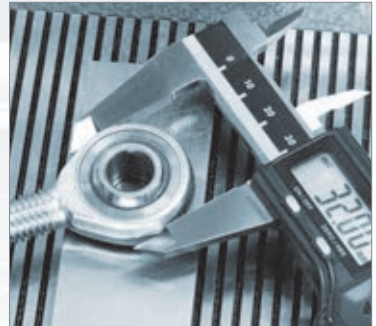
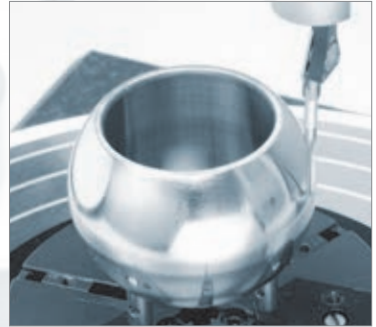

PRODUCT CATALOG

SPHERICAL PLAIN BEARINGS

Spherical Plain Bearings - Rod Ends - Standardized Fasteners

In-house Manufacturing.
Individually Optimized Bearings.
Significant Price Advantage.



SIMPLY
WELL-
ENGINEERED





PRODUCT CATALOG

SPHERICAL PLAIN BEARINGS

Spherical Plain Bearings -
Rod Ends - Standardized Fasteners

INDEX



LFD SPHERICAL PLAIN BEARING ENGINEERING

LFD Bearings - Simply well-engineered	8
Service and consulting	10
Maintenance: Minimize customer down time	10
Automized production lines	11
Development laboratory	11
Quality management based on German standards	12
Logistics with worldwide storage capacity	13
LFD spherical plain bearings in standard versions and special designs	14
LFD spherical plain bearings in the high quality range	14
Special solutions in spherical plain bearing engineering	15
Applications for spherical plain bearing technology	16
Spherical plain bearings in mobile working machines	17
Dry construction in the steel industry	17
Agricultural engineering	18

1.0 TECHNICAL BASICS OF SPHERICAL PLAIN BEARINGS

1.1 Technical part - General notes	22
1.2 Installation & maintenance / Illustrations for Installation	24
1.3 Combination list	27
1.4 Tolerances for radial spherical plain bearings	28
1.5 Types of construction	29
1.6 Series	30
1.7 Accuracies	30
1.8 Bearing selection	31
1.9 LFD spherical plain bearings product offering	32

2.0 SPHERICAL PLAIN BEARINGS - requiring maintenance

2.1 Radial spherical plain bearing DIN ISO 12240-1 series E Sliding contact surface: steel/steel - GE ... E / GE ... ES / GE ... ES-2RS	36
2.2 Radial spherical plain bearing DIN ISO 12240-1 series G Sliding contact surface: steel/steel - GE ... FO / GE ... FO-2RS	38
2.3 Radial spherical plain bearing – steel/steel - GE ... HO-2RS	40
2.4 Radial spherical plain bearing DIN ISO 12240-1 series W Sliding contact surface: steel/steel - GE ... LO	42
2.5 Angular contact spherical plain bearing DIN ISO 12240-2 Sliding contact surface: steel/steel - GE ... SX	44
2.6 Axial spherical plain bearing DIN ISO 12240-3 Sliding contact surface: steel/steel - GE ... AX	46

3.0 SPHERICAL PLAIN BEARINGS - maintenance-free

3.1 Radial spherical plain bearing DIN ISO 12240-1 series E Sliding contact surface: hard chromium/PTFE composite - GE ... UK	50
3.2 Radial spherical plain bearing DIN ISO 12240-1 series E Sliding contact surface: hard chromium/PTFE fabric - GE ... UK-2RS	52
3.3 Radial spherical plain bearing DIN ISO 12240-1 series G Sliding contact surface: hard chromium/PTFE composite - GE ... FW	54
3.4 Radial spherical plain bearing DIN ISO 12240-1 series G Sliding contact surface: hard chromium/PTFE fabric - GE ... FW-2RS	56
3.5 Angular contact spherical plain bearing DIN ISO 12240-2 Sliding contact surface: steel/PTFE - GE ... SW	58
3.6 Axial spherical plain bearing DIN ISO 12240-3 Sliding contact surface: steel/PTFE - GE ... AW	60

4.0 ROD ENDS - requiring maintenance

4.1 Rod end DIN ISO 12240-4 series E Sliding contact surface: steel/steel - EI ... / EI ...-2RS	64
4.2 Rod end DIN ISO 12240-4 series E Sliding contact surface: steel/steel - EA ... / EA ...-2RS	66
4.3 Rod end DIN ISO 12240-4 series K + CETOP Sliding contact surface: steel/bronze - KI	68
4.4 Rod end DIN ISO 12240-4 series K Sliding contact surface: steel/bronze - KA	70

5.0 ROD ENDS - maintenance-free

5.1	Rod end DIN ISO 12240-4 series E Sliding contact surface: hard chromium/PTFE composite - EI ... D	74
5.2	Rod end DIN ISO 12240-4 series E Sliding contact surface: hard chromium/PTFE fabric - EI ... D-2RS	76
5.3	Rod end DIN ISO 12240-4 series E Sliding contact surface: hard chromium/PTFE composite - EA ... D	78
5.4	Rod end DIN ISO 12240-4 series E Sliding contact surface: hard chromium/PTFE fabric - EA ... D-2RS	80
5.5	Rod end DIN ISO 12240-4 series K + CETOP Sliding contact surface: steel/PTFE - KI ... D	82
5.6	Rod end DIN ISO 12240-4 series K Sliding contact surface: steel/PTFE - KA ... D	84

6.0 HYDRAULIC ROD ENDS - requiring maintenance

6.1	Hydraulic rod end clampable Sliding contact surface: steel/steel - GIHRK ... DO	88
6.2	Hydraulic rod end clampable DIN ISO 8132 Sliding contact surface: steel/steel - GIHN-K ... LO	90
6.3	Hydraulic rod end - heavy version clampable with spherical plain bearing GE ... ES Sliding contact surface: steel/steel - IGAS ...	92
6.4	Hydraulic rod end clampable DIN ISO 8133 Sliding contact surface: steel/steel - GIHO-K ... DO	94
6.5	Hydraulic rod end for screwing on Sliding contact surface: steel/steel - GIHR ... DO	96
6.6	Hydraulic rod end for welding on Sliding contact surface: steel/steel - GF ... LO	98
6.7	Hydraulic rod end for welding on Sliding contact surface: steel/steel - GF ... DO	100
6.8	Hydraulic rod end for welding on Sliding contact surface: steel/steel - GK ... DO	102

7.0 STANDARDIZED FASTENERS

7.1	Fork bearing block 90° type CBB DIN ISO 8132	106
7.2	Fork bearing block 180° type CBA DIN ISO 8132	108
7.3	Bolt type PP DIN ISO 8132	110
7.4	Bolt type PPA DIN ISO 8132	111
7.5	Clevis type RC DIN ISO 8132	112
7.6	Axle guard type A DIN ISO 8132/8133	113
7.7	Pivot pin bearing block type TB DIN ISO 8132	114
7.8	Weld plate type TBP	116
7.9	Weld plate type TBK	118
7.10	Flanges for piston rods type RF DIN ISO 8132	119
7.11	Swivel bearing block type LD-N DIN ISO 8132/8133	120
7.12	Bolt type BA case hardened DIN ISO 8132/8133	122
7.13	Bolt type BS case hardened (not standardized)	123
7.14	Pivot pin bearing block type SD	124

8.0 LFD BEARINGS PRODUCT OFFERING

8.1	LFD deep groove ball bearings	128
8.2	LFD taper roller bearings	128
8.3	LFD spherical roller bearings	128
8.4	LFD cylindrical roller bearings	128
8.5	LFD bearing units	129
8.6	LFD plumber blocks	129
8.7	LFD spherical plain bearings	129

We have made every effort to ensure that all data has been compiled and checked thoroughly, however, we accept no responsibility for any errors or incompleteness. © Copyright by LFD Wälzlager GmbH. Any reproduction, in whole or in part, is only permitted with our prior written permission. 4nd edition 2018.



SIMPLY WELL-ENGINEERED



Whether it's conveyor technology, drive technology, mechanical and plant engineering, pumps and compressors, automotive and agricultural technology, or the sports and leisure industry—industries around the world appreciate high quality LFD rolling bearings manufactured according to German standards.

SERVICE AND CONSULTING

The LFD Group has been a family business since its founding in 1978. Our team of professionals provide seamless solutions for even the most sophisticated client needs. Our range of services is constantly growing because we have the ability to tailor our products around the niche concepts of any industry.

It is a client’s individual requirements—terms of service life, noise level, load capacity, maintenance, etc.—that define the design of an LFD bearing.

LFD also accommodates special operating conditions, such as very high or very low temperatures, speeds, or forces.

Our engineering staff gives competent and thorough advice on the following subjects:

- Selection of fits
- Mounting/Adjustment
- Materials
- Seals
- Lubricants
- Bearing suitability
- Special bearings
- Bearing design



MAINTENANCE: MINIMIZE CUSTOMER DOWN TIME

Customers rely on the fact that with servicing the existing cylinder can be accurately re-installed in the same configuration. The rod ends are removed and exchanged if necessary. LFD provides both completely assembled rod ends, but is also able to produce special solutions themselves and deliver them to the respective maintenance operation. This minimizes downtime.

AUTOMIZED PRODUCTION LINES

100 million deep groove ball bearings per year, produced on automatized production lines, make up the core business of the LFD Group. Our new production site for tapered and cylindrical roller bearings in Germany offers the best control possible for all quality requirements.

In addition LFD offers bearing units, spherical roller bearings, and spherical plain bearings.



DEVELOPMENT LABORATORY

Our LFD development laboratory at our headquarters in Dortmund has the latest measuring technologies which enable us to easily document every new development for our clients and promptly implement the optimizations.

The standard model of LFD rolling bearings is designed to cover a wide range of applications. Our engineering team acts as advisors to a client during the early design phase, adjusting the constituents of the bearing to particular operating conditions—resulting in another cost advantage for the client.

QUALITY MANAGEMENT BASED ON GERMAN STANDARDS

Having our own automatized production lines guarantee rolling bearings with high quality throughout. The aim of the LFD Group is to provide the ideal bearings for all sectors. All products are manufactured in accordance to DIN standards and their specific requirements.

The quality management system begins at the steel works. The groundwork for ensuring a high level of utilization and a long service life lies in the high-quality bearing steel and its remarkable degree of purity. All deliveries to our factories are strictly controlled. Quality management according to German standards is a clear benefit for all production sectors of the LFD Group. That is the reason why LFD bearings are exceptionally resilient even under harsh conditions.



LOGISTICS WITH WORLDWIDE STORAGE CAPACITY

The LFD Group includes the central warehouse in Germany, as well as further storage facilities in the United States, Italy and China. Our worldwide representation ensures the fastest response and delivery times possible for LFD customers.

Due to strong partners in logistics with branches across the world, we provide our customers with further benefits. Being close to our customers has always been and will always be important for the LFD Group.



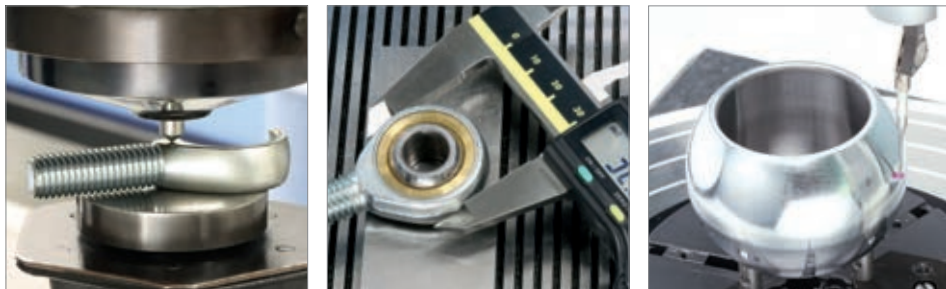
LFD SPHERICAL PLAIN BEARINGS IN STANDARD VERSIONS AND SPECIAL DESIGNS

We supply mechanical engineering and hydraulic cylinder manufacturing. A spherical plain bearing tilts, pivots, turns, and oscillates, which sets it apart from other bearings. The product range spans from rod ends of the K or E series (DIN ISO 12240-4) with a diameter of just 4 mm to the largest spherical plain bearing (DIN ISO 12240-1) with a diameter of 420 mm. In addition, special solutions produced in small quantities are possible at any time – the individual LFD components are easily combined.

The LFD spherical plain bearing catalog gives an overview of all current spherical plain bearings and rod ends, as well as a variety of standardized fasteners.

LFD SPHERICAL PLAIN BEARINGS IN THE HIGH QUALITY RANGE

LFD has its own quality management system according to ISO 9001:2015. We have, for instance, carried out a benchmarking with our rod ends of the K series. In doing so, we have tested our KA 12 D rod end against five comparable rod ends of the same size from competitors. The result: the LFD rod end ranks in the high quality range.



SPECIAL SOLUTIONS IN SPHERICAL PLAIN BEARING ENGINEERING

There are many specific requirements. So far, our portfolio of special solutions comprises more than 60 different series with inner diameters up to 90 mm. To give you a better overview, we have prepared a "combination list" on page 27 of this catalog, detailing which bearing can be fitted into which rod end.

Special solutions can be very individual and tailored to the client. Our customers trust in our know-how and collaborate with us. It is precisely this flexibility and expertise that gives us a competitive edge over competitors.



Example – special solution: extract the GE 50 DO in order to install a GE 50 FW. The reason: the outer dimensions of the GE 50 DO are larger than those of a GE 50 DO.

Example – special solution: rod end without bearing, the spherical plain bearing and the appropriate snap rings provided separately.





APPLICATIONS FOR SPHERICAL PLAIN BEARING TECHNOLOGY

The range of current spherical plain bearings made of metal ranges from 6 to 300 mm. Core areas are the industrial sectors agricultural and forestry equipment, construction machinery, all types of commercial vehicles, railways, lifting and transport equipment, steel, textile and paper industries, as well as the wide range of power generation.

In the field of commercial vehicles, spherical plain bearings are used for external circuits, steering, stabilizers and for moving heavy cargo doors, which are frequently associated with hydraulic cylinders. Trailer technology and earth moving equipment are also relevant in this context.

In the renewable energy sector, there are further applications of spherical plain bearing technology: for targeting photo voltaic systems toward the sun, in the rotor blades of wind turbines, but also in hydroelectric and biogas plants.

Spherical plain bearings are also used in structures such as bridges, earthquake-proof buildings, and weirs and locks. The latter form protective structures preventing damage from natural disasters by having a regulating effect, protecting us humans from major disasters. The integrated locks offer shipping an unimpeded route on the waterways. But also in the private sphere, there are numerous examples, such as in shock absorbers for bicycles, doors, cabinets, and model building.



SPHERICAL PLAIN BEARINGS IN MOBILE WORKING MACHINES

Spherical plain bearings are used in all applications where misalignment must be balanced and extremely high force loads have to be absorbed. A key area is the use in mobile working machines in the industrial sectors such as agricultural and forestry machinery, construction machinery, all types of commercial vehicles as well as lifting and handling vehicles where for example LFD spherical plain bearings are located in external circuits, steering and stabilizers.



DRY CONSTRUCTION IN THE STEEL INDUSTRY

LFD rod ends ensure proper management of the heat shields. Due to the long boom arms, the bearings must withstand considerable loads.

That requires not only high load-bearing capacity, but also resistance against harsh operating conditions with excessive heat, lots of dust and gases. The mechanical load is also extreme. The customer considers the LFD spherical plain bearings as an optimal solution for this application.





AGRICULTURAL ENGINEERING

Depending on the type of production, a large number of highly specialized equipment and machinery is used in agriculture. Whether in tillage, harvesters and balers or in animal husbandry - in many of these machines LFD spherical plain bearing technology is used to perform the varied motion sequences. In this catalog you will find the appropriate product for just about every application where spherical plain bearing technology is needed. Many spherical plain bearings or rod ends are installed in hydraulic cylinders. Of particular interest are also the special parts that we produce for agricultural engineering. LFD is one of the few suppliers worldwide in this specialist area.



Tillage and harvesters

Tillage machines are subjected to enormous loads, which are caused by the type of terrain and extreme weather conditions. With the high-power loads due to bumps, exposure to dust, sand and even rocks, the LFD spherical plain bearing technology has proven its worth.

In the field of hydraulic cylinder technology, the use of LFD spherical plain bearings and rod ends is broad. Usually, the rod ends are bolted or welded on rods and piston crowns. Folding cylinders are used for adjusting the working width of sprayer booms, hay tedders, seeders and grass harrows.

The track width adjustment of countless vehicles is controlled by means of hydraulic cylinders. Suspension cylinders with spherical plain bearings control height adjustment. Equipped with rod ends, plow turning cylinders and ball grippers are driven hydraulically as well. Spherical plain bearings are also sometimes installed in chassis shock absorbers. Furthermore, rod ends are used in turnbuckles.

Reversible plows, for example, are equipped with Vario transmissions. Integrated in the frame, they allow the stepless adjustment of the cutting width. Often, hydraulic nonstop-systems provide the necessary maneuverability. For this purpose, LFD rod ends are the right choice. Forged plowshares and tempered moldboards additionally ensure robust machinery.



Economic livestock production

LFD is also positioned in the automated world of livestock farming. Sorting systems for eggs, for instance, work with adjusting rods, which are fitted with rod ends.



1.0

1.0 TECHNICAL BASICS OF SPHERICAL PLAIN BEARINGS

- 1.1 Technical part - General Notes 22
- 1.2 Installation & maintenance / Illustrations for Installation 24
- 1.3 Combination list 27
- 1.4 Tolerances for radial spherical plain bearings 28
- 1.5 Types of construction 29
- 1.6 Series 30
- 1.7 Accuracies 30
- 1.8 Bearing selection 31
- 1.9 LFD spherical plain bearings Product Offering 32

1.1 TECHNICAL PART - GENERAL NOTES

Bearing designation

The spherical plain bearing / rod end designation consists of standard elements as follows:

1. Prefix: defines the type
2. Bore diameter: indicates the internal diameter d [mm] of the bearing
3. Suffix: detailed specification of the type

Prefixes

GE:	Spherical plain bearing
EI :	Rod end, series E with internal thread
EA :	Rod end, series E with external thread
KI:	Rod end, series K with internal thread
KA:	Rod end, series K with external thread
GK/GF:	Hydraulic weldable rod ends
GIHRK:	Hydraulic rod end, clampable
GIHN-K/GIHO-K:	Hydraulic rod end
GIHR:	Hydraulic rod end, screwable
IGAS:	Hydraulic rod end heavy execution, clampable

Suffixes

-C2:	Clearance smaller than normal (CN) ** only on request!
-CN :	Normal clearance (not specifically indicated)
-C3:	Clearance larger than normal (CN) ** only on request!
-RS:	Unilateral seal
-2RS:	Double-sided seal
-AX:	Axial spherical plain bearing
-SX:	Angular contact spherical plain bearing
-SW:	Angular contact spherical plain bearing, maintenance-free

Abbreviations used

A	[mm]	=	Position of the lubrication groove on the outer ring
B	[mm]	=	Inner ring width
C	[mm]	=	Outer ring width
C	[kN]	=	Dynamic load rating of the bearing
C ₀	[kN]	=	Static load rating of the bearing
C ₁	[mm]	=	Width of the rod end head
C ₂	[mm]	=	Width of the rod end shank
d	[mm]	=	Bore diameter
D	[mm]	=	Outside diameter
d _K	[mm]	=	Ball spherical diameter
D ₁	[-]	=	Abutment dimensions spherical plain bearings
d ₂	[mm]	=	Axial inner ring length
d ₃	[mm]	=	Piston diameter
d ₄	[mm]	=	Base/shank diameter
d ₅	[mm]	=	Thread of the clamping screw
G	[mm]	=	Thread
L ₁	[mm]	=	Centre height
l ₃	[mm]	=	Thread length
l ₄	[mm]	=	Rod end length
l ₅	[mm]	=	Height of the hexagonal key size
L ₅	[mm]	=	Rod end width at the shank
m	[kg]	=	Mass/weight
MA	[mm]	=	Tightening torque for locking screw
r _{1smin}	[mm]	=	Minimum chamfer radius on the inner ring
r _{2smin}	[mm]	=	Minimum chamfer radius on the outer ring
W	[-]	=	Hexagonal key size
α	[°]	=	Angle of tilt

1.2 INSTALLATION & MAINTENANCE

Although this is not obvious at first sight, spherical plain bearings are precision components. Both the outside diameter and the bore diameter of the bearing and the ball contact surfaces are made with high precision. For this reason, the bearings are to be handled accordingly. The following provides you with advice on how to handle spherical plain bearings:

A. Bearings should remain in the package until the final installation. Frequent removal from the packaging increases the susceptibility to corrosion and can easily lead to external damage.

B. Install the bearings only with suitable mounting tools. Cylindrical tools are particularly suitable; having a maximum contact surface, they minimize surface damage.

C. The mounting tolerances specified in the technical dimension tables are merely recommendations. The tasks of the alignment seat include, among others: pushing back the generally blown, slightly non-circular outer ring; guiding the bearing safely; ensuring the sliding movement of the ball contact surfaces of the bearing; and, where necessary, partially absorbing axial forces caused by misalignment or external influences.

D. The bearings are to be centrally installed. Bearings that are placed obliquely can affect the alignment seating and lead to an unexpected loosening of the alignment seat.

E. The mounting and dismounting forces should be applied exclusively through the ring to be assembled. This means that when mounting the bearing into the housing, the assembly forces should be applied via the outer ring, while when mounting the bearing onto the shaft, the assembly forces should be applied via the inner ring.

F. Direct blows to the bearing should be avoided! This could cause damage, affecting the adjustment surfaces, or even destroy the entire bearing.

G. Bearings requiring maintenance must be greased after installation.

- For the sliding contact surface steel/steel, in general Lithium soap multipurpose grease is recommended with approx. 3% MoS₂ (Molybdenum disulfide), NLGI consistency number 2.

- For the sliding contact surface steel/bronze in general a lithium soap multipurpose grease is recommended. Initially, the bearings can be greased once, in such a way that the lubricant feeds and the bearing are completely filled with grease. Later, a smaller quantity of grease lubrication is sufficient, because only the grease chamber has to be replenished. It is impossible to generalize the relubrication interval. Rather, the relubrication interval depends on many factors (e.g. ambient temperature, bearing load, bearing speed, frequency of use, time, type of grease, operating standards, etc.). In principle, there is no objection to using oils or pastes for lubricating spherical plain bearings. However, the pressure transmitting ability of the lubricants needs to be considered, as well as their facilitating capacities. Furthermore, it should be noted that, by and large, the parameters to determine the optimal spherical plain bearings are based on grease lubricated bearings.

H. Maintenance-free bearings normally do not require any lubrication. However, bearings with the sliding contact surface steel or hard chromium/ PTFE composite or PTFE film permit grease lubrication. Maintenance-free spherical plain bearings with a PTFE fabric sliding contact surface, on the other hand, allow absolutely no lubrication.

I. Spherical plain bearings are to be protected, according to the conditions acting on the bearings, against contamination and corrosion. The 2RS sealing protects spherical plain bearings only against dry, coarse dust. If the bearing is exposed to other, less favorable atmospheric conditions, external sealing measures may be necessary.

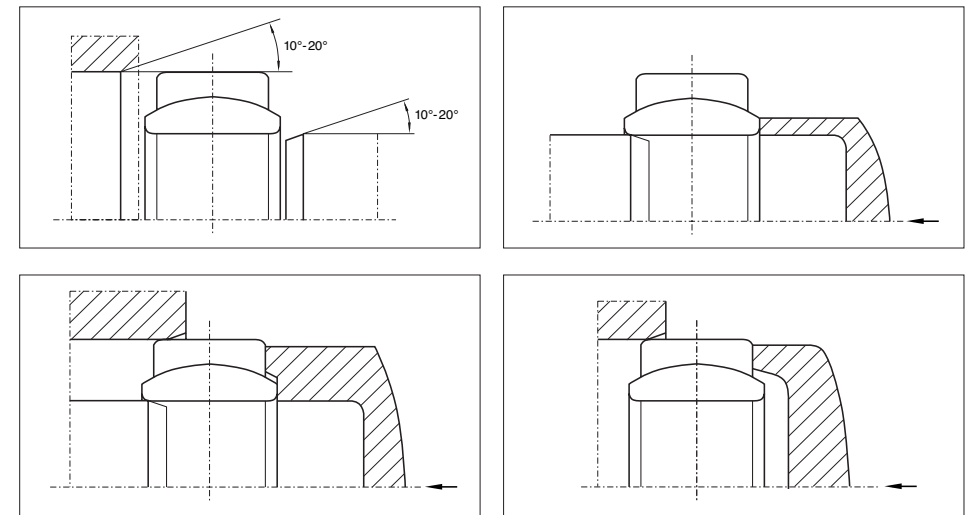
J. Maintenance intervals can be determined only with great difficulty. In general, the bearing behavior should undergo monitoring at least once per year. Criteria for spherical plain bearings can be unusually high wear, temperature increase; appearance of corrosion, noise or sluggishness.

Sketches illustrating the correct mounting method

The mounting preparations include a visual inspection, as well as the verification of the dimensional and form accuracy of the bearing seats and the existence of centering chamfers in the range of $15^\circ \pm 5^\circ$. By all means, the centering chamfers on the counter partner for guide bushes should be rounded at the transition to the cylindrical part.

A combined impact cap is required when the installation force is simultaneously passed through the outer and inner ring faces while synchronously mounting on a shaft and in a housing.

Light oiling of the mating surfaces is allowed to ease installation. However, regarding maintenance-free bearings, no oil should reach the bearing function zone. Direct blows on the bearing rings are not allowed! To ensure proper installation, appropriate mounting aids are to be prepared.



1.3 COMBINATION LIST

This list provides guidance in identifying combinations other than the standard rod end combinations. All nonstandard combinations are supplied only on request. If you cannot find the desired combination in this list, please contact us.



Rod end series	Spherical plain bearing series					
	GE ... ES (-2RS)	GE ... HO-2RS	GE ... LO	GE ... FO (-2RS)	GE ... UK (-2RS)	GE ... FW (-2RS)
GF ... DO	ES is standard, -2RS also poss.	Installation possible	Installation possible	Installation possible, please note special feature**	Installation possible	Installation possible, please note special feature**
GK ... DO	ES is standard, -2RS also poss.	Installation technically not possible at LFD	Installation technically not possible at LFD	Installation technically not possible at LFD	Installation possible	Installation technically not possible at LFD
GIHR-K ... DO	ES is standard, -2RS also poss.	Installation possible	Installation possible	Installation possible, please note special feature**	Installation possible	Installation possible, please note special feature**
GIHR ... DO	ES is standard, -2RS also poss.	Installation possible	Installation possible	Installation possible, please note special feature**	Installation possible	Installation possible, please note special feature**
IGAS ...	ES is standard, -2RS also poss.	Installation possible	Installation possible	Installation possible, please note special feature**	Installation possible	Installation possible, please note special feature**
GIHO-K ... DO	ES is standard, -2RS also poss.	Installation possible	Installation possible	Installation possible, please note special feature**	Installation possible	Installation possible, please note special feature**
GIHNK ... LO	Installation possible	Installation possible	LO is standard	Installation possible, please note special feature**	Installation possible	Installation possible, please note special feature**

The interchangeability of spherical plain bearings in rod ends is feasible in principle, if the outside diameter D of the bearings and their outer ring width C are identical. The subsequent exchange of spherical plain bearings in various rod ends may - as a result of a modified fit - lead to a reduction of the axial and / or radial location!

When maintenance-free spherical plain bearings are combined with rod ends which, in their standard version, have a grease nipple, it remains in place.

** When installing GE ... FO and GE ... FW or GE ... FO-2RS and GE ... FW-2RS spherical plain bearings, the following is to be observed: The respective rod end must always be one size larger than the bore of the bearing.

Example: If a GE 30 FO is to be incorporated into a rod end of the GF ... DO series, then a GF 35 DO has to be used. The outer ring dimension "D" (refer to LFD catalog) of the spherical plain bearing is always the decisive factor. For a GE 30 FO, the dimension "D" is 55 mm. A GE 35 ES is fitted into the GF 35 DO. The dimension "D" of this bearing is also 55 mm, so that the GE 30 FO can be installed here.

1.4 TOLERANCES FOR RADIAL SPHERICAL PLAIN BEARINGS

Inner ring

d [mm]		Δ dmp [μm]		Δ dmp* [μm]		Vdp [μm]	Vdmp [μm]	Vdp* [μm]		Δ Bs [μm]		Δ Bs* [μm]	
over	incl.	max	min	max	min	max	max	max	max	max	min	max	min
-	18	0	-8	+18	0	8	6	18	14	0	-120	0	180
18	30	0	-10	+21	0	10	8	21	16	0	-120	0	210
30	50	0	-12	+25	0	12	9	25	19	0	-120	0	250
50	80	0	-15	+30	0	15	11	30	22	0	-150	0	300
80	120	0	-20	+35	0	20	15	35	26	0	-200	0	350
120	180	0	-25	+40	0	25	19	40	30	0	-250	0	400
180	250	0	-30	+46	0	30	23	46	35	0	-300	0	460
250	315	0	-35	+52	0	35	26	52	39	0	-350	0	520
315	400	0	-40	+57	0	40	30	57	43	0	-400	0	570
400	500	0	-45	-	-	45	34	-	-	0	-450	-	-
500	630	0	-50	-	-	50	38	-	-	0	-500	-	-

Specified with * for series GE ... LO

Outer ring

D [mm]		Δ Dmp [μm]		VDp [μm]	Vdmp [μm]	Δ Cs [μm]	
over	incl.	max	min	max	max	max	min
-	18	0	-8	10	6	0	-240
18	30	0	-9	12	7	0	-240
30	50	0	-11	15	8	0	-240
50	80	0	-13	17	10	0	-300
80	120	0	-15	20	11	0	-400
120	150	0	-18	24	14	0	-500
150	180	0	-25	33	19	0	-500
180	250	0	-30	40	23	0	-600
250	315	0	-35	47	26	0	-700
315	400	0	-40	53	30	0	-800
400	500	0	-45	60	34	0	-900
500	630	0	-50	67	38	0	-1000
630	800	0	-75	100	56	0	-1100
800	1000	0	-100	135	75	0	-1200

ROD END DIN ISO 12240-4 series K + CETOP

Inner ring

d [mm]		Δ dmp [μm]		Δ Bs [μm]	
over	incl.	max	min	max	min
-	6	+12	0	0	-100
6	10	+15	0	0	-100
10	18	+18	0	0	-100
18	30	+21	0	0	-100

Outer ring

D [mm]		Δ Dmp [μm]		Δ Cs [μm]	
over	incl.	max	min	max	min
10	18	0	-11	+100	-100
18	30	0	-13	+100	-100
30	50	0	-16	+100	-100
50	60	0	-19	+100	-100

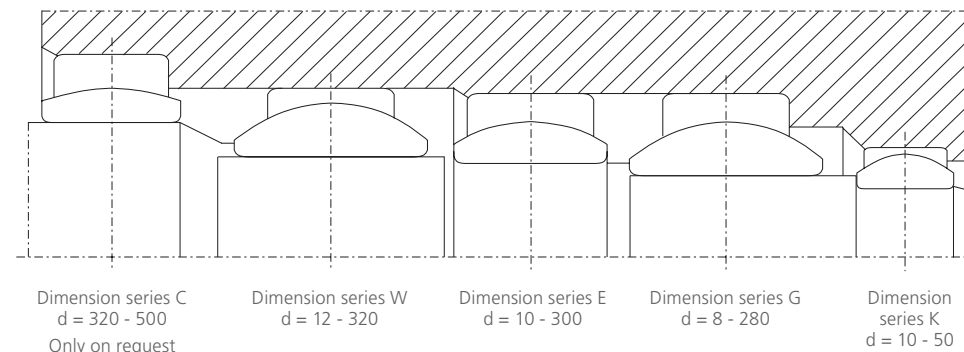
1.5 TYPES OF CONSTRUCTION

Radial spherical plain bearings according to DIN ISO 12240-1 are standardized, ready to install machine elements. They consist of an outer ring with a cylindrical outer / outer surface and a concave inner surface, and an inner ring with cylindrical bore and spherical outer / sliding surface.

