

## 4. Ball Screw Support Bearings



For High-Rigidity Applications

NSKTAC C Series



For High-Load Drive Applications

NSKTAC 03 Series



Double-Row Bearings

BSBD Series



Units

Units for Ball Screw Support

### Ball Screw Support Bearings

NSKHPS Angular Contact Thrust Ball Bearings for Ball Screw Support ···144-153

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For High-Rigidity Applications

NSKTAC C Series

For High-Load Drive Applications

NSKTAC 03 Series

Double-Row Bearings

BSBD Series

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## 4. Ball Screw Support Bearings

### NSKHPS Angular Contact Thrust Ball Bearings for Ball Screw Support

#### Features

NSKHPS: Reliability has been improved by focusing on material cleanliness, which has the biggest impact on bearing life, by employing NSK's proprietary material evaluation technology. The dynamic load rating has been improved by 5% compared with that of conventional bearings.

The NSK TAC C Series features high axial rigidity and is suitable for machine tool feeding mechanisms, while the NSK TAC 03 Series with its high axial load capacity is well suited for the support of large ball screws in high-load drive applications such as electric injection molding machines. With these series users can achieve much lower torque and higher accuracy than with roller bearings.

#### NSKTAC C Angular Contact Thrust Ball Bearings for Ball Screw Support in High-Rigidity Applications

A larger number of balls and a 60° contact angle provide high axial rigidity and make these bearings ideally suited for machine tool feeding mechanisms.

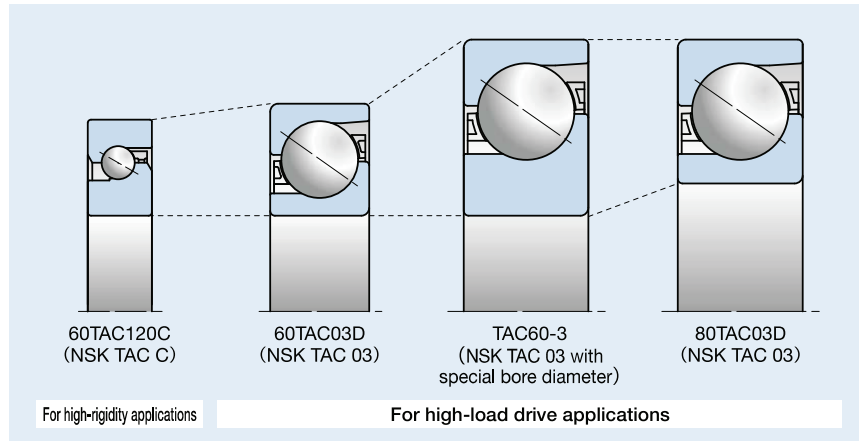
The "DDG" seals used for the sealed bearings of this series are light-contact seals for high-speed capability; a strong sealing effect is achieved by a labyrinth between the seal lip and the seal groove of the inner ring. This ensures that no foreign particles can get into the bearing and no grease can leak out, thus helping to keep the surrounding area clean. Some bearings from this series are also available as non-contact sealed bearings for even lower torque and lower heat generation.

For ease of handling and increased efficiency, NSKTAC C bearings come prepacked with "WPH" grease that resists high temperatures and is less likely to soften and leak.

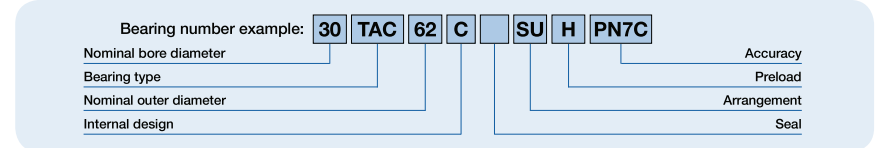
#### NSKTAC 03 Angular Contact Thrust Ball Bearings for Ball Screw Support in High-Load Drive Applications

Optimized internal design has led to a higher limiting axial load. The number of rows may be reduced, contributing to smaller sized devices. We also offer bearings with special bore diameters. That way, bearings with higher load capacity may be employed without any need to modify the shaft diameter, allowing for more compact screw shaft ends.

For the validity of this series for industries except Injection molding machines and machine tools, please ask NSK.

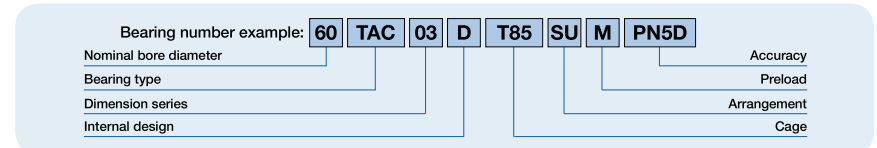


#### Numbering System of NSKHPS Angular Contact Thrust Ball Bearings for Ball Screw Support (for High-Rigidity Applications)



		Reference pages
<b>30</b>	Nominal bore diameter	Bore diameter (mm) 146-147
<b>TAC</b>	Bearing type	Angular contact thrust ball bearing 28, 144
<b>62</b>	Nominal outer diameter	Outer diameter (mm) 146-147
<b>C</b>	Internal design	Contact angle 60° —
	Seal	No symbol: Open type DDG: Contact rubber seal V1V: Non-contact rubber seal 144
<b>SU</b>	Arrangement	SU: Universal arrangement (single-row) 200-205
<b>H</b>	Preload	H: Heavy preload (standard in the HPS Series) 146-147
<b>PN7C</b>	Accuracy	PN7C: NES Class 7C (axial runout equivalent to P2) 229

#### Numbering System of NSKHPS Angular Contact Thrust Ball Bearings for Ball Screw Support (for High-Load Drive Applications)



