SCHAEFFLER

Schaeffler Aerospace Standard Products

We pioneer motion

Catalog

Contents

1 Foreword

1.1 Schaeffler Aerospace

We are committed to joint development partnerships with technology leaders in the aviation and aerospace industry. The products of Schaeffler Aerospace meet the highest quality requirements according to AS9100. Our customers are world renowned manufacturers of airplanes, landing gear, passenger seats, actuation systems, and other equipment parts.

Our products are used in a wide range of applications in the aviation and aerospace industry. Our worldwide customer base, which includes all the renowned manufacturers of aircraft engines, helicopters, turbopumps, space systems, and parts of the medical technology sector, not only appreciates the quality of the products we manufacture, but also our innovative solutions for new developments. We are a system supplier of highly reliable special bearing arrangements, both in terms of the materials used and the design. In addition to the development of special bearings, Schaeffler Aerospace offers complex and highly integrated bearing systems and electromechanical units including the relevant sensor systems.

Your benefits:

- highest aviation and aerospace quality standards
- cost savings through the use of standard production
- short delivery times
- wide product range
- customer-specific products
- high delivery reliability
- more than 50 years of aviation and aerospace expertise
- direct communication with customer service

Certifications

Schaeffler Aerospace is certified by the following civil aviation authorities:

- AS9100
- EASA
- FAA
- CAAC
- TCCA
- CAA
- Nadcap

1.2 Standard Products

Schaeffler Aerospace Standard Products are manufactured in Schaeffler industrial plants and used in aviation applications. These parts are classified in categories (CAT 0 to CAT 4) according to their possible hazard potential in a case of impaired function or failure. The risk categories of the following Commodity Products are CAT 0 – CAT 2.

1 Failure categories

Category	Description
CAT0	Parts in subordinate functions that do not compromise the success of the flight or mission
CAT1	Parts, the failure of which is unlikely to cause: • termination of the flight or • failure of the device (slight impairment of function, ancillary drive outputs, accessory equipment)
CAT2	Parts, the failure of which is likely to cause: • termination of the flight or • failure of the device (significant impairment of function, ancillary drive outputs, accessory equipment)

1.3 Further information

More detailed information on the technical principles and product data for the standard products presented in this catalog can be found in the following documents.

HR 1 | Wälzlager |
https://www.schaeffler.de/std/1D3D

HG 1 | Plain Bearings |
https://www.schaeffler.de/std/1D64

medias | Product catalog |
medias.schaeffler.com

HR 1 Rolling Bearings

Catalog HR 1 is a fundamental information, selection, and advisory tool for technical issues relating to the wide-ranging field of rotary rolling bearings. It has become established worldwide as an important engineering compendium for the calculation and design of rolling bearing arrangements. It describes the rolling bearings in accordance with DIN EN ISO that are required for original equipment manufacturers, distribution, and the aftermarket, specific rolling bearing accessories, and further rolling bearing types and design variants.

HG 1 Plain Bearings

Catalog HG 1 contains radial, angular contact, and axial spherical plain bearings, rod ends, metal/polymer composite plain bearings in the form of plain bushes, thrust washers, and strips as well as ELGOTEX plain bushes and other plain bearings. Spherical plain bearings are ready-to-fit precision machine elements. Due to the outer ring with its concave inner slideway and the inner ring with its crowned outer slideway, they can perform spatial adjustment motions. The bearings can support static loads and are suitable for tilt and swivel motion. They can compensate for shaft misalignment, are not subject to edge stresses under misalignment, and allow substantial manufacturing tolerances in the adjacent construction.

medias

Under the name medias, Schaeffler publishes electronic media for the designer. The medias product catalog contains the entire range of rolling bearings, plain bearings, and linear systems, including the technical principles and comprehensive product descriptions.

In the medias product catalog, you can calculate the selected products to catalog standard and transfer these to your CAD drawing. Application examples show you how the requirements of bearing arrangements can be successfully fulfilled using INA and FAG products. Naturally, our Application Engineering personnel and the Engineering Service will be pleased to support you in the selection of rolling bearings or linear guidance systems and assist you in the preparation of installation proposals.

2 OEM – Schaeffler Aerospace

2.1 Schaeffler Aerospace

We develop and manufacture high-precision special bearing systems and precision components for aircraft engines, helicopters, and space applications as well as for special fields of application with high performance requirements, e.g., turbochargers, or applications with the highest possible reliability requirements, e.g., medical technology. In addition, we offer our customers a bearing diagnosis and reconditioning service, enabling them to benefit from lower life cycle costs and the same high level of reliability obtained from new bearings.

2.2 Applications

System supplier for all bearing applications

Our products are used in a wide range of applications in the aerospace industry. Our worldwide customer base, which includes all the renowned manufacturers of aircraft engines, helicopters, turbopumps, space systems, and parts of the medical technology sector, not only appreciates the quality of the products that we manufacture, but also especially our innovative solutions for new developments. We are a system supplier of highly reliable special bearing applications, both in terms of the materials used and the design. In addition to the development of special bearings, Schaeffler Aerospace offers complex and highly integrated bearing systems and electromechanical units including the relevant sensor systems.

- aircraft engines
- Airbus helicopters
- turbopumps for space propulsion

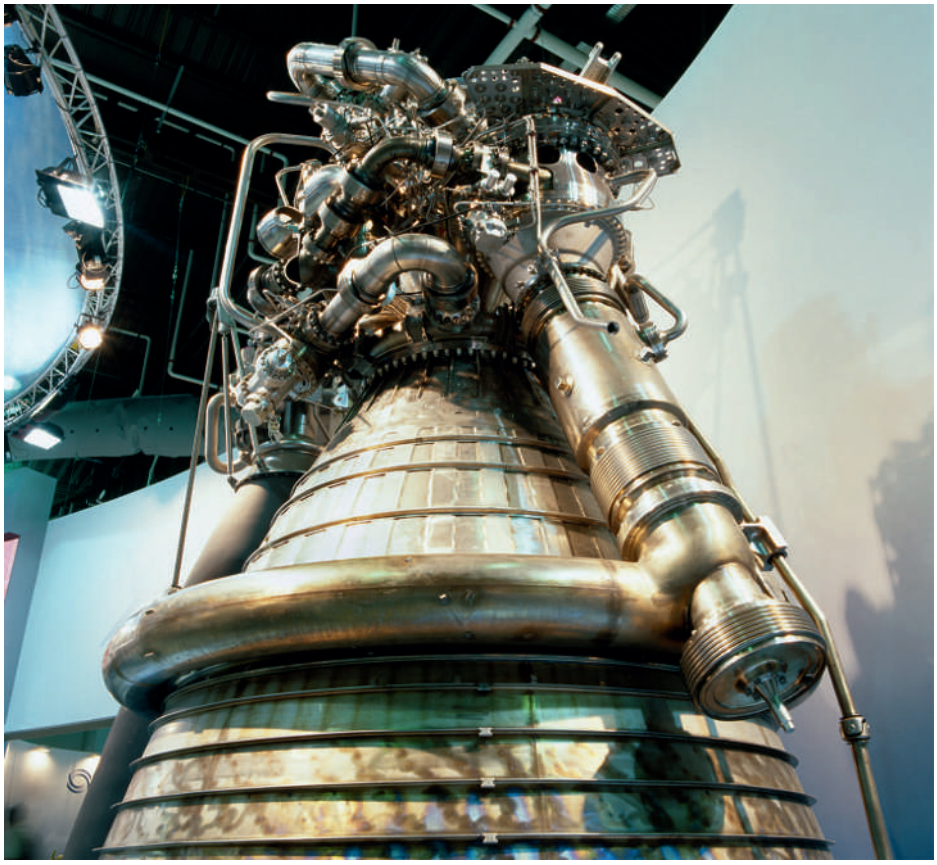
1 Aircraft engine

001B14E3

2 Helicopter

001B14D3

3 Rocket engine



001B14F3

2.3 Products

Exceptional reliability even under extreme conditions

Our rolling bearing systems with integrated adjacent components help to ensure that aircraft and spacecraft can be developed, built, and operated to deliver increased performance, safety, reliability, and reduced system costs. These parts also withstand extremely low or high temperatures, weightlessness, and high acceleration forces:

- engine bearings
- helicopter bearings
- aerospace bearings
- thin section bearings

2.4 Service

In addition to the development, manufacture, diagnosis, and reconditioning of the described products, our service portfolio also includes test rig testing and pre-qualification rig testing of bearings. Furthermore, we offer high-quality chemical and electroplated coating of parts for the aerospace industry and other industrial sectors. The main focus areas of our development activities include:

- materials, heat treatments, and surface technologies
- coatings, lubricants, and the associated test procedures
- non-destructive testing
- analysis, calculation, and simulation
- performance and pre-qualification rig testing of bearing systems

3 MRO – Overhauling of engine bearings

3.1 Reconditioning and repair of engine bearings

Our reconditioning service can help you to considerably reduce your overhaul costs since we only replace components that actually need to be substituted for new parts. Our certified reconditioning processes ensure that the remaining components acquire the full performance capability of corresponding new parts.

Schaeffler Aerospace holds many official reconditioning approvals directly from engine manufacturers and is certified as a manufacturing, reconditioning, and development organization by the aviation authorities. Our highly qualified team of experienced test and application engineers are on hand to assist you in the event of bearing damage. We are often able to identify approaches for preventing bearing damage that occurs during operation (e.g., due to contamination, overloading, insufficient lubrication, or inappropriate handling), which we will gladly discuss with you in order to increase the reliability of your bearing systems and ultimately your engines. We can also offer customer-specific training for your team.

Not just a repair facility

Schaeffler Aerospace originally provided bearings for the Charles Lindbergh Wright J5 Whirlwind engine. Since then, the materials, design innovations, and demands associated with engines have changed considerably, but our leadership in this field has remained constant. Today, Schaeffler Aerospace is prime supplier to every major engine manufacturer in the aviation industry. Schaeffler Aerospace bearings support engines both large and small, powering today's lightest and largest commercial aircraft. Technologies developed by Schaeffler Aerospace have been used aboard the "Orion" space transporter.

Years of concentrated research and development allowed Schaeffler Aerospace to be the first company to formally introduce the concept of infinite fatigue life to the industry in 1983. Since then, it has been acknowledged that the useful bearing service life is primarily limited by damage caused by environmental factors (e.g., contamination, corrosion, overheating, etc.). Understanding these factors is critical to developing robust systems and, through expert diagnosis and repair, prolonging the service life of modern aerospace bearings.

Schaeffler Aerospace repair facilities offer:

- cost savings of up to 70% compared to the aftermarket
- engine manufacturer-approved repairs
- reduction in inventory and storage costs
- use of OEM equipment for the repair process
- short turnaround times
- high yield rates
- no schedule required
- OEM repairs performed to the highest quality standards

3.2 Civil applications

Maintenance of main shaft bearings for civil aviation applications

Schaeffler Aerospace holds many official reconditioning approvals direct from engine manufacturers. Our reconditioning methods and quality inspections are directly monitored and audited by the engine manufacturers themselves. Schaeffler Aerospace is audited to NADCAP and AS9100, among other standards.

We offer a reconditioning service for many civil aircraft engine bearings and are continuously receiving new approvals. We are listed as an official repair service provider in the engine manuals of Pratt & Whitney, Rolls Royce, GE, CFM, Avio, and IAE.

Please contact us for further information about our capability list for engines, part numbers, and repair levels:
aerospace.repair@schaeffler.com

3.3 Military applications

Maintenance of main shaft bearings for military applications and helicopters

Schaeffler Aerospace products for the aerospace sector have also proven extremely reliable in many military applications. Our product range allows us to offer you a comprehensive repair service for all kinds of engines.

As the military sector is subject to a wide variety of restrictions, please contact us for further information:
aerospace.repair@schaeffler.com

3.4 Products

Main shaft bearings, gearbox bearings, and rotor shaft bearings

From main shaft bearings and gearbox bearings through to rotor shaft bearings, Schaeffler Aerospace offers a wide range of high-precision bearings for the engines in aircraft, helicopters, and space applications.

We are the right point of contact if you require prompt assistance. Please feel free to contact us. We will provide you with the required information as quickly as possible – regardless of whether you are making an informal inquiry or require a binding quotation.

Schaeffler Aerospace is approved for the maintenance of the engines listed below:

- RB211 family
- Trent family
- CFM56
- PW2000
- PW4000
- V2500
- CF34

- CF6-80
- GEnx
- and many more

3.5 Reconditioning

Approved reconditioning levels can be described as follows:

- **Level 1**
  - cleaning
  - dimensional and visual inspection of bearing components
- **Level 2**
  - Level 1+
  - reworking of raceways
  - replacement of rolling elements and
  - recoating or replacement of the cage
- **Level 3**
  - Level 2+
  - grinding of one component
- **Level 4**
  - Level 3+
  - replacement of one bearing ring
  - Level 4 can also include the update to the latest configuration with a new part number assigned

3.6 Certifications

Schaeffler Aerospace is certified as a maintenance company by the following civil aviation authorities:

- EASA, repair base no. DE.145.0127
- FAA, repair base no. F2GY854J
- CAAC, repair base no. F04900413
- TCCA, repair station no. 809-23

Comprehensive information and contact details can be found at: mailto aerospace.repair@schaeffler.com

3.7 Training

Visual inspection training

Our highly qualified training personnel can provide your employees with training on rolling bearing damage as well as on its causes and effects.

Please contact us and we will provide you with a relevant cost proposal: aerospace.repair@schaeffler.com

3.8 Service – Repair, diagnosis, and training

Repair service

The Schaeffler Aerospace service portfolio covers so much more than just the cleaning and inspection of aerospace bearings. Our reconditioning service can help you to considerably reduce your overhaul costs since we only replace components that actually need to be substituted for new parts. The remaining components are reconditioned and reused. Schaeffler Aerospace can also help you to find individual solutions that will leave your customers even more satisfied.

Diagnosis of bearing damage

Our highly qualified team of engineers and trained, experienced visual inspectors will help you to gain as much information as possible about your failed bearings. As an original equipment manufacturer, Schaeffler Aerospace uses its many years of experience in areas such as material analysis and NDT and will provide you with a detailed report of the findings.

Visual inspection training

If you are looking to raise awareness among your employees about rolling bearing damage as well as its causes and effects, our highly qualified trainers are on hand to assist.

Simply contact us and we will prepare a relevant training offer:
aerospace.repair@schaeffler.com

4 Rod ends

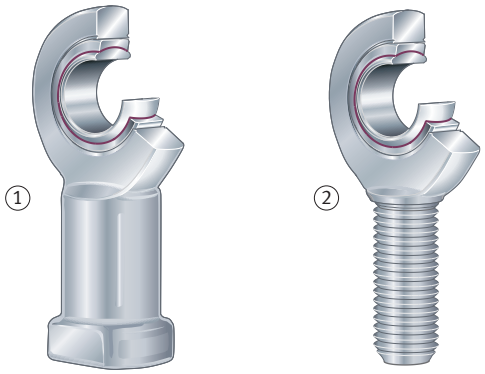
Maintenance-free rod ends and maintenance-free corrosion-resistant rod ends comprise a housing with integral shank and a maintenance-free spherical plain bearing. The shank has an internal or external thread, the spherical plain bearing is firmly seated and located in the housing. The rod ends are available in open designs and in designs sealed on both sides. The housings and shanks are protected against corrosion by a zinc coating. The sliding layer between the inner ring and outer ring is made up of PTFE composite, ELGOGLIDE, or PTFE film.

Area of application

Maintenance-free rod ends can support radial loads in a tensile or compressive direction. They are particularly suitable for slow movements with small to moderate swivel angles and unilateral loads. For alternating loads, rod ends with bearings of series GE..-UK-2RS(-2TS) and GE..-FW-2RS(-2TS) can be used.

Rod ends to DIN ISO 12240-4, dimension series E, incorporate radial spherical plain bearings GE..-UK or GE..-UK-2RS(-2TS) and have a right or left hand internal or external thread. The sliding contact surfaces are hard chromium/PTFE composite or hard chromium/ELGOGLIDE. The thin walled design of the eye housing allows compact adjacent constructions. These rod ends are also available by agreement with radial spherical plain bearings GE..-FW or GE..-FW-2RS(-2TS) of dimension series G.

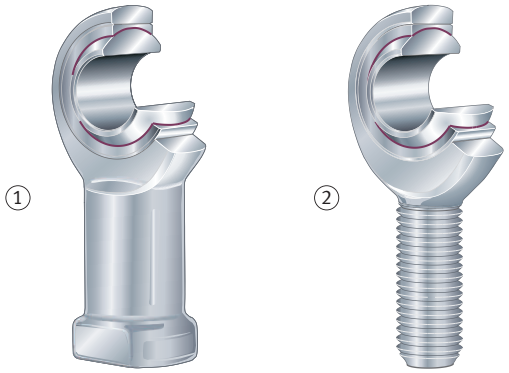
4 Rod ends, dimension series E



1	With internal thread	2	With external thread

Rod ends to DIN ISO 12240-4, dimension series K, incorporate radial spherical plain bearings GE..-PW and have a right or left hand internal or external thread. The sliding contact surface is steel/PTFE film.

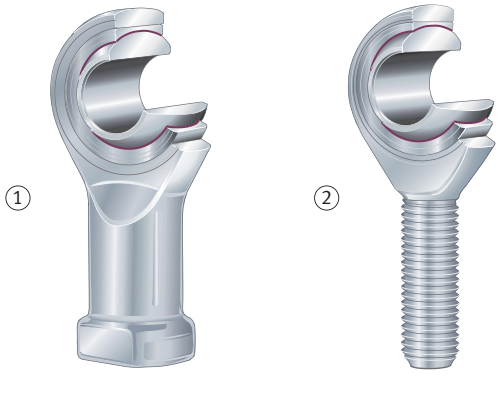
5 Rod ends, dimension series K



1	With internal thread	2	With external thread

Corrosion-resistant rod ends to DIN ISO 12240-4, dimension series K, incorporate radial spherical plain bearings GE..-PS and have a right hand or left hand internal or external thread. The sliding contact surface comprises corrosion-resistant steel and corrosion-resistant PTFE film attached to the curved outer ring surface. The housing and shank has a thread to DIN 13 and the diameter range extends from 5 mm to 30 mm. The bore tolerance of the spherical plain bearings is H7 e. Corrosion-resistant rod ends with an internal thread are also available with CETOP mounting dimensions to ISO 8139 for pneumatic cylinders. These are used in preference in control and automation engineering.

6 Corrosion-resistant rod ends, corrosion-resistant, dimension series K



1	With internal thread	2	With external thread

4.1 Clarification of product tables

B	mm	Inner ring width
C_{0r}	N	Basic static load rating, radial
C_1	mm	Width of rod end eye housing
C_r	N	Basic dynamic load rating, radial
d	mm	Bearing bore diameter
D	mm	Bearing outside diameter
d_1	mm	Outside flange diameter, inner ring
d_2	–	Thread size
d_2	mm	Outside eye diameter
d_2	mm	Shank diameter
d_2	mm	Shank diameter, large
d_K	mm	Ball diameter
$G_{r\ max}$	mm	Max. radial internal clearance
$G_{r\ min}$	mm	Min. radial internal clearance
h	mm	Shank length, external thread rod
I_1	mm	Thread length, external thread
I_2	mm	Total length, external thread rod
I_3	mm	Thread length, internal thread
I_4	mm	Total length, internal thread on rod
I_5	mm	Flange length, rod end shank
I_7	mm	Hole spacing at start of shaft
L	mm	Lower limit deviation
m	kg or lbs	Mass
$r_{1\ min}$	mm	Min. chamfer dimension
U	mm	Upper limit deviation
W	mm	Width across flats
α	°	Tilt angle

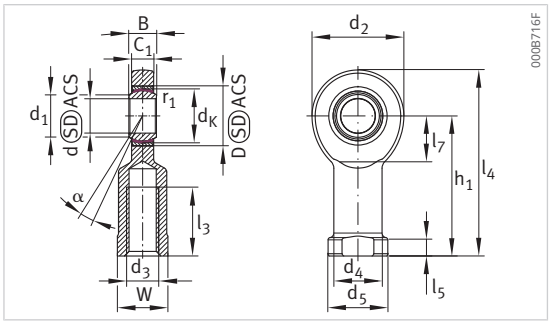
4.2 GIR..-UK

With internal thread, maintenance-free

DIN ISO 12240-4, dimension series E , type F

Inner ring curved surface with hard chromium coating

Open design



GIR..-UK (PTFE composite)

Designation	m	d	d L	D	B	B L	d_K	d_1	d_2	d_3	d_4
	kg	mm	mm	mm	mm	mm	mm	mm	mm	–	mm
GIR6-UK	0.023	6	–0.008	14	6	–0.12	10	8	21	M6	10
GIR8-UK	0.039	8	–0.008	16	8	–0.12	13	10.2	24	M8	12.5
GIR10-UK	0.066	10	–0.008	19	9	–0.12	16	13.2	29	M10	15
GIR12-UK	0.1	12	–0.008	22	10	–0.12	18	14.9	34	M12	17.5
GIR15-UK	0.18	15	–0.008	26	12	–0.12	22	18.4	40	M14	21
GIR17-UK	0.25	17	–0.008	30	14	–0.12	25	20.7	46	M16	24
GIR20-UK	0.36	20	–0.01	35	16	–0.12	29	24.2	53	M20×1.5	27.5
GIR25-UK	0.6	25	–0.01	42	20	–0.12	35.5	29.3	64	M24×2	33.5
GIR30-UK	0.98	30	–0.01	47	22	–0.12	40.7	34.2	73	M30×2	40

h_1	C_1	α	l_3	l_4	l_5	l_7	d_5	W	$r_{1\ min}$	C_r	C_{0r}	$G_{r\ min}$	$G_{r\ max}$
mm	mm	°	mm	mm	mm	mm	mm	mm	mm	N	N	mm	mm
30	4.4	13	11	40.5	5	12	13	11	0.3	3600	10300	0	0.032
36	6	15	15	48	5	14	16	14	0.3	5850	16000	0	0.032
43	7	12	20	57.5	6.5	15	19	17	0.3	8640	22000	0	0.032
50	8	11	23	67	6.5	18	22	19	0.3	11300	30400	0	0.032
61	10	8	30	81	8	20	26	22	0.3	17800	44800	0	0.04
67	11	10	34	90	10	23	30	27	0.3	22500	56500	0	0.04
77	13	9	40	103.5	10	27	35	32	0.3	31300	75600	0	0.04
94	17	7	48	126	12	32	42	36	0.6	51100	105000	0	0.05
110	19	6	56	146.5	15	37	50	41	0.6	65900	139000	0	0.05

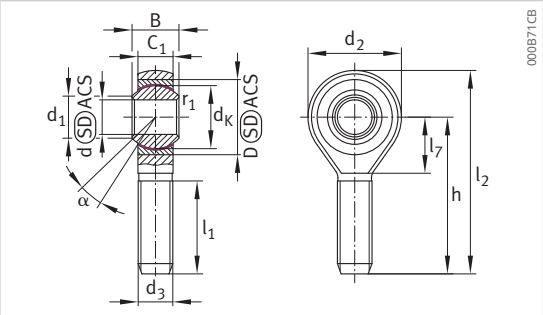
4.3 GIR..-UK-2RS, GIR..-UK-2TS

With internal thread, maintenance-free

DIN ISO 12240-4, dimension series E , type F

Inner ring curved surface with hard chromium coating

Sealed



GIR..-UK-2RS, GIR..-UK-2TS (ELGOGLIDE)

Designation	m	d L	d L	D	B	B L	d_K	d_1	d_2	d_3	d_4
	kg	mm	mm	mm	mm	mm	mm	mm	mm	–	mm
GIR17-UK-2RS	0.25	17	−0.008	30	14	−0.12	25	20.7	46	M16	24
GIR20-UK-2RS	0.36	20	−0.01	35	16	−0.12	29	24.2	53	M20×1.5	27.5
GIR25-UK-2RS	0.65	25	−0.01	42	20	−0.12	35.5	29.3	64	M24×2	33.5
GIR30-UK-2RS	0.97	30	−0.01	47	22	−0.12	40.7	34.2	73	M30×2	40
GIR30-UK-2TS	0.97	30	−0.01	47	22	−0.12	40.7	34.2	73	M30×2	40
GIR35-UK-2RS	1.43	35	−0.012	55	25	−0.12	47	39.8	82	M36×3	47
GIR35-UK-2TS	1.43	35	−0.012	55	25	−0.12	47	39.8	82	M36×3	47
GIR40-UK-2RS	2.1	40	−0.012	62	28	−0.12	53	45	92	M39×3	52
GIR40-UK-2TS	2.1	40	−0.012	62	28	−0.12	53	45	92	M39×3	52
GIR45-UK-2TS	2.7	45	−0.012	68	32	−0.12	60	50.8	102	M42×3	58
GIR45-UK-2RS	2.7	45	−0.012	68	32	−0.12	60	50.8	102	M42×3	58
GIR50-UK-2RS	3.54	50	−0.012	75	35	−0.12	66	56	112	M45×3	62
GIR50-UK-2TS	3.54	50	−0.012	75	35	−0.12	66	56	112	M45×3	62
GIR60-UK-2TS	5.6	60	−0.015	90	44	−0.15	80	66.8	135	M52×3	70
GIR60-UK-2RS	5.6	60	−0.015	90	44	−0.15	80	66.8	135	M52×3	70
GIR70-UK-2RS	8.61	70	−0.015	105	49	−0.15	92	77.9	160	M56×4	80
GIR70-UK-2TS	8.61	70	−0.015	105	49	−0.15	92	77.9	160	M56×4	80
GIR80-UK-2RS	13.2	80	−0.015	120	55	−0.15	105	89.4	180	M64×4	95
GIR80-UK-2TS	13.2	80	−0.015	120	55	−0.15	105	89.4	180	M64×4	95

h_1	C_1	α	l_3	l_4	l_5	l_7	d_5	W	$r_{1\ min}$	C_r	C_{0r}	$G_{r\ min}$	$G_{r\ max}$
mm	mm	°	mm	mm	mm	mm	mm	mm	mm	N	N	mm	mm
67	11	10	34	90	10	23	30	27	0.3	48800	56500	0	0.04
77	13	9	40	103.5	10	27	35	32	0.3	67900	75600	0	0.04
94	17	7	48	126	12	32	42	36	0.6	128000	105000	0	0.05
110	19	6	56	146.5	15	37	50	41	0.6	165000	139000	0	0.05
110	19	6	56	146.5	15	37	50	41	0.6	165000	139000	0	0.05
125	21	6	60	166	15	42	58	50	0.6	212000	159000	0	0.05
125	21	6	60	166	15	42	58	50	0.6	212000	159000	0	0.05
142	23	7	65	188	18	48	65	55	0.6	280000	194000	0	0.06
142	23	7	65	188	18	48	65	55	0.6	280000	194000	0	0.06
145	27	7	65	196	20	52	70	60	0.6	360000	259000	0	0.06
145	27	7	65	196	20	52	70	60	0.6	360000	259000	0	0.06
160	30	6	68	216	20	60	75	65	0.6	444000	314000	0	0.06
160	30	6	68	216	20	60	75	65	0.6	444000	314000	0	0.06
175	38	6	70	242.5	20	75	88	75	1	691000	485000	0	0.06
175	38	6	70	242.5	20	75	88	75	1	691000	485000	0	0.06
200	42	6	80	280	20	87	98	85	1	883000	564000	0	0.072
200	42	6	80	280	20	87	98	85	1	883000	564000	0	0.072
230	47	6	85	320	25	100	110	100	1	1130000	690000	0	0.072
230	47	6	85	320	25	100	110	100	1	1130000	690000	0	0.072

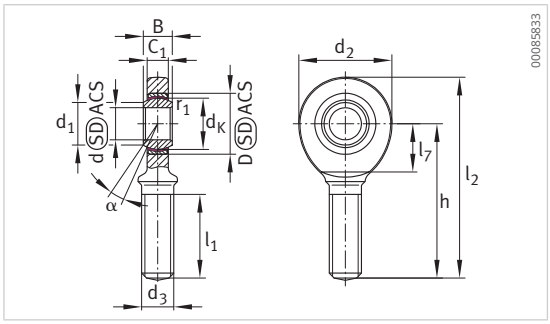
4.4 GAR..-UK

With external thread, maintenance-free

DIN ISO 12240-4, dimension series E , type M

Inner ring curved surface with hard chromium coating

Open design



GAR..-UK (PTFE composite)

Designation	m	d L	D	B	B L	d_K	d_1	d_2	d_3
	kg	mm	mm	mm	mm	mm	mm	mm	–
GAR6-UK	0.018	6 −0.008	14	6	−0.12	10	8	21	M6
GAR8-UK	0.033	8 −0.008	16	8	−0.12	13	10.2	24	M8
GAR10-UK	0.056	10 −0.008	19	9	−0.12	16	13.2	29	M10
GAR12-UK	0.086	12 −0.008	22	10	−0.12	18	14.9	34	M12
GAR15-UK	0.15	15 −0.008	26	12	−0.12	22	18.4	40	M14
GAR17-UK	0.21	17 −0.008	30	14	−0.12	25	20.7	46	M16
GAR20-UK	0.33	20 −0.01	35	16	−0.12	29	24.2	53	M20×1.5
GAR25-UK	0.6	25 −0.01	42	20	−0.12	35.5	29.3	64	M24×2
GAR30-UK	0.95	30 −0.01	47	22	−0.12	40.7	34.2	73	M30×2

h	C_1	α	l_1	l_2	l_7	$r_{1\ min}$	C_r	C_{0r}	$G_{r\ min}$	$G_{r\ max}$
mm	mm	°	mm	mm	mm	mm	N	N	mm	mm
36	4.4	13	18	46.5	12	0.3	3600	6930	0	0.032
42	6	15	22	54	14	0.3	5850	12900	0	0.032
48	7	12	26	62.5	15	0.3	8640	20600	0	0.032
54	8	11	28	71	18	0.3	11300	30200	0	0.032
63	10	8	34	83	20	0.3	17800	41600	0	0.04
69	11	10	36	92	23	0.3	22500	56500	0	0.04
78	13	9	43	104.5	27	0.3	31300	75600	0	0.04
94	17	7	53	126	32	0.6	51100	105000	0	0.05
110	19	6	65	146.5	37	0.6	65900	139000	0	0.05

4.5 GAR..-UK-2RS, GAR..-UK-2TS

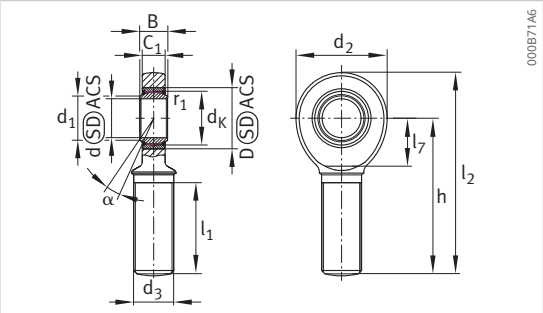
4

With external thread, maintenance-free

DIN ISO 12240-4, dimension series E , type M

Inner ring curved surface with hard chromium coating

Sealed



GAR..-UK-2RS, GAR..-UK-2TS (ELGOGLIDE)

Designation	m	d	d L	D	B	B L	d_K	d_1	d_2
	kg	mm	mm	mm	mm	mm	mm	mm	mm
GAR17-UK-2RS	0.2	17	–0.008	30	14	–0.12	25	20.7	46
GAR20-UK-2RS	0.33	20	–0.01	35	16	–0.12	29	24.2	53
GAR25-UK-2RS	0.59	25	–0.01	42	20	–0.12	35.5	29.3	64
GAR30-UK-2TS	0.93	30	–0.01	47	22	–0.12	40.7	34.2	73
GAR30-UK-2RS	0.93	30	–0.01	47	22	–0.12	40.7	34.2	73
GAR35-UK-2TS	1.53	35	–0.012	55	25	–0.12	47	39.8	82
GAR35-UK-2RS	1.53	35	–0.012	55	25	–0.12	47	39.8	82
GAR40-UK-2TS	1.97	40	–0.012	62	28	–0.12	53	45	92
GAR40-UK-2RS	1.97	40	–0.012	62	28	–0.12	53	45	92
GAR45-UK-2RS	2.65	45	–0.012	68	32	–0.12	60	50.8	102
GAR45-UK-2TS	2.65	45	–0.012	68	32	–0.12	60	50.8	102
GAR50-UK-2TS	3.53	50	–0.012	75	35	–0.12	66	56	112
GAR50-UK-2RS	3.53	50	–0.012	75	35	–0.12	66	56	112
GAR60-UK-2RS	5.91	60	–0.015	90	44	–0.15	80	66.8	135
GAR60-UK-2TS	5.91	60	–0.015	90	44	–0.15	80	66.8	135
GAR70-UK-2TS	8.51	70	–0.015	105	49	–0.15	92	77.9	160
GAR70-UK-2RS	8.51	70	–0.015	105	49	–0.15	92	77.9	160
GAR80-UK-2RS	12.5	80	–0.015	120	55	–0.15	105	89.4	180
GAR80-UK-2TS	12.5	80	–0.015	120	55	–0.15	105	89.4	180

d_3	h	C_1	α	l_1	l_2	l_7	$r_{1\ min}$	C_r	C_{0r}	$G_{r\ min}$	$G_{r\ max}$
–	mm	mm	°	mm	mm	mm	mm	N	N	mm	mm
M16	69	11	10	36	92	23	0.3	48800	56500	0	0.04
M20×1.5	78	13	9	43	104.5	27	0.3	67900	75600	0	0.04
M24×2	94	17	7	53	126	32	0.6	128000	105000	0	0.05
M30×2	110	19	6	65	146.5	37	0.6	165000	139000	0	0.05
M30×2	110	19	6	65	146.5	37	0.6	165000	139000	0	0.05
M36×3	140	21	6	82	181	42	0.6	212000	159000	0	0.05
M36×3	140	21	6	82	181	42	0.6	212000	159000	0	0.05
M39×3	150	23	7	86	196	48	0.6	280000	194000	0	0.06
M39×3	150	23	7	86	196	48	0.6	280000	194000	0	0.06
M42×3	163	27	7	94	214	52	0.6	360000	259000	0	0.06
M42×3	163	27	7	94	214	52	0.6	360000	259000	0	0.06
M45×3	185	30	6	107	241	60	0.6	444000	314000	0	0.06
M45×3	185	30	6	107	241	60	0.6	444000	314000	0	0.06
M52×3	210	38	6	115	277.5	75	1	691000	485000	0	0.06
M52×3	210	38	6	115	277.5	75	1	691000	485000	0	0.06
M56×4	235	42	6	125	315	87	1	883000	564000	0	0.072
M56×4	235	42	6	125	315	87	1	883000	564000	0	0.072
M64×4	270	47	6	140	360	100	1	1130000	690000	0	0.072
M64×4	270	47	6	140	360	100	1	1130000	690000	0	0.072

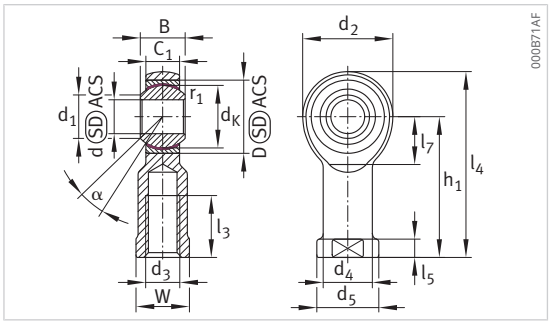
4.6 GIKR..-PW, GIKPR..-PW

With internal thread, maintenance-free

DIN ISO 12240-4, dimension series K , type F

Brass outer ring

Open design



GIKR..-PW, GIKPR..-PW (PTFE film)

Designation	m	d H7	d L	D	B	B L	d_K	d_1	d_2	d_3	d_4
	kg	mm	mm	mm	mm	mm	mm	mm	mm	–	mm
GIKR6-PW	0.028	6	0.012	16	9	–0.12	12.7	9	20	M6	10
GIKR8-PW	0.05	8	0.015	19	12	–0.12	15.875	10.4	24	M8	12.5
GIKPR10-PW	0.08	10	0.015	22	14	–0.12	19.05	12.9	28	M10×1.25	15
GIKR10-PW	0.08	10	0.015	22	14	–0.12	19.05	12.9	28	M10	15
GIKR12-PW	0.12	12	0.018	26	16	–0.12	22.225	15.4	32	M12	17.5
GIKPR12-PW	0.12	12	0.018	26	16	–0.12	22.225	15.4	32	M12×1.25	17.5
GIKR14-PW	0.18	14	0.018	28	19	–0.12	25.4	16.9	36	M14	21
GIKPR16-PW	0.24	16	0.018	32	21	–0.12	28.575	19.4	42	M16×1.5	22
GIKR16-PW	0.24	16	0.018	32	21	–0.12	28.575	19.4	42	M16	22
GIKR20-PW	0.43	20	0.021	40	25	–0.12	34.925	24.4	50	M20×1.5	27.5
GIKR25-PW	0.73	25	0.021	47	31	–0.12	42.85	29.6	60	M24×2	33.5
GIKR30-PW	1.17	30	0.021	55	37	–0.12	50.8	34.8	70	M30×2	40
GIKPR30-PW	1.17	30	0.021	55	37	–0.12	50.8	34.8	70	M27×2	40

h_1	C_1	α	l_3	l_4	l_5	l_7	d_5	W	$r_{1\ min}$	C_r	C_{0r}	$G_{r\ min}$	$G_{r\ max}$
mm	mm	°	mm	mm	mm	mm	mm	mm	mm	N	N	mm	mm
30	6.75	13	12	40	5	11	13	11	0.3	7750	7990	0	0.035
36	9	14	16	48	5	13	16	14	0.3	12900	13100	0	0.035
43	10.5	13	20	57	6.5	15	19	17	0.3	18100	18500	0	0.035
43	10.5	13	20	57	6.5	15	19	17	0.3	18100	18500	0	0.035
50	12	13	22	66	6.5	17	22	19	0.3	24000	20800	0	0.035
50	12	13	22	66	6.5	17	22	19	0.3	24000	20800	0	0.035
57	13.5	16	25	75	8	18	26	22	0.3	31000	32000	0	0.035
64	15	15	28	85	8	23	28	22	0.3	38600	45300	0	0.035
64	15	15	28	85	8	23	28	22	0.3	38600	45300	0	0.035
77	18	14	33	102	10	26	35	30	0.3	56600	45600	0	0.035
94	22	15	42	124	12	32	42	36	0.3	84800	72900	0	0.035
110	25	17	51	145	15	37	50	41	0.3	114000	95900	0	0.035
110	25	17	51	145	15	37	50	41	0.3	114000	95900	0	0.035

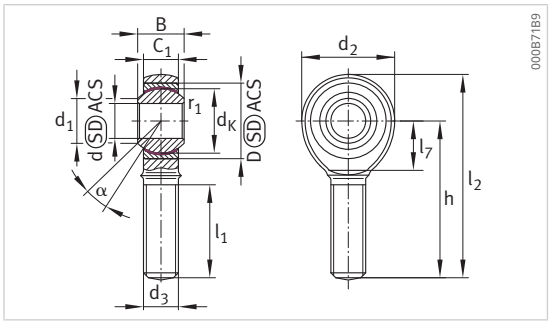
4.7 GAKR..-PW

With external thread, maintenance-free

DIN ISO 12240-4, dimension series K , type M

Brass outer ring

Open design



GAKR..-PW (PTFE film)

Designation	m	d H7	d L	D	B	B L	d_K	d_1	d_2
	kg	mm	mm	mm	mm	mm	mm	mm	mm
GAKR6-PW	0.022	6	0.012	16	9	–0.12	12.7	9	20
GAKR8-PW	0.042	8	0.015	19	12	–0.12	15.875	10.4	24
GAKR10-PW	0.069	10	0.015	22	14	–0.12	19.05	12.9	28
GAKR12-PW	0.11	12	0.018	26	16	–0.12	22.225	15.4	32
GAKR14-PW	0.16	14	0.018	28	19	–0.12	25.4	16.9	36
GAKR16-PW	0.23	16	0.018	32	21	–0.12	28.575	19.4	42
GAKR20-PW	0.39	20	0.021	40	25	–0.12	34.925	24.4	50
GAKR25-PW	0.67	25	0.021	47	31	–0.12	42.85	29.6	60
GAKR30-PW	1.1	30	0.021	55	37	–0.12	50.8	34.8	70

d_3	h	C_1	α	l_1	l_2	l_7	$r_{1\ min}$	C_r	C_{0r}	$G_{r\ min}$	$G_{r\ max}$
–	mm	mm	°	mm	mm	mm	mm	N	N	mm	mm
M6	36	6.75	13	21	46	–	0.3	7750	6930	0	0.035
M8	42	9	14	25	54	–	0.3	12900	12900	0	0.035
M10	48	10.5	13	28	62	–	0.3	18100	18500	0	0.035
M12	54	12	13	32	70	–	0.3	24000	20800	0	0.035
M14	60	13.5	16	36	78	18	0.3	31000	32000	0	0.035
M16	66	15	15	37	87	23	0.3	38600	45300	0	0.035
M20×1.5	78	18	14	45	103	26	0.3	56600	45600	0	0.035
M24×2	94	22	15	55	124	32	0.3	84800	72900	0	0.035
M30×2	110	25	17	66	145	37	0.3	114000	95900	0	0.035

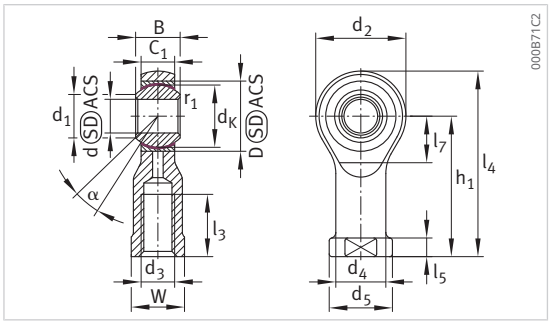
4.8 GIKSR..-PS, GIKPSR..-PS

With internal thread, maintenance-free

DIN ISO 12240-4, dimension series K , type F

Corrosion-resistant

Open design



GIKSR..-PS, GIKPSR..-PS (PTFE film)

Designation	m	d H7	d L	D	B	B L	d_K	d_1	d_2	d_3
	kg	mm	mm	mm	mm	mm	mm	mm	mm	–
GIKSR5-PS	0.017	5	0.012	13	8	–0.12	11.1	7.7	19	M5
GIKPSR5-PS	0.017	5	0.012	13	8	–0.12	11.1	7.7	19	M4
GIKSR6-PS	0.025	6	0.012	16	9	–0.12	12.7	9	21	M6
GIKSR8-PS	0.043	8	0.015	19	12	–0.12	15.8	10.4	25	M8
GIKPSR10-PS	0.072	10	0.015	22	14	–0.12	19	12.9	29	M10×1.25
GIKSR10-PS	0.072	10	0.015	22	14	–0.12	19	12.9	29	M10
GIKSR12-PS	0.11	12	0.018	26	16	–0.12	22.2	15.4	33	M12
GIKPSR12-PS	0.11	12	0.018	26	16	–0.12	22.2	15.4	33	M12×1.25
GIKSR14-PS	0.16	14	0.018	28	19	–0.12	25.4	16.8	37	M14
GIKPSR16-PS	0.21	16	0.018	32	21	–0.12	28.5	19.4	43	M16×1.5
GIKSR16-PS	0.21	16	0.018	32	21	–0.12	28.5	19.4	43	M16
GIKSR18-PS	0.3	18	0.018	35	23	–0.12	31.7	21.9	47	M18×1.5
GIKSR20-PS	0.38	20	0.021	40	25	–0.12	34.9	24.4	51	M20×1.5
GIKSR22-PS	0.49	22	0.021	42	28	–0.12	38.1	25.8	55	M22×1.5
GIKSR25-PS	0.65	25	0.021	47	31	–0.12	42.8	29.6	61	M24×2
GIKSR30-PS	1.15	30	0.021	55	37	–0.12	50.8	34.8	71	M30×2
GIKPSR30-PS	1.15	30	0.021	55	37	–0.12	50.8	34.8	71	M27×2

d_4	h_1	C_1	α	l_3	l_4	l_5	l_7	d_5	W	$r_{1\ min}$	C_r	C_{0r}	$G_{r\ min}$	$G_{r\ max}$
mm	mm	mm	°	mm	mm	mm	mm	mm	mm	mm	N	N	mm	mm
9	27	6	13	8	36.5	4	9	11	9	0.3	6000	3800	0.003	0.035
9	27	6	13	8	36.5	4	9	11	9	0.3	6000	3800	0.003	0.035
10	30	6.75	13	9	40.5	5	10	13	11	0.3	7650	3400	0.003	0.035
12.5	36	9	13	12	48.5	5	12	16	14	0.3	12900	5700	0.005	0.04
15	43	10.5	13	15	57.5	6.5	14	19	17	0.3	18000	8000	0.005	0.04
15	43	10.5	13	15	57.5	6.5	14	19	17	0.3	18000	8000	0.005	0.04
17.5	50	12	13	18	66.5	6.5	16	22	19	0.3	24000	9100	0.005	0.045
17.5	50	12	13	18	66.5	6.5	16	22	19	0.3	24000	9100	0.005	0.045
20	57	13.5	15	21	75.5	8	18	25	22	0.3	31000	13700	0.005	0.045
22	64	15	15	24	85.5	8	21	27	22	0.3	39000	19000	0.005	0.045
22	64	15	15	24	85.5	8	21	27	22	0.3	39000	19000	0.005	0.045
25	71	16.5	15	27	94.5	10	23	31	27	0.3	47500	23000	0.005	0.045
27.5	77	18	15	30	102.5	10	25	34	30	0.3	57000	22800	0.01	0.055
30	84	20	15	33	111.5	12	27	37	32	0.3	68000	30400	0.01	0.055
33.5	94	22	15	36	124.5	12	30	42	36	0.3	85000	36200	0.01	0.055
40	110	25	15	45	145.5	15	35	50	41	0.3	114000	47500	0.01	0.055
40	110	25	15	45	145.5	15	35	50	41	0.3	114000	47500	0.01	0.055

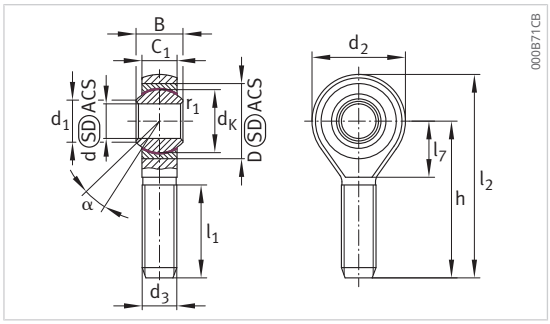
4.9 GAKSR..-PS

With external thread, maintenance-free

DIN ISO 12240-4, dimension series K , type M

Corrosion-resistant

Open design



GAKR..-PW (PTFE film)

Designation	m	d H7	d L	D	B	B L	d_K	d_1	d_2
	kg	mm	mm	mm	mm	mm	mm	mm	mm
GAKSR5-PS	0.01	5	0.012	13	8	–0.12	11.1	7.7	19
GAKSR6-PS	0.02	6	0.012	16	9	–0.12	12.7	9	21
GAKSR8-PS	0.03	8	0.015	19	12	–0.12	15.8	10.4	25
GAKSR10-PS	0.05	10	0.015	22	14	–0.12	19	12.9	29
GAKSR12-PS	0.09	12	0.018	26	16	–0.12	22.2	15.4	33
GAKSR14-PS	0.13	14	0.018	28	19	–0.12	25.4	16.9	37
GAKSR16-PS	0.19	16	0.018	32	21	–0.12	28.5	19.4	43
GAKSR18-PS	0.26	18	0.018	35	23	–0.12	31.7	21.9	47
GAKSR20-PS	0.34	20	0.021	40	25	–0.12	34.9	24.4	51
GAKSR22-PS	0.44	22	0.021	42	28	–0.12	38.1	25.8	55
GAKSR25-PS	0.59	25	0.021	47	31	–0.12	42.8	29.6	61
GAKSR30-PS	1.06	30	0.021	55	37	–0.12	50.8	34.8	71

d_3	h	C_1	α	l_1	l_2	l_7	$r_{1\ min}$	C_r	C_{0r}	$G_{r\ min}$	$G_{r\ max}$
–	mm	mm	°	mm	mm	mm	mm	N	N	mm	mm
M5	33	6	13	19	42.5	9	0.3	6000	1800	0.003	0.035
M6	36	6.75	13	21	46.5	10	0.3	7650	2500	0.003	0.035
M8	42	9	13	25	54.5	12	0.3	12900	4600	0.005	0.04
M10	48	10.5	13	28	62.5	14	0.3	18000	7300	0.005	0.04
M12	54	12	13	32	70.5	16	0.3	24000	9100	0.005	0.045
M14	60	13.5	15	36	78.5	18	0.3	31000	13700	0.005	0.045
M16	66	15	15	37	87.5	21	0.3	39000	19000	0.005	0.045
M18×1.5	72	16.5	15	41	95.5	23	0.3	47500	23000	0.005	0.045
M20×1.5	78	18	15	45	104	25	0.3	57000	22800	0.01	0.055
M22×1.5	84	20	15	48	112	27	0.3	68000	30400	0.01	0.055
M24×2	94	22	15	55	125	30	0.3	85000	36200	0.01	0.055
M30×2	110	25	15	66	146	35	0.3	114000	47500	0.01	0.055

5 Spherical plain bearings

Spherical plain bearings allow spatial adjustment movements and, depending on the bearing type, can support radial, combined, or axial loads.

Radial spherical plain bearings

Maintenance-free radial spherical plain bearings comprise inner rings, outer rings, and maintenance-free sliding layers. The inner rings have a cylindrical bore and a curved outer slideway. The outer rings have a cylindrical outside surface and a concave inner slideway. Between the inner and outer ring is an ELGOGLIDE sliding surface. In series GE..-UK and GE..-FW the sliding surface is made up of PTFE composite, while the sliding surface in series GE..-PW is PTFE film. The bearings are available in open and sealed designs.

Area of application

Radial spherical plain bearings are preferably used to support radial forces. GE..-UK-2RS(-2TS), GE..-FW-2RS(-2TS), GE..-DW, and GE..-DW-2RS2 are also suitable for alternating loads up to a contact pressure of p = 150 N/mm2. The bearings are used where particular requirements for operating life apply in conjunction with maintenance-free operation or where, for reasons of lubrication, bearings with metallic sliding contact surfaces are not suitable, for example under unilateral load.

X-life

Large radial spherical plain bearings GE..-DW and GE..-DW-2RS2 of d = 320 mm are X-life bearings and are indicated as such in the product tables. These bearings have even higher performance materials, lower coefficients of friction, and lower running-in wear than comparable bearings.

Axial spherical plain bearings

Axial spherical plain bearings GE..-AW correspond to DIN ISO 12240-3. In these units, the shaft locating washer is supported in the ball socket-shaped sliding zone of the housing locating washer. The sliding material in the housing locating washer is ELGOGLIDE or, from a nominal diameter of 220 mm, ELGOGLIDE in X-life. The bearings are available for shaft diameters from 10 mm to 360 mm. Other sizes are available by agreement

Area of application

The bearings are preferably used to support axial forces. They are suitable as support or base bearings and can also be combined with radial spherical plain bearings of dimension series E to DIN ISO 12240-1.

X-life

Axial spherical plain bearings GE..-AW of d = 220 mm mm are X-life bearings and are indicated as such in the dimension tables. These bearings have even higher performance materials, lower coefficients of friction, and lower running-in wear than comparable bearings.

Angular contact spherical plain bearings

Angular contact spherical plain bearings GE..-SW correspond to DIN ISO 12240-2. They have inner rings with a curved outer slideway and outer rings with a concave inner slideway to which the sliding layer ELGOGLIDE is attached by adhesive. The bearings are available for shaft diameters from 25 mm to 200 mm. Other sizes are available by agreement

Area of application

The bearings can support radial and axial loads and are suitable for alternating dynamic loads. Preloaded units can be achieved using paired arrangements. Angular contact spherical plain bearings are used to support high loads in conjunction with small motions. They are a good plain bearing alternative to tapered roller bearings 320..-X in accordance with ISO 355 and DIN 720, since they have the same mounting dimensions.