As the name implies, spherical plain bearings can perform spherical movements that are also referred to as joint flexibility. This refers to movements in the circumferential directions (pivoting or rotary movements) and/or movements transversely to the bearing axis (tilting).

Misalignments of the corresponding bearing points due to manufacturing inaccuracies, foundation settlements, component deformations etc. are easily compensated without load rating loss due to edge pressure. Acting forces are introduced torque-free into the bearing parts.

LFD delivers the construction / dimensional series E, C, G and K also as maintenance-free radial spherical plain bearings according to DIN ISO 12240-1.



Dimension series C
d = 320 - 500
Only on request

Dimension series W
d = 12 - 320

Dimension series E
d = 10 - 300

Dimension series G
d = 8 - 280

Dimension series K
d = 10 - 50

1.6 SERIES

Series E

according to DIN ISO 12240-1 (standard series) is made with $d = 10\text{--}300$ mm.

The radial spherical plain bearings with the designation GE ... WK in the range of $d = 10\text{--}30$ mm optionally have an unhardened ST outer ring, which, including a sliding layer, is formed around the inner ring.

Series C

according to DIN ISO 12240-1 is made with $d = 320\text{--}500$ mm.

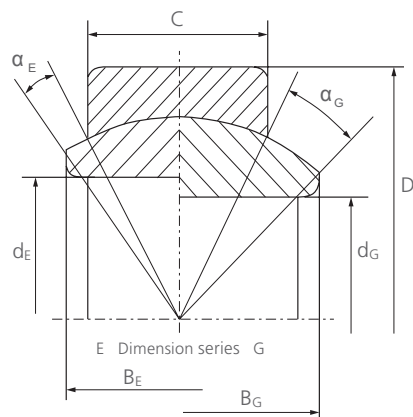
The radial spherical plain bearings, also called large spherical plain bearings, have the designation GE ... CW. The sliding layer is anchored in a radially and symmetrically split, and axially bolted steel outer ring with corresponding strength.

The hardened inner ring of bearing steel is hard chromium plated on the spherical surface. The series C is a continuation of the series E (standard series) beyond $d = 300$ mm.

Series G

according to DIN ISO 12240-1 is made with $d = 8\text{--}280$ mm.

Using identical outer rings, the series G is different to the series E in having a widened inner ring for a greater tilt range; the bearing bore, however, is always a stage smaller (see picture right).



Series K

according to DIN ISO 12240-1 is made with $d = 10\text{--}50$ mm.

Series W

according to DIN ISO 12240-1 is made with $d = 12\text{--}320$ mm.

1.7 ACCURACIES

The main measurements and the dimensional and form accuracies, meet DIN ISO 12240-1. The dimensions and tolerances are arithmetic mean values that are tested according to ISO 8015.

Blasted or split outer ring

On the blasted or split outer ring, testing of dimensions and tolerances is no longer possible. However, production obviously complies with the specifications according to the dimension tables.

The slight eccentricities of the outer rings after blasting are absorbed once mounted into a properly crafted housing bore.

1.8 BEARING SELECTION

The question of which spherical plain bearing to choose cannot be answered in a general way. In fact, more detailed information regarding application and application environment is required.

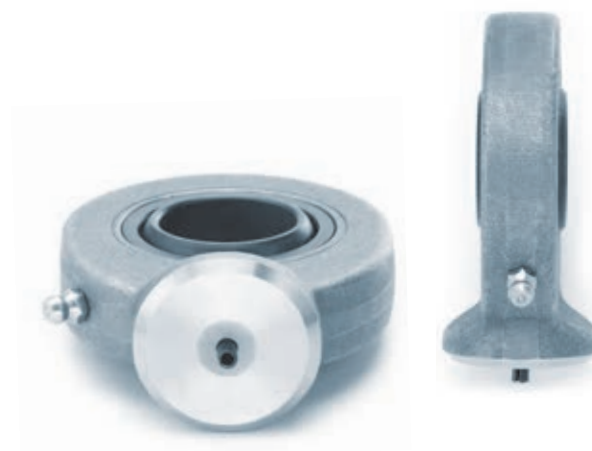
The following information is essential to choose the right spherical plain bearing:

- Spherical plain bearing loadings
- Type of loading (axial, radial forces, moments...)
- Application geometry (shaft diameter, shaft length, housing bore...)
- Type of movement (rotating or oscillating)
- Ambient temperature
- Type of lubrication (grease, oil lubrication...)

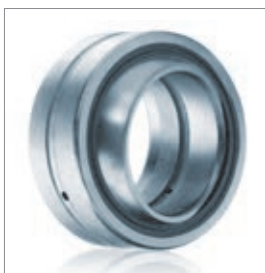
These are the main criteria for selecting a bearing.

Furthermore, we need data regarding the application environment and/or environmental influences, in order to choose the right spherical plain bearings. The fact that a spherical plain bearing will be used in water or in a vacuum is as important as information regarding load or speed.

All information provided in this catalog is nonbinding, it only shows a selection of our options. Therefore, all required features have to be specified when placing an order.



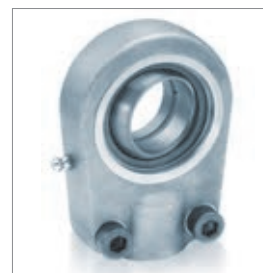
1.9 LFD SPHERICAL PLAIN BEARINGS PRODUCT OFFERING



LFD spherical plain bearings requiring maintenance

the series GE ... E, GE ... ES, GE ... ES-2RS, GE ... FO, GE ... FO-2RS,
GE ... HO-2RS, GE ... LO, GE ... SX, GE ... AX

- Sliding contact surface: steel/steel
- Radial spherical plain bearings, axial spherical plain bearings,
angular contact spherical plain bearings
- Other designations: GE ... DO, GE ... DO-2RS, GE ... GS, GE ... GS-2RS, GEH ... ES,
GEH ... ES-2RS, GEG ... ES, GEG ... ES-2RS, GEEM ... ES-2RS, GEM ... ES-2RS,
GEEW ... ES, GAC ... S, GX ... S



LFD hydraulic rod ends

the series GIHR-K ... DO, GIHN-K ... LO, GIHO-K ... DO, IGAS ...,
GIHR ... DO, GF ... DO, GK ... DO

- Sliding contact surface: steel / steel
- screwable, weldable
- Other designations: TAPR ... U / IHGK ... U / SIR ... ES, TAPR ... CE / IHGK ... CE /
SIQG ... ES, SIGEW ... ES, TAPR ... S / IHGK ... S / CGAS ... / WGAS,
TAPR ... N / IHGK ... N, TS ... N / IHAGK ... N / SF ... ES, SCF ... ES,
TS ... C / IHAGK ... C / SC ... ES, SK ... ES



LFD spherical plain bearings maintenance free

the series GE ... UK, GE ... UK-2RS, GE ... FW, GE ... FW-2RS, GE ... SW,
GE ... AW

- Sliding contact surface: hard chromium / PTFE fabric or composite
- Radial spherical plain bearings, axial spherical plain bearings,
angular contact spherical plain bearings
- Other designations: GE ... EC, GE ... EC-2RS, GE ... C, GE ... TE-2RS, GE ... TA-2RS,
GE ... ET-2RS, GE ... XT-2RS, GEH ... C, GEG ... ET-2RS, GEG ... XT-2RS, GAC ... T,
GX ... T



LFD standardized fasteners

the series CBB ..., CBA ..., PP ..., PPA ..., RC ..., TB ..., TBP ..., TBK ..., RF ...,
LD-N ..., BA ..., BS ... SD ...

- Forked bearing block CBB ... 90° / CBA ... 180°
- Bolts PP... / PPA ... / BA ... / BS ...
- Fork head RC ...
- Axle guard A ...
- Pivot pin bearing block TB ... / LD-N ... / SD ...
- Weld plate TBP ... / TBK ...
- Swiveling bearing block RF ...



LFD Rod ends requiring maintenance + free

the series EI ..., EI ...-2RS, EA ..., EA ...-2RS, KI ... / KA ..., KI ... nach CETOP,
EI ... D, EI ... D-2RS, EA ... D, EA ... D-2RS, KI ... D, KA ... D, KI ... D nach
CETOP

- Sliding contact surface: steel / steel, steel / bronze, hard chromium / PTFE
composite, hard chromium / PTFE fabric, steel / PTFE
- Series E and K
- Other designations: GIR ... DO, GIR ... DO-2RS, GAR ... DO, GAR ... DO-2RS,
GIKFR ... PB, GAKFR ... PB, PHS ..., POS ..., GIR ... UK, GIR ... UK-2RS, GAR ... UK,
GAR ... UK-2RS, GIKFR ... PW, GAKFR ... PW, PHS ... EC, POS ... EC

LFD products

Agricultural parts: upper links, ball joints, ball sockets

Cylinder bases

Clevises DIN 71752, DIN 71751

Angle joints DIN 71802

Hydraulic safety systems: double check valves, pipe rupture protection

Bushings on request



2.0

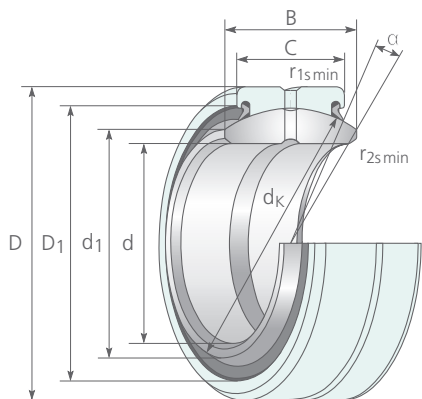
2.0 SPHERICAL PLAIN BEARINGS - requiring maintenance

2.1 Radial spherical plain bearing DIN ISO 12240-1 series E Sliding contact surface: steel/steel - GE ... E / GE ... ES / GE ... ES-2RS	36
2.2 Radial spherical plain bearing DIN ISO 12240-1 series G Sliding contact surface: steel/steel - GE ... FO / GE ... FO-2RS	38
2.3 Radial spherical plain bearing Sliding contact surface: steel/steel - GE ... HO-2RS	40
2.4 Radial spherical plain bearing DIN ISO 12240-1 series W Sliding contact surface: steel/steel - GE ... LO	42
2.5 Angular contact spherical plain bearing DIN ISO 12240-2 Sliding contact surface: steel/steel - GE ... SX	44
2.6 Axial spherical plain bearing DIN ISO 12240-3 Sliding contact surface: steel/steel - GE ... AX	46

- Special dimensions on request
- Spherical plain bearing GE...PB according to DIN ISO 12240-1 on request
- Large spherical plain bearings starting at Ø 320mm on request
- Other clearance groups on request

2.1 RADIAL SPHERICAL PLAIN BEARING DIN ISO 12240-1 series E

Sliding contact surface: steel/steel - GE ... E / GE ... ES / GE ... ES-2RS



Alternative designations

There can be no guarantee made for the exact equality of the bearing between the different manufacturers!

GE ... DO (-2RS)
GE ... E (-2RS)

Allowable operating temperature: -60° C to 130° C (use up to 200 °C without seals possible, from 150 °C with a reduced bearing service life). Other limitations of the lubricant must be observed!

Lubricant: Lithium soap multipurpose grease with minimum 3% MoS₂ additive (for restrictions please ask the respective lubricant supplier)

Materials: Outer ring: Roller bearing steel (**GCr 15**), hardened, manganese phosphate
Inner ring: Roller bearing steel (**GCr 15**), hardened, manganese phosphate
Seal: Plastic

Installation conditions GE ... E / GE ... ES / GE ... ES-2RS

Material	Valid for shafts Ø	Surface roughness	Installation adjustment according to clearance group		
			C2	CN	C3
Shaft made of steel	d ≤ 300 mm	≤ Rz 10	j6	m6	m6
Housing made of steel	d ≤ 300 mm	Rz 10 to Rz 16	K7	M7	M7
Housing made of light metal	d ≤ 300 mm	Rz 10 to Rz 16	M7	N7	N7

Clearance groups [µm] GE ... E / GE ... ES / GE ... ES-2RS

d [mm]	6 ≤ d ≤ 12	12 < d ≤ 20	20 < d ≤ 35	35 < d ≤ 60	60 < d ≤ 90	90 < d ≤ 140	140 < d ≤ 240	240 < d ≤ 300
C2	8 to 32	10 to 40	12 to 50	15 to 60	18 to 72	18 to 85	18 to 100	18 to 110
CN	32 to 68	40 to 82	50 to 100	60 to 120	72 to 142	85 to 165	100 to 192	110 to 214
C3	68 to 104	82 to 124	100 to 150	120 to 180	142 to 212	165 to 245	192 to 284	214 to 318

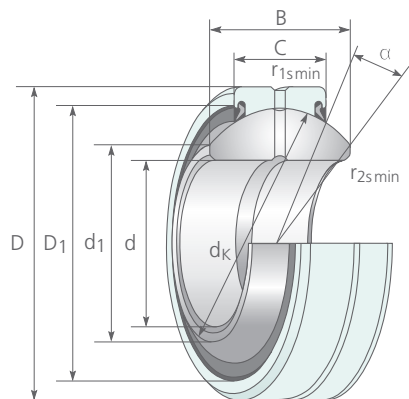
Clearance groups other than CN are available on request

Designation	Main dimensions								Mass m [kg]	Load ratings		Abutment dimensions	
	d [mm]	D [mm]	B [mm]	C [mm]	d _K [mm]	α [°]	r _{1smin} [mm]	r _{2smin} [mm]		C [kN]	C ₀ [kN]	d ₁ [mm]	D ₁ [mm]
GE 6 E*)	6	14	6	4	10,0	13	0,3	0,3	0,004	3,4	17,0	8	9,6
GE 8 E*)	8	16	8	5	13,0	15	0,3	0,3	0,008	5,5	27,0	10	12,5
GE 10 E*)	10	19	9	6	16,0	12	0,3	0,3	0,011	8,1	40,0	13	15,5
GE 12 E*)	12	22	10	7	18,0	11	0,3	0,3	0,015	10,0	53,0	15	17,5
GE 15 ES ...-2RS	15	26	12	9	22,0	8	0,3	0,3	0,027	16,0	84,0	18	21,0
GE 16 ES ...-2RS	16	30	14	10	25,0	10	0,3	0,3	0,043	21,0	106,0	20	24,0
GE 17 ES ...-2RS	17	30	14	10	25,0	10	0,3	0,3	0,041	21,0	106,0	20	24,0
GE 20 ES ...-2RS	20	35	16	12	29,0	9	0,3	0,3	0,066	30,0	146,0	24	27,5
GE 25 ES ...-2RS	25	42	20	16	35,5	7	0,6	0,6	0,119	48,0	240,0	29	33,0
GE 30 ES ...-2RS	30	47	22	18	40,7	6	0,6	0,6	0,153	62,0	310,0	34	38,0
GE 35 ES ...-2RS	35	55	25	20	47,0	6	0,6	1,0	0,233	79,0	399,0	39	44,5
GE 40 ES ...-2RS	40	62	28	22	53,0	7	0,6	1,0	0,306	99,0	495,0	45	51,0
GE 45 ES ...-2RS	45	68	32	25	60,0	7	0,6	1,0	0,427	127,0	637,0	50	57,0
GE 50 ES ...-2RS	50	75	35	28	66,0	6	0,6	1,0	0,546	156,0	780,0	55	63,0
GE 60 ES ...-2RS	60	90	44	36	80,0	6	1,0	1,0	1,040	245,0	1220,0	66	75,0
GE 70 ES ...-2RS	70	105	49	40	92,0	6	1,0	1,0	1,550	313,0	1560,0	77	87,0
GE 80 ES ...-2RS	80	120	55	45	105,0	6	1,0	1,0	2,310	400,0	2000,0	88	99,0
GE 90 ES ...-2RS	90	130	60	50	115,0	5	1,0	1,0	2,750	488,0	2240,0	98	108,0
GE 100 ES ...-2RS	100	150	70	55	130,0	7	1,0	1,0	4,450	607,0	3030,0	109	123,0
GE 110 ES ...-2RS	110	160	70	55	140,0	6	1,0	1,0	4,820	654,0	3270,0	120	134,0
GE 120 ES ...-2RS	120	180	85	70	160,0	6	1,0	1,0	8,050	950,0	4750,0	130	150,0
GE 140 ES ...-2RS	140	210	90	70	180,0	7	1,0	1,0	11,020	1070,0	5350,0	150	173,0
GE 160 ES ...-2RS	160	230	105	80	200,0	8	1,0	1,0	14,010	1360,0	6800,0	170	191,0
GE 180 ES ...-2RS	180	260	105	80	225,0	6	1,0	1,0	18,650	1530,0	7650,0	192	219,0
GE 200 ES ...-2RS	200	290	130	100	250,0	7	1,1	1,1	28,300	2120,0	10600,0	212	239,0
GE 220 ES ...-2RS	220	320	135	100	275,0	8	1,1	1,1	35,510	2320,0	11600,0	238	267,0
GE 240 ES ...-2RS	240	340	140	100	300,0	8	1,1	1,1	39,910	2550,0	12700,0	265	295,0
GE 260 ES ...-2RS	260	370	150	110	325,0	7	1,1	1,1	51,540	3030,0	15190,0	285	319,0
GE 280 ES ...-2RS	280	400	155	120	350,0	6	1,1	1,1	65,060	3570,0	17850,0	310	342,0
GE 300 ES ...-2RS	300	430	165	120	375,0	7	1,1	1,1	78,070	3800,0	19100,0	330	370,0

Further dimensions on request, *) Relubrication not possible

2.2 RADIAL SPHERICAL PLAIN BEARING DIN ISO 12240-1 series G

Sliding contact surface: steel/steel - GE ... FO / GE ... FO -2RS



Alternative designations

There can be no guarantee made for the exact equality of the bearing between the different manufacturers!

- GE ... FO (-2RS)
- GEH ... ES (-2RS)
- GEG ... E
- GEG ... ES (-2RS)

Allowable

operating temperature: -60° C to 130° C (inserts to 200° C without seals and from +150° C with loss of bearing service life possible). Other limitations of the lubricant must be observed!

Lubricant:

Lithium soap multipurpose grease with minimum 3% MoS₂ additive (for restrictions please ask the respective lubricant supplier)

Materials:

Outer ring: Roller bearing steel (**GCr 15**), hardened, manganese phosphate
 Inner ring: Roller bearing steel (**GCr 15**), hardened, manganese phosphate
 Seal: Plastic

Installation conditions GE ... FO / GE ... FO -2RS

Material	Valid for shafts Ø	Surface roughness	Installation adjustment according to clearance group		
			C2	CN	C3
Shaft made of steel	d ≤ 280 mm	≤ Rz 10	j6	m6	m6
Housing made of steel	d ≤ 280 mm	Rz 10 to Rz 16	K7	M7	M7
Housing made of light metal	d ≤ 280 mm	Rz 10 to Rz 16	M7	N7	N7

Clearance groups [µm] GE ... FO / GE ... FO -2RS

d [mm]	6 ≤ d ≤ 10	10 < d ≤ 17	17 < d ≤ 30	30 < d ≤ 50	50 < d ≤ 80	80 < d ≤ 120	120 < d ≤ 220	220 < d ≤ 280
C2	8 to 32	10 to 40	12 to 50	15 to 60	18 to 72	18 to 85	18 to 100	18 to 110
CN	32 to 68	40 to 82	50 to 100	60 to 120	72 to 142	85 to 165	100 to 192	110 to 214
C3	68 to 104	82 to 124	100 to 150	120 to 180	142 to 212	165 to 245	192 to 284	214 to 318

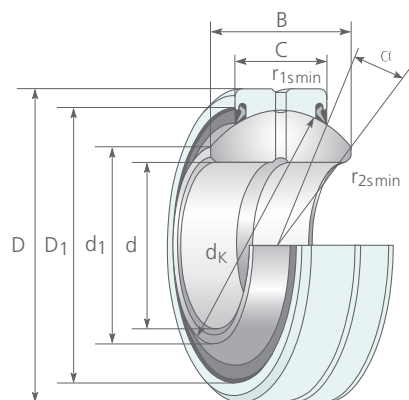
Clearance groups other than CN are available on request

Designation	Main dimensions							Mass m [kg]	Load ratings		Abutment dimensions		
	d [mm]	D [mm]	B [mm]	C [mm]	dk [mm]	α [°]	r1smin [mm]		r2smin [mm]	C [kN]	C0 [kN]	d1 [mm]	D1 [mm]
GE 6 FO*)	6	16	9	5	13,0	21	0,3	0,3	0,006	5,5	27,0	9	12,5
GE 8 FO*)	8	19	11	6	16,0	21	0,3	0,3	0,014	8,15	40,0	11	15,5
GE 10 FO*)	10	22	12	7	18,0	18	0,3	0,3	0,021	10,0	53,0	13	17,5
GE 12 FO*)	12	26	15	9	22,0	18	0,3	0,3	0,033	16,0	84,0	16	21,0
GE 15 FO ...-2RS	15	30	16	10	25,0	16	0,3	0,3	0,049	21,0	106,0	19	24,0
GE 17 FO ...-2RS	17	35	20	12	29,0	19	0,3	0,3	0,083	30,0	146,0	21	27,5
GE 20 FO ...-2RS	20	42	25	16	35,5	17	0,3	0,6	0,153	48,0	240,0	24	33,0
GE 25 FO ...-2RS	25	47	28	18	40,7	17	0,6	1,0	0,203	62,0	310,0	29	38,0
GE 30 FO ...-2RS	30	55	32	20	47,0	17	0,6	1,0	0,304	79,0	399,0	34	44,5
GE 35 FO ...-2RS	35	62	35	22	53,0	16	0,6	1,0	0,408	99,0	495,0	39	51,0
GE 40 FO ...-2RS	40	68	40	25	60,0	17	0,6	1,0	0,542	127,0	637,0	44	57,0
GE 45 FO ...-2RS	45	75	43	28	66,0	15	0,6	1,0	0,713	156,0	780,0	50	63,0
GE 50 FO ...-2RS	50	90	56	36	80,0	17	0,6	1,0	1,140	245,0	1220,0	57	75,0
GE 60 FO ...-2RS	60	105	63	40	92,0	17	1,0	1,0	2,050	313,0	1560,0	67	87,0
GE 70 FO ...-2RS	70	120	70	45	105,0	16	1,0	1,0	3,010	400,0	2000,0	77	99,0
GE 80 FO ...-2RS	80	130	75	50	115,0	14	1,0	1,0	3,640	488,0	2450,0	87	108,0
GE 90 FO ...-2RS	90	150	85	55	130,0	15	1,0	1,0	5,220	607,0	3030,0	98	123,0
GE 100 FO ...-2RS	100	160	85	55	140,0	14	1,0	1,0	6,050	654,0	3270,0	110	134,0
GE 110 FO ...-2RS	110	180	100	70	160,0	12	1,0	1,0	9,680	950,0	4750,0	122	150,0
GE 120 FO ...-2RS	120	210	115	70	180,0	16	1,0	1,0	14,010	1070,0	5350,0	132	173,0
GE 140 FO ...-2RS	140	230	130	80	200,0	16	1,0	1,0	19,010	1360,0	6800,0	151	191,0
GE 160 FO ...-2RS	160	260	135	80	225,0	16	1,0	1,1	24,700	1530,0	7650,0	176	219,0
GE 180 FO ...-2RS	180	290	155	100	250,0	14	1,1	1,1	35,900	2120,0	10600,0	196	239,0
GE 200 FO ...-2RS	200	320	165	100	275,0	15	1,1	1,1	45,280	2320,0	11600,0	220	267,0
GE 220 FO ...-2RS	220	340	175	100	300,0	16	1,1	1,1	51,120	2550,0	12700,0	243	295,0
GE 240 FO ...-2RS	240	370	190	110	325,0	15	1,1	1,1	65,120	3030,0	15190,0	263	319,0
GE 260 FO ...-2RS	260	400	205	120	350,0	15	1,1	1,1	82,440	3570,0	17850,0	283	342,0
GE 280 FO ...-2RS	280	430	210	120	375,0	15	1,1	1,1	97,210	3800,0	19100,0	310	370,0

Further dimensions on request, *) Relubrication not possible

2.3 RADIAL SPHERICAL PLAIN BEARING

Sliding contact surface: steel/steel - GE ... HO-2RS



Alternative designations

There can be no guarantee made for the exact equality of the bearing between the different manufacturers!

- GE ... FO (-2RS)
- GEH ... ES (-2RS)
- GEG ... E
- GEG ... ES (-2RS)

Allowable

operating temperature: -60° C to 130° C (inserts to 200° C without seals and from +150° C with loss of bearing service life possible). Other limitations of the lubricant must be observed!

Lubricant:

Lithium soap multipurpose grease with minimum 3% MoS₂ additive (for restrictions please ask the respective lubricant supplier)

Materials:

Outer ring: Roller bearing steel (**GCr 15**), hardened, manganese phosphate
 Inner ring: Roller bearing steel (**GCr 15**), hardened, manganese phosphate
 Seal: Plastic

Installation conditions GE ... HO-2RS

Material	Valid for shafts Ø	Surface roughness	Installation adjustment according to clearance group		
			C2	CN	C3
Shaft made of steel	d ≤ 80 mm	≤ Rz 10	j6	m6	m6
Housing made of steel	d ≤ 80 mm	Rz 10 to Rz 16	K7	M7	M7
Housing made of light metal	d ≤ 80 mm	Rz 10 to Rz 16	M7	N7	N7

Clearance groups [µm] GE ... HO-2RS

d [mm]	17 ≤ d ≤ 20	20 < d ≤ 35	35 < d ≤ 60	60 < d ≤ 80
C2	10 to 40	12 to 50	15 to 60	18 to 72
CN	40 to 82	50 to 100	60 to 120	72 to 142
C3	82 to 124	100 to 150	120 to 180	142 to 212

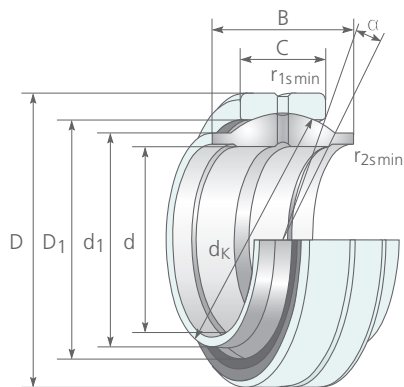
Clearance groups other than CN are available on request

Designation	Main dimensions								Mass m [kg]	Load ratings		Abutment dimensions	
	d [mm]	D [mm]	B [mm]	C [mm]	dk [mm]	≈ α [°]	r1smin [mm]	r2smin [mm]		C [kN]	C ₀ [kN]	≈ d ₁ [mm]	≈ D ₁ [mm]
GE 17 HO-2RS	17	30	21	10	25,0	3	0,2	0,3	0,055	21	106	21,0	24,0
GE 20 HO-2RS	20	35	24	12	29,0	3	0,2	0,3	0,073	30	146	24,0	27,5
GE 25 HO-2RS	25	42	29	16	35,5	3	0,2	0,6	0,130	48	240	29,0	33,0
GE 30 HO-2RS	30	47	30	18	40,7	3	0,2	1,0	0,170	62	310	34,2	38,0
GE 35 HO-2RS	35	55	35	20	47,0	3	0,3	1,0	0,250	80	400	40,0	44,5
GE 40 HO-2RS	40	62	38	22	53,0	3	0,3	1,0	0,350	100	500	45,0	51,0
GE 45 HO-2RS	45	68	40	25	60,0	3	0,3	1,0	0,450	127	640	51,5	57,0
GE 50 HO-2RS	50	75	43	28	66,0	3	0,3	1,0	0,600	156	780	56,5	63,0
GE 60 HO-2RS	60	90	54	36	80,0	3	0,3	1,0	1,150	245	1220	67,7	75,0
GE 70 HO-2RS	70	105	65	40	92,0	3	0,3	1,0	1,650	315	1560	78,0	87,0
GE 80 HO-2RS	80	120	74	45	105,0	3	0,3	1,0	2,450	400	2000	90,0	99,0

Further dimensions on request, *) Relubrication not possible

2.4 RADIAL SPHERICAL PLAIN BEARING DIN ISO 12240-1 series W

Sliding contact surface: steel/steel - GE ... LO



Alternative designations

There can be no guarantee made for the exact equality of the bearing between the different manufacturers!

GEG ... ES
GEEW ... ES

Allowable

operating temperature: -60° C to 130° C (inserts to 200° C without seals and from +150° C with loss of bearing service life possible). Other limitations of the lubricant must be observed!

Lubricant:

Lithium soap multipurpose grease with minimum 3% MoS₂ additive (for restrictions please ask the respective lubricant supplier)

Materials:

Outer ring: Roller bearing steel (**GCr 15**), hardened, manganese phosphate
Inner ring: Roller bearing steel (**GCr 15**), hardened, manganese phosphate
Seal: Plastic

Installation conditions GE ... LO

Material	Valid for shafts Ø	Surface roughness	Installation adjustment according to clearance group		
			C2	CN	C3
Shaft made of steel	d ≤ 80 mm	≤ Rz 10	r6	r6	r6
Housing made of steel	d ≤ 80 mm	Rz 10 to Rz 16	K7	M7	M7
Housing made of light metal	d ≤ 80 mm	Rz 10 to Rz 16	M7	N7	N7

Clearance groups [µm] GE ... LO

d [mm]	12 ≤ d ≤ 12	12 < d ≤ 20	20 < d ≤ 35	35 < d ≤ 60	60 < d ≤ 90	90 < d ≤ 140	140 < d ≤ 240	240 < d ≤ 300	300 < d ≤ 320
C2	8 to 32	10 to 40	12 to 50	15 to 60	18 to 72	18 to 85	18 to 100	18 to 110	18 to 135
CN	32 to 68	40 to 82	50 to 100	60 to 120	72 to 142	85 to 165	100 to 192	110 to 214	135 to 261
C3	68 to 104	82 to 124	100 to 150	120 to 180	142 to 212	165 to 245	192 to 284	214 to 318	261 to 387

Clearance groups other than CN are available on request

Designation	Main dimensions								Mass m [kg]	Load ratings		Abutment dimensions	
	d [mm]	D [mm]	B [mm]	C [mm]	d _K [mm]	α [°]	r _{1smin} [mm]	r _{2smin} [mm]		C [kN]	C ₀ [kN]	d ₁ [mm]	D ₁ [mm]
GE 12 LO*	12	22	12	7	18,0	4	0,3	0,3	0,021	10,0	53,0	15,5	17,5
GE 16 LO	16	28	16	9	23,0	4	0,3	0,3	0,034	17,6	88,0	20,0	23,0
GE 20 LO	20	35	20	12	29,0	4	0,3	0,6	0,070	30,0	146,0	25,0	27,5
GE 25 LO	25	42	25	16	35,5	4	0,6	1,0	0,130	48,0	240,0	30,5	33,0
GE 32 LO	32	52	32	18	44,0	4	0,6	1,0	0,200	67,0	335,0	38,0	42,0
GE 40 LO	40	62	40	22	53,0	4	0,6	1,0	0,340	100,0	500,0	46,0	51,0
GE 50 LO	50	75	50	28	66,0	4	0,6	1,0	0,580	156,0	780,0	57,0	63,0
GE 63 LO	63	95	63	36	83,0	4	0,6	1,0	1,300	255,0	1270,0	71,5	78,0
GE 70 LO	70	105	70	40	92,0	4	0,6	1,0	1,700	315,0	1560,0	79,0	87,0
GE 80 LO	80	120	80	45	105,0	4	1,0	1,0	2,500	400,0	2000,0	91,0	99,0
GE 90 LO	90	130	90	50	115,0	4	1,0	1,0	3,200	488,0	2450,0	99,0	108,0
GE 100 LO	100	150	100	55	130,0	4	1,0	1,0	4,800	607,0	3050,0	113,0	123,0
GE 110 LO	110	160	110	55	140,0	4	1,0	1,0	5,700	645,0	3250,0	124,0	134,0
GE 125 LO	125	180	125	70	160,0	4	1,0	1,1	8,300	950,0	4750,0	138,0	150,0
GE 160 LO	160	230	160	80	200,0	4	1,1	1,1	16,300	1360,0	6800,0	177,0	191,0
GE 200 LO	200	290	200	100	250,0	4	1,1	1,1	32,500	2120,0	10600,0	221,0	239,0
GE 250 LO	250	400	250	120	350,0	4	1,1	1,1	101,000	3750,0	18000,0	317,0	342,0
GE 320 LO	320	520	320	160	450,0	4	1,1	4,0	225,000	6100,0	30500,0	405,0	438,0

Further dimensions on request. *) Relubrication not possible

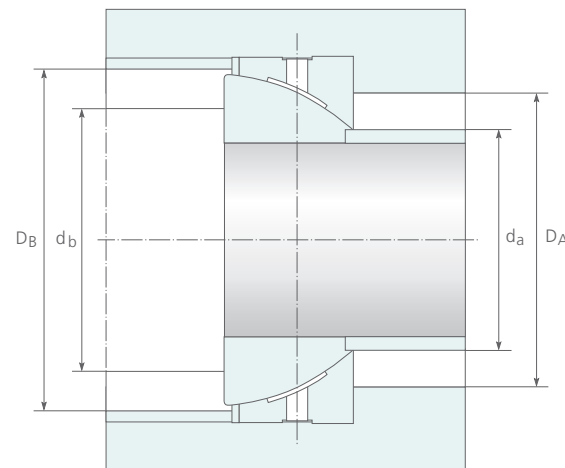
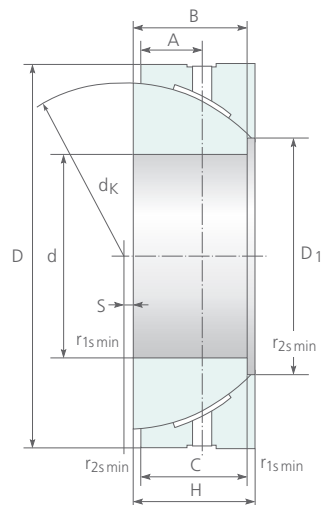
2.5 ANGULAR CONTACT SPHERICAL PLAIN BEARING DIN ISO 12240-2

Sliding contact surface: steel/steel - GE ... SX

Alternative designs

There can be no guarantee made for the exact equality of the bearing between the different manufacturers!

