-P4S-DBL**
100	150	45	52 000	118 000	9 500	6 300	9 000	2,58	**BAX100-F-T-P4S-DBL**
	150	45	63 000	154 000	12 400	5 600	8 000	2,58	**BAX100-H-T-P4S-DBL**
105	160	49,5	52 000	124 000	9 700	6 000	8 500	3,2	**BAX105-F-T-P4S-DBL**
	160	49,5	64 000	162 000	12 600	5 300	7 500	3,2	**BAX105-H-T-P4S-DBL**
110	170	54	64 000	150 000	11 400	5 600	8 000	4,12	**BAX110-F-T-P4S-DBL**
	170	54	78 000	195 000	14 800	4 800	7 000	4,12	**BAX110-H-T-P4S-DBL**

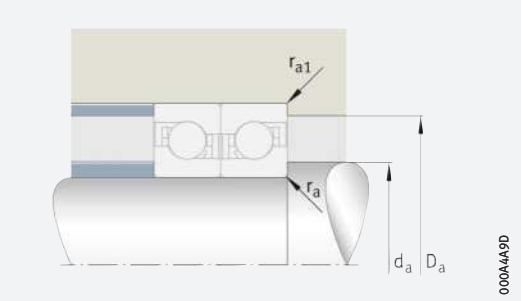
medias ➤ *https://www.schaeffler.de/std/1D7C*

1) Light preload.

2) Moderate preload.



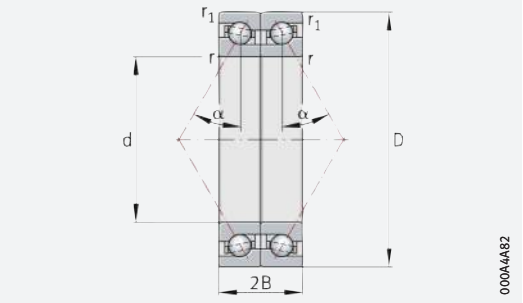
Mounting dimensions



Mounting dimensions

Dimensions			Contact angle	Mounting dimensions				Preload force F_V		Lift-off force K_{aE}		Axial rigidity c_a	
d	r	r_1	α	d_a h12	D_a H12	r_a	r_{a1}	L[1]	M[2]	L[1]	M[2]	L[1]	M[2]
	min.	min.	°			max.	max.	N	N	N	N	N/µm	N/µm
50	0,6	0,6	30	57	73	0,6	0,6	84	416	240	1 214	123	216
	0,6	0,6	40	57	73	0,6	0,6	107	595	304	1 711	200	361
55	0,6	0,6	30	63,5	81,5	0,6	0,6	88	436	251	1 269	129	226
	0,6	0,6	40	63,5	81,5	0,6	0,6	144	741	410	2 131	229	401
60	0,6	0,6	30	68,5	86,5	0,6	0,6	110	517	315	1 508	143	247
	0,6	0,6	40	68,5	86,5	0,6	0,6	143	747	407	2 147	235	415
65	0,6	0,6	30	73,5	91,5	0,6	0,6	120	554	343	1 615	156	268
	0,6	0,6	40	73,5	91,5	0,6	0,6	155	792	441	2 276	256	448
70	0,6	0,6	30	80,5	99,5	0,6	0,6	149	661	426	1 928	173	293
	0,6	0,6	40	80,5	99,5	0,6	0,6	194	944	552	2 713	284	489
75	0,6	0,6	30	85,5	104,5	0,6	0,6	149	668	426	1 947	178	302
	0,6	0,6	40	85,5	104,5	0,6	0,6	194	955	552	2 744	292	504
80	0,6	0,6	30	91	113,5	0,6	0,6	217	903	621	2 633	206	342
	0,6	0,6	40	91	113,5	0,6	0,6	297	1 323	845	3 803	345	577
85	0,6	0,6	30	96	118,5	0,6	0,6	220	922	630	2 688	213	354
	0,6	0,6	40	96	118,5	0,6	0,6	297	1 332	845	3 828	354	594
90	0,6	0,6	30	102	128	0,6	0,6	300	1 181	860	3 447	234	381
	0,6	0,6	40	102	128	0,6	0,6	406	1 700	1 156	4 888	389	637
95	0,6	0,6	30	107	133	0,6	0,6	296	1 188	848	3 465	239	392
	0,6	0,6	40	107	133	0,6	0,6	400	1 711	1 139	4 918	398	657
100	0,6	0,6	30	112	138	0,6	0,6	299	1 206	856	3 516	247	404
	0,6	0,6	40	112	138	0,6	0,6	404	1 740	1 150	5 000	410	678
105	1	1	30	119,5	145,5	1	1	297	1 216	850	3 543	253	416
	1	1	40	119,5	145,5	1	1	396	1 737	1 127	4 989	418	695
110	1	1	30	125,5	154,5	1	1	380	1 495	1 088	4 357	278	451
	1	1	40	125,5	154,5	1	1	524	2 178	1 491	6 258	466	760

Super precision angular contact ball bearings BAX



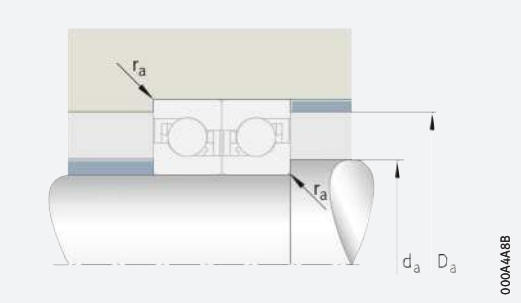
d = 120 – 200 mm

Main dimensions			Basic load ratings		Fatigue limit load	Limiting speeds		Mass	Designation
d	D	2B	dyn. C_a	stat. C_{0a}	C_{ua}	n_G grease	n_G oil	m	
			N	N	N	min^{-1}	min^{-1}	≈ kg	
120	180	54	66 000	163 000	12 000	5 300	7 500	4,42	**BAX120-F-T-P4S-DBL**
	180	54	81 000	212 000	15 600	4 500	6 300	4,42	**BAX120-H-T-P4S-DBL**
130	200	63	90 000	217 000	15 200	4 800	7 000	6,54	**BAX130-F-T-P4S-DBL**
	200	63	111 000	285 000	19 900	4 000	6 000	6,54	**BAX130-H-T-P4S-DBL**
140	210	63	94 000	237 000	16 100	4 500	6 700	6,96	**BAX140-F-T-P4S-DBL**
	210	63	115 000	310 000	21 000	3 800	5 600	6,96	**BAX140-H-T-P4S-DBL**
150	225	67,5	101 000	255 000	16 800	4 300	6 000	8,2	**BAX150-F-T-P4S-DBL**
	225	67,5	124 000	335 000	21 900	3 600	5 300	8,2	**BAX150-H-T-P4S-DBL**
160	240	72	111 000	290 000	18 400	4 000	5 600	10,6	**BAX160-F-T-P4S-DBL**
	240	72	136 000	380 000	24 000	3 400	4 800	10,6	**BAX160-H-T-P4S-DBL**
170	260	81	143 000	370 000	22 600	3 800	5 300	13,4	**BAX170-F-T-P4S-DBL**
	260	81	175 000	480 000	29 500	3 200	4 500	13,4	**BAX170-H-T-P4S-DBL**
180	280	90	177 000	450 000	26 500	3 400	5 000	17,8	**BAX180-F-T-P4S-DBL**
	280	90	218 000	590 000	35 000	3 000	4 300	17,8	**BAX180-H-T-P4S-DBL**
190	290	90	181 000	470 000	27 500	3 400	4 800	18,6	**BAX190-F-T-P4S-DBL**
	290	90	222 000	610 000	35 500	2 800	4 000	18,6	**BAX190-H-T-P4S-DBL**
200	310	99	183 000	495 000	28 000	3 200	4 500	24	**BAX200-F-T-P4S-DBL**
	310	99	225 000	640 000	36 000	2 600	3 800	24	**BAX200-H-T-P4S-DBL**

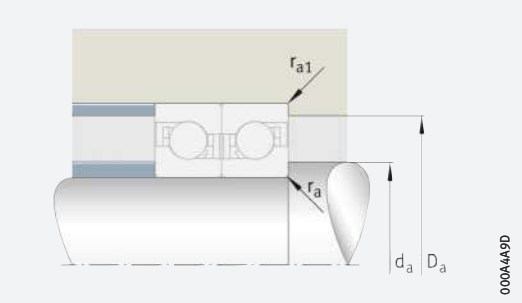
medias ➤ *https://www.schaeffler.de/std/1D7D*

[1] Light preload.

[2] Moderate preload.



Mounting dimensions



Mounting dimensions

Dimensions			Contact angle	Mounting dimensions				Preload force F_V		Lift-off force K_{aE}		Axial rigidity c_a	
d	r	r_1	α	d_a h12	D_a H12	r_a	r_{a1}	L[1]	M[2]	L[1]	M[2]	L[1]	M[2]
	min.	min.	°			max.	max.	N	N	N	N	N/µm	N/µm
120	1	1	30	135,5	164,5	1	1	392	1 554	1 122	4 525	296	481
	1	1	40	135,5	164,5	1	1	543	2 275	1 545	6 535	496	811
130	1	1	30	147,5	182,5	1	1	603	2 235	1 729	6 518	338	538
	1	1	40	147,5	182,5	1	1	850	3 280	2 421	9 429	570	907
140	1	1	30	157,5	192,5	1	1	621	2 317	1 779	6 752	360	573
	1	1	40	157,5	192,5	1	1	865	3 372	2 463	9 688	604	965
150	1,1	1,1	30	169	206	1,1	1,1	674	2 494	1 931	7 266	375	596
	1,1	1,1	40	169	206	1,1	1,1	938	3 623	2 670	10 408	630	1 003
160	1,1	1,1	30	180,5	219,5	1,1	1,1	752	2 764	2 154	8 049	405	641
	1,1	1,1	40	180,5	219,5	1,1	1,1	1 052	4 028	2 995	11 569	681	1 080
170	1,1	1,1	30	192,5	237,5	1,1	1,1	1 016	3 609	2 912	10 517	448	702
	1,1	1,1	40	192,5	237,5	1,1	1,1	1 447	5 305	4 121	15 244	758	1 185
180	1,1	1,1	30	204	255,5	1,1	1,1	1 329	4 610	3 811	13 438	498	775
	1,1	1,1	40	204	255,5	1,1	1,1	1 910	6 798	5 441	19 538	846	1 310
190	1,1	1,1	30	214	265,5	1,1	1,1	1 082	4 261	3 096	12 394	477	773
	1,1	1,1	40	214	265,5	1,1	1,1	1 503	6 245	4 276	17 927	801	1 306
200	1,1	1,1	30	229	280,5	1,1	1,1	1 089	4 312	3 116	12 537	490	796
	1,1	1,1	40	229	280,5	1,1	1,1	1 501	6 286	4 270	18 039	822	1 343

2 Bearings for screw drives

2.1 General features

✎ *Design variants*

Bearings for screw drives are available as:

- axial angular contact ball bearings
  - double row, for screw mounting ➤ *1269* | *1*
  - double row, not for screw mounting ➤ *1269* | *2*
  - single row, for any combination ➤ *1269* | *3*
  - angular contact ball bearing unit, for screw mounting ➤ *1269* | *4*
  - double row or triple row, flange with flattened areas, for screw mounting ➤ *1270* | *5*
- needle roller/axial cylindrical roller bearings
  - for screw mounting
  - not for screw mounting
- with accessories
  - seal carrier assembly
  - precision locknuts
  - sockets
  - free-of-charge calculation using BEARINX-online Easy Ballscrew.

Product catalogue

The standard range of these bearings is described in detail in Technical Product Information ➤ 🕮 *TPI 123*, Bearings for Screw Drives, and in our electronic product catalogue ***medias*** *professional*.

✎ *Downloading TPI 123*

Technical Product Information TPI 123 is available from Schaeffler at ➤ *https://www.schaeffler.de/std/1D5A*.

✎ ***medias***

The following link will take you to the Schaeffler electronic product selection and information system: ➤ *https://medias.schaeffler.com*.

✎ *App for services*

The app “PrecisionDesk” offers extensive services for rotary and linear bearings of a super precision design and assists fitters and engineers in the selection and mounting of bearings. Further information on PrecisionDesk ➤ *1374*, download ➤ *https://www.schaeffler.de/std/1D59*.

Calculations on screw drive bearing arrangements can be carried out free of charge using BEARINX-online Easy Ballscrew.

2.2 Axial angular contact ball bearings

Bearing design

✎ *Precision bearings for screw drive bearing arrangements*

Axial angular contact ball bearings are precision bearings for screw drive bearing arrangements. Depending on the series, they can support radial forces as well as axial forces in one or both directions. Contact seals protect the rolling element system against contamination and moisture. For higher speeds, non-contact minimal gap seals can be used.

✎ *With and without fixing holes*

The bearings are available with and without fixing holes in the outer ring. Bearings with holes are screw mounted directly on the adjacent construction. This solution is particularly economical since there is then no need for the locating bore that would otherwise be required or for the bearing cover with the associated matching work.

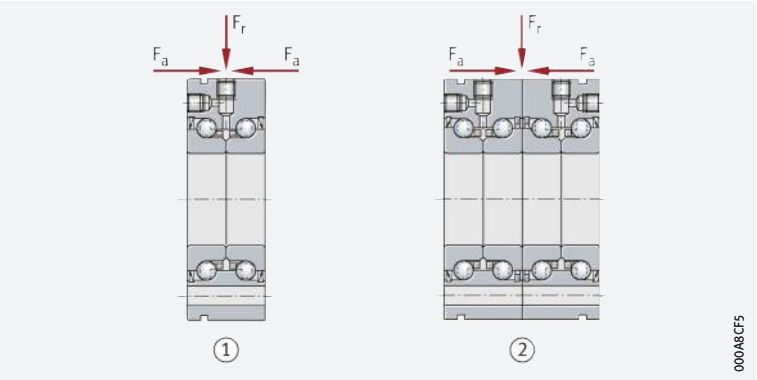
✎ *Available with less stringent tolerances*

For some areas of application, a bearing arrangement of lower precision is often sufficient. For this purpose, bearings with less stringent tolerances are available.

1
Axial angular contact ball bearings, double row, with fixing holes

① *With lip seals or minimal gap seals ZKLF..-2RS, ZKLF..-2Z, ZKLF..-2RS-PE*

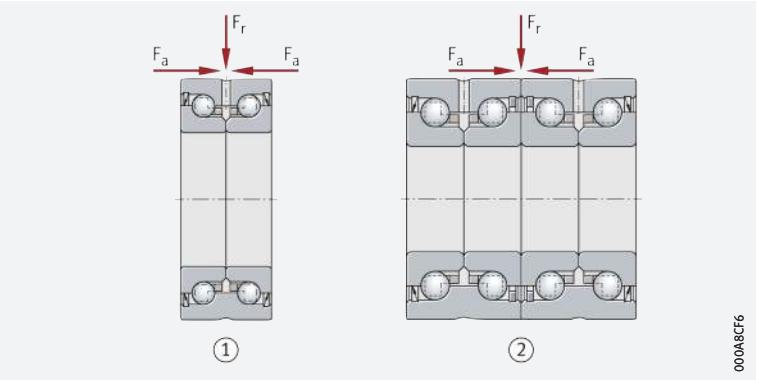
② *Matched pair ZKLF..-2RS-2AP*



2
Axial angular contact ball bearings, double row, without fixing holes

① *With lip seals or minimal gap seals ZKLN..-2RS, ZKLN..-2Z, ZKLN..-2RS-PE*

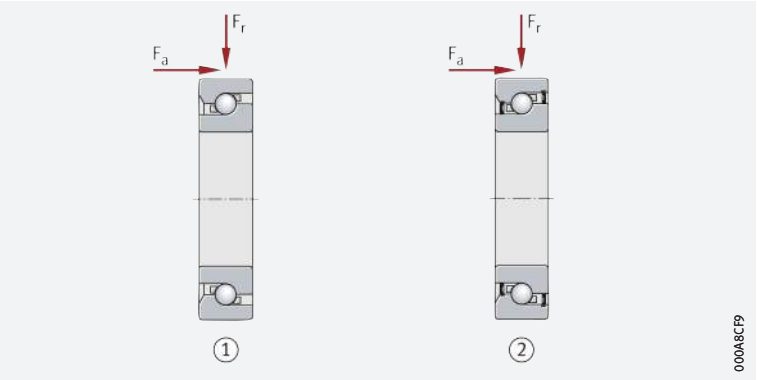
② *Matched pair ZKLN..-2RS-2AP*



3
Axial angular contact ball bearings, single row, for any combination

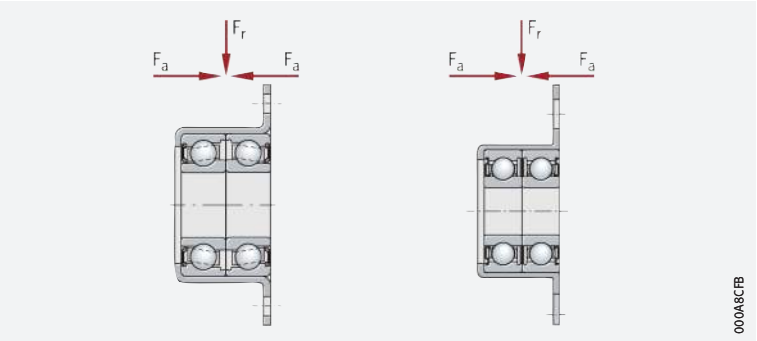
① *Without seals 7602, 7603, BSB, BSB..-SU*

② *With seals 7602..-2RS, 7603..-2RS, BSB..-2RS, BSB..-2Z-SU*



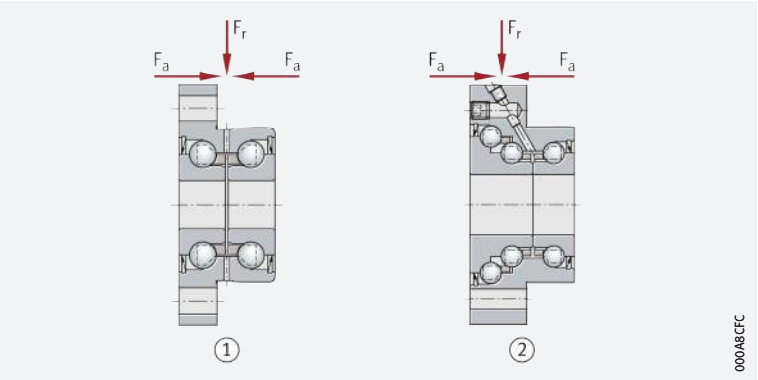
4
Angular contact ball bearing unit, with fixing holes

Lip seals or gap seals ZKLR..-2RS, ZKLR..-2Z



5
Axial angular contact ball bearings, double or triple row, flange with flattened areas, with fixing holes

① *Double row, lip seals or minimal gap seals ZKLFA..-2RS, ZKLFA..-2Z*
② *Triple row, lip seals DKLFA..-2RS*



✎ For special requirements

Screw drive bearing arrangements are subjected to requirements that often cannot be optimally fulfilled by the design construction of conventional bearings.

✎ Wide product range

For the design of bearing arrangements that have high accuracy, high load carrying capacity, high rigidity, low friction, are easy to fit and maintenance-free or low-maintenance and are suitable for the highly dynamic operating conditions of threaded spindles, there is a wide range of INA and FAG axial angular contact ball bearings. With this product range, solutions can be found to all the technical and economic demands placed on the bearing arrangements of feed spindles ➤ *1276*.

✎ Single row and multiple row designs

Axial angular contact ball bearings are available as single, double or triple row ready-to-fit units. They are self-retaining and comprise thick-walled, geometrically stable outer rings, ball and cage assemblies and one-piece or two-piece inner rings. In several series, the outer ring has through holes for simple flange mounting of the bearing to the adjacent construction. The bearing rings are matched to each other such that a defined preload is achieved when the rings are clamped in place using a precision locknut.

✎ Axial and radial load capacity

Due to the 60° contact angle, the bearings can support high axial forces as well as radial forces.

✎ In X or O arrangement

In arrangements of multiple row angular contact ball bearings, a distinction is made between O, X and tandem arrangements in relation to the arrangement of contact angles. The arrangement of contact angles has an essential influence on the tilting rigidity of the bearing position.

The characteristics of the O arrangement are:

- high tilting rigidity
- higher critical whirling speed of the threaded spindle due to the high tilting rigidity of the bearing position
- longer rating life under additional radial loads due, for example, to a belt drive.

The characteristics of the X arrangement are:

- low tilting rigidity
- lower critical whirling speed of the threaded spindle
- shorter rating life under additional radial loads due, for example, to a belt drive.

X-life premium quality

Axial angular contact ball bearings ZKLF and ZKLN are supplied in the X-life design. As a result of increased raceway accuracy and raceway quality, there is a significant reduction in the stress conditions present on the rolling elements and raceways under the same load, compared to the standard bearings. The improved quality gives reduced friction in the bearing and lower bearing temperatures; running resistance is lower, less strain is placed on the lubricant and the grease operating life and, where applicable, necessary relubrication intervals are extended. As a result of the lower frictional energy, there is a simultaneous increase in the energy efficiency of the bearing arrangement.

Higher basic load ratings and limiting speeds with X-life

The basic dynamic load ratings C_a of axial angular contact ball bearings in the X-life design are 10% higher than those of the previous standard designs. This leads to a longer rating life L_{10} or can be used to allow higher loads on the bearing arrangement while achieving the same rating life. The lower bearing friction and associated reduction in heat generation in the bearing permit significantly higher limiting speeds $n_{G\ grease}$.

Temperature range

Limiting values

The operating temperature of the bearings is limited by:

- the dimensional stability of the bearing rings and rolling elements
- the cage
- the lubricant
- the seals.

Possible operating temperatures of axial angular contact ball bearings ➤*1271*|▦ *1*.

▦ **1**
Permissible temperature range

Operating temperature	Axial angular contact ball bearings	
	from	to
	−30 °C	+120 °C

The operating temperature influences the dynamic bearing characteristics. The values given in the product tables are based on a room temperature of +20 °C.

Cages

The axial angular contact ball bearings have plastic cages. The cage design is not indicated in the suffix.

In axial angular contact ball bearings 7602, 7603 and BSB, the polyamide cages are indicated by the suffix TVP or T.

Suffixes

For a description of the suffixes used in this chapter ➤*1271*|▦ *2* and ***medias*** interchange ➤*https://www.schaeffler.de/std/1D52*.

▦ **2**
Suffixes and corresponding descriptions

Suffix	Description of suffix	
PE	Bearing design with less stringent tolerances	Standard
T, TVP	Polyamide cage	
2AP	Axial angular contact ball bearings, matched pair (ZKLN, ZKLF)	
2RS	Contact seal on both sides (lip seal)	
2Z	Minimal gap seal on both sides	
L055	Greased with high performance grease Arcanol MULTITOP	
SU	Universal bearing; single bearings can be used in sets in any combination required	
HC	Hybrid Ceramic, rings made from rolling bearing steel, balls made from ceramic	Special design, available by agreement

2.3 Needle roller/axial cylindrical roller bearings

Bearing design

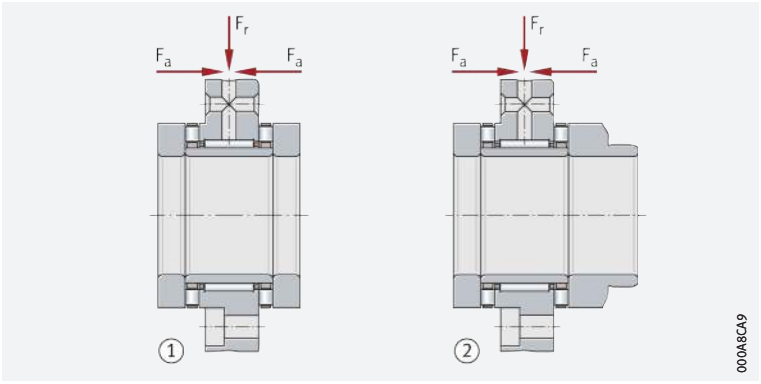
Double direction

These precision bearings are double direction axial cylindrical roller bearings with a radial bearing component.

With and without fixing holes

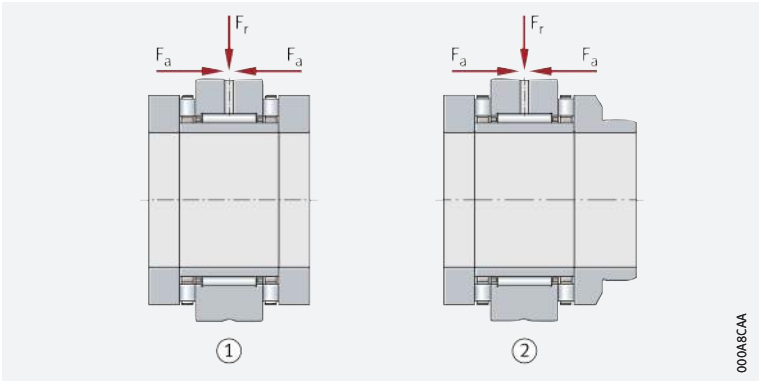
The bearings are available with and without fixing holes in the outer ring. Bearings with holes are screw mounted directly on the adjacent construction. The large contact surface and the small pitch of the holes allow a connection to the adjacent construction that is extremely rigid and with low tendency to settling. There is therefore no need for the bearing cover that would otherwise be required to hold the bearing, and the matching work required.

If the axial abutment of the shaft locating washer is not sufficient or a seal raceway is required, bearings with a stepped shaft locating washer extended on one side are suitable.



6 *Needle roller/axial cylindrical roller bearings, for screw mounting*

① *ZARF*
② *With stepped shaft locating washer extended on one side ZARF..-L*



7 *Needle roller/axial cylindrical roller bearings, not for screw mounting*

① *ZARN*
② *With stepped shaft locating washer extended on one side ZARN..-L*

Features

Needle roller/axial cylindrical roller bearings comprise an outer ring with radial and axial raceways, shaft locating washers, an inner ring, a radial needle roller and cage assembly and axial cylindrical roller and cage assemblies. The bearings are available with or without fixing holes.

Capable of supporting radial and axial loads

In addition to radial forces, the bearings can also support axial forces from both directions and tilting moments.

Preload and internal clearance

The outer ring, inner ring and axial cages are matched to each other such that the bearing is axially clearance-free after preloading by means of an INA precision locknut. The radial internal clearance corresponds to Group 2 in accordance with ISO 5753-1 (DIN 620-4).

Bearings for screw mounting

Screw mounting of the outer ring: cover and matching work can be dispensed with

Needle roller/axial cylindrical roller bearings ZARF(-L) have holes in the outer ring. These are used for screw mounting directly on the adjacent construction or in a radial locating bore. Due to screw mounting of the outer ring, the cover that would otherwise be required and the matching work can therefore be dispensed with. The bearings are preloaded against the shaft shoulder by means of a locknut AM or ZM(A).

With seal carrier assembly

In the interests of a simpler design, a seal carrier assembly DRS is recommended. The seal carrier assembly is centred on the outer ring and seals the bearing against external influences.

Bearings not for screw mounting

Mounting in the housing bore

Bearings ZARN(-L) are mounted in the housing bore and the outer ring is located using a cover. They are preloaded against the shaft shoulder by means of a locknut AM or ZM(A).

With stepped shaft locating washer

ZARN/F..-L has a stepped shaft locating washer extended on one side. These series are used in preference where the shaft locating washer is not adequately supported axially by the shaft shoulder or the bearing unit cannot be sealed on the outside surface of the normal shaft locating washer due to space conditions in the adjacent construction.

Heavy series

ZARN/F(-L) is also available in a heavy series. This series has a larger cross-section for the same shaft diameter and therefore higher basic load ratings.

Temperature range

Limiting values

The operating temperature of the bearings is limited by:

- the dimensional stability of the bearing rings and rolling elements
- the lubricant
- the seals.

Possible operating temperatures of needle roller/axial cylindrical roller bearings ➤ *1273*| ▦ *3*.

▦ **3**
Permissible temperature range

Operating temperature	Needle roller/axial cylindrical roller bearings	
	from	to
	–30 °C	+120 °C

Suffixes

For a description of the suffixes used in this chapter ➤ *1273*| ▦ *4* and ***medias*** interchange ➤ *https://www.schaeffler.de/std/1D52*.

▦ **4**
Suffixes and corresponding descriptions

Suffix	Description of suffix	
L	Stepped shaft locating washer extended on one side	Standard
TVP	Axial bearing cages made from glass fibre reinforced polyamide PA66	

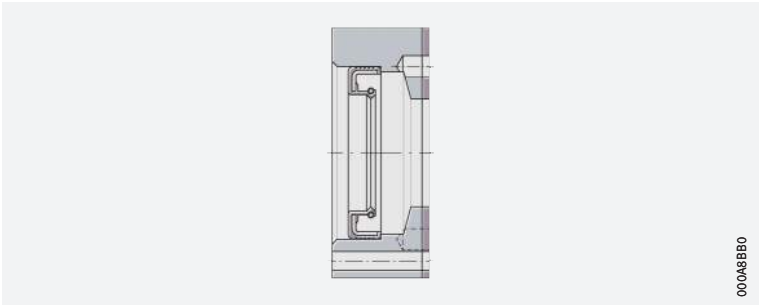
2.4 Accessories

Seal carrier assemblies

✎ *Complete sealing sets*

Seal carrier assemblies DRS are complete sealing sets ➤*1274*|🗀*8* that are screw mounted on the outer ring of needle roller/axial cylindrical roller bearings ZARF(-L). They are precisely centred in this position and seal the bearings against external influences ➤*1274*|🗀*9*.

🗀**8**
Seal carrier assembly DRS



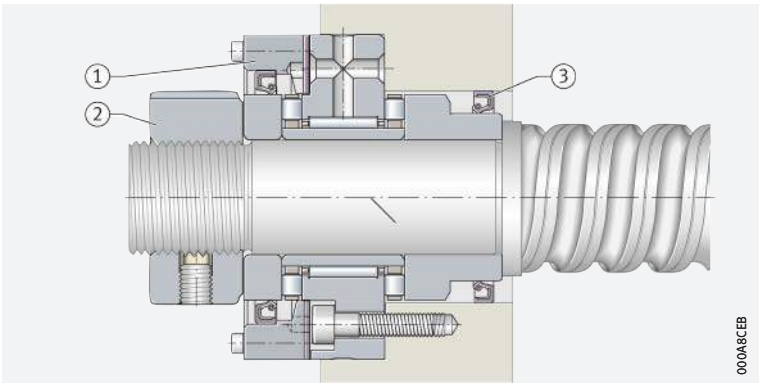
✎ *Components of DRS*

The sealing elements are supplied as a complete set of individual parts and comprise:

- a seal flange
- a rotary shaft seal to DIN 3760, with an elastomer part made from NBR
- a gasket
- hexagonal socket head screws for fixing the carrier to the central washer of the bearing.

🗀**9**
Needle roller/axial cylindrical roller bearing ZARF..-L with seal carrier assembly

① *Seal carrier assembly DRS*
② *Precision locknut ZM or ZMA*
③ *Rotary shaft seal to DIN 3760*



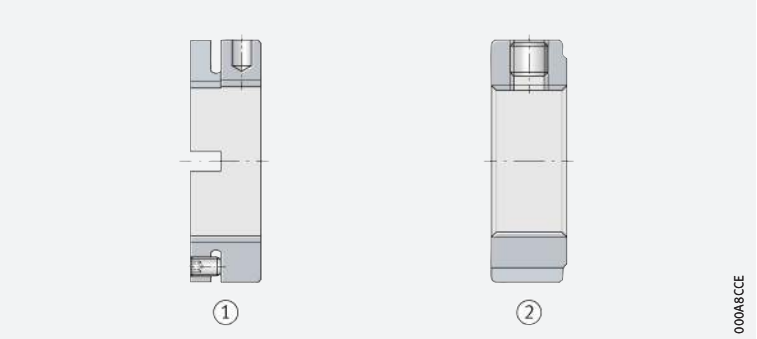
Precision locknuts

Precision locknuts are used in the axial preloading of bearings for screw drives

Precision locknuts are used to achieve a defined axial preload in bearings for screw drives. They are also used where high axial forces must be supported and high axial runout accuracy and rigidity are required.

10
Precision locknuts

① *For axial clamping AM*
② *For radial clamping ZM or ZMA*

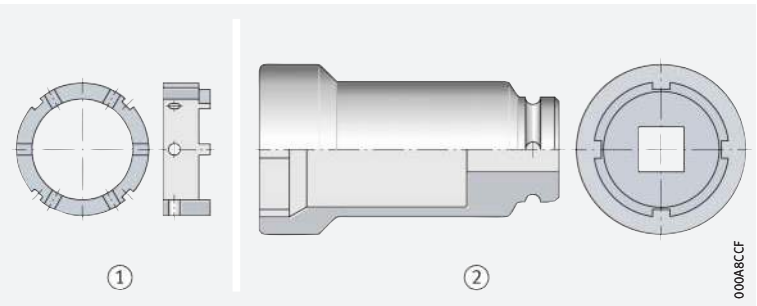


Sockets

For simple tightening and loosening of precision locknuts ZM on shafts, the sockets LOCKNUT-SOCKET-KM ➤*1275*|*11* are suitable. In combination with the socket AMS, this socket is also suitable for precision locknuts AM. They require less space on the circumference of the locknut than hook wrenches and allow the use of torque wrenches.

11
FAG sockets for precision locknuts ZM and sockets AMS

① *Socket AMS*
② *Socket LOCKNUT-SOCKET-KM*

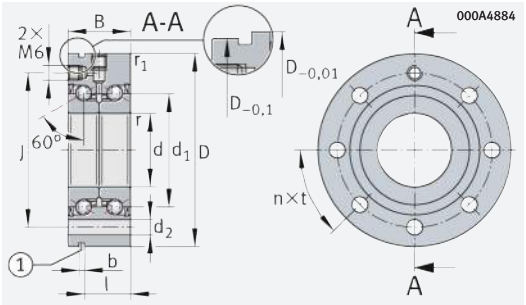


Secure sockets using a locking pin and rubber washer

For increased reliability, FAG sockets should be secured using a locking pin and rubber washer. They therefore have a hole for the locking pin and a groove for the rubber washer. The locking pin and rubber washer are included in the scope of delivery.

Axial angular contact ball bearings

With fixing holes



ZKLF..-2RS, ZKLF..-2Z (d ≦ 50 mm)

d = 12 – 20 mm

Main dimensions			Dimensions			Designation
d	D	B	d_1	r min.	r_1 min.	
12 0/–0,005	55 0/–0,010	25 0/–0,25	25	0,3	0,6	**ZKLF1255-2RS-XL**
0/–0,005	55 0/–0,010	25 0/–0,25	25	0,3	0,6	**ZKLF1255-2Z-XL**
15 0/–0,005	60 0/–0,010	25 0/–0,25	28	0,3	0,6	**ZKLF1560-2RS-XL**
0/–0,005	60 0/–0,010	25 0/–0,25	28	0,3	0,6	**ZKLF1560-2Z-XL**
17 0/–0,005	62 0/–0,010	25 0/–0,25	30	0,3	0,6	**ZKLF1762-2RS-XL**
0/–0,005	62 0/–0,010	25 0/–0,25	30	0,3	0,6	**ZKLF1762-2Z-XL**
20 0/–0,005	68 0/–0,010	28 0/–0,25	34,5	0,3	0,6	**ZKLF2068-2RS-XL**
0/–0,005	68 0/–0,010	28 0/–0,25	34,5	0,3	0,6	**ZKLF2068-2Z-XL**

	Basic load ratings axial		Fatigue limit load	Limiting speed	Thermally safe operating speed	Bearing frictional torque	Mass	Designation
d	dyn. C_a N	stat. C_{0a} N	C_{ua} N	n_G grease min^{-1}	n_ϑ min^{-1}	M_R Nm	m ≈ kg	
12	18 600	24 700	1 460	9 200	3 800	0,16	0,37	**ZKLF1255-2RS-XL**
	18 600	24 700	1 460	12 000	7 600	0,08	0,37	**ZKLF1255-2Z-XL**
15	19 600	28 000	1 650	8 200	3 500	0,2	0,43	**ZKLF1560-2RS-XL**
	19 600	28 000	1 650	10 800	7 000	0,1	0,43	**ZKLF1560-2Z-XL**
17	20 700	31 000	1 840	7 600	3 300	0,24	0,45	**ZKLF1762-2RS-XL**
	20 700	31 000	1 840	10 100	6 600	0,12	0,45	**ZKLF1762-2Z-XL**
20	28 500	47 000	2 750	6 600	3 000	0,3	0,61	**ZKLF2068-2RS-XL**
	28 500	47 000	2 750	8 700	5 400	0,15	0,61	**ZKLF2068-2Z-XL**

medias ➤ *https://www.schaeffler.de/std/1E49*

① Extraction slot. ② Adjacent construction, bearing screw mounted on flat surface.
③ Adjacent construction, bearing screw mounted in bore. ④ Only valid in assembled condition.

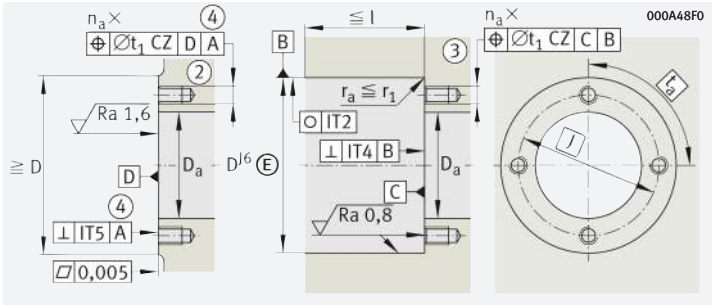
1) Screws 10.9 not included in scope of delivery. Tightening torque according to manufacturer's data. Number of holes in adjacent construction corresponds to n_a.

2) Based on rotating inner ring.

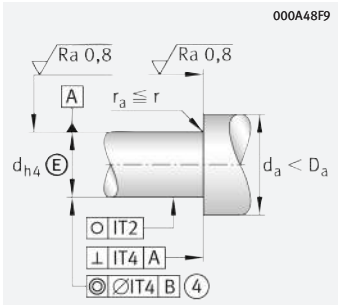
3) The recommended INA precision locknuts are not included in the scope of delivery and must be ordered separately.

4) The required axial locknut force must be observed when using other locknuts.

5) Only valid in conjunction with INA precision locknuts. Observe the guidelines on locating/locating bearing arrangements ➤ 🕮 *TPI 123*.



