
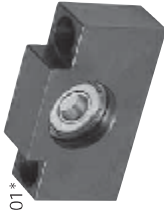



B-3-2.5 Accessories




Accessories to use with ball screw are available in stock.

Table 1 Support unit categories

Application	Shape	Support side	Bearing in use	Bearing bore seat diameter	Page
Small equipment, light load	 WBK**-01*	Fixed support side	Angular contact ball bearing	$\phi 6 - \phi 25$	B439 -
	 WBK**-S-01*	Simple support side	Deep groove ball bearing	$\phi 6 - \phi 25$	B443 -
	 WBK**-SF-01				
			Deep groove ball bearing	$\phi 12, \phi 15$ (Exclusive for VFA Type)	B446

① Classification

Ball screw support units are classified into categories by their shape (Table 1). Select the type that is appropriate for you to use.

Application	Shape	Support side	Bearing in use	Bearing bore seat diameter	Page
Small equipment, light load	 WBK**-R-11 (Support kit)	Fixed support side	Deep groove ball bearing (arranged to have angular contact)	$\phi 4, \phi 6$ (Exclusive for RMA and RMS Type)	B445
	 WBK**-11*	Round side	Angular contact ball bearing	$\phi 6 - \phi 25$	B441 -
Machine tools, heavy load	 WBK**-DF*-31	Fixed support side	Thrust angular contact ball bearing	$\phi 17 - \phi 40$	B451 -

② Features

- Short delivery time: Standardized items in stock
- Bearings and seal
On the fixed support side, the angular contact ball bearing is used. It has great rigidity and low friction torque which match the rigidity of the ball screw. The thrust angular contact ball bearing with high precision and great rigidity is another choice for the fixed support side. An oil seal is installed on fixed support side used with an angular contact ball bearing. The seal may have fine clearance.
- A deep-groove ball bearing with a shield on both sides is used on the simple support side.

- Lock nut is provided.
A lock nut of fine grade finish is provided to fix the bearing with high precision.



③ Reference number coding

(For light load)

Example : **WBK 08 S - 01 A**

Product code for support unit

Nominal size code*

Mounting code

No code: Fixed support unit

S: Simple support unit

SF: Simple support unit (for VFA)

R: Fixed support unit (support kit for miniature ball screws)

No code or A: For general use

C: For clean environment use

01: Square type

11: Round type

* In case of simple support unit, be careful that 12 or less size codes do not represent internal bores of bearing. Please refer to the dimensional table for internal bore of bearing.

(For heavy load)

Example : **WBK 25 DF - 31**

Product code for support unit

Nominal size code (internal bore of bearing)

Bearing combination code

DF : Face to face duplex combination

DFD : Face to face triplex combination

DFDFF : Face to face quadruplex combination

(1) Support Units for Light Load and Small Equipment

Support units for light load and small equipment provide both fixed and support side bearing assemblies to support screw shafts. They provide all required parts such as bearing locknuts so that you can mount them directly to NSK standard ball screws, of which shaft ends are machined.

Please refer to the dimensions listed on the dimension table for configuration of standard screw shaft ends for NSK standard ball screws with blank shaft ends. For transporting ball screws, you require optional spacers when mounting fixed support side support units.

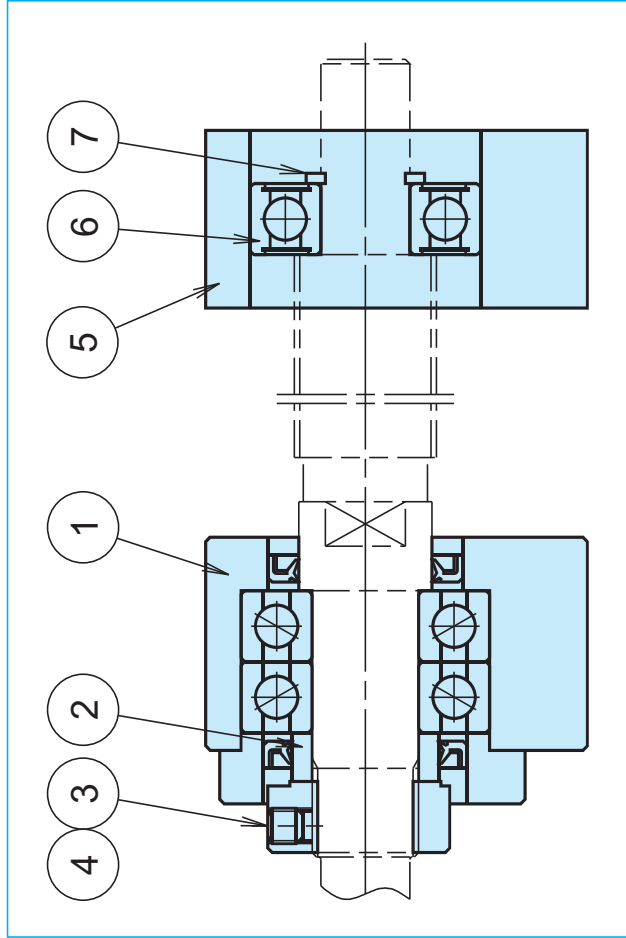
① Features

- Prompt delivery
All support units are standard stocked items.
- Best selection of bearings for your application
General use support units for fixed support side are equipped with highly rigid angular contact ball bearings that have been assembled with proper preload, and packed with the appropriate volume of grease. On the other hand, clean support units for fixed support side uses low dust emission grease, and low torque special bearings. Sealed deep groove ball bearings are used for simple support side units for both general and clean environment use.

Accessories

- Accessories
Support units provide everything necessary for mounting ball screws to machines. (Please refer to the table below.)

* Do not disassemble fixed support side units as they are equipped with bearings and oil seals.



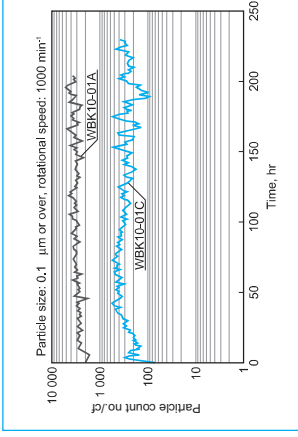
- Antirust treatment

The table on the right shows the surface treatment for the bearing housing, and material of small parts.

Fixed support side		Simple support side	
Part no.	Name of parts	Part no.	Name of parts
①	Bearing housing	⑤	Bearing housing
②	Spacer	⑥	Bearing
③	Locknut	⑦	Snap ring
④	Set screw with set piece		

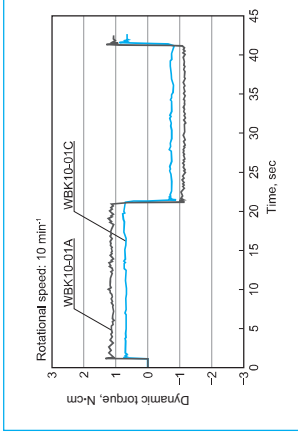
General support unit	
Bearings and grease	Angular contact ball bearings, PS2
Surface treatment	Black oxide
Screws and snap rings	Standard material

- ⑥ Features of Clean Support Unit
 - Outstanding low dust emission
Clean support unit uses "NSK clean grease LG2" which has a proven feature of low dust emission. It reduces dust emission to 1/10 of general support units.



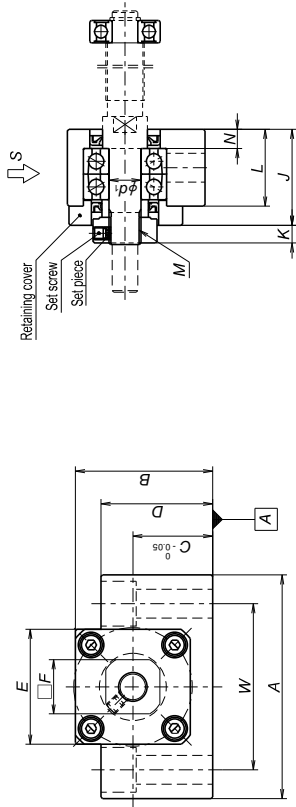
- Low torque
It features low torque characteristics because of special bearings. (50% lower than general support unit.)