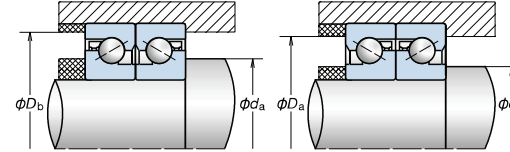
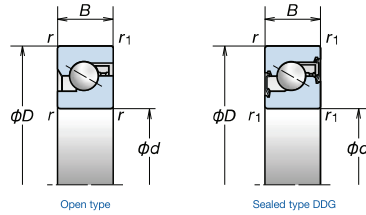
		Reference pages
<b>60</b>	Nominal bore diameter	Bore diameter (mm) 148-149
<b>TAC</b>	Bearing type	Angular contact thrust ball bearing 30, 144
<b>03</b>	Dimension series	02: 02 Series 03: 03 Series 144
<b>D</b>	Internal design	Contact angle 55° —
<b>T85</b>	Cage	T85: Polyamide cage M: Brass Cage —
<b>SU</b>	Arrangement	SU: Universal arrangement (single-row) 200-205
<b>M</b>	Preload	M: Medium preload EL: Extra light preload 148-149
<b>PN5D</b>	Accuracy	PN5D: Standard accuracy (equivalent to ISO Class 5) 229

NSKHPS is not applicable for TAC160-3 and 180TAC03D.

# 4. Ball Screw Support Bearings

Bore Diameter **15-60 mm**

for High-Rigidity



Calculation of preload, axial rigidity and starting torque for bearing arrangements  
Multiply by factors in table B.

	DFD	DF	DFT
	$\otimes \otimes \otimes$	$\otimes \otimes \otimes$	$\otimes \otimes \otimes$
	DBD	DBB	DBT
	$\otimes \otimes \otimes$	$\otimes \otimes \otimes$	$\otimes \otimes \otimes$
Preload factor	1.36	2.00	1.57
Axial rigidity	1.49	2.00	1.89
Starting torque	1.35	2.00	1.55

(Open type)

Bearing Numbers	Boundary Dimensions (mm)					Abutment and Fillet Dimensions (mm)				Recommended Grease Quantities (cc)	Contact angle (degree)	Limiting Speeds (1) (min <sup>-1</sup> )		Mass (kg) (approx.)
	d	D	B	r (min.)	r <sub>1</sub> (min.)	D <sub>b</sub> (max.)	d <sub>a</sub> (min.)	D <sub>a</sub> (max.)	d <sub>b</sub> (min.)			Grease	Oil	
15TAC47C	15	47	15	1	0.6	42	19.5	41	19.5	2.2	60	6 900	9 200	0.146
17TAC47C	17	47	15	1	0.6	42	23	41	23	2.2	60	6 900	9 200	0.140
20TAC47C	20	47	15	1	0.6	42	25	41	25	2.2	60	6 900	9 200	0.135
25TAC62C	25	62	15	1	0.6	57	31	56	31	3.0	60	5 200	6 900	0.252
30TAC62C	30	62	15	1	0.6	57	36	56	36	3.2	60	4 900	6 400	0.224
35TAC72C	35	72	15	1	0.6	67	42	66	42	3.8	60	4 100	5 800	0.310
40TAC72C	40	72	15	1	0.6	67	47	66	47	3.9	60	4 100	5 500	0.275
40TAC90C	40	90	20	1	0.6	85	48	84	48	8.8	60	3 500	4 600	0.674
45TAC75C	45	75	15	1	0.6	68	54	67	54	4.2	60	3 700	4 900	0.270
45TAC100C	45	100	20	1	0.6	93	55	92	55	9.7	60	3 000	4 100	0.842
50TAC100C	50	100	20	1	0.6	92	60	91	60	10.2	60	3 000	3 900	0.778
55TAC100C	55	100	20	1	0.6	92	63	91	63	10.2	60	3 000	3 900	0.714
55TAC120C	55	120	20	1	0.6	112	63	111	63	12	60	2 500	3 500	1.23
60TAC120C	60	120	20	1	0.6	112	70	111	70	12	60	2 500	3 500	1.16

(Sealed type)

Bearing Numbers (1)	Boundary Dimensions (mm)					Abutment and Fillet Dimensions (mm)				Contact angle (degree)	Limiting Speeds (1) (min <sup>-1</sup> )		Mass (kg) (approx.)
	d	D	B	r (min.)	r <sub>1</sub> (min.)	D <sub>b</sub> (max.)	d <sub>a</sub> (min.)	D <sub>a</sub> (max.)	d <sub>b</sub> (min.)		Grease	Oil	
* 15TAC47CDDG	15	47	15	1	0.6	42	19.5	41	19.5	60		6 900	0.146
* 17TAC47CDDG	17	47	15	1	0.6	42	22	41	22	60		6 900	0.140
* 20TAC47CDDG	20	47	15	1	0.6	42	25	41	25	60		6 900	0.135
* 25TAC62CDDG	25	62	15	1	0.6	57	30	56	30	60		5 200	0.252
30TAC62CDDG	30	62	15	1	0.6	57	36	56	36	60		4 900	0.224
35TAC72CDDG	35	72	15	1	0.6	67	41	66	41	60		4 100	0.310
40TAC72CDDG	40	72	15	1	0.6	67	46	66	46	60		4 100	0.275
40TAC90CDDG	40	90	20	1	0.6	85	47	84	47	60		3 500	0.674
45TAC100CDDG	45	100	20	1	0.6	93	54	92	54	60		3 000	0.842
50TAC100CDDG	50	100	20	1	0.6	92	59	91	59	60		3 000	0.778
55TAC100CDDG	55	100	20	1	0.6	92	63	91	63	60		3 000	0.714

(1) An asterisk (\*) indicates bearings that are also available as non-contact sealed bearings.  
 (2) Limiting speeds are based on high preload (H). The values shown are valid for all types of bearing arrangement.  
 (3) To calculate permissible axial load, multiply limiting axial load by 0.7.  
 (4) The starting torque values in the table apply to grease lubricated bearings. Contact seal torque is not included. For oil lubricated bearings, multiply by 1.4.  
 (5) Abutment and fillet dimensions are recommendable values for the use of standard Machine tool applications. For heavy load applications, please ask NSK

