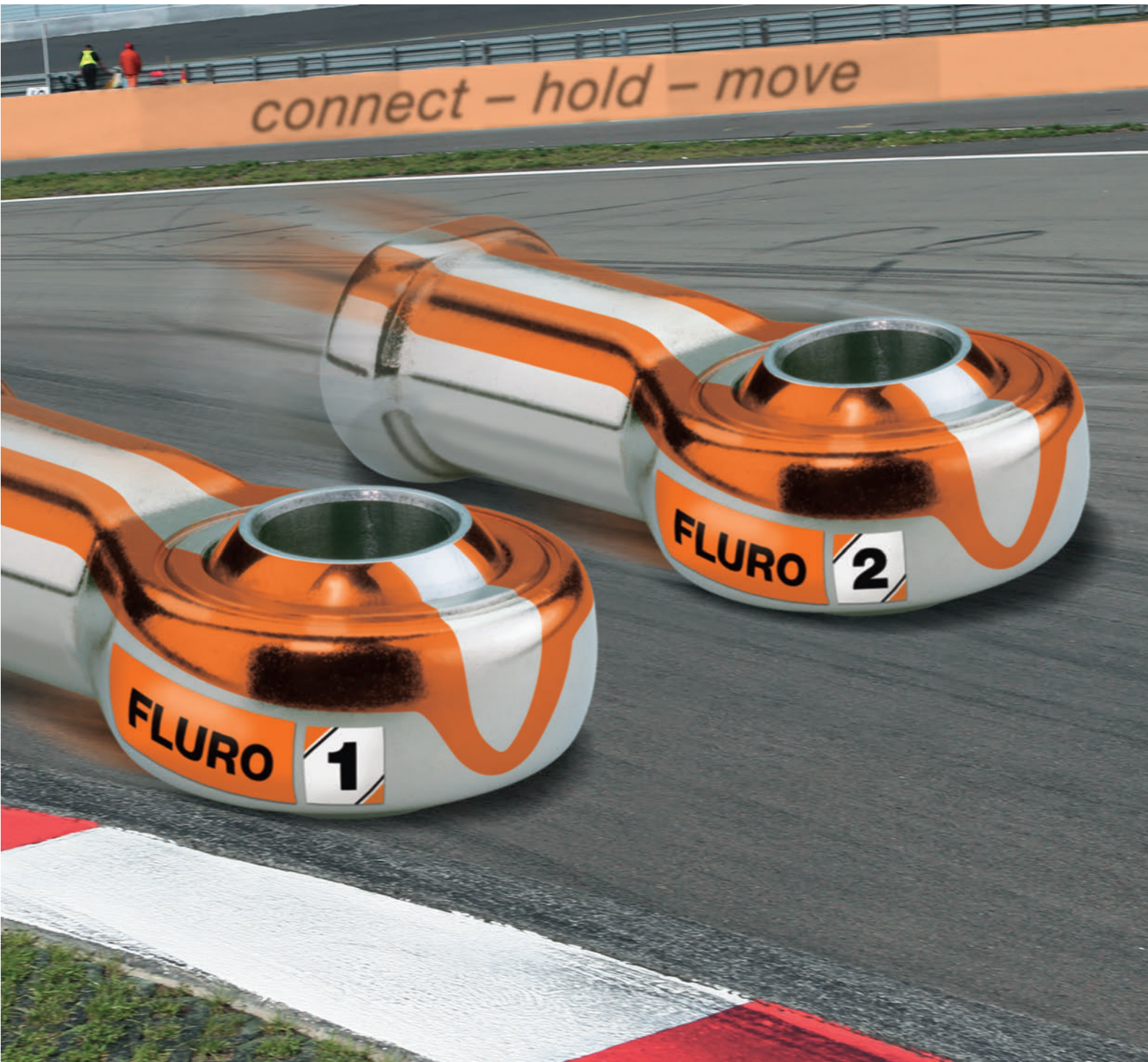


**ROD ENDS AND
SPHERICAL PLAIN BEARINGS
FOR MOTOR SPORT**



Introduction

The **FLURO**[®] production program consists of Rod Ends to DIN ISO 12240 - 4 and Spherical Plain Bearings to DIN ISO 12240 - 1, Series K and E. Stainless steel, maintenance free and versions with lubrication fittings are available. Where bearings with standard dimensions cannot be used, parts to customer designs are manufactured.

Since many years the **FLURO**[®] products have achieved a reputation of high quality and durability. Therefore the demand within the industrial application market continuously increased. Market observation and customer requests initiated the development and design of a Motor Sport product.

Technical research and continuous product development enabled **FLURO**[®] to establish a product version exclusively designed for motor sport applications.

On the following pages Rod Ends and Spherical Plain Bearings are introduced, which have already proven itself in Motor Sport applications.

For Rod Ends and Spherical Plain Bearings for the industrial application sector, please refer to FLURO[®]'s general catalogue which is available on request.

Recently our industrial plant was enlarged and modernized. This means advanced improvements to our logistics and an enlarged stock of products for faster production and delivery response.



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| | | |
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Spherical Plain Bearings Series K

| | | |
|--------------|---|----|
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Motor Sport Catalogue Edition 2015

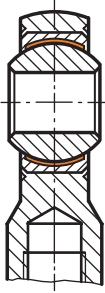
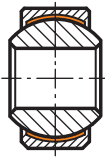
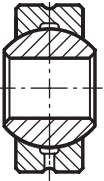
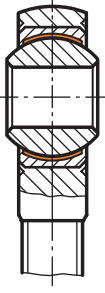

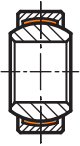
Every care has been taken to ensure the accuracy of the information in this catalogue.

However no liability can be accepted for any errors or omissions.

Due to continuing technical advances we reserve the right to alter our products without notice.

www.fluro.de

Production Program - Technical Data

| Rod Ends DIN ISO 12240-4 Series K - Motor Sport | | | Spherical Plain Bearings DIN ISO 12240-1 Series K - Motor Sport | | | Spherical Plain Bearings DIN ISO 12240-1 Series K - Extra Heavy Duty | | |
|--|---|--|--|---|---|---|--|---|
| GIXSW ..MS | Rod Ends with female thread maintenance free |  | GXSW..MS | Spherical Plain Bearings smaller outside-Ø, maintenance free |  | GXO..ICR (RR) | Spherical Plain Bearings larger outside-Ø, Steel on Steel |  |
| GAXSW ..MS | Rod Ends with male thread maintenance free |  | GXOW..MS | Spherical Plain Bearings larger outside-Ø, maintenance free |  | Spherical Plain Bearings DIN ISO 12240-1 Series E - Motor Sport | | |
| | | | | | | GE..EC- NIRO MS | Spherical Plain Bearing stainless maintenance free |  |

Characteristics of MS - Series:

Preloaded bearing fit

An internal play with 'zero' tolerance is achieved through a preloaded bearing. Under normal permissible conditions and usage a minimal settlement of the bearing components or a minimal tolerance increase at the mating surface will take place. This special bearing technology causes a considerably higher bearing life with continuous low internal clearance. However MS-Spherical Plain Bearings are not suited for rotation as well as very high swivel frequency.

Please note that the series GXO..ICR(RR) is not a preloaded bearing version, but the clearance is reduced to a minimal fit.

Surface

The nickel plated housing surface with a high polish finish achieves a sporty appealing design, especially on visible components. This high-quality surface treatment with high corrosion resistance minimizes the sedimentation of dirt and is easy to clean.

Lubrication

Maintenance Free Rod Ends and Spherical Plain Bearings must not be lubricated. The ball revolves on a PTFE liner incorporated in the Insert.

The Motor Sport steel on steel version should be lubricated with the FLURO® high performance grease FE 3752. This grease can be ordered from FLURO®.

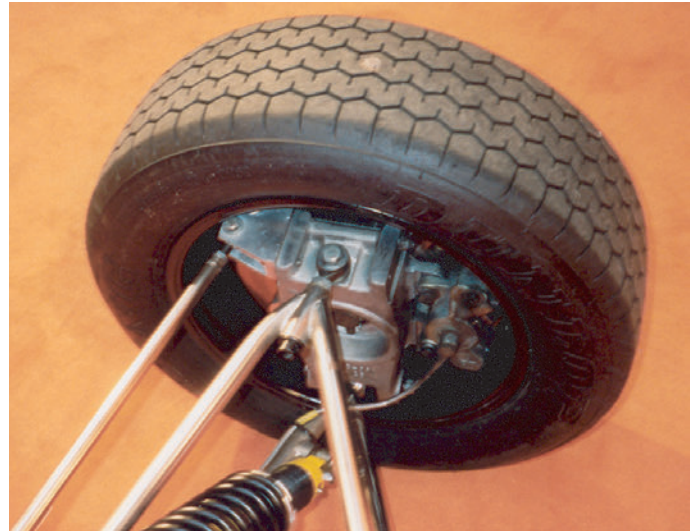
Examination:

Upon customer requirements the parts can be checked against cracks.

Applications

The Motor Sport application has its own demand on product and technique. The required task is to create a product which combines high performance and an appealing sporty design. Animated through customers and in close contact with technicians and university development teams FLURO® developed this MS series. For the below mentioned applications the technical geometric design in connection with the performance of the bearing becomes important. A special emphasis has to be laid on the bearing's composition of inner ring, insert, mating surface and housing.