- High antirust specification
Low temperature chrome plating is applied to bearing housings, retaining plates, locknuts and spacers to improve antirust properties. Moreover, bolts and snap rings are made of stainless steel. The table below shows the surface treatment of the bearing housing and material of small parts.



	Clean support unit
Bearing • grease	Special bearings, LG2
Surface treatment	Low temperature chrome plating
Set screw and snap ring material	Stainless steel

Support Units for Light Load and Small Equipment

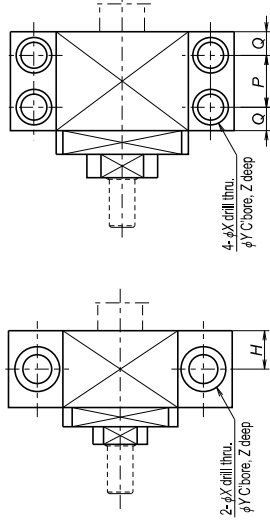


Fixed support side support unit (square type)

Reference no.	Use	d_1	A	B	C	D	E	F	L	J	K
WBK06-01A*	General	6	42	25	13	20	18	12	20	20	5.5
WBK08-01A*	General		52	32	17	26	25		23	23	7
WBK08-01B	Low type	8	62	31	15.5	31	—	14	21.5	25.5	4.5
WBK08-01C*	Clean environment		52	32	17	26	25		23	23	7
WBK10-01A	General		43	25	35	36					
WBK10-01B	Low type	10	70	38	20	38	—	17	24	30	5.5
WBK10-01C	Clean environment		43	25	35	36					
WBK12-01A	General		43	25	35	36					
WBK12-01B	Low type	12	70	38	20	38	—	19	24	30	5.5
WBK12-01C	Clean environment		43	25	35	36					
WBK15-01A	General		50	30	40	41					
WBK15-01B	Low type	15	80	42	22	42	—	22	25	31	12
WBK15-01C	Clean environment		50	30	40	41					
WBK17-01A	General	17	86	64	39	55	50	24	35	44	7
WBK20-01	General	20	95	58	30	45	56	30	42	52	10
WBK25-01	General	25	105	68	35	25	66	36	48	61	13

- Notes:
1. Use datum face A for mounting to the machine base.
 2. Tighten the set screw after the locknut has been adjusted and tightened.
 3. The brass pad (set piece), provided with the unit, is inserted into locknut set screw hole, then set screw is inserted and tightened over it.
 4. A deep groove ball bearing and a snap ring are attached.
- *There are no seals for the retaining cover side of WBK06-01A, WBK08-01A, and WBK08-01C.

Support Unit (Support Units for Light Load and Small Equipment)



View S (WBK06 – 15)

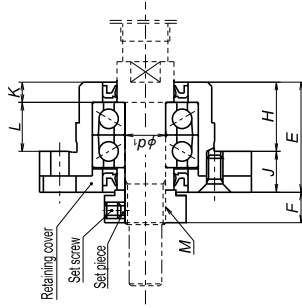
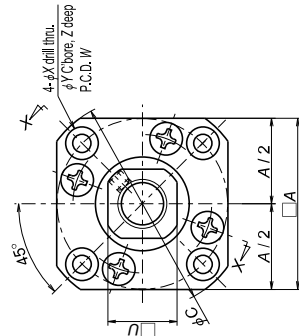
View S (WBK17 – 25)

Reference no.	Tightening torque [reference] [N · cm]	
	Locknut	Set screw
WBK06-**	190	69 (M3)
WBK08-**	230	69 (M3)
WBK10-**	280	147 (M4)
WBK12-**	630	147 (M4)
WBK15-**	790	147 (M4)
WBK17-**	910	147 (M4)
WBK20-**	1670	147 (M4)
WBK25-**	2060	490 (M6)

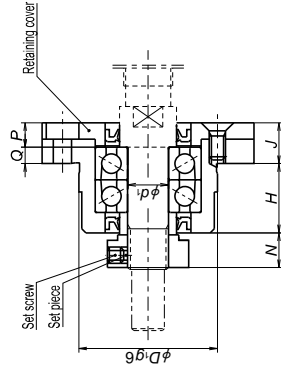
Units: mm

N	Counter bore dimensions											Mass (kg)	Locknut screw M	Attached bearing for support side
	H	P	Q	W	X	Y	Z							
3.5	10	—	—	30	5.5	9.5	11	0.15	M6x0.75	—				
4	11.5	—	—	38	6.6	11	12	0.25		606ZZ				
3.5	11	—	—	46	9	14	18	0.3	M8x1	606ZZ				
4	11.5	—	—	38	6.6	11	12	0.25		606VV				
6	12	—	—	52	9	14	11	0.5	M10x1	608ZZ				
										608ZZ				
										608VV				
6	12	—	—	52	9	14	11	0.5	M12x1	6000ZZ				
										6000ZZ				
										6000VV				
5	12.5	—	—	60	11	17	15	0.7	M15x1	6002ZZ				
										6002ZZ				
										6002VV				
7	—	19	8	68	9	14	11	1.3	M17x1	6203ZZ				
10	—	22	10	75	11	17	15	1.4	M20x1	6204ZZ				
14	—	30	9	85	11	—	—	1.9	M25x1.5	6205ZZ				

B
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View X-X (Example 1)



View X-X (Example 2)

Reference no.	Tightening torque (reference) [N · cm]	
	Locknut	Set screw
WBK06-**	190	69 (M3)
WBK08-**	230	69 (M3)
WBK10-**	280	147 (M4)
WBK12-**	630	147 (M4)
WBK15-**	790	147 (M4)
WBK17-**	910	147 (M4)
WBK20-**	1670	147 (M4)
WBK25-**	2060	490 (M6)

Fixed support side support unit (round type)

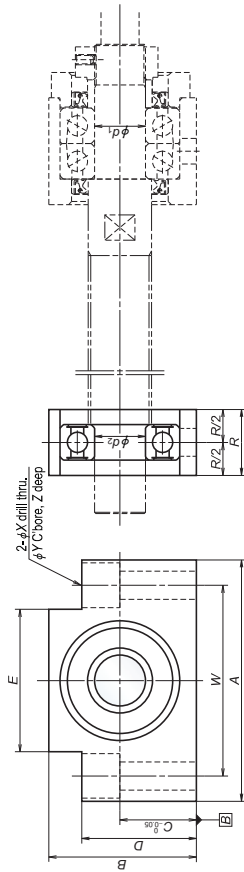
Reference no.	Use	d ₁	A	C	D ₁	E	H	L	K	F	N
WBK06-11*	General	6	28	35	22	20	13	9.5	3.5	5.5	6.5
WBK08-11*	General		35	43	28	23	14	10	4	7	8
WBK08-11B	Low type	8	42	52	34	25.5	15.5	12	3.5	4.5	7
WBK08-11C*	Clean environment		35	43	28	23	14	10	4	7	8
WBK10-11	General	10	42	52	34	27	17	12	5	7.5	8.5
WBK10-11C	Clean environment										
WBK12-11	General	12	44	54	36	27	17	12	5	7.5	8.5
WBK12-11C	Clean environment										
WBK15-11	General	15	52	63	40	32	17	11	6	12	14
WBK15-11C	Clean environment										
WBK20-11	General	20	68	85	57	52	30	20	10	10	14
WBK25-11	General	25	79	98	63	57	30	20	10	13	20

- Notes:
1. Tighten the set screw after the locknut has been adjusted and tightened.
 2. The brass pad (set piece), provided with the unit, is inserted into locknut set screw hole, then set screw is inserted and tightened over it.
 3. A deep groove ball bearing and a snap ring are attached.
- *There are no seals for the retaining cover side of WBK06-01A, WBK08-01A, and WBK08-01C.

