

# Ball Screw Support Units - Classification

**Table 5 Support unit categories**

Application	Shape	Support side	Bearing in use	Bearing bore Bearing seat diameter	Page	
Small equipment, light load	Square	 WBK**-01	Fixed support side	Angular contact ball bearing	ø6~ø25	26
		 WBK**S-01	Simple support side	Deep groove ball bearing	ø6~ø25	28
Small equipment, light load	Round	 WBK**-11	Fixed support side	Angular contact ball bearing	ø6~ø25	30
Machine tools, heavy load	Round	 WBK**DF*-31	Fixed support side	Thrust angular contact ball bearing	ø17~ø40	32

## Features

- Short delivery time: Standardized items in stock.
  - Use most suitable bearings.
- 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.

- High dust prevention, and low friction torque.  
Oil seal is installed in small clearance on the fixed support side. A deep-groove ball bearing with a shield on both sides is used on the simple support side. This minimizes friction torque.
- Lock nut is provided.  
A lock nut of fine grade finish is provided to fix the bearing with high precision.

# Ball Screw Support Units - Reference Numbers

(For light load)

**Example: W B K 0 8 S - 0 1 A**

Product code for support unit

Nominal size code\*

Mounting code

No code: Fixed support unit  
S: Simple support unit

No code or A: For general 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 (Page 29).

(For heavy load)

**Example: W B / B K 2 5 D F - 3 1**

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  
DFF : Face to face quadruplex combination

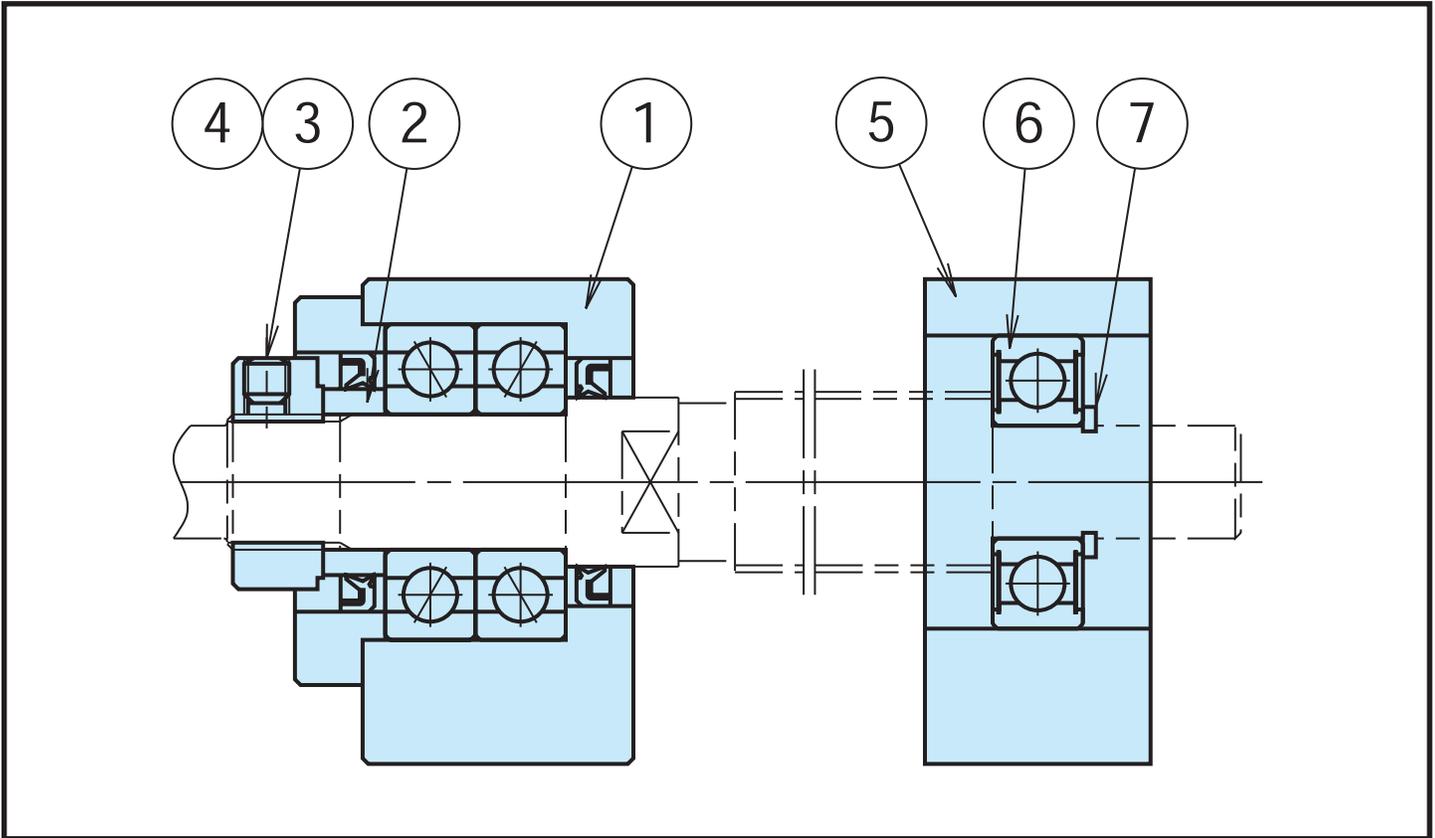
Design serial number

# Ball Screw Support Units - Components

Support units provide everything necessary for mounting ball screws to machines.