5.1 Clarification of product tables

B	mm	Inner ring width
B_{tol}	mm	Inner ring width, deviation
C	mm	Outer ring width
C_{0r}	N	Basic static load rating, radial
C_r	N	Basic dynamic load rating, radial
d	mm	Bearing bore diameter
D	mm	Bearing outside diameter
D_1	mm	Bore diameter, housing locating washer
d_2	mm	Outside eye diameter
d_3	mm	End face diameter of shaft locating washer
$d_{a\ max}$	mm	Max. mounting dimension, inner ring
$D_{a\ min}$	mm	Min. housing mounting diameter
$d_{b\ max}$	mm	Max. mounting dimension, inner ring
$D_{b\ min}$	mm	Min. mounting dimension
d_K	mm	Ball diameter
$G_{r\ max}$	mm	Max. radial internal clearance
$G_{r\ min}$	mm	Min. radial internal clearance
L	mm	Lower limit deviation
m	kg or lbs	Mass
$r_{1\ min}$	mm	Min. chamfer dimension
$r_{2\ min}$	mm	Min. chamfer dimension
s	mm	End face spacing
T	mm	Height
U	mm	Upper limit deviation
α	°	Tilt angle

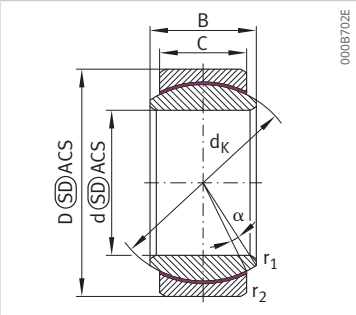
5.2 GE..-UK

Maintenance-free

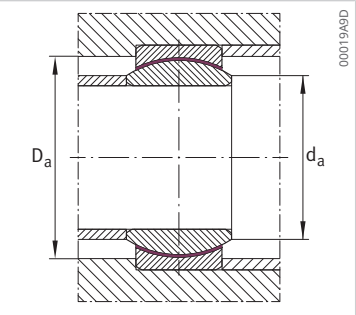
DIN ISO 12240-1, dimension series E , type E

Inner ring curved surface with hard chromium coating

Open design



GE..-UK (PTFE composite)



Mounting dimensions

Designation	m	d L	d L	D	D L	B	B L	C	C L	d_K
	kg	mm	mm	mm	mm	mm	mm	mm	mm	mm
GE6-UK	0.004	6	−0.008	14	−0.008	6	−0.12	4	−0.24	10
GE8-UK	0.007	8	−0.008	16	−0.008	8	−0.12	5	−0.24	13
GE10-UK	0.011	10	−0.008	19	−0.009	9	−0.12	6	−0.24	16
GE12-UK	0.016	12	−0.008	22	−0.009	10	−0.12	7	−0.24	18
GE15-UK	0.027	15	−0.008	26	−0.009	12	−0.12	9	−0.24	22
GE17-UK	0.042	17	−0.008	30	−0.009	14	−0.12	10	−0.24	25
GE20-UK	0.067	20	−0.01	35	−0.011	16	−0.12	12	−0.24	29
GE25-UK	0.12	25	−0.01	42	−0.011	20	−0.12	16	−0.24	35.5
GE30-UK	0.15	30	−0.01	47	−0.011	22	−0.12	18	−0.24	40.7

α	$r_{1\ min}$	$r_{2\ min}$	$d_{a\ max}$	$D_{a\ min}$	C_r	C_{0r}	$G_{r\ min}$	$G_{r\ max}$
°	mm	mm	mm	mm	N	N	mm	mm
13	0.3	0.3	8	9.6	3600	9000	0	0.032
15	0.3	0.3	10.2	12.5	5850	14600	0	0.032
12	0.3	0.3	13.2	15.5	8640	21600	0	0.032
11	0.3	0.3	14.9	17.5	11300	28400	0	0.032
8	0.3	0.3	18.4	21	17800	44600	0	0.04
10	0.3	0.3	20.7	24	22500	56300	0	0.04
9	0.3	0.3	24.2	27.5	31300	78300	0	0.04
7	0.6	0.6	29.3	33	51100	128000	0	0.05
6	0.6	0.6	34.2	38	65900	165000	0	0.05

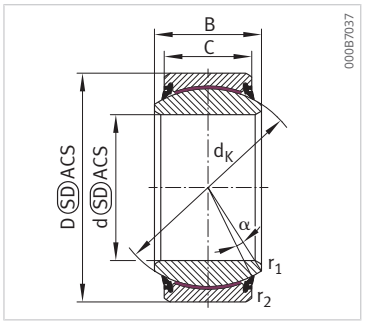
5.3 GE..-UK-2RS, GE..-UK-2TS

Maintenance-free

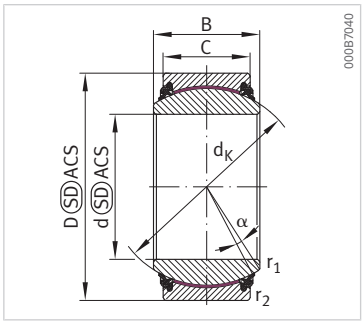
DIN ISO 12240-1, dimension series E

Inner ring curved surface with hard chromium coating

Sealed

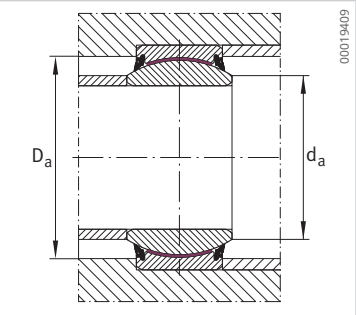


GE..-UK-2RS (ELGOGLIDE)



GE..-UK-2TS (ELGOGLIDE)

Designation	m	d	d L	D	D L	B	B L	C	C L	d_K
	kg	mm	mm	mm	mm	mm	mm	mm	mm	mm
GE17-UK-2RS	0.038	17	–0.008	30	–0.009	14	–0.12	10	–0.24	25
GE20-UK-2RS	0.061	20	–0.01	35	–0.011	16	–0.12	12	–0.24	29
GE25-UK-2RS	0.11	25	–0.01	42	–0.011	20	–0.12	16	–0.24	35.5
GE30-UK-2TS	0.14	30	–0.01	47	–0.011	22	–0.12	18	–0.24	40.7
GE30-UK-2RS	0.14	30	–0.01	47	–0.011	22	–0.12	18	–0.24	40.7
GE35-UK-2TS	0.22	35	–0.012	55	–0.013	25	–0.12	20	–0.3	47
GE35-UK-2RS	0.22	35	–0.012	55	–0.013	25	–0.12	20	–0.3	47
GE40-UK-2RS	0.31	40	–0.012	62	–0.013	28	–0.12	22	–0.3	53
GE40-UK-2TS	0.31	40	–0.012	62	–0.013	28	–0.12	22	–0.3	53
GE45-UK-2TS	0.41	45	–0.012	68	–0.013	32	–0.12	25	–0.3	60
GE45-UK-2RS	0.41	45	–0.012	68	–0.013	32	–0.12	25	–0.3	60
GE50-UK-2RS	0.55	50	–0.012	75	–0.013	35	–0.12	28	–0.3	66
GE50-UK-2TS	0.55	50	–0.012	75	–0.013	35	–0.12	28	–0.3	66
GE60-UK-2TS	1	60	–0.015	90	–0.015	44	–0.15	36	–0.4	80
GE60-UK-2RS	1	60	–0.015	90	–0.015	44	–0.15	36	–0.4	80
GE70-UK-2TS	1.53	70	–0.015	105	–0.015	49	–0.15	40	–0.4	92
GE70-UK-2RS	1.53	70	–0.015	105	–0.015	49	–0.15	40	–0.4	92
GE80-UK-2TS	2.25	80	–0.015	120	–0.015	55	–0.15	45	–0.4	105
GE80-UK-2RS	2.25	80	–0.015	120	–0.015	55	–0.15	45	–0.4	105
GE90-UK-2TS	2.73	90	–0.02	130	–0.018	60	–0.2	50	–0.5	115
GE90-UK-2RS	2.73	90	–0.02	130	–0.018	60	–0.2	50	–0.5	115
GE100-UK-2RS	4.34	100	–0.02	150	–0.018	70	–0.2	55	–0.5	130
GE100-UK-2TS	4.34	100	–0.02	150	–0.018	70	–0.2	55	–0.5	130
GE110-UK-2TS	4.71	110	–0.02	160	–0.025	70	–0.2	55	–0.5	140
GE110-UK-2RS	4.71	110	–0.02	160	–0.025	70	–0.2	55	–0.5	140
GE120-UK-2RS	7.98	120	–0.02	180	–0.025	85	–0.2	70	–0.5	160
GE120-UK-2TS	7.98	120	–0.02	180	–0.025	85	–0.2	70	–0.5	160
GE140-UK-2TS	11.1	140	–0.025	210	–0.03	90	–0.25	70	–0.6	180
GE140-UK-2RS	11.1	140	–0.025	210	–0.03	90	–0.25	70	–0.6	180
GE160-UK-2RS	14	160	–0.025	230	–0.03	105	–0.25	80	–0.6	200
GE160-UK-2TS	14	160	–0.025	230	–0.03	105	–0.25	80	–0.6	200



Mounting dimensions

α	$r_{1\ min}$	$r_{2\ min}$	$d_{a\ max}$	$D_{a\ min}$	C_r	C_{0r}	$G_{r\ min}$	$G_{r\ max}$
°	mm	mm	mm	mm	N	N	mm	mm
10	0.3	0.3	20.7	24	48800	81300	0	0.04
9	0.3	0.3	24.2	27.5	67900	113000	0	0.04
7	0.6	0.6	29.3	33	128000	213000	0	0.05
6	0.6	0.6	34.2	38	165000	275000	0	0.05
6	0.6	0.6	34.2	38	165000	275000	0	0.05
6	0.6	1	39.8	44.5	212000	353000	0	0.05
6	0.6	1	39.8	44.5	212000	353000	0	0.05
7	0.6	1	45	51	280000	466000	0	0.06
7	0.6	1	45	51	280000	466000	0	0.06
7	0.6	1	50.8	57	360000	600000	0	0.06
7	0.6	1	50.8	57	360000	600000	0	0.06
6	0.6	1	56	63	444000	739000	0	0.06
6	0.6	1	56	63	444000	739000	0	0.06
6	1	1	66.8	75	691000	1150000	0	0.06
6	1	1	66.8	75	691000	1150000	0	0.06
6	1	1	77.9	87	883000	1470000	0	0.072
6	1	1	77.9	87	883000	1470000	0	0.072
6	1	1	89.4	99	1130000	1890000	0	0.072
6	1	1	89.4	99	1130000	1890000	0	0.072
5	1	1	98.1	108	1380000	2300000	0	0.072
5	1	1	98.1	108	1380000	2300000	0	0.072
7	1	1	109.5	123	1720000	2860000	0	0.085
7	1	1	109.5	123	1720000	2860000	0	0.085
6	1	1	121.2	134	1850000	3080000	0	0.085
6	1	1	121.2	134	1850000	3080000	0	0.085
6	1	1	135.6	150	2690000	4480000	0	0.085
6	1	1	135.6	150	2690000	4480000	0	0.085
7	1	1	155.9	173	3020000	5040000	0	0.085
7	1	1	155.9	173	3020000	5040000	0	0.085
8	1	1	170.2	191	3840000	6400000	0	0.1
8	1	1	170.2	191	3840000	6400000	0	0.1

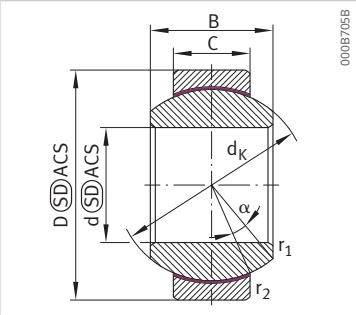
5.4 GE..-FW

Maintenance-free

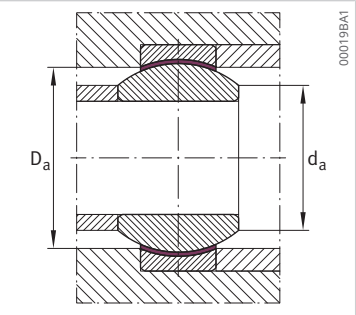
DIN ISO 12240-1, dimension series G

Inner ring curved surface with hard chromium coating

Open design



GE..-FW (PTFE composite)



Mounting dimensions

Designation	m	d L	d L	D	D L	B	B L	C	C L	d_K
	kg	mm	mm	mm	mm	mm	mm	mm	mm	mm
GE6-FW	0.009	6	−0.008	16	−0.008	9	−0.12	5	−0.24	13
GE8-FW	0.015	8	−0.008	19	−0.009	11	−0.12	6	−0.24	16
GE10-FW	0.021	10	−0.008	22	−0.009	12	−0.12	7	−0.24	18
GE12-FW	0.037	12	−0.008	26	−0.009	15	−0.12	9	−0.24	22
GE15-FW	0.05	15	−0.008	30	−0.009	16	−0.12	10	−0.24	25
GE17-FW	0.083	17	−0.008	35	−0.011	20	−0.12	12	−0.24	29
GE20-FW	0.16	20	−0.01	42	−0.011	25	−0.12	16	−0.24	35.5
GE25-FW	0.21	25	−0.01	47	−0.011	28	−0.12	18	−0.24	40.7

α	$r_{1\ min}$	$r_{2\ min}$	$d_{a\ max}$	$D_{a\ min}$	C_r	C_{0r}	$G_{r\ min}$	$G_{r\ max}$
°	mm	mm	mm	mm	N	N	mm	mm
21	0.3	0.3	9.4	12.5	5850	14600	0	0.032
21	0.3	0.3	11.6	15.5	8640	21600	0	0.032
18	0.3	0.3	13.4	17.5	11300	28400	0	0.032
18	0.3	0.3	16.1	21	17800	44600	0	0.04
16	0.3	0.3	19.2	24	22500	56300	0	0.04
19	0.3	0.3	21	27.5	31300	78300	0	0.04
17	0.3	0.3	25.2	33	51100	128000	0	0.05
17	0.6	0.6	29.5	38	65900	165000	0	0.05

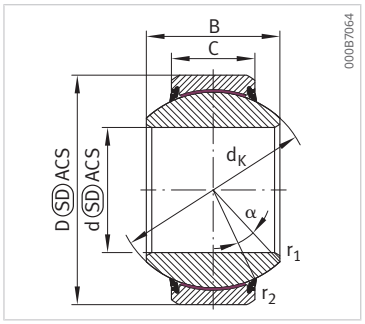
5.5 GE..-FW-2RS, GE..-FW-2TS

Maintenance-free

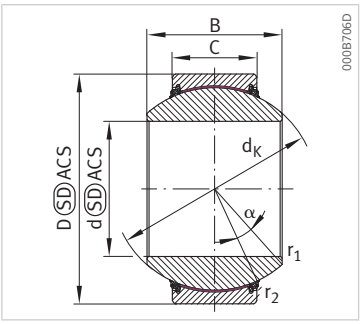
DIN ISO 12240-1, dimension series G

Inner ring curved surface with hard chromium coating

Sealed

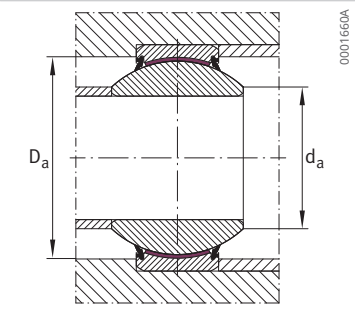


GE..-FW-2RS (ELGOGLIDE)



GE..-FW-2TS (ELGOGLIDE)

Designation	m	d	d L	D	D L	B	B L	C	C L	d_K
	kg	mm	mm	mm	mm	mm	mm	mm	mm	mm
GE25-FW-2RS	0.2	25	–0.01	47	–0.011	28	–0.12	18	–0.24	40.7
GE25-FW-2TS	0.2	25	–0.01	47	–0.011	28	–0.12	18	–0.24	40.7
GE30-FW-2RS	0.29	30	–0.01	55	–0.013	32	–0.12	20	–0.3	47
GE30-FW-2TS	0.29	30	–0.01	55	–0.013	32	–0.12	20	–0.3	47
GE35-FW-2RS	0.4	35	–0.012	62	–0.013	35	–0.12	22	–0.3	53
GE35-FW-2TS	0.4	35	–0.012	62	–0.013	35	–0.12	22	–0.3	53
GE40-FW-2RS	0.53	40	–0.012	68	–0.013	40	–0.12	25	–0.3	60
GE40-FW-2TS	0.53	40	–0.012	68	–0.013	40	–0.12	25	–0.3	60
GE45-FW-2TS	0.69	45	–0.012	75	–0.013	43	–0.12	28	–0.3	66
GE45-FW-2RS	0.69	45	–0.012	75	–0.013	43	–0.12	28	–0.3	66
GE50-FW-2TS	1.4	50	–0.012	90	–0.015	56	–0.12	36	–0.4	80
GE50-FW-2RS	1.4	50	–0.012	90	–0.015	56	–0.12	36	–0.4	80
GE60-FW-2TS	2.1	60	–0.015	105	–0.015	63	–0.15	40	–0.4	92
GE60-FW-2RS	2.1	60	–0.015	105	–0.015	63	–0.15	40	–0.4	92
GE70-FW-2RS	3	70	–0.015	120	–0.015	70	–0.15	45	–0.4	105
GE70-FW-2TS	3	70	–0.015	120	–0.015	70	–0.15	45	–0.4	105
GE80-FW-2RS	3.6	80	–0.015	130	–0.018	75	–0.15	50	–0.5	115
GE80-FW-2TS	3.6	80	–0.015	130	–0.018	75	–0.15	50	–0.5	115
GE90-FW-2TS	5.34	90	–0.02	150	–0.018	85	–0.2	55	–0.5	130
GE90-FW-2RS	5.34	90	–0.02	150	–0.018	85	–0.2	55	–0.5	130
GE100-FW-2TS	6	100	–0.02	160	–0.025	85	–0.2	55	–0.5	140
GE100-FW-2RS	6	100	–0.02	160	–0.025	85	–0.2	55	–0.5	140
GE110-FW-2TS	9.7	110	–0.02	180	–0.025	100	–0.2	70	–0.5	160
GE110-FW-2RS	9.7	110	–0.02	180	–0.025	100	–0.2	70	–0.5	160
GE120-FW-2RS	15.1	120	–0.02	210	–0.03	115	–0.2	70	–0.6	180
GE120-FW-2TS	15.1	120	–0.02	210	–0.03	115	–0.2	70	–0.6	180

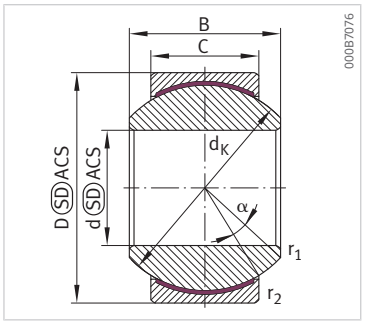


Mounting dimensions

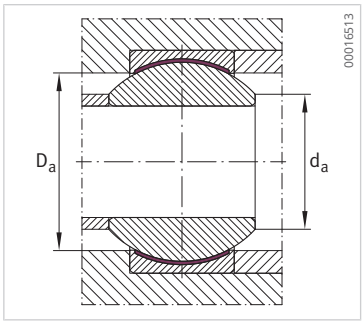
α	$r_{1\ min}$	$r_{2\ min}$	$d_{a\ max}$	$D_{a\ min}$	C_r	C_{0r}	$G_{r\ min}$	$G_{r\ max}$
°	mm	mm	mm	mm	N	N	mm	mm
17	0.6	0.6	29.5	38	165000	275000	0	0.05
17	0.6	0.6	29.5	38	165000	275000	0	0.05
17	0.6	1	34.4	44.5	212000	353000	0	0.05
17	0.6	1	34.4	44.5	212000	353000	0	0.05
16	0.6	1	39.8	51	280000	466000	0	0.06
16	0.6	1	39.8	51	280000	466000	0	0.06
17	0.6	1	44.7	57	360000	600000	0	0.06
17	0.6	1	44.7	57	360000	600000	0	0.06
15	0.6	1	50.1	63	444000	739000	0	0.06
15	0.6	1	50.1	63	444000	739000	0	0.06
17	0.6	1	57.1	75	691000	1150000	0	0.06
17	0.6	1	57.1	75	691000	1150000	0	0.06
17	1	1	67	87	883000	1470000	0	0.072
17	1	1	67	87	883000	1470000	0	0.072
16	1	1	78.3	99	1130000	1890000	0	0.072
16	1	1	78.3	99	1130000	1890000	0	0.072
14	1	1	87.2	108	1380000	2300000	0	0.072
14	1	1	87.2	108	1380000	2300000	0	0.072
15	1	1	98.4	123	1720000	2860000	0	0.085
15	1	1	98.4	123	1720000	2860000	0	0.085
14	1	1	111.2	134	1850000	3080000	0	0.085
14	1	1	111.2	134	1850000	3080000	0	0.085
12	1	1	124.9	150	2690000	4480000	0	0.085
12	1	1	124.9	150	2690000	4480000	0	0.085
16	1	1	138.5	173	3020000	5040000	0	0.085
16	1	1	138.5	173	3020000	5040000	0	0.085

5.6 GE..-PW

Maintenance-free
DIN ISO 12240-1, dimension series K
Brass outer ring
Open design



GE..-PW (PTFE film)



Mounting dimensions

Designation	m	d H7	d U	D	D L	B	B L	C	C L	d_K
	kg	mm	mm	mm	mm	mm	mm	mm	mm	mm
GE6-PW	0.01	6	0.012	16	−0.008	9	−0.12	6.75	−0.24	12.7
GE8-PW	0.018	8	0.015	19	−0.009	12	−0.12	9	−0.24	15.875
GE10-PW	0.027	10	0.015	22	−0.009	14	−0.12	10.5	−0.24	19.05
GE12-PW	0.043	12	0.018	26	−0.009	16	−0.12	12	−0.24	22.225
GE14-PW	0.055	14	0.018	28	−0.009	19	−0.12	13.5	−0.24	25.4
GE16-PW	0.079	16	0.018	32	−0.011	21	−0.12	15	−0.24	28.575
GE18-PW	0.11	18	0.018	35	−0.011	23	−0.12	16.5	−0.24	31.75
GE20-PW	0.15	20	0.021	40	−0.011	25	−0.12	18	−0.24	34.925
GE22-PW	0.18	22	0.021	42	−0.011	28	−0.12	20	−0.24	38.1
GE25-PW	0.25	25	0.021	47	−0.011	31	−0.12	22	−0.24	42.85
GE30-PW	0.38	30	0.021	55	−0.013	37	−0.12	25	−0.3	50.8

α	$r_{1\ min}$	$r_{2\ min}$	$d_{a\ max}$	$D_{a\ min}$	C_r	C_{0r}	$G_{r\ min}$	$G_{r\ max}$
°	mm	mm	mm	mm	N	N	mm	mm
13	0.3	0.3	9	11.5	7750	19400	0.006	0.035
14	0.3	0.3	10.4	14	12900	32100	0.006	0.035
13	0.3	0.3	12.9	17	18100	45200	0.006	0.035
13	0.3	0.3	15.4	19.5	24000	60000	0.006	0.035
16	0.3	0.3	16.9	22.5	31000	77500	0.006	0.035
15	0.3	0.3	19.4	25.5	38600	96400	0.006	0.035
15	0.3	0.3	21.9	28.5	47300	118000	0.006	0.035
14	0.3	0.6	24.4	31.5	56600	141000	0.006	0.035
15	0.3	0.6	25.8	34	68600	171000	0.006	0.035
15	0.3	0.6	29.6	38.5	84800	212000	0.006	0.035
17	0.3	0.6	34.8	46	114000	286000	0.006	0.035

5.7 GE..-SW

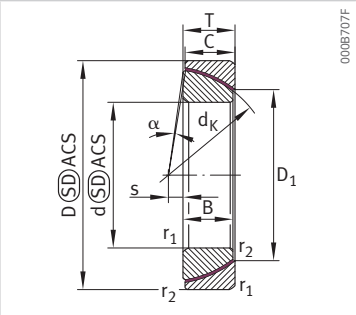
Maintenance-free

DIN ISO 12240-2

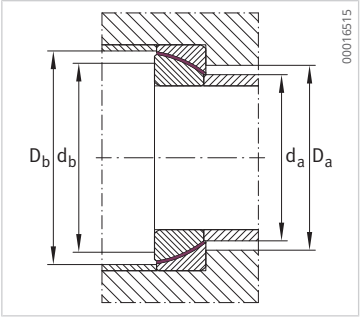
Inner ring curved surface with hard chromium coating

Open design

5

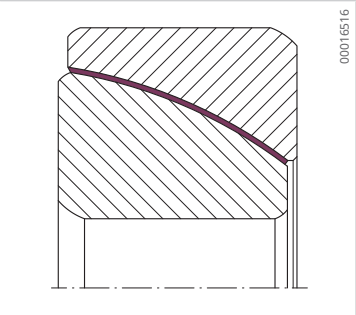


GE..-SW (ELGOGLIDE)



Mounting dimensions

Designation	m	d	d L	D	D L	T	T U	d_K	D_1	B	B L	C	C L
	kg	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm
GE25-SW	0.14	25	−0.012	47	−0.014	15	0.25	42.5	31.4	14	−0.2	14	−0.2
GE28-SW	0.18	28	−0.012	52	−0.016	16	0.25	47	35.7	15	−0.2	15	−0.2
GE30-SW	0.21	30	−0.012	55	−0.016	17	0.25	50	36.1	16	−0.2	16	−0.2
GE35-SW	0.28	35	−0.012	62	−0.016	18	0.25	56	42.4	17	−0.24	17	−0.24
GE40-SW	0.34	40	−0.012	68	−0.016	19	0.25	60	46.8	18	−0.24	18	−0.24
GE45-SW	0.42	45	−0.012	75	−0.016	20	0.25	66	52.9	19	−0.24	19	−0.24
GE50-SW	0.46	50	−0.012	80	−0.016	20	0.25	74	59.1	19	−0.24	19	−0.24
GE55-SW	0.68	55	−0.015	90	−0.018	23	0.25	80	62	22	−0.3	22	−0.3
GE60-SW	0.73	60	−0.015	95	−0.018	23	0.25	86	68.1	22	−0.3	22	−0.3
GE65-SW	0.78	65	−0.015	100	−0.018	23	0.25	92	75.6	22	−0.3	22	−0.3
GE70-SW	1.1	70	−0.015	110	−0.018	25	0.25	102	82.2	24	−0.3	24	−0.3
GE80-SW	1.56	80	−0.015	125	−0.02	29	0.25	115	90.5	27	−0.3	27	−0.3
GE90-SW	2.15	90	−0.02	140	−0.02	32	0.25	130	103.3	30	−0.4	30	−0.4
GE100-SW	2.33	100	−0.02	150	−0.02	32	0.25	140	114.3	30	−0.4	30	−0.4
GE110-SW	3.76	110	−0.02	170	−0.025	38	0.25	160	125.8	36	−0.4	36	−0.4
GE120-SW	4.1	120	−0.02	180	−0.025	38	0.25	170	135.4	36	−0.4	36	−0.4



Detailed view

s	α	$r_{1\ min}$	$r_{2\ min}$	$d_{a\ max}$	$d_{b\ max}$	$D_{a\ min}$	$D_{b\ min}$	C_r	C_{0r}
mm	°	mm	mm	mm	mm	mm	mm	N	N
1	2.7	0.6	0.3	30.1	39.5	34	43	143000	239000
1	2.4	1	0.3	34.4	42	40	47.5	173000	288000
2	2.3	1	0.3	34.7	45	40.5	50.5	194000	323000
2	2.1	1	0.3	41.1	50	47	57	236000	393000
1.5	1.9	1	0.3	45.6	54	52	61	272000	454000
1.5	1.7	1	0.3	51.7	60	58	67	319000	532000
4	1.6	1	0.3	58	67	65	75	355000	592000
4	1.4	1.5	0.6	60.8	71	70	81	448000	746000
5	1.3	1.5	0.6	66.9	77	76	87	483000	805000
5	1.3	1.5	0.6	74.5	83	84	93	520000	867000
7	1.1	1.5	0.6	81	92	90	104	627000	1040000
10	2	1.5	0.6	88	104	99	117	734000	1220000
11	1.8	2	0.6	100.9	118	112	132	941000	1570000
12	1.7	2	0.6	112	128	123	142	1020000	1700000
15	1.5	2.5	0.6	123.3	146	135	162	1410000	2340000
17	1.4	2.5	0.6	132.9	155	145	172	1500000	2490000

5.8 GE..-AW

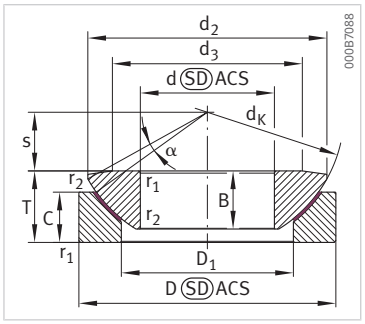
Maintenance-free

DIN ISO 12240-3

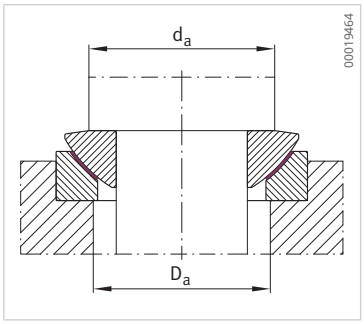
Shaft washer curved surface with hard chromium coating

Open design

5

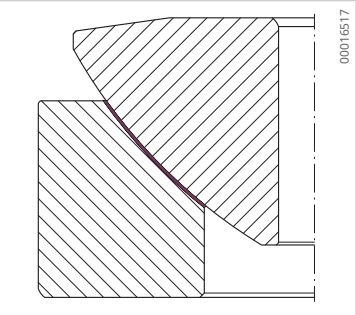


GE..-AW (ELGOGLIDE)



Mounting dimensions

Designation	m	d	d L	D	D L	T	T L	d_K	d_2	d_3	D_1
	kg	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm
GE10-AW	0.039	10	−0.008	30	−0.009	9.5	−0.4	32	27.5	21	16.5
GE12-AW	0.071	12	−0.008	35	−0.011	13	−0.4	37	32	24	19.5
GE15-AW	0.12	15	−0.008	42	−0.011	15	−0.4	45	38.9	29	24
GE17-AW	0.16	17	−0.008	47	−0.011	16	−0.4	50	43.4	34	28
GE20-AW	0.27	20	−0.01	55	−0.013	20	−0.4	60	50	40	33.5
GE25-AW	0.39	25	−0.01	62	−0.013	22.5	−0.4	66	57.5	45	34.5
GE30-AW	0.65	30	−0.01	75	−0.013	26	−0.4	80	69	56	44
GE35-AW	1.04	35	−0.012	90	−0.015	28	−0.4	98	84	66	52
GE40-AW	1.65	40	−0.012	105	−0.015	32	−0.4	114	98	78	59
GE45-AW	2.48	45	−0.012	120	−0.015	36.5	−0.4	130	112	89	68
GE50-AW	3.43	50	−0.012	130	−0.018	42.5	−0.4	140	122.5	98	69
GE60-AW	4.65	60	−0.015	150	−0.018	45	−0.4	160	139.5	109	86
GE70-AW	5.65	70	−0.015	160	−0.025	50	−0.4	170	149.5	121	95
GE80-AW	7.16	80	−0.015	180	−0.025	50	−0.4	194	168	130	108
GE100-AW	10.7	100	−0.02	210	−0.03	59	−0.4	220	195.5	155	133
GE120-AW	13.1	120	−0.02	230	−0.03	64	−0.4	245	214	170	154



Detailed view

B	B L	C	C L	s	α	$r_{1\ min}$	$r_{2\ min}$	$d_{a\ max}$	$D_{a\ min}$	C_a	C_{0a}
mm	mm	mm	mm	mm	°	mm	mm	mm	mm	N	N
7.9	−0.24	6	−0.24	7	10	0.6	0.2	21	18.5	73200	122000
9.3	−0.24	9	−0.24	8	9	0.6	0.2	24	21.5	97300	162000
10.7	−0.24	11	−0.24	10	7	0.6	0.2	29	26	157000	261000
11.5	−0.24	11	−0.24	11	6	0.6	0.2	34	30.5	178000	296000
14.3	−0.24	13	−0.24	12.5	6	1	0.3	40	38	225000	376000
16	−0.24	17	−0.24	14	7	1	0.3	45	39	388000	646000
18	−0.24	19	−0.24	17.5	6	1	0.3	56	49	509000	848000
22	−0.24	20	−0.24	22	6	1	0.3	66	57	778000	1300000
27	−0.24	22	−0.24	24.5	6	1	0.3	78	64	1120000	1870000
31	−0.24	25	−0.24	27.5	6	1	0.3	89	74	1460000	2430000
33.5	−0.24	32	−0.24	30	5	1	0.3	98	75	1950000	3250000
37	−0.3	33	−0.3	35	7	1	0.3	108	92	2210000	3680000
40	−0.3	36	−0.3	35	6	1	0.3	121	102	2420000	4030000
42	−0.3	36	−0.3	42.5	6	1	0.3	130	115	3110000	5180000
50	−0.4	42	−0.4	45	7	1	0.3	155	141	3610000	6020000
52	−0.4	45	−0.4	52.5	6.5	1	0.3	170	162	3740000	6230000

6 Yoke type track rollers, stud type track rollers

6.1 Yoke type track rollers

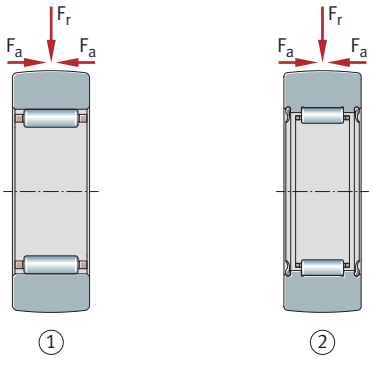
Yoke type track rollers are single or double row units mounted on shafts or studs. They comprise thick-walled outer rings with a profiled outside surface and needle roller and cage assemblies or full complement needle roller or cylindrical roller sets. Yoke type track rollers can support high radial loads as well as axial loads arising from slight misalignment and skewed running. The bearings are available with or without an inner ring, with or without axial guidance, and in sealed or open versions.

Proven areas of application of these products include cam gears, bed ways, conveying equipment, and linear guidance systems.

Series PWTR is supplied as an X-life design. Due to a modified material and the optimized raceway geometry of the outer rings, the basic rating life of this design has been increased by up to 30%. The static and dynamic load carrying capacity has also been increased. At the same time, the stress placed on the mating track has been reduced as a result of the optimized lateral surface profile and its improved surface quality. 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. X-life yoke type track rollers include the suffix XL in the designation

Yoke type track rollers RSTO and RNA22..-2RSR do not have an inner ring. Depending on the design, yoke type track rollers are also available as sealed versions. Radially, they are particularly compact but require a hardened and ground raceway on the shaft or stud. Series RSTO is not self-retaining, which means that the outer ring and the needle roller and cage assembly can be fitted independently of each other. This gives simplified mounting of the bearings. The rolling elements are guided by the cage. These designs do not have axial guidance of the outer ring. Axial guidance of the outer ring and needle roller and cage assembly (for RSTO only) must be provided in the adjacent construction.

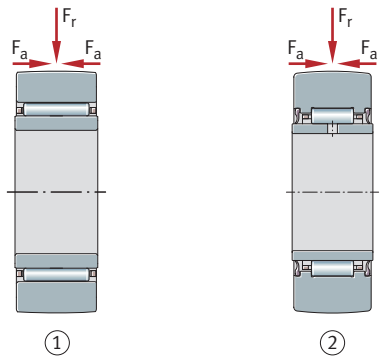
7 Yoke type track rollers without inner ring, without axial guidance, open or sealed on both sides



F_r	Radial load	F_a	Axial load
1	Open (RSTO)	2	Contact seals (RNA22..-2RSR)

Yoke type track rollers STO and NA22..-2RSR have an inner ring. Depending on the design, yoke type track rollers are also available as sealed versions. Bearings with an inner ring are used if the shaft or stud does not have a hardened and ground raceway. Series STO is not self-retaining. This means that the outer ring, inner ring, and the needle roller and cage assembly can be fitted independently of each other. This gives simplified mounting of the bearings. The rolling elements are guided by the cage. These designs do not have axial guidance of the outer ring. Axial guidance of the outer ring and needle roller and cage assembly (for STO only) must be provided in the adjacent construction.

8 Yoke type track rollers with inner ring, without axial guidance, open or sealed on both sides

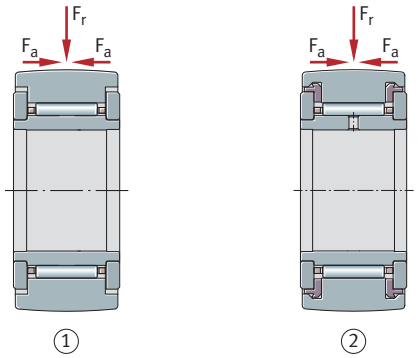


F_r	Radial load	F_a	Axial load
1	Open (RSTO)	2	Contact seals (NA22..-2RSR)

Yoke type track rollers with an inner ring are used if the shaft or stud does not have a hardened and ground raceway. Series NATR and NATR..-PP have a cage. Series NATV and NATV..-PP have a full complement needle roller set, while yoke type track rollers NUTR have a full complement cylindrical roller set. Yoke type track rollers PWTR..-2RS and NNTR..-2ZL have a full complement cylindrical roller set and a central rib. Depending on the design, yoke type track rollers are also available as sealed versions. Bearings without a cage have the largest possible number of rolling elements and therefore have particularly high load carrying capacity. Due to the kinematic conditions, however, the speeds achievable with these bearings are somewhat lower than those achievable with the cage-guided yoke type track rollers. These designs have axial guidance of the outer ring. In NATR and NATV, axial guidance is provided directly by thrust washers, while in NATR..-PP and NATV..-PP this is provided by thrust washers and plastic axial plain washers. In NUTR, the outer ring is guided by the rolling elements, in PWTR..-2RS and NNTR..-2ZL it is guided by the central rib and the rolling elements.

Series PWTR..-2RS-RR is protected against corrosion by the special Cr(VI)-free coating Corrotect. These bearings have the suffix RR.

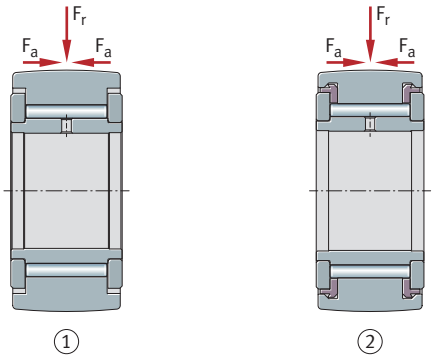
9 Yoke type track rollers with inner ring, with cage, with axial guidance, open or sealed on both sides



000A655D

F_r	Radial load	F_a	Axial load
1	Gap seals (NATR)	2	Plastic axial plain washers (NATR..-PP)

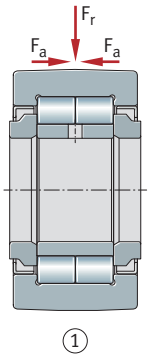
10 Yoke type track rollers with inner ring, full complement needle roller set, with axial guidance, open or sealed on both sides



000A7507

F_r	Radial load	F_a	Axial load
1	Gap seals (NATV)	2	Plastic axial plain washers (NATV..-PP)

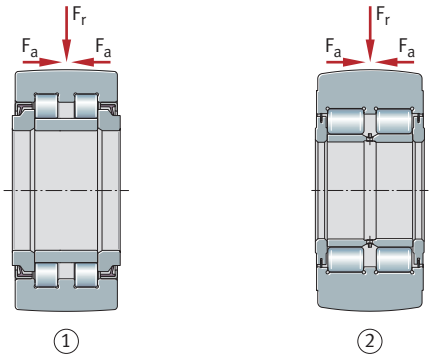
11 Yoke type track rollers with inner ring, full complement cylindrical roller set, with axial guidance, sealed on both sides



000A750A

F_r	Radial load	F_a	Axial load
1	Labyrinth seals (NUTR)		

12 Yoke type track rollers with inner ring, full complement cylindrical roller set, with central rib, with axial guidance, sealed on both sides



F_r	Radial load	F_a	Axial load
1	Protected lip seals (PWTR..-2RS)	2	Thrust washers with lamellar ring (NNTR..-2ZL)

6.1.1 Clarification of product tables

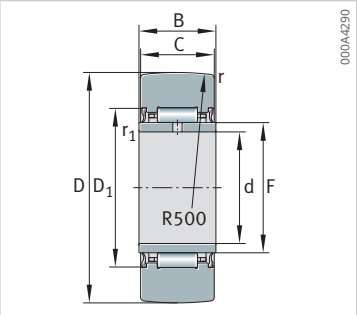
B	mm	Inner ring width
C	mm	Outer ring width
C_{0rw}	N	Effective basic static load rating, radial
C_{rw}	N	Effective basic dynamic load rating, radial
C_{urw}	N	Effective fatigue limit load, radial
d	mm	Bore diameter
D	inch or mm	Outside diameter
d_2	mm	Outside diameter, thrust washer
F	mm	Raceway diameter, inner ring
$F_{0r\ per}$	N	Permissible static radial load
$F_{r\ per}$	N	Outer ring limit load
F_w	mm	Needle enveloping circle with tolerance class F6
m	kg or lbs	Mass
$n_{D\ G}$	min^{-1}	Speed during continuous operation with grease lubrication
$r_{1\ min}$	mm	Min. chamfer dimension
r_{min}	mm	Min. chamfer dimension

6.1.2 NA22..-2RSR

Without axial guidance

Sealed

With inner ring



NA22 with seal 2RSR

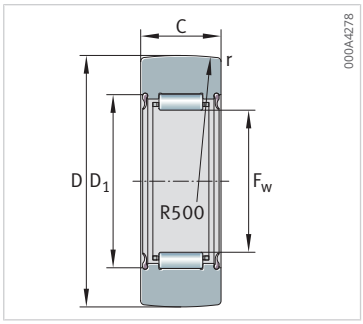
Designation	m	D	F	C	$C_{r\,w}$	$C_{0r\,w}$	$C_{ur\,w}$	$n_{D\,G}$	d	B	D_1 min	r_{min}	$r_{1\,min}$
	kg	mm	mm	mm	N	N	N	min^{-1}	mm	mm	mm	mm	mm
NA22/6-2RSR	0.022	19	10	11.8	3350	3650	495	9000	6	12	16	0.3	0.3
NA22/8-2RSR	0.034	24	12	11.8	4100	4300	650	7000	8	12	18	0.3	0.3
NA2200-2RSR	0.06	30	14	13.8	6100	6900	1120	5500	10	14	20	0.6	0.3
NA2201-2RSR	0.067	32	16	13.8	6600	8300	1300	4700	12	14	22	0.6	0.3
NA2202-2RSR	0.075	35	20	13.8	6700	9500	1400	3400	15	14	26	0.6	0.3
NA2203-2RSR	0.112	40	22	15.8	8900	13600	1890	3000	17	16	28	1	0.3
NA2204-2RSR	0.177	47	25	17.8	14000	18600	2700	2300	20	18	33	1	0.3
NA2205-2RSR	0.209	52	30	17.8	14500	20300	2950	1800	25	18	38	1	0.3
NA2206-2RSR	0.324	62	35	19.8	17100	26500	3600	1400	30	20	43	1	0.3
NA2207-2RSR	0.505	72	42	22.7	21500	36500	5300	1100	35	23	50	1.1	0.6
NA2208-2RSR	0.628	80	48	22.7	26000	41500	5400	850	40	23	57	1.1	0.6
NA2210-2RSR	0.69	90	58	22.7	26000	44000	5700	650	50	23	68	1.1	0.6

6.1.3 RNA22..-2RSR

Without axial guidance

Sealed

Without inner ring



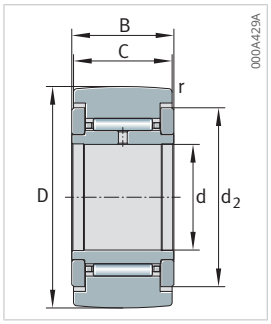
RNA22 with seal 2RSR

Designation	m	D	F F_w	C	$C_{r\,w}$	$C_{0r\,w}$	$C_{ur\,w}$	$n_{D\,G}$	D_1 min	r_{min}
	kg	mm	mm	mm	N	N	N	min^{-1}	mm	mm
RNA22/6-2RSR	0.018	19	10	11.8	3350	3650	495	9000	15.15	0.3
RNA22/8-2RSR	0.029	24	12	11.8	4100	4300	650	7000	18	0.3
RNA2200-2RSR	0.052	30	14	13.8	6100	6900	1120	5500	20	0.6
RNA2201-2RSR	0.057	32	16	13.8	6600	8300	1300	4700	22	0.6
RNA2202-2RSR	0.06	35	20	13.8	6700	9500	1400	3400	26	0.6
RNA2203-2RSR	0.094	40	22	15.8	8900	13600	1890	3000	28	1
RNA2204-2RSR	0.152	47	25	17.8	14000	18600	2700	2300	33	1
RNA2205-2RSR	0.179	52	30	17.8	14500	20300	2950	1800	38	1
RNA2206-2RSR	0.284	62	35	19.8	17100	26500	3600	1400	43	1
RNA2207-2RSR	0.432	72	42	22.7	21500	36500	5300	1100	50	1.1
RNA2208-2RSR	0.53	80	48	22.7	26000	41500	5400	850	57	1.1

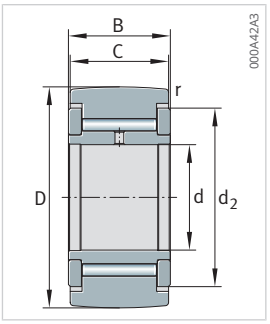
6.1.4 NATR, NATV

With axial guidance

Gap seal



NATR (R = 500 mm)
with gap seal



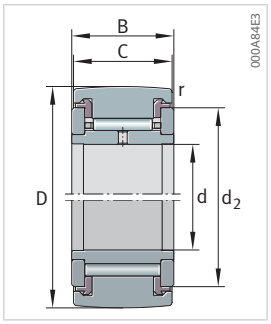
NATV (R = 500 mm)
with gap seal

Designation	m	d	D	B	$C_{r\,w}$	$C_{0r\,w}$	$C_{ur\,w}$	$n_{D\,G}$	C	d_2	r_{min}
	kg	mm	mm	mm	N	N	N	min^{-1}	mm	mm	mm
NATR5	0.014	5	16	12	3200	3450	465	14000	11	12.5	0.15
NATV5	0.015	5	16	12	4850	6700	970	3800	11	12.5	0.15
NATR6	0.02	6	19	12	3550	4100	560	11000	11	15	0.15
NATV6	0.021	6	19	12	5400	8100	1190	3100	11	15	0.15
NATR8	0.041	8	24	15	5500	6700	940	7500	14	19	0.3
NATV8	0.042	8	24	15	7800	11700	1620	2500	14	19	0.3
NATR10	0.064	10	30	15	6800	8700	1240	5500	14	23	0.6
NATV10	0.065	10	30	15	9500	15100	2080	2100	14	23	0.6
NATR12	0.071	12	32	15	7000	9200	1320	4500	14	25	0.6
NATV12	0.072	12	32	15	9600	15900	2210	1800	14	25	0.6
NATR15	0.101	15	35	19	9700	14500	1860	3600	18	27.6	0.6
NATV15	0.109	15	35	19	12700	23400	3250	1600	18	27.6	0.6
NATR17	0.144	17	40	21	10900	16000	2130	2900	20	31.5	1
NATV17	0.152	17	40	21	14700	27000	3550	1400	20	31.5	1
NATR20	0.246	20	47	25	15400	26000	3450	2400	24	36.5	1
NATV20	0.254	20	47	25	20200	42500	6000	1300	24	36.5	1
NATR25	0.275	25	52	25	15200	27000	3600	1800	24	41.5	1
NATV25	0.285	25	52	25	20100	44500	6300	1000	24	41.5	1
NATR30	0.47	30	62	29	23300	39500	5300	1300	28	51	1
NATV30	0.481	30	62	29	30000	63000	9000	850	28	51	1

6.1.5 NATR..-PP, NATV..-PP

With axial guidance

Axial plain washer



NATR, NATV with optimized INA profile and axial plain washer

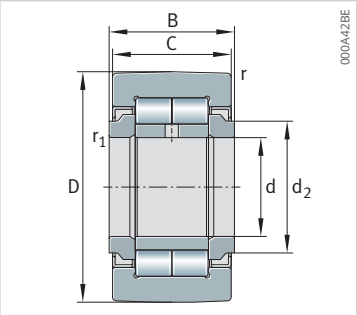
Designation	m	d	D	B	$C_{r\,w}$	$C_{0r\,w}$	$C_{ur\,w}$	$n_{D\,G}$	C	d_2	r_{min}
	kg	mm	mm	mm	N	N	N	min^{-1}	mm	mm	mm
NATR5-PP	0.014	5	16	12	3200	3450	465	14000	11	12.5	0.15
NATV5-PP	0.015	5	16	12	4850	6700	970	3800	11	12.5	0.15
NATR6-PP	0.019	6	19	12	3550	4100	560	11000	11	15	0.15
NATV6-PP	0.021	6	19	12	5400	8100	1190	3100	11	15	0.15
NATR8-PP	0.038	8	24	15	5500	6700	940	7500	14	19	0.3
NATV8-PP	0.041	8	24	15	7800	11700	1620	2500	14	19	0.3
NATR10-PP	0.064	10	30	15	6800	8700	1240	5500	14	23	0.6
NATV10-PP	0.064	10	30	15	9500	15100	2080	2100	14	23	0.6
NATR12-PP	0.066	12	32	15	7000	9200	1320	4500	14	25	0.6
NATV12-PP	0.069	12	32	15	9600	15900	2210	1800	14	25	0.6
NATR15-PP	0.095	15	35	19	9700	14500	1860	3600	18	27.6	0.6
NATV15-PP	0.101	15	35	19	12700	23400	3250	1600	18	27.6	0.6
NATR17-PP	0.139	17	40	21	10900	16000	2130	2900	20	31.5	1
NATV17-PP	0.147	17	40	21	14700	27000	3550	1400	20	31.5	1
NATR20-PP	0.236	20	47	25	15400	26000	3450	2400	24	36.5	1
NATV20-PP	0.245	20	47	25	20200	42500	6000	1300	24	36.5	1
NATR25-PP	0.271	25	52	25	15200	27000	3600	1800	24	41.5	1
NATV25-PP	0.281	25	52	25	20100	44500	6300	1000	24	41.5	1
NATR30-PP	0.444	30	62	29	23300	39500	5300	1300	28	51	1
NATV30-PP	0.468	30	62	29	30000	63000	9000	850	28	51	1
NATR35-PP	0.547	35	72	29	24800	45000	6000	1000	28	58	1.1
NATV35-PP	0.63	35	72	29	32000	72000	10300	750	28	58	1.1
NATR40-PP	0.795	40	80	32	32500	59000	8400	850	30	66	1.1
NATV40-PP	0.832	40	80	32	39500	89000	13200	650	30	66	1.1
NATR50-PP	0.867	50	90	32	31000	60000	8500	650	30	76	1.1
NATV50-PP	0.969	50	90	32	39500	93000	13800	550	30	76	1.1

6.1.6 NUTR, PWTR..-2RS

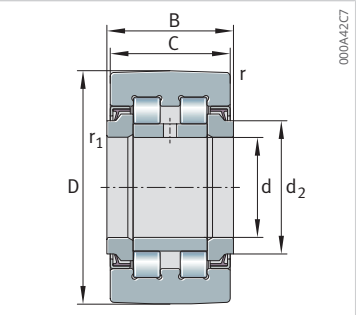
With optimized INA profile

With axial guidance

Sealed



NUTR, with optimized INA profile, with labyrinth seal



PWTR, with optimized INA profile, with seal 2RS

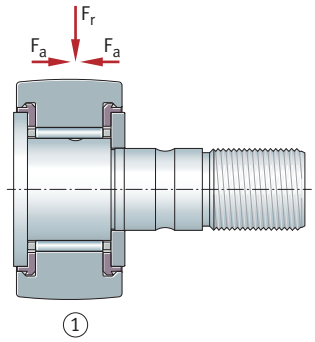
Designation	m	D	d	B	$C_{r\,w}$	$C_{0r\,w}$	$F_{r\,per}$	$F_{0r\,per}$	$C_{ur\,w}$	$n_{D\,G}$	C	d_2	r_{min}	$r_{1\,min}$
	kg	mm	mm	mm	N	N	N	N	N	min^{-1}	mm	mm	mm	mm
NUTR15	0.099	35	15	19	15600	18600	8500	16800	2480	6500	18	20	0.6	0.3
PWTR15-2RS-XL	0.099	35	15	19	12500	14900	10600	14900	1790	6000	18	20	0.6	0.3
NUTR17	0.147	40	17	21	19100	24800	12900	24800	3250	5500	20	22	1	0.5
PWTR17-2RS-XL	0.147	40	17	21	14300	18200	16400	18200	2200	5000	20	22	1	0.5
NUTR1542	0.158	42	15	19	18700	24200	24200	24200	3200	6500	18	20	0.6	0.3
PWTR1542-2RS-XL	0.158	42	15	19	14600	16200	16200	16200	2180	6000	18	20	0.6	0.3
NUTR1747	0.22	47	17	21	22000	30500	30500	30500	3950	5500	20	22	1	0.5
PWTR1747-2RS-XL	0.22	47	17	21	15900	18400	18400	18400	2480	5000	20	22	1	0.5
NUTR20	0.245	47	20	25	28500	38000	16300	32500	4950	4200	24	27	1	0.5
PWTR20-2RS-XL	0.245	47	20	25	24400	31000	20600	31000	3800	3800	24	27	1	0.5
NUTR2052	0.321	52	20	25	31500	44500	38000	44500	5800	4200	24	27	1	0.5
PWTR2052-2RS-XL	0.321	52	20	25	27000	35500	31000	35500	4350	3800	24	27	1	0.5
NUTR25	0.281	52	25	25	29000	41500	17100	34000	5400	4200	24	31	1	0.5
PWTR25-2RS-XL	0.281	52	25	25	25500	33500	21800	33500	4200	3800	24	31	1	0.5
NUTR2562	0.45	62	25	25	35500	54000	54000	54000	7000	4200	24	31	1	0.5
PWTR2562-2RS-XL	0.45	62	25	25	30000	42500	42500	42500	5300	3800	24	31	1	0.5
NUTR30	0.465	62	30	29	41000	54000	23300	46000	7400	2600	28	38	1	0.5
PWTR30-2RS-XL	0.465	62	30	29	35000	44500	28500	44500	6000	2200	28	38	1	0.5
NUTR3072	0.697	72	30	29	49000	69000	68000	69000	9400	2600	28	38	1	0.5
PWTR3072-2RS-XL	0.697	72	30	29	41000	56000	53000	56000	7400	2200	28	38	1	0.5
NUTR35	0.63	72	35	29	45500	65000	31500	62000	8900	2100	28	44	1.1	0.6
PWTR35-2RS-XL	0.63	72	35	29	39000	53000	38500	53000	7100	1800	28	44	1.1	0.6
NUTR3580	0.836	80	35	29	52000	77000	76000	77000	10500	2100	28	44	1.1	0.6
PWTR3580-2RS-XL	0.836	80	35	29	43500	62000	59000	62000	8300	1800	28	44	1.1	0.6
NUTR40	0.816	80	40	32	57000	80000	31000	60000	11300	1600	30	50.5	1.1	0.6
PWTR40-2RS-XL	0.816	80	40	32	45000	60000	39000	60000	8100	1500	30	50.5	1.1	0.6
NUTR45	0.883	85	45	32	57000	83000	31500	62000	11800	1400	30	55.2	1.1	0.6
PWTR45-2RS-XL	0.883	85	45	32	46000	62000	40500	62000	8400	1300	30	55.2	1.1	0.6
NUTR4090	1.129	90	40	32	67000	101000	83000	101000	14200	1600	30	50.5	1.1	0.6
PWTR4090-2RS-XL	1.129	90	40	32	53000	74000	66000	74000	9900	1500	30	50.5	1.1	0.6
NUTR50	0.95	90	50	32	58000	86000	32500	63000	12200	1300	30	59.8	1.1	0.6
PWTR50-2RS-XL	0.95	90	50	32	46500	64000	41500	64000	8700	1100	30	59.8	1.1	0.6
NUTR45100	1.396	100	45	32	73000	114000	105000	114000	16100	1400	30	55.2	1.1	0.6
PWTR45100-2RS-XL	1.396	100	45	32	56000	83000	83000	83000	11100	1300	30	55.2	1.1	0.6
NUTR50110	1.69	110	50	32	77000	127000	127000	127000	18000	1300	30	59.8	1.1	0.6
PWTR50110-2RS-XL	1.69	110	50	32	60000	92000	92000	92000	12300	1100	30	59.8	1.1	0.6

6.2 Stud type track rollers

Stud type track rollers are similar in their construction to single and double row yoke type track rollers with axial guidance, except that the raceway is formed by a heavy-section roller stud with a fixing thread and type-dependent relubrication facility. Due to the thick-walled outer ring with profiled outside surface and the rolling element set, they can support high radial loads as well as axial loads arising from slight misalignment and skewed running. The stud type track rollers are available with or without an eccentric collar. Proven areas of application of these products include cam gears, bed ways, conveying equipment, and linear guidance systems.