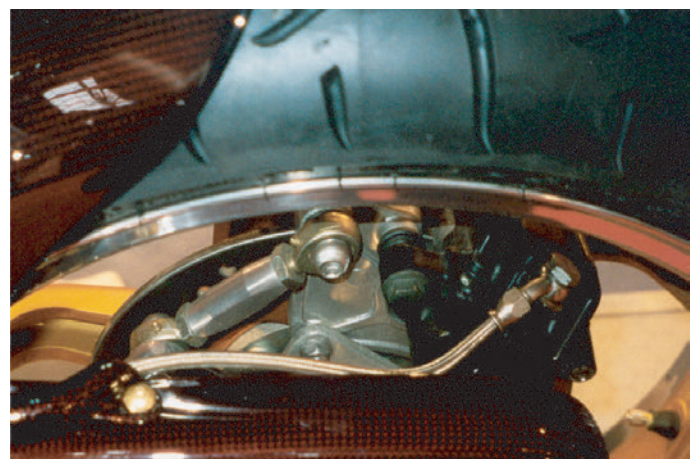
A classic application for Rod Ends is the suspension system. Related to it are different load problems such as vibrations and shocks under radial or axial loads. This dynamic stress demands a technically high quality bearing.



Depending on the race course and the driving performance of the driver, different loads can occur on the steering system.

In addition racing vehicles require a sporty design and appearance. The nickel plated housing with a high polish finish offers a professional racing look and is easy to clean from dirt and grease.

For motor cycles Rod Ends and Spherical Plain Bearings are used as stabilizers, for rod linkages and steering devices.



Technical Information

Bearing Load ratings

Bearing Load ratings are bearing specific data, derived from the characteristics of the materials used. They are used when selecting Spherical Plain Bearings or Rod Ends for a particular load, but may have to be reduced in adverse operating conditions.

Static Load ratings C_o [kN]

C_o indicates the maximum permissible static load which a Rod End at its weakest cross section can withstand without developing permanent distortion. The C_o values listed in the tables of this brochure have been calculated by using the appropriate material specifications and have been tested on a number of Rod Ends during tensile tests carried out at ambient temperature. 80% of the yield strength resulting from the tests have been used so that a safety factor of 1.25 is included.

The static load C_o is also used for establishing the maximum axial load which is limited by an additional bending stress principally due to the method of fastening of the insert. Following are maximum axial values (deformation) which have been established by pressure testing:

$$(1) \quad F_a = F_{a, zul} = a \cdot C_o \quad [\text{kN}]$$

$a = \lesseqgtr 0,4$ GXO MS

$a = \lesseqgtr 0,2$ für GXSW, GXOW MS mounted in a FLURO® Rod End housing

$a = \lesseqgtr 0,1$ für GE...EC-NIRO MS

For Spherical Plain Bearings C_o indicates the radial load, which does not deform the mating surface permanently. Precondition is the stable configuration of the housing.

Dynamic Load ratings C [kN]

This rating is used to establish the working life of Spherical Plain Bearings or Rod Ends when under dynamic load conditions. That is to say when they oscillate, rotate or pivot under load. The values listed in the table result from multiplying the maximum surface pressure p_{max} admissible in gliding movements by the projected bearing surface. A_{proj} , whereby a specific load rating is established for each type of Rod End. The established standard values for maximum surface load for various combinations of anti friction material have been listed in table 1 which allows for movement when oscillating.

Information: Depending on the material strength of the Rod End housing (eg. pages 10 and 11) the static load might be lower than the dynamic load.

| p_{zul} [N/mm ²] | St/St soft | St/St hard | St/TBz |
|-----------------------------------|---------------|---------------|--------|
| | 50 | 100 | 150 |

Table 1: Maximum surface pressure

Abbreviations: St = Steel

TBz = Woven Bronze Fabric

Ball diameter for Rod Ends and Spherical Plain Bearings

| Series K | | Series E | |
|----------|-------|----------|------|
| Size | Ø dk | Size | Ø dk |
| 6 | 12,70 | 10 | 16,0 |
| 8 | 15,87 | 12 | 18,0 |
| 10 | 19,05 | 15 | 22,0 |
| 12 | 22,22 | 17 | 25,0 |
| 14 | 25,40 | 20 | 29,0 |
| 16 | 28,57 | 25 | 35,5 |
| 18 | 31,75 | 30 | 40,7 |
| 20 | 34,92 | | |
| 22 | 38,10 | | |
| 25 | 42,86 | | |
| 30 | 50,80 | | |

Torque:

Because the bearing has 'no play', the internal clearance (torque) of the MS parts can be only defined by the force with which the ball can be moved.

Requirements:

The force (torque) with which the ball can be moved is measured in Ndm (Newton per decimetre). Herewith a bolt with one decimetre length is inserted into the ball's bore and the force to move the ball is measured with a spring balance. To neutralise the slip stick effect before measuring, the ball has to be moved at least five times the maximum possible distance. Because the 'breakaway torque' will be three times higher than the real torque value.

The torque rating on the rod ends data sheet in this catalogue, is the load during operating process (after a short period of warm-up time).

The torque rating on the spherical plain bearings data sheet in this catalogue refers to the ex factory condition and can increase after being mounted.

Temperature / Material

Due to the use of special materials, FLURO® is able to design high performance bearings, which can operate within a temperature range of minus 50° to plus 720° Celsius / minus 58° to plus 1328° Fahrenheit. This high performance bearing can be used in the area of turbo chargers or exhaust return mechanisms.

In the area of very aggressive substances such as sand, salt and dust these bearings are highly recommended. They are also very resistant against vibration.

Temperature range for FLURO® rod ends

| Mating surface | Temperature in Celsius | Temperature in Fahrenheit |
|------------------------|------------------------|---------------------------|
| Steel/Steel/PTFE-liner | -150° to +250° | -238° to +482° |
| Steel/Steel | - 50° to +200° | - 58° to +392° |

Temperature range for FLURO® spherical plain bearings

| Mating surface | Temperature Celsius | Temperature in Fahrenheit |
|------------------------|---------------------|---------------------------|
| Steel/Steel/PTFE-liner | -150° to +250° | -238° to + 482° |
| Steel/Steel | - 50° to +200° | - 58° to + 392° |
| CF1/CF1 Special* | - 50° to +420° | - 58° to + 788° |
| CF2/CF2 Special* | - 50° to +720° | - 58° to +1328° |

* on request

Material Conversion Table

| Material | DIN German | France | Italy | Sweden | UK | USA |
|----------|-------------------|---------------|----------------|--------|--------|------------------|
| 1.0402 | C22 | XC25 | C21 | 1450 | 070M20 | M1023 |
| 1.0503 | C45 | 1C45 | C45 | 1650 | 080M46 | Aisi 1045 |
| 2.1030 | CuSn8 | | | | | |
| 2.0561 | CuZn40Al1 | | | | | |
| 1.3505 | 100Cr6 | 100Cr6 | 100Cr6 | 2258 | 2S135 | Aisi 52100 |
| 1.7225 | 42CrMo4 | 42CrMo4 | 42CrMo4 | 2244 | 708M40 | Aisi 4140 |
| 1.0718 | 9SMnPb28K | S250Pb | CF9SMnPb28 | 1912 | 230M07 | 12L13 |
| 1.4006 | X10Cr13 | Z10C13 | X12Cn13 | 2302 | 410C21 | Aisi 410 |
| 1.4034 | X46Cr13 | Z44C14 | X40Cr14 | | 420S45 | Aisi 420C |
| 1.4057 | X20CrNi172 | Z15CN16-02 | X16CrNi16 | 2321 | 431S29 | Aisi 431 |
| 1.4112 | X90CrMoV18 | | | | | Aisi 440B |
| 1.4125 | X105CrMo17 | Z100CD17 | | | | Aisi 440C |
| 1.4301 | X5CrNi1810 | Z4CN19-10FF | X5CrNi1810 | 2332 | 304S17 | Aisi 304 |
| 1.4305 | X10CrNiS189 | Z8CNF18-09 | X10CrNiS1809 | 2346 | 303S22 | Aisi 303 |
| 1.4401 | X5CrNiMo17122 | Z7CND17-12-02 | X5CrNiMo1712 | 2347 | 316S17 | Aisi 316 |
| 1.4542 | X5CrNiCuNb174 | Z7CNU15-05 | ————— | ————— | ————— | Aisi 630 (174Ph) |
| 1.4571 | X6CrNiMoTi17-12-2 | Z6CNDT17-12 | X6CrNiMoTi1712 | 2350 | 320S18 | Aisi 316Ti |

Fit, Installation

Recommended fits for the bore housings to incorporate Spherical Plain Bearings

| Design | Steel Housing Series K (MS) | Light Alloy Housing Series K (MS) | Steel Series E (MS) | Light Alloy Housing Series E (MS) |
|------------------|-----------------------------|-----------------------------------|---------------------|-----------------------------------|
| maintenance free | M7 | N7 | M7 | N7 |
| regreasable | K7 | M7 | M7 | N7 |

The outside diameter of the Spherical Plain Bearings, Series K (MS) is tolerated to h6. For Series E, please refer to each individual product page.

Recommended fit for the shaft

| Load | Series K (MS) | Series E (MS) |
|--------|---------------|---------------|
| normal | h6 | g6 |
| high | k6 | j6/h6 |

The bore diameter of the ball of Spherical Plain Bearings, Series K is tolerated to H7. For Series E (MS) please refer to each product page.

Installation instructions:

Attention: No tolerance or play can be allowed for the shaft when incorporated in the Ball or the Outer Ring when incorporated in a housing. Through this it is guaranteed that the glide movement arises on the nodular gliding surface only.

When mounting extra precaution has to be taken that the press force does not damage the bearing. The press force should not be initiated via the bearing itself. Thermal installation will reduce the necessary press force.