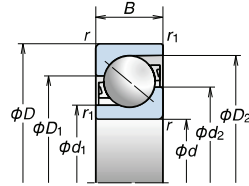
Preload (DB and DF Arrangement) (N)	Axial Rigidity (DB and DF Arrangement) (N/μm)	Starting Torque (DB and DF Arrangement) (1) (N·m) (reference)	Basic dynamic load rating Ca by number of rows sustaining Fa			Limiting axial load by number of rows sustaining Fa (2)		
			1 row (kN)	2 rows (kN)	3 rows (kN)	1 row (kN)	2 rows (kN)	3 rows (kN)
H	H	H	1 row (kN)	2 rows (kN)	3 rows (kN)	1 row (kN)	2 rows (kN)	3 rows (kN)
1 450	630	0.09	23.0	37.5	49.5	26.6	53.0	79.5
1 450	630	0.09	23.0	37.5	49.5	26.6	53.0	79.5
1 450	630	0.09	23.0	37.5	49.5	26.6	53.0	79.5
2 280	850	0.15	29.9	48.5	64.5	40.5	81.5	122
2 400	890	0.16	30.5	50.0	66.0	43.0	86.0	129
2 750	1 030	0.18	32.5	53.0	70.5	50.0	100	150
2 860	1 080	0.19	33.5	54.0	72.0	52.0	104	157
3 450	1 150	0.29	62.0	101	134	89.5	179	269
3 100	1 170	0.20	34.5	56.0	74.5	57.0	114	170
4 440	1 340	0.40	64.5	105	140	99.0	198	298
4 650	1 410	0.42	66.0	107	142	104	208	310
4 650	1 410	0.42	66.0	107	142	104	208	310
5 450	1 660	0.49	70.5	115	153	123	246	370
5 450	1 660	0.49	70.5	115	153	123	246	370

Preload (DB and DF Arrangement) (N)	Axial Rigidity (DB and DF Arrangement) (N/μm)	Starting Torque (DB and DF Arrangement) (1) (N·m) (reference)	Basic dynamic load rating Ca by number of rows sustaining Fa			Limiting axial load by number of rows sustaining Fa (2)		
			1 row (kN)	2 rows (kN)	3 rows (kN)	1 row (kN)	2 rows (kN)	3 rows (kN)
H	H	H	1 row (kN)	2 rows (kN)	3 rows (kN)	1 row (kN)	2 rows (kN)	3 rows (kN)
1 450	630	0.09	23.0	37.5	49.5	26.6	53.0	79.5
1 450	630	0.09	23.0	37.5	49.5	26.6	53.0	79.5
1 450	630	0.09	23.0	37.5	49.5	26.6	53.0	79.5
2 280	850	0.15	29.9	48.5	64.5	40.5	81.5	122
2 400	890	0.16	30.5	50.0	66.0	43.0	86.0	129
2 750	1 030	0.18	32.5	53.0	70.5	50.0	100	150
2 860	1 080	0.19	33.5	54.0	72.0	52.0	104	157
3 450	1 150	0.29	62.0	101	134	89.5	179	269
4 440	1 340	0.40	64.5	105	140	99.0	198	298
4 650	1 410	0.42	66.0	107	142	104	208	310
4 650	1 410	0.42	66.0	107	142	104	208	310

# 4. Ball Screw Support Bearings

Bore Diameter **15-180mm**

for High-Load Drive Applications



Calculation of preload, axial rigidity and starting torque for bearing arrangements  
Multiply by factors in table B.

Table B Number of load-sustaining rows	2 rows		3 rows			4 rows		5 rows	
	DFD DBD	DFF DBB	DFT DBT	DFFD DBBD	DFFF DBBB	DFTD DBTD	DFFT DBBT	DFFT DBTT	DFFT DBTT
Preload factor	1.36	2.00	1.57	2.42	3.00	1.72	2.72	1.83	
Axial rigidity	1.49	2.00	1.89	2.51	3.00	2.24	2.97	2.57	
Starting torque	1.35	2.00	1.55	2.41	3.00	1.68	2.71	1.77	

