Super-precision bearings interchange

SKF

Contents

Use of the equivalents data manual

SKF offers a wide range of super-precision bearings. They are designed for machine tool spindles and other applications that require a high level of running accuracy at high to extremely high speeds.

This interchange guide to SKF super-precision bearings provides fast and easy conversions of manufacturer's designations to the SKF equivalent designations. However, it will not result in an identical bearing, since competitors' designs may vary from SKF designs, and you can have differences in shoulder diameter, number of balls, cage location, etc.

The interchange information was compiled using data available at the time of publication; however, SKF makes no claims about performance equivalence and assumes no responsibility or liability for use of this interchange information.

This interchange is to be used as a guideline only, as manufacturers' designations may change without notice.

Interchanges to SKF super-precision bearings are made in the following bearing types:

- super-precision angular contact ball bearings
- super-precision cylindrical roller bearings
- super-precision double direction angular contact thrust ball bearings
- super-precision angular contact thrust ball bearings for screw drives

Work flow to crossover super-precision bearing designations

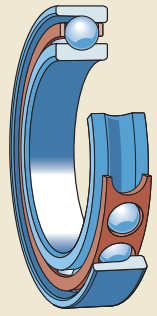
1 Determine the manufacturer and designation of the bearing. This is normally found on the side face of the bearing.
2 Use the tables to identify the characteristics and features of the bearing by identifying the prefix or suffix (symbol • means "information not available"; symbol ■ means "not included in the range").
3 Use the SKF designation system tables to construct the complete SKF designation of the bearing.

If the bearing designation is not recognizable or incomplete, please contact the SKF application engineering service or your local SKF company with as much information as possible regarding external dimensions, bearing type, cage, ball and ring material, number of rolling elements, bearing set arrangement and preload, and manufacturer of the bearing and the machine.

Detailed information on the individual SKF super-precision bearing types, including their characteristics and the available designs, is provided in the SKF catalogue Super-precision bearings (→ *Publ. 13383*) or at skf.com.


Super-precision bearing
SKF

Super-precision angular contact ball bearings



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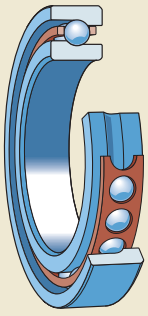

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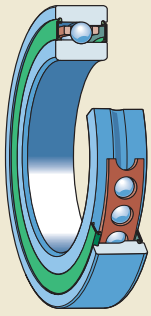

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SKF super-precision angular contact ball bearings high-capacity D design (1), high-speed E design (2), high-speed B design (3).

Designation examples

Manufacturer	SKF S7016 ACE/HCP4ADGA – Designation										SKF 7010 CD/P4ADGB – Designation							
SKF	S	70	16	AC	E	HC	P4A	DG	A		70	10	C	D	P4A	DG	B	
NSK	80	B	ER	10	H	T	V1V	DU	EL	P4Y	70	10	C	TR	DU	L	P4	
FAG	HC	RS	70	16	D	2RSD	T	P4S	DU	L	B	70	10	C	T	DU	L	P4
NTN	5S	HSE	0	16	LLB	T1	AD	GD2	GL	P42	70	10	U	C	GD2	GL	P4	
GMN	HY	SM	60	16	2RZ	E	TA	P4	DU	L	S	60	10	C	TAM	7	DU	L
RHP	T	70	16	S	C	T	RR	DU	L	P3	B	70	10	X2	TA	DU	L	EP7
BARDEN	C	1	16	J	RR	DU	L				1	10	H	C	DU	L		
IBC	CB	H	70	16	E	T	2RSZ	P4A	DU	X	70	10	C	–	T	P4	DU	L
FAFNIR	3	MMV	C	91	16	HX	VV	DU	X		2	MM	91	10	WI	CR	DU	L
KOYO	3NC	HAR	00	0	16	CA	GLx2	S	P4		70	10	C	PA	DG	L	P4	
SNR	ML	E	CH	70	16	H	V	DU	J7	4S	70	10	C	V	DU	J	8	4
ZYS	V7	0	16	AC	–	HQ1	2RZ	P4A	DG	A	7	0	10	C	-	P4	DG	B
SNFA	VE	X	80	S	NS	7/9	CE	3	DU	L	E	X	50	7	CE	1	DU	M

Colour codes

- Sealing
- Contact angle
- Accuracy
- Bearing series
- Bearing size
- Internal design
- Cage
- Bearing set arrangement
- Preload
- Ball material
- Special ring material
- Lubrication features

Sealing

Manufacturer	Designation
SKF	S
NSK	V1V
FAG	2RSD[1] HSS, HCS, XCS[2]
NTN	LLB
GMN	2RZ
RHP	RR
BARDEN	RR
IBC	2RSZ
FAFNIR	VV
KOYO	00
SNR	E
ZYS	2RZ
SNFA	S

[1] for B design
[2] for other types

Contact angle

Manufacturer	15°	18°	20°	25°	30°
SKF	C	F	■	AC	■
NSK	C	BNR[2]	•	A5 BER[2]	A
FAG	C	•	D	E	•
NTN	C	•	– [1]	AD	– [1]
GMN	C	18	•	E	•
RHP	X2	•	•	X3	•
BARDEN	C	•	•	E	•
IBC	C	•	•	E	A
FAFNIR	2	•	•	3	•
KOYO	C	•	CA	•	A
SNR	C	•	•	H	•
ZYS	C	•	•	AC	•
SNFA	1	2	•	3	•