(Please refer to Table 6.)

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



## Antirust treatment

Table 7 shows the surface treatment for the bearing housing and material of small parts.

**Table 6**

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

**Table 7**

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

# Ball Screw Support Units - Light Loads

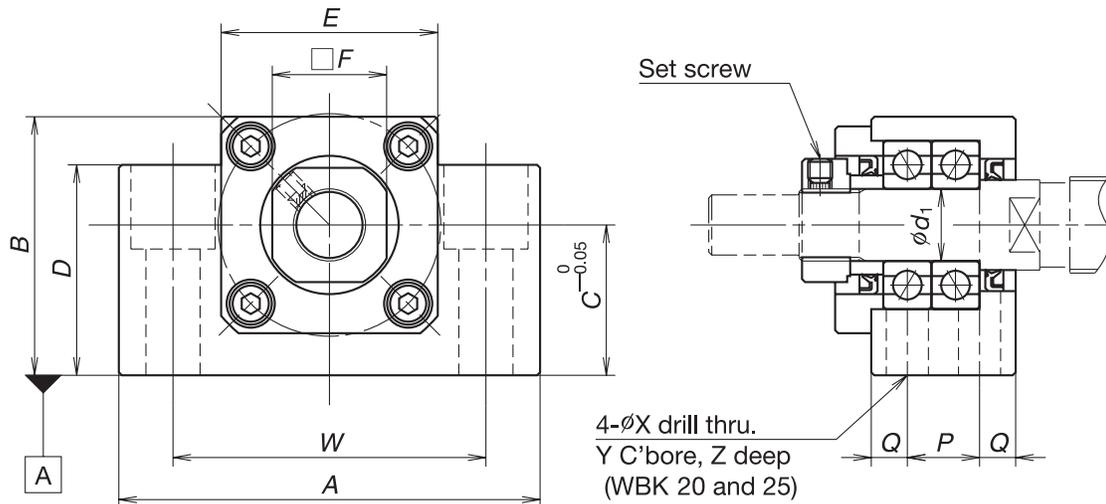
**Table 8 Specifications of support unit for general use**

Fixed support side support unit					Simple support side support unit		
Reference no.	Axial direction			Maximum starting torque [N·cm]	Reference no.	Bearing reference no.	Radial direction
	Basic dynamic load rating Ca [N]	Load limit [N]	Stiffness [N/μm]				Basic dynamic load rating C [N]
WBK06-01A (SQUARE) WBK06-11 (ROUND)	2 670	1 040	28	0.49	—	—	—
WBK08-01A (SQUARE) WBK08-11 (ROUND)	4 400	1 450	49	0.88	WBK08S-01 (SQUARE)	606ZZ	2 260
WBK10-01A (SQUARE) WBK10-11 (ROUND)	6 600	2 730	94	1.9	WBK10S-01 (SQUARE)	608ZZ	3 300
WBK12-01A (SQUARE) WBK12-11 (ROUND)	7 100	3 040	104	2.1	WBK12S-01 (SQUARE)	6000ZZ	4 550
WBK15-01A (SQUARE) WBK15-11 (ROUND)	7 600	3 380	113	2.4	WBK15S-01 (SQUARE)	6002ZZ	5 600
WBK20-01 (SQUARE) WBK20-11 (ROUND)	17 900	8 240	155	6.0	WBK20S-01 (SQUARE)	6204ZZ	12 800
WBK25-01 (SQUARE) WBK25-11 (ROUND)	20 200	10 000	192	7.2	WBK25S-01 (SQUARE)	6205ZZ	14 000

# Support Unit

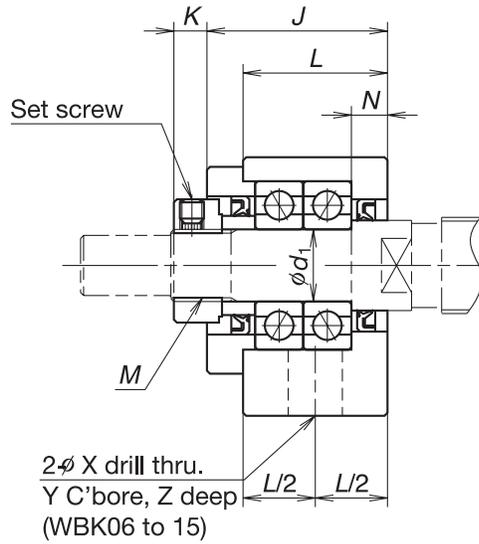
(Support units for light load and small equipment)