Units: mm

U	P	Q	Counter bore dimensions						Mass (kg)	Locknut screw M	Attached bearing for support side
			J	W	X	Y	Z				
12	4.5	2.5	7	28	2.9	5.5	3.5	0.1	M6x0.75	—	
			9	35	3.4	6.5	4				
			10	42	4.5	8	4				
14	6	4	9	35	3.4	6.5	4	0.15	M8x1	606ZZ	
			10	42	4.5	8	4				
			17	50	5.5	9.5	6				
17	6	4	10	42	4.5	8	4	0.2	M10x1	608ZZ	
			19	44	4.5	8	4				
			22	50	5.5	9.5	6				
19	6	4	10	44	4.5	8	4	0.25	M12x1	6000ZZ	
			30	70	6.6	11	10				
			36	80	9	15	13				
22	8	7	15	50	5.5	9.5	6	0.4	M15x1	6002VV	
			19	55	6.0	10.5	7				
			22	60	6.5	11.5	8				
30	14	8	22	70	6.6	11	10	1.1	M20x1	6204ZZ	
			36	80	9	15	13				
			42	90	10	16	15				
36	17	10	27	80	9	15	13	1.5	M25x1.5	6205ZZ	
			42	100	10	16	15				
			48	110	11	17	16				

B
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Simple support side support unit (square type)

Units: mm

Reference no.	Use	d_1	A	B	C	D	E	R	Counter bore dimensions				Mass		
									W	X	Y	Z	(kg)		
WBK08S-01	General	6	52	32	17	26	25	15	38	6,6	11	12	0,15		
WBK08S-01B	Low type		62	31	15,5	31	—	16	46	9	14	18	0,2		
WBK08S-01C	Clean environment		52	32	17	26	25	15	38	6,6	11	12	0,15		
WBK10S-01	General	8	70	43	25	35	36	20	52	9	14	11	0,4		
WBK10S-01C	Clean environment														
WBK12S-01	General	10	43	25	35	36	36		52	9	14	11	0,35		
WBK12S-01B	Low type		70	38	20	38	—	20					0,4		
WBK12S-01C	Clean environment			43	25	35	36						0,35		
WBK15S-01	General	15	80	42	30	40	41		60	9	14	23	0,4		
WBK15S-01B	Low type			42	22	42	—	20					0,4		
WBK15S-01C	Clean environment			50	30	40	41						0,45		
WBK17S-01	General	17	86	64	39	55	50	23	68	9	14	11	0,8		
WBK20S-01	General	20	95	58	30	45	56	26	75	11	17	15	0,8		
WBK25S-01	General	25	105	68	35	25	66	30	85	11	—	—	0,9		

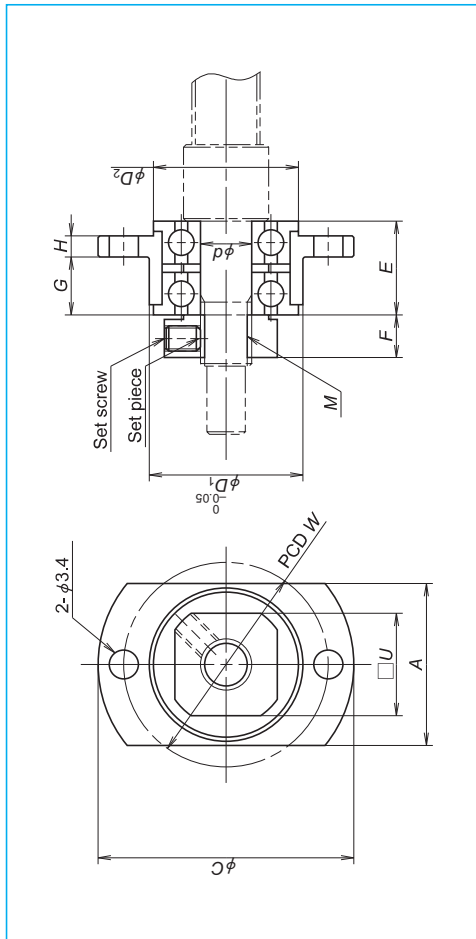
Notes: 1. Use datum face B for mounting to the machine base.

Specifications of support unit

Reference no.	Use	Fixed support side support unit				Axial direction		Maximum starting torque [N · cm]	Simple support side support unit		Radial direction Basic dynamic load rating C [N]
		Basic dynamic load rating Ca [N]	Load limit [N]	Stiffness [N / μm]	Stiffness [N / μm]	Reference no.	Bearing reference no.				
WBK06-01A	General	2670	1040	28	—	—	0,49	—	—	—	
WBK06-11	General	2670	1040	28	—	—	0,49	—	—	—	
WBK08-01A	General	4400	1450	49	—	—	0,88	WBK08S-01	606ZZ	2260	
WBK08-01B	Low type	6600	2730	94	—	—	1,9	WBK08S-01B	606ZZ	2260	
WBK08-01C	Clean environment	3100	1100	36	—	—	0,52	WBK08S-01C	606VV	2260	
WBK08-11	General	4400	1450	49	—	—	0,88	WBK08S-01	606ZZ	2260	
WBK08-11B	Low type	6600	2730	94	—	—	1,9	—	—	2260	
WBK08-11C	Clean environment	3100	1100	36	—	—	0,52	WBK08S-01C	606VV	2260	
WBK10-01A	General	6600	2730	94	—	—	1,9	WBK10S-01	608ZZ	3300	
WBK10-01B	Low type	6600	2730	94	—	—	1,9	—	—	3300	
WBK10-01C	Clean environment	4250	1364	50	—	—	1,1	WBK10S-01C	608VV	3300	
WBK10-11	General	6600	2730	94	—	—	1,9	WBK10S-01	608ZZ	3300	
WBK10-11C	Clean environment	4250	1364	50	—	—	1,1	WBK10S-01C	608VV	3300	
WBK12-01A	General	7100	3040	104	—	—	2,1	WBK12S-01	600ZZ	4550	
WBK12-01B	Low type	7100	3040	104	—	—	2,1	WBK12S-01B	600ZZ	4550	
WBK12-01C	Clean environment	4700	2443	57	—	—	1,2	WBK12S-01C	600VV	4550	
WBK12-11	General	7100	3040	104	—	—	2,1	WBK12S-01	600ZZ	4550	
WBK12-11C	Clean environment	4700	2443	57	—	—	1,2	WBK12S-01C	600VV	4550	
WBK15-01A	General	7600	3380	113	—	—	2,4	WBK15S-01	600ZZ	5600	
WBK15-01B	Low type	7600	3380	113	—	—	2,4	WBK15S-01B	600ZZ	5600	
WBK15-01C	Clean environment	5100	2757	63	—	—	1,3	WBK15S-01C	600VV	5600	
WBK15-11	General	7600	3380	113	—	—	2,4	WBK15S-01	600ZZ	5600	
WBK15-11C	Clean environment	5100	2757	63	—	—	1,3	WBK15S-01C	600VV	5600	
WBK17-01A	General	13400	5800	120	—	—	3,5	WBK17S-01	6203ZZ	9550	
WBK20-01	General	17900	8240	155	—	—	6,2	WBK20S-01	6204ZZ	12800	
WBK20-11	General	17900	8240	155	—	—	6,2	WBK20S-01	6204ZZ	12800	
WBK25-01	General	20200	10000	192	—	—	7,2	WBK25S-01	6205ZZ	14000	
WBK25-11	General	20200	10000	192	—	—	7,2	WBK25S-01	6205ZZ	14000	
WBK04R-11	General	615	490	6,5	—	—	0,59	—	—	—	
WBK06R-11	General	1280	930	9	—	—	0,59	—	—	—	

Support kits for ball screws for transfer equipment

Support kits are for the RMS type ball screw. However, please use support units for general use in case of RMA1002 or larger rolled ball screws.