[1] – no designation suffix
[2] bearing type and contact angle in the ROBUST series

Accuracy

Manufacturer	Designation			
SKF	P4	P4A	PA9A	VQ126
NSK	P4	P3	P2	P4Y
FAG	P4	P4S	•	P4S-K5[2]
NTN	P4	P42	P2	•
GMN	A7	P4	P2/A9	•
RHP	EP7	EP7/9	EP9	•
BARDEN	– [1]	•	•	C
IBC	P4A	P2H	P2A	X1 to X9
FAFNIR	MM	MMV	MMX	•
KOYO	P2	P4	•	•
SNR	4	4S	2	R
ZYS	P4	P4A	P2	•
SNFA	7	7/9	9	SQ

[1] – no designation suffix
[2] Reduced bore and outer diameter tolerance as per VQ253

Bearing series

Manufacturer	Designation			
SKF	718	719	70	72
NSK	• •	9 19	0 10	2 20
FAG	718	719	70	72
NTN	78	79	70	72
GMN	618	619	60	62
RHP	•	9	0	2
BARDEN	•	19	1	2
IBC	718	719	70	72
FAFNIR	•	93	91	2
KOYO	•	9	0	2
SNR	•	719	70	72
ZYS	18	19	0	2
SNFA	A	B	X	2

Bearing size

Manufacturer	Designation (bore code)				
	10 mm[1]	12 mm	15 mm	17 mm	20 mm
SKF	00	01	02	03	04[2]
NSK[3]	00	01	02	03	04[2]
FAG	00	01	02	03	04[2]
NTN	00	01	02	03	04[2]
GMN	00	01	02	03	04[2]
IBC	00	01	02	03	04[2]
RHP	00	01	02	03	04[2]
BARDEN	00	01	02	03	04[2]
FAFNIR	00	01	02	03	04[2]
KOYO	00	01	02	03	04[2]
SNR	00	01	02	03	04[2]
ZYS	00	01	02	03	04[2]
SNFA	10	12	15	17	20

[1] less than 10 mm, bearing size = mm bore diameter
[2] from 04 and up multiply by 5 (for example 05 = 25 mm bore diameter)
[3] for BER and BNR code = mm bore diameter

Cage

Manufacturer	Outer ring centred				Ball centred		
	Phenolic	Brass	PEEK	Polyamide	Phenolic	PEEK	Polyamide
SKF	– [1]	MA	TNHA	■	T	TNH	TN9
NSK	TR	•	•	•	•	•	TYN
FAG	T	•	•	•	•	•	•
NTN	T1	L1	•	T2	•	•	•
GMN	TA, TAM[2]	•	TXM[2]	TA	•	•	•
RHP	T (design E) TA (design D)	MA	•	•	•	•	•
BARDEN	– [1], H	•	•	•	•	•	•
IBC	T	M	K	PX	•	•	•
FAFNIR	CR	•	•	PRB, PRC	•	•	•
KOYO	PA .. FT	PA .. FY	•	PA .. FG	–5 .. FT	•	–5 .. FG
SNR	V (70-719) G1 (72)	•	•	•	•	•	•
ZYS	– [1]	•	•	TN1	•	•	•
SNFA	CE	LE	KE	PE	C	K	•

[1] – no designation suffix
[2] ball retaining

Bearing set arrangement

Manufacturer	Designation													
SKF	DB	DF	DT	DG	TBT	TFT	TT	TG	QBC	QFC	QBT	QFT	QT	QG
NSK	DB	DF	DT	DU	DBD	DFD	DTD	DUD	DBB	DFF	DBT	DFT	DTT	QU
FAG	DB	DF	DT	DU	TBT	TFT	TT	TU	QBC	QFC	QBT	QFT	QT	QU
NTN	DB	DF	DT	GD2	DBT	•	•	GD3	DTBT	•	•	•	•	GD4
GMN	DB	DF	DT	DU	TBT	TFT	TT	TU	QB	QF	QBT	QFT	QT	QU
RHP	DB	DF	DT	DU	2TB	2FT	3T	3U	2TB2T	2T2FT	3TB	3TF	4T	4U
BARDEN	DB	DF	DT	DU	•	•	•	•	•	•	•	•	•	•
IBC	DB	DF	DT	DU	TBT	TFT	TT	TU	QBC	QFC	QBT	QFT	QT	QU
FAFNIR	DB	DF	DT	DU	•	•	•	TU	•	•	•	•	•	QU
KOYO	DB	DF	DT	GLx2	DBD	DFD	DTD	GLx3	DBB	DFF	DBT	DFT	•	GLx4
SNR	DB	DF	DT	DU	Q16	•	•	TU	Q21	•	Q18	•	•	QU
ZYS	DB	DF	DT	DG	TBT	TFT	TT	TG	QBC	QFC	QBT	QFT	QT	QG
SNFA	DD	FF	T	DU	TD	TF	TT	TU	TDT	TFT	3TD	3TF	4T	4U