Bearing Numbers (*)	Boundary Dimensions (mm)					Reference Dimensions (mm)				Recommended Grease Quantities (cc/row)	Contact angle (degree)	Limiting Speeds (†) (min <sup>-1</sup> )		Mass (kg) (approx.)
	d	D	B	r (min.)	r1 (min.)	d1	d2	D1	D2			Grease	Oil	
15TAC02D	15	35	11	0.6	0.3	19.1	24.5	26	31.9	1	55	12 000	14 800	0.047
20TAC03D	20	52	15	1.1	0.6	27.2	35.3	37.5	46.1	2.7	55	8 300	10 300	0.155
25TAC02D	25	52	15	1	0.6	30.8	38.1	39.6	47.3	3	55	7 700	9 700	0.137
TAC35-3	35	90	23	1.5	1	50.4	64.2	67.1	81.7	14	55	4 600	6 000	0.712
40TAC03D	40	90	23	1.5	1	50.4	64.2	67.1	81.7	14	55	4 600	5 700	0.659
TAC40-3	40	110	27	2	1	62	79.1	82.4	100.6	25	55	3 700	5 000	1.28
45TAC03D	45	100	25	1.5	1	56.5	71.7	74.7	90.8	18	55	4 100	5 200	0.877
TAC45-3	45	110	27	2	1	62	79.1	82.4	100.6	25	55	3 700	4 800	1.21
50TAC03D	50	110	27	2	1	62	79.1	82.4	100.6	25	55	3 700	4 700	1.14
TAC50-3	50	130	31	2.1	1.1	73.9	93.8	98	119	40	55	3 100	4 200	2.00
55TAC03D	55	120	29	2	1	68	86.4	90.2	109.7	32	55	3 400	4 300	1.44
60TAC03D	60	130	31	2.1	1.1	73.9	93.8	98	119	40	55	3 100	3 900	1.80
TAC60-3	60	170	39	2.1	1.1	98.5	123.6	128.7	157.5	85	55	2 400	3 300	4.47
70TAC03D	70	150	35	2.1	1.1	86.3	108.6	113.4	137.8	59	55	2 700	3 400	2.67
75TAC03D	75	160	37	2.1	1.1	92.4	116.2	121	146.2	67	55	2 500	3 200	3.20
80TAC03D	80	170	39	2.1	1.1	98.5	123.6	128.7	157.5	85	55	2 400	3 000	3.80
TAC80-3	80	215	47	3	1.1	124	154.9	160.4	194.5	156	55	1 900	2 600	8.66
100TAC03D	100	215	47	3	1.1	124	154.9	160.4	194.5	156	55	1 900	2 400	7.54
TAC100-3	100	260	55	3	1.1	150.5	186.9	193.4	231.7	254	55	1 500	2 100	14.8
120TAC03D	120	260	55	3	1.1	150.5	186.9	193.4	231.7	254	55	1 500	2 000	13.3
* TAC120-3M	120	300	62	4	1.5	170.8	215.3	224.1	265.7	336	55	1 300	1 800	24.5
* 140TAC03DM	140	300	62	4	1.5	170.8	215.3	224.1	265.7	336	55	1 300	1 700	22.5
* TAC140-3M	140	340	68	4	1.5	197.5	246.2	254.3	298.8	442	55	1 200	1 600	34.5
* 160TAC03DM	160	340	68	4	1.5	197.5	246.2	254.3	298.8	442	55	1 200	1 500	32.0
* TAC160-3M	160	380	75	4	1.5	221.1	275.6	284.9	334.9	624	55	1 000	1 400	46.8
* 180TAC03DM	180	380	75	4	1.5	221.1	275.6	284.9	334.9	624	55	1 000	1 400	43.7

Preload (°) (DB and DF Arrangement) (N)	Axial Rigidity (°) (DB and DF Arrangement) (N/µm)	Starting Torque (°) (DB and DF Arrangement) (N·m)	Basic dynamic load rating Ca by number of rows sustaining Fa					Limiting axial load by number of rows sustaining Fa (°)				
			1 row (kN)	2 rows (kN)	3 rows (kN)	4 rows (kN)	5 rows (kN)	1 row (kN)	2 rows (kN)	3 rows (kN)	4 rows (kN)	5 rows (kN)
400	290	0.017	21.0	34.0	45.0	55.5	64.5	18.6	37.5	56.0	74.5	93.0
830	430	0.026	42.5	69.5	92.0	113	132	38.5	77.0	116	154	193
690	430	0.036	37.0	60.0	79.5	97.5	114	36.0	72.5	109	145	181
2 500	780	0.26	113	184	244	299	350	118	235	355	470	590
2 500	780	0.26	113	184	244	299	350	118	235	355	470	590
3 900	970	0.50	166	270	360	440	515	181	360	540	720	905
2 800	830	0.31	133	216	287	350	410	142	283	425	565	710
3 900	970	0.50	166	270	360	440	515	181	360	540	720	905
3 900	970	0.50	166	270	360	440	515	181	360	540	720	905
5 200	1 120	0.78	218	355	470	575	670	242	485	725	965	1 210
4 280	1 060	0.68	190	310	410	500	585	210	420	630	840	1 050
5 200	1 120	0.78	218	355	470	575	670	242	485	725	965	1 210
8 050	1 400	1.5	305	495	660	805	940	390	775	1 170	1 550	1 940
6 400	1 250	1.1	262	425	565	690	810	305	615	920	1 230	1 530
7 230	1 330	1.3	283	460	610	750	875	345	690	1 040	1 380	1 730
8 050	1 400	1.5	305	495	660	805	940	390	775	1 170	1 550	1 940
1 240	880	0.15	420	685	910	1 110	1 300	510	1 020	1 530	2 040	2 550
1 240	880	0.15	420	685	910	1 110	1 300	510	1 020	1 530	2 040	2 550
1 620	1 050	0.21	520	850	1 130	1 380	1 610	680	1 360	2 040	2 720	3 400
1 620	1 050	0.21	520	850	1 130	1 380	1 610	680	1 360	2 040	2 720	3 400
1 710	1 130	0.24	640	1 040	1 380	1 680	1 970	794	1 590	2 380	3 200	3 950
1 710	1 130	0.24	640	1 040	1 380	1 680	1 970	794	1 590	2 380	3 200	3 950
1 850	1 240	0.27	725	1 180	1 570	1 920	2 240	1 040	2 080	3 100	4 150	5 200
1 850	1 240	0.27	725	1 180	1 570	1 920	2 240	1 040	2 080	3 100	4 150	5 200
1 940	1 310	0.30	815	1 330	1 760	2 150	2 520	1 360	2 720	4 100	5 450	6 800
1 940	1 310	0.30	815	1 330	1 760	2 150	2 520	1 360	2 720	4 100	5 450	6 800

(\*) An asterisk (\*) indicates bearings that are also available equipped with screw holes for mounting bolts.  
 (†) Limiting speeds are based on the standard preload of each bearing. The values shown are valid for all types of bearing arrangement.  
 (°) Preload values for bearings with a bore diameter of 100mm or more as well as for TAC80-3 are based on EL preload.  
 (°) The starting torque values in the table apply to grease lubrication.  
 (°) To calculate permissible axial load, multiply limiting axial load by 0.7.



# 4. Ball Screw Support Bearings

## NSKHPS™ BSBD Series

The BSBD Series are double-row bearing units for the support of ball screws that can accurately and quickly position a work piece or a spindle unit.