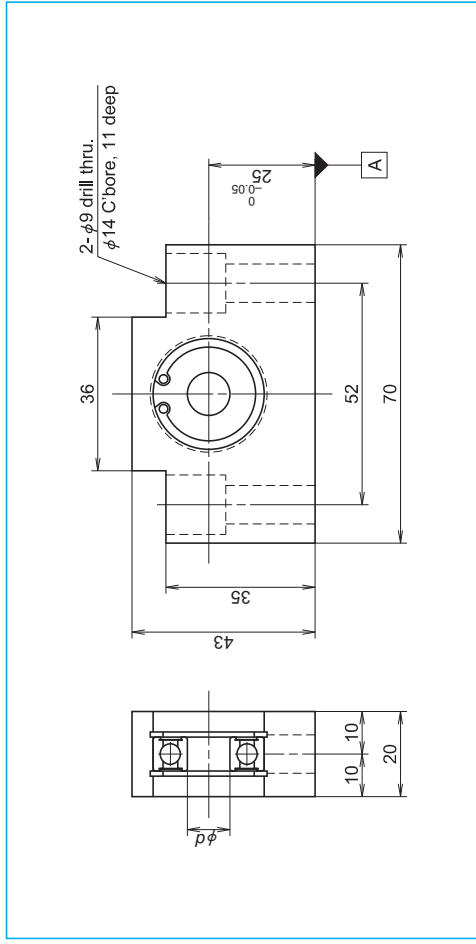
Units: mm

Reference no.	A	C	d	D ₁	D ₂	E	F	G	H	W	U	M
WBK04R-11	14	25	4	13	12.5	9	5	5	2.5	19	10	M4×0.5
WBK06R-11	19	30	6	18	17	11	5	6.8	2.5	24	12	M6×0.75

Reference no.	Applicable ball screw	Locknut tightening torque (reference) [N·cm]	Set screw tightening torque (reference) [N·cm]
WBK04R-11	RMA0601 RMA0801	100	38 (M2.5)
WBK06R-11	RMA0801.5 RMA0802	190	69 (M3)

- Notes:**
- Oscillate bearings slowly so that they fall into a place to make run-out of mounting face minimal, and then tighten a locknut.
 - A support kit is put on a provisional shaft (bolt) for shipping.
 - When securing support unit on the shaft, insert the set piece (brass pad) that is provided with the support unit into the lock nut screw hole, and then tighten the set screw.

Simple support side support units for VFA type ball screws



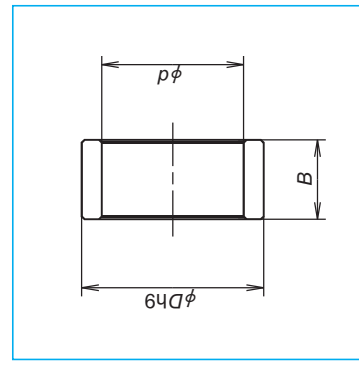
Units: mm

Reference no.	d	Applicable ball screw
WBK12SF-01	12	VFA12T0 VFA15T0
WBK15SF-01	15	VFA15T0 VFA1520

- Notes:**
- Use datum face A for mounting to the machine base.
 - This type of simple side support unit is made exclusively for NSK VFA ball screws. This unit supports the outer diameter of the screw shaft.

Spacer

The shaft requires an optional spacer on the journal where the ball thread is cut through the bearing shoulder. This is common for R series for transportation ball screw shaft, when mounting the support unit for fixed support side.

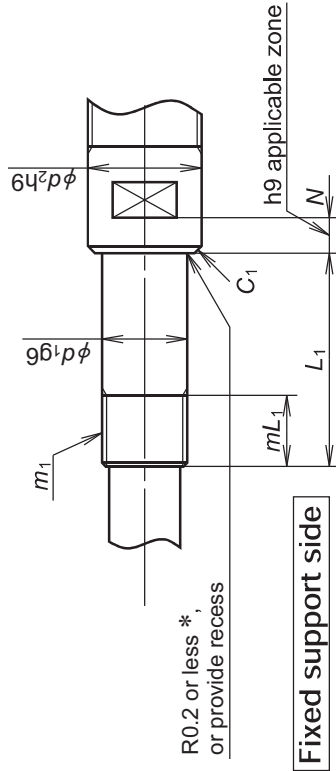


Units: mm

Reference no.	Internal diameter, d	Outside diameter, D	Width B	Applicable support unit
WBK06K	6	9.5	5.0	WBK06-**-*
WBK08K	8	11.5	5.5	WBK08-**-*
WBK10K	10	14.5	5.5	WBK10-**-*
WBK12K	12	15.0	5.6	WBK12-**-*
WBK15K	15	19.5	10.0	WBK15-**-*
WBK17K	17	24.4	7.0	WBK17-**-*
WBK20K	20	25.5	11.0	WBK20-**-*
WBK25K	25	32.0	14.0	WBK25-**-*

Screw shaft end configuration

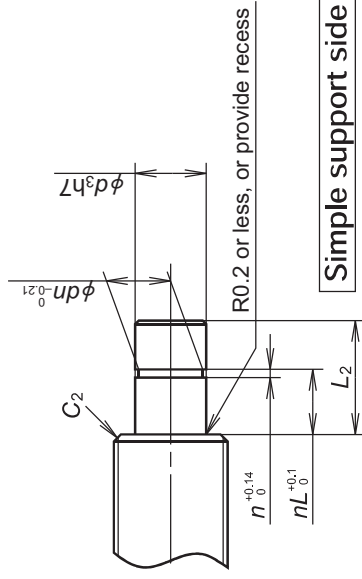
Dimensions of the shaft end configurations for the light load and small equipment support units, are shown in the table below. When using a spacer for a ball screw for transportation, add the width of the spacer (B from table of spacer dimensions on page B446) to the L_1 dimension below.



Radius marked with * above is 0.15 or less for WBK04R-11 and WBK06R-11.

Units: mm

Reference no.	Fixed support side			Sealing part			Chamfer
	Bearing journal	Locknut thread	Locknut thread	d_i	N	C_1	
WBK06-**-*	6	M6x0.75	7	9.5	3.5	0.2	
WBK08-**-*	8	M8x1	9	11.5	4	0.2	
WBK10-**-*	10	M10x1	10	14	6	0.2	
WBK12-**-*	12	M12x1	10	15	6	0.2	
WBK15-**-*	15	M15x1	15	19.5	5	0.3	
WBK17-**-*	17	M17x1	17	24	7	0.3	
WBK20-**-*	20	M20x1	16	25	10	0.3	
WBK25-**-*	25	M25x1.5	20	32	14	0.5	
WBK04R-11	4	M4x0.5	7.5	—	—	0.3	
WBK06R-11	6	M6x0.75	7.5	—	—	0.3	