Preload

Manufacturer	Designation					
SKF	A	B	C	D	G...	K...
NSK	EL	L	M	H	CP	CA
FAG	L	M	H	•	•	•
NTN	•	GL	GN	GM	G	CS
GMN	•	L	M	S	V	•
RHP	•	L	M	H	•	•
BARDEN	•	L	M	H	•	•
IBC	X	L	M	H	U	A
FAFNIR	X	L	M	H	•	•
KOYO	S	L	M	H	CY	CS
SNR	7	8	9	•	X	•
ZYS	A	B	C	•	G	•
SNFA	L	M	F	•	...daN	...µm

Internal design

Manu-facturer	High capacity	High speed	High speed (small balls)
SKF	D	E	B
NSK	7	BNC	BNR
		BGR	BER
FAG	B	RS	HS
NTN	D	HSE	HSF
		HSB	
GMN	S	SM	KH
RHP	B	T	X or S
BARDEN	H	J	•
IBC	•	•	H
FAFNIR	WI	HX	WN
KOYO	7	HAR	•
SNR	– [1]	ML	•
ZYS	7	V7	•
SNFA	E/SE	VE	H

[1] – no designation suffix

Ball material

Manu-facturer	Designation	
	Steel balls	Ceramic balls
SKF	– [1]	HC
NSK[2]	– [1]	SN24
FAG	– [1]	HC
NTN	– [1]	5S
GMN	– [1]	HY
RHP	– [1]	SN
BARDEN	– [1]	C
IBC	– [1]	CB
FAFNIR	– [1]	C
KOYO	– [1]	3NC
SNR	– [1]	CH
ZYS	– [1]	HQ1
SNFA	– [1]	NS

[1] – no designation suffix
[2] for BRN, BER and BGR series:
S = steel balls
H = ceramic balls

Special ring material

Manu-facturer	Designation
SKF	V
NSK	X
FAG	XC
NTN	2LA
GMN	N
RHP	•
BARDEN	XC
IBC	X
FAFNIR	•
KOYO	•
SNR	N
ZYS	•
SNFA	XN

Lubrication features[1]

Manu-facturer	Designation	
SKF	L	H
NSK	E33	•
FAG	DLR	•
NTN	•	•
GMN	+L	+LB
RHP	•	•
BARDEN	•	•
IBC	S	•
FAFNIR	•	•
KOYO	HAF	•
SNR	L2	L1
ZYS	•	•
SNFA	GH	H

[1] For other lubrication features refer to the manufacturers' publications

SKF super-precision angular contact ball bearings designation system

Examples: Single bearing – 71922 CDGBTNHA/PA9AL
Matched bearing set – S7010 ACD/HCP4AQBCC

	719	22	CD	GB	TNHA	/		
S	70	10	ACD			/		

Prefix

–	Open bearing (no designation prefix)
S	Sealed bearing
V	Bearing with NitroMax steel rings and bearing grade silicon nitride Si_3N_4 balls (hybrid bearing)

Bearing series

718	Angular contact ball bearing in accordance with ISO dimension series 18
719	Angular contact ball bearing in accordance with ISO dimension series 19
70	Angular contact ball bearing in accordance with ISO dimension series 10
72	Angular contact ball bearing in accordance with ISO dimension series 02

Bearing size

6	6 mm bore diameter
7	7 mm bore diameter
8	8 mm bore diameter
9	9 mm bore diameter
00	10 mm bore diameter
01	12 mm bore diameter
02	15 mm bore diameter
03	17 mm bore diameter
04	(x5) 20 mm bore diameter
to	
72	(x5) 360 mm bore diameter

Internal design

CD	15° contact angle, high-capacity design
ACD	25° contact angle, high-capacity design
CE	15° contact angle, high-speed E design
FE	18° contact angle, high-speed E design
ACE	25° contact angle, high-speed E design
CB	15° contact angle, high-speed B design
FB	18° contact angle, high-speed B design
ACB	25° contact angle, high-speed B design

Single bearing – execution and preload

–	Single standalone bearing (no designation suffix) (718 .. D, 719 .. D, 70 .. D, 72 .. D, 719 .. E, 70 .. E, 719 .. B and 70 .. B series)
GA	Single, universally matchable, extra light preload (719 .. D, 70 .. D and 72 .. D series)
GA	Single, universally matchable, light preload (718 .. D, 719 .. E, 70 .. E, 719 .. B and 70 .. B series)
GB	Single, universally matchable, light preload (719 .. D, 70 .. D and 72 .. D series)
GB	Single, universally matchable, moderate preload (718 .. D, 719 .. E, 70 .. E, 719 .. B and 70 .. B series)
GC	Single, universally matchable, moderate preload (719 .. D, 70 .. D and 72 .. D series)
GC	Single, universally matchable, heavy preload (718 .. D, 719 .. E, 70 .. E, 719 .. B and 70 .. B series)
GD	Single, universally matchable, heavy preload (719 .. D, 70 .. D and 72 .. D series)

Cage

–	Cotton fabric reinforced phenolic resin or carbon fibre reinforced PEEK, outer ring centred (no designation suffix)
MA	Machined brass, outer ring centred
TNHA	Glass fibre reinforced PEEK, outer ring centred