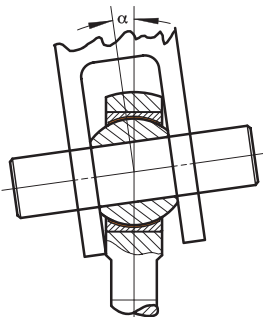
Axial locking of Spherical Plain Bearings:

When under high static or dynamic axial load, vibration, impacting load changes or high pivoting angles Spherical Plain Bearings have to be locked axially.

Possible locking methods:

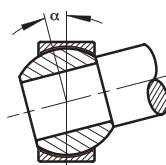
- locking through several puncher points
- caulking of bearing on the housing through a flanging groove
- with locking snap rings
- clamped with bushings on the facing surface of the Insert

Pivoting Angle:



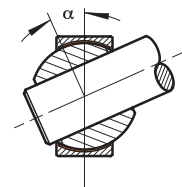
Situation 1

$$\alpha = \sin^{-1} \frac{B}{A} - \sin^{-1} \frac{M}{A}$$



Situation 2

$$\alpha = \sin^{-1} \frac{B}{dK} - \sin^{-1} \frac{M}{dK}$$



Situation 3

$$\alpha = \cos^{-1} \frac{D}{dK} - \sin^{-1} \frac{M}{dK}$$

A = Outside diameter Rod End/Spherical Plain Bearing
 B = Width Ball
 dK = diameter Ball

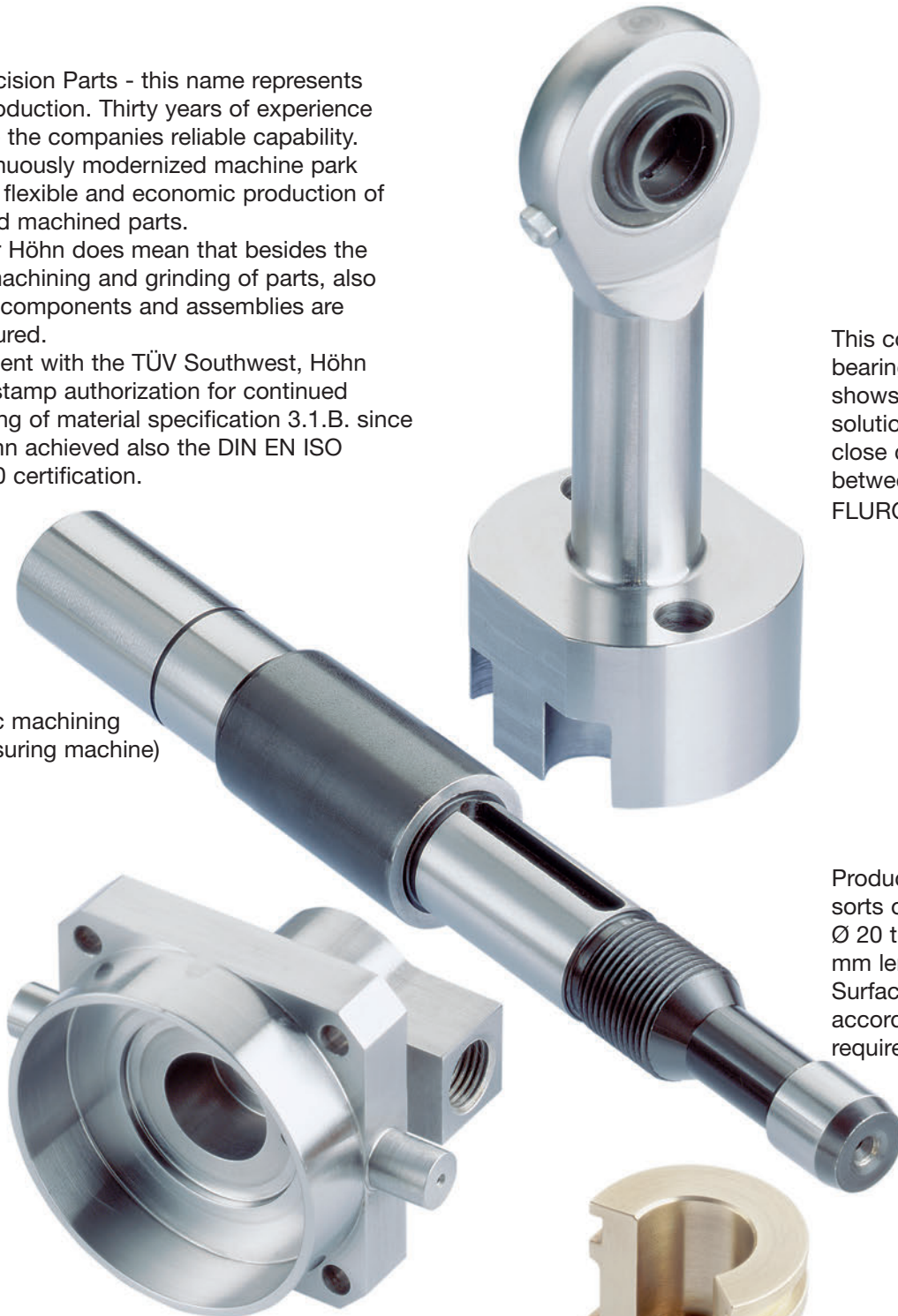
M = Width Rod End/Spherical Plain Bearing
 D = diameter Bore Ball

Höhn Precision Parts - this name represents quality production. Thirty years of experience guarantee the companies reliable capability. The continuously modernized machine park enables a flexible and economic production of turned and machined parts.

Variety for Höhn does mean that besides the turning, machining and grinding of parts, also complete components and assemblies are manufactured.

In agreement with the TÜV Southwest, Höhn received stamp authorization for continued re-stamping of material specification 3.1.B. since 1981. Höhn achieved also the DIN EN ISO 9001:2000 certification.

5-axial
symmetric machining
(3-D measuring machine)



This connecting rod with bearing for carriages shows a constructive solution through the close cooperation between Höhn and FLURO®.

Production of all sorts of shafts, Ø 20 to Ø 120 x 1000 mm length. Surface finish according to customer requirements.

Höhn processes all sorts of steel e.g.: Titan, Hasteloy, 17-4Ph, non-iron and non-ferrous heavy metal. Though constant stock of stainless steel material such as 1.4104, Aisi 430F, 1.4301, Aisi 304, 1.4305, Aisi 303, 1.4571, Aisi 316Ti, 1.4541, Aisi 321 a prompt delivery response is guaranteed.

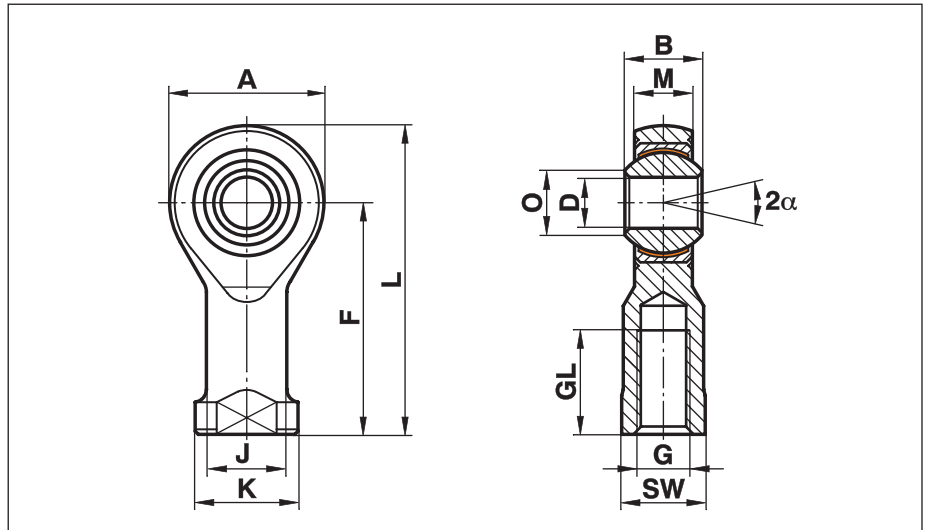
Machining of the rod from Ø 10 to Ø 80 mm, chucking parts from Ø 10 to Ø 300 mm.

Rod Ends Motor Sport Maintenance Free

Series GIXSW..MS

Rod Ends with female thread made from heat-treated steel, nickel plated with PTFE-liner, maintenance free. Preloaded bearing