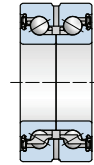
### Features

The bearings of this series are double-row angular contact thrust ball bearings with a 60° contact angle and a single outer ring. The specifications are the same as those of the NSKTAC bearings, both series being optimized for the support of ball screws in machine tools. All BSBD Series bearings are equipped with a rubber contact seal and prepacked with high performance grease.

### ■ BSN Type

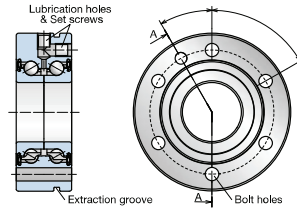
The BSN series of ball screw support bearings are double-row angular contact thrust ball bearings in a back-to-back arrangement, with a single outer ring. The bearings are prepacked with high performance grease. Lubrication holes

allow for relubrication during operation if necessary. The contact seal offers minimized friction and temperature rise while providing excellent sealing performance.



### ■ BSF Type

The BSF series of bearings is equivalent to the BSN range of bearings, with bolt holes on the outer ring for easy direct mounting. Two lubrication holes – one in the outer surface and one in the face of the outer ring – allow for relubrication during operation if required. If not used, these holes are closed off with set screws. An extraction groove on the outer surface of the outer ring aids removal of the bearing.



Note: BSF series bearings are supplied with seal and set screws included. Mounting bolts are not included.

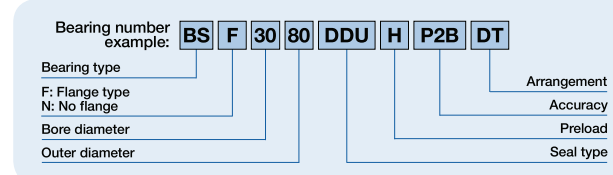
BSN Type Single product

Bearing Numbers	Boundary Dimensions (mm)				Abutment and Fillet Dimensions (mm)		Contact angle (Degree)	Basic Load Ratings (kN)		Limiting axial load (¹) (kN)	Preload (N)	Axial Rigidity (N/µm)	Mass (kg)	Limiting Speeds (min⁻¹) Grease	Starting Torque (N·m) H (²)	Recommended Clamping Force (N)
	d	D	B	r	r₁	D <sub>b</sub>		d <sub>a</sub>	C <sub>a</sub>							
BSN1242	12	42	25	0.6	0.3	15	33	60	18.5	24.0	17.6	720	0.20	8 000	0.038	4 030
BSN1545	15	45	25	0.6	0.3	19	35	60	19.4	26.9	19.4	675	0.22	7 100	0.034	4 050
BSN1747	17	47	25	0.6	0.6	21	37	60	20.3	29.7	21.2	880	0.23	6 700	0.05	4 400
BSN2052	20	52	28	0.6	0.6	24	43	60	26.4	41.0	29.3	1 885	0.31	5 800	0.13	7 600
BSN2557	25	57	28	0.6	0.6	29	48	60	28.3	48.0	34.0	2 245	0.36	5 100	0.16	8 100
BSN3062	30	62	28	0.6	0.6	34	53	60	30.0	55.5	38.5	2 625	0.40	4 500	0.19	8 600
BSN3072	30	72	38	0.6	0.6	35	64	60	60.5	94.0	66.5	4 855	0.74	3 900	0.59	11 100
BSN3572	35	72	34	0.6	0.6	40	62	60	42.0	77.5	52.0	2 630	0.66	3 800	0.21	13 500
BSN4075	40	75	34	0.6	0.6	46	67	60	44.5	88.0	58.5	3 065	1 000	3 500	0.24	14 100
BSN4090	40	90	46	0.6	0.6	46	80	60	78.5	135	91.0	7 220	1 200	3 100	1.02	18 700
BSN5090	50	90	34	0.6	0.6	56	82	60	48.0	110	71.5	4 020	1 250	2 800	0.33	15 400
BSN50110	50	110	54	0.6	0.6	57	98	60	116	219	149	7 435	1 400	2 500	1.06	19 100
BSN60110	60	110	45	0.6	0.6	68	100	60	86.5	187	126	4 780	1 300	2 400	0.50	20 900

(¹) Permissible axial load equals 0.7 times of limiting axial load.

(²) The values indicate starting torque of preloaded bearings, not including seal torque.

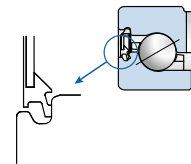
### NSKHPS BSBD Series



Note: P2B is an accuracy class specific to the BSBD Series, indicating the following: Running accuracy: ISO Class 2 Others: NSK-specific

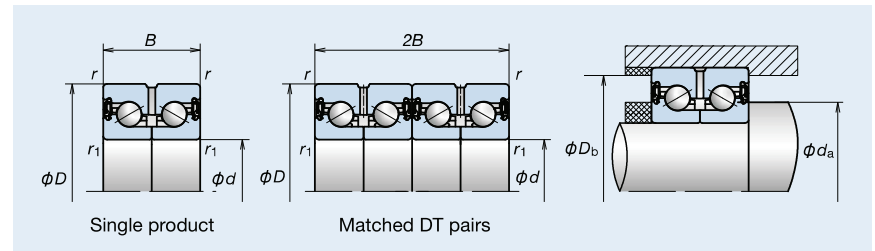
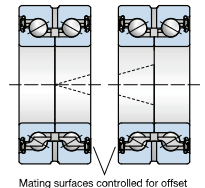
### ■ Seal

Rubber contact seal on both sides. Triple lip structure provides high grease sealing performance and dust resistance.



### ■ Matched DT pairs

BSBD bearings are available in matched DT pairs for applications with large external loads or where high rigidity and long life are required. The mating surfaces of the 2-row bearing set are controlled for offset, so as to have no impact on the preload of each individual bearing.