	PA9A	L		
HC	P4A		QBC	C

Bearing set – preload

A	Extra light preload (719 .. D, 70 .. D and 72 .. D series)
A	Light preload (718 .. D, 719 .. E, 70 .. E, 719 .. B and 70 .. B series)
L	Light preload – only for matched bearings sets in TBT, TFT, QBT and QFT arrangements (718 .. D, 719 .. E and 70 .. E series)
B	Light preload (719 .. D, 70 .. D and 72 .. D series)
B	Moderate preload (718 .. D, 719 .. E, 70 .. E, 719 .. B and 70 .. B series)
M	Moderate preload – only for matched bearings sets in TBT, TFT, QBT and QFT arrangements (718 .. D, 719 .. E and 70 .. E series)
C	Moderate preload (719 .. D, 70 .. D and 72 .. D series)
C	Heavy preload (718 .. D, 719 .. E, 70 .. E, 719 .. B and 70 .. B series)
F	Heavy preload – only for matched bearings sets in TBT, TFT, QBT and QFT arrangements (718 .. D, 719 .. E and 70 .. E series)
D	Heavy preload (719 .. D, 70 .. D and 72 .. D series)
G...	Special preload, expressed in daN e.g. G240 (718 .. D, 719 .. D, 70 .. D, 72 .. D, 719 .. E, 70 .. E, 719 ..B and 70 .. B series)

Bearing set arrangement

DB	Set of two bearings arranged back-to-back <>
DF	Set of two bearings arranged face-to-face ><
DT	Set of two bearings arranged in tandem <<
DG	Set of two bearings for universal matching
TBT	Set of three bearings arranged back-to-back and tandem <>>
TFT	Set of three bearings arranged face-to-face and tandem >><
TT	Set of three bearings arranged in tandem <<<
TG	Set of three bearings for universal matching
QBC	Set of four bearings arranged tandem back-to-back <<>>
QFC	Set of four bearings arranged tandem face-to-face >>><
QBT	Set of four bearings arranged back-to-back and tandem <>>>
QFT	Set of four bearings arranged face-to-face and tandem >>><
QT	Set of four bearings arranged in tandem <<<<
QG	Set of four bearings for universal matching
PBC	Set of five bearings arranged tandem back-to-back <<>>>
PFC	Set of five bearings arranged tandem face-to-face >>>><
PBT	Set of five bearings arranged back-to-back and tandem <>>>>
PFT	Set of five bearings arranged face-to-face and tandem >>>><
PT	Set of five bearings arranged in tandem <<<<<
PG	Set of five bearings for universal matching

Lubrication features

H	Two lubrication holes on the non-thrust side of the outer ring
H1	Two lubrication holes on the thrust side of the outer ring
L	Annular groove with two lubrication holes on the non-thrust side of the outer ring and two annular grooves fitted with O-rings in the outer ring
L1	Annular groove with two lubrication holes on the thrust side of the outer ring and two annular grooves fitted with O-rings in the outer ring

Accuracy

P4	Dimensional and running accuracy in accordance with ISO tolerance class 4
P4A	Dimensional accuracy in accordance with ISO tolerance class 4, running accuracy better than ISO tolerance class 4
P2	Dimensional and running accuracy in accordance with ISO tolerance class 2
PA9A	Dimensional and running accuracy in accordance with ISO tolerance class 2

Ball material

–	Carbon chromium steel (no designation suffix)
HC	Balls made of bearing grade silicon nitride Si_3N_4 (hybrid bearing)


Super-precision bearing
SKF

Super-precision cylindrical roller bearings

Designation examples

SKF N 1016 KPHA/HC5SP

Manufacturer	Designation								
SKF	N	10	16	K	PHA	HC5	SP		
NTN	5S	N	10	16	HS[1]	T6	K	NA	P4
FAG	HC	N	10	16	K	PVPA1	SP		
KOYO	3NC	N	10	16	K	C1NA	FG	P4	
NSK	N	10	16	RXH[2]	TP	KR	CC0	P4	

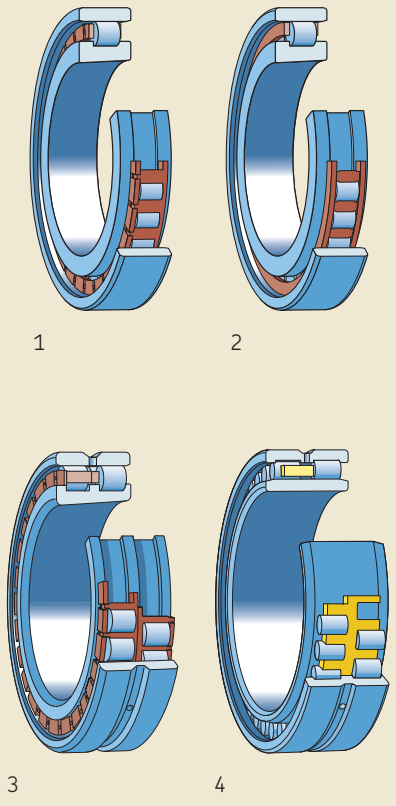
SKF NN 3020 KTN9/SPW33

Manufacturer	Designation							
SKF	NN	30	20	K	TN9	SP	W33	
NTN	NN	30	20	HS[1]	T6	K	NA	P4
FAG	NN	30	20	AS	K	M	SP	
KOYO	NN	30	20	K	W	C1NA	FG	P4
NSK	NN	30	20	TB[3]	KR	E44	CC0	P4

SKF NNU 4924 BK/SPW33

Manufacturer	Designation						
SKF	NNU	49	24	BK	SP	W33	
NTN	NNU	49	24	K	P4		
FAG	NNU	49	24	S	K	M	SP
NSK	NNU	49	24	MB	KR	E44	P4

[1] HS = high speed design
[2] RXH identifies heat resistant steel SHX in inner and outer rings, ceramic rollers, outer ring guided PEEK cage
[3] cage material PPS (220°)



SKF super-precision cylindrical roller bearings single row (N design) basic design (1), high-speed design (2), double row (NN design) (3), double row (NNU design) (4).