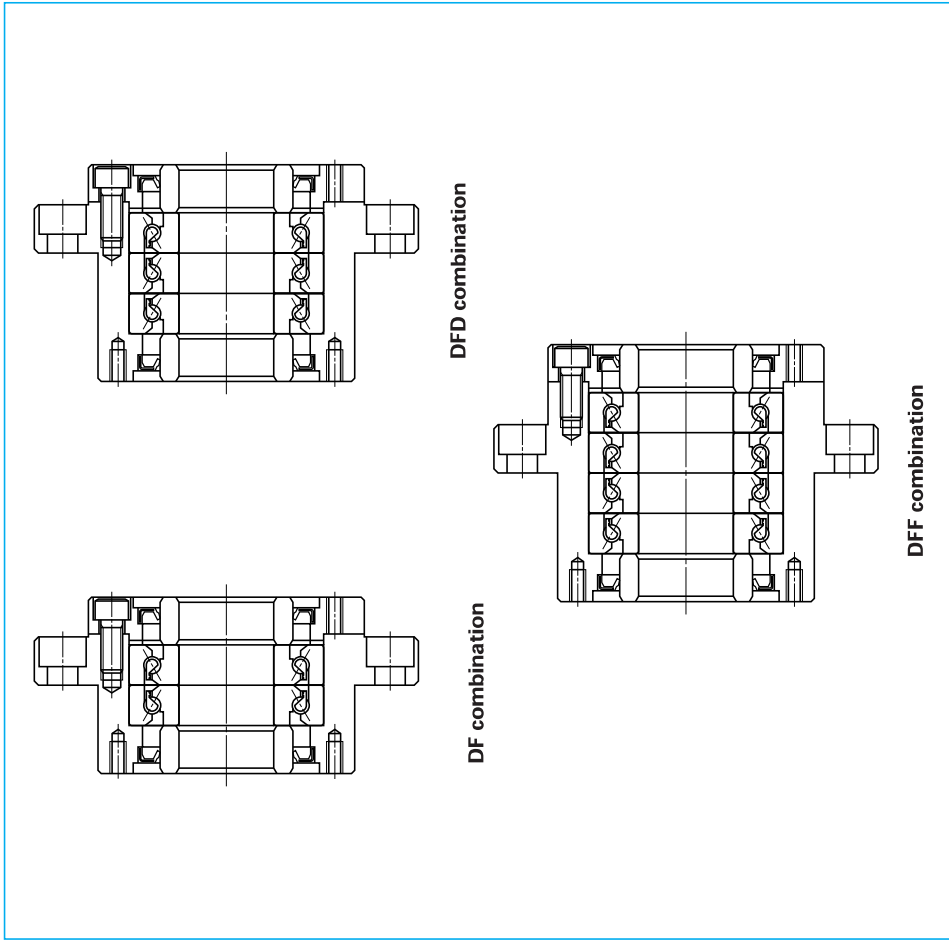
Units: mm

Reference no.	Bearing journal			Snap ring groove			Chamfer
	d_i	L_2	n	dh	nL	C_2	
WBK08S-**-*	6	9	0.8	5.7	6.8	0.2	
WBK10S-**-*	8	10	0.9	7.6	7.9	0.2	
WBK12S-**-*	10	22	1.15	9.6	9.15	0.5	
WBK15S-**-*	15	25	1.15	14.3	10.15	0.5	
WBK17S-**-*	17	16	1.15	16.2	13.15	0.5	
WBK20S-**-*	20	19	1.35	19	15.35	0.5	
WBK25S-**-*	25	20	1.35	23.9	16.35	0.5	

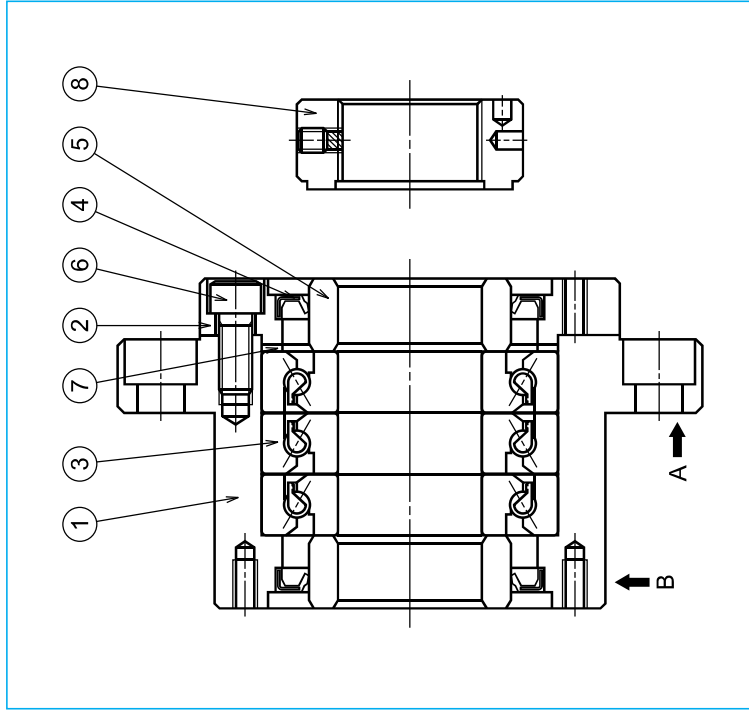
(2) Dimensions of support unit for ball screws for heavy-load/machine tools

Support units for heavy-load/machine tools use a thrust angular contact ball bearing (TAC Series) with high rigidity and accuracy. The thrust angular contact ball bearing has very

suitable functions and structure as a ball screw support bearing. There are three combinations as shown below.



Support Unit (For heavy load f/ machine tools)

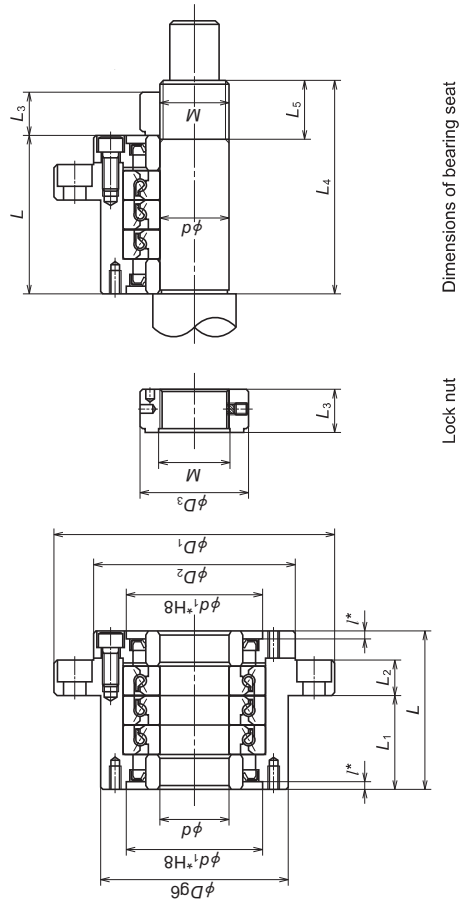


Parts list

Part number	Part name	Quantity
①	Housing	1
②	Retaining cover	1
③	High accuracy thrust angular contact ball bearing	One set
④	Dust seal	2
⑤	Collar	2
⑥	Preload bolt	6 or 8
⑦	Shim	One set
⑧	Lock nut	1

Remarks

1. Mount sections A and B to the machine base.
2. NSK support units are precisely preloaded and adjusted. Components ①, ②, ③, ④, ⑤, ⑥, ⑦ are assembled into a unit. Do not disassemble.
3. Grease is packed into the bearings.
4. Lock nut ⑧ is exclusively prepared for ball screw. The end face of the nut is in strict control being precisely perpendicular to the V thread. Secure the lock nut using the set screw. Lock nut is also available as an accessory (See page B453). Refer to Page B457 as well for high-precision thrust angular contact ball bearing (TAC Series).



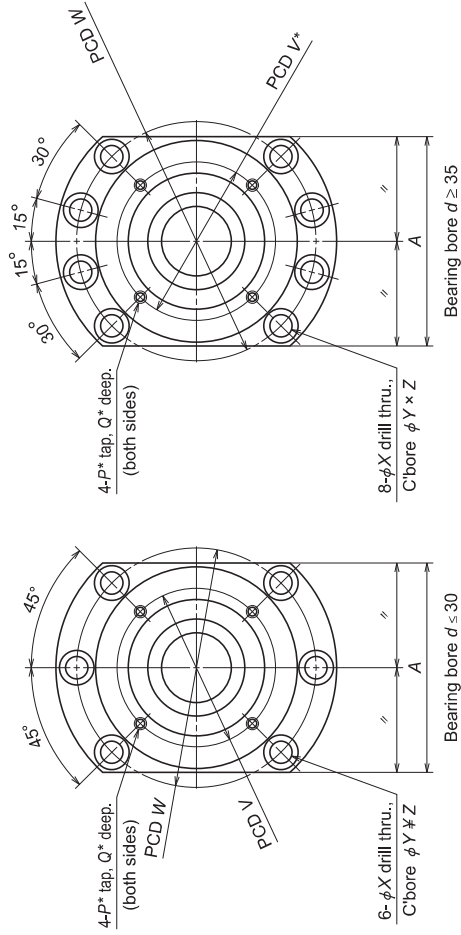
Dimensions of bearing seat

Lock nut

Support unit No.	Support unit																
	d	D	D1	D2	L	L1	L2	A	W	X	Y	Z	d1*	f*	V*	P*	Q*
WBK 17DF-31	17	70	106	72	60	32	15	80	88	9	14	8.5	45	3	58	M5	10
WBK 20DF-31	20	70	106	72	60	32	15	80	88	9	14	8.5	45	3	58	M5	10
WBK 25DF-31	25	85	130	90	81	48	18	100	110	11	17.5	11	57	4	70	M6	12
WBK 30DF-31	30	85	130	90	81	48	18	100	110	11	17.5	11	57	4	70	M6	12
WBK 30DF-31	30	85	130	90	81	48	18	100	110	11	17.5	11	57	4	70	M6	12
WBK 35DF-31	35	95	142	102	81	48	18	106	121	11	17.5	11	69	4	80	M6	12
WBK 35DF-31	35	95	142	102	81	48	18	106	121	11	17.5	11	69	4	80	M6	12
WBK 40DF-31	40	95	142	102	81	48	18	106	121	11	17.5	11	69	4	80	M6	12
WBK 40DF-31	40	95	142	102	81	48	18	106	121	11	17.5	11	69	4	80	M6	12

Remarks

1. Rigidity
Values in the Table are theoretical values obtained from the elastic deformation between the groove and the balls.
2. Starting torque
Starting torque indicates torque due to the preload of the bearing. It does not include seal torque.
3. The tolerance of the shaft bearing seat
We recommend h5 class of the fits tolerance.