BSN Type Matched DT pairs

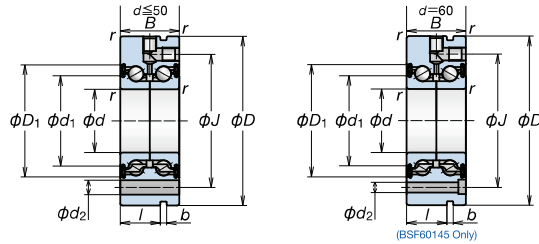
Bearing Numbers	Boundary Dimensions (mm)				Abutment and Fillet Dimensions (mm)		Contact angle (Degree)	Basic Load Ratings (kN)		Limiting axial load (¹) (kN)	Axial Rigidity (N/µm)	Mass (kg)	Limiting Speeds (min⁻¹) Grease	Starting Torque (N·m) H (²)	Recommended Clamping Force (N)	
	d	D	2B	r	r₁	D <sub>b</sub>		d <sub>a</sub>	C <sub>a</sub>							C <sub>0a</sub>
BSN1747-DT	17	47	50	0.6	0.6	21	37	60	33.0	59.5	42.5	790	0.46	6 700	0.10	4 400
BSN2052-DT	20	52	56	0.6	0.6	24	43	60	43.0	82.0	58.5	1 180	0.62	5 800	0.26	7 600
BSN2557-DT	25	57	56	0.6	0.6	29	48	60	46.0	96.0	68.0	1 370	0.71	5 100	0.32	8 100
BSN3062-DT	30	62	56	0.6	0.6	34	53	60	49.0	111	77.0	1 580	0.80	4 500	0.37	8 600
BSN3072-DT	30	72	76	0.6	0.6	35	64	60	98.0	188	133	1 800	1.47	3 900	1.17	11 100
BSN3572-DT	35	72	68	0.6	0.6	40	62	60	68.0	155	104	1 630	1.32	3 800	0.41	13 500
BSN4075-DT	40	75	68	0.6	0.6	46	67	60	72.0	176	117	1 850	1.30	3 500	0.49	14 100
BSN4090-DT	40	90	92	0.6	0.6	46	80	60	128	269	182	2 300	2.76	3 100	2.03	18 700
BSN5090-DT	50	90	68	0.6	0.6	56	82	60	78.0	220	143	2 330	1.86	2 800	0.66	15 400
BSN50110-DT	50	110	108	0.6	0.6	57	98	60	188	440	299	2 690	4.92	2 500	2.11	19 100

(¹) Inner rings can be separable easily. Please push or pull bearings by clamping innering at mounting and dismounting.

(²) Abutment and fillet dimensions are recommendable values for the use of standard Machine tool applications. For heavy load applications, please ask NSK

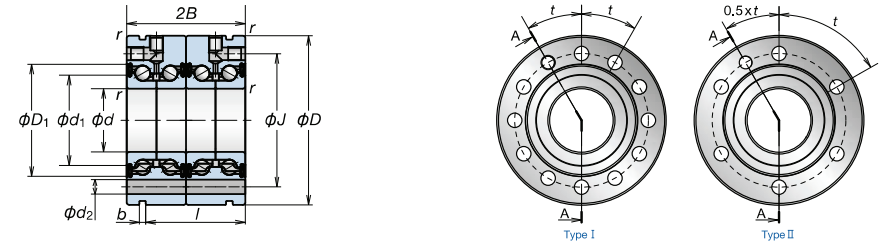
# 4. Ball Screw Support Bearings

## NSKHPS™ BSBD Series



BSF Type Single product

Bearing Numbers	Boundary Dimensions (mm)					Basic Load Ratings (kN)		Limiting axial load (1) (kN)	Axial Rigidity (N/μm)	Mass (kg)	Limiting Speeds (mm <sup>-1</sup> )	
	d	D	B	r (min.)	r <sub>1</sub> (min.)	C <sub>a</sub> (Dynamic)	C <sub>oa</sub> (Static)				Grease	Oil
BSF1255	12	55	25	0.6	0.3	18.5	24.0	17.6	375	0.37	8 000	
BSF1560	15	60	25	0.6	0.3	19.4	26.9	19.4	400	0.44	7 100	
BSF1762	17	62	25	0.6	0.6	20.3	29.7	21.2	450	0.46	6 700	
BSF2068	20	68	28	0.6	0.6	26.4	41.0	29.3	650	0.61	5 800	
BSF2575	25	75	28	0.6	0.6	28.3	48.0	34.0	750	0.73	5 100	
BSF3080	30	80	28	0.6	0.6	30.0	55.5	38.5	850	0.79	4 500	
BSF30100	30	100	38	0.6	0.6	60.5	94.0	66.5	950	1.71	3 900	
BSF3590	35	90	34	0.6	0.6	42.0	77.5	52.0	900	1.20	3 800	
BSF40100	40	100	34	0.6	0.6	44.5	88.0	58.5	1 000	1.49	3 500	
BSF40115	40	115	46	0.6	0.6	78.5	135	91.0	1 200	2.56	3 100	
BSF50115	50	115	34	0.6	0.6	48.0	110	71.5	1 250	1.89	2 800	
BSF50140	50	140	54	0.6	0.6	116	219	149	1 400	4.46	2 500	
BSF60145	60	145	45	0.6	0.6	86.5	187	126	1 300	4.06	2 400	



