Overview of THK Ball Screws

Positioning Ball Screw

A15-72

ISO 3408 compliant

Preload	Preload/ No preload
SDAN-V	**SDA-V**
Caged Ball	Caged Ball
Double nut	High speed
High speed	Various leads
Compact	Compact
SDAN-VX	**SDA-VZ**
Double nut	High speed
High speed	Various leads
Compact	Compact
EPB-V	**EBB-V**
High speed	High speed
Compact	Compact

Positioning Ball Screw

A15-98

Preload	Preload/ No preload	No preload
SBN-V	**BNK**	**MDK**
Caged Ball	Standard to super lead	**MBF**
High speed		Miniature
SBK		**BNF-V**
Caged Ball		High speed
High speed		**DK**
Large lead		Compact
BIF-V		**WHF**
High speed		High speed
BNFN-V		Large lead
Double nut		**BLK**
High speed		**WGF**
DIK		Large lead
Compact		**BNT**
DKN		Flat nut
Compact		
Double nut		
BLW		