Colour codes

- Bearing design
- Dimension series
- Bearing size
- Internal design and bore shape
- Cage
- Roller material
- Internal clearance
- Tolerance class
- Lubrication features

Tolerance class

Manu-facturer	Designation	
SKF	SP	UP
NTN	P4	UP
FAG	SP	UP
KOYO	P4	•
NSK	P4	•

Lubrication features

Manu-facturer	Designation
SKF	W33
NTN	•
FAG	AS[1], S[2]
KOYO	W
NSK	E44

[1] NN series
[2] NNU series

Bearing design

Manufacturer	Designation		
SKF	NNU	NN	N
NTN	NNU	NN	N
FAG	NNU	NN	N
KOYO	•	NN	N
NSK	NNU	NN	N

Dimension series

Manufacturer	Designation		
SKF	49	10	30
NTN	49	10	30
FAG	49	10	30
KOYO	•	10	30
NSK	49	10	30

Bearing size

Manufacturer	Designation	Bore diameter [mm]
SKF	1)	1)
NTN	1)	1)
FAG	1)	1)
KOYO	1)	1)
NSK	1)	1)

1) bearing size from 05 and up x5 (for example 05 = 25 mm bore diameter)

Internal design and bore shape

Manufacturer	Tapered bore	Cylindrical bore
SKF	K	– 1)
NTN	K	– 1)
FAG	K	– 1)
KOYO	K	– 1)
NSK	KR	– 1)

1) – no designation suffix

Roller material

Manufacturer	Steel rollers	Ceramic rollers
SKF	– 1)	HC5
NTN	– 1)	CS
FAG	– 1)	HC
KOYO	– 1)	3NC
NSK	– 1)	RXH

1) – no designation suffix

Internal clearance

Manufacturer	Standard clearance	Special reduced clearance	Special increased clearance
SKF	– 1)	VS019	SPC2
NTN	C1NA	C9NA	C2NA
FAG	– 1)	•	C2
KOYO	C1NA	C9NA	C2NA
NSK	CC1	CC9	CC2

1) – no designation suffix

Cage (Single row cylindrical roller bearing N design)

Manufacturer	Brass roller centred	Polyamide PA66 roller centred	Glass fibre reinforced PA66 roller centred	Carbon fibre reinforced PEEK outer ring centred	Glass fibre reinforced PA66 outer ring centred
SKF	■	TN	TN9	PHA	TNHA
NTN	– 1)	•	•	•	T6
FAG	M1	•	•	•	PVPA1
KOYO	FY2)	•	FG	•	•
NSK	MR	•	•	•	•

Cage (Double row cylindrical roller bearing NN)

Manufacturer	Brass roller centred	Polyamide PA66 roller centred	Glass fibre reinforced PA66 roller centred	Carbon fibre reinforced PEEK outer ring landed	Glass fibre reinforced PEEK outer ring landed
SKF	– 1)	TN	TN9	■	■
NTN	– 1)	•	•	•	T6
FAG	M	•	•	•	•
KOYO	FW3)	•	FG	•	•
NSK	MB	•	•	TB	•

SKF super-precision bearing double row cylindrical roller bearings in the NNU series are available only with machined brass cage, roller centred (no designation suffix).

1) – no designation suffix
2) FY: integrated machined cage made of copper alloy
3) FW: separable machined cage made of copper alloy

SKF super-precision cylindrical roller bearings designation system

Examples:
N 1016 KPHA/HC5SP
NN 3020 KTN9/SPVR521
NNU 49/500 B/SPC3W33X

N	10	16	K	PHA	/	HC5	SP	
NN	30	20	K	TN9	/		SP	VR521
NNU	49	/500	B		/		SPC3	W33X

Bearing design

N	Single row cylindrical roller bearing
NN	Double row cylindrical roller bearing
NNU	Double row cylindrical roller bearing

Dimension series

10	In accordance with ISO dimension series 10
30	In accordance with ISO dimension series 30
49	In accordance with ISO dimension series 49

Bearing size

05	(x5) 25 mm bore diameter
to	
92	(x5) 460 mm bore diameter
from	
/500	Bore diameter uncoded [mm]

Internal design and bore shape

–	Cylindrical bore (no designation suffix)
B	Modified internal design
K	Tapered bore, taper 1:12

Cage

–	Machined brass cage, roller centred (no designation suffix)
PHA	Carbon fibre reinforced PEEK cage, outer ring centred
TN	PA66 cage, roller centred
TN9	Glass fibre reinforced PA66 cage, roller centred
TNHA	Glass fibre reinforced PEEK cage, outer ring centred