BSF Type Matched DT pairs

Bearing Numbers	Boundary Dimensions (mm)					Basic Load Ratings (kN)		Limiting axial load (1) (kN)	Axial Rigidity (N/μm)	Mass (kg)	Limiting Speeds (mm <sup>-1</sup> )	
	d	D	2B	r (min.)	r <sub>1</sub> (min.)	C <sub>a</sub> (Dynamic)	C <sub>oa</sub> (Static)				Grease	Oil
BSF1762-DT	17	62	50	0.6	0.6	33.0	59.5	42.5	790	0.890	6 700	
BSF2068-DT	20	68	56	0.6	0.6	43.0	82.0	58.5	1 180	1.17	5 800	
BSF2575-DT	25	75	56	0.6	0.6	46.0	96.0	68.0	1 370	1.46	5 100	
BSF3080-DT	30	80	56	0.6	0.6	49.0	111	77.0	1 580	1.58	4 500	
BSF30100-DT	30	100	76	0.6	0.6	98.0	188	133	1 800	3.41	3 900	
BSF3590-DT	35	90	68	0.6	0.6	68.0	155	104	1 630	2.30	3 800	
BSF40100-DT	40	100	68	0.6	0.6	72.0	176	117	1 850	2.88	3 500	
BSF40115-DT	40	115	92	0.6	0.6	128	269	182	2 300	5.12	3 100	
BSF50115-DT	50	115	68	0.6	0.6	78.0	220	143	2 330	3.78	2 800	
BSF50140-DT	50	140	108	0.6	0.6	188	440	299	2 690	8.92	2 500	

(1) Permissible axial load equals 0.7 times of limiting axial load.  
 To calculate permissible axial load, multiply limiting axial load by 0.7. The values refer to the limiting load of the bearing only, without taking the mounting bolts into account.  
 (2) The values indicate starting torque of preloaded bearings, not including seal torque.  
 (3) Inner rings can be separable easily. Please push or pull bearings by clamping inner ring at mounting and dismounting.

Reference Dimensions (mm)							Type	Mounting Bolts		Preload (N)	Starting Torque (2) (N·m)	Recommended Clamping Force (N)
d <sub>1</sub>	D <sub>1</sub>	J	d <sub>2</sub>	l	b	t		Bolt Dia.	Number of Bolts			
23.7	32.7	42	6.8	17	3	3 x 120°	II	M6	3	720	0.038	4 030
26.7	35.7	46	6.8	17	3	3 x 120°	II	M6	3	675	0.034	4 050
28.1	37.7	48	6.8	17	3	3 x 120°	II	M6	3	890	0.05	4 400
32.6	43	53	6.8	19	3	4 x 90°	II	M6	4	1 885	0.13	7 600
37.6	48	58	6.8	19	3	4 x 90°	II	M6	4	2 245	0.16	8 100
42.6	53	63	6.8	19	3	6 x 60°	II	M6	6	2 625	0.19	8 600
49.1	64.4	80	8.8	30	3	8 x 45°	II	M8	8	4 855	0.59	11 100
53.1	62.2	75	8.8	25	3	4 x 90°	II	M8	4	2 630	0.21	13 500
55.1	67.2	80	8.8	25	3	4 x 90°	II	M8	4	3 065	0.24	14 100
63.1	80.1	94	8.8	36	3	12 x 30°	II	M8	12	7 220	1.02	18 700
70.1	82.2	94	8.8	25	3	6 x 60°	II	M8	6	4 020	0.33	15 400
78.1	97.5	113	11	45	3	12 x 30°	II	M10	12	7 435	1.06	19 100
83.1	99.3	120	8.8	35	3	8 x 45°	II	M8	8	4 780	0.50	20 900

Reference Dimensions (mm)							Type	Mounting Bolts		Starting Torque (2) (N·m)	Recommended Clamping Force (N)
d <sub>1</sub>	D <sub>1</sub>	J	d <sub>2</sub>	l	b	t		Bolt Dia.	Number of Bolts		
28.1	37.7	48	6.8	42	3	6 x 60°	I	M6	5	0.10	4 400
32.6	43	53	6.8	47	3	8 x 45°	I	M6	7	0.26	7 600
37.6	48	58	6.8	47	3	8 x 45°	I	M6	7	0.32	8 100
42.6	53	63	6.8	47	3	12 x 30°	I	M6	11	0.37	8 600
49.1	64.4	80	8.8	68	3	8 x 45°	II	M8	8	1.17	11 100
53.1	62.2	75	8.8	59	3	8 x 45°	I	M8	7	0.41	13 500
55.1	67.2	80	8.8	59	3	8 x 45°	I	M8	7	0.49	14 100
63.1	80.1	94	8.8	82	3	12 x 30°	II	M8	12	2.03	18 700
70.1	82.2	94	8.8	59	3	12 x 30°	I	M8	11	0.66	15 400
78.1	97.5	113	11	99	3	12 x 30°	II	M10	12	2.11	19 100

# 4. Ball Screw Support Bearings

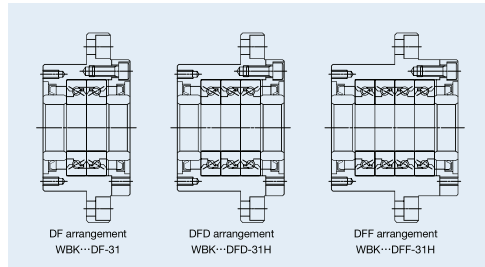
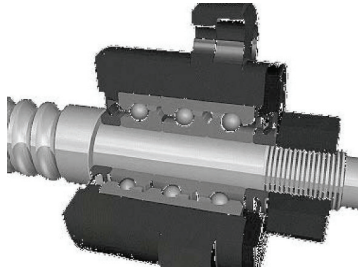
## Ball Screw Support Units



This unit for ball screw support in heavy-load and machine tool applications features NSK TAC C Series high-accuracy, high-rigidity angular contact thrust ball bearings. Three types of arrangement are available, as shown below.

### Features

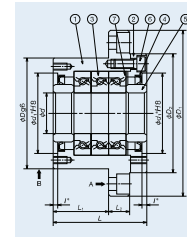
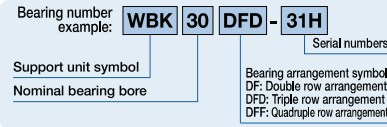
- The dust-resistant unit allows the user to easily design the support side of the ball screw.
- Preload-controlled and ready-mounted bearings eliminate the need for on-site mounting of bearings.