Fixed support side, support unit (square type)



Reference no.	Fixed support side support unit (square type)							
For general use	$d_1$	A	B	C	D	E	F	J
WBK06-01A	6	42	25	13	20	18	12	20
WBK08-01A	8	52	32	17	26	25	14	23
WBK10-01A	10	70	43	25	35	36	17	30
WBK12-01A	12	70	43	25	35	36	19	30
WBK15-01A	15	80	50	30	40	41	22	31
WBK20-01	20	95	58	30	45	56	30	52
WBK25-01	25	105	68	35	25	66	36	61

- Notes:
1. Use datum face A to mount a machine base.
  2. Tighten a set screw after a locknut is adjusted and tightened.
  3. Insert the set piece that is provided with support unit to a screw hole, and then tighten the set screw.



Reference no.	Locknut tightening torque (reference) [N•cm]	Set screw tightening torque (reference) [N•cm]
WBK06-**	245	69 (M3)
WBK08-**	490	69 (M3)
WBK10-**	930	147 (M4)
WBK12-**	1 370	147 (M4)
WBK15-**	2 350	147 (M4)
WBK20-**	4 700	147 (M4)
WBK25-**	8 400	490 (M6)

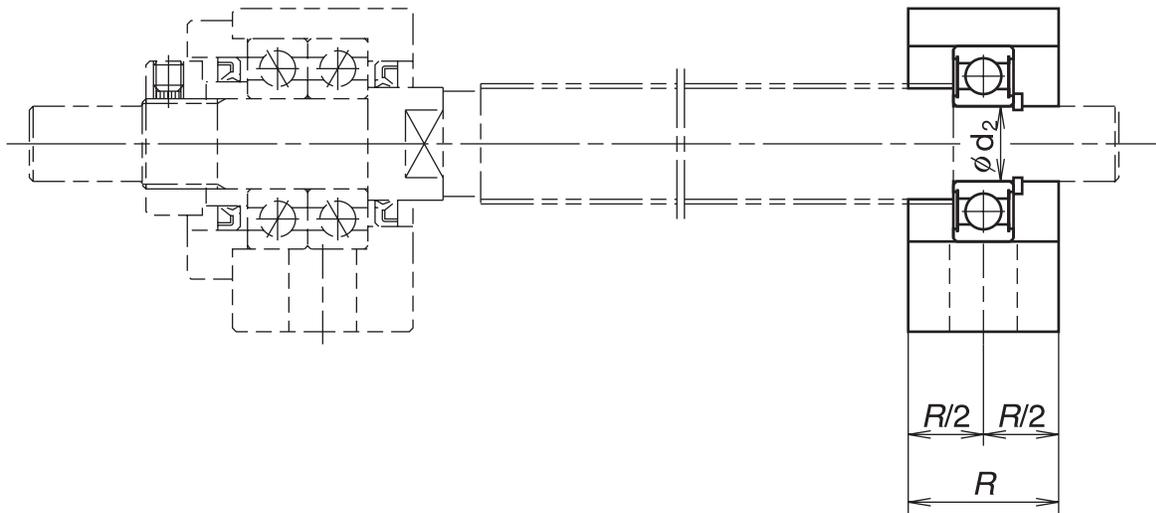
Unit: mm

Fixed support side support unit (square type)									
$K$	$L$	$N$	$P$	$Q$	$W$	$X$	$Y$	$Z$	$M$
5.5	—	3.5	—	—	30	5.5	9.5	11	M6 x 0.75
7	—	4	—	—	38	6.6	11	12	M8 x 1
5.5	24	6	—	—	52	9	14	11	M10 x 1
5.5	24	6	—	—	52	9	14	11	M12 x 1
12	25	5	—	—	60	11	17	15	M15 x 1
10	42	10	22	10	75	11	17	15	M20 x 1
13	48	14	30	9	85	11	No counter bores		M25 x 1.5