Stud type track rollers without an eccentric collar do not have a defined adjustment facility in relation to the mating track on the adjacent construction in mounting of the bearings. The series KR and KR..-PP have a cage, the design KRV..-PP has a full complement needle roller set. Series NUKR has a full complement cylindrical roller set, series PWKR..-2RS has a full complement cylindrical roller set and a central rib. Bearings without a cage have the largest possible number of rolling elements and therefore have a particularly high load carrying capacity. Due to the kinematic conditions, however, the speeds achievable with these bearings are somewhat lower than those achievable with the cage-guided stud type track rollers. The type of guidance is dependent on the series. In KR, axial guidance is provided directly by the contact flange and thrust washer, while in KR..-PP and KRV..-PP this is provided by plastic axial plain washers, the contact flange, and thrust washer. The outer rings of series NUKR and PWKR..-2RS are guided by the rolling elements and ribs. In terms of relubrication facility, stud type track rollers KR16 and KR19 with a hexagonal socket cannot be relubricated, while stud type track rollers KR16 and KR19 with a mounting slot have a relubrication facility.

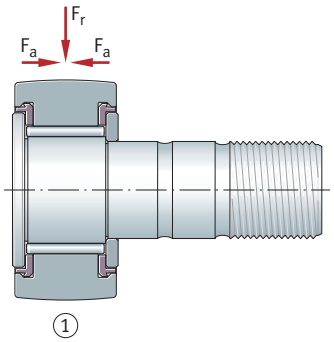
13 Stud type track roller without eccentric collar, with cage, sealed on both sides



000A7522

F_r	Radial load	F_a	Axial load
1	Plastic axial plain washers (for KR..-PP) or gap seals (for KR)		

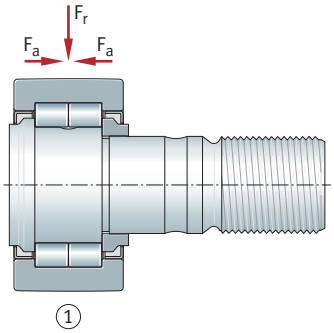
14 Stud type track roller without eccentric collar, full complement needle roller set, sealed on both sides



000A7525

F_r	Radial load	F_a	Axial load
1	Plastic axial plain washers (KRV..-PP)		

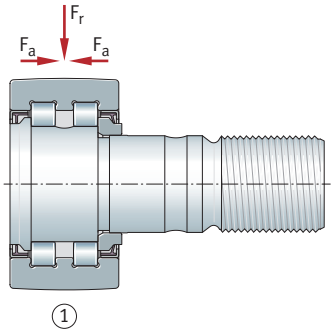
15 Stud type track roller without eccentric collar, full complement cylindrical roller set, sealed on both sides



000A7534

F_r	Radial load	F_a	Axial load
1	Labyrinth seals (NUKR)		

16 Stud type track roller without eccentric collar, full complement cylindrical roller set, with central rib, sealed on both sides



000A7538

F_r	Radial load	F_a	Axial load
1	Protected lip seals (PWKR..-2RS)		

6.2.1 Clarification of product tables

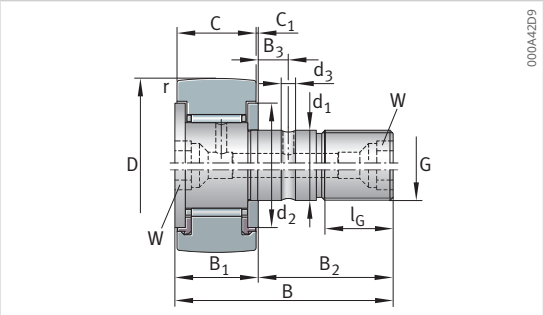
B	mm	Width
B_1	mm	Width over thrust washers
B_2	mm	Effective pin/stud length
B_3	mm	Lubrication hole spacing
B_e	mm	Eccentric collar width
C	mm	Outer ring width
C_{0rw}	N	Effective basic static load rating, radial
C_1	mm	Outer ring projection relative to thrust washer
C_{rw}	N	Effective basic dynamic load rating, radial
C_{urw}	N	Effective fatigue limit load, radial
D	inch or mm	Outside diameter
d_1	mm	Fit diameter of roller stud/pin
d_2	mm	Locating diameter, thrust washer
d_3	mm	Lubrication hole diameter
d_e	mm	Eccentric collar diameter
e	mm	Eccentricity
$F_{0r\ per}$	N	Permissible static radial load
$F_{r\ per}$	N	Outer ring limit load
G	–	Thread
l_G	mm	Thread length
m	kg or lbs	Mass
M_A	Nm	Tightening torque
$n_{D\ G}$	min^{-1}	Speed during continuous operation with grease lubrication
r_{min}	mm	Min. chamfer dimension
W	mm	Width across flats, nominal dimension for hexagonal socket

6.2.2 KR, KR..-PP

With axial guidance

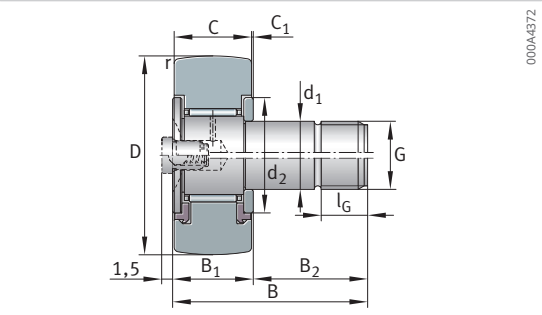
Open or sealed

Without eccentric collar

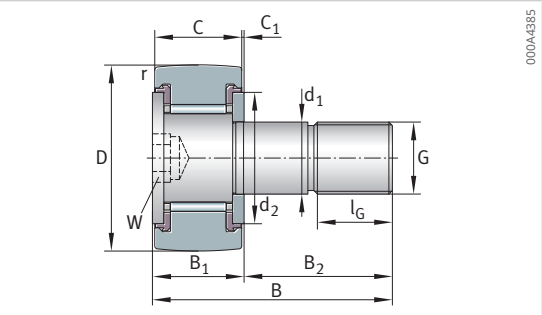


D ≥ 22 mm: KR (top: R = 500 mm),
KR..-PP (bottom: with optimized INA profile)

Designation	m	D	d_1 h7	B	$C_{r\,w}$	$C_{0r\,w}$	$C_{ur\,w}$	$n_{D\,G}$	B_1 max.	B_2	B_3
	kg	mm	mm	mm	N	N	N	min^{-1}	mm	mm	mm
KR16	0.019	16	6	28	3200	3450	465	14000	12.2	16	–
KR16-PP	0.018	16	6	28	3200	3450	465	14000	12.2	16	–
KR16-SK-PP	0.019	16	6	28	3200	3450	465	14000	12.2	16	–
KR19	0.029	19	8	32	3550	4100	560	11000	12.2	20	–
KR19-PP	0.029	19	8	32	3550	4100	560	11000	12.2	20	–
KR19-SK-PP	0.029	19	8	32	3550	4100	560	11000	12.2	20	–
KR22	0.045	22	10	36	4500	5400	740	8000	13.2	23	–
KR22-PP	0.043	22	10	36	4500	5400	740	8000	13.2	23	–
KR26	0.059	26	10	36	5100	6500	860	8000	13.2	23	–
KR26-PP	0.057	26	10	36	5100	6500	860	8000	13.2	23	–
KR30	0.092	30	12	40	6800	8700	1240	5500	15.2	25	6
KR30-PP	0.088	30	12	40	6800	8700	1240	5500	15.2	25	6
KR32	0.103	32	12	40	7100	9300	1320	5500	15.2	25	6
KR32-PP	0.098	32	12	40	7100	9300	1320	5500	15.2	25	6
KR35	0.173	35	16	52	9700	14500	1860	3600	19.6	32.5	8
KR35-PP	0.164	35	16	52	9700	14500	1860	3600	19.6	32.5	8
KR40	0.247	40	18	58	10900	16000	2130	2900	21.6	36.5	8
KR40-PP	0.239	40	18	58	10900	16000	2130	2900	21.6	36.5	8
KR47-PP	0.381	47	20	66	15400	26000	3450	2400	25.6	40.5	9
KR52-PP	0.454	52	20	66	16700	29500	3850	2400	25.6	40.5	9
KR62-PP	0.77	62	24	80	26000	48500	7000	1900	30.6	49.5	11
KR72-PP	1.01	72	24	80	28000	53000	7300	1900	30.6	49.5	11
KR80-PP	1.608	80	30	100	38500	78000	11200	1300	37	63	15
KR90-PP	1.975	90	30	100	40500	84000	11900	1300	37	63	15



KR16, KR19 (top), KR16-PP, KR19-PP (bottom)

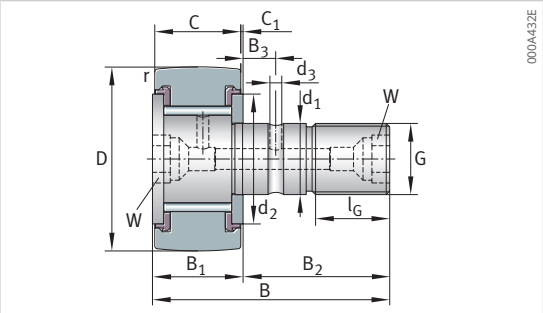


KR16-SK-PP, KR19-SK-PP

C	C_1	r_{min}	d_2	d_3	G	l_G	W	Drive fit lubrication nipple	M_A
mm	mm	mm	mm	mm	–	mm	mm	–	Nm
11	0.6	0.15	12.5	–	M6	8	–	NIPA1	3
11	0.6	0.15	12.5	–	M6	8	–	NIPA1	3
11	0.6	0.15	12.5	–	M6	8	4	–	3
11	0.6	0.15	15	–	M8	10	–	NIPA1	8
11	0.6	0.15	15	–	M8	10	–	NIPA1	8
11	0.6	0.15	15	–	M8	10	4	–	8
12	0.6	0.3	17.5	–	M10×1	12	5	NIPA1×4,5	15
12	0.6	0.3	17.5	–	M10×1	12	5	NIPA1×4,5	15
12	0.6	0.3	17.5	–	M10×1	12	5	NIPA1×4,5	15
12	0.6	0.3	17.5	–	M10×1	12	5	NIPA1×4,5	15
14	0.6	0.6	23	3	M12×1.5	13	6	NIPA1×4,5	22
14	0.6	0.6	23	3	M12×1.5	13	6	NIPA1×4,5	22
14	0.6	0.6	23	3	M12×1.5	13	6	NIPA1×4,5	22
14	0.6	0.6	23	3	M12×1.5	13	6	NIPA1×4,5	22
18	0.8	0.6	27.6	3	M16×1.5	17	8	NIPA2×7,5	58
18	0.8	0.6	27.6	3	M16×1.5	17	8	NIPA2×7,5	58
20	0.8	1	31.5	3	M18×1.5	19	8	NIPA2×7,5	87
20	0.8	1	31.5	3	M18×1.5	19	8	NIPA2×7,5	87
24	0.8	1	36.5	4	M20×1.5	21	10	NIPA2×7,5	120
24	0.8	1	36.5	4	M20×1.5	21	10	NIPA2×7,5	120
29	0.8	1	44	4	M24×1.5	25	14	NIPA3×9,5	220
29	0.8	1.1	44	4	M24×1.5	25	14	NIPA3×9,5	220
35	1	1.1	53	4	M30×1.5	32	14	NIPA3×9,5	450
35	1	1.1	53	4	M30×1.5	32	14	NIPA3×9,5	450

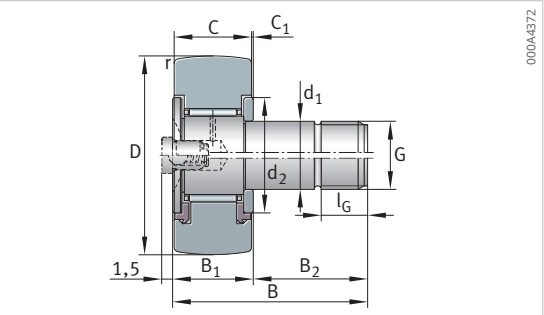
6.2.3 KRV..-PP

With axial guidance
Open or sealed
Without eccentric collar



D ≥ 22 mm: KRV..-PP, with optimized INA profile

Designation	m	D	d_1 h7	B	$C_{r\,w}$	$C_{0r\,w}$	$C_{ur\,w}$	$n_{D\,G}$	B_1 max.	B_2	B_3
	kg	mm	mm	mm	N	N	N	min^{-1}	mm	mm	mm
KRV16-PP	0.019	16	6	28	4850	6700	970	3800	12.2	16	–
KRV19-PP	0.031	19	8	32	5400	8100	1190	3100	12.2	20	–
KRV22-PP	0.045	22	10	36	6200	9300	1230	2600	13.2	23	–
KRV26-PP	0.059	26	10	36	7300	11600	1520	2600	13.2	23	–
KRV30-PP	0.091	30	12	40	9500	15100	2080	2100	15.2	25	6
KRV32-PP	0.101	32	12	40	10000	16300	2240	2100	15.2	25	6
KRV35-PP	0.166	35	16	52	12700	23400	3250	1600	19.6	32.5	8
KRV40-PP	0.247	40	18	58	14700	27000	3550	1400	21.6	36.5	8
KRV47-PP	0.39	47	20	66	20200	42500	6000	1300	25.6	40.5	9
KRV52-PP	0.463	52	20	66	22200	48500	6800	1300	25.6	40.5	9
KRV62-PP	0.787	62	24	80	33500	76000	11400	1100	30.6	49.5	11
KRV72-PP	1.027	72	24	80	36500	86000	12800	1100	30.6	49.5	11
KRV80-PP	1.636	80	30	100	48000	118000	17600	850	37	63	15
KRV90-PP	2.003	90	30	100	51000	130000	19400	850	37	63	15

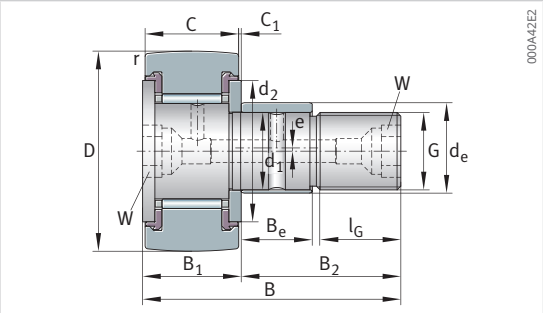


KR16, KR19 (top), KRV16-PP, KRV19-PP (bottom)

C	C_1	r_{min}	d_2	d_3	G	l_G	W	Drive fit lubrication nipple	M_A
mm	mm	mm	mm	mm	–	mm	mm	–	Nm
11	0.6	0.15	12.5	–	M6	8	–	NIPA1	3
11	0.6	0.15	15	–	M8	10	–	NIPA1	8
12	0.6	0.3	17.5	–	M10×1	12	5	NIPA1×4,5	15
12	0.6	0.3	17.5	–	M10×1	12	5	NIPA1×4,5	15
14	0.6	0.6	23	3	M12×1.5	13	6	NIPA1×4,5	22
14	0.6	0.6	23	3	M12×1.5	13	6	NIPA1×4,5	22
18	0.8	0.6	27.6	3	M16×1.5	17	8	NIPA2×7,5	58
20	0.8	1	31.5	3	M18×1.5	19	8	NIPA2×7,5	87
24	0.8	1	36.5	4	M20×1.5	21	10	NIPA2×7,5	120
24	0.8	1	36.5	4	M20×1.5	21	10	NIPA2×7,5	120
29	0.8	1	44	4	M24×1.5	25	14	NIPA3×9,5	220
29	0.8	1.1	44	4	M24×1.5	25	14	NIPA3×9,5	220
35	1	1.1	53	4	M30×1.5	32	14	NIPA3×9,5	450
35	1	1.1	53	4	M30×1.5	32	14	NIPA3×9,5	450

6.2.4 KRE..-PP

With axial guidance
Open or sealed
With eccentric collar



KRE..-PP, with optimized INA profile

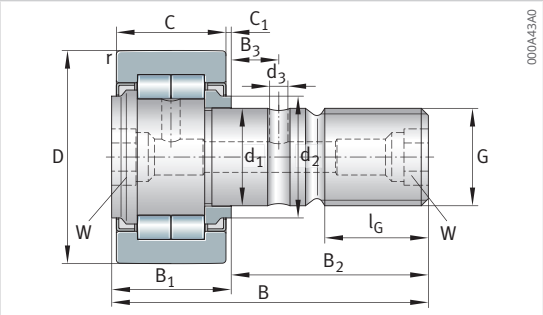
Designation	m	D	d_1 h7	B	$C_{r\,w}$	$C_{0r\,w}$	$C_{ur\,w}$	$n_{D\,G}$	B_1 max.	B_2	B_3
	kg	mm	mm	mm	N	N	N	min^{-1}	mm	mm	mm
KRE16-PP	0.02	16	6	28	3200	3450	465	14000	12.2	16	–
KRE19-PP	0.032	19	8	32	3550	4100	560	11000	12.2	20	–
KRE22-PP	0.047	22	10	36	4500	5400	740	8000	13.2	23	–
KRE26-PP	0.062	26	10	36	5100	6500	860	8000	13.2	23	–
KRE30-PP	0.093	30	12	40	6800	8700	1240	5500	15.2	25	6
KRE32-PP	0.104	32	12	40	7100	9300	1320	5500	15.2	25	6
KRE35-PP	0.177	35	16	52	9700	14500	1860	3600	19.6	32.5	8
KRE40-PP	0.255	40	18	58	10900	16000	2130	2900	21.6	36.5	8
KRE47-PP	0.4	47	20	66	15400	26000	3450	2400	25.6	40.5	9
KRE52-PP	0.473	52	20	66	16700	29500	3850	2400	25.6	40.5	9
KRE62-PP	0.789	62	24	80	26000	48500	7000	1900	30.6	49.5	11
KRE72-PP	1.038	72	24	80	28000	53000	7300	1900	30.6	49.5	11
KRE80-PP	1.665	80	30	100	38500	78000	11200	1300	37	63	15
KRE90-PP	2.032	90	30	100	40500	84000	11900	1300	37	63	15

C	C_1	r_{min}	d_2	d_3	G	l_G	W	d_e h9	B_e	e	Drive fit lubrication nipple	M_A
mm	mm	mm	mm	mm	–	mm	mm	mm	mm	mm	–	Nm
11	0.6	0.15	12.5	–	M6	8	–	9	7	0.5	NIPA1	3
11	0.6	0.15	15	–	M8	10	–	11	9	0.5	NIPA1	8
12	0.6	0.3	17.5	–	M10×1	12	5	13	10	0.5	NIPA1×4,5	15
12	0.6	0.3	17.5	–	M10×1	12	5	13	10	0.5	NIPA1×4,5	15
14	0.6	0.6	23	3	M12×1.5	13	6	15	11	0.5	NIPA1×4,5	22
14	0.6	0.6	23	3	M12×1.5	13	6	15	11	0.5	NIPA1×4,5	22
18	0.8	0.6	27.6	3	M16×1.5	17	8	20	14	1	NIPA2×7,5	58
20	0.8	1	31.5	3	M18×1.5	19	8	22	16	1	NIPA2×7,5	87
24	0.8	1	36.5	4	M20×1.5	21	10	24	18	1	NIPA2×7,5	120
24	0.8	1	36.5	4	M20×1.5	21	10	24	18	1	NIPA2×7,5	120
29	0.8	1	44	4	M24×1.5	25	14	28	22	1	NIPA3×9,5	220
29	0.8	1.1	44	4	M24×1.5	25	14	28	22	1	NIPA3×9,5	220
35	1	1.1	53	4	M30×1.5	32	14	35	29	1.5	NIPA3×9,5	450
35	1	1.1	53	4	M30×1.5	32	14	35	29	1.5	NIPA3×9,5	450

6.2.5 NUKR, PWKR..-2RS

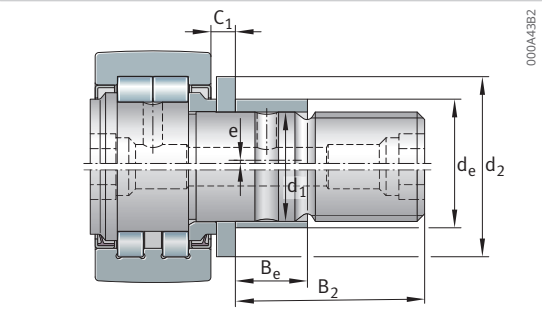
With axial guidance

Without eccentric collar



NUKR, with optimized INA profile

Designation	m	D	d_1 h7	B	$C_{r\ w}$	$C_{0r\ w}$	$F_{r\ per}$	$F_{0r\ per}$	$C_{ur\ w}$	$n_{D\ G}$
	kg	mm	mm	mm	N	N	N	N	N	min^{-1}
NUKR35	0.164	35	16	52	15600	18600	8500	16800	2480	6500
PWKR35-2RS-XL	0.164	35	16	52	12500	14900	10600	14900	1790	6000
NUKR40	0.242	40	18	58	19100	24800	12900	24800	3250	5500
PWKR40-2RS-XL	0.242	40	18	58	14300	18200	16400	18200	2200	5000
NUKR47	0.38	47	20	66	28500	38000	16300	32500	4950	4200
PWKR47-2RS-XL	0.38	47	20	66	24400	31000	20600	31000	3800	3800
NUKR52	0.45	52	20	66	29000	41500	17100	34000	5400	4200
PWKR52-2RS-XL	0.45	52	20	66	25500	33500	21800	33500	4200	3800
NUKR62	0.795	62	24	80	41000	54000	23300	46000	7400	2600
PWKR62-2RS-XL	0.795	62	24	80	35000	44500	28500	44500	6000	2200
NUKR72	1.02	72	24	80	45500	65000	31500	62000	8900	2600
PWKR72-2RS-XL	1.02	72	24	80	39000	53000	38500	53000	7100	2200
NUKR80	1.6	80	30	100	71000	103000	47000	94000	14400	1800
PWKR80-2RS-XL	1.6	80	30	100	57000	77000	59000	77000	10900	1800
NUKR90	1.96	90	30	100	80000	123000	76000	123000	17000	1800
PWKR90-2RS-XL	1.96	90	30	100	63000	89000	89000	89000	12500	1800



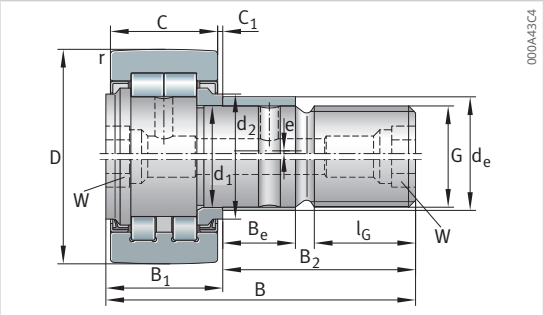
PWKR..-2RS, with optimized INA profile

B_1 max.	B_2	B_3	C	C_1	r_{min}	d_2	d_3	G	l_G	W	Drive fit lubrication nipple	M_A
mm	mm	mm	mm	mm	mm	mm	mm	–	mm	mm	–	Nm
19.6	32.5	7.8	18	0.8	0.6	20	3	M16×1.5	17	8	NIPA2×7,5	58
19.6	32.5	7.8	18	0.8	0.6	20	3	M16×1.5	17	8	NIPA2×7,5	58
21.6	36.5	8	20	0.8	1	22	3	M18×1.5	19	8	NIPA2×7,5	87
21.6	36.5	8	20	0.8	1	22	3	M18×1.5	19	8	NIPA2×7,5	87
25.6	40.5	9	24	0.8	1	27	4	M20×1.5	21	10	NIPA2×7,5	120
25.6	40.5	9	24	0.8	1	27	4	M20×1.5	21	10	NIPA2×7,5	120
25.6	40.5	9	24	0.8	1	31	4	M20×1.5	21	10	NIPA2×7,5	120
25.6	40.5	9	24	0.8	1	31	4	M20×1.5	21	10	NIPA2×7,5	120
30.6	49.5	11	28	1.3	1	38	4	M24×1.5	25	14	NIPA3×9,5	220
30.6	49.5	11	28	1.3	1	38	4	M24×1.5	25	14	NIPA3×9,5	220
30.6	49.5	11	28	1.3	1.1	44	4	M24×1.5	25	14	NIPA3×9,5	220
30.6	49.5	11	28	1.3	1.1	44	4	M24×1.5	25	14	NIPA3×9,5	220
37	63	15	35	1	1.1	47	4	M30×1.5	32	14	NIPA3×9,5	450
37	63	15	35	1	1.1	47	4	M30×1.5	32	14	NIPA3×9,5	450
37	63	15	35	1	1.1	47	4	M30×1.5	32	14	NIPA3×9,5	450
37	63	15	35	1	1.1	47	4	M30×1.5	32	14	NIPA3×9,5	450

6.2.6 NUKRE, PWKRE..-2RS

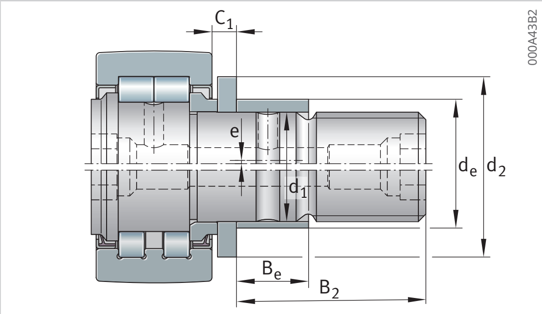
With axial guidance

With eccentric collar



NUKRE (top), PWKRE..-2RS (bottom),
with optimized INA profile

Designation	m	D	d_1 h7	B	$C_{r\,w}$	$C_{0r\,w}$	$F_{r\,per}$	$F_{0r\,per}$	$C_{ur\,w}$	$n_{D\,G}$
	kg	mm	mm	mm	N	N	N	N	N	min^{-1}
NUKRE35	0.177	35	16	52	15600	18600	8500	16800	2480	6500
PWKRE35-2RS-XL	0.177	35	16	52	12500	14900	10600	14900	1790	6000
NUKRE40	0.258	40	18	58	19100	24800	12900	24800	3250	5500
PWKRE40-2RS-XL	0.258	40	18	58	14300	18200	16400	18200	2200	5000
NUKRE47	0.4	47	20	66	28500	38000	16300	32500	4950	4200
PWKRE47-2RS-XL	0.4	47	20	66	24400	31000	20600	31000	3800	3800
NUKRE52	0.47	52	20	66	29000	41500	17100	34000	5400	4200
PWKRE52-2RS-XL	0.47	52	20	66	25500	33500	21800	33500	4200	3800
NUKRE62	0.824	62	24	80	41000	54000	23300	46000	7400	2600
PWKRE62-2RS-XL	0.824	62	24	80	35000	44500	28500	44500	6000	2200
NUKRE72	1.05	72	24	80	45500	65000	31500	62000	8900	2600
PWKRE72-2RS-XL	1.05	72	24	80	39000	53000	38500	53000	7100	2200
NUKRE80	1.67	80	30	100	71000	103000	47000	94000	14400	1800
PWKRE80-2RS-XL	1.67	80	30	100	57000	77000	59000	77000	10900	1800
NUKRE90	2.02	90	30	100	80000	123000	76000	123000	17000	1800
PWKRE90-2RS-XL	2.02	90	30	100	63000	89000	89000	89000	12500	1800



NUKRE35/NUKRE40 (top),
PWKRE35-2RS/PWKRE40-2RS (bottom),
with optimized INA profile

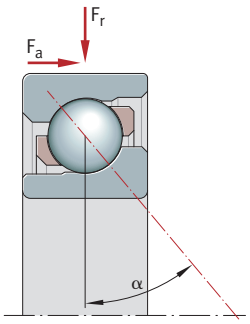
B_1 max.	B_2	B_3	C	C_1	r_{min}	d_2	d_3	G	l_G	W	d_e h9	B_e	e	Drive fit lubrication nipple	M_A
mm	mm	mm	mm	mm	mm	mm	mm	–	mm	mm	mm	mm	mm	–	Nm
22.6	29.5	–	18	3.8	0.6	27.6	–	M16×1.5	17	8	20	12	1	NIPA2×7,5	58
22.6	29.5	–	18	3.8	0.6	27.6	–	M16×1.5	17	8	20	12	1	NIPA2×7,5	58
24.6	33.5	–	20	3.8	1	30	–	M18×1.5	19	8	22	14	1	NIPA2×7,5	87
24.6	33.5	–	20	3.8	1	30	–	M18×1.5	19	8	22	14	1	NIPA2×7,5	87
25.6	40.5	9	24	0.8	1	27	4	M20×1.5	21	10	24	18	1	NIPA2×7,5	120
25.6	40.5	9	24	0.8	1	27	4	M20×1.5	21	10	24	18	1	NIPA2×7,5	120
25.6	40.5	9	24	0.8	1	31	4	M20×1.5	21	10	24	18	1	NIPA2×7,5	120
25.6	40.5	9	24	0.8	1	31	4	M20×1.5	21	10	24	18	1	NIPA2×7,5	120
30.6	49.5	11	28	1.3	1	38	4	M24×1.5	25	14	28	22	1	NIPA3×9,5	220
30.6	49.5	11	28	1.3	1	38	4	M24×1.5	25	14	28	22	1	NIPA3×9,5	220
30.6	49.5	11	28	1.3	1.1	44	4	M24×1.5	25	14	28	22	1	NIPA3×9,5	220
30.6	49.5	11	28	1.3	1.1	44	4	M24×1.5	25	14	28	22	1	NIPA3×9,5	220
37	63	15	35	1	1.1	47	4	M30×1.5	32	14	35	29	1.5	NIPA3×9,5	450
37	63	15	35	1	1.1	47	4	M30×1.5	32	14	35	29	1.5	NIPA3×9,5	450
37	63	15	35	1	1.1	47	4	M30×1.5	32	14	35	29	1.5	NIPA3×9,5	450
37	63	15	35	1	1.1	47	4	M30×1.5	32	14	35	29	1.5	NIPA3×9,5	450

7 Single row angular contact ball bearings

Bearings of basic design for bearing arrangements with single bearings

Single row angular contact ball bearings are part of the group of radial ball bearings. These self-retaining units have solid outer and inner rings. The rolling elements are guided by cages made from polyamide, sheet steel, or brass. The bearing rings are designed with one high shoulder and one low shoulder. As a result of the different shoulder heights, the mounting method differs from that of deep groove ball bearings. The possible number of balls for angular contact ball bearings with identical dimensions is higher than for deep groove ball bearings. In contrast to deep groove ball bearings, the raceways on the inner and outer rings are arranged obliquely to each other in the direction of the bearing axis. As a result, the forces are transmitted from one raceway to the other at a defined contact angle (oblique to the radial plane). These angular contact ball bearings can be considered when only one bearing is used per bearing position. As the bearings have standard bearing ring tolerances (they are manufactured to tolerance class Normal), they are not suitable for mounting directly adjacent to each other. In such cases, universal bearings should be used.

17 Single row angular contact ball bearing of basic design



F_r	Radial load	F_a	Axial load
α	Nominal contact angle		

Universal bearings for mounting in sets

Single row angular contact ball bearings, which are intended for mounting in pairs (in sets) directly adjacent to each other, are manufactured in the so-called universal design. These bearings can be used in pairs in any arrangement without shims. Depending on the design selected, the mounted bearing pair has the required axial clearance, freedom from clearance, or preload. This gives easier design of the bearing arrangement and mounting of the bearings. When ordering, please state the number of bearings, not the number of bearing pairs.

Suffixes

Bearings of a universal design are indicated by the suffix UA, UB, UO, UL, UM, or UH. If bearings of the universal design are arranged in sets, this gives a defined axial clearance or an axial preload:

- UA = bearing set with small axial internal clearance
- UB = bearing set with smaller axial internal clearance than UA
- UO = bearing set clearance-free in O or X arrangement
- UL = bearing set with light preload
- UM = bearing set with moderate preload
- UH = bearing set with high preload

Single row angular contact ball bearings are mounted in sets if:

- the load carrying capacity of one bearing is not sufficient (bearing set in a tandem arrangement)
- combined or axial loads occur in both directions and the bearing arrangement must have a defined axial clearance (bearing set in O or X arrangement)

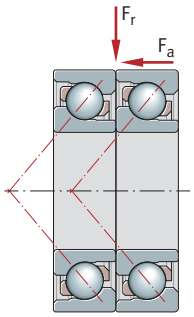
The following arrangements are possible for mounting in sets:

- tandem arrangement
- O arrangement
- X arrangement

Universal bearings, mounted in sets in a tandem arrangement

In a tandem arrangement, the contact lines run parallel to each other. Axial forces are distributed equally over both bearings, but can only be supported by the bearing set from one direction. In order to support axial forces from the opposing direction, as well as combined loads, the bearing set is always adjusted against a further bearing.

18 Universal bearings, mounted in sets in a tandem arrangement

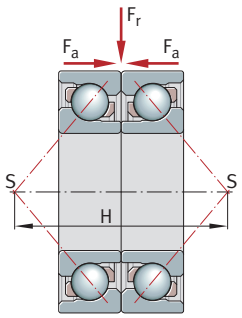


F_r	Radial load	F_a	Axial load

Universal bearings, mounted in sets in an O arrangement

In an O arrangement, the apexes of the cones formed by the contact lines point outwards, i.e., they diverge relative to the bearing axis. Bearing sets in an O arrangement support axial forces from both directions, but only ever with one bearing. Due to the large support spacing (this is the spacing between the contact cone apexes), these give relatively rigid bearing arrangements (small tilting clearance) and are also suitable for supporting tilting moments.

19 Universal bearings, mounted in sets in an O arrangement



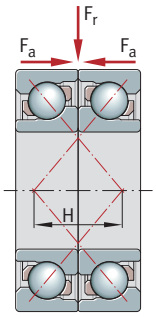
0009A7E0

F_r	Radial load	F_a	Axial load
S	Contact cone apex	H	Support spacing

Universal bearings, mounted in sets in an X arrangement

In an X arrangement, the apexes of the cones formed by the contact lines point inwards, i.e., they converge relative to the bearing axis. Once again, bearing sets of this type support axial forces from both directions, but also only ever with one bearing. The support base is, however, smaller than in an O arrangement. As a result, the sets are not as rigid as in an O arrangement. Furthermore, they are less suitable for supporting tilting moments.

20 Universal bearings, mounted in sets in an X arrangement



0009A7E4

F_r	Radial load	F_a	Axial load
H	Support spacing		

X-life premium quality

Many sizes in series 70..-B, 72..-B, 73..-B, and 74..-B are available as X-life bearings. These bearings exhibit considerably higher performance than standard single row angular contact ball bearings. This is achieved, for example, through the modified internal construction, higher surface quality of the contact surfaces, and optimized cage design, as well as through the improved quality of the steel and rolling elements.

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

- a more favorable 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

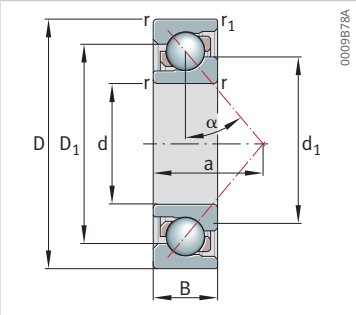
Single row X-life angular contact ball bearings include the suffix XL in the designation.

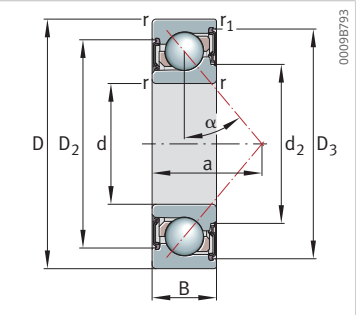
7.1 Clarification of product tables

a	mm	Contact cone apex spacing
B	mm	Width
C_{0r}	N	Basic static load rating, radial
C_r	N	Basic dynamic load rating, radial
C_{ur}	N	Fatigue limit load, radial
d	mm	Bore diameter
D	inch or mm	Outside diameter
d_1	mm	Rib diameter, inner ring
D_1	mm	Rib diameter, outer ring
d_2	mm	Groove diameter, inner ring
D_2	mm	Groove diameter, outer ring
D_3	mm	Groove diameter, narrow lateral face of outer ring
d_a	mm	Abutment diameter, shaft shoulder
D_a	mm	Housing shoulder diameter
D_b	mm	Abutment diameter, outside, width S
m	kg or lbs	Mass
n_G	min^{-1}	Limiting speed
$n_{\vartheta r}$	min^{-1}	Thermal speed rating
$r_{1\ min}$	mm	Min. chamfer dimension
$r_{a\ max}$	mm	Max. undercut radius
$r_{a1\ max}$	mm	Max. undercut radius
r_{min}	mm	Min. chamfer dimension
α	°	Contact angle

7.2 7..-B-TVH, 7..-B-XL-TVP, 7..-B-XL-2RS-TVP, 7..-B-XL-JP, 7..-B-XL-MP

Single row

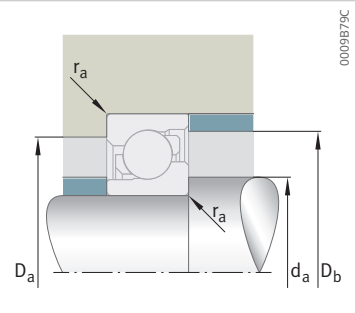




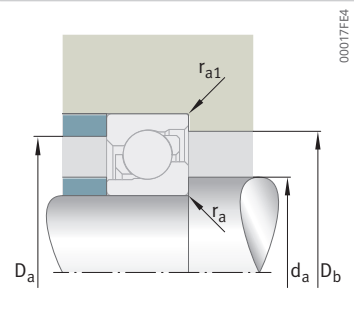
With seal 2RS

7

Designation	m	d	D	B	D_1	D_2	D_3	d_1	d_2	r_{min}	$r_{1\ min}$
	kg	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm
71806-B-TVH	0.026	30	42	7	37.3	–	–	34.7	–	0.3	0.2
7006-B-XL-TVP	0.109	30	55	13	47.1	–	–	41.3	–	1	0.6
7006-B-XL-2RS-TVP	0.109	30	55	13	47.1	47.7	51.9	41.3	38	1	0.6
7206-B-XL-JP	0.203	30	62	16	49.5	–	–	43.2	–	1	0.6
7206-B-XL-TVP	0.197	30	62	16	49.5	–	–	43.2	–	1	0.6
7206-B-XL-2RS-TVP	0.204	30	62	16	49.5	51.7	57.1	43.2	39.5	1	0.6
7306-B-XL-JP	0.362	30	72	19	55.9	–	–	47.1	–	1.1	0.6
7306-B-XL-TVP	0.341	30	72	19	55.9	–	–	47.1	–	1.1	0.6
7306-B-XL-2RS-TVP	0.341	30	72	19	55.9	58.5	65.9	47.1	42.7	1.1	0.6
7406-B-XL-MP	0.791	30	90	23	66	–	–	55.3	–	1.5	1
71807-B-TVH	0.029	35	47	7	42.3	–	–	39.7	–	0.3	0.2
7007-B-XL-TVP	0.14	35	62	14	53.4	–	–	47	–	1	0.6
7007-B-XL-2RS-TVP	0.14	35	62	14	53.4	54	58.9	47	43.6	1	0.6
7207-B-XL-JP	0.29	35	72	17	57.6	–	–	50.2	–	1.1	0.6
7207-B-XL-TVP	0.282	35	72	17	57.6	–	–	50.2	–	1.1	0.6
7207-B-XL-2RS-TVP	0.292	35	72	17	57.6	60.2	66.5	50.2	45.8	1.1	0.6
7307-B-XL-JP	0.48	35	80	21	63	–	–	53.1	–	1.5	1
7307-B-XL-TVP	0.48	35	80	21	63	–	–	53.1	–	1.5	1
7307-B-XL-2RS-TVP	0.477	35	80	21	63	65.6	73.9	53.1	48.7	1.5	1
7407-B-XL-MP	1.01	35	100	25	79.8	–	–	66.7	–	1.5	1
71808-B-TVH	0.033	40	52	7	47.3	–	–	44.7	–	0.3	0.2
7008-B-XL-TVP	0.176	40	68	15	58.8	–	–	51.9	–	1	0.6
7008-B-XL-2RS-TVP	0.17	40	68	15	58.8	59.4	65	51.9	48.3	1	0.6
7208-B-XL-JP	0.372	40	80	18	64.4	–	–	56.4	–	1.1	0.6
7208-B-XL-TVP	0.367	40	80	18	64.4	–	–	56.4	–	1.1	0.6
7208-B-XL-2RS-TVP	0.379	40	80	18	64.4	67	73.8	56.4	52	1.1	0.6
7308-B-XL-JP	0.646	40	90	23	71.3	–	–	60	–	1.5	1
7308-B-XL-TVP	0.61	40	90	23	71.3	–	–	60	–	1.5	1
7308-B-XL-2RS-TVP	0.61	40	90	23	71.3	73.9	83.3	60	55.6	1.5	1
7408-B-XL-MP	1.34	40	110	27	87.6	–	–	73.1	–	2	1
71809-B-TVH	0.041	45	58	7	52.8	–	–	50.2	–	0.3	0.2
7209-B-XL-JP	0.411	45	85	19	69.8	–	–	61.2	–	1.1	0.6
7209-B-XL-TVP	0.405	45	85	19	69.8	–	–	61.2	–	1.1	0.6
7209-B-XL-2RS-TVP	0.405	45	85	19	69.8	72.4	79.6	61.2	56.8	1.1	0.6
7309-B-XL-JP	0.937	45	100	25	79.8	–	–	66.7	–	1.5	1
7309-B-XL-TVP	0.937	45	100	25	79.8	–	–	66.7	–	1.5	1
7409-B-XL-MP	1.68	45	120	29	95.3	–	–	80.3	–	2	1
71810-B-TVH	0.058	50	65	7	59.3	–	–	56.7	–	0.3	0.2
7210-B-XL-JP	0.466	50	90	20	74.8	–	–	66.3	–	1.1	0.6
7210-B-XL-TVP	0.456	50	90	20	74.8	–	–	66.3	–	1.1	0.6



Mounting dimensions

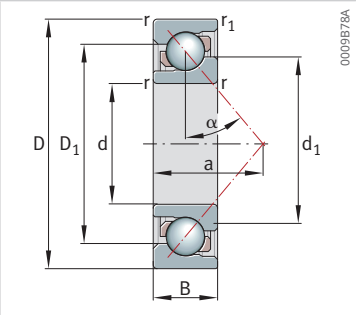


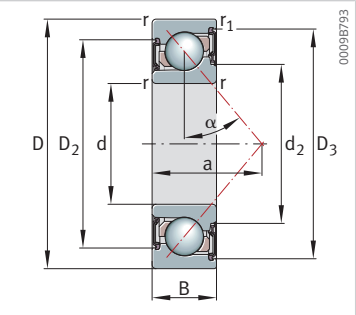
Mounting dimensions

a	α	d_a min.	D_a max.	D_b max.	$r_{a\ max}$	$r_{a1\ max}$	C_r	C_{0r}	C_{ur}	n_G	$n_{\delta r}$
mm	°	mm	mm	mm	mm	mm	N	N	N	min^{-1}	min^{-1}
18.6	40	32	40	40	0.3	0.2	5600	4550	300	20600	9600
24	40	34.6	50.4	51.8	1	0.6	19900	13400	930	16800	10200
24	40	34.6	50.4	51.8	1	0.6	19900	13400	930	6900	–
27	40	35.6	56.4	57.8	1	0.6	23100	14100	980	15800	11200
27	40	35.6	56.4	57.8	1	0.6	23100	14100	980	15800	11200
27	40	35.6	56.4	57.8	1	0.6	23100	14100	980	6500	–
31	40	37	65	67.8	1	0.6	37500	22100	1530	13500	8600
31	40	37	65	67.8	1	0.6	37500	22100	1530	13500	8600
31	40	37	65	67.8	1	0.6	37500	22100	1530	6000	–
37	40	41	79	84.4	1.5	1	51000	30500	2110	14500	6800
20.7	40	37	45	45.6	0.3	0.2	6000	5300	360	18100	8200
27	40	39.6	57.4	58.8	1	0.6	24300	17200	1200	14700	9000
27	40	39.6	57.4	58.8	1	0.6	24300	17200	1200	6000	–
31	40	42	65	67.8	1	0.6	30000	19000	1320	13400	9600
31	40	42	65	67.8	1	0.6	30000	19000	1320	13400	9600
31	40	42	65	67.8	1	0.6	30000	19000	1320	5600	–
35	40	44	71	74.4	1.5	1	45500	27500	1910	11900	7900
35	40	44	71	74.4	1.5	1	45500	27500	1910	11900	7900
35	40	44	71	74.4	1.5	1	45500	27500	1910	5300	–
41	40	46	94.4	100	1.5	1	65000	43000	3000	12100	5400
22.8	40	42	50	50	0.3	0.2	6300	5800	405	16200	7200
30	40	44.6	63.4	64.8	1	0.6	28000	20300	1410	13300	8400
30	40	44.6	63.4	64.8	1	0.6	28000	20300	1410	5400	–
34	40	47	73	75.8	1	0.6	36000	23500	1630	11900	8600
34	40	47	73	75.8	1	0.6	36000	23500	1630	11900	8600
34	40	47	73	75.8	1	0.6	36000	23500	1630	5000	–
39	40	49	81	84.4	1.5	1	57000	34500	2390	10400	7100
39	40	49	81	84.4	1.5	1	57000	34500	2390	10400	7100
39	40	49	81	84.4	1.5	1	57000	34500	2390	4650	–
45	40	53	97	104.4	2	1	75000	50000	3500	10900	5000
25.1	40	47	56	56	0.3	0.2	6600	6500	465	14500	6300
37	40	52	78	80.8	1	0.6	40000	27000	1870	11000	8000
37	40	52	78	80.8	1	0.6	40000	27000	1870	11000	8000
37	40	52	78	80.8	1	0.6	40000	27000	1870	4550	–
43	40	54	91	94.4	1.5	1	69000	43000	3000	9300	6500
43	40	54	91	94.4	1.5	1	69000	43000	3000	9300	6500
49	40	58	107	114.4	2	1	86000	61000	4250	10000	4650
27.8	40	52	63	63	0.3	0.2	7000	7400	540	12900	5400
39	40	57	83	85.8	1	0.6	41500	28500	1970	10300	7600
39	40	57	83	85.8	1	0.6	41500	28500	1970	10300	7600

7.2 7..-B-TVH, 7..-B-XL-TVP, 7..-B-XL-2RS-TVP, 7..-B-XL-JP, 7..-B-XL-MP

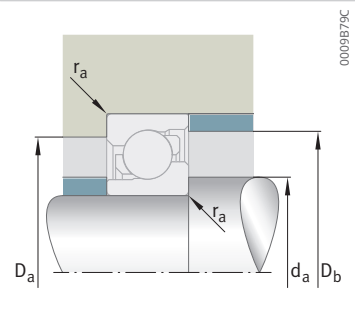
Single row



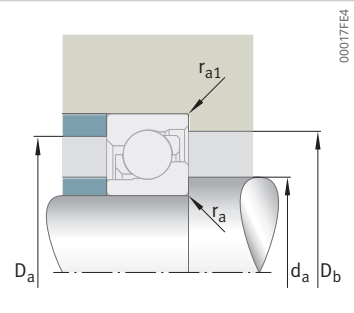


With seal 2RS

Designation	m	d	D	B	D_1	D_2	D_3	d_1	d_2	r_{min}	$r_{1\ min}$
	kg	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm
7210-B-XL-2RS-TVP	0.468	50	90	20	74.8	77.4	84.6	66.3	61.8	1.1	0.6
7310-B-XL-JP	1.13	50	110	27	87.6	–	–	73.1	–	2	1
7310-B-XL-TVP	1.05	50	110	27	87.6	–	–	73.1	–	2	1
7410-B-XL-MP	2.05	50	130	31	103.4	–	–	87.3	–	2.1	1.1
71811-B-TVH	0.084	55	72	9	65.3	–	–	61.7	–	0.3	0.2
7211-B-XL-JP	0.645	55	100	21	83	–	–	72.6	–	1.5	1
7211-B-XL-TVP	0.604	55	100	21	83	–	–	72.6	–	1.5	1
7311-B-XL-JP	1.46	55	120	29	95.3	–	–	80.3	–	2	1
7311-B-XL-TVP	1.38	55	120	29	95.3	–	–	80.3	–	2	1
7411-B-XL-MP	2.64	55	140	33	111.5	–	–	95.3	–	2.1	1.1
71812-B-TVH	0.11	60	78	10	70.8	–	–	67.2	–	0.3	0.2
7212-B-XL-JP	0.782	60	110	22	90.8	–	–	80.3	–	1.5	1
7212-B-XL-TVP	0.808	60	110	22	90.8	–	–	80.3	–	1.5	1
7212-B-XL-2RS-TVP	0.78	60	110	22	90.8	94.4	103.4	80.3	75.3	1.5	1
7312-B-XL-JP	1.74	60	130	31	103.4	–	–	87.3	–	2.1	1.1
7312-B-XL-TVP	1.71	60	130	31	103.4	–	–	87.3	–	2.1	1.1
7412-B-XL-MP	3.1	60	150	35	119.6	–	–	102.3	–	2.1	1.1
71813-B-TVH	0.13	65	85	10	77	–	–	73	–	0.6	0.3
7213-B-XL-JP	1.08	65	120	23	98.9	–	–	86.3	–	1.5	1
7213-B-XL-TVP	1	65	120	23	98.9	–	–	86.3	–	1.5	1
7313-B-XL-JP	2.22	65	140	33	111.5	–	–	95.3	–	2.1	1.1
7313-B-XL-TVP	2.12	65	140	33	111.5	–	–	95.3	–	2.1	1.1
7413-B-XL-MP	3.71	65	160	37	128	–	–	109.2	–	2.1	1.1
71814-B-TVH	0.14	70	90	10	82	–	–	78	–	0.6	0.3
7214-B-XL-JP	1.17	70	125	24	104	–	–	92.3	–	1.5	1
7214-B-XL-TVP	1.08	70	125	24	104	–	–	92.3	–	1.5	1
7214-B-XL-2RS-TVP	1.08	70	125	24	104	107.6	117.9	92.3	87.3	1.5	1
7314-B-XL-JP	2.76	70	150	35	119.6	–	–	102.3	–	2.1	1.1
7314-B-XL-TVP	2.58	70	150	35	119.6	–	–	102.3	–	2.1	1.1
7414-B-XL-MP	5.39	70	180	42	144.3	–	–	123.1	–	3	1.1
71815-B-TVH	0.15	75	95	10	87	–	–	83	–	0.6	0.3
7215-B-XL-JP	1.25	75	130	25	109.2	–	–	96.5	–	1.5	1
7215-B-XL-TVP	1.16	75	130	25	109.2	–	–	96.5	–	1.5	1
7315-B-XL-JP	3.29	75	160	37	128	–	–	109.2	–	2.1	1.1
7315-B-XL-TVP	3.1	75	160	37	128	–	–	109.2	–	2.1	1.1
7415-B-XL-MP	6.7	75	190	45	144.3	–	–	123.1	–	3	1.1
71816-B-TVH	0.155	80	100	10	92	–	–	88	–	0.6	0.3
7216-B-XL-JP	1.53	80	140	26	117.2	–	–	102.9	–	2	1