GAC ... S



Designation	d [mm]	D [mm]	B [mm]	C [mm]	H [mm]	dk [mm]	D1 [mm]	S [mm]	A [mm]	r1s min [mm]	r2s [mm]	da max [mm]	db max [mm]	DA max [mm]	DB min [mm]	C [kN]	C0 [kN]	Mass [kg]	Designation
GE 25 SX	25	47	14	14	15	42,5	31,4	1	7,5	0,6	0,2	30,1	39,5	34	43	47,5	236	0,148	GE 25 SX
GE 28 SX	28	52	15	15	16	47	35,7	1	8,0	1	0,3	34,4	42	40	47,5	60	300	0,186	GE 28 SX
GE 30 SX	30	55	16	16	17	50	36,1	2	8,5	1	0,3	34,6	45	40,5	50,5	63	315	0,208	GE 30 SX
GE 32 SX	32	58	17	16	17	52	37,5	2	8,5	1	0,3	37,9	47,5	44	54	71	354	0,241	GE 32 SX
GE 35 SX	35	62	17	17	18	56	42,4	2	9,0	1	0,3	41,1	50	47	57	77	390	0,268	GE 35 SX
GE 40 SX	40	68	18	18	19	60	46,8	1,5	9,5	1	0,3	45,5	54	52	61	76,5	450	0,327	GE 40 SX
GE 45 SX	45	75	19	19	20	66	52,9	1,5	10,0	1	0,3	51,7	60	58	67	106	530	0,416	GE 45 SX
GE 50 SX	50	80	19	19	20	74	59,1	4	10,0	1	0,3	57,9	67	65	75	118	585	0,455	GE 50 SX
GE 55 SX	55	90	22	22	23	80	62	4	11,5	1,5	0,6	60,7	71	70	81	146	735	0,645	GE 55 SX
GE 60 SX	60	95	22	22	23	86	68,1	5	11,5	1,5	0,6	66,9	77	76	87	160	800	0,714	GE 60 SX
GE 65 SX	65	100	22	22	23	92	75,6	5	11,5	1,5	0,6	74,4	83	84	93	173	865	0,759	GE 65 SX
GE 70 SX	70	110	24	24	25	102	82,2	7	12,5	1,5	0,6	80,9	92	90	104	208	1040	1,040	GE 70 SX
GE 75 SX	75	115	25	24	25	107	84,4	7,9	12,5	1,5	0,6	84,7	95	94	107	220	1129	1,120	GE 75 SX
GE 80 SX	80	125	27	27	29	115	90,5	10	14,5	1,5	0,6	88,0	104	99	117	250	1250	1,540	GE 80 SX
GE 85 SX	85	130	29	26,5	29	122	94,8	9,4	14,5	1,5	0,6	94,4	109	105	122	284	1422	1,610	GE 85 SX
GE 90 SX	90	140	30	30	32	130	103,3	11	16,0	2,0	0,6	100,8	118	112	132	320	1600	2,090	GE 90 SX
GE 95 SX	95	145	32	29,5	32	135	104,4	10,8	16,0	2,0	0,6	105,4	119	117	137	335	1750	2,220	GE 95 SX
GE 100 SX	100	150	30	30	32	140	114,3	12	16,0	2,0	0,6	112	128	123	142	345	1760	2,340	GE 100 SX
GE 105 SX	105	160	35	32,5	35	148	113,8	12,3	17,5	2,5	0,6	116,8	137	129	152	423	2116	2,930	GE 105 SX
GE 110 SX	110	170	36	36	38	160	125,8	15	19,0	2,5	0,6	123,2	146	135	162	475	2360	3,680	GE 110 SX
GE 120 SX	120	180	36	36	38	170	135,4	17	19,0	2,5	0,6	132,9	155	145	172	510	2550	3,970	GE 120 SX
GE 130 SX	130	200	42	42	45	190	148	20	22,5	2,5	0,6	143,9	174	158	192	640	3200	5,920	GE 130 SX
GE 140 SX	140	210	42	42	45	200	160,6	20	22,5	2,5	0,6	156,9	184	171	202	680	3450	6,330	GE 140 SX
GE 150 SX	150	225	45	45	48	213	170,9	21	24,0	3	1,0	167,1	194	184	216	780	3900	8,010	GE 150 SX
GE 160 SX	160	240	48	48	51	225	181,4	21	25,5	3	1,0	177,7	206	195	228	900	4500	9,420	GE 160 SX
GE 170 SX	170	260	51	54	57	250	194,3	27	28,5	3	1,0	190,4	228	208	253	1100	5500	12,300	GE 170 SX
GE 180 SX	180	280	61	61	64	260	205,5	21	32,0	3	1,0	201,7	240	220	263	1320	6700	17,400	GE 180 SX
GE 190 SX	190	290	61	61	64	275	211,8	29	32,0	3	1,0	207,9	252	226	278	1370	6950	18,200	GE 190 SX
GE 200 SX	200	310	66	66	70	290	229,2	26	35,0	3	1,0	224,1	268	244	293	1560	7800	22,500	GE 200 SX

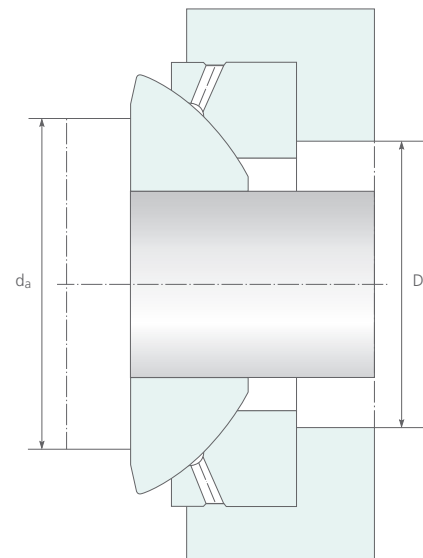
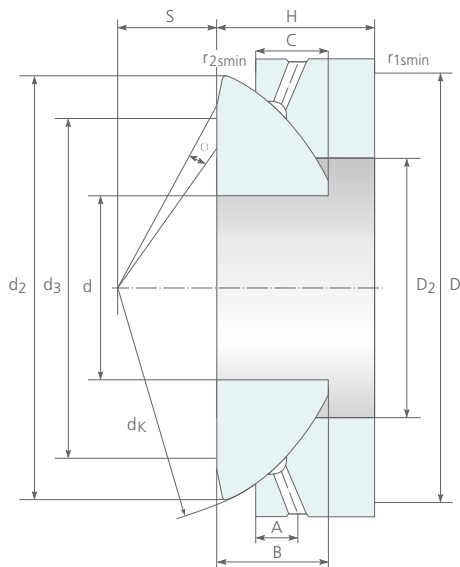
2.6 AXIAL SPHERICAL PLAIN BEARING DIN ISO 12240-3

Sliding contact surface: steel/steel - GE ... AX

Alternative designations

There can be no guarantee made for the exact equality of the bearing between the different manufacturers!

GX ... S



Designation	d [mm]	D [mm]	B [mm]	C [mm]	H [mm]	d _K [mm]	D ₂ [mm]	d ₂ [mm]	d ₃ [mm]	S [-]	A [-]	≈ α [°]	r _{1smin} [mm]	r _{2smin} [mm]	d _{a max} [mm]	D _{A min} [mm]	C [kN]	C ₀ [kN]	Mass [kg]	Designation
GE 10 AX	10	30	7,9	6	9,5	32	16,5	27,5	21	7	3	10	0,6	0,2	21	18,5	24	120	0,036	GE 10 AX
GE 12 AX	12	35	9,3	9	13	37	19,4	32	24	8	4	9	0,6	0,2	24	21,5	32,5	163	0,072	GE 12 AX
GE 15 AX	15	42	10,7	11	15	45	24	38,9	29	10	5	7	0,6	0,2	29	26	52	260	0,108	GE 15 AX
GE 17 AX	17	47	11,5	11,5	16	50	28	43,4	34	11	5	6	0,6	0,2	34	30,5	58,5	300	0,137	GE 17 AX
GE 20 AX	20	55	14,3	13	20	60	33,5	50	40	12,5	6	6	1	0,3	40	38	75	375	0,246	GE 20 AX
GE 25 AX	25	62	16	17	22,5	66	34,5	57,5	45	14	6	7	1	0,3	45	39	129	640	0,415	GE 25 AX
GE 30 AX	30	75	18	19,5	26	80	44	69	56	17,5	8	6	1	0,3	56	49	170	850	0,614	GE 30 AX
GE 35 AX	35	90	22	20	28	98	52	84	66	22	8	6	1	0,3	66	57	260	1290	0,973	GE 35 AX
GE 40 AX	40	105	27	22	32	114	59	98	78	24,5	9	6	1	0,3	78	64	375	1860	1,590	GE 40 AX
GE 45 AX	45	120	31	25	36,5	130	68	112	89	27,5	11	6	1	0,3	89	74	490	2450	2,240	GE 45 AX
GE 50 AX	50	130	33,5	32	42,5	140	69	122,5	98	30	10	5	1	0,3	98	75	655	3250	3,140	GE 50 AX
GE 60 AX	60	150	37	33	45	160	86	140	108	35	12,5	7	1	0,3	108	92	735	3650	4,630	GE 60 AX
GE 70 AX	70	160	40	36	50	170	95	149,5	121	35	13,5	6	1	0,3	121	102	800	4050	5,370	GE 70 AX
GE 80 AX	80	180	42	36	50	194	108	168	130	42,5	14,5	6	1	0,3	130	115	1040	5200	6,910	GE 80 AX
GE 100 AX	100	210	50	42	59	220	133	195,5	155	45	15	7	1	0,3	155	141	1200	6000	10,900	GE 100 AX
GE 120 AX	120	230	52	45	64	245	154	214	170	52,5	16,5	8	1	0,3	170	162	1250	6200	13,900	GE 120 AX
GE 140 AX	140	260	61	50	72	272	176	244	198	52,5	23	6	1,5	0,6	198	187	1630	8150	18,100	GE 140 AX
GE 160 AX	160	290	65	52	77	310	199	272	213	65	23	7	1,5	0,6	213	211	1900	9500	23,200	GE 160 AX
GE 180 AX	180	320	70	60	86	335	224	300	240	67,5	26	8	1,5	0,6	240	236	2120	10600	30,900	GE 180 AX
GE 200 AX	200	340	74	60	87	358	246	321	265	70	27	8	1,5	0,6	265	259	2360	11800	34,200	GE 200 AX



3.0

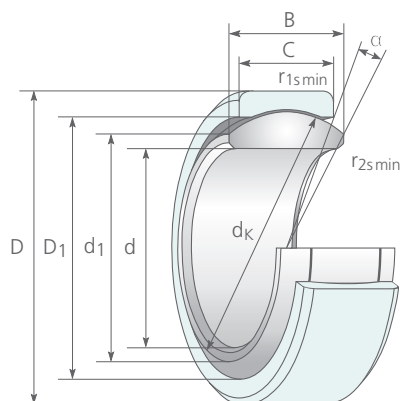
3.0 SPHERICAL PLAIN BEARINGS - maintenance-free

3.1 Radial spherical plain bearing DIN ISO 12240-1 series E Sliding contact surface: hard chromium/PTFE composite - GE ... UK ...	50
3.2 Radial spherical plain bearing DIN ISO 12240-1 series E Sliding contact surface: hard chromium/PTFE fabric - GE ... UK-2RS ...	52
3.3 Radial spherical plain bearing DIN ISO 12240-1 series G Sliding contact surface: hard chromium/PTFE composite - GE ... FW ...	54
3.4 Radial spherical plain bearing DIN ISO 12240-1 series G Sliding contact surface: hard chromium/PTFE fabric - GE ... FW-2RS ...	56
3.5 Angular contact spherical plain bearing DIN ISO 12240-2 Sliding contact surface: steel/PTFE - GE ... SW	58
3.6 Axial spherical plain bearing DIN ISO 12240-3 Sliding contact surface: steel/PTFE - GE ... AW	60

- Maintenance-free large spherical plain bearings on request
- Stainless steel versions available on request
- Special dimensions on request
- Spherical plain bearings with higher load ratings and longer service life on request

3.1 RADIAL SPHERICAL PLAIN BEARING DIN ISO 12240-1 series E

Sliding contact surface: hard chromium/PTFE composite - GE ... UK



Alternative designations

There can be no guarantee made for the exact equality of the bearing between the different manufacturers!

GE ... EC
GE ... C

Allowable

operating temperature: -50° C to +95° C (inserts to +200° C with loss of bearing service life possible).

Materials:

Outer ring: Steel-incorporated with PTFE composite slide material
Inner ring: Roller bearing steel (**GCr 15**), hardened, chromed spherical surface
Stainless steel versions are available on request!

Installation conditions GE ... UK

Material	Valid for shafts Ø	Surface roughness	Fit
Shaft made of steel	$d \leq 30$ mm	$\leq Rz 10$	j6
Housing made of steel	$d \leq 30$ mm	Rz 10 to Rz 16	K7
Housing made of light metal	$d \leq 30$ mm	Rz 10 to Rz 16	M7

Clearance groups [µm] GE ... UK

d [mm]	$6 \leq d \leq 12$	$12 < d \leq 20$	$20 < d \leq 30$
CN	0 to 32	0 to 40	0 to 50

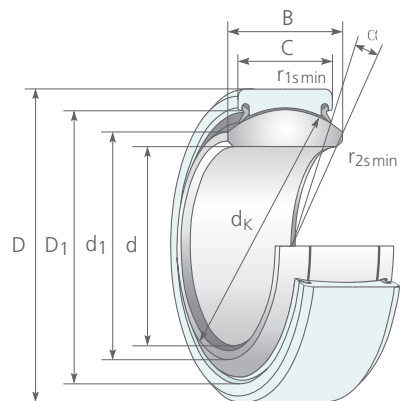
Other clearance groups on request

Designation	Main dimensions								Mass m [kg]	Load ratings		Abutment dimensions	
	d [mm]	D [mm]	B [mm]	C [mm]	dk [mm]	$\approx \alpha$ [°]	r1smin [mm]	r2smin [mm]		C [kN]	C0 [kN]	$\approx d_1$ [mm]	$\approx D_1$ [mm]
GE 6 UK	6	14	6	4	10,0	13	0,3	0,3	0,004	3,6	9,1	8	9,6
GE 8 UK	8	16	8	5	13,0	15	0,3	0,3	0,008	5,8	14,0	10	12,5
GE 10 UK	10	19	9	6	16,0	12	0,3	0,3	0,011	8,6	21,0	13	15,5
GE 12 UK	12	22	10	7	18,0	11	0,3	0,3	0,015	11,0	28,0	15	17,5
GE 15 UK	15	26	12	9	22,0	8	0,3	0,3	0,027	18,0	45,0	18	21,0
GE 17 UK	17	30	14	10	25,0	10	0,3	0,3	0,041	22,0	56,0	20	24,0
GE 20 UK	20	35	16	12	29,0	9	0,6	0,3	0,066	31,0	78,0	24	27,5
GE 25 UK	25	42	20	16	35,5	7	0,6	0,6	0,119	51,0	127,0	29	33,0
GE 30 UK	30	47	22	18	40,7	6	0,6	0,6	0,163	65,0	166,0	34	38,0

Other dimensions on request

3.2 RADIAL SPHERICAL PLAIN BEARING DIN ISO 12240-1 series E

Sliding contact surface: steel/PTFE fabric - GE ... UK-2RS



Alternative designations

There can be no guarantee made for the exact equality of the bearing between the different manufacturers!

- GE ... EC-2RS
- GE ... TE-2RS
- GE ... TA-2RS
- GE ... ET-2RS
- GE ... XT-2RS

Allowable

operating temperature: -20° C to +130° C (inserts to +150° C without seal and up to -50° C with loss of bearing service life possible).

Materials:

Outer ring: Roller bearing steel, hardened, with introduced PTFE fabric
 Inner ring: Roller bearing steel, hardened, chromed spherical surface
 Seal: Plastic

Stainless steel versions are available on request!

Installation conditions GE ... UK-2RS

Material	Valid for shafts Ø	Surface roughness	Fit
Shaft made of steel	17 ≤ d ≤ 300 mm	≤ Rz 10	j6
Housing made of steel	17 ≤ d ≤ 300 mm	Rz 10 to Rz 16	K7
Housing made of light metal	17 ≤ d ≤ 300 mm	Rz 10 to Rz 16	M7

Clearance groups [µm] GE ... UK-2RS

d [mm]	17 ≤ d ≤ 20	20 < d ≤ 35	35 < d ≤ 60	60 < d ≤ 90	90 < d ≤ 140	140 < d ≤ 240	240 < d ≤ 300
CN	0 to 40	0 to 50	0 to 60	0 to 72	0 to 85	0 to 100	0 to 110

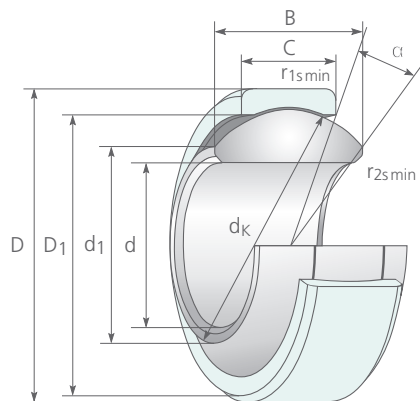
Other clearance groups on request

Designation	Main dimensions								Mass m [kg]	Load ratings		Abutment dimensions	
	d [mm]	D [mm]	B [mm]	C [mm]	dk [mm]	≈ α [°]	r1smin [mm]	r2smin [mm]		C [kN]	C0 [kN]	≈ d1 [mm]	≈ D1 [mm]
GE 17 UK-2RS	17	30	14	10	25,0	10	0,3	0,3	0,041	48,7	81,2	20	24,0
GE 20 UK-2RS	20	35	16	12	29,0	9	0,6	0,3	0,066	67,5	112,0	24	27,5
GE 25 UK-2RS	25	42	20	16	35,5	7	0,6	0,6	0,119	127,0	212,0	29	33,0
GE 30 UK-2RS	30	47	22	18	40,7	6	0,6	0,6	0,153	165,0	275,0	34	38,0
GE 35 UK-2RS	35	55	25	20	47,0	6	0,6	1,0	0,233	210,0	350,0	39	44,5
GE 40 UK-2RS	40	62	28	22	53,0	7	0,6	1,0	0,306	277,0	462,0	45	51,0
GE 45 UK-2RS	45	68	32	25	60,0	7	0,6	1,0	0,427	360,0	600,0	50	57,0
GE 50 UK-2RS	50	75	35	28	66,0	6	0,6	1,0	0,546	442,0	737,0	55	63,0
GE 60 UK-2RS	60	90	44	36	80,0	6	1,0	1,0	1,040	690,0	1150,0	66	75,0
GE 70 UK-2RS	70	105	49	40	92,0	6	1,0	1,0	1,550	885,0	1475,0	77	87,0
GE 80 UK-2RS	80	120	55	45	105,0	6	1,0	1,0	2,310	1125,0	1875,0	88	99,0
GE 90 UK-2RS	90	130	60	50	115,0	5	1,0	1,0	2,750	1380,0	2300,0	98	108,0
GE 100 UK-2RS	100	150	70	55	130,0	7	1,0	1,0	4,450	1717,0	2862,0	109	123,0
GE 110 UK-2RS	110	160	70	55	140,0	6	1,0	1,0	4,820	1845,0	3075,0	120	134,0
GE 120 UK-2RS	120	180	85	70	160,0	6	1,0	1,0	8,050	2685,0	4475,0	130	150,0
GE 140 UK-2RS	140	210	90	70	180,0	7	1,0	1,0	11,020	3015,0	5025,0	150	173,0
GE 160 UK-2RS	160	230	105	80	200,0	8	1,0	1,0	14,010	3840,0	6400,0	170	191,0
GE 180 UK-2RS	180	260	105	80	225,0	6	1,1	1,1	18,650	4320,0	7200,0	192	219,0
GE 200 UK-2RS	200	290	130	100	250,0	7	1,1	1,1	28,030	6000,0	10000,0	212	239,0
GE 220 UK-2RS	220	320	135	100	275,0	8	1,1	1,1	35,510	6600,0	11000,0	238	267,0
GE 240 UK-2RS	240	340	140	100	300,0	8	1,1	1,1	39,910	7200,0	12000,0	265	295,0
GE 260 UK-2RS	260	370	150	110	325,0	7	1,1	1,1	51,540	8550,0	14250,0	285	319,0
GE 280 UK-2RS	280	400	155	120	350,0	6	1,1	1,1	65,060	10050,0	16750,0	310	342,0
GE 300 UK-2RS	300	430	165	120	375,0	7	1,1	1,1	78,070	10800,0	18000,0	330	370,0

Other dimensions on request

3.3 RADIAL SPHERICAL PLAIN BEARING DIN ISO 12240-1 series G

Sliding contact surface: hard chromium/PTFE composite - GE ... FW



Alternative designations

There can be no guarantee made for the exact equality of the bearing between the different manufacturers!

GEH ... C
GEG ... C

Allowable operating temperature: -50° C to +95° C (inserts to +200° C with loss of bearing service life possible).

Materials:
Outer ring: Steel-incorporated with PTFE composite slide material
Inner ring: Roller bearing steel (**GCr 15**), hardened, chromed spherical surface
Stainless steel versions are available on request!

Installation conditions GE ... FW

Material	Valid for shafts Ø	Surface roughness	Installation adjustment according to clearance group		
			CN		
Shaft made of steel	d ≤ 25 mm	≤ Rz 10	j6	m6	m6
Housing made of steel	d ≤ 25 mm	Rz 10 to Rz 16	K7	M7	M7
Housing made of light metal	d ≤ 25 mm	Rz 10 to Rz 16	M7	N7	N7

Clearance groups [µm] GE ... FW

d [mm]	6 ≤ d ≤ 10	10 < d ≤ 17	17 < d ≤ 25
CN	0 to 32	0 to 40	0 to 50

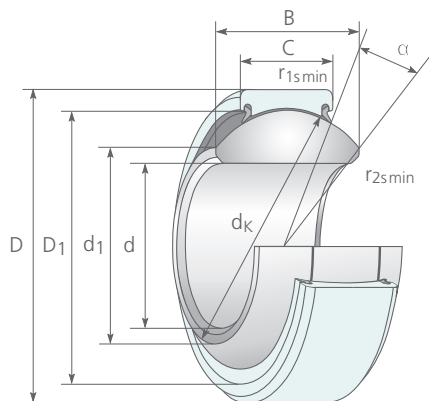
Other clearance groups on request

Designation	Main dimensions								Mass m [kg]	Load ratings		Abutment dimensions	
	d [mm]	D [mm]	B [mm]	C [mm]	dk [mm]	≈ α [°]	r1smin [mm]	r2smin [mm]		C [kN]	C0 [kN]	≈ d1 [mm]	≈ D1 [mm]
GE 6 FW	6	16	9	5	13,0	21	0,3	0,3	0,007	5,8	14,0	9	12,5
GE 8 FW	8	19	11	6	16,0	21	0,3	0,3	0,014	8,6	21,0	11	15,5
GE 10 FW	10	22	12	7	18,0	18	0,3	0,3	0,021	11,0	28,0	13	17,5
GE 12 FW	12	26	15	9	22,0	18	0,3	0,3	0,033	18,0	45,0	16	21,0
GE 15 FW	15	30	16	10	25,0	16	0,3	0,3	0,049	22,0	56,0	19	24,0
GE 17 FW	17	35	20	12	29,0	19	0,3	0,3	0,083	31,0	78,0	21	27,5
GE 20 FW	20	42	25	16	35,5	17	0,6	0,6	0,153	51,0	127,0	24	33,0
GE 25 FW	25	47	28	18	40,7	17	0,6	0,6	0,203	65,0	166,0	29	38,0
GE 30 FW	30	55	32	20	47,0	17	0,6	1,0	0,304	83,0	212,0	34	44,5

Other dimensions on request

3.4 RADIAL SPHERICAL PLAIN BEARING DIN ISO 12240-1 series G

Sliding contact surface: hard chromium/PTFE fabric - GE ... FW-2RS



Alternative designations

There can be no guarantee made for the exact equality of the bearing between the different manufacturers!

GEG ... ET-2RS
GEG ... XT-2RS

Allowable

operating temperature: -20° C to +130° C (inserts to +150° C without seal and up to -50° C with loss of bearing service life possible).

Materials:

Outer ring: Roller bearing steel, hardened, with introduced PTFE fabric
Inner ring: Roller bearing steel, hardened, chromed spherical surface
Seal: Plastic

Stainless steel versions are available on request!

Installation conditions GE ... FW-2RS

Material	Valid for shafts Ø	Surface roughness	Installation adjustment according to clearance group
			CN
Shaft made of steel	30 ≤ d ≤ 280 mm	≤ Rz 10	j6
Housing made of steel	30 ≤ d ≤ 280 mm	Rz 10 to Rz 16	K7
Housing made of light metal	30 ≤ d ≤ 280 mm	Rz 10 to Rz 16	M7

Clearance groups [µm] GE ... FW-2RS

d [mm]	d = 30	30 < d ≤ 50	50 < d ≤ 80	80 < d ≤ 120	120 < d ≤ 240	240 < d ≤ 280
CN	0 to 50	0 to 60	0 to 72	0 to 85	0 to 100	0 to 110

Other clearance groups on request

Designation	Main dimensions								Mass m [kg]	Load ratings		Abutment dimensions	
	d [mm]	D [mm]	B [mm]	C [mm]	dk [mm]	α [°]	r1smin [mm]	r2smin [mm]		C [kN]	C0 [kN]	d1 [mm]	D1 [mm]
GE 17 FW-2RS	17	35	20	12	29,0	19	0,3	0,3	0,078	31,5	78,0	21	27,5
GE 20 FW-2RS	20	42	25	16	35,5	17	0,6	0,6	0,150	51,0	127,0	24	33,0
GE 25 FW-2RS	25	47	28	18	40,7	17	0,6	0,6	0,190	65,5	166,0	29	38,0
GE 30 FW-2RS	30	55	32	20	47,0	17	0,6	1,0	0,290	210,0	350,0	34	44,5
GE 35 FW-2RS	35	62	35	22	53,0	16	0,6	1,0	0,390	277,0	462,0	39	51,0
GE 40 FW-2RS	40	68	40	25	60,0	17	0,6	1,0	0,520	360,0	600,0	44	57,0
GE 45 FW-2RS	45	75	43	28	66,0	15	0,6	1,0	0,680	442,0	737,0	50	63,0
GE 50 FW-2RS	50	90	56	36	80,0	17	0,6	1,0	1,400	690,0	1150,0	57	75,0
GE 60 FW-2RS	60	105	63	40	92,0	17	1,0	1,0	2,050	885,0	1475,0	67	87,0
GE 70 FW-2RS	70	120	70	45	105,0	16	1,0	1,0	2,900	1125,0	1875,0	77	99,0
GE 80 FW-2RS	80	130	75	50	115,0	14	1,0	1,0	3,500	1380,0	2300,0	87	108,0
GE 90 FW-2RS	90	150	85	55	130,0	15	1,0	1,0	5,400	1717,0	2862,0	98	123,0
GE 100 FW-2RS	100	160	85	55	140,0	14	1,0	1,0	6,000	1845,0	3075,0	110	134,0
GE 110 FW-2RS	110	180	100	70	160,0	12	1,0	1,0	9,700	2685,0	4475,0	122	150,0
GE 120 FW-2RS	120	210	115	70	180,0	16	1,0	1,0	14,000	3015,0	5025,0	132	173,0
GE 140 FW-2RS	140	230	130	80	200,0	16	1,0	1,0	19,000	3840,0	6400,0	151	191,0
GE 160 FW-2RS	160	260	135	80	225,0	16	1,0	1,0	24,700	4320,0	7200,0	176	219,0
GE 180 FW-2RS	180	290	155	100	250,0	14	1,1	1,1	35,900	6000,0	10000,0	196	239,0
GE 200 FW-2RS	200	320	165	100	275,0	15	1,1	1,1	45,300	6600,0	11000,0	220	267,0
GE 220 FW-2RS	220	340	175	100	300,0	16	1,1	1,1	51,100	7200,0	12000,0	243	295,0
GE 240 FW-2RS	240	370	190	110	325,0	15	1,1	1,1	65,100	8550,0	14250,0	263	319,0
GE 260 FW-2RS	260	400	205	120	350,0	15	1,1	1,1	82,400	10050,0	16750,0	283	342,0
GE 280 FW-2RS	280	430	210	120	375,0	15	1,1	1,1	97,200	10800,0	18000,0	310	370,0

Other dimensions on request

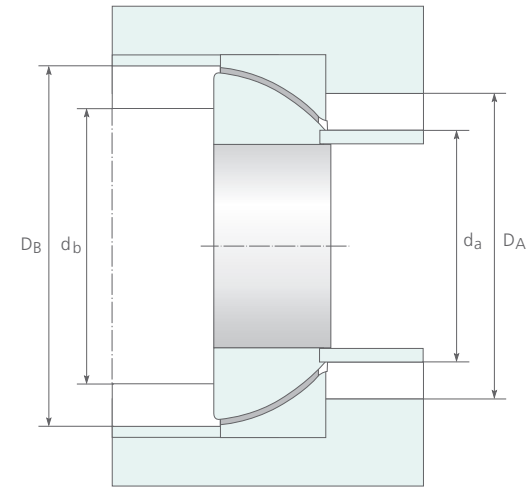
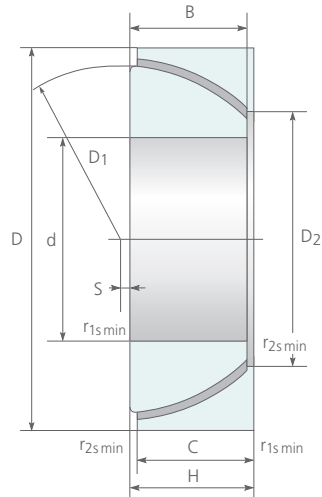
3.5 ANGULAR CONTACT SPHERICAL PLAIN BEARING DIN ISO 12240-2

Sliding contact surface: steel/PTFE - GE ... SW

Alternative designs

There can be no guarantee made for the exact equality of the bearing between the different manufacturers!