Roller material

–	Carbon chromium steel (no designation suffix)
HC5	Rollers made of bearing grade silicon nitride Si_3N_4 (hybrid bearing)

Tolerance class and internal clearance

SP	Dimensional accuracy in accordance with ISO tolerance class 5, running accuracy in accordance with ISO tolerance class 4
UP	Dimensional accuracy in accordance with ISO tolerance class 4, running accuracy better than ISO tolerance class 4
–	Standard radial internal clearance C1 (no designation suffix)
C2	Radial internal clearance greater than C1
CN	Normal radial internal clearance
C3	Radial internal clearance greater than Normal

Other variants

VR521	Bearing supplied with measuring report (standard for NN 30 series bearings with d > 130 mm)
VU001	Inner ring raceway with finish-grinding allowance
W33	Annular groove and three lubrication holes in the outer ring
W33X	Annular groove and six lubrication holes in the outer ring


Super-precision bearing

Super-precision double direction angular contact thrust ball bearings

Designation examples

SKF BTW 70 CTN9/SPW33

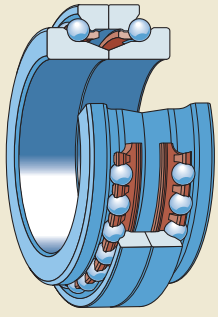
Manufacturer	Designation					
SKF	BTW	70	C	TN9	SP	W33
NTN	562	0	14	GN	P4	
FAG	2344	14	M	SP		
KOYO	2344	14	B	FY	P4	
NSK	70	TAC	20D	PN7	C7	

SKF BTM 150 AM/P4CDBA

Manufacturer	Designation								
SKF	BTM	150	A	M	P4C	DB	A		
NTN	HTA	0	30	U	A	L1	DB	GL	P4L
KOYO	ACT	0	30	A	DB	L	FY	P4	
NSK	150	BAR	10	S	DB	L	P4A		
FAG	BAX	150	F	T	P4S	DB			

Colour codes

- Accuracy
- Bearing series
- Bearing size
- Internal design
- Cage
- Preload
- Ball material
- Arrangement
- Lubrication features



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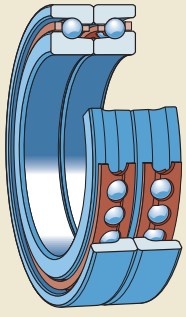


2

SKF super-precision double direction angular contact thrust ball bearings basic design (BTW series) (1), high-speed design (BTM series) (2).

Bearing series – contact angle 60° BTW series[1)]

Manufacturer	Designation
SKF	BTW .. C
NTN	5620
FAG	2344
KOYO	2347.. B
NSK	TAC20D

[1)] Bearings in the BTW series are dimensionally interchangeable with bearings in the former 2344(00) and 2347(00) series.

Bearing series BTM series

Manufacturer	Designation
SKF	BTM
NTN	HTA 0 U
FAG	BAX
KOYO	ACT 0
NSK	10

Balls material BTW and BTM series

Manufacturer	Steel ball	Ceramic ball
SKF	– [1)]	HC5
NTN	– [1)]	5S
FAG	– [1)]	•
KOYO	– [1)]	•
NSK	S	H

[1)] – no designation suffix

Bearing size BTW series

Manufacturer	Designation	Bore diameter [mm]
SKF	70	70
NTN	14	(×5) 70 mm bore
FAG	14	(×5) 70 mm bore
KOYO	14	(×5) 70 mm bore
NSK	70	70

Bearing size BTM series

Manufacturer	Designation	Bore diameter [mm]
SKF	150	150
NTN	30	(×5) 150 mm bore
FAG	150	150
KOYO	30	(×5) 150 mm bore
NSK	150	150

Internal design BTW series

Manufacturer	small bore diameter type	large bore diameter type
SKF	– [1)]	A
NTN	– [1)]	M
FAG	4	7
KOYO	4	7
NSK	•	•

[1)] – no designation suffix

Internal design – Contact angle BTM series

Manufacturer	30°	40°
SKF	A	B
NTN	A	– [1)]
FAG	F	H
KOYO	– [1)]	B
NSK	BAR	BTR

[1)] – no designation suffix

Cage BTW series

Manufacturer	Brass ball centred	glass fibre reinforced PA66 ball centred
SKF	M	TN9
NTN	– [1)]	•
FAG	M	•
KOYO	FY	•
NSK	– [1)]	•

[1)] – no designation suffix

Cage BTM series

Manufacturer	Brass ball centred	glass fibre reinforced PA66 ball centred
SKF	M	TN9
NTN	L1	T2
FAG[2)]	•	•
KOYO	FY	FG
NSK	– [1)]	TYN

[1)] – no designation suffix
[2)] laminated fabric, outer ring centered cage, designation suffix T

Accuracy BTW series

Manufacturer	Designation
SKF	SP
NTN	P4
FAG	SP
KOYO	P4
NSK	PN7

Accuracy BTM series

Manufacturer	Designation
SKF	P4C
NTN	P4L
FAG	P4S
KOYO	P4
NSK	P4A

Preload BTW series

Manufacturer	Designation
SKF	–[1]
NTN	GN
FAG	–[1]
KOYO	–[1]
NSK	C7

[1] – no designation suffix

Preload BTM series

Manufacturer	Light preload	Heavy preload	Special preload
SKF	A	B	G...
NTN	GL	GM	•
FAG	L	M	
KOYO	L	M	•
NSK	L	•	CP...