For use at highest dynamic pressure and tension loads in corrosive environments



| Description | DH7 | B | M | A | F | L | K | J | O | SW | G | GL | static radial load C ₀ kN | dynamic radial load C ₀ kN | torque N/dm | α | weight g |
|------------------|-----|----|-------|----|----|-----|----|------|------|----|-----------|----|---|--|----------------|-----|-------------|
| GIXSW 6 MS | 6 | 9 | 6,75 | 20 | 30 | 40 | 13 | 10,0 | 8,9 | 11 | M 6x1 | 12 | 16,7 | 9,8 | 4-10 | 13° | 27 |
| GIXSW 8 MS | 8 | 12 | 9,00 | 24 | 36 | 48 | 16 | 12,5 | 10,4 | 13 | M 8x1,25 | 16 | 25,5 | 20,0 | 4-12 | 14° | 46 |
| GIXSW 10x1,25 MS | 10 | 14 | 10,50 | 28 | 43 | 57 | 19 | 15,0 | 12,9 | 17 | M 10x1,25 | 20 | 34,8 | 28,1 | 6-16 | 13° | 76 |
| GIXSW 10 MS | 10 | 14 | 10,50 | 28 | 43 | 57 | 19 | 15,0 | 12,9 | 17 | M 10x1,5 | 20 | 34,8 | 28,1 | 6-16 | 13° | 76 |
| GIXSW 12x1,25 MS | 12 | 16 | 12,00 | 32 | 50 | 66 | 22 | 17,5 | 15,4 | 19 | M 12x1,25 | 22 | 42,0 | 38,4 | 10-22 | 13° | 115 |
| GIXSW 12 MS | 12 | 16 | 12,00 | 32 | 50 | 66 | 22 | 17,5 | 15,4 | 19 | M 12x1,75 | 22 | 42,0 | 38,4 | 10-22 | 13° | 115 |
| GIXSW 14 MS | 14 | 19 | 13,50 | 36 | 57 | 75 | 25 | 20,0 | 16,8 | 22 | M 14x2 | 25 | 57,0 | 50,5 | 12-24 | 16° | 170 |
| GIXSW 14x1,5 MS | 14 | 19 | 13,50 | 36 | 57 | 75 | 25 | 20,0 | 16,8 | 22 | M 14x1,5 | 25 | 57,0 | 50,5 | 12-24 | 16° | 170 |
| GIXSW 16 MS | 16 | 21 | 15,00 | 42 | 64 | 85 | 27 | 22,0 | 19,3 | 22 | M 16x2 | 28 | 67,5 | 63,0 | 14-28 | 15° | 230 |
| GIXSW 16x1,5 MS | 16 | 21 | 15,00 | 42 | 64 | 85 | 27 | 22,0 | 19,3 | 22 | M 16x1,5 | 28 | 67,5 | 63,0 | 14-28 | 15° | 230 |
| GIXSW 18 MS | 18 | 23 | 16,50 | 46 | 71 | 94 | 31 | 25,0 | 21,8 | 27 | M 18x1,5 | 32 | 81,5 | 76,5 | 18-32 | 15° | 320 |
| GIXSW 20 MS | 20 | 25 | 18,00 | 50 | 77 | 102 | 34 | 27,5 | 24,3 | 32 | M 20x1,5 | 33 | 93,5 | 93,5 | 20-34 | 14° | 415 |

Materials:

Housing: Heat-treated steel to 42CrMo4, Aisi 4140, forged, nickel plated with high polish finish.

Insert: Stainless steel to 1.4571, Aisi 316Ti with PTFE liner bonded to the inner surface

Ball: Bearing steel to 100Cr6, Aisi 52100, hardened, ground, polished, hard chrome plated on the running surface

Clearance: preloaded, zero tolerance

On request:

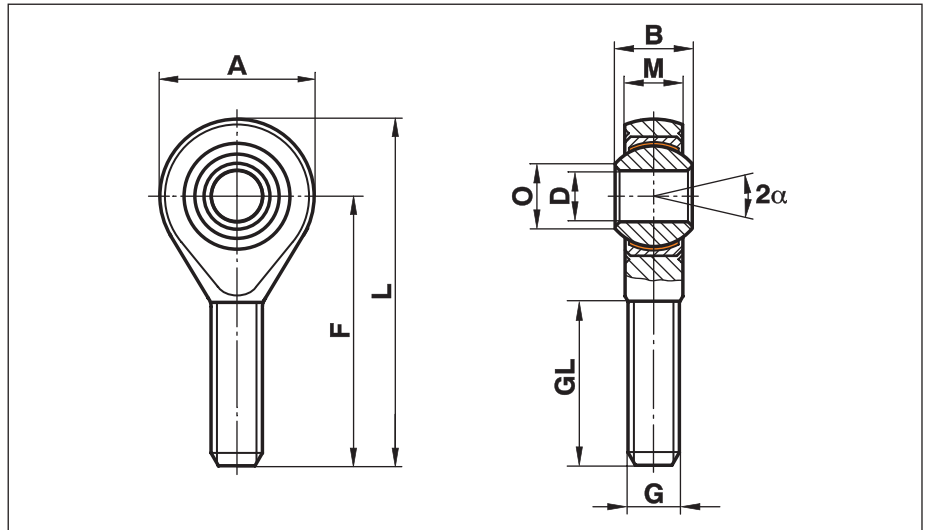
- with left hand thread
- Rod End with reduced bore (D)
- with threaded bolt
- further sizes are available

Rod Ends Motor Sport Maintenance Free

Series GAXSW..MS

Rod Ends with male thread made from heat-treated steel, nickel plated with PTFE-liner, maintenance free. Preloaded bearing

For use at highest dynamic pressure and tension loads in corrosive environments



| Description | DH7 | B | M | A | F | L | O | G | GL | static radial load C ₀ kN | dynamic radial load C ₀ kN | torque N/dm | α | weight g |
|------------------|-----|----|-------|----|----|-----|------|-----------|----|---|--|----------------|-----|-------------|
| GAXSW 6 MS | 6 | 9 | 6,75 | 20 | 36 | 46 | 8,9 | M 6x1 | 21 | 9,8 | 9,8 | 4-10 | 13° | 20 |
| GAXSW 8 MS | 8 | 12 | 9,00 | 24 | 42 | 54 | 10,4 | M 8 x1,25 | 25 | 19,5 | 19,5 | 4-12 | 14° | 33 |
| GAXSW 8x1 MS | 8 | 12 | 9,00 | 24 | 42 | 54 | 10,4 | M 8 x1 | 25 | 19,5 | 19,5 | 4-12 | 14° | 33 |
| GAXSW 10 MS | 10 | 14 | 10,50 | 28 | 48 | 62 | 12,9 | M 10x1,5 | 28 | 31,4 | 28,1 | 6-16 | 13° | 56 |
| GAXSW 10x1,25 MS | 10 | 14 | 10,50 | 28 | 48 | 62 | 12,9 | M 10x1,25 | 28 | 31,4 | 28,1 | 6-16 | 13° | 56 |
| GAXSW 10x1 MS | 10 | 14 | 10,50 | 28 | 48 | 62 | 12,9 | M 10x1 | 28 | 31,4 | 28,1 | 6-16 | 13° | 56 |
| GAXSW 12 MS | 12 | 16 | 12,00 | 32 | 54 | 70 | 15,4 | M 12x1,75 | 32 | 42,0 | 38,4 | 10-22 | 13° | 87 |
| GAXSW 12x1,5 MS | 12 | 16 | 12,00 | 32 | 54 | 70 | 15,4 | M 12x1,5 | 32 | 42,0 | 38,4 | 10-22 | 13° | 87 |
| GAXSW 12x1,25 MS | 12 | 16 | 12,00 | 32 | 54 | 70 | 15,4 | M 12x1,25 | 32 | 42,0 | 38,4 | 10-22 | 13° | 87 |
| GAXSW 14 MS | 14 | 19 | 13,50 | 36 | 60 | 78 | 16,8 | M 14x2 | 38 | 57,0 | 50,5 | 12-24 | 16° | 129 |
| GAXSW 14x1,5 MS | 14 | 19 | 13,50 | 36 | 60 | 78 | 16,8 | M 14x1,5 | 38 | 57,0 | 50,5 | 12-24 | 16° | 129 |
| GAXSW 16 MS | 16 | 21 | 15,00 | 42 | 66 | 87 | 19,3 | M 16x2 | 40 | 67,0 | 63,0 | 14-28 | 15° | 189 |
| GAXSW 16x1,5 MS | 16 | 21 | 15,00 | 42 | 66 | 87 | 19,3 | M 16x1,5 | 40 | 67,0 | 63,0 | 14-28 | 15° | 189 |
| GAXSW 18 MS | 18 | 23 | 16,50 | 46 | 72 | 95 | 21,8 | M 18x1,5 | 44 | 81,5 | 76,5 | 18-32 | 15° | 267 |
| GAXSW 20 MS | 20 | 25 | 18,00 | 50 | 78 | 103 | 24,3 | M 20x1,5 | 47 | 93,5 | 93,5 | 20-34 | 14° | 348 |
| GAXSW 25 MS | 25 | 31 | 22,00 | 60 | 94 | 124 | 29,6 | M 24x2 | 58 | 135,0 | 135,0 | 34-52 | 15° | 600 |

Rod Ends with reduced bore:

| Description | DH7 | B | M | A | F | L | O | G | GL | static radial load C ₀ kN | dynamic radial load C ₀ kN | torque N/dm | α ¹⁾ | weight g |
|----------------|-----|----|-------|----|----|----|------|-----------|----|---|--|----------------|-----------------|-------------|
| GAXSW 10.8 MS | 8 | 14 | 10,50 | 28 | 48 | 62 | 12,9 | M 10x1,5 | 28 | 31,4 | 28,1 | 6-16 | 13° | 56 |
| GAXSW 12.10 MS | 10 | 16 | 12,00 | 32 | 54 | 70 | 15,4 | M 12x1,75 | 32 | 42,0 | 38,4 | 10-22 | 13° | 87 |
| GAXSW 14.12 MS | 12 | 19 | 13,50 | 36 | 60 | 78 | 16,8 | M 14x2 | 38 | 57,0 | 50,5 | 12-24 | 16° | 129 |
| GAXSW 16.14 MS | 14 | 21 | 15,00 | 42 | 66 | 87 | 19,3 | M 16x2 | 40 | 67,0 | 63,0 | 14-28 | 15° | 189 |
| GAXSW 18.16 MS | 16 | 23 | 16,50 | 46 | 72 | 95 | 21,8 | M 18x1,5 | 44 | 81,5 | 76,5 | 18-32 | 15° | 267 |

Materials:

Housing: Heat-treated steel to 42CrMo4, Aisi 4140, forged, polished, nickel plated with high polish finish