GAC ... T



Designation	d [mm]	D [mm]	B [mm]	C [mm]	H [mm]	D ₁ [mm]	D ₂ [mm]	S [-]	r _{1smin} [mm]	r _{2smin} [mm]	d _{a max} [mm]	d _{b max} [mm]	D _{A max} [mm]	D _{B min} [mm]	C [kN]	C ₀ [kN]	Mass [kg]	Designation
GE 25 SW	25	47	14	14	15	42,5	31,4	1	0,6	0,2	30,1	39,5	34	43	71	140	0,148	GE 25 SW
GE 28 SW	28	52	15	15	16	47	35,7	1	1,0	0,3	34,4	42	40	47,5	90	180	0,186	GE 28 SW
GE 30 SW	30	55	16	16	17	50	36,1	2	1,0	0,3	34,6	45	40,5	50,5	95	190	0,208	GE 30 SW
GE 32 SW	32	58	17	16	17	52	37,5	2	1,0	0,3	37,9	47,5	44	54	102	204	0,241	GE 32 SW
GE 35 SW	35	62	17	17	18	56	42,4	2	1,0	0,3	41,1	50	47	57	116	232	0,268	GE 35 SW
GE 40 SW	40	68	18	18	19	60	46,8	1,5	1,0	0,3	45,5	54	52	61	134	270	0,327	GE 40 SW
GE 45 SW	45	75	19	19	20	66	52,9	1,5	1,0	0,3	51,7	60	58	67	160	320	0,416	GE 45 SW
GE 50 SW	50	80	19	19	20	74	59,1	4	1,0	0,3	57,9	67	65	75	176	355	0,455	GE 50 SW
GE 55 SW	55	90	22	22	23	80	62	4	1,5	0,6	60,7	71	70	81	220	440	0,645	GE 55 SW
GE 60 SW	60	95	22	22	23	86	68,1	5	1,5	0,6	66,9	77	76	87	240	480	0,714	GE 60 SW
GE 65 SW	65	100	22	22	23	92	75,6	5	1,5	0,6	74,4	83	84	93	260	520	0,759	GE 65 SW
GE 70 SW	70	110	24	24	25	102	82,2	7	1,5	0,6	80,9	92	90	104	315	630	1,040	GE 70 SW
GE 75 SW	75	115	25	25	25	107	84,4	7,9	1,5	0,6	84,7	95	94	107	345	670	1,120	GE 75 SW
GE 80 SW	80	125	27	27	29	115	90,5	10	1,5	0,6	88,0	104	99	117	375	750	1,540	GE 80 SW
GE 85 SW	85	130	29	26,5	29	122	94,8	9,4	1,5	0,6	94,4	109	105	122	425	810	1,610	GE 85 SW
GE 90 SW	90	140	30	30	32	130	103,3	11	2,0	0,6	100,8	118	112	132	480	965	2,090	GE 90 SW
GE 95 SW	95	145	32	29,5	32	135	104,4	10,8	2,0	0,6	105,4	119	117	132	500	1000	2,220	GE 95 SW
GE 100 SW	100	150	30	30	32	140	114,3	12	2,0	0,6	112,0	128	123	142	520	1040	2,340	GE 100 SW
GE 105 SW	105	160	35	36	35	148	113,8	12,3	2,0	0,6	116,8	137	129	152	565	1250	2,930	GE 105 SW
GE 110 SW	110	170	36	36	38	160	125,8	15	2,5	0,6	123,2	146	135	162	710	1430	3,680	GE 110 SW
GE 120 SW	120	180	36	42	38	170	135,4	17	2,5	0,6	132,9	155	145	172	765	1530	3,970	GE 120 SW
GE 130 SW	130	200	42	42	45	190	148	20	2,5	0,6	143,9	174	158	192	965	1930	5,920	GE 130 SW
GE 140 SW	140	210	42	42	45	200	160,6	20	2,5	0,6	156,9	184	171	202	1020	2040	6,330	GE 140 SW
GE 150 SW	150	225	45	45	48	213	170,9	21	3,0	1,0	167,1	194	184	216	1180	2360	8,010	GE 150 SW
GE 160 SW	160	240	48	48	51	225	181,4	21	3,0	1,0	177,7	206	195	228	1340	2700	9,420	GE 160 SW
GE 170 SW	170	260	54	54	57	250	194,3	27	3,0	1,0	190,4	228	208	253	1660	3350	12,300	GE 170 SW
GE 180 SW	180	280	61	61	64	260	205,5	21	3,0	1,0	201,7	240	220	263	2000	4000	17,400	GE 180 SW
GE 190 SW	190	290	61	61	64	275	211,8	29	3,0	1,0	207,9	252	226	278	2080	4150	18,200	GE 190 SW
GE 200 SW	200	310	66	66	70	290	229,2	26	3,0	1,0	224,1	268	244	293	2360	4750	22,500	GE 200 SW

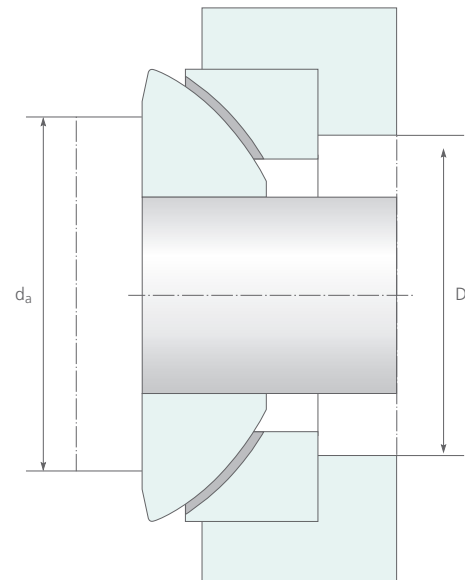
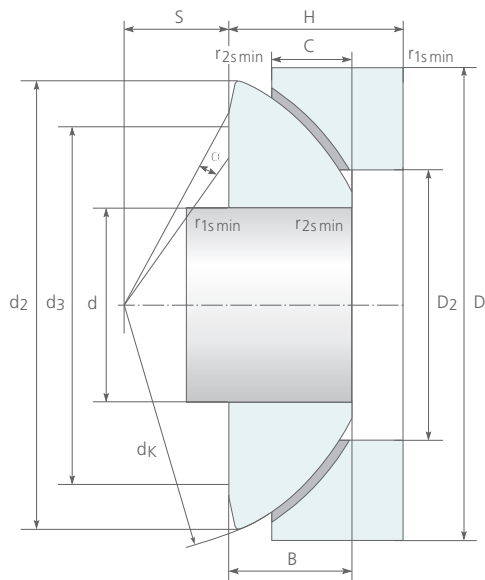
3.6 AXIAL SPHERICAL PLAIN BEARING DIN ISO 12240-3

Sliding contact surface: steel/PTFE - GE ... AW ≈ GX ... F

Alternative designations

There can be no guarantee made for the exact equality of the bearing between the different manufacturers!

GX ... T



Designation	d [mm]	D [mm]	B [mm]	C [mm]	H [mm]	d _k [mm]	D ₂ [mm]	d ₂ [mm]	d ₃ [mm]	S [-]	≈ α [°]	r _{1s min} [mm]	r _{2s min} [mm]	d _{a max} [mm]	D _{A min} [mm]	C [kN]	C ₀ [kN]	Mass [kg]	Designation
GE 10 AW	10	30	7,9	6	9,5	32	16,5	27,5	21	7	10	0,6	0,2	21	18,5	36	72	0,036	GE 10 AW
GE 12 AW	12	35	9,3	9	13	37	19,5	32	24	8	9	0,6	0,2	24	21,5	49	98	0,072	GE 12 AW
GE 15 AW	15	42	10,7	11	15	45	24	38,9	29	10	7	0,6	0,2	29	26	78	156	0,108	GE 15 AW
GE 17 AW	17	47	11,5	11,5	16	50	28	43,4	34	11	6	0,6	0,2	34	30,5	88	176	0,137	GE 17 AW
GE 20 AW	20	55	14,3	13	20	60	33,5	50	40	12,5	6	1,0	0,3	40	38	112	224	0,246	GE 20 AW
GE 25 AW	25	62	16	17	22,5	66	34,5	57,5	45	14	7	1,0	0,3	45	39	193	390	0,415	GE 25 AW
GE 30 AW	30	75	18	19,5	26	80	44	69	56	17,5	6	1,0	0,3	56	49	255	510	0,614	GE 30 AW
GE 35 AW	35	90	22	20	28	98	52	84	66	22	6	1,0	0,3	66	57	390	780	0,973	GE 35 AW
GE 40 AW	40	105	27	22	32	114	59	98	78	24,5	6	1,0	0,3	78	64	560	1120	1,590	GE 40 AW
GE 45 AW	45	120	31	25	36,5	130	68	112	89	27,5	6	1,0	0,3	89	74	735	1460	2,240	GE 45 AW
GE 50 AW	50	130	33,5	32	42,5	140	69	122,5	98	30	5	1,0	0,3	98	75	980	1960	3,140	GE 50 AW
GE 60 AW	60	150	37	33	45	160	86	140	108	35	7	1,0	0,3	108	92	1100	2200	4,630	GE 60 AW
GE 70 AW	70	160	40	36	50	170	95	149,5	121	35	6	1,0	0,3	121	102	1200	2400	5,370	GE 70 AW
GE 80 AW	80	180	42	36	50	194	108	168	130	42,5	6	1,0	0,3	130	115	1560	3100	6,910	GE 80 AW
GE 100 AW	100	210	50	42	59	220	133	195,5	155	45	7	1,0	0,3	155	141	1800	3600	10,900	GE 100 AW
GE 120 AW	120	230	52	45	64	245	154	214	170	52,5	8	1,0	0,3	170	162	1860	3750	13,900	GE 120 AW
GE 140 AW	140	260	61	50	72	272	176	244	198	52,5	6	1,5	0,6	198	187	2450	4900	18,100	GE 140 AW
GE 160 AW	160	290	65	52	77	310	199	272	213	65	7	1,5	0,6	213	211	2850	5700	23,200	GE 160 AW
GE 180 AW	180	320	70	60	86	335	224	300	240	67,5	8	1,5	0,6	240	236	3200	6400	30,900	GE 180 AW
GE 200 AW	200	340	74	60	87	358	246	321	265	70	8	1,5	0,6	265	259	3550	7100	34,200	GE 200 AW



4.0 ROD ENDS REQUIRING - requiring maintenance

4.0

4.1 Rod end DIN ISO 12240-4 series E Sliding contact surface: steel/steel - EI ... / EI ...-2RS	64
4.2 Rod end DIN ISO 12240-4 series E Sliding contact surface: steel/steel - EA ... / EA ...-2RS	66
4.3 Rod end DIN ISO 12240-4 series K + CETOP Sliding contact surface: steel/bronze - KI	68
4.4 Rod end DIN ISO 12240-4 series K Sliding contact surface: steel/bronze - KA	70

- Special dimensions on request
- High-performance rod ends on request [HPE]

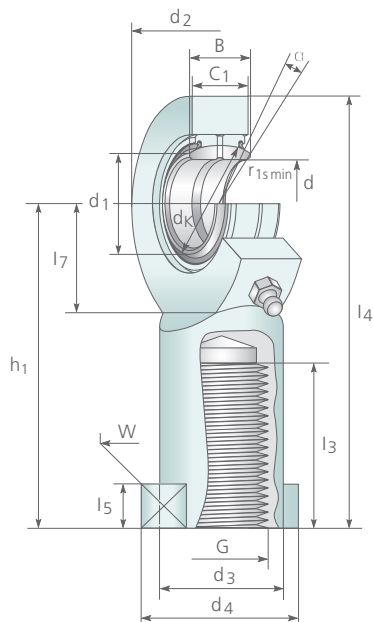
4.1 ROD END DIN ISO 12240-4 series E

Sliding contact surface: steel/steel - EI ... / EI ...-2RS

Alternative designations

There can be no guarantee made for the exact equality of the bearing between the different manufacturers!

- CGK ...
- IEI(L) ...
- IEI(L) ...-2RS
- FI ... D(-2RS)
- GIR(L) ... DO
- GIR(L) ... DO-2RS
- TFI(L) ... FK
- TFI(L) ... FK-2RS



Allowable

operating temperature: -25° C to 130° C (inserts from -60° C to 200° C without seals and from +150° C with loss of service life possible). Other limitations of the lubricant must be observed!

Lubricant:

Lithium soap multipurpose grease with minimum 3% MoS₂ additive (for restrictions please ask the respective lubricant supplier)

Lubrication nipple:

if provided, taper lubricating nipple form A as per DIN 71412

Materials:

Headboard: Galvanized steel
 Outer ring: Roller bearing steel (**GCr 15**), hardened, manganese phosphate
 Inner ring: Roller bearing steel (**GCr 15**), hardened, manganese phosphate
 Seal: Plastic

Stainless steel versions are available on request!

Characteristic

calculation value: $F_{head} = 2.0$ without lubrication hole - $F_{head} = 2.75$ with lubrication hole
 Allowable rod end load when swiveling or alternating load: **C₀ permissible = C₀ / F_{head}**

Built-in

bearing type: **GE ... ES (-2RS)**. For more information on bearing dimensions, see **GE ... ES (-2RS)**.

Designation	Main dimensions					Mass m [kg]	Load ratings		Abutment dimensions					Abutment dimensions						
	d [mm]	B [mm]	C ₁ max [mm]	d _K [mm]	α [°]		C [kN]	C ₀ [kN]	d ₁ [mm]	G [mm]	d ₂ max [mm]	d ₃ [mm]	d ₄ max [mm]	h ₁ [mm]	l ₃ min [mm]	l ₄ max [mm]	l ₅ [mm]	l ₇ min [mm]	W1 [mm]	
EI 6*	6	6	4,4	10,0	13	0,022	3,4	8,15	8	M 6x1,0	21	10,0	13	30	11	43	5,0	12	11	
EI 8*	8	8	6,0	13,0	15	0,039	5,5	12,9	10	M 8x1,25	24	12,5	16	36	15	50	5,0	14	14	
EI 10*	10	9	7,0	16,0	12	0,065	8,15	17,6	13	M 10x1,5	29	15,0	19	43	20	60	6,5	15	17	
EI 12*	12	10	8,0	18,0	11	0,098	10,8	24,5	15	M 12x1,75	34	17,5	22	50	23	69	6,5	18	19	
EI 15**	15	12	10,0	22,0	8	0,180	17,0	36,0	18	M 14x2,0	40	21,0	26	61	30	83	8,0	20	22	
EI 17**	17	14	11,0	25,0	10	0,220	21,2	45,0	20	M 16x2,0	46	24,0	30	67	34	92	10,0	23	27	
EI 20** EI 20-2RS**	20	16	13,0	29,0	9	0,350	30,0	60,0	24	M 20x1,5	53	27,5	35	77	40	106	10,0	27	32	
EI 25 EI 25-2RS	25	20	17,0	35,5	7	0,640	48,0	83,0	29	M 24x2,0	64	33,5	42	94	48	128	12,0	32	36	
EI 30 EI 30-2RS	30	22	19,0	40,7	6	0,930	62,0	110,0	34	M 30x2,0	73	40,0	50	110	56	149	15,0	37	41	
EI 35 EI 35-2RS	35	25	21,0	47,0	6	1,300	80,0	146,0	39	M 36x3,0	82	47,0	58	125	60	169	15,0	42	50	
EI 40-2RS	40	28	23,0	53,0	7	2,000	100,0	180,0	45	M 39x3,0	92	52,0	65	142	65	191	18,0	48	55	
EI 45-2RS	45	32	27,0	60,0	7	2,500	127,0	240,0	50	M 42x3,0	102	58,0	70	145	65	199	20,0	52	60	
EI 50-2RS	50	35	30,0	66,0	6	3,500	156,0	290,0	55	M 45x3,0	112	62,0	75	160	68	219	20,0	60	65	
EI 60-2RS	60	44	38,0	80,0	6	5,500	245,0	450,0	66	M 52x3,0	135	70,0	88	175	70	246	20,0	75	75	
EI 70-2RS	70	49	42,0	92,0	6	8,600	315,0	610,0	77	M 56x4,0	160	80,0	98	200	80	284	20,0	87	85	
EI 80-2RS	80	55	47,0	105,0	6	12,000	400,0	750,0	88	M 64x4,0	180	95,0	110	230	85	324	25,0	100	100	

Installation conditions EI ... / EI ...-2RS

Material	Valid for shafts Ø	Surface roughness	Installation adjustment according to clearance group
			CN
Shaft made of steel	d ≤ 80 mm	≤ Rz 10	m6

Limit of the chamfer [mm] EI ... / EI ...-2RS

d [mm]	6 < d ≤ 20	20 < d ≤ 50	50 < d ≤ 80
r _{1s min} [mm]	0,3	0,6	1,0

Clearance groups [µm] EI ... / EI ...-2RS

d [mm]	6 ≤ d ≤ 12	12 < d ≤ 20	20 < d ≤ 35	35 < d ≤ 60	60 < d ≤ 80
CN	23 to 68	30 to 82	37 to 100	43 to 120	55 to 142

Relubrication

- Designations done in accordance with DIN ISO 12240
- 1) Manufacturer-related deviations of the key width allowed
- *) Rod end cannot be relubricated
- **) Rod ends can only be re-lubricated via the lubrication hole
- Designation for left-hand thread: EIL ... (-2RS)
- Other dimensions on request



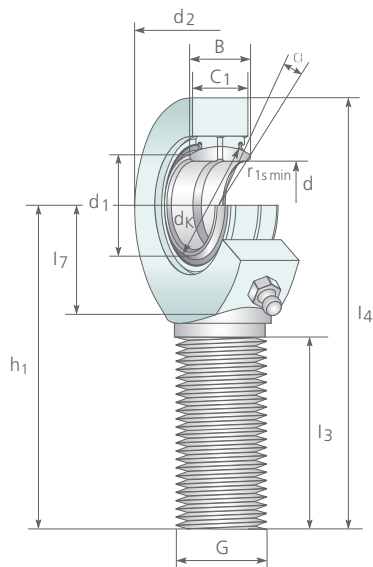
4.2 ROD END DIN ISO 12240-4 series E

Sliding contact surface: steel/steel - EA ... / EA ...-2RS

Alternative designations

There can be no guarantee made for the exact equality of the bearing between the different manufacturers!

- GAR(L) ...
- GAR(L) ...-2RS
- FE ... D(-2RS)
- IEA ...
- IEA ...-2RS
- TFE(L) ... MK
- TFE(L) ... MK-2RS



Allowable

operating temperature: -60° C to 130° C (inserts from -60° C to 200° C without seals and from +150° C with loss of service life possible). Other limitations of the lubricant must be observed!

Lubricant:

Lithium soap multipurpose grease with minimum 3% MoS₂ additive (for restrictions please ask the respective lubricant supplier)

Lubrication nipple:

if provided, taper lubricating nipple form A as per DIN 71412

Materials:

Headboard: Galvanized steel
 Outer ring: Roller bearing steel (**GCr 15**), hardened, manganese phosphate
 Inner ring: Roller bearing steel (**GCr 15**), hardened, manganese phosphate
 Seal: Plastic

Stainless steel versions are available on request!

Characteristic

calculation value: $F_{head} = 2.0$ without lubrication hole - $F_{head} = 2,75$ with lubrication hole
 Allowable rod end load when swiveling or alternating load: **C₀ permissible = C₀ / F_{head}**

Built-in

bearing type: **GE ... ES (-2RS)**. For more information on bearing dimensions, see **GE ... ES (-2RS)**.

Designation	Main dimensions					Mass m [kg]	Load ratings		Abutment dimensions		Abutment dimensions				
	d [mm]	B [mm]	C ₁ max [mm]	d _K [mm]	≈ α [°]		C [kN]	C ₀ [kN]	≈ d ₁ [mm]	G [mm]	d ₂ max [mm]	h ₁ [mm]	l ₃ min [mm]	l ₄ max [mm]	l ₇ min [mm]
EA 6*	6	6	4,4	10,0	13	0,018	8,15	8,15	8	M 6 x 1,0	21	36	18	46,5	12
EA 8*	8	8	6,0	13,0	15	0,030	5,5	12,9	10	M 8 x 1,25	24	42	22	54,0	14
EA 10*	10	9	7,0	16,0	12	0,051	8,1	17,6	13	M 10 x 1,5	29	48	26	62,5	15
EA 12*	12	10	8,0	18,0	11	0,086	10,8	24,5	15	M 12 x 1,75	34	54	28	71,0	18
EA 15**	15	12	10,0	22,0	8	0,140	17,0	36,0	18	M 14 x 2,0	40	63	34	83,0	20
EA 17**	17	14	11,0	25,0	10	0,190	21,2	45,0	20	M 16 x 2,0	46	69	36	92,0	23
EA 20**	EA 20-2RS**	20	16	13,0	29,0	9	0,310	30,0	24	M 20 x 1,5	53	78	43	107,5	27
EA 25	EA 25-2RS	25	20	17,0	35,5	7	0,560	48,0	29	M 24 x 2,0	64	94	53	126,0	32
EA 30	EA 30-2RS	30	22	19,0	40,7	6	0,890	62,0	34	M 30 x 2,0	73	110	65	146,5	37
EA 35	EA 35-2RS	35	25	21,0	47,0	6	1,400	80,0	39	M 36 x 3,0	82	140	82	171,0	42
	EA 40-2RS	40	28	23,0	53,0	7	1,800	100,0	45	M 39 x 3,0	92	150	86	196,0	48
	EA 45-2RS	45	32	27,0	60,0	7	2,600	127,0	50	M 42 x 3,0	102	163	94	214,0	52
	EA 50-2RS	50	35	30,0	66,0	6	3,400	156,0	55	M 45 x 3,0	112	185	107	241,0	60
	EA 60-2RS	60	44	38,0	80,0	6	5,900	245,0	66	M 52 x 3,0	135	210	115	277,5	75
	EA 70-2RS	70	49	42,0	92,0	6	8,200	315,0	77	M 56 x 4,0	160	235	125	315,0	87
	EA 80-2RS	80	55	47,0	105,0	6	12,000	400,0	88	M 64 x 4,0	180	270	140	360,0	100

Installation conditions EA ... / EA ...-2RS

Material	Valid for shafts Ø	Surface roughness	Installation adjustment according to clearance group
			CN
Shaft made of steel	d ≤ 80 mm	≤ Rz 10	m6

Limit of the chamfer [mm] EA ... / EA ...-2RS

d [mm]	6 < d ≤ 20	20 < d ≤ 50	50 < d ≤ 80
r 1s min [mm]	0,3	0,6	1,0

Clearance groups [µm] EA ... / EA ...-2RS

d [mm]	6 ≤ d ≤ 12	12 < d ≤ 20	20 < d ≤ 35	35 < d ≤ 60	60 < d ≤ 80
CN	23 to 68	30 to 82	37 to 100	43 to 120	55 to 142

- Designations done in accordance with DIN ISO 12240
- *) Rod end cannot be relubricated
- **) Rod ends can only be re-lubricated via the lubrication hole
- Designation for left-hand thread: EAL ... (-2RS)
- Other dimensions on request

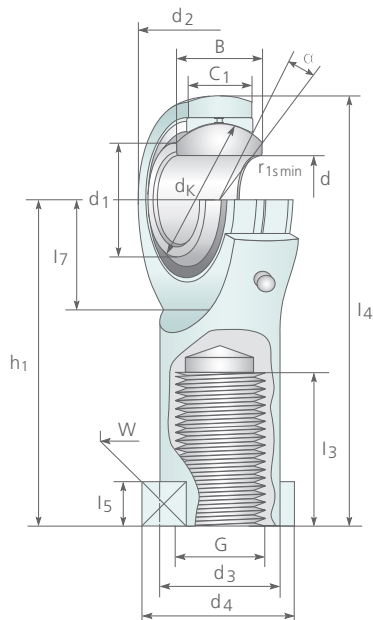
4.3 ROD END DIN ISO 12240-4 series K + CETOP

Sliding contact surface: steel/bronze - KI ...

Alternative designations

There can be no guarantee made for the exact equality of the bearing between the different manufacturers!

- GI(L) ...
- GIKFR(/L) ... PB
- GIPFR(/L) ... PB
- GI(L)S ...
- IKI(L) ...
- PFI ... D
- PHS ...
- SIBP ... S
- SIKAC ... M
- SIKAC ... M/VZ019
- TFI(L) ... FK



Allowable

operating temperature: -50° C to 150° C (inserts to +250° C with loss of service life possible).
Other limitations of the lubricant must be observed!

Lubricant:

Lithium soap multipurpose grease (for restrictions please ask the respective lubricant supplier)

Lubrication nipple:

if provided, funnel grease nipple form D as per DIN 3405

Materials:

Headboard: Galvanized steel
Outer ring: Bronze
Inner ring: Roller bearing steel (**GCr 15**), hardened
Stainless steel versions are available on request!

Characteristic

calculation value:

$F_{head} = 2.75$
Allowable rod end load when swiveling or alternating load: $C_0 \text{ permissible} = C_0 / F_{head}$

Built-in

bearing type:

GE ... PB. Further information concerning these bearings is available on request!

Designation	Main dimensions					Mass m [kg]	Load ratings			Abutment dimensions				Abutment dimensions					
	d [mm]	B [mm]	C ₁ max [mm]	d _K [mm]	≈ α [°]		C [kN]	C ₀ [kN]	≈ d ₁ [mm]	G [mm]	d ₂ max [mm]	≈ d ₃ [mm]	d ₄ max [mm]	h ₁ [mm]	l ₃ min [mm]	l ₄ max [mm]	l ₅ [mm]	l ₇ min [mm]	W ¹⁾ [mm]
KI 5	5	8	6,0	11,112	13	0,018	3,25	5,7	7,7	M 5x0,8	18	9,0	11	27	10	36	4,0	9	9,0
KI 6	6	9	6,75	12,700	13	0,027	4,3	7,2	8,9	M 6x1,0	20	10,0	13	30	12	40	5,0	10	11,0
KI 8	8	12	9,0	15,875	14	0,046	7,2	11,6	10,3	M 8x1,25	24	12,5	16	36	16	48	5,0	12	13,0
KI 10	10	14	10,5	19,050	13	0,076	10,0	14,5	12,9	M 10x1,5	28	15,0	19	43	20	57	6,5	14	17,0
KI 12	12	16	12,0	22,225	13	0,110	13,4	17,0	15,4	M 12x1,75	32	17,5	22	50	22	66	6,5	16	19,0
KI 14	14	19	13,5	25,400	16	0,170	17,0	24,0	16,8	M 14x2,0	36	20,0	25	57	25	75	8,0	18	22,0
KI 16	16	21	15,0	28,575	15	0,210	21,6	28,5	19,3	M 16x2,0	42	22,0	27	64	28	85	8,0	21	22,0
KI 18	18	23	16,5	31,750	15	0,310	26,0	42,5	21,8	M 18x1,5	44	25,0	31	71	32	93	10,0	23	27,0
KI 20	20	25	18,0	34,925	14	0,410	31,5	42,5	24,3	M 20x1,5	50	27,5	34	77	33	102	10,0	25	32,0
KI 22	22	28	20,0	38,100	15	0,550	38,0	57,0	25,8	M 22x1,5	54	30,0	38	84	37	111	12,0	27	32,0
KI 25	25	31	22,0	42,850	15	0,750	47,5	68,0	29,5	M 24x2,0	60	33,5	42	94	42	124	12,0	30	36,0
KI 30	30	37	25,0	50,800	17	1,150	64,0	88,0	34,8	M 30x2,0	70	40,0	50	110	51	145	15,0	35	41,0
KI 35	35	43	28,0	57,150	16	1,600	80,0	95,9	37,7	M 36x2,0	81	46,0	58	125	56	165,5	18,0	40	50,0
According to CETOP RP 103 P													According to CETOP RP 103 P						
KI 5 M 4	5	8	6,0	11,112	13	0,018	3,25	9,1	7,7	M 4	18	9,0	12	27	8	38	4,0	9	9,0
KI 10 M 10x1,25	10	14	10,5	19,050	13	0,076	10,0	14,5	12,9	M 10x1,25	28	15,0	20	43	15	59	6,5	14	17,0
KI 12 M 12x1,25	12	16	12,0	22,225	13	0,115	13,4	17,0	15,4	M 12x1,25	32	17,5	23	50	18	68	6,5	16	19,0
KI 16 M 16x1,5	16	21	15,0	28,575	15	0,230	21,6	28,5	19,3	M 16x1,5	42	22,0	29	64	24	87	8,0	21	22,0
KI 30 M 27x2,0	30	37	25,0	50,800	15	1,130	64,0	88,0	34,8	M 27x2,0	70	40,0	52	110	45	148	15,0	35	41,0

Installation conditions KI ...

Material	Valid for shafts Ø	Surface roughness	Installation adjustment according to clearance group
			CN
Shaft made of steel	5 ≤ d ≤ 35 mm	≤ Rz 10	m6

Limit of the chamfer [mm] KI ...

d [mm]	5 < d ≤ 30	30 < d ≤ 35
r 1s min [mm]	0,3	0,6

Clearance groups [µm] KI ...

d [mm]	5 ≤ d ≤ 35
CN	30 to 50

- Designations done in accordance with DIN ISO 12240
- 1) Manufacturer-related deviations of the key width allowed
- The total load capacity is predetermined by the load capacity of the head part C₀ and when under constant load in the radial load direction.
- Designation for left-hand thread: KIL ... / KIL ... M ...
- Other dimensions on request

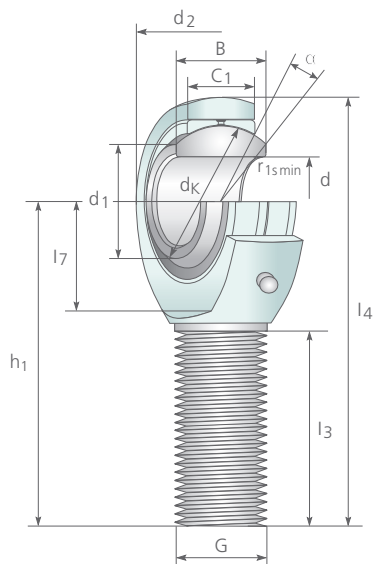
4.4 ROD END DIN ISO 12240-4 series K

Sliding contact surface: steel/bronze - KA ...

Alternative designations

There can be no guarantee made for the exact equality of the bearing between the different manufacturers!

GA(L) ...
GAKFR(L) ... PB
GA(L)S ...
IKA(L) ...
PFE ... D
POS ...
SABP ... S
SAKAC ... M
SAKAC ... M/VZ019
TFA(L) ... MK



Allowable

operating temperature: -50° C to 150° C (inserts to +250° C with loss of service life possible).
Other limitations of the lubricant must be observed!

Lubricant:

Lithium soap multipurpose grease (for restrictions please ask the respective lubricant supplier)

Lubrication nipple:

if provided, funnel grease nipple form D as per DIN 3405

Materials:

Headboard: Galvanized steel
Outer ring: Bronze
Inner ring: Roller bearing steel (**GCr 15**), hardened
Stainless steel versions are available on request!

Characteristic

calculation value:

$F_{head} = 2.75$
Allowable rod end load when swiveling or alternating load: $C_0 \text{ permissible} = C_0 / F_{head}$

Built-in

bearing type:

GE ... PB. Further information concerning these bearings is available on request!

Designation	Main dimensions					Mass m [kg]	Load ratings			Abutment dimensions		Abutment dimensions				
	d [mm]	B [mm]	C ₁ max [mm]	d _k [mm]	≈ α [°]		C [kN]	C ₀ [kN]	≈ d ₁ [mm]	G [mm]	d ₂ max [mm]	h ₁ [mm]	l ₃ min [mm]	l ₄ max [mm]	l ₇ min [mm]	
KA 5	5	8	6,0	11,112	13	0,013	3,52	9,1	7,7	M 5x0,8	18	33	19	42,0	9	
KA 6	6	9	6,75	12,700	13	0,020	4,3	8,0	8,9	M 6x1,0	20	36	21	46,0	10	
KA 8	8	12	9,0	15,875	14	0,033	7,2	13,1	10,3	M 8x1,25	24	42	25	54,0	12	
KA 10	10	14	10,5	19,050	13	0,056	10,0	14,5	12,9	M 10x1,5	28	48	28	62,0	14	
KA 12	12	16	12,0	22,225	13	0,087	13,4	17,0	15,4	M 12x1,25	32	54	32	70,0	16	
KA 14	14	19	13,5	25,400	16	0,150	17,0	24,0	16,8	M 14x2,0	36	60	36	78,0	18	
KA 16	16	21	15,0	28,575	15	0,190	21,6	28,5	19,3	M 16x2,0	42	66	37	87,0	21	
KA 18	18	23	16,5	31,750	15	0,260	26,0	42,5	21,8	M 18x1,5	44	72	41	94,0	23	
KA 20	20	25	18,0	34,925	14	0,350	31,5	42,5	24,3	M 20x1,5	50	78	45	103,0	25	
KA 22	22	28	20,0	38,100	15	0,450	38,0	57,0	25,8	M 22x1,5	54	84	48	111,0	27	
KA 25	25	31	22,0	42,850	15	0,600	47,5	68,0	29,5	M 24x2,0	60	94	55	124,0	30	
KA 30	30	37	25,0	50,800	17	1,030	64,0	88,0	34,8	M 30x2,0	70	110	66	145,0	35	
KA 35	35	43	28,0	57,150	16	1,600	80,0	95,9	37,7	M 36x2,0	81	140	85	180,5	40	

Installation conditions KA ...