Housing design



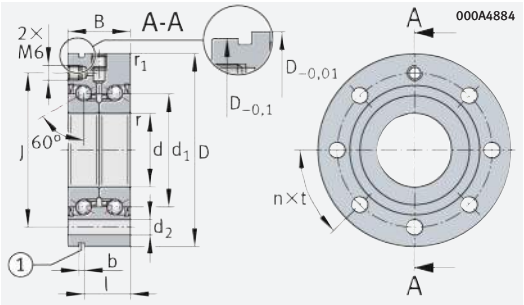
Shaft design (threaded spindle)

Dimensions					Pitch		Mounting dimensions			Fixing screws[1] DIN EN ISO 4762		
d	J	d_2	b	l	n	t °	D_a max.	d_a min.	t_1	Size	n_a	t_a °
12	42	6,8	3	17	3	120	33	16	0,1	M6	3	120
	42	6,8	3	17	3	120	33	16	0,1	M6	3	120
15	46	6,8	3	17	3	120	35	20	0,1	M6	3	120
	46	6,8	3	17	3	120	35	20	0,1	M6	3	120
17	48	6,8	3	17	6	60	37	23	0,1	M6	3	120
	48	6,8	3	17	6	60	37	23	0,1	M6	3	120
20	53	6,8	3	19	8	45	43	25	0,1	M6	4	90
	53	6,8	3	19	8	45	43	25	0,1	M6	4	90

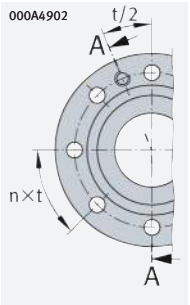
	Rigidity axial	Tilting rigidity	Mass moment of inertia[2]	Axial runout[2]	Recommended INA precision locknuts[3]			Required locknut force[4]
					for radial clamping	for axial clamping	Tightening torque[5]	axial
d	c_{aL}	c_{kL}	M_m				M_A	
	N/µm	Nm/mrad	kg · cm²	µm			Nm	N
12	375	50	0,068	2	ZM12	–	8	5 307
	375	50	0,068	2	ZM12	–	8	5 307
15	400	65	0,102	2	ZM15	AM15	10	5 484
	400	65	0,102	2	ZM15	AM15	10	5 484
17	450	80	0,132	2	ZM17	AM17	15	7 514
	450	80	0,132	2	ZM17	AM17	15	7 514
20	650	140	0,273	2	ZM20	AM20	18	8 258
	650	140	0,273	2	ZM20	AM20	18	8 258

Axial angular contact ball bearings

With fixing holes



ZKLF..-2RS, ZKLF..-2Z (d ≦ 50 mm)



ZKLF30100

d = 25 – 35 mm

Main dimensions			Dimensions			Designation
d	D	B	d_1	r min.	r_1 min.	
25 0/–0,005	75 0/–0,010	28 0/–0,25	40,5	0,3	0,6	**ZKLF2575-2RS-XL**
0/–0,005	75 0/–0,010	28 0/–0,25	40,5	0,3	0,6	**ZKLF2575-2Z-XL**
30 0/–0,005	80 0/–0,010	28 0/–0,25	45,5	0,3	0,6	**ZKLF3080-2RS-XL**
0/–0,005	80 0/–0,010	28 0/–0,25	45,5	0,3	0,6	**ZKLF3080-2Z-XL**
0/–0,005	100 0/–0,010	38 0/–0,25	51	0,3	0,6	**ZKLF30100-2RS-XL**[2]
0/–0,005	100 0/–0,010	38 0/–0,25	51	0,3	0,6	**ZKLF30100-2Z-XL**[2]
35 0/–0,005	90 0/–0,010	34 0/–0,25	52	0,3	0,6	**ZKLF3590-2RS-XL**
0/–0,005	90 0/–0,010	34 0/–0,25	52	0,3	0,6	**ZKLF3590-2Z-XL**

	Basic load ratings axial		Fatigue limit load	Limiting speed	Thermally safe operating speed	Bearing frictional torque	Mass	Designation
d	dyn. C_a N	stat. C_{0a} N	C_{ua} N	n_G grease min^{-1}	n_ϑ min^{-1}	M_R Nm	m ≈ kg	
25	30 500	55 000	3 250	5 700	2 600	0,4	0,72	**ZKLF2575-2RS-XL**
	30 500	55 000	3 250	7 500	4 700	0,2	0,72	**ZKLF2575-2Z-XL**
30	32 000	64 000	3 750	5 000	2 200	0,5	0,78	**ZKLF3080-2RS-XL**
	32 000	64 000	3 750	6 700	4 300	0,25	0,78	**ZKLF3080-2Z-XL**
	65 000	108 000	6 400	4 500	2 100	0,8	1,63	**ZKLF30100-2RS-XL**[2]
	65 000	108 000	6 400	5 600	4 000	0,4	1,63	**ZKLF30100-2Z-XL**[2]
35	45 000	89 000	5 200	4 400	2 000	0,6	1,13	**ZKLF3590-2RS-XL**
	45 000	89 000	5 200	5 800	3 800	0,3	1,13	**ZKLF3590-2Z-XL**

medias ➤ *https://www.schaeffler.de/std/1E4A*

① Extraction slot. ② Adjacent construction, bearing screw mounted on flat surface.
③ Adjacent construction, bearing screw mounted in bore. ④ Only valid in assembled condition.

1) Screws 10.9 not included in scope of delivery. Tightening torque according to manufacturer's data. Number of holes in adjacent construction corresponds to n_a.

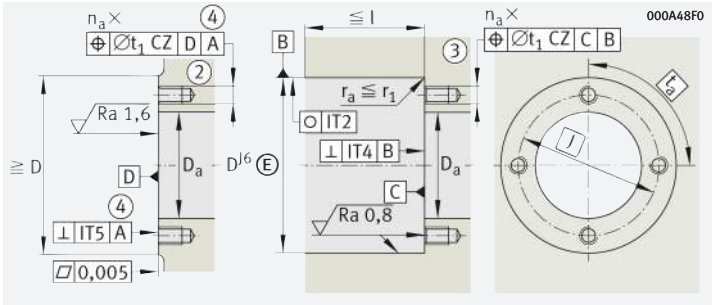
2) Heavy series.

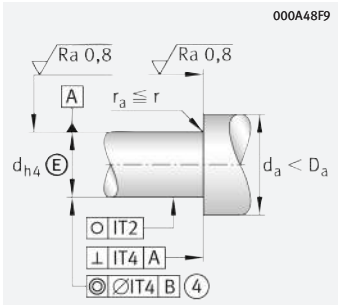
3) Based on rotating inner ring.

4) The recommended INA precision locknuts are not included in the scope of delivery and must be ordered separately.

5) The required axial locknut force must be observed when using other locknuts.

6) Only valid in conjunction with INA precision locknuts. Observe the guidelines on locating/locating bearing arrangements ➤ 🕮 *TPI 123*.



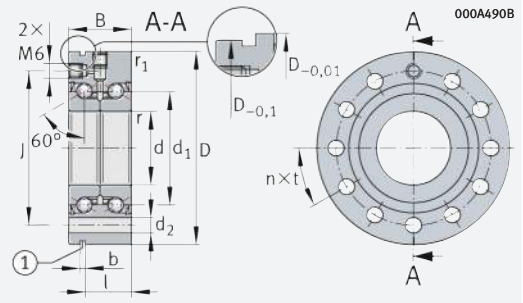


Dimensions					Pitch		Mounting dimensions			Fixing screws[1] DIN EN ISO 4762		
d	J	d_2	b	l	n	t °	D_a max.	d_a min.	t_1	Size	n_a	t_a °
25	58	6,8	3	19	8	45	48	32	0,1	M6	4	90
	58	6,8	3	19	8	45	48	32	0,1	M6	4	90
30	63	6,8	3	19	12	30	53	40	0,1	M6	6	60
	63	6,8	3	19	12	30	53	40	0,1	M6	6	60
	80	8,8	3	30	8	45	64	47	0,2	M8	8	45
	80	8,8	3	30	8	45	64	47	0,2	M8	8	45
35	75	8,8	3	25	8	45	62	45	0,2	M8	4	90
	75	8,8	3	25	8	45	62	45	0,2	M8	4	90

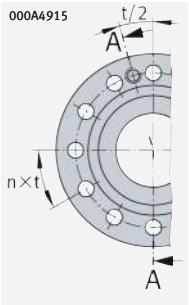
	Rigidity axial	Tilting rigidity	Mass moment of inertia[3]	Axial runout[3]	Recommended INA precision locknuts[4]			Required locknut force[5]
					for radial clamping	for axial clamping	Tightening torque[6]	axial
d	c_{aL}	c_{kL}	M_m				M_A	
	N/µm	Nm/mrad	kg · cm²	µm			Nm	N
25	750	200	0,486	2	ZM25	AM25	25	9 123
	750	200	0,486	2	ZM25	AM25	25	9 123
30	850	300	0,73	2,5	ZM30	AM30	32	9 947
	850	300	0,73	2,5	ZM30	AM30	32	9 947
	950	400	1,91	2,5	ZMA30/52	AM30	65	19 509
	950	400	1,91	2,5	ZMA30/52	AM30	65	19 509
35	900	400	1,51	2,5	ZM35	AM35/58	40	10 770
	900	400	1,51	2,5	ZM35	AM35/58	40	10 770

Axial angular contact ball bearings

With fixing holes



ZKLF..-2RS, ZKLF..-2Z (d ≦ 50 mm)



ZKLF40115
ZKLF50140

d = 40 – 50 mm

Main dimensions			Dimensions			Designation
d	D	B	d_1	r min.	r_1 min.	
40 0/–0,005	100 0/–0,010	34 0/–0,25	58	0,3	0,6	**ZKLF40100-2RS-XL**
0/–0,005	100 0/–0,010	34 0/–0,25	58	0,3	0,6	**ZKLF40100-2Z-XL**
0/–0,005	115 0/–0,010	46 0/–0,25	65	0,6	0,6	**ZKLF40115-2RS-XL**[2]
0/–0,005	115 0/–0,010	46 0/–0,25	65	0,6	0,6	**ZKLF40115-2Z-XL**[2]
50 0/–0,005	115 0/–0,010	34 0/–0,25	72	0,3	0,6	**ZKLF50115-2RS-XL**
0/–0,005	115 0/–0,010	34 0/–0,25	72	0,3	0,6	**ZKLF50115-2Z-XL**
0/–0,005	140 0/–0,010	54 0/–0,25	80	0,6	0,6	**ZKLF50140-2RS-XL**[2]
0/–0,005	140 0/–0,010	54 0/–0,25	80	0,6	0,6	**ZKLF50140-2Z-XL**[2]

	Basic load ratings axial		Fatigue limit load	Limiting speed	Thermally safe operating speed	Bearing frictional torque	Mass	Designation
d	dyn. C_a	stat. C_{0a}	C_{ua}	n_G grease	n_ϑ	M_R	m	
	N	N	N	min^{-1}	min^{-1}	Nm	≈ kg	
40	47 500	101 000	6 000	4 000	1 800	0,7	1,46	**ZKLF40100-2RS-XL**
	47 500	101 000	6 000	5 200	3 300	0,35	1,46	**ZKLF40100-2Z-XL**
	79 000	149 000	8 800	3 500	1 600	1,3	2,2	**ZKLF40115-2RS-XL**[2]
	79 000	149 000	8 800	4 400	3 100	0,65	2,2	**ZKLF40115-2Z-XL**[2]
50	51 000	126 000	7 400	3 200	1 500	0,9	1,86	**ZKLF50115-2RS-XL**
	51 000	126 000	7 400	4 200	3 000	0,45	1,86	**ZKLF50115-2Z-XL**
	125 000	250 000	14 800	2 900	1 200	2,6	4,7	**ZKLF50140-2RS-XL**[2]
	125 000	250 000	14 800	3 500	2 500	1,3	4,7	**ZKLF50140-2Z-XL**[2]

medias ➤ *https://www.schaeffler.de/std/1E4B*

① Extraction slot. ② Adjacent construction, bearing screw mounted on flat surface.
③ Adjacent construction, bearing screw mounted in bore. ④ Only valid in assembled condition.

1) Screws 10.9 not included in scope of delivery. Tightening torque according to manufacturer's data. Number of holes in adjacent construction corresponds to n_a.

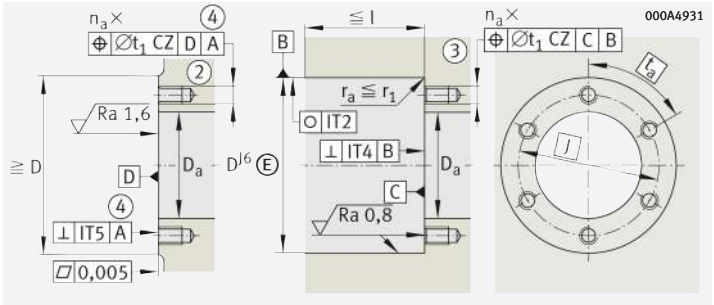
2) Heavy series.

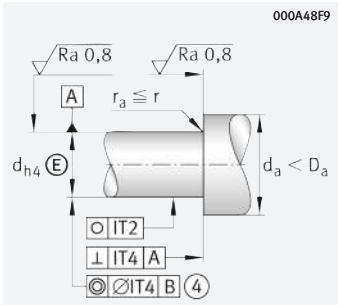
3) Based on rotating inner ring.

4) The recommended INA precision locknuts are not included in the scope of delivery and must be ordered separately.

5) The required axial locknut force must be observed when using other locknuts.

6) Only valid in conjunction with INA precision locknuts. Observe the guidelines on locating/locating bearing arrangements ➤ 🕮 *TPI 123*.



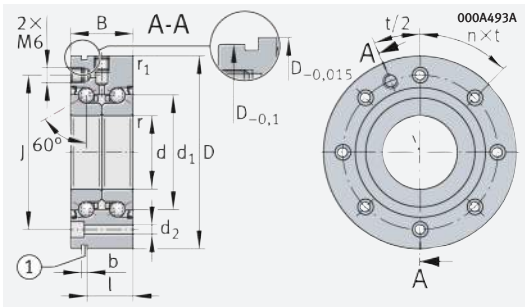


Dimensions					Pitch		Mounting dimensions			Fixing screws[1] DIN EN ISO 4762		
d	J	d_2	b	l	n	t °	D_a max.	d_a min.	t_1	Size	n_a	t_a °
40	80	8,8	3	25	8	45	67	50	0,2	M8	4	90
	80	8,8	3	25	8	45	67	50	0,2	M8	4	90
	94	8,8	3	36	12	30	80	56	0,2	M8	12	30
	94	8,8	3	36	12	30	80	56	0,2	M8	12	30
50	94	8,8	3	25	12	30	82	63	0,2	M8	6	60
	94	8,8	3	25	12	30	82	63	0,2	M8	6	60
	113	11	3	45	12	30	98	63	0,2	M10	12	30
	113	11	3	45	12	30	98	63	0,2	M10	12	30

	Rigidity axial	Tilting rigidity	Mass moment of inertia[3]	Axial runout[3]	Recommended INA precision locknuts[4]			Required locknut force[5]
					for radial clamping	for axial clamping	Tightening torque[6]	axial
d	c_{aL}	c_{kL}	M_m				M_A	
	N/µm	Nm/mrad	kg · cm²	µm			Nm	N
40	1 000	550	2,26	2,5	ZM40	AM40	55	13 412
	1 000	550	2,26	2,5	ZM40	AM40	55	13 412
	1 200	750	5,5	2,5	ZMA40/62	AM40	110	25 185
	1 200	750	5,5	2,5	ZMA40/62	AM40	110	25 815
50	1 250	1 000	5,24	2,5	ZM50	AM50	85	16 280
	1 250	1 000	5,24	2,5	ZM50	AM50	85	16 280
	1 400	1 500	15,2	2,5	ZMA50/75	AM50	150	28 451
	1 400	1 500	15,2	2,5	ZMA50/75	AM50	150	28 451

Axial angular contact ball bearings

With fixing holes



ZKLF..-2Z (60 mm ≦ d ≦ 100 mm)

d = 60 – 100 mm

Main dimensions				Dimensions			Designation
d		D	B	d_1	r min.	r_1 min.	
60	0/–0,008	145 0/–0,015	45 0/–0,25	85	0,6	0,6	**ZKLF60145-2Z-XL**
70	0/–0,008	155 0/–0,015	45 0/–0,25	95	0,6	0,6	**ZKLF70155-2Z-XL**
80	0/–0,008	165 0/–0,015	45 0/–0,25	105	0,6	0,6	**ZKLF80165-2Z-XL**
90	0/–0,008	190 0/–0,015	55 0/–0,25	120	0,6	0,6	**ZKLF90190-2Z-XL**
100	0/–0,008	200 0/–0,015	55 0/–0,25	132	0,6	0,6	**ZKLF100200-2Z-XL**
	0/–0,008	230 0/–0,015	85 0/–0,25	146	0,6	0,6	**ZKLF100230-2Z**

	Basic load ratings axial		Fatigue limit load	Limiting speed	Thermally safe operating speed	Bearing frictional torque	Mass	Designation
d	dyn. C_a N	stat. C_{0a} N	C_{ua} N	n_G grease min^{-1}	n_ϑ min^{-1}	M_R Nm	m ≈ kg	
60	93 000	214 000	12 600	4 000	3 000	1	4,3	**ZKLF60145-2Z-XL**
70	97 000	241 000	14 200	3 800	2 800	1,2	4,9	**ZKLF70155-2Z-XL**
80	100 000	265 000	15 400	3 600	2 700	1,4	5,3	**ZKLF80165-2Z-XL**
90	149 000	395 000	21 300	3 500	2 300	2,3	8,7	**ZKLF90190-2Z-XL**
100	154 000	435 000	22 400	3 300	2 150	2,6	9,3	**ZKLF100200-2Z-XL**
	295 000	790 000	29 000	2 900	2 000	3	17,6	**ZKLF100230-2Z**

medias ➤ *https://www.schaeffler.de/std/1E4C*

① Extraction slot. ② Adjacent construction, bearing screw mounted on flat surface.
③ Adjacent construction, bearing screw mounted in bore. ④ Only valid in assembled condition.

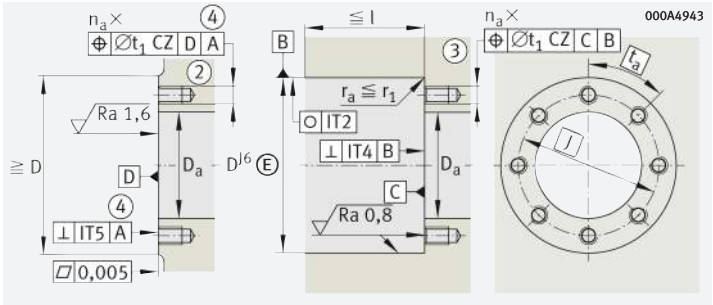
1) Screws 10.9 not included in scope of delivery. Tightening torque according to manufacturer's data. Number of holes in adjacent construction corresponds to n_a.

2) Based on rotating inner ring.

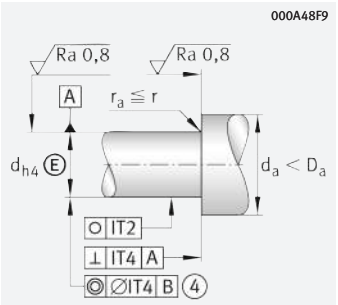
3) The recommended INA precision locknuts are not included in the scope of delivery and must be ordered separately.

4) The required axial locknut force must be observed when using other locknuts.

5) Only valid in conjunction with INA precision locknuts. Observe the guidelines on locating/locating bearing arrangements ➤ 🕮 *TPI 123*.



Housing design



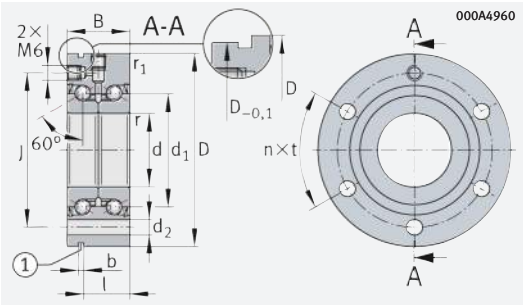
Shaft design (threaded spindle)

Dimensions					Pitch		Mounting dimensions			Fixing screws[1] DIN EN ISO 4762		
d	J	d_2	b	l	n	t °	D_a max.	d_a min.	t_1	Size	n_a	t_a °
60	120	8,8	3	35	8	45	100	82	0,2	M8	8	45
70	130	8,8	3	35	8	45	110	92	0,2	M8	8	45
80	140	8,8	3	35	8	45	120	102	0,2	M8	8	45
90	165	11	3	45	8	45	138	116	0,2	M10	8	45
100	175	11	3	45	8	45	150	128	0,2	M10	8	45
	200	14	3	73	12	30	175	130	0,4	M12	12	30

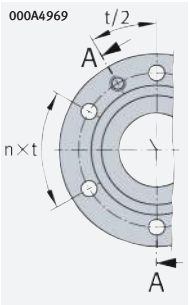
	Rigidity axial	Tilting rigidity	Mass moment of inertia[2]	Axial runout[2]	Recommended INA precision locknuts[3]			Required locknut force[4]
					for radial clamping	for axial clamping	Tightening torque[5]	axial
d	c_{aL}	c_{kL}	M_m				M_A	
	N/µm	Nm/mrad	kg · cm²	µm			Nm	N
60	1 300	1 650	13,7	3	ZMA60/98	AM60	100	16 700
70	1 450	2 250	19,8	3	ZMA70/110	AM70	130	19 031
80	1 600	3 000	27,6	3	ZMA80/120	AM80	160	20 604
90	1 700	4 400	59,9	3	ZMA90/130	AM90	200	22 731
100	1 900	5 800	85,3	3	ZMA100/140	AM100	250	25 624
	2 450	8 200	185	3	–	AM100	500	52 000

Axial angular contact ball bearings

With fixing holes
Less stringent tolerances



ZKLF..-2RS-PE



ZKLF12, ZKLF15

d = 12 – 50 mm

Main dimensions			Dimensions			Designation
d	D	B	d_1	r min.	r_1 min.	
12 0/–0,01	55 0/–0,013	25 0/–0,25	25	0,3	0,6	**ZKLF1255-2RS-PE**
15 0/–0,01	60 0/–0,013	25 0/–0,25	28	0,3	0,6	**ZKLF1560-2RS-PE**
17 0/–0,01	62 0/–0,013	25 0/–0,25	30	0,3	0,6	**ZKLF1762-2RS-PE**
20 0/–0,01	68 0/–0,013	28 0/–0,25	34,5	0,3	0,6	**ZKLF2068-2RS-PE**
25 0/–0,01	75 0/–0,013	28 0/–0,25	40,5	0,3	0,6	**ZKLF2575-2RS-PE**
30 0/–0,01	80 0/–0,013	28 0/–0,25	45,5	0,3	0,6	**ZKLF3080-2RS-PE**
35 0/–0,01	90 0/–0,015	34 0/–0,25	52	0,3	0,6	**ZKLF3590-2RS-PE**
40 0/–0,01	100 0/–0,015	34 0/–0,25	58	0,3	0,6	**ZKLF40100-2RS-PE**
50 0/–0,01	115 0/–0,015	34 0/–0,25	72	0,3	0,6	**ZKLF50115-2RS-PE**

	Basic load ratings axial		Fatigue limit load	Limiting speed	Thermally safe operating speed	Bearing frictional torque	Mass	Designation
d	dyn. C_a N	stat. C_{0a} N	C_{ua} N	n_G grease min^{-1}	n_ϑ min^{-1}	M_R Nm	m ≈ kg	
12	16 900	24 700	1 090	9 200	3 800	0,16	0,37	**ZKLF1255-2RS-PE**
15	17 900	28 000	1 240	8 200	3 500	0,2	0,43	**ZKLF1560-2RS-PE**
17	18 800	31 000	1 380	7 600	3 300	0,24	0,45	**ZKLF1762-2RS-PE**
20	26 000	47 000	2 070	6 600	3 000	0,3	0,61	**ZKLF2068-2RS-PE**
25	27 500	55 000	2 450	5 700	2 600	0,4	0,72	**ZKLF2575-2RS-PE**
30	29 000	64 000	2 800	5 000	2 200	0,5	0,78	**ZKLF3080-2RS-PE**
35	41 000	89 000	3 950	4 400	2 000	0,6	1,13	**ZKLF3590-2RS-PE**
40	43 000	101 000	4 450	4 000	1 800	0,7	1,46	**ZKLF40100-2RS-PE**
50	46 500	126 000	5 600	3 200	1 500	0,9	1,86	**ZKLF50115-2RS-PE**

medias ➤ *https://www.schaeffler.de/std/1E4D*

① Extraction slot. ② Adjacent construction, bearing screw mounted on flat surface.
③ Adjacent construction, bearing screw mounted in bore. ④ Only valid in assembled condition.

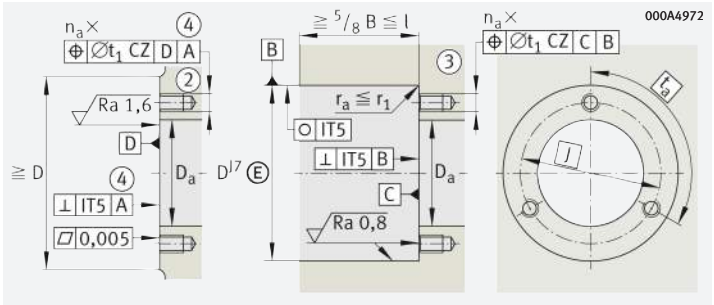
1) Screws 10.9 not included in scope of delivery. Tightening torque according to manufacturer's data. Number of holes in adjacent construction corresponds to n_a.

2) Based on rotating inner ring.

3) The recommended INA precision locknuts are not included in the scope of delivery and must be ordered separately.

4) The required axial locknut force must be observed when using other locknuts.

5) Only valid in conjunction with INA precision locknuts. Observe the guidelines on locating/locating bearing arrangements ➤ 🕮 *TPI 123*.



Housing design

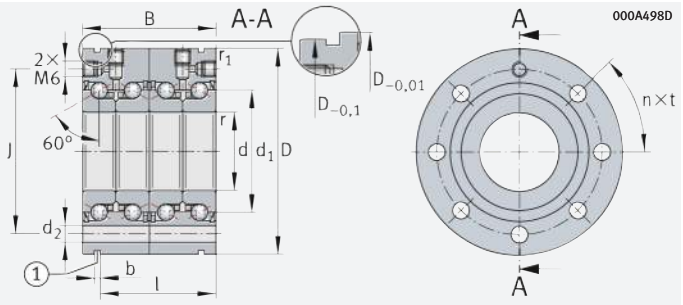
Shaft design (threaded spindle)

Dimensions					Pitch		Mounting dimensions			Fixing screws[1] DIN EN ISO 4762		
d	J	d_2	b	l	n	t °	D_a max.	d_a min.	t_1	Size	n_a	t_a °
12	42	6,8	3	17	3	120	33	16	0,1	M6	3	120
15	46	6,8	3	17	3	120	35	20	0,1	M6	3	120
17	48	6,8	3	17	6	60	37	23	0,1	M6	3	120
20	53	6,8	3	19	8	45	43	25	0,1	M6	4	90
25	58	6,8	3	19	8	45	48	32	0,1	M6	4	90
30	63	6,8	3	19	12	30	53	40	0,1	M6	6	60
35	75	8,8	3	25	8	45	62	45	0,2	M8	4	90
40	80	8,8	3	25	8	45	67	50	0,2	M8	4	90
50	94	8,8	3	25	12	30	82	63	0,2	M8	6	60

	Rigidity axial	Tilting rigidity	Mass moment of inertia[2]	Axial runout[2]	Recommended INA precision locknuts[3]			Required locknut force[4]
					for radial clamping	for axial clamping	Tightening torque[5]	axial
d	c_{aL}	c_{kL}	M_m				M_A	
	N/µm	Nm/mrad	kg · cm²	µm			Nm	N
12	375	50	0,068	5	ZM12	–	8	5 307
15	400	65	0,102	5	ZM15	AM15	10	5 484
17	450	80	0,132	5	ZM17	AM17	15	7 514
20	650	140	0,273	5	ZM20	AM20	18	8 258
25	750	200	0,486	5	ZM25	AM25	25	9 123
30	850	300	0,73	5	ZM30	AM30	32	9 947
35	900	400	1,51	5	ZM35	AM35/58	40	10 770
40	1 000	550	2,26	5	ZM40	AM40	55	13 412
50	1 250	1 000	5,24	5	ZM50	AM50	85	16 280

Axial angular contact ball bearings

With fixing holes
Matched pair



ZKLF..-2RS-2AP

d = 17 – 50 mm

Main dimensions			Dimensions			Designation
d	D	B	d_1	r min.	r_1 min.	
17 0/–0,005	62 0/–0,010	50 0/–0,25	30	0,3	0,6	**ZKLF1762-2RS-2AP-XL**
20 0/–0,005	68 0/–0,010	56 0/–0,25	34,5	0,3	0,6	**ZKLF2068-2RS-2AP-XL**
25 0/–0,005	75 0/–0,010	56 0/–0,25	40,5	0,3	0,6	**ZKLF2575-2RS-2AP-XL**
30 0/–0,005	80 0/–0,010	56 0/–0,25	45,5	0,3	0,6	**ZKLF3080-2RS-2AP-XL**
35 0/–0,005	90 0/–0,010	68 0/–0,25	52	0,3	0,6	**ZKLF3590-2RS-2AP-XL**
40 0/–0,005	100 0/–0,010	68 0/–0,25	58	0,3	0,6	**ZKLF40100-2RS-2AP-XL**
50 0/–0,005	115 0/–0,010	68 0/–0,25	72	0,3	0,6	**ZKLF50115-2RS-2AP-XL**

	Basic load ratings axial		Fatigue limit load	Limiting speed	Thermally safe operating speed	Bearing frictional torque	Mass	Designation
d	dyn. C_a N	stat. C_{0a} N	C_{ua} N	n_G grease min^{-1}	n_ϑ min^{-1}	M_R Nm	m ≈ kg	
17	33 500	62 000	3 700	7 600	3 300	0,36	0,9	**ZKLF1762-2RS-2AP-XL**
20	46 000	94 000	5 500	6 600	3 000	0,45	1,22	**ZKLF2068-2RS-2AP-XL**
25	49 000	111 000	6 500	5 700	2 600	0,6	1,44	**ZKLF2575-2RS-2AP-XL**
30	52 000	127 000	7 500	5 000	2 200	0,75	1,56	**ZKLF3080-2RS-2AP-XL**
35	73 000	177 000	10 500	4 400	2 000	0,9	2,26	**ZKLF3590-2RS-2AP-XL**
40	77 000	202 000	11 900	4 000	1 800	1,05	2,92	**ZKLF40100-2RS-2AP-XL**
50	83 000	250 000	14 900	3 200	1 500	1,35	3,72	**ZKLF50115-2RS-2AP-XL**

medias ➤ *https://www.schaeffler.de/std/1E4E*

① Extraction slot. ② Adjacent construction, bearing screw mounted on flat surface.
③ Adjacent construction, bearing screw mounted in bore. ④ Only valid in assembled condition.

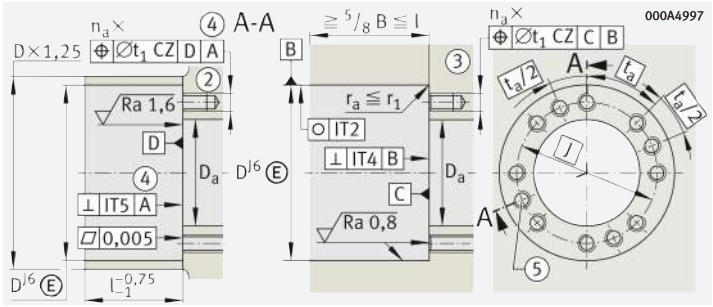
1) Screws 10.9 not included in scope of delivery. Tightening torque according to manufacturer's data. Number of holes in adjacent construction corresponds to n_a.

2) Based on rotating inner ring.

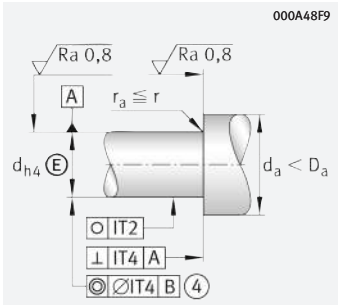
3) The recommended INA precision locknuts are not included in the scope of delivery and must be ordered separately.

4) The required axial locknut force must be observed when using other locknuts.

5) Only valid in conjunction with INA precision locknuts.
Observe the guidelines on locating/locating bearing arrangements ➤ 🕮 *TPI 123*.



Housing design



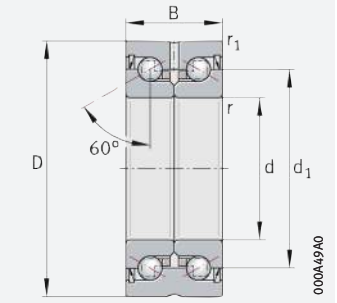
Shaft design (threaded spindle)

Dimensions					Pitch		Mounting dimensions			Fixing screws[1] DIN EN ISO 4762		
d	J	d_2	b	l	n	t °	D_a max.	d_a min.	t_1	Size	n_a	t_a °
17	48	6,8	3	42	6	60	37	23	0,1	M6×60	6	60
20	53	6,8	3	47	8	45	43	25	0,1	M6×70	8	45
25	58	6,8	3	47	8	45	48	32	0,1	M6×70	8	45
30	63	6,8	3	47	12	30	53	40	0,1	M6×70	12	30
35	75	8,8	3	59	8	45	62	45	0,2	M8×80	8	45
40	80	8,8	3	59	8	45	67	50	0,2	M8×80	8	45
50	94	8,8	3	59	12	30	82	63	0,2	M8×80	12	30

	Rigidity axial	Tilting rigidity	Mass moment of inertia[2]	Axial runout[2]	Recommended INA precision locknuts[3]			Required locknut force[4]
					for radial clamping	for axial clamping	Tightening torque[5]	axial
d	c_{aL}	c_{kL}	M_m				M_A	
	N/µm	Nm/mrad	kg · cm²	µm			Nm	N
17	800	200	0,264	2	ZM17	AM17	15	7 514
20	1 150	320	0,564	2	ZMA20/38	AM20	18	8 258
25	1 300	450	0,972	2	ZMA25/45	AM25	25	9 123
30	1 500	620	1,46	2,5	ZMA30/52	AM30	32	9 947
35	1 600	900	3,02	2,5	ZMA35/58	AM35/58	40	10 770
40	1 750	1 200	4,52	2,5	ZMA40/62	AM40	55	13 412
50	2 200	2 250	10,48	2,5	ZMA50/75	AM50	85	16 280

Axial angular contact ball bearings

Without fixing holes



ZKLN..-2RS, ZKLN..-2Z

d = 6 – 12 mm

Main dimensions			Mass	Designation
d	D	B	m ≈ kg	
6 +0,002/–0,003	19 0/–0,01	12 0/–0,25	0,02	**ZKLN0619-2Z-XL**[5]
+0,002/–0,003	24 0/–0,01	15 0/–0,25	0,03	**ZKLN0624-2RS-XL**
+0,002/–0,003	24 0/–0,01	15 0/–0,25	0,03	**ZKLN0624-2Z-XL**
8 0 /–0,005	32 0/–0,01	20 0/–0,25	0,09	**ZKLN0832-2RS-XL**
0 /–0,005	32 0/–0,01	20 0/–0,25	0,09	**ZKLN0832-2Z-XL**
10 0 /–0,005	34 0/–0,01	20 0/–0,25	0,1	**ZKLN1034-2RS-XL**
0 /–0,005	34 0/–0,01	20 0/–0,25	0,1	**ZKLN1034-2Z-XL**
12 0 /–0,005	42 0/–0,01	25 0/–0,25	0,2	**ZKLN1242-2RS-XL**
0 /–0,005	42 0/–0,01	25 0/–0,25	0,2	**ZKLN1242-2Z-XL**

	Basic load ratings axial		Fatigue limit load	Limiting speed	Thermally safe operating speed	Bearing frictional torque	Designation
d	dyn. C_a N	stat. C_{0a} N	C_{ua} N	n_G grease min^{-1}	n_ϑ min^{-1}	M_R Nm	
6	5 400	6 100	360	22 800	14 000	0,01	**ZKLN0619-2Z-XL**[5]
	7 600	8 500	500	16 400	6 800	0,04	**ZKLN0624-2RS-XL**
	7 600	8 500	500	19 900	12 000	0,02	**ZKLN0624-2Z-XL**
8	13 800	16 300	960	12 100	5 100	0,08	**ZKLN0832-2RS-XL**
	13 800	16 300	960	15 500	9 500	0,04	**ZKLN0832-2Z-XL**
10	14 700	18 800	1 110	10 900	4 600	0,12	**ZKLN1034-2RS-XL**
	14 700	18 800	1 110	14 400	8 600	0,06	**ZKLN1034-2Z-XL**
12	18 600	24 700	1 460	9 200	3 800	0,16	**ZKLN1242-2RS-XL**
	18 600	24 700	1 460	12 000	7 600	0,08	**ZKLN1242-2Z-XL**

medias ➤ *https://www.schaeffler.de/std/1E4F*

④ Only valid in assembled condition.

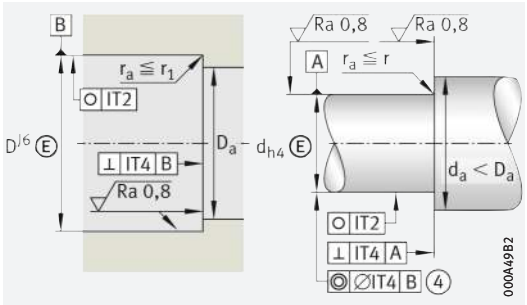
1) Based on rotating inner ring.

2) The recommended INA precision locknuts are not included in the scope of delivery and must be ordered separately.

3) The required axial locknut force must be observed when using other locknuts.

4) Only valid in conjunction with INA precision locknuts.
Observe the guidelines on locating/locating bearing arrangements ➤ 🕮 *TPI 123*.

5) No relubrication facility.



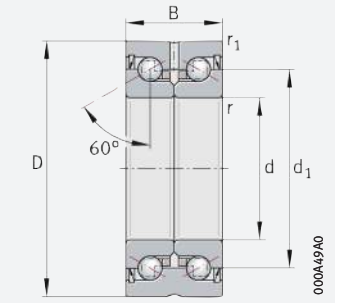
Design of housing and shaft (threaded spindle)

d	Mass moment of inertia[1] M_m kg · cm²	Axial runout[1] µm	Dimensions d_1	r min.	r_1 min.	Mounting dimensions D_a max.	d_a min.
6	0,0019	2	12	0,3	0,3	16	9
	0,0044	2	14	0,3	0,6	19	9
	0,0044	2	14	0,3	0,6	19	9
8	0,02	2	19	0,3	0,6	26	11
	0,02	2	19	0,3	0,6	26	11
10	0,029	2	21	0,3	0,6	28	14
	0,029	2	21	0,3	0,6	28	14
12	0,068	2	25	0,3	0,6	33	16
	0,068	2	25	0,3	0,6	33	16

d	Rigidity axial c_{aL} N/µm	Tilting rigidity c_{kL} Nm/mrad	Recommended INA precision locknuts[2] for radial clamping	for axial clamping	Tightening torque[4] M_A Nm	Required locknut force[3] axial N
6	150	4	ZM06	–	1	2 010
	200	8	ZM06	–	2	2 404
	200	8	ZM06	–	2	2 404
8	250	20	ZM08	–	4	3 468
	250	20	ZM08	–	4	3 468
10	325	25	ZM10	–	6	4 891
	325	25	ZM10	–	6	4 891
12	375	50	ZM12	–	8	5 307
	375	50	ZM12	–	8	5 307

Axial angular contact ball bearings

Without fixing holes



ZKLN..-2RS, ZKLN..-2Z

d = 15 – 25 mm

Main dimensions			Mass	Designation
d	D	B	m ≈ kg	
15 0/–0,005	45 0/–0,01	25 0/–0,25	0,21	**ZKLN1545-2RS-XL**
0/–0,005	45 0/–0,01	25 0/–0,25	0,21	**ZKLN1545-2Z-XL**
17 0/–0,005	47 0/–0,01	25 0/–0,25	0,22	**ZKLN1747-2RS-XL**
0/–0,005	47 0/–0,01	25 0/–0,25	0,22	**ZKLN1747-2Z-XL**
20 0/–0,005	52 0/–0,01	28 0/–0,25	0,31	**ZKLN2052-2RS-XL**
0/–0,005	52 0/–0,01	28 0/–0,25	0,31	**ZKLN2052-2Z-XL**
25 0/–0,005	57 0/–0,01	28 0/–0,25	0,34	**ZKLN2557-2RS-XL**
0/–0,005	57 0/–0,01	28 0/–0,25	0,34	**ZKLN2557-2Z-XL**

	Basic load ratings axial		Fatigue limit load	Limiting speed	Thermally safe operating speed	Bearing frictional torque	Designation
d	dyn. C_a	stat. C_{0a}	C_{ua}	n_G grease	n_ϑ	M_R	
	N	N	N	min^{-1}	min^{-1}	Nm	
15	19 600	28 000	1 650	8 200	3 500	0,2	**ZKLN1545-2RS-XL**
	19 600	28 000	1 650	10 800	7 000	0,1	**ZKLN1545-2Z-XL**
17	20 700	31 000	1 840	7 600	3 300	0,24	**ZKLN1747-2RS-XL**
	20 700	31 000	1 840	10 100	6 600	0,12	**ZKLN1747-2Z-XL**
20	28 500	47 000	2 750	6 600	3 000	0,3	**ZKLN2052-2RS-XL**
	28 500	47 000	2 750	8 700	5 400	0,15	**ZKLN2052-2Z-XL**
25	30 500	55 000	3 250	5 700	2 600	0,4	**ZKLN2557-2RS-XL**
	30 500	55 000	3 250	7 500	4 700	0,2	**ZKLN2557-2Z-XL**

medias ➤ *https://www.schaeffler.de/std/1E50*

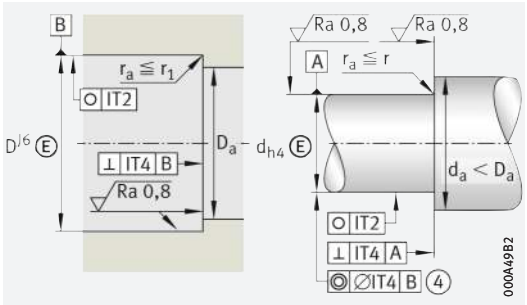
④ Only valid in assembled condition.

1) Based on rotating inner ring.

2) The recommended INA precision locknuts are not included in the scope of delivery and must be ordered separately.

3) The required axial locknut force must be observed when using other locknuts.

4) Only valid in conjunction with INA precision locknuts.
Observe the guidelines on locating/locating bearing arrangements ➤ 🕮 *TPI 123*.