# Support Unit

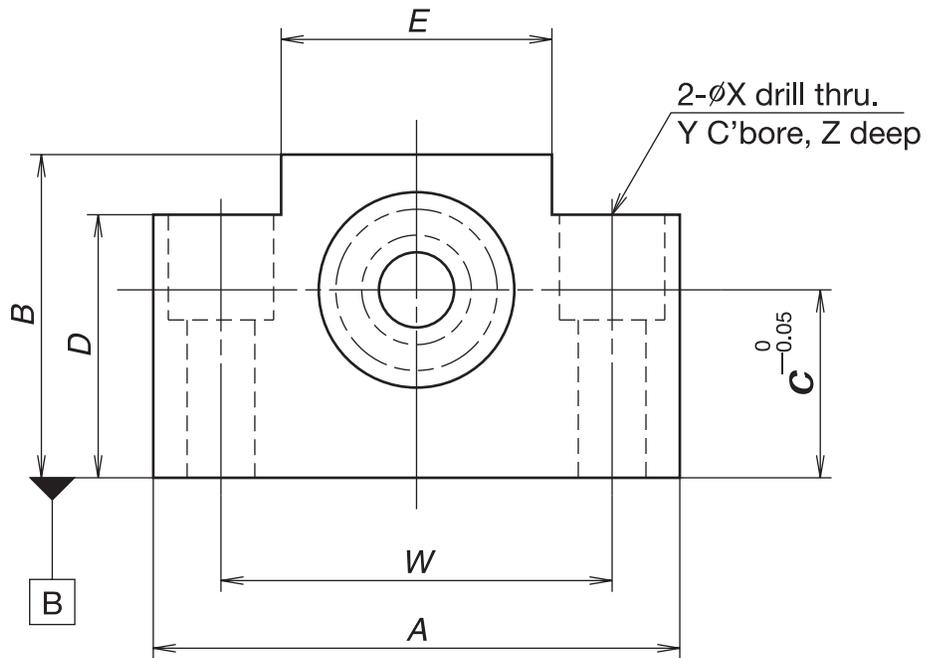
(Support units for light load and small equipment)

Simple support side, support unit (square type)



Reference no.	Simple support side support unit (square type)			
For general use	$d_2$	$R$	$A$	$B$
<b>WBK08S-01</b>	6	15	52	32
<b>WBK10S-01</b>	8	20	70	43
<b>WBK12S-01</b>	10	20	70	43
<b>WBK15S-01</b>	15	20	80	50
<b>WBK20S-01</b>	20	26	95	58
<b>WBK25S-01</b>	25	30	105	68

Notes: 1. Use datum face B to mount a machine base.



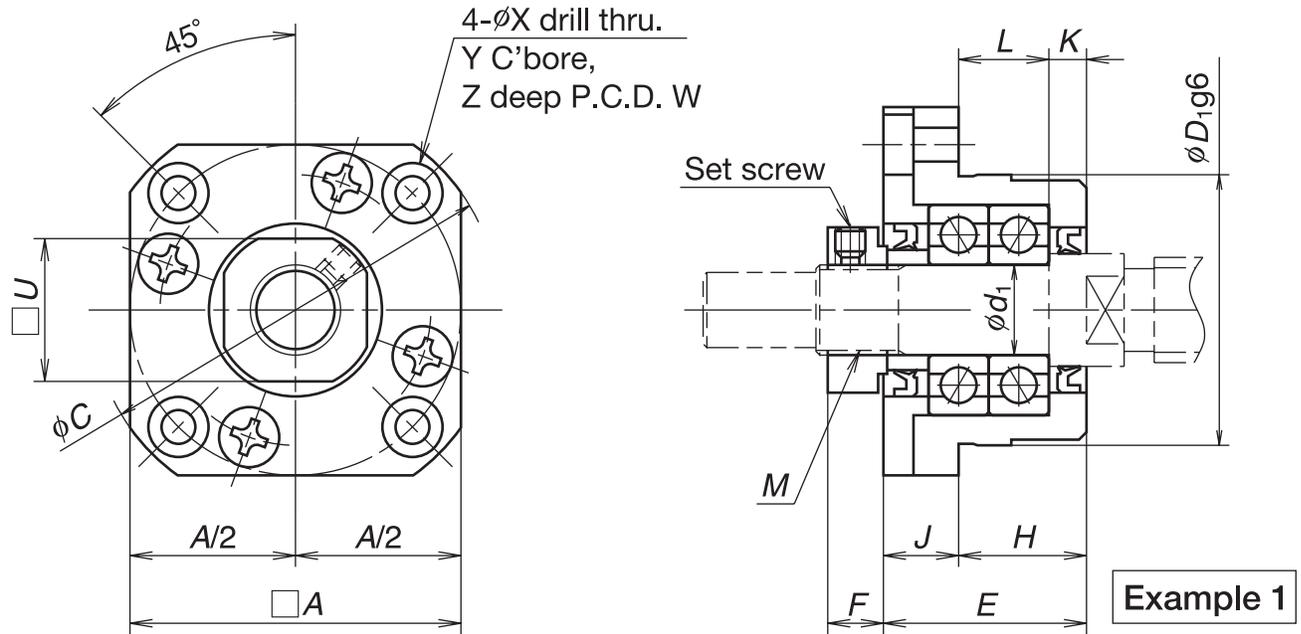
Unit: mm

Fixed support side support unit (square type)						
C	D	E	W	X	Y	Z
17	26	25	38	6.6	11	12
25	35	36	52	9	14	11
25	35	36	52	9	14	11
30	40	41	60	9	14	11
30	45	56	75	11	17	15
35	25	66	85	11	No counter bores	