Basic dynamic load rating C (N)	Permissible axial load (N)	Preload (N)	Axial rigidity (N/μm)	Maximum Starting torque (N·cm)	Lock nut		Mass (kg)	Bearing seat for unit			
					M	D1		d	L1	L2	
21900	26600	2150	750	19	M17x1	37	18	1.9	17	81	23
21900	26600	2150	750	19	M20x1	40	18	1.9	20	81	23
28500	40500	3150	1000	29	M25x1.5	45	20	3.1	25	89	26
46500	81500	4300	1470	39	M30x1.5	50	20	3.4	30	104	26
29200	43000	3350	1030	30	M30x1.5	50	20	3.0	30	89	26
47500	86000	4500	1520	40	M30x1.5	50	20	3.3	30	104	26
31000	50000	3800	1180	34	M35x1.5	55	22	4.3	35	107	30
50500	100000	5200	1710	45	M35x1.5	55	22	4.3	35	107	30
50500	100000	7650	2350	59	M40x1.5	60	22	5.0	40	122	30
31500	52000	3900	1230	36	M40x1.5	60	22	4.2	40	107	30
51500	104000	5300	1810	47	M40x1.5	60	22	4.2	40	107	30
51500	104000	7850	2400	61	M40x1.5	60	22	4.7	40	122	30

Remarks

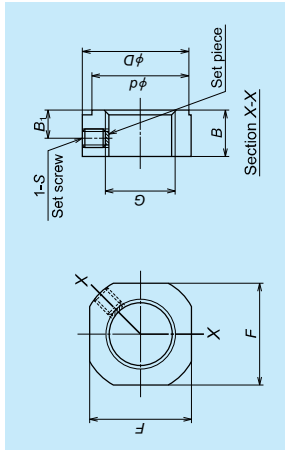
4. Dimensions with * (asterisk) mark
*Pilot diameter and tapped screws marked with *asterisk* are used for seal unit installation for NSK standard hollow shaft ball screws. They also can be used for dust cover and damper installation.
5. Grease is packed into the bearing. It is not necessary to apply grease before use.

Accessories

In addition to the support units, NSK has other components for the ball screw as shown below.

(3) Lock nuts

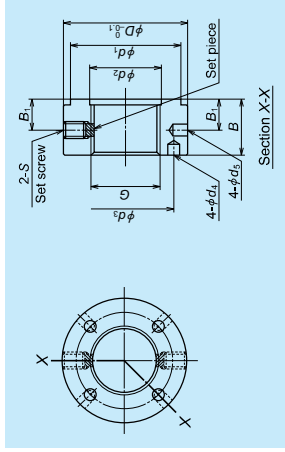
Ball screw support bearing must be installed



with minimum inclination. NSK lock nuts exclusive for ball screw help to reduce this inclination.

Lock nut, grease unit, and travel stopper

NSK



A Type Shapes and dimensions

A Type lock nuts

Lock nut reference number	G	D	F	B	d
WBK06L-01	M6×0.75	14.5	12	5	10
WBK08L-01	M8×1	17	14	6.5	13
WBK10L-01	M10×1	20	17	8	16
WBK12L-01	M12×1	22	19	8	17
WBK15L-01	M15×1	25	22	10	21
WBK17L-01	M17×1	29	24	13	24
WBK20L-01	M20×1	35	30	13	26
WBK25L-01	M25×1.5	42	36	16	34

Remarks: Insert a set piece (brass pad) and tighten the securing set screw.

S Type lock nuts

Lock nut reference number	G	D _h	B	d _i	d _e	d _o
WBK17L-31	M17×1	37	18	30	18	27
WBK20L-31	M20×1	40	18	30	21	30
WBK25L-31	M25×1.5	45	20	40	26	35
WBK30L-31	M30×1.5	50	20	40	31	40
WBK35L-31	M35×1.5	55	22	50	36	45
WBK40L-31	M40×1.5	60	22	50	41	50

S Type Shapes and dimensions

S Type lock nuts

B ₁	S	Tightening torque (N·cm) (for reference)	Set screw tightening torque (reference) (N·cm)	Unit: mm
2.75	M3, with brass made set piece	190	69 (M3)	<div style="text-align: right;">B 454</div>
4	M3, with brass made set piece	230	69 (M3)	
5	M4, with brass made set piece	280	147 (M4)	
5	M4, with brass made set piece	630	147 (M4)	
6	M4, with brass made set piece	790	147 (M4)	
8	M4, with brass made set piece	910	147 (M4)	
8	M4, with brass made set piece	1670	147 (M4)	
10	M6, with brass made set piece	2060	490 (M6)	

Unit: mm

d _i	d _e	B ₁	S	Tightening torque (N·cm) (for reference)	Set screw tightening torque (reference) (N·cm)	Unit: mm
4.3	4	10	M6	4100	490 (M6)	
4.3	4	10	M6	4500	490 (M6)	
4.3	4	11	M6	8500	490 (M6)	
4.3	5	11	M6	10100	490 (M6)	
4.3	5	12	M6	13800	490 (M6)	
4.3	5	12	M6	15500	490 (M6)	

(4) Grease unit

NSK has numerous grease types that are exclusive for ball screw lubrication. They come in bellows-shaped tubes, that can be attached to a grease gun quickly. For details of grease types, refer to Page D13 or for grease pump and nozzles, refer to Page D20.



NSK greases

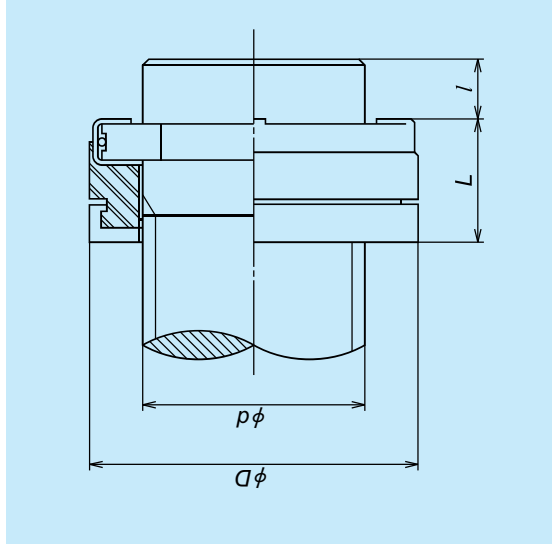
Lubricant greases

Name	Use	Base oil viscosity mm ² /s (40°C)
NSK Grease AS2	For heavy load	130
NSK Grease PS2	High-speed, light load	15
NSK Grease LR3	High-speed, medium load	30
NSK Grease LG2	Clean environment	30
NSK Grease LGU	Clean environment	100

(5) Travel stopper (by order)

A travel stopper is installed in some cases to prevent the nut from overrunning due to the malfunction of the safety system of the equipment or by human error. NSK has several types of series of shock-absorbing travel stoppers. Please request NSK for installation.