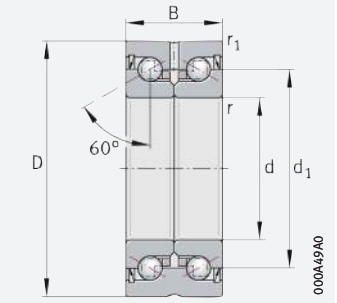
Design of housing and shaft (threaded spindle)

d	Mass moment of inertia[1] M_m kg · cm²	Axial runout[1] μm	Dimensions d_1	r min.	r_1 min.	Mounting dimensions D_a max.	d_a min.
15	0,102	2	28	0,3	0,6	35	20
	0,102	2	28	0,3	0,6	35	20
17	0,132	2	30	0,3	0,6	37	23
	0,132	2	30	0,3	0,6	37	23
20	0,273	2	34,5	0,3	0,6	43	25
	0,273	2	34,5	0,3	0,6	43	25
25	0,486	2	40,5	0,3	0,6	48	32
	0,486	2	40,5	0,3	0,6	48	32

d	Rigidity axial c_{aL} N/μm	Tilting rigidity c_{kL} Nm/mrad	Recommended INA precision locknuts[2] for radial clamping	for axial clamping	Tightening torque[4] M_A Nm	Required locknut force[3] axial N
15	400	65	ZM15	AM15	10	5 484
	400	65	ZM15	AM15	10	5 484
17	450	80	ZM17	AM17	15	7 514
	450	80	ZM17	AM17	15	7 514
20	650	140	ZM20	AM20	18	8 258
	650	140	ZM20	AM20	18	8 258
25	750	200	ZM25	AM25	25	9 123
	750	200	ZM25	AM25	25	9 123

Axial angular contact ball bearings

Without fixing holes



ZKLN..-2RS, ZKLN..-2Z

d = 30 – 40 mm

Main dimensions			Mass	Designation
d	D	B	m ≈ kg	
30 0/–0,005	62 0/–0,01	28 0/–0,25	0,39	**ZKLN3062-2RS-XL**
0/–0,005	62 0/–0,01	28 0/–0,25	0,39	**ZKLN3062-2Z-XL**
0/–0,005	72 0/–0,01	38 0/–0,25	0,72	**ZKLN3072-2RS-XL**[5]
0/–0,005	72 0/–0,01	38 0/–0,25	0,72	**ZKLN3072-2Z-XL**[5]
35 0/–0,005	72 0/–0,01	34 0/–0,25	0,51	**ZKLN3572-2RS-XL**
0/–0,005	72 0/–0,01	34 0/–0,25	0,51	**ZKLN3572-2Z-XL**
40 0/–0,005	75 0/–0,01	34 0/–0,25	0,61	**ZKLN4075-2RS-XL**
0/–0,005	75 0/–0,01	34 0/–0,25	0,61	**ZKLN4075-2Z-XL**
0/–0,005	90 0/–0,01	46 0/–0,25	0,95	**ZKLN4090-2RS-XL**[5]
0/–0,005	90 0/–0,01	46 0/–0,25	0,95	**ZKLN4090-2Z-XL**[5]

	Basic load ratings axial		Fatigue limit load	Limiting speed	Thermally safe operating speed	Bearing frictional torque	Designation
d	dyn. C_a	stat. C_{0a}	C_{ua}	n_G grease	n_ϑ	M_R	
	N	N	N	min^{-1}	min^{-1}	Nm	
30	32 000	64 000	3 750	5 000	2 200	0,5	**ZKLN3062-2RS-XL**
	32 000	64 000	3 750	6 700	4 300	0,25	**ZKLN3062-2Z-XL**
	65 000	108 000	6 400	4 500	2 100	0,8	**ZKLN3072-2RS-XL**[5]
	65 000	108 000	6 400	5 600	4 000	0,4	**ZKLN3072-2Z-XL**[5]
35	45 000	89 000	5 200	4 400	2 000	0,6	**ZKLN3572-2RS-XL**
	45 000	89 000	5 200	5 800	3 800	0,3	**ZKLN3572-2Z-XL**
40	47 500	101 000	6 000	4 000	1 800	0,7	**ZKLN4075-2RS-XL**
	47 500	101 000	6 000	5 200	3 300	0,35	**ZKLN4075-2Z-XL**
	79 000	149 000	8 800	3 500	1 600	1,3	**ZKLN4090-2RS-XL**[5]
	79 000	149 000	8 800	4 400	3 100	0,65	**ZKLN4090-2Z-XL**[5]

medias ➤ *https://www.schaeffler.de/std/1E51*

④ Only valid in assembled condition.

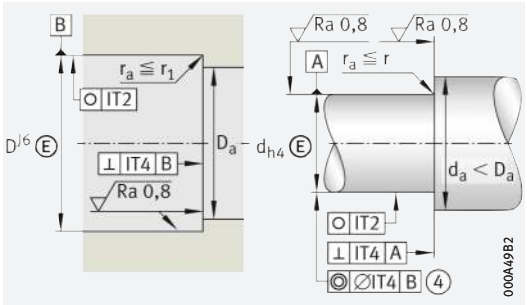
1) Based on rotating inner ring.

2) The recommended INA precision locknuts are not included in the scope of delivery and must be ordered separately.

3) The required axial locknut force must be observed when using other locknuts.

4) Only valid in conjunction with INA precision locknuts.
Observe the guidelines on locating/locating bearing arrangements ➤ 🕮 *TPI 123*.

5) Heavy series.



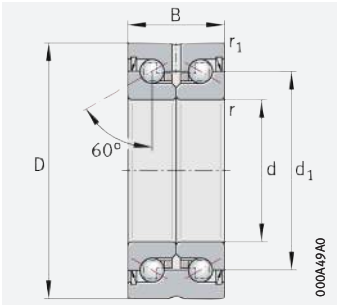
Design of housing and shaft (threaded spindle)

	Mass moment of inertia[1]	Axial runout[1]	Dimensions			Mounting dimensions	
d	M_m		d_1	r	r_1	D_a	d_a
	kg · cm²	µm		min.	min.	max.	min.
30	0,73	2,5	45,5	0,3	0,6	53	40
	0,73	2,5	45,5	0,3	0,6	53	40
	1,91	2,5	51	0,3	0,6	64	47
	1,91	2,5	51	0,3	0,6	64	47
35	1,51	2,5	52	0,3	0,6	62	45
	1,51	2,5	52	0,3	0,6	62	45
40	2,26	2,5	58	0,3	0,6	67	50
	2,26	2,5	58	0,3	0,6	67	50
	5,5	2,5	65	0,6	0,6	80	56
	5,5	2,5	65	0,6	0,6	80	56

	Rigidity	Tilting rigidity	Recommended INA precision locknuts[2]			Required locknut force[3]
	axial		for radial clamping	for axial clamping	Tightening torque[4]	axial
d	c_{aL}	c_{kL}			M_A	
	N/µm	Nm/mrad			Nm	N
30	850	300	ZM30	AM30	32	9 947
	850	300	ZM30	AM30	32	9 947
	950	400	ZMA30/52	AM30	65	19 509
	950	400	ZMA30/52	AM30	65	19 509
35	900	400	ZM35	AM35/58	40	10 770
	900	400	ZM35	AM35/58	40	10 770
40	1 000	550	ZM40	AM40	55	13 412
	1 000	550	ZM40	AM40	55	13 412
	1 200	750	ZMA40/62	AM40	110	25 185
	1 200	750	ZMA40/62	AM40	110	25 185

Axial angular contact ball bearings

Without fixing holes



ZKLN..-2RS, ZKLN..-2Z

d = 50 – 100 mm

Main dimensions			Mass	Designation
d	D	B	m ≈ kg	
50 0/–0,005	110 0/–0,01	54 0/–0,25	2,5	**ZKLN50110-2RS-XL**[5]
0/–0,005	110 0/–0,01	54 0/–0,25	2,5	**ZKLN50110-2Z-XL**[5]
0/–0,005	90 0/–0,01	34 0/–0,25	0,88	**ZKLN5090-2RS-XL**
0/–0,005	90 0/–0,01	34 0/–0,25	0,88	**ZKLN5090-2Z-XL**
60 0/–0,008	110 0/–0,015	45 0/–0,25	2,2	**ZKLN60110-2Z-XL**
70 0/–0,008	120 0/–0,015	45 0/–0,25	2,4	**ZKLN70120-2Z-XL**
80 0/–0,008	130 0/–0,015	45 0/–0,25	2,7	**ZKLN80130-2Z-XL**
90 0/–0,008	150 0/–0,015	55 0/–0,25	4,5	**ZKLN90150-2Z-XL**
100 0/–0,008	160 0/–0,015	55 0/–0,25	4,9	**ZKLN100160-2Z-XL**

	Basic load ratings axial		Fatigue limit load	Limiting speed	Thermally safe operating speed	Bearing frictional torque	Designation
d	dyn. C_a	stat. C_{0a}	C_{ua}	n_G grease	n_ϑ	M_R	
	N	N	N	min^{-1}	min^{-1}	Nm	
50	125 000	250 000	14 800	2 900	1 200	2,6	**ZKLN50110-2RS-XL**[5]
	125 000	250 000	14 800	3 500	2 500	1,3	**ZKLN50110-2Z-XL**[5]
	51 000	126 000	7 400	3 200	1 500	0,9	**ZKLN5090-2RS-XL**
	51 000	126 000	7 400	4 200	3 000	0,45	**ZKLN5090-2Z-XL**
60	93 000	214 000	12 600	4 000	3 000	1	**ZKLN60110-2Z-XL**
70	97 000	241 000	14 200	3 800	2 800	1,2	**ZKLN70120-2Z-XL**
80	100 000	265 000	15 400	3 600	2 700	1,4	**ZKLN80130-2Z-XL**
90	149 000	395 000	21 300	3 500	2 300	2,3	**ZKLN90150-2Z-XL**
100	154 000	435 000	22 400	3 300	2 150	2,6	**ZKLN100160-2Z-XL**

medias ➤ *https://www.schaeffler.de/std/1E52*

④ Only valid in assembled condition.

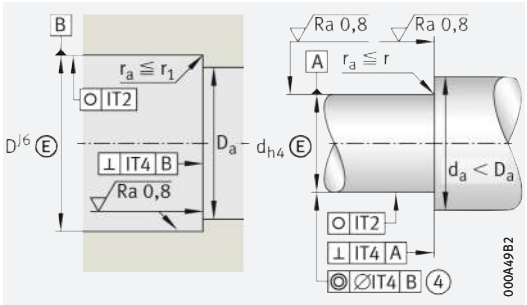
1) Based on rotating inner ring.

2) The recommended INA precision locknuts are not included in the scope of delivery and must be ordered separately.

3) The required axial locknut force must be observed when using other locknuts.

4) Only valid in conjunction with INA precision locknuts.
Observe the guidelines on locating/locating bearing arrangements ➤ 🕮 *TPI 123*.

5) Heavy series.



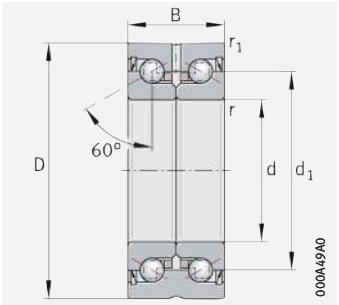
Design of housing and shaft (threaded spindle)

d	Mass moment of inertia[1] M_m kg · cm²	Axial runout[1] µm	Dimensions d_1	r min.	r_1 min.	Mounting dimensions D_a max.	d_a min.
50	15,2	2,5	80	0,6	0,6	98	63
	15,2	2,5	80	0,6	0,6	98	63
	5,24	2,5	72	0,3	0,6	82	63
	5,24	2,5	72	0,3	0,6	82	63
60	13,7	3	85	0,6	0,6	100	82
70	19,8	3	95	0,6	0,6	110	92
80	27,6	3	105	0,6	0,6	120	102
90	59,9	3	120	0,6	0,6	138	116
100	85,3	3	132	0,6	0,6	150	128

d	Rigidity axial c_{aL} N/µm	Tilting rigidity c_{kL} Nm/mrad	Recommended INA precision locknuts[2] for radial clamping	for axial clamping	Tightening torque[4] M_A Nm	Required locknut force[3] axial N
50	1 400	1 500	ZMA50/75	AM50	150	28 451
	1 400	1 500	ZMA50/75	AM50	150	28 451
	1 250	1 000	ZM50	AM50	85	16 280
	1 250	1 000	ZM50	AM50	85	16 280
60	1 300	1 650	ZMA60/98	AM60	100	16 700
70	1 450	2 250	ZMA70/110	AM70	130	19 031
80	1 600	3 000	ZMA80/120	AM80	160	20 604
90	1 700	4 400	ZMA90/130	AM90	200	22 731
100	1 900	5 800	ZMA100/140	AM100	250	25 624

Axial angular contact ball bearings

Without fixing holes
Less stringent tolerances



ZKLN..-2RS-PE

d = 6 – 50 mm

Main dimensions			Mass	Designation
d	D	B	m ≈ kg	
6 +0,003 /–0,005	24 0/–0,01	15 0/–0,25	0,03	**ZKLN0624-2RS-PE**
10 0 /–0,008	34 0/–0,011	20 0/–0,25	0,1	**ZKLN1034-2RS-PE**
12 0 /–0,01	42 0/–0,011	25 0/–0,25	0,2	**ZKLN1242-2RS-PE**
15 0 /–0,01	45 0/–0,011	25 0/–0,25	0,21	**ZKLN1545-2RS-PE**
17 0 /–0,01	47 0/–0,011	25 0/–0,25	0,22	**ZKLN1747-2RS-PE**
20 0 /–0,01	52 0/–0,013	28 0/–0,25	0,31	**ZKLN2052-2RS-PE**
25 0 /–0,01	57 0/–0,013	28 0/–0,25	0,34	**ZKLN2557-2RS-PE**
30 0 /–0,01	62 0/–0,013	28 0/–0,25	0,39	**ZKLN3062-2RS-PE**
35 0 /–0,01	72 0/–0,013	34 0/–0,25	0,51	**ZKLN3572-2RS-PE**
50 0 /–0,01	90 0/–0,015	34 0/–0,25	0,88	**ZKLN5090-2RS-PE**

	Basic load ratings axial		Fatigue limit load	Limiting speed	Thermally safe operating speed	Bearing frictional torque	Designation
d	dyn. C_a N	stat. C_{0a} N	C_{ua} N	n_G grease min^{-1}	n_ϑ min^{-1}	M_R Nm	
6	6 900	8 500	375	16 400	6 800	0,04	**ZKLN0624-2RS-PE**
10	13 400	18 800	830	10 900	4 600	0,12	**ZKLN1034-2RS-PE**
12	16 900	24 700	1 090	9 200	3 800	0,16	**ZKLN1242-2RS-PE**
15	17 900	28 000	1 240	8 200	3 500	0,2	**ZKLN1545-2RS-PE**
17	18 800	31 000	1 380	7 600	3 300	0,24	**ZKLN1747-2RS-PE**
20	26 000	47 000	2 070	6 600	3 000	0,3	**ZKLN2052-2RS-PE**
25	27 500	55 000	2 450	5 700	2 600	0,4	**ZKLN2557-2RS-PE**
30	29 000	64 000	2 800	5 000	2 200	0,5	**ZKLN3062-2RS-PE**
35	41 000	89 000	3 950	4 400	2 000	0,6	**ZKLN3572-2RS-PE**
50	46 500	126 000	5 600	3 200	1 500	0,9	**ZKLN5090-2RS-PE**

medias ➤ *https://www.schaeffler.de/std/1E53*

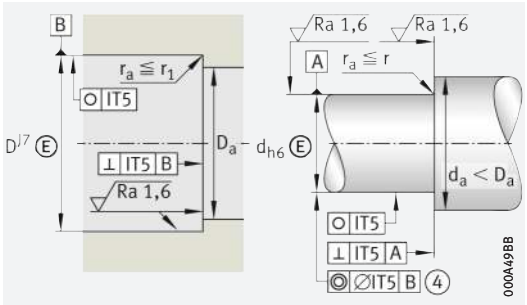
④ Only valid in assembled condition.

1) Based on rotating inner ring.

2) The recommended INA precision locknuts are not included in the scope of delivery and must be ordered separately.

3) The required axial locknut force must be observed when using other locknuts.

4) Only valid in conjunction with INA precision locknuts.
Observe the guidelines on locating/locating bearing arrangements ➤ 🕮 *TPI 123*.



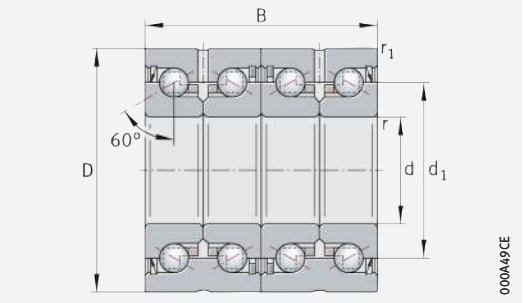
Design of housing and shaft (threaded spindle)

d	Mass moment of inertia[1] M_m kg · cm²	Axial runout[1] µm	Dimensions d_1	r min.	r_1 min.	Mounting dimensions D_a max.	d_a min.
6	0,0044	5	14	0,3	0,6	19	9
10	0,029	5	21	0,3	0,6	28	14
12	0,068	5	25	0,3	0,6	33	16
15	0,102	5	28	0,3	0,6	35	20
17	0,132	5	30	0,3	0,6	37	23
20	0,273	5	34,5	0,3	0,6	43	25
25	0,486	5	40,5	0,3	0,6	48	32
30	0,73	5	45,5	0,3	0,6	53	40
35	1,51	5	52	0,3	0,6	62	45
50	5,24	5	72	0,3	0,6	82	63

d	Rigidity axial c_{aL} N/µm	Tilting rigidity c_{kL} Nm/mrad	Recommended INA precision locknuts[2] for radial clamping	for axial clamping	Tightening torque[4] M_A Nm	Required locknut force[3] axial N
6	200	8	ZM06	–	2	2 404
10	325	25	ZM10	–	6	4 891
12	375	50	ZM12	–	8	5 307
15	400	65	ZM15	AM15	10	5 484
17	450	80	ZM17	AM17	15	7 514
20	650	140	ZM20	AM20	18	8 258
25	750	200	ZM25	AM25	25	9 123
30	850	300	ZM30	AM30	32	9 947
35	900	400	ZM35	AM35/38	40	10 770
50	1 250	1 000	ZM50	AM50	85	16 280

Axial angular contact ball bearings

Without fixing holes
Matched pair



ZKLN..-2RS-2AP

d = 17 – 50 mm

Main dimensions			Mass	Designation
d	D	B	m ≈ kg	
17 0/–0,005	47 0/–0,01	50 0/–0,5	0,44	**ZKLN1747-2RS-2AP-XL**
20 0/–0,005	52 0/–0,01	56 0/–0,5	0,62	**ZKLN2052-2RS-2AP-XL**
25 0/–0,005	57 0/–0,01	56 0/–0,5	0,68	**ZKLN2557-2RS-2AP-XL**
30 0/–0,005	62 0/–0,01	56 0/–0,5	0,78	**ZKLN3062-2RS-2AP-XL**
35 0/–0,005	72 0/–0,01	68 0/–0,5	1,02	**ZKLN3572-2RS-2AP-XL**
40 0/–0,005	75 0/–0,01	68 0/–0,5	1,22	**ZKLN4075-2RS-2AP-XL**
50 0/–0,005	90 0/–0,01	68 0/–0,5	1,76	**ZKLN5090-2RS-2AP-XL**

	Basic load ratings axial		Fatigue limit load	Limiting speed	Thermally safe operating speed	Bearing frictional torque	Designation
d	dyn. C_a N	stat. C_{0a} N	C_{ua} N	n_G grease min^{-1}	n_ϑ min^{-1}	M_R Nm	
17	33 500	62 000	3 700	7 600	3 300	0,36	**ZKLN1747-2RS-2AP-XL**
20	46 000	94 000	5 500	6 600	3 000	0,45	**ZKLN2052-2RS-2AP-XL**
25	49 000	111 000	6 500	5 700	2 600	0,6	**ZKLN2557-2RS-2AP-XL**
30	52 000	127 000	7 500	5 000	2 200	0,75	**ZKLN3062-2RS-2AP-XL**
35	73 000	177 000	10 500	4 400	2 000	0,9	**ZKLN3572-2RS-2AP-XL**
40	77 000	202 000	11 900	4 000	1 800	1,05	**ZKLN4075-2RS-2AP-XL**
50	83 000	250 000	14 900	3 200	1 500	1,35	**ZKLN5090-2RS-2AP-XL**

medias ➤ *https://www.schaeffler.de/std/1E54*

Further sizes and designs with seals 2Z by agreement.

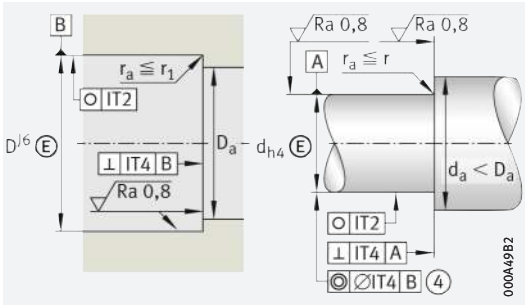
④ Only valid in assembled condition.

1) Based on rotating inner ring.

2) The recommended INA precision locknuts are not included in the scope of delivery and must be ordered separately.

3) The required axial locknut force must be observed when using other locknuts.

4) Only valid in conjunction with INA precision locknuts.
Observe the guidelines on locating/locating bearing arrangements ➤ 🕮 *TPI 123*.



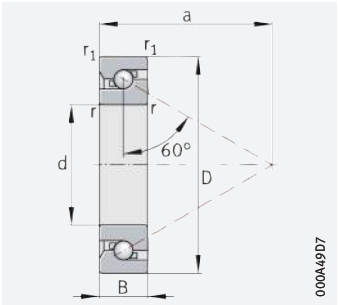
Design of housing and shaft (threaded spindle)

d	Mass moment of inertia[1] M_m kg · cm²	Axial runout[1] µm	Dimensions d_1	r min.	r_1 min.	Mounting dimensions D_a max.	d_a min.
17	0,264	2	30	0,3	0,6	37	23
20	0,546	2	34,5	0,3	0,6	43	25
25	0,972	2	40,5	0,3	0,6	48	32
30	1,46	2,5	45,5	0,3	0,6	53	40
35	3,02	2,5	52	0,3	0,6	62	45
40	4,52	2,5	58	0,3	0,6	67	50
50	10,48	2,5	72	0,3	0,6	82	63

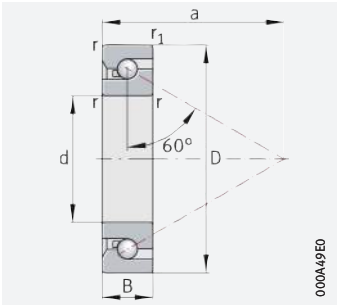
d	Rigidity axial c_{aL} N/µm	Tilting rigidity c_{kL} Nm/mrad	Recommended INA precision locknuts[2] for radial clamping	for axial clamping	Tightening torque[4] M_A Nm	Required locknut force[3] axial N
17	800	200	ZM17	AM17	15	7 514
20	1 150	320	ZMA20/38	AM20	18	8 258
25	1 300	450	ZMA25/45	AM25	25	9 123
30	1 500	620	ZMA30/52	AM30	32	9 947
35	1 600	900	ZMA35/58	AM35/58	40	10 770
40	1 750	1 200	ZMA40/62	AM40	55	13 412
50	2 200	2 250	ZMA50/75	AM50	85	16 280

Axial angular contact ball bearings

Single direction
Open



7602, 7603, BSB



BSB..-SU

d = 12 – 20 mm

Main dimensions			Mass	Designation
d	D	B	m ≈ kg	
12 0/–0,004	32 0/–0,006	10 0/–0,08	0,042	**7602012-TVP**
15 0/–0,004	35 0/–0,006	11 0/–0,08	0,052	**7602015-TVP**
17 0/–0,004	40 0/–0,006	12 0/–0,08	0,074	**7602017-TVP**
0/–0,004	47 0/–0,006	15 0/–0,12	0,13	**BSB1747-SU**
0/–0,004	47 0/–0,006	15 0/–0,12	0,13	**BSB1747-SU-L055**
20 0/–0,005	47 0/–0,006	14 0/–0,12	0,139	**7602020-TVP**
0/–0,005	47 0/–0,006	15 0/–0,12	0,12	**BSB2047-SU**
0/–0,005	47 0/–0,006	15 0/–0,12	0,12	**BSB2047-SU-L055**
0/–0,005	52 0/–0,007	15 0/–0,12	0,17	**7603020-TVP**

	Basic load ratings axial		Fatigue limit load	Limiting speed	Thermally safe operating speed	Bearing frictional torque[1]	Designation
d	dyn. C_a N	stat. C_{0a} N	C_{ua} N	n_G grease min^{-1}	n_ϑ min^{-1}	M_R Nm	
12	12 200	20 700	920	14 100	8 000	0,015	**7602012-TVP**
15	13 100	24 700	1 090	12 300	6 700	0,02	**7602015-TVP**
17	17 200	32 500	1 430	10 600	6 000	0,03	**7602017-TVP**
	26 000	47 000	2 070	8 700	6 200	0,08	**BSB1747-SU**
	26 000	47 000	2 070	8 700	6 200	0,08	**BSB1747-SU-L055**
20	19 100	38 000	1 670	9 200	5 000	0,05	**7602020-TVP**
	26 000	47 000	2 070	8 700	6 200	0,08	**BSB2047-SU**
	26 000	47 000	2 070	8 700	6 200	0,08	**BSB2047-SU-L055**
	25 500	53 000	2 360	8 200	4 500	0,06	**7603020-TVP**

medias ➤ *https://www.schaeffler.de/std/1E55*

④ Only valid in assembled condition.

1) Valid for single bearings with stated preload force.

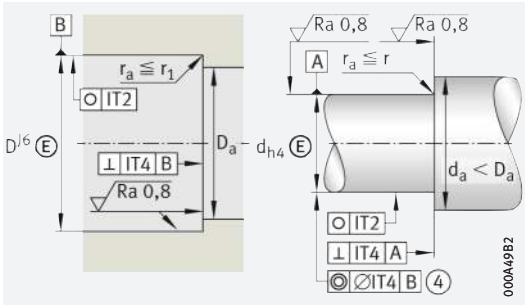
2) Valid for matched pair of bearings in O or X arrangement.

3) Based on rotating inner ring.

4) The recommended INA precision locknuts are not included in the scope of delivery and must be ordered separately.

5) The required axial locknut force must be observed when using other locknuts.

6) Only valid in conjunction with INA precision locknuts.
Observe the guidelines on locating/locating bearing arrangements ➤ 🕮 *TPI 123*.



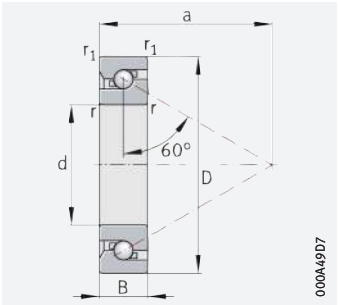
Design of housing and shaft (threaded spindle)

	Dimensions			Mounting dimensions			
d	r min.	r_1 min.	a ≈	D_a max.		d_a min.	
12	0,6	0,6	24	27	H12	17	h12
15	0,6	0,6	27,5	30	H12	20,5	h12
17	0,6	0,6	31	34,5	H12	23	h12
	1	0,6	29,9	43	H12	27	h12
	1	0,6	29,9	43	H12	27	h12
20	1	1	36	39,5	H12	27,5	h12
	1	0,6	29,9	43	H12	27	h12
	1	0,6	29,9	43	H12	27	h12
	1,1	1,1	39,5	43,5	H12	30,5	h12

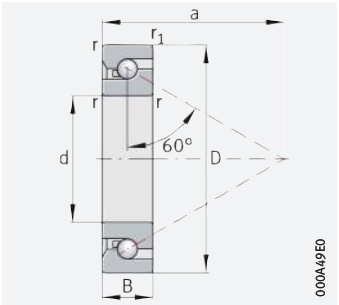
	Rigidity[2]	Axial runout[3]	Recommended INA precision locknuts[4]			Required locknut force[5]
	axial		for radial clamping	for axial clamping	Tightening torque[6]	axial
d	c_{aL}				M_A	
	N/µm	µm			Nm	N
12	476	2	ZM12	–	8	6 110
15	516	2	ZM15	AM15	10	5 740
17	596	2	ZM17	AM17	15	8 060
	764	2	ZM17	AM17	15	9 000
	764	2	ZM17	AM17	15	9 000
20	703	2	ZM20	AM20	18	8 490
	764	2	ZM20	AM20	18	9 000
	764	2	ZM20	AM20	18	9 000
	787	2	ZM20	AM20	25	11 600

Axial angular contact ball bearings

Single direction
Open



7602, 7603, BSB



BSB..-SU

d = 25 – 30 mm

Main dimensions				Mass	Designation
d		D	B	m	
				≈ kg	
25	0/–0,005	52 0/–0,007	15 0/–0,12	0,147	**7602025-TVP**
	0/–0,005	62 0/–0,007	17 0/–0,12	0,275	**7603025-TVP**
	0/–0,005	62 0/–0,007	15 0/–0,12	0,24	**BSB2562-SU**
	0/–0,005	62 0/–0,007	15 0/–0,12	0,24	**BSB2562-SU-L055**
30	0/–0,005	62 0/–0,007	16 0/–0,12	0,232	**7602030-TVP**
	0/–0,005	62 0/–0,007	15 0/–0,12	0,22	**BSB3062-SU**
	0/–0,005	62 0/–0,007	15 0/–0,12	0,22	**BSB3062-SU-L055**
	0/–0,005	72 0/–0,007	19 0/–0,12	0,409	**7603030-TVP**

	Basic load ratings axial		Fatigue limit load	Limiting speed	Thermally safe operating speed	Bearing frictional torque[1]	Designation
d	dyn. C_a	stat. C_{0a}	C_{ua}	n_G grease	n_ϑ	M_R	
	N	N	N	min^{-1}	min^{-1}	Nm	
25	23 200	50 000	2 220	8 000	4 500	0,07	**7602025-TVP**
	29 500	68 000	3 000	6 800	3 800	0,09	**7603025-TVP**
	29 000	64 000	2 800	6 700	5 400	0,13	**BSB2562-SU**
	29 000	64 000	2 800	6 700	5 400	0,13	**BSB2562-SU-L055**
30	27 500	66 000	2 900	6 700	3 800	0,09	**7602030-TVP**
	29 000	64 000	2 800	6 700	5 400	0,13	**BSB3062-SU**
	29 000	64 000	2 800	6 700	5 400	0,13	**BSB3062-SU-L055**
	36 500	89 000	3 950	5 700	3 200	0,13	**7603030-TVP**

medias ➤ *https://www.schaeffler.de/std/1E56*

④ Only valid in assembled condition.

1) Valid for single bearings with stated preload force.

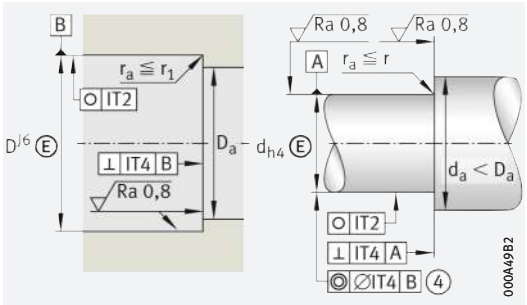
2) Valid for matched pair of bearings in O or X arrangement.

3) Based on rotating inner ring.

4) The recommended INA precision locknuts are not included in the scope of delivery and must be ordered separately.

5) The required axial locknut force must be observed when using other locknuts.

6) Only valid in conjunction with INA precision locknuts.
Observe the guidelines on locating/locating bearing arrangements ➤ 🕮 *TPI 123*.



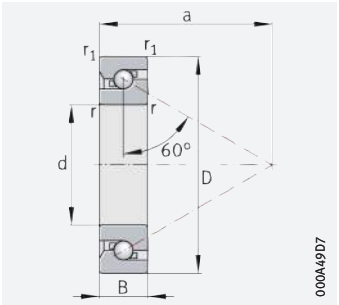
Design of housing and shaft (threaded spindle)

d	Dimensions			Mounting dimensions			
	r	r_1	a	D_a		d_a	
	min.	min.	≈	max.		min.	
25	1	1	41	45	H12	32	h12
	1,1	1,1	47,5	52	H12	38	h12
	1	0,6	39,4	54	H12	38	h12
	1	0,6	39,4	54	H12	38	h12
30	1	1	48	52,5	H12	39,5	h12
	1	0,6	39,4	54	H12	38	h12
	1	0,6	39,4	54	H12	38	h12
	1,1	1,1	55,5	61	H12	45	h12

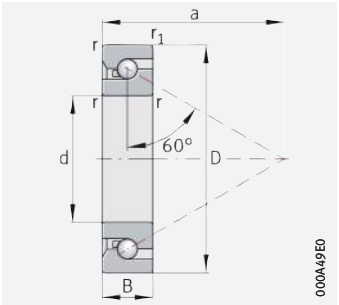
d	Rigidity[2]	Axial runout[3]	Recommended INA precision locknuts[4]			Required locknut force[5]
	axial		for radial clamping	for axial clamping	Tightening torque[6]	axial
	c_{aL}				M_A	
	N/µm	µm			Nm	N
25	772	2	ZM25	AM25	25	9 430
	917	2	ZM25	AM25	40	14 480
	1 001	2	ZMA25/45	AM25	30	11 810
	1 001	2	ZMA25/45	AM25	30	11 810
30	893	2	ZM30	AM30	32	10 240
	1 034	2,5	ZM30	AM30	32	11 080
	1 034	2,5	ZM30	AM30	32	11 080
	1 073	2	ZM30	AM30	55	16 180

Axial angular contact ball bearings

Single direction
Open



7602, 7603, BSB



BSB..-SU

d = 35 – 40 mm

Main dimensions			Mass	Designation
d	D	B	m ≈ kg	
35 0/–0,006	72 0/–0,007	17 0/–0,12	0,339	**7602035-TVP**
0/–0,006	72 0/–0,007	15 0/–0,12	0,3	**BSB3572-SU**
0/–0,006	72 0/–0,007	15 0/–0,12	0,3	**BSB3572-SU-L055**
0/–0,006	80 0/–0,007	21 0/–0,12	0,546	**7603035-TVP**
40 0/–0,006	72 0/–0,007	15 0/–0,12	0,26	**BSB4072-SU**
0/–0,006	72 0/–0,007	15 0/–0,12	0,26	**BSB4072-SU-L055**
0/–0,006	80 0/–0,007	18 0/–0,12	0,418	**7602040-TVP**
0/–0,006	90 0/–0,008	23 0/–0,12	0,751	**7603040-TVP**
0/–0,006	90 0/–0,008	20 0/–0,12	0,65	**BSB040090-T**

	Basic load ratings axial		Fatigue limit load	Limiting speed	Thermally safe operating speed	Bearing frictional torque[1]	Designation
d	dyn. C_a	stat. C_{0a}	C_{ua}	n_G grease	n_ϑ	M_R	
	N	N	N	min^{-1}	min^{-1}	Nm	
35	31 500	81 000	3 600	5 700	3 200	0,12	**7602035-TVP**
	37 000	89 000	3 950	5 400	4 700	0,18	**BSB3572-SU**
	37 000	89 000	3 950	5 400	4 700	0,18	**BSB3572-SU-L055**
	38 000	100 000	4 450	5 100	3 000	0,17	**7603035-TVP**
40	37 000	89 000	3 950	5 400	4 700	0,18	**BSB4072-SU**
	37 000	89 000	3 950	5 400	4 700	0,18	**BSB4072-SU-L055**
	39 000	106 000	4 650	4 900	2 800	0,17	**7602040-TVP**
	52 000	138 000	6 100	4 500	2 600	0,23	**7603040-TVP**
	52 000	138 000	6 100	4 500	3 100	0,23	**BSB040090-T**

medias ➤ *https://www.schaeffler.de/std/1E57*

④ Only valid in assembled condition.

1) Valid for single bearings with stated preload force.

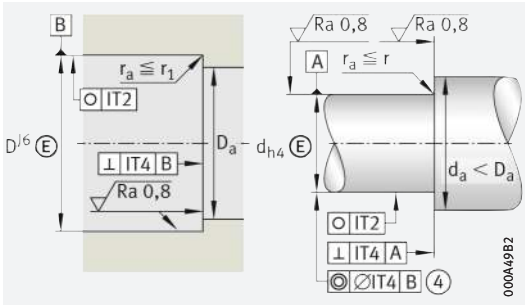
2) Valid for matched pair of bearings in O or X arrangement.

3) Based on rotating inner ring.

4) The recommended INA precision locknuts are not included in the scope of delivery and must be ordered separately.

5) The required axial locknut force must be observed when using other locknuts.

6) Only valid in conjunction with INA precision locknuts.
Observe the guidelines on locating/locating bearing arrangements ➤ 🕮 *TPI 123*.



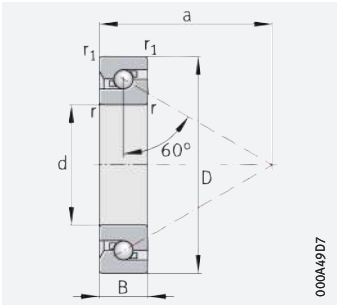
Design of housing and shaft (threaded spindle)

	Dimensions			Mounting dimensions			
d	r min.	r_1 min.	a ≈	D_a max.		d_a min.	
35	1,1	1,1	55	60,5	H12	46,5	h12
	1	0,6	48,5	65	H12	47	h12
	1	0,6	48,5	65	H12	47	h12
	1,5	1,5	61,5	67	H12	51	h12
40	1	0,6	48,5	65	H12	47	h12
	1	0,6	48,5	65	H12	47	h12
	1,1	1,1	62,5	69,5	H12	53,5	h12
	1,5	1,5	68,5	75,5	H12	56,5	h12
	1,5	1,5	67	75,5	H12	56,5	h12

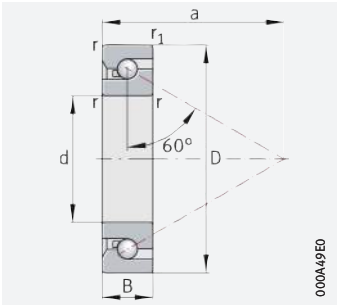
	Rigidity[2]	Axial runout[3]	Recommended INA precision locknuts[4]			Required locknut force[5]
	axial		for radial clamping	for axial clamping	Tightening torque[6]	axial
d	c_{aL}				M_A	
	N/µm	µm			Nm	N
35	1 020	2	ZM35	AM35	40	11 310
	1 196	2,5	ZM35	AM35	50	15 220
	1 196	2,5	ZM35	AM35	50	15 220
	1 192	2	ZM35	AM35	65	17 380
40	1 235	2,5	ZM40	AM40	60	15 650
	1 235	2,5	ZM40	AM40	60	15 650
	1 190	2	ZM40	AM40	55	13 330
	1 292	2	ZM40	AM40	110	25 120
	1 292	2	ZM40	AM40	110	25 120

Axial angular contact ball bearings

Single direction
Open



7602, 7603, BSB



BSB..-SU

d = 45 – 50 mm

Main dimensions				Mass	Designation
d		D	B	m	
				≈ kg	
45	0/–0,006	75 0/–0,007	15 0/–0,12	0,26	**BSB045075-T**
	0/–0,006	85 0/–0,008	19 0/–0,12	0,488	**7602045-TVP**
	0/–0,006	100 0/–0,008	25 0/–0,12	0,992	**7603045-TVP**
	0/–0,006	100 0/–0,008	20 0/–0,12	0,81	**BSB045100-T**
50	0/–0,006	90 0/–0,008	20 0/–0,12	0,557	**7602050-TVP**
	0/–0,006	100 0/–0,008	20 0/–0,12	0,75	**BSB050100-T**
	0/–0,006	110 0/–0,008	27 0/–0,12	1,29	**7603050-TVP**

	Basic load ratings axial		Fatigue limit load	Limiting speed	Thermally safe operating speed	Bearing frictional torque[1]	Designation
d	dyn. C_a	stat. C_{0a}	C_{ua}	n_G grease	n_ϑ	M_R	
	N	N	N	min^{-1}	min^{-1}	Nm	
45	30 000	85 000	3 750	5 100	3 300	0,13	**BSB045075-T**
	39 500	111 000	4 900	4 700	2 600	0,19	**7602045-TVP**
	62 000	172 000	7 600	4 000	2 200	0,3	**7603045-TVP**
	62 000	172 000	7 600	4 000	2 700	0,3	**BSB045100-T**
50	41 000	122 000	5 400	4 300	2 400	0,23	**7602050-TVP**
	62 000	172 000	7 600	4 000	2 700	0,33	**BSB050100-T**
	72 000	203 000	9 000	3 600	2 000	0,36	**7603050-TVP**

medias ➤ *https://www.schaeffler.de/std/1E58*

④ Only valid in assembled condition.