Material	Valid for shafts Ø	Surface roughness	Installation adjustment according to clearance group
			CN
Shaft made of steel	5 ≤ d ≤ 35 mm	≤ Rz 10	m6

Limit of the chamfer [mm] KA ...

d [mm]	5 < d ≤ 30	30 < d ≤ 35
r _{1s min} [mm]	0,3	0,6

Clearance groups [µm] KA ...

d [mm]	5 ≤ d ≤ 35
CN	30 to 50

- Designations done in accordance with DIN ISO 12240
- 1) Manufacturer-related deviations of the key width allowed
- The total load capacity is predetermined by the load capacity of the head part C₀ and when under constant load in the radial load direction.
- Designation for left-hand thread: KAL ...
- Other dimensions on request



5.0

5.0 ROD ENDS - maintenance-free

- 5.1 Rod end DIN ISO 12240-4 series E
Sliding contact surface: hard chromium/PTFE composite - EI ... D 74
- 5.2 Rod end DIN ISO 12240-4 series E
Sliding contact surface: hard chromium/PTFE fabric - EI ... D-2RS 76
- 5.3 Rod end DIN ISO 12240-4 series E
Sliding contact surface: hard chromium/PTFE composite - EA ... D 78
- 5.4 Rod end DIN ISO 12240-4 series E
Sliding contact surface: hard chromium/PTFE fabric - EA ... D-2RS 80
- 5.5 Rod end DIN ISO 12240-4 series K + CETOP
Sliding contact surface: steel/PTFE - KI ... D 82
- 5.6 Rod end DIN ISO 12240-4 series K
Sliding contact surface: steel/PTFE - KA ... D 84

- Special dimensions on request
- Rod ends in stainless steel on request
- High-performance rod ends on request [HPE]

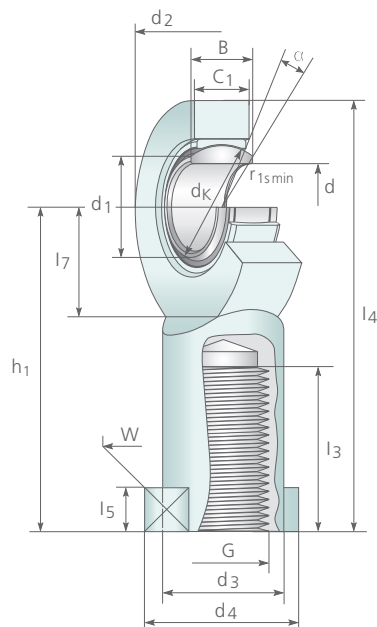
5.1 ROD END DIN ISO 12240-4 series E

Sliding contact surface: hard chromium/PTFE composite - EI ... D

Alternative designations

There can be no guarantee made for the exact equality of the bearing between the different manufacturers!

GIR(L) ... UK
FI(L) ... U
IEI(L) ... W
TFI(L) ... FKB



Allowable

operating temperature: -50° C to +95° C (inserts to +200° C with loss of bearing service life possible).

Materials:

Headboard: Galvanized steel
Outer ring: Steel with inserted PTFE composite slide material
Inner ring: Roller bearing steel (**GCr 15**), hardened, hardened chromed spherical surface

Stainless steel versions are available on request!

Characteristic calculation value:

$F_{head} = 2.0$
Allowable rod end load when swiveling or alternating load: C_0 permissible = C_0 / F_{head}

Built-in bearing type:

GE ... UK. For more information on bearing dimensions, see **GE ... UK**.

Designation	Main dimensions					Mass m [kg]	Load ratings		Abutment dimensions					Abutment dimensions						
	d [mm]	B [mm]	C ₁ max [mm]	d _K [mm]	≈ α [°]		C [kN]	C ₀ [kN]	≈ d ₁ [mm]	G [mm]	d ₂ max [mm]	≈ d ₃ [mm]	d ₄ max [mm]	h ₁ [mm]	l ₃ min [mm]	l ₄ max [mm]	l ₅ min [mm]	l ₇ min [mm]	W1) [mm]	
EI 6 D	6	6	4,4	10,0	13	0,021	3,6	8,1	8,15	M 6 x 1,0	21	11	13	30	11	40,0	5,0	12	11	
EI 8 D	8	8	6,0	13,0	15	0,039	5,85	12,9	10,0	M 8 x 1,25	24	13	16	36	15	48,0	5,0	14	14	
EI 10 D	10	9	7,0	16,0	12	0,061	8,65	17,6	13,0	M 10 x 1,5	29	16	19	43	20	57,0	6,5	15	17	
EI 12 D	12	10	8,0	18,0	11	0,096	11,4	24,5	15,0	M 12 x 1,75	34	19	22	50	23	66,0	6,5	18	19	
EI 15 D	15	12	10,0	22,0	8	0,180	17,6	36,0	18,0	M 14 x 2,0	40	22	26	61	30	80,0	8,0	20	22	
EI 17 D	17	14	11,0	25,0	10	0,220	22,4	45,0	21,0	M 16 x 2,0	46	25	30	67	34	90,0	10,0	23	27	
EI 20 D	20	16	13,0	29,0	9	0,350	31,5	60,0	24,0	M 20 x 1,5	53	28	35	77	40	103,5	10,0	27	32	
EI 25 D	25	20	17,0	35,5	7	0,640	51,0	83,0	29,0	M 24 x 2,0	64	35	42	94	48	126,0	12,0	32	36	
EI 30 D	30	22	19,0	40,7	6	1,050	66,5	110,0	34,0	M 30 x 2,0	73	42	50	110	56	146,5	15,0	37	41	

Installation conditions EI ... D

Material	Valid for shafts Ø	Surface roughness	Installation adjustment according to clearance group
			CN
Shaft made of steel	d ≤ 30 mm	≤ Rz 10	j6

Limit of the chamfer [mm] EI ... D

d [mm]	6 < d ≤ 20	20 < d ≤ 30
r _{1s min} [mm]	0,3	0,6

Clearance groups [µm] EI ... D

d [mm]	6 ≤ d ≤ 12	12 < d ≤ 20	20 < d ≤ 30
CN	0,0 to 0,032	0,0 to 0,040	0,0 to 0,050

- Designations done in accordance with DIN ISO 122400
- 1) Manufacturer-related deviations of the key width permitted
- Designation for left-hand threads: EIL ... D
- Other dimensions on request

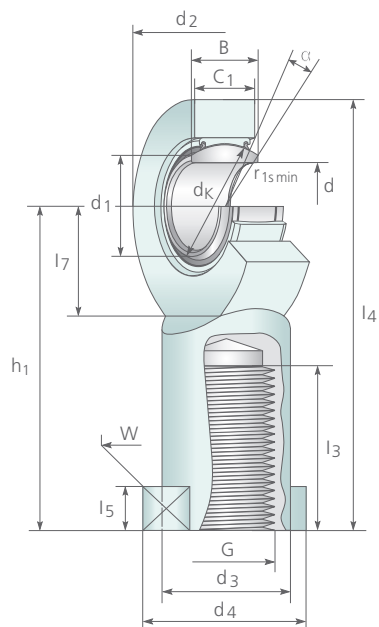
5.2 ROD END DIN ISO 12240-4 series E

Sliding contact surface: hard chromium/PTFE fabric - EI ... D-2RS

Alternative designations

There can be no guarantee made for the exact equality of the bearing between the different manufacturers!

- GIR (L) ... UK2RS
- FI(L) ... U-2RS
- IEI(/L) ... W-2RS
- SI(L) ... ET-2RS
- SI(L)A ... TE-2RS
- TFI(L) ... T-2RS



Allowable

operating temperature: -20°C to +130°C (inserts from -50° C to +150° C without seals and with loss of service life possible).

Materials:

- Headboard: Galvanized steel
 - Outer ring: Roller bearing steel (**GCr 15**), hardened, with inserted PTFE fabric
 - Inner ring: Roller bearing steel (**GCr 15**), hardened, hardened chromed spherical surface
 - Seal: Plastic
- Stainless steel versions are available on request!

Characteristic

calculation value: $F_{head} = 2.0$
 Allowable rod end load when swiveling or alternating load: $C_0 \text{ permissible} = C_0 / F_{head}$

Built-in

bearing type: **GE ... UK-2RS**. For more information on bearing dimensions, see **GE ... UK-2RS**.

Designation	Main dimensions					Mass m [kg]	Load ratings			Abutment dimensions				Abutment dimensions						
	d [mm]	B [mm]	C ₁ max [mm]	dk [mm]	≈ α [°]		C [kN]	C ₀ [kN]	≈ d ₁ [mm]	G [mm]	d ₂ max [mm]	≈ d ₃ [mm]	d ₄ max [mm]	h ₁ [mm]	l ₃ min [mm]	l ₄ max [mm]	l ₅ min [mm]	l ₇ min [mm]	W ¹⁾ [mm]	
EI 20 D-2RS	20	16	13	29,0	9	0,350	31,5	60,0	24	M 20 x 1,5	53	27,5	35	77	40	104	10,0	27	32	
EI 25 D-2RS	25	20	17	35,5	7	0,640	51	83,0	29	M 24 x 2,0	64	33,5	42	94	48	126	12,0	32	36	
EI 30 D-2RS	30	22	19	40,7	6	0,930	66,5	110,0	34	M 30 x 2,0	73	40,0	50	110	56	147	15,0	37	41	
EI 35 D-2RS	35	25	21	47,0	6	1,300	112	146,0	40	M 36 x 3,0	82	4,0	58	125	60	125	15,0	42	50	
EI 40 D-2RS	40	28	23	53,0	7	2,000	140	180,0	45	M 39 x 3,0	92	52,0	65	142	65	166	18,0	48	55	
EI 45 D-2RS	45	32	27	60,0	7	2,500	180	240,0	51	M 42 x 3,0	102	58,0	70	145	65	196	20,0	52	60	
EI 50 D-2RS	50	35	30	66,0	6	3,500	220	290,0	55	M 45 x 3,0	112	62,0	75	160	68	216	20,0	60	65	
EI 60 D-2RS	60	44	38	80,0	6	5,500	345	450,0	67	M 52 x 3,0	135	70,0	88	175	70	243	20,0	75	75	
EI 70 D-2RS	70	49	42	92,0	6	8,600	440	564,0	78	M 56 x 4,0	160	80,0	98	200	80	280	20,0	87	85	
EI 80 D-2RS	80	55	47	105,0	6	12,000	570	689,0	89	M 64 x 4,0	180	95,0	110	230	85	320	25,0	100	100	

Installation conditions EI ... D-2RS

Material	Valid for shafts Ø	Surface roughness	Installation adjustment according to clearance group
			CN
Shaft made of steel	d ≤ 80 mm	≤ Rz 10	j6

Limit of the chamfer [mm] EI ... D-2RS

d [mm]	20 < d ≤ 20	20 < d ≤ 50	50 < d ≤ 80
r 1s min [mm]	0,3	0,6	1,0

Clearance groups [µm] EI ... D-2RS

d [mm]	20 ≤ d ≤ 12	20 < d ≤ 35	35 < d ≤ 60	60 < d ≤ 80
CN	0 to 40	0 to 50	0 to 60	0 to 72

- Designations done in accordance with DIN ISO 12240
- 1) Manufacturer-related deviations of the key width permitted
- Designation for left-hand threads: EIL ... D-2RS
- Other dimensions on request



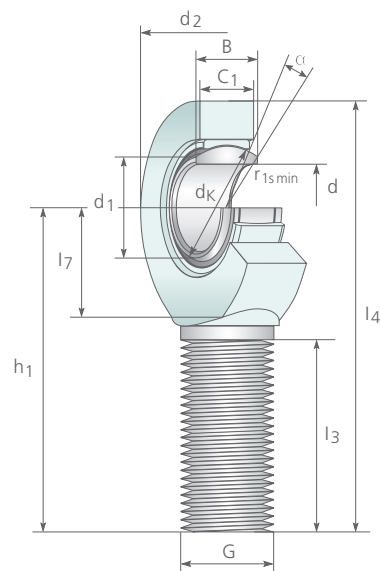
5.3 ROD END DIN ISO 12240-4 series E

Sliding contact surface: hard chromium/PTFE composite - EA ... D

Alternative designations

There can be no guarantee made for the exact equality of the bearing between the different manufacturers!

GAR(L) ... UK
FA(L) ... U
IEA(L) ... W
SA(L) ... C
TFE(L) ... MKB



Allowable

operating temperature: -50° C to +95° C (inserts to +200° C with loss of bearing service life possible).

Materials:

Headboard: Galvanized steel
Outer ring: Steel with inserted PTFE composite slide material
Inner ring: Roller bearing steel (**GCr 15**), hardened, hardened chromed spherical surface

Stainless steel versions are available on request!

Characteristic calculation value:

$F_{head} = 2.0$
Allowable rod end load when swiveling or alternating load: C_0 permissible = C_0 / F_{head}

Built-in bearing type:

GE ... UK. For more information on bearing dimensions, see **GE ... UK**.

Designation	Main dimensions					Mass m [kg]	Load ratings		Abutment dimensions			Abutment dimensions				
	d [mm]	B [mm]	C ₁ max [mm]	d _K [mm]	≈ α [°]		C [kN]	C ₀ [kN]	≈ d ₁ [mm]	G [mm]	d ₂ max [mm]	h ₁ [mm]	l ₃ min [mm]	l ₄ max [mm]	l ₇ min [mm]	
EA 6 D	6	6	4,4	10,0	13	0,018	3,6	8,15	8	M 6 x 1,0	21		30	18	46	12
EA 8 D	8	8	6,0	13,0	15	0,030	5,85	12,9	10	M 8 x 1,25	24		36	22	54	14
EA 10 D	10	9	7,0	16,0	12	0,054	8,65	17,6	13	M 10 x 1,5	29		43	26	62	15
EA 12 D	12	10	8,0	18,0	11	0,086	11,4	24,5	15	M 12 x 1,75	34		50	28	71	18
EA 15 D	15	12	10,0	22,0	8	0,140	17,6	36,0	18	M 14 x 2,0	40		61	34	83	20
EA 17 D	17	14	11,0	25,0	10	0,190	22,4	45,0	21	M 16 x 2,0	46		67	36	92	23
EA 20 D	20	16	13,0	29,0	9	0,310	31,5	60,0	24	M 20 x 1,5	53		77	43	104	27
EA 25 D	25	20	17,0	35,5	7	0,600	51,0	83,0	29	M 24 x 2,0	64		94	53	126	32
EA 30 D	30	22	19,0	40,7	6	0,890	66,5	110,0	34	M 30 x 2,0	73		110	65	181	37

Installation conditions EA ... D

Material	Valid for shafts Ø	Surface roughness	Installation adjustment according to clearance group
			CN
Shaft made of steel	d ≤ 80 mm	≤ Rz 10	j6

Limit of the chamfer [mm] EA ... D

d [mm]	6 < d ≤ 20	20 < d ≤ 30
r 1s min [mm]	0,3	0,6

Clearance groups [µm] EA ... D

d [mm]	6 ≤ d ≤ 12	12 < d ≤ 20	20 < d ≤ 30
CN	0 to 32	0 to 40	0 to 50

- Designations done in accordance with DIN ISO 12240
- 1) Manufacturer-related deviations of the key width permitted
- Designation for left-hand threads: EAL ... D
- Other dimensions on request

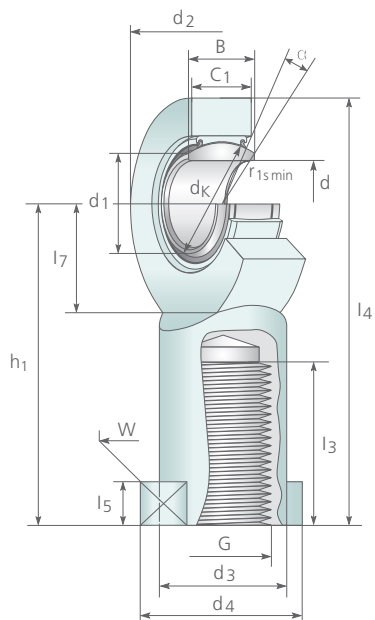
5.4 ROD END DIN ISO 12240-4 series E

Sliding contact surface: hard chromium/PTFE fabric - EA ... D-2RS

Alternative designations

There can be no guarantee made for the exact equality of the bearing between the different manufacturers!

- GAR(L) ... UK-2RS
- FA(L) ... U-2RS
- IEA(L) ... W-2RS
- SA(L) ... ET-2RS
- SA(L)A ... TE-2RS
- TFE(L) ... T-2RS



Allowable

operating temperature: -20°C to +130°C (inserts from -50° C to +150° C without seals and with loss of service life possible).

Materials:

- Headboard: Galvanized steel
 - Outer ring: Roller bearing steel (**GCr 15**), hardened, with inserted PTFE fabric
 - Inner ring: Roller bearing steel (**GCr 15**), hardened, hardened chromed spherical surface
 - Seal: Plastic
- Stainless steel versions are available on request!

Characteristic

calculation value: $F_{head} = 2.0$
 Allowable rod end load when swiveling or alternating load: $C_0 \text{ permissible} = C_0 / F_{head}$

Built-in

bearing type: **GE ... UK-2RS**. For more information on bearing dimensions, see **GE ... UK-2RS**.

Designation	Main dimensions					Mass m [kg]	Load ratings		Abutment dimensions			Abutment dimensions			
	d [mm]	B [mm]	C ₁ max [mm]	d _K [mm]	≈ α [°]		C [kN]	C ₀ [kN]	≈ d ₁ [mm]	G [mm]	d ₂ max [mm]	h ₁ [mm]	l ₃ min [mm]	l ₄ max [mm]	l ₇ min [mm]
EA 20 D-2RS	20	16	13,5	29,0	9	0,310	31,5	60,0	24	M 20 x 1,5	53	78	43	104	27
EA 25 D-2RS	25	20	18,0	35,5	7	0,560	51	83,0	29	M 24 x 2,0	64	94	53	126	32
EA 30 D-2RS	30	22	20,0	40,7	6	0,890	66,5	110,0	34	M 30 x 2,0	73	110	65	146	37
EA 35 D-2RS	35	25	22,0	47,0	6	1,450	112	146,0	40	M 36 x 3,0	82	140	82	181	42
EA 40 D-2RS	40	28	24,0	53,0	7	1,800	140	180,0	45	M 39 x 3,0	92	150	86	196	48
EA 45 D-2RS	45	32	28,0	60,0	7	2,600	180	240,0	51	M 42 x 3,0	102	163	94	214	52
EA 50 D-2RS	50	35	31,0	66,0	6	3,400	220	290,0	56	M 45 x 3,0	112	185	107	241	60
EA 60 D-2RS	60	44	39,0	80,0	6	5,900	345	450,0	67	M 52 x 3,0	135	210	115	277	75
EA 70 D-2RS	70	49	43,0	92,0	6	8,200	440	610,0	78	M 56 x 4,0	160	235	125	315	87
EA 80 D-2RS	80	55	48,0	105,0	6	12,000	570	750,0	89	M 64 x 4,0	180	270	140	360	100

Installation conditions EA ... D-2RS

Material	Valid for shafts Ø	Surface roughness	Installation adjustment according to clearance group
			CN
Shaft made of steel	d ≤ 80 mm	≤ Rz 10	j6

Limit of the chamfer [mm] EA ... D-2RS

d [mm]	20 < d ≤ 20	20 < d ≤ 50	50 < d ≤ 80
r _{1s} min [mm]	0,3	0,6	1,0

Clearance groups [µm] EA ... D-2RS

d [mm]	20 ≤ d ≤ 12	20 < d ≤ 35	35 < d ≤ 60	60 < d ≤ 80
CN	0 to 40	0 to 50	0 to 60	0 to 72

- Designations done in accordance with DIN ISO 12240
- 1) Manufacturer-related deviations of the key width permitted
- Designation for left-hand threads: EAL ... D-2RS
- Other dimensions on request

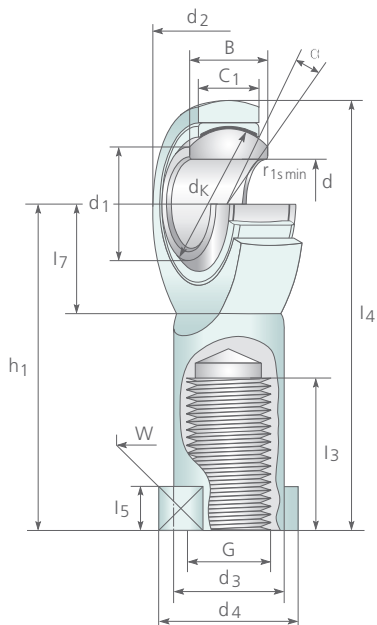
5.5 ROD END DIN ISO 12240-4 series K + CETOP

Sliding contact surface: steel/PTFE - KI ... D

Alternative designations

There can be no guarantee made for the exact equality of the bearing between the different manufacturers!

- GIKFR ... PW
- GIKR ... PW
- GISW ...
- IKI ... W
- PFI ... U
- PHS ... EC
- SIBP ... S
- SIKB ... F
- SIKAC ... M
- SIKAC ... M/VZ019
- TFI ... FKB



Allowable

operating temperature: -60° C to +100° C (inserts to +200° C with loss of bearing service life possible).

Materials:

- Headboard: Galvanized steel
- Outer ring: Bronze/brass lined with PTFE
- Inner ring: Roller bearing steel, hardened
- Stainless steel versions are available on request!

Characteristic calculation value:

$F_{head} = 3.0$
 Allowable rod end load when swiveling or alternating load: $C_0 \text{ permissible} = C_0 / F_{head}$

Built-in bearing type:

GE ... PW. Further information concerning these bearings is available on request!

Designation	Main dimensions					Mass m [kg]	Load ratings		Abutment dimensions					Abutment dimensions						
	d [mm]	B [mm]	C ₁ max [mm]	d _k [mm]	α [°]		C [kN]	C ₀ [kN]	d ₁ [mm]	G [mm]	d ₂ max [mm]	d ₃ [mm]	d ₄ max [mm]	h ₁ [mm]	l ₃ min [mm]	l ₄ max [mm]	l ₅ [mm]	l ₇ min [mm]	W ¹⁾ [mm]	
KI 5 D	5	8	6,0	11,112	13	0,018	6,0	5,7	7,7	M 5 x 0,8	18	8,5	11	27	10	36	4,0	10	9	
KI 6 D	6	9	6,75	12,700	13	0,027	7,65	7,2	8,9	M 6 x 1,0	20	10,0	13	30	12	40	5,0	11	11	
KI 8 D	8	12	9,0	15,875	14	0,046	12,9	11,6	10,3	M 8 x 1,25	24	12,5	16	36	16	48	5,0	13	13	
KI 10 D	10	14	10,5	19,050	13	0,076	18,0	14,5	12,9	M 10 x 1,5	28	15,0	19	43	20	57	6,5	15	17	
KI 12 D	12	16	12,0	22,225	13	0,110	24,0	17,0	15,4	M 12 x 1,75	32	17,5	22	50	22	66	6,5	17	19	
KI 14 D	14	19	13,5	25,400	16	0,170	30,0	24,0	16,8	M 14 x 2,0	36	21,0	26	57	25	75	8,0	18	22	
KI 16 D	16	21	15,0	28,575	15	0,210	39,0	28,5	19,3	M 16 x 2,0	42	22,0	28	64	28	85	8,0	23	22	
KI 18 D	18	23	16,5	31,750	15	0,310	47,5	42,5	21,8	M 18 x 1,5	46	25,0	31	71	32	94	10,0	25	27	
KI 20 D	20	25	18,0	34,925	14	0,410	57,0	42,5	24,3	M 20 x 1,5	50	27,5	35	77	33	102	10,0	26	32	
KI 22 D	22	28	20,0	38,100	15	0,550	68,0	57,0	25,8	M 22 x 1,5	54	30,0	38	84	37	111	12,0	29	32	
KI 25 D	25	31	22,0	42,850	15	0,750	85,0	68,0	29,5	M 24 x 2,0	60	33,5	42	94	42	124	12,0	32	36	
KI 30 D	30	37	25,0	50,800	17	1,150	114,0	88,0	34,8	M 30 x 2,0	70	40,0	50	110	51	145	15,0	37	41	
KI 35 D	35	43	30,0	57,150	16	1,600	206,0	101,0	37,7	M 36 x 2,0	80	46,0	60	125	56	168	18,0	40	50	
According to CETOP RP 103 P													according to CETOP RP 103 P							
KI 5 D M 4	5	8	6,0	11,112	13	0,018	6,0	5,7	7,7	M 4	18	8,5	11	27	10	36	4,0	10	9	
KI 10 D M 10 x 1,25	10	14	10,5	19,050	13	0,076	18,0	14,5	12,9	M 10 x 1,25	28	15,0	19	43	20	57	6,5	15	17	
KI 12 D M 12 x 1,25	12	16	12,0	22,225	13	0,115	24,0	17,0	15,4	M 12 x 1,25	32	17,5	22	50	22	66	6,5	17	19	
KI 16 D M 16 x 1,5	16	21	15,0	28,575	15	0,230	39,0	28,5	19,3	M 16 x 1,5	42	22,0	28	64	28	85	8,0	23	22	
KI 30 D M 27 x 2,0	30	37	25,0	50,800	15	1,130	114,0	88,0	34,8	M 27 x 2,0	70	40,0	50	110	51	145	15,0	37	41	

Installation conditions KI ... D

Material	Valid for shafts Ø	Surface roughness	Installation adjustment according to clearance group
			CN
Shaft made of steel	5 ≤ d ≤ 35 mm	≤ Rz 10	m6

Limit of the chamfer [mm] KI ... D

d [mm]	5 < d ≤ 30	30 < d ≤ 35
r 1s min [mm]	0,3	0,6

Clearance groups [µm] KI ... D

d [mm]	5 ≤ d ≤ 35
CN	30 to 50

- Designations done in accordance with DIN ISO 12240
- The total load capacity is predetermined by the load capacity of the head part C₀ and when under constant load in the radial load direction.
- 1) Manufacturer-related deviations of the key width allowed
- Designation for left-hand thread: KIL ... D / KIL ... D M ...
- Other dimensions on request



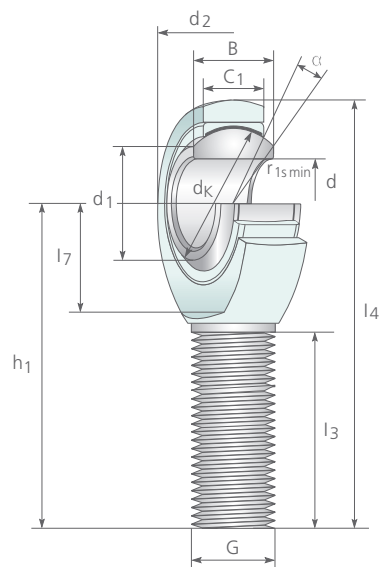
5.6 ROD END DIN ISO 12240-4 series K

Sliding contact surface: steel/PTFE - KA ... D

Alternative designations

There can be no guarantee made for the exact equality of the bearing between the different manufacturers!

GAKFR ... PW
GASW ...
PFE ... D
POS ... EC
IKA ... W
SABP ... S
SAKB ... F
SAKAC ... M
SMCP ...
TFE ... MKB



Allowable

operating temperature: -50° C to +100° C (inserts to +200° C with loss of bearing service life possible).

Materials:

Headboard: Galvanized steel
Outer ring: Bronze/brass lined with PTFE
Inner ring: Roller bearing steel, hardened
Stainless steel versions are available on request!

Characteristic calculation value:

$F_{head} = 3.0$
Allowable rod end load when swiveling or alternating load: $C_0 \text{ permissible} = C_0 / F_{head}$

Built-in

bearing type: **GE ... PW**. Further information concerning these bearings is available on request!

Designation	Main dimensions					Mass m [kg]	Load ratings			Abutment dimensions			Abutment dimensions			
	d [mm]	B [mm]	C ₁ max [mm]	d _k [mm]	≈ α [°]		C [kN]	C ₀ [kN]	≈ d ₁ [mm]	G [mm]	d ₂ max [mm]	h ₁ [mm]	l ₃ min [mm]	l ₄ max [mm]	l ₇ min [mm]	
KA 5 D	5	8	6,0	11,112	13	0,013	6,0	5,7	7,7	M 5 x 0,8	18		33	19	42	9
KA 6 D	6	9	6,75	12,700	13	0,020	7,65	7,2	8,9	M 6 x 1,0	20		36	21	46	10
KA 8 D	8	12	9,0	15,875	14	0,033	12,9	11,6	10,3	M 8 x 1,25	24		42	25	54	12
KA 10 D	10	14	10,5	19,050	13	0,056	18,0	14,5	12,9	M 10 x 1,5	28		48	28	62	14
KA 12 D	12	16	12,0	22,225	13	0,087	24,0	17,0	15,4	M 12 x 1,75	32		54	32	70	16
KA 14 D	14	19	13,5	25,400	16	0,150	33,0	24,0	16,8	M 14 x 2,0	36		60	36	78	18
KA 16 D	16	21	15,0	28,575	15	0,190	39,0	28,5	19,3	M 16 x 2,0	42		66	37	87	21
KA 18 D	18	23	16,5	31,750	15	0,260	47,5	42,5	21,8	M 18 x 1,5	46		72	41	95	23
KA 20 D	20	25	18,0	34,925	15	0,350	57,0	42,5	24,3	M 20 x 1,5	50		78	45	103	25
KA 22 D	22	28	20,0	38,100	15	0,450	68,0	57,0	25,8	M 22 x 1,5	54		84	48	111	27
KA 25 D	25	31	22,0	42,850	15	0,600	85,0	68,0	29,5	M 24 x 2,0	60		94	55	124	30
KA 30 D	30	37	25,0	50,800	17	1,030	114,0	88,0	34,8	M 30 x 2,0	70		110	66	145	35
KA 35 D	35	43	30,0	57,150	16	1,600	122,0	101,0	37,7	M 36 x 2,0	80		140	85	183	40

Installation conditions KA ... D

Material	Valid for shafts Ø	Surface roughness	Installation adjustment according to clearance group
			CN
Shaft made of steel	5 ≤ d ≤ 35 mm	≤ Rz 10	m6

Limit of the chamfer [mm] KA ... D

d [mm]	5 < d ≤ 30	30 < d ≤ 35
r 1s min [mm]	0,3	0,6

Clearance groups [µm] KA ... D

d [mm]	5 ≤ d ≤ 35
CN	30 to 50

- Designations done in accordance with DIN ISO 12240
- The total load capacity is predetermined by the load capacity of the head part C₀ and when under constant load in the radial load direction.
- 1) Manufacturer-related deviations of the key width allowed
- Designation for left-hand thread: KAL ... D
- Other dimensions on request



6.0 HYDRAULIC ROD ENDS - requiring maintenance

6.0

6.1 Hydraulic rod end clampable Sliding contact surface: steel/steel - GIHRK ... DO	88
6.2 Hydraulic rod end clampable DIN ISO 8132 Sliding contact surface: steel/steel - GIHN-K ... LO	90
6.3 Hydraulic rod end - heavy version clampable with spherical plain bearing GE ... ES Sliding contact surface: steel/steel - IGAS	92
6.4 Hydraulic rod end clampable DIN ISO 8133 Sliding contact surface: steel/steel - GIHO-K ... DO	94
6.5 Hydraulic rod end for screwing on Sliding contact surface: steel/steel - GIHR ... DO	96
6.6 Hydraulic rod end for welding on Sliding contact surface: steel/steel - GF ... LO	98
6.7 Hydraulic rod end for welding on Sliding contact surface: steel/steel - GF ... DO	100
6.8 Hydraulic rod end for welding on Sliding contact surface: steel/steel - GK ... DO	102

- Special rod ends on request
- Special materials on request
- Rod ends with maintenance-free design
- Processing and conversion as requested by customer

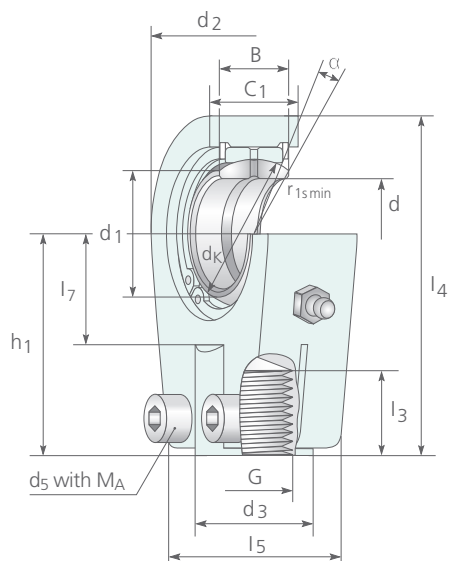
6.1 HYDRAULIC ROD END CLAMPABLE

Sliding contact surface: steel/steel - GIHRK ... DO

Alternative designations

There can be no guarantee made for the exact equality of the bearing between the different manufacturers!