The travel stopper is not sold as a single item since it does not have a general use. Also, a travel stopper cannot be used for end cap type recirculation system, because the stopper would come directly into contact with the ball recirculating portion.



stopper No.	Applicable shaft dia. d	Outer dia. D	Length L	Unit: mm	
				Shaft end width (Min.) l	l
BSR 20	20	32	16	5	5
BSR 25	25	38	16	5	5
BSR 32	32	46	20	6	6
BSR 40	40	60	22	6	6
BSR 50	50	72	24	7	7
BSR 63	63	85	25	7	7

Remarks: This stopper is patented by NSK Ltd.



Shock-absorbing travel stopper

Thrust Angular Contact Ball Bearing for Ball Screw

(1) Features

This is highly rigid and accurate ball screw support bearing often used for the machine tool driving mechanism.

- ① High axial rigidity
Uses many balls, and set high contact angle at 60 degrees.
- ② Small friction torque
Friction torque is smaller than that of tapered or cylindrical roller bearing. This contributes to accurate rotation by a small driving power.
- ③ Axial play is pre-adjusted
Combination bearings are already adjusted to a suitable preload. Universal combination bearing (SU) furnishes certain preload for all combinations (DB, DF, and other).
- ④ Simple mounting structure
A duplex combination of bearings can receive axial and radial loads. Therefore, the installation structure is simpler than when both a thrust bearing and a radial bearing are used.
- ⑤ Easy handling
Inner and outer rings are inseparable, and are easy to handle.
- ⑥ Superb polyamide resin retainer
Uses polyamide resin retainer which is superb to friction and furnishes high precision rotations.

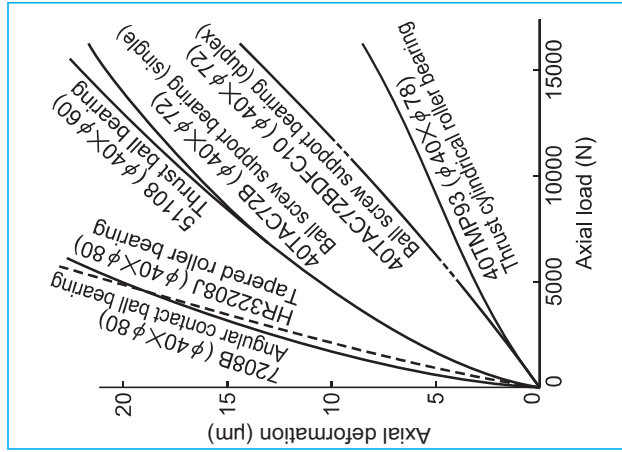


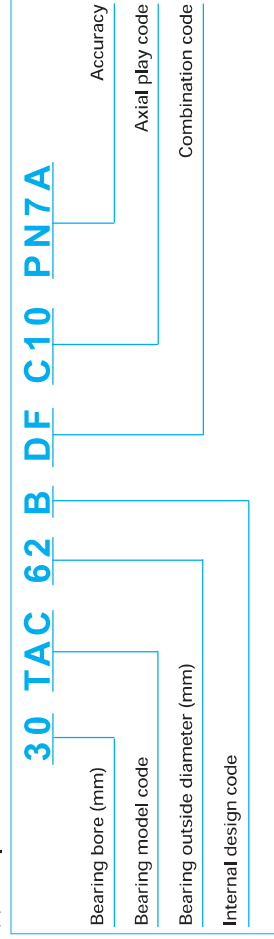
Fig. 1 Axial rigidity of various bearings

Table 2 Comparison with other types of bearings

Bearing type	Bearing rigidity (See Fig. 1)	Starting torque	Preload adjustment	Installation structure
Thrust angular contact ball bearing for NSK precision ball screw support unit	High	Low	Not required	Simple
Combined angular contact ball bearing	Low	Low	Not required	Simple
Combination of tapered roller bearings	Low	High	Complicated	Simple
Thrust ball bearing and radial bearing	High	Low	Complicated	Complicated
Thrust cylindrical roller bearing and radial bearing	Extremely high	Extremely high	Complicated	Complicated

Note : Consult NSK when you use these bearings other than the purpose of ball screw support.

(2) Composition of reference number



Remark : As "30 TAC 62 B," any part of the first half of the reference number is referred to as "nominal size" in this catalog.

(3) Bearing combinations

Generally, a set uses more than two pieces (referred to as 'two rows') of bearings and, thus the preload is applied.

There are two types of combination:

● Bearing combination

Bearings are adjusted as a single combined set. Since the bearing alignment is pre-set, there is no interchangeability:

● Universal combination bearing (SU)

A combination of independent bearings, which is manufactured as a single bearing. Bearings are randomly-matched to obtain required preload by more than one of randomly picked up bearings.

① Bearing combination

- Figure 2 shows examples of combinations. There is "V" mark on the outside surface of the bearing to avoid misarrangement. A complete letter "V" should be formed when all bearings align correctly to form a set.
- DF combination which easily absorbs misalignment with the ball screw nut is used in general.

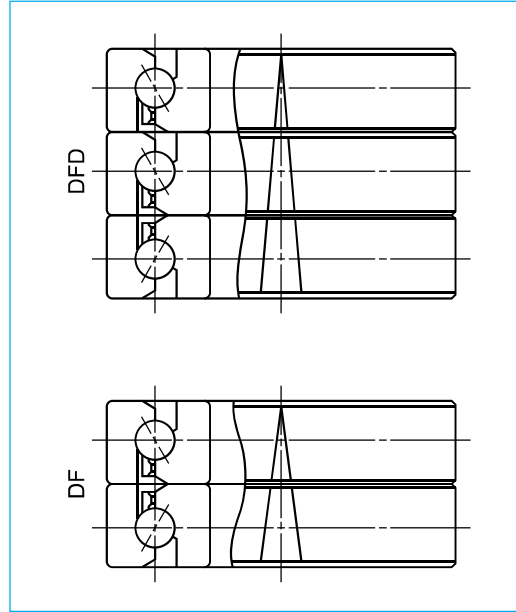


Fig. 2 Examples of combination and "V" mark

② Universal combination bearing (SU)

- Unlike the above case, marks on the bearing outside surface do not form a letter "V." The tip of the "V" on each bearing simply indicates the direction to which axial load can be applied.

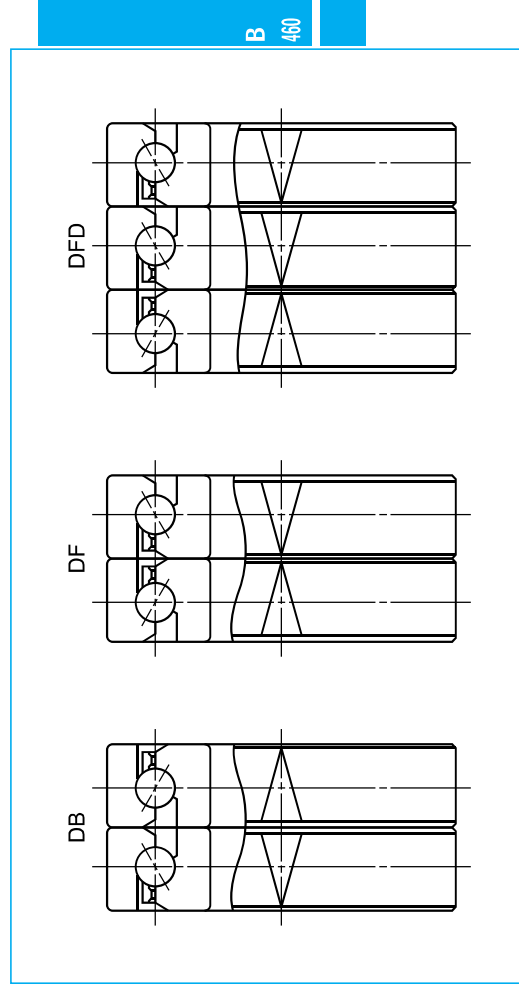


Fig. 3 Example of universal combination (SU) and "V" mark

(4) Preload, rigidity, and starting torque

The table 3 shows preload, rigidity (spring modulus), and starting torque with grease lubrication. (The starting torque should be 1.4 times higher when oil is used as a lubricant.) Consult NSK for the bearing combinations not included in the Table below.