1) Valid for single bearings with stated preload force.

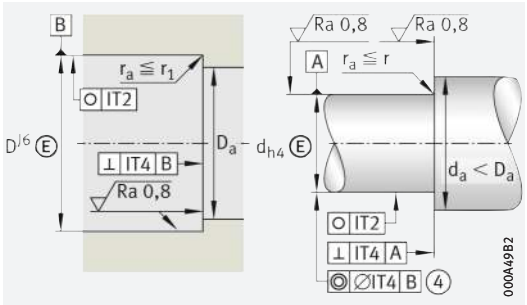
2) Valid for matched pair of bearings in O or X arrangement.

3) Based on rotating inner ring.

4) The recommended INA precision locknuts are not included in the scope of delivery and must be ordered separately.

5) The required axial locknut force must be observed when using other locknuts.

6) Only valid in conjunction with INA precision locknuts.
Observe the guidelines on locating/locating bearing arrangements ➤ 🕮 *TPI 123*.



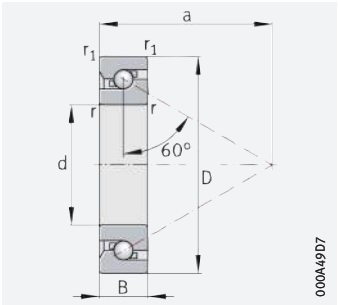
Design of housing and shaft (threaded spindle)

	Dimensions			Mounting dimensions			
d	r min.	r_1 min.	a ≈	D_a max.		d_a min.	
45	1	1	59,5	68	H12	52	h12
	1,1	1,1	66	73	H12	57	h12
	1,5	1,5	77,5	85,5	H12	64,5	h12
	1,5	1,5	75	85,5	H12	64,5	h12
50	1,1	1,1	71,5	79	H12	63	h12
	1,5	1,5	75	85,5	H12	64,5	h12
	2	2	85,5	94	H12	72	h12

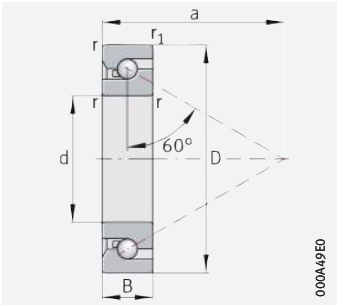
	Rigidity[2]	Axial runout[3]	Recommended INA precision locknuts[4]			Required locknut force[5]
	axial		for radial clamping	for axial clamping	Tightening torque[6]	axial
d	c_{aL}				M_A	
	N/µm	µm			Nm	N
45	1 072	2	ZM45	AM45	50	11 140
	1 247	2	ZM45	AM45	65	14 410
	1 473	2	ZM45	AM45	120	25 160
	1 473	2	ZM45	AM45	120	25 160
50	1 360	2	ZM50	AM50	85	16 810
	1 473	2	ZM50	AM50	120	23 770
	1 601	2	ZM50	AM50	150	28 930

Axial angular contact ball bearings

Single direction
Open



7602, 7603, BSB



BSB..-SU

d = 55 – 60 mm

Main dimensions				Mass	Designation
d		D	B	m	
				≈ kg	
55	0/–0,007	90 0/–0,008	15 0/–0,15	0,38	**BSB055090-T**
	0/–0,007	100 0/–0,008	21 0/–0,15	0,74	**7602055-TVP**
	0/–0,007	120 0/–0,008	29 0/–0,15	1,67	**7603055-TVP**[7]
	0/–0,007	120 0/–0,008	20 0/–0,15	1,2	**BSB055120-T**[7]
60	0/–0,007	120 0/–0,008	20 0/–0,15	1,1	**BSB060120-T**

	Basic load ratings axial		Fatigue limit load	Limiting speed	Thermally safe operating speed	Bearing frictional torque[1]	Designation
d	dyn. C_a	stat. C_{0a}	C_{ua}	n_G grease	n_ϑ	M_R	
	N	N	N	min^{-1}	min^{-1}	Nm	
55	33 500	98 000	4 300	4 200	2 800	0,19	**BSB055090-T**
	42 000	132 000	5 800	3 900	2 200	0,25	**7602055-TVP**
	85 000	255 000	11 200	3 300	1 900	0,46	**7603055-TVP**[7]
	63 000	188 000	8 300	3 400	2 400	0,36	**BSB055120-T**[7]
60	64 000	196 000	8 700	3 800	2 300	0,38	**BSB060120-T**

medias ➤ *https://www.schaeffler.de/std/1E59*

④ Only valid in assembled condition.

1) Valid for single bearings with stated preload force.

2) Valid for matched pair of bearings in O or X arrangement.

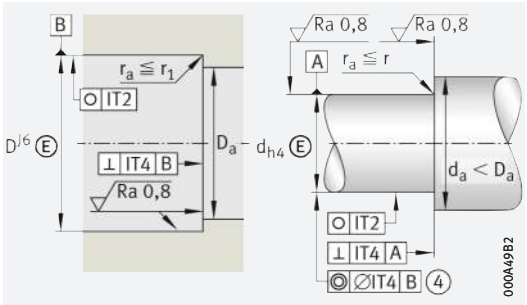
3) Based on rotating inner ring.

4) The recommended INA precision locknuts are not included in the scope of delivery and must be ordered separately.

5) The required axial locknut force must be observed when using other locknuts.

6) Only valid in conjunction with INA precision locknuts.
Observe the guidelines on locating/locating bearing arrangements ➤ 🕮 *TPI 123*.

7) Delivery possibility by agreement.



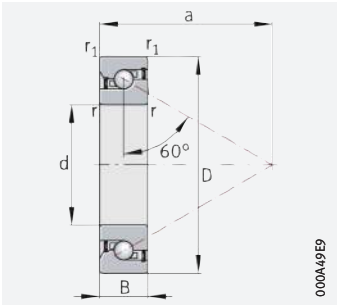
Design of housing and shaft (threaded spindle)

d	Dimensions			Mounting dimensions			
	r min.	r_1 min.	a ≈	D_a max.		d_a min.	
55	1	1	70,5	80	H12	65	h12
	1,5	1,5	77,5	85,5	H12	69,5	h12
	2	2	91,5	101	H12	77	h12
	2	2	86	97,5	H12	77	h12
60	1,5	1,5	88	100,5	H12	79,5	h12

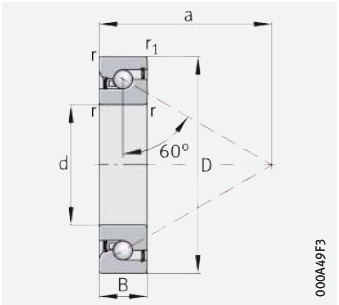
d	Rigidity[2] axial c_{aL} N/µm	Axial runout[3] µm	Recommended INA precision locknuts[4] for radial clamping	for axial clamping	Tightening torque[6] M_A Nm	Required locknut force[5] axial N
55	1 246	3	ZM55	AM55	60	12 040
	1 394	3	ZM55	AM55	85	15 060
	1 723	3	ZM55	AM55	130	24 120
	1 553	3	ZM55	AM55	110	20 070
60	1 623	3	ZM60	AM60	120	20 020

Axial angular contact ball bearings

Single direction
Sealed on both sides



7602..-2RS, 7603..-2RS, BSB..-2RS



BSB..-2Z-SU

d = 12 – 20 mm

Main dimensions			Mass	Designation
d	D	B	m	
			≈ kg	
12 0/–0,004	32 0/–0,006	10 0/–0,08	0,042	**7602012-2RS-TVP**
15 0/–0,004	35 0/–0,006	11 0/–0,08	0,052	**7602015-2RS-TVP**
17 0/–0,004	47 0/–0,006	15 0/–0,12	0,13	**BSB1747-2Z-SU**
20 0/–0,005	47 0/–0,006	14 0/–0,12	0,12	**7602020-2RS-TVP**
0/–0,005	47 0/–0,006	15 0/–0,12	0,12	**BSB2047-2Z-SU**
0/–0,005	52 0/–0,007	15 0/–0,12	0,17	**7603020-2RS-TVP**

	Basic load ratings axial		Fatigue limit load	Limiting speed	Thermally safe operating speed	Bearing frictional torque[1]	Designation
d	dyn. C_a	stat. C_{0a}	C_{ua}	n_G grease	n_ϑ	M_R	
	N	N	N	min^{-1}	min^{-1}	Nm	
12	12 200	20 700	920	10 400	8 000	0,015	**7602012-2RS-TVP**
15	13 100	24 700	1 090	9 000	6 700	0,02	**7602015-2RS-TVP**
17	26 000	47 000	2 070	8 700	6 200	0,08	**BSB1747-2Z-SU**
20	19 100	38 000	1 670	6 800	5 000	0,05	**7602020-2RS-TVP**
	26 000	47 000	2 070	8 700	6 200	0,08	**BSB2047-2Z-SU**
	25 500	53 000	2 360	6 200	4 500	0,06	**7603020-2RS-TVP**

medias ➤ *https://www.schaeffler.de/std/1E5A*

④ Only valid in assembled condition.

1) Valid for single bearings with stated preload force.

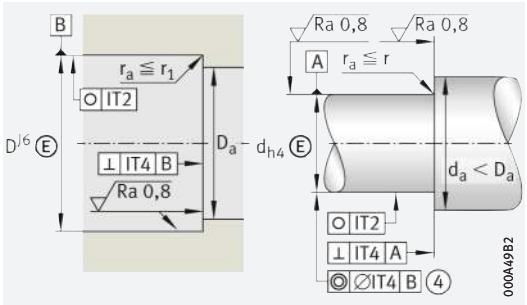
2) Valid for matched pair of bearings in O or X arrangement.

3) Based on rotating inner ring.

4) The recommended INA precision locknuts are not included in the scope of delivery and must be ordered separately.

5) The required axial locknut force must be observed when using other locknuts.

6) Only valid in conjunction with INA precision locknuts.
Observe the guidelines on locating/locating bearing arrangements ➤ 🕮 *TPI 123*.



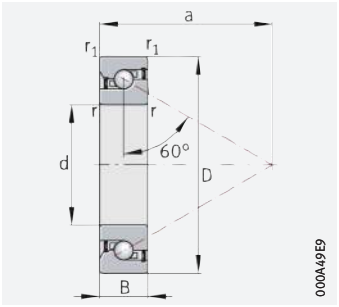
Design of housing and shaft (threaded spindle)

	Dimensions			Mounting dimensions			
d	r	r_1	a	D_a		d_a	
	min.	min.	≈	max.		min.	
12	0,6	0,6	24	27	H12	17	h12
15	0,6	0,6	27,5	30	H12	20,5	h12
17	1	0,6	29,9	43	H12	27	h12
20	1	1	36	39,5	H12	27,5	h12
	1	0,6	29,9	43	H12	27	h12
	1,1	1,1	36,5	43,5	H12	30,5	h12

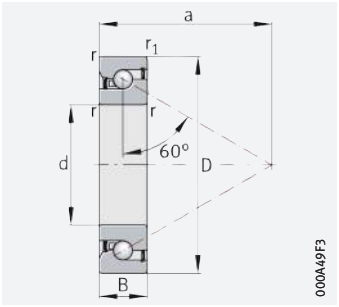
	Rigidity[2]	Axial runout[3]	Recommended INA precision locknuts[4]			Required locknut force[5]
	axial		for radial clamping	for axial clamping	Tightening torque[6]	axial
d	c_{aL}				M_A	
	N/µm	µm			Nm	N
12	476	2	ZM12	–	8	6 110
15	516	2	ZM15	AM15	10	5 740
17	764	2	ZM17	AM17	15	9 000
20	703	2	ZM20	AM20	18	8 490
	764	2	ZM20	AM20	18	9 000
	787	2	ZM20	AM20	18	11 600

Axial angular contact ball bearings

Single direction
Sealed on both sides



7602..-2RS, 7603..-2RS, BSB..-2RS



BSB..-2Z-SU

d = 25 – 40 mm

Main dimensions			Mass	Designation
d	D	B	m	
			≈ kg	
25 0/–0,005	52 0/–0,007	15 0/–0,12	0,15	**7602025-2RS-TVP**
0/–0,005	62 0/–0,007	17 0/–0,12	0,27	**7603025-2RS-TVP**
0/–0,005	62 0/–0,007	15 0/–0,12	0,24	**BSB2562-2Z-SU**
30 0/–0,005	62 0/–0,007	16 0/–0,12	0,23	**7602030-2RS-TVP**
0/–0,005	62 0/–0,007	15 0/–0,12	0,22	**BSB3062-2Z-SU**
35 0/–0,006	72 0/–0,007	15 0/–0,12	0,3	**BSB3572-2Z-SU**
40 0/–0,006	72 0/–0,007	15 0/–0,12	0,26	**BSB4072-2Z-SU**

	Basic load ratings axial		Fatigue limit load	Limiting speed	Thermally safe operating speed	Bearing frictional torque[1]	Designation
d	dyn. C_a	stat. C_{0a}	C_{ua}	n_G grease	n_ϑ	M_R	
	N	N	N	min^{-1}	min^{-1}	Nm	
25	23 200	50 000	2 220	5 100	3 800	0,07	**7602025-2RS-TVP**
	29 500	68 000	3 000	5 100	3 800	0,09	**7603025-2RS-TVP**
	29 000	64 000	2 800	6 700	5 400	0,13	**BSB2562-2Z-SU**
30	27 500	66 000	2 900	5 000	3 800	0,09	**7602030-2RS-TVP**
	29 000	64 000	2 800	6 700	5 400	0,13	**BSB3062-2Z-SU**
35	37 000	89 000	3 950	5 400	4 700	0,18	**BSB3572-2Z-SU**
40	37 000	89 000	3 950	5 400	4 700	0,18	**BSB4072-2Z-SU**

medias ➤ *https://www.schaeffler.de/std/1E5B*

④ Only valid in assembled condition.

1) Valid for single bearings with stated preload force.

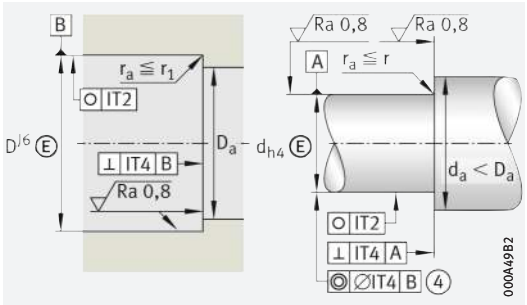
2) Valid for matched pair of bearings in O or X arrangement.

3) Based on rotating inner ring.

4) The recommended INA precision locknuts are not included in the scope of delivery and must be ordered separately.

5) The required axial locknut force must be observed when using other locknuts.

6) Only valid in conjunction with INA precision locknuts.
Observe the guidelines on locating/locating bearing arrangements ➤ 🕮 *TPI 123*.



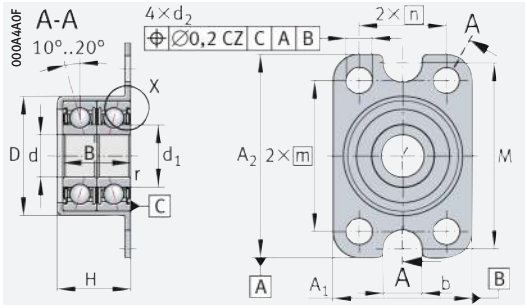
Design of housing and shaft (threaded spindle)

	Dimensions			Mounting dimensions			
d	r	r_1	a	D_a		d_a	
	min.	min.	≈	max.		min.	
25	1	1	41	45	H12	32	h12
	1,1	1,1	47,5	52	H12	38	h12
	1	0,6	39,4	54	H12	38	h12
30	1	1	48	52,5	H12	39,5	h12
	1	0,6	39,4	54	H12	38	h12
35	1	0,6	48,5	65	H12	47	h12
40	1	0,6	48,5	65	H12	47	h12

	Rigidity[2]	Axial runout[3]	Recommended INA precision locknuts[4]			Required locknut force[5]
	axial		for radial clamping	for axial clamping	Tightening torque[6]	axial
d	c_{aL}				M_A	
	N/µm	µm			Nm	N
25	772	2	ZM25	AM25	25	9 430
	917	2	ZM25	AM25	40	14 480
	1 001	2	ZMA25/45	AM25	30	11 810
30	893	2	ZM30	AM30	32	10 240
	1 034	2,5	ZM30	AM30	32	11 080
35	1 196	2,5	ZM35	AM35	50	15 220
40	1 235	2,5	ZM40	AM40	60	15 650

Angular contact ball bearing units

For screw mounting



ZKLR0624-2Z, ZKLR0828-2Z

d = 6 – 20 mm

Main dimensions				Dimensions			Designation
d	D		B	d_1	r min.	d_2	
6 0,000/–0,008	20,5	+0,03/–0,01	12 +0,25/–0,25	9	0,3	4,5	**ZKLR0624-2Z**
8 0,000/–0,008	23,9	+0,03/–0,01	14 +0,25/–0,25	11	0,3	4,5	**ZKLR0828-2Z**
10 0,000/–0,008	28,14	+0,03/–0,01	16 +0,25/–0,25	13,55	0,3	4,5	**ZKLR1035-2Z**
12 0,000/–0,007	35,45	+0,03/–0,01	20 +0,25/–0,25	16,6	0,3	6,6	**ZKLR1244-2RS**
15 0,000/–0,007	38,45	+0,03/–0,01	22 +0,25/–0,25	18	0,3	6,6	**ZKLR1547-2RS**
20 0,000/–0,008	50,45	+0,03/–0,01	28 +0,25/–0,25	24,4	0,3	6,6	**ZKLR2060-2RS**

	Basic load ratings				Fatigue limit load	Limiting speed	Bearing frictional torque	Mass	Designation
	radial		axial						
d	dyn. C_r	stat. C_{0r}	dyn. C_a	stat. C_{0a}	C_{ur}	n_G grease	M_R	m	
	N	N	N	N	N	min^{-1}	Nm	≈ kg	
6	4 100	2 060	1 650	1 520	104	7 300	0,04	0,023	**ZKLR0624-2Z**
8	5 000	2 700	2 060	1 850	138	6 200	0,08	0,03	**ZKLR0828-2Z**
10	7 000	3 900	2 430	2 420	197	5 100	0,12	0,05	**ZKLR1035-2Z**
12	13 600	8 500	13 200	17 900	430	3 700	0,16	0,12	**ZKLR1244-2RS**
15	16 700	10 700	16 400	22 400	540	3 400	0,2	0,14	**ZKLR1547-2RS**
20	28 000	19 100	27 500	40 000	970	2 800	0,3	0,3	**ZKLR2060-2RS**

medias ➤ *https://www.schaeffler.de/std/1E5C*

② Adjacent construction, bearing screw mounted on flat surface. ④ Only valid in assembled condition.

1) The screws are not included in the scope of delivery.
Tightening torque according to manufacturer's data.

2) Statistically determined mean values from measurements on the complete bearing. Due to the design, larger variations in rigidity must be expected with axial angular contact ball bearing units ZKLR.

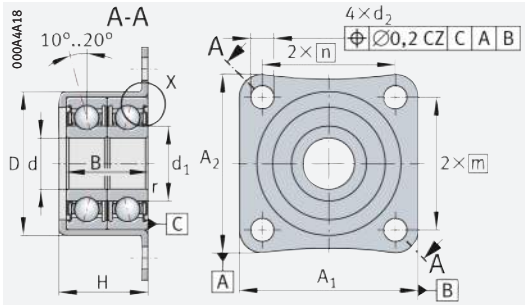
3) Based on rotating inner ring.

4) The locknut is only used to axially locate the bearing unit.
It has no influence on the bearing preload.

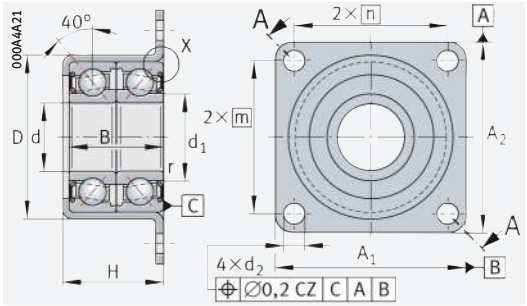
5) The recommended INA precision locknuts are not included in the scope of delivery and must be ordered separately.

6) Only valid in conjunction with INA precision locknuts.
Observe the guidelines on locating/locating bearing arrangements ➤ 🕮 *TPI 123*.

7) The geometrical tolerances stated are only required in the area of the diameter between D_{ai} and D_{aa}.
When IT5-7 is stated, the tolerance should be selected as IT5 to IT7 depending on the accuracy requirement of the subassembly.



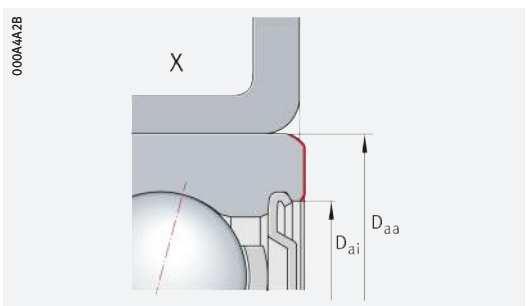
ZKLR1035-2Z



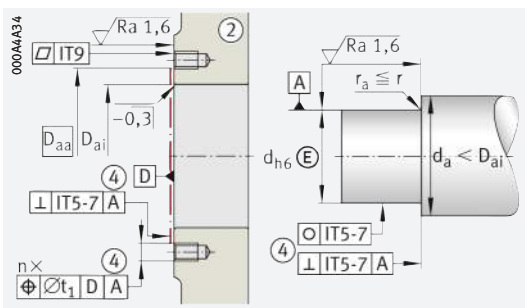
ZKLR1244-2RS, ZKLR1547-2RS, ZKLR2060-2RS

Dimensions									Mounting dimensions			Fixing screws[1] DIN EN ISO 4762				
d	A_1	A_2	b	m	n	M	H		d_a	D_{ai}	D_{aa} min.	Size	n	Size	n	t_1 ○
6	24	35	6,6	26	15	32	13	0/–0,5	8	16	19	M4	4	M6	2	0,2
8	28	35	6,6	26	20	35	15,5	0/–0,5	10,4	18	22	M4	4	M6	2	0,2
10	35	35	–	26	26	–	17,5	0/–0,5	12,4	22	26	M4	4	–	–	0,2
12	44	50	–	38	32	–	22	0/–0,5	14	27	32	M6	4	–	–	0,2
15	47	51	–	39	35	–	24	0/–0,5	17,5	29	35	M6	4	–	–	0,2
20	60	60	–	47	47	–	30	0/–0,5	24	39	47	M6	4	–	–	0,2

	Rigidity[2] axial	Mass moment of inertia[3]	Axial runout[3]	Recommended INA precision locknuts[4] [5]		
				for radial clamping	for axial clamping	Tightening torque[6]
d	c_{aL}	M_m				M_A
	N/µm	kg · cm²	µm			Nm
6	14	0,0014	7	ZM06	–	2
8	16	0,0028	7	ZM08	–	4
10	19	0,0075	7	ZM10	–	6
12	170	0,0102	7	ZM12	–	8
15	200	0,0178	7	ZM15	AM15	10
20	250	0,263	8	ZM20	AM20	18



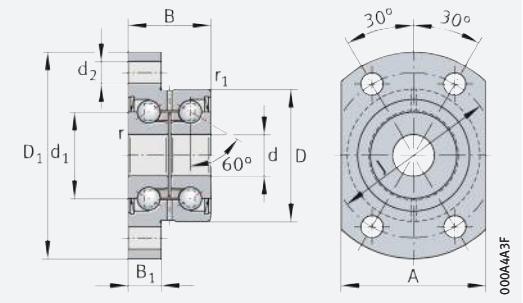
Axial abutment area of outer ring



Design of housing and shaft[7]

Double row axial angular contact ball bearings with flange

With fixing holes



ZKLFA..-2RS, ZKLFA..-2Z

d = 6 – 8 mm

Main dimensions			Dimensions			Designation
d	D	B	d_1	D_1	r min.	
6 +0,002/–0,003	19 0/–0,01	12 0/–0,25	12	30	0,3	**ZKLFA0630-2Z**[2]
+0,002/–0,003	24 0/–0,01	15 0/–0,25	14	40	0,3	**ZKLFA0640-2RS**
+0,002/–0,003	24 0/–0,01	15 0/–0,25	14	40	0,3	**ZKLFA0640-2Z**
8 0 /–0,005	32 0/–0,01	20 0/–0,25	19	50	0,3	**ZKLFA0850-2RS**
0 /–0,005	32 0/–0,01	20 0/–0,25	19	50	0,3	**ZKLFA0850-2Z**

	Basic load ratings axial		Fatigue limit load	Limiting speed	Thermally safe operating speed	Bearing frictional torque	Mass	Designation
d	dyn. C_a N	stat. C_{0a} N	C_{ua} N	n_G grease min^{-1}	n_ϑ min^{-1}	M_R Nm	m ≈ kg	
6	4 900	6 100	270	22 800	14 000	0,01	0,05	**ZKLFA0630-2Z**[2]
	6 900	8 500	375	16 400	6 800	0,04	0,08	**ZKLFA0640-2RS**
	6 900	8 500	375	19 900	12 000	0,02	0,08	**ZKLFA0640-2Z**
8	12 500	16 300	720	12 100	5 100	0,08	0,17	**ZKLFA0850-2RS**
	12 500	16 300	720	15 500	9 500	0,04	0,17	**ZKLFA0850-2Z**

medias ➤ *https://www.schaeffler.de/std/1E5D*

② Adjacent construction, bearing screw mounted on flat surface ④ Only valid in assembled condition.

1) Screws 10.9 are not included in the scope of delivery. Tightening torque according to manufacturer's data.

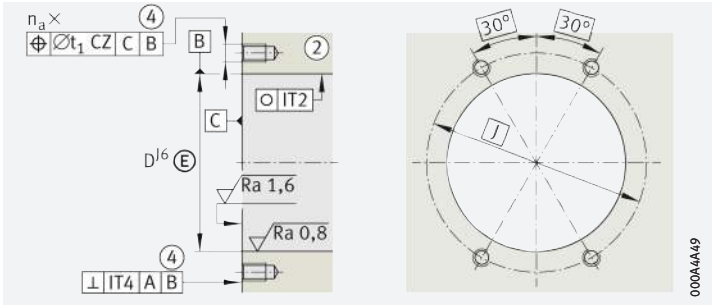
2) No relubrication facility.

3) Based on rotating inner ring.

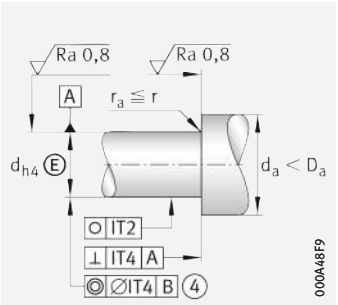
4) The recommended INA precision locknuts are not included in the scope of delivery and must be ordered separately.

5) The required axial locknut force must be observed when using other locknuts.

6) Only valid in conjunction with INA precision locknuts. Observe the guidelines on locating/locating bearing arrangements ➤ 🕮 *TPI 123*.



Housing design



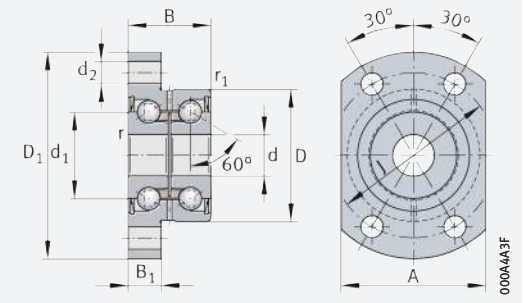
Shaft design
(threaded spindle)

Dimensions						Mounting dimensions			Fixing screws[1] DIN EN ISO 4762	
d	r_1 min.	B_1	d_2	J	A	d_a min.	d_a max.	t_1	Size	n_a
6	0,3	5	3,5	24	22	9	15	0,1	M3	4
	0,6	6	4,5	32	27	9	18	0,1	M4	4
	0,6	6	4,5	32	27	9	18	0,1	M4	4
8	0,6	8	5,5	40	35	11	25	0,1	M5	4
	0,6	8	5,5	40	35	11	25	0,1	M5	4

	Rigidity axial	Tilting rigidity	Mass moment of inertia[3]	Axial runout[3]	Recommended INA precision locknuts[4]			Required locknut force[5]
					for radial clamping	for axial clamping	Tightening torque[6]	axial
d	c_{aL}	c_{kL}	M_m				M_A	
	N/µm	Nm/mrad	kg · cm^2	µm			Nm	N
6	150	4	0,0019	2	ZM06	–	2	2 010
	200	8	0,0044	2	ZM06	–	2	2 404
	200	8	0,0044	2	ZM06	–	2	2 404
8	250	20	0,02	2	ZM08	–	4	3 468
	250	20	0,02	2	ZM08	–	4	3 468

Double row axial angular contact ball bearings with flange

With fixing holes



ZKLFA..-2RS, ZKLFA..-2Z

d = 10 – 15 mm

Main dimensions			Dimensions			Designation
d	D	B	d_1	D_1	r min.	
10 0/–0,005	32 0/–0,01	20 0/–0,25	21	50	0,3	**ZKLFA1050-2RS**
0/–0,005	32 0/–0,01	20 0/–0,25	21	50	0,3	**ZKLFA1050-2Z**
12 0/–0,005	42 0/–0,01	25 0/–0,25	25	63	0,3	**ZKLFA1263-2RS**
0/–0,005	42 0/–0,01	25 0/–0,25	25	63	0,3	**ZKLFA1263-2Z**
15 0/–0,005	42 0/–0,01	25 0/–0,25	28	63	0,3	**ZKLFA1563-2RS**
0/–0,005	42 0/–0,01	25 0/–0,25	28	63	0,3	**ZKLFA1563-2Z**

	Basic load ratings axial		Fatigue limit load	Limiting speed	Thermally safe operating speed	Bearing frictional torque	Mass	Designation
d	dyn. C_a N	stat. C_{0a} N	C_{ua} N	n_G grease min^{-1}	n_ϑ min^{-1}	M_R Nm	m ≈ kg	
10	13 400	18 800	830	10 900	4 600	0,12	0,18	**ZKLFA1050-2RS**
	13 400	18 800	830	14 400	8 600	0,06	0,18	**ZKLFA1050-2Z**
12	16 900	24 700	1 090	9 200	3 800	0,16	0,3	**ZKLFA1263-2RS**
	16 900	24 700	1 090	12 000	7 600	0,08	0,3	**ZKLFA1263-2Z**
15	17 900	28 000	1 240	8 200	3 500	0,2	0,31	**ZKLFA1563-2RS**
	17 900	28 000	1 240	10 800	7 000	0,1	0,31	**ZKLFA1563-2Z**

medias ➤ *https://www.schaeffler.de/std/1E5E*

② Adjacent construction, bearing screw mounted on flat surface ④ Only valid in assembled condition.

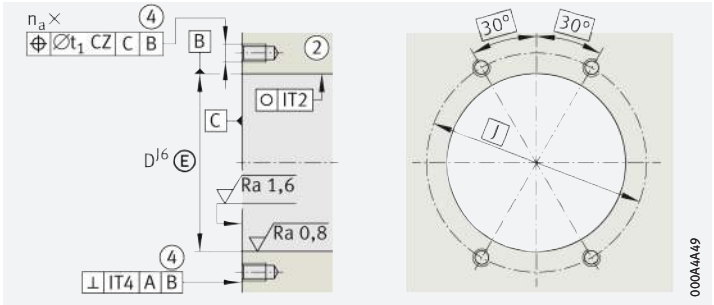
1) Screws 10.9 are not included in the scope of delivery.
Tightening torque according to manufacturer's data.

2) Based on rotating inner ring.

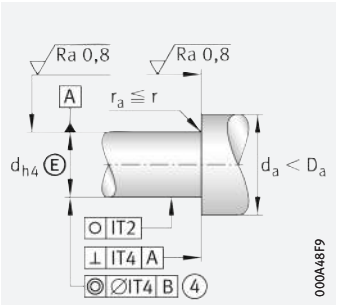
3) The recommended INA precision locknuts are not included in the scope of delivery and must be ordered separately.

4) The required axial locknut force must be observed when using other locknuts.

5) Only valid in conjunction with INA precision locknuts.
Observe the guidelines on locating/locating bearing arrangements ➤ 🕮 *TPI 123*.



Housing design



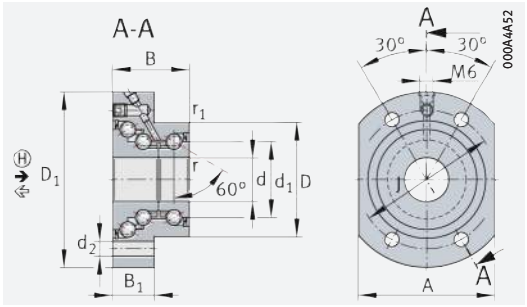
Shaft design (threaded spindle)

Dimensions						Mounting dimensions			Fixing screws[1] DIN EN ISO 4762	
d	r_1 min.	B_1	d_2	J	A	d_a min.	d_a max.	t_1	Size	n_a
10	0,6	8	5,5	40	35	14	27	0,1	M5	4
	0,6	8	5,5	40	35	14	27	0,1	M5	4
12	0,6	10	6,8	53	45	16	31	0,1	M6	4
	0,6	10	6,8	53	45	16	31	0,1	M6	4
15	0,6	10	6,8	53	45	20	34	0,1	M6	4
	0,6	10	6,8	53	45	20	34	0,1	M6	4

	Rigidity axial	Tilting rigidity	Mass moment of inertia[2]	Axial runout[2]	Recommended INA precision locknuts[3]			Required locknut force[4]
					for radial clamping	for axial clamping	Tightening torque[5]	axial
d	c_{aL}	c_{kL}	M_m				M_A	
	N/µm	Nm/mrad	kg · cm²	µm			Nm	N
10	325	25	0,029	2	ZM10	–	6	4 891
	325	25	0,029	2	ZM10	–	6	4 891
12	375	50	0,068	2	ZM12	–	8	5 307
	375	50	0,068	2	ZM12	–	8	5 307
15	400	65	0,102	2	ZM15	AM15	10	5 484
	400	65	0,102	2	ZM15	AM15	10	5 484

Triple row axial angular contact ball bearings with flange

With fixing holes



DKLFA..-2RS (d ≦ 20 mm)

d = 15 – 25 mm

Main dimensions			Dimensions			Designation
d	D	B	d_1	D_1 min.	r min.	
15 0/–0,010	45 0/–0,013	32 0/–0,25	28	75	0,3	**DKLFA1575-2RS**
20 0/–0,010	52 0/–0,013	35 0/–0,25	34,5	80	0,3	**DKLFA2080-2RS**
25 0/–0,010	57 0/–0,013	38 0/–0,25	40,5	90	0,3	**DKLFA2590-2RS**

	Basic load ratings				Fatigue limit load		Limiting speed	Thermally safe operating speed	Bearing frictional torque	Mass	Designation
	axial ⇐		axial (H) ➔								
d	dyn. C_a	stat. C_{0a}	dyn. C_a	stat. C_{0a}	C_{ua}	C_{ua} (H)	n_G grease	n_ϑ	M_R	m	
	N	N	N	N	N	N	min^{-1}	min^{-1}	Nm	≈ kg	
15	17 900	28 000	37 000	83 000	1 240	2 450	5 700	2 600	0,35	0,53	**DKLFA1575-2RS**
20	26 000	47 000	44 500	110 000	2 070	2 800	5 000	2 200	0,45	0,7	**DKLFA2080-2RS**
25	27 500	55 000	53 000	144 000	2 450	3 950	4 400	2 000	0,6	0,9	**DKLFA2590-2RS**

medias ➤ *https://www.schaeffler.de/std/1E5F*

Attention!
The bearings require continuous load in the main load direction (H)!

(4) Only valid in assembled condition. (5) Adjacent construction, bearing screw mounted on flat surface.
(6) Bearing centred in adjacent construction.

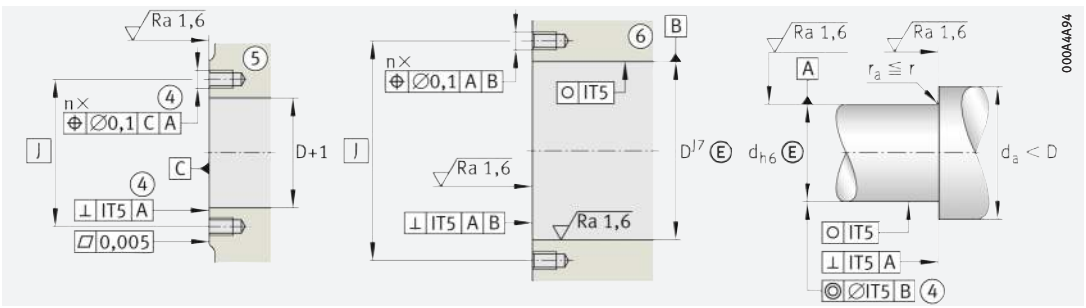
1) Screws 10.9 not included in scope of delivery. Tightening torque according to manufacturer's data.

2) Based on rotating inner ring.

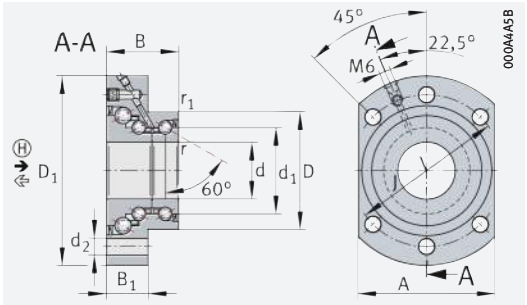
3) The recommended INA precision locknuts are not included in the scope of delivery and must be ordered separately.

4) The required axial locknut force must be observed when using other locknuts.

5) Only valid in conjunction with INA precision locknuts in locating/non-locating bearing arrangements and for (1) in locating/locating bearing arrangements.
Observe the guidelines on locating/locating bearing arrangements ➤ 🕮 *TPI 123*.