Support Unit Numbers	Support Unit Parts (mm)																
	d	D	D <sub>1</sub>	D <sub>2</sub>	L	L <sub>1</sub>	L <sub>2</sub>	A	W	X	Y	Z	d <sub>1</sub> *	I*	V*	P*	Q*
WBK17DF-31H	17	70	106	72	60	32	15	80	88	9	14	8.5	45	3	58	M5	10
WBK20DF-31H	20	70	106	72	60	32	15	80	88	9	14	8.5	45	3	58	M5	10
WBK25DF-31H	25	85	130	90	66	33	18	100	110	11	17.5	11	57	4	70	M6	12
WBK25DFD-31H	25	85	130	90	81	48	18	100	110	11	17.5	11	57	4	70	M6	12
WBK30DF-31H	30	85	130	90	66	33	18	100	110	11	17.5	11	57	4	70	M6	12
WBK30DFD-31H	30	85	130	90	81	48	18	100	110	11	17.5	11	57	4	70	M6	12
WBK35DF-31H	35	95	142	102	66	33	18	106	121	11	17.5	11	69	4	80	M6	12
WBK35DFD-31H	35	95	142	102	81	48	18	106	121	11	17.5	11	69	4	80	M6	12
WBK35DFF-31H	35	95	142	102	96	48	18	106	121	11	17.5	11	69	4	80	M6	12
WBK40DF-31H	40	95	142	102	66	33	18	106	121	11	17.5	11	69	4	80	M6	12
WBK40DFD-31H	40	95	142	102	81	48	18	106	121	11	17.5	11	69	4	80	M6	12
WBK40DFF-31H	40	95	142	102	96	48	18	106	121	11	17.5	11	69	4	80	M6	12

(1) Rigidity: Rigidity values in the table are theoretical values calculated from elastic displacement between grooves and steel balls.  
 (2) Starting torque: The values indicate starting torque of preloaded bearings, not including seal torque.  
 (3) Tolerance of shaft outer diameter at bearing seat; h5 Class is recommended for the shaft outer diameter at the support unit's bearing seat.

### Numbering system of support units

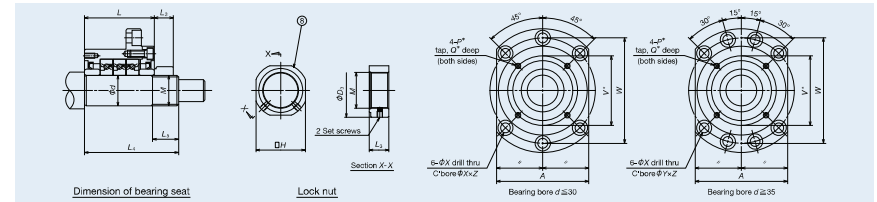


### Components of support unit

Part No.	Name of Part	Quantities
①	Housing	1
②	Retaining cover	1
③	Angular contact thrust ball bearings for Ball Screw Support	1 set
④	Dust seal	2
⑤	Collar	2
⑥	Preload securing bolt	6 or 8
⑦	Shim	1 set
⑧	Locknut	1

1. Use datum faces A and B to mount the support unit to a machine base.
2. Do not try to disassemble the NSK Support Unit because its preload is adjusted with high precision and the components ①, ②, ③, ④, ⑤ and ⑦ are integrated into a single piece.
3. The bearings are prepacked with grease.
4. Locknut ⑧ is designed specifically for ball screws with its perpendicularities controlled against the triangular thread of the screw. Tighten the set screws to prevent loosening of the locknut.

The locknut is also available separately. For further information on angular contact thrust ball bearings for ball screw support (NSKTAC C Series), please refer to Page 144.



Basic Dynamic Load Rating Ca [N]	Limiting axial load [N]	Preload [N]	Axial Rigidity [N/μm]	Starting Torque [N·cm]	Locknut				Bearing seat for unit [mm]			Limiting Speeds [min <sup>-1</sup> ]	Mass [kg]	
					Reference Dimensions [mm]	Tightening torque [N·cm] (Ref.)			d	L <sub>4</sub>	L <sub>5</sub>			
M	H	D <sub>3</sub>	L <sub>3</sub>	M	H	D <sub>3</sub>	L <sub>3</sub>	d	L <sub>4</sub>	L <sub>5</sub>				
23 000	26 600	1 450	630	14	M17×1.0	32	37	18	4 100	17	81	23	6 900	1.9
23 000	26 600	1 450	630	14	M20×1.0	36	40	18	4 500	20	81	23	6 900	1.9
29 900	40 500	2 280	850	21	M25×1.5	41	45	20	8 500	25	89	26	5 200	3.1
48 500	81 500	3 100	1 250	28	M25×1.5	41	45	20	8 500	25	89	26	5 200	3.4
30 500	43 000	2 400	890	23	M30×1.5	46	50	20	10 100	30	89	26	4 900	3.0
50 000	86 000	3 260	1 310	30	M30×1.5	46	50	20	10 100	30	89	26	4 900	3.3
32 500	50 000	2 750	1 030	27	M35×1.5	50	55	22	13 800	35	92	30	4 100	3.4
53 000	100 000	3 740	1 500	34	M35×1.5	50	55	22	13 800	35	107	30	4 100	4.3
53 000	100 000	5 490	2 060	43	M35×1.5	50	55	22	13 800	35	122	30	4 100	5.0
33 500	52 000	2 860	1 080	28	M40×1.5	55	60	22	15 500	40	92	30	4 100	3.6
54 000	104 000	3 900	1 590	36	M40×1.5	55	60	22	15 500	40	107	30	4 100	4.2
54 000	104 000	5 730	2 150	46	M40×1.5	55	60	22	15 500	40	122	30	4 100	4.7

(4) Dimensions marked with \* : The spigot and screw parts marked with \* are used for mounting a seal unit for the NSK standard hollow ball screw shaft as well as for mounting a dust cover and damper.  
 (5) As bearings are prepacked with grease, the unit can be used immediately as is.  
 (6) To calculate permissible axial load, multiply limiting axial load by 0.7.