Mounting dimensions

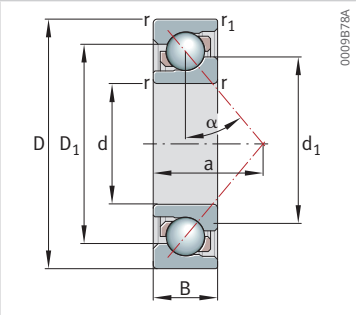


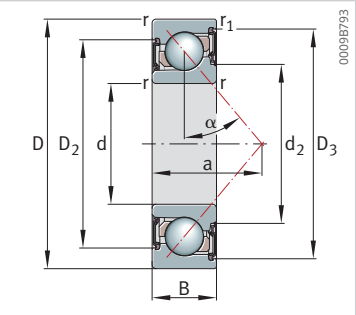
Mounting dimensions

a	α	d_a min.	D_a max.	D_b max.	$r_{a\ max}$	$r_{a1\ max}$	C_r	C_{0r}	C_{ur}	n_G	$n_{\delta r}$
mm	°	mm	mm	mm	mm	mm	N	N	N	min^{-1}	min^{-1}
39	40	57	83	85.8	1	0.6	41500	28500	1970	4200	–
47	40	61	99	104.4	2	1	80000	50000	3500	8400	6100
47	40	61	99	104.4	2	1	80000	50000	3500	8400	6100
53	40	64	116	121	2.1	1	96000	69000	4750	9200	4400
31.1	40	57	70	70	0.3	0.2	11800	11800	780	11400	5600
43	40	64	91	94.4	1.5	1	52000	38500	2650	9200	6800
43	40	64	91	94.4	1.5	1	52000	38500	2650	9200	6800
51	40	66	109	114.4	2	1	91000	61000	4250	7700	5600
51	40	66	109	114.4	2	1	91000	61000	4250	7700	5600
57	40	69	126	131	2.1	1	110000	82000	5600	8400	4150
33.9	40	62	76	76.6	0.3	0.2	12300	12800	870	10500	5400
47	40	69	101	104.4	1.5	1	62000	45000	3150	8300	6200
47	40	69	101	104.4	1.5	1	62000	45000	3150	8300	6200
47	40	69	101	104.4	1.5	1	62000	45000	3150	3450	–
55	40	72	118	123	2.1	1	96000	69000	4750	7000	5300
55	40	72	118	123	2.1	1	96000	69000	4750	7000	5300
62	40	74	136	141	2.1	1	126000	93000	6200	7800	3950
36.5	40	68.2	81.8	83	0.6	0.3	15200	15800	1000	9600	4850
51	40	74	111	114.4	1.5	1	71000	55000	3850	7600	5700
51	40	74	111	114.4	1.5	1	71000	55000	3850	7600	5700
60	40	77	128	133	2.1	1	110000	82000	5600	6500	5000
60	40	77	128	133	2.1	1	110000	82000	5600	6500	5000
66	40	79	146	151	2.1	1	140000	107000	6900	7300	3800
38.5	40	73.2	86.8	88	0.6	0.3	15800	17200	1100	9000	4500
53	40	79	116	119.4	1.5	1	74000	62000	4300	7200	5400
53	40	79	116	119.4	1.5	1	74000	62000	4300	7200	5400
53	40	79	116	119.4	1.5	1	74000	62000	4300	3000	–
64	40	82	138	143	2.1	1	126000	93000	6200	6000	4750
64	40	82	138	143	2.1	1	126000	93000	6200	6000	4750
73	40	86	164	171	2.5	1	167000	138000	8300	6400	3450
40.7	40	78.2	91.8	93	0.6	0.3	16200	18100	1170	8500	4150
56	40	84	121	124.4	1.5	1	73000	62000	4250	6900	5300
56	40	84	121	124.4	1.5	1	73000	62000	4250	6900	5300
68	40	87	148	153	2.1	1	140000	107000	6900	5600	4500
68	40	87	148	153	2.1	1	140000	107000	6900	5600	4500
78	40	91	174	181	2.5	1	167000	138000	8300	6400	3750
42.8	40	85.2	96.8	98	0.6	0.3	16500	19100	1240	8000	3900
59	40	91	129	134.4	2	1	85000	72000	4800	6400	4950

7.2 7..-B-TVH, 7..-B-XL-TVP, 7..-B-XL-2RS-TVP, 7..-B-XL-JP, 7..-B-XL-MP

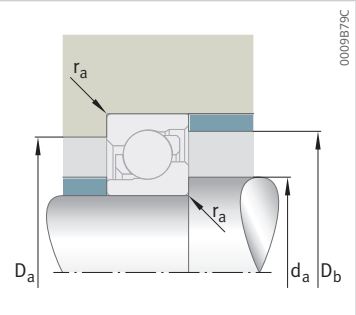
Single row



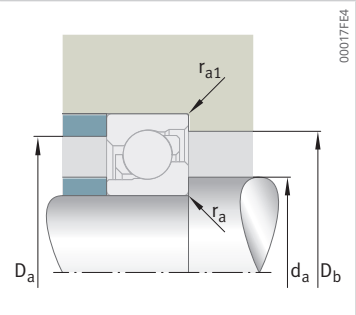


With seal 2RS

Designation	m	d	D	B	D_1	D_2	D_3	d_1	d_2	r_{min}	$r_{1\ min}$
	kg	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm
7216-B-XL-TVP	1.42	80	140	26	117.2	–	–	102.9	–	2	1
7316-B-XL-JP	3.86	80	170	39	136.7	–	–	115.7	–	2.1	1.1
7316-B-XL-TVP	3.66	80	170	39	136.7	–	–	115.7	–	2.1	1.1
7416-B-XL-MP	7.48	80	200	48	153.9	–	–	129	–	3	1.1



Mounting dimensions



Mounting dimensions

a	α	d_a min.	D_a max.	D_b max.	$r_{a\ max}$	$r_{a1\ max}$	C_r	C_{0r}	C_{ur}	n_G	$n_{\delta r}$
mm	°	mm	mm	mm	mm	mm	N	N	N	min^{-1}	min^{-1}
59	40	91	129	134.4	2	1	85000	72000	4800	6400	4950
72	40	92	158	163	2.1	1	155000	124000	7700	5200	4250
72	40	92	158	163	2.1	1	155000	124000	7700	5200	4250
83	40	96	184	191	2.5	1	200000	169000	9900	5800	3600

8 Axial angular contact ball bearings

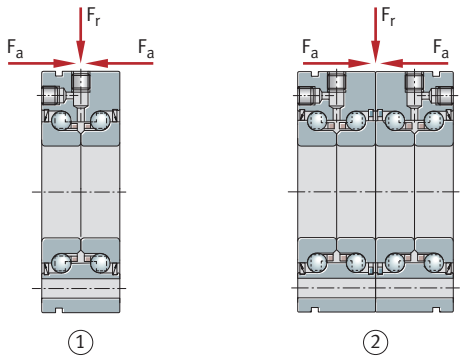
Axial angular contact ball bearings are precision bearings for screw drive bearing arrangements. Depending on the series, they can support radial forces as well as axial forces in one or both directions. Contact seals protect the rolling element system against contamination and moisture. For higher speeds, non-contact minimal gap seals can be used. 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. For some areas of application, a bearing arrangement of lower precision is often sufficient. For this purpose, bearings with less stringent tolerances are available.

Screw drive bearing arrangements are subjected to requirements that often cannot be optimally fulfilled by the design construction of conventional bearings. 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 screw drives.

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. Due to the 60° contact angle, the bearings can support high axial forces as well as radial forces. 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.

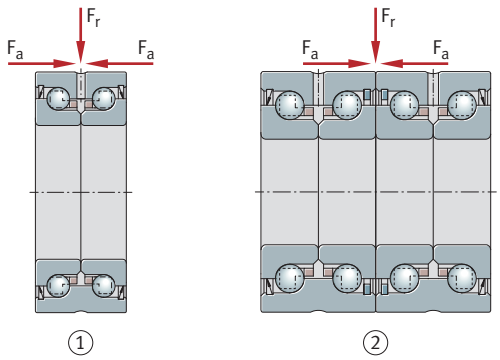
Axial angular contact ball bearings ZKLF and ZKLN are supplied in the X-life design. As a result of increased raceway accuracy and raceway quality, there is a significant reduction in the stress conditions present on the rolling elements and raceway under the same load, compared to the standard bearings. 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. 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 $n_{G\ grease}$.

21 Axial angular contact ball bearings, double row, with fixing holes



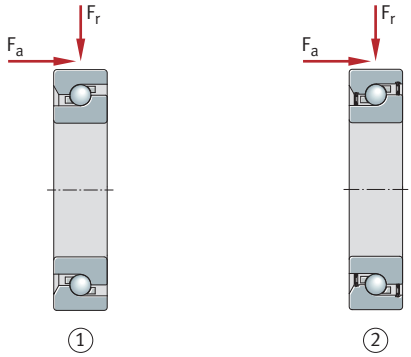
F_r	Radial load	F_a	Axial load
1	With lip seals or minimal gap seals ZKLF..-2RS, ZKLF..-2Z, ZKLF..-2RS-PE	2	Matched pair ZKLF..-2RS-2AP

22 Axial angular contact ball bearings, double row, without fixing holes



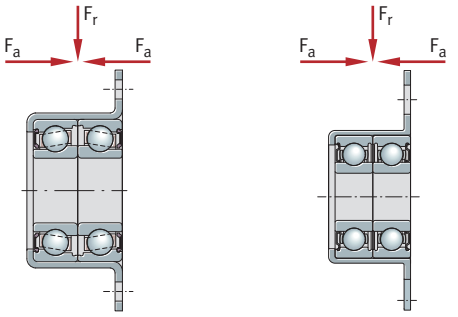
F_r	Radial load	F_a	Axial load
1	With lip seals or minimal gap seals ZKLN..-2RS, ZKLN..-2Z, ZKLN..-2RS-PE	2	Matched pair ZKLN..-2RS-2AP

23 Axial angular contact ball bearings, single row, for any combination



F_r	Radial load	F_a	Axial load
1	Without seals 7602, 7603, BSB, BSB..-SU	2	With seals 7602..-2RS, 7603..-2RS, BSB..-2RS, BSB..-2Z-SU

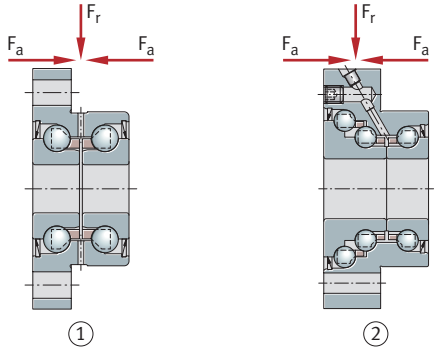
24 Angular contact ball bearing unit, with fixing holes



000A8CFB

F_r	Radial load	F_a	Axial load
lip seals or gap seals ZKLR..-2RS, ZKLR..-2Z			

25 Axial angular contact ball bearings, double or triple row, flange with flattened areas, with fixing holes



000A8CFC

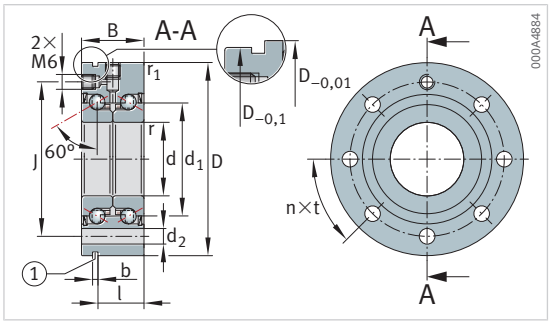
F_r	Radial load	F_a	Axial load
1	Double row, lip seals or minimal gap seals ZKLFA..-2RS, ZKLFA..-2Z	2	Triple row, lip seals DKLFA..-2RS

8.1 Clarification of product tables

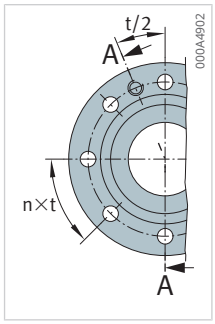
A	mm	Flange width
b	mm	Extraction slot width
B	mm	Width
B_1	mm	Flange thickness
C_{0a}	N	Basic static load rating, axial
C_a	N	Basic dynamic load rating, axial
c_{aL}	N/µm	Axial rigidity
c_{kL}	Nm/mrad	Tilting rigidity
C_{ua}	N	Fatigue limit load, axial
d	mm	Bore diameter
D	inch or mm	Outside diameter
d_1	mm	Rib diameter, inner ring
D_1	mm	Flange diameter
d_2	mm	Diameter, fixing holes
d_a	mm	Abutment diameter, shaft
d_a	mm	Abutment diameter, shaft shoulder
D_a	mm	Abutment diameter, housing
H	–	Main load direction
I	mm	Extraction slot spacing
J	mm	Pitch circle diameter, fixing holes
J	kg · cm²	Mass moment of inertia
m	kg or lbs	Mass
M_A	Nm	Tightening torque for the recommended INA precision locknuts
M_R	Nm	Bearing frictional torque
n	–	Number of screw mounting holes
n	–	Number of fixing screws
n_a	–	Number of holes in the adjacent construction
n_a	–	Number of fixing screws
n_G	min^{-1}	Limiting speed
n_ϑ	min^{-1}	Thermally safe operating speed
$r_{1\ min}$	mm	Min. chamfer dimension
r_{min}	mm	Min. chamfer dimension
t	°	Pitch angle, fixing holes
t_1	mm	Positional tolerance of bore in housing
t_a	°	Pitch angle of bores in the adjacent construction

8.2 ZKLF..-2RS, ZKLF..-2Z

With fixing holes



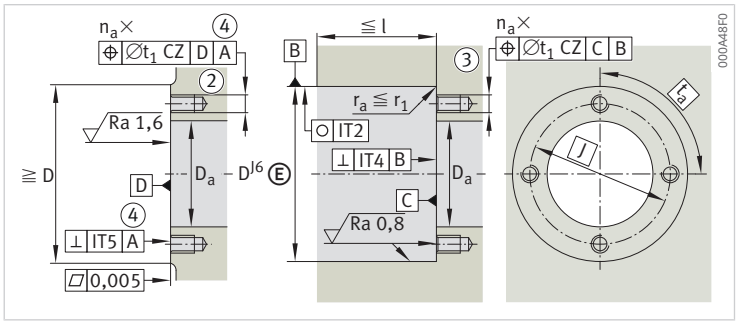
ZKLF..-2RS, ZKLF..-2Z (d ≤ 50 mm)



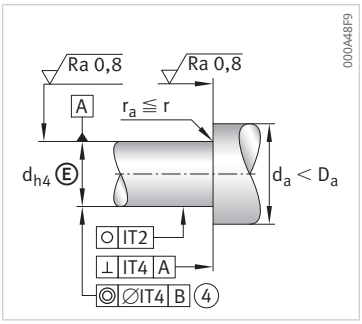
ZKLF30100

8

Designation	m	d	D	B	d_1	r_{min}	$r_{1\ min}$
	kg	mm	mm	mm	mm	mm	mm
ZKLF1255-2RS-XL	0.37	12	55	25	25	0.3	0.6
ZKLF1255-2Z-XL	0.37	12	55	25	25	0.3	0.6
ZKLF1560-2RS-XL	0.43	15	60	25	28	0.3	0.6
ZKLF1560-2Z-XL	0.43	15	60	25	28	0.3	0.6
ZKLF1762-2RS-XL	0.45	17	62	25	30	0.3	0.6
ZKLF1762-2Z-XL	0.45	17	62	25	30	0.3	0.6
ZKLF2068-2RS-XL	0.61	20	68	28	34.5	0.3	0.6
ZKLF2068-2Z-XL	0.61	20	68	28	34.5	0.3	0.6
ZKLF2575-2RS-XL	0.72	25	75	28	40.5	0.3	0.6
ZKLF2575-2Z-XL	0.72	25	75	28	40.5	0.3	0.6
ZKLF3080-2RS-XL	0.78	30	80	28	45.5	0.3	0.6
ZKLF3080-2Z-XL	0.78	30	80	28	45.5	0.3	0.6
ZKLF30100-2RS-XL	1.63	30	100	38	51	0.3	0.6
ZKLF30100-2Z-XL	1.63	30	100	38	51	0.3	0.6
ZKLF3590-2RS-XL	1.13	35	90	34	52	0.3	0.6
ZKLF3590-2Z-XL	1.13	35	90	34	52	0.3	0.6



Housing design



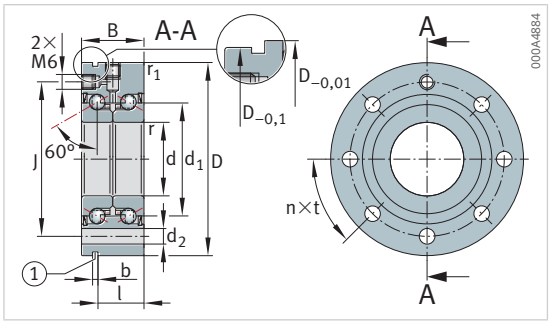
Shaft design (threaded spindle)

8

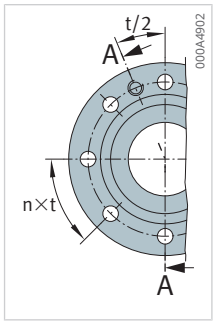
J	d_2	b	I	n	t	D_a	d_a	t_1	Screws Size	n_a	t_a
mm	mm	mm	mm	mm	°	max.	min.	mm			°
42	6.8	3	17	3	120	33	16	0.1	M6	3	120
42	6.8	3	17	3	120	33	16	0.1	M6	3	120
46	6.8	3	17	3	120	35	20	0.1	M6	3	120
46	6.8	3	17	3	120	35	20	0.1	M6	3	120
48	6.8	3	17	6	60	37	23	0.1	M6	3	120
48	6.8	3	17	6	60	37	23	0.1	M6	3	120
53	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
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
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
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

ZKLF..-2RS, ZKLF..-2Z

With fixing holes

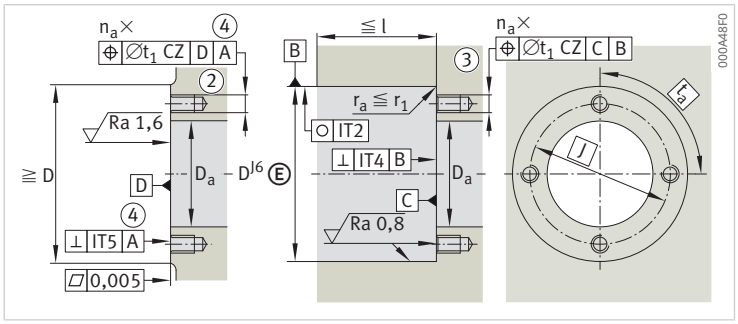


ZKLF..-2RS, ZKLF..-2Z (d ≤ 50 mm)

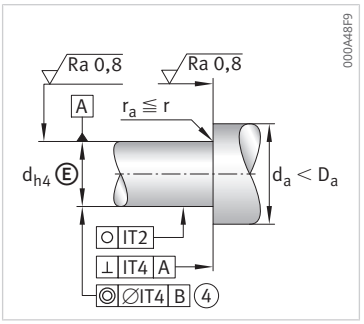


ZKLF30100

Designation	d	C_a	C_{0a}	C_{ua}	n_G grease	n_ϑ	M_R
	mm	N	N	N	min^{-1}	min^{-1}	Nm
ZKLF1255-2RS-XL	12	18800	25000	1520	9200	3800	0.16
ZKLF1255-2Z-XL	12	18800	25000	1520	12000	7600	0.08
ZKLF1560-2RS-XL	15	19800	28500	1730	8200	3500	0.2
ZKLF1560-2Z-XL	15	19800	28500	1730	10800	7000	0.1
ZKLF1762-2RS-XL	17	20800	31500	1920	7600	3300	0.24
ZKLF1762-2Z-XL	17	20800	31500	1920	10100	6600	0.12
ZKLF2068-2RS-XL	20	28500	47000	2850	6600	3000	0.3
ZKLF2068-2Z-XL	20	28500	47000	2850	8700	5400	0.15
ZKLF2575-2RS-XL	25	30500	55000	3350	5700	2600	0.4
ZKLF2575-2Z-XL	25	30500	55000	3350	7500	4700	0.2
ZKLF3080-2RS-XL	30	32000	64000	3850	5000	2200	0.5
ZKLF3080-2Z-XL	30	32000	64000	3850	6700	4300	0.25
ZKLF30100-2RS-XL	30	65000	108000	6500	4500	2100	0.8
ZKLF30100-2Z-XL	30	65000	108000	6500	5600	4000	0.4
ZKLF3590-2RS-XL	35	45000	89000	5400	4400	2000	0.6
ZKLF3590-2Z-XL	35	45000	89000	5400	5800	3800	0.3



Housing design

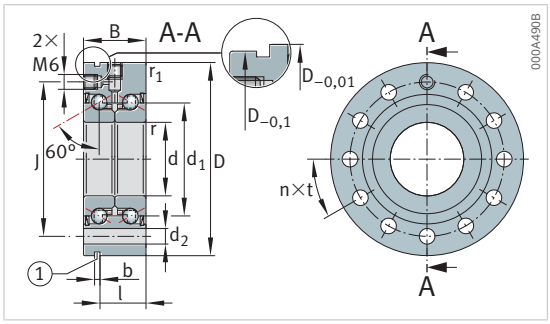


Shaft design (threaded spindle)

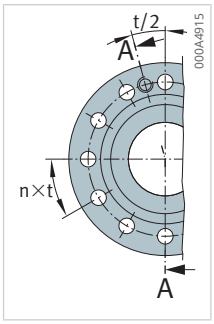
c_{aL}	c_{kL}	J	Axial runout	Locknut for radial clamping	Locknut for axial clamping	Locknut M_A	Locknut force axial
N/µm	Nm/mrad	kg · cm²	µm	–	–	Nm	N
375	50	0.068	2	ZM12	–	8	5307
375	50	0.068	2	ZM12	–	8	5307
400	65	0.102	2	ZM15	AM15	10	5484
400	65	0.102	2	ZM15	AM15	10	5484
450	80	0.132	2	ZM17	AM17	15	7514
450	80	0.132	2	ZM17	AM17	15	7514
650	140	0.273	2	ZM20	AM20	18	8258
650	140	0.273	2	ZM20	AM20	18	8258
750	200	0.486	2	ZM25	AM25	25	9123
750	200	0.486	2	ZM25	AM25	25	9123
850	300	0.73	2.5	ZM30	AM30	32	9947
850	300	0.73	2.5	ZM30	AM30	32	9947
950	400	1.91	2.5	ZMA30/52	AM30	65	19509
950	400	1.91	2.5	ZMA30/52	AM30	65	19509
900	400	1.51	2.5	ZM35	AM35/58	40	10770
900	400	1.51	2.5	ZM35	AM35/58	40	10770

ZKLF..-2RS, ZKLF..-2Z

With fixing holes

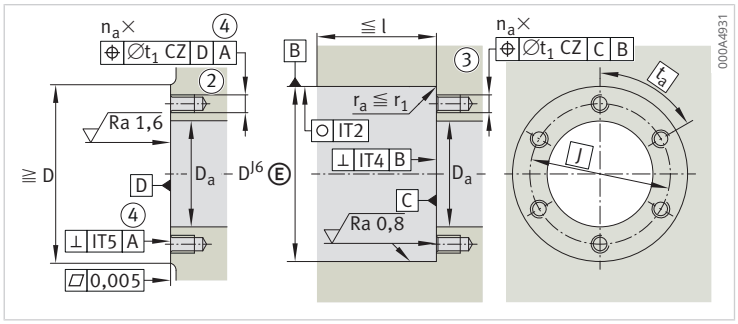


ZKLF..-2RS, ZKLF..-2Z (d ≤ 50 mm)

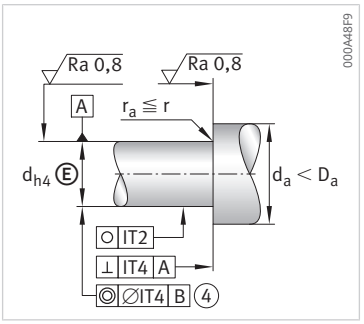


ZKLF40115, ZKLF50140

Designation	m	d	D	B	d_1	r_{min}	$r_{1\ min}$
	kg	mm	mm	mm	mm	mm	mm
ZKLF40100-2RS-XL	1.46	40	100	34	58	0.3	0.6
ZKLF40100-2Z-XL	1.46	40	100	34	58	0.3	0.6
ZKLF40115-2RS-XL	2.2	40	115	46	65	0.6	0.6
ZKLF40115-2Z-XL	2.2	40	115	46	65	0.6	0.6
ZKLF50115-2RS-XL	1.86	50	115	34	72	0.3	0.6
ZKLF50115-2Z-XL	1.86	50	115	34	72	0.3	0.6
ZKLF50140-2RS-XL	4.7	50	140	54	80	0.6	0.6
ZKLF50140-2Z-XL	4.7	50	140	54	80	0.6	0.6



Housing design

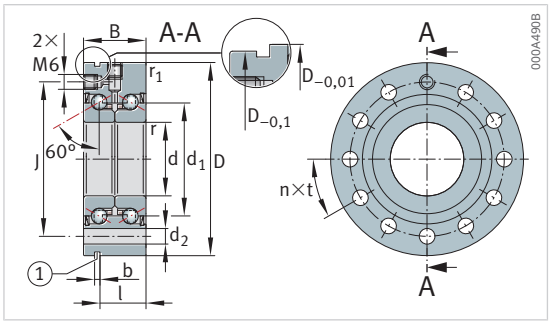


Shaft design (threaded spindle)

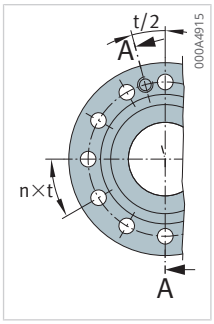
J	d_2	b	I	n	t	D_a	d_a	t_1	Screws Size	n_a	t_a
mm	mm	mm	mm	mm	°	max.	min.	mm			°
80	8.8	3	25	8	45	67	50	0.2	M8	4	90
80	8.8	3	25	8	45	67	50	0.2	M8	4	90
94	8.8	3	36	12	30	80	56	0.2	M8	12	30
94	8.8	3	36	12	30	80	56	0.2	M8	12	30
94	8.8	3	25	12	30	82	63	0.2	M8	6	60
94	8.8	3	25	12	30	82	63	0.2	M8	6	60
113	11	3	45	12	30	98	63	0.2	M10	12	30
113	11	3	45	12	30	98	63	0.2	M10	12	30

ZKLF..-2RS, ZKLF..-2Z

With fixing holes

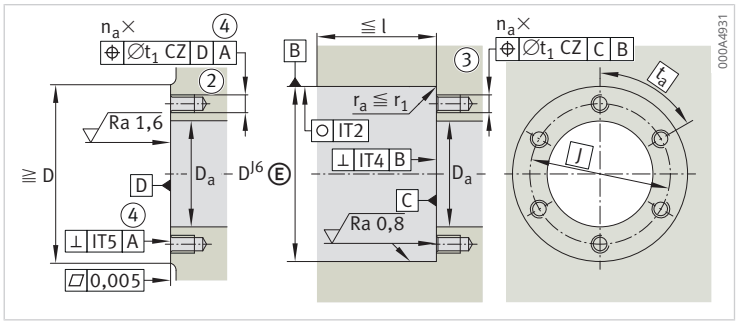


ZKLF..-2RS, ZKLF..-2Z (d ≤ 50 mm)

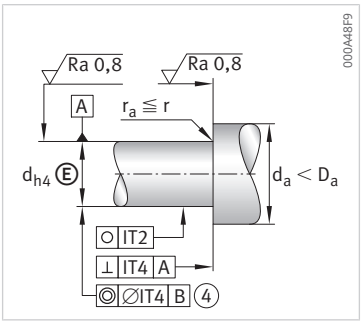


ZKLF40115, ZKLF50140

Designation	d	C_a	C_{0a}	C_{ua}	n_G grease	n_ϑ	M_R
	mm	N	N	N	min^{-1}	min^{-1}	Nm
ZKLF40100-2RS-XL	40	47500	101000	6100	4000	1800	0.7
ZKLF40100-2Z-XL	40	47500	101000	6100	5200	3300	0.35
ZKLF40115-2RS-XL	40	79000	149000	9100	3500	1600	1.3
ZKLF40115-2Z-XL	40	79000	149000	9100	4400	3100	0.65
ZKLF50115-2RS-XL	50	46500	126000	7700	3200	1500	0.9
ZKLF50115-2Z-XL	50	46500	126000	7700	4200	3000	0.45
ZKLF50140-2RS-XL	50	125000	250000	15200	2900	1200	2.6
ZKLF50140-2Z-XL	50	125000	250000	15200	3500	2500	1.3



Housing design

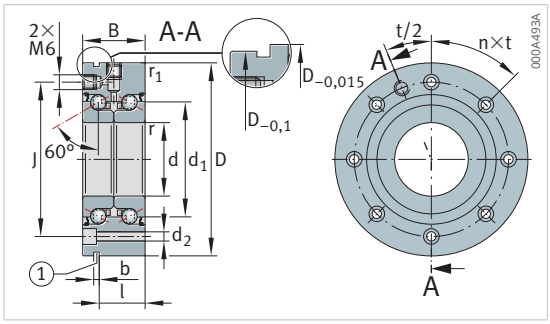


Shaft design (threaded spindle)

c_{aL}	c_{kL}	J	Axial runout	Locknut for radial clamping	Locknut for axial clamping	Locknut M_A	Locknut force axial
N/µm	Nm/mrad	kg · cm²	µm	–	–	Nm	N
1000	550	2.26	2.5	ZM40	AM40	55	13412
1000	550	2.26	2.5	ZM40	AM40	55	13412
1200	750	5.5	2.5	ZMA40/62	AM40	110	25185
1200	750	5.5	2.5	ZMA40/62	AM40	110	25815
1250	1000	5.24	2.5	ZM50	AM50	85	16280
1250	1000	5.24	2.5	ZM50	AM50	85	16280
1400	1500	15.2	2.5	ZMA50/75	AM50	150	28451
1400	1500	15.2	2.5	ZMA50/75	AM50	150	28451

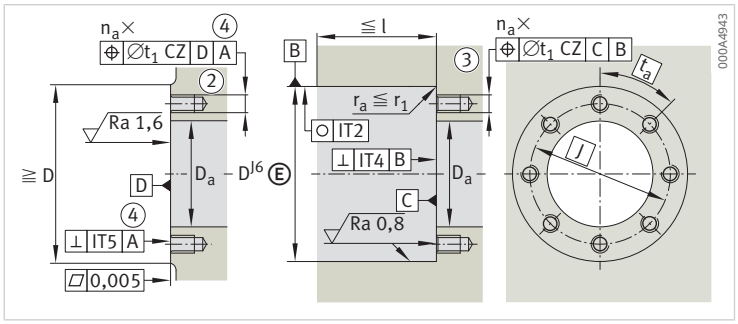
ZKLF..-2Z

With fixing holes

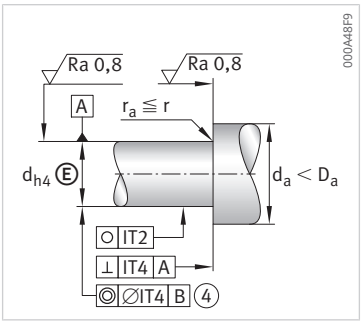


ZKLF..-2Z (60 mm ≤ d ≤ 100 mm)

Designation	m	d	D	B	d_1	r_{min}	$r_{1\ min}$
	kg	mm	mm	mm	mm	mm	mm
ZKLF60145-2Z-XL	4.3	60	145	45	85	0.6	0.6
ZKLF70155-2Z-XL	4.9	70	155	45	95	0.6	0.6
ZKLF80165-2Z-XL	5.3	80	165	45	105	0.6	0.6
ZKLF90190-2Z-XL	8.7	90	190	55	120	0.6	0.6
ZKLF100200-2Z-XL	9.3	100	200	55	132	0.6	0.6
ZKLF100230-2Z	17.6	100	230	85	146	0.6	0.6



Housing design

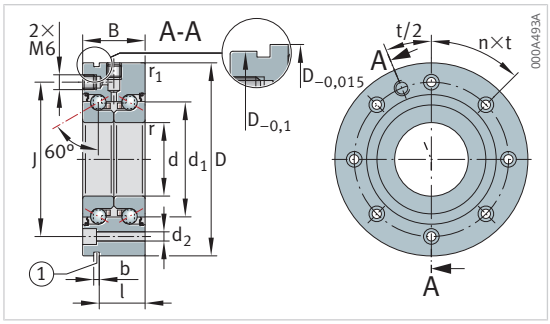


Shaft design (threaded spindle)

J	d_2	b	I	n	t	D_a	d_a	t_1	Screws Size	n_a	t_a
mm	mm	mm	mm	mm	°	max.	min.	mm			°
120	8.8	3	35	8	45	100	82	0.2	M8	8	45
130	8.8	3	35	8	45	110	92	0.2	M8	8	45
140	8.8	3	35	8	45	120	102	0.2	M8	8	45
165	11	3	45	8	45	138	116	0.2	M10	8	45
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

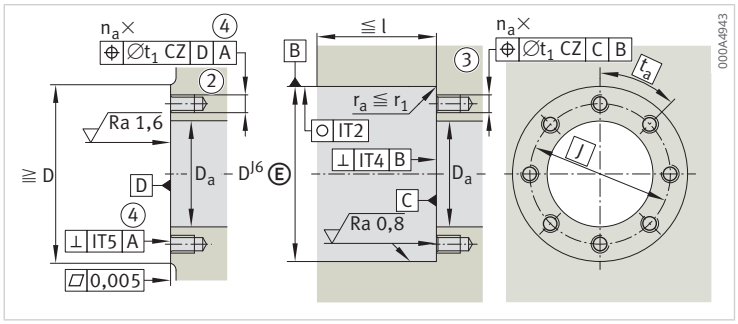
ZKLF..-2Z

With fixing holes

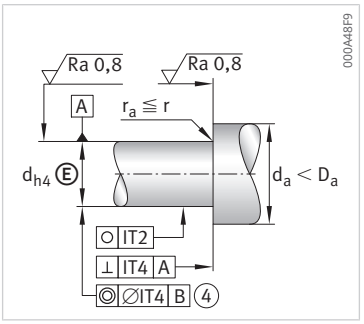


ZKLF..-2Z (60 mm ≤ d ≤ 100 mm)

Designation	d	C_a	C_{0a}	C_{ua}	n_G grease	n_ϑ	M_R
	mm	N	N	N	min^{-1}	min^{-1}	Nm
ZKLF60145-2Z-XL	60	93000	214000	13000	4000	3000	1
ZKLF70155-2Z-XL	70	97000	241000	14600	3800	2800	1.2
ZKLF80165-2Z-XL	80	100000	265000	15800	3600	2700	1.4
ZKLF90190-2Z-XL	90	149000	395000	21900	3500	2300	2.3
ZKLF100200-2Z-XL	100	154000	435000	23000	3300	2150	2.6
ZKLF100230-2Z	100	295000	790000	30000	2900	2000	3



Housing design



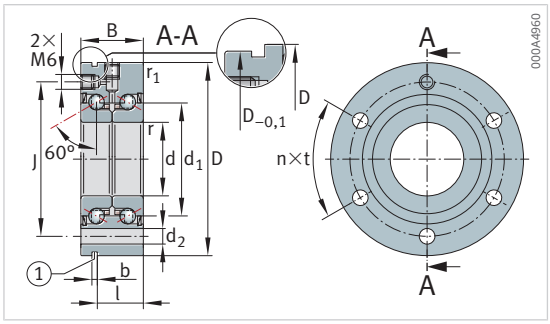
Shaft design (threaded spindle)

c_{aL}	c_{kL}	J	Axial runout	Locknut for radial clamping	Locknut for axial clamping	Locknut M_A	Locknut force axial
N/µm	Nm/mrad	kg · cm²	µm	–	–	Nm	N
1300	1650	13.7	3	ZMA60/98	AM60	100	16700
1450	2250	19.8	3	ZMA70/110	AM70	130	19031
1600	3000	27.6	3	ZMA80/120	AM80	160	20604
1700	4400	59.9	3	ZMA90/130	AM90	200	22731
1900	5800	85.3	3	ZMA100/140	AM100	250	25624
2450	8200	185	3	–	AM100	500	52000

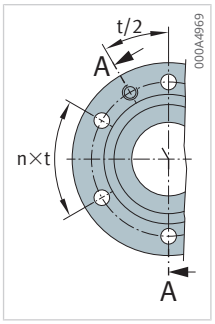
8.3 ZKLF..-2RS-PE

With fixing holes

Less stringent tolerances



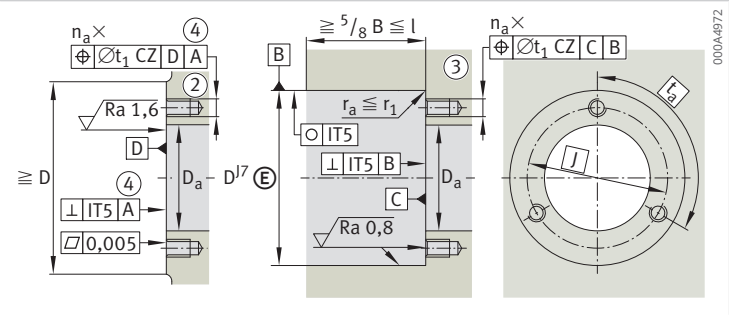
ZKLF..-2RS-PE



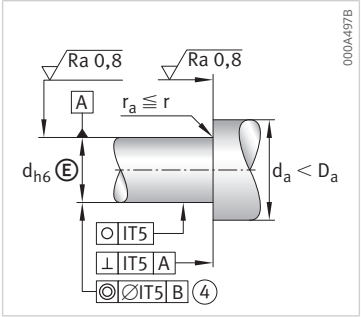
ZKLF12, ZKLF15

8

Designation	m	d	D	B	d_1	r_{min}	$r_{1\ min}$
	kg	mm	mm	mm	mm	mm	mm
ZKLF1255-2RS-PE	0.37	12	55	25	25	0.3	0.6
ZKLF1560-2RS-PE	0.43	15	60	25	28	0.3	0.6
ZKLF1762-2RS-PE	0.45	17	62	25	30	0.3	0.6
ZKLF2068-2RS-PE	0.61	20	68	28	34.5	0.3	0.6
ZKLF2575-2RS-PE	0.72	25	75	28	40.5	0.3	0.6
ZKLF3080-2RS-PE	0.78	30	80	28	45.5	0.3	0.6
ZKLF3590-2RS-PE	1.13	35	90	34	52	0.3	0.6
ZKLF40100-2RS-PE	1.46	40	100	34	58	0.3	0.6
ZKLF50115-2RS-PE	1.86	50	115	34	72	0.3	0.6



Housing design



Shaft design (threaded spindle)

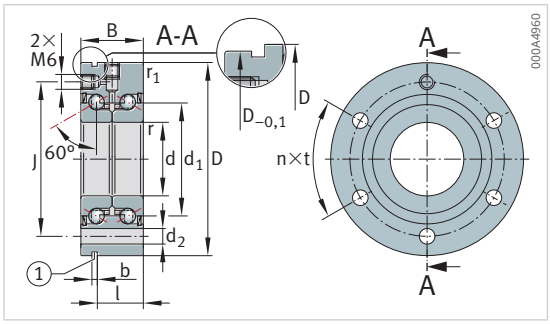
8

J	d_2	b	I	n	t	D_a	d_a	t_1	Screws Size	n_a	t_a
mm	mm	mm	mm	mm	°	max.	min.	mm			°
42	6.8	3	17	3	120	33	16	0.1	M6	3	120
46	6.8	3	17	3	120	35	20	0.1	M6	3	120
48	6.8	3	17	6	60	37	23	0.1	M6	3	120
53	6.8	3	19	8	45	43	25	0.1	M6	4	90
58	6.8	3	19	8	45	48	32	0.1	M6	4	90
63	6.8	3	19	12	30	53	40	0.1	M6	6	60
75	8.8	3	25	8	45	62	45	0.2	M8	4	90
80	8.8	3	25	8	45	67	50	0.2	M8	4	90
94	8.8	3	25	12	30	82	63	0.2	M8	6	60

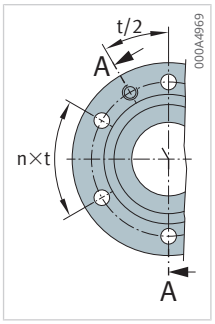
ZKLF..-2RS-PE

With fixing holes

Less stringent tolerances

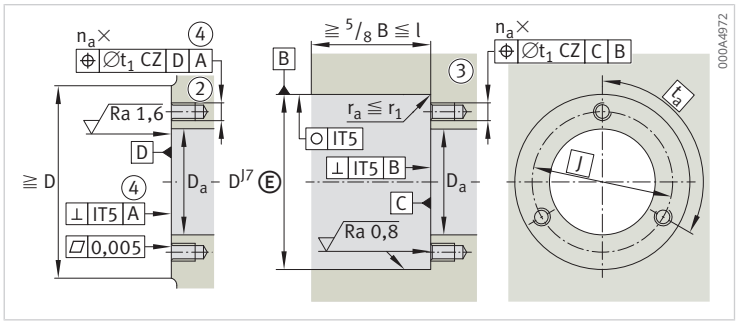


ZKLF..-2RS-PE

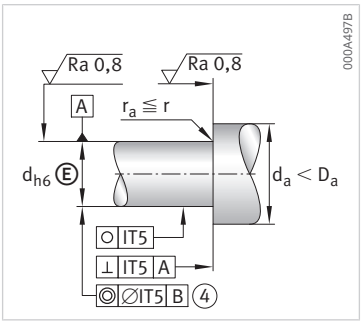


ZKLF12, ZKLF15

Designation	d	C_a	C_{0a}	C_{ua}	n_G grease	n_ϑ	M_R
	mm	N	N	N	min^{-1}	min^{-1}	Nm
ZKLF1255-2RS-PE	12	17100	25000	1140	9200	3800	0.16
ZKLF1560-2RS-PE	15	18000	28500	1300	8200	3500	0.2
ZKLF1762-2RS-PE	17	18900	31500	1440	7600	3300	0.24
ZKLF2068-2RS-PE	20	26000	47000	2130	6600	3000	0.3
ZKLF2575-2RS-PE	25	27500	55000	2500	5700	2600	0.4
ZKLF3080-2RS-PE	30	29000	64000	2900	5000	2200	0.5
ZKLF3590-2RS-PE	35	41000	89000	4050	4400	2000	0.6
ZKLF40100-2RS-PE	40	43000	101000	4600	4000	1800	0.7
ZKLF50115-2RS-PE	50	46500	126000	5800	3200	1500	0.9



Housing design



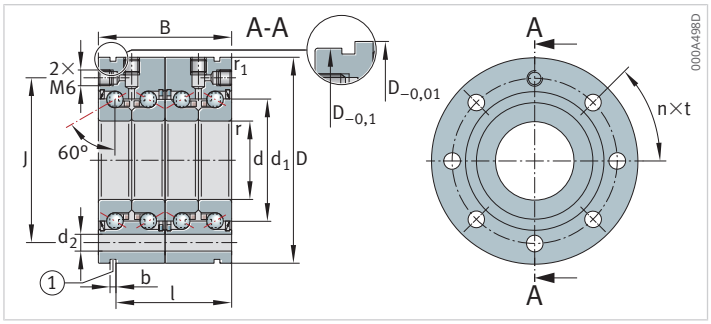
Shaft design (threaded spindle)

c_{aL}	c_{kL}	J	Axial runout	Locknut for radial clamping	Locknut for axial clamping	Locknut M_A	Locknut force axial
N/µm	Nm/mrad	kg · cm²	µm	–	–	Nm	N
375	50	0.068	5	ZM12	–	8	5307
400	65	0.102	5	ZM15	AM15	10	5484
450	80	0.132	5	ZM17	AM17	15	7514
650	140	0.273	5	ZM20	AM20	18	8258
750	200	0.486	5	ZM25	AM25	25	9123
850	300	0.73	5	ZM30	AM30	32	9947
900	400	1.51	5	ZM35	AM35/58	40	10770
1000	550	2.26	5	ZM40	AM40	55	13412
1250	1000	5.24	5	ZM50	AM50	85	16280

8.4 ZKLF..-2RS-2AP

With fixing holes

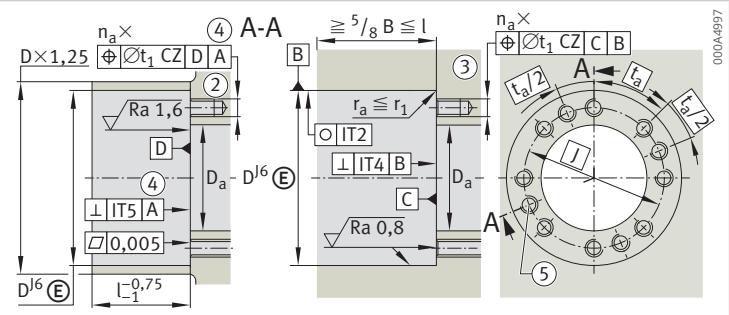
Matched pair



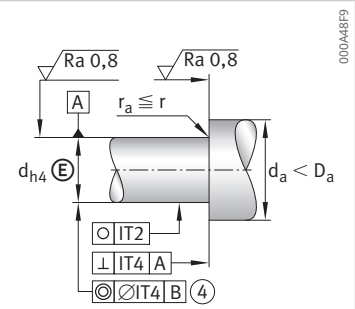
ZKLF..-2RS-2AP

8

Designation	m	d	D	B	d_1	r_{min}	$r_{1\ min}$
	kg	mm	mm	mm	mm	mm	mm
ZKLF1762-2RS-2AP-XL	0.9	17	62	50	30	0.3	0.6
ZKLF2068-2RS-2AP-XL	1.22	20	68	56	34.5	0.3	0.6
ZKLF2575-2RS-2AP-XL	1.44	25	75	56	40.5	0.3	0.6
ZKLF3080-2RS-2AP-XL	1.56	30	80	56	45.5	0.3	0.6
ZKLF3590-2RS-2AP-XL	2.26	35	90	68	52	0.3	0.6
ZKLF40100-2RS-2AP-XL	2.92	40	100	68	58	0.3	0.6
ZKLF50115-2RS-2AP-XL	3.72	50	115	68	72	0.3	0.6



Housing design



Shaft design (threaded spindle)

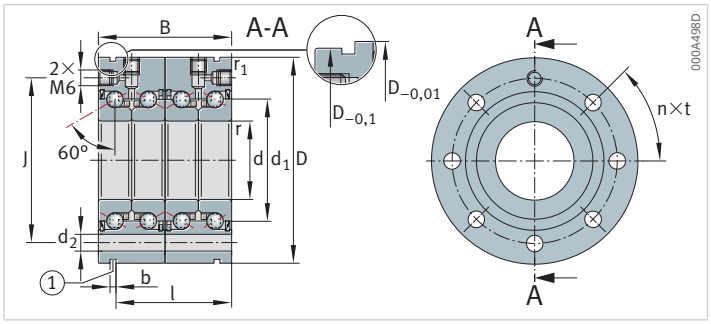
8

J	d_2	b	I	n	t	D_a	d_a	t_1	Screws Size	n_a	t_a
mm	mm	mm	mm	mm	°	max.	min.	mm			°
48	6.8	3	42	6	60	37	23	0.1	M6×60	6	60
53	6.8	3	47	8	45	43	25	0.1	M6×70	8	45
58	6.8	3	47	8	45	48	32	0.1	M6×70	8	45
63	6.8	3	47	12	30	53	40	0.1	M6×70	12	30
75	8.8	3	59	8	45	62	45	0.2	M8×80	8	45
80	8.8	3	59	8	45	67	50	0.2	M8×80	8	45
94	8.8	3	59	12	30	82	63	0.2	M8×80	12	30

ZKLF..-2RS-2AP

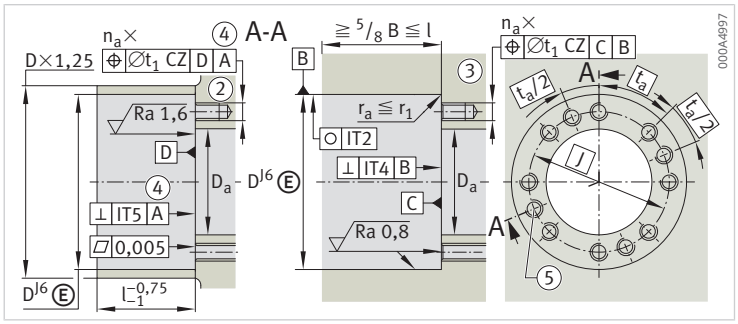
With fixing holes

Matched pair

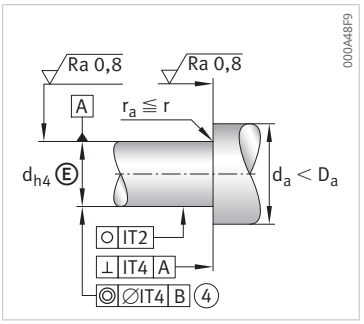


ZKLF..-2RS-2AP

Designation	d	C_a	C_{0a}	C_{ua}	n_G grease	n_ϑ	M_R
	mm	N	N	N	min^{-1}	min^{-1}	Nm
ZKLF1762-2RS-2AP-XL	17	34000	63000	3850	7600	3300	0.36
ZKLF2068-2RS-2AP-XL	20	46000	94000	5700	6600	3000	0.45
ZKLF2575-2RS-2AP-XL	25	49000	111000	6700	5700	2600	0.6
ZKLF3080-2RS-2AP-XL	30	52000	127000	7700	5000	2200	0.75
ZKLF3590-2RS-2AP-XL	35	73000	177000	10800	4400	2000	0.9
ZKLF40100-2RS-2AP-XL	40	77000	202000	12300	4000	1800	1.05
ZKLF50115-2RS-2AP-XL	50	76000	250000	15300	3200	1500	1.35



Housing design

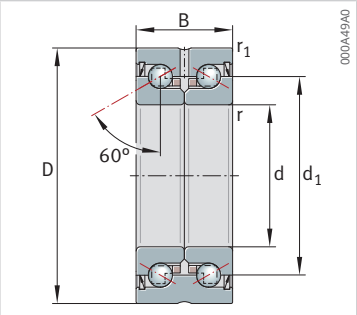


Shaft design (threaded spindle)

c_{aL}	c_{kL}	J	Axial runout	Locknut for radial clamping	Locknut for axial clamping	Locknut M_A	Locknut force axial
N/µm	Nm/mrad	kg · cm²	µm	–	–	Nm	N
800	200	0.264	2	ZM17	AM17	15	7514
1150	320	0.564	2	ZMA20/38	AM20	18	8258
1300	450	0.972	2	ZMA25/45	AM25	25	9123
1500	620	1.46	2.5	ZMA30/52	AM30	32	9947
1600	900	3.02	2.5	ZMA35/58	AM35/58	40	10770
1750	1200	4.52	2.5	ZMA40/62	AM40	55	13412
2200	2250	10.48	2.5	ZMA50/75	AM50	85	16280