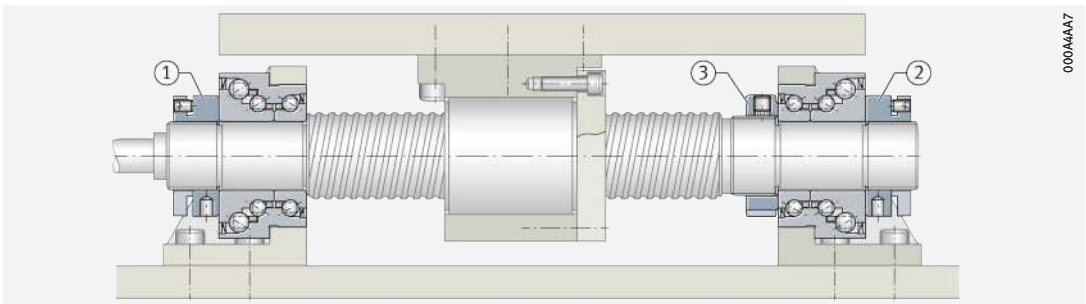
Design of housing and shaft (threaded spindle)



DKLFA..-2RS (d ≧ 25 mm)

d	Dimensions					Mounting dimensions		Fixing screws[1] DIN EN ISO 4762		
	r_1 min.	B_1	d_2	J	A	d_a min.	d_a max.	Size	n	t °
15	0,6	18	6,8	58	55	20	35	M6	4	60
20	0,6	19	6,8	63	62	25	43	M6	4	60
25	0,6	22	8,8	75	70	32	48	M8	6	45

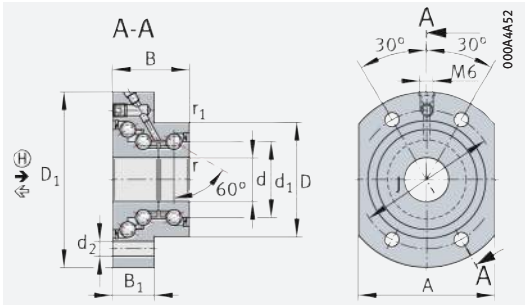
d	Rigidity		Tilting rigidity	Mass moment of inertia[2]	Axial runout[2]	Recommended INA precision locknuts[3]				Required locknut force[4]
	axial ⇐	axial ➔				for radial clamping		for axial clamping	Tightening torque[5]	axial
	c_{aL}	c_{aL}	c_{kL}	M_m		①, ②	③	①, ②	M_A ①	①
	N/µm	N/µm	Nm/mrad	kg · cm²	µm				Nm	N
15	500	950	140	0,278	5	ZMA15/33	ZM17	AM15	10	6 270
20	750	1 100	260	0,553	5	ZMA20/38	ZM25	AM20	18	8 580
25	850	1 200	370	1,12	5	ZMA25/45	ZM30	AM25	25	9 670



Ball screw drive with locating bearing arrangement on both sides

Triple row angular contact ball bearings with flange

With fixing holes



DKLFA..-2RS (d ≦ 20 mm)

d = 30 – 40 mm

Main dimensions			Dimensions			Designation
d	D	B	d_1	D_1 min.	r min.	
30 0/–0,010	62 0/–0,013	38 0/–0,25	45,5	100	0,3	**DKLFA30100-2RS**
0/–0,010	75 0/–0,013	56 0/–0,25	51	110	0,3	**DKLFA30110-2RS**[2]
40 0/–0,010	72 0/–0,013	42 0/–0,25	58	115	0,3	**DKLFA40115-2RS**
0/–0,010	90 0/–0,013	60 0/–0,25	65	140	0,3	**DKLFA40140-2RS**[2]

	Basic load ratings				Fatigue limit load		Limiting speed	Thermally safe operating speed	Bearing frictional torque	Mass	Designation
	axial ⇐		axial Ⓗ ➔								
d	dyn. C_a	stat. C_{0a}	dyn. C_a	stat. C_{0a}	C_{ua}	C_{ua} Ⓗ	n_G grease	n_ϑ	M_R	m	
	N	N	N	N	N	N	min^{-1}	min^{-1}	Nm	≈ kg	
30	29 000	64 000	56 000	165 000	2 800	4 450	4 000	1 800	0,75	1	**DKLFA30100-2RS**
	59 000	108 000	107 000	255 000	4 800	6 600	3 500	1 600	1,5	2,5	**DKLFA30110-2RS**[2]
40	43 000	101 000	73 000	227 000	4 450	5 600	3 200	1 500	1	1,5	**DKLFA40115-2RS**
	72 000	149 000	127 000	365 000	6 600	9 500	2 900	1 200	2,5	4,2	**DKLFA40140-2RS**[2]

medias ➤ *https://www.schaeffler.de/std/1E60*

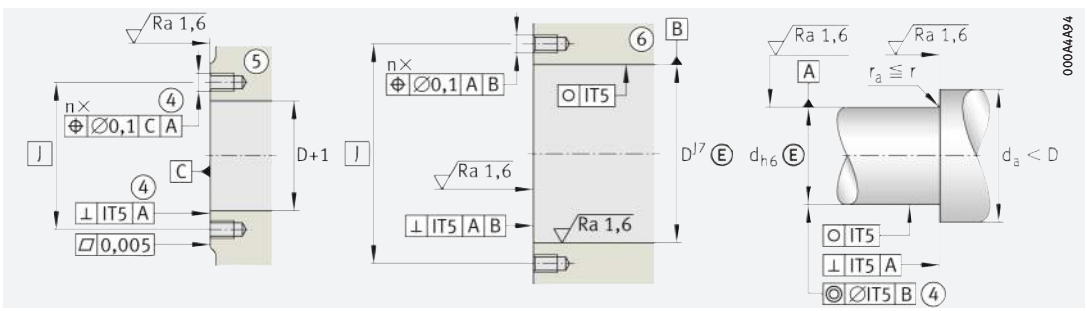
Attention!
The bearings require continuous load in the main load direction Ⓗ!

④ Only valid in assembled condition. ⑤ Adjacent construction, bearing screw mounted on flat surface.
⑥ Bearing centred in adjacent construction.

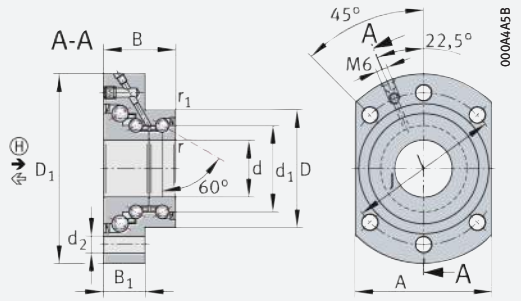
1) Screws 10.9 not included in scope of delivery. Tightening torque according to manufacturer's data.

2) Heavy series.

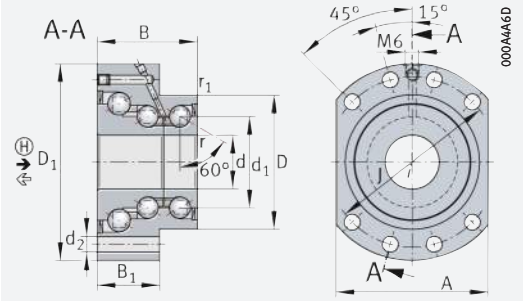
3) Based on rotating inner ring.



Design of housing and shaft (threaded spindle)



DKLFA..-2RS (d ≧ 25 mm)



DKLFA..-2RS
Heavy series

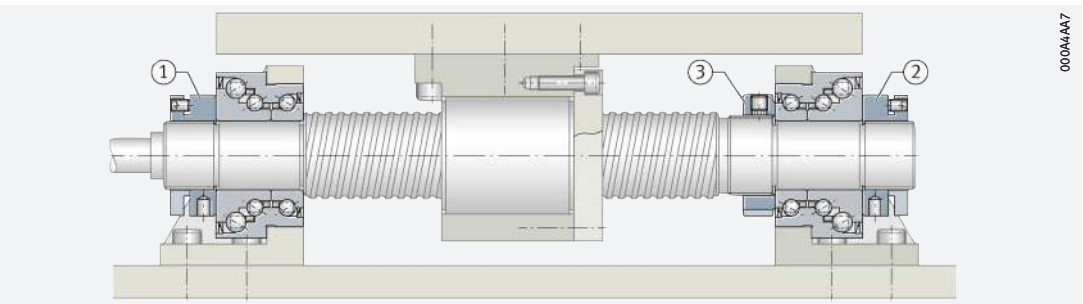
Dimensions						Mounting dimensions		Fixing screws[1] DIN EN ISO 4762		
d	r_1 min.	B_1	d_2	J	A	d_a min.	d_a max.	Size	n	t °
30	0,6	22	8,8	80	72	40	53	M8	6	45
	0,6	35	8,8	95	85	47	64	M8	8	30
40	0,6	23	8,8	94	90	50	67	M8	6	45
	0,6	35	11	118	110	56	80	M10	8	30

	Rigidity		Tilting rigidity	Mass moment of inertia[3]	Axial runout[3]	Recommended INA precision locknuts[4]				Required locknut force[5]
	axial ⇐	axial ➔				for radial clamping		for axial clamping	Tightening torque[6]	axial
d	c_{aL}	c_{aL}	c_{kL}	M_m		①, ②	③	①, ②	M_A ①	①
	N/µm	N/µm	Nm/mrad	kg · cm²	µm				Nm	N
30	900	1 400	500	1,7	5	ZMA30/52	ZM35	AM30	32	10 350
	1 300	1 600	650	3,23	5	–	ZM35	AM30/65	65	20 500
40	1 100	1 700	1 000	4,23	5	ZMA40/62	ZM45	AM40	55	13 420
	1 800	2 000	1 370	9,32	5	–	ZM45	AM40/85	110	26 600

4) The recommended INA precision locknuts are not included in the scope of delivery and must be ordered separately.

5) The required axial locknut force must be observed when using other locknuts.

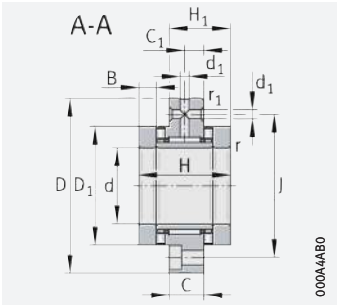
6) Only valid in conjunction with INA precision locknuts in locating/non-locating bearing arrangements and for ① in locating/locating bearing arrangements.
Observe the guidelines on locating/locating bearing arrangements ➤ 🕮 *TPI 123*.



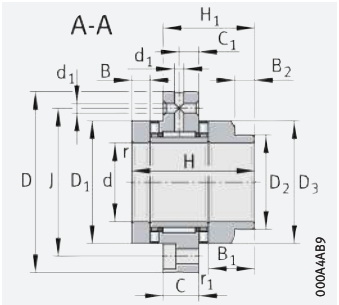
Ball screw drive with locating bearing arrangement on both sides

Needle roller/axial cylindrical roller bearings

Light series
With fixing holes



ZARF



ZARF..-L

d = 15 – 30 mm

Main dimensions			Basic load ratings				Fatigue limit load		Limiting speeds		Bearing frictional torque	Mass	Designation
			axial		radial								
d	D	H	dyn. C_a	stat. C_{0a}	dyn. C_r	stat. C_{0r}	C_{ua}	C_{ur}	n_G oil	n_G grease	M_R	m	
			N	N	N	N	N	N	min^{-1}	min^{-1}	Nm	≈ kg	
15	60	40	24 900	53 000	13 000	17 500	7 300	2 600	8 500	2 200	0,35	0,42	**ZARF1560-TV**
	60	53	24 900	53 000	13 000	17 500	7 300	2 600	8 500	2 200	0,35	0,45	**ZARF1560-L-TV**
17	62	43	26 000	57 000	14 000	19 900	7 900	2 950	7 800	2 100	0,4	0,49	**ZARF1762-TV**
	62	57	26 000	57 000	14 000	19 900	7 900	2 950	7 800	2 100	0,4	0,52	**ZARF1762-L-TV**
20	68	46	33 500	76 000	14 900	22 400	6 300	3 350	7 000	2 000	0,5	0,56	**ZARF2068-TV**
	68	60	33 500	76 000	14 900	22 400	6 300	3 350	7 000	2 000	0,5	0,61	**ZARF2068-L-TV**
25	75	50	35 500	86 000	22 600	36 000	7 100	5 100	6 000	1 900	0,55	0,78	**ZARF2575-TV**
	75	65	35 500	86 000	22 600	36 000	7 100	5 100	6 000	1 900	0,55	0,84	**ZARF2575-L-TV**
30	80	50	39 000	101 000	24 300	41 500	8 400	5 900	5 500	1 800	0,65	0,85	**ZARF3080-TV**
	80	65	39 000	101 000	24 300	41 500	8 400	5 900	5 500	1 800	0,65	0,9	**ZARF3080-L-TV**

medias ➤ *https://www.schaeffler.de/std/1E61*

① Mounting dimension for seal carrier assembly DRS ➤ 🕮 *TPI 123*.
③ Adjacent construction, bearing screw mounted in bore. ④ Only valid in assembled condition.

1) If rotary shaft seals are used, the outside diameter of the sealing ring must be taken into consideration.

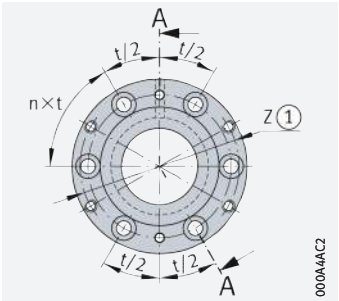
2) Based on rotating inner ring.

3) The recommended INA precision locknuts are not included in the scope of delivery and must be ordered separately.

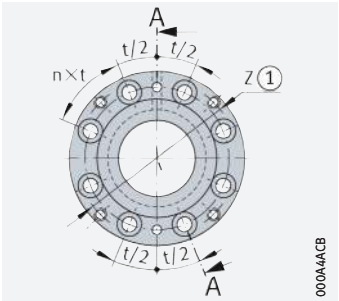
4) The required axial locknut force must be observed when using other locknuts.

5) Screws not included in scope of delivery. Tightening torque according to manufacturer's data.

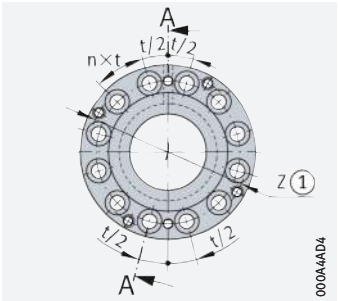
6) Only valid in conjunction with INA precision locknuts.
Observe the guidelines on locating/locating bearing arrangements ➤ 🕮 *TPI 123*.



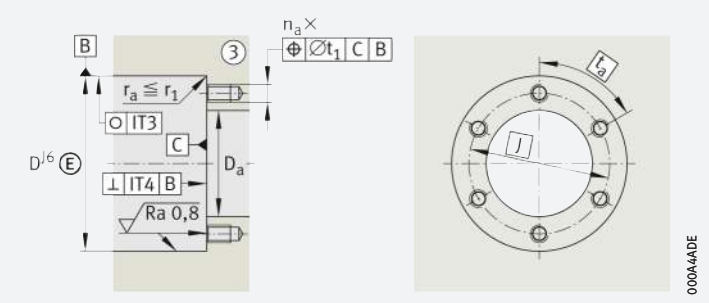
Hole pattern
ZARF1560, ZARF1762



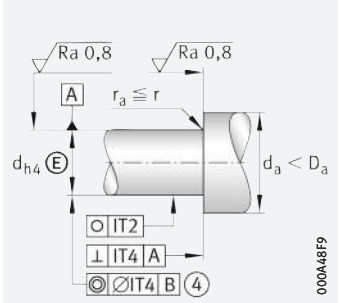
Hole pattern
ZARF2068, ZARF2575



Hole pattern
ZARF3080



Housing design



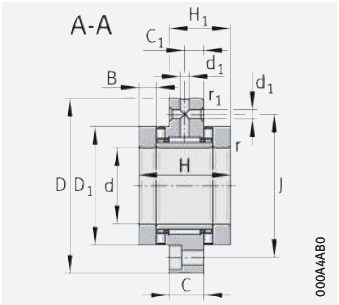
Shaft design (threaded spindle)

Dimensions														Pitch		Mounting dimensions[1]			Mass moment of inertia[2]
d	H_1	C	C_1	D_1	D_2	D_3	B	B_1	B_2	r	r_1	d_1	J	n	t	D_a	d_a	t_1	M_m
										min.	min.				°	max.	min.		kg · cm^2
15	26	14	8	35	–	–	7,5	–	–	0,3	0,6	3,2	46	6	60	36	28	0,1	0,24
	39	14	8	35	24	34	7,5	20,5	11	0,3	0,6	3,2	46	6	60	36	22	0,1	0,274
17	27,5	14	8	38	–	–	9	–	–	0,3	0,6	3,2	48	6	60	39	28	0,1	0,373
	41,5	14	8	38	28	38	9	23	11	0,3	0,6	3,2	48	6	60	39	26	0,1	0,464
20	29	14	8	42	–	–	10	–	–	0,3	0,6	3,2	53	8	45	43	33	0,1	0,615
	43	14	8	42	30	40	10	24	12	0,3	0,6	3,2	53	8	45	43	28	0,1	0,683
25	33	18	10	47	–	–	10	–	–	0,3	0,6	3,2	58	8	45	48	39	0,1	0,989
	48	18	10	47	36	45	10	25	12	0,3	0,6	3,2	58	8	45	48	34	0,1	1,15
30	33	18	10	52	–	–	10	–	–	0,3	0,6	3,2	63	12	30	53	44	0,1	1,46
	48	18	10	52	40	50	10	25	13	0,3	0,6	3,2	63	12	30	53	38	0,1	1,7

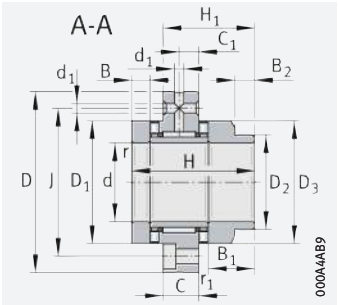
	Rigidity	Tilting rigidity	Axial runout[2]	Recommended INA precision locknuts[3]			Required locknut force[4]	Rotary shaft seal to DIN 3760; to be ordered separately	Fixing screws[5] DIN EN ISO 4762		
	axial			for radial clamping	for axial clamping	Tightening torque[6]	axial		Size	n_a	t_a
d	c_{aL}	c_{kL}				M_A					
	N/µm	Nm/mrad	µm			Nm	N				°
15	1 400	110	1	ZMA15/33	AM15	10	6 506	–	M6	6	60
	1 400	110	1	ZMA15/33	AM15	10	6 506	24×35×7	M6	6	60
17	1 600	160	1	ZM17	AM17	12	7 078	–	M6	6	60
	1 600	160	1	ZM17	AM17	12	7 078	28×40×7	M6	6	60
20	1 800	230	1	ZMA20/38	AM20	18	8 972	–	M6	8	45
	1 800	230	1	ZMA20/38	AM20	18	8 972	30×42×7	M6	8	45
25	1 900	350	1	ZMA25/45	AM25	25	9 745	–	M6	8	45
	1 900	350	1	ZMA25/45	AM25	25	9 745	36×47×7	M6	8	45
30	2 200	520	1	ZMA30/52	AM30	32	10 662	–	M6	12	30
	2 200	520	1	ZMA30/52	AM30	32	10 662	40×52×7	M6	12	30

Needle roller/axial cylindrical roller bearings

Light series
With fixing holes



ZARF



ZARF..-L

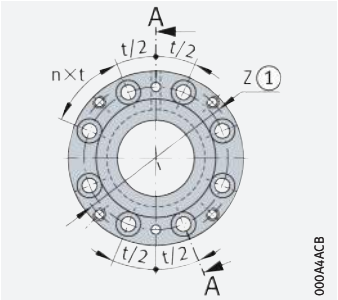
d = 35 – 50 mm

Main dimensions			Basic load ratings				Fatigue limit load		Limiting speeds		Bearing frictional torque	Mass	Designation
			axial		radial								
d	D	H	dyn. C_a	stat. C_{0a}	dyn. C_r	stat. C_{0r}	C_{ua}	C_{ur}	n_G oil	n_G grease	M_R	m	
			N	N	N	N	N	N	min^{-1}	min^{-1}	Nm	≈ kg	
35	90	54	56 000	148 000	26 000	47 000	12 800	6 700	4 800	1 700	0,9	1,12	**ZARF3590-TV**
	90	70	56 000	148 000	26 000	47 000	12 800	6 700	4 800	1 700	0,9	1,25	**ZARF3590-L-TV**
40	100	54	59 000	163 000	27 500	53 000	14 100	7 500	4 400	1 600	1	1,35	**ZARF40100-TV**
	100	70	59 000	163 000	27 500	53 000	14 100	7 500	4 400	1 600	1	1,45	**ZARF40100-L-TV**
45	105	60	61 000	177 000	38 000	74 000	15 400	10 200	4 000	1 500	1,2	1,7	**ZARF45105-TV**
	105	75	61 000	177 000	38 000	74 000	15 400	10 200	4 000	1 500	1,2	1,85	**ZARF45105-L-TV**
50	115	60	90 000	300 000	40 000	82 000	27 500	11 300	3 600	1 200	2,2	2,1	**ZARF50115-TV**
	115	78	90 000	300 000	40 000	82 000	27 500	11 300	3 600	1 200	2,2	2,45	**ZARF50115-L-TV**

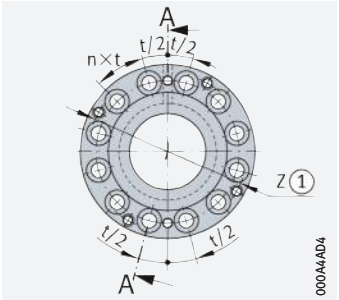
medias ➤ *https://www.schaeffler.de/std/1E62*

① Mounting dimension for seal carrier assembly DRS ➤ 🕮 *TPI 123*.
③ Adjacent construction, bearing screw mounted in bore. ④ Only valid in assembled condition.

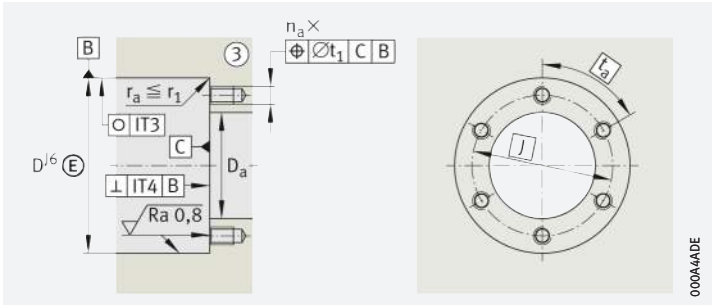
1) If rotary shaft seals are used, the outside diameter of the sealing ring must be taken into consideration.
2) Based on rotating inner ring.
3) The recommended INA precision locknuts are not included in the scope of delivery and must be ordered separately.
4) The required axial locknut force must be observed when using other locknuts.
5) Screws 10.9 not included in scope of delivery. Tightening torque according to manufacturer's data.
6) Only valid in conjunction with INA precision locknuts.
Observe the guidelines on locating/locating bearing arrangements ➤ 🕮 *TPI 123*.



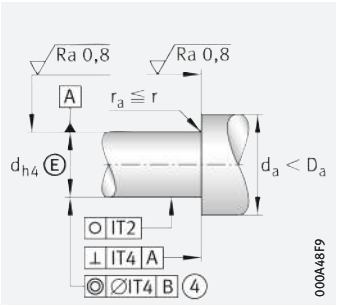
Hole pattern
ZARF40100, ZARF45105



Hole pattern
ZARF3590, ZARF50115



Housing design



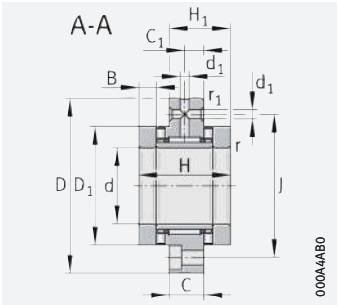
Shaft design (threaded spindle)

Dimensions														Pitch		Mounting dimensions[1]			Mass moment of inertia[2]
d	H_1	C	C_1	D_1	D_2	D_3	B	B_1	B_2	r	r_1	d_1	J	n	t	D_a	d_a	t_1	M_m
										min.	min.				°	max.	min.		kg · cm^2
35	35	18	10	60	–	–	11	–	–	0,3	0,6	3,2	73	12	30	61	50	0,1	2,8
	51	18	10	60	45	58	11	27	13	0,3	0,6	3,2	73	12	30	61	43	0,1	3,21
40	35	18	10	65	–	–	11	–	–	0,3	0,6	3,2	80	8	45	66	55	0,2	3,78
	51	18	10	65	50	63	11	27	14	0,3	0,6	3,2	80	8	45	66	48	0,2	4,35
45	40	22,5	12,5	70	–	–	11,5	–	–	0,3	0,6	6	85	8	45	71	60	0,2	5,33
	55	22,5	12,5	70	56	68	11,5	26,5	13	0,3	0,6	6	85	8	45	71	54	0,2	6,03
50	40	22,5	12,5	78	–	–	11,5	–	–	0,3	0,6	6	94	12	30	79	67	0,2	8,42
	58	22,5	12,5	78	60	78	11,5	29,5	14	0,3	0,6	6	94	12	30	79	58	0,2	10,46

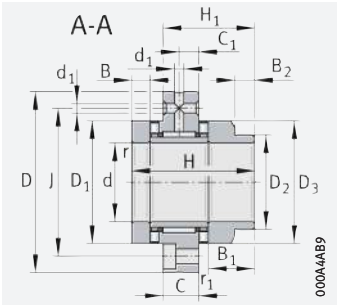
	Rigidity	Tilting rigidity	Axial runout[2]	Recommended INA precision locknuts[3]			Required locknut force[4]	Rotary shaft seal to DIN 3760; to be ordered separately	Fixing screws[5] DIN EN ISO 4762		
	axial			for radial clamping	for axial clamping	Tightening torque[6]	axial				
d	c_{aL}	c_{kL}				M_A			Size	n_a	t_a
	N/µm	Nm/mrad	µm			Nm	N				°
35	2 600	740	1	ZMA35/58	AM35/58	40	12 143	–	M6	12	30
	2 600	740	1	ZMA35/58	AM35/58	40	12 143	45×60×8	M6	12	30
40	2 800	1 030	1	ZMA40/62	AM40	55	14 240	–	M8	8	45
	2 800	1 030	1	ZMA40/62	AM40	55	14 240	50×65×8	M8	8	45
45	3 000	1 340	1	ZMA45/68	AM45	65	15 112	–	M8	8	45
	3 000	1 340	1	ZMA45/68	AM45	65	15 112	56×70×8	M8	8	45
50	4 800	2 470	1	ZMA50/75	AM50	85	18 410	–	M8	12	30
	4 800	2 470	1	ZMA50/75	AM50	85	18 410	60×80×8	M8	12	30

Needle roller/axial cylindrical roller bearings

Heavy series
With fixing holes



ZARF



ZARF..-L

d = 20 – 45 mm

Main dimensions			Basic load ratings				Fatigue limit load		Limiting speeds		Bearing frictional torque	Mass	Designation
			axial		radial								
d	D	H	dyn. C_a	stat. C_{0a}	dyn. C_r	stat. C_{0r}	C_{ua}	C_{ur}	n_G oil	n_G grease	M_R	m	
			N	N	N	N	N	N	min^{-1}	min^{-1}	Nm	≈ kg	
20	80	60	64 000	141 000	22 600	36 000	12 900	5 100	6 000	1 500	1,3	1,1	**ZARF2080-TV**
	80	75	64 000	141 000	22 600	36 000	12 900	5 100	6 000	1 500	1,3	1,22	**ZARF2080-L-TV**
25	90	60	80 000	199 000	24 300	41 500	18 300	5 900	4 900	1 400	1,6	1,6	**ZARF2590-TV**
	90	75	80 000	199 000	24 300	41 500	18 300	5 900	4 900	1 400	1,6	1,75	**ZARF2590-L-TV**
30	105	66	107 000	265 000	26 000	47 000	22 500	6 700	4 400	1 300	2,1	1,95	**ZARF30105-TV**
	105	82	107 000	265 000	26 000	47 000	22 500	6 700	4 400	1 300	2,1	2,15	**ZARF30105-L-TV**
35	110	66	105 000	265 000	27 500	53 000	22 500	7 500	4 000	1 250	2,3	1,6	**ZARF35110-TV**
	110	82	105 000	265 000	27 500	53 000	22 500	7 500	4 000	1 250	2,3	1,85	**ZARF35110-L-TV**
40	115	75	117 000	315 000	38 000	74 000	26 500	10 200	3 700	1 200	2,5	2,7	**ZARF40115-TV**
	115	93	117 000	315 000	38 000	74 000	26 500	10 200	3 700	1 200	2,5	3	**ZARF40115-L-TV**
45	130	82	154 000	405 000	40 000	82 000	36 500	11 300	3 300	1 150	3,5	3,9	**ZARF45130-TV**
	130	103	154 000	405 000	40 000	82 000	36 500	11 300	3 300	1 150	3,5	4,3	**ZARF45130-L-TV**

medias ➤ *https://www.schaeffler.de/std/1E63*

① Mounting dimension for seal carrier assembly DRS ➤ 🕮 *TPI 123*.
③ Adjacent construction, bearing screw mounted in bore. ④ Only valid in assembled condition.

1) If rotary shaft seals are used, the outside diameter of the sealing ring must be taken into consideration.

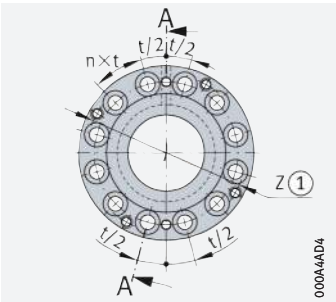
2) Based on rotating inner ring.

3) The recommended INA precision locknuts are not included in the scope of delivery and must be ordered separately.

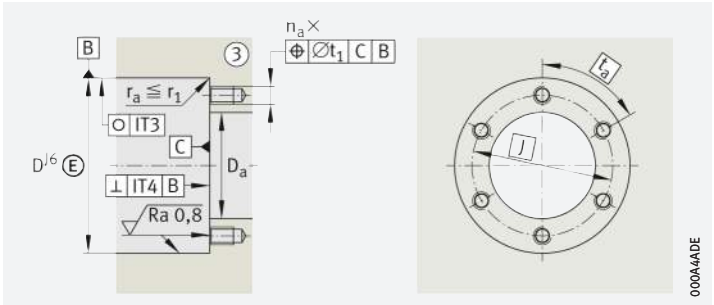
4) The required axial locknut force must be observed when using other locknuts.

5) Screws not included in scope of delivery. Tightening torque according to manufacturer's data.

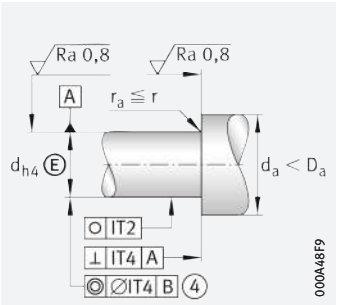
6) Only valid in conjunction with INA precision locknuts.
Observe the guidelines on locating/locating bearing arrangements ➤ 🕮 *TPI 123*.



Hole pattern



Housing design



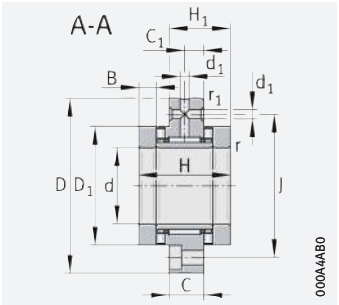
Shaft design (threaded spindle)

Dimensions														Pitch		Mounting dimensions[1]			Mass moment of inertia[2]
d	H_1	C	C_1	D_1	D_2	D_3	B	B_1	B_2	r	r_1	d_1	J	n	t	D_a	d_a	t_1	M_m
										min.	min.				°	max.	min.		kg · cm^2
20	38	18	10	52	–	–	12,5	–	–	0,3	0,6	3,2	63	12	30	53	38	0,1	1,98
	53	18	10	52	40	50	12,5	27,5	13	0,3	0,6	3,2	63	12	30	53	38	0,1	2,27
25	38	18	10	62	–	–	12,5	–	–	0,3	0,6	3,2	73	12	30	63	45	0,1	3,88
	53	18	10	62	48	60	12,5	27,5	13	0,3	0,6	3,2	73	12	30	63	45	0,1	4,51
30	41	18	10	68	–	–	14	–	–	0,3	0,6	3,2	85	12	30	69	52	0,2	6,53
	57	18	10	68	52	66	14	30	13	0,3	0,6	3,2	85	12	30	69	50	0,2	7,43
35	41	18	10	73	–	–	14	–	–	0,3	0,6	3,2	88	12	30	74	60	0,2	8,47
	57	18	10	73	60	73	14	30	13	0,3	0,6	3,2	88	12	30	74	58	0,2	10,4
40	47,5	22,5	12,5	78	–	–	16	–	–	0,3	0,6	6	94	12	30	79	65	0,2	13,3
	65,5	22,5	12,5	78	60	78	16	34	14	0,3	0,6	6	94	12	30	79	58	0,2	15,5
45	51	22,5	12,5	90	–	–	17,5	–	–	0,3	0,6	6	105	12	30	91	70	0,2	23,7
	72	22,5	12,5	90	70	88	17,5	38,5	18	0,3	0,6	6	105	12	30	91	68	0,2	28,1

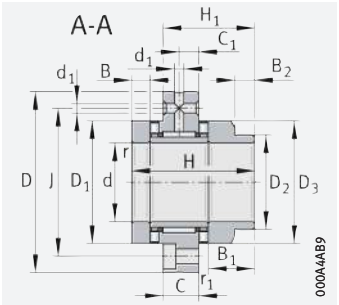
	Rigidity	Tilting rigidity	Axial runout[2]	Recommended INA precision locknuts[3]			Required locknut force[4]	Rotary shaft seal to DIN 3760; to be ordered separately	Fixing screws[5] DIN EN ISO 4762		
	axial			for radial clamping	for axial clamping	Tightening torque[6]	axial				
d	c_{aL}	c_{kL}				M_A			Size	n_a	t_a
	N/µm	Nm/mrad	µm			Nm	N				°
20	2 300	400	1	ZMA20/52	AM20	38	17 623	–	M6	12	30
	2 300	400	1	ZMA20/52	AM20	38	17 623	40×52×7	M6	12	30
25	3 000	800	1	ZMA25/58	AM25	55	20 790	–	M6	12	30
	3 000	800	1	ZMA25/58	AM25	55	20 790	48×62×8	M6	12	30
30	3 300	1 100	1	ZMA30/65	AM30	75	24 287	–	M8	12	30
	3 300	1 100	1	ZMA30/65	AM30	75	24 287	52×68×8	M8	12	30
35	3 500	1 300	1	ZMA35/70	AM35	100	27 480	–	M8	12	30
	3 500	1 300	1	ZMA35/70	AM35	100	27 480	60×75×8	M8	12	30
40	3 800	1 800	1	ZMA40/75	AM40	120	29 834	–	M8	12	30
	3 800	1 800	1	ZMA40/75	AM40	120	29 834	60×80×8	M8	12	30
45	4 000	2 100	1	ZMA45/85	AM45	150	33 549	–	M8	12	30
	4 000	2 100	1	ZMA45/85	AM45	150	33 549	70×90×10	M8	12	30

Needle roller/axial cylindrical roller bearings

Heavy series
With fixing holes



ZARF



ZARF..-L

d = 50 – 65 mm

Main dimensions			Basic load ratings				Fatigue limit load		Limiting speeds		Bearing frictional torque	Mass	Designation
			axial		radial								
d	D	H	dyn. C_a	stat. C_{0a}	dyn. C_r	stat. C_{0r}	C_{ua}	C_{ur}	n_G oil	n_G grease	M_R	m	
			N	N	N	N	N	N	min^{-1}	min^{-1}	Nm	≈ kg	
50	140	82	172 000	480 000	41 500	88 000	43 500	12 400	3 100	1 100	3,8	4,2	**ZARF50140-TV**
	140	103	172 000	480 000	41 500	88 000	43 500	12 400	3 100	1 100	3,8	4,65	**ZARF50140-L-TV**
55	145	82	177 000	500 000	44 000	98 000	46 000	13 500	2 900	1 000	4	4,5	**ZARF55145-TV**
	145	103	177 000	500 000	44 000	98 000	46 000	13 500	2 900	1 000	4	5	**ZARF55145-L-TV**
60	150	82	187 000	550 000	44 500	92 000	50 000	12 600	2 700	950	4,2	4,7	**ZARF60150-TV**
	150	103	187 000	550 000	44 500	92 000	50 000	12 600	2 700	950	4,2	5,35	**ZARF60150-L-TV**
65	155	82	172 000	500 000	54 000	104 000	46 000	14 600	2 600	900	4	5,1	**ZARF65155-TV**
	155	103	172 000	500 000	54 000	104 000	46 000	14 600	2 600	900	4	5,7	**ZARF65155-L-TV**

medias ➤ *https://www.schaeffler.de/std/1E64*

① Mounting dimension for seal carrier assembly DRS ➤ 🕮 *TPI 123*.
③ Adjacent construction, bearing screw mounted in bore. ④ Only valid in assembled condition.

1) If rotary shaft seals are used, the outside diameter of the sealing ring must be taken into consideration.

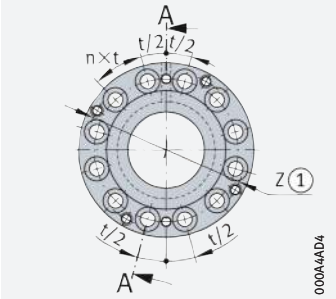
2) Based on rotating inner ring.

3) The recommended INA precision locknuts are not included in the scope of delivery and must be ordered separately.

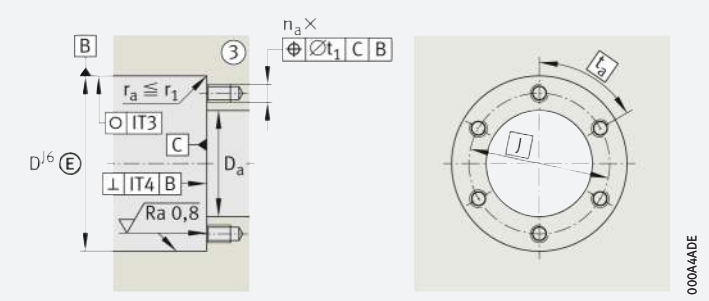
4) The required axial locknut force must be observed when using other locknuts.

5) Screws not included in scope of delivery. Tightening torque according to manufacturer's data.

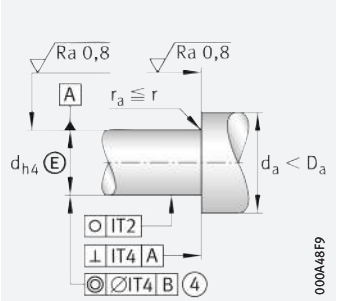
6) Only valid in conjunction with INA precision locknuts.
Observe the guidelines on locating/locating bearing arrangements ➤ 🕮 *TPI 123*.



Hole pattern
ZARF5, ZARF6



Housing design



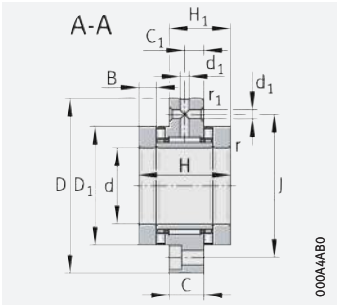
Shaft design (threaded spindle)

Dimensions														Pitch		Mounting dimensions[1]			Mass moment of inertia[2]
d	H_1	C	C_1	D_1	D_2	D_3	B	B_1	B_2	r	r_1	d_1	J	n	t	D_a	d_a	t_1	M_m
										min.	min.				°	max.	min.		kg · cm^2
50	51	22,5	12,5	95	–	–	17,5	–	–	0,3	0,6	6	113	12	30	96	75	0,2	29,8
	72	22,5	12,5	95	75	93	17,5	38,5	18	0,3	0,6	6	113	12	30	96	73	0,2	35,3
55	51	22,5	12,5	100	–	–	17,5	–	–	0,3	0,6	6	118	12	30	101	85	0,2	36,1
	72	22,5	12,5	100	80	98	17,5	38,5	18	0,3	0,6	6	118	12	30	101	78	0,2	43
60	51	22,5	12,5	105	–	–	17,5	–	–	0,3	0,6	6	123	12	30	106	90	0,2	43,8
	72	22,5	12,5	105	90	105	17,5	38,5	18	0,3	0,6	6	123	12	30	106	88	0,2	54,5
65	51	22,5	12,5	110	–	–	17,5	–	–	0,3	0,6	6	128	12	30	111	97	0,2	51
	72	22,5	12,5	110	90	108	17,5	38,5	18	0,3	0,6	6	128	12	30	111	88	0,2	60,1

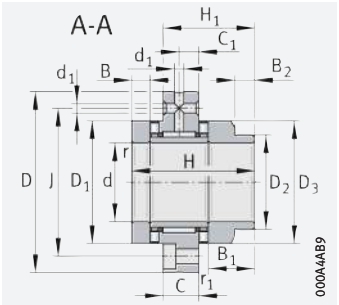
	Rigidity	Tilting rigidity	Axial runout[2]	Recommended INA precision locknuts[3]			Required locknut force[4]	Rotary shaft seal to DIN 3760; to be ordered separately	Fixing screws[5] DIN EN ISO 4762		
	axial			for radial clamping	for axial clamping	Tightening torque[6]	axial				
d	c_{aL}	c_{kL}				M_A			Size	n_a	t_a
	N/µm	Nm/mrad	µm			Nm	N				°
50	4 600	2 900	1	ZMA50/92	AM50	180	36 224	–	M10	12	30
	4 600	2 900	1	ZMA50/92	AM50	180	36 224	75×95×10	M10	12	30
55	4 900	3 600	1	ZMA55/98	AM55	220	39 807	–	M10	12	30
	4 900	3 600	1	ZMA55/98	AM55	220	39 807	80×100×10	M10	12	30
60	5 300	4 300	1	ZMA60/98	AM60	250	41 144	–	M10	12	30
	5 300	4 300	1	ZMA60/98	AM60	250	41 144	90×110×12	M10	12	30
65	4 800	4 000	1	ZMA65/105	AM65	270	40 652	–	M10	12	30
	4 800	4 000	1	ZMA65/105	AM65	270	40 652	90×110×12	M10	12	30

Needle roller/axial cylindrical roller bearings

Heavy series
With fixing holes



ZARF



ZARF..-L

d = 70 – 90 mm

Main dimensions			Basic load ratings				Fatigue limit load		Limiting speeds		Bearing frictional torque	Mass	Designation
			axial		radial								
d	D	H	dyn. C_a	stat. C_{0a}	dyn. C_r	stat. C_{0r}	C_{ua}	C_{ur}	n_G oil	n_G grease	M_R	m	
			N	N	N	N	N	N	min^{-1}	min^{-1}	Nm	≈ kg	
70	160	82	201 000	630 000	56 000	119 000	57 000	15 800	2 400	800	4,8	5,2	**ZARF70160-TV**
	160	103	201 000	630 000	56 000	119 000	57 000	15 800	2 400	800	4,8	5,95	**ZARF70160-L-TV**
75	185	100	290 000	890 000	72 000	132 000	84 000	18 800	2 100	700	8	9,4	**ZARF75185-TV**
	185	125	290 000	890 000	72 000	132 000	84 000	18 800	2 100	700	8	10,6	**ZARF75185-L-TV**
90	210	110	325 000	1 030 000	98 000	210 000	93 000	28 500	1 800	700	10,5	13,7	**ZARF90210-TV**
	210	135	325 000	1 030 000	98 000	210 000	93 000	28 500	1 800	700	10,5	15,1	**ZARF90210-L-TV**

medias ➤ *https://www.schaeffler.de/std/1E65*

① Mounting dimension for seal carrier assembly DRS ➤ 🕮 *TPI 123*.
③ Adjacent construction, bearing screw mounted in bore. ④ Only valid in assembled condition.