Insert: Stainless steel to 1.4571, Aisi 316Ti with PTFE liner bonded to the inner surface

Ball: Bearing steel to 100Cr6, Aisi 52100, hardened, ground, polished, hard chrome plated on the running surface

Clearance: preloaded, zero tolerance

On request: with left hand thread, threaded bolt and further sizes are available

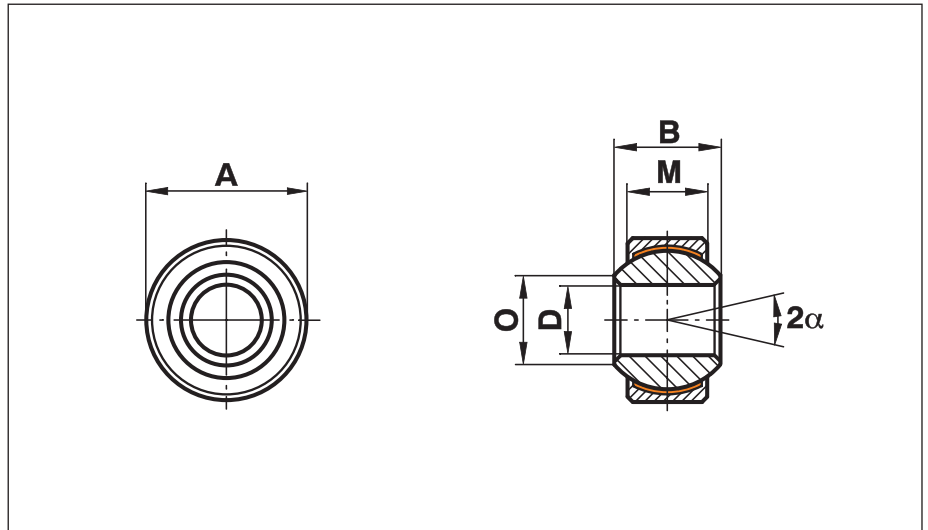
¹⁾ The reduced bore diameter offers to the engineer the possibility to construct a bearing with a very high pivoting angle, especially when a minimal shaft collar is used (in some cases twice as high as standard listing).

Spherical Plain Bearings Motor Sport Maintenance Free

Series GXSW..MS

Spherical Plain Bearings
with smaller outside Ø,
maintenance free.
Preloaded bearing

For use at highest
dynamic pressure and
tension loads in corrosive
environments

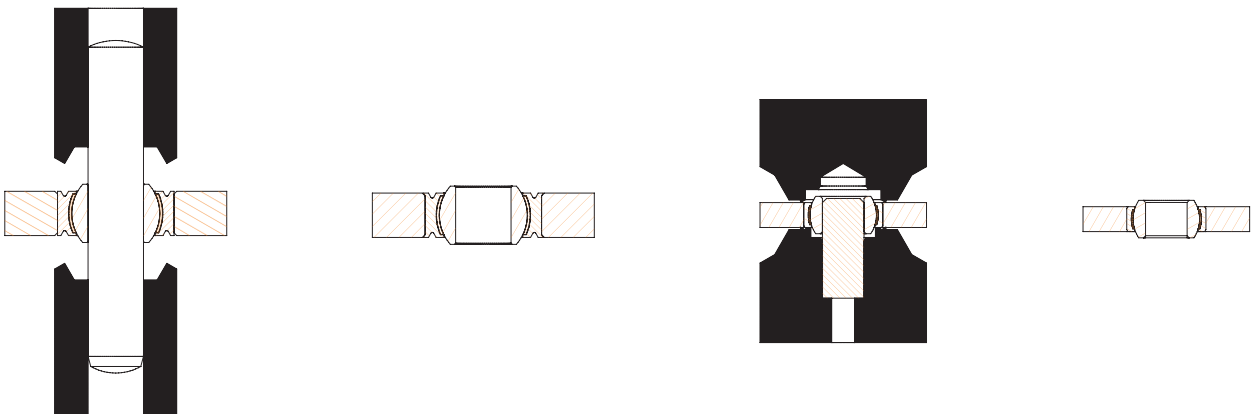


| Description | DH7 | B | M | A h6 | O | static radial load C ₀ kN | dynamic radial load C ₀ kN | torque N/dm | α | weight g |
|---------------|-----|----|-------|------|------|--|---|----------------|-----|-------------|
| GXSW 8.19 MS | 8 | 12 | 9,00 | 19 | 10,4 | 27,8 | 20,8 | 1-10 | 14° | 17 |
| GXSW 10.22 MS | 10 | 14 | 10,50 | 22 | 12,9 | 39,0 | 28,1 | 2-14 | 13° | 26 |
| GXSW 12.26 MS | 12 | 16 | 12,00 | 26 | 15,4 | 53,5 | 38,4 | 6-18 | 13° | 41 |
| GXSW 14.29 MS | 14 | 19 | 13,50 | 29 | 16,8 | 70,0 | 50,5 | 6-20 | 16° | 56 |
| GXSW 16.32 MS | 16 | 21 | 15,00 | 32 | 19,3 | 88,0 | 63,0 | 8-22 | 15° | 75 |
| GXSW 18.35 MS | 18 | 23 | 16,50 | 35 | 21,8 | 106,5 | 76,5 | 8-22 | 15° | 97 |
| GXSW 20.40 MS | 20 | 25 | 18,00 | 40 | 24,3 | 130,0 | 93,5 | 8-25 | 14° | 142 |

Materials:

- Insert:** Stainless steel to 1.4571, Aisi 316Ti with PTFE liner bonded to the inner surface
- Ball:** Bearing steel to 100Cr6, Aisi 52100, hardened, ground, polished, hard chrome plated on the running surface
- Clearance:** preloaded, zero tolerance
- On request:**
- Ball made from stainless steel to 1.4034, Aisi 420C, hardened, ground, polished
 - with V-Groove on both sides
 - with threaded bolt

V-Groove and caulking tool for mounting can be ordered from Fluro®.



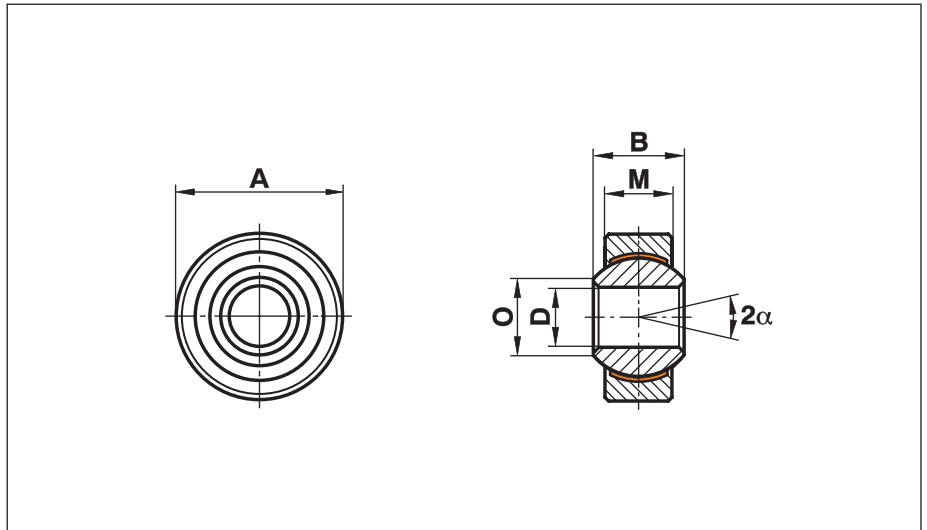
FLURO-Gelenklager GmbH

Spherical Plain Bearings Motor Sport Maintenance Free

Series GXOW..MS

Spherical Plain Bearings with larger outside \varnothing , Insert from extra heavy-duty steel, zinc plated with PTFE-liner, maintenance free. Preloaded bearing

For use at highest dynamic pressure and tension loads



| Description | DH7 | B | M | A h6 | O | static radial load C_0 kN | dynamic radial load C_0 kN | torque N/dm | α | weight g |
|---------------|-----|----|-------|------|------|-----------------------------|------------------------------|-------------|----------|----------|
| GXOW 8.22 MS | 8 | 12 | 9,00 | 22 | 10,4 | 27,8 | 20,8 | 4-12 | 14° | 23 |
| GXOW 10.26 MS | 10 | 14 | 10,50 | 26 | 12,9 | 39,0 | 28,1 | 6-16 | 13° | 38 |
| GXOW 12.30 MS | 12 | 16 | 12,00 | 30 | 15,4 | 53,5 | 38,4 | 10-22 | 13° | 58 |
| GXOW 14.34 MS | 14 | 19 | 13,50 | 34 | 16,8 | 70,0 | 50,5 | 12-24 | 16° | 83 |
| GXOW 16.38 MS | 16 | 21 | 15,00 | 38 | 19,3 | 88,0 | 63,0 | 14-28 | 15° | 115 |
| GXOW 18.42 MS | 18 | 23 | 16,50 | 42 | 21,8 | 106,5 | 76,5 | 18-32 | 15° | 150 |
| GXOW 20.46 MS | 20 | 25 | 18,00 | 46 | 24,3 | 130,0 | 93,5 | 20-34 | 14° | 200 |

Materials:

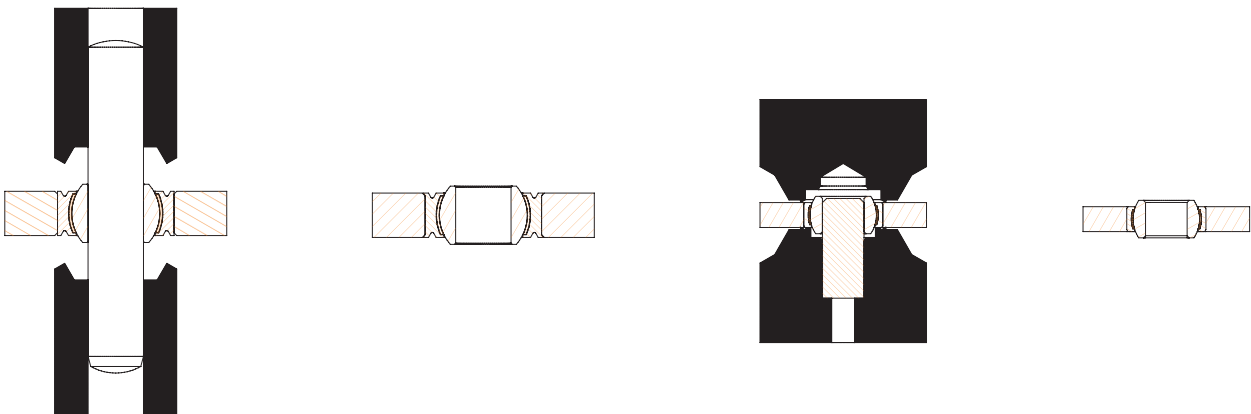
Insert: Extra heavy-duty steel to 45S20, zinc plated

Ball: Bearing steel to 100Cr6, Aisi 52100, hardened, ground, polished, hard chrome plated on the running surface

Clearance: preloaded, zero tolerance

On request:
 - with threaded bolt
 - with V-Groove on both sides

V-Groove and caulking tool for mounting can be ordered from Fluro®.

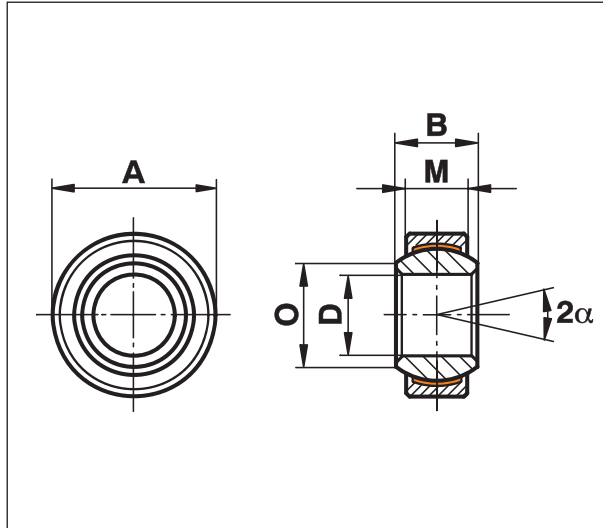


Spherical Plain Bearings Motor Sport-Stainless, Maintenance Free

Series GE..EC-NIRO MS

Spherical Plain Bearings, narrow series made from stainless steel running on PTFE, maintenance free. Preloaded Bearing

For use at dynamic pressure and tension loads in corrosive environments and limited fitting dimensions



Materials:

Insert:

Stainless steel to 1.4571, Aisi 316Ti, with PTFE liner bonded to the inner surface

Ball:

Stainless steel to 1.4125, Aisi 440C, hardened, ground, polished

Clearance:

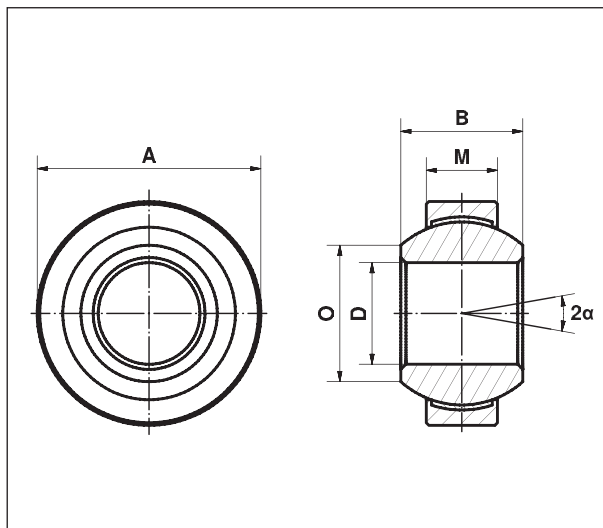
preloaded, zero tolerance

| Description | D | B | M | A | O | static radial load C ₀ kN | dynamic radial load C ₀ kN | torque N/dm | α | weight g |
|------------------|-----------------------------------|----|----|-----------------------------------|------|--------------------------------------|---------------------------------------|-------------|-----|----------|
| GE 10 EC-NIRO MS | 10 ⁰ _{-0,008} | 9 | 6 | 19 ⁰ _{-0,009} | 13,2 | 23,4 | 10,0 | 4-14 | 12° | 11 |
| GE 12 EC-NIRO MS | 12 ⁰ _{-0,008} | 10 | 7 | 22 ⁰ _{-0,009} | 14,9 | 32,0 | 14,0 | 8-18 | 11° | 16 |
| GE 15 EC-NIRO MS | 15 ⁰ _{-0,008} | 12 | 9 | 26 ⁰ _{-0,009} | 18,4 | 50,0 | 30,0 | 10-20 | 11° | 26 |
| GE 17 EC-NIRO MS | 17 ⁰ _{-0,008} | 14 | 10 | 30 ⁰ _{-0,009} | 20,7 | 65,0 | 39,0 | 12-22 | 10° | 38 |
| GE 20 EC-NIRO MS | 20 ⁰ _{-0,010} | 16 | 12 | 35 ⁰ _{-0,011} | 24,2 | 90,5 | 54,0 | 18-28 | 9° | 61 |

Series GE...FW-NIRO-MS

Spherical Plain Bearings, narrow series made from stainless steel running on PTFE, maintenance free. Preloaded Bearing

For use at dynamic pressure and tension loads in corrosive environments and limited fitting dimensions



Materials:

Insert:

Stainless steel to 1.4571, Aisi 316Ti, with PTFE liner bonded to the inner surface

Ball:

Stainless steel to 1.4125, Aisi 440C, hardened, ground, polished

Clearance:

preloaded, zero tolerance

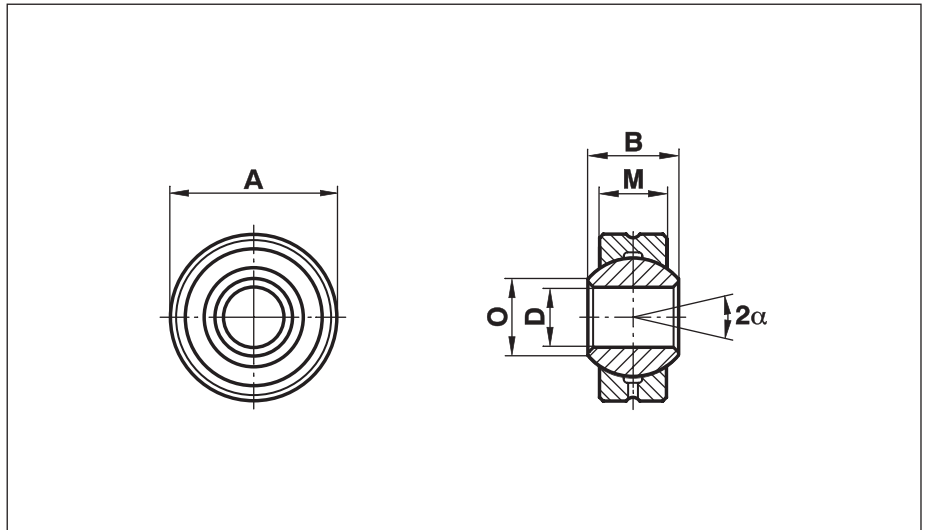
| Description | D | B | M | A | O | static radial load C ₀ kN | dynamic radial load C ₀ kN | torque N/dm | α | weight g |
|------------------|-----------------------------------|----|----|-----------------------------------|------|--------------------------------------|---------------------------------------|-------------|-----|----------|
| GE 12 FW-NIRO MS | 12 ⁰ _{-0,008} | 15 | 9 | 26 ⁰ _{-0,009} | 14,9 | 50,0 | 30,0 | 8-18 | 18° | 16 |
| GE 15 FW-NIRO MS | 15 ⁰ _{-0,008} | 16 | 10 | 30 ⁰ _{-0,009} | 18,4 | 65,0 | 39,0 | 10-20 | 16° | 26 |
| GE 17 FW-NIRO MS | 17 ⁰ _{-0,008} | 20 | 12 | 35 ⁰ _{-0,011} | 20,7 | 90,5 | 54,0 | 12-22 | 19° | 38 |
| GE 20 FW-NIRO MS | 20 ⁰ _{-0,010} | 25 | 16 | 42 ⁰ _{-0,011} | 24,2 | 159,0 | 96,0 | 18-28 | 17° | 61 |

Spherical Plain Bearings Extra Heavy Duty Steel on Steel, Stainless

Series GXO..ICR(RR)