# Support Unit

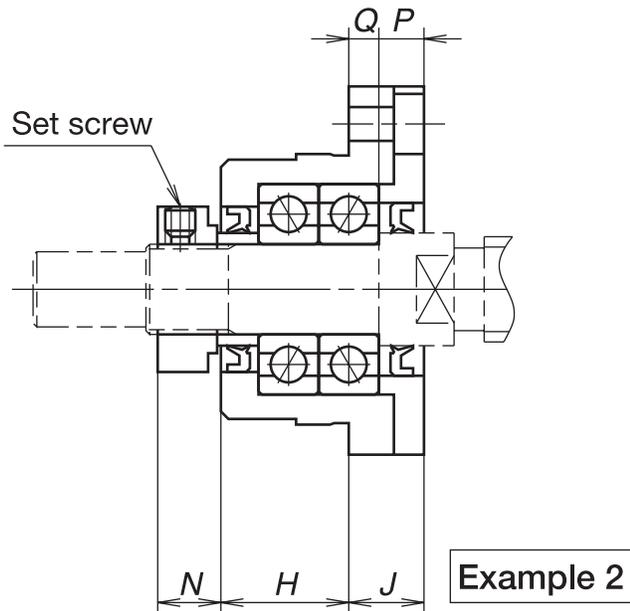
(Support units for light load and small equipment)

Fixed support side, support unit (round type)



Reference no.	Fixed support side support unit (square type)								
For general use	$d_1$	A	C	$D_1$	E	F	H	J	K
WBK06-11	6	28	35	22	20	5.5	13	7	3.5
WBK08-11	8	35	43	28	23	7	14	9	4
WBK10-11	10	42	52	34	27	7.5	17	10	5
WBK12-11	12	44	54	36	27	7.5	17	10	5
WBK15-11	15	52	63	40	32	12	17	15	6
WBK20-11	20	68	85	57	52	10	30	22	10
WBK25-11	25	79	98	63	57	13	30	27	10

- Notes:
1. Tighten a set screw after a locknut is adjusted and tightened.
  2. Insert the set piece that is provided with support unit to a screw hole, and then tighten the set screw.



Reference no.	Locknut tightening torque (reference) [N•cm]	Set screw tightening torque (reference) [N•cm]
WBK06-**	245	69 (M3)
WBK08-**	490	69 (M3)
WBK10-**	930	147 (M4)
WBK12-**	1 370	147 (M4)
WBK15-**	2 350	147 (M4)
WBK20-**	4 700	147 (M4)
WBK25-**	8 400	490 (M6)

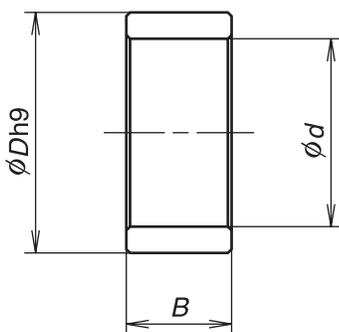
Unit: mm

Fixed support side support unit (square type)									
<i>L</i>	<i>N</i>	<i>P</i>	<i>Q</i>	<i>U</i>	<i>W</i>	<i>X</i>	<i>Y</i>	<i>Z</i>	<i>M</i>
9.5	6.5	4.5	2.5	12	28	2.9	5.5	3.5	M6 x 0.75
10	8	5	4	14	35	3.4	6.5	4	M8 x 1
12	8.5	6	4	17	42	4.5	8	4	M10 x 1
12	8.5	6	4	19	44	4.5	8	4	M12 x 1
11	14	8	7	22	50	5.5	9.5	6	M15 x 1
20	14	14	8	30	70	6.6	11	10	M20 x 1
20	20	17	10	36	80	9	15	13	M25 x 1.5

### Spacer

It requires an optional spacer to the side where ball thread is cut through, such as a rolled ball screw shaft when mounting the support unit for fixed support side.

Unit: mm



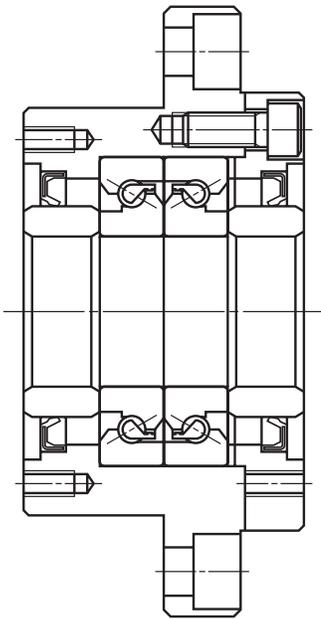
Reference no.	Internal diameter, d	Outside diameter, D	Width B	Applicable support unit
WBK06K	6	9.5	5.0	WBK06-**
WBK08K	8	11.5	5.5	WBK08-**
WBK10K	10	14.5	5.5	WBK10-**
WBK12K	12	15.0	5.6	WBK12-**
WBK15K	15	19.5	10.0	WBK15-**
WBK20K	20	25.5	11.0	WBK20-**
WBK25K	25	32.0	14.0	WBK25-**

Note: Refer to page 20 for spacer location.