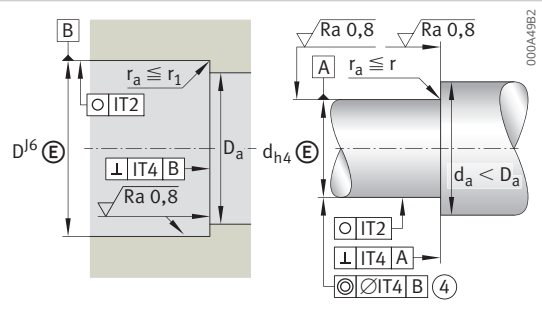
8.5 ZKLN..-2RS, ZKLN..-2Z

Without fixing holes



ZKLN..-2RS, ZKLN..-2Z

Designation	m	d	D	B
	kg	mm	mm	mm
ZKLN0619-2Z-XL	0.02	6	19	12
ZKLN0624-2RS-XL	0.03	6	24	15
ZKLN0624-2Z-XL	0.03	6	24	15
ZKLN0832-2RS-XL	0.09	8	32	20
ZKLN0832-2Z-XL	0.09	8	32	20
ZKLN1034-2RS-XL	0.1	10	34	20
ZKLN1034-2Z-XL	0.1	10	34	20
ZKLN1242-2RS-XL	0.2	12	42	25
ZKLN1242-2Z-XL	0.2	12	42	25
ZKLN1545-2RS-XL	0.21	15	45	25
ZKLN1545-2Z-XL	0.21	15	45	25
ZKLN1747-2RS-XL	0.22	17	47	25
ZKLN1747-2Z-XL	0.22	17	47	25
ZKLN2052-2RS-XL	0.31	20	52	28
ZKLN2052-2Z-XL	0.31	20	52	28
ZKLN2557-2RS-XL	0.34	25	57	28
ZKLN2557-2Z-XL	0.34	25	57	28
ZKLN3062-2RS-XL	0.39	30	62	28
ZKLN3062-2Z-XL	0.39	30	62	28
ZKLN3072-2RS-XL	0.72	30	72	38
ZKLN3072-2Z-XL	0.72	30	72	38
ZKLN3572-2RS-XL	0.51	35	72	34
ZKLN3572-2Z-XL	0.51	35	72	34
ZKLN4075-2RS-XL	0.61	40	75	34
ZKLN4075-2Z-XL	0.61	40	75	34
ZKLN4090-2RS-XL	0.95	40	90	46
ZKLN4090-2Z-XL	0.95	40	90	46
ZKLN50110-2RS-XL	2.5	50	110	54
ZKLN50110-2Z-XL	2.5	50	110	54
ZKLN5090-2RS-XL	0.88	50	90	34
ZKLN5090-2Z-XL	0.88	50	90	34
ZKLN60110-2Z-XL	2.2	60	110	45
ZKLN70120-2Z-XL	2.4	70	120	45
ZKLN80130-2Z-XL	2.7	80	130	45
ZKLN90150-2Z-XL	4.5	90	150	55
ZKLN100160-2Z-XL	4.9	100	160	55



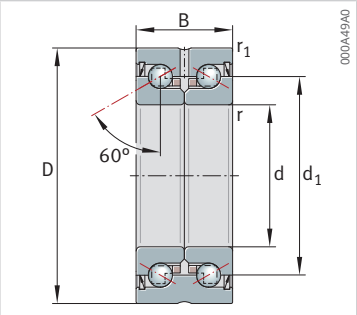
Design of housing and shaft (threaded spindle)

8

J	Axial runout	d_1	r_{min}	$r_{1\ min}$	D_a max.	d_a min.
kg · cm²	µm	mm	mm	mm	mm	mm
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
0.02	2	19	0.3	0.6	26	11
0.02	2	19	0.3	0.6	26	11
0.029	2	21	0.3	0.6	28	14
0.029	2	21	0.3	0.6	28	14
0.068	2	25	0.3	0.6	33	16
0.068	2	25	0.3	0.6	33	16
0.102	2	28	0.3	0.6	35	20
0.102	2	28	0.3	0.6	35	20
0.132	2	30	0.3	0.6	37	23
0.132	2	30	0.3	0.6	37	23
0.273	2	34.5	0.3	0.6	43	25
0.273	2	34.5	0.3	0.6	43	25
0.486	2	40.5	0.3	0.6	48	32
0.486	2	40.5	0.3	0.6	48	32
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
1.51	2.5	52	0.3	0.6	62	45
1.51	2.5	52	0.3	0.6	62	45
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
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
13.7	3	85	0.6	0.6	100	82
19.8	3	95	0.6	0.6	110	92
27.6	3	105	0.6	0.6	120	102
59.9	3	120	0.6	0.6	138	116
85.3	3	132	0.6	0.6	150	128

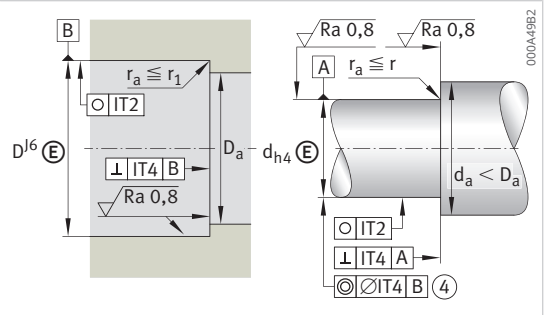
ZKLN..-2RS, ZKLN..-2Z

Without fixing holes



ZKLN..-2RS, ZKLN..-2Z

Designation	d	C_a	C_{0a}	C_{ua}	n_G grease	n_ϑ	M_R
	mm	N	N	N	min^{-1}	min^{-1}	Nm
ZKLN0619-2Z-XL	6	5000	5700	345	22800	14000	0.01
ZKLN0624-2RS-XL	6	7600	8500	520	16400	6800	0.04
ZKLN0624-2Z-XL	6	6900	8500	520	19900	12000	0.02
ZKLN0832-2RS-XL	8	13800	16300	990	12100	5100	0.08
ZKLN0832-2Z-XL	8	13800	16300	990	15500	9500	0.04
ZKLN1034-2RS-XL	10	13400	18800	1140	10900	4600	0.12
ZKLN1034-2Z-XL	10	13400	18800	1140	14400	8600	0.06
ZKLN1242-2RS-XL	12	18800	25000	1520	9200	3800	0.16
ZKLN1242-2Z-XL	12	18800	25000	1520	12000	7600	0.08
ZKLN1545-2RS-XL	15	19800	28500	1730	8200	3500	0.2
ZKLN1545-2Z-XL	15	19800	28500	1730	10800	7000	0.1
ZKLN1747-2RS-XL	17	20800	31500	1920	7600	3300	0.24
ZKLN1747-2Z-XL	17	20800	31500	1920	10100	6600	0.12
ZKLN2052-2RS-XL	20	28500	47000	2850	6600	3000	0.3
ZKLN2052-2Z-XL	20	26000	47000	2850	8700	5400	0.15
ZKLN2557-2RS-XL	25	30500	55000	3350	5700	2600	0.4
ZKLN2557-2Z-XL	25	30500	55000	3350	7500	4700	0.2
ZKLN3062-2RS-XL	30	29000	64000	3850	5000	2200	0.5
ZKLN3062-2Z-XL	30	29000	64000	3850	6700	4300	0.25
ZKLN3072-2RS-XL	30	59000	108000	6500	4500	2100	0.8
ZKLN3072-2Z-XL	30	59000	180000	6500	5600	4000	0.4
ZKLN3572-2RS-XL	35	41000	89000	5400	4400	2000	0.6
ZKLN3572-2Z-XL	35	41000	89000	5400	5800	3800	0.3
ZKLN4075-2RS-XL	40	43000	101000	6100	4000	1800	0.7
ZKLN4075-2Z-XL	40	43000	101000	6100	5200	3300	0.35
ZKLN4090-2RS-XL	40	79000	149000	9100	3500	1600	1.3
ZKLN4090-2Z-XL	40	79000	149000	9100	4400	3100	0.65
ZKLN50110-2RS-XL	50	113000	250000	15200	2900	1200	2.6
ZKLN50110-2Z-XL	50	125000	250000	15200	3500	2500	1.3
ZKLN5090-2RS-XL	50	51000	126000	7700	3200	1500	0.9
ZKLN5090-2Z-XL	50	51000	126000	7700	4200	3000	0.45
ZKLN60110-2Z-XL	60	93000	214000	13000	4000	3000	1
ZKLN70120-2Z-XL	70	97000	241000	14600	3800	2800	1.2
ZKLN80130-2Z-XL	80	100000	265000	15800	3600	2700	1.4
ZKLN90150-2Z-XL	90	149000	395000	21900	3500	2300	2.3
ZKLN100160-2Z-XL	100	154000	435000	23000	3300	2150	2.6



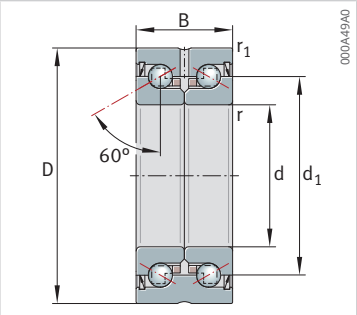
Design of housing and shaft (threaded spindle)

c_{aL}	c_{kL}	Locknut for radial clamping	Locknut for axial clamping	Locknut M_A	Locknut force axial
N/µm	Nm/mrad	–	–	Nm	N
150	4	ZM06	–	1	2010
200	8	ZM06	–	2	2404
200	8	ZM06	–	2	2404
250	20	ZM08	–	4	3468
250	20	ZM08	–	4	3468
325	25	ZM10	–	6	4891
325	25	ZM10	–	6	4891
375	50	ZM12	–	8	5307
375	50	ZM12	–	8	5307
400	65	ZM15	AM15	10	5484
400	65	ZM15	AM15	10	5484
450	80	ZM17	AM17	15	7514
450	80	ZM17	AM17	15	7514
650	140	ZM20	AM20	18	8258
650	140	ZM20	AM20	18	8258
750	200	ZM25	AM25	25	9123
750	200	ZM25	AM25	25	9123
850	300	ZM30	AM30	32	9947
850	300	ZM30	AM30	32	9947
950	400	ZMA30/52	AM30	65	19509
950	400	ZMA30/52	AM30	65	19509
900	400	ZM35	AM35/58	40	10770
900	400	ZM35	AM35/58	40	10770
1000	550	ZM40	AM40	55	13412
1000	550	ZM40	AM40	55	13412
1200	750	ZMA40/62	AM40	110	25185
1200	750	ZMA40/62	AM40	110	25185
1400	1500	ZMA50/75	AM50	150	28451
1400	1500	ZMA50/75	AM50	150	28451
1250	1000	ZM50	AM50	85	16280
1250	1000	ZM50	AM50	85	16280
1300	1650	ZMA60/98	AM60	100	16700
1450	2250	ZMA70/110	AM70	130	19031
1600	3000	ZMA80/120	AM80	160	20604
1700	4400	ZMA90/130	AM90	200	22731
1900	5800	ZMA100/140	AM100	250	25624

8.6 ZKLN..-2RS-PE

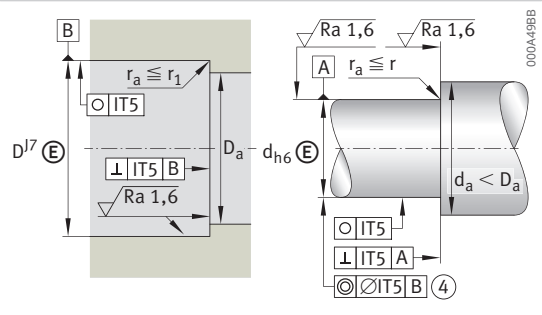
Without fixing holes

Less stringent tolerances



ZKLN..-2RS-PE

Designation	m	d	D	B
	kg	mm	mm	mm
ZKLN0624-2RS-PE	0.03	6	24	15
ZKLN1034-2RS-PE	0.1	10	34	20
ZKLN1242-2RS-PE	0.2	12	42	25
ZKLN1545-2RS-PE	0.21	15	45	25
ZKLN1747-2RS-PE	0.22	17	47	25
ZKLN2052-2RS-PE	0.31	20	52	28
ZKLN2557-2RS-PE	0.34	25	57	28
ZKLN3062-2RS-PE	0.39	30	62	28
ZKLN3572-2RS-PE	0.51	35	72	34
ZKLN5090-2RS-PE	0.88	50	90	34



Design of housing and shaft (threaded spindle)

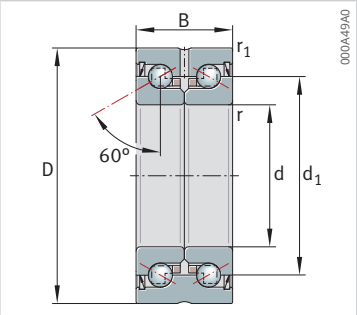
8

J	Axial runout	d_1	r_{min}	$r_{1\ min}$	D_a max.	d_a min.
kg · cm²	µm	mm	mm	mm	mm	mm
0.0044	5	14	0.3	0.6	19	9
0.029	5	21	0.3	0.6	28	14
0.068	5	25	0.3	0.6	33	16
0.102	5	28	0.3	0.6	35	20
0.132	5	30	0.3	0.6	37	23
0.273	5	34.5	0.3	0.6	43	25
0.486	5	40.5	0.3	0.6	48	32
0.73	5	45.5	0.3	0.6	53	40
1.51	5	52	0.3	0.6	62	45
5.24	5	72	0.3	0.6	82	63

ZKLN..-2RS-PE

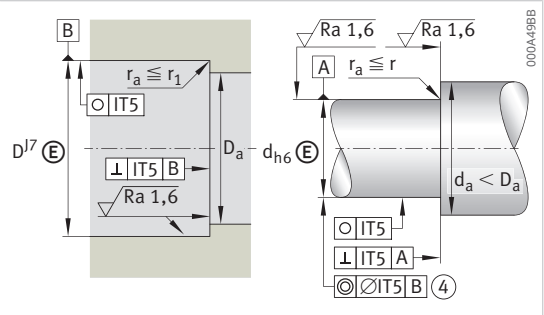
Without fixing holes

Less stringent tolerances



ZKLN..-2RS-PE

Designation	d	C_a	C_{0a}	C_{ua}	n_G grease	n_ϑ	M_R
	mm	N	N	N	min^{-1}	min^{-1}	Nm
ZKLN0624-2RS-PE	6	6900	8500	385	16400	6800	0.04
ZKLN1034-2RS-PE	10	13400	18800	850	10900	4600	0.12
ZKLN1242-2RS-PE	12	17100	25000	1140	9200	3800	0.16
ZKLN1545-2RS-PE	15	18000	28500	1300	8200	3500	0.2
ZKLN1747-2RS-PE	17	18900	31500	1440	7600	3300	0.24
ZKLN2052-2RS-PE	20	26000	47000	2130	6600	3000	0.3
ZKLN2557-2RS-PE	25	27500	55000	2500	5700	2600	0.4
ZKLN3062-2RS-PE	30	29000	64000	2900	5000	2200	0.5
ZKLN3572-2RS-PE	35	41000	89000	4050	4400	2000	0.6
ZKLN5090-2RS-PE	50	46500	126000	5800	3200	1500	0.9



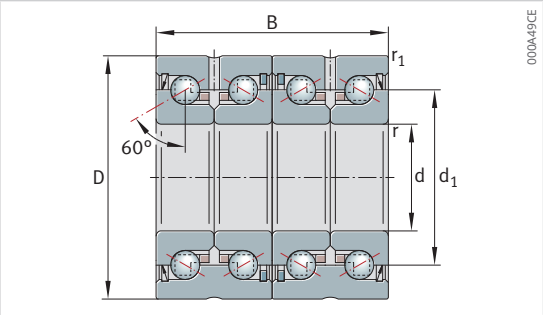
Design of housing and shaft (threaded spindle)

c_{aL}	c_{kL}	Locknut for radial clamping	Locknut for axial clamping	Locknut M_A	Locknut force axial
N/µm	Nm/mrad	–	–	Nm	N
200	8	ZM06	–	2	2404
325	25	ZM10	–	6	4891
375	50	ZM12	–	8	5307
400	65	ZM15	AM15	10	5484
450	80	ZM17	AM17	15	7514
650	140	ZM20	AM20	18	8258
750	200	ZM25	AM25	25	9123
850	300	ZM30	AM30	32	9947
900	400	ZM35	AM35/38	40	10770
1250	1000	ZM50	AM50	85	16280

8.7 ZKLN..-2RS-2AP

Without fixing holes

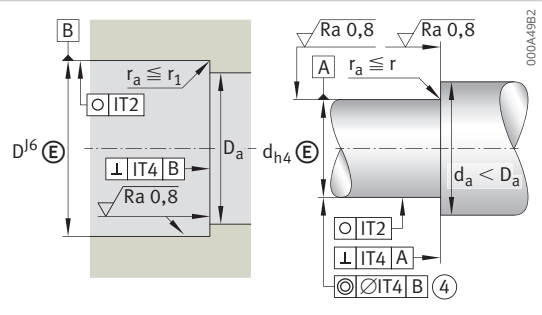
Matched pair



ZKLN..-2RS-2AP

8

Designation	m	d	D	B
	kg	mm	mm	mm
ZKLN1747-2RS-2AP-XL	0.44	17	47	50
ZKLN2052-2RS-2AP-XL	0.62	20	52	56
ZKLN2557-2RS-2AP-XL	0.68	25	57	56
ZKLN3062-2RS-2AP-XL	0.78	30	62	56
ZKLN3572-2RS-2AP-XL	1.02	35	72	68
ZKLN4075-2RS-2AP-XL	1.22	40	75	68
ZKLN5090-2RS-2AP-XL	1.76	50	90	68



Design of housing and shaft (threaded spindle)

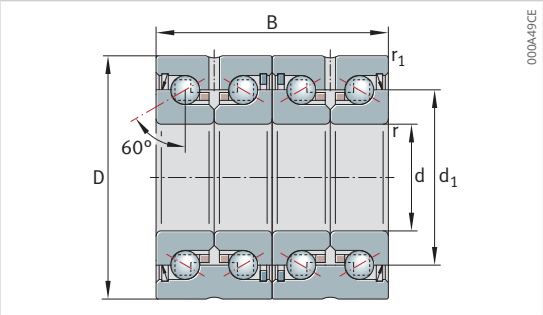
8

J	Axial runout	d_1	r_{min}	$r_{1\ min}$	D_a max.	d_a min.
kg · cm²	µm	mm	mm	mm	mm	mm
0.264	2	30	0.3	0.6	37	23
0.546	2	34.5	0.3	0.6	43	25
0.972	2	40.5	0.3	0.6	48	32
1.46	2.5	45.5	0.3	0.6	53	40
3.02	2.5	52	0.3	0.6	62	45
4.52	2.5	58	0.3	0.6	67	50
10.48	2.5	72	0.3	0.6	82	63

ZKLN..-2RS-2AP

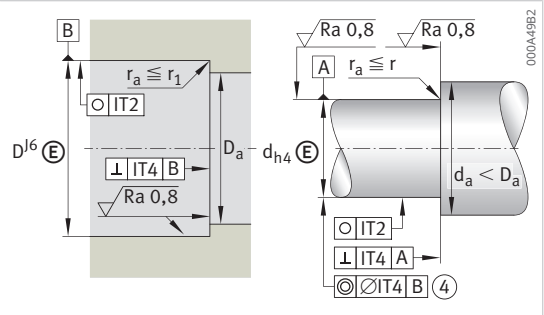
Without fixing holes

Matched pair



ZKLN..-2RS-2AP

Designation	d	C_a	C_{0a}	C_{ua}	n_G grease	n_ϑ	M_R
	mm	N	N	N	min^{-1}	min^{-1}	Nm
ZKLN1747-2RS-2AP-XL	17	34000	63000	3850	7600	3300	0.36
ZKLN2052-2RS-2AP-XL	20	46000	94000	5700	6600	3000	0.45
ZKLN2557-2RS-2AP-XL	25	44500	111000	6700	5700	2600	0.6
ZKLN3062-2RS-2AP-XL	30	52000	127000	7700	5000	2200	0.75
ZKLN3572-2RS-2AP-XL	35	73000	177000	10800	4400	2000	0.9
ZKLN4075-2RS-2AP-XL	40	77000	202000	12300	4000	1800	1.05
ZKLN5090-2RS-2AP-XL	50	83000	250000	15300	3200	1500	1.35

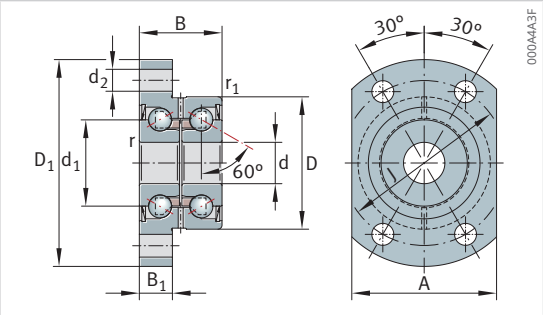


Design of housing and shaft (threaded spindle)

c_{aL}	c_{kL}	Locknut for radial clamping	Locknut for axial clamping	Locknut M_A	Locknut force axial
N/µm	Nm/mrad	–	–	Nm	N
800	200	ZM17	AM17	15	7514
1150	320	ZMA20/38	AM20	18	8258
1300	450	ZMA25/45	AM25	25	9123
1500	620	ZMA30/52	AM30	32	9947
1600	900	ZMA35/58	AM35/58	40	10770
1750	1200	ZMA40/62	AM40	55	13412
2200	2250	ZMA50/75	AM50	85	16280

8.8 ZKLFA..-2RS, ZKLFA..-2Z

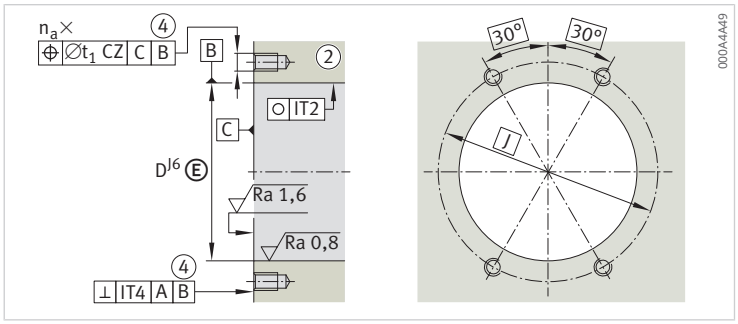
With fixing holes



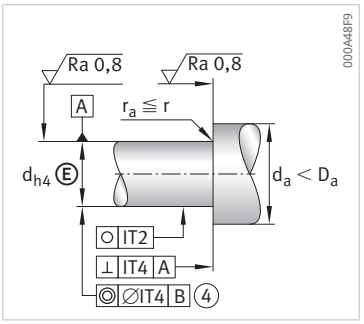
ZKLFA..-2RS, ZKLFA..-2Z

8

Designation	m	d	D	B	d_1	D_1	r_{min}
	kg	mm	mm	mm	mm	mm	mm
ZKLFA0630-2Z	0.05	6	19	12	12	30	0.3
ZKLFA0640-2RS	0.08	6	24	15	14	40	0.3
ZKLFA0640-2Z	0.08	6	24	15	14	40	0.3
ZKLFA0850-2RS	0.17	8	32	20	19	50	0.3
ZKLFA0850-2Z	0.17	8	32	20	19	50	0.3
ZKLFA1050-2RS	0.18	10	32	20	21	50	0.3
ZKLFA1050-2Z	0.18	10	32	20	21	50	0.3
ZKLFA1263-2RS	0.3	12	42	25	25	63	0.3
ZKLFA1263-2Z	0.3	12	42	25	25	63	0.3
ZKLFA1563-2RS	0.31	15	42	25	28	63	0.3
ZKLFA1563-2Z	0.31	15	42	25	28	63	0.3



Housing design



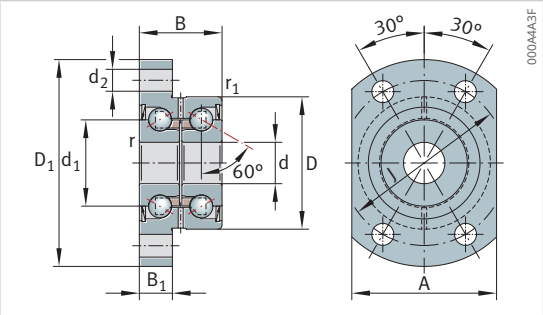
Shaft design (threaded spindle)

8

$r_{1\,min}$	B_1	d_2	J	A	d_a	d_a	t_1	Screws Size	n_a
mm	mm	mm	mm	mm	min.	max.	mm		
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
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
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
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
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

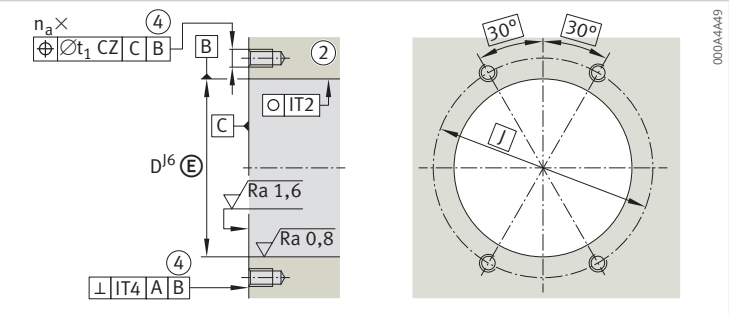
ZKLFA..-2RS, ZKLFA..-2Z

With fixing holes

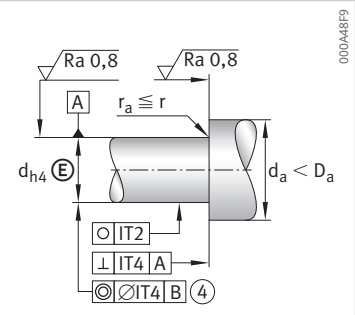


ZKLFA..-2RS, ZKLFA..-2Z

Designation	d	C_a	C_{0a}	C_{ua}	n_G grease	n_ϑ	M_R
	mm	N	N	N	min^{-1}	min^{-1}	Nm
ZKLFA0630-2Z	6	4550	5700	260	22800	14000	0.01
ZKLFA0640-2RS	6	6900	8500	385	16400	–	0.04
ZKLFA0640-2Z	6	6900	8500	385	19900	12000	0.02
ZKLFA0850-2RS	8	12500	16300	740	12100	–	0.08
ZKLFA0850-2Z	8	12500	16300	740	15500	9500	0.04
ZKLFA1050-2RS	10	13400	18800	850	10900	–	0.12
ZKLFA1050-2Z	10	13400	18800	850	14400	8600	0.06
ZKLFA1263-2RS	12	17100	25000	1140	9200	–	0.16
ZKLFA1263-2Z	12	17100	25000	1140	12000	7600	0.08
ZKLFA1563-2RS	15	18000	28500	1300	8200	–	0.2
ZKLFA1563-2Z	15	18000	28500	1300	10800	7000	0.1



Housing design

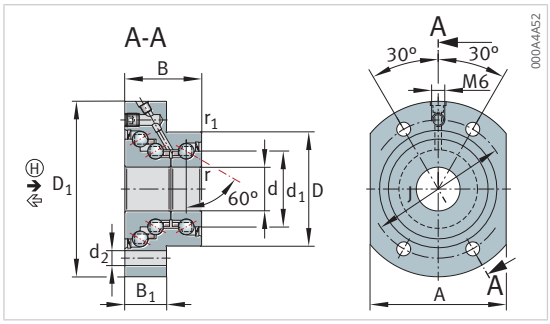


Shaft design (threaded spindle)

c_{aL}	c_{kL}	M_m	Axial runout	Locknut for radial clamping	Locknut for axial clamping	Locknut M_A	Locknut force axial
N/µm	Nm/mrad	kg · cm²	µm	–	–	Nm	N
150	4	0.0019	2	ZM06	–	2	2010
200	8	0.0044	2	ZM06	–	2	2404
200	8	0.0044	2	ZM06	–	2	2404
250	20	0.02	2	ZM08	–	4	3468
250	20	0.02	2	ZM08	–	4	3468
325	25	0.029	2	ZM10	–	6	4891
325	25	0.029	2	ZM10	–	6	4891
375	50	0.068	2	ZM12	–	8	5307
375	50	0.068	2	ZM12	–	8	5307
400	65	0.102	2	ZM15	AM15	10	5484
400	65	0.102	2	ZM15	AM15	10	5484

8.9 DKLFA..-2RS

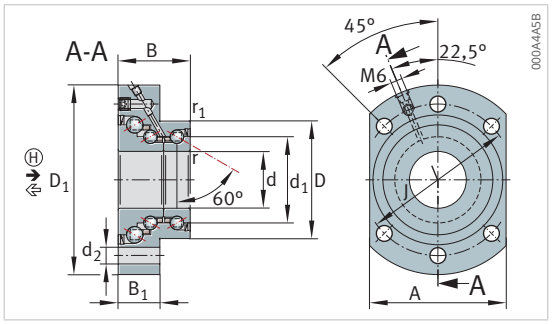
With fixing holes



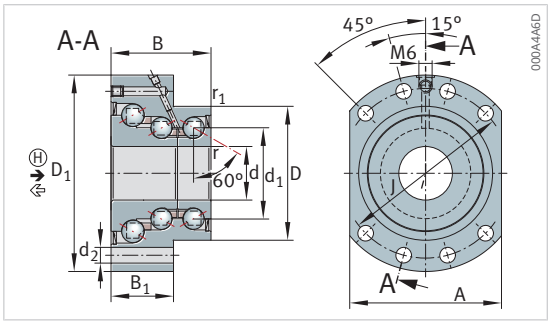
DKLFA..-2RS (d ≤ 20 mm)

8

Designation	m	d	D	B	d_1	D_1 min.	r_{min}
	kg	mm	mm	mm	mm	mm	mm
DKLFA1575-2RS	0.53	15	45	32	28	75	0.3
DKLFA2080-2RS	0.7	20	52	35	34.5	80	0.3
DKLFA2590-2RS	0.9	25	57	38	40.5	90	0.3
DKLFA30100-2RS	1	30	62	38	45.5	100	0.3
DKLFA30110-2RS	2.5	30	75	56	51	110	0.3
DKLFA40115-2RS	1.5	40	72	42	58	115	0.3
DKLFA40140-2RS	4.2	40	90	60	65	140	0.3



DKLFA..-2RS (d ≥ 25 mm)



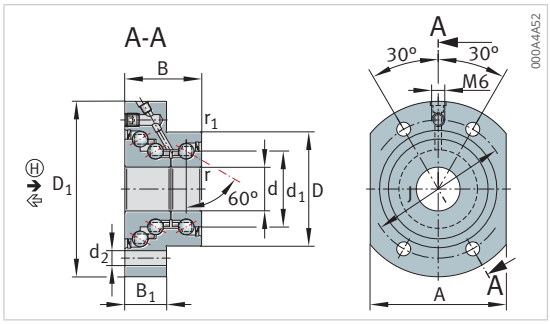
DKLFA..-2RS, heavy series

8

$r_{1\ min}$	B_1	d_2	J	A	d_a min.	d_a max.	Screws Size	n	t
mm	mm	mm	mm	mm	mm	mm	–	–	°
0.6	18	6.8	58	55	20	35	M6	4	60
0.6	19	6.8	63	62	25	43	M6	4	60
0.6	22	8.8	75	70	32	48	M8	6	60
0.6	22	8.8	80	72	40	53	M8	6	60
0.6	35	8.8	95	85	47	64	M8	8	60
0.6	23	8.8	94	90	50	67	M8	6	60
0.6	35	11	118	110	56	80	M10	8	60

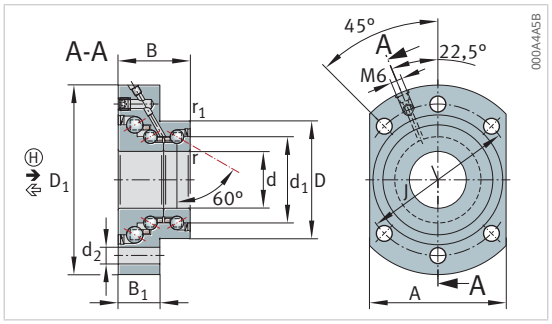
DKLFA..-2RS

With fixing holes

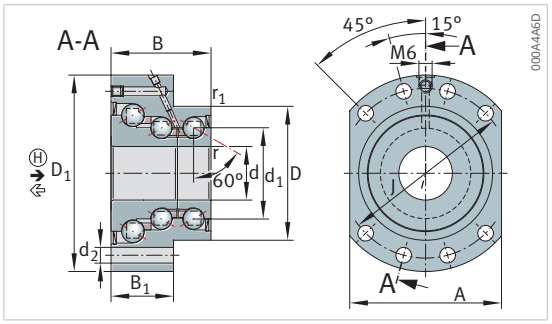


DKLFA..-2RS (d ≤ 20 mm)

Designation	d	C_a axial ⇦	C_{0a} axial ⇦	C_a axial H ➡	C_{0a} axial H ➡	C_{ua}	C_{ua} H	n_G grease	n_ϑ	M_R
	mm	N	N	N	N	N	N	min^{-1}	min^{-1}	Nm
DKLFA1575-2RS	15	17900	28000	37000	83000	1240	2450	5700	2600	0.35
DKLFA2080-2RS	20	26000	47000	44500	110000	2070	2800	5000	2200	0.45
DKLFA2590-2RS	25	27500	55000	53000	144000	2450	3950	4400	2000	0.6
DKLFA30100-2RS	30	29000	64000	56000	165000	2800	4450	4000	1800	0.75
DKLFA30110-2RS	30	59000	108000	107000	255000	4800	6600	3500	1600	1.5
DKLFA40115-2RS	40	43000	101000	73000	227000	4450	5600	3200	1500	1
DKLFA40140-2RS	40	72000	149000	127000	365000	6600	9500	2900	1200	2.5



DKLFA..-2RS (d ≥ 25 mm)



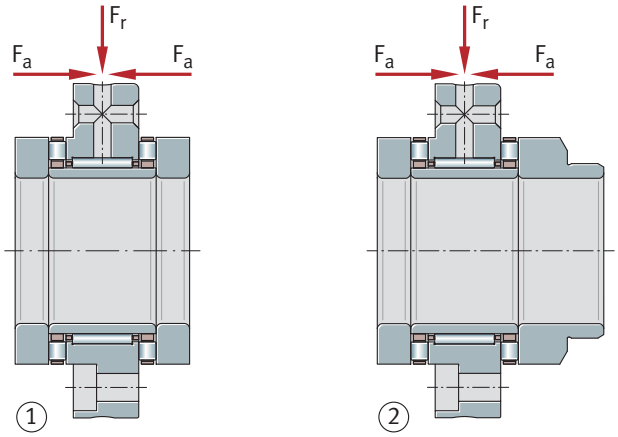
DKLFA..-2RS, heavy series

c_{aL} axial ⇦	c_{aL} axial H ➡	c_{kL}	J	Axial runout	Locknut for radial clamping	Locknut for radial clamping	Locknut for axial clamping	Locknut M_A	Required locknut force axial
N/µm	N/µm	Nm/mrad	kg · cm²	µm	–	–	–	Nm	N
500	950	140	0.278	5	ZMA15/33	ZM17	AM15	10	6270
750	1100	260	0.553	5	ZMA20/38	ZM25	AM20	18	8580
850	1200	370	1.12	5	ZMA25/45	ZM30	AM25	25	9670
900	1400	500	1.7	5	ZMA30/52	ZM35	AM30	32	10350
1300	1600	650	3.23	5	ZM35	ZM35	AM30/65	65	20500
1100	1700	1000	4.23	5	ZMA40/62	ZM45	AM40	55	13420
1800	2000	1370	9.32	5	ZM45	ZM45	AM40/85	110	26600

9 Needle roller/axial cylindrical roller bearings

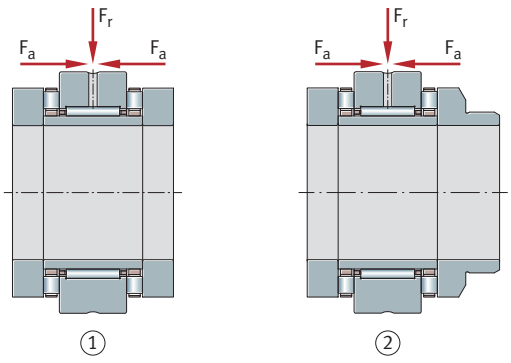
These precision bearings are double direction axial cylindrical roller bearings with a radial bearing component. The bearings are available with and without fixing holes in the outer ring. Bearings with holes are screw mounted directly on the adjacent construction. The large contact surface and the small 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.

26 Needle roller/axial cylindrical roller bearings, for screw mounting



F_r	Radial load	F_a	Axial load
1	ZARF	2	With stepped shaft locating washer extended on one side ZARF..-L

27 Needle roller/axial cylindrical roller bearings, not for screw mounting



F_r	Radial load	F_a	Axial load
1	ZARN	2	With stepped shaft locating washer extended on one side ZARN..-L

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. In

addition to radial forces, the bearings can also support axial forces from both directions and tilting moments. 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

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). In the interests of a simpler design, a seal carrier assembly DRS is recommended. The seal carrier assembly is centered on the outer ring and seals the bearing against external influences.

Bearings not for screw mounting

Bearings ZARN..-L are mounted in a housing bore and the outer ring is located using a cover. The bearings are preloaded against the shaft shoulder by means of a locknut AM or ZM(A). 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. 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.

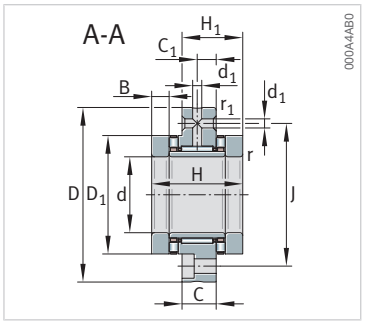
9.1 Clarification of product tables

B	mm	Inner ring width
B_1	mm	Width, shaft locating washer, long
B_2	mm	Shoulder width, shaft locating washer, long
C	mm	Outer ring width
C_{0a}	N	Basic static load rating, axial
C_{0r}	N	Basic static load rating, radial
C_1	mm	Lubrication hole spacing
C_a	N	Basic dynamic load rating, axial
c_{aL}	N/µm	Axial rigidity
c_{kL}	Nm/mrad	Tilting rigidity
C_r	N	Basic dynamic load rating, radial
C_{ua}	N	Fatigue limit load, axial
C_{ur}	N	Fatigue limit load, radial
d	mm	Bore diameter
D	inch or mm	Outside diameter
d_1	mm	Lubrication hole diameter
D_1	mm	Rib diameter, shaft locating washer
D_2	mm	Shoulder diameter, shaft locating washer, long
D_3	mm	Outside diameter, shaft locating washer, long
d_a	mm	Abutment diameter, shaft shoulder
D_a	mm	Housing shoulder diameter
H	mm	Height
H_1	mm	Outer ring height over shaft locating washer
J	mm	Pitch circle diameter, fixing holes
J	kg · cm^2	Mass moment of inertia
m	kg or lbs	Mass
M_A	Nm	Tightening torque for the recommended INA precision locknuts
M_R	Nm	Bearing frictional torque
n	–	Number of fixing screws
n_G	min^{-1}	Limiting speed
$r_{1\ min}$	mm	Min. chamfer dimension
r_{min}	mm	Min. chamfer dimension
t	°	Pitch angle, fixing holes
t_1	mm	Positional tolerance of bore in housing
t_a	°	Pitch angle of bores in the adjacent construction

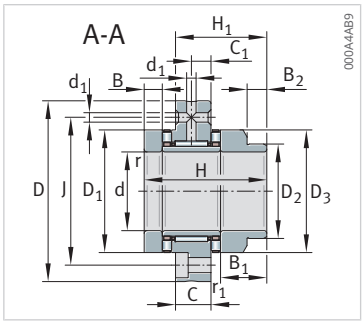
9.2 ZARF, ZARF..-L

Light series

With fixing holes



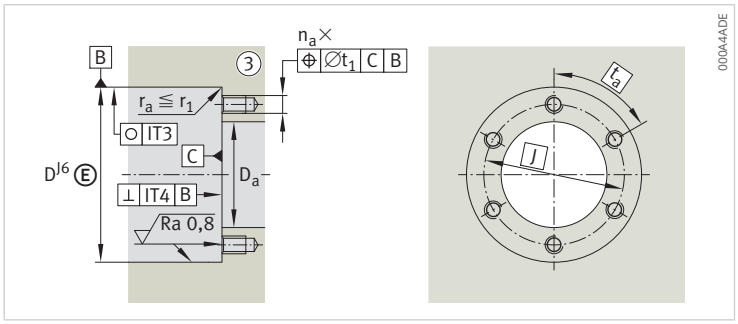
ZARF



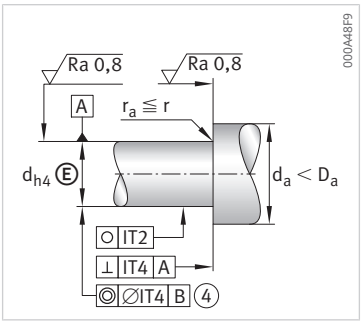
ZARF..-L

9

Designation	m	d	D	H	C_a	C_{0a}	C_r	C_{0r}	C_{ua}	C_{ur}	n_G oil	n_G grease	M_R
	kg	mm	mm	mm	N	N	N	N	N	N	min^{-1}	min^{-1}	Nm
ZARF1560-TV	0.42	15	60	40	24900	53000	13000	17500	7500	2650	8500	2200	0.35
ZARF1560-L-TV	0.45	15	60	53	24900	53000	13000	17500	7500	2650	8500	2200	0.35
ZARF1762-TV	0.49	17	62	43	26000	57000	14000	19900	8000	3000	7800	2100	0.4
ZARF1762-L-TV	0.52	17	62	57	26000	57000	14000	19900	8000	3000	7800	2100	0.4
ZARF2068-TV	0.56	20	68	46	33500	76000	14900	22400	6400	3400	7000	2000	0.5
ZARF2068-L-TV	0.61	20	68	60	33500	76000	14900	22400	6400	3400	7000	2000	0.5
ZARF2575-TV	0.78	25	75	50	35500	86000	22600	36000	7300	5200	6000	1900	0.55
ZARF2575-L-TV	0.84	25	75	65	35500	86000	22600	36000	7300	5200	6000	1900	0.55
ZARF3080-TV	0.85	30	80	50	39000	101000	24300	41500	8500	6000	5500	1800	0.65
ZARF3080-L-TV	0.9	30	80	65	39000	101000	24300	41500	8500	6000	5500	1800	0.65
ZARF3590-TV	1.12	35	90	54	56000	148000	26000	47000	12900	6800	4800	1700	0.9
ZARF3590-L-TV	1.25	35	90	70	56000	148000	26000	47000	12900	6800	4800	1700	0.9
ZARF40100-TV	1.35	40	100	54	59000	163000	27500	53000	14200	7600	4400	1600	1
ZARF40100-L-TV	1.45	40	100	70	59000	163000	27500	53000	14200	7600	4400	1600	1
ZARF45105-TV	1.7	45	105	60	61000	177000	38000	74000	15500	10400	4000	1500	1.2
ZARF45105-L-TV	1.85	45	105	75	61000	177000	38000	74000	15500	10400	4000	1500	1.2
ZARF50115-TV	2.1	50	115	60	90000	300000	40000	82000	28000	11500	3600	1200	2.2
ZARF50115-L-TV	2.45	50	115	78	90000	300000	40000	82000	28000	11500	3600	1200	2.2



Housing design



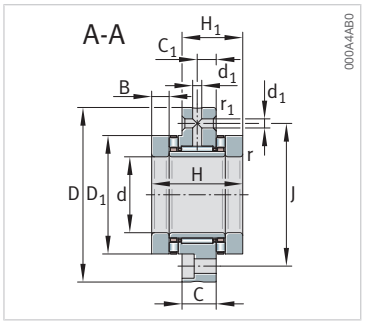
Shaft design (threaded spindle)

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
mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	–	°	mm	mm	mm	kg · cm²
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
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
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
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
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
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
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
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
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

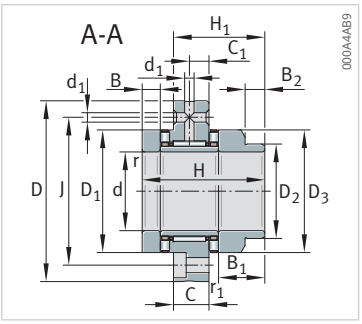
ZARF, ZARF..-L

Light series

With fixing holes

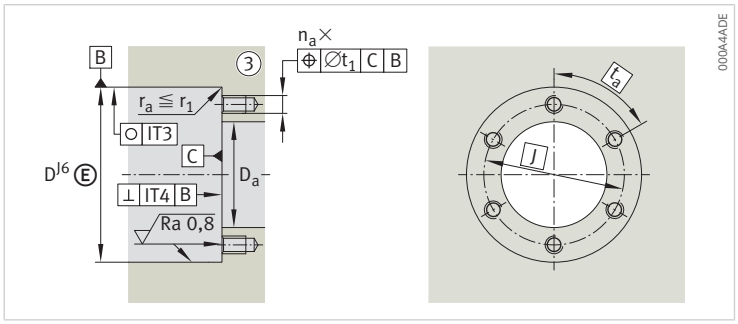


ZARF

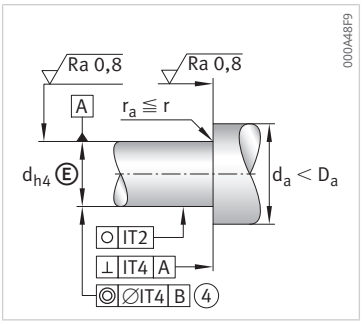


ZARF..-L

Designation	d	C_{aL}	C_{kL}	Axial runout
	mm	N/µm	Nm/mrad	µm
ZARF1560-TV	15	1400	110	1
ZARF1560-L-TV	15	1400	110	1
ZARF1762-TV	17	1600	160	1
ZARF1762-L-TV	17	1600	160	1
ZARF2068-TV	20	1800	230	1
ZARF2068-L-TV	20	1800	230	1
ZARF2575-TV	25	1900	350	1
ZARF2575-L-TV	25	1900	350	1
ZARF3080-TV	30	2200	520	1
ZARF3080-L-TV	30	2200	520	1
ZARF3590-TV	35	2600	740	1
ZARF3590-L-TV	35	2600	740	1
ZARF40100-TV	40	2800	1030	1
ZARF40100-L-TV	40	2800	1030	1
ZARF45105-TV	45	3000	1340	1
ZARF45105-L-TV	45	3000	1340	1
ZARF50115-TV	50	4800	2470	1
ZARF50115-L-TV	50	4800	2470	1



Housing design



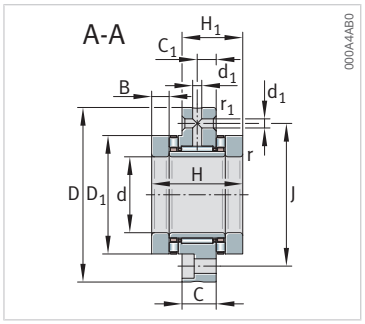
Shaft design (threaded spindle)

Locknut for radial clamping	Locknut for axial clamping	Locknut M_A	Locknut force axial	Sealing ring radial	Screws Size	n_a	t_a
–	–	Nm	N	–	–	–	°
ZMA15/33	AM15	10	6506	–	M6	6	60
ZMA15/33	AM15	10	6506	24×35×7	M6	–	60
ZM17	AM17	12	7078	–	M6	6	60
ZM17	AM17	12	7078	28×40×7	M6	6	60
ZMA20/38	AM20	18	8972	–	M6	8	45
ZMA20/38	AM20	18	8972	30×42×7	M6	–	45
ZMA25/45	AM25	25	9745	–	M6	8	45
ZMA25/45	AM25	25	9745	36×47×7	M6	–	45
ZMA30/52	AM30	32	10662	–	M6	12	30
ZMA30/52	AM30	32	10662	40×52×7	M6	–	30
ZMA35/58	AM35/58	40	12143	–	M6	12	30
ZMA35/58	AM35/58	40	12143	45×60×8	M6	–	30
ZMA40/62	AM40	55	14240	–	M8	8	45
ZMA40/62	AM40	55	14240	50×65×8	M8	–	45
ZMA45/68	AM45	65	15112	–	M8	8	45
ZMA45/68	AM45	65	15112	56×70×8	M8	–	45
ZMA50/75	AM50	85	18410	–	M8	12	30
ZMA50/75	AM50	85	18410	60×80×8	M8	–	30

ZARF, ZARF..-L

Heavy series

With fixing holes



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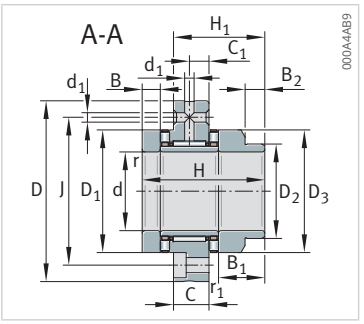
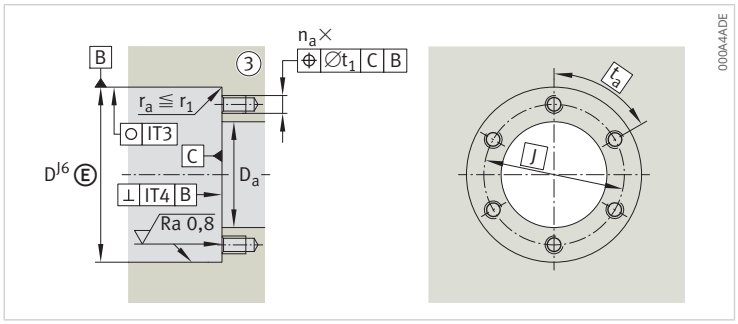
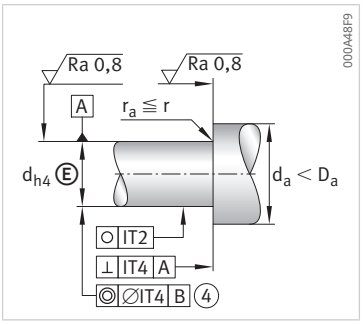


ZARF..-L

Designation	m	d	D	H	C_a	C_{0a}	C_r	C_{0r}	C_{ua}	C_{ur}	n_G oil	n_G grease	M_R
	kg	mm	mm	mm	N	N	N	N	N	N	min^{-1}	min^{-1}	Nm
ZARF2080-TV	1.1	20	80	60	64000	141000	22600	36000	13100	5200	6000	1500	1.3
ZARF2080-L-TV	1.22	20	80	75	64000	141000	22600	36000	13100	5200	6000	1500	1.3
ZARF2590-TV	1.6	25	90	60	80000	199000	24300	41500	18600	6000	4900	1400	1.6
ZARF2590-L-TV	1.75	25	90	75	80000	199000	24300	41500	18600	6000	4900	1400	1.6
ZARF30105-TV	1.95	30	105	66	107000	265000	26000	47000	22900	6800	4400	1300	2.1
ZARF30105-L-TV	2.15	30	105	82	107000	265000	26000	47000	22900	6800	4400	1300	2.1
ZARF35110-TV	1.6	35	110	66	105000	265000	27500	53000	22900	7600	4000	1250	2.3
ZARF35110-L-TV	1.85	35	110	82	105000	265000	27500	53000	22900	7600	4000	1250	2.3
ZARF40115-TV	2.7	40	115	75	117000	315000	38000	74000	27000	10400	3700	1200	2.5
ZARF40115-L-TV	3	40	115	93	117000	315000	38000	74000	27000	10400	3700	1200	2.5
ZARF45130-TV	3.9	45	130	82	154000	405000	40000	82000	37500	11500	3300	1150	3.5
ZARF45130-L-TV	4.3	45	130	103	154000	405000	40000	82000	37500	11500	3300	1150	3.5
ZARF50140-TV	4.2	50	140	82	172000	480000	46500	103000	44500	12700	3100	1100	3.8
ZARF50140-L-TV	4.65	50	140	103	172000	480000	46500	103000	44500	12700	3100	1100	3.8
ZARF55145-TV	4.5	55	145	82	177000	500000	44000	98000	46500	13800	2900	1000	4
ZARF55145-L-TV	5	55	145	103	177000	500000	44000	98000	46500	13800	2900	1000	4
ZARF60150-TV	4.7	60	150	82	187000	550000	44500	92000	51000	12900	2700	950	4.2
ZARF60150-L-TV	5.35	60	150	103	187000	550000	44500	92000	51000	12900	2700	950	4.2
ZARF65155-TV	5.1	65	155	82	172000	500000	54000	104000	46500	14900	2600	900	4
ZARF65155-L-TV	5.7	65	155	103	172000	500000	54000	104000	46500	14900	2600	900	4
ZARF70160-TV	5.2	70	160	82	201000	630000	56000	119000	58000	16100	2400	800	4.8
ZARF70160-L-TV	5.95	70	160	103	201000	630000	56000	119000	58000	16100	2400	800	4.8
ZARF75185-TV	9.4	75	185	100	290000	890000	81000	132000	85000	19100	2100	700	8
ZARF75185-L-TV	10.6	75	185	125	290000	890000	81000	132000	85000	19100	2100	700	8
ZARF90210-TV	13.7	90	210	110	325000	1030000	98000	210000	95000	29000	1800	700	10.5
ZARF90210-L-TV	15.1	90	210	135	325000	1030000	98000	210000	95000	29000	1800	700	10.5



Housing design



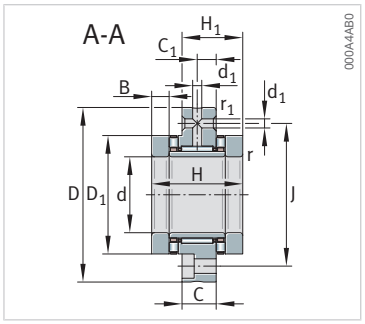
Shaft design (threaded spindle)

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
mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	–	°	mm	mm	mm	kg · cm²
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
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
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
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
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
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
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
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
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
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
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
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
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