(5) Accuracy

① Accuracy grades

Uses NSK standard PN7A and PN7B which are equivalent to JIS4 grade of the radial ball bearing. Combined bearing ——— PN7A
Universal combination bearing ——— PN7B
However, PN7A is stricter than JIS4 grade regarding axial run out of inner and outer rings. PN7B is stricter regarding the tolerance of the bore and outside diameter (Table 4).

Table 3 Preload, rigidity, and starting torque

Reference number	Duplex combination DF			Triplex combination DFD		
	Axial play code	Preload (N)	Rigidity (N/μm)	Starting torque (N·m)	Axial play code	Preload (N)
15TAC 47B	C10	2150	750	0.14	C10	2950
17TAC 47B	C10	2150	750	0.14	C10	2950
20TAC 47B	C10	2150	750	0.14	C10	2950
25TAC 62B	C10	3150	1000	0.23	C10	4300
30TAC 62B	C10	3350	1030	0.24	C10	4500
35TAC 72B	C10	3800	1180	0.28	C10	5200
40TAC 72B	C10	3900	1230	0.28	C10	5300
40TAC 90B	C10	5000	1320	0.48	C10	6750
45TAC 75B	C10	4100	1270	0.29	C10	5600
45TAC 100B	C10	5900	1520	0.58	C10	8050
50TAC 100B	C10	6100	1570	0.60	C10	8250
55TAC 100B	C10	6100	1570	0.60	C10	8250
55TAC 120B	C10	6650	1810	0.64	C10	9100
60TAC 120B	C10	6650	1810	0.64	C10	9100

Table 4 Tolerance: thrust angular contact ball bearing for ball screw support

Nominal size of bearing bore or outside diameter (mm)	Tolerance of bore						Tolerance of outside diameter						Tolerance of inner ring width or outer ring					
	Accuracy grade		Accuracy grade		Accuracy grade		Accuracy grade		Accuracy grade		Accuracy grade		Accuracy grade		Accuracy grade		Accuracy grade	
	PN7A	PN7B	PN7A	PN7B	PN7A	PN7B	PN7A	PN7B	PN7A	PN7B	PN7A	PN7B	PN7A	PN7B	PN7A	PN7B	Maximum	
over	upper	lower	upper	lower	upper	lower	upper	lower	upper	lower	upper	lower	upper	lower	upper	lower	Maximum	
10	0	-4	0	-4	-	-	-	0	-80	2.5								
18	0	-5	0	-4	-	-	-	0	-120	2.5								
30	0	-6	0	-4	0	-4	0	-4	0	-120	2.5							
50	0	-7	0	-5	0	-5	0	-5	0	-150	2.5							
80	0	-8	0	-6	0	-6	0	-6	0	-200	2.5							

Remarks : The tolerance of the outer ring width is the same as that of the inner ring width of the same bearing.

② Fits

Table 5 shows recommended values of the tolerance of shaft and housing bore.

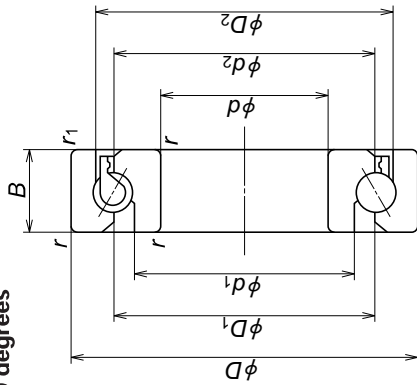
Rigidity (N/μm)	Starting torque (N·m)	Axial play code	Preload (N)	Rigidity (N/μm)	Starting torque (N·m)	Quadruplet combination DFF	
						Preload (N)	Rigidity (N/μm)
1080	0.20	C10	4300	1470	0.29		
1080	0.20	C10	4300	1470	0.29		
1080	0.20	C10	4300	1470	0.29		
1470	0.31	C10	6250	1960	0.46		
1520	0.33	C10	6650	2010	0.49		
1710	0.37	C10	7650	2350	0.55		
1810	0.38	C10	7850	2400	0.57		
1960	0.65	C10	10300	2650	0.96		
1910	0.40	C10	8250	2550	0.59		
2210	0.78	C10	11800	3000	1.16		
2300	0.80	C10	12300	3100	1.18		
2300	0.80	C10	12300	3100	1.18		
2650	0.86	C10	13200	3550	1.27		
2650	0.86	C10	13200	3550	1.27		

Table 5 Tolerance of shaft bearing seat and housing bore

Size of shaft or housing bore (mm)	Tolerance of bearing seat		Tolerance of housing hole	
	upper	lower	upper	lower
10	0	-8	-	-
18	0	-9	-	-
30	0	-11	+16	0
50	0	-13	+19	0
80	0	-15	+22	0

TACB

Nominal contact angle 60 degrees



Dynamic equivalent load $P_a = X F_r + Y F_a$

Bearing configuration Combination code Name of the row that receives axial load	Duplex		Triplex		Quadruplet				
	DF	DT	DFD	DTD	DFT	DFF			
	One row		Two rows		Three rows				
$e=2.17$	X	1.9	-	1.43	2.33	-	1.17	2.33	2.53
$F_a/F_r \leq e$	Y	0.54	-	0.77	0.35	-	0.89	0.35	0.26
$F_a/F_r > e$	X	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
	Y	1	1	1	1	1	1	1	1

External dimensions (mm)			Dimensions (mm)			Permissible rotational speed (mm ⁻¹)		Bearing No.			
d	D	B	d ₁	d ₂	D ₁	D ₂	Grease lubrication		Oil lubrication		
15	47	15	1	0.6	27.2	34	34	39.6	6000	8000	15TAC 47B
17	47	15	1	0.6	27.2	34	34	39.6	6000	8000	17TAC 47B
20	47	15	1	0.6	27.2	34	34	39.6	6000	8000	20TAC 47B
25	62	15	1	0.6	37	45	45	50.7	4500	6000	25TAC 62B
30	62	15	1	0.6	39.5	47	47	53.2	4300	5600	30TAC 62B
35	72	15	1	0.6	47	55	55	60.7	3600	5000	35TAC 72B
40	72	15	1	0.6	49	57	57	62.7	3600	4800	40TAC 72B
40	90	20	1	0.6	57	68	68	77.2	3000	4000	40TAC 90B
45	75	15	1	0.6	54	62	62	67.7	3200	4300	45TAC 75B
45	100	20	1	0.6	64	75	75	84.2	2600	3600	45TAC 100B
50	100	20	1	0.6	67.5	79	79	87.7	2600	3400	50TAC 100B
55	100	20	1	0.6	67.5	79	79	87.7	2600	3400	55TAC 100B
55	120	20	1	0.6	82	93	93	102.2	2200	3000	55TAC 120B
60	120	20	1	0.6	82	93	93	102.2	2200	3000	60TAC 120B

Note : (1) Values are based on a standard preload (C10).

Basic dynamic load rating C ₀				Permissible axial load				Mass (kg)
One row sustaining load DF (N)	Two rows sustaining load DT, DFD, DFF (N)	Three rows sustaining load DTD, DFT (N)	One row sustains load DF (N)	Two rows sustain load DT, DFD, DFF (N)	Three rows sustain load DTD, DFT (N)	(Reference)		
21900	35500	47500	26600	53000	79500		0.144	
21900	35500	47500	26600	53000	79500	0.144		
21900	35500	47500	26600	53000	79500	0.135		
28500	46500	61500	40500	81500	122000	0.252		
29200	47500	63000	43000	86000	129000	0.224		
31000	50500	67000	50000	100000	150000	0.310		
31500	51500	68500	52000	104000	157000	0.275		
59000	95500	127000	89500	179000	269000	0.674		
33000	53500	71000	57000	114000	170000	0.270		
61500	100000	133000	99000	198000	298000	0.842		
63000	102000	136000	104000	208000	310000	0.778		
63000	102000	136000	104000	208000	310000	0.714		
67500	109000	145000	123000	246000	370000	1.23		
67500	109000	145000	123000	246000	370000	1.16		

* "Row" means the quantity of bearings that receive axial load.

"Two rows" means two bearings are receiving axial load.