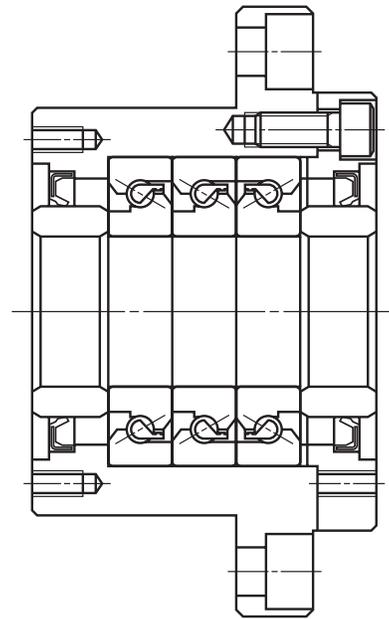
# Ball Screw Support Units - Heavy Loads

## Dimensions of support unit: heavy-load applications

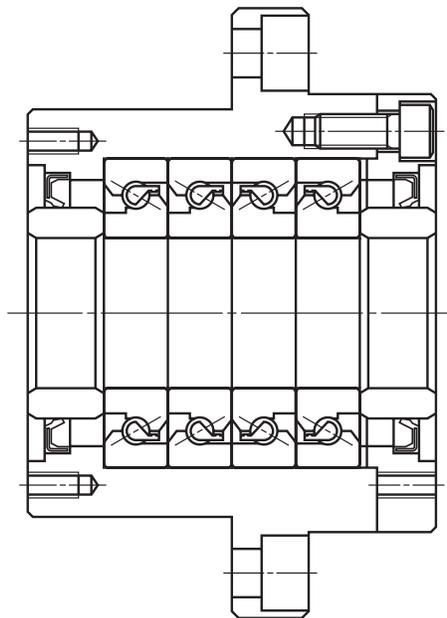
Support units for heavy-load / machine tools use a thrust angular contact ball bearing (TAC Series) with high rigidity and accuracy. The thrust angular contact ball bearing has very suitable functions and structure as a ball screw support bearing. There are three combinations as shown below.



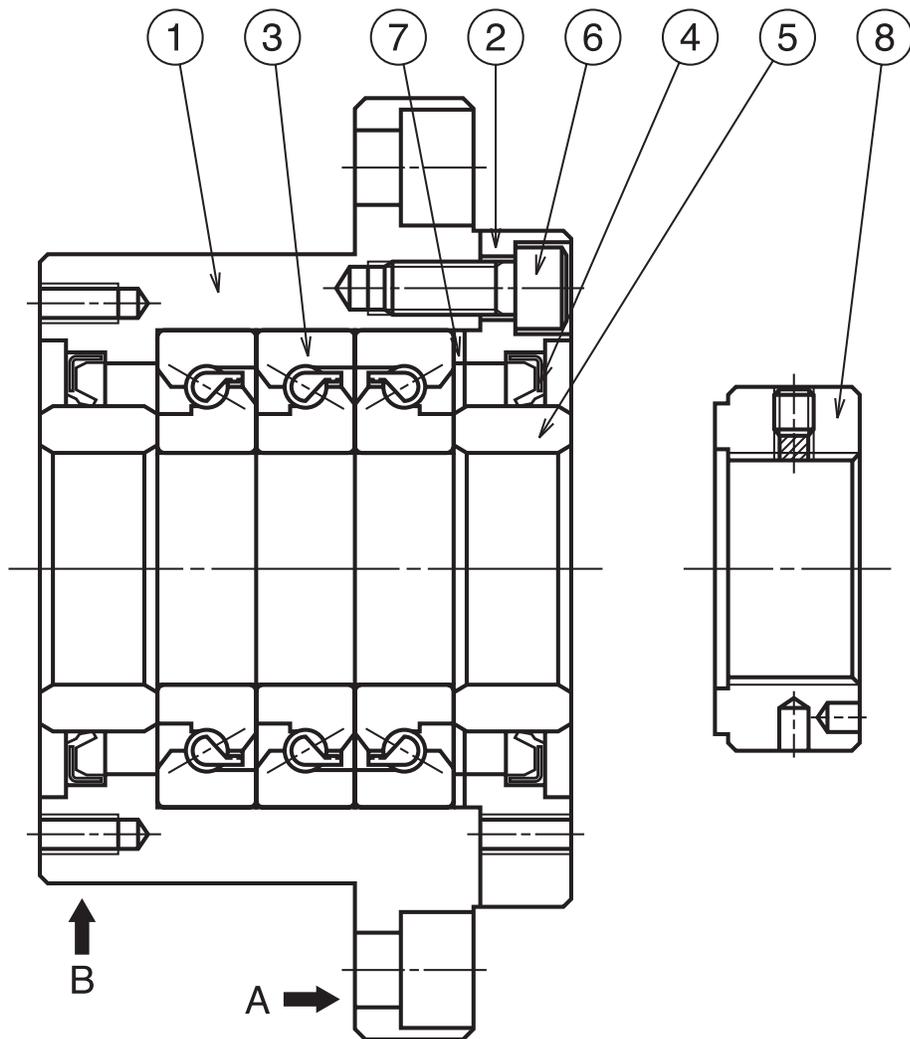
**DF combination**



**DFD combination**



**DFF combination**



### Parts list

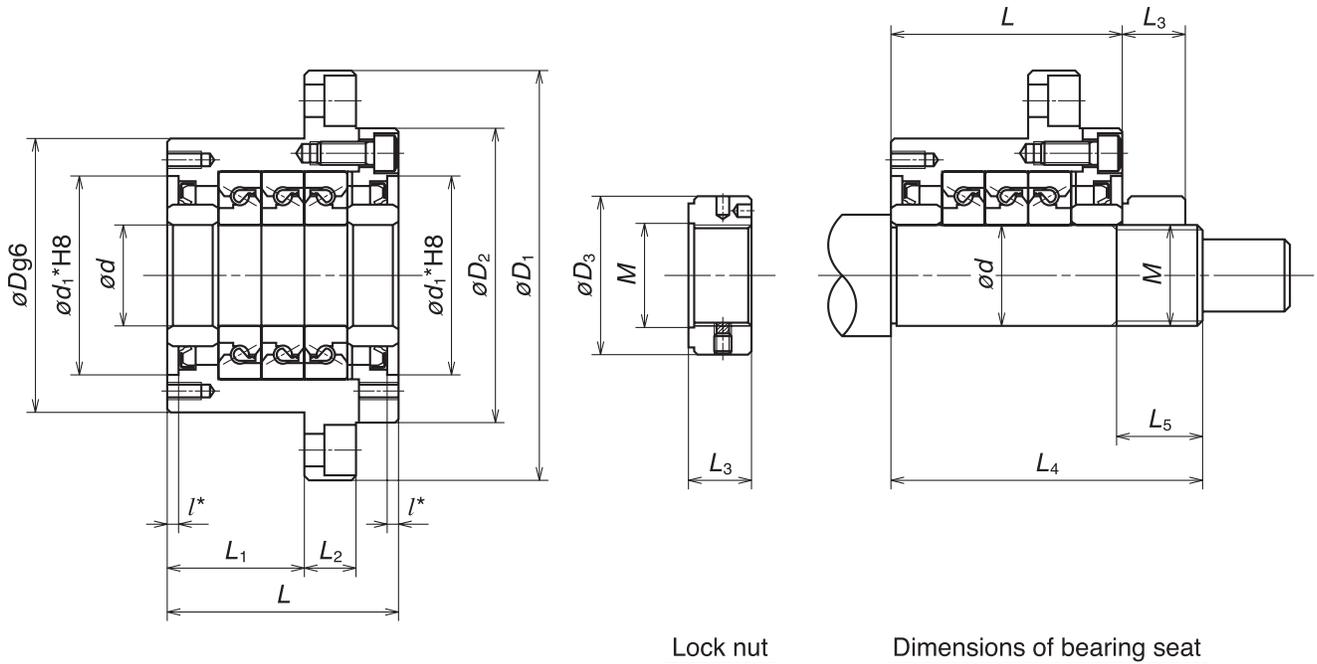
Part number	Part name	Quantity
①	Housing	1
②	Retaining cover	1
③	High accuracy thrust angular contact ball bearing	One set
④	Dust seal	2
⑤	Collar	2
⑥	Preload bolt	6 or 8
⑦	Shim	One set
⑧	Lock nut	1

### 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, ⑥ and 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.

# Support Unit

## For heavy load applications



Support unit No.	Support unit																
	<i>d</i>	<i>D</i>	<i>D</i> <sub>1</sub>	<i>D</i> <sub>2</sub>	<i>L</i>	<i>L</i> <sub>1</sub>	<i>L</i> <sub>2</sub>	<i>A</i>	<i>W</i>	<i>X</i>	<i>Y</i>	<i>Z</i>	<i>d</i> <sub>1</sub> <sup>*</sup>	<i>l</i> <sup>*</sup>	<i>V</i> <sup>*</sup>	<i>P</i> <sup>*</sup>	<i>Q</i> <sup>*</sup>
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	66	33	18	100	110	11	17.5	11	57	4	70	M6	12
WBK 25DFD-31					81	48											
WBK 30DF-31	30	85	130	90	66	33	18	100	110	11	17.5	11	57	4	70	M6	12
WBK 30DFD-31					81	48											
WBK 35DF-31	35	95	142	102	66	33	18	106	121	11	17.5	11	69	4	80	M6	12
WBK 35DFD-31					81	48											
WBK 35DFF-31					96	48											
WBK 40DF-31	40	95	142	102	66	33	18	106	121	11	17.5	11	69	4	80	M6	12
WBK 40DFD-31					81	48											
WBK 40DFF-31					96	48											

Remarks 1. Rigidity

Values in the Table are theoretical values obtained from the elastic deformation between the groove and the balls.

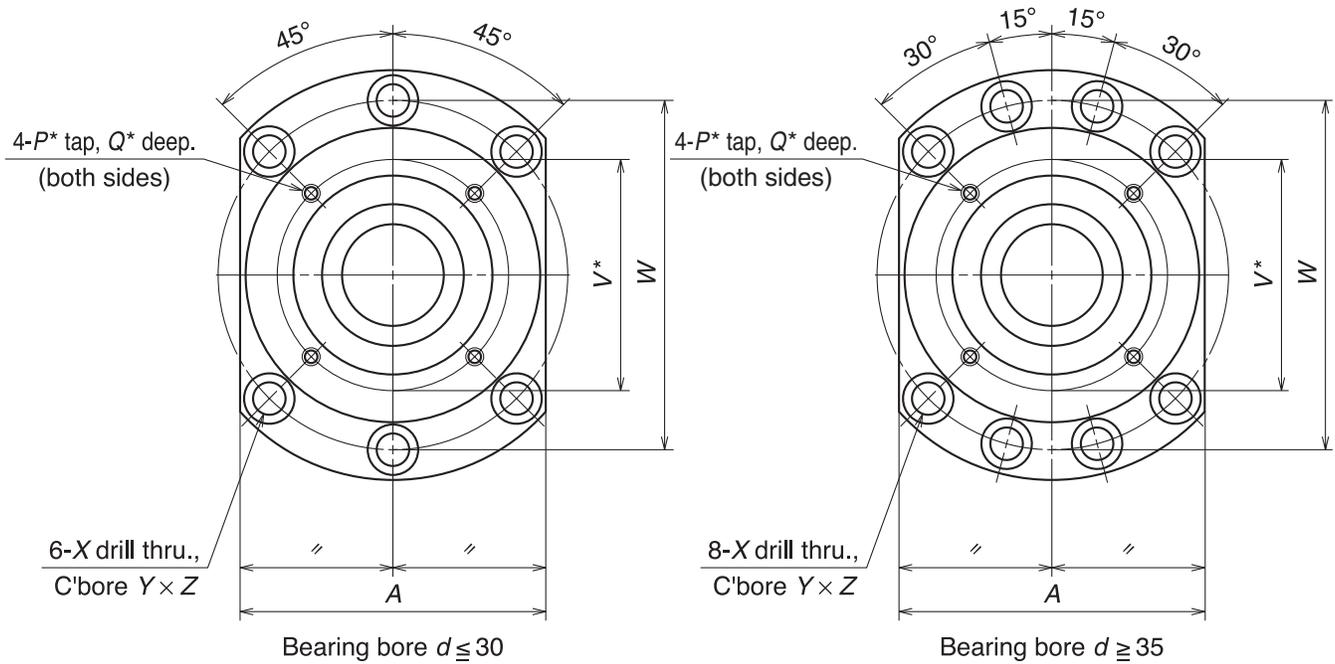
2. Starting torque

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.

# WBK\*\*DF, DFD, DFF



Unit: mm

Basic dynamic load rating $C_a$ (N)	Permissible axial load (N)	Preload (N)	Axial rigidity (N/μm)	Starting torque (N·cm)	Lock nut			Mass (kg)	Bearing seat for unit		
					M	$D_3$	$L_3$		d	$L_4$	$L_5$
21900	26600	2150	750	19	M17 x 1	37	18	1.9	17	81	23
21900	26600	2150	750	19	M20 x 1	40	18	1.9	20	81	23
28500	40500	3150	1000	29	M25 x 1.5	45	20	3.1	25	89	26
46500	81500	4300	1470	39				3.4		104	
29200	43000	3350	1030	30	M30 x 1.5	50	20	3.0	30	89	26
47500	86000	4500	1520	40				3.3		104	
31000	50000	3800	1180	34	M35 x 1.5	55	22	3.4	35	92	30
50500	100000	5200	1710	45				4.3		107	
50500	100000	7650	2350	59				5.0		122	
31500	52000	3900	1230	36	M40 x 1.5	60	22	3.6	40	92	30
51500	104000	5300	1810	47				4.2		107	
51500	104000	7850	2400	61				4.7		122	

Remarks 4. Dimensions with \* (asterisk)

\*Pilot diameter and tapped screws marked with "" 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.