Spherical Plain Bearings with larger outside \varnothing , regreasable

For use at highest dynamic radial and **axial** pressure and tension loads. Vibration and impact resistant



| Description | DH7 | B | M | A h6 | O | static radial load C_0 kN | dynamic radial load C_0 kN | Internal Clearance μm | α | weight g |
|---------------|-----|----|-------|------|------|-----------------------------|------------------------------|----------------------------------|----------|----------|
| GXO 8.22 ICR | 8 | 12 | 9,00 | 22 | 10,4 | 60,7 | 7,1 | 5-20 | 14° | 23 |
| GXO 10.26 ICR | 10 | 14 | 10,50 | 26 | 12,9 | 85,2 | 9,9 | 5-20 | 13° | 38 |
| GXO 12.30 ICR | 12 | 16 | 12,00 | 30 | 15,4 | 113,5 | 13,0 | 5-25 | 13° | 58 |
| GXO 14.34 ICR | 14 | 19 | 13,50 | 34 | 16,8 | 146,0 | 17,0 | 5-25 | 16° | 83 |
| GXO 16.38 ICR | 16 | 21 | 15,00 | 38 | 19,3 | 182,5 | 21,0 | 5-25 | 15° | 115 |
| GXO 18.42 ICR | 18 | 23 | 16,50 | 42 | 21,8 | 224,0 | 26,0 | 5-25 | 15° | 150 |
| GXO 20.46 ICR | 20 | 25 | 18,00 | 46 | 24,3 | 268,0 | 31,0 | 5-30 | 14° | 200 |

Materials:

Insert: Extra heavy-duty steel to 45S20, zinc plated

Ball: Bearing steel to 100Cr6, Aisi 52100, hardened, ground, polished, hard chrome plated on the running surface

| Description | DH7 | B | M | A h6 | O | static radial load C_0 kN | dynamic radial load C_0 kN | Internal Clearance μm | α | weight g |
|--------------|-----|----|-------|------|------|-----------------------------|------------------------------|----------------------------------|----------|----------|
| GXO 8.22 RR | 8 | 12 | 9,00 | 22 | 10,4 | 30,4 | 3,5 | 5-20 | 14° | 23 |
| GXO 10.26 RR | 10 | 14 | 10,50 | 26 | 12,9 | 42,6 | 4,9 | 5-20 | 13° | 38 |
| GXO 12.30 RR | 12 | 16 | 12,00 | 30 | 15,4 | 57,0 | 6,5 | 5-25 | 13° | 58 |
| GXO 14.34 RR | 14 | 19 | 13,50 | 34 | 16,8 | 73,0 | 8,5 | 5-25 | 16° | 83 |
| GXO 16.38 RR | 16 | 21 | 15,00 | 38 | 19,3 | 91,0 | 10,5 | 5-25 | 15° | 115 |
| GXO 18.42 RR | 18 | 23 | 16,50 | 42 | 21,8 | 112,0 | 13,0 | 5-25 | 15° | 150 |
| GXO 20.46 RR | 20 | 25 | 18,00 | 46 | 24,3 | 134,0 | 15,5 | 5-30 | 14° | 200 |

Materials:

Insert: Stainless steel to 1.4571, Aisi 316Ti

Ball: Stainless steel to 1.4034, Aisi 420C, hardened, ground, polished

These high performance bearings are a steel on steel design without PTFE liner. This spherical plain bearing has a reduced internal clearance and is not pre-loaded.

Internal clearance: the radial internal clearance is the value with which the ball can be moved in radial direction from one cutoff point to the opposite.

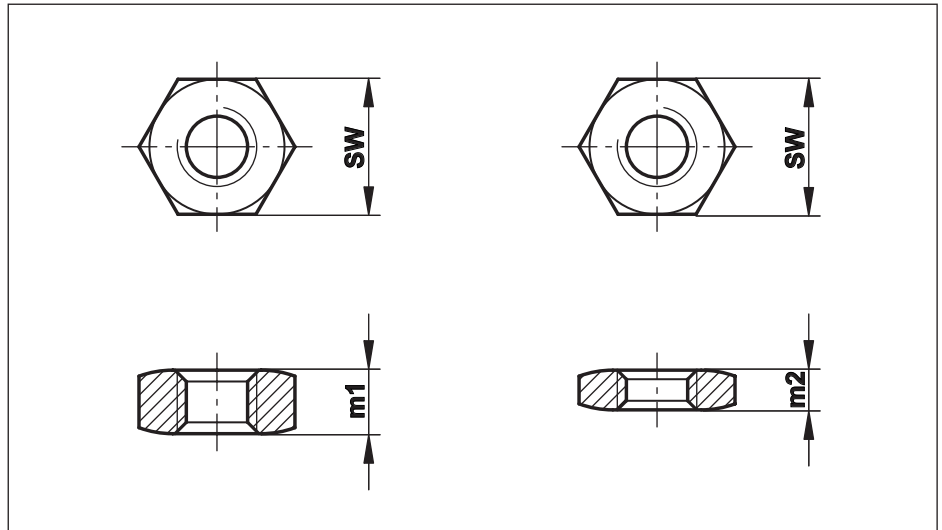
Both series are also available with threaded bolt.

Locking Nuts to DIN 934 / 439

Normal Form
DIN 934 / ISO 4032

Narrow Form
DIN 439 / 936

Locking Nuts with right
or left hand thread.
Steel zinc plated or
stainless Steel A2



| Nominal Size | Standard Thread Pitch | SW | Thread Pitch M ... | | | | | | | | | | | | ISO 4032/DIN934 | | ISO 4036/DIN439 | |
|--------------|-----------------------|------|--------------------|------|------|------|------|-------|------|-------|------|------|------|------|-----------------|----------|-----------------|----------|
| | | | x0,4 | x0,5 | x0,7 | x0,8 | x1,0 | x1,25 | x1,5 | x1,75 | x2,0 | x2,5 | x3,0 | x4,0 | m ₁ | Weight g | m ₂ | Weight g |
| M 3 | (M 3x0,5) | 5,5 | | X | | | | | | | | | | | 2,4 | 0,4 | 1,8 | 0,3 |
| M 4 | (M 4x0,7) | 7,0 | | | X | | | | | | | | | | 3,2 | 0,8 | 2,2 | 0,6 |
| M 5 | (M 5x0,8) | 8,0 | | | | X | | | | | | | | | 4,0 | 1,2 | 2,7 | 0,8 |
| M 6 | (M 6x1) | 10,0 | | | | | X | | | | | | | | 5,0 | 2,4 | 3,2 | 1,5 |
| M 8 | (M 8x1,25) | 13,0 | | | | | X | X | | | | | | | 6,5 | 5,1 | 4,0 | 3,1 |
| M 10 | (M10x1,5) | 17,0 | | | | | X | X | X | | | | | | 8,0 | 11,1 | 5,0 | 6,9 |
| M 12 | (M 12x1,75) | 19,0 | | | | | | X | X | X | | | | | 10,0 | 16,3 | 6,0 | 9,8 |
| M 14 | (M 14x2) | 22,0 | | | | | | | | | X | | | | 11,0 | 24,0 | 7,0 | 15,0 |
| M 16 | (M 16x2) | 24,0 | | | | | | | X | | X | | | | 13,0 | 32,0 | 8,0 | 19,5 |
| M 18 | (M 18x2,5) | 27,0 | | | | | | | X | | | | | | 15,0 | 47,0 | 9,0 | 28,0 |
| M 20 | (M 20x2,5) | 30,0 | | | | | | | X | | | X | | | 16,0 | 61,0 | 10,0 | 38,0 |
| M 22 | (M22x2,5) | 32,0 | | | | | | | X | | | | | | 18,0 | 75,0 | 11,0 | 46,0 |
| M 24 | (M 24x3) | 36,0 | | | | | | | | | X | | | | 19,0 | 104,0 | 12,0 | 66,0 |
| M 27 | (M 27x3) | 41,0 | | | | | | | | | | X | | | 22,0 | 158,0 | 13,5 | 96,0 |
| M 30 | (M 30x3,5) | 46,0 | | | | | | | | | | X | | | 24,0 | 219,0 | 15,0 | 137,0 |
| M 36 | (M 36x4) | 55,0 | | | | | | | | | | X | | X | 29,0 | 370,0 | 18,0 | 230,0 |
| M 39 | (M 39x4) | 60,0 | | | | | | | | | | | X | | 31,0 | 470,0 | 19,5 | 300,0 |
| M 42 | (M 42x4,5) | 65,0 | | | | | | | | | | X | | X | 34,0 | 610,0 | 21,0 | 380,0 |
| M 45 | (M 45x4,5) | 70,0 | | | | | | | | | | | X | | 36,0 | 750,0 | 22,5 | 470,0 |
| M 48 | (M 48x5) | 75,0 | | | | | | | | | | X | | | 38,0 | 910,0 | 24,0 | 580,0 |
| M 52 | (M 52x5) | 80,0 | | | | | | | | | | | | X | 42,0 | 1130,0 | 26,0 | 700,0 |
| M 56 | (M 56x5,5) | 85,0 | | | | | | | | | | | | | X | 1350,0 | 28,0 | 840,0 |
| M 64 | (M 64x6) | 95,0 | | | | | | | | | | | | X | 51,0 | 1850,0 | 32,0 | 1160,0 |

X) available ex stock, Standard Form only with standard thread in stock

Materials: Steel zinc plated, strength grade: 04 or better
A2 is equivalent to stainless steel 1.4301, Aisi 304 and 1.4303, Aisi 305 or alternative material

Thread: Right hand or left hand threads

Remarks: Across-flats dimension SW, Weight, Width m1/m2 and Chamfer can differ from the table above and the DIN, because of different manufacturing methods
Locking Nuts DIN 439 according to **ISO 4036** (without chamfer) or **ISO 4035** (with chamfer).
Locking Nuts DIN 439 Fine Thread according to **ISO 8675** (with chamfer).