1) If rotary shaft seals are used, the outside diameter of the sealing ring must be taken into consideration.

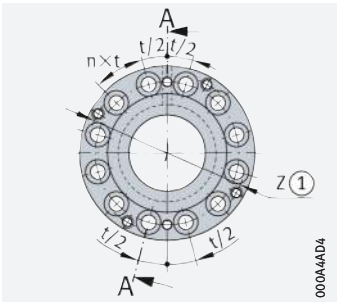
2) Based on rotating inner ring.

3) The recommended INA precision locknuts are not included in the scope of delivery and must be ordered separately.

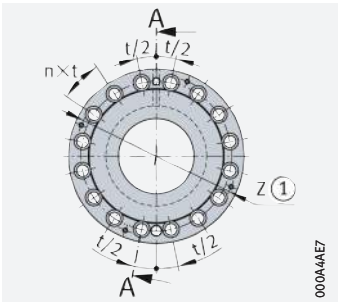
4) The required axial locknut force must be observed when using other locknuts.

5) Screws not included in scope of delivery. Tightening torque according to manufacturer's data.

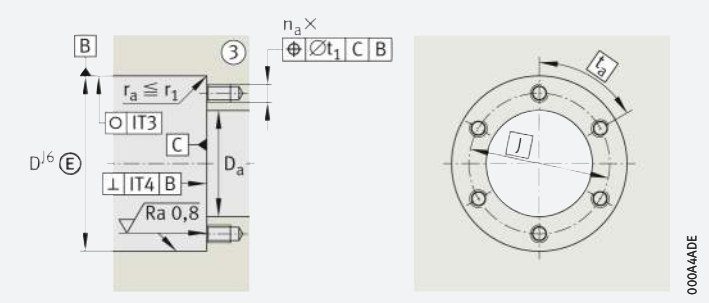
6) Only valid in conjunction with INA precision locknuts.
Observe the guidelines on locating/locating bearing arrangements ➤ 🕮 *TPI 123*.



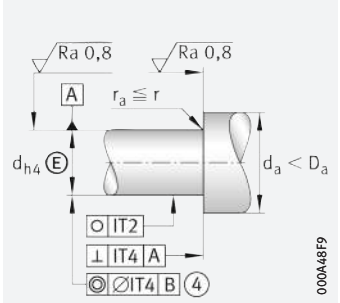
Hole pattern
ZARF7



Hole pattern
ZARF90210



Housing design



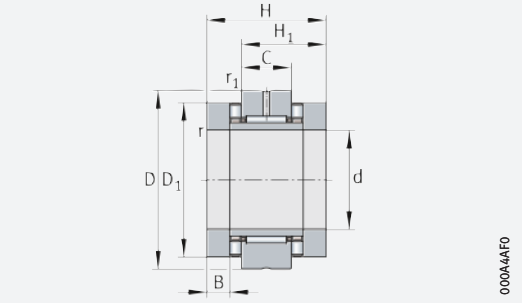
Shaft design (threaded spindle)

Dimensions														Pitch	Mounting dimensions[1]			Mass moment of inertia[2]
d	H_1	C	C_1	D_1	D_2	D_3	B	B_1	B_2	r min.	r_1 min.	d_1	J	n	t °	D_a max.	d_a min.	t_1	M_m kg · cm^2
70	51	22,5	12,5	115	–	–	17,5	–	–	0,3	0,6	6	133	12	30	116	100	0,2	62,2
	72	22,5	12,5	115	100	115	17,5	38,5	18	0,3	0,6	6	133	12	30	116	98	0,2	77,3
75	62	27	15	135	–	–	21	–	–	0,3	1	6	155	12	30	136	113	0,4	149
	87	27	15	135	115	135	21	46	20	0,3	1	6	155	12	30	136	110	0,4	188
90	69,5	32	17,5	160	–	–	22,5	–	–	0,3	1	8	180	16	22,5	161	130	0,4	312
	94,5	32	17,5	160	130	158	22,5	47,5	18	0,3	1	8	180	16	22,5	161	125	0,4	372

	Rigidity axial	Tilting rigidity	Axial runout[2]	Recommended INA precision locknuts[3]			Required locknut force[4] axial	Rotary shaft seal to DIN 3760; to be ordered separately	Fixing screws[5] DIN EN ISO 4762		
				for radial clamping	for axial clamping	Tightening torque[6]			Size	n_a	t_a
d	c_{aL} N/µm	c_{kL} Nm/mrad	µm			M_A Nm	N				°
70	5 800	6 000	1	ZMA70/110	AM70	330	46 786	–	M10	12	30
	5 800	6 000	1	ZMA70/110	AM70	330	46 786	100×120×12	M10	12	30
75	6 600	8 500	2	ZMA75/125	AM75	580	72 971	–	M12	12	30
	6 600	8 500	2	ZMA75/125	AM75	580	72 971	115×140×12	M12	12	30
90	7 700	14 500	2	ZMA90/155	AM90	960	100 669	–	M12	16	22,5
	7 700	14 500	2	ZMA90/155	AM90	960	100 669	130×160×12	M12	16	22,5

Needle roller/axial cylindrical roller bearings

Light series
Without fixing holes



ZARN

d = 15 – 30 mm

Main dimensions			Basic load ratings				Fatigue limit load		Limiting speeds		Bearing frictional torque	Mass	Designation
			axial		radial								
d	D	H	dyn. C_a	stat. C_{0a}	dyn. C_r	stat. C_{0r}	C_{ua}	C_{ur}	n_G oil	n_G grease	M_R	m	
			N	N	N	N	N	N	min^{-1}	min^{-1}	Nm	≈ kg	
15	45	40	24 900	53 000	13 000	17 500	7 300	2 600	8 500	2 200	0,35	0,34	**ZARN1545-TV**
	45	53	24 900	53 000	13 000	17 500	7 300	2 600	8 500	2 200	0,35	0,37	**ZARN1545-L-TV**
17	47	43	26 000	57 000	14 000	19 900	7 900	2 950	7 800	2 100	0,4	0,37	**ZARN1747-TV**
	47	57	26 000	57 000	14 000	19 900	7 900	2 950	7 800	2 100	0,4	0,41	**ZARN1747-L-TV**
20	52	46	33 500	76 000	14 900	22 400	6 300	3 350	7 000	2 000	0,5	0,41	**ZARN2052-TV**
	52	60	33 500	76 000	14 900	22 400	6 300	3 350	7 000	2 000	0,5	0,46	**ZARN2052-L-TV**
25	57	50	35 500	86 000	22 600	36 000	7 100	5 100	6 000	1 900	0,55	0,53	**ZARN2557-TV**
	57	65	35 500	86 000	22 600	36 000	7 100	5 100	6 000	1 900	0,55	0,59	**ZARN2557-L-TV**
30	62	50	39 000	101 000	24 300	41 500	8 400	5 900	5 500	1 800	0,65	0,6	**ZARN3062-TV**
	62	65	39 000	101 000	24 300	41 500	8 400	5 900	5 500	1 800	0,65	0,75	**ZARN3062-L-TV**

medias ➤ *https://www.schaeffler.de/std/1E66*

④ Only valid in assembled condition.

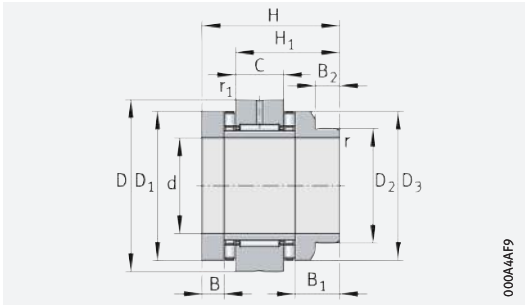
1) If rotary shaft seals are used, the outside diameter of the sealing ring must be taken into consideration.

2) Based on rotating inner ring.

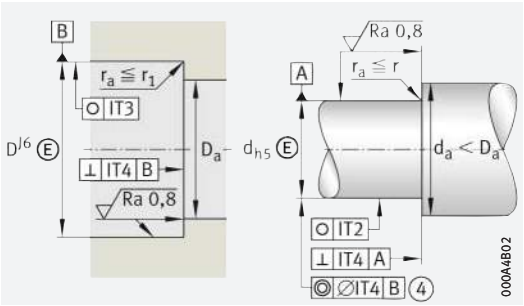
3) The recommended INA precision locknuts are not included in the scope of delivery and must be ordered separately.

4) The required axial locknut force must be observed when using other locknuts.

5) Only valid in conjunction with INA precision locknuts.
Observe the guidelines on locating/locating bearing arrangements ➤ 🕮 *TPI 123*.



ZARN..-L



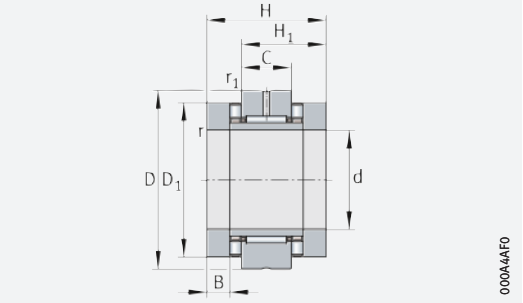
Design of housing and shaft (threaded spindle)

Dimensions											Mounting dimensions[1]	
d	H_1	C	D_1	D_2	D_3	B	B_1	B_2	r min.	r_1 min.	D_a max.	d_a min.
15	28	16	35	–	–	7,5	–	–	0,3	0,6	36	28
	41	16	35	24	34	7,5	20,5	11	0,3	0,6	36	22
17	29,5	16	38	–	–	9	–	–	0,3	0,6	39	28
	43,5	16	38	28	38	9	23	11	0,3	0,6	39	26
20	31	16	42	–	–	10	–	–	0,3	0,6	43	33
	45	16	42	30	40	10	24	12	0,3	0,6	43	28
25	35	20	47	–	–	10	–	–	0,3	0,6	48	39
	50	20	47	36	45	10	25	12	0,3	0,6	48	34
30	35	20	52	–	–	10	–	–	0,3	0,6	53	44
	50	20	52	40	50	10	25	13	0,3	0,6	53	38

	Rigidity axial	Tilting rigidity	Mass moment of inertia[2]	Axial runout[2]	Recommended INA precision locknuts[3]			Required locknut force[4] axial	Rotary shaft seal to DIN 3760; to be ordered separately
					for radial clamping	for axial clamping	Tightening torque[5] M_A		
d	c_{aL} N/µm	c_{kL} Nm/mrad	M_m kg · cm²	µm			Nm	N	
15	1 400	110	0,24	1	ZMA15/33	AM15	10	6 506	–
	1 400	110	0,274	1	ZMA15/33	AM15	10	6 506	24×35×7
17	1 600	160	0,373	1	ZM17	AM17	12	7 078	–
	1 600	160	0,464	1	ZM17	AM17	12	7 078	28×40×7
20	1 800	230	0,615	1	ZMA20/38	AM20	18	8 972	–
	1 800	230	0,683	1	ZMA20/38	AM20	18	8 972	30×42×7
25	1 900	350	0,989	1	ZMA25/45	AM25	25	9 745	–
	1 900	350	1,15	1	ZMA25/45	AM25	25	9 745	36×47×7
30	2 200	520	1,46	1	ZMA30/52	AM30	32	10 662	–
	2 200	520	1,7	1	ZMA30/52	AM30	32	10 662	40×52×7

Needle roller/axial cylindrical roller bearings

Light series
Without fixing holes



ZARN

d = 35 – 50 mm

Main dimensions			Basic load ratings				Fatigue limit load		Limiting speeds		Bearing frictional torque	Mass	Designation
			axial		radial								
d	D	H	dyn. C_a	stat. C_{0a}	dyn. C_r	stat. C_{0r}	C_{ua}	C_{ur}	n_G oil	n_G grease	M_R	m	
			N	N	N	N	N	N	min^{-1}	min^{-1}	Nm	≈ kg	
35	70	54	56 000	148 000	26 000	47 000	12 800	6 700	4 800	1 700	0,9	0,8	**ZARN3570-TV**
	70	70	56 000	148 000	26 000	47 000	12 800	6 700	4 800	1 700	0,9	0,93	**ZARN3570-L-TV**
40	75	54	59 000	163 000	27 500	53 000	14 100	7 500	4 400	1 600	1	0,9	**ZARN4075-TV**
	75	70	59 000	163 000	27 500	53 000	14 100	7 500	4 400	1 600	1	1	**ZARN4075-L-TV**
45	80	60	61 000	177 000	38 000	74 000	15 400	10 200	4 000	1 500	1,2	1,12	**ZARN4580-TV**
	80	75	61 000	177 000	38 000	74 000	15 400	10 200	4 000	1 500	1,2	1,27	**ZARN4580-L-TV**
50	90	60	90 000	300 000	40 000	82 000	27 500	11 300	3 600	1 200	2,2	1,43	**ZARN5090-TV**
	90	78	90 000	300 000	40 000	82 000	27 500	11 300	3 600	1 200	2,2	1,78	**ZARN5090-L-TV**

medias ➤ *https://www.schaeffler.de/std/1E67*

④ Only valid in assembled condition.

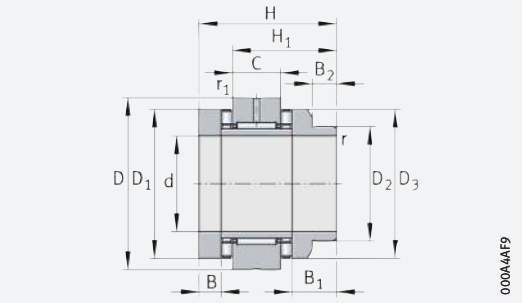
1) If rotary shaft seals are used, the outside diameter of the sealing ring must be taken into consideration.

2) Based on rotating inner ring.

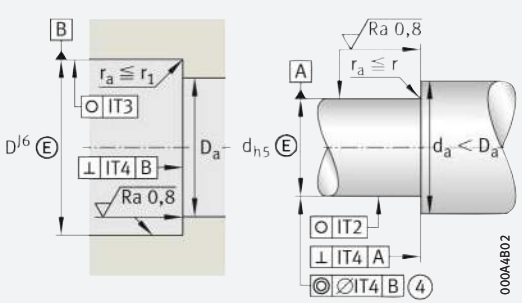
3) The recommended INA precision locknuts are not included in the scope of delivery and must be ordered separately.

4) The required axial locknut force must be observed when using other locknuts.

5) Only valid in conjunction with INA precision locknuts.
Observe the guidelines on locating/locating bearing arrangements ➤ 🕮 *TPI 123*.



ZARN..-L



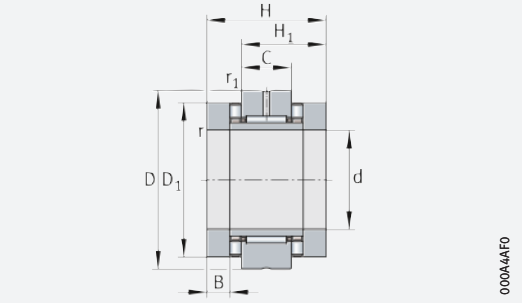
Design of housing and shaft (threaded spindle)

Dimensions											Mounting dimensions[1]	
d	H_1	C	D_1	D_2	D_3	B	B_1	B_2	r min.	r_1 min.	D_a max.	d_a min.
35	37	20	60	–	–	11	–	–	0,3	0,6	61	50
	53	20	60	45	58	11	27	13	0,3	0,6	61	43
40	37	20	65	–	–	11	–	–	0,3	0,6	66	55
	53	20	65	50	63	11	27	14	0,3	0,6	66	48
45	42,5	25	70	–	–	11,5	–	–	0,3	0,6	71	60
	57,5	25	70	56	68	11,5	26,5	13	0,3	0,6	71	54
50	42,5	25	78	–	–	11,5	–	–	0,3	0,6	79	67
	60,5	25	78	60	78	11,5	29,5	14	0,3	0,6	79	58

	Rigidity axial	Tilting rigidity	Mass moment of inertia[2]	Axial runout[2]	Recommended INA precision locknuts[3]			Required locknut force[4] axial	Rotary shaft seal to DIN 3760; to be ordered separately
					for radial clamping	for axial clamping	Tightening torque[5]		
d	c_{aL} N/µm	c_{kL} Nm/mrad	M_m kg · cm²	µm			M_A Nm	N	
35	2 600	740	2,8	1	ZMA35/58	AM35/58	40	12 143	–
	2 600	740	3,21	1	ZMA35/58	AM35/58	40	12 143	45×60×8
40	2 800	1 030	3,78	1	ZMA40/62	AM40	55	14 240	–
	2 800	1 030	4,35	1	ZMA40/62	AM40	55	14 240	50×65×8
45	3 000	1 340	5,33	1	ZMA45/68	AM45	65	15 112	–
	3 000	1 340	6,03	1	ZMA45/68	AM45	65	15 112	56×70×8
50	4 800	2 470	8,42	1	ZMA50/75	AM50	85	18 410	–
	4 800	2 470	10,46	1	ZMA50/75	AM50	85	18 410	60×80×8

Needle roller/axial cylindrical roller bearings

Heavy series
Without fixing holes



ZARN

d = 20 – 35 mm

Main dimensions			Basic load ratings				Fatigue limit load		Limiting speeds		Bearing frictional torque	Mass	Designation
			axial		radial								
d	D	H	dyn. C_a	stat. C_{0a}	dyn. C_r	stat. C_{0r}	C_{ua}	C_{ur}	n_G oil	n_G grease	M_R	m	
			N	N	N	N	N	N	min^{-1}	min^{-1}	Nm	≈ kg	
20	62	60	64 000	141 000	22 600	36 000	12 900	5 100	6 000	1 500	1,3	0,87	**ZARN2062-TV**
	62	75	64 000	141 000	22 600	36 000	12 900	5 100	6 000	1 500	1,3	0,99	**ZARN2062-L-TV**
25	72	60	80 000	199 000	24 300	41 500	18 300	5 900	4 900	1 400	1,6	1,17	**ZARN2572-TV**
	72	75	80 000	199 000	24 300	41 500	18 300	5 900	4 900	1 400	1,6	1,32	**ZARN2572-L-TV**
30	80	66	107 000	265 000	26 000	47 000	22 500	6 700	4 400	1 300	2,1	1,5	**ZARN3080-TV**
	80	82	107 000	265 000	26 000	47 000	22 500	6 700	4 400	1 300	2,1	1,7	**ZARN3080-L-TV**
35	85	66	105 000	265 000	27 500	53 000	22 500	7 500	4 000	1 250	2,3	1,65	**ZARN3585-TV**
	85	82	105 000	265 000	27 500	53 000	22 500	7 500	4 000	1 250	2,3	1,8	**ZARN3585-L-TV**

medias ➤ *https://www.schaeffler.de/std/1E68*

④ Only valid in assembled condition.

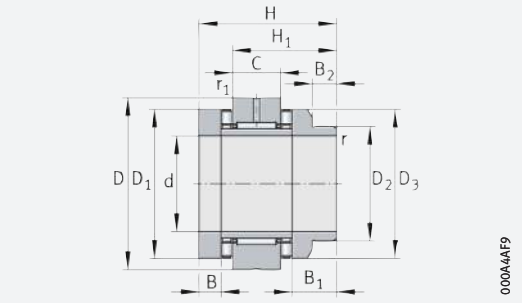
1) If rotary shaft seals are used, the outside diameter of the sealing ring must be taken into consideration.

2) Based on rotating inner ring.

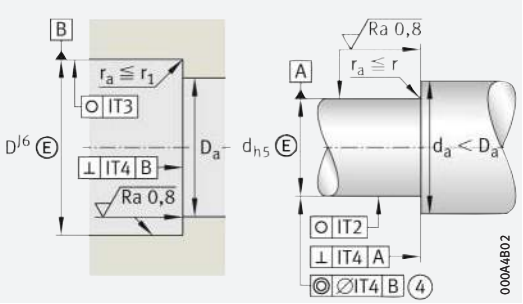
3) The recommended INA precision locknuts are not included in the scope of delivery and must be ordered separately.

4) The required axial locknut force must be observed when using other locknuts.

5) Only valid in conjunction with INA precision locknuts.
Observe the guidelines on locating/locating bearing arrangements ➤ 🕮 *TPI 123*.



ZARN..-L



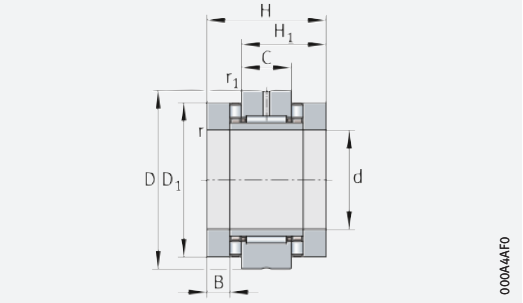
Design of housing and shaft (threaded spindle)

Dimensions											Mounting dimensions[1]	
d	H_1	C	D_1	D_2	D_3	B	B_1	B_2	r min.	r_1 min.	D_a max.	d_a min.
20	40	20	52	–	–	12,5	–	–	0,3	0,6	53	38
	55	20	52	40	50	12,5	27,5	13	0,3	0,6	53	38
25	40	20	62	–	–	12,5	–	–	0,3	0,6	63	45
	55	20	62	48	60	12,5	27,5	13	0,3	0,6	63	45
30	43	20	68	–	–	14	–	–	0,3	0,6	69	52
	59	20	68	52	66	14	30	13	0,3	0,6	69	50
35	43	20	73	–	–	14	–	–	0,3	0,6	74	60
	59	20	73	60	73	14	30	13	0,3	0,6	74	58

	Rigidity axial	Tilting rigidity	Mass moment of inertia[2]	Axial runout[2]	Recommended INA precision locknuts[3]			Required locknut force[4] axial	Rotary shaft seal to DIN 3760; to be ordered separately
					for radial clamping	for axial clamping	Tightening torque[5]		
d	c_{aL} N/µm	c_{kL} Nm/mrad	M_m kg · cm²	µm			M_A Nm	N	
20	2 300	400	1,98	1	ZMA20/52	AM20	38	17 623	–
	2 300	400	2,27	1	ZMA20/52	AM20	38	17 623	40×52×7
25	3 000	800	3,88	1	ZMA25/58	AM25	55	20 790	–
	3 000	800	4,51	1	ZMA25/58	AM25	55	20 790	48×62×8
30	3 300	1 100	6,53	1	ZMA30/65	AM30	75	24 287	–
	3 300	1 100	7,43	1	ZMA30/65	AM30	75	24 287	52×68×8
35	3 500	1 300	8,47	1	ZMA35/70	AM35	100	27 480	–
	3 500	1 300	10,4	1	ZMA35/70	AM35	100	27 480	60×75×8

Needle roller/axial cylindrical roller bearings

Heavy series
Without fixing holes



ZARN

d = 40 – 55 mm

Main dimensions			Basic load ratings				Fatigue limit load		Limiting speeds		Bearing frictional torque	Mass	Designation
			axial		radial								
d	D	H	dyn. C_a	stat. C_{0a}	dyn. C_r	stat. C_{0r}	C_{ua}	C_{ur}	n_G oil	n_G grease	M_R	m	
			N	N	N	N	N	N	min^{-1}	min^{-1}	Nm	≈ kg	
40	90	75	117 000	315 000	38 000	74 000	26 500	10 200	3 700	1 200	2,5	2,09	**ZARN4090-TV**
	90	93	117 000	315 000	38 000	74 000	26 500	10 200	3 700	1 200	2,5	2,39	**ZARN4090-L-TV**
45	105	82	154 000	405 000	40 000	82 000	36 500	11 300	3 300	1 150	3,5	3,02	**ZARN45105-TV**
	105	103	154 000	405 000	40 000	82 000	36 500	11 300	3 300	1 150	3,5	3,42	**ZARN45105-L-TV**
50	110	82	172 000	480 000	41 500	88 000	43 500	12 400	3 100	1 100	3,8	3,3	**ZARN50110-TV**
	110	103	172 000	480 000	41 500	88 000	43 500	12 400	3 100	1 100	3,8	3,75	**ZARN50110-L-TV**
55	115	82	177 000	500 000	44 000	98 000	46 000	13 500	2 900	1 000	4	3,5	**ZARN55115-TV**
	115	103	177 000	500 000	44 000	98 000	46 000	13 500	2 900	1 000	4	4	**ZARN55115-L-TV**

medias ➤ *https://www.schaeffler.de/std/1E69*

④ Only valid in assembled condition.

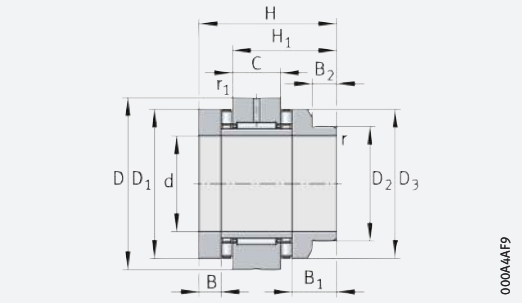
1) If rotary shaft seals are used, the outside diameter of the sealing ring must be taken into consideration.

2) Based on rotating inner ring.

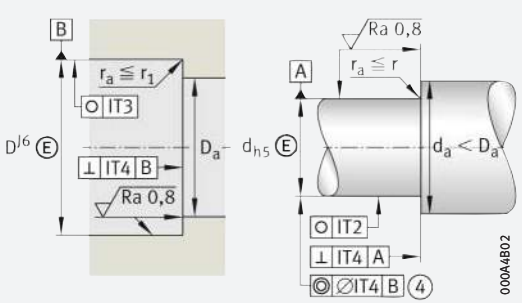
3) The recommended INA precision locknuts are not included in the scope of delivery and must be ordered separately.

4) The required axial locknut force must be observed when using other locknuts.

5) Only valid in conjunction with INA precision locknuts.
Observe the guidelines on locating/locating bearing arrangements ➤ 🕮 *TPI 123*.



ZARN..-L



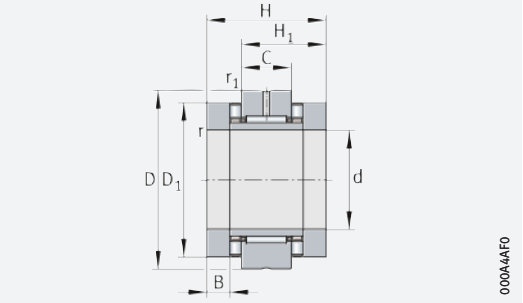
Design of housing and shaft (threaded spindle)

Dimensions											Mounting dimensions[1]	
d	H_1	C	D_1	D_2	D_3	B	B_1	B_2	r min.	r_1 min.	D_a max.	d_a min.
40	50	25	78	–	–	16	–	–	0,3	0,6	79	65
	68	25	78	60	78	16	34	14	0,3	0,6	79	58
45	53,5	25	90	–	–	17,5	–	–	0,3	0,6	91	70
	74,5	25	90	70	88	17,5	38,5	18	0,3	0,6	91	68
50	53,5	25	95	–	–	17,5	–	–	0,3	0,6	96	75
	74,5	25	95	75	93	17,5	38,5	18	0,3	0,6	96	73
55	53,5	25	100	–	–	17,5	–	–	0,3	0,6	101	85
	74,5	25	100	80	98	17,5	38,5	18	0,3	0,6	101	78

	Rigidity axial	Tilting rigidity	Mass moment of inertia[2]	Axial runout[2]	Recommended INA precision locknuts[3]			Required locknut force[4] axial	Rotary shaft seal to DIN 3760; to be ordered separately
					for radial clamping	for axial clamping	Tightening torque[5]		
d	c_{aL}	c_{kL}	M_m				M_A		
	N/µm	Nm/mrad	kg · cm²	µm			Nm	N	
40	3 800	1 800	13,3	1	ZMA40/75	AM40	120	29 834	–
	3 800	1 800	15,5	1	ZMA40/75	AM40	120	29 834	60×80×8
45	4 000	2 100	23,7	1	ZMA45/85	AM45	150	33 549	–
	4 000	2 100	28,1	1	ZMA45/85	AM45	150	33 549	70×90×10
50	4 600	2 900	29,8	1	ZMA50/92	AM50	180	36 224	–
	4 600	2 900	35,3	1	ZMA50/92	AM50	180	36 224	75×95×10
55	4 900	3 600	36,1	1	ZMA55/98	AM55	220	39 807	–
	4 900	3 600	43	1	ZMA55/98	AM55	220	39 807	80×100×10

Needle roller/axial cylindrical roller bearings

Heavy series
Without fixing holes



ZARN

d = 60 – 90 mm

Main dimensions			Basic load ratings				Fatigue limit load		Limiting speeds		Bearing frictional torque	Mass	Designation
			axial		radial								
d	D	H	dyn. C_a	stat. C_{0a}	dyn. C_r	stat. C_{0r}	C_{ua}	C_{ur}	n_G oil	n_G grease	M_R	m	
			N	N	N	N	N	N	min^{-1}	min^{-1}	Nm	≈ kg	
60	120	82	187 000	550 000	44 500	92 000	50 000	12 600	2 700	950	4,2	3,7	**ZARN60120-TV**
	120	103	187 000	550 000	44 500	92 000	50 000	12 600	2 700	950	4,2	4,85	**ZARN60120-L-TV**
65	125	82	172 000	500 000	54 000	104 000	46 000	14 600	2 600	900	4	4	**ZARN65125-TV**
	125	103	172 000	500 000	54 000	104 000	46 000	14 600	2 600	900	4	4,6	**ZARN65125-L-TV**
70	130	82	201 000	630 000	56 000	119 000	57 000	15 800	2 400	800	4,8	4,1	**ZARN70130-TV**
	130	103	201 000	630 000	56 000	119 000	57 000	15 800	2 400	800	4,8	4,85	**ZARN70130-L-TV**
75	155	100	290 000	890 000	72 000	132 000	84 000	18 800	2 100	700	8	7,9	**ZARN75155-TV**
	155	125	290 000	890 000	72 000	132 000	84 000	18 800	2 100	700	8	9,1	**ZARN75155-L-TV**
90	180	110	325 000	1 030 000	98 000	210 000	93 000	28 500	1 800	700	10,5	11,8	**ZARN90180-TV**
	180	135	325 000	1 030 000	98 000	210 000	93 000	28 500	1 800	700	10,5	13,2	**ZARN90180-L-TV**

medias ➤ *https://www.schaeffler.de/std/1E6A*

④ Only valid in assembled condition.

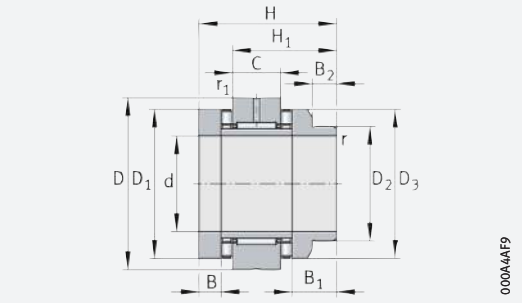
1) If rotary shaft seals are used, the outside diameter of the sealing ring must be taken into consideration.

2) Based on rotating inner ring.

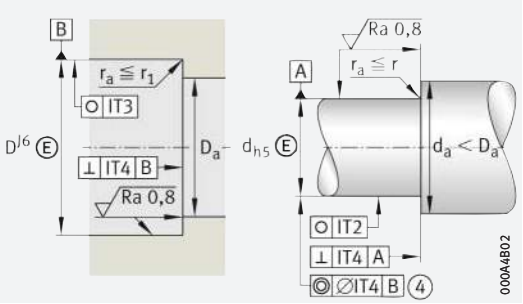
3) The recommended INA precision locknuts are not included in the scope of delivery and must be ordered separately.

4) The required axial locknut force must be observed when using other locknuts.

5) Only valid in conjunction with INA precision locknuts.
Observe the guidelines on locating/locating bearing arrangements ➤ 🕮 *TPI 123*.



ZARN..-L



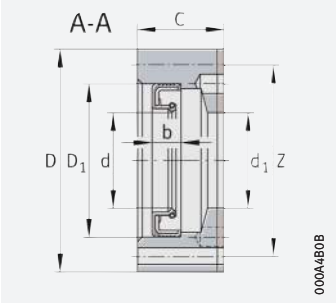
Design of housing and shaft (threaded spindle)

Dimensions											Mounting dimensions[1]	
d	H_1	C	D_1	D_2	D_3	B	B_1	B_2	r min.	r_1 min.	D_a max.	d_a min.
60	53,5	25	105	–	–	17,5	–	–	0,3	0,6	106	90
	74,5	25	105	90	105	17,5	38,5	18	0,3	0,6	106	88
65	53,5	25	110	–	–	17,5	–	–	0,3	0,6	111	97
	74,5	25	110	90	108	17,5	38,5	18	0,3	0,6	111	88
70	53,5	25	115	–	–	17,5	–	–	0,3	0,6	116	100
	74,5	25	115	100	115	17,5	38,5	18	0,3	0,6	116	98
75	65	30	135	–	–	21	–	–	0,3	1	136	113
	90	30	135	115	135	21	46	20	0,3	1	136	110
90	72,5	35	160	–	–	22,5	–	–	0,3	1	161	130
	97,5	35	160	130	158	22,5	47,5	18	0,3	1	161	125

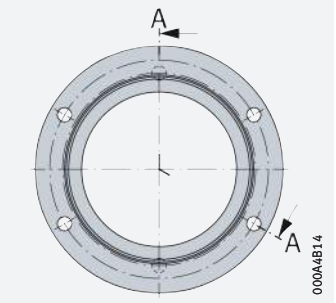
	Rigidity axial	Tilting rigidity	Mass moment of inertia[2]	Axial runout[2]	Recommended INA precision locknuts[3]			Required locknut force[4] axial	Rotary shaft seal to DIN 3760; to be ordered separately
					for radial clamping	for axial clamping	Tightening torque[5] M_A		
d	c_{aL} N/µm	c_{kL} Nm/mrad	M_m kg · cm²	µm			Nm	N	
60	5 300	4 300	43,8	1	ZMA60/98	AM60	250	41 144	–
	5 300	4 300	54,5	1	ZMA60/98	AM60	250	41 144	90×110×12
65	4 800	4 000	51	1	ZMA65/105	AM65	270	40 652	–
	4 800	4 000	60,1	1	ZMA65/105	AM65	270	40 652	90×110×12
70	5 800	6 000	62,2	1	ZMA70/110	AM70	330	46 786	–
	5 800	6 000	77,3	1	ZMA70/110	AM70	330	46 786	100×120×12
75	6 600	8 500	149	2	ZMA75/125	AM75	580	72 971	–
	6 600	8 500	188	2	ZMA75/125	AM75	580	72 971	115×140×12
90	7 700	14 500	312	2	ZMA90/155	AM90	960	100 669	–
	7 700	14 500	372	2	ZMA90/155	AM90	960	100 669	130×160×12

Seal carrier assemblies

For ZARF, light series



DRS[1)]



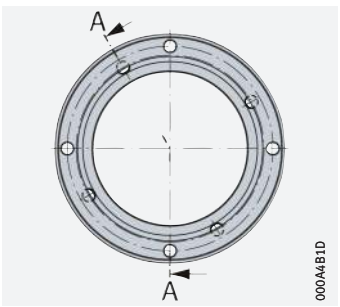
Hole pattern DRS1560, DRS1762

d_1 = 35 – 78 mm

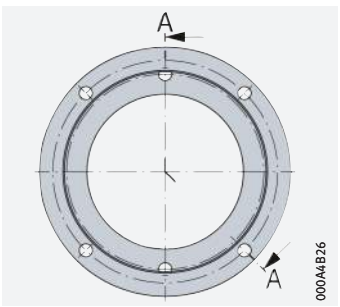
Main dimensions			Dimension	Mass	Designation	Rotary shaft seal					Matching bearing
d_1	D	C	Z	m ≈ kg		d	D_1	b	Socket head screws to DIN EN ISO 4762		
									Size	Quantity	
35	60	14	52,4	0,16	**DRS1560**	35	45	7	M3×20	4	ZARF1560(-L)-TV
38	62	15,5	54,4	0,18	**DRS1762**	38	47	7	M3×25	4	ZARF1762(-L)-TV
42	68	17	60,4	0,2	**DRS2068**	42	55	8	M3×25	4	ZARF2068(-L)-TV
47	75	17	67,4	0,22	**DRS2575**	47	62	6	M3×25	4	ZARF2575(-L)-TV
52	80	17	73,4	0,26	**DRS3080**	52	68	8	M3×25	4	ZARF3080(-L)-TV
60	90	19	80	0,38	**DRS3590**	60	72	8	M4×25	4	ZARF3590(-L)-TV
65	100	19	90	0,47	**DRS40100**	65	80	8	M4×30	4	ZARF40100(-L)-TV
70	105	20	95	0,53	**DRS45105**	70	85	8	M4×30	4	ZARF45105(-L)-TV
78	115	20	106	0,54	**DRS50115**	78	100	10	M3×30	4	ZARF50115(-L)-TV

medias ➤ *https://www.schaeffler.de/std/1E6B*

1) The seal carrier assembly is supplied as a sealing set in individual parts comprising:
- a seal flange
- a rotary shaft seal
- a gasket
- socket head screws.



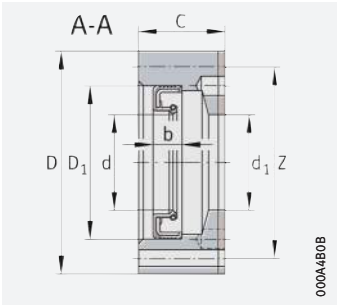
Hole pattern DRS3080, DRS3590, DRS50115



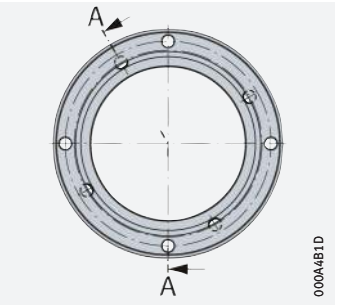
Hole pattern DRS2068, DRS2575, DRS40100, DRS45105

Seal carrier assemblies

For ZARF, heavy series



DRS[1)]



Hole pattern

d_1 = 52 – 160 mm

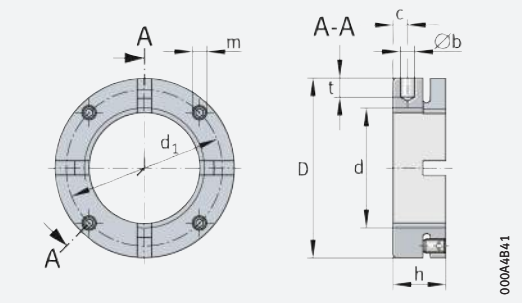
Main dimensions			Dimension	Mass	Designation	Rotary shaft seal					Matching bearing
d_1	D	C	Z	m ≈ kg		d	D_1	b	Socket head screws to DIN EN ISO 4762 Size	Quantity	
52	80	22	73,4	0,3	**DRS2080**	52	68	8	M3×30	4	ZARF2080(-L)-TV
62	90	22	81	0,38	**DRS2590**	62	75	10	M3×30	4	ZARF2590(-L)-TV
68	105	25	95	0,67	**DRS30105**	68	85	10	M4×35	4	ZARF30105(-L)-TV
73	110	25	101	0,6	**DRS35110**	73	95	10	M3×30	4	ZARF35110(-L)-TV
78	115	27,5	106	0,7	**DRS40115**	78	100	10	M3×35	4	ZARF40115(-L)-TV
90	130	31	120	1,1	**DRS45130**	90	110	12	M4×40	4	ZARF45130(-L)-TV
95	140	30	127,5	1,4	**DRS50140**	95	115	13	M5×40	4	ZARF50140(-L)-TV
100	145	30	132,5	1,42	**DRS55145**	100	120	12	M5×40	4	ZARF55145(-L)-TV
105	150	30	137,5	1,42	**DRS60150**	105	125	12	M5×40	4	ZARF60150(-L)-TV
110	155	30	142,5	1,43	**DRS65155**	110	130	12	M5×40	4	ZARF65155(-L)-TV
115	160	30	147,5	1,5	**DRS70160**	115	135	13	M5×40	4	ZARF70160(-L)-TV
135	185	36	172,5	2,4	**DRS75185**	135	160	15	M5×50	4	ZARF75185(-L)-TV
160	210	38	194	2,7	**DRS90210**	160	180	15	M5×50	4	ZARF90210(-L)-TV

medias ➤ *https://www.schaeffler.de/std/1E6C*

1) The seal carrier assembly is supplied as a sealing set in individual parts comprising:
- a seal flange
- a rotary shaft seal
- a gasket
- socket head screws.