- CGAK ...
- FPR ... U
- IHGK(L) ... U
- PR ... U
- SIR ... ES
- TAPR ... U
- WAPR ... U



Allowable

operating temperature: -60° C to +150° C (up to +200°C with possible reduction of life).
Please consider further restrictions caused by the lubricant!

Lubricant:

Lithium soap multipurpose grease with 3% MoS₂
(for restrictions please ask the respective lubricant supplier)

Lubrication nipple:

if provided, taper lubricating nipple form A as per DIN 71412

Materials:

- Headboard:** Steel up to d ≤ 50 mm, according to the manufacturer's steel or cast iron for d ≥ 63 mm
- Outer ring:** Roller bearing steel, hardened, manganese phosphate
- Inner ring:** Roller bearing steel, hardened, manganese phosphate
- Retaining rings:** Spring steel
- Lubrication nipple:** if assigned, taper type lubrication nipple type A according to DIN 71412
- Clamping screws DIN EN ISO 4762:** Steel screws

Characteristic

calculation value:

- F_{head} = 3.0
- Allowable rod end load when swiveling or alternating load: **C₀ permissible = C₀ / F_{head}**

Built-in

bearing type:

GE ... ES. For more information on bearing dimensions, see GE ... ES.

Designation	Main dimensions					Mass m [kg]	Load ratings			Abutment dimensions					Abutment dimensions				
	d [mm]	B [mm]	C ₁ max [mm]	d _k [mm]	≈ α [°]		C [kN]	C ₀ [kN]	≈ d ₁ [mm]	G [-]	d ₂ max [mm]	d ₃ max [mm]	h ₁ [mm]	l ₃ min [mm]	l ₄ max [mm]	l ₅ max [mm]	l ₇ min [mm]	d ₅ 1) [-]	M _A [Nm]
GIHRK 20 DO	20	16	19,5	29,0	9	0,43	30	72	24	M 16 x 1,5	56	26,5	50	17	80	46	25	M 8 x 20	25
GIHRK 25 DO	25	20	23,5	35,5	7	0,48	48	72	29	M 16 x 1,5	58	26,5	50	17	80	46	28	M 8 x 25	25
GIHRK 30 DO	30	22	28,5	40,7	6	0,74	62	106	34	M 22 x 1,5	64	34,0	60	23	94	50	30	M 8 x 25	25
GIHRK 35 DO	35	25	30,5	47,0	6	1,20	80	153	40	M 28 x 1,5	78	42,0	70	29	112	66	38	M 10 x 30	49
GIHRK 40 DO	40	28	35,5	53,0	7	2,15	100	250	45	M 35 x 1,5	94	51,0	85	36	135	76	45	M 10 x 35	49
GIHRK 50 DO	50	35	40,5	66,0	6	3,80	156	365	56	M 45 x 1,5	116	63,5	105	46	168	90	55	M 12 x 35	86
GIHRK 60 DO	60	44	50,5	80,0	6	6,55	245	400	67	M 58 x 1,5	130	77,5	130	59	200	120	65	M 16 x 45	210
GIHRK 70 DO	70	49	55,5	92,0	6	9,95	315	540	78	M 65 x 1,5	154	89,0	150	66	232	130	75	M 16 x 50	210
GIHRK 80 DO	80	55	60,5	105,0	6	14,00	400	670	89	M 80 x 2,0	176	109,0	170	81	265	160	80	M 20 x 55	410
GIHRK 90 DO	90	60	65,5	115,0	5	20,80	490	980	98	M 100 x 2,0	206	128,0	210	101	323	180	90	M 20 x 60	410
GIHRK 100 DO	100	70	70,5	130,0	7	32,40	610	1120	109	M 110 x 2,0	231	142,0	235	111	360	200	105	M 24 x 65	710
GIHRK 110 DO	110	70	80,5	140,0	6	48,00	655	1700	121	M 120 x 3,0	266	157,0	265	125	407,5	220	115	M 24 x 80	710
GIHRK 120 DO	120	85	90,5	160,0	6	78,00	950	2900	135	M 130 x 3,0	340	177,0	310	135	490	257	140	M 24 x 85	710

Installation conditions GIHRK ... DO

Material	Valid for shafts Ø	Surface roughness	Installation adjustment according to clearance group		
			C2	CN	C3
Shaft made of steel	20 ≤ d ≤ 120 mm	≤ Rz 10	j6	m6	m6

Limit of the chamfer [mm] GIHRK ... DO

d [mm]	d ≤ 20	20 < d ≤ 50	50 < d ≤ 120
r 1s min [mm]	0,3	0,6	1,0

Clearance groups [µm] GIHRK ... DO

d [mm]	12 < d ≤ 20	20 < d ≤ 32	32 < d ≤ 50	50 < d ≤ 90	90 < d ≤ 120
CN	30 to 82	37 to 100	43 to 120	55 to 142	65 to 165

- 1) Notice: Position the clamping screws (d₅) (one or both sides) selected by the manufacturer. Tightening torques see above specifications
- Designation for left-hand thread: GIHLK ... DO
- Other dimensions on request

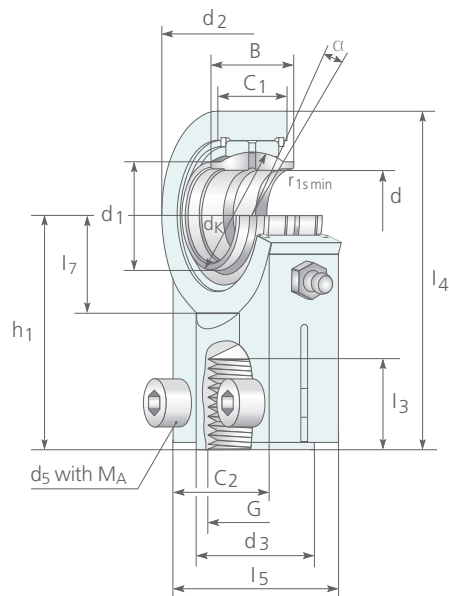
6.2 HYDRAULIC ROD END CLAMPABLE DIN ISO 8132

Sliding contact surface: steel/steel - GIHN-K ... LO

Alternative designations

There can be no guarantee made for the exact equality of the bearing between the different manufacturers!

- CGKD ...
- FPR ... CE
- IHGK ... CE
- GIHNR(L)K ... LO
- PR ... CE
- SIGEW ... ES
- SIQG ... ES
- TAPR ... CE
- WAPR ... CE



Allowable

operating temperature: -60° C to +150° C (up to +200°C with possible reduction of life).
Please consider further restrictions caused by the lubricant!

Lubricant:

Lithium soap multipurpose grease with 3% MoS₂
(for restrictions please ask the respective lubricant supplier)

Lubrication nipple:

if provided, taper lubricating nipple form A as per DIN 71412

Materials:

- Headboard:** Steel up to $d \leq 50$ mm, according to the manufacturer's steel or cast iron for $d \geq 63$ mm
- Outer ring:** Roller bearing steel, hardened, manganese phosphate
- Inner ring:** Roller bearing steel, hardened, manganese phosphate
- Retaining rings:** Spring steel
- Lubrication nipple:** if assigned, taper type lubrication nipple type A according to DIN 71412
- Clamping screws DIN EN ISO 4762:** Steel screws

Characteristic

calculation value:

$F_{head} = 3.0$
Allowable rod end load when swiveling or alternating load: **C₀ permissible = C₀ / F_{head}**

Built-in

bearing type:

GE ... ES. For more information on bearing dimensions, see **GE ... ES**.

Designation	Main dimensions					Mass m [kg]	Load ratings		Abutment dimensions						Abutment dimensions					
	d [mm]	B [mm]	C ₁ max [mm]	d _K [mm]	≈ α [°]		C [kN]	C ₀ [kN]	≈ d ₁ [mm]	G [-]	d ₂ max [mm]	d ₃ max [mm]	h ₁ [mm]	l ₃ min [mm]	l ₄ max [mm]	l ₅ max [mm]	l ₇ min [mm]	C ₂ max [mm]	d ₅ 1) [-]	M _A [Nm]
GIHN-K 12 LO*)	12	12	11	18,0	4	0,10	10,8	24,5	15,5	M 12 x 1,25	33	17,0	38	17	55,5	32	14	10,6	M 5 x 16	6
GIHN-K 16 LO	16	16	13	23,0	4	0,21	17,6	36,5	20,0	M 14 x 1,5	32	22,5	44	19	64,5	40	18	13,0	M 6 x 14	10
GIHN-K 20 LO	20	20	17	29,0	4	0,35	30,0	48,0	25,0	M 16 x 1,5	40	26,5	52	23	77,5	47	22	17,0	M 8 x 20	25
GIHN-K 25 LO	25	25	21	35,5	4	0,65	48,0	78,0	30,5	M 20 x 1,5	47	32,0	65	29	97,0	54	27	17,0	M 8 x 20	25
GIHN-K 32 LO	32	32	27	44,0	4	1,20	67,0	114,0	38,0	M 27 x 2,0	58	40,0	80	37	120,0	66	32	22,0	M 10 x 25	49
GIHN-K 40 LO	40	40	32	53,0	4	2,00	100,0	204,0	46,0	M 33 x 2,0	70	49,0	97	46	147,0	80	41	26,0	M 10 x 30	49
GIHN-K 50 LO	50	50	40	66,0	4	3,75	156,0	310,0	57,0	M 42 x 2,0	89	60,5	120	57	181,0	96	50	32,0	M 12 x 35	86
GIHN-K 63 LO	63	63	52	83,0	4	7,25	255,0	430,0	71,5	M 48 x 2,0	108	72,5	140	64	213,0	114	62	38,0	M 16 x 40	210
GIHN-K 70 LO 2)	70	70	57	92,0	4	11,05	315,0	540,0	79,0	M 56 x 2,0	132	83,0	160	76	247,0	135	70	42,0	M 16 x 40	210
GIHN-K 80 LO	80	80	66	105,0	4	15,15	400,0	605,0	91,0	M 64 x 3,0	155	93,0	180	86	272,0	148	78	48,0	M 20 x 50	410
GIHN-K 90 LO 2)	90	90	72	115,0	4	19,70	490,0	750,0	99,0	M 72 x 3,0	168	103,5	195	91	298,0	160	85	52,0	M 20 x 60	410
GIHN-K 100 LO	100	100	84	130,0	4	25,50	610,0	1060,0	113,0	M 80 x 3,0	185	114,0	210	96	324,0	178	98	62,0	M 24 x 60	710
GIHN-K 110 LO 2)	110	110	88	140,0	4	32,50	655,0	1200,0	124,0	M 90 x 3,0	210	129,0	235	106	366,0	190	105	62,0	M 24 x 60	710
GIHN-K 125 LO	125	125	102	160,0	4	46,00	950,0	1430,0	138,0	M 100 x 3,0	262	139,0	260	113	407,0	200	120	72,0	M 24 x 70	710
GIHN-K 160 LO	160	160	130	200,0	4	82,50	1370,0	2200,0	177,0	M 125 x 4,0	326	170,0	310	126	490,0	250	150	82,0	M 24 x 80	710
GIHN-K 200 LO	200	200	162	250,0	4	168,00	2120,0	3650,0	221,0	M 160 x 4,0	418	221,0	390	161	623,0	320	195	102,0	M 30 x 100	1500

Installation conditions GIHN-K ... LO

Material	Valid for shafts Ø	Surface roughness	Installation adjustment according to clearance group		
			C2	CN	C3
Shaft made of steel	12 ≤ d ≤ 320 mm	≤ Rz 10	j6	m6	m6

Limit of the chamfer [mm] GIHN-K ... LO

d [mm]	12 ≤ d ≤ 20	20 < d ≤ 50	50 < d ≤ 160	160 < d ≤ 200
r 1s min [mm]	0,3	0,6	1,0	1,1

Clearance groups [µm] GIHN-K ... LO

d [mm]	12	12 < d ≤ 20	20 < d ≤ 32	32 < d ≤ 50	50 < d ≤ 90	90 < d ≤ 125	125 < d ≤ 200
CN	23 to 68	30 to 82	37 to 100	43 to 120	55 to 142	65 to 165	65 to 192

- *) Rod end cannot be relubricated
- 1) Notice: Position the clamping screws (d5) (one or both sides) selected by the manufacturer. Tightening torques see above specifications
- 2) Not included in DIN 24338
- Designation for left-hand thread: GIHNL-K ... LO
- Other dimensions on request

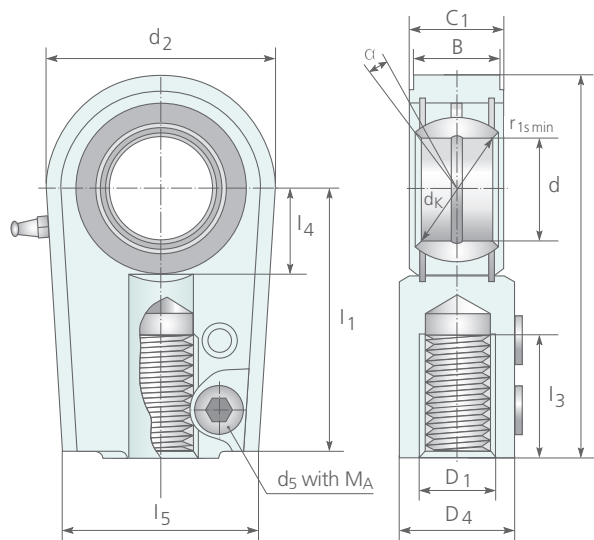
6.3 HYDRAULIC ROD END - HEAVY VERSION CLAMPABLE WITH SPHERICAL PLAIN BEARING GE ... ES

Sliding contact surface: steel/steel - IGAS ...

Alternative designations

There can be no guarantee made for the exact equality of the bearing between the different manufacturers!

- CGAS ...
- CGAS ... DO
- FMA ... D
- MA ... D
- TAPR ... U GAS
- WGAS ...



Allowable

operating temperature: -55° C to +150° C (inserts to +250° C with loss of bearing service life possible).
Other limitations of the lubricant must be observed!

Lubricant:

Lithium soap multipurpose grease with 3% MoS₂
(for restrictions please ask the respective lubricant supplier)

Lubrication nipple:

if provided, taper lubricating nipple form A as per DIN 71412

Materials:

- Headboard: Steel up to d ≤ 60 mm, according to the manufacturer's steel or cast iron for d ≥ 70 mm
- Outer ring: Roller bearing steel, hardened, manganese phosphate
- Inner ring: Roller bearing steel, hardened, manganese phosphate
- Retaining rings: Spring steel
- Lubrication nipple: if assigned, taper type lubrication nipple type A according to DIN 71412
- Clamping screws DIN EN ISO 4762: Steel screws

Characteristic

calculation value: F_{head} = 3.0
Allowable rod end load when swiveling or alternating load: **C₀ permissible = C₀ / F_{head}**

Built-in

bearing type: **GE ... ES.** For more information on bearing dimensions, see **GE ... ES.**

Tightening torque/tightening sequence clamping screws - with one-sided screw connection

Tightening sequence: lower screw, upper screw, lower screw, upper screw tightening sequence (see table values).

Note: The joint head must always be screwed against the shoulder of the piston rod.

Thereafter, the clamping screws must be tightened to the specified torque!

Designation	Main dimensions					Mass m [kg]	Load ratings			Abutment dimensions					Abutment dimensions				
	d [mm]	B [mm]	C ₁ [mm]	d _k [mm]	α [°]		C [kN]	C ₀ [kN]	D ₁ [-]	d ₂ [mm]	D ₄ [mm]	l ₁ [mm]	l ₃ min [mm]	l [mm]	l ₅ [mm]	l ₄ [mm]	d ₅ [-]	M _A [Nm]	
IGAS 25	25	20	23	35,5	7	0,65	48	82	M 18 x 2	56	28,0	65	30	95	48	25	M 8	20	
IGAS 30	30	22	28	40,7	6	1,00	62	122	M 24 x 2	64	34,0	75	35	109	56	30	M 8	20	
IGAS 35	35	25	30	47,0	6	1,50	79	177	M 30 x 2	78	45,0	90	45	132	70	40	M 10	40	
IGAS 40	40	28	35	53,0	7	2,40	99	287	M 39 x 3	94	56,5	105	55	155	78	45	M 12	80	
IGAS 50	50	35	40	66,0	6	4,40	156	422	M 50 x 3	116	70,0	135	75	198	88	55	M 12	80	
IGAS 60	60	44	50	80,0	6	8,60	245	522	M 64 x 3	130	87,0	170	95	240	118	65	M 16	160	
IGAS 70	70	49	55	92,0	6	12,10	313	707	M 80 x 3	154	110,0	195	110	278	138	75	M 16	160	
IGAS 80	80	55	60	105,0	6	18,60	400	870	M 90 x 3	176	128,0	210	120	305	168	80	M 20	300	
IGAS 90	90	60	65	115,0	5	27,00	488	1284	M 100 x 3	206	152,0	250	140	363	180	90	M 20	300	
IGAS 100	100	70	70	130,0	7	36,50	607	1460	M 110 x 4	230	170,0	275	150	400	188	105	M 20	300	
IGAS 110	110	70	80	140,0	6	49,00	654	2024	M 120 x 4	264	180,0	300	160	442	210	115	M 24	500	
IGAS 120	120	85	90	160,0	6	88,00	950	2970	M 150 x 4	340	210,0	360	190	540	240	140	M 24	500	
IGAS 140	140	90	110	180,0	7	130,00	1070	3350	M 160 x 4	380	230,0	420	200	620	256	185	M 30	1100	
IGAS 160	160	105	110	200,0	8	185,00	1360	4302	M 180 x 4	480	260,0	450	220	710	290	200	M 30	1100	

Installation conditions IGAS ...

Material	Valid for shafts Ø	Surface roughness	Installation adjustment according to clearance group		
			C2	CN	C3
Shaft made of steel	25 ≤ d ≤ 120 mm	≤ Rz 10	j6	m6	m6

Limit of the chamfer [mm] IGAS ...

d [mm]	25 < d ≤ 50	50 < d ≤ 100
r _{1smin} [mm]	0,6	1,0

Clearance groups [µm] IGAS ...

d [mm]	25 ≤ d ≤ 30	30 < d ≤ 50	50 < d ≤ 80	80 < d ≤ 100
CN	37 to 100	43 to 120	55 to 142	65 to 165

- Designation for left-hand thread: IGASL ...
- Other dimensions on request

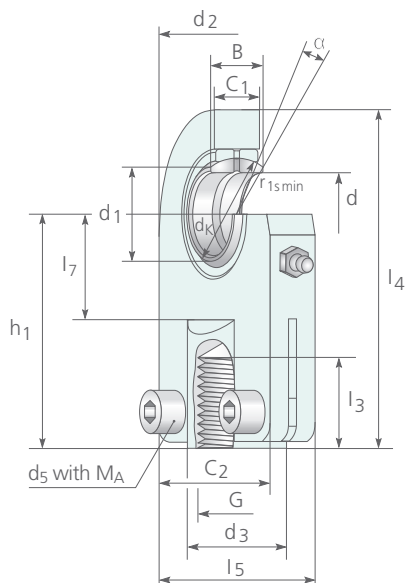
6.4 HYDRAULIC ROD END CLAMPABLE DIN ISO 8133

Sliding contact surface: steel/steel - GIHO-K ... DO

Alternative designations

There can be no guarantee made for the exact equality of the bearing between the different manufacturers!

- CGKA ...
- FPR ... S
- IHGK ... S
- GIHOR(L)K ... DO
- KD-...
- PR ... S
- SIJ ... ES
- SIQ ... E
- SIQ ... ES
- TAPR ... S
- WAPR ... S



Allowable

operating temperature: -60° C to 130° C (inserts to 200° C without seals and from +150° C with loss of bearing service life possible). Other limitations of the lubricant must be observed!

Lubricant:

Lithium soap multipurpose grease with 3% MoS₂
(for restrictions please ask the respective lubricant supplier)

Lubrication nipple:

if provided, taper lubricating nipple form A as per DIN 71412

Materials:

- Headboard: Steel up to $d \leq 50$ mm, according to the manufacturer's steel or cast iron for $d \geq 60$ mm
- Outer ring: Roller bearing steel, hardened, manganese phosphate
- Inner ring: Roller bearing steel, hardened, manganese phosphate
- Retaining rings: Spring steel
- Lubrication nipple: if assigned, taper type lubrication nipple type A according to DIN 71412
- Clamping screws DIN EN ISO 4762: Steel screws

Characteristic

calculation value: $F_{head} = 2.25$
Allowable rod end load when swiveling or alternating load: C_0 permissible = C_0 / F_{head}

Built-in

bearing type: **GE ... ES**. For more information on bearing dimensions, see **GE ... ES**.

Tightening torque/tightening sequence clamping screws - with one-sided screw connection

- Tightening sequence:
- First screw 2% of the specified value
 - Second screw 2% of the specified value
 - First screw 33% of the specified value
 - Second screw 100% of the specified value
 - First screw 100% of the specified value (see table values)
- (For the values please see data sheet)

Designation	Main dimensions					Mass m [kg]	Load ratings		Abutment dimensions						l ₅ max [mm]	l ₇ min [mm]	C ₂ max [mm]	d ₅ [-]	M _A [Nm]	
	d [mm]	B [mm]	C ₁ [mm]	d _K [mm]	α [°]		C [kN]	C ₀ [kN]	d ₁ [mm]	G [-]	d ₂ max [mm]	d ₃ max [mm]	h ₁ [mm]	l ₃ min [mm]						l ₄ max [mm]
GIHO-K 12 DO	12	10	8	18,0	11	0,20	10,8	17,0	15	M 10 x 1,25	35	17	42	15	58,0	40	16	13	M 6 x 14	10
GIHO-K 16 DO	16	14	11	25,0	10	0,25	21,2	28,5	21	M 12 x 1,25	45	21	48	17	69,0	45	20	13	M 6 x 14	10
GIHO-K 20 DO	20	16	13	29,0	9	0,40	30,0	42,5	24	M 14 x 1,5	55	25	58	19	83,0	55	25	17	M 8 x 18	25
GIHO-K 25 DO	25	20	17	35,5	7	0,70	48,0	67,0	29	M 16 x 1,5	65	30	68	23	99,0	62	30	17	M 8 x 18	25
GIHO-K 30 DO	30	22	19	40,7	5	1,20	62,0	108,0	34	M 20 x 1,5	80	36	85	29	123,0	80	35	19	M 10 x 20	49
GIHO-K 40 DO	40	28	23	53,0	7	2,20	100,0	156,0	45	M 27 x 2,0	100	45	105	37	153,0	90	45	23	M 10 x 25	49
GIHO-K 50 DO	50	35	30	66,0	6	4,20	156,0	245,0	56	M 33 x 2,0	120	55	130	46	188,0	105	58	30	M 12 x 30	86
GIHO-K 60 DO	60	44	38	80,0	6	8,25	245,0	380,0	67	M 42 x 2,0	160	68	150	57	225,0	134	68	38	M 16 x 40	210
GIHO-K 80 DO	80	55	47	105,0	6	15,60	400,0	585,0	89	M 48 x 2,0	205	90	185	64	282,5	156	92	47	M 20 x 50	410
GIHO-K 100 DO	100	70	55	130,0	6	27,90	610,0	865,0	109	M 64 x 3,0	240	110	240	86	357,5	190	116	57	M 24 x 60	710

Installation conditions GIHO-K ... DO

Material	Valid for shafts Ø	Surface roughness	Installation adjustment according to clearance group		
			C2	CN	C3
Shaft made of steel	25 ≤ d ≤ 120 mm	≤ Rz 10	j6	m6	m6

Limit of the chamfer [mm] GIHO-K ... DO

d [mm]	12 ≤ d ≤ 20	20 < d ≤ 50	50 < d ≤ 100
r _{1s min} [mm]	0,3	0,6	1,0

Clearance groups [µm] GIHO-K ... DO

d [mm]	12	12 < d ≤ 20	20 < d ≤ 30	30 < d ≤ 50	50 < d ≤ 80
CN	23 to 68	30 to 82	37 to 100	43 to 120	55 to 142

- Please note: position of clamping screws (d₅) (single- or double-sided) depending on producer
- *) rod end not regreasable
- **) rod end only regreasable by lubrication hole
- Designation for left-hand thread: GIHO-KL ... DO
- Other dimensions on request

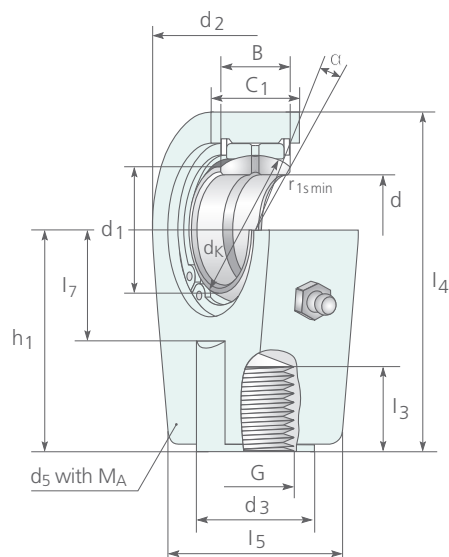
6.5 HYDRAULIC ROD END FOR SCREWING ON

Sliding contact surface: steel/steel - GIHR ... DO

Alternative designations

There can be no guarantee made for the exact equality of the bearing between the different manufacturers!

- CGA ...
- FPR ... N
- IHGK ... N
- PR ... N
- SIRD ... ES
- TAPR ... N
- WAPR ... N



Allowable

operating temperature: -60°C to +150°C (inserts to +200° C with loss of bearing service life possible).
Other limitations of the lubricant must be observed!

Lubricant:

Lithium soap multipurpose grease with 3% MoS₂
(for restrictions please ask the respective lubricant supplier)

Lubrication nipple:

if provided, selected by the manufacturer

Materials:

- Headboard:** Steel up to $d \leq 50$ mm, according to the manufacturer's steel or cast iron for $d \geq 63$ mm
- Outer ring:** Roller bearing steel, hardened, manganese phosphate
- Inner ring:** Roller bearing steel, hardened, manganese phosphate
- Retaining rings:** Spring steel
- Lubrication nipple:** if assigned, depending on producer

Characteristic

calculation value:

$F_{head} = 3.0$
Allowable rod end load when swiveling or alternating load: **C₀ permissible = C₀ / F_{head}**

Built-in

bearing type:

GE ... ES. For more information on bearing dimensions, see **GE ... ES.**

Designation	Main dimensions					Mass m [kg]	Load ratings		Abutment dimensions						Abutment dimensions				
	d [mm]	B [mm]	C ₁ max [mm]	d _K [mm]	$\approx \alpha$ [°]		C [kN]	C ₀ [kN]	$\approx d_1$ [mm]	G [-]	d ₂ max [mm]	d ₃ max [mm]	h ₁ [mm]	l ₃ min [mm]	l ₄ min [mm]	l ₅ max [mm]	l ₇ min [mm]	d ₅ [-]	M _A [Nm]
GIHR 20 DO	20	16	19,5	29,0	9	0,45	30	81	24	M 16 x 1,5	56	26,5	50	17	78,0	46	25	M 6 x 16	13
GIHR 25 DO	25	20	23,5	35,5	7	0,50	48	72	29	M 16 x 1,5	56	26,5	50	17	78,0	46	28	M 6 x 20	13
GIHR 30 DO	30	22	28,5	40,7	6	0,75	62	106	34	M 22 x 1,5	64	34,0	60	23	92,0	50	30	M 6 x 25	13
GIHR 35 DO	35	25	30,5	47,0	6	1,25	80	153	39	M 28 x 1,5	78	42,0	70	29	109,0	66	38	M 8 x 25	32
GIHR 40 DO	40	28	35,5	53,0	7	2,15	100	250	45	M 35 x 1,5	94	51,0	85	36	132,0	76	45	M 8 x 30	32
GIHR 50 DO	50	35	40,5	66,0	6	3,80	156	365	55	M 45 x 1,5	116	63,5	105	46	163,0	90	55	M 10 x 35	64
GIHR 60 DO	60	44	50,5	80,0	6	6,60	245	400	66	M 58 x 1,5	130	77,5	130	59	200,0	120	65	M 10 x 45	46
GIHR 70 DO	70	49	55,5	92,0	6	9,80	315	540	77	M 65 x 1,5	154	89,0	150	66	232,0	130	75	M 12 x 50	80
GIHR 80 DO	80	55	60,5	105,0	6	14,15	400	670	88	M 80 x 2,0	176	109,0	170	81	265,0	160	80	M 16 x 50	195
GIHR 90 DO	90	60	65,5	115,0	5	23,60	490	980	98	M 100 x 2,0	206	128,0	210	101	323,0	180	90	M 16 x 60	195
GIHR 100 DO	100	70	70,5	130,0	7	32,65	610	1120	109	M 110 x 2,0	230	142,0	235	111	360,0	200	105	M 20 x 60	385
GIHR 110 DO	110	70	80,5	140,0	6	47,50	655	1700	120	M 120 x 3,0	265	157,0	265	125	407,5	220	115	M 20 x 70	385
GIHR 120 DO	120	85	90,5	160,0	6	78,00	950	2900	130	M 130 x 3,0	340	177,0	310	135	490,0	257	140	M 24 x 80	660

Installation conditions GIHR ... DO

Material	Valid for shafts Ø	Surface roughness	Installation adjustment according to clearance group		
			C2	CN	C3
Shaft made of steel	20 ≤ d ≤ 120 mm	≤ Rz 10	j6	m6	m6

Limit of the chamfer [mm] GIHR ... DO

d [mm]	d ≤ 20	20 < d ≤ 50	50 < d ≤ 120
r 1s min [mm]	0,3	0,6	1,0

Clearance groups [µm] GIHR ... DO

d [mm]	12 < d ≤ 20	20 < d ≤ 32	32 < d ≤ 50	50 < d ≤ 90	90 < d ≤ 120
CN	30 to 82	37 to 100	43 to 120	55 to 142	65 to 165

- Please note: position of clamping screws (d₅) (single- or double-sided) depending on producer
- Designation for left-hand thread: GIHL ... DO
- Other dimensions on request

6.6 HYDRAULIC ROD END FOR WELDING ON

Sliding contact surface: steel/steel - GF ... LO

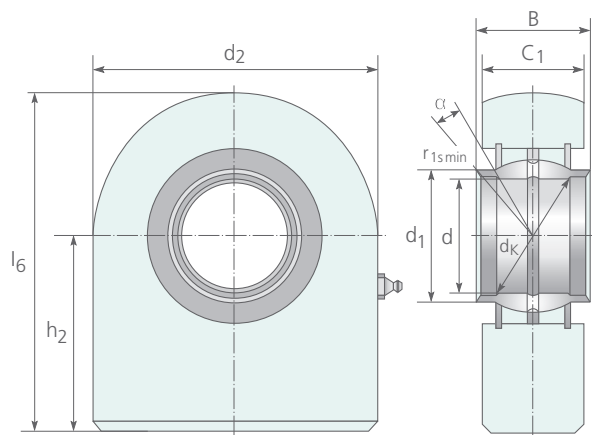
Alternative designations

There can be no guarantee made for the exact equality of the bearing between the different manufacturers!