Arrangement BTM series

Manufacturer	Designation
SKF	DB
NTN	DB
FAG	DB
KOYO	DB
NSK	DB

Lubrication features BTW series

Manufacturer	Designation
SKF	W33
NTN	•
FAG	•
KOYO	•
NSK	•

SKF super-precision double direction angular contact thrust ball bearings designation system

Examples: BTW 70 CTN9/SPW33
BTM 150 AM/HCP4CDBA

BTW	70	C	TN9	/		SP	W33		
BTM	150	A	M	/	HC	P4C		DB	A

Bearing series

BTW Basic design double direction angular contact thrust ball bearing
BTM High-speed design double direction angular contact thrust ball bearing

Bearing size

35 to **200** Bore diameter [mm]

Internal design

A 30° contact angle
B 40° contact angle
C 60° contact angle
A As a second letter after the contact angle information (for BTW series only): Bearing with a larger bore to to be mounted on the large diameter side of a cylindrical roller bearing with a tapered bore.

Cage

M Two machined brass cages, snap-type (for BTW series), window-type (for BTM series), ball centred
TN9 Two glass fibre reinforced PA66 cages, snap-type (for BTW series), window-type (for BTM series), ball centred

Ball material

– Carbon chromium steel (no designation suffix)
HC Balls made of bearing grade silicon nitride Si_3N_4 (hybrid bearing)

Accuracy

P4C Dimensional accuracy approximately to ISO tolerance class 4 and running accuracy better than ISO tolerance class 4 for radial bearings (for BTM series bearings only).
SP Dimensional accuracy approximately to ISO tolerance class 5 and running accuracy better than ISO tolerance class 4 for thrust bearings (for BTW series bearings only).
UP Dimensional accuracy approximately to ISO tolerance class 4 and running accuracy better than ISO tolerance class 4 for thrust bearings (for BTW series bearings only).

Lubrication feature (for BTW series bearings only)

W33 Annular groove and three lubrication holes in the housing washer

Arrangement (for BTM series bearings only)

DB Two bearings arranged back-to-back

Preload (for BTM series bearings only)

A Light preload
B Heavy preload
G... Special preload, expressed in daN e.g. G240


Super-precision bearing

Super-precision angular contact thrust ball bearings for screw drives

Designation examples

SKF BSD 3062 CGA-2RZ

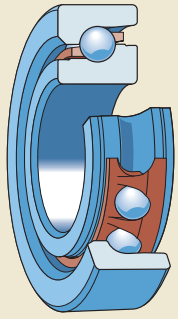
Manufacturer	Designation								
SKF	BSD	30	62	C	GA	2RZ			
NSK	30	TAC	62	B	DDG	SU	C10	PN7B	
FAG	BSB	030	062	2Z	T				
NTN	BST	30X	62	1B	LXL				
NACHI	30	TAB	06	U	2NK	GM	P4		
SNFA	BS	30	62	S	7	P	62	U	M

SKF FBSA 206/QBCA

Manufacturer	Designation					
SKF	FBSA 2	06	QBC	A		
NSK	WBK	30	DBB	31		
SNFA	BSQU 2	30	TDT	430		
IBC	BSBU	30	Q	C	88	M

Colour codes

- Bearing series
- Bearing size
- Design features
- Execution – Preload
- Sealing solutions
- Bearing set arrangement
- Tolerance class



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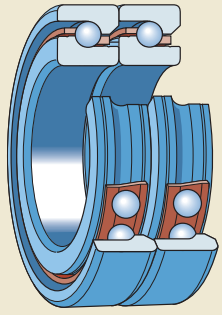

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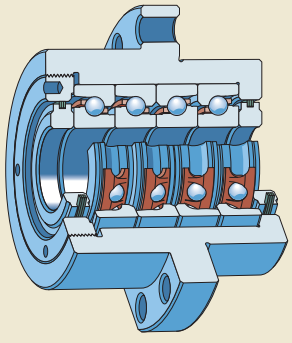


3

SKF super-precision angular contact thrust ball bearings for screw drives single direction (BSA and BSD series) (1), universally matchable for mounting as sets (2); cartridge units with a flanged housing (FBSA series) (3)

Bearing series

Manufacturer	Designation			
SKF	BSA 2	BSA 3	BSD	FBSA
NSK	BSB	•	TAC	WBK .. 31 [1]
FAG	7602	7603	BSB	•
NTN	•	•	BST	•
NACHI	•	TAB	•	•
SNFA	BS2	•	BS	BSDU/BSQU
IBC	•	•	•	BSBU

[1] WBK = support unit symbol; 31 = serial number

Bearing size

Manufacturer	Designation	Bore diameter [mm]
SKF	1) 2)	1) 2)
NSK	2)	2)
FAG	1) 2)	1) 2)
NTN	2)	2)
NACHI	2)	2)
SNFA	2)	2)
IBC	2)	2)

[1] from 04 and up ×5 (for example 04 = 20 mm bore diameter)
[2] bearing size 20 = 20 mm bore diameter, 25 = 25 mm, etc.