Precision locknuts

For axial clamping



AM15 to AM40 with 4 segments
AM45 to AM90 with 6 segments
AM100 to AM130 with 8 segments

d = M15×1 – M130×2

Main dimensions			Grub screw	Locknut[1]				Mass	Designation	Dimensions				
			Tightening torque	Axial rupture load	Breakaway torque	Reference tightening torque	Mass moment of inertia							
d	D	h	M_A	F_{aB}	M_L at M_{AL}		M_M	m		b	t	d_1	c	m
			Nm	N	Nm	Nm	kg · cm²	≈ kg		H11				
M15×1	30	18	3	100 000	20	10	0,09	0,06	**AM15**	4	5	24	5	M5
M17×1	32	18	3	120 000	25	15	0,11	0,07	**AM17**	4	5	26	5	M5
M20×1	38	18	5	145 000	45	18	0,23	0,13	**AM20**	4	6	31	5	M6
M25×1,5	45	20	5	205 000	60	25	0,49	0,16	**AM25**	5	6	38	6	M6
M30×1,5	52	20	5	250 000	70	32	0,86	0,2	**AM30**	5	7	45	6	M6
M30×1,5	65	30	5	400 000	70	32	2,8	0,5	**AM30/65**	6	8	45	6	M6
M35×1,5	58	20	5	280 000	90	40	1,3	0,23	**AM35/58**	5	7	51	6	M6
M35×1,5	65	22	5	330 000	100	40	2,4	0,33	**AM35**	6	8	58	6	M6
M40×1,5	65	22	5	350 000	120	55	2,3	0,3	**AM40**	6	8	58	6	M6
M40×1,5	85	32	5	570 000	120	55	7,6	0,75	**AM40/85**	6	8	58	6	M6
M45×1,5	70	22	5	360 000	220	65	2,9	0,34	**AM45**	6	8	63	6	M6
M50×1,5	75	25	5	450 000	280	85	4,3	0,43	**AM50**	6	8	68	8	M6
M55×2	85	26	15	520 000	320	95	7,7	0,6	**AM55**	6	8	75	8	M8
M60×2	90	26	15	550 000	365	100	9,4	0,65	**AM60**	6	8	80	8	M8
M65×2	100	26	15	560 000	400	120	14,6	0,83	**AM65**	8	10	88	8	M8
M70×2	100	28	15	650 000	450	130	14,7	0,79	**AM70**	8	10	90	9	M8
M75×2	115	30	20	750 000	610	150	29	1,23	**AM75**	8	10	102	10	M10
M80×2	110	30	20	670 000	770	160	21,3	0,93	**AM80**	8	10	98	10	M10
M85×2	115	30	20	690 000	930	180	24,8	0,97	**AM85**	8	10	102	10	M10
M90×2	130	32	20	900 000	1 100	200	48	1,53	**AM90**	8	10	118	13	M10
M100×2	130	30	20	740 000	1 200	250	38	1,12	**AM100**	8	10	118	10	M10
M110×2	140	30	20	770 000	1 300	250	48	1,22	**AM110**	8	10	128	10	M10
M120×2	155	30	20	880 000	1 450	250	75	1,56	**AM120**	8	10	142	10	M10
M130×2	165	30	20	900 000	1 600	250	92	1,67	**AM130**	8	10	152	10	M10

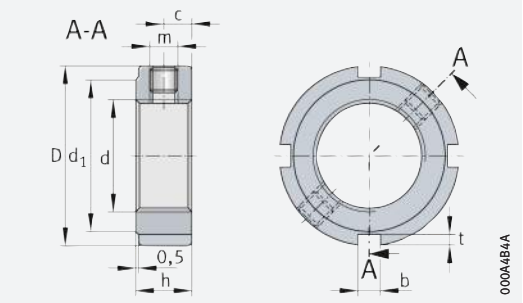
medias ➤ *https://www.schaeffler.de/std/1E6D*

[1] Attention!

If precision locknuts AM are fitted using the socket AMS, a maximum of twice the tightening torque of the bearing is permissible in accordance with the dimension table.

Precision locknuts

For radial clamping



ZM, ZMA

d = M6×0,5 – M55×2

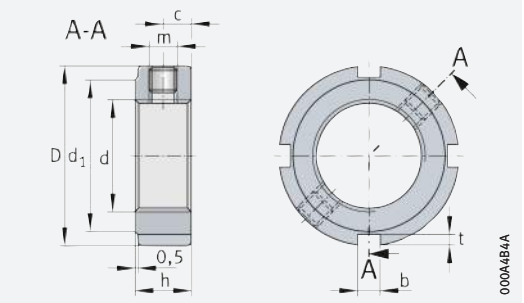
Main dimensions			Grub screw	Locknut			Mass	Designation	Dimensions				
			Tightening torque	Axial rupture load	Breakaway torque	Reference tightening torque	Mass moment of inertia						
d	D	h	M_A	F_{aB}	M_L at M_{AL}		M_M	m		b	t	d_1	c	m
			Nm	N	Nm	Nm	kg · cm^2	≈ kg						
M6×0,5	16	8	1	17 000	20	2	0,004	0,01	**ZM06**	3	2	11	4	M4
M8×0,75	16	8	1	23 000	25	4	0,004	0,01	**ZM08**[1]	3	2	11	4	M4
M10×1	18	8	1	31 000	30	6	0,006	0,01	**ZM10**[1]	3	2	14	4	M4
M12×1	22	8	1	38 000	30	8	0,013	0,015	**ZM12**	3	2	18	4	M4
M15×1	25	8	1	50 000	30	10	0,021	0,018	**ZM15**	3	2	21	4	M4
M15×1	33	16	3	106 000	30	10	0,14	0,08	**ZMA15/33**	4	2	28	8	M5
M17×1	28	10	3	57 000	30	15	0,401	0,028	**ZM17**	4	2	23	5	M5
M20×1	32	10	3	69 000	40	18	0,068	0,035	**ZM20**	4	2	27	5	M5
M20×1	38	20	3	174 000	40	18	0,297	0,12	**ZMA20/38**	5	2	33	10	M5
M20×1	52	25	3	218 000	40	18	1,38	0,32	**ZMA20/52**	5	2	47	12,5	M5
M25×1,5	38	12	5	90 000	60	25	0,157	0,055	**ZM25**	5	2	33	6	M6
M25×1,5	45	20	5	211 000	60	25	0,572	0,16	**ZMA25/45**	5	2	40	10	M6
M25×1,5	58	28	5	305 000	60	25	2,36	0,43	**ZMA25/58**	6	2,5	52	14	M6
M30×1,5	45	12	5	112 000	70	32	0,304	0,075	**ZM30**	5	2	40	6	M6
M30×1,5	52	22	5	270 000	70	32	1,1	0,22	**ZMA30/52**	5	2	47	11	M6
M30×1,5	65	30	5	390 000	70	32	3,94	0,55	**ZMA30/65**	6	2,5	59	15	M6
M35×1,5	52	12	5	134 000	80	40	0,537	0,099	**ZM35**	5	2	47	6	M6
M35×1,5	58	22	5	300 000	80	40	1,66	0,26	**ZMA35/58**	6	2,5	52	11	M6
M35×1,5	70	30	5	460 000	80	40	5,2	0,61	**ZMA35/70**	6	2,5	64	15	M6
M40×1,5	58	14	5	157 000	95	55	0,945	0,14	**ZM40**	6	2,5	52	7	M6
M40×1,5	62	22	15	310 000	95	55	2,07	0,27	**ZMA40/62**	6	2,5	56	11	M8
M40×1,5	75	30	15	520 000	95	55	6,72	0,67	**ZMA40/75**	6	2,5	69	15	M8
M45×1,5	65	14	5	181 000	110	65	1,48	0,17	**ZM45**	6	2,5	59	7	M6
M45×1,5	68	24	15	360 000	110	65	3,2	0,35	**ZMA45/68**	6	2,5	62	12	M8
M45×1,5	85	32	15	630 000	110	65	11,9	0,92	**ZMA45/85**	7	3	78	16	M8
M50×1,5	70	14	5	205 000	130	85	1,92	0,19	**ZM50**	6	2,5	64	7	M6
M50×1,5	75	25	15	415 000	130	85	4,89	0,43	**ZMA50/75**	6	2,5	68	12,5	M8
M50×1,5	92	32	15	680 000	130	85	16,1	1,06	**ZMA50/92**	8	3,5	84	16	M8
M55×2	75	16	5	229 000	150	95	2,77	0,23	**ZM55**	7	3	68	8	M6
M55×2	98	32	15	620 000	150	95	20,5	1,17	**ZMA55/98**	8	3,5	90	16	M8

medias ➤ *https://www.schaeffler.de/std/1E6E*

[1] When clamped, the grub screw protrudes by ≈ 0,5 mm.

Precision locknuts

For radial clamping



ZM, ZMA

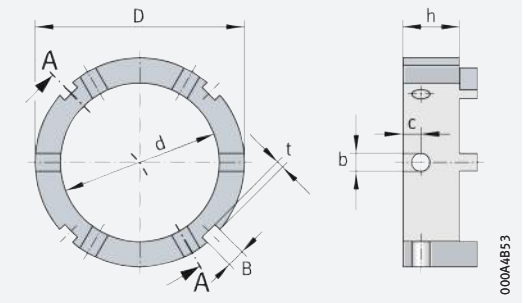
d = M60×2 – M150×2

Main dimensions			Grub screw	Locknut				Mass	Designation	Dimensions				
			Tightening torque	Axial rupture load	Breakaway torque	Reference tightening torque	Mass moment of inertia							
d	D	h	M_A	F_{aB}	M_L at M_{AL}		M_M	m		b	t	d_1	c	m
			Nm	N	Nm	Nm	kg · cm^2	≈ kg						
M60×2	80	16	5	255 000	180	100	3,45	0,25	**ZM60**	7	3	73	8	M6
M60×2	98	32	15	680 000	180	100	19,6	1,07	**ZMA60/98**	8	3,5	90	16	M8
M65×2	85	16	5	280 000	200	120	4,24	0,27	**ZM65**	7	3	78	8	M6
M65×2	105	32	15	750 000	200	120	25,6	1,21	**ZMA65/105**	8	3,5	97	16	M8
M70×2	92	18	15	305 000	220	130	6,61	0,36	**ZM70**	8	3,5	85	9	M8
M70×2	110	35	15	810 000	220	130	33	1,4	**ZMA70/110**	8	3,5	102	17,5	M8
M75×2	98	18	15	331 000	260	150	8,41	0,4	**ZM75**	8	3,5	90	9	M8
M75×2	125	38	15	880 000	260	150	62,2	2,11	**ZMA75/125**	8	3,5	117	19	M8
M80×2	105	18	15	355 000	285	160	11,2	0,46	**ZM80**	8	3,5	95	9	M8
M80×2	120	35	15	810 000	285	160	44,6	1,33	**ZMA80/120**	8	4	105	17,5	M8
M85×2	110	18	15	385 000	320	190	13,1	0,49	**ZM85**	8	3,5	102	9	M8
M90×2	120	20	15	410 000	360	200	21,8	0,7	**ZM90**	10	4	108	10	M8
M90×2	130	38	15	910 000	360	200	64,1	2,01	**ZMA90/130**	10	4	120	19	M8
M90×2	155	38	15	1 080 000	360	200	150	3,36	**ZMA90/155**	10	4	146	19	M8
M100×2	130	20	15	465 000	425	250	28,6	0,77	**ZM100**	10	4	120	10	M8
M100×2	140	38	20	940 000	425	250	82,8	2,23	**ZMA100/140**	12	5	128	19	M10
M105×2	140	22	20	495 000	475	300	44,5	1,05	**ZM105**	12	5	126	11	M10
M110×2	145	22	20	520 000	510	350	50,1	1,09	**ZM110**	12	5	133	11	M10
M115×2	150	22	20	550 000	550	400	56,2	1,13	**ZM115**	12	5	137	11	M10
M120×2	155	24	20	580 000	600	450	68,4	1,28	**ZM120**	12	5	138	12	M10
M125×2	160	24	20	610 000	640	500	76,1	1,33	**ZM125**	12	5	148	12	M10
M130×2	165	24	20	630 000	700	550	84,3	1,36	**ZM130**	12	5	149	12	M10
M140×2	180	26	38	690 000	800	600	133	1,85	**ZM140**	14	6	160	13	M12
M150×2	195	26	38	750 000	900	650	188	2,24	**ZM150**	14	6	171	13	M12

medias ➤ *https://www.schaeffler.de/std/1E6F*

Sockets

For precision locknuts with axial clamping



AMS

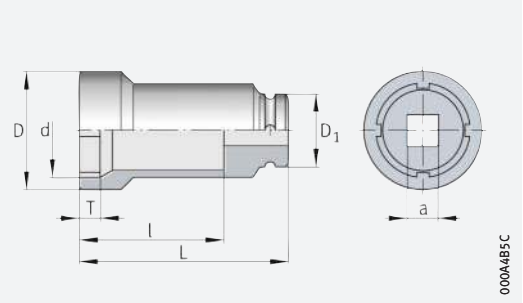
D = 32 – 155 mm

Main dimensions			Mass	Designation	Dimensions				For precision locknuts
D	h	d	m ≈ kg		b H11	c	B	t	
32	14	22	0,047	**AMS20**	4	5	4	2	AM15, AM17, AM20
45	15	35	0,093	**AMS30**	5	5	5	2	AM25, AM30, AM35/58, AM30/65
65	16	45	0,217	**AMS40**	6	6	6	2,5	AM35, AM40
70	19	53	0,245	**AMS50**	6	6	6	2,5	AM45, AM50
85	20	65	0,37	**AMS60**	6	6	7	3	AM55, AM60
98	25	75	0,615	**AMS70**	8	10	8	3,5	AM65, AM70
110	25	85	0,755	**AMS80**	8	10	8	3,5	AM75, AM80, AM85
130	25	95	1,215	**AMS90**	8	10	10	4	AM90
130	25	110	0,74	**AMS110**	8	10	10	4	AM100, AM110
155	25	130	1,485	**AMS130**	8	10	12	5	AM120, AM130

medias ➤ *https://www.schaeffler.de/std/1E70*

Sockets

For precision locknuts suitable for radial or axial clamping
For torque wrenches
Suitable for combination with socket AMS



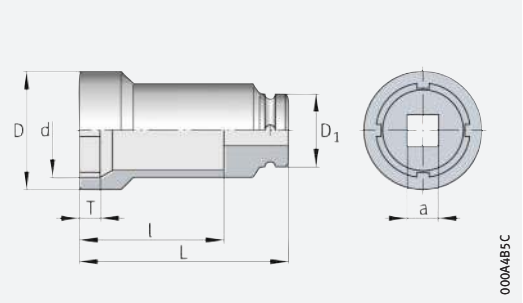
LOCKNUT-SOCKET-KM

Main dimensions			Mass	Designation	Dimensions				Suitable for		Suitable in combination with AMS for
									Precision locknuts	Sockets	
d	D	a inch	m ≈ kg		D_1	L	T	D	ZM	AMS	AM
18,1	22	3/8	0,1	**LOCKNUT-SOCKET-KM0**	22	57	5	22	ZM10	–	–
22,2	28	3/8	0,1	**LOCKNUT-SOCKET-KM1**	22	57	5	28	ZM12	–	–
25,2	33	1/2	0,2	**LOCKNUT-SOCKET-KM2**	30	82	6	33	ZM15	–	–
28,2	36	1/2	0,24	**LOCKNUT-SOCKET-KM3**	30	82	6	36	ZM17	–	–
32,2	38	1/2	0,28	**LOCKNUT-SOCKET-KM4**	30	82	9	38	ZM20	AMS20	AM15
32,2	38	1/2	0,28	**LOCKNUT-SOCKET-KM4**	30	82	9	38	ZM20	AMS20	AM17
32,2	38	1/2	0,28	**LOCKNUT-SOCKET-KM4**	30	82	9	38	ZM20	AMS20	AM20
38,2	46	1/2	0,38	**LOCKNUT-SOCKET-KM5**	30	82	9	46	ZMA20/38	–	–
38,2	46	1/2	0,38	**LOCKNUT-SOCKET-KM5**	30	82	9	46	ZM25	–	–
45,2	53	1/2	0,42	**LOCKNUT-SOCKET-KM6**	30	82	9	53	ZMA25/45	AMS30	AM25
45,2	53	1/2	0,42	**LOCKNUT-SOCKET-KM6**	30	82	9	53	ZM30	AMS30	AM30
45,2	53	1/2	0,42	**LOCKNUT-SOCKET-KM6**	30	82	9	53	–	AMS30	AM35/58
45,2	53	1/2	0,42	**LOCKNUT-SOCKET-KM6**	30	82	9	53	–	AMS30	AM30/65
52,2	60	1/2	0,45	**LOCKNUT-SOCKET-KM7**	30	82	9	60	ZMA20/52	–	–
52,2	60	1/2	0,45	**LOCKNUT-SOCKET-KM7**	30	82	9	60	ZMA30/52	–	–
52,2	60	1/2	0,45	**LOCKNUT-SOCKET-KM7**	30	82	9	60	ZM35	–	–
58,3	68	1/2	0,61	**LOCKNUT-SOCKET-KM8**	30	82	9	68	ZMA25/58	–	–
58,3	68	1/2	0,61	**LOCKNUT-SOCKET-KM8**	30	82	9	68	ZMA35/58	–	–
58,3	68	1/2	0,61	**LOCKNUT-SOCKET-KM8**	30	82	9	68	ZM40	–	–
65,4	73,5	3/4	0,8	**LOCKNUT-SOCKET-KM9**	44	90	13,5	73,5	ZMA30/65	–	–
65,4	73,5	3/4	0,8	**LOCKNUT-SOCKET-KM9**	44	90	13,5	73,5	–	AMS40	AM35
65,4	73,5	3/4	0,8	**LOCKNUT-SOCKET-KM9**	44	90	13,5	73,5	–	AMS40	AM40
65,4	73,5	3/4	0,8	**LOCKNUT-SOCKET-KM9**	44	90	13,5	73,5	ZM45	–	–
70,4	78,5	3/4	0,85	**LOCKNUT-SOCKET-KM10**	44	90	13,5	78,5	ZMA35/70	–	–
70,4	78,5	3/4	0,85	**LOCKNUT-SOCKET-KM10**	44	90	13,5	78,5	–	AMS50	AM45
70,4	78,5	3/4	0,85	**LOCKNUT-SOCKET-KM10**	44	90	13,5	78,5	ZM50	AMS50	AM50
75,4	83,5	3/4	0,9	**LOCKNUT-SOCKET-KM11**	44	90	13,5	83,5	ZMA40/75	–	–
75,4	83,5	3/4	0,9	**LOCKNUT-SOCKET-KM11**	44	90	13,5	83,5	ZMA50/75	–	–
75,4	83,5	3/4	0,9	**LOCKNUT-SOCKET-KM11**	44	90	13,5	83,5	ZM55	–	–

medias ➤ *https://www.schaeffler.de/std/1E71*

Sockets

For precision locknuts suitable for radial or axial clamping
For torque wrenches
Suitable for combination with socket AMS



LOCKNUT-SOCKET-KM

Main dimensions			Mass	Designation	Dimensions				Suitable for		Suitable in combination with AMS for
									Precision locknuts	Sockets	
d	D	a	m		D_1	L	T	D	ZM	AMS	AM
		inch	≈ kg								
85,4	94	3/4	1,1	**LOCKNUT-SOCKET-KM13**	44	90	13,5	94	ZMA45/85	–	–
85,4	94	3/4	1,1	**LOCKNUT-SOCKET-KM13**	44	90	13,5	94	–	AMS60	AM55
85,4	94	3/4	1,1	**LOCKNUT-SOCKET-KM13**	44	90	13,5	94	–	AMS60	AM60
85,4	94	3/4	1,1	**LOCKNUT-SOCKET-KM13**	44	90	13,5	94	ZM65	–	–
92,5	103	1	2,2	**LOCKNUT-SOCKET-KM14**	76	110	12	103	ZMA50/92	–	–
92,5	103	1	2,2	**LOCKNUT-SOCKET-KM14**	76	110	12	103	ZM70	–	–
98,5	109	1	2,3	**LOCKNUT-SOCKET-KM15**	76	110	13	109	ZMA55/98	–	–
98,5	109	1	2,3	**LOCKNUT-SOCKET-KM15**	76	110	13	109	ZMA60/98	–	–
98,5	109	1	2,3	**LOCKNUT-SOCKET-KM15**	76	110	13	109	–	AMS70	AM65
98,5	109	1	2,3	**LOCKNUT-SOCKET-KM15**	76	110	13	109	–	AMS70	AM70
98,5	109	1	2,3	**LOCKNUT-SOCKET-KM15**	76	110	13	109	ZM75	–	–
105,6	116	1	2,45	**LOCKNUT-SOCKET-KM16**	76	110	15	116	ZMA65/105	–	–
105,6	116	1	2,45	**LOCKNUT-SOCKET-KM16**	76	110	15	116	ZM80	–	–
110,6	121	1	2,6	**LOCKNUT-SOCKET-KM17**	76	110	16	121	ZMA70/110	–	–
110,6	121	1	2,6	**LOCKNUT-SOCKET-KM17**	76	110	16	121	–	AMS80	AM75
110,6	121	1	2,6	**LOCKNUT-SOCKET-KM17**	76	110	16	121	–	AMS80	AM80
110,6	121	1	2,6	**LOCKNUT-SOCKET-KM17**	76	110	16	121	ZM85	AMS80	AM85
120,6	131	1	2,9	**LOCKNUT-SOCKET-KM18**	76	110	16	131	ZMA80/120	–	–
120,6	131	1	2,9	**LOCKNUT-SOCKET-KM18**	76	110	16	131	ZM90	–	–
125,6	137	1	3,05	**LOCKNUT-SOCKET-KM19**	76	110	17	137	ZMA75/125	–	–
130,6	143	1	3,3	**LOCKNUT-SOCKET-KM20**	76	110	18	143	ZMA90/130	AMS90	AM90
130,6	143	1	3,3	**LOCKNUT-SOCKET-KM20**	76	110	18	143	ZM100	AMS110	AM100
130,6	143	1	3,3	**LOCKNUT-SOCKET-KM20**	76	110	18	143	–	AMS110	AM110
115	153	1	3,43	**LOCKNUT-SOCKET-KM21**	76	110	18	153	ZMA100/140	–	–
115	153	1	3,43	**LOCKNUT-SOCKET-KM21**	76	110	18	153	ZM105	–	
120	158	1	3,54	**LOCKNUT-SOCKET-KM22**	76	110	18	158	ZM110	–	–
130	170	1	4,15	**LOCKNUT-SOCKET-KM24**	76	110	18	170	ZMA90/155	–	–
130	170	1	4,15	**LOCKNUT-SOCKET-KM24**	76	110	18	170	ZM120	AMS130	AM120
130	170	1	4,15	**LOCKNUT-SOCKET-KM24**	76	110	18	170	–	AMS130	AM130

medias ➤ *https://www.schaeffler.de/std/1E72*

3 Bearings for combined loads

3.1 General features

✎ *Design variants*

Bearings for combined loads are available as:

- axial/radial bearings ➤*1353*|🗀*1*
- axial angular contact ball bearings ➤*1353*|🗀*2*
- axial/radial bearings with incremental angular measuring system, with pitch-coded reference marks ➤*1354*|🗀*3*
- axial/radial bearings with absolute value angular measuring system ➤*1355*|🗀*4*.

Product catalogue

The standard range of these bearings is described in detail in Technical Product Information ➤🕮 *TPI 120*, High Precision Bearings for Combined Loads, and in our electronic product catalogue ***medias*** *professional*.

✎ *Downloading TPI 120*

Technical Product Information TPI 120 is available from Schaeffler at ➤*https://www.schaeffler.de/std/1D5B*.

✎ ***medias***

The following link will take you to the Schaeffler electronic product selection and information system: ➤*https://medias.schaeffler.com*.

✎ *App for services*

The app “PrecisionDesk” offers extensive services for rotary and linear bearings of a super precision design and assists fitters and engineers in the selection and mounting of bearings. Further information on PrecisionDesk ➤*1374*, download ➤*https://www.schaeffler.de/std/1D59*.

3.2 Axial/radial bearings, axial angular contact ball bearings

Axial/radial bearings YRT, YRTC and YRTS and axial angular contact ball bearings ZKLDF are ready-to-fit high precision bearings for high precision applications with combined loads. They can support radial loads, axial loads from both sides and tilting moments without clearance and are particularly suitable for bearing arrangements with high requirements for running accuracy.

✎ *Simple mounting due to fixing holes*

Due to the fixing holes in the bearing rings, mounting of the units is very simple. After mounting, the bearings are radially and axially preloaded. The mounting dimensions of all series are identical.

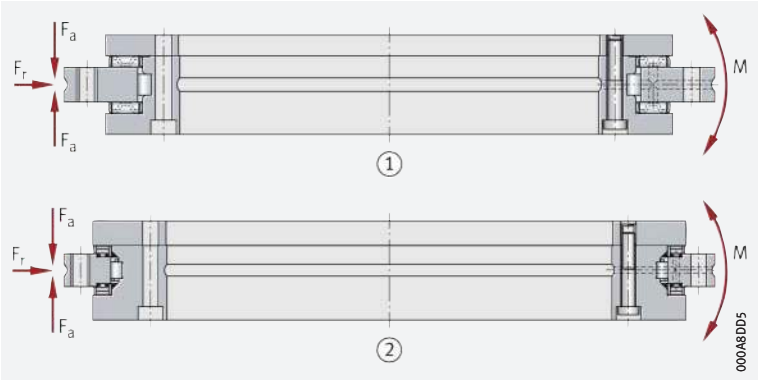
Axial/radial bearings YRT, YRTC and YRTS

Axial/radial bearings are double direction axial bearings for screw mounting, with a radial guidance bearing. These ready-to-fit, greased units are very rigid, have high load carrying capacity and run with particularly high accuracy. They can support radial forces, axial forces from both directions and tilting moments free from clearance. The bearings are available in several series ➤1353|1.

1
Axial/radial bearings

F_r = *radial load*
F_a = *axial load*
M = *tilting moment*

① *For standard applications (YRT, YRTC)*
② *For high speeds (YRTS)*



✎ *YRT and YRTC suitable for low speeds and small operating durations*

For standard applications with low speeds and small operating durations, such as indexing tables and swivel type milling heads, the most suitable bearings are series YRT and YRTC.

✎ *YRTS suitable for high speeds with low frictional torque*

For the bearing arrangements of direct drive axes, there is the series YRTS. Due to their high limiting speeds and very low, uniform frictional torque across the whole speed range, these bearings are particularly suitable for combination with torque motors.

For higher running accuracy requirements, both series are also available with restricted axial and radial runout.

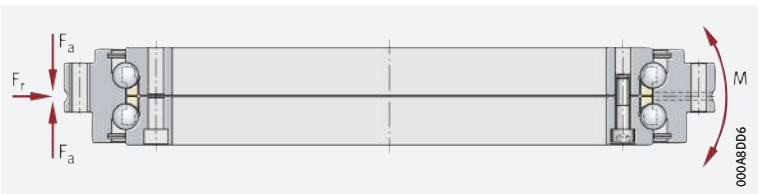
Axial angular contact ball bearings ZKLDF

✎ *Suitable for very high speeds and long operating durations*

Axial angular contact ball bearings ZKLDF are highly suitable for high speed applications with long operating duration ➤1353|2.
They are characterised by high tilting rigidity, low friction and low lubricant consumption.

2
Axial angular contact ball bearing ZKLDF

F_r = *radial load*
F_a = *axial load*
M = *tilting moment*



✎ *Preferred areas of use*

Axial angular contact ball bearings are particularly suitable for precision applications involving combined loads. Their preferred areas of use are bearing arrangements in rotary tables with a main spindle function, for example in combined milling and turning, as well as in milling, grinding and honing heads and in measurement and testing equipment.

3.3 Axial/radial bearings with incremental angular measuring system

✎ *Features*

Axial/radial bearings with an incremental angular measuring system and pitch-coded reference marks comprise an axial/radial bearing YRTCM or YRTSM, each with a dimensional scale, an SRM electronic measuring system and signal leads SRMC ➤*1354*|🗀*3*. The electronic measuring system SRM comprises two measuring heads, two stacks of shims and an electronic evaluation system ➤*1354*|🗀*3*. The signal leads for connecting the measuring heads to the electronic evaluation system can be ordered individually in various designs.

✎ *Equivalent in mechanical terms to series YRT and YRTS*

Bearings of series YRTM or YRTSM correspond in mechanical terms to axial/radial bearings YRT or YRTS, but are additionally fitted with a magnetic dimensional scale. The measuring system can measure angles to an accuracy of a few angular seconds by non-contact, magneto-resistive means.

🗀*3*
Axial/radial bearing with incremental angular measuring system

① *Measuring heads with shims*
② *Connection cable SRMC*
③ *Electronic evaluation system*

Advantages of the angular measuring system

The measuring system:

- allows, due to the rigid connection to the adjacent construction, very good control characteristics (control stability and dynamics) and is therefore particularly suitable for axes with torque motor drive
- offers a high maximum measuring speed of up to 16,5 m/s
- operates by non-contact means and is therefore not subject to wear
- carries out measurement irrespective of tilting and position
- has automatically self-adjusting electronics
- has a self-centring function
- is unaffected by lubricants
- is easy to fit, the measuring heads are easily adjustable, there is no need for alignment of the bearing and a separate measuring system
- requires no additional parts
  - the dimensional scale and measuring heads are integrated in the bearings and adjacent construction respectively
  - the resulting space saved can be used for the machining area of the machine
- does not give any problems relating to supply cables. The cables can be laid within the adjacent construction directly through the large bearing bore
- gives savings on components, overall design envelope and costs due to the compact, integrated design requiring fewer components.

3.4 Axial/radial bearings with absolute value angular measuring system

Equivalent in mechanical terms to series YRT and YRTS

Axial/radial bearings with absolute value angular measuring system YRTCMA and YRTSMA correspond in mechanical terms to series YRT and YRTS, but are additionally fitted with an absolute value angular measuring system ➤*1355*|*4*.

4 *Axial/radial bearing with absolute value angular measuring system*

High system measuring accuracy of angular measuring systems integrated in the bearing

The ideal location for mounting a measuring system is directly in the bearing arrangement, which means that higher system accuracies can be achieved with measuring systems integrated in the bearing than with measuring systems that are attached to the axis a significant distance from the relevant bearing arrangement. The very precise radial runout of the precision rotary axis bearing YRT(S)MA is utilised here.

The absolute angular measuring system integrated directly in the bearing offers considerable advantages:

- an absolute interface, dispensing with the need for reference travel
- a hollow shaft design, freeing up the centre of the machine for other components
- the facility for highly dynamic and precise control loops
- savings in terms of design envelope
- simplifications in design and mounting
- resistance to environmental influences, lubricants and cooling lubricants.

Inductive measurement method ABSYS (AMO)

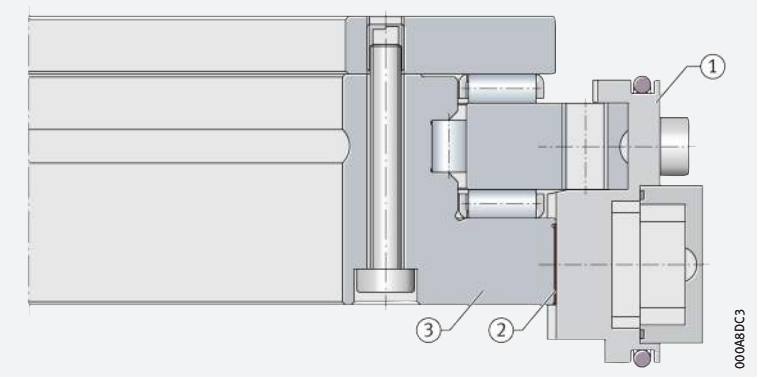
The inductive measurement method ABSYS (AMO) is based on contact-free scanning of a structured dimensional scale that is applied directly as a measurement ring to the bearing inner ring ➤ *1356* | *5*. The irregular structure with absolute coding is captured on a bitwise inductive basis by a coil arrangement that is integrated in the measuring head.

The binary value obtained, which occurs only once per angular position within the entire measurement range, is converted into an absolute angular value by a microcontroller using a conversion table.

The electronic evaluation system is integrated in the measuring head, so the system can be connected directly to the controller. The measuring head is configured such that no adjustment of the measurement gap is required and the rolling bearing chamber is protected against the egress and ingress of lubricants and other media. Other measuring head designs are available by agreement.

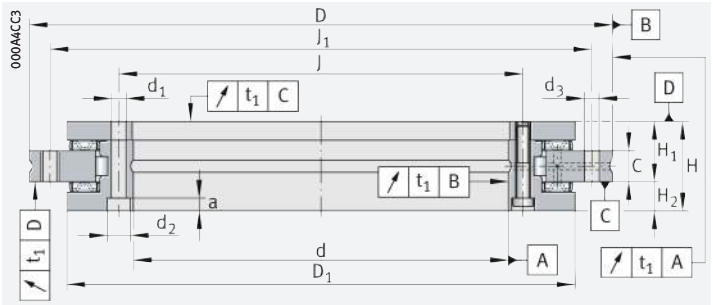
5
Absolute value angular measuring system

① *Measuring head*
② *Measurement ring*
③ *Inner ring of axial/radial bearing*



Axial/radial bearings

Double direction



YRT

d = 50 – 180 mm

Main dimensions			Basic load ratings				Fatigue limit load		Limiting speed[1]	Mass	Designation
			axial		radial		axial	radial			
d	D	H	dyn. C_a	stat. C_{0a}	dyn. C_r	stat. C_{0r}	C_{ua}	C_{ur}	n_G	m	
			kN	kN	kN	kN	kN	kN	min^{-1}	≈ kg	
50 0/–0,008	126 0/–0,011	30	56	280	28,5	49,5	29,5	7,1	440	1,6	**YRT50**
80 0/–0,009	146 0/–0,011	35	38	158	44	98	14,1	13,9	350	2,4	**YRT80-TV**[6]
100 0/–0,01	185 0/–0,015	38	73	370	52	108	35,5	14,7	280	4,1	**YRT100**
120 0/–0,01	210 0/–0,015	40	80	445	70	148	40,5	19,1	230	5,3	**YRT120**
150 0/–0,013	240 0/–0,015	40	85	510	77	179	44	21,9	210	6,2	**YRT150**
180 0/–0,013	280 0/–0,018	43	92	580	83	209	48,5	24,4	190	7,7	**YRT180**

medias ➤ *https://www.schaeffler.de/std/1F23*

① Two retaining screws; ② Screw counterbores open (in the L-section ring to the bearing bore), bearing inside diameter is unsupported in this area

1) For high operating durations or continuous operation, please contact us.

2) Including retaining screws or threaded extraction holes.

3) Diameter of inner ring for design of adjacent construction.

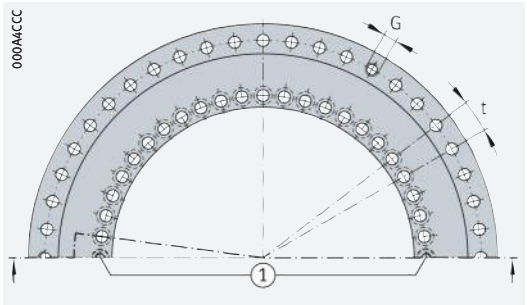
4) Attention!
For fixing holes in the adjacent construction. Observe the pitch of the bearing holes.

5) Tightening torque for screws to DIN EN ISO 4762, grade 10.9.

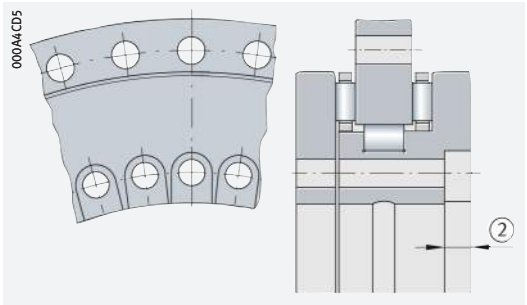
6) Cages made from glass fibre reinforced polyamide 66.

7) M5 screws (on inner ring) to 8,5 Nm and M4 screws (on outer ring) to 4,5 Nm.

8) Rigidity values taking account of the rolling element set, the deformation of the bearing rings and the screw connections.
For explanations ➤ 🕮 *TPI 120*.



Hole pattern



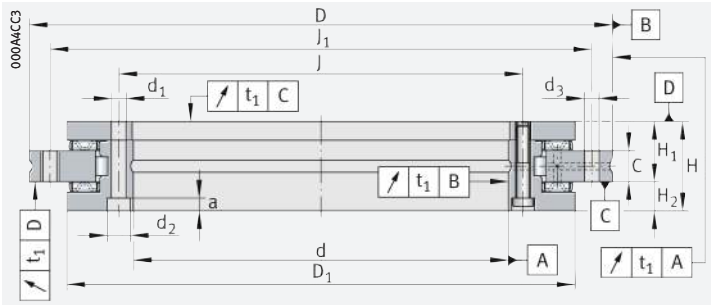
For YRT80-TV and YRT100

Dimensions							Fixing holes						Pitch[2]		Threaded extraction hole		Screw tightening torque
							Inner ring				Outer ring						
d	H_1	H_2	C	D_1[3] max.	J	J_1	d_1	d_2	a	Quantity[4]	d_3	Quantity[4]	n	t °	G	Quantity	M_A[5] Nm
50	20	10	10	105	63	116	5,6	–	–	10	5,6	12	12	30	–	0	8,5
80	23,35	11,65	12	130	92	138	5,6	10	4	10	4,6	12	12	30	–	0	8,5[7]
100	25	13	12	161	112	170	5,6	10	5,4	16	5,6	15	18	20	M5	3	8,5
120	26	14	12	185	135	195	7	11	6,2	22	7	21	24	15	M8	3	14
150	26	14	12	214,5	165	225	7	11	6,2	34	7	33	36	10	M8	3	14
180	29	14	15	245,1	194	260	7	11	6,2	46	7	45	48	7,5	M8	3	14

	Designation	Rigidity					
		Bearing position[8]			Rolling element set		
d		axial c_{aL} kN/µm	radial c_{rL} kN/µm	Tilting rigidity c_{kL} kNm/mrad	axial c_{aL} kN/µm	radial c_{rL} kN/µm	Tilting rigidity c_{kL} kNm/mrad
50	**YRT50**	1,3	1,1	1,25	6,2	1,5	5,9
80	**YRT80-TV**[6]	1,6	1,8	2,5	4	2,6	6,3
100	**YRT100**	2	2	5	6,8	2,4	15
120	**YRT120**	2,1	2,2	7	7,8	3,8	24
150	**YRT150**	2,3	2,6	11	8,7	4,6	38
180	**YRT180**	2,6	3	17	9,9	5,3	57

Axial/radial bearings

Double direction



YRTC

d = 200 – 1 030 mm

Main dimensions				Basic load ratings				Fatigue limit load		Limiting speed		Mass	Designation
				axial		radial		axial	radial	Continuous operation	Swivel type operation[2]		
d		D	H	dyn. C_a	stat. C_{0a}	dyn. C_r	stat. C_{0r}	C_{ua}	C_{ur}	n_G	n_G	m	
				kN	kN	kN	kN	kN	kN	min^{-1}	min^{-1}	≈ kg	
200	0/–0,015	300 0/–0,018	45	147	850	123	275	62	31,5	450	–	9,2	**YRTC200-XL**
260	0/–0,018	385 0/–0,02	55	168	1 090	140	355	74	37,5	300	–	17,8	**YRTC260-XL**
325	0/–0,023	450 0/–0,023	60	248	1 900	183	530	130	49	200	–	24,7	**YRTC325-XL**
395	0/–0,023	525 0/–0,028	65	265	2 190	200	640	143	56	150	–	32,5	**YRTC395-XL**
460	0/–0,023	600 0/–0,028	70	288	2 550	267	880	160	77	150	–	45,2	**YRTC460-XL**
580	0/–0,025	750 0/–0,035	90	577	4 450	235	730	255	62	80	200	89	**YRTC580-XL**
650	0/–0,038	870 0/–0,05	122	916	6 800	458	1 300	405	108	70	170	170	**YRTC650-XL**
850	0/–0,05	1 095 0/–0,063	124	900	8 500	520	1 690	470	130	50	125	253	**YRTC850-XL**
1 030	0/–0,063	1 300 0/–0,08	145	1 000	10 300	577	2 050	540	149	40	100	375	**YRTC1030-XL**

medias ➤ *https://www.schaeffler.de/std/1F24*

① Two retaining screws

1) Including retaining screws or threaded extraction holes.