ZARF, ZARF..-L

Heavy series

With fixing holes



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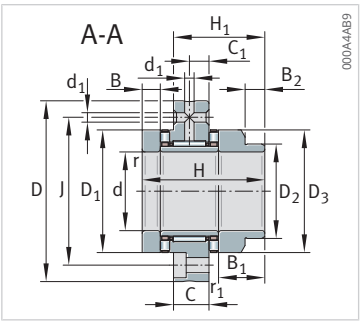
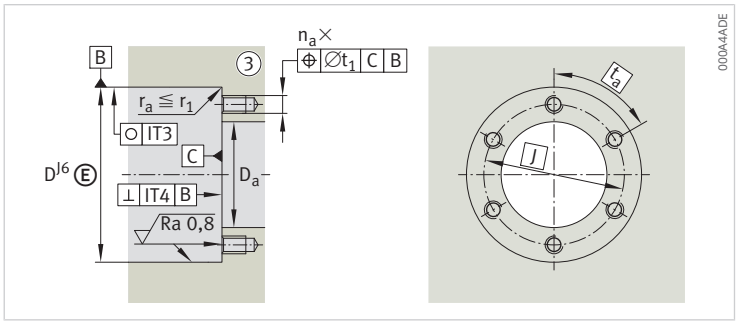
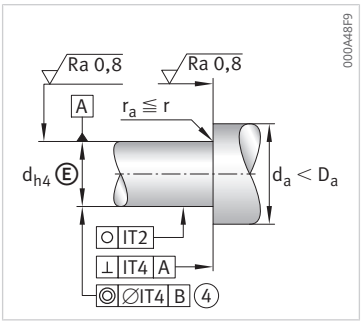


ZARF..-L

Designation	d	C_{aL}	C_{kL}	Axial runout
	mm	N/µm	Nm/mrad	µm
ZARF2080-TV	20	2300	400	1
ZARF2080-L-TV	20	2300	400	1
ZARF2590-TV	25	3000	800	1
ZARF2590-L-TV	25	3000	800	1
ZARF30105-TV	30	3300	1100	1
ZARF30105-L-TV	30	3300	1100	1
ZARF35110-TV	35	3500	1300	1
ZARF35110-L-TV	35	3500	1300	1
ZARF40115-TV	40	3800	1800	1
ZARF40115-L-TV	40	3800	1800	1
ZARF45130-TV	45	4000	2100	1
ZARF45130-L-TV	45	4000	2100	1
ZARF50140-TV	50	4600	2900	1
ZARF50140-L-TV	50	4600	2900	1
ZARF55145-TV	55	4900	3600	1
ZARF55145-L-TV	55	4900	3600	1
ZARF60150-TV	60	5300	4300	1
ZARF60150-L-TV	60	5300	4300	1
ZARF65155-TV	65	4800	4000	1
ZARF65155-L-TV	65	4800	4000	1
ZARF70160-TV	70	5800	6000	1
ZARF70160-L-TV	70	5800	6000	1
ZARF75185-TV	75	6600	8500	2
ZARF75185-L-TV	75	6600	8500	2
ZARF90210-TV	90	7700	14500	2
ZARF90210-L-TV	90	7700	14500	2



Housing design



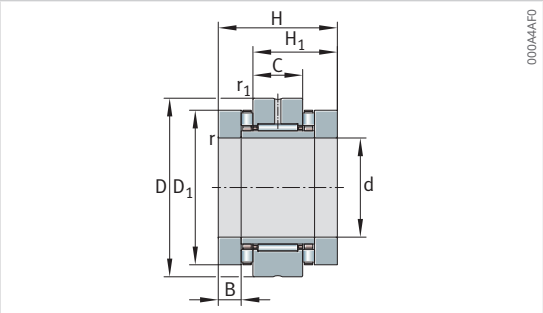
Shaft design (threaded spindle)

Locknut for radial clamping	Locknut for axial clamping	Locknut M_A	Locknut force axial	Sealing ring radial	Screws Size	n_a	t_a
		Nm	N				°
ZMA20/52	AM20	38	17623	–	M6	12	30
ZMA20/52	AM20	38	17623	40×52×7	M6	–	30
ZMA25/58	AM25	55	20790	–	M6	12	30
ZMA25/58	AM25	55	20790	48×62×8	M6	–	30
ZMA30/65	AM30	75	24287	–	M8	12	30
ZMA30/65	AM30	75	24287	52×68×8	M8	–	30
ZMA35/70	AM35	100	27480	–	M8	12	30
ZMA35/70	AM35	100	27480	60×75×8	M8	–	30
ZMA40/75	AM40	120	29834	–	M8	12	30
ZMA40/75	AM40	120	29834	60×80×8	M8	–	30
ZMA45/85	AM45	150	33549	–	M8	12	30
ZMA45/85	AM45	150	33549	70×90×10	M8	–	30
ZMA50/92	AM50	180	36224	–	M10	12	30
ZMA50/92	AM50	180	36224	75×95×10	M10	–	30
ZMA55/98	AM55	220	39807	–	M10	12	30
ZMA55/98	AM55	220	39807	80×100×10	M10	–	30
ZMA60/98	AM60	250	41144	–	M10	12	30
ZMA60/98	AM60	250	41144	90×110×12	M10	–	30
ZMA65/105	AM65	270	40652	–	M10	12	30
ZMA65/105	AM65	270	40652	90×110×12	M10	–	30
ZMA70/110	AM70	330	46786	–	M10	12	30
ZMA70/110	AM70	330	46786	100×120×12	M10	–	30
ZMA75/125	AM75	580	72971	–	M12	12	30
ZMA75/125	AM75	580	72971	115×140×12	M12	–	30
ZMA90/155	AM90	960	100669	–	M12	16	22.5
ZMA90/155	AM90	960	100669	130×160×12	M12	–	22.5

9.3 ZARN, ZARN..-L

Light series

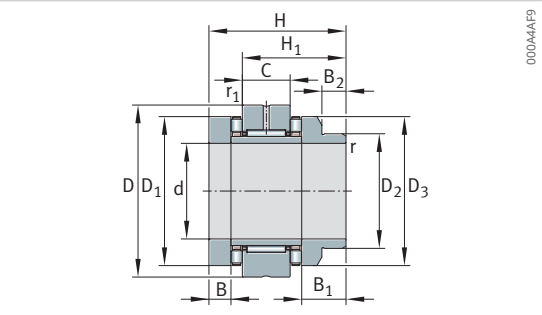
Without fixing holes



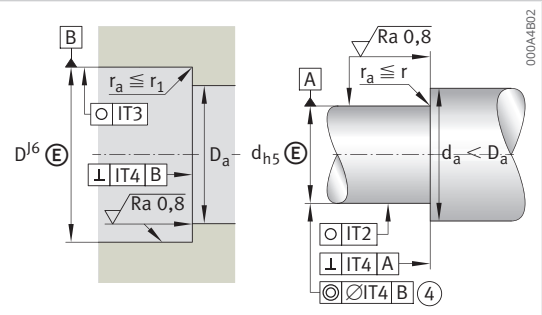
ZARN

9

Designation	m	d	D	H	C_a	C_{0a}	C_r	C_{0r}	C_{ua}	C_{ur}	n_G oil	n_G grease	M_R
	kg	mm	mm	mm	N	N	N	N	N	N	min^{-1}	min^{-1}	Nm
ZARN1545-TV	0.34	15	45	40	24900	53000	13000	17500	7500	2650	8500	2200	0.35
ZARN1545-L-TV	0.37	15	45	53	24900	53000	13000	17500	7500	2650	8500	2200	0.35
ZARN1747-TV	0.37	17	47	43	26000	57000	14000	19900	8000	3000	7800	2100	0.4
ZARN1747-L-TV	0.41	17	47	57	26000	57000	14000	19900	8000	3000	7800	2100	0.4
ZARN2052-TV	0.41	20	52	46	33500	76000	14900	22400	6400	3400	7000	2000	0.5
ZARN2052-L-TV	0.46	20	52	60	33500	76000	14900	22400	6400	3400	7000	2000	0.5
ZARN2557-TV	0.53	25	57	50	35500	86000	22600	36000	7300	5200	6000	1900	0.55
ZARN2557-L-TV	0.59	25	57	65	35500	86000	22600	36000	7300	5200	6000	1900	0.55
ZARN3062-TV	0.6	30	62	50	39000	101000	24300	41500	8500	6000	5500	1800	0.65
ZARN3062-L-TV	0.75	30	62	65	39000	101000	24300	41500	8500	6000	5500	1800	0.65
ZARN3570-TV	0.8	35	70	54	56000	148000	26000	47000	12900	6800	4800	1700	0.9
ZARN3570-L-TV	0.93	35	70	70	56000	148000	26000	47000	12900	6800	4800	1700	0.9
ZARN4075-TV	0.9	40	75	54	59000	163000	27500	53000	14200	7600	4400	1600	1
ZARN4075-L-TV	1	40	75	70	59000	163000	27500	53000	14200	7600	4400	1600	1
ZARN4580-TV	1.12	45	80	60	61000	177000	38000	74000	15500	10400	4000	1500	1.2
ZARN4580-L-TV	1.27	45	80	75	61000	177000	38000	74000	15500	10400	4000	1500	1.2
ZARN5090-TV	1.43	50	90	60	90000	300000	40000	82000	28000	11500	3600	1200	2.2
ZARN5090-L-TV	1.78	50	90	78	90000	300000	40000	82000	28000	11500	3600	1200	2.2



ZARN..-L



Design of housing and shaft (threaded spindle)

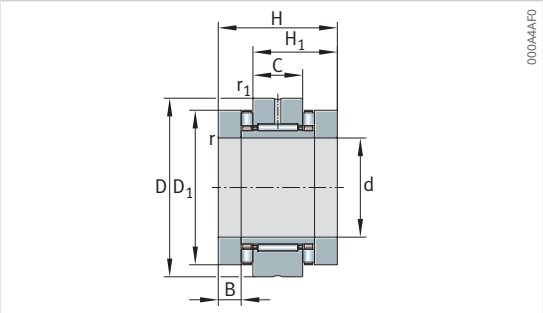
9

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.
mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm
28	16	35	–	–	7.5	–	–	0.3	0.6	36	28
41	16	–	24	34	7.5	20.5	11	0.3	0.6	36	22
29.5	16	38	–	–	9	–	–	0.3	0.6	39	28
43.5	16	–	28	38	9	23	11	0.3	0.6	39	26
31	16	42	–	–	10	–	–	0.3	0.6	43	33
45	16	–	42	30	10	24	12	0.3	0.6	43	28
35	20	47	–	–	10	–	–	0.3	0.6	48	39
50	20	–	36	45	10	25	12	0.3	0.6	48	34
35	20	52	–	–	10	–	–	0.3	0.6	53	44
50	20	–	40	50	10	25	13	0.3	0.6	53	38
37	20	60	–	–	11	–	–	0.3	0.6	61	50
53	20	–	45	58	11	27	13	0.3	0.6	61	43
37	20	65	–	–	11	–	–	0.3	0.6	66	55
53	20	–	50	63	11	27	14	0.3	0.6	66	48
42.5	25	70	–	–	11.5	–	–	0.3	0.6	71	60
57.5	25	–	56	68	11.5	26.5	13	0.3	0.6	71	54
42.5	25	78	–	–	11.5	–	–	0.3	0.6	79	67
60.5	25	–	60	78	11.5	29.5	14	0.3	0.6	79	58

ZARN, ZARN..-L

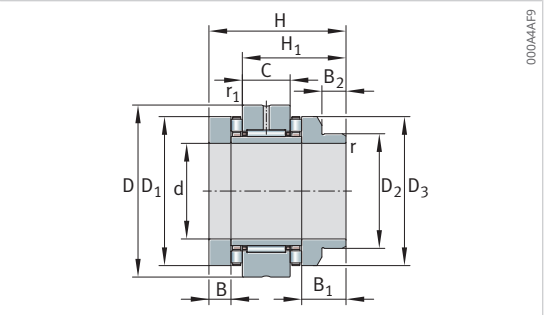
Light series

Without fixing holes



ZARN

Designation	d	C_{aL}	C_{kL}	J	Axial runout
	mm	N/µm	Nm/mrad	kg · cm²	µm
ZARN1545-TV	15	1400	110	0.24	1
ZARN1545-L-TV	15	1400	110	274	1
ZARN1747-TV	17	1600	160	0.373	1
ZARN1747-L-TV	17	1600	160	0.464	1
ZARN2052-TV	20	1800	230	0.615	1
ZARN2052-L-TV	20	1800	230	0.683	1
ZARN2557-TV	25	1900	350	0.989	1
ZARN2557-L-TV	25	1900	350	1.15	1
ZARN3062-TV	30	2200	520	1.46	1
ZARN3062-L-TV	30	2200	520	1.7	1
ZARN3570-TV	35	2600	740	2.8	1
ZARN3570-L-TV	35	2600	740	3.21	1
ZARN4075-TV	40	2800	1030	3.78	1
ZARN4075-L-TV	40	2800	1030	4.35	1
ZARN4580-TV	45	3000	1340	5.33	1
ZARN4580-L-TV	45	3000	1340	6.03	1
ZARN5090-TV	50	4800	2470	8.42	1
ZARN5090-L-TV	50	4800	2470	10.46	1



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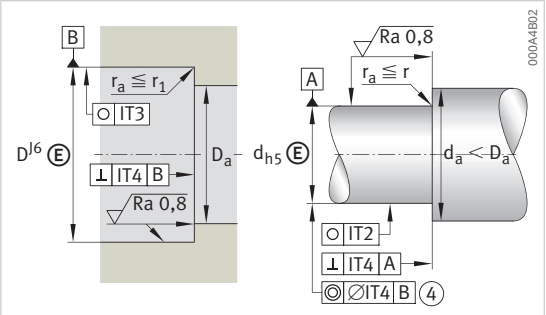


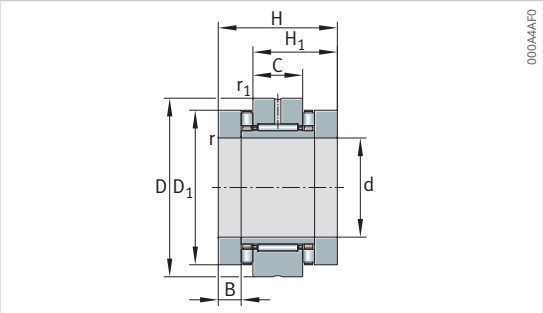
Design of housing and shaft (threaded spindle)

Locknut for radial clamping	Locknut for axial clamping	Locknut M_A	Locknut force axial	Sealing ring radial
–	–	Nm	N	–
ZMA15/33	AM15	10	6506	–
ZMA15/33	AM15	10	6506	–
ZM17	AM17	12	7078	–
ZM17	AM17	12	7078	–
ZMA20/38	AM20	18	8972	–
ZMA20/38	AM20	18	8972	–
ZMA25/45	AM25	25	9745	–
ZMA25/45	AM25	25	9745	–
ZMA30/52	AM30	32	10662	–
ZMA30/52	AM30	32	10662	–
ZMA35/58	AM35/58	40	12143	–
ZMA35/58	AM35/58	40	12143	–
ZMA40/62	AM40	55	14240	–
ZMA40/62	AM40	55	14240	–
ZMA45/68	AM45	65	15112	–
ZMA45/68	AM45	65	15112	–
ZMA50/75	AM50	85	18410	–
ZMA50/75	AM50	85	18410	–

ZARN, ZARN..-L

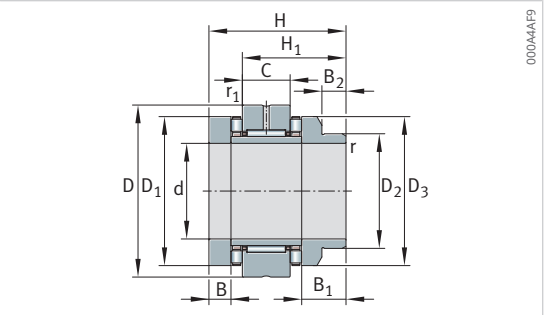
Heavy series

Without fixing holes



ZARN

Designation	m	d	D	H	C_a	C_{0a}	C_r	C_{0r}	C_{ua}	C_{ur}	n_G oil	n_G grease	M_R
	kg	mm	mm	mm	N	N	N	N	N	N	min^{-1}	min^{-1}	Nm
ZARN2062-TV	0.87	20	62	60	64000	141000	22600	36000	13100	5200	6000	1500	1.3
ZARN2062-L-TV	0.99	20	62	75	64000	141000	22600	36000	13100	5200	6000	1500	1.3
ZARN2572-TV	1.17	25	72	60	80000	199000	24300	41500	18600	6000	4900	1400	1.6
ZARN2572-L-TV	1.32	25	72	75	80000	199000	24300	41500	18600	6000	4900	1400	1.6
ZARN3080-TV	1.5	30	80	66	107000	265000	26000	47000	22900	6800	4400	1300	2.1
ZARN3080-L-TV	1.7	30	80	82	107000	265000	26000	47000	22900	6800	4400	1300	2.1
ZARN3585-TV	1.65	35	85	66	105000	265000	27500	53000	22900	7600	4000	1250	2.3
ZARN3585-L-TV	1.8	35	85	82	105000	265000	27500	53000	22900	7600	4000	1250	2.3
ZARN4090-TV	2.09	40	90	75	117000	315000	38000	74000	27000	10400	3700	1200	2.5
ZARN4090-L-TV	2.39	40	90	93	117000	315000	38000	74000	27000	10400	3700	1200	2.5
ZARN45105-TV	3.02	45	105	82	154000	405000	40000	82000	37500	11500	3300	1150	3.5
ZARN45105-L-TV	3.42	45	105	103	154000	405000	40000	82000	37500	11500	3300	1150	3.5
ZARN50110-TV	3.3	50	110	82	172000	480000	46500	103000	44500	12700	3100	1100	3.8
ZARN50110-L-TV	3.75	50	110	103	172000	480000	46500	103000	44500	12700	3100	1100	3.8
ZARN55115-TV	3.5	55	115	82	177000	500000	44000	98000	46500	13800	2900	1000	4
ZARN55115-L-TV	4	55	115	103	177000	500000	44000	98000	46500	13800	2900	1000	4
ZARN60120-TV	3.7	60	120	82	187000	550000	44500	92000	51000	12900	2700	950	4.2
ZARN60120-L-TV	4.85	60	120	103	187000	550000	44500	92000	51000	12900	2700	950	4.2
ZARN65125-TV	4	65	125	82	172000	500000	54000	104000	46500	14900	2600	900	4
ZARN65125-L-TV	4.6	65	125	103	172000	500000	54000	104000	46500	14900	2600	900	4
ZARN70130-TV	4.1	70	130	82	201000	630000	56000	119000	58000	16100	2400	800	4.8
ZARN70130-L-TV	4.85	70	130	103	201000	630000	56000	119000	58000	16100	2400	800	4.8
ZARN75155-TV	7.9	75	155	100	290000	890000	81000	132000	85000	19100	2100	700	8
ZARN75155-L-TV	9.1	75	155	125	290000	890000	81000	132000	85000	19100	2100	700	8
ZARN90180-TV	11.8	90	180	110	325000	1030000	98000	210000	95000	29000	1800	700	10.5
ZARN90180-L-TV	13.2	90	180	135	325000	1030000	98000	210000	95000	29000	1800	700	10.5



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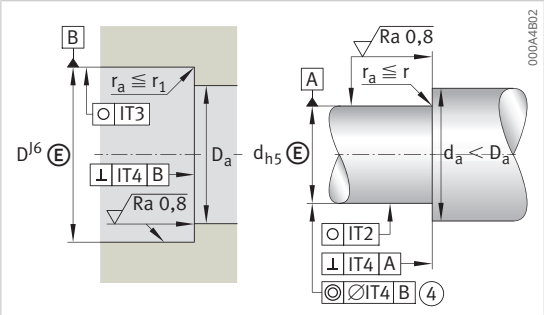


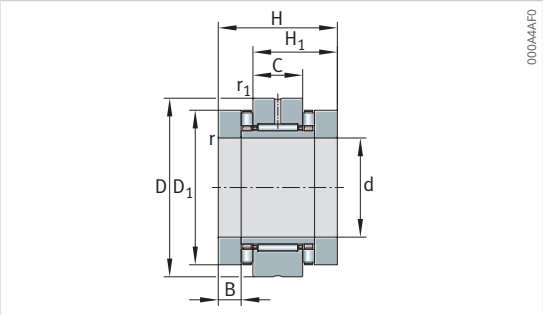
Design of housing and shaft (threaded spindle)

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.
mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm
40	20	52	–	–	12.5	–	–	0.3	0.6	53	38
55	20	–	40	50	12.5	27.5	13	0.3	0.6	53	38
40	20	62	–	–	12.5	–	–	0.3	0.6	63	45
55	20	–	48	60	12.5	27.5	13	0.3	0.6	63	45
43	20	68	–	–	14	–	–	0.3	0.6	69	52
4359	20	–	52	66	14	30	13	0.3	0.6	69	50
43	20	73	–	–	14	–	–	0.3	0.6	74	60
59	20	–	60	73	14	30	13	0.3	0.6	74	58
50	25	78	–	–	16	–	–	0.3	0.6	79	65
68	25	–	60	78	16	34	14	0.3	0.6	79	58
53.5	25	90	–	–	17.5	–	–	0.3	0.6	91	70
74.5	25	–	70	88	17.5	38.5	18	0.3	0.6	91	68
53.5	25	95	–	–	17.5	–	–	0.3	0.6	96	75
74.5	25	–	75	93	17.5	38.5	18	0.3	0.6	96	73
53.5	25	100	–	–	17.5	–	–	0.3	0.6	101	85
74.5	25	–	80	98	17.5	38.5	18	0.3	0.6	101	78
53.5	25	105	–	–	17.5	–	–	0.3	0.6	106	90
74.5	25	–	90	105	17.5	18.5	18	0.3	0.6	106	88
53.5	25	110	–	–	17.5	–	–	0.3	0.6	111	97
74.5	25	–	90	108	17.5	38.5	18	0.3	0.6	111	88
53.5	25	115	–	–	17.5	–	–	0.3	0.6	116	100
74.5	25	–	100	115	17.5	38.5	18	0.3	0.6	116	98
65	30	135	–	–	21	–	–	0.3	1	136	113
90	30	–	115	135	21	46	20	0.3	1	136	110
72.5	35	160	–	–	22.5	–	–	0.3	1	161	130
97.5	35	–	130	158	22.5	47.5	18	0.3	1	161	125

ZARN, ZARN..-L

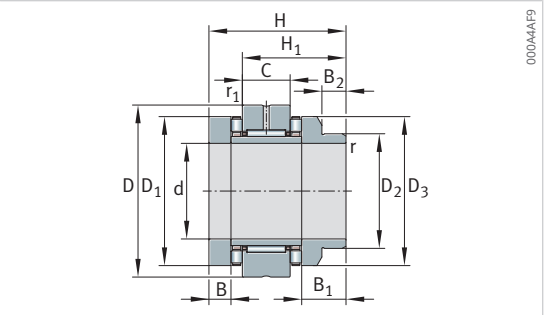
Heavy series

Without fixing holes

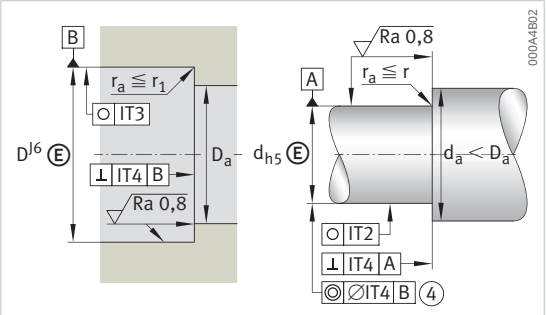


ZARN

Designation	d	C_{aL}	C_{kL}	J	Axial runout
	mm	N/µm	Nm/mrad	kg · cm²	µm
ZARN2062-TV	20	2300	400	1.98	1
ZARN2062-L-TV	20	2300	400	2.27	1
ZARN2572-TV	25	3000	800	3.88	1
ZARN2572-L-TV	25	3000	800	4.51	1
ZARN3080-TV	30	3300	1100	6.53	1
ZARN3080-L-TV	30	3300	1100	7.43	1
ZARN3585-TV	35	3500	1300	8.47	1
ZARN3585-L-TV	35	3500	1300	10.4	1
ZARN4090-TV	40	3800	1800	13.3	1
ZARN4090-L-TV	40	3800	1800	15.5	1
ZARN45105-TV	45	4000	2100	23.7	1
ZARN45105-L-TV	45	4000	2100	28.1	1
ZARN50110-TV	50	4600	2900	29.8	1
ZARN50110-L-TV	50	4600	2900	35.3	1
ZARN55115-TV	55	4900	3600	36.1	1
ZARN55115-L-TV	55	4900	3600	43	1
ZARN60120-TV	60	5300	4300	43.8	1
ZARN60120-L-TV	60	5300	4300	54.5	1
ZARN65125-TV	65	4800	4000	51	1
ZARN65125-L-TV	65	4800	4000	60.1	1
ZARN70130-TV	70	5800	6000	62.2	1
ZARN70130-L-TV	70	5800	6000	77.3	1
ZARN75155-TV	75	6600	8500	149	2
ZARN75155-L-TV	75	6600	8500	188	1
ZARN90180-TV	90	7700	14500	312	2
ZARN90180-L-TV	90	7700	14500	372	1



ZARN..-L



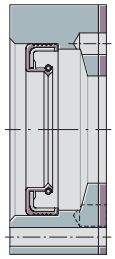
Design of housing and shaft (threaded spindle)

Locknut for radial clamping	Locknut for axial clamping	Locknut M_A	Locknut force axial	Sealing ring radial
–	–	Nm	N	–
ZMA20/52	AM20	38	17623	–
ZMA20/52	AM20	38	17623	–
ZMA25/58	AM25	55	20790	–
ZMA25/58	AM25	55	20790	–
ZMA30/65	AM30	75	24287	–
ZMA30/65	AM30	75	24287	–
ZMA35/70	AM35	100	27480	–
ZMA35/70	AM35	100	27480	–
ZMA40/75	AM40	120	29834	–
ZMA40/75	AM40	120	29834	–
ZMA45/85	AM45	150	33549	–
ZMA45/85	AM45	150	33549	–
ZMA50/92	AM50	180	36224	–
ZMA50/92	AM50	180	36224	–
ZMA55/98	AM55	220	39807	–
ZMA55/98	AM55	220	39807	–
ZMA60/98	AM60	250	41144	–
ZMA60/98	AM60	250	41144	–
ZMA65/105	AM65	270	40652	–
ZMA65/105	AM65	270	40652	–
ZMA70/110	AM70	330	46786	–
ZMA70/110	AM70	330	46786	–
ZMA75/125	AM75	580	72971	–
ZMA75/125	AM75	580	72971	–
ZMA90/155	AM90	960	100669	–
ZMA90/155	AM90	960	100669	–

10 Seal carrier assemblies for ZARF

Seal carrier assemblies DRS are complete sealing sets that are screw mounted on the outer ring of needle roller/axial cylindrical roller bearings ZARF(-L). They are precisely centered in this position and seal the bearings against external influences.

28 Seal carrier assembly DRS



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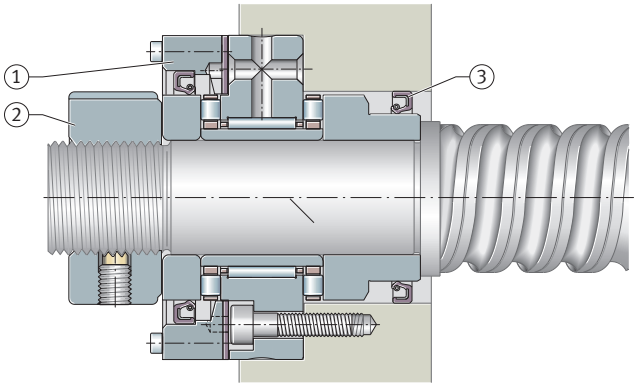
The sealing elements are supplied as a complete set of individual parts and comprise:

- a seal flange
- a rotary shaft seal to DIN 3670, with an elastomer part made from NBR
- a gasket
- hexagonal socket head screws for fixing the carrier to the central washer of the bearing

29 Needle roller/axial cylindrical roller bearing ZARF..-L with seal carrier assembly



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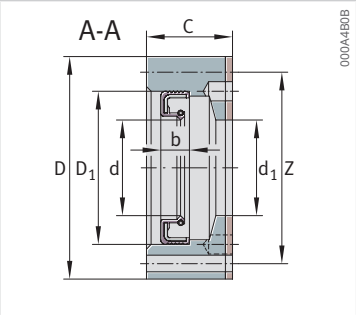
1	Seal carrier assembly DRS	2	Precision locknut ZM or ZMA
3	Rotary shaft seal to DIN 3670		

10.1 Clarification of product tables

b	mm	Seal carrier assembly width
C	mm	Seal carrier assembly width
d	mm	Inside diameter of seal lip
D	inch or mm	Outside diameter
d_1	mm	Inside diameter of centering facility
D_1	mm	Outside diameter of seal
m	kg or lbs	Mass
Z	mm	Pitch circle diameter of holes

10.2 DRS

For ZARF light series

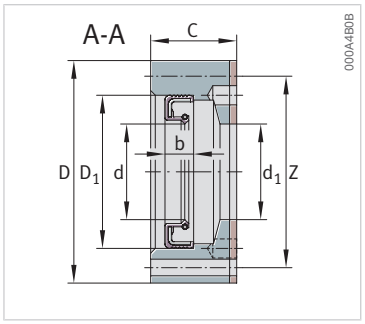


DRS

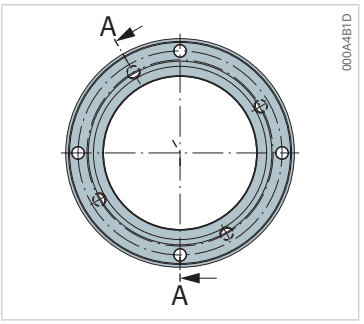
Designation	m	d_1	D	C	Z	d	D_1	b	Screws Size	Number	Matching bearing
	kg	mm	mm	mm	mm	mm	mm	mm	–	–	–
DRS1560	0.16	35	60	14	52.4	35	45	7	M3×20	4	ZARF1560(-L)-TV
DRS1762	0.18	38	62	15.5	54.4	38	47	7	M3×25	4	ZARF1762(-L)-TV
DRS2068	0.2	42	68	17	60.4	42	55	8	M3×25	4	ZARF2068(-L)-TV
DRS2575	0.22	47	75	17	67.4	47	62	6	M3×25	4	ZARF2575(-L)-TV
DRS3080	0.26	52	80	17	73.4	52	68	8	M3×25	4	ZARF3080(-L)-TV
DRS3590	0.38	60	90	19	80	60	72	8	M4×25	4	ZARF3590(-L)-TV
DRS40100	0.47	65	100	19	90	65	80	8	M4×30	4	ZARF40100(-L)-TV
DRS45105	0.53	70	105	20	95	70	85	8	M4×30	4	ZARF45105(-L)-TV
DRS50115	0.54	78	115	20	106	78	100	10	M3×30	4	ZARF50115(-L)-TV

10.3 DRS

For ZARF heavy series



DRS



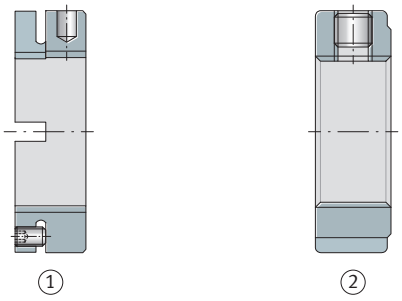
Hole pattern

Designation	m	d_1	D	C	Z	d	D_1	b	Screws Size	Number	Matching bearing
	kg	mm	mm	mm	mm	mm	mm	mm	–	–	–
DRS2080	0.3	52	80	22	73.4	52	68	8	M3×30	4	ZARF2080(-L)-TV
DRS2590	0.38	62	90	22	81	62	75	10	M3×30	4	ZARF2590(-L)-TV
DRS30105	0.67	68	105	25	95	68	85	10	M4×35	4	ZARF30105(-L)-TV
DRS35110	0.6	73	110	25	101	73	95	10	M3×30	4	ZARF35110(-L)-TV
DRS40115	0.7	78	115	27.5	106	78	100	10	M3×35	4	ZARF40115(-L)-TV
DRS45130	1.1	90	130	31	120	90	110	12	M4×40	4	ZARF45130(-L)-TV
DRS50140	1.4	95	140	30	127.5	95	115	13	M5×40	4	ZARF50140(-L)-TV
DRS55145	1.42	100	145	30	132.5	100	120	12	M5×40	4	ZARF55145(-L)-TV
DRS60150	1.42	105	150	30	137.5	105	125	12	M5×40	4	ZARF60150(-L)-TV
DRS65155	1.43	110	155	30	142.5	110	130	12	M5×40	4	ZARF65155(-L)-TV
DRS70160	1.5	115	160	30	147.5	115	135	13	M5×40	4	ZARF70160(-L)-TV
DRS75185	2.4	135	185	36	172.5	135	160	15	M5×50	4	ZARF75185(-L)-TV
DRS90210	2.7	160	210	38	194	160	180	15	M5×50	4	ZARF90210(-L)-TV

11 Precision locknuts

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.

30 Precision locknuts



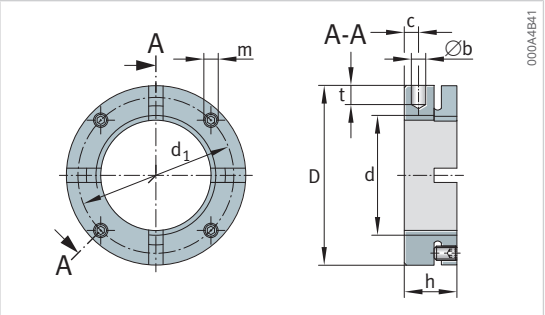
1	For axial clamping AM	2	For radial clamping ZM or ZMA

11.1 Clarification of product tables

b	mm	Blind hole bore diameter
c	mm	Hole spacing
d	–	Thread
D	inch or mm	Outside diameter
d_1	mm	Pitch circle diameter 1 (holes)
F_{aB}	N	Axial rupture load
h	mm	Height
J	kg · cm²	Mass moment of inertia
m	kg or lbs	Mass
m	–	Thread – grub screw thread
M_A	Nm	Tightening torque
M_{AL}	Nm	Tightening torque
M_L	Nm	Breakaway torque
t	mm	Blind hole depth

11.2 AM

For axial clamping



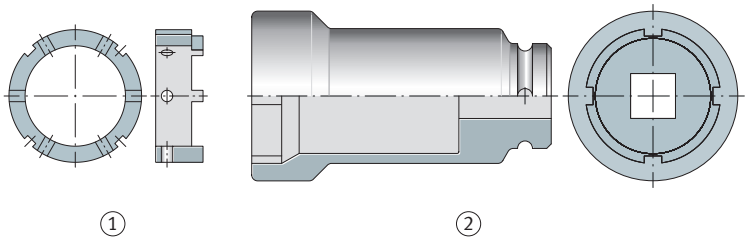
AM15 to AM40 with 4 segments,
AM45 to AM90 with 6 segments,
AM100 to AM130 with 8 segments

Designation	m	d	D	h	Pin M_A	F_{aB}	Locknut M_L at M_{AL}	Reference M_{AL}	J	b H11	t	d_1	c	m
	kg	–	mm	mm	Nm	N	Nm	Nm	kg · cm²	mm	mm	mm	mm	mm
AM15	0.06	M15×1	30	18	3	100000	20	10	0.09	4	5	24	5	M5
AM17	0.07	M17×1	32	18	3	120000	25	15	0.11	4	5	26	5	M5
AM20	0.13	M20×1	38	18	5	145000	45	18	0.23	4	6	31	5	M6
AM25	0.16	M25×1.5	45	20	5	205000	60	25	0.49	5	6	38	6	M6
AM30	0.2	M30×1.5	52	20	5	250000	70	32	0.86	5	7	45	6	M6
AM30/65	0.5	M30×1.5	65	30	5	400000	70	32	2.8	6	8	45	6	M6
AM35/58	0.23	M35×1.5	58	20	5	280000	90	40	1.3	5	7	51	6	M6
AM35	0.33	M35×1.5	65	22	5	330000	100	40	2.4	6	8	58	6	M6
AM40	0.3	M40×1.5	65	22	5	350000	120	55	2.3	6	8	58	6	M6
AM40/85	0.75	M40×1.5	85	32	5	570000	120	55	7.6	6	8	58	6	M6
AM45	0.34	M45×1.5	70	22	5	360000	220	65	2.9	6	8	63	6	M6
AM50	0.43	M50×1.5	75	25	5	450000	280	85	4.3	6	8	68	8	M6
AM55	0.6	M55×2	85	26	15	520000	320	95	7.7	6	8	75	8	M8
AM60	0.65	M60×2	90	26	15	550000	365	100	9.4	6	8	80	8	M8
AM65	0.83	M65×2	100	26	15	560000	400	120	14.6	8	10	88	8	M8
AM70	0.79	M70×2	100	28	15	650000	450	130	14.7	8	10	90	9	M8
AM75	1.23	M75×2	115	30	20	750000	610	150	29	8	10	102	10	M10
AM80	0.93	M80×2	110	30	20	670000	770	160	21.3	8	10	98	10	M10
AM85	0.97	M85×2	115	30	20	690000	930	180	24.8	8	10	102	10	M10
AM90	1.53	M90×2	130	32	20	900000	1100	200	48	8	10	118	13	M10
AM100	1.12	M100×2	130	30	20	740000	1200	250	38	8	10	118	10	M10
AM110	1.22	M110×2	140	30	20	770000	1300	250	48	8	10	128	10	M10
AM120	1.56	M120×2	155	30	20	880000	1450	250	75	8	10	142	10	M10
AM130	1.67	M130×2	165	30	20	900000	1600	250	92	8	10	152	10	M10

12 Sockets

For simple tightening and loosening of precision locknuts ZM on shafts, the sockets LOCKNUT-SOCKET are suitable. In combination with the socket AMS, these sockets are also suitable for precision locknuts AM. They require less space on the circumference of the nut than hook wrenches and allow the use of torque wrenches. safer working, 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.

31 Sockets for precision locknuts ZM and sockets AMS



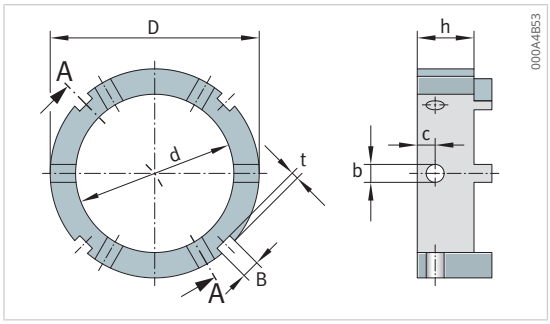
1	Socket AMS	2	Socket LOCKNUT-SOCKET

12.1 Clarification of product tables

b	mm	Through hole bore diameter
B	mm	Groove width
c	mm	Hole spacing
d	mm	Bore diameter
D	inch or mm	Outside diameter
h	mm	Height
m	kg or lbs	Mass
t	mm	Groove depth

12.2 AMS

For precision locknuts with axial clamping



AMS

Designation	m	D	h	d	b H11	c	B	t	For precision locknuts
	kg	mm	mm	mm	mm	mm	mm	mm	–
AMS20	0.047	32	14	22	4	5	4	2	AM15, AM17, AM20
AMS30	0.093	45	15	35	5	5	5	2	AM25, AM30, AM35/58, AM30/65
AMS40	0.217	65	16	45	6	6	6	2.5	AM35, AM40
AMS50	0.245	70	19	53	6	6	6	2.5	AM45, AM50
AMS60	0.37	85	20	65	6	6	7	3	AM55, AM60
AMS70	0.615	98	25	75	8	10	8	3.5	AM65, AM70
AMS80	0.755	110	25	85	8	10	8	3.5	AM75, AM80, AM85
AMS90	1.215	130	25	95	8	10	10	4	AM90
AMS110	0.74	130	25	110	8	10	10	4	AM100, AM110
AMS130	1.485	155	25	130	8	10	12	5	AM120, AM130

13 Needle roller and cage assemblies

13.1 Needle roller and cage assemblies of basic design

Needle roller and cage assemblies of basic design

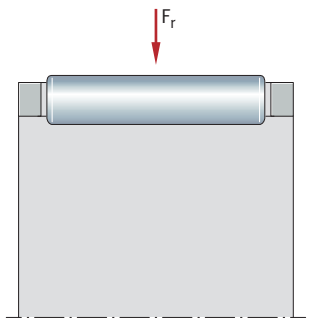
Needle roller and cage assemblies are part of the group of radial needle roller bearings. These ready-to-fit bearing arrangement elements comprise needle cages, which are fitted with needle rollers. They are rolling bearings with a very small radial section height and, apart from full complement needle 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.

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 needles 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.

Standard needle roller sorts are used as needle rollers. 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. 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.

32 Single row needle roller and cage assembly



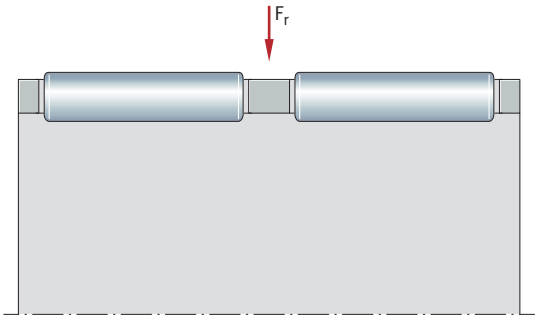
000A270F

F_r Radial load | F_a Axial load

Double row needle roller and cage assemblies

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

33 Double row needle roller and cage assembly



F_r	Radial load

Needle rollers

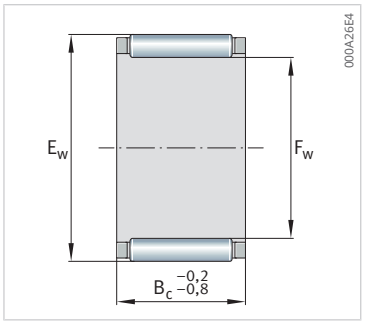
Needle roller and cage assemblies are supplied with standard needle roller sorts of grade G2. In all cases, needle rollers of only one sort are used in any one needle roller and cage assembly. The sort is printed on the packaging and color coded. The sorts are designated by the upper and lower deviations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

13.1.1 Clarification of product tables

B_c	mm	Cage width
C_{0r}	N	Basic static load rating, radial
C_r	N	Basic dynamic load rating, radial
C_{ur}	N	Fatigue limit load, radial
E_w	mm	Outer enveloping circle diameter
F_w	mm	Inner enveloping circle diameter
m	kg	Mass
n_G	min^{-1}	Limiting speed

13.1.2 K

Single row

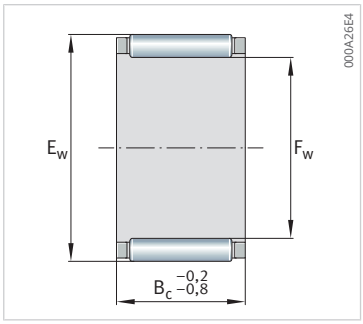


K...

Designation	F_w	E_w	B_c	C_r	C_{0r}	C_{ur}	n_G	$n_{\vartheta r}$	m
	mm	mm	mm	N	N	N	min^{-1}	min^{-1}	kg
K14×18×10	14	18	10	7100	8500	1070	25000	17300	0.004
K14×18×13	14	18	13	8200	10100	1340	25000	17700	0.0065
K14×20×12	14	20	12	10800	11200	1620	24300	16000	0.0085
K14×18×17	14	18	17	10800	14400	1920	25000	17300	0.008
K15×21×15	15	21	15	14300	16400	2250	23600	14700	0.011
K15×19×17	15	19	17	11300	15600	2070	24300	16200	0.0095
K15×19×13	15	19	13	8500	10900	1450	24300	16600	0.007
K15×21×21	15	21	21	19400	24300	3350	23600	14400	0.017
K15×19×10	15	19	10	7500	9200	1160	24300	16200	0.005
K16×22×20	16	22	20	18300	22800	3100	22900	14000	0.017
K16×22×16	16	22	16	14800	17500	2430	22900	14100	0.012
K16×20×17	16	20	17	11700	16800	2230	23600	15200	0.01
K16×20×13	16	20	13	8900	11800	1560	23600	15600	0.0075
K16×22×12	16	22	12	11500	12500	1810	22900	14300	0.01
K16×20×10	16	20	10	7800	9900	1250	23600	15200	0.0055
K16×24×20	16	24	20	21400	23500	3000	22400	13200	0.022
K17×21×13	17	21	13	10400	14600	1840	22900	14100	0.0065
K17×21×17	17	21	17	12200	17900	2390	22900	14400	0.0095
K17×21×10	17	21	10	8100	10600	1340	22900	14400	0.0055
K18×22×17	18	22	17	12100	18000	2400	22400	13900	0.011
K18×22×10	18	22	10	8400	11300	1430	22400	13600	0.006
K18×25×22	18	25	22	23100	29000	3800	21600	12200	0.023
K18×24×12	18	24	12	12800	14900	2160	21800	12700	0.012
K18×22×13	18	22	13	9200	12700	1680	22400	14200	0.008
K18×24×20	18	24	20	20200	27000	3600	21800	12400	0.018
K18×24×13	18	24	13	13100	15300	2030	21800	12900	0.013
K19×23×13	19	23	13	9500	13500	1790	21800	13500	0.008
K19×23×17	19	23	17	12500	19200	2550	21800	13200	0.011
K20×28×25	20	28	25	30500	39000	5400	20400	10800	0.032
K20×28×16	20	28	16	19800	22400	2550	20400	11100	0.02
K20×24×10	20	24	10	8900	12600	1600	21300	12400	0.0065
K20×24×17	20	24	17	12900	20400	2700	21300	12500	0.012
K20×28×20	20	28	20	23900	28500	3650	20400	11100	0.027
K20×26×20	20	26	20	21100	29000	3950	20900	11400	0.019
K20×26×12	20	26	12	13400	16200	2350	20900	11700	0.011
K20×24×13	20	24	13	9800	14300	1900	21300	12800	0.009
K20×26×13	20	26	13	14400	17900	2380	20900	11600	0.012
K20×30×30	20	30	30	35500	41500	5600	19600	10800	0.049
K20×26×17	20	26	17	19200	26000	3350	20900	11200	0.016
K21×25×13	21	25	13	10100	15100	2010	20900	12300	0.009

13.1.2 K

Single row

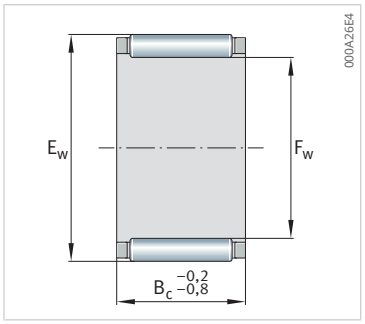


K...

Designation	F_w	E_w	B_c	C_r	C_{0r}	C_{ur}	n_G	$n_{\vartheta r}$	m
	mm	mm	mm	N	N	N	min^{-1}	min^{-1}	kg
K22×32×24	22	32	24	34000	40000	5000	18100	9700	0.043
K22×28×17	22	28	17	19400	27000	3500	19600	10500	0.018
K22×26×17	22	26	17	13700	22700	3050	20400	11500	0.012
K22×26×10	22	26	10	9100	13400	1700	20400	11500	0.0075
K22×29×16	22	29	16	20000	25500	3450	19200	10300	0.016
K22×26×13	22	26	13	10400	15900	2120	20400	11800	0.0095
K24×30×17	24	30	17	19500	27500	3600	18100	10000	0.019
K24×28×10	24	28	10	9600	14800	1880	18800	10600	0.0085
K24×28×17	24	28	17	14500	25000	3350	18800	10600	0.013
K24×28×13	24	28	13	11000	17600	2330	18800	10800	0.01
K25×33×20	25	33	20	28500	38000	4950	16900	9000	0.033
K25×32×16	25	32	16	20800	27500	3750	17200	9400	0.021
K25×30×20	25	30	20	21700	36500	4950	17800	9500	0.018
K25×35×30	25	35	30	47000	62000	7300	16300	8500	0.065
K25×29×13	25	29	13	11300	18400	2440	18100	10400	0.011
K25×30×13	25	30	13	14600	21800	2850	17800	9800	0.012
K25×31×17	25	31	17	19600	28500	3650	17500	9600	0.019
K25×31×21	25	31	21	24700	38000	5200	17500	9400	0.02
K25×30×17	25	30	17	18700	30000	3900	17800	9600	0.016
K25×29×10	25	29	10	9900	15400	1960	18100	10200	0.0085
K25×33×24	25	33	24	34000	47000	6500	16900	8900	0.039
K25×29×17	25	29	17	14900	26000	3500	18100	10200	0.014
K26×30×13	26	30	13	11600	19200	2550	17500	10100	0.011
K26×30×17	26	30	17	15200	27500	3650	17500	9800	0.015
K28×33×17	28	33	17	19700	33500	4350	16100	8700	0.017
K28×40×25	28	40	25	45500	55000	6800	14400	7700	0.07
K28×33×13	28	33	13	15300	24200	3150	16100	8900	0.013
K28×34×17	28	34	17	21800	33500	4350	15800	8600	0.024
K28×35×18	28	35	18	24000	34000	4800	15600	8600	0.027
K28×35×16	28	35	16	21500	29500	4000	15600	8700	0.024
K30×40×18	30	40	18	32000	40000	5100	14000	7600	0.048
K30×37×16	30	37	16	23100	33500	4550	14600	8000	0.027
K30×40×30	30	40	30	49000	69000	9400	14000	7500	0.073
K30×34×13	30	34	13	12300	21700	2900	15300	8900	0.014
K30×35×27	30	35	27	30500	59000	8600	15100	8100	0.03
K30×37×18	30	37	18	26000	38500	5400	14600	8000	0.03
K30×35×17	30	35	17	19600	34000	4350	15100	8300	0.019
K30×35×13	30	35	13	15600	25500	3350	15100	8400	0.014
K32×37×27	32	37	27	30000	60000	8600	14200	7800	0.03
K32×40×25	32	40	25	37500	58000	8000	13600	7400	0.049

13.1.2 K

Single row



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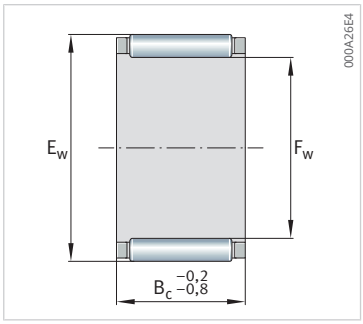
Designation	F_w	E_w	B_c	C_r	C_{0r}	C_{ur}	n_G	$n_{\vartheta r}$	m
	mm	mm	mm	N	N	N	min^{-1}	min^{-1}	kg
K32×37×13	32	37	13	15500	25500	3350	14200	8100	0.018
K32×37×17	32	37	17	19900	35500	4600	14200	7900	0.019
K32×39×16	32	39	16	23800	35500	4800	13800	7600	0.037
K32×46×32	32	46	32	66000	84000	11300	12600	6700	0.119
K32×39×18	32	39	18	26500	41000	5700	13800	7500	0.031
K32×38×20	32	38	20	26500	45000	6100	14000	7700	0.03
K35×42×20	35	42	20	30000	49000	6300	12700	7000	0.037
K35×45×20	35	45	20	37000	50000	6600	12300	6800	0.056
K35×40×13	35	40	13	16200	28000	3650	13100	7500	0.019
K35×40×25	35	40	25	29500	60000	8500	13100	7200	0.031
K35×40×17	35	40	17	20800	38500	5000	13100	7400	0.021
K35×42×16	35	42	16	24400	37500	5100	12700	7100	0.034
K35×45×30	35	45	30	53000	79000	10700	12300	6700	0.08
K35×42×30	35	42	30	39000	68000	9500	12700	7200	0.067
K35×42×18	35	42	18	27500	43000	6100	12700	7100	0.034
K37×42×17	37	42	17	22400	43000	5600	12400	6900	0.022
K38×46×32	38	46	32	55000	99000	14400	11700	6200	0.076
K38×46×20	38	46	20	35500	57000	7300	11700	6300	0.047
K38×43×27	38	43	27	31500	68000	9700	12100	6800	0.043
K38×43×17	38	43	17	20500	38500	4950	12100	7000	0.029
K40×45×13	40	45	13	17600	32500	4250	11500	6600	0.022
K40×47×20	40	47	20	32500	57000	7300	11300	6200	0.042
K40×45×27	40	45	27	33000	73000	10500	11500	6500	0.046
K40×47×18	40	47	18	29500	50000	7000	11300	6300	0.039
K40×48×20	40	48	20	36000	59000	7700	11100	6100	0.049
K40×45×17	40	45	17	21400	41500	5300	11500	6700	0.031
K42×47×13	42	47	13	17800	33500	4400	11000	6400	0.018
K42×47×17	42	47	17	21700	43000	5500	11000	6400	0.032
K42×50×20	42	50	20	35000	57000	7400	10700	6000	0.053
K43×48×17	43	48	17	21600	43000	5500	10800	6300	0.03
K43×48×27	43	48	27	33500	75000	10800	10800	6200	0.05
K45×50×27	45	50	27	34500	80000	11600	10300	5900	0.051
K45×53×21	45	53	21	38500	67000	8800	10000	5600	0.06
K45×53×28	45	53	28	52000	98000	13900	10000	5400	0.081
K45×52×18	45	52	18	31500	57000	8000	10100	5700	0.042
K45×53×20	45	53	20	39000	67000	8800	10000	5500	0.055
K45×50×17	45	50	17	22500	46000	5900	10300	6100	0.034
K47×52×17	47	52	17	23300	49000	6300	9900	5800	0.035
K47×52×27	47	52	27	35000	83000	12000	9900	5700	0.051
K50×58×25	50	58	25	44000	81000	11000	9100	5300	0.09

13.1.2 K

Single row



K...