Ordering e.g. **Locking Nut M 10 Left Hand** (Normal Form with standard thread) in stainless steel A2:

Details: **Locking Nut DIN 934-M10-A2-Left Hand**
e.g. **Locking Nut M 39x3 Right Hand** (Narrow Form) in Steel, zinc plated:
Locking Nut DIN 439-M39x3-04

Rubber Seals

RERS

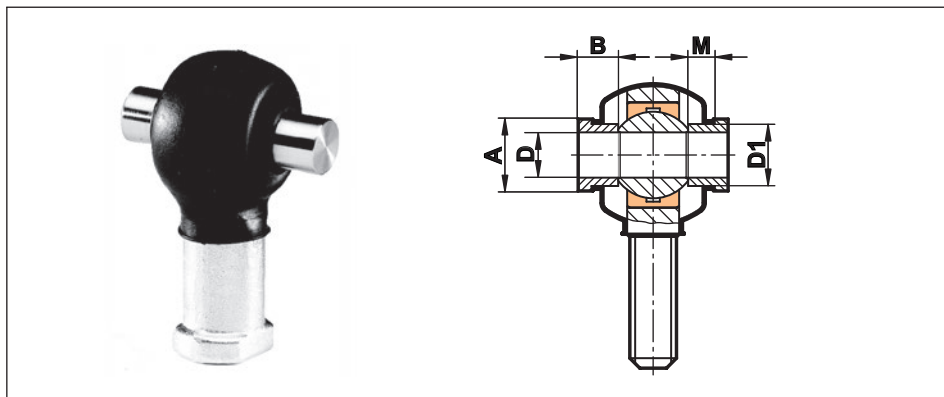
Rubber Protector Caps
made from Neoprene

Protects against dust, chemical substances and aggressive environment. Resistant to oil, grease, saltwater, chemical components and other substances.

Temperature range from -20° till +120° Celsius or -4° till +248° Fahrenheit.

The Steel/Steel version can be completely filled with grease. Mounted easily with Seeger retaining pliers

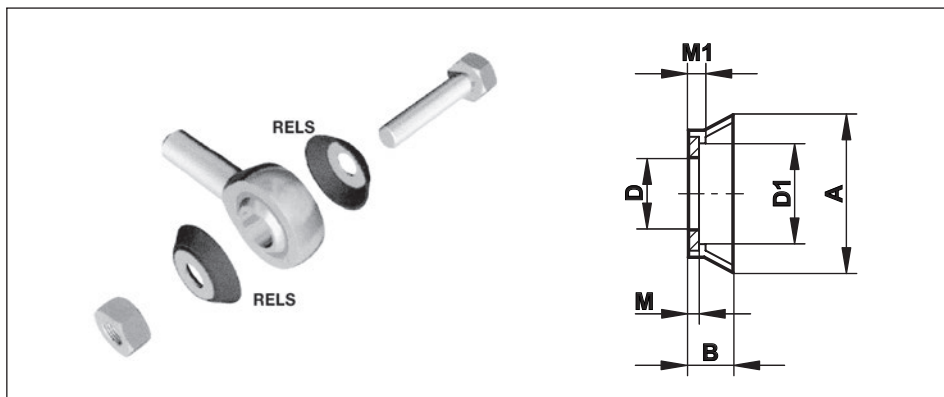
* Spacers separately on request



| Rod End Size | Rubber Protector Cap Type | Spacers Type* | D | D1 | B | M | A |
|--------------|---------------------------|---------------|----|------|----|---|----|
| 6 | RERS 1 | DR 6 | 6 | 8,7 | 6 | 4 | 11 |
| 8 | RERS 1 | DR 8 | 8 | 10,3 | 6 | 4 | 12 |
| 10 | RERS 2 | DR 10 | 10 | 12,5 | 6 | 4 | 14 |
| 12 | RERS 2 | DR 12 | 12 | 15,0 | 8 | 6 | 17 |
| 14 | RERS 3 | DR 14 | 14 | 16,8 | 8 | 6 | 19 |
| 16 | RERS 3 | DR 16 | 16 | 19,0 | 8 | 6 | 21 |
| 18 | RERS 3 | DR 18 | 18 | 21,8 | 8 | 6 | 25 |
| 20 | RERS 4 | DR 20 | 20 | 24,3 | 10 | 8 | 28 |
| 22 | RERS 4 | DR 22 | 22 | 25,7 | 10 | 8 | 29 |
| 25 | RERS 4 | DR 25 | 25 | 29,7 | 10 | 8 | 33 |

RELS

Washer Seals
Rubber Seals
vulcanized to
stainless steel washer
rings



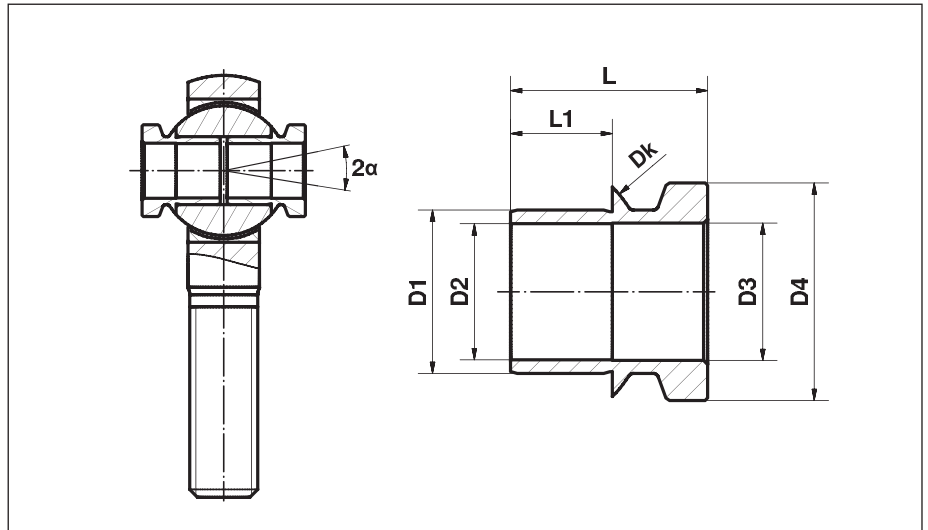
| Rod End / Spherical Plain Bearing size | Washer Seal Type | D | D1 | B | M | M1 | A |
|--|------------------|-------|------|------|------|-----|------|
| 5 | RELS 5 | 5,25 | 8,3 | 2,4 | 0,50 | 0,8 | 11,2 |
| 6 | RELS 6 | 6,25 | 9,5 | 3,1 | 0,69 | 0,9 | 12,7 |
| 8 | RELS 8 | 8,25 | 12,4 | 5,1 | 1,20 | 1,4 | 17,8 |
| 10 | RELS 10 | 10,25 | 13,5 | 5,6 | 1,20 | 1,4 | 20,3 |
| 12 | RELS 12 | 12,25 | 18,5 | 6,4 | 1,20 | 1,7 | 28,6 |
| 14 | RELS 14 | 14,25 | 18,5 | 6,4 | 1,20 | 1,7 | 28,6 |
| 16 | RELS 16 | 16,25 | 22,4 | 6,8 | 1,20 | 1,7 | 31,7 |
| 18 | RELS 18 | 18,25 | 22,6 | 8,3 | 1,20 | 1,7 | 32,7 |
| 20 | RELS 20 | 20,25 | 25,2 | 10,2 | 1,20 | 1,7 | 38,1 |
| 25 | RELS 25 | 25,25 | 33,8 | 12,7 | 1,50 | 2,3 | 53,3 |
| 30 | RELS 30 | 30,25 | 55,9 | 14,0 | 1,50 | 2,3 | 56,7 |

Prevents dirt entering the mating surface.
Easily mounted.
Temperature resistant up to +110° Celsius or +230° Fahrenheit

Stainless Steel Bushing to increase tilting angle

Bushing KRC..

Bushing in stainless steel to increase tilting angle capability, by reducing the bore size of standard size rod end



| Size (D) | D1 | D2H7 | D3 | D4 | L | L1 | Dk | Tilting Angle α |
|----------|------------------|------------------|------|------|------|------|-------|------------------------|
| 10 | 10 ¹⁾ | 8 ²⁾ | 8,1 | 13,5 | 11,5 | 6,5 | 19,00 | 23 |
| 12 | 12 ¹⁾ | 10 ²⁾ | 10,1 | 16,0 | 14,5 | 7,5 | 22,20 | 23 |
| 14 | 14 ¹⁾ | 10 ²⁾ | 10,1 | 17,5 | 14,0 | 9,0 | 25,35 | 22 |
| 16 | 16 ¹⁾ | 12 ²⁾ | 12,1 | 20,0 | 15,0 | 10,0 | 28,50 | 21 |
| 18 | 18 ¹⁾ | 14 ²⁾ | 14,1 | 22,5 | 19,0 | 11,0 | 31,70 | 22 |
| 20 | 20 ¹⁾ | 16 ²⁾ | 16,1 | 25,0 | 20,0 | 12,0 | 34,90 | 21 |

Material: Stainless steel to 1.4057, Aisi 431

Order description: e.g.: **KRC016**
for Rod Ends bore size 16 mm
(reduces the bore from 16 mm to 12 mm)

¹⁾ Fit for receiving bore H7

²⁾ Bore tolerance when mounted H7

Custom-Made Products



FLURO-Gelenklager GmbH



Rosenfeld is situated between the city of Stuttgart and the lake Bodensee, in southern Germany. You can get to us easily from the international airport of Stuttgart by car. Drive Highway A81 south (towards Singen), exit at Oberndorf and follow the road to Rosenfeld. Our company's plant is situated in the midst of an industrial area on the right hand side behind the town's entrance. We invite you to pay a visit at our manufacturing plant to see our capability.

FLURO - Gelenklager GmbH

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E-Mail: info@fluro.de



This is how you can get to us:

