

1. Angular Contact Ball Bearings



High-Accuracy Angular Contact Ball Bearings

Standard Series



Ultra High-Speed Angular Contact Ball Bearings

NSKROBUST Series

Spinshot™ II

ROBUSTSHOT

NSKROBUST BSR Series

Angular Contact Ball Bearings

Angular Contact Ball Bearings 50-107

Numbering System

Bearing Tables

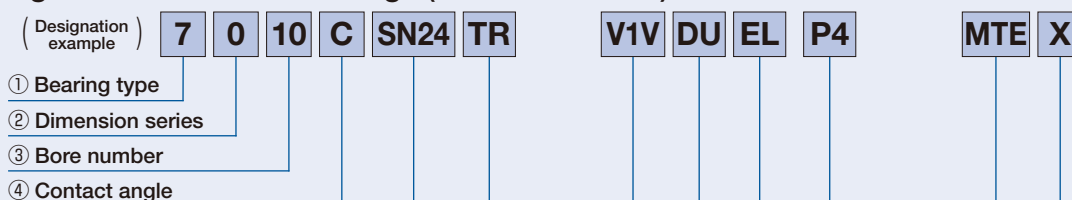
High-Accuracy Angular Contact Ball Bearings (Standard Series)

Ultra High-Speed Angular Contact Ball Bearings (NSK ROBUST Series)

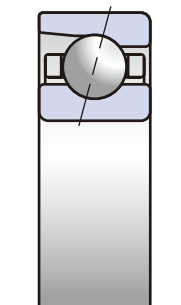
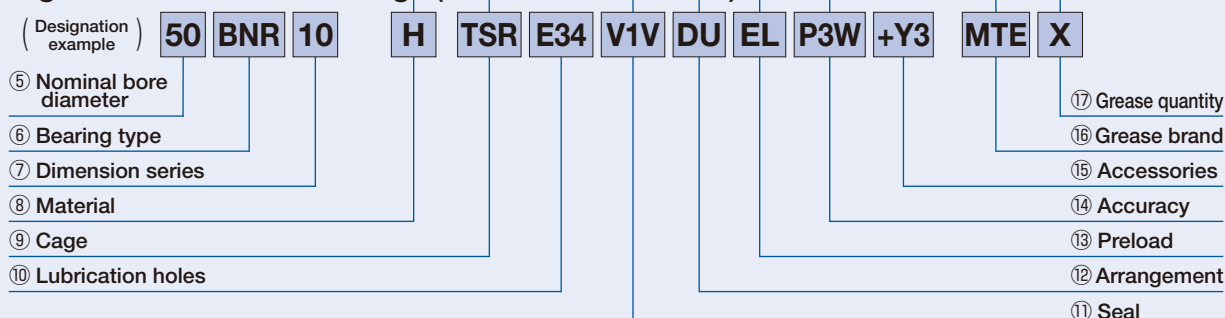
1. Angular Contact Ball Bearings

Numbering System

Angular Contact Ball Bearings (Standard Series)



Angular Contact Ball Bearings (NSKROBUST Series)



①⑥ Bearing Type

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① 7: High-Accuracy Angular Contact Ball Bearings (Standard Series)

The high performance standard NSK HPS Series features a high basic dynamic load rating and is suitable for low to medium speed operation and high-load applications. NSK's original material evaluation technology ensures only high purity materials are used in their manufacture, which has the most influence on bearing life. Superior steel materials have led to a 15% extension of rolling fatigue life.

⑥ BNR, BER, BSR: High-Speed Angular Contact Ball Bearings (NSKROBUST Series)

High performance ACBBs with high rigidity and low heat generation. The results of temperature rise simulations undertaken to evaluate rolling element slip were used to optimize the design of this series.

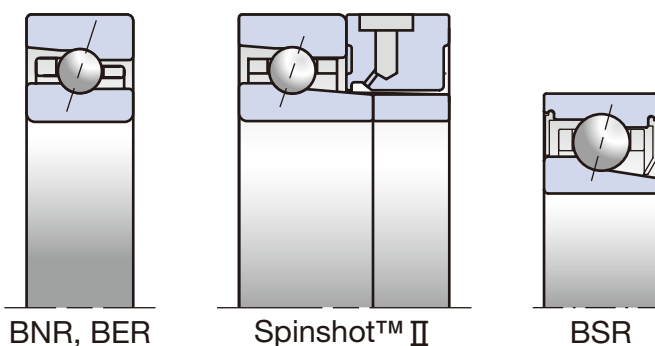
NSKROBUST bearings are available as S, E, H or X type with different combinations of materials such as high-accuracy ceramic balls and heat-resistant high-speed SHX Steel, enabling our customers to choose the most suitable bearing for each application.

Sealed bearings are available mainly up to 120mm bore diameter. Optimization of the space between seal and cage and minimization of the seal labyrinth prevent grease leakage. The wide-width series (29, 20 series) has been designed to allow more grease to be held inside the bearing. This helps keep temperature rise down and prolongs grease life.

The Spinshot type has been designed for noise reduction and greater reliability of oil-air lubrication during ultra high-speed operation.

The BSR series bearings retain high radial rigidity even in high-speed operation with constant pressure preload. This makes them ideal for grinders and similar applications.

BNR: 18° contact angle BER: 25° contact angle BSR: 15° contact angle



BNR, BER

Spinshot™ II

BSR

Available sizes

| | BNR, BER | BSR |
|-----------|--------------------|-------------------|
| 19 Series | 30BxR19 ~ 200BxR19 | 10BSR19 ~ 25BSR19 |
| 10 Series | 30BxR10 ~ 160BxR10 | 6BSR10 ~ 25BSR10 |
| 02 Series | — | 10BSR02 ~ 25BSR02 |

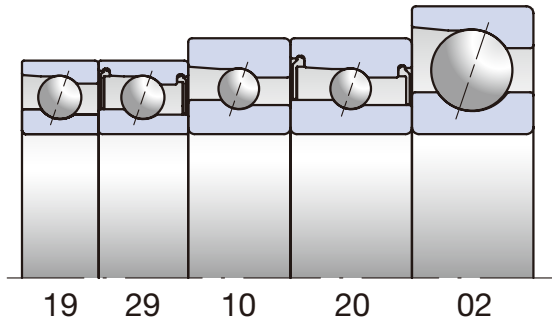
②⑦ Dimension series

② Standard Series

9: 19 Series, 0: 10 Series, 2: 02 Series

⑦ NSKROBUST Series

19: 19 Series, 29: 29 Series, 10: 10 Series, 20: 20 Series, 02: 02 Series



As shown in the figure above, for identical bore diameters, the bearings' outside diameter and width increase in the order 19– 29– 10– 20– 02 Series as expressed by the dimension series codes.

Please note the 29 and 20 Series are only available as NSKROBUST Series sealed ultra high-speed angular contact ball bearings.

③ Bore Number ⑤ Nominal Bore Diameter

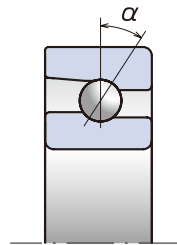
③ Standard Series

Up to 3: Bore diameter 00: 10mm, 01: 12mm,
02: 15mm, 03: 17mm
4 and above: Bore diameter = Bore number x 5 (mm)

⑤ NSKROBUST Series

Nominal bore diameter = Bore dimension (mm)

④ Contact Angle ⑥ Bearing Type Page 44-45



④ Standard Series

C: 15° A5: 25° A: 30°

⑥ NSKROBUST Series

BNR: 18° BER: 25° BSR: 15°

⑧ Material Page 14-17, 22

Standard Series

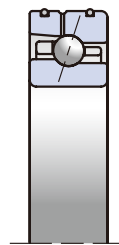
No code: steel ball SN24: ceramic ball

NSKROBUST Series

| Type | Material | |
|-------------------|---|---|
| | Inner and outer ring | Balls |
| S | Bearing steel (SUJ2) | Bearing steel (SUJ2) |
| E | Bearing steel (SUJ2) | Ultra long life rolling elements (EQTF) |
| H | Bearing steel (SUJ2) | Ceramic (Si ₃ N ₄) |
| X | Heat resistant steel for high-speed operation (SHX) | Ceramic (Si ₃ N ₄) |
| XE (Spinshot™ II) | Heat resistant steel for high-speed operation (SHX) | Ceramic (Si ₃ N ₄) |

⑩ Lubrication holes Page 22

No code: No lubrication holes E34: Direct lubricating bearing



⑩ NSKROBUST Series

E34: Direct lubricating bearing

Space-saving bearings designed specifically for oil-air lubrication, equipped with lubrication groove, lubrication holes and O-ring groove on outer ring.

Available for NSKROBUST Series only.

⑨ Cage Page 18

| | Code | Material | Guiding | Features | Limiting Speed (d _m n value) | Available for |
|--|------|-----------------|-------------------|---|---|--|
| | TYN | Polyamide resin | Ball guided | Excellent wear and noise characteristics, especially effective with grease lubrication | Oil: 1.4 million Grease: 1.2 million | · Standard Series · NSKROBUST Series (not available for 19 Series sealed type) |
| | T | Phenolic resin | Outer ring guided | Stable cage rotation in high-speed operation | 2.8 million | TR: Standard Series T: NSKROBUST Series TA: BSR series (sealed type) |
| | TSR | PPS resin | Outer ring guided | Reduction of non-repeatable run-out (NRRO). Low temperature rise in ultra high-speed operation due to unique design with enhanced oil drain | 3.0 million | · NSKROBUST Series |
| | MY | Brass | Ball guided | Excellent noise and temperature rise characteristics. Extended grease life. | Oil: 0.8 million Grease: 0.7 million | · Standard Series · NSKROBUST Series only for large bearings that are not equipped with TYN cages |

1. Angular Contact Ball Bearings

Numbering System

Angular Contact Ball Bearings (Standard Series)

(Designation example)

7010C SN24 TR V1V DU EL P4 MTE X

① Bearing type

② Dimension series

③ Bore number

④ Contact angle

Angular Contact Ball Bearings (NSKROBUST Series)

(Designation example)

50BNR10 H TSR E34 V1V DU EL P3W +Y3 MTE X

⑤ Nominal bore diameter

⑥ Bearing type

⑦ Dimension series

⑧ Material

⑨ Cage

⑩ Lubrication holes

⑪ Seal

⑫ Arrangement

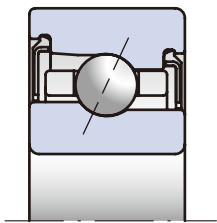
⑬ Preload

⑭ Accuracy

⑮ Accessories

⑯ Grease brand

⑰ Grease quantity



⑪ Seal

No code: Open type V1V: Non-contact rubber seal

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Non-contact rubber seals on both sides of the bearing prevent entry of foreign matter and grease expulsion, thereby ensuring high reliability and longer grease life.

⑫ Arrangement

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| Universal arrangement | | Arrangement example | | |
|-----------------------|------------|---------------------|-----|-----|
| SU | Single row | | | |
| DU | 2 row | DB | DF | DT |
| DUD | 3 row | DBD | DFD | DTD |
| QU | 4 row | DBB | DFF | DTT |
| | | DBT | DFT | |

Universal arrangement bearings SU, DU, DUD and QU are controlled during production to ensure front face stand out is the same as back face stand out.

In addition, if the designation indicates two or more rows (DU, DUD and QU), tolerances for the bore and outside diameter are controlled for the set of bearings.

⑬ Preload

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Measured (+) Axial Clearance

Measured (-) Axial Clearance

EL: Extra Light Preload L: Light Preload

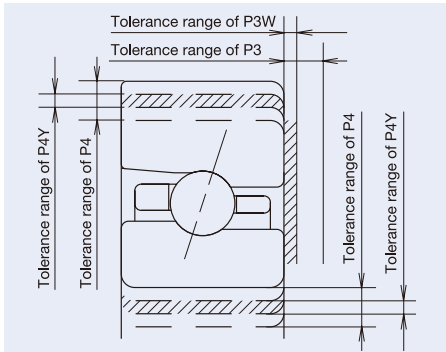
M: Medium Preload H: Heavy Preload

CP: Special Measured (-) Axial Clearance

CA: Special Measured (+) Axial Clearance

14 Accuracy

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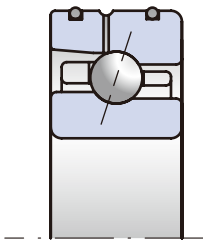
P2: ISO Class 2 P4: ISO Class 4 P5: ISO Class 5

P3W: Special class (Special tolerances for deviation of inner/outer ring width, others are P3)

P3: Special class (ISO Class 4 dimensional tolerances and ISO Class 2 running accuracy)

P4Y: Special class (Special bore and outside diameter tolerances, others are ISO Class 4. See figure on left.)

15 Accessories



+Y3: O-ring on bearing outside surface

Available for NSKROBUST direct lubricating bearings (E34) only.

16 Grease brand

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Grease typically used in machine tool spindles:

MTE: MTE grease MTS: MTS grease

17 Grease quantity

Page 256

X: 15% of internal space K: 20% of internal space L: 30% of internal space

Which specification is available for which bearing?

| Standard Series | Bore diameter | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
|-----------------------|---------------|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|--|--|
| | 10 | 12 | 15 | 17 | 20 | 25 | 30 | 35 | 40 | 45 | 50 | 55 | 60 | 65 | 70 | 75 | 80 | 85 | 90 | 95 | 100 | 105 | 110 | 120 | 130 | 140 | 150 | 160 | 170 | 180 | 190 | 200 | 220 | 240 | 260 | 280 | 300 | | |
| ① Bearing type NSKHPS | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| ⑧ Material SN24 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| ⑨ Cage TYN | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| ⑨ Cage TR | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| ⑪ Seal V1V | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |

19Series

10Series

02Series

| NSKROBUST Series | Bore diameter | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
|---|---------------|---|---|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|--|--|--|
| | 6 | 7 | 8 | 10 | 12 | 15 | 17 | 20 | 25 | 30 | 35 | 40 | 45 | 50 | 55 | 60 | 65 | 70 | 75 | 80 | 85 | 90 | 95 | 100 | 105 | 110 | 120 | 130 | 140 | 150 | 160 | 170 | 180 | 190 | 200 | | | |
| ⑧ Material H,X (Ceramic balls) | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| ⑧ Material E (Ultra long life rolling elements) | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| ⑨ Cage TYN | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| ⑨ Cage T | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| ⑨ Cage TSR | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| ⑪ Seal V1V | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |

For designation not listed in the tables, please contact NSK for details.