IHAGK ... CE-N

TS ... CE-N

WS ... CE-N



Allowable

operating temperature: -60°C to +150°C (inserts to +200° C with loss of bearing service life possible).
Other limitations of the lubricant must be observed!

Lubricant:

Lithium soap multipurpose grease with 3% MoS₂
(for restrictions please ask the respective lubricant supplier)

Lubrication nipple:

if provided, taper lubricating nipple form A as per DIN 71412

Materials:

Headboard: Steel St 52-3
Outer ring: Roller bearing steel, hardened, manganese phosphate
Inner ring: Roller bearing steel, hardened, manganese phosphate

Characteristic

calculation value:

$F_{head} = 2.25$
Allowable rod end load when swiveling or alternating load: **C₀ permissible = C₀ / F_{head}**

Built-in

bearing type: GE ... LO. For more information on bearing dimensions, see **GE ... LO**.

Designation	Main dimensions					Mass m [kg]	Load ratings		Abutment dimensions			
	d [mm]	B [mm]	C ₁ max [mm]	d _k [mm]	≈ α [°]		C [kN]	C ₀ [kN]	≈ d ₁ [mm]	d ₂ max [mm]	h ₂ [mm]	l ₆ max [mm]
GF 16 LO	16	16	17,5	23,0	4	0,30	17	40	20,0	48	35	59,0
GF 20 LO	20	20	19,0	29,0	4	0,36	30	74	25,0	50	38	63,0
GF 25 LO	25	25	23,0	35,5	4	0,54	48	95	30,5	55	45	72,5
GF 32 LO	32	32	27,0	44,0	4	1,12	62,5	168	38,0	70	65	100,0
GF 40 LO	40	40	35,0	53,0	4	2,50	100	268	46,0	100	69	119,0
GF 50 LO	50	50	40,0	66,0	4	4,60	156	362	57,0	123	88	149,5
GF 63 LO	63	63	50,0	83,0	4	9,30	248	570	71,5	145	107	179,5
GF 70 LO	70	70	55,0	92,0	4	11,25	315	800	79,0	164	115	197,0
GF 80 LO	80	80	60,0	105,0	4	15,75	400	874	91,0	180	141	231,0
GF 90 LO	90	90	65,0	115,0	4	24,00	490	1045	99,0	226	150	263,0
GF 100 LO	100	100	70,0	130,0	4	33,95	610	1330	113,0	250	170	295,0
GF 110 LO	110	110	80,0	140,0	4	49,00	655	1490	124,0	295	185	332,5

Installation conditions GF ... LO

Material	Valid for shafts Ø	Surface roughness	Installation adjustment according to clearance group
			C3
Shaft made of steel	≤ 120 mm	≤ Rz 10	m6

Limit of the chamfer [mm] GF ... LO

d [mm]	d ≤ 20	d ≤ 50	d ≤ 120
r 1s min [mm]	0,3	0,6	1,0

Clearance groups [µm] GF ... LO

d [mm]	d ≤ 20 mm	12 < d ≤ 20 mm	20 < d ≤ 35 mm
CN	23 to 68	30 to 82	37 to 100

d [mm]	35 < d ≤ 60 mm	60 < d ≤ 80 mm	80 < d ≤ 120 mm
CN	43 to 120	55 to 142	65 to 165

- Other dimensions on request

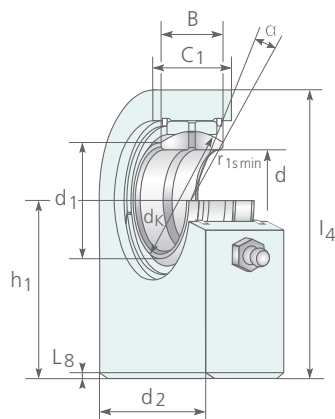
6.7 HYDRAULIC ROD END FOR WELDING ON

Sliding contact surface: steel/steel - GF ... DO

Alternative designations

There can be no guarantee made for the exact equality of the bearing between the different manufacturers!

- FS ... N
- IHAGK ... N
- S ... N
- SCF ... ES
- SF ... ES
- TS ... N
- WS ... N



Allowable

operating temperature: -60°C to +150°C (inserts to +200° C with loss of bearing service life possible).
Other limitations of the lubricant must be observed!

Lubricant:

Lithium soap multipurpose grease with 3% MoS₂
(for restrictions please ask the respective lubricant supplier)

Lubrication nipple:

if provided, taper lubricating nipple form A as per DIN 71412

Materials:

Headboard: Steel St 52-3
Outer ring: Roller bearing steel, hardened, manganese phosphate
Inner ring: Roller bearing steel, hardened, manganese phosphate

Characteristic

calculation value:

F head = 2.25
Allowable rod end load when swiveling or alternating load: **C₀ permissible = C₀ / F head**

Built-in

bearing type:

GE ... ES. For more information on bearing dimensions, see **GE ... ES.**

Designation	Main dimensions					Mass m [kg]	Load ratings			L ₈ [mm]	Abutment dimensions			
	d [mm]	B [mm]	C ₁ max [mm]	d _k [mm]	≈ α [°]		C [kN]	C ₀ [kN]	≈ d ₁ [mm]		d ₂ max [mm]	h ₁ [mm]	l ₄ max [mm]	
GF 15 DO	15	12	16,0	22,0	8	0,22	17	53,0	2	18,4	45,0	31	53,5	
GF 16 DO	16	14	17,5	25,0	10	0,29	21,2	59,0	2	20,7	48,0	35	59,0	
GF 17 DO	17	14	17,5	25,0	10	0,29	21,2	65,0	2	20,7	48,0	35	59,0	
GF 20 DO	20	16	19,0	29,0	9	0,40	30	67,0	2	24,2	51,5	38	63,0	
GF 25 DO	25	20	23,0	35,5	7	0,50	48	69,5	2	29,3	56,5	45	72,5	
GF 30 DO	30	22	28,0	40,7	6	0,87	62	118,0	3	34,2	66,5	51	83,5	
GF 35 DO	35	25	30,0	47,0	6	1,50	80	196,0	3	39,8	85,0	61	102,5	
GF 40 DO	40	28	30,0	53,0	7	2,45	100	300,0	3	45,0	102,0	69	119,0	
GF 45 DO	45	32	40,0	60,0	7	3,55	127	380,0	3	50,8	112,0	77	132,0	
GF 50 DO	50	35	40,0	66,0	6	4,40	156	440,0	3	55,9	125,5	88	149,5	
GF 60 DO	60	44	50,0	80,0	6	7,00	245	570,0	4	66,8	142,5	100	170,0	
GF 70 DO	70	49	55,0	92,0	6	10,50	315	695,0	4	77,9	166,5	115	197,0	
GF 80 DO	80	55	60,0	105,0	6	15,00	400	780,0	4	89,4	182,5	141	231,0	
GF 90 DO	90	60	65,0	115,0	5	24,00	490	1340,0	4	98,1	229,0	150	263,0	
GF 100 DO	100	70	70,0	130,0	7	31,50	610	1500,0	4	109,5	253,0	170	295,0	
GF 110 DO	110	70	80,0	140,0	6	48,30	655	2160,0	4	121,2	298,0	185	332,5	
GF 120 DO	120	85	90,0	160,0	6	79,00	950	3250,0	4	135,5	363,0	210	390,0	

Installation conditions GF ... DO

Material	Valid for shafts Ø	Surface roughness	Installation adjustment according to clearance group
			C3
Shaft made of steel	≤ 120 mm	≤ Rz 10	m6

Limit of the chamfer [mm] GF ... DO

d [mm]	d ≤ 20	d ≤ 50	d ≤ 120
r 1s min [mm]	0,3	0,6	1,0

Clearance groups [µm] GF ... DO

d [mm]	10 < d ≤ 12 mm	12 < d ≤ 20 mm	20 < d ≤ 35 mm
CN	23 bis 68	30 bis 82	37 bis 100

d [mm]	35 < d ≤ 60 mm	60 < d ≤ 80 mm	80 < d ≤ 120 mm
CN	43 bis 120	55 bis 142	65 bis 165

- Other dimensions on request

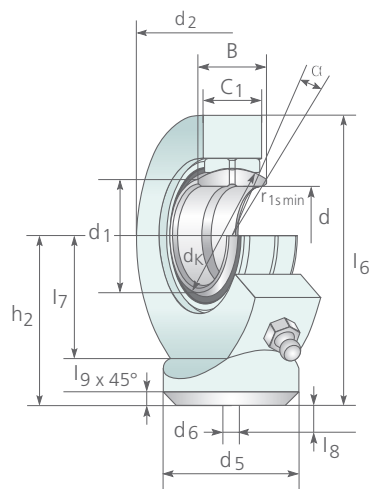
6.8 HYDRAULIC ROD END FOR WELDING ON DIN ISO 12240-4 series E

Sliding contact surface: steel/steel - GK ... DO

Alternative designations

There can be no guarantee made for the exact equality of the bearing between the different manufacturers!

- FS ... C
- IHAGK ... C
- S ... C
- SC ... ES
- SK ... E
- SK ... ES
- TS ... C
- WS ... C



- Allowable operating temperature:** -60°C to +150°C (inserts to +200° C with loss of bearing service life possible). Other limitations of the lubricant must be observed!
- Lubricant:** Lithium soap multipurpose grease with 3% MoS₂ (for restrictions please ask the respective lubricant supplier)
- Lubrication nipple:** if provided, taper lubricating nipple form A as per DIN 71412
- Materials:**
 - Headboard: Steel St 52-3
 - Outer ring: Roller bearing steel, hardened, manganese phosphate
 - Inner ring: Roller bearing steel, hardened, manganese phosphate
- Characteristic calculation value:** F_{head} = 2.25
Allowable rod end load when swiveling or alternating load: **C₀ permissible = C₀ / F_{head}**
- Built-in bearing type:** **GE ... ES.** For more information on bearing dimensions, see GE ... ES.

Designation	Main dimensions					Mass m [kg]	Load ratings			Abutment dimensions				Abutment dimensions				
	d [mm]	B [mm]	C ₁ max [mm]	d _k [mm]	≈ α [°]		C [kN]	C ₀ [kN]	≈ d ₁ [mm]	d ₂ max [mm]	d ₅ max [mm]	d ₆ [mm]	h ₂ [mm]	l ₆ max [mm]	l ₇ min [mm]	l ₈ min [mm]	l ₉ [mm]	
GK 10 DO*)	10	9	7	16,0	12	0,05	8,1	15,6	13	29	15,0	3	24	38,5	15,0	1,5	2,0	
GK 12 DO*)	12	10	8	18,0	11	0,07	10,8	21,5	15	34	17,5	3	27	44,0	18,0	1,5	2,0	
GK 15 DO**)	15	12	10	22,0	8	0,12	17,0	31,8	18	40	21,0	4	31	51,0	20,0	2	2,5	
GK 16 DO**)	16	14	11	25,0	9	0,17	19,0	36,0	20	46	24,0	4	35	58,0	23,0	2	3,0	
GK 17 DO**)	17	14	11	25,0	10	0,18	21,2	40,0	20	46	24,0	4	35	58,0	23,0	2	3,0	
GK 20 DO**)	20	16	13	29,0	9	0,25	30,0	52,4	24	53	27,5	4	38	64,5	27,5	2	3,0	
GK 25 DO	25	20	17	35,5	7	0,50	48,0	70,8	29	64	33,5	4	45	77,0	33,0	3	4,0	
GK 30 DO	30	22	19	40,7	6	0,65	62,0	95,0	34	73	40,0	4	51	87,5	37,5	3	4,0	
GK 35 DO	35	25	21	47,0	6	1,00	80,0	125,0	39	82	47,0	4	61	102,0	43,0	3	4,0	
GK 40 DO	40	28	23	53,0	7	1,35	100,0	155,0	45	92	52,0	4	69	115,0	48,0	4	5,0	
GK 45 DO	45	32	27	60,0	7	2,00	127,0	208,0	50	102	58,0	6	77	128,0	52,0	4	5,0	
GK 50 DO	50	35	30	66,0	6	2,70	156,0	250,0	55	112	62,0	6	88	144,0	59,0	4	6,0	
GK 60 DO	60	44	38	80,0	6	4,65	245,0	389,0	66	135	70,0	6	100	167,5	72,5	4	8,0	
GK 70 DO	70	49	42	92,0	6	7,10	315,0	510,0	77	160	80,0	6	115	195,0	86,0	5	10,0	
GK 80 DO	80	55	47	105,0	6	11,00	400,0	620,0	88	180	95,0	6	141	231,0	98,0	5	10,0	

Installation conditions GK ... DO

Material	Valid for shafts Ø	Surface roughness	Installation adjustment according to clearance group
			C3
Shaft made of steel	≤ 120 mm	≤ Rz 10	m6

Limit of the chamfer [mm] GK ... DO

d [mm]	d ≤ 20	d ≤ 50	d ≤ 120
r 1s min [mm]	0,3	0,6	1,0

Clearance groups [µm] GK ... DO

d [mm]	10 < d ≤ 12 mm	12 < d ≤ 20 mm	20 < d ≤ 35 mm
CN	23 to 68	30 to 82	37 to 100

d [mm]	35 < d ≤ 60 mm	60 < d ≤ 80 mm
CN	43 to 120	55 to 142

- *) Rod end cannot be relubricated
 - **) Rod end can only be relubricated via the lubrication hole
 - Other dimensions on request



7.0

7.0 STANDARDIZED FASTENERS

7.1	Fork bearing block 90° type CBB DIN ISO 8132	106
7.2	Fork bearing block 180° type CBA DIN ISO 8132	108
7.3	Bolt type PP DIN ISO 8132	110
7.4	Bolt type PPA DIN ISO 8132	111
7.5	Clevis type RC DIN ISO 8132	112
7.6	Axle guard type A DIN ISO 8132/8133	113
7.7	Pivot pin bearing block type TB DIN ISO 8132	114
7.8	Weld plate type TBP	116
7.9	Weld plate type TBK	118
7.10	Flanges for piston rods type RF DIN ISO 8132	119
7.11	Swivel bearing block type LD-N DIN ISO 8132/8133	120
7.12	Bolt type BA case hardened DIN ISO 8132/8133	122
7.13	Bolt type BS case hardened (not standardized)	123
7.14	Pivot pin bearing block type SD	124

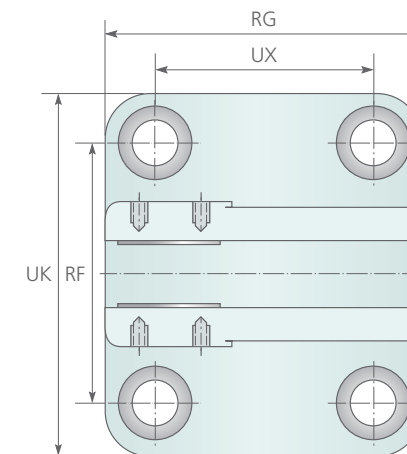
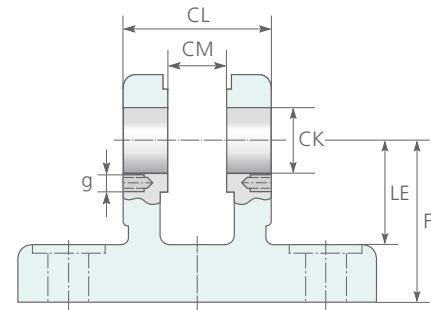
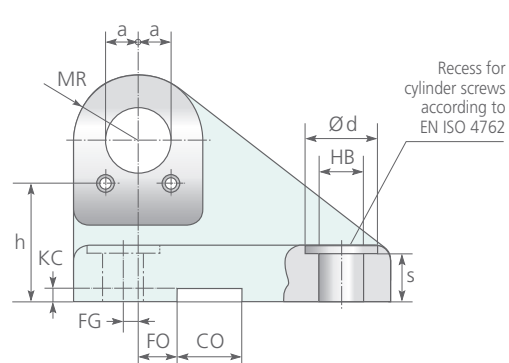
7.1 FORK BEARING BLOCK 90° TYPE CBB DIN ISO 8132 CBB ...

Alternative designations

There can be no guarantee made for the exact equality of the bearing/head between the different manufacturers!

CLCA ...
IKB ...
CBB-...

Material: Steel



Designation	Main dimensions												Main dimensions								Mass m [kg]	Nominal power F nom. [kN]	Designation
	a 1) [mm]	CK H9 [mm]	CL H16 [mm]	CM A12 [mm]	CO N9 [mm]	Ø d 1) [mm]	FG Js14 [mm]	FL Js12 [mm]	FO Js14 [mm]	g 1) [-]	h 1) [mm]	HB H13 [mm]	KC +0,3 to 0 [mm]	LE min [mm]	MR max [mm]	RF Js14 [mm]	RG Js14 [mm]	s 1) [-]	UK max [mm]	UX max [mm]			
CBB 10	5,5	10	24	10	8	11	2,0	32	10	M 5	22,5	6,6	3,3	22	10	39	44	9,0	56	60	0,30	5,0	CBB 12
CBB 12	5,5	12	28	12	10	15	2,0	34	10	M 5	24,5	9,0	3,3	22	12	52	45	11,0	72	65	0,5	8,0	CBB 12
CBB 16	8,0	16	36	16	16	18	3,5	40	10	M 6	28,5	11,0	4,3	27	16	65	55	12,0	90	80	0,9	12,5	CBB 16
CBB 20	12,5	20	45	20	16	18	7,5	45	10	M 6	31,0	11,0	4,3	30	20	75	70	13,5	100	95	1,5	20,0	CBB 20
CBB 25	12,5	25	56	25	25	20	10,0	55	10	M 6	38,5	13,5	5,4	37	25	90	85	16,5	120	115	2,7	32,0	CBB 25
CBB 32	15,0	32	70	32	25	26	14,5	65	6	M 6	45,0	17,5	5,4	43	32	110	110	20,0	145	145	4,5	50,0	CBB 32
CBB 40	21,0	40	90	40	36	33	17,5	76	6	M 8	53,0	22,0	8,4	52	40	140	125	22,0	185	170	8,5	80,0	CBB 40
CBB 50	22,5	50	110	50	36	40	25,0	95	0	M 8	65,5	26,0	8,4	65	50	165	150	28,0	215	200	13,5	125,0	CBB 50
CBB 63	27,5	63	140	63	50	48	33,0	112	0	M 10	77,0	33,0	11,4	75	63	210	170	35,0	270	230	23,4	200,0	CBB 63
CBB 70 1)	30,0	70	150	70	50	48	40,0	130	0	M 10	90,0	33,0	11,4	90	70	230	190	38,0	290	250	-	250,0	CBB 70 1)
CBB 80	30,0	80	170	80	50	57	45,0	140	0	M 10	96,0	39,0	11,4	95	80	250	210	43,0	320	280	38,5	320,0	CBB 80
CBB 90 1)	35,0	90	190	90	63	66	47,5	160	0	M 10	112,0	45,0	12,4	108	90	280	235	50,0	360	320	-	400,0	CBB 90 1)
CBB 100 1)	45,0	100	210	100	63	76	52,5	180	0	M 10	124,0	52,0	12,4	120	100	315	250	57,0	405	345	-	500,0	CBB 100 1)
CBB 110 1)	50,0	110	240	110	80	76	62,5	200	0	M 12	140,0	52,0	15,4	138	110	335	305	59,0	425	400	-	635,0	CBB 110 1)
CBB 125 1)	60,0	125	270	125	80	76	75,0	230	0	M 12	159,0	52,0	15,4	170	125	365	350	57,0	455	450	-	800,0	CBB 125 1)

1) Non-standard size

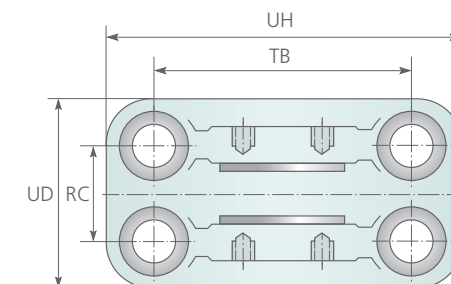
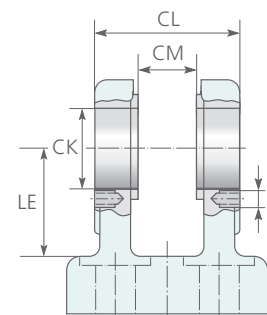
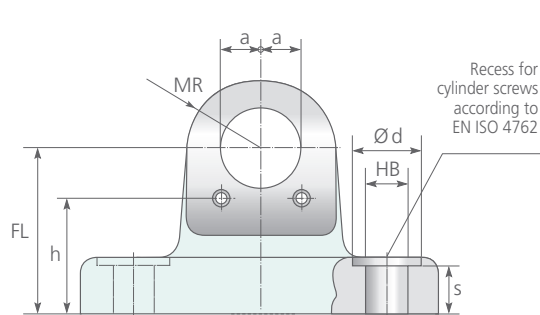
7.2 FORK BEARING BLOCK 180° TYPE CBB DIN ISO 8132 CBA ...

Alternative designations

There can be no guarantee made for the exact equality of the bearing/head between the different manufacturers!

CLCD ...
IKA ...
CBA-...

Material: Steel



Designation	Main dimensions									Main dimensions							Mass m [kg]	Nominal power F nom. [kN]	Designation
	a 1) [mm]	CK H9 [mm]	CL H16 [mm]	CM A12 [mm]	Ø d [mm]	FL Js12 [mm]	g [-]	h [mm]	HB H13 [mm]	LE max [mm]	MR max [mm]	RC Js14 [mm]	s 1) [-]	TB Js14 [mm]	UD max [mm]	UH max [mm]			
CBA 10	5,5	10	24	10	11	32	M 5	22,5	6,6	22	10	17	9,0	42	33	60	-	5,0	CBA 10
CBA 12	5,5	12	28	12	15	34	M 5	24,5	9,0	22	12	20	11,0	50	40	70	0,31	8,0	CBA 12
CBA 16	8,0	16	36	16	18	40	M 6	28,5	11,0	27	16	26	12,0	65	50	90	0,59	12,5	CBA 16
CBA 20	12,5	20	45	20	18	45	M 6	31,0	11,0	30	20	32	13,5	75	58	98	0,90	20,0	CBA 20
CBA 25	12,5	25	56	25	20	55	M 6	38,5	13,5	37	25	40	16,5	85	70	113	1,58	32,0	CBA 25
CBA 32	15,0	32	70	32	26	65	M 6	45,0	17,5	43	32	50	20,0	110	85	143	2,88	50,0	CBA 32
CBA 40	21,0	40	90	40	33	76	M 8	53,0	22,0	52	40	65	22,0	130	108	170	5,04	80,0	CBA 40
CBA 50	22,5	50	110	50	40	95	M 8	65,5	26,0	65	50	80	28,0	170	130	220	10,15	125,0	CBA 50
CBA 63	27,5	63	140	63	48	112	M 10	77,0	33,0	75	63	100	35,0	210	160	270	16,40	200,0	CBA 63
CBA 70 1)	30,0	70	150	70	48	130	M 10	90,0	33,0	90	70	110	38,0	230	175	300	-	250,0	CBA 70 1)
CBA 80	30,0	80	170	80	57	140	M 10	96,0	39,0	95	80	125	43,0	250	210	320	30,00	320,0	CBA 80
CBA 90 1)	35,0	90	190	90	66	160	M 10	112,0	45,0	108	90	140	50,0	290	230	370	-	400,0	CBA 90 1)
CBA 100 1)	45,0	100	210	100	66	180	M 10	124,0	45,0	120	100	160	57,0	315	260	400	-	500,0	CBA 100 1)
CBA 110 1)	50,0	110	240	110	76	200	M 12	140,0	52,0	138	110	180	59,0	350	290	445	-	635,0	CBA 110 1)
CBA 125 1)	60,0	125	270	125	66	230	M 12	159,0	45,0	170	125	200	57,0	385	320	470	-	800,0	CBA 125 1)

1) Non-standard size

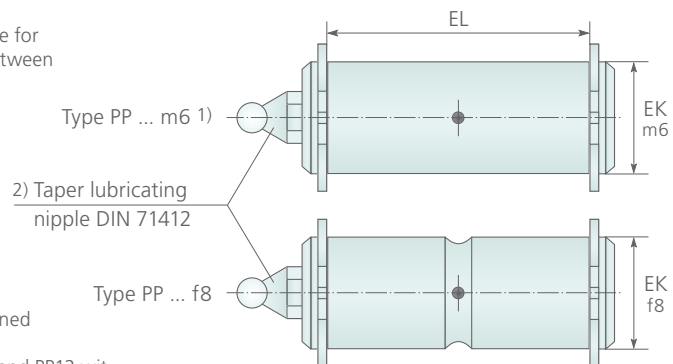
7.3 BOLT TYPE PP DIN ISO 8132 PP ... f8 / PP ... m6

Alternative designations

There can be no guarantee made for the exact equality of the bolt between the different manufacturers!

BP... f8
BP... m6
KPC ... m6
KPD ... f8

Material:
Bolts: Steel, hardened
Snap ring: Spring steel
Lubrication nipple: Steel (PP10 and PP12 without grease nipple)



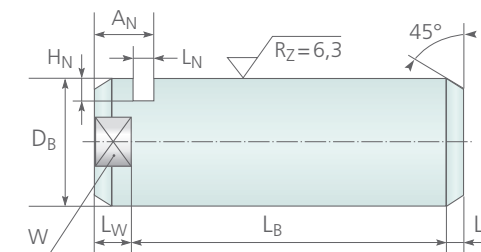
7.4 BOLT TYPE PPA DIN ISO 8132 PPA ... 6

Alternative designations

There can be no guarantee made for the exact equality of the bolt between the different manufacturers!

PPA-...
KPE ...

Material:
Steel, hardened 60 HRC



Designation		For piston-Ø / piston rod-Ø			Nominal power	Main dimensions			Mass
		at 100 bar [mm]	at 160 bar [mm]	at 250 bar [mm]		F nom. [kN]	EK f8 [mm]	EK m6 [mm]	
PP 10 f8	PP 10 m6	25 / 12	-	-	5,0	10	10	25	0,010
PP 12 f8	PP 12 m6	32 / 14	25 / 14 - 25 / 18	-	8,0	12	12	29	0,030
PP 16 f8	PP 16 m6	40 / 18	32 / 18 - 32 / 22	-	12,5	16	16	37	0,065
PP 20 f8	PP 20 m6	55 / 22	40 / 22 - 40 / 28	-	20,0	20	20	46	0,130
PP 25 f8	PP 25 m6	63 / 28	50 / 28 - 50 / 36	40 / 25 - 40 / 28	32,0	25	25	57	0,245
PP 32 f8	PP 32 m6	80 / 36	63 / 36 - 63 / 45	50 / 32 - 50 / 36	50,0	32	30	72	0,500
PP 40 f8	PP 40 m6	100 / 45	80 / 45 - 80 / 56	63 / 40 - 63 / 45	80,0	40	40	92	1,000
PP 50 f8	PP 50 m6	125 / 56	100 / 56 - 100 / 70	80 / 50 - 80 / 56	125,0	50	50	112	1,900
PP 63 f8	PP 63 m6	160 / 70	125 / 70 - 125 / 90	100 / 63 - 100 / 70	200,0	63	60	142	3,800
PP 80 f8	PP 80 m6	200 / 90	160 / 90 - 160 / 110	125 / 80 - 125 / 90	320,0	80	80	172	7,600

Note: m6 type for spherical plain bearings Other dimensions on request

Designation	Main dimensions								Mass
	DB m6 [mm]	LN [mm]	LB [mm]	AN [mm]	H_N [mm]	LF [mm]	LW [mm]	W1) [mm]	
PPA 10	10	3,3	35	8	3,0	1,0	4,5	8	0,020
PPA 12	12	3,3	38	8	4,0	1,0	4,5	10	0,030
PPA 16	16	3,3	46	8	4,0	1,0	5,5	13	0,070
PPA 20	20	4,5	58	10	5,0	1,5	5,5	17	0,140
PPA 25	25	4,5	69	10	5,0	1,5	6,5	21	0,300
PPA 32	32	5,5	87	13	6,0	2,0	8,5	27	0,500
PPA 40	40	6,5	110	16	7,0	2,0	8,5	32	1,000
PPA 50	50	9,0	133	19	8,0	2,0	8,5	41	2,000
PPA 63	63	9,0	164	20	9,0	2,0	8,5	55	4,000
PPA 70 2)	70	11,0	183	25	10,0	2,0	11,5	60	5,500
PPA 80	80	11,0	202	26	11,0	3,0	11,5	65	8,000
PPA 90 2)	90	11,0	224	28	12,0	3,0	14,0	75	11,000
PPA 100 2)	100	13,0	246	30	14,0	3,0	14,0	85	16,000
PPA 110 2)	110	13,0	277	31	15,0	3,0	14,0	95	21,000
PPA 125 2)	125	13,0	310	32	16,5	4,0	14,0	110	30,000

1) Wrench size „W“ as per DIN 475 Part 1 2) Non-standard intermediate sizes Other dimensions on request

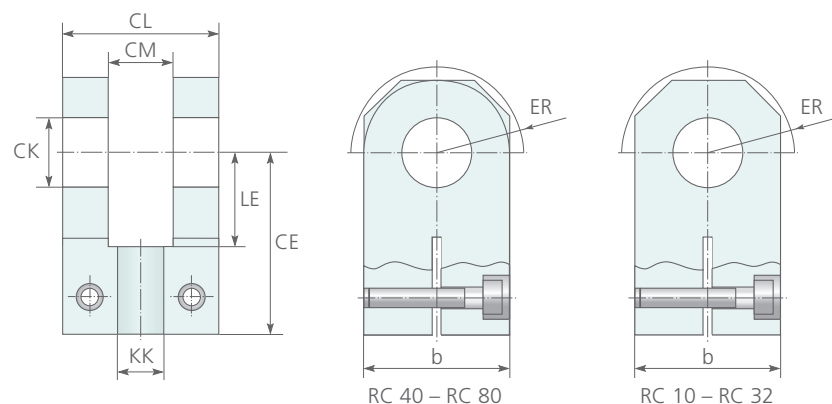
7.5 CLEVIS TYPE RC DIN ISO 8132 RC ...

Alternative designations

There can be no guarantee made for the exact equality of the clevis between the different manufacturers!

CCKB ...
IF ...
RC...

Material:
Steel



RC 40 – RC 80

RC 10 – RC 32

Designation	Main dimensions								Mass m [kg]	Nominal power F nom. [kN]	Clamping screw [-]
	b max [mm]	CE JS12 [mm]	CK H9 [mm]	CL h16 [mm]	CM A12 [mm]	ER max [mm]	KK [-]	LE min [mm]			
RC 10	20	37	10	24	10	11	M 10 x 1,25	18	0,10	5,0	M 3 x 12
RC 12	25	38	12	28	12	16	M 12 x 1,25	18	0,15	8,0	M 4 x 16
RC 16	30	44	16	36	16	20	M 14 x 1,5	22	0,27	12,5	M 6 x 20
RC 20	40	52	20	45	20	25	M 16 x 1,5	27	0,53	20,0	M 8 x 30
RC 25	50	65	25	56	25	32	M 20 x 1,5	34	1,13	32,0	M 10 x 35
RC 32	65	80	32	70	32	40	M 27 x 2	42	2,18	50,0	M 12 x 40
RC 40	80	97	40	90	40	50	M 33 x 2	52	4,40	80,0	M 16 x 50
RC 50	100	120	50	110	50	63	M 42 x 2	64	7,60	125,0	M 20 x 60
RC 63	140	140	63	140	63	71	M 48 x 2	75	11,70	200,0	M 24 x 80
RC 70 1)	160	160	70	150	70	80	M 56 x 2	90	-	250,0	M 24 x 90
RC 80	180	180	80	170	80	90	M 64 x 3	94	30,60	320,0	M 30 x 100
RC 90 1)	200	195	90	190	90	100	M 72 x 3	108	-	400,0	M 36 x 120
RC 100 1)	220	210	100	210	100	110	M 80 x 3	120	-	500,0	M 36 x 130

1) Non-standard size

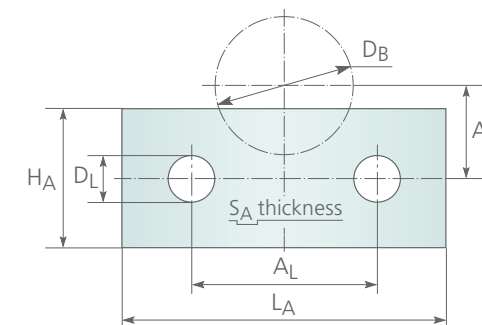
7.6 AXLE GUARD TYPE A DIN ISO 8132/8133 A ...

Alternative designations

There can be no guarantee made for the exact equality of the axle guard between the different manufacturers!

A-... PPP ...

Material:
Steel



Designation		Main dimensions							Mass	Accessories	
Order indication		DB [mm]	AL [mm]	DL [mm]	LA [mm]	HA [mm]	SA [mm]	AB [mm]	W1) [kg]	Lock washer	Cyl screw DIN EN ISO 4762
A 10 1)	A 10 1)	10	11	5,4	20	15	3	9,5	0,015	5	M 5 x 12
A 12	A 12	12	16	6,4	27	15	3	9,5	0,020	6	M 6 x 12
A 16	A 16	16	25	6,4	40	15	3	11,5	0,025	6	M 6 x 12
A 20 / 25	A 20	20	25	6,4	40	18	4	14,5	0,035	6	M 6 x 16
	A 25	25	25	6,4	40	18	4	16,5	0,035	6	M 6 x 16
A 30 / 32	A 30	30	30	6,4	45	20	5	19,0	0,065	6	M 6 x 16
	A 32	32	30	6,4	45	20	5	20,0	0,065	6	M 6 x 16
A 40	A 40	40	42	8,4	62	20	6	23,0	0,080	8	M 8 x 20
A 50	A 50	50	45	8,4	65	25	8	29,5	0,090	8	M 8 x 20
A 60 / 63	A 60	60	55	10,5	80	25	8	33,5	0,170	10	M 10 x 25
	A 63	63	55	10,5	80	25	8	35,0	0,170	10	M 10 x 25
A 70 / 80	A 70	70	60	10,5	90	30	10	40,0	0,250	10	M 10 x 25
	A 80	80	60	10,5	90	30	10	44,0	0,250	10	M 10 x 25
A 90	A 90	90	70	10,5	100	30	10	48,0	0,280	10	M 10 x 25
A 100	A 100	100	90	10,5	120	40	12	56,0	0,490	10	M 10 x 25
A 110	A 110	110	100	13,0	140	40	12	60,0	0,600	12	M 12 x 30
A 125	A 125	125	120	13,0	160	50	12	71,0	1,000	12	M 12 x 30

1) Axle guard A10 is also for use in PPA12, CBA 12 and 12 CBB

Other dimensions on request

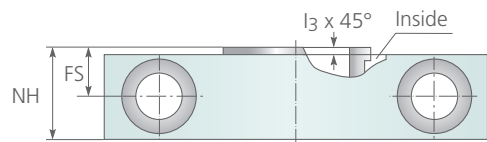
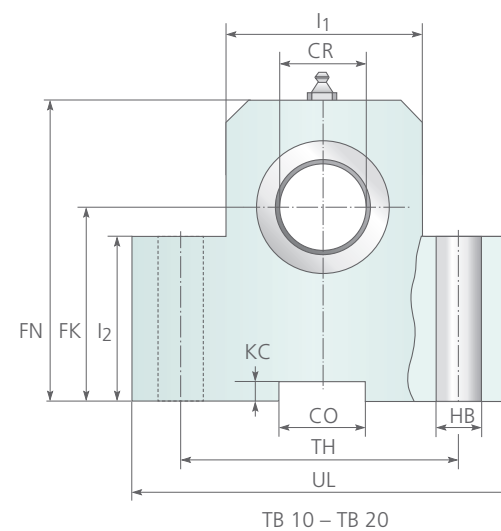
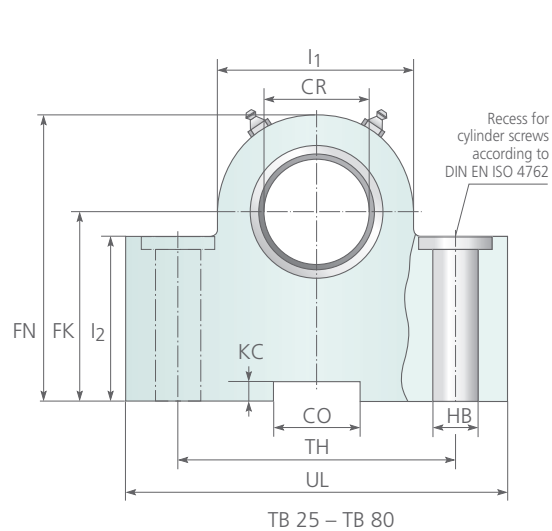
7.7 PIVOT PIN BEARING BLOCK TYPE TB DIN ISO 8132 TB ...

Alternative designations

There can be no guarantee made for the exact equality of the bearing blocks between the different manufacturers!

CLTB-...
IS ...
TB-...

Material:
Frame steel;
bushing ferrous metal



Designation	Main dimensions									Main dimensions					Mass m [kg]	Nominal power F nom. [kN]	Designation
	CO _{N9} [mm]	CR _{H7} [mm]	FK _{J512} [mm]	FN [mm]	FS _{J514} [mm]	HB _{H13} [mm]	KC _{+0,3 to 0} [mm]	I ₁ [mm]		I ₂ [mm]	I ₃ [mm]	NH _{max} [mm]	TH _{J514} [-]	UL _{max} [mm]			
TB 12	10	12	34	49	8	9,0	3,3	25	25	1,0	17	40	63	0,46	8,0	TB 12	
TB 16	16	16	40	59	10	11,0	4,3	30	30	1,0	21	50	80	0,83	12,5	TB 16	
TB 20	16	20	45	69	10	11,0	4,3	40	38	1,5	21	60	90	1,21	20,0	TB 20	
TB 25	25	25	55	80	12	13,5	5,4	56	45	1,5	26	80	110	2,15	32,0	TB 25	
TB 32	25	32	65	100	15	17,5	5,4	70	52	2,0	33	110	150	4,70	50,0	TB 32	
TB 40	36	40	76	120	16	22,0	8,4	88	60	2,5	41	125	170	7,80	80,0	TB 40	
TB 50	36	50	95	140	20	26,0	8,4	90	72	2,5	51	160	210	14,20	125,0	TB 50	
TB 63	50	63	112	177	25	33,0	11,4	136	87	3,0	61	200	265	23,40	200,0	TB 63	
TB 80	50	80	140	220	31	39,0	11,4	160	112	3,5	81	250	325	53,10	320,0	TB 80	

Parts are sold in pairs Details of the weight is for a pair!

7.8 WELD PLATE TYPE TBP TBP ...

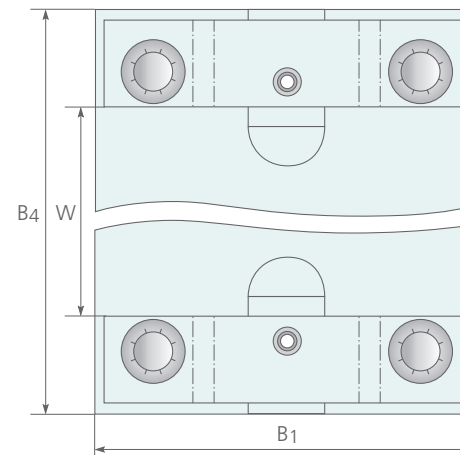
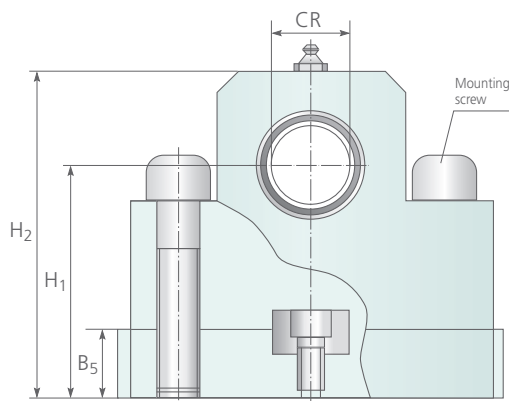
Alternative designations

There can be no guarantee made for the exact equality of the weld plates between the different manufacturers!

IPD ...
TBP-...

Suitable for pivot pin bearing block in accordance with ISO 8132
for hydraulic cylinders according to ISO 6020/1 and ISO 6022

Material:
Steel, case hardened



Designation	Main dimensions									Main dimensions			Key Form D - DIN 6885 [-]	Cylinder screw ISO 1207 [-]	Cylinder screw ISO 4762-10.9 [-]	Designation
	B ₁ [mm]	B ₄ at 100 bar [mm]	B ₄ at 160 bar [mm]	B ₄ at 250 bar [mm]	B ₅ [mm]	CR H7 [mm]	H ₁ [mm]	H ₂ [mm]		W at 100 bar [mm]	W at 160 bar [mm]	W at 250 bar [mm]				
TBP 12	65	101	99	-	13	12	47	63	65	63	-	10 x 8 x 20	M 3 x 10	M 8 x 35	TBP 12	
TBP 16	85	127	122	-	18	16	58	78	80	75	-	16 x 10 x 28	M 5 x 10	M 10 x 45	TBP 16	
TBP 20	95	137	137	-	18	20	63	88	90	90	-	16 x 10 x 28	M 5 x 10	M 10 x 50	TBP 20	
TBP 25	115	167	162	-	18	25	73	98	110	105	-	25 x 14 x 40	M 8 x 16	M 12 x 60	TBP 25	
TBP 32	160	201	196	188	28	32	93	128	125	120	112	25 x 14 x 40	M 8 x 16	M 16 x 75	TBP 32	
TBP 40	180	242	227	217	33	40	109	153	150	135	125	36 x 20 x 56	M 12 x 25	M 20 x 90	TBP 40	
TBP 50	220	-	272	262	38	50	133	178	-	160	150	36 x 20 x 56	M 12 x 25	M 24 x 110	TBP 50	
TBP 63	280	-	332	317	48	63	160	228	-	195	180	50 x 28 x 90	M 12 x 30	M 30 x 130	TBP 63	
TBP 80	340	-	417	401	53	80	193	273	-	240	224	50 x 28 x 90	M 12 x 30	M 36 x 160	TBP 80	

*) When ordering please specify the pressure range e.g. TBP 40, 160 bar

7.9 WELD PLATE TYPE TBK TBK ...

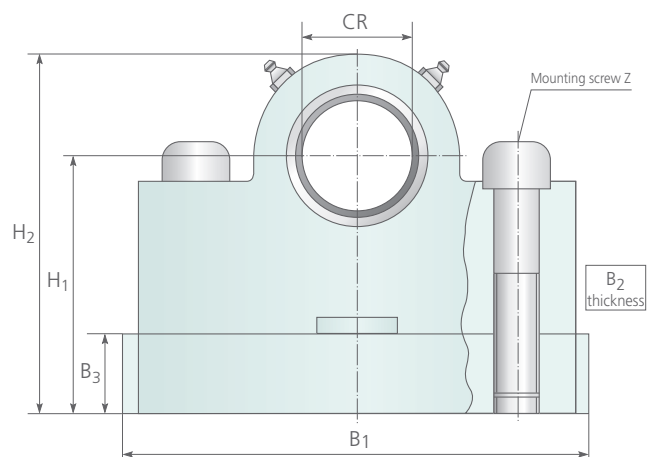
Alternative designations

There can be no guarantee made for the exact equality of the bolt between the different manufacturers!

IPS ...
TBK-...

Material:
Steel

Suitable for
pivot pin bearing block
as per ISO 8132



Designation	Main dimensions							Cylinder screw
	B ₁ [mm]	B ₂ [mm]	B ₃ [mm]	CR H7 [mm]	H ₁ [mm]	H ₂ [mm]	Z [-]	ISO 4762-10.9 [-]
TBK 12	65	19	15	12	49	65	2	M 8 x 35
TBK 16	85	24	20	16	60	80	2	M 10 x 45
TBK 20	95	24	20	20	65	90	2	M 10 x 50
TBK 25	115	29	20	25	75	100	2	M 12 x 60
TBK 32	160	38	30	32	95	130	4	M 16 x 75
TBK 40	180	48	35	40	111	155	4	M 20 x 90
TBK 50	220	58	40	50	135	180	4	M 24 x 110
TBK 63	280	68	50	63	162	230	4	M 30 x 130
TBK 80	340	88	55	80	195	275	4	M 36 x 160

Parts are sold in pairs

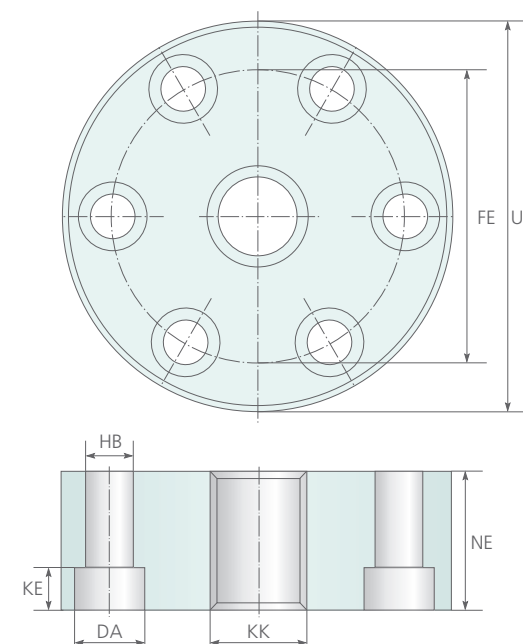
7.10 FLANGES FOR PISTON RODS TYPE RF DIN ISO 8132 RF ...

Alternative designations

There can be no guarantee made for the exact equality of the flanges between the different manufacturers!

ISC ...
RF-...

Material:
Steel



Designation	Main dimensions						Mass m [kg]	Nominal power F nom. [kN]	For piston-Ø [-]	
	DA H13 [mm]	FE J513 [mm]	HB H13 [mm]	KE +0,4 to +0 [mm]	KK [-]	NE H13 [mm]				UP max [-]
RF 10	-	-	-	-	-	-	-	5,0	25	
RF 12	11,0	40	4 x Ø 6,6	6,8	M 12 x 1,25	17	56	0,30	8,0	32
RF 16	14,5	45	4 x Ø 9,0	9,0	M 14 x 1,5	19	63	0,39	12,5	40
RF 20	14,5	54	6 x Ø 9,0	9,0	M 16 x 1,5	23	72	0,60	20,0	50
RF 25	14,5	63	6 x Ø 9,0	9,0	M 20 x 1,5	29	82	1,00	32,0	63
RF 32	17,5	78	6 x Ø 11,0	11,0	M 27 x 2	37	100	1,90	50,0	80
RF 40	20,0	95	8 x Ø 13,5	13,0	M 33 x 2	46	120	3,19	80,0	100
RF 50	26,0	120	8 x Ø 17,5	17,5	M 42 x 2	57	150	6,20	125,0	125
RF 63	33,0	150	8 x Ø 22,0	21,5	M 48 x 2	64	190	11,40	200,0	160
RF 80	40,0	180	8 x Ø 26,0	25,5	M 64 x 3	86	230	33,00	320,0	200

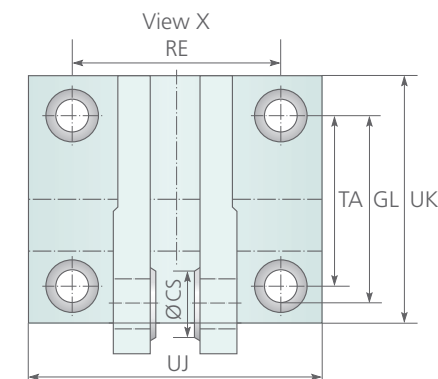
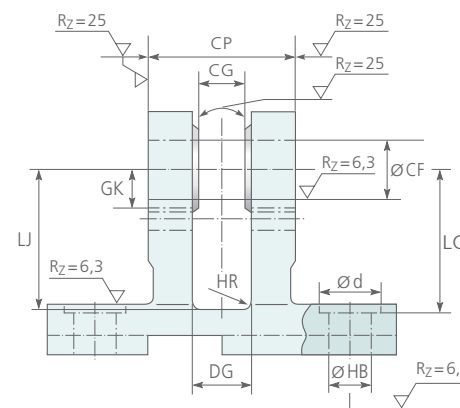
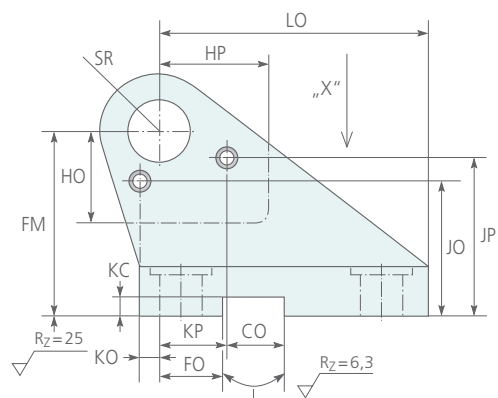
7.11 SWIVEL BEARING BLOCK TYPE LD-N DIN ISO 8132/8133 LD ... N

Alternative designations

There can be no guarantee made for the exact equality of the bearing blocks from the different manufacturers!

CLCB ... / DK ...

Material: Steel



Designation	Main dimensions								Main dimensions							Designation
	CF K7 [mm]	CP h14 [mm]	CG [mm]	CS +0,3 to +0,01 [mm]	CO N9 [mm]	d H15 [mm]	DG +2 to 0 [mm]	LO [mm]	FM js11 [mm]	GK [-]	GL js13 [mm]	HB H13 [mm]	HO [mm]	HP [mm]	HR [mm]	
LD 12 N	12	30	10	18	10	18	12	56	40	M 6	46	9,0	22	22	3	LD 12 N
LD 16 N	16	40	14	24	16	22	16	74	50	M 6	61	11,0	25	30	3	LD 16 N
LD 20 N	20	50	16	28	16	26	19	80	55	M 6	64	13,5	30	35	3	LD 20 N
LD 25 N	25	60	20	34	25	30	24	98	65	M 6	78	15,5	35	35	4	LD 25 N
LD 30 N	30	70	22	40	25	33	26	120	85	M 6	97	17,5	40	40	4	LD 30 N
LD 40 N	40	80	28	50	36	40	32	148	100	M 8	123	22,0	45	45	4	LD 40 N
LD 50 N	50	100	35	60	36	53	41	190	125	M 8	155	30,0	50	50	6	LD 50 N
LD 60 N	60	120	44	72	50	71	50	225	150	M 10	187	39,0	60	60	6	LD 60 N
LD 80 N	80	160	55	96	50	82	65	295	190	M 10	255	45,0	70	70	6	LD 80 N
LD 100 N	100	200	70	120	63	89	80	335	210	M 10	285	48,0	85	85	6	LD 100 N

Designation	Main dimensions								Main dimensions					Mass m [kg]	Nominal power F nom. [kN]	for piston-Ø / piston rod-Ø at 160 bar [mm]	Designation
	JO+0,2 to -0,2 [mm]	JP+0,2 to -0,2 [mm]	KO+0,2 to -0,2 [mm]	KP+0,2 to -0,2 [mm]	LG [mm]	LJ [mm]	FO js14 [mm]	KC+0,3 to 0 [mm]	RE js13 [mm]	SRmax [mm]	TA js13 [mm]	UJ [mm]	UK [mm]				
LD 12 N	29,1	33,2	3,9	11,6	28	29	16	3,3	55	12	40	75	60	0,52	8,0	25 / 12 - 25 / 18	LD 12 N
LD 16 N	36,7	43,2	5,2	18,9	37	38	18	4,3	70	16	55	95	80	1,05	12,5	32 / 14 - 32 / 22	LD 16 N
LD 20 N	38,3	44,7	8,5	15,6	39	40	20	4,3	85	20	58	120	90	1,72	20,0	40 / 18 - 40 / 28	LD 20 N
LD 25 N	48,5	48,5	11,0	14,0	48	49	22	5,4	100	25	70	140	110	2,72	32,0	50 / 22 - 50 / 36	LD 25 N
LD 30 N	66,0	66,0	15,0	15,0	62	63	24	5,4	115	30	90	160	135	5,15	50,0	63 / 28 - 63 / 45	LD 30 N
LD 40 N	77,0	77,0	21,0	21,0	72	73	24	8,4	135	40	120	190	170	9,30	80,0	80 / 36 - 80 / 56	LD 40 N
LD 50 N	95,5	95,5	22,5	22,5	90	92	35	8,4	170	50	145	240	215	18,30	125,0	100 / 45 - 100 / 70	LD 50 N
LD 60 N	116,5	116,5	27,5	27,5	108	110	35	11,4	200	60	185	270	260	35,00	200,0	125 / 56 - 125 / 90	LD 60 N
LD 80 N	146,0	146,0	30,0	30,0	140	142	35	11,4	240	80	260	320	340	63,00	320,0	160 / 70 - 160 / 110	LD 80 N
LD 100 N	154,0	154,0	45,0	45,0	150	152	35	12,4	300	100	300	400	400	109,00	500,0	200 / 90 - 200 / 140	LD 100 N

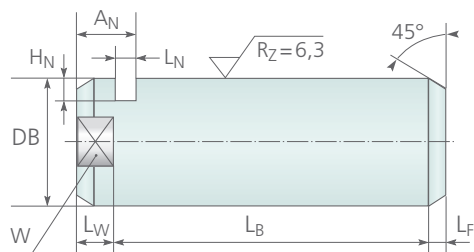
7.12 BOLT TYPE BA CASE HARDENED DIN ISO 8132/8133 BA ...

Alternative designations

There can be no guarantee made for the exact equality of the bolts between the different manufacturers!

BA-...
KPB ...

Material:
Steel, hardened 60 HRC



Designation	Main dimensions								Mass
	DB h6 [mm]	LN [mm]	LB [mm]	AN [mm]	HN [mm]	LF [mm]	LW [mm]	W1) [mm]	m [kg]
BA 12	12	3,3	40	8	4	1,0	4,5	10	0,035
BA 16	16	3,3	50	8	4	1,0	5,5	13	0,075
BA 20	20	4,5	62	10	5	1,5	5,5	17	0,150
BA 25	25	4,5	72	10	5	1,5	5,5	22	0,270
BA 30	30	5,5	85	13	6	2,0	7,5	24	0,410
BA 40	40	6,5	100	16	7	2,0	9,5	32	0,910
BA 50	50	9,0	122	19	8	2,0	10,0	41	1,710
BA 60	60	9,0	145	20	9	2,0	11,0	50	3,130
BA 80	80	11,0	190	26	11	3,0	15,0	70	7,140
BA 100	100	13,0	235	30	14	3,0	15,0	90	14,400

1) Width across flats „W“ according to DIN 475 part 1 Other dimensions on request

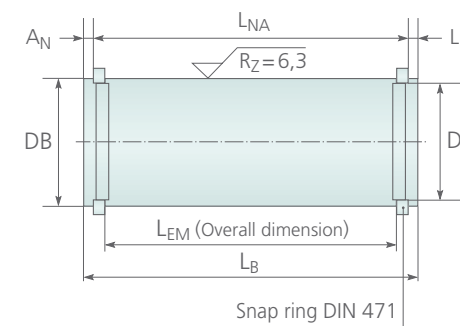
7.13 BOLT TYPE BS CASE HARDENED (NOT STANDARDIZED) BS ...

Alternative designations

There can be no guarantee made for the exact equality of the bolts between the different manufacturers!

BS-...
KPA ...

Material:
Bolts: Steel
Snap ring: Spring steel



Designation	Main dimensions							Mass	Accessories
	DB h6 [mm]	DN [mm]	LN H13 [mm]	LNA [mm]	LB [mm]	LEM [mm]	AN [mm]	m [kg]	Locking ring DIN 471
BS 12	12	11,5	1,10	33,0	35	30	1,0	0,030	12 x 1,0
BS 16	16	15,2	1,10	43,0	46	40	1,5	0,075	16 x 1,0
BS 20	20	19,2	1,30	53,4	57	50	1,8	0,140	20 x 1,2
BS 25	25	23,9	1,30	63,47	67	60	1,8	0,260	25 x 1,2
BS 30	30	28,6	1,60	74,0	79	70	2,5	0,440	30 x 1,5
BS 40	40	37,5	1,85	84,5	93	80	4,2	0,900	40 x 1,75
BS 50	50	47,0	2,15	105,0	115	100	5,0	1,700	50 x 2,0
BS 60	60	57,0	2,15	125,0	135	120	5,0	3,100	60 x 2,0
BS 80	80	76,5	2,65	166,0	178	160	6,0	7,100	80 x 2,5
BS 100	100	96,5	3,15	207,0	221	200	7,0	14,400	100 x 3,0

Other dimensions on request

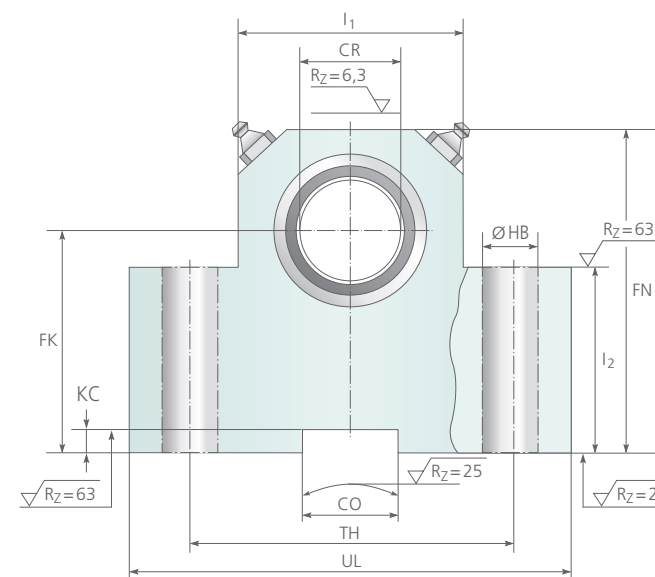
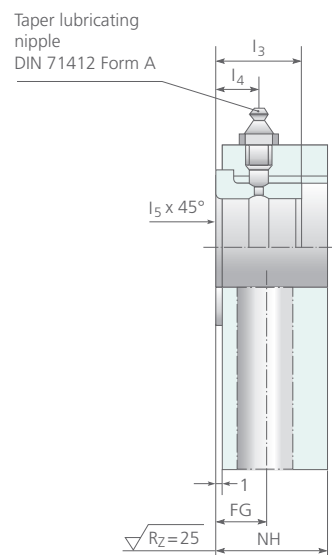
7.14 PIVOT PIN BEARING BLOCK TYPE SD SD ...

Alternative designations

There can be no guarantee made for the exact equality of the bearing blocks between the different manufacturers!

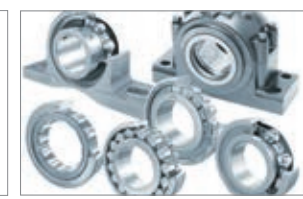
CLTA ...
ISS ...
SD-...

Material:
Frame steel;
bushing ferrous metal



Designation	Main dimensions									Main dimensions							Mass	Nominal power	Designation
	CO N9 [mm]	CR H7 [mm]	FK Js12 [mm]	FN max [mm]	FG Js14 [mm]	HB H13 [mm]	KC +0,3 bis 0 [mm]	I1 [mm]	I2 [mm]	I3 [mm]	I4 [mm]	I5 [mm]	NH max [mm]	TH Js14 [mm]	ULmax [mm]	m [kg]	F nom. [kN]		
SD 12	10	12	38	55	8	16	3,3	25	25	11	5	1,0	17	40	63	0,48	8,0	SD 12	
SD 16	16	16	45	65	10	20	4,3	30	30	13	6	1,0	21	50	80	0,87	12,5	SD 16	
SD 20	16	20	55	80	10	25	4,3	40	38	17	8	1,5	21	60	90	1,30	20,0	SD 20	
SD 25	25	25	65	90	12	32	5,4	56	45	21	10	1,5	26	80	110	2,35	32,0	SD 25	
SD 32	25	32	75	110	15	40	5,4	70	52	26	13	2,0	33	110	150	4,80	50,0	SD 32	
SD 40	36	40	95	140	16	50	8,4	88	60	33	16	2,5	41	125	170	8,10	80,0	SD 40	
SD 50	36	50	105	150	20	63	8,4	90	72	41	20	2,5	51	160	210	20,10	125,0	SD 50	
SD 63	50	63	125	195	25	71	11,4	136	87	51	25	3,0	61	200	265	31,30	200,0	SD 63	
SD 80	50	80	150	230	31	80	11,4	160	112	64	31	3,5	81	250	325	69,30	320,0	SD 80	
SD 100	63	100	200	300	42	90	12,4	200	150	82	41	4,5	101	320	410	-	500,0	SD 100	

Parts are sold in pairs Details of the weight is for a pair!



8.0

8.0 LFD BEARINGS PRODUCT OFFERING

8.1	LFD deep groove ball bearings	128
8.1	LFD taper roller bearings	128
8.2	LFD spherical roller bearings	128
8.3	LFD cylindrical roller bearings	128
8.4	LFD bearing units	129
8.5	LFD plummer blocks	129
8.6	LFD spherical plain bearings	129

LFD BEARINGS PRODUCT OVERVIEW



LFD deep groove ball bearings

- Series
60., 62., 63., 64., 68., 69., 160., -ZZ/-2RS
- are suitable for radial and axial loads in both directions
 - are especially versatile
 - are suitable for high speeds
 - simple structure for more economic bearing solutions
 - also available in steel with increased corrosion resistance (AISI 440C)



LFD taper roller bearings

- Series
320., 330., 331., 302., 322., 332., 303., 313., 323..
- are suitable for high radial and axial loads in one direction
 - capable of absorbing simultaneously acting radial and axial loads
 - are dismountable; the inner ring (including rollers and cage) can be mounted separately from the outer ring



LFD spherical roller bearings

- Series
213., 222., 223., 230., 231., 232., 240., 241., 239..
- are suitable for high axial and radial loads in both directions
 - are designed for very high loads
 - compensate for angular misalignments



LFD cylindrical roller bearings

- Series
N, NJ, NU, NUP 2., 3., 4., 22., 23., (E)..
- are suitable for high radial loads
 - reinforced E-version designed for highest load carrying capacities
 - detachable design facilitating mounting and dismounting
 - various cylindrical roller guide configurations, with or without guiding lips on outer or inner ring

LFD bearing units

- in different types
- available as grey cast iron or sheet steel housings with sealed, deep groove ball bearings inserted
 - are fixed to the shaft by grub screws, eccentric collar, or adapter sleeve
 - compensate for static misalignment of the shaft by the spherical outer ring of the inserted ball bearing
 - under normal service conditions, the sealed bearings are oiled with lubricant for their entire service life



LFD plummer blocks

- SNL 5., 7225., S 30.. K, SD 31.. TS
- reinforced design
 - optimum heat dissipation
 - can be relubricated, with oil or grease lubrication
 - made of grey cast iron, or spheroidal graphite iron for higher strength
 - combination of cylindrical and tapered, self-aligning ball bearings and spherical roller bearings 22., 23., 222., 223., 240., 230., 231.. and 232..
 - for locating or non-locating bearings
 - different sealing options



LFD spherical plain bearings

- in different types, maintenance-free and requiring maintenance
- for high radial loads
 - sliding contact surface: hard chromium/PTFE fabric or composite
 - sliding contact surface: steel/steel
 - rod ends
 - hydraulic rod ends
 - standardized accessories



SYSTEM ENGINEERING

LFD AGRI HUB

- Quick mounting
- Relubrication-free
- Cost reduction
- Reinforced stone protection





SIMPLY WELL-ENGINEERED

SIMPLY WELL-ENGINEERED



LFD-HEADQUARTERS

Germany

Giselherstrasse 9 - D 44319 DORTMUND

Phone + 49 231 977 250 - Fax + 49 231 977 252 50

Email info@LFD.eu - Internet www.LFD.eu

THE LFD GROUP

The company is represented on all continents.

In addition to the central warehouse in Germany, the LFD Group also maintains storage capacities in Italy, USA, Chile and China. Further branch offices world-wide ensure quick response and short delivery times.

Please see your corresponding contact persons at:

www.LFD.eu/contacts

Success Through Precision.