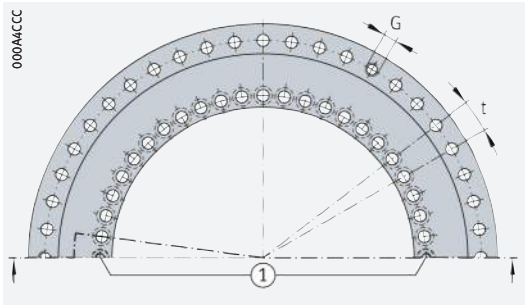
2) Short operating duration.

3) Diameter of inner ring for design of adjacent construction.

4) Attention!
For fixing holes in the adjacent construction. Observe the pitch of the bearing holes.

5) Tightening torque for screws to DIN EN ISO 4762, grade 10.9.

6) Rigidity values taking account of the rolling element set,
the deformation of the bearing rings and the screw connections.
For explanations ➤ 🕮 *TPI 120*.



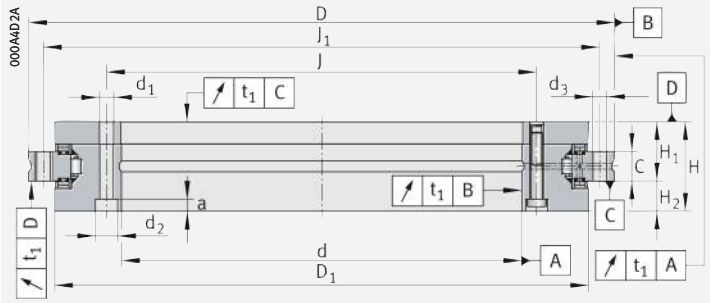
Hole pattern

Dimensions							Fixing holes						Pitch[1]		Threaded extraction hole		Screw tightening torque
							Inner ring				Outer ring						
d	H_1	H_2	C	D_1[3] max.	J	J_1	d_1	d_2	a	Quantity[4]	d_3	Quantity[4]	n	t °	G	Quantity	M_A[5] Nm
200	30	15	15	274,4	215	285	7	11	6,2	46	7	45	48	7,5	M8	3	14
260	36,5	18,5	18	347	280	365	9,3	15	8,2	34	9,3	33	36	10	M12	3	34
325	40	20	20	415,1	342	430	9,3	15	8,2	34	9,3	33	36	10	M12	3	34
395	42,5	22,5	20	487,7	415	505	9,3	15	8,2	46	9,3	45	48	7,5	M12	3	34
460	46	24	22	560,9	482	580	9,3	15	8,2	46	9,3	45	48	7,5	M12	3	34
580	60	30	30	700	610	720	11,4	18	11	46	11,4	42	48	7,5	M12	6	68
650	78	44	34	800	680	830	14	20	13	46	14	42	48	7,5	M12	6	116
850	80,5	43,5	37	1 018	890	1 055	18	26	17	58	18	54	60	6	M12	6	284
1 030	92,5	52,5	40	1 215	1 075	1 255	18	26	17	70	18	66	72	5	M16	6	284

	Designation	Rigidity					
		Bearing position[6]			Rolling element set		
d		axial c_{aL} kN/µm	radial c_{rL} kN/µm	Tilting rigidity c_{kL} kNm/mrad	axial c_{aL} kN/µm	radial c_{rL} kN/µm	Tilting rigidity c_{kL} kNm/mrad
200	**YRTC200-XL**	4,9	4,1	37	15,5	6,2	128
260	**YRTC260-XL**	6,9	5,3	82	19	8,1	265
325	**YRTC325-XL**	7,1	6,3	130	33	9,9	633
395	**YRTC395-XL**	9,9	5,8	228	37	13	1 002
460	**YRTC460-XL**	12	6,5	348	43	17	1 543
580	**YRTC580-XL**	11,9	2,9	735	41,8	11,2	1 960
650	**YRTC650-XL**	20,6	7,3	1 193	51,4	8,2	3 554
850	**YRTC850-XL**	26,5	11,9	2 351	61,9	12	6 772
1 030	**YRTC1030-XL**	36,4	11,2	5 400	74,9	14,2	11 165

Axial/radial bearings

Double direction



YRTS

d = 200 – 460 mm

Main dimensions			Basic load ratings				Fatigue limit load		Limiting speed	Mass	Designation
			axial		radial		axial	radial			
d	D	H	dyn. C_a	stat. C_{0a}	dyn. C_r	stat. C_{0r}	C_{ua}	C_{ur}	n_G	m	
			kN	kN	kN	kN	kN	kN	min^{-1}	≈ kg	
200 0/–0,015	300 0/–0,018	45	155	840	94	226	91	31,5	1 160	9,7	**YRTS200**
260 0/–0,018	385 0/–0,02	55	173	1 050	110	305	106	39,5	910	18,3	**YRTS260**
325 0/–0,023	450 0/–0,023	60	191	1 260	109	320	120	42	760	25	**YRTS325**
395 0/–0,023	525 0/–0,028	65	214	1 540	121	390	139	48,5	650	33	**YRTS395**
460 0/–0,023	600 0/–0,028	70	221	1 690	168	570	145	64	560	45	**YRTS460**

medias ➤ *https://www.schaeffler.de/std/1F25*

① Two retaining screws; ② Screw counterbores open (in the L-section ring to the bearing bore), bearing inside diameter is unsupported in this area

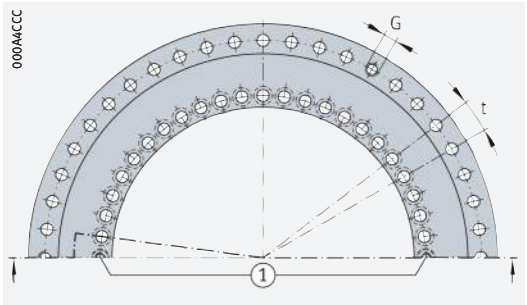
1) Including retaining screws or threaded extraction holes.

2) Diameter of inner ring for design of adjacent construction.

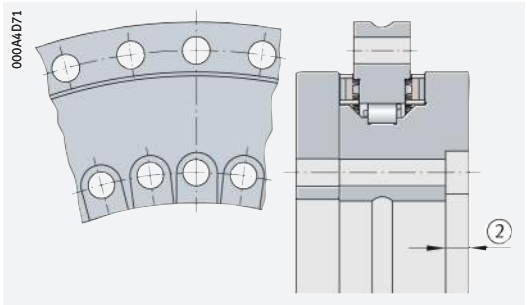
3) Attention!
For fixing holes in the adjacent construction. Observe the pitch of the bearing holes.

4) Tightening torque for screws to DIN EN ISO 4762, grade 10.9.

5) Rigidity values taking account of the rolling element set, the deformation of the bearing rings and the screw connections.
For explanations ➤ 🕮 *TPI 120*.



Hole pattern



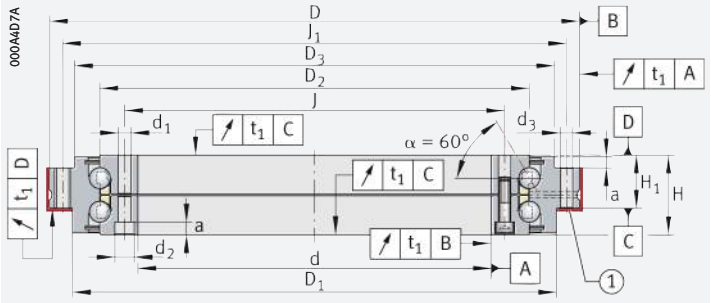
For YRTS325

Dimensions							Fixing holes						Pitch[1]		Threaded extraction hole		Screw tightening torque
							Inner ring				Outer ring						
d	H_1	H_2	C	D_1[2] max.	J	J_1	d_1	d_2	a	Quantity[3]	d_3	Quantity[3]	n	t °	G	Quantity	M_A[4] Nm
200	30	15	15	274,4	215	285	7	11	6,2	46	7	45	48	7,5	M8	3	14
260	36,5	18,5	18	347	280	365	9,3	15	8,2	34	9,3	33	36	10	M12	3	34
325	40	20	20	415,1	342	430	9,3	15	8,2	34	9,3	33	36	10	M12	3	34
395	42,5	22,5	20	487,7	415	505	9,3	15	8,2	46	9,3	45	48	7,5	M12	3	34
460	46	24	22	560,9	482	580	9,3	15	8,2	46	9,3	45	48	7,5	M12	3	34

	Designation	Rigidity					
		Bearing position[5]			Rolling element set		
d		axial c_{aL} kN/µm	radial c_{rL} kN/µm	Tilting rigidity c_{kL} kNm/mrad	axial c_{aL} kN/µm	radial c_{rL} kN/µm	Tilting rigidity c_{kL} kNm/mrad
200	**YRTS200**	4	1,2	29	13,6	3,9	101
260	**YRTS260**	5,4	1,6	67	16,8	5,8	201
325	**YRTS325**	6,6	1,8	115	19,9	7,1	350
395	**YRTS395**	7,8	2	195	23,4	8,7	582
460	**YRTS460**	8,9	1,8	280	25,4	9,5	843

Axial angular contact ball bearings

Double direction



ZKLDF

d = 100 – 460 mm

Main dimensions[1]			Basic load ratings		Fatigue limit load	Limiting speed[2]	Mass	Designation
d	D	H	dyn. C_a	stat. C_{0a}	C_{ua}	n_G	m	
			kN	kN	kN	min^{-1}	≈ kg	
100	185	38	71	265	10,1	5 000	3,8	**ZKLDF100**
120	210	40	76	315	11,1	4 300	4,8	**ZKLDF120**
150	240	40	81	380	12,2	3 600	5,6	**ZKLDF150**
180	280	43	85	440	13,1	3 500	7,7	**ZKLDF180**
200	300	45	121	610	17,4	3 200	10	**ZKLDF200**
260	385	55	162	920	23,1	2 400	19	**ZKLDF260**
325	450	60	172	1 110	25	2 000	25	**ZKLDF325**
395	525	65	241	1 580	33	1 600	33	**ZKLDF395**
460	600	70	255	1 860	36	1 400	47	**ZKLDF460**

medias ➤ *https://www.schaeffler.de/std/1F26*

① Contact surface/centring diameter; ② Two retaining screws; ③ Screw counterbores open (in the L-section ring to the bearing bore), bearing inside diameter is unsupported in this area

1) Sizes d > 460 mm available by agreement.

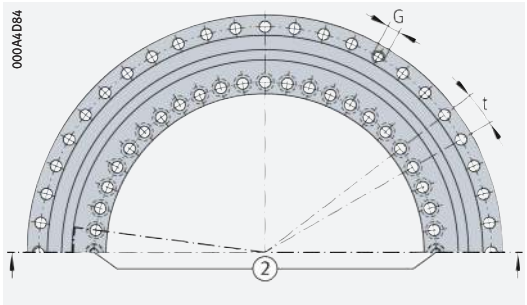
2) The limiting speeds increased by a factor of two are valid for bearings of the current generation with the internal suffix -B.

3) Including retaining screws or threaded extraction holes.

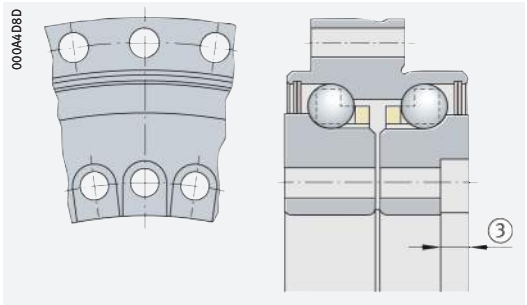
4) Attention!
For fixing holes in the adjacent construction. Observe the pitch of the bearing holes.

5) Tightening torque for screws to DIN EN ISO 4762, grade 10.9.

6) Rigidity values taking account of the rolling element set, the deformation of the bearing rings and the screw connections.
For explanations ➤ 🕮 *TPI 120*.



Hole pattern



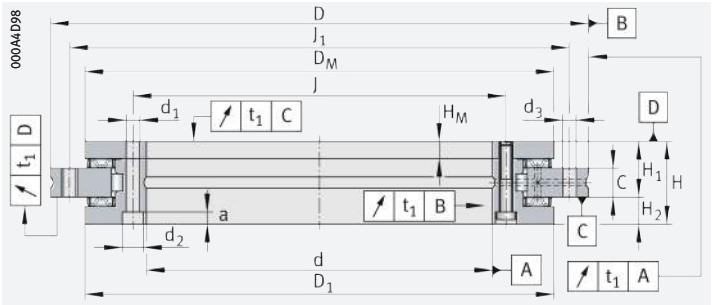
For ZKLDF100, ZKLDF325

Dimensions[1]							Fixing holes						Pitch[3]		Threaded extraction hole		Screw tightening torque
							Inner ring				Outer ring						
d	H_1	D_1	D_2	D_3	J	J_1	d_1	d_2	a	Quantity[4]	d_3	Quantity[4]	n	t	G	Quantity	M_A[5]
														°			Nm
100	25	161	136	158	112	170	5,6	10	5,4	16	5,6	15	18	20	M5	3	8,5
120	26	185	159	181	135	195	7	11	6,2	22	7	21	24	15	M8	3	14
150	26	214	188	211	165	225	7	11	6,2	34	7	33	36	10	M8	3	14
180	29	244	219	246	194	260	7	11	6,2	46	7	45	48	7,5	M8	3	14
200	30	274	243	271	215	285	7	11	6,2	46	7	45	48	7,5	M8	3	14
260	36,5	345	313	348	280	365	9,3	15	8,2	34	9,3	33	36	10	M12	3	34
325	40	415	380	413	342	430	9,3	15	8,2	34	9,3	33	36	10	M12	3	34
395	42,5	486	450	488	415	505	9,3	15	8,2	46	9,3	45	48	7,5	M12	3	34
460	46	560	520	563	482	580	9,3	15	8,2	46	9,3	45	48	7,5	M12	3	34

	Designation	Rigidity					
		Bearing position[6]			Rolling element set		
d		axial	radial	Tilting rigidity	axial	radial	Tilting rigidity
		c_{aL} kN/µm	c_{rL} kN/µm	c_{kL} kNm/mrad	c_{aL} kN/µm	c_{rL} kN/µm	c_{kL} kNm/mrad
100	**ZKLDF100**	1,2	0,35	3,6	2,2	0,35	5
120	**ZKLDF120**	1,5	0,4	5,5	2,5	0,4	8
150	**ZKLDF150**	1,7	0,4	7,8	2,9	0,4	12
180	**ZKLDF180**	1,9	0,5	10,7	2,8	0,5	16
200	**ZKLDF200**	2,5	0,6	17,5	3,7	0,6	26
260	**ZKLDF260**	3,2	0,7	40	4,7	0,7	54
325	**ZKLDF325**	4	0,8	60	5,4	0,8	90
395	**ZKLDF395**	4,5	0,9	100	6,3	0,9	148
460	**ZKLDF460**	5,3	1,1	175	7,1	1,1	223

Axial/radial bearings

Double direction
With incremental angular measuring system



YRTM, YRTCM

d = 150 – 460 mm

Main dimensions			Basic load ratings				Fatigue limit load		Limiting speed		Mass	Designation
			axial		radial		axial	radial	Electronic evaluation system and bearing	Reference travel		
d	D	H	dyn. C_a	stat. C_{0a}	dyn. C_r	stat. C_{0r}	C_{ua}	C_{ur}	n_G	n_{Ref}	m	
			kN	kN	kN	kN	kN	kN	min^{-1}	min^{-1}	≈ kg	
150 0/–0,013	240 0/–0,015	41[6]	85	510	77	179	44	21,9	210	35	6,4	**YRTM150**[7]
180 0/–0,013	280 0/–0,018	44[6]	92	580	83	209	48,5	24,4	190	30	7,7	**YRTM180**[7]
200 0/–0,015	300 0/–0,018	45	147	850	123	275	62	31,5	450	–	9,7	**YRTCM200-XL**[7]
260 0/–0,018	385 0/–0,02	55	168	1 090	140	355	74	37,5	300	–	18,3	**YRTCM260-XL**
325 0/–0,023	450 0/–0,023	60	248	1 900	183	530	130	49	200	–	25	**YRTCM325-XL**
395 0/–0,023	525 0/–0,028	65	265	2 190	200	640	143	56	150	–	33	**YRTCM395-XL**
460 0/–0,023	600 0/–0,028	70	288	2 550	267	880	160	77	150	–	45	**YRTCM460-XL**

medias ➤ *https://www.schaeffler.de/std/1F27*

① Two retaining screws; ② Screw counterbores open (in the L-section ring to the bearing bore), bearing inside diameter is unsupported in this area

1) Including retaining screws or threaded extraction holes.

2) Diameter of inner ring for design of adjacent construction.

3) Diameter of dimensional scale on shaft locating washer.

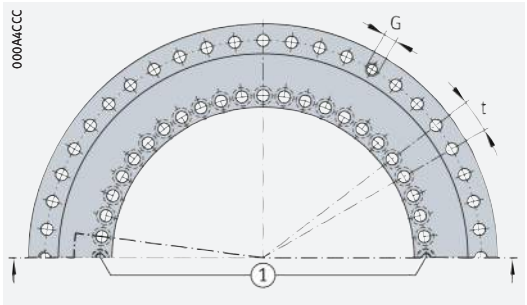
4) Attention!
For fixing holes in the adjacent construction. Observe the pitch of the bearing holes.

5) Tightening torque for screws to DIN EN ISO 4762, grade 10.9.

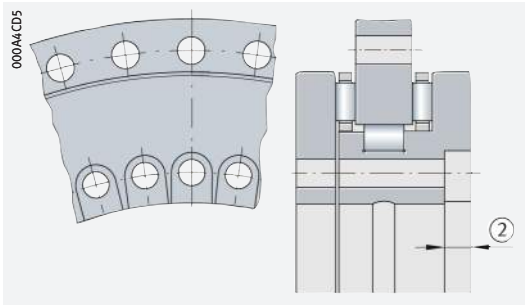
6) Attention!
H and H1 are 1 mm higher than standard bearing YRT.

7) The measuring head cannot be mounted between the fixing holes or the heads of the fixing screws. Two holes for fixing screws therefore remain unused in the bearing outer ring.

8) Rigidity values taking account of the rolling element set, the deformation of the bearing rings and the screw connections.
For explanations ➤ 🕮 *TPI 120*.



Hole pattern



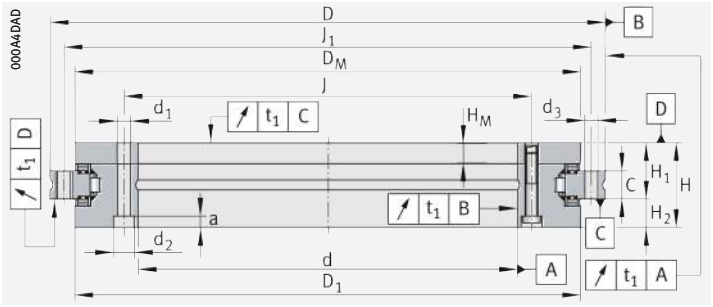
For YRTM325

Dimensions								Fixing holes						Pitch[1]		Threaded extraction hole		Screw tightening torque
								Inner ring				Outer ring						
d	H_1	H_M	C	D_1[2] max.	D_M[3]	J	J_1	d_1	d_2	a	Quantity[4]	d_3	Quantity[4]	n	t °	G	Quantity	M_A[5] Nm
150	27[6]	10	12	214,5	213,82	165	225	7	11	6,2	34	7	33	36	10	M8	3	14
180	30[6]	10	15	245,1	244,38	194	260	7	11	6,2	46	7	45	48	7,5	M8	3	14
200	30	10	15	274,4	271,12	215	285	7	11	6,2	46	7	45	48	7,5	M8	3	14
260	36,5	13,5	18	347	343,69	280	365	9,3	15	8,2	34	9,3	33	36	10	M12	3	34
325	40	15	20	415,1	412,45	342	430	9,3	15	8,2	34	9,3	33	36	10	M12	3	34
395	42,5	17,5	20	487,7	485,02	415	505	9,3	15	8,2	46	9,3	45	48	7,5	M12	3	34
460	46	19	22	560,9	557,6	482	580	9,3	15	8,2	46	9,3	45	48	7,5	M12	3	34

	Designation	Rigidity					
		Bearing position[8]			Rolling element set		
d		axial c_{aL} kN/µm	radial c_{rL} kN/µm	Tilting rigidity c_{kL} kNm/mrad	axial c_{aL} kN/µm	radial c_{rL} kN/µm	Tilting rigidity c_{kL} kNm/mrad
150	**YRTM150**[7]	2,3	2,6	11	8,7	4,6	38
180	**YRTM180**[7]	2,6	3	17	9,9	5,3	57
200	**YRTCM200-XL**[7]	4,9	4,1	37	15,5	6,2	128
260	**YRTCM260-XL**	6,9	5,3	82	19	8,1	265
325	**YRTCM325-XL**	7,1	6,3	130	33	9,9	633
395	**YRTCM395-XL**	9,9	5,8	228	37	13	1 002
460	**YRTCM460-XL**	12	6,5	348	43	17	1 543

Axial/radial bearings

Double direction
With incremental angular measuring system



YRTSM

d = 200 – 460 mm

Main dimensions			Basic load ratings				Fatigue limit load		Limiting speed		Mass	Designation
			axial		radial		axial	radial	Electronic evaluation system and bearing	Reference travel		
d	D	H	dyn. C_a	stat. C_{0a}	dyn. C_r	stat. C_{0r}	C_{ua}	C_{ur}	n_G	n_{Ref}	m	
			kN	kN	kN	kN	kN	kN	min^{-1}	min^{-1}	≈ kg	
200 0/–0,015	300 0/–0,018	45	155	840	94	226	91	31,5	1 160	30	9,7	**YRTSM200**[6]
260 0/–0,018	385 0/–0,02	55	173	1 050	110	305	106	39,5	910	25	18,3	**YRTSM260**
325 0/–0,023	450 0/–0,023	60	191	1 260	109	320	120	42	760	25	25	**YRTSM325**
395 0/–0,023	525 0/–0,028	65	214	1 540	121	390	139	48,5	650	15	33	**YRTSM395**
460 0/–0,023	600 0/–0,028	70	221	1 690	168	570	145	64	560	15	45	**YRTSM460**

medias ➤ *https://www.schaeffler.de/std/1F28*

① Two retaining screws; ② Screw counterbores open (in the L-section ring to the bearing bore), bearing inside diameter is unsupported in this area

1) Including retaining screws or threaded extraction holes.

2) Diameter of inner ring for design of adjacent construction.

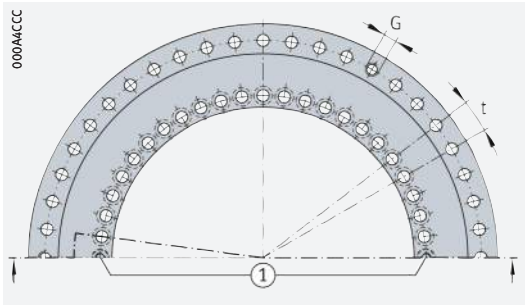
3) Diameter of dimensional scale on shaft locating washer.

4) Attention!
For fixing holes in the adjacent construction. Observe the pitch of the bearing holes.

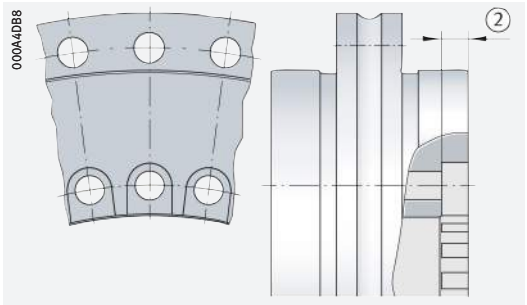
5) Tightening torque for screws to DIN EN ISO 4762, grade 10.9.

6) The measuring head cannot be mounted between the fixing holes or the heads of the fixing screws. Two holes for fixing screws therefore remain unused in the bearing outer ring.

7) Rigidity values taking account of the rolling element set, the deformation of the bearing rings and the screw connections. For explanations ➤ 🕮 *TPI 120*.



Hole pattern



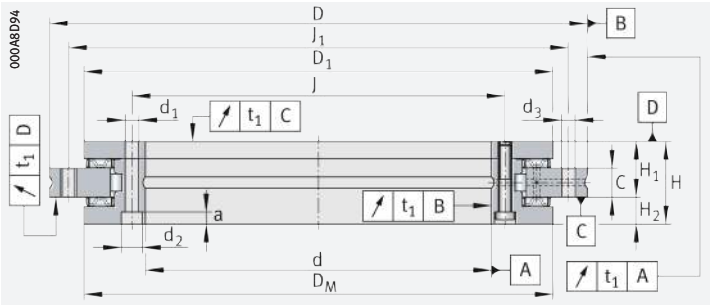
For YRTSM325

Dimensions								Fixing holes						Pitch[1]		Threaded extraction hole		Screw tightening torque
								Inner ring				Outer ring						
d	H_1	H_M	C	D_1[2] max.	D_M[3]	J	J_1	d_1	d_2	a	Quantity[4]	d_3	Quantity[4]	n	t °	G	Quantity	M_A[5] Nm
200	30	10	15	274,4	271,12	215	285	7	11	6,2	46	7	45	48	7,5	M8	3	14
260	36,5	13,5	18	347	343,69	280	365	9,3	15	8,2	34	9,3	33	36	10	M12	3	34
325	40	15	20	415,1	412,45	342	430	9,3	15	8,2	34	9,3	33	36	10	M12	3	34
395	42,5	17,5	20	487,7	485,02	415	505	9,3	15	8,2	46	9,3	45	48	7,5	M12	3	34
460	46	19	22	560,9	557,6	482	580	9,3	15	8,2	46	9,3	45	48	7,5	M12	3	34

	Designation	Rigidity					
		Bearing position[7]			Rolling element set		
d		axial c_{aL} kN/µm	radial c_{rL} kN/µm	Tilting rigidity c_{kL} kNm/mrad	axial c_{aL} kN/µm	radial c_{rL} kN/µm	Tilting rigidity c_{kL} kNm/mrad
200	**YRTSM200**[6]	4	1,2	29	13,6	3,9	101
260	**YRTSM260**	5,4	1,6	67	16,8	5,8	201
325	**YRTSM325**	6,6	1,8	115	19,9	7,1	350
395	**YRTSM395**	7,8	2	195	23,4	8,7	582
460	**YRTSM460**	8,9	1,8	280	25,4	9,5	843

Axial/radial bearings

Double direction
With absolute value angular measuring system



YRTCMA

d = 200 – 460 mm

Main dimensions			Basic load ratings				Fatigue limit load		Limiting speed[1]	Mass	Designation
			axial		radial		axial	radial			
d	D	H	dyn. C_a	stat. C_{0a}	dyn. C_r	stat. C_{0r}	C_{ua}	C_{ur}	n_G	m	
			kN	kN	kN	kN	kN	kN	min^{-1}	≈ kg	
200 0/–0,015	300 0/–0,018	51[7]	147	850	123	275	62	31,5	450	10,7	**YRTCMA200-XL**
260 0/–0,018	385 0/–0,02	57,5[7]	168	1 090	140	355	74	37,5	300	18,7	**YRTCMA260-XL**
325 0/–0,023	450 0/–0,023	61	248	1 900	183	530	130	49	200	25	**YRTCMA325-XL**
395 0/–0,023	525 0/–0,028	65	265	2 190	200	640	143	56	150	33	**YRTCMA395-XL**
460 0/–0,023	600 0/–0,028	70	288	2 550	267	880	160	77	150	45	**YRTCMA460-XL**

medias ➤ *https://www.schaeffler.de/std/1F29*

① Two retaining screws; ② Screw counterbores open (in the L-section ring to the bearing bore), bearing inside diameter is unsupported in this area; ③ Shaft locating washer; ④ Inner ring

1) For high operating durations or continuous operation, please contact us.

2) Including retaining screws or threaded extraction holes.

3) Diameter of shaft locating washer for design of adjacent construction.

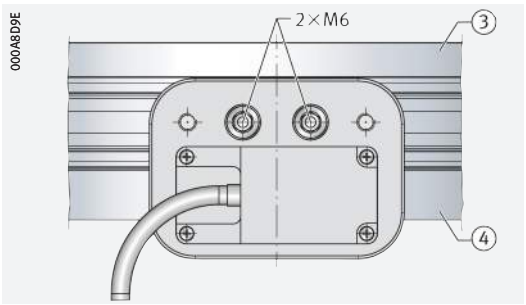
4) Diameter of dimensional scale on inner ring.

5) Attention!
For fixing holes in the adjacent construction. Observe the pitch of the bearing holes.

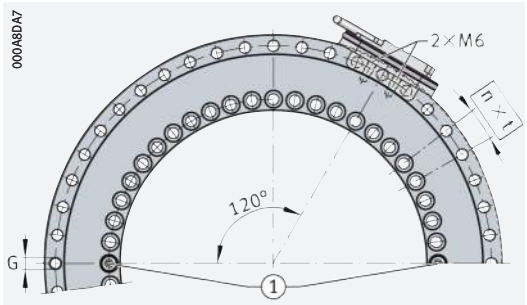
6) Tightening torque for screws to DIN EN ISO 4762, grade 10.9.

7) Dimension differs from the axial/radial bearing YRT.

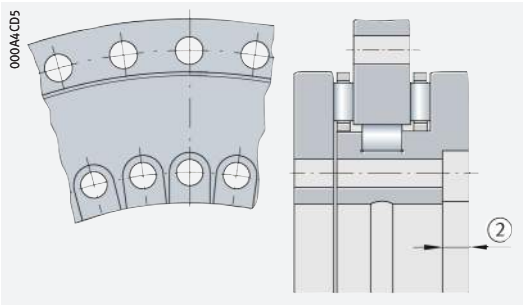
8) Rigidity values taking account of the rolling element set, the deformation of the bearing rings and the screw connections. For explanations ➤ 🕮 *TPI 120*.



Measuring head suitable for radial screw mounting



Hole pattern, measuring head suitable for radial screw mounting



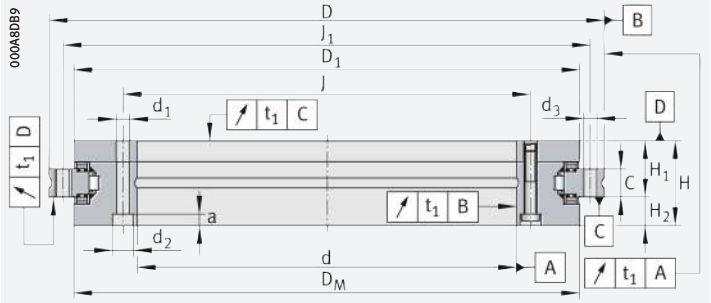
For YRTCMA325

Dimensions							Fixing holes						Pitch[2]		Threaded extraction hole		Screw tightening torque
							Inner ring				Outer ring						
d	H_1	C	D_1[3]	D_M[4] max.	J	J_1	d_1	d_2	a	Quantity[5]	d_3	Quantity[5]	n	t °	G	Quantity	M_A[6] Nm
200	30	15	274	274,4	215	285	7	11	6,2	46	7	45	48	7,5	M8	3	14
260	36,5	18	345	347	280	365	9,3	15	8,2	34	9,3	33	36	10	M12	3	34
325	40	20	415	415,1	342	430	9,3	15	8,2	34	9,3	33	36	10	M12	3	34
395	42,5	20	486	487,7	415	505	9,3	15	8,2	46	9,3	45	48	7,5	M12	3	34
460	46	22	560	560,9	482	580	9,3	15	8,2	46	9,3	45	48	7,5	M12	3	34

	Designation	Rigidity					
		Bearing position[8]			Rolling element set		
d		axial c_{aL} kN/µm	radial c_{rL} kN/µm	Tilting rigidity c_{kL} kNm/mrad	axial c_{aL} kN/µm	radial c_{rL} kN/µm	Tilting rigidity c_{kL} kNm/mrad
200	**YRTCMA200-XL**	4,9	4,1	37	15,5	6,2	128
260	**YRTCMA260-XL**	7,1	6,3	130	33	9,9	633
325	**YRTCMA325-XL**	9,9	5,8	228	37	13	1 002
395	**YRTCMA395-XL**	12	6,5	348	43	17	1 543
460	**YRTCMA460-XL**	6,9	5,3	82	19	8,1	265

Axial/radial bearings

Double direction
With absolute value angular measuring system



YRTSMA

d = 200 – 460 mm

Main dimensions			Basic load ratings				Fatigue limit load		Limiting speed[1]	Mass	Designation
			axial		radial		axial	radial			
d	D	H	dyn. C_a	stat. C_{0a}	dyn. C_r	stat. C_{0r}	C_{ua}	C_{ur}	n_G	m	
			kN	kN	kN	kN	kN	kN	min^{-1}	≈ kg	
200 0/–0,015	300 0/–0,018	51[7]	155	840	94	226	91	31,5	1 160	10,7	**YRTSMA200**
260 0/–0,018	385 0/–0,02	57,5[7]	173	1 050	110	305	106	39,5	910	18,7	**YRTSMA260**
325 0/–0,023	450 0/–0,023	61[7]	191	1 260	109	320	120	42	760	25	**YRTSMA325**
395 0/–0,023	525 0/–0,028	65	214	1 540	121	390	139	48,5	650	33	**YRTSMA395**
460 0/–0,023	600 0/–0,028	70	221	1 690	168	570	145	64	560	45	**YRTSMA460**

medias ➤ *https://www.schaeffler.de/std/1F2A*

① Two retaining screws; ② Screw counterbores open (in the L-section ring to the bearing bore), bearing inside diameter is unsupported in this area; ③ Shaft locating washer; ④ Inner ring

1) For high operating durations or continuous operation, please contact us.

2) Including retaining screws or threaded extraction holes.

3) Diameter of shaft locating washer for design of adjacent construction.

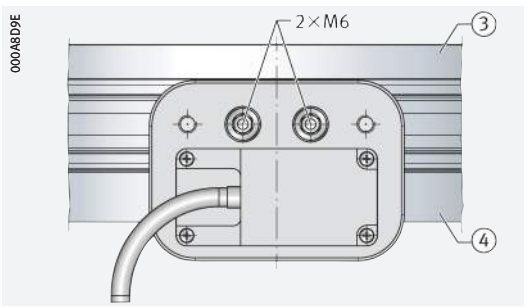
4) Diameter of dimensional scale on inner ring.

5) Attention!
For fixing holes in the adjacent construction. Observe the pitch of the bearing holes.

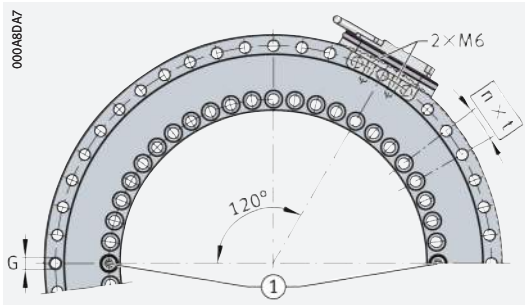
6) Tightening torque for screws to DIN EN ISO 4762, grade 10.9.

7) Dimension differs from the axial/radial bearing YRTS.

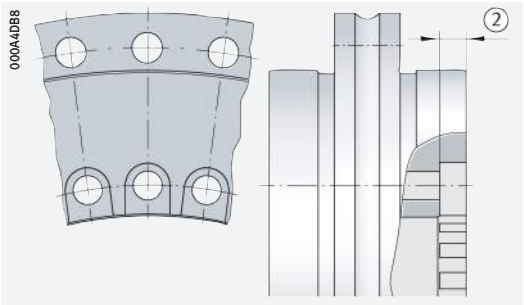
8) Rigidity values taking account of the rolling element set, the deformation of the bearing rings and the screw connections. For explanations ➤ 🕮 *TPI 120*.



Measuring head suitable for radial screw mounting



Hole pattern, measuring head suitable for radial screw mounting



For YRTSMA325

Dimensions							Fixing holes						Pitch[2]		Threaded extraction hole		Screw tightening torque
							Inner ring				Outer ring						
d	H_1	C	D_1[3]	D_M[4] max.	J	J_1	d_1	d_2	a	Quantity[5]	d_3	Quantity[5]	n	t °	G	Quantity	M_A[6] Nm
200	30	15	274	274,4	215	285	7	11	6,2	46	7	45	48	7,5	M8	3	14
260	36,5	18	345	347	280	365	9,3	15	8,2	34	9,3	33	36	10	M12	3	34
325	40	20	415	415,1	342	430	9,3	15	8,2	34	9,3	33	36	10	M12	3	34
395	42,5	20	486	487,7	415	505	9,3	15	8,2	46	9,3	45	48	7,5	M12	3	34
460	46	22	560	560,9	482	580	9,3	15	8,2	46	9,3	45	48	7,5	M12	3	34

	Designation	Rigidity					
		Bearing position[8]			Rolling element set		
d		axial c_{aL} kN/µm	radial c_{rL} kN/µm	Tilting rigidity c_{kL} kNm/mrad	axial c_{aL} kN/µm	radial c_{rL} kN/µm	Tilting rigidity c_{kL} kNm/mrad
200	**YRTSMA200**	4	1,2	29	13,6	3,9	101
260	**YRTSMA260**	5,4	1,6	67	16,8	5,8	201
325	**YRTSMA325**	6,6	1,8	115	19,9	7,1	350
395	**YRTSMA395**	7,8	2	195	23,4	8,7	582
460	**YRTSMA460**	8,9	1,8	280	25,4	9,5	843

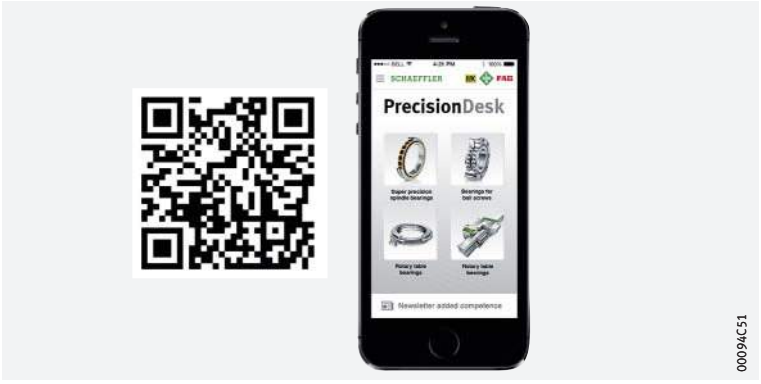
4 App for super precision bearings

4.1 PrecisionDesk

✎ PrecisionDesk simplifies bearing selection and assists in the mounting of bearing arrangement components

The free-of-charge Schaeffler app PrecisionDesk for super precision bearings includes services for rotary and linear bearings of a high precision design ➤*1374*|🗀 *1*. It assists fitters and engineers in the selection and mounting of bearing arrangement components.

🗀 ***1***
PrecisionDesk for super precision bearings



✎ Advantages

The advantage for the user is that the data can be accessed from any smartphone. For example, the app can be used to call off bearing-specific measurement records for spindle and rotary table bearings directly and store or send these for the purposes of documentation. For spindle bearings, it is possible to create electronic, bearing-specific data sets in the .csv format and use these, for example, for a logistics system.
The app offers Schaeffler customers the possibility of monitoring their own inventory and improving quality in mounting. With such a service tool, Schaeffler is a pioneer in the market.

✎ Access via DMC

Scanning the data matrix code (DMC) on the bearing or the bearing packaging gives access to the scope of performance of the program ➤*1374*|🗀 *2*.

🗀 ***2***
Data matrix code on rolling bearing

✎ *Scope of performance*

The scope of performance of the app comprises ➤ *1375*|🗀 *3*:

- checking of data matrix codes (anti-piracy protection)
- measurement records for spindle and rotary table bearings
- recommendations for mounting
- performance data.

🗀 **3**
Scope of performance of PrecisionDesk

✎ *Measurement records for spindle bearings*

The measurement records which can be generated contain the following ➤ *1375*|🗀 *4*:

- bearing ID
- designation
- date of manufacture
- actual value codes (bore diameter, outside diameter)
- width deviation
- contact angle
- overhang.

🗀 **4**
Measurement record for spindle bearings

✎ *Recommendations for mounting*

- Correct grease quantity
- Grease distribution cycle
- Universal bearing sets
- Permissible heating temperatures
- Designation and marking.

✎ *Performance data*

- Catalogue information
- Additional product information
- Direct access to Schaeffler Library.

The PrecisionDesk app can be used on Android, IOS and Windows-based operating systems and can be downloaded from the corresponding app stores ➤ *https://www.schaeffler.de/std/1D59*.