Designation	F_w	E_w	B_c	C_r	C_{0r}	C_{ur}	n_G	$n_{\vartheta r}$	m
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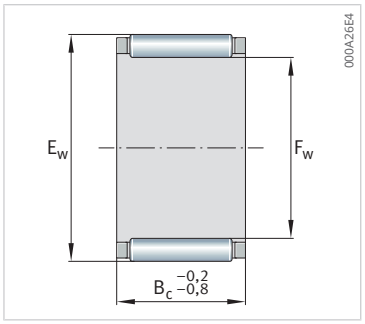
K50×55×30	50	55	30	39000	97000	14100	9300	5400	0.065
K50×57×18	50	57	18	33500	63000	9000	9200	5200	0.047
K50×58×20	50	58	20	35500	62000	8900	9100	5400	0.075
K50×55×17	50	55	17	22100	47000	6400	9300	5700	0.035
K50×55×13,5	50	55	13.5	18200	36500	4700	9300	5700	0.03
K50×55×20	50	55	20	26500	60000	7900	9300	5500	0.043
K52×57×12	52	57	12	18000	36500	4700	9000	5400	0.024
K55×63×20	55	63	20	40000	74000	9700	8300	4800	0.067
K55×63×25	55	63	25	51000	101000	14000	8300	4700	0.08
K55×62×18	55	62	18	35500	70000	9900	8400	4750	0.052
K55×63×32	55	63	32	62000	130000	18900	8300	4650	0.102
K55×60×30	55	60	30	41000	108000	15700	8500	4950	0.071
K55×60×27	55	60	27	38000	97000	13800	8500	4950	0.06
K58×65×18	58	65	18	35000	70000	10000	8000	4650	0.052
K60×65×30	60	65	30	42500	116000	16900	7800	4650	0.077
K60×65×20	60	65	20	29500	72000	9500	7800	4750	0.052
K60×68×25	60	68	25	53000	111000	15500	7700	4350	0.089
K60×68×23	60	68	23	49500	101000	13800	7700	4350	0.094
K60×68×20	60	68	20	43500	85000	11200	7700	4400	0.071
K65×70×20	65	70	20	30500	77000	10200	7300	4450	0.056
K65×70×30	65	70	30	44000	124000	18100	7300	4350	0.083
K65×73×30	65	73	30	57000	123000	17400	7100	4300	0.141
K65×73×23	65	73	23	46000	94000	12400	7100	4300	0.108
K68×74×20	68	74	20	35500	84000	11200	6900	4200	0.071
K68×74×30	68	74	30	46500	118000	17200	6900	4300	0.1
K70×78×30	70	78	30	60000	135000	19100	6600	4000	0.148
K70×76×30	70	76	30	52000	139000	20400	6700	4000	0.11
K72×80×20	72	80	20	41500	85000	12200	6400	4000	0.098
K73×79×20	73	79	20	37000	90000	12000	6400	4000	0.075
K75×81×30	75	81	30	52000	143000	20700	6300	3850	0.114
K75×81×20	75	81	20	37500	94000	12600	6300	3850	0.079
K75×83×30	75	83	30	62000	143000	20300	6200	3800	0.147
K75×83×23	75	83	23	50000	109000	14400	6200	3800	0.124
K80×88×30	80	88	30	71000	176000	25500	5800	3400	0.138
K80×86×20	80	86	20	38500	98000	13100	5900	3700	0.06
K85×92×20	85	92	20	44500	108000	15400	5500	3450	0.102
K90×98×30	90	98	30	68000	172000	24400	5200	3300	0.172
K90×98×27	90	98	27	61000	150000	20600	5200	3300	0.15
K90×97×20	90	97	20	45000	113000	16100	5200	3300	0.109
K95×103×30	95	103	30	69000	180000	25500	4950	3150	0.165

13.1.2 K

Single row

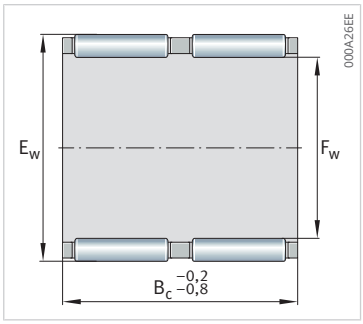


K...

Designation	F_w	E_w	B_c	C_r	C_{0r}	C_{ur}	n_G	$n_{\vartheta r}$	m
	mm	mm	mm	N	N	N	min^{-1}	min^{-1}	kg
K100×108×30	100	108	30	71000	188000	26500	4700	3050	0.18
K100×107×21	100	107	21	48000	127000	17900	4750	3100	0.12
K100×108×27	100	108	27	57000	143000	19200	4700	3200	0.185
K105×112×21	105	112	21	47500	127000	17700	4500	3000	0.129
K110×118×30	110	118	30	78000	219000	30000	4300	2750	0.217
K110×117×24	110	117	24	56000	158000	20200	4300	2850	0.172
K115×123×27	115	123	27	63000	170000	22000	4100	2850	0.2
K120×127×24	120	127	24	59000	174000	21800	3950	2650	0.165
K125×133×35	125	133	35	86000	260000	35000	3800	2600	0.275
K130×137×24	130	137	24	61000	186000	22700	3650	2500	0.17
K135×143×35	135	143	35	91000	290000	38000	3550	2390	0.3
K145×153×26	145	153	26	74000	225000	27500	3300	2280	0.262
K150×160×46	150	160	46	147000	470000	61000	3150	2100	0.57
K155×163×26	155	163	26	75000	236000	28500	3100	2180	0.265
K165×173×26	165	173	26	81000	265000	31000	2900	2030	0.32
K175×183×32	175	183	32	99000	350000	42000	2750	1930	0.4
K185×195×37	185	195	37	128000	425000	49500	2600	1840	0.607

13.1.3 K..-ZW

Double row



K...-ZW

Designation	F_w	E_w	B_c	C_r	C_{0r}	C_{ur}	n_G	$n_{\vartheta r}$	m
	mm	mm	mm	N	N	N	min^{-1}	min^{-1}	kg
K24×30×31-ZW	31	24	30	27500	43500	5900	18100	10400	0.032
K25×30×26-ZW	26	25	30	21400	35500	4550	17800	10400	0.019
K26×30×22-ZW	22	26	30	15700	28500	3600	17500	10400	0.012
K42×47×30-ZW	30	42	47	33500	76000	10200	11000	6400	0.054
K60×66×33-ZW	33	60	66	46000	112000	15400	7800	4800	0.104
K60×66×40-ZW	40	60	66	58000	151000	20200	7800	4650	0.116
K60×68×30-ZW	30	60	68	44500	88000	11500	7700	4950	0.129
K62×70×40-ZW	40	62	70	66000	146000	20900	7400	4550	0.174
K68×74×35-ZW	35	68	74	48500	125000	17500	6900	4450	0.12
K75×83×35-ZW	35	75	83	63000	147000	20300	6200	3950	0.182
K80×88×40-ZW	40	80	88	76000	192000	27500	5800	3700	0.227
K80×88×46-ZW	46	80	88	88000	231000	30500	5800	3650	0.26
K95×103×40-ZW	40	95	103	83000	228000	33000	4950	3200	0.266

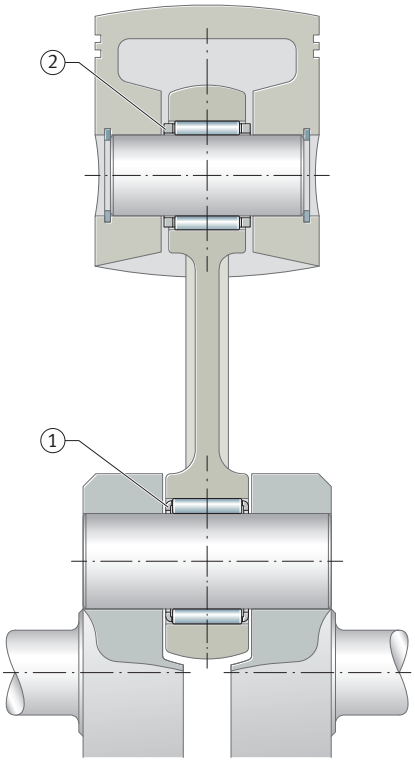
13.2 Needle roller and cage assemblies for centrifugal forces and high acceleration forces (KZK, KBK)

Needle roller and cage assemblies for connecting rod bearing arrangements

Needle roller and cage assemblies for connecting rod bearing arrangements are used in the crank mechanisms of two and four stroke combustion engines as well as in compressors, for supporting crank pins and piston pins. 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. As catalog 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.

TPI 94 | Needle roller and cage assemblies for crank pins and piston pins | https://www.schaeffler.de/std/1FD0

34 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 (series KZK) are externally guided, which means that the connecting rod bore guides the cage radially with little clearance. 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.

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. 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 piston pin abutment distance. The low-wear steel cages are case hardened or quenched and tempered and have high strength.

Needle roller and cage assemblies are also used for applications in planetary gearing arrangements, such as automatic gearboxes. 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.

35 Planetary gear bearing arrangement

000A5DEB

Needle roller and cage assemblies customized from profiled strip (K)

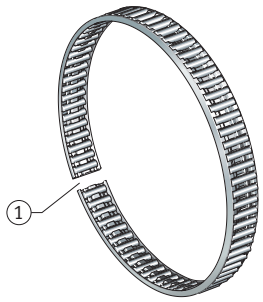
These radial needle roller and cage assemblies are produced by bending flat cages BF and fitted with needle rollers after forming. As a result, it is possible to achieve simple designs of clearance-free bearing arrangements with high running accuracy, load carrying capacity, and speed suitability, in 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 catalog 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. 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.

TPI 203 | Radial and Axial Needle Roller and Cage Assemblies Made From Profiled Strip, Axial Bearing Washers | https://www.schaeffler.de/std/200B

36 Radial needle roller and cage assembly produced by bending from a flat cage BF



000A38EA

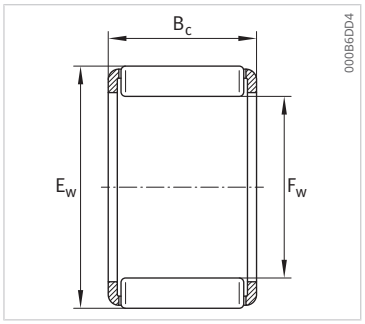
1	Open joint	

13.2.1 Clarification of product tables

B_c	mm	Cage width
C_{0r}	N	Basic static load rating, radial
C_r	N	Basic dynamic load rating, radial
C_{ur}	N	Fatigue limit load, radial
E_w	mm	Outer enveloping circle diameter
F_w	mm	Inner enveloping circle diameter
m	kg	Mass
n_G	min^{-1}	Limiting speed

13.2.2 KZK

Single row

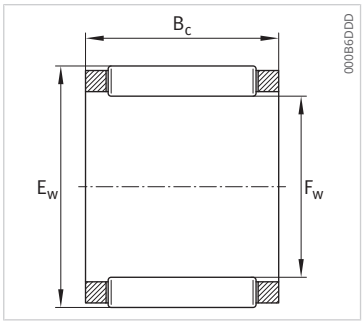


KZK

Designation	F_w	E_w	B_c	C_r	C_{0r}	C_{ur}	n_G	m
	mm	mm	mm	N	N	N	min^{-1}	kg
KZK6×9X11	6	9	11	3850	3750	500	36500	0.002
KZK12×16×10	12	16	10	6400	7200	900	–	0.004
KZK14,4×20,4×10	14.4	20.4	10	8100	7800	1050	–	0.007
KZK16×21×10	16	21	10	8200	9200	1240	23200	–
KZK16×22×12	16	22	12	11000	11900	1700	22900	–
KZK22×28×13	22	28	13	13900	17500	2550	19600	0.015
KZK22×29×16	22	29	16	17800	21800	2900	19200	0.021
KZK25×32×16	25	32	16	18200	23100	3100	17200	–

13.2.3 KBK

Single row



KBK

Designation	F_w	E_w	B_c	C_r	C_{0r}	C_{ur}	n_G	m
	mm	mm	mm	N	N	N	min^{-1}	kg
KBK9×13×12,5	9	13	12.5	6000	6100	800	–	0.004
KBK10×13×14,5	10	13	14.5	5400	6600	920	29500	–
KBK10×14×13	10	14	13	6000	6200	820	29000	0.006
KBK12×15×15	12	15	15	6000	7900	1110	27000	0.005
KBK12×15×17,5	12	15	17.5	7800	11000	1610	27000	–
KBK12×16×13	12	16	13	6900	7800	1030	26500	–
KBK12×16×16	12	16	16	8000	9500	1200	26500	0.008
KBK12×17×13	12	17	13	7600	7700	970	26500	–
KBK13×16×14	13	16	14	6200	8300	1140	26500	0.005
KBK15×19×17	15	19	17	8900	11500	1470	24300	–
KBK15×19×20	15	19	20	11300	15500	2130	24300	0.013
KBK16×20×20	16	20	20	11800	16900	2310	23600	0.013
KBK18×22×22	18	22	22	13500	20700	2850	22400	–
KBK18×22×24	18	22	24	14100	22000	3100	22400	0.018

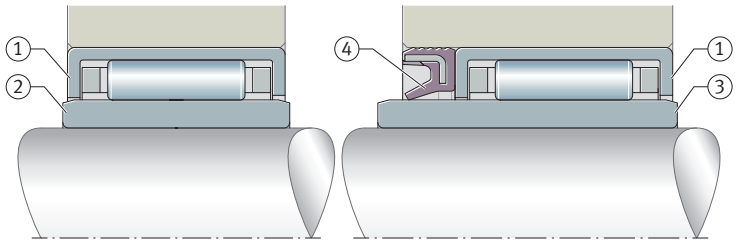
14 Drawn cup needle roller bearings with open ends, drawn cup needle roller bearings with closed end

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. The cage guides the needle rollers parallel to the axis in pockets.

Due to the thin-walled outer cup and the absence of an inner ring, the bearings have a very low cross-sectional height. 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.

Due to the absence of an inner ring, drawn cup needle roller bearings require a hardened and ground bearing raceway on the shaft. If the shaft cannot be produced as a rolling bearing raceway, the bearings can be combined with inner rings IR or LR. If wider inner rings are used, these can also serve as the running surface for sealing rings G and SD.

37 Drawn cup needle roller bearings with open ends and inner ring



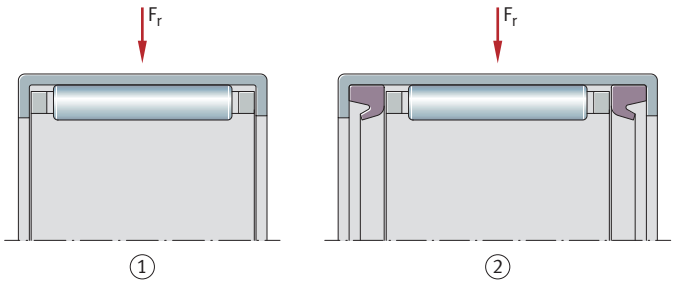
1	Drawn cup needle roller bearing with open ends	2	Standard inner ring
3	Wide inner ring	4	Sealing ring G

14.1 Drawn cup needle roller bearings with open ends, single row, with cage

Standard drawn cup needle roller bearings with open ends and cage

Drawn cup needle roller bearings of this design are open at both ends and have the basic designation HK. 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 designs. Double row designs have a lubrication hole in the outer cup and the suffix ZW.

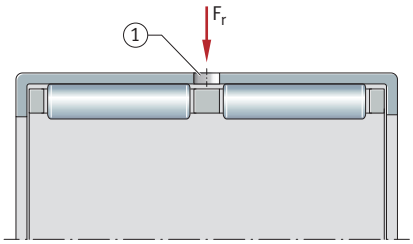
38 Single row drawn cup needle roller bearings with open ends



000A2D04

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

39 Double row drawn cup needle roller bearing with open ends



000A3BD9

F_r	Radial load	
1	Lubrication hole	

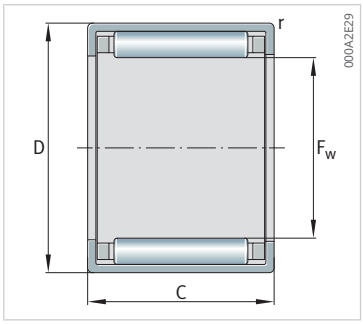
14.1.1 Clarification of product tables

B	mm	Width
B_o	mm	Outer ring width
C_{0r}	N	Basic static load rating, radial
C_r	N	Basic dynamic load rating, radial
$C_{t\ min}$	mm	Min. width to drawn cup base
C_{ur}	N	Fatigue limit load, radial
D	mm	Outside diameter
F_w	mm	Inner enveloping circle diameter
L	mm	Lower limit deviation
m	kg	Mass
n_G	min^{-1}	Limiting speed
$n_{\vartheta r}$	min^{-1}	Thermal speed rating
r_{min}	mm	Min. chamfer dimension
U	mm	Upper limit deviation

14.1.2 HK

Single row

With cage



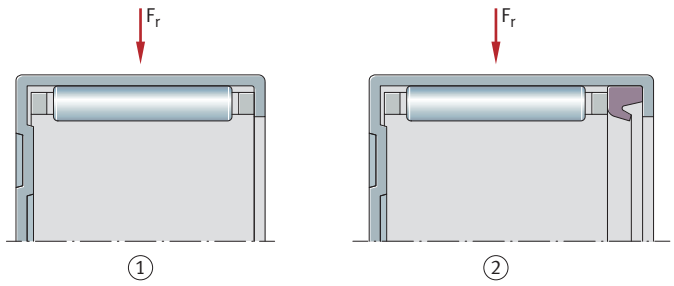
HK

Designation	F_w	D	B	B_o	B_o L	B_o U	r_{min}	C_r	C_{0r}	C_{ur}	n_G	$n_{\vartheta r}$	m
	mm	mm	mm	mm	mm	mm	mm	N	N	N	min^{-1}	min^{-1}	kg
HK0408	4	8	8	8	−0.3	0	0.4	1780	1310	147	42500	44500	0.002
HK0509	5	9	9	9	−0.3	0	0.4	2400	1990	243	39000	36500	0.002
HK0606	6	10	6	6	−0.3	0	0.4	1610	1220	212	36500	31500	0.0015
HK0608	6	10	8	8	−0.3	0	0.4	2030	1650	187	36500	31500	0.0021
HK0609	6	10	9	9	−0.3	0	0.4	2850	2600	320	36500	30500	0.0025
HK0709	7	11	9	9	−0.3	0	0.4	3100	2950	360	33000	26500	0.0026
HK0808	8	12	8	8	−0.3	0	0.4	2750	2600	300	29500	23800	0.0027
HK0908	9	13	8	8	−0.3	0	0.4	3550	3750	450	26500	20600	0.003
HK0910	9	13	10	10	−0.3	0	0.4	4250	4650	610	26500	20600	0.004
HK0912	9	13	12	12	−0.3	0	0.4	5300	6300	870	26500	20200	0.0046
HK1010	10	14	10	10	−0.3	0	0.4	4400	5100	670	24300	18700	0.0041
HK1012	10	14	12	12	−0.3	0	0.4	5500	6800	950	24300	18400	0.0048
HK1015	10	14	15	15	−0.3	0	0.4	6800	8800	1230	24300	18200	0.006
HK1210	12	16	10	10	−0.3	0	0.4	4950	6200	820	20700	15700	0.0046
HK1212	12	18	12	12	−0.3	0	0.8	6500	7300	880	20000	15500	0.009
HK1312	13	19	12	12	−0.3	0	0.8	6800	7900	960	18700	14400	0.01
HK1412	14	20	12	12	−0.3	0	0.8	7100	8500	1030	17500	13500	0.0105
HK1512	15	21	12	12	−0.3	0	0.8	7900	9400	1170	16300	12300	0.011
HK1516	15	21	16	16	−0.3	0	0.8	10500	14400	1810	16500	12300	0.015
HK1612	16	22	12	12	−0.3	0	0.8	7600	9700	1180	15600	11900	0.012
HK1616	16	22	16	16	−0.3	0	0.8	10900	15300	1940	15600	11600	0.016
HK1712	17	23	12	12	−0.3	0	0.8	7900	10300	1260	14700	11200	0.012
HK1812	18	24	12	12	−0.3	0	0.8	8100	10900	1330	14000	10700	0.013

14.2 Drawn cup needle roller bearings with closed end, single row, with cage

Drawn cup needle roller bearings of this design are closed at one end. 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.

40 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

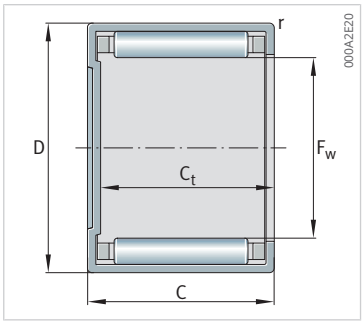
14.2.1 Clarification of product tables

B_o	mm	Outer ring width
C_{0r}	N	Basic static load rating, radial
C_r	N	Basic dynamic load rating, radial
$C_{t\ min}$	mm	Min. width to drawn cup base
C_{ur}	N	Fatigue limit load, radial
D	mm	Outside diameter
F_w	mm	Inner enveloping circle diameter
L	mm	Lower limit deviation
m	kg	Mass
n_G	min^{-1}	Limiting speed
$n_{\vartheta r}$	min^{-1}	Thermal speed rating
r_{min}	mm	Min. chamfer dimension
U	mm	Upper limit deviation

14.2.2 BK

Single row

With cage



BK

Designation	F_w	D	B_o	B_o L	B_o U	r_{min}	C_t min	C_r	C_{0r}	C_{ur}	n_G	$n_{\vartheta r}$	m
	mm	mm	mm	mm	mm	mm	mm	N	N	N	min^{-1}	min^{-1}	kg
BK0408	4	8	8	–0.3	0	0.3	6.4	1780	1310	147	42500	44500	0.0016
BK0509	5	9	9	–0.3	0	0.4	7.4	2400	1990	243	39000	36500	0.0021
BK0609	6	10	9	–0.3	0	0.4	7.4	2850	2600	320	36500	30500	0.0026
BK0709	7	11	9	–0.3	0	0.4	7.4	3100	2950	360	33000	26500	0.0029
BK0808	8	12	8	–0.3	0	0.4	6.4	2750	2600	300	29500	23800	0.003
BK0810	8	12	10	–0.3	0	0.4	8.4	3800	3950	510	29500	23200	0.0034
BK0910	9	13	10	–0.3	0	0.4	8.4	4250	4650	610	26500	20600	0.0043
BK0912	9	13	12	–0.3	0	0.4	10.4	5300	6300	870	26500	20200	0.0049
BK1010	10	14	10	–0.3	0	0.4	8.4	4400	5100	670	24300	18700	0.0043
BK1012	10	14	12	–0.3	0	0.4	10.4	5500	6800	950	24300	18400	0.005
BK1015	10	14	15	–0.3	0	0.4	13.4	6800	8800	1230	24300	18200	0.0062
BK1210	12	16	10	–0.3	0	0.4	8.4	4950	6200	820	20700	15700	0.0052

15 Needle roller 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. 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 either direction.

15.1 Needle roller bearings with ribs on the outer ring

Needle roller bearings with ribs on the outer ring 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 = 10 mm and NKI with d = 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
- in a single or double row design
- as open or sealed versions

Needle roller bearings with ribs on the outer ring, without inner ring

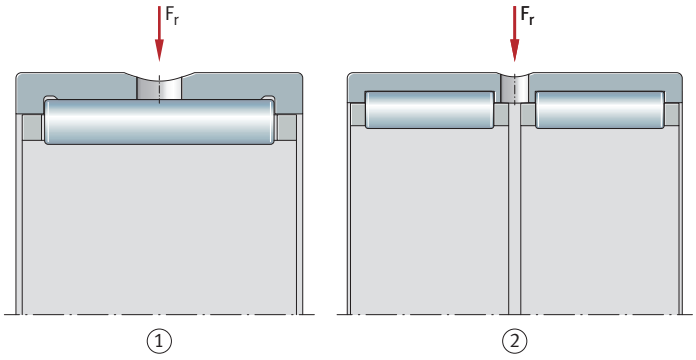
Needle roller bearings with ribs on the outer ring and without an inner ring are available in the following types and dimension series:

- NK, NKS, RNA48, RNA49, RNA69 (single row)
- RNA69..-ZW (double row)
- RNA49..-RSR, RNA49..-2RSR (sealed on one or both sides)

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. If no inner ring is used, the shaft can be designed to a greater thickness and thus with increased rigidity.

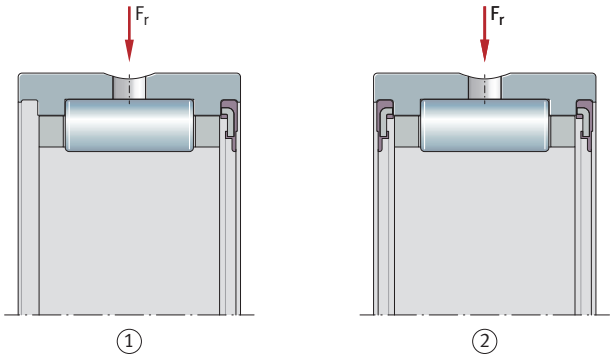
Radial needle roller bearings are used as non-locating bearings, i.e., when the shaft must allow axial length compensation relative to the housing. For bearings without an inner ring, the axial displacement facility of the shaft is dependent on the width of the shaft raceway.

41 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

42 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

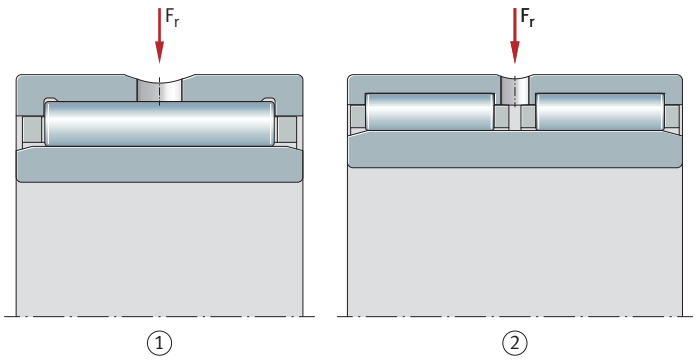
Needle roller bearings with ribs on the outer ring and with an inner ring are available in the following types and dimension series:

- NKI, NKIS, NA48, NA49, NA69 (single row)
- NA69..-ZW (double row)
- NA49..-RSR, NA49..-2RSR (sealed on one or both sides)

Bearings with an inner ring are used if the shaft cannot be produced as a rolling bearing raceway. The bearings are of a single row design, NA69 is of a double row design from d = 32 A.

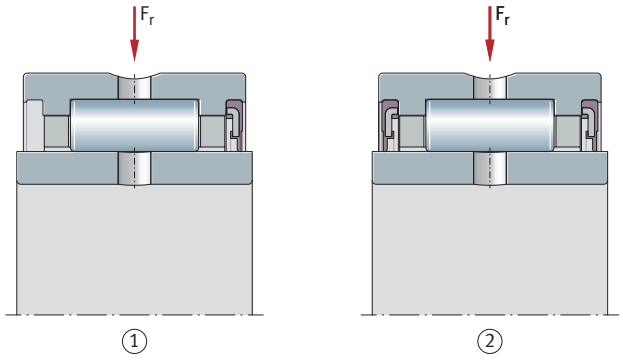
For bearings with an inner ring, the axial displacement of the shaft relative to the housing occurs during rotational motion, without constraint in the bearing, between the needle rollers and the inner ring raceway without ribs. The maximum axial displacement s is given in the product tables. Where larger displacements occur, the standard ring can be replaced by a wider inner ring IR.

43 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

44 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

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.

15.1.1 Clarification of product tables

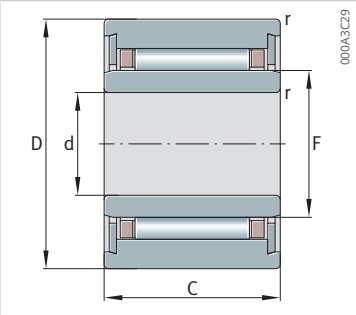
B	mm	Width
B_o	mm	Outer ring width
B_w	mm	Inner ring width
C_{0r}	N	Basic static load rating, radial
C_r	N	Basic dynamic load rating, radial
C_{ur}	N	Fatigue limit load, radial
d	mm	Bore diameter
D	mm	Outside diameter
F	mm	Raceway diameter, inner ring
F_w	mm	Inner enveloping circle diameter
m	kg	Mass
n_G	min^{-1}	Limiting speed
$n_{\vartheta r}$	min^{-1}	Thermal speed rating
r_{min}	mm	Min. chamfer dimension
s	mm	Axial displacement

15.1.2 NA49, NA69, NKI, NKIS

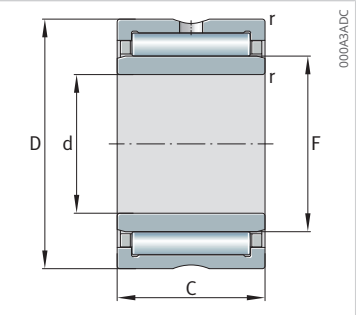
Single row

With inner ring

2 ribs on outer ring

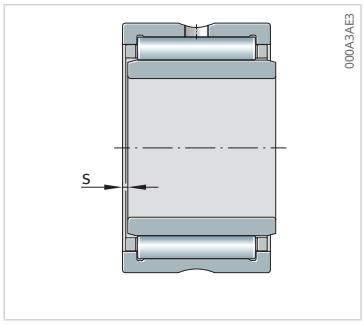


NKI (d ≤ 7 mm)



NA49/69 (d ≤ 30 mm),
NKI (d ≥ 9 mm), NKIS

Designation	F	D	B	r_{min}	d	s
	mm	mm	mm	mm	mm	mm
NA49/22-XL	28	39	17	0.3	22	0.8
NA49/28-XL	32	45	17	0.3	28	0.8
NA49/32-XL	40	52	20	0.6	32	0.8
NA4900-XL	14	22	13	0.3	10	0.5
NA4901-XL	16	24	13	0.3	12	0.5
NA4902-XL	20	28	13	0.3	15	0.5
NA4903-XL	22	30	13	0.3	17	0.5
NA4904-XL	25	37	17	0.3	20	0.8
NA4905-XL	30	42	17	0.3	25	0.8
NA4906-XL	35	47	17	0.3	30	0.8
NA4907-XL	42	55	20	0.6	35	0.8
NA4908-XL	48	62	22	0.6	40	1
NA4909-XL	52	68	22	0.6	45	1
NA4910-XL	58	72	22	0.6	50	1
NA4911-XL	63	80	25	1	55	1.5
NA4912-XL	68	85	25	1	60	1.5
NA4913-XL	72	90	25	1	65	1.5
NA4914-XL	80	100	30	1	70	1.5
NA4915-XL	85	105	30	1	75	1.5
NA4916-XL	90	110	30	1	80	1.5
NA4917-XL	100	120	35	1.1	85	1
NA69/22-XL	28	39	30	0.3	22	0.5
NA69/28-XL	32	45	30	0.3	28	1
NA6901-XL	16	24	22	0.3	12	1
NA6902-XL	20	28	23	0.3	15	1
NA6903-XL	22	30	23	0.3	17	1
NA6904-XL	25	37	30	0.3	20	1
NA6905-XL	30	42	30	0.3	25	1
NA6906-XL	35	47	30	0.3	30	1
NKI10/16-XL	14	22	16	0.3	10	0.5
NKI10/20-XL	14	22	20	0.3	10	0.5
NKI12/20-XL	16	24	20	0.3	12	0.5
NKI15/20-XL	19	27	20	0.3	15	0.5
NKI17/16-XL	21	29	16	0.3	17	0.5
NKI17/20-XL	21	29	20	0.3	17	0.5
NKI20/16-XL	24	32	16	0.3	20	0.5
NKI22/16-XL	26	34	16	0.3	22	0.5
NKI22/20-XL	26	34	20	0.3	22	0.5
NKI25/20-TV-XL	29	38	20	0.3	25	1
NKI25/30-XL	29	38	30	0.3	25	1.5



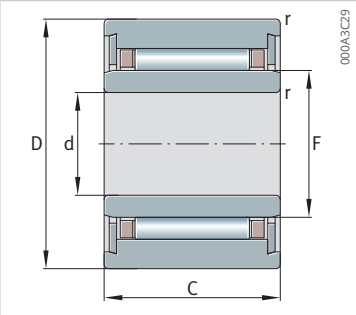
C_r	C_{0r}	C_{ur}	n_G	$n_{\vartheta r}$	m
N	N	N	min^{-1}	min^{-1}	kg
26000	29500	5400	15300	8100	0.08
27500	33500	6200	13600	7400	0.0977
34500	47500	9100	11100	6000	0.158
9600	9200	1660	24600	16400	0.023
10600	10900	1970	23200	14200	0.026
12000	13600	2470	21100	11200	0.034
12400	14600	2650	20000	10200	0.037
23700	25500	4700	16900	9400	0.0752
26500	31500	5800	14400	7700	0.088
28500	35500	6600	12600	6600	0.101
35500	50000	9600	10700	5800	0.17
48500	67000	11700	9200	5000	0.23
51000	73000	12900	8600	4700	0.271
53000	80000	14100	7800	4150	0.274
65000	100000	17600	7200	4000	0.393
68000	108000	19100	6700	3700	0.426
69000	112000	19900	6300	3500	0.456
95000	156000	28000	5700	3250	0.728
97000	162000	29000	5400	3100	0.775
101000	174000	31000	5100	2900	0.878
125000	237000	42500	4600	2650	1.25
42000	55000	10000	15300	7900	0.15
45500	63000	11600	13600	7100	0.182
18100	21600	3850	23200	13300	0.046
19500	25500	4550	21100	10900	0.0636
21100	29000	5200	20000	9800	0.072
40500	51000	9200	16900	8900	0.141
44000	59000	10800	14400	7500	0.161
49000	71000	13100	12600	6300	0.192
11400	11500	2140	24600	16400	0.0294
14500	15600	2750	24600	16100	0.0371
16300	18800	3350	23200	14200	0.0419
18700	23600	4200	21600	12100	0.0487
15200	18700	3500	20600	11400	0.0424
19300	25500	4500	20600	11200	0.0534
16900	22300	4200	18500	10100	0.049
17300	23600	4450	17200	9500	0.052
22000	32000	5700	17200	9300	0.0654
27500	39000	7000	15300	8100	0.0758
37000	57000	10700	15300	8200	0.124

15.1.2 NA49, NA69, NKI, NKIS

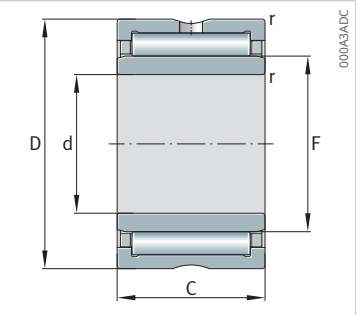
Single row

With inner ring

2 ribs on outer ring

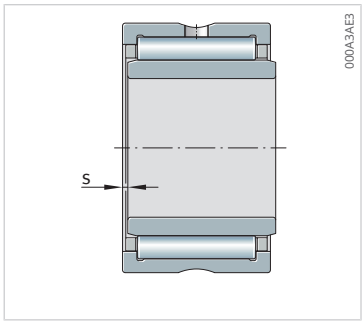


NKI (d ≤ 7 mm)



NA49/69 (d ≤ 30 mm),
NKI (d ≥ 9 mm), NKIS

Designation	F	D	B	r_{min}	d	s
	mm	mm	mm	mm	mm	mm
NKI28/30-XL	32	42	30	0.3	28	1.5
NKI30/20-TV-XL	35	45	20	0.3	30	0.5
NKI30/30-TV-XL	35	45	30	0.3	30	1
NKI32/20-XL	37	47	20	0.3	32	0.5
NKI32/30-XL	37	47	30	0.3	32	1
NKI35/20-TV-XL	40	50	20	0.3	35	0.5
NKI35/20-TW-XL	40	50	20	0.3	35	0.5
NKI38/20-XL	43	53	20	0.3	38	0.5
NKI38/30-XL	43	53	30	0.3	38	1
NKI40/20-TV-XL	45	55	20	0.3	40	0.5
NKI42/20-XL	47	57	20	0.3	42	0.5
NKI42/30-XL	47	57	30	0.3	42	1
NKI45/25-TV-XL	50	62	25	0.6	45	1.5
NKI45/35-TV-XL	50	62	35	0.6	45	2
NKI5/12-TV-XL	8	15	12	0.3	5	1.5
NKI5/16-TV-XL	8	15	16	0.3	5	2
NKI50/25-XL	55	68	25	0.6	50	1.5
NKI50/35-XL	55	68	35	0.6	50	2
NKI55/25-TV-XL	60	72	25	0.6	55	1.5
NKI55/35-XL	60	72	35	0.6	55	2
NKI6/12-TV-XL	9	16	12	0.3	6	1.5
NKI6/16-TV-XL	9	16	16	0.3	6	2
NKI60/25-XL	68	82	25	0.6	60	1
NKI60/35-XL	68	82	35	0.6	60	1
NKI65/25-XL	73	90	25	1	65	1
NKI65/35-XL	73	90	35	1	65	1
NKI7/12-TV-XL	10	17	12	0.3	7	1.5
NKI7/16-TV-XL	10	17	16	0.3	7	2
NKI70/25-XL	80	95	25	1	70	0.8
NKI70/35-XL	80	95	35	1	70	0.8
NKI75/25-XL	85	105	25	1	75	1
NKI75/35-XL	85	105	35	1	75	1
NKI80/25-XL	90	110	25	1	80	1
NKI80/35-XL	90	110	35	1	80	1
NKI85/26-XL	95	115	26	1	85	1.5
NKI85/36-XL	95	115	36	1	85	1.5
NKI9/12-XL	12	19	12	0.3	9	1.5
NKI9/16-XL	12	19	16	0.3	9	2
NKI90/26-XL	100	120	26	1	90	1.5
NKI90/36-XL	100	120	36	1	90	1.5



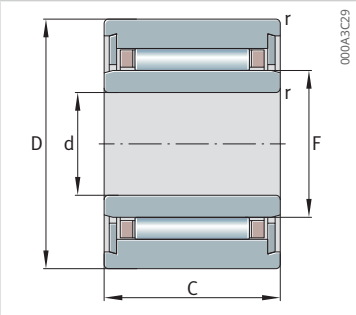
C_r	C_{0r}	C_{ur}	n_G	$n_{\vartheta r}$	m
N	N	N	min^{-1}	min^{-1}	kg
39000	63000	11900	14000	7600	0.146
31000	48500	8600	12900	6800	0.108
46000	81000	15300	12900	6600	0.165
28000	43500	7800	12300	6900	0.118
42000	73000	13700	12300	6600	0.18
33500	56000	10000	11400	6100	0.122
32500	48500	10100	11400	6900	0.122
30500	51000	9100	10700	6000	0.136
45500	85000	16100	10700	5900	0.207
35000	62000	11000	10200	5600	0.136
32500	56000	10100	9800	5600	0.148
48500	94000	17800	9800	5400	0.222
48500	87000	15000	9200	5100	0.217
67000	132000	24300	9200	4950	0.308
4450	4100	700	32500	32500	0.0115
5800	5800	990	32500	32000	0.0153
45500	82000	14300	8400	4950	0.27
60000	118000	21600	8400	4900	0.379
53000	103000	17800	7700	4400	0.255
63000	130000	23900	7700	4550	0.379
5100	5000	860	31000	28500	0.0135
6600	7100	1210	31000	28000	0.0174
49500	89000	15500	6800	4200	0.394
70000	139000	26000	6800	4050	0.553
60000	100000	17900	6300	3900	0.467
85000	156000	27500	6300	3750	0.659
5300	5500	940	29500	26000	0.0137
7000	7800	1330	29500	25500	0.0182
63000	119000	20000	5800	3500	0.521
89000	184000	33000	5800	3350	0.737
78000	123000	22100	5400	3300	0.641
111000	193000	35000	5400	3200	0.908
81000	132000	23700	5100	3150	0.677
116000	208000	38000	5100	3050	0.959
83000	137000	24500	4850	3100	0.743
121000	223000	40500	4850	2950	1.04
7200	7100	1310	26500	20200	0.0166
10100	11000	1950	26500	19500	0.0219
86000	146000	25500	4600	2950	0.778
125000	237000	42500	4600	2800	1.09

15.1.2 NA49, NA69, NKI, NKIS

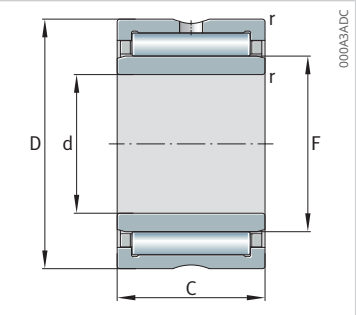
Single row

With inner ring

2 ribs on outer ring

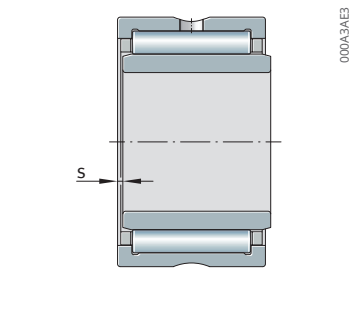


NKI (d ≤ 7 mm)



NA49/69 (d ≤ 30 mm),
NKI (d ≥ 9 mm), NKIS

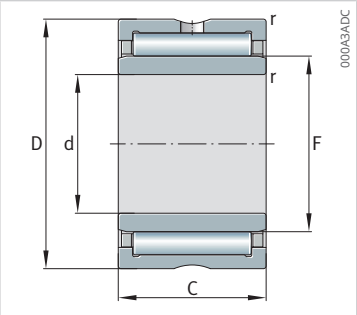
Designation	F	D	B	r_{min}	d	s
	mm	mm	mm	mm	mm	mm
NKIS15-XL	22	35	20	0.6	15	0.5
NKIS25-XL	32	47	22	0.6	25	1
NKIS35-XL	43	58	22	0.6	35	0.5
NKIS45-XL	55	72	22	1	45	0.5
NKIS50-XL	60	80	28	1.1	50	2
NKIS55-XL	65	85	28	1.1	55	2
NKIS60-XL	70	90	28	1.1	60	2

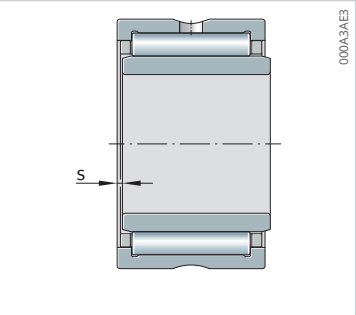


C_r	C_{0r}	C_{ur}	n_G	$n_{\vartheta r}$	m
N	N	N	min^{-1}	min^{-1}	kg
27500	28000	5000	18500	9400	0.092
38000	43500	7600	13200	7100	0.162
44000	57000	10000	10200	5600	0.22
51000	74000	13000	8200	4600	0.336
71000	98000	17600	7400	4250	0.518
75000	108000	19400	6900	4000	0.558
77000	113000	20400	6400	3800	0.56

15.1.3 NA69...-ZW-XL

Double row
With inner ring
2 ribs on outer ring





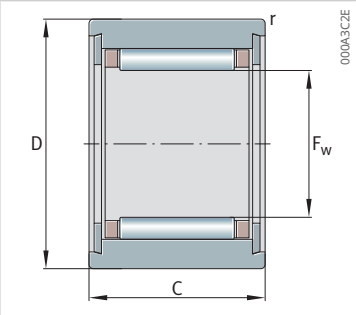
Designation	F	D	B	r_{min}	d	s	C_r	C_{0r}	C_{ur}	n_G	$n_{\vartheta r}$	m
	mm	mm	mm	mm	mm	mm	N	N	N	min^{-1}	min^{-1}	kg
NA69/32-ZW-XL	40	52	36	0.6	32	0.5	53000	82000	15400	11100	6100	0.288
NA6907-ZW-XL	42	55	36	0.6	35	0.5	54000	86000	16200	10700	5900	0.31
NA6908-ZW-XL	48	62	40	0.6	40	0.5	74000	116000	19800	9200	5100	0.43
NA6909-ZW-XL	52	68	40	0.6	45	0.5	79000	127000	21800	8600	4750	0.495
NA6910-ZW-XL	58	72	40	0.6	50	0.5	82000	139000	23800	7800	4200	0.515
NA6911-ZW-XL	63	80	45	1	55	1.5	102000	176000	30500	7200	4000	0.78
NA6912-ZW-XL	68	85	45	1	60	1.5	106000	191000	33000	6700	3700	0.808
NA6913-ZW-XL	72	90	45	1	65	1.5	108000	198000	34500	6300	3550	0.833
NA6914-ZW-XL	80	100	54	1	70	1	145000	265000	48000	5700	3300	1.34
NA6915-ZW-XL	85	105	54	1	75	1	147000	275000	50000	5400	3150	1.45
NA6916-ZW-XL	90	110	54	1	80	1	153000	300000	54000	5100	2900	1.522
NA6917-ZW-XL	100	120	63	1.1	85	1	188000	400000	72000	4600	2700	2.2

15.1.4 RNA49, RNA69, NK, NKS

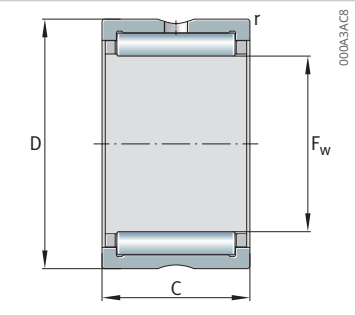
Single row

Without inner ring

2 ribs on outer ring



NK ($F_W \leq 10$ mm)



NK ($F_W \geq 12$ mm), NKS, RNA49/69

Designation	F_w	D	B	B_o	r_{min}
	mm	mm	mm	mm	mm
NK5/12-TV-XL	5	10	–	12	0.15
NK5/10-TV-XL	5	10	–	10	0.15
NK6/10-TV-XL	6	12	–	10	0.15
NK6/12-TV-XL	6	12	–	12	0.15
NK7/10-TV-XL	7	14	–	10	0.3
NK7/12-TV-XL	7	14	–	12	0.3
NK8/16-TV-XL	8	15	–	16	0.3
NK8/12-TV-XL	8	15	–	12	0.3
NK9/16-TV-XL	9	16	–	16	0.3
NK9/12-TV-XL	9	16	–	12	0.3
NK10/16-TV-XL	10	17	–	16	0.3
NK10/12-TV-XL	10	17	–	12	0.3
NK12/12-XL	12	19	–	12	0.3
NK12/16-XL	12	19	–	16	0.3
RNA4900-2RSR-XL	14	22	13	13	0.3
RNA4900-XL	14	22	13	13	0.3
NK14/20-XL	14	22	–	20	0.3
NK14/16-XL	14	22	–	16	0.3
RNA4900-RSR-XL	14	22	–	13	0.3
NK15/20-XL	15	23	–	20	0.3
NK15/16-XL	15	23	–	16	0.3
NK16/20-XL	16	24	–	20	0.3
RNA6901-XL	16	24	22	22	0.3
RNA4901-2RSR-XL	16	24	13	13	0.3
RNA4901-XL	16	24	13	13	0.3
RNA4901-RSR-XL	16	24	–	13	0.3
NK17/20-XL	17	25	–	20	0.3
NK17/16-XL	17	25	–	16	0.3
NK18/16-XL	18	26	–	16	0.3
NK18/20-XL	18	26	–	20	0.3
NK19/20-XL	19	27	–	20	0.3
NK20/20-XL	20	28	–	20	0.3
RNA4902-XL	20	28	13	13	0.3
RNA6902-XL	20	28	23	23	0.3
RNA4902-RSR-XL	20	28	–	13	0.3
RNA4902-2RSR-XL	20	28	13	13	0.3
NK21/20-XL	21	29	–	20	0.3
NK21/16-XL	21	29	–	16	0.3
NKS22-XL	22	35	–	20	0.6
RNA4903-XL	22	30	13	13	0.3

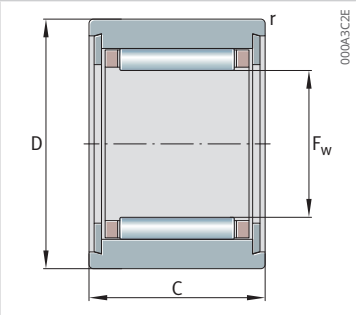
C_r	C_{0r}	C_{ur}	n_G	$n_{\vartheta r}$	m
N	N	N	min^{-1}	min^{-1}	kg
3400	2650	440	39000	54000	0.0037
2650	1920	300	39000	55000	0.0031
2950	2280	360	36500	48500	0.0047
3800	3150	530	36500	47500	0.0057
3250	2650	420	34500	43000	0.0069
4150	3600	610	34500	42000	0.0082
5800	5800	990	32500	36500	0.012
4450	4100	700	32500	37000	0.0087
6600	7100	1210	31000	32000	0.0128
5100	5000	860	31000	32000	0.0103
7000	7800	1330	29500	28500	0.0133
5300	5500	940	29500	29000	0.0101
7200	7100	1310	26500	22400	0.0121
10100	11000	1950	26500	21600	0.0159
7700	6900	1390	14800	–	0.016
9600	9200	1660	24600	17800	0.0165
14500	15600	2750	24600	18300	0.0255
11400	11500	2140	24600	18600	0.0207
7700	6900	1390	14800	–	0.016
15400	17200	3050	23900	17000	0.0266
12100	12700	2360	23900	17300	0.0218
16300	18800	3350	23200	15900	0.0284
18100	21600	3850	23200	14300	0.031
8600	8300	1660	13900	–	0.018
10600	10900	1970	23200	15300	0.0174
8600	8300	1660	13900	–	0.018
17100	20400	3600	22600	15000	0.0298
13500	15000	2800	22600	15300	0.0237
14100	16200	3050	22100	14400	0.0249
17900	22000	3900	22100	14100	0.0314
18700	23600	4200	21600	13400	0.0322
18600	23800	4200	21100	12900	0.0339
12000	13600	2470	21100	12000	0.0217
19500	25500	4550	21100	11700	0.0397
9700	10300	2070	12600	–	0.0215
9700	10300	2070	12600	–	0.0215
19300	25500	4500	20600	12300	0.0352
15200	18700	3500	20600	12600	0.0281
27500	28000	5000	18500	10900	0.0615
12400	14600	2650	20000	10900	0.0222

15.1.4 RNA49, RNA69, NK, NKS

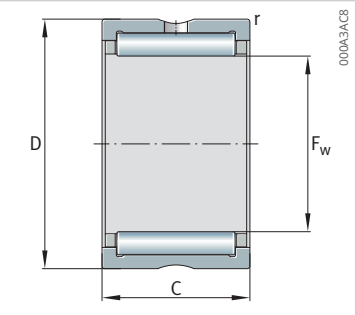
Single row

Without inner ring

2 ribs on outer ring



NK ($F_W \leq 10$ mm)



NK ($F_W \geq 12$ mm), NKS, RNA49/69

Designation	F_w	D	B	B_o	r_{min}
	mm	mm	mm	mm	mm
NK22/16-XL	22	30	–	16	0.3
NK22/20-XL	22	30	–	20	0.3
RNA4903-2RSR-XL	22	30	13	13	0.3
RNA6903-XL	22	30	23	23	0.3
RNA4903-RSR-XL	22	30	–	13	0.3
NK24/16-XL	24	32	–	16	0.3
RNA6904-XL	25	37	30	30	0.3
RNA4904-RSR-XL	25	37	–	17	0.3
RNA4904-2RSR-XL	25	37	17	17	0.3
RNA4904-XL	25	37	17	17	0.3
NK25/20-XL	25	33	–	20	0.3
NK26/16-XL	26	34	–	16	0.3
NK26/20-XL	26	34	–	20	0.3
NK28/20-XL	28	37	–	20	0.3
NK28/30-XL	28	37	–	30	0.3
NKS28-XL	28	42	–	20	0.6
RNA69/22-XL	28	39	30	30	0.3
RNA49/22-XL	28	39	17	17	0.3
NK29/30-XL	29	38	–	30	0.3
NK29/20-TV-XL	29	38	–	20	0.3
NK30/20-TV-XL	30	40	–	20	0.3
NK30/30-TV-XL	30	40	–	30	0.3
NK30/20-TW-XL	30	40	–	20	0.3
NKS30-XL	30	45	–	22	0.6
RNA6905-XL	30	42	30	30	0.3
RNA4905-2RSR-XL	30	42	17	17	0.3
RNA4905-RSR-XL	30	42	–	17	0.3
NKS32-XL	32	47	–	22	0.6
RNA49/28-XL	32	45	17	17	0.3
NK32/30-XL	32	42	–	30	0.3
RNA69/28-XL	32	45	30	30	0.3
RNA4906-RSR-XL	35	47	–	17	0.3
NK35/30-TV-XL	35	45	–	30	0.3
NK35/20-TV-XL	35	45	–	20	0.3
NKS35-XL	35	50	–	22	0.6
RNA4906-2RSR-XL	35	47	17	17	0.3
RNA6906-XL	35	47	30	30	0.3
RNA4906-XL	35	47	17	17	0.3
NK37/30-XL	37	47	–	30	0.3
NK37/20-XL	37	47	–	20	0.3

