

# Axial cylindrical roller bearings



Matrix for bearing preselection ..... 1075

## **1 Axial cylindrical roller bearings ..... 1076**

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# Matrix for bearing preselection

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

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

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

| Design features and suitability                                                                                                              |                                    |         | Axial cylindrical roller bearings |                                     |
|----------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------|---------|-----------------------------------|-------------------------------------|
| +++ extremely suitable<br>++ highly suitable<br>+ suitable<br>(+) suitable with restrictions<br>– not suitable/not applicable<br>✓ available |                                    |         |                                   | detailed information<br><b>1076</b> |
| Load carrying capacity                                                                                                                       | radial                             |         | –                                 | ➤ 1079   1.2                        |
|                                                                                                                                              | axial, one direction               |         | ++                                | ➤ 1079   1.2                        |
|                                                                                                                                              | axial, both directions             |         | –                                 | ➤ 1079   1.2                        |
|                                                                                                                                              | moments                            |         | –                                 |                                     |
| Compensation of angular misalignments                                                                                                        | static                             |         | –                                 | ➤ 1079   1.3                        |
|                                                                                                                                              | dynamic                            |         | –                                 | ➤ 1079   1.3                        |
| Bearing design                                                                                                                               | cylindrical bore                   |         | ✓                                 | ➤ 1076   1.1                        |
|                                                                                                                                              | tapered bore                       |         | –                                 |                                     |
|                                                                                                                                              | separable                          |         | ✓                                 | ➤ 1085   1.17                       |
| Lubrication                                                                                                                                  | greased                            |         | –                                 | ➤ 1079   1.4                        |
| Sealing                                                                                                                                      | open                               |         | ✓                                 | ➤ 1079   1.5                        |
|                                                                                                                                              | non-contact                        |         | –                                 | 1079                                |
|                                                                                                                                              | contact                            |         | –                                 | ➤ 1079   1.5                        |
| Operating temperature in °C                                                                                                                  |                                    | from to | –20<br>+120                       | ➤ 1080   1.8                        |
| Suitability for                                                                                                                              | high speeds                        |         | (+)                               | ➤ 1080   1.6                        |
|                                                                                                                                              | high running accuracy              |         | ++                                | ➤ 1082   1.11<br>➤ 114              |
|                                                                                                                                              | low-noise running                  |         | (+)                               | ➤ 1080   1.7<br>➤ 27                |
|                                                                                                                                              | high rigidity                      |         | ++                                | ➤ 54                                |
|                                                                                                                                              | reduced friction                   |         | (+)                               | ➤ 56                                |
|                                                                                                                                              | length compensation within bearing |         | –                                 |                                     |
|                                                                                                                                              | non-locating bearing arrangement   |         | –                                 |                                     |
|                                                                                                                                              | locating bearing arrangement       |         | ++                                | ➤ 139                               |
| X-life bearings                                                                                                                              |                                    | X-life  | –                                 |                                     |
| Bearing bore d in mm                                                                                                                         |                                    | from to | 15<br>320 <sup>1)</sup>           | ➤ 1088                              |
| Product tables                                                                                                                               |                                    |         | from page ➤                       | <b>1088</b>                         |

<sup>1)</sup> Larger catalogue bearings  
➤ GL 1

# 1 Axial cylindrical roller bearings



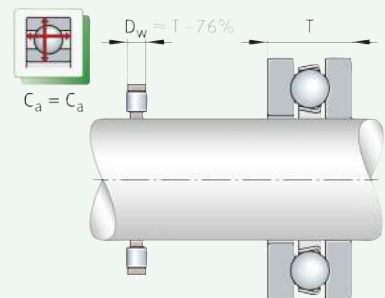
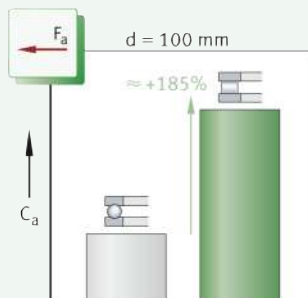
Single and double row axial cylindrical roller bearings are particularly suitable where:

- high axial and shock loads occur in one direction but no radial loads are present ► 1076 | 1 and ► 1079 | 1.2
- the load carrying capacity of the corresponding axial deep groove ball bearings is no longer adequate (in this case, bearings of series 811 and 812 are especially suitable) ► 1076 | 1
- the bearing arrangement must have very high axial rigidity
- the axial space available is very small ► 1076 | 1 and ► 1088 | 1
- the bearing arrangement can be configured, where the axial space is very small, as a direct bearing arrangement ► 1076 | 1.1
- the bearing parts can or must be mounted separately
- the bearing arrangement is not configured in itself but, for cost reasons, ready-to-fit standard bearings are to be used.

For an overview of other product-specific features, see the Matrix for bearing preselection ► 1075.

**1**  
Axial cylindrical roller bearing and axial ball bearing – comparison of load carrying capacity and design envelope

$F_a$  = axial load  
 $C_a$  = basic dynamic load rating  
 $D_w$  = roller diameter  
 $T$  = axial section height of axial deep groove ball bearing



## 1.1 Bearing design

### Design variants

Axial cylindrical roller bearings are available as:

- single and double row bearings
- individual bearing parts for combination, comprising
  - axial cylindrical roller and cage assembly (prefix K)
  - housing locating washer (prefix GS)
  - shaft locating washer (prefix WS)
  - bearing washers (prefix LS, alternatively for shaft and housing locating washer).

Larger catalogue bearings and other bearing designs ► GL 1.

Designed  
for bearing arrangements  
with very small axial space

Rollers with profiled ends  
increase the operating life  
of the bearings



Roller and cage assembly  
and bearing washers are also  
available individually



## Axial cylindrical roller bearings

Axial cylindrical roller bearings are part of the group of axial roller bearings. In contrast to the ball, the roller has a larger contact area perpendicular to the roller axis. As a result, it can transmit higher forces, has greater rigidity and allows smaller rolling element diameters under the same load. The single and double row bearings comprise flat, ribless washers (housing and shaft locating washers) between which axial cylindrical roller and cage assemblies are arranged ► 1077 | 2 and ► 1078 | 5. Their axial section height  $T$  corresponds only to the diameter of the rollers plus the thickness of the washers. Due to this design, the bearings are particularly small in axial height ► 1088 | 7. The axial cages are made from brass or plastic and are fitted with one or two rows of cylindrical rollers. Since sliding occurs towards the ends of the rollers during rolling of the rolling elements and this increases with the length of the roller, bearings with a wide cross-section have several short rollers arranged adjacent to each other, e.g. double row designs ► 1077 | 2.

The cylindrical rollers have profiled ends, i.e. they have a slight lateral curvature towards the ends. This modified line contact between the rollers and raceways prevents damaging edge stresses ► 1077 | 3. This in turn has a positive effect on the operating life of the bearings.

The use of complete axial cylindrical roller bearings (shaft locating washer, axial cylindrical roller and cage assembly and housing locating washer) is then advisable if, for example, high speeds occur and the bearing washers must therefore be centred precisely.

The bearing parts for axial cylindrical roller bearings are also available individually ► 1078 | 4 and ► 1078 | 5. Axial cylindrical roller and cage assemblies (without shaft and housing locating washers) are suitable, for example, for bearing arrangements with very small axial design space.

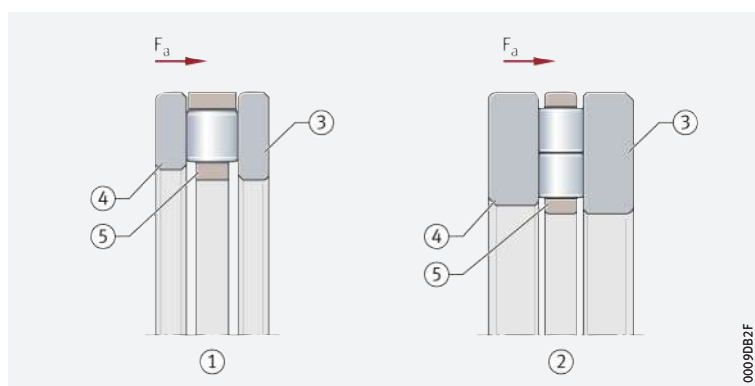
Cylindrical roller bearings 811 and 812 are of a single row design and correspond to DIN 722:2005 and ISO 104:2015. The bearings 893 and 894 are of a double row design and are configured in accordance with DIN 616:2000 and ISO 104:2015.



### 2 Axial cylindrical roller bearings

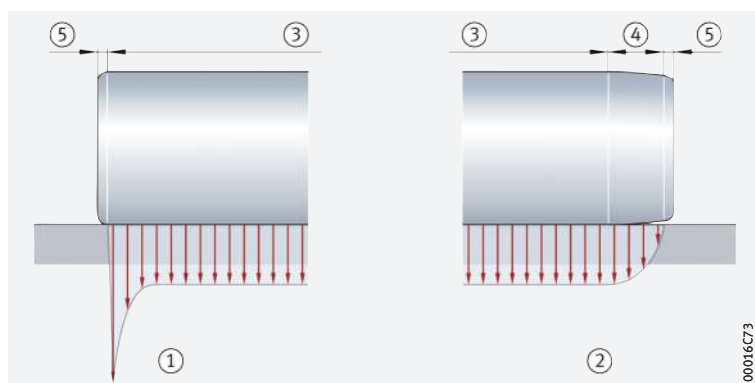
$F_a$  = axial load

- ① Single row bearing
- ② Double row bearing
- ③ Shaft locating washer
- ④ Housing locating washer
- ⑤ Axial cylindrical roller and cage assembly



### 3 Roller profile and stress distribution

- ① Cylindrical roller profile (high stress peaks)
- ② Roller with profiled ends (no stress peak)
- ③ Cylindrical outside surface region
- ④ Region of logarithmic tapering
- ⑤ Rounding of edge



☞ *Very high axial load carrying capacity with low section height*

☞ *For direct bearing arrangements, running surfaces must be produced as a rolling bearing raceway*



4

Axial cylindrical roller and cage assemblies

$F_a$  = axial load

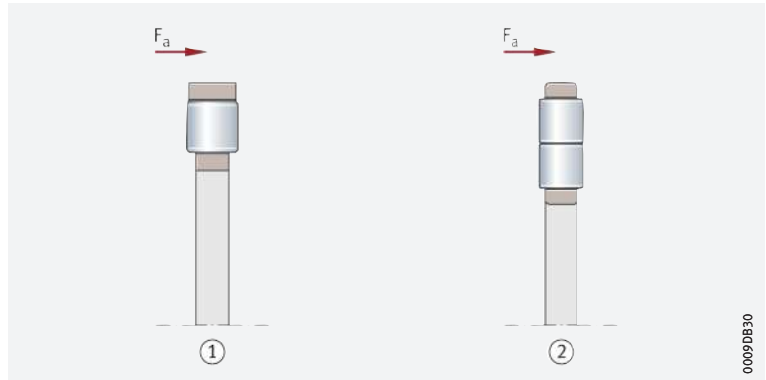
- ① Single row
- ② Double row

### Axial cylindrical roller and cage assemblies

The cage assemblies comprise axial cages and one or two rows of cylindrical rollers ➤ 1078 | 4. They have a particularly small axial section height and high axial load carrying capacity. The cages are made from polyamide or brass and are guided on the shaft.

Axial cylindrical roller and cage assemblies are generally combined with one housing locating washer and one shaft locating washer. If they are to be used directly – i.e. without axial bearing washers – in the adjacent construction, the raceway for the rollers must be produced as a rolling bearing raceway ➤ 1084 | 1.16. It is also possible to use two shaft locating washers or two housing locating washers in combination with one axial cylindrical roller and cage assembly.

The diameter series 1, 2, 3, 4 of the axial cylindrical roller and cage assemblies correspond to DIN 616:2000 and ISO 104:2015.



☞ *Housing and shaft locating washers*



5

Axial bearing washers

- ① Housing locating washer, externally centred
- ② Shaft locating washer, internally centred
- ③ Bearing washer
- ④ Raceway

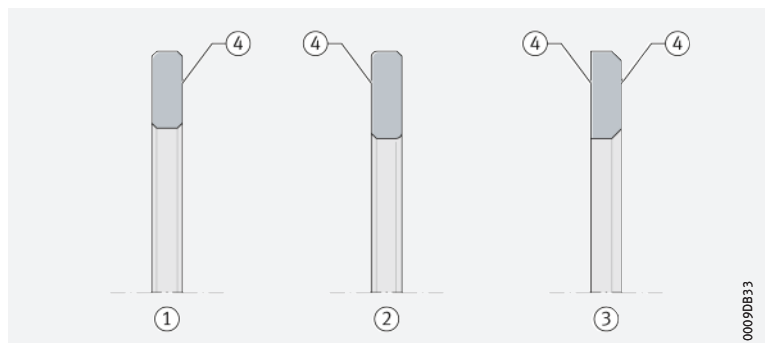
### Axial bearing washers

Housing locating washers are externally centred, shaft locating washers are internally centred ➤ 1078 | 5 and ➤ 1084 | 1.16. They must be used if the adjacent construction cannot be used as a raceway for the rolling elements. The washers are made from through hardening rolling bearing steel. The bore and outside diameter are precision machined, the raceways are ground to high accuracy.

The diameter series 1, 2, 3, 4 of the axial bearing washers correspond to DIN 616:2000 and ISO 104:2015.

☞ *Bearing washers*

Bearing washers are suitable for use as a housing or shaft locating washer. They are used in applications that do not require precise centring of the axial bearing washers. The raceway of the bearing washers is hardened and ground. The bearing washers are suitable for axial cylindrical roller and cage assemblies K811 and axial needle roller and cage assemblies AXK.



## 1.2 Load carrying capacity

☞ *For very high axial loads acting in one direction*

Single and double row axial cylindrical roller bearings can support high axial loads as well as axial shock loads in one direction, but must not be subjected to radial load ► 1083 | 1.14. If radial loads do occur, these forces must be supported by an additional bearing (e.g. by a needle roller and cage assembly) ► 1079 | 6.

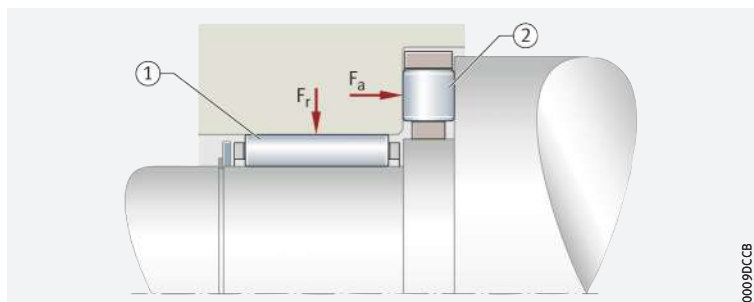


6  
Axial and radial loads

$F_r$  = radial load

$F_a$  = axial load

- ① Needle roller and cage assembly as radial bearing (direct bearing arrangement)
- ② Axial cylindrical roller and cage assembly as axial bearing (direct bearing arrangement)



## 1.3 Compensation of angular misalignments



The bearings do not permit any skewing between the shaft and the housing. If angular misalignments occur between the locating surfaces on the shaft and in the housing, this will cause damage to the bearing and considerably reduce its operating life.

## 1.4 Lubrication

☞ *Oil or grease lubrication is possible*

☞ *Compatibility with plastic cages*

Axial cylindrical roller bearings are not greased. The bearings must be lubricated with oil or grease.

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



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

☞ *Observe oil change intervals*

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

## 1.5 Sealing

☞ *Provide seals in the adjacent construction*

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

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

1.6

Speeds

⌚ Limiting speeds and reference speeds in the product tables

Two speeds are generally indicated in the product tables ➤ 304 | :

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

Limiting speed



The limiting speed  $n_G$  is the kinematically permissible speed of a bearing. Even under favourable mounting and operating conditions, this value should not be exceeded without prior consultation with Schaeffler ➤ 64. The values in the product tables are valid for oil lubrication.

⌚ Values for grease lubrication

For grease lubrication, 25% of the value stated in the product tables is permissible in each case.

Reference speeds

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

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

1.7

Noise

Schaeffler Noise Index

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

Further information:

■ medias ➤ <https://medias.schaeffler.com>.

1.8

Temperature range

⌚ Limiting values

The operating temperature of the bearings is limited by:

- the dimensional stability of the bearing washers and cylindrical rollers
- the cage
- the lubricant.

Possible operating temperatures of axial cylindrical roller bearings ➤ 1080 |  1.

 1  
Permissible temperature range

| Operating temperature                                                               | Axial cylindrical roller bearings with brass or polyamide cage PA66 |
|-------------------------------------------------------------------------------------|---------------------------------------------------------------------|
|  | –20 °C to +120 °C                                                   |



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

## 1.9 Cages

☞ *Solid cages made from brass and polyamide PA66 are used as standard*



Cage, cage suffix, bore code

Standard cages ➤ 1081 | 2. The cage design is dependent on the bearing series and the bearing size. Other cage designs are available by agreement. With such cages, however, suitability for high speeds and temperatures as well as the basic load ratings may differ from the values for the bearings with standard cages.

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

| Bearing series | Solid cage made from polyamide PA66 | Solid brass cage |
|----------------|-------------------------------------|------------------|
|                | TV                                  | M                |
|                | standard                            | standard         |
| Bore code      |                                     |                  |
| 811, K811      | up to 34                            | from 36          |
| 812, K812      | 06 to 26                            | from 28          |
| 893, K893      | 06 to 16                            | 17 to 30         |
| 894, K894      | 12 to 14                            | from 15          |



## 1.10 Internal clearance

☞ *Axial clearance and preload are determined by the application*

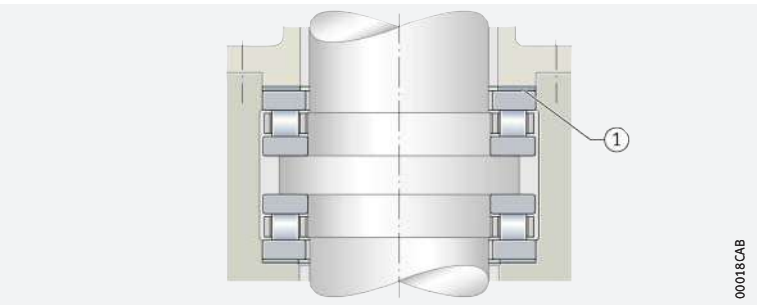


Setting the axial clearance by means of shims

① Calibrated sheet (shim)

In the case of axial cylindrical roller bearings, the internal clearance (axial clearance) is only achieved when the bearings are mounted. The requisite axial clearance of the bearing arrangement is dependent on the application and must take account of the conditions in the bearing arrangement while warm from operation and subjected to load. If axial cylindrical roller bearings are subjected to vibrations while under predominantly static load, for example, they must be lightly preloaded. Preload can be applied, for example, using calibrated sheets (shims) ➤ 1081 | 7. Other suitable means include shaft nuts, disc springs, etc. ➤ 1084 | 1.15. It must always be ensured that no slippage occurs in operation between the rolling elements and raceways ➤ 1084 | 1.15. It must also be ensured that the preload does not exceed the optimum value, otherwise there will be an increase in friction and therefore in heat generation in the bearing. These will both have a negative effect on the operating life of the bearings.

If there is any uncertainty regarding correct setting, please consult Schaeffler.



00018CAB

1.11

Dimensions, tolerances

Dimension standards



The main dimensions of axial cylindrical roller bearings correspond to ISO 104:2015.

Chamfer dimensions



The limiting dimensions for chamfer dimensions correspond to DIN 620-6:2004. Overview and limiting values ➤ 138. Nominal value of chamfer dimension ➤ 1088|

Tolerances



The dimensional and running tolerances of axial bearing washers GS and WS correspond to the tolerance class Normal in accordance with ISO 199:2014 ➤ 133| 25 to ➤ 135| 28.

Tolerances of the bore and outside diameter as well as of the width of the bearing parts ➤ 1082| 3 and ➤ 1082| 8.



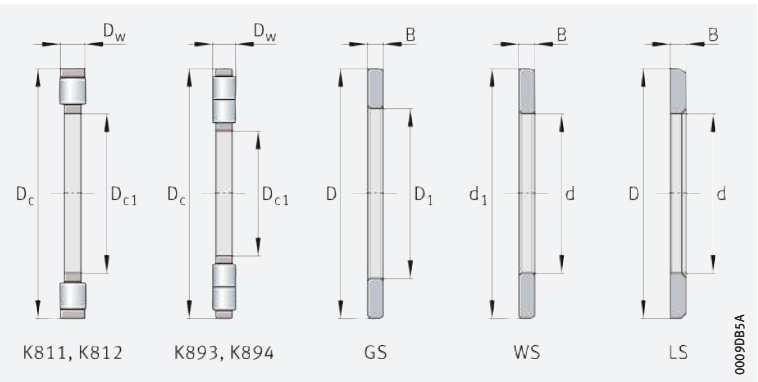
Dimensions and tolerances of bearing parts

| Bearing component                            | Dimension | Tolerance         |
|----------------------------------------------|-----------|-------------------|
| Axial cylindrical roller and cage assembly K | $D_{c1}$  | E11 <sup>1)</sup> |
|                                              | $D_c$     | a13 <sup>1)</sup> |
|                                              | $D_w$     | to DIN 5402-1     |
| Housing locating washer GS                   | $D_1$     | –                 |
|                                              | $D$       | to ISO 199        |
|                                              | $B$       | h11               |
| Shaft locating washer WS                     | $d$       | to ISO 199        |
|                                              | $d_1$     | –                 |
|                                              | $B$       | h11               |
| Bearing washer LS                            | $d$       | E12 <sup>1)</sup> |
|                                              | $D$       | a12 <sup>1)</sup> |
|                                              | $B$       | h11               |

<sup>1)</sup> Deviation of the bore diameter  $\Delta_{dmp}$  and deviation of the outside diameter  $\Delta_{Dmp}$  ➤ 138.



Bearing parts – axial cylindrical roller and cage assemblies and bearing washers



1.12

Suffixes

For a description of the suffixes used in this chapter ➤ 1082| 4 and **medias** interchange ➤ <https://www.schaeffler.de/std/1D52>.



Suffixes and corresponding descriptions

| Suffix | Description of suffix                                      |                                                                         |
|--------|------------------------------------------------------------|-------------------------------------------------------------------------|
| M      | Solid brass cage                                           | Standard, dependent on bore code                                        |
| TV     | Solid cage made from glass fibre reinforced polyamide PA66 |                                                                         |
| P5     | High dimensional, geometrical and running accuracy         | Special design for axial bearing washers GS, WS; available by agreement |

1.13

Structure of bearing designation

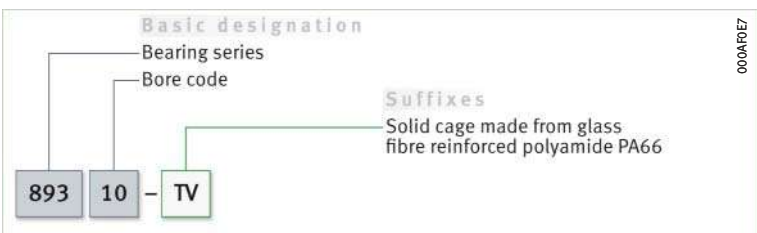
Examples of composition of bearing designation

The designation of bearings follows a set model. Examples ▶1083| 9 and ▶1083| 10. The composition of the designation is subject to DIN 623-1 ▶102| 10.

9  
Single row axial cylindrical roller bearing, comprising axial roller and cage assembly, shaft locating washer and housing locating washer: designation structure



10  
Double row axial cylindrical roller bearing, comprising axial roller and cage assembly, shaft locating washer and housing locating washer: designation structure



1.14

Dimensioning

Equivalent dynamic bearing load



Axial cylindrical roller bearings can only support axial forces ▶1079| 1.2. In the rating life equation, P is therefore substituted by the value for  $F_a$  ▶1083| 1.

1  
Equivalent dynamic load

Legend

$$P = F_a$$

|       |   |                                 |
|-------|---|---------------------------------|
| P     | N | Equivalent dynamic bearing load |
| $F_a$ | N | Axial load.                     |

Equivalent static bearing load

Combined loads are not possible

In relation to the direction of load, the same conditions apply as for the equivalent dynamic bearing load, i.e. combined loads are not permissible. In the rating life equation,  $P_0$  is therefore substituted by the value for  $F_{0a}$  ▶1083| 2.

2  
Equivalent static load

Legend

$$P_0 = F_{0a}$$

|          |   |                                            |
|----------|---|--------------------------------------------|
| $P_0$    | N | Equivalent static bearing load             |
| $F_{0a}$ | N | Largest axial load present (maximum load). |

Static load safety factor

$$S_0 = C_0 / P_0$$

In addition to the basic rating life  $L_{10h}$ , it is also always necessary to check the static load safety factor  $S_0$  ▶1083| 3.

3  
Static load safety factor

Legend

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

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

1.15 Minimum load

Rolling bearings under low loads are particularly prone to slippage

In order to prevent slippage damage, the bearing must be subjected to a minimum axial load  $F_{a\min}$  ▶1084|f1 4 and ▶1084|5. In vertical bearing arrangements in particular, the requisite minimum axial load  $F_{a\min}$  is normally achieved, however, simply by the weight of the bearing parts and the external forces. If this is not the case, the bearing arrangement must be preloaded, for example by means of springs or a housing nut.

f1 4  
Minimum axial load

$$F_{a\min} = 0,0005 \cdot C_{0a} + k_a \left( \frac{C_{0a} \cdot n}{10^8} \right)^2$$

Legend

|             |                   |                                                       |
|-------------|-------------------|-------------------------------------------------------|
| $F_{a\min}$ | N                 | Minimum axial load                                    |
| $C_{0a}$    | N                 | Basic static load rating ▶1088 5                      |
| $k_a$       | –                 | Factor for determining the minimum axial load ▶1084 5 |
| $n$         | min <sup>-1</sup> | Speed.                                                |

5  
Factor  $k_a$  for calculating the minimum axial load

| Series | Factor $k_a$ |
|--------|--------------|
| K811   | 1,4          |
| K812   | 0,9          |
| K893   | 0,7          |
| K894   | 0,5          |

1.16 Design of bearing arrangements

Design of adjacent parts



Axial cylindrical roller bearings cannot tolerate angular misalignments ▶1079|1.3. The locating surfaces for the bearing parts on the shaft and in the housing must therefore be vertical to the shaft axis, while the adjacent parts must be rigid and flat. They must be configured such that the bearing washers are supported as far as possible over the whole circumference and over the whole raceway width; values ▶1088|5. The radial cage guidance surfaces must be precision machined and wear-resistant (R<sub>max</sub> 0,8 (R<sub>zmax</sub> 4)).

Mounting diameter on the shaft and in the housing

- For the mounting dimensions, the following values apply ▶1088|5:
- mounting diameter on the shaft  $\geq d_a$
  - mounting diameter in the housing  $\leq D_a$ .

Tolerances for shaft and housing bore

Proven tolerances are given in ▶1084|6. If the data are observed, this will give correct radial guidance of the bearing elements.

6  
Tolerances for shafts and housing bores

| Bearing component                 |                                               | Tolerance class <sup>1)</sup> for |               |
|-----------------------------------|-----------------------------------------------|-----------------------------------|---------------|
|                                   |                                               | Shaft                             | Bore          |
| Axial cylindrical roller bearings | Shaft guided                                  | h8                                | –             |
| Housing locating washers          | –                                             | –                                 | H9            |
| Shaft locating washers            | –                                             | h8                                | –             |
| Bearing washers                   | Externally centred as housing locating washer | Shaft released                    | H9            |
|                                   | Internally centred as shaft locating washer   | h8                                | Bore released |

<sup>1)</sup> The envelope requirement © applies.



🔑 *Rolling bearings must be handled with great care*



### Schaeffler Mounting Handbook

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

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

## 1.18

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

## Legal notice regarding data freshness

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



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### Link to electronic product catalogue



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## 1.19

## Further information



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

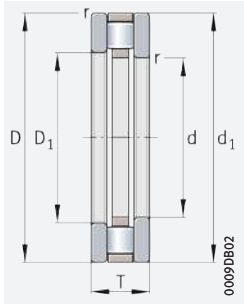
- Determining the bearing size ➤ 34
- Rigidity ➤ 54
- Friction and increases in temperature ➤ 56
- Speeds ➤ 64
- Bearing data ➤ 97
- Lubrication ➤ 70
- Sealing ➤ 182
- Design of bearing arrangements ➤ 139
- Mounting and dismounting ➤ 191.



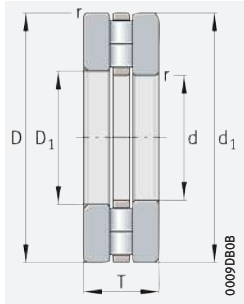


Axial cylindrical roller bearings

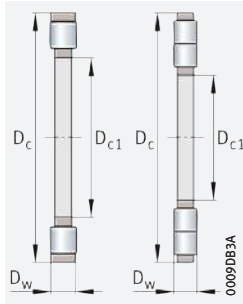
Axial cylindrical roller and cage assemblies  
Axial bearing washers



811, 812



893, 894

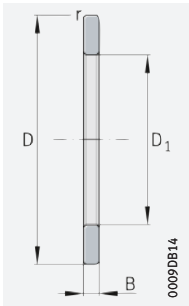


Single row: K811, K812  
Double row: K893, K894

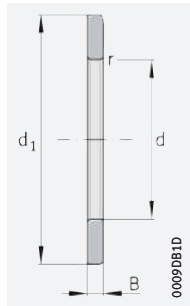
d = 15 – 60 mm

| Main dimensions |                 |    | Basic load ratings  |                       | Fatigue limit load | Limiting speed    | Speed rating      | Axial cylindrical roller bearings |             | Axial cylindrical roller and cage assemblies |             |
|-----------------|-----------------|----|---------------------|-----------------------|--------------------|-------------------|-------------------|-----------------------------------|-------------|----------------------------------------------|-------------|
|                 |                 |    |                     |                       |                    |                   |                   | Mass                              | Designation | Mass                                         | Designation |
| d               | D <sub>c1</sub> | T  | dyn. C <sub>a</sub> | stat. C <sub>0a</sub> | C <sub>ua</sub>    | n <sub>G</sub>    | n <sub>gr</sub>   | m                                 |             | m                                            |             |
|                 |                 |    | N                   | N                     | N                  | min <sup>-1</sup> | min <sup>-1</sup> | ≈ kg                              |             | ≈ kg                                         |             |
| 15              | 28              | 9  | 14 400              | 28 500                | 4 000              | 13 600            | 6 400             | 0,024                             | 81102-TV    | 0,006                                        | K81102-TV   |
| 17              | 30              | 9  | 16 000              | 33 500                | 4 650              | 12 800            | 5 800             | 0,027                             | 81103-TV    | 0,009                                        | K81103-TV   |
| 20              | 35              | 10 | 25 000              | 53 000                | 7 300              | 10 800            | 4 500             | 0,037                             | 81104-TV    | 0,013                                        | K81104-TV   |
| 25              | 42              | 11 | 33 500              | 76 000                | 7 100              | 8 900             | 3 650             | 0,053                             | 81105-TV    | 0,015                                        | K81105-TV   |
| 30              | 47              | 11 | 35 500              | 86 000                | 8 000              | 7 700             | 3 150             | 0,057                             | 81106-TV    | 0,017                                        | K81106-TV   |
|                 | 52              | 16 | 64 000              | 141 000               | 14 100             | 7 200             | 2 700             | 0,123                             | 81206-TV    | 0,033                                        | K81206-TV   |
|                 | 60              | 18 | 69 000              | 197 000               | 18 900             | 6 400             | 2 650             | 0,24                              | 89306-TV    | 0,04                                         | K89306-TV   |
| 35              | 52              | 12 | 39 000              | 101 000               | 9 500              | 6 800             | 2 700             | 0,073                             | 81107-TV    | 0,019                                        | K81107-TV   |
|                 | 62              | 18 | 80 000              | 199 000               | 20 000             | 6 000             | 2 360             | 0,195                             | 81207-TV    | 0,043                                        | K81207-TV   |
|                 | 68              | 20 | 80 000              | 237 000               | 23 200             | 5 700             | 2 420             | 0,34                              | 89307-TV    | 0,053                                        | K89307-TV   |
| 40              | 60              | 13 | 56 000              | 148 000               | 14 500             | 5 900             | 2 240             | 0,105                             | 81108-TV    | 0,031                                        | K81108-TV   |
|                 | 68              | 19 | 107 000             | 265 000               | 23 300             | 5 200             | 1 820             | 0,249                             | 81208-TV    | 0,081                                        | K81208-TV   |
|                 | 78              | 22 | 123 000             | 385 000               | 39 000             | 4 850             | 1 770             | 0,484                             | 89308-TV    | 0,098                                        | K89308-TV   |
| 45              | 65              | 14 | 59 000              | 163 000               | 16 000             | 5 300             | 2 020             | 0,13                              | 81109-TV    | 0,035                                        | K81109-TV   |
|                 | 73              | 20 | 105 000             | 265 000               | 23 300             | 4 950             | 1 840             | 0,287                             | 81209-TV    | 0,085                                        | K81209-TV   |
|                 | 85              | 24 | 139 000             | 445 000               | 44 500             | 4 400             | 1 600             | 0,615                             | 89309-TV    | 0,121                                        | K89309-TV   |
| 50              | 70              | 14 | 62 000              | 177 000               | 17 400             | 4 900             | 1 840             | 0,14                              | 81110-TV    | 0,038                                        | K81110-TV   |
|                 | 78              | 22 | 118 000             | 315 000               | 27 500             | 4 550             | 1 570             | 0,356                             | 81210-TV    | 0,098                                        | K81210-TV   |
|                 | 95              | 27 | 168 000             | 560 000               | 58 000             | 3 950             | 1 450             | 0,887                             | 89310-TV    | 0,175                                        | K89310-TV   |
| 55              | 78              | 16 | 90 000              | 300 000               | 31 000             | 4 350             | 1 350             | 0,218                             | 81111-TV    | 0,045                                        | K81111-TV   |
|                 | 90              | 25 | 155 000             | 405 000               | 38 500             | 4 050             | 1 540             | 0,568                             | 81211-TV    | 0,166                                        | K81211-TV   |
|                 | 105             | 30 | 184 000             | 600 000               | 52 000             | 3 600             | 1 500             | 1,18                              | 89311-TV    | 0,195                                        | K89311-TV   |
| 60              | 85              | 17 | 103 000             | 315 000               | 32 000             | 4 000             | 1 360             | 0,266                             | 81112-TV    | 0,082                                        | K81112-TV   |
|                 | 95              | 26 | 172 000             | 480 000               | 45 500             | 3 700             | 1 290             | 0,642                             | 81212-TV    | 0,176                                        | K81212-TV   |
|                 | 110             | 30 | 197 000             | 670 000               | 58 000             | 3 400             | 1 350             | 1,26                              | 89312-TV    | 0,21                                         | K89312-TV   |
|                 | 130             | 42 | 390 000             | 1 220 000             | 129 000            | 3 050             | 1 080             | 2,818                             | 89412-TV    | 0,538                                        | K89412-TV   |

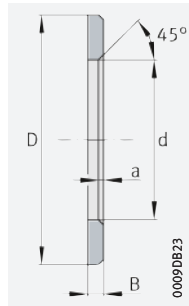
medias ► <https://www.schaeffler.de/std/1DCC>



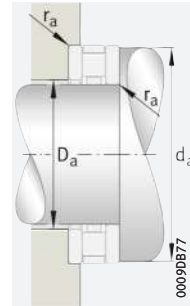
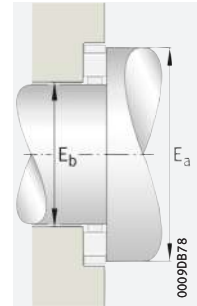
GS



WS



LS

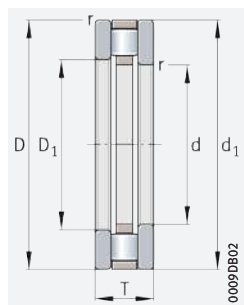
Mounting  
dimensionsMounting dimen-  
sions, direct bearing  
arrangement

| d<br>D <sub>c1</sub> | Axial bearing washers |                               |                             |                   | Dimensions     |                |                |      |                | Mounting dimensions |                |                | Raceway dimensions |                |
|----------------------|-----------------------|-------------------------------|-----------------------------|-------------------|----------------|----------------|----------------|------|----------------|---------------------|----------------|----------------|--------------------|----------------|
|                      | Mass                  | Designation                   |                             |                   | D <sub>1</sub> | d <sub>1</sub> | D <sub>w</sub> | B    | a<br>r<br>min. | d <sub>a</sub>      | D <sub>a</sub> | r <sub>a</sub> | E <sub>b</sub>     | E <sub>a</sub> |
|                      | m<br>≈ kg             | Housing<br>locating<br>washer | Shaft<br>locating<br>washer | Bearing<br>washer |                |                |                |      |                |                     |                |                |                    |                |
| 15                   | 0,008                 | GS81102                       | WS81102                     | LS1528            | 16             | 28             | 3,5            | 2,75 | 0,3            | 27                  | 16             | 0,3            | 16                 | 27             |
| 17                   | 0,009                 | GS81103                       | WS81103                     | LS1730            | 18             | 30             | 3,5            | 2,75 | 0,3            | 29                  | 18             | 0,3            | 18                 | 29             |
| 20                   | 0,011                 | GS81104                       | WS81104                     | LS2035            | 21             | 35             | 4,5            | 2,75 | 0,3            | 34                  | 21             | 0,3            | 21                 | 34             |
| 25                   | 0,019                 | GS81105                       | WS81105                     | LS2542            | 26             | 42             | 5              | 3    | 0,6            | 41                  | 26             | 0,6            | 26                 | 41             |
| 30                   | 0,02                  | GS81106                       | WS81106                     | LS3047            | 32             | 47             | 5              | 3    | 0,6            | 46                  | 31             | 0,6            | 31                 | 46             |
|                      | 0,045                 | GS81206                       | WS81206                     | –                 | 32             | 52             | 7,5            | 4,25 | 0,6            | 50                  | 31             | 0,6            | 31                 | 50             |
|                      | 0,095                 | GS89306                       | WS89306                     | –                 | 32             | 60             | 5,5            | 6,25 | 1              | 59                  | 33             | 1              | 33                 | 59             |
| 35                   | 0,027                 | GS81107                       | WS81107                     | LS3552            | 37             | 52             | 5              | 3,5  | 0,6            | 51                  | 36             | 0,6            | 36                 | 51             |
|                      | 0,076                 | GS81207                       | WS81207                     | –                 | 37             | 62             | 7,5            | 5,25 | 1              | 58                  | 39             | 1              | 39                 | 58             |
|                      | 0,134                 | GS89307                       | WS89307                     | –                 | 37             | 68             | 6              | 7    | 1              | 67                  | 38             | 1              | 38                 | 67             |
| 40                   | 0,037                 | GS81108                       | WS81108                     | LS4060            | 42             | 60             | 6              | 3,5  | 0,6            | 58                  | 42             | 0,6            | 42                 | 58             |
|                      | 0,084                 | GS81208                       | WS81208                     | –                 | 42             | 68             | 9              | 5    | 1              | 66                  | 43             | 1              | 43                 | 66             |
|                      | 0,193                 | GS89308                       | WS89308                     | –                 | 42             | 78             | 7              | 7,5  | 1              | 77                  | 44             | 1              | 44                 | 77             |
| 45                   | 0,047                 | GS81109                       | WS81109                     | LS4565            | 47             | 65             | 6              | 4    | 0,6            | 63                  | 47             | 0,6            | 47                 | 63             |
|                      | 0,101                 | GS81209                       | WS81209                     | –                 | 47             | 73             | 9              | 5,5  | 1              | 70                  | 48             | 1              | 48                 | 70             |
|                      | 0,247                 | GS89309                       | WS89309                     | –                 | 47             | 85             | 7,5            | 8,25 | 1              | 83                  | 49             | 1              | 49                 | 83             |
| 50                   | 0,051                 | GS81110                       | WS81110                     | LS5070            | 52             | 70             | 6              | 4    | 0,6            | 68                  | 52             | 0,6            | 52                 | 68             |
|                      | 0,129                 | GS81210                       | WS81210                     | –                 | 52             | 78             | 9              | 6,5  | 1              | 75                  | 53             | 1              | 53                 | 75             |
|                      | 0,356                 | GS89310                       | WS89310                     | –                 | 52             | 95             | 8              | 9,5  | 1,1            | 92                  | 56             | 1,1            | 56                 | 92             |
| 55                   | 0,082                 | GS81111                       | WS81111                     | LS5578            | 57             | 78             | 6              | 5    | 0,6            | 77                  | 56             | 0,6            | 57                 | 77             |
|                      | 0,201                 | GS81211                       | WS81211                     | –                 | 57             | 90             | 11             | 7    | 1              | 85                  | 59             | 1              | 59                 | 85             |
|                      | 0,485                 | GS89311                       | WS89311                     | –                 | 57             | 105            | 9              | 10,5 | 1,1            | 103                 | 61             | 1,1            | 61                 | 103            |
| 60                   | 0,092                 | GS81112                       | WS81112                     | LS6085            | 62             | 85             | 7,5            | 4,75 | 1              | 82                  | 62             | 1              | 62                 | 82             |
|                      | 0,233                 | GS81212                       | WS81212                     | –                 | 62             | 95             | 11             | 7,5  | 1              | 91                  | 64             | 1              | 64                 | 91             |
|                      | 0,55                  | GS89312                       | WS89312                     | –                 | 62             | 110            | 9              | 10,5 | 1,1            | 108                 | 66             | 1,1            | 66                 | 108            |
|                      | 1,115                 | GS89412                       | WS89412                     | –                 | 62             | 130            | 14             | 14   | 1,5            | 126                 | 65             | 1,5            | 65                 | 126            |

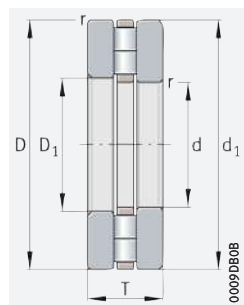


## Axial cylindrical roller bearings

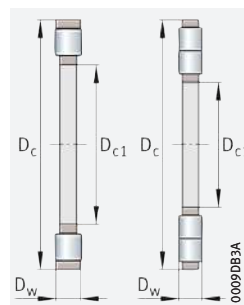
Axial cylindrical roller and cage assemblies  
Axial bearing washers



811, 812



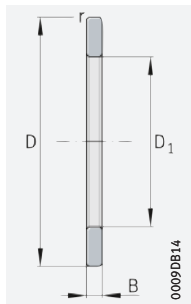
893, 894

Single row: K811, K812  
Double row: K893, K894

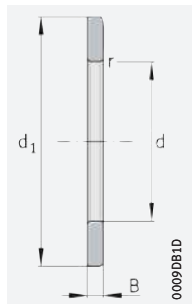
**d = 65 – 100 mm**

| Main dimensions |                 |    | Basic load ratings  |                       | Fatigue limit load | Limiting speed    | Speed rating      | Axial cylindrical roller bearings |                 | Axial cylindrical roller and cage assemblies |                  |
|-----------------|-----------------|----|---------------------|-----------------------|--------------------|-------------------|-------------------|-----------------------------------|-----------------|----------------------------------------------|------------------|
|                 |                 |    |                     |                       |                    |                   |                   | Mass                              | Designation     | Mass                                         | Designation      |
| d               | D <sub>c1</sub> | T  | dyn. C <sub>a</sub> | stat. C <sub>0a</sub> | C <sub>ua</sub>    | n <sub>G</sub>    | n <sub>thr</sub>  | m                                 |                 | m                                            |                  |
|                 |                 |    | N                   | N                     | N                  | min <sup>-1</sup> | min <sup>-1</sup> | ≈ kg                              |                 | ≈ kg                                         |                  |
| 65              | 90              | 18 | 107 000             | 340 000               | 34 000             | 3 700             | 1 260             | 0,31                              | <b>81113-TV</b> | 0,09                                         | <b>K81113-TV</b> |
|                 | 100             | 27 | 177 000             | 500 000               | 48 000             | 3 550             | 1 250             | 0,721                             | <b>81213-TV</b> | 0,185                                        | <b>K81213-TV</b> |
|                 | 115             | 30 | 194 000             | 670 000               | 58 000             | 3 200             | 1 330             | 1,33                              | <b>89313-TV</b> | 0,21                                         | <b>K89313-TV</b> |
|                 | 140             | 45 | 445 000             | 1 410 000             | 148 000            | 2 850             | 1 010             | 3,52                              | <b>89413-TV</b> | 0,72                                         | <b>K89413-TV</b> |
| 70              | 95              | 18 | 111 000             | 365 000               | 36 500             | 3 500             | 1 170             | 0,332                             | <b>81114-TV</b> | 0,092                                        | <b>K81114-TV</b> |
|                 | 105             | 27 | 187 000             | 550 000               | 53 000             | 3 250             | 1 120             | 0,768                             | <b>81214-TV</b> | 0,212                                        | <b>K81214-TV</b> |
|                 | 125             | 34 | 239 000             | 830 000               | 75 000             | 2 950             | 1 200             | 1,82                              | <b>89314-TV</b> | 0,29                                         | <b>K89314-TV</b> |
|                 | 150             | 48 | 475 000             | 1 500 000             | 158 000            | 2 650             | 1 010             | 4,18                              | <b>89414-TV</b> | 0,76                                         | <b>K89414-TV</b> |
| 75              | 100             | 19 | 107 000             | 350 000               | 35 500             | 3 300             | 1 190             | 0,393                             | <b>81115-TV</b> | 0,096                                        | <b>K81115-TV</b> |
|                 | 110             | 27 | 173 000             | 500 000               | 48 000             | 3 150             | 1 220             | 0,8                               | <b>81215-TV</b> | 0,195                                        | <b>K81215-TV</b> |
|                 | 135             | 36 | 290 000             | 1 010 000             | 92 000             | 2 750             | 1 090             | 2,23                              | <b>89315-TV</b> | 0,375                                        | <b>K89315-TV</b> |
|                 | 160             | 51 | 500 000             | 1 580 000             | 160 000            | 2 440             | 1 000             | 5,96                              | <b>89415-M</b>  | 1,78                                         | <b>K89415-M</b>  |
| 80              | 105             | 19 | 106 000             | 350 000               | 35 500             | 3 150             | 1 180             | 0,4                               | <b>81116-TV</b> | 0,095                                        | <b>K81116-TV</b> |
|                 | 115             | 28 | 201 000             | 630 000               | 60 000             | 2 900             | 980               | 0,9                               | <b>81216-TV</b> | 0,234                                        | <b>K81216-TV</b> |
|                 | 140             | 36 | 305 000             | 1 110 000             | 100 000            | 2 650             | 1 000             | 2,37                              | <b>89316-TV</b> | 0,42                                         | <b>K89316-TV</b> |
|                 | 170             | 54 | 560 000             | 1 770 000             | 180 000            | 2 280             | 940               | 7,04                              | <b>89416-M</b>  | 2,04                                         | <b>K89416-M</b>  |
| 85              | 110             | 19 | 113 000             | 385 000               | 39 000             | 3 000             | 1 090             | 0,42                              | <b>81117-TV</b> | 0,118                                        | <b>K81117-TV</b> |
|                 | 125             | 31 | 217 000             | 660 000               | 65 000             | 2 800             | 1 080             | 1,26                              | <b>81217-TV</b> | 0,28                                         | <b>K81217-TV</b> |
|                 | 150             | 39 | 325 000             | 1 140 000             | 104 000            | 2 450             | 1 030             | 3,39                              | <b>89317-M</b>  | 0,93                                         | <b>K89317-M</b>  |
|                 | 180             | 58 | 620 000             | 1 980 000             | 199 000            | 2 160             | 890               | 8,65                              | <b>89417-M</b>  | 2,71                                         | <b>K89417-M</b>  |
| 90              | 120             | 22 | 141 000             | 465 000               | 40 000             | 2 750             | 1 070             | 0,62                              | <b>81118-TV</b> | 0,15                                         | <b>K81118-TV</b> |
|                 | 135             | 35 | 290 000             | 890 000               | 94 000             | 2 550             | 910               | 1,77                              | <b>81218-TV</b> | 0,54                                         | <b>K81218-TV</b> |
|                 | 155             | 39 | 335 000             | 1 200 000             | 109 000            | 2 350             | 980               | 3,63                              | <b>89318-M</b>  | 0,97                                         | <b>K89318-M</b>  |
|                 | 190             | 60 | 680 000             | 2 200 000             | 221 000            | 2 040             | 840               | 9,94                              | <b>89418-M</b>  | 3,04                                         | <b>K89418-M</b>  |
| 100             | 135             | 25 | 199 000             | 650 000               | 60 000             | 2 480             | 930               | 0,95                              | <b>81120-TV</b> | 0,25                                         | <b>K81120-TV</b> |
|                 | 150             | 38 | 340 000             | 1 080 000             | 111 000            | 2 300             | 840               | 2,2                               | <b>81220-TV</b> | 0,6                                          | <b>K81220-TV</b> |
|                 | 170             | 42 | 380 000             | 1 400 000             | 123 000            | 2 130             | 910               | 4,56                              | <b>89320-M</b>  | 1,18                                         | <b>K89320-M</b>  |
|                 | 210             | 67 | 850 000             | 2 850 000             | 280 000            | 1 830             | 710               | 13,42                             | <b>89420-M</b>  | 3,92                                         | <b>K89420-M</b>  |

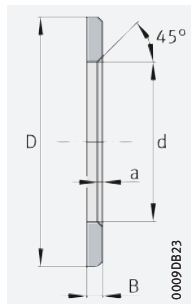
medias ► <https://www.schaeffler.de/std/1DCD>



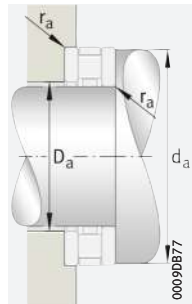
GS



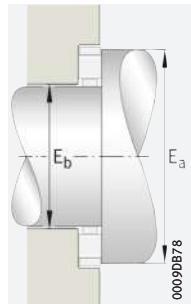
WS



LS



Mounting dimensions



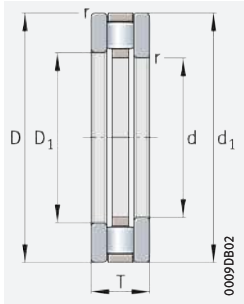
Mounting dimensions, direct bearing arrangement



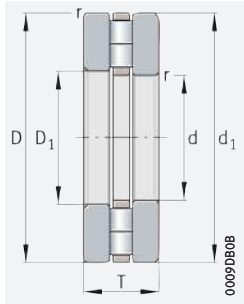
| d<br>D <sub>c1</sub> | Axial bearing washers |                         |                       |                | Dimensions     |                |                |      |                | Mounting dimensions |                |                | Raceway dimensions |                |
|----------------------|-----------------------|-------------------------|-----------------------|----------------|----------------|----------------|----------------|------|----------------|---------------------|----------------|----------------|--------------------|----------------|
|                      | Mass                  | Designation             |                       |                | D <sub>1</sub> | d <sub>1</sub> | D <sub>w</sub> | B    | a<br>r<br>min. | d <sub>a</sub>      | D <sub>a</sub> | r <sub>a</sub> | E <sub>b</sub>     | E <sub>a</sub> |
|                      | m<br>≈ kg             | Housing locating washer | Shaft locating washer | Bearing washer |                |                |                |      |                |                     |                |                |                    |                |
| 65                   | 0,11                  | GS81113                 | WS81113               | LS6590         | 67             | 90             | 7,5            | 5,25 | 1              | 87                  | 67             | 1              | 67                 | 87             |
|                      | 0,268                 | GS81213                 | WS81213               | –              | 67             | 100            | 11             | 8    | 1              | 96                  | 69             | 1              | 69                 | 96             |
|                      | 0,535                 | GS89313                 | WS89313               | –              | 67             | 115            | 9              | 10,5 | 1,1            | 113                 | 71             | 1,1            | 71                 | 113            |
|                      | 1,4                   | GS89413                 | WS89413               | –              | 68             | 140            | 15             | 15   | 2              | 135                 | 70             | 2              | 70                 | 135            |
| 70                   | 0,12                  | GS81114                 | WS81114               | LS7095         | 72             | 95             | 7,5            | 5,25 | 1              | 92                  | 72             | 1              | 72                 | 92             |
|                      | 0,278                 | GS81214                 | WS81214               | –              | 72             | 105            | 11             | 8    | 1              | 102                 | 74             | 1              | 74                 | 102            |
|                      | 0,8                   | GS89314                 | WS89314               | –              | 72             | 125            | 10             | 12   | 1,1            | 123                 | 76             | 1,1            | 76                 | 123            |
|                      | 1,73                  | GS89414                 | WS89414               | –              | 73             | 150            | 16             | 16   | 2              | 147                 | 76             | 2              | 76                 | 147            |
| 75                   | 0,136                 | GS81115                 | WS81115               | LS75100        | 77             | 100            | 7,5            | 5,75 | 1              | 97                  | 78             | 1              | 78                 | 97             |
|                      | 0,293                 | GS81215                 | WS81215               | –              | 77             | 110            | 11             | 8    | 1              | 106                 | 79             | 1              | 79                 | 106            |
|                      | 0,97                  | GS89315                 | WS89315               | –              | 77             | 135            | 11             | 12,5 | 1,5            | 132                 | 81             | 1,5            | 81                 | 132            |
|                      | 2,09                  | GS89415                 | WS89415               | –              | 78             | 160            | 17             | 17   | 2              | 156                 | 82             | 2              | 82                 | 156            |
| 80                   | 0,144                 | GS81116                 | WS81116               | LS80105        | 82             | 105            | 7,5            | 5,75 | 1              | 102                 | 83             | 1              | 83                 | 102            |
|                      | 0,333                 | GS81216                 | WS81216               | –              | 82             | 115            | 11             | 8,5  | 1              | 112                 | 84             | 1              | 84                 | 112            |
|                      | 1,02                  | GS89316                 | WS89316               | –              | 82             | 140            | 11             | 12,5 | 1,5            | 137                 | 86             | 1,5            | 86                 | 137            |
|                      | 2,5                   | GS89416                 | WS89416               | –              | 83             | 170            | 18             | 18   | 2,1            | 165                 | 88             | 2,1            | 88                 | 165            |
| 85                   | 0,151                 | GS81117                 | WS81117               | LS85110        | 87             | 110            | 7,5            | 5,75 | 1              | 108                 | 87             | 1              | 87                 | 108            |
|                      | 0,49                  | GS81217                 | WS81217               | –              | 88             | 125            | 12             | 9,5  | 1              | 119                 | 90             | 1              | 90                 | 119            |
|                      | 1,23                  | GS89317                 | WS89317               | –              | 88             | 150            | 12             | 13,5 | 1,5            | 147                 | 93             | 1,5            | 93                 | 146            |
|                      | 2,97                  | GS89417                 | WS89417               | –              | 88             | 180            | 19             | 19,5 | 2,1            | 175                 | 93             | 2,1            | 93                 | 175            |
| 90                   | 0,225                 | GS81118                 | WS81118               | LS90120        | 92             | 120            | 9              | 6,5  | 1              | 117                 | 93             | 1              | 93                 | 117            |
|                      | 0,614                 | GS81218                 | WS81218               | –              | 93             | 135            | 14             | 10,5 | 1,1            | 129                 | 95             | 1,1            | 95                 | 129            |
|                      | 1,33                  | GS89318                 | WS89318               | –              | 93             | 155            | 12             | 13,5 | 1,5            | 152                 | 98             | 1,5            | 98                 | 151            |
|                      | 3,45                  | GS89418                 | WS89418               | –              | 93             | 190            | 20             | 20   | 2,1            | 185                 | 99             | 2,1            | 99                 | 185            |
| 100                  | 0,35                  | GS81120                 | WS81120               | LS100135       | 102            | 135            | 11             | 7    | 1              | 131                 | 104            | 1              | 104                | 131            |
|                      | 0,8                   | GS81220                 | WS81220               | –              | 103            | 150            | 15             | 11,5 | 1,1            | 142                 | 107            | 1,1            | 107                | 142            |
|                      | 1,69                  | GS89320                 | WS89320               | –              | 103            | 170            | 13             | 14,5 | 1,5            | 167                 | 107            | 1,5            | 109                | 166            |
|                      | 4,75                  | GS89420                 | WS89420               | –              | 103            | 210            | 22             | 22,5 | 3              | 205                 | 111            | 3              | 111                | 205            |



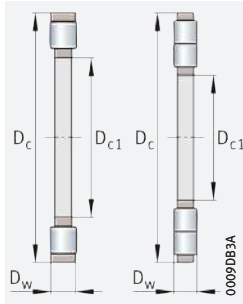
Axial cylindrical roller bearings  
Axial cylindrical roller and cage assemblies  
Axial bearing washers



811, 812



893, 894

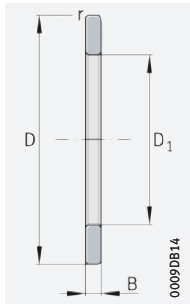


Single row: K811, K812  
Double row: K893, K894

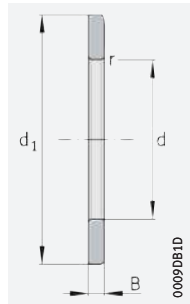
d = 110 – 170 mm

| Main dimensions |                 |     | Basic load ratings  |                       | Fatigue limit load | Limiting speed    | Speed rating      | Axial cylindrical roller bearings |             | Axial cylindrical roller and cage assemblies |             |
|-----------------|-----------------|-----|---------------------|-----------------------|--------------------|-------------------|-------------------|-----------------------------------|-------------|----------------------------------------------|-------------|
|                 |                 |     |                     |                       |                    |                   |                   | Mass                              | Designation | Mass                                         | Designation |
| d               | D <sub>c1</sub> | T   | dyn. C <sub>a</sub> | stat. C <sub>0a</sub> | C <sub>ua</sub>    | n <sub>G</sub>    | n <sub>dr</sub>   | m                                 |             | m                                            |             |
|                 |                 |     | N                   | N                     | N                  | min <sup>-1</sup> | min <sup>-1</sup> | ≈ kg                              |             | ≈ kg                                         |             |
| 110             | 145             | 25  | 207 000             | 700 000               | 63 000             | 2 280             | 860               | 1,04                              | 81122-TV    | 0,27                                         | K81122-TV   |
|                 | 160             | 38  | 325 000             | 1 030 000             | 104 000            | 2 150             | 870               | 2,29                              | 81222-TV    | 0,53                                         | K81222-TV   |
|                 | 190             | 48  | 500 000             | 1 870 000             | 177 000            | 1 900             | 780               | 6,7                               | 89322-M     | 1,83                                         | K89322-M    |
|                 | 230             | 73  | 1 010 000           | 3 400 000             | 330 000            | 1 680             | 640               | 17,41                             | 89422-M     | 5,11                                         | K89422-M    |
| 120             | 155             | 25  | 214 000             | 760 000               | 66 000             | 2 110             | 790               | 1,12                              | 81124-TV    | 0,29                                         | K81124-TV   |
|                 | 170             | 39  | 340 000             | 1 120 000             | 111 000            | 2 000             | 800               | 2,54                              | 81224-TV    | 0,58                                         | K81224-TV   |
|                 | 210             | 54  | 640 000             | 2 420 000             | 224 000            | 1 730             | 690               | 9,44                              | 89324-M     | 2,64                                         | K89324-M    |
|                 | 250             | 78  | 1 170 000           | 4 000 000             | 385 000            | 1 540             | 570               | 21,9                              | 89424-M     | 6,37                                         | K89424-M    |
| 130             | 170             | 30  | 255 000             | 900 000               | 79 000             | 1 940             | 770               | 1,67                              | 81126-TV    | 0,38                                         | K81126-TV   |
|                 | 190             | 45  | 480 000             | 1 520 000             | 151 000            | 1 820             | 720               | 3,98                              | 81226-TV    | 0,92                                         | K81226-TV   |
|                 | 225             | 58  | 720 000             | 2 700 000             | 250 000            | 1 620             | 650               | 11,2                              | 89326-M     | 2,09                                         | K89326-M    |
|                 | 270             | 85  | 1 330 000           | 4 600 000             | 430 000            | 1 420             | 520               | 27,1                              | 89426-M     | 7,96                                         | K89426-M    |
| 140             | 180             | 31  | 260 000             | 960 000               | 83 000             | 1 820             | 720               | 1,9                               | 81128-TV    | 0,4                                          | K81128-TV   |
|                 | 200             | 46  | 455 000             | 1 450 000             | 141 000            | 1 690             | 730               | 5,07                              | 81228-M     | 1,8                                          | K81228-M    |
|                 | 240             | 60  | 820 000             | 3 200 000             | 290 000            | 1 520             | 570               | 13,2                              | 89328-M     | 2,57                                         | K89328-M    |
|                 | 280             | 85  | 1 390 000           | 4 950 000             | 455 000            | 1 350             | 480               | 29,8                              | 89428-M     | 8,53                                         | K89428-M    |
| 150             | 190             | 31  | 270 000             | 1 020 000             | 86 000             | 1 710             | 670               | 2,2                               | 81130-TV    | 0,43                                         | K81130-TV   |
|                 | 215             | 50  | 590 000             | 1 940 000             | 188 000            | 1 580             | 610               | 7,17                              | 81230-M     | 2,81                                         | K81230-M    |
|                 | 250             | 60  | 840 000             | 3 350 000             | 300 000            | 1 440             | 540               | 13,9                              | 89330-M     | 3,75                                         | K89330-M    |
|                 | 300             | 90  | 1 580 000           | 5 700 000             | 520 000            | 1 250             | 440               | 35,4                              | 89430-M     | 10,4                                         | K89430-M    |
| 160             | 200             | 31  | 270 000             | 1 050 000             | 87 000             | 1 610             | 640               | 2,12                              | 81132-TV    | 0,44                                         | K81132-TV   |
|                 | 225             | 51  | 600 000             | 2 030 000             | 194 000            | 1 500             | 580               | 7,6                               | 81232-M     | 3,01                                         | K81232-M    |
|                 | 320             | 95  | 1 780 000           | 6 500 000             | 590 000            | 1 170             | 400               | 42                                | 89432-M     | 12,4                                         | K89432-M    |
| 170             | 215             | 34  | 360 000             | 1 380 000             | 124 000            | 1 510             | 570               | 2,41                              | 81134-TV    | 0,66                                         | K81134-TV   |
|                 | 240             | 55  | 680 000             | 2 340 000             | 222 000            | 1 400             | 540               | 9,3                               | 81234-M     | 3,5                                          | K81234-M    |
|                 | 340             | 103 | 1 990 000           | 7 400 000             | 660 000            | 1 100             | 365               | 51,9                              | 89434-M     | 14,9                                         | K89434-M    |

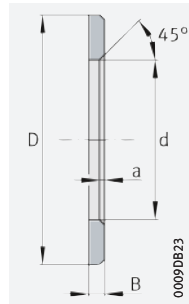
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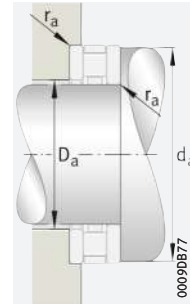
GS



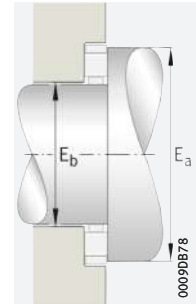
WS



LS



Mounting dimensions



Mounting dimensions, direct bearing arrangement

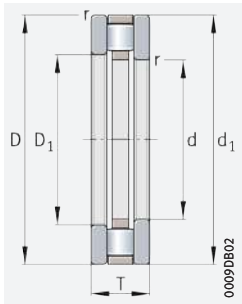


| Axial bearing washers |           |                         |                       |                | Dimensions     |                |                |      |                | Mounting dimensions |                |                | Raceway dimensions |                |
|-----------------------|-----------|-------------------------|-----------------------|----------------|----------------|----------------|----------------|------|----------------|---------------------|----------------|----------------|--------------------|----------------|
| d<br>D <sub>c1</sub>  | Mass      | Designation             |                       |                | D <sub>1</sub> | d <sub>1</sub> | D <sub>w</sub> | B    | a<br>r<br>min. | d <sub>a</sub>      | D <sub>a</sub> | r <sub>a</sub> | E <sub>b</sub>     | E <sub>a</sub> |
|                       | m<br>≈ kg | Housing locating washer | Shaft locating washer | Bearing washer |                |                |                |      |                |                     |                |                |                    |                |
| 110                   | 0,385     | GS81122                 | WS81122               | LS110145       | 112            | 145            | 11             | 7    | 1              | 141                 | 114            | 1              | 114                | 141            |
|                       | 0,88      | GS81222                 | WS81222               | –              | 113            | 160            | 15             | 11,5 | 1,1            | 152                 | 117            | 1,1            | 117                | 152            |
|                       | 2,44      | GS89322                 | WS89322               | –              | 113            | 190            | 15             | 16,5 | 2              | 186                 | 120            | 2              | 120                | 185            |
|                       | 6,15      | GS89422                 | WS89422               | –              | 113            | 230            | 24             | 24,5 | 3              | 223                 | 121            | 3              | 121                | 223            |
| 120                   | 0,415     | GS81124                 | WS81124               | LS120155       | 122            | 155            | 11             | 7    | 1              | 151                 | 124            | 1              | 124                | 151            |
|                       | 0,98      | GS81224                 | WS81224               | –              | 123            | 170            | 15             | 12   | 1,1            | 162                 | 127            | 1,1            | 127                | 162            |
|                       | 3,4       | GS89324                 | WS89324               | –              | 123            | 210            | 17             | 18,5 | 2,1            | 206                 | 130            | 2,1            | 132                | 205            |
|                       | 7,7       | GS89424                 | WS89424               | –              | 123            | 250            | 26             | 26   | 4              | 243                 | 133            | 4              | 133                | 243            |
| 130                   | 0,643     | GS81126                 | WS81126               | LS130170       | 132            | 170            | 12             | 9    | 1              | 165                 | 135            | 1              | 135                | 165            |
|                       | 1,53      | GS81226                 | WS81226               | –              | 133            | 187            | 19             | 13   | 1,5            | 181                 | 137            | 1,5            | 137                | 181            |
|                       | 4,045     | GS89326                 | WS89326               | –              | 134            | 225            | 18             | 20   | 2,1            | 220                 | 141            | 2,1            | 141                | 219            |
|                       | 9,5       | GS89426                 | WS89426               | –              | 134            | 270            | 28             | 28,5 | 4              | 263                 | 145            | 4              | 145                | 263            |
| 140                   | 0,749     | GS81128                 | WS81128               | LS140180       | 142            | 178            | 12             | 9,5  | 1              | 175                 | 145            | 1              | 145                | 175            |
|                       | 1,635     | GS81228                 | WS81228               | –              | 143            | 197            | 19             | 13,5 | 1,5            | 191                 | 147            | 1,5            | 151                | 195            |
|                       | 4,8       | GS89328                 | WS89328               | –              | 144            | 240            | 19             | 20,5 | 2,1            | 235                 | 152            | 2,1            | 152                | 234            |
|                       | 10,6      | GS89428                 | WS89428               | –              | 144            | 280            | 28             | 28,5 | 4              | 273                 | 155            | 4              | 155                | 273            |
| 150                   | 0,796     | GS81130                 | WS81130               | LS150190       | 152            | 188            | 12             | 9,5  | 1              | 185                 | 155            | 1              | 155                | 185            |
|                       | 2,18      | GS81230                 | WS81230               | –              | 153            | 212            | 21             | 14,5 | 1,5            | 211                 | 158            | 1,5            | 162                | 210            |
|                       | 5,06      | GS89330                 | WS89330               | –              | 154            | 250            | 19             | 20,5 | 2,1            | 245                 | 162            | 2,1            | 162                | 244            |
|                       | 12,5      | GS89430                 | WS89430               | –              | 154            | 300            | 30             | 30   | 4              | 293                 | 167            | 4              | 167                | 293            |
| 160                   | 0,842     | GS81132                 | WS81132               | LS160200       | 162            | 198            | 12             | 9,5  | 1              | 195                 | 165            | 1              | 165                | 195            |
|                       | 2,3       | GS81232                 | WS81232               | –              | 163            | 222            | 21             | 15   | 1,5            | 220                 | 168            | 1,5            | 171                | 219            |
|                       | 14,8      | GS89432                 | WS89432               | –              | 164            | 320            | 32             | 31,5 | 5              | 313                 | 179            | 5              | 179                | 313            |
| 170                   | 1,1       | GS81134                 | WS81134               | –              | 172            | 213            | 14             | 10   | 1,1            | 209                 | 176            | 1,1            | 176                | 209            |
|                       | 2,9       | GS81234                 | WS81234               | –              | 173            | 237            | 22             | 16,5 | 1,5            | 235                 | 180            | 1,5            | 184                | 233            |
|                       | 18,5      | GS89434                 | WS89434               | –              | 174            | 340            | 34             | 34,5 | 5              | 333                 | 191            | 5              | 191                | 333            |

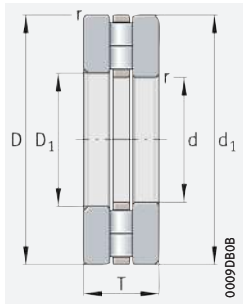


Axial cylindrical roller bearings

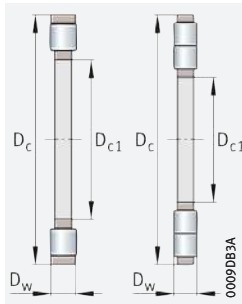
Axial cylindrical roller and cage assemblies  
Axial bearing washers



811, 812



893, 894

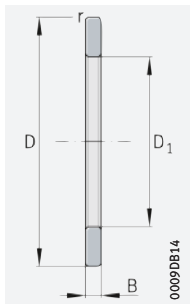


Single row: K811, K812  
Double row: K893, K894

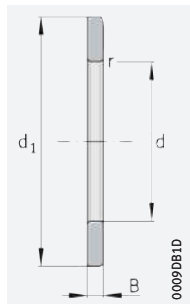
d = 180 – 320 mm

| Main dimensions |                 |     | Basic load ratings  |                       | Fatigue limit load | Limiting speed    | Speed rating      | Axial cylindrical roller bearings |             | Axial cylindrical roller and cage assemblies |             |
|-----------------|-----------------|-----|---------------------|-----------------------|--------------------|-------------------|-------------------|-----------------------------------|-------------|----------------------------------------------|-------------|
|                 |                 |     |                     |                       |                    |                   |                   | Mass                              | Designation | Mass                                         | Designation |
| d               | D <sub>c1</sub> | T   | dyn. C <sub>a</sub> | stat. C <sub>0a</sub> | C <sub>ua</sub>    | n <sub>G</sub>    | n <sub>thr</sub>  | m                                 |             | m                                            |             |
|                 |                 |     | N                   | N                     | N                  | min <sup>-1</sup> | min <sup>-1</sup> | ≈ kg                              |             | ≈ kg                                         |             |
| 180             | 225             | 34  | 340 000             | 1 300 000             | 115 000            | 1 430             | 590               | 3,3                               | 81136-M     | 1,46                                         | K81136-M    |
|                 | 250             | 56  | 700 000             | 2 440 000             | 228 000            | 1 340             | 520               | 9,9                               | 81236-M     | 3,67                                         | K81236-M    |
|                 | 360             | 109 | 2 210 000           | 8 200 000             | 720 000            | 1 050             | 345               | 60                                | 89436-M     | 17,6                                         | K89436-M    |
| 190             | 240             | 37  | 390 000             | 1 500 000             | 131 000            | 1 340             | 570               | 4,74                              | 81138-M     | 1,84                                         | K81138-M    |
|                 | 270             | 62  | 880 000             | 3 000 000             | 285 000            | 1 250             | 475               | 12,8                              | 81238-M     | 5,17                                         | K81238-M    |
|                 | 380             | 115 | 2 460 000           | 9 200 000             | 800 000            | 1 010             | 330               | 72,1                              | 89438-M     | 20,9                                         | K89438-M    |
| 200             | 250             | 37  | 395 000             | 1 550 000             | 134 000            | 1 290             | 550               | 4,95                              | 81140-M     | 1,93                                         | K81140-M    |
|                 | 280             | 62  | 900 000             | 3 150 000             | 295 000            | 1 190             | 450               | 14,2                              | 81240-M     | 5,4                                          | K81240-M    |
|                 | 400             | 122 | 2 700 000           | 10 200 000            | 880 000            | 960               | 305               | 82,6                              | 89440-M     | 24                                           | K89440-M    |
| 220             | 270             | 37  | 420 000             | 1 730 000             | 146 000            | 1 180             | 490               | 5,22                              | 81144-M     | 2,04                                         | K81144-M    |
|                 | 300             | 63  | 950 000             | 3 450 000             | 310 000            | 1 100             | 405               | 15,3                              | 81244-M     | 5,8                                          | K81244-M    |
|                 | 420             | 122 | 2 900 000           | 11 500 000            | 980 000            | 880               | 265               | 90,1                              | 89444-M     | 25,7                                         | K89444-M    |
| 240             | 300             | 45  | 600 000             | 2 500 000             | 212 000            | 1 070             | 420               | 8,45                              | 81148-M     | 3,32                                         | K81148-M    |
|                 | 340             | 78  | 1 370 000           | 5 000 000             | 445 000            | 970               | 330               | 26,2                              | 81248-M     | 9,94                                         | K81248-M    |
|                 | 440             | 122 | 3 000 000           | 12 200 000            | 1 030 000          | 850               | 250               | 95,9                              | 89448-M     | 27,3                                         | K89448-M    |
| 260             | 320             | 45  | 620 000             | 2 650 000             | 219 000            | 990               | 390               | 9,08                              | 81152-M     | 3,55                                         | K81152-M    |
|                 | 360             | 79  | 1 440 000           | 5 400 000             | 475 000            | 910               | 305               | 28,6                              | 81252-M     | 10,8                                         | K81252-M    |
|                 | 480             | 132 | 3 600 000           | 14 700 000            | 1 200 000          | 780               | 224               | 125                               | 89452-M     | 36,8                                         | K89452-M    |
| 280             | 350             | 53  | 870 000             | 3 650 000             | 305 000            | 910               | 330               | 12,6                              | 81156-M     | 5,31                                         | K81156-M    |
|                 | 380             | 80  | 1 460 000           | 5 600 000             | 485 000            | 860               | 290               | 31                                | 81256-M     | 11,5                                         | K81256-M    |
|                 | 520             | 145 | 4 250 000           | 17 600 000            | 1 420 000          | 700               | 195               | 159                               | 89456-M     | 48,5                                         | K89456-M    |
| 300             | 380             | 62  | 1 070 000           | 4 500 000             | 370 000            | 840               | 295               | 19,4                              | 81160-M     | 7,6                                          | K81160-M    |
|                 | 420             | 95  | 1 930 000           | 7 300 000             | 620 000            | 780               | 255               | 48,25                             | 81260-M     | 17,8                                         | K81260-M    |
|                 | 540             | 145 | 4 350 000           | 18 500 000            | 1 480 000          | 670               | 184               | 170                               | 89460-M     | 49,8                                         | K89460-M    |
| 320             | 400             | 63  | 1 100 000           | 4 750 000             | 385 000            | 800               | 280               | 20,7                              | 81164-M     | 8,04                                         | K81164-M    |
|                 | 580             | 155 | 5 500 000           | 19 900 000            | 1 460 000          | 640               | 184               | 203                               | 89464-M     | 80,3                                         | K89464-M    |

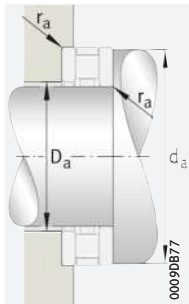
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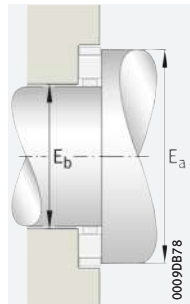
GS



WS



Mounting dimensions



Mounting dimensions, direct bearing arrangement



| d<br>D <sub>c1</sub> | Axial bearing washers |                         |                       |  | Dimensions     |                |                |      |        | Mounting dimensions |                |                | Raceway dimensions |                |
|----------------------|-----------------------|-------------------------|-----------------------|--|----------------|----------------|----------------|------|--------|---------------------|----------------|----------------|--------------------|----------------|
|                      | Mass                  | Designation             |                       |  | D <sub>1</sub> | d <sub>1</sub> | D <sub>w</sub> | B    | a<br>r | d <sub>a</sub>      | D <sub>a</sub> | r <sub>a</sub> | E <sub>b</sub>     | E <sub>a</sub> |
|                      | m<br>≈ kg             | Housing locating washer | Shaft locating washer |  |                |                |                |      |        |                     |                |                |                    |                |
| 180                  | 1,12                  | GS81136                 | WS81136               |  | 183            | 222            | 14             | 10   | 1,1    | 219                 | 185            | 1,1            | 186                | 220            |
|                      | 3,13                  | GS81236                 | WS81236               |  | 183            | 247            | 22             | 17   | 1,5    | 245                 | 190            | 1,5            | 194                | 243            |
|                      | 21,3                  | GS89436                 | WS89436               |  | 184            | 360            | 36             | 36,5 | 5      | 351                 | 200            | 5              | 200                | 351            |
| 190                  | 1,45                  | GS81138                 | WS81138               |  | 193            | 237            | 15             | 11   | 1,1    | 233                 | 197            | 1,1            | 198                | 234            |
|                      | 3,835                 | GS81238                 | WS81238               |  | 194            | 267            | 26             | 18   | 2      | 265                 | 200            | 2              | 205                | 263            |
|                      | 25,6                  | GS89438                 | WS89438               |  | 195            | 380            | 38             | 38,5 | 5      | 373                 | 214            | 5              | 212                | 371            |
| 200                  | 1,51                  | GS81140                 | WS81140               |  | 203            | 247            | 15             | 11   | 1,1    | 243                 | 206            | 1,1            | 208                | 244            |
|                      | 4,41                  | GS81240                 | WS81240               |  | 204            | 277            | 26             | 18   | 2      | 275                 | 210            | 2              | 215                | 273            |
|                      | 29,3                  | GS89440                 | WS89440               |  | 205            | 400            | 40             | 41   | 5      | 393                 | 226            | 5              | 224                | 391            |
| 220                  | 1,59                  | GS81144                 | WS81144               |  | 223            | 267            | 15             | 11   | 1,1    | 263                 | 226            | 1,1            | 228                | 264            |
|                      | 4,75                  | GS81244                 | WS81244               |  | 224            | 297            | 26             | 18,5 | 2      | 296                 | 230            | 2              | 236                | 294            |
|                      | 32,2                  | GS89444                 | WS89444               |  | 225            | 420            | 40             | 41   | 6      | 411                 | 244            | 6              | 244                | 411            |
| 240                  | 2,57                  | GS81148                 | WS81148               |  | 243            | 297            | 18             | 13,5 | 1,5    | 296                 | 248            | 1,5            | 253                | 294            |
|                      | 8,15                  | GS81248                 | WS81248               |  | 244            | 335            | 32             | 23   | 2,1    | 335                 | 261            | 2,1            | 263                | 333            |
|                      | 34,3                  | GS89448                 | WS89448               |  | 245            | 440            | 40             | 41   | 6      | 433                 | 266            | 6              | 264                | 431            |
| 260                  | 2,765                 | GS81152                 | WS81152               |  | 263            | 317            | 18             | 13,5 | 1,5    | 316                 | 268            | 1,5            | 272                | 314            |
|                      | 8,9                   | GS81252                 | WS81252               |  | 264            | 355            | 32             | 23,5 | 2,1    | 353                 | 280            | 2,1            | 281                | 351            |
|                      | 44,25                 | GS89452                 | WS89452               |  | 265            | 480            | 44             | 44   | 6      | 472                 | 288            | 6              | 286                | 468            |
| 280                  | 3,65                  | GS81156                 | WS81156               |  | 283            | 347            | 22             | 15,5 | 1,5    | 346                 | 288            | 1,5            | 294                | 344            |
|                      | 9,75                  | GS81256                 | WS81256               |  | 284            | 375            | 32             | 24   | 2,1    | 373                 | 300            | 2,1            | 301                | 371            |
|                      | 55,6                  | GS89456                 | WS89456               |  | 285            | 520            | 48             | 48,5 | 6      | 512                 | 311            | 6              | 309                | 508            |
| 300                  | 5,92                  | GS81160                 | WS81160               |  | 304            | 376            | 25             | 18,5 | 2      | 373                 | 315            | 2              | 316                | 372            |
|                      | 15,2                  | GS81260                 | WS81260               |  | 304            | 415            | 38             | 28,5 | 3      | 413                 | 328            | 3              | 329                | 412            |
|                      | 60,15                 | GS89460                 | WS89460               |  | 305            | 540            | 48             | 48,5 | 6      | 533                 | 331            | 6              | 329                | 528            |
| 320                  | 6,35                  | GS81164                 | WS81164               |  | 324            | 396            | 25             | 19   | 2      | 394                 | 334            | 2              | 336                | 392            |
|                      | 61,5                  | GS89464                 | WS89464               |  | 325            | 575            | 68             | 43,5 | 6      | 573                 | 340            | 6              | 343                | 566            |