Design features

Manufacturer	Designation	
SKF	C	– [1]
NSK	B	– [1]
FAG	– [1]	– [1]
NTN	– [1]	– [1]
NACHI	– [1]	– [1]
SNFA	62	P
IBC	Q[2]	A[2]
IBC	D[2]	B[2]

[1] – no designation suffix
[2] only housing form and execution

Execution and preload

Manufacturer	Designation			
SKF	■	A	B	G...
NSK	•	C10/31	•	•
FAG	L	M	H	•
NTN	11B	1B	•	•
NACHI	•	M	•	•
SNFA	L	M	F	...daN
IBC	L	M	H	•

Sealing solutions

Manufacturer	Designation	
SKF	–2RZ	–2RS
NSK	•	DDG
FAG	2Z	2RS
NTN	•	LXL
NACHI	2NK	2LR
SNFA	S	C
IBC	•	•

Tolerance class

Manufacturer	Designation			
SKF	– [1]	– [1]	■	■
NSK	PN7B	•	•	•
FAG	– [1]	– [1]	•	•
NTN	P5	P4	•	•
NACHI	P5	P4	•	•
SNFA	5	7	9	SQ
IBC	– [1]	– [1]	•	•

[1] – no designation suffix

Bearing set arrangement

Manufacturer	Designation										
SKF	DB	DF	DT	TBT	TFT	TT	QBC	QFC	QBT	QFT	QT
NSK	DB	DF	DT	DBD	DFD	DTD	DBB	DFF	DBT	DFT	DTT
FAG	DB	DF	DT	TBT	TFT	TT	QBC	QFC	QBT	QFT	QT
NTN	DB	DF	DT	DBT	DFT	•	DTBT	DTFT	•	•	•
NACHI	DB	DF	DT	FFB	BFF	FFF	FFBB	BBFF	FFFB	BFFF	•
SNFA	DD	FF	T	TD	TF	3T	TDT	TFT	3TD	3TF	4T
IBC	– [1]	DF	DT	TBT	TFT	TT	– [1]	QFC	QBT	QFT	QT

[1] – no designation suffix

SKF super-precision angular contact thrust ball bearings for screw drives designation system

Examples:

Single direction bearing – BSA 205 CGB/GMM
Matched set of single direction bearings – BSA 208 C/TFTA
Double direction bearing – BEAM 030080-2RS/PE
Cartridge unit – FBSA 206 A/QBCA

BSA 2	05	C	GB		/
BSA 2	08	C			/
BEAM	030080			-2RS	
FSBA 2	06	A			

Bearing series

BSA 2 Single direction bearing in the 02 ISO dimension series
BSA 3 Single direction bearing in the 03 ISO dimension series
BSD Single direction bearing
BEAS Double direction bearing
BEAM Double direction bearing for bolt mounting
FBSA 2 Cartridge unit with a flanged housing

Bearing size

For single direction bearings in accordance with an ISO dimension series
01 12 mm bore diameter
02 15 mm bore diameter
03 17 mm bore diameter
04 (×5) 20 mm bore diameter
to
15 (×5) 75 mm bore diameter

For single direction bearings, not standardized
2047 20 mm bore diameter and 47 mm outside diameter
to
60120 60 mm bore diameter and 120 mm outside diameter

For double direction bearings
008032 8 mm bore diameter and 32 mm outside diameter
to
060145 60 mm bore diameter and 145 mm outside diameter

Design features

C Improved internal design (single direction bearings only)
A Different flange position (cartridge units only)

Single direction bearing – execution and preload

GA Universally matchable, light preload
GB Universally matchable, moderate preload
G... Universally matchable, special preload, expressed in daN e.g. G240

Sealing solutions

-2RS Contact seal on both sides, NBR
-2RZ Non-contact seal on both sides, NBR

GMM			
		TFT	A
	PE		
		QBC	A

Bearing set – preload

A	Light preload
B	Moderate preload
G...	Special preload, expressed in daN e.g. G240

Bearing arrangement

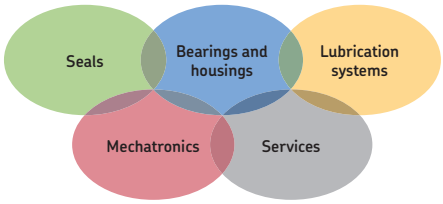
DB	Set of two bearings arranged back-to-back <>
DF	Set of two bearings arranged face-to-face ><
DT	Set of two bearings arranged in tandem <<
TBT	Set of three bearings arranged back-to-back and tandem <>>
TFT	Set of three bearings arranged face-to-face and tandem >><
TT	Set of three bearings arranged in tandem <<<
QBC	Set of four bearings arranged tandem back-to-back <<>>
QFC	Set of four bearings arranged tandem face-to-face >>><
QBT	Set of four bearings arranged back-to-back and tandem <>>>
QFT	Set of four bearings arranged face-to-face and tandem >>><
QT	Set of four bearings arranged in tandem <<<<

Tolerance class

–	Dimensional accuracy to ISO tolerance class 4, running accuracy to ISO tolerance class 2
PE	Enlarged diameter tolerance and axial run-out to P5 tolerance class for radial bearing (BEAM/BEAS series only)

Grease fill

GMM	Open single direction bearing filled with standard grease



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