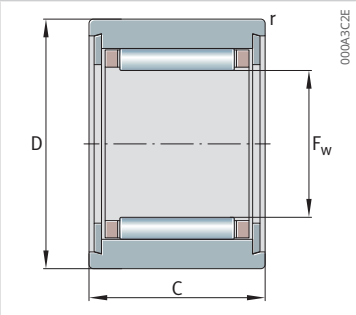
C_r	C_{0r}	C_{ur}	n_G	$n_{\vartheta r}$	m
N	N	N	min^{-1}	min^{-1}	kg
15800	19900	3750	20000	12000	0.03
20000	27000	4800	20000	11700	0.037
10000	11000	2220	12000	–	0.023
21100	29000	5200	20000	10500	0.0424
10000	11000	2220	12000	–	0.023
16900	22300	4200	18500	11000	0.0319
40500	51000	9200	16900	9500	0.1
19500	19900	3800	10100	–	0.056
19500	19900	3800	10100	–	0.056
23700	25500	4700	16900	9900	0.0523
21300	30500	5400	17800	10400	0.042
17300	23600	4450	17200	10300	0.034
22000	32000	5700	17200	10100	0.042
24800	34000	6000	15800	9300	0.0522
37000	57000	10700	15800	9000	0.082
32500	36500	6500	15100	8900	0.0836
42000	55000	10000	15300	8400	0.098
26000	29500	5400	15300	8600	0.0502
37000	57000	10700	15300	8800	0.0843
27500	39000	7000	15300	8700	0.05
28000	41000	7300	14800	8500	0.061
42000	69000	12900	14800	8200	0.0924
27500	35500	7400	14800	8900	0.061
36500	40000	7000	14000	8500	0.104
44000	59000	10800	14400	7900	0.112
21800	24200	4650	8600	–	0.06
21800	24200	4650	8600	–	0.06
38000	43500	7600	13200	8000	0.11
27500	33500	6200	13600	7600	0.0732
39000	63000	11900	14000	8200	0.102
45500	63000	11600	13600	7400	0.135
23900	28500	5500	7500	–	0.069
46000	81000	15300	12900	7100	0.106
31000	48500	8600	12900	7400	0.0694
39500	47000	8200	12300	7400	0.118
23900	28500	5500	7500	–	0.069
49000	71000	13100	12600	6600	0.126
28500	35500	6600	12600	6900	0.0694
42000	73000	13700	12300	7200	0.113
28000	43500	7800	12300	7400	0.077

15.1.4 RNA49, RNA69, NK, NKS

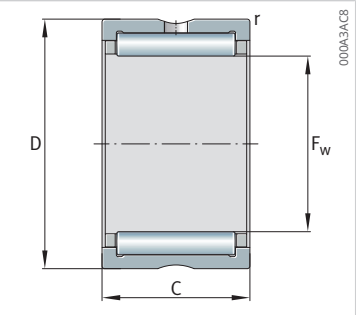
Single row

Without inner ring

2 ribs on outer ring



NK ($F_W \leq 10$ mm)



NK ($F_W \geq 12$ mm), NKS, RNA49/69

Designation	F_w	D	B	B_o	r_{min}
	mm	mm	mm	mm	mm
NK38/20-XL	38	48	–	20	0.3
NK38/30-XL	38	48	–	30	0.3
RNA49/32-XL	40	52	20	20	0.6
NK40/20-TV-XL	40	50	–	20	0.3
RNA4907-2RSR-XL	42	55	20	20	0.6
NK42/20-XL	42	52	–	20	0.3
RNA4907-RSR-XL	42	55	–	20	0.6
RNA4907-XL	42	55	20	20	0.6
NK42/30-XL	42	52	–	30	0.3
NKS43-XL	43	58	–	22	0.6
NK43/20-XL	43	53	–	20	0.3
NK43/30-XL	43	53	–	30	0.3
NK45/20-TV-XL	45	55	–	20	0.3
NK47/20-XL	47	57	–	20	0.3
NK47/30-XL	47	57	–	30	0.3
RNA4908-2RSR-XL	48	62	22	22	0.6
RNA4908-XL	48	62	22	22	0.6
RNA4908-RSR-XL	48	62	–	22	0.6
NK50/25-TV-XL	50	62	–	25	0.6
NK50/35-TV-XL	50	62	–	35	0.6
RNA4909-2RSR-XL	52	68	22	22	0.6
RNA4909-RSR-XL	52	68	–	22	0.6
RNA4909-XL	52	68	22	22	0.6
NK55/35-XL	55	68	–	35	0.6
NKS55-XL	55	72	–	22	1
NK55/25-XL	55	68	–	25	0.6
RNA4910-2RSR-XL	58	72	22	22	0.6
RNA4910-RSR-XL	58	72	–	22	0.6
RNA4910-XL	58	72	22	22	0.6
NK60/35-XL	60	72	–	35	0.6
NKS60-XL	60	80	–	28	1.1
NK60/25-TV-XL	60	72	–	25	0.6
RNA4911-XL	63	80	25	25	1
NK65/25-XL	65	78	–	25	0.6
NK65/35-XL	65	78	–	35	0.6
NKS65-XL	65	85	–	28	1.1
RNA4912-XL	68	85	25	25	1
NK68/35-XL	68	82	–	35	0.6
NK68/25-XL	68	82	–	25	0.6
NK70/35-XL	70	85	–	35	0.6

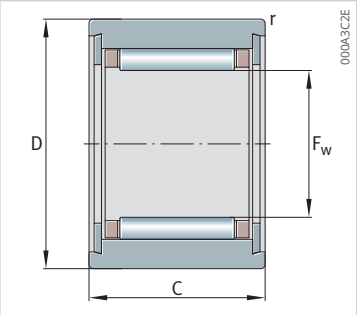
C_r	C_{0r}	C_{ur}	n_G	$n_{\vartheta r}$	m
N	N	N	min^{-1}	min^{-1}	kg
29000	45000	8100	12000	7200	0.0794
43000	76000	14300	12000	7000	0.116
34500	47500	9100	11100	6400	0.0891
33500	56000	10000	11400	6500	0.078
29500	39500	7400	6400	–	0.107
30000	49000	8800	10900	6600	0.0858
29500	39500	7400	6400	–	0.107
35500	50000	9600	10700	6100	0.107
44500	82000	15500	10900	6400	0.13
44000	57000	10000	10200	6200	0.139
30500	51000	9100	10700	6500	0.086
45500	85000	16100	10700	6300	0.133
35000	62000	11000	10200	5900	0.0853
32500	56000	10100	9800	6000	0.0945
48500	94000	17800	9800	5800	0.142
41000	53000	9000	5500	–	0.154
48500	67000	11700	9200	5300	0.14
41000	53000	9000	5500	–	0.154
48500	87000	15000	9200	5400	0.146
67000	132000	24300	9200	5200	0.207
43000	59000	9900	5100	–	0.157
43000	59000	9900	5100	–	0.157
51000	73000	12900	8600	4900	0.182
60000	118000	21600	8400	5200	0.25
51000	74000	13000	8200	5100	0.221
45500	82000	14300	8400	5200	0.18
45000	64000	10800	4600	–	0.16
45000	64000	10800	4600	–	0.16
53000	80000	14100	7800	4350	0.163
63000	130000	23900	7700	4800	0.258
71000	98000	17600	7400	4750	0.335
53000	103000	17800	7700	4600	0.17
65000	100000	17600	7200	4150	0.255
50000	98000	17000	7200	4500	0.221
66000	142000	26000	7200	4450	0.31
75000	108000	19400	6900	4400	0.356
68000	108000	19100	6700	3850	0.275
70000	139000	26000	6800	4350	0.338
49500	89000	15500	6800	4500	0.241
71000	144000	27000	6600	4300	0.37

15.1.4 RNA49, RNA69, NK, NKS

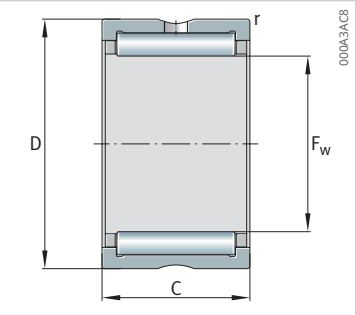
Single row

Without inner ring

2 ribs on outer ring



NK (F_W ≤ 10 mm)



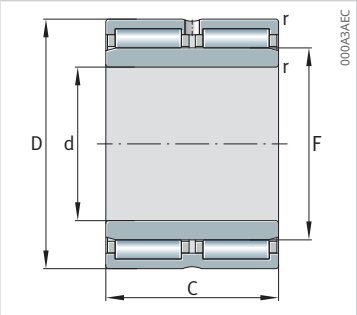
NK (F_W ≥ 12 mm), NKS, RNA49/69

Designation	F_w	D	B	B_o	r_{min}
	mm	mm	mm	mm	mm
NKS70-XL	70	90	–	28	1.1
NK70/25-XL	70	85	–	25	0.6
RNA4913-XL	72	90	25	25	1
NK73/25-XL	73	90	–	25	1
NK73/35-XL	73	90	–	35	1
NK75/35-XL	75	92	–	35	1
NK75/25-XL	75	92	–	25	1
NK80/35-XL	80	95	–	35	1
RNA4914-XL	80	100	30	30	1
NK80/25-XL	80	95	–	25	1
RNA4915-XL	85	105	30	30	1
NK85/25-XL	85	105	–	25	1
NK85/35-XL	85	105	–	35	1
NK90/25-XL	90	110	–	25	1
NK90/35-XL	90	110	–	35	1
RNA4916-XL	90	110	30	30	1
NK95/36-XL	95	115	–	36	1
NK95/26-XL	95	115	–	26	1
NK100/36-XL	100	120	–	36	1
RNA4917-XL	100	120	35	35	1.1
NK100/26-XL	100	120	–	26	1

C_r	C_{0r}	C_{ur}	n_G	$n_{\vartheta r}$	m
N	N	N	min^{-1}	min^{-1}	kg
77000	113000	20400	6400	4200	0.38
50000	92000	16000	6600	4450	0.26
69000	112000	19900	6300	3650	0.312
60000	100000	17900	6300	4150	0.302
85000	156000	27500	6300	4050	0.428
87000	162000	28500	6100	3950	0.445
61000	104000	18500	6100	4050	0.315
89000	184000	33000	5800	3650	0.425
95000	156000	28000	5700	3400	0.46
63000	119000	20000	5800	3750	0.301
97000	162000	29000	5400	3200	0.489
78000	123000	22100	5400	3550	0.425
111000	193000	35000	5400	3450	0.6
81000	132000	23700	5100	3400	0.45
116000	208000	38000	5100	3250	0.63
101000	174000	31000	5100	3000	0.516
121000	223000	40500	4850	3150	0.68
83000	137000	24500	4850	3300	0.49
125000	237000	42500	4600	3000	0.715
125000	237000	42500	4600	2800	0.657
86000	146000	25500	4600	3150	0.515

15.1.5 RNA69..-ZW

Double row
Without inner ring
2 ribs on outer ring



RNA69...-ZW-XL

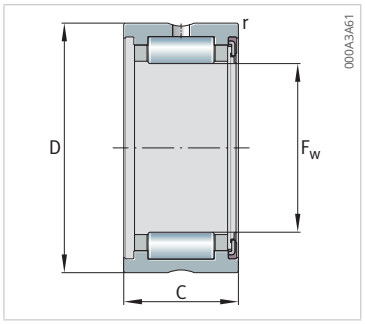
Designation	F_w	D	B_o	r_{min}	C_r	C_{0r}	C_{ur}	n_G	$n_{\vartheta r}$	m
	mm	mm	mm	mm	N	N	N	min^{-1}	min^{-1}	kg
RNA69/32-ZW-XL	40	52	36	0.6	53000	82000	15400	11100	6500	0.162
RNA6907-ZW-XL	42	55	36	0.6	54000	86000	16200	10700	6200	0.193
RNA6908-ZW-XL	48	62	40	0.6	74000	116000	19800	9200	5400	0.256
RNA6909-ZW-XL	52	68	40	0.6	79000	127000	21800	8600	4950	0.338
RNA6910-ZW-XL	58	72	40	0.6	82000	139000	23800	7800	4400	0.31
RNA6911-ZW-XL	63	80	45	1	102000	176000	30500	7200	4200	0.47
RNA6912-ZW-XL	68	85	45	1	106000	191000	33000	6700	3850	0.488
RNA6913-ZW-XL	72	90	45	1	108000	198000	34500	6300	3650	0.58
RNA6914-ZW-XL	80	100	54	1	145000	265000	48000	5700	3450	0.857
RNA6915-ZW-XL	85	105	54	1	147000	275000	50000	5400	3250	0.935
RNA6916-ZW-XL	90	110	54	1	153000	300000	54000	5100	3050	0.987
RNA6917-ZW-XL	100	120	63	1.1	188000	400000	72000	4600	2850	1.2

15.1.6 NA49..-RSR, NA49..-2RSR

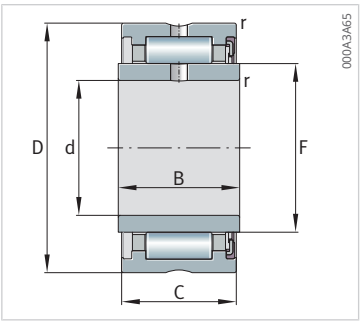
Single row

With extended inner ring

2 ribs on outer ring

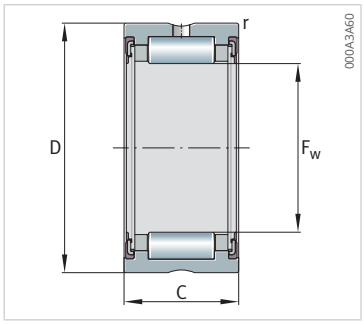


RSR

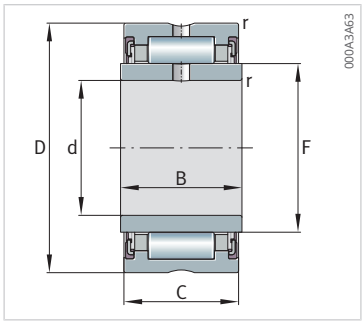


RSR

Designation	F_w	D	B_o	B_w	d
	mm	mm	mm	mm	mm
NA4900-2RSR-XL	14	22	13	14	10
NA4900-RSR-XL	14	22	13	14	10
NA4901-2RSR-XL	16	24	13	14	12
NA4901-RSR-XL	16	24	13	14	12
NA4902-2RSR-XL	20	28	13	14	15
NA4902-RSR-XL	20	28	13	14	15
NA4903-2RSR-XL	22	30	13	14	17
NA4903-RSR-XL	22	30	13	14	17
NA4904-2RSR-XL	25	37	17	18	20
NA4904-RSR-XL	25	37	17	18	20
NA4905-2RSR-XL	30	42	17	18	25
NA4905-RSR-XL	30	42	17	18	25
NA4906-2RSR-XL	35	47	17	18	30
NA4906-RSR-XL	35	47	17	18	30
NA4907-2RSR-XL	42	55	20	21	35
NA4907-RSR-XL	42	55	20	21	35
NA4908-2RSR-XL	48	62	22	23	40
NA4908-RSR-XL	48	62	22	23	40
NA4909-2RSR-XL	52	68	22	23	45
NA4909-RSR-XL	52	68	22	23	45
NA4910-2RSR-XL	58	72	22	23	50
NA4910-RSR-XL	58	72	22	23	50



2RSR



2RSR

r_{min}	C_r	C_{0r}	C_{ur}	m
mm	N	N	N	kg
0.3	7700	6900	1390	0.0245
0.3	7700	6900	1390	0.0245
0.3	8600	8300	1660	0.0275
0.3	8600	8300	1660	0.0275
0.3	9700	10300	2070	0.037
0.3	9700	10300	2070	0.037
0.3	10000	11000	2220	0.04
0.3	10000	11000	2220	0.04
0.3	19500	19900	3800	0.08
0.3	19500	19900	3800	0.08
0.3	21800	24200	4650	0.0895
0.3	21800	24200	4650	0.0895
0.3	23900	28500	5500	0.104
0.3	23900	28500	5500	0.104
0.6	29500	39500	7400	0.175
0.6	29500	39500	7400	0.175
0.6	41000	53000	9000	0.252
0.6	41000	53000	9000	0.252
0.6	43000	59000	9900	0.29
0.6	43000	59000	9900	0.29
0.6	45000	64000	10800	0.295
0.6	45000	64000	10800	0.295

15.2 Needle roller bearings without ribs on the outer ring

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. Bearings are also available with a lubrication hole in the inner ring; these have the suffix IS1.

Needle roller bearings without ribs on the outer ring are available:

- with and without an inner ring
- in a single or double row design

Needle roller bearings without ribs on the outer ring, without inner ring

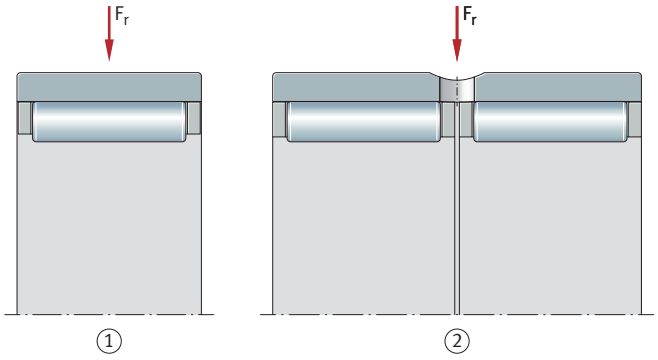
Needle roller bearings without ribs on the outer ring and without an inner ring are available in the following types:

- RNAO (single row)
- RNAO..-ZW-ASR1 (double row)

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. 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.

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.

45 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

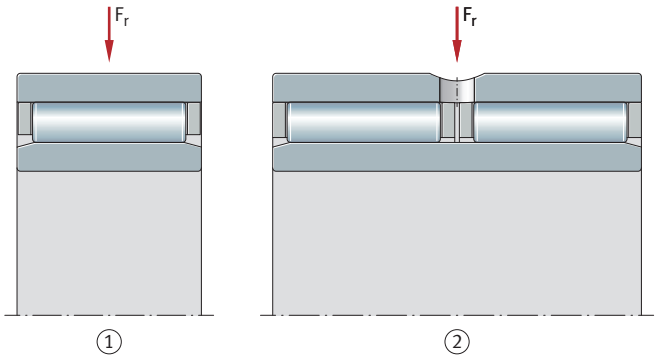
Needle roller bearings without ribs on the outer ring and with an inner ring are available in the following types:

- NAO (single row)
- NAO..-ZW-ASR1 (double row)

Bearings with an inner ring are used if the shaft cannot be produced as a rolling bearing raceway.

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.

46 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

Replacement of inner rings

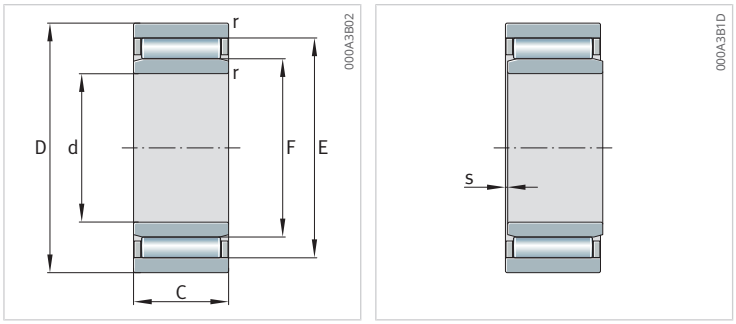
The outer ring and the needle roller and cage assembly are matched to each other and must not be interchanged during mounting with components from other bearings of the same size. In the case of the standard bearings, the inner rings are matched to the enveloping circle tolerance F6 and can be interchanged with each other (mixed use) within the same accuracy class.

15.2.1 Clarification of product tables

B	mm	Width
B_o	mm	Outer ring width
C_{0r}	N	Basic static load rating, radial
C_r	N	Basic dynamic load rating, radial
C_{ur}	N	Fatigue limit load, radial
D	mm	Outside diameter
d_a	mm	Mounting dimension
D_a	mm	Abutment diameter, outer ring
d_b	mm	Abutment diameter, axial guidance, needle roller and cage assembly/shaft
D_b	mm	Abutment diameter, axial guidance, needle roller and cage assembly/housing
E	mm	Raceway diameter, outer ring
F	mm	Raceway diameter, inner ring
F_w	mm	Inner enveloping circle diameter
L	mm	Lower limit deviation
m	kg	Mass
n_G	min^{-1}	Limiting speed
$n_{\vartheta r}$	min^{-1}	Thermal speed rating
$r_{a\ max}$	mm	Max. undercut radius
r_{min}	mm	Min. chamfer dimension
s	mm	Axial displacement
U	mm	Upper limit deviation

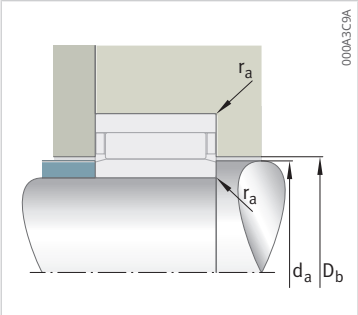
15.2.2 NAO, NAO...-IS1

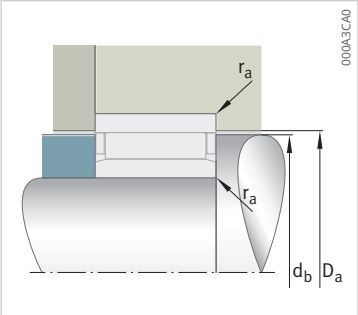
Single row
With inner ring
Without ribs



NAO, NAO...-IS1

Designation	F	D	B	E	d	d_a	D_a	D_b	d_b
	mm	mm	mm	mm	mm	mm	mm	mm	mm
NAO6×17×10-TV-IS1-XL	10	17	10	13	6	9.7	13.3	10.3	12.7
NAO17×30×13-XL	22	30	13	26	17	21.5	26.3	22.4	25.6
NAO20×37×16-XL	25	37	16	32	20	24.5	32.5	25.6	31.4
NAO25×40×17-XL	30	40	17	35	25	29.5	35.5	30.6	34.4
NAO35×55×20-XL	40	55	20	47	35	39.5	47.5	40.6	46.2
NAO70×100×30-XL	80	100	30	88	70	79.3	89	81	87.2

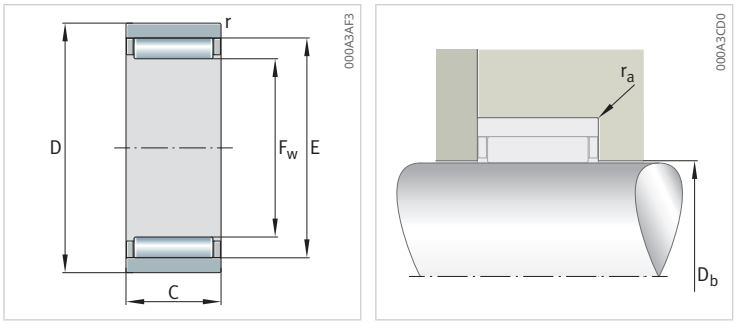




r_{min}	$r_{a\ max}$	s	C_r	C_{0r}	C_{ur}	n_G	$n_{\vartheta r}$	m
mm	mm	mm	N	N	N	min^{-1}	min^{-1}	kg
0.3	0.3	0.5	5300	5500	940	29500	23800	0.014
0.3	0.3	0.5	11800	15900	2600	20400	11100	0.042
0.3	0.3	0.5	23500	27500	4650	17200	9100	0.082
0.3	0.3	0.8	22100	34000	5400	15100	8100	0.088
0.3	0.3	0.8	37000	57000	9100	11300	6200	0.19
1	1	1	80000	176000	31500	5800	3350	0.85

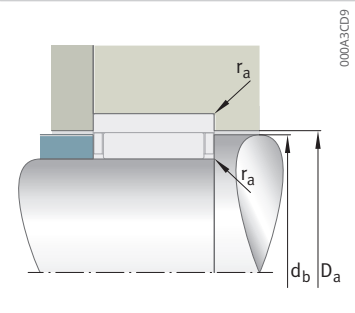
15.2.3 RNAO

Single row
Without inner ring
Without ribs



RNAO

Designation	F_w	D	E	B_o	D_a	D_b	d_b
	mm	mm	mm	mm	mm	mm	mm
RNAO5×10×8-TV-XL	5	10	8	8	8.3	5.3	7.7
RNAO6×13×8-TV-XL	6	13	9	8	9.3	6.3	8.7
RNAO10×17×10-TV-XL	10	17	13	10	13.3	10.3	12.7
RNAO22×30×13-XL	22	30	26	13	26.3	22.4	25.6
RNAO25×37×16-XL	25	37	32	16	32.5	25.6	31.4
RNAO30×40×17-XL	30	40	35	17	35.5	30.6	34.4
RNAO30×42×16-XL	30	42	37	16	37.5	30.6	36.4
RNAO40×55×20-XL	40	55	47	20	47.5	40.6	46.2
RNAO60×78×20-XL	60	78	68	20	68.8	60.8	67.2
RNAO80×100×30-XL	80	100	88	30	89	81	87.2
RNAO100×120×30-XL	100	120	108	30	109	101	107.2



r_{min}	$r_{a\ max}$	C_r	C_{0r}	C_{ur}	n_G	$n_{\vartheta r}$	m
mm	mm	N	N	N	min^{-1}	min^{-1}	kg
0.15	0.1	2650	1920	300	39000	53000	0.003
0.3	0.3	2950	2280	360	36500	48500	0.006
0.3	0.3	5300	5500	940	29500	28000	0.01
0.3	0.3	11800	15900	2600	20400	12400	0.027
0.3	0.3	23500	27500	4650	17200	10000	0.06
0.3	0.3	22100	34000	5400	15100	8800	0.06
0.3	0.3	26000	33500	5600	14600	8500	0.059
0.3	0.3	37000	57000	9100	11300	6600	0.145
1	1	49500	85000	13900	7700	4650	0.255
1	1	80000	176000	31500	5800	3600	0.58
1	1	80000	188000	32500	4700	3150	0.694

16 Combined needle roller bearings

Combined needle roller bearings comprise a radial needle roller bearing, which is combined with an axial bearing component. 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. 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.

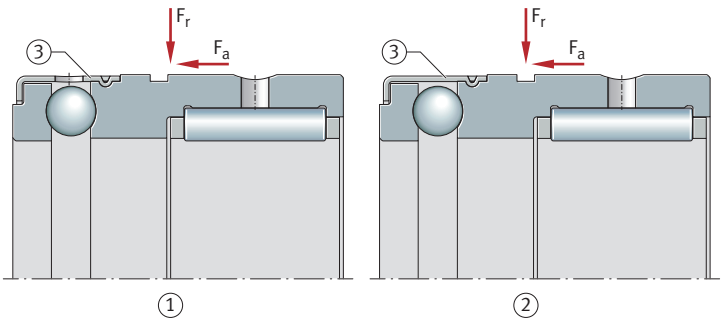
16.1 Needle roller/axial deep groove ball bearings

Needle roller/axial deep groove ball bearings do not have an inner ring and are therefore particularly compact in a radial direction. However, they require a shaft raceway that is hardened and ground. If the shaft cannot be used as a rolling bearing raceway, inner rings IR can be used instead. The suitable inner rings are given in the product tables and must be ordered in addition to the bearing. For lubrication, the outer ring of the radial bearing component has a lubrication groove and lubrication holes.

Type NX, NX..-Z

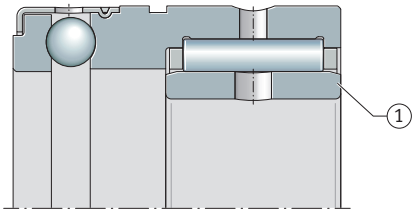
Needle roller/axial deep groove ball bearings NX and NX..-Z have a full complement ball rolling element set and an extremely low radial section height. Due to the compact radial dimensions, bearing arrangements can be achieved with very small shaft center distances, such as those that may be present in multi-spindle drilling machines. A sheet steel end cap secured to the radial bearing component grips the shaft locating washer of the axial bearing and holds the axial bearing component together. As a result, the bearings are self-retaining. The sheet metal caps for bearings NX have lubrication holes for oil lubrication.

47 Needle roller/axial deep groove ball bearings 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		

48 Needle roller/axial deep groove ball bearing NX..-Z with inner ring



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1	Inner ring IR		

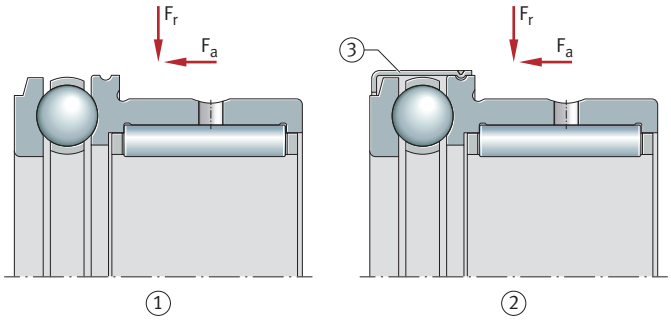
Type NKX, NKX..-Z

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. 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.

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.

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.

49 Needle roller/axial deep groove ball bearings without inner ring



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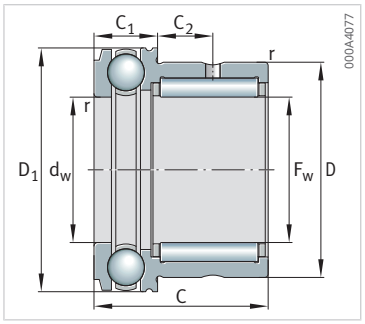
F_r	Radial load	F_a	Axial load
1	NKX, axial bearing component with ball and cage assembly, without end cap	2	NKX..-Z, axial bearing component with ball and cage assembly, with end cap, no lubrication holes in the cap
3	End cap		

16.1.1 Clarification of product tables

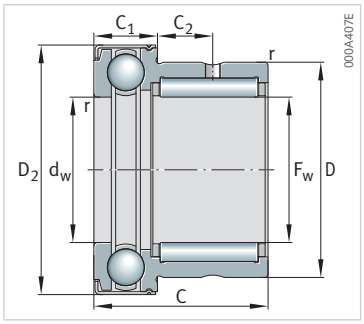
B	mm	Width
B_2	mm	Mounting width with snap ring
B_w	mm	Inner ring width
C_{0a}	N	Basic static load rating, axial
C_{0r}	N	Basic static load rating, radial
C_1	mm	Axial bearing component width
C_a	N	Basic dynamic load rating, axial
C_r	N	Basic dynamic load rating, radial
C_{ua}	N	Fatigue limit load, axial
C_{ur}	N	Fatigue limit load, radial
d	mm	Bore diameter
D	mm	Outside diameter
D_1	mm	Mounting diameter with snap ring
$D_{1\ max}$	mm	Max. outside diameter, flange
$D_{2\ max}$	mm	Max. outside diameter, flange
d_s	mm	Mounting dimension, shaft shoulder
d_w	mm	Inside diameter, shaft washer
G_1	mm	Lubrication hole spacing
G_2	mm	Lubrication hole spacing
L	mm	Lower limit deviation
m	kg	Mass
n_G	min^{-1}	Limiting speed
$n_{\vartheta r}$	min^{-1}	Thermal speed rating
$r_{a\ max}$	mm	Max. undercut radius
r_{min}	mm	Min. chamfer dimension
T	mm	Height
U	mm	Upper limit deviation

16.1.2 NKX, NKX..-Z

Without inner ring

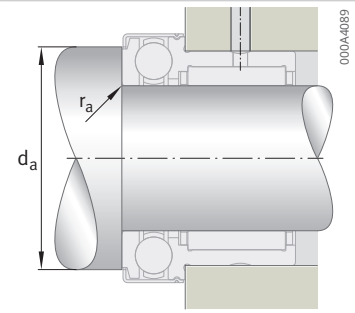


NKX



NKX..-Z

Designation	d	T	D	B L	B U	C_1	C_1 L	C_1 U	D_1	B_2	D_1 max	D_2 max	d_s
	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm
NKX10-TV-XL	10	23	19	−0.25	0	9	−0.2	0	–	–	24.1	24.1	19.7
NKX10-Z-TV-XL	10	23	19	−0.25	0	9	−0.2	0	–	–	25.2	25.2	19.7
NX10-Z-XL	10	18	19	−0.25	0	–	–	–	21.9	10	–	–	14.6
NKX12-Z-XL	12	23	21	−0.25	0	9	−0.2	0	–	–	27.2	27.2	21.7
NX12-Z-XL	12	18	21	−0.25	0	–	–	–	23.7	10	–	–	16.6
NX12-XL	12	18	21	−0.25	0	–	–	–	23.7	10	–	–	16.6
NKX12-XL	12	23	21	−0.25	0	9	−0.2	0	–	–	26.1	26.1	21.7
NX15-Z-XL	15	28	24	−0.25	0	–	–	–	26.5	12.2	–	–	19
NKX15-Z-XL	15	23	24	−0.25	0	9	−0.2	0	–	–	29.2	29.2	23.7
NKX15-XL	15	23	24	−0.25	0	9	−0.2	0	–	–	28.1	28.1	23.7
NX15-XL	15	28	24	−0.25	0	–	–	–	26.5	12.2	–	–	19
NKX17-Z-XL	17	25	26	−0.25	0	9	−0.2	0	–	–	31.2	31.2	25.7
NX17-XL	17	28	26	−0.25	0	–	–	–	28.5	12.2	–	–	21
NX17-Z-XL	17	28	26	−0.25	0	–	–	–	28.5	12.2	–	–	21
NKX17-XL	17	25	26	−0.25	0	9	−0.2	0	–	–	30.1	30.1	25.7
NKX20-XL	20	30	30	−0.25	0	10	−0.2	0	–	–	35.1	35.1	30.7
NKX20-Z-XL	20	30	30	−0.25	0	10	−0.2	0	–	–	36.2	36.2	30.7
NX20-XL	20	28	30	−0.25	0	–	–	–	33.6	12.2	–	–	25
NX20-Z-XL	20	28	30	−0.25	0	–	–	–	33.6	12.2	–	–	25
NKX25-XL	25	30	37	−0.25	0	11	−0.2	0	–	–	42.1	42.1	37.7
NKX25-Z-XL	25	30	37	−0.25	0	11	−0.2	0	–	–	43.2	43.2	37.7
NX25-Z-XL	25	30	37	−0.25	0	–	–	–	40.4	14.2	–	–	31.6
NX25-XL	25	30	37	−0.25	0	–	–	–	40.4	14.2	–	–	31.6
NKX30-XL	30	30	42	−0.25	0	11	−0.2	0	–	–	47.1	47.1	42.7
NX30-XL	30	30	42	−0.25	0	–	–	–	45.1	14.2	–	–	36.5
NX30-Z-XL	30	30	42	−0.25	0	–	–	–	45.1	14.2	–	–	36.5
NKX30-Z-XL	30	30	42	−0.25	0	11	−0.2	0	–	–	48.2	48.2	42.7
NKX35-XL	35	30	47	−0.25	0	12	−0.2	0	–	–	52.1	52.1	47.7
NX35-XL	35	30	47	−0.25	0	–	–	–	50.1	14.2	–	–	40.5
NX35-Z-XL	35	30	47	−0.25	0	–	–	–	50.1	14.2	–	–	40.5
NKX35-Z-XL	35	30	47	−0.25	0	12	−0.2	0	–	–	53.2	53.2	47.7
NKX40-Z-XL	40	32	52	−0.25	0	13	−0.2	0	–	–	61.2	61.2	55.7
NKX40-XL	40	32	52	−0.25	0	13	−0.2	0	–	–	60.1	60.1	55.7
NKX45-XL	45	32	58	−0.25	0	14	−0.2	0	–	–	65.2	65.2	60.5
NKX45-Z-XL	45	32	58	−0.25	0	14	−0.2	0	–	–	66.5	66.5	60.5
NKX50-Z-XL	50	35	62	−0.25	0	14	−0.2	0	–	–	71.5	71.5	65.5
NKX50-XL	50	35	62	−0.25	0	14	−0.2	0	–	–	70.2	70.2	65.5
NKX60-XL	60	40	72	−0.25	0	17	−0.2	0	–	–	85.2	85.2	80.5
NKX60-Z-XL	60	40	72	−0.25	0	17	−0.2	0	–	–	86.5	86.5	80.5
NKX70-Z-XL	70	40	85	−0.25	0	18	−0.2	0	–	–	96.5	96.5	90.5
NKX70-XL	70	40	85	−0.25	0	18	−0.2	0	–	–	95.2	95.2	90.5



G_1	G_2	d_w	r_{min}	$r_{a\ max}$	C_a	C_r	C_{0a}	C_{0r}	C_{ua}	C_{ur}	n_G	m
mm	mm	mm	mm	mm	N	N	N	N	N	N	min^{-1}	kg
6.5	6.5	10	0.3	0.3	10000	7000	14000	7800	690	1330	12400	0.034
6.5	6.5	10	0.3	0.3	10000	7000	14000	7800	690	1330	12400	0.036
4.7	4.7	10	0.3	0.3	4600	5000	7200	3700	330	730	11000	0.025
6.5	6.5	12	0.3	0.3	10300	10100	15400	11000	760	1950	11000	0.04
4.7	4.7	12	0.3	0.3	4850	5400	8200	4300	375	840	9500	0.028
4.7	4.7	12	0.3	0.3	4850	5400	8200	4300	375	840	9500	0.028
6.5	6.5	12	0.3	0.3	10300	10100	15400	11000	760	1950	11000	0.038
8	8	15	0.3	0.3	5600	12100	10400	12700	475	2360	8000	0.048
6.5	6.5	15	0.3	0.3	10500	12100	16800	12700	830	2360	9500	0.047
6.5	6.5	15	0.3	0.3	10500	12100	16800	12700	830	2360	9500	0.044
8	8	15	0.3	0.3	5600	12100	10400	12700	475	2360	8000	0.048
8	8	17	0.3	0.3	10800	13500	18200	15000	900	2800	8500	0.055
8	8	17	0.3	0.3	5800	13500	11500	15000	530	2800	7500	0.053
8	8	17	0.3	0.3	5800	13500	11500	15000	530	2800	7500	0.053
8	8	17	0.3	0.3	10800	13500	18200	15000	900	2800	8500	0.053
10.5	10.5	20	0.3	0.3	14200	18600	24700	23800	1220	4200	7500	0.083
10.5	10.5	20	0.3	0.3	14200	18600	24700	23800	1220	4200	7500	0.09
8	8	20	0.3	0.3	7000	14600	14700	17500	670	3300	6500	0.068
8	8	20	0.3	0.3	7000	14600	14700	17500	670	3300	6500	0.068
9.5	9.5	25	0.6	0.6	19600	21300	37500	30500	1840	5400	6000	0.125
9.5	9.5	25	0.6	0.6	19600	21300	37500	30500	1840	5400	6000	0.132
8	8	25	0.3	0.3	11100	16800	24300	22400	1110	4200	4900	0.115
8	8	25	0.3	0.3	11100	16800	24300	22400	1110	4200	4900	0.115
9.5	9.5	30	0.6	0.6	20400	25500	42000	36000	2090	6400	5000	0.141
10	10	30	0.3	0.3	11700	25500	28000	36000	1270	6400	4300	0.13
10	10	30	0.3	0.3	11700	25500	28000	36000	1270	6400	4300	0.13
9.5	9.5	30	0.6	0.6	20400	25500	42000	36000	2090	6400	5000	0.148
9	9	35	0.6	0.6	21200	27500	47000	41500	2340	7400	4600	0.163
10	10	35	0.3	0.3	12400	27500	32500	41500	1480	7400	3700	0.16
10	10	35	0.3	0.3	12400	27500	32500	41500	1480	7400	3700	0.16
9	9	35	0.6	0.6	21200	27500	47000	41500	2340	7400	4600	0.168
10	10	40	0.6	0.6	27000	29500	63000	47000	3100	8400	4000	0.208
10	10	40	0.6	0.6	27000	29500	63000	47000	3100	8400	4000	0.2
9	9	45	0.6	0.6	28000	31000	69000	53000	3400	9400	3600	0.252
9	9	45	0.6	0.6	28000	31000	69000	53000	3400	9400	3600	0.265
10	10	50	0.6	0.6	29000	43000	75000	74000	3750	12900	3300	0.3
10	10	50	0.6	0.6	29000	43000	75000	74000	3750	12900	3300	0.28
12	12	60	1	1	41500	47500	113000	90000	5600	15600	2800	0.36
12	12	60	1	1	41500	47500	113000	90000	5600	15600	2800	0.38
11	11	70	1	1	43000	50000	127000	92000	6300	16000	2400	0.52
11	11	70	1	1	43000	50000	127000	92000	6300	16000	2400	0.5

16.2 Needle roller/axial cylindrical roller bearings

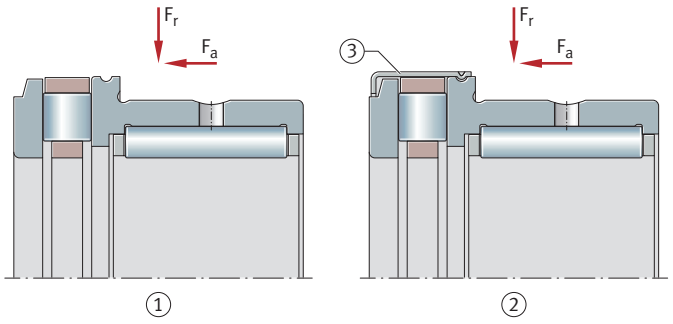
Type NKXR, NKXR..-Z

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. If the shaft cannot be used as a rolling bearing raceway, inner rings IR can be used instead. The suitable inner rings are given in the product tables and must be ordered in addition to the bearing. For lubrication, the outer ring of the radial bearing component has a lubrication groove and lubrication holes.

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.

A sheet steel end cap secured to the radial bearing component grips the shaft locating washer of the axial cylindrical roller bearing and holds the axial bearing component together. As a result, these bearings are self-retaining.

50 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		

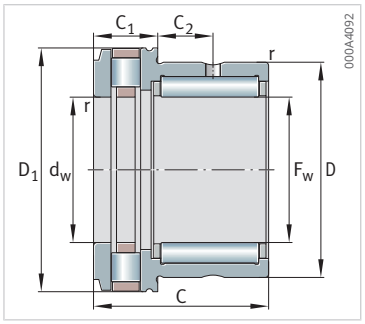
16.2.1 Clarification of product tables

B	mm	Width
C_{0a}	N	Basic static load rating, axial
C_{0r}	N	Basic static load rating, radial
C_1	mm	Axial bearing component width
C_a	N	Basic dynamic load rating, axial
C_r	N	Basic dynamic load rating, radial
C_{ua}	N	Fatigue limit load, axial
C_{ur}	N	Fatigue limit load, radial
d	mm	Bore diameter
D	mm	Outside diameter
$D_{1\ max}$	mm	Max. outside diameter, flange
$D_{2\ max}$	mm	Max. outside diameter, flange
d_s	mm	Mounting dimension, shaft shoulder
d_w	mm	Inside diameter, shaft washer
G_2	mm	Lubrication hole spacing
L	mm	Lower limit deviation
m	kg	Mass
n_G	min^{-1}	Limiting speed
$n_{\vartheta r}$	min^{-1}	Thermal speed rating
$r_{a\ max}$	mm	Max. undercut radius
r_{min}	mm	Min. chamfer dimension
T	mm	Height
U	mm	Upper limit deviation

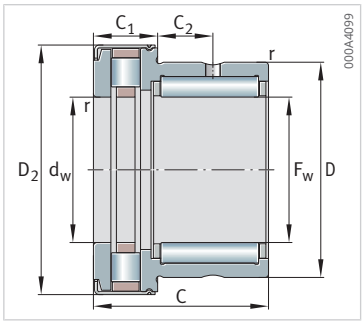
16.2.2 NKXR, NKXR..-Z

Single direction

Not for screw mounting

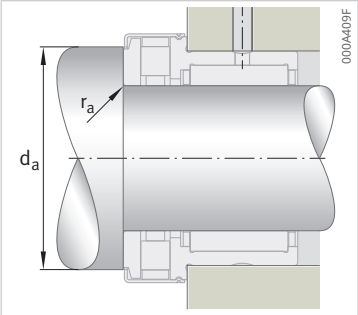


NKXR



NKXR..-Z

Designation	d	T	D	B L	B U	C_1	C_1 L	C_1 U	D_1 max	D_2 max	d_s
	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm
NKXR15-XL	15	23	24	−0.25	0	9	−0.2	0	28.1	–	23.7
NKXR15-Z-XL	15	23	24	−0.25	0	9	−0.2	0	–	29.2	23.7
NKXR17-Z-XL	17	25	26	−0.25	0	9	−0.2	0	–	31.2	25.7
NKXR17-XL	17	25	26	−0.25	0	9	−0.2	0	30.1	–	25.7
NKXR20-XL	20	30	30	−0.25	0	10	−0.2	0	35.1	–	30.7
NKXR20-Z-XL	20	30	30	−0.25	0	10	−0.2	0	–	36.2	30.7
NKXR25-XL	25	30	37	−0.25	0	11	−0.2	0	42.1	–	37.7
NKXR25-Z-XL	25	30	37	−0.25	0	11	−0.2	0	–	43.2	37.7
NKXR30-Z-XL	30	30	42	−0.25	0	11	−0.2	0	–	48.2	42.7
NKXR30-XL	30	30	42	−0.25	0	11	−0.2	0	47.1	–	42.7
NKXR35-XL	35	30	47	−0.25	0	12	−0.2	0	52.1	–	47.7
NKXR35-Z-XL	35	30	47	−0.25	0	12	−0.2	0	–	53.2	47.7
NKXR40-Z-XL	40	32	52	−0.25	0	13	−0.2	0	–	61.2	55.7
NKXR40-XL	40	32	52	−0.25	0	13	−0.2	0	60.1	–	55.7
NKXR45-Z-XL	45	32	58	−0.25	0	14	−0.2	0	–	66.5	60.6
NKXR45-XL	45	32	58	−0.25	0	14	−0.2	0	65.2	–	60.6
NKXR50-XL	50	35	62	−0.25	0	14	−0.2	0	70.2	–	65.5
NKXR50-Z-XL	50	35	62	−0.25	0	14	−0.2	0	–	71.5	65.5



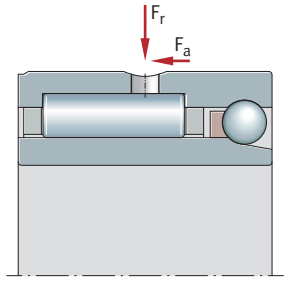
G_2	d_w	r_{min}	$r_{a\ max}$	C_a	C_r	C_{0a}	C_{0r}	C_{ua}	C_{ur}	n_G	$n_{\vartheta r}$	m
mm	mm	mm	mm	N	N	N	N	N	N	min^{-1}	min^{-1}	kg
6.5	15	0.3	0.3	14400	12100	28500	12700	4050	2360	13000	6500	0.042
6.5	15	0.3	0.3	14400	12100	28500	12700	4050	2360	13000	6500	0.045
8	17	0.3	0.3	16000	13500	33500	15000	4700	2800	12000	5500	0.053
8	17	0.3	0.3	16000	13500	33500	15000	4700	2800	12000	5500	0.05
10.5	20	0.3	0.3	25000	18600	53000	23800	7500	4200	10000	4200	0.08
10.5	20	0.3	0.3	25000	18600	53000	23800	7500	4200	10000	4200	0.084
9.5	25	0.6	0.6	33500	21300	76000	30500	7200	5400	8500	3400	0.12
9.5	25	0.6	0.6	33500	21300	76000	30500	7200	5400	8500	3400	0.125
9.5	30	0.6	0.6	35500	25500	86000	36000	8200	6400	7500	2900	0.141
9.5	30	0.6	0.6	35500	25500	86000	36000	8200	6400	7500	2900	0.135
9	35	0.6	0.6	39000	27500	101000	41500	9600	7400	6500	2500	0.157
9	35	0.6	0.6	39000	27500	101000	41500	9600	7400	6500	2500	0.165
10	40	0.6	0.6	56000	29500	148000	47000	14800	8400	6000	2000	0.214
10	40	0.6	0.6	56000	29500	148000	47000	14800	8400	6000	2000	0.204
9	45	0.6	0.6	59000	31000	163000	53000	16300	9400	5000	1900	0.26
9	45	0.6	0.6	59000	31000	163000	53000	16300	9400	5000	1900	0.244
10	50	0.6	0.6	62000	43000	177000	74000	17700	12900	4800	1700	0.268
10	50	0.6	0.6	62000	43000	177000	74000	17700	12900	4800	1700	0.288

16.3 Needle roller/angular contact ball bearings

Type NKIA, NKIB

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. 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. The bearings have a low radial section height and are suitable for high speeds. 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.

51 Needle roller/angular contact ball bearing NKIA



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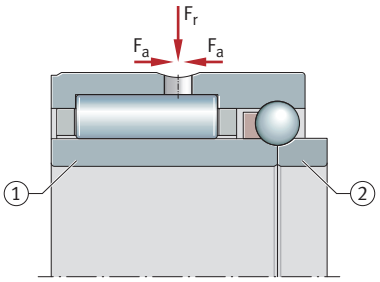
F_r	Radial load	F_a	Axial load

52 Needle roller/angular contact ball bearing NKIB



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F_r	Radial load	F_a	Axial load
1	Wide inner ring	2	Narrow inner ring

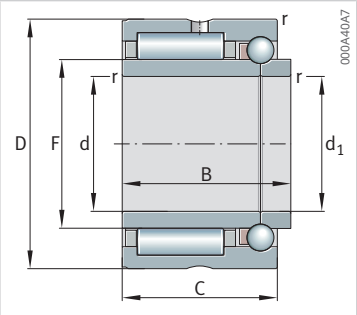
16.3.1 Clarification of product tables

B	mm	Width
B_o	mm	Outer ring width
C_{0a}	N	Basic static load rating, axial
C_{0r}	N	Basic static load rating, radial
C_a	N	Basic dynamic load rating, axial
C_r	N	Basic dynamic load rating, radial
C_{ua}	N	Fatigue limit load, axial
C_{ur}	N	Fatigue limit load, radial
d	mm	Bore diameter
D	mm	Outside diameter
F_w	mm	Inner enveloping circle diameter
m	kg	Mass
n_G	min^{-1}	Limiting speed
$n_{\vartheta r}$	min^{-1}	Thermal speed rating
r_{min}	mm	Min. chamfer dimension

16.3.2 NKIB

With inner ring

Single direction



NKIB

Designation	F_w	D	B	B_o	d	r_{min}	C_a	C_r
	mm	mm	mm	mm	mm	mm	N	N
NKIB59/22-XL	28	39	25	23	22	0.3	5300	26000
NKIB5901-XL	16	24	17.5	16	12	0.3	2700	8600
NKIB5902-XL	20	28	20	18	15	0.3	2900	12000
NKIB5903-XL	22	30	20	18	17	0.3	3150	12400
NKIB5904-XL	25	37	25	23	20	0.3	4900	23700
NKIB5905-XL	30	42	25	23	25	0.3	5400	26500
NKIB5906-XL	35	47	25	23	30	0.3	5900	28500
NKIB5907-XL	42	55	30	27	35	0.6	7400	35500
NKIB5908-XL	48	62	34	30	40	0.6	9200	48500
NKIB5909-XL	52	68	34	30	45	0.6	9600	51000
NKIB5910-XL	58	72	34	30	50	0.6	10100	53000
NKIB5911-XL	63	80	38	34	55	1	12100	65000
NKIB5912-XL	68	85	38	34	60	1	12400	68000
NKIB5913-XL	72	90	38	34	65	1	12800	69000
NKIB5914-XL	80	100	45	40	70	1	16800	95000

C_{0a}	C_{0r}	C_{ua}	C_{ur}	n_G	$n_{\vartheta r}$	m
N	N	N	N	min^{-1}	min^{-1}	kg
8600	29500	395	5400	16100	12000	0.122
3450	8300	157	1660	23600	21000	0.043
4200	13600	191	2470	21600	17000	0.052
4900	14600	222	2650	20600	15000	0.058
7400	25500	335	4700	17200	14000	0.107
9300	31500	420	5800	14600	12000	0.134
11200	35500	510	6600	12700	10000	0.151
14900	50000	680	9600	10900	9000	0.247
19400	67000	880	11700	9600	7500	0.32
21400	73000	970	12900	8700	7000	0.38
24300	80000	1110	14100	8000	6500	0.385
29500	100000	1340	17600	7300	6000	0.555
32000	108000	1450	19100	6800	5500	0.595
34000	112000	1560	19900	6300	5500	0.64
44500	156000	2020	28000	5800	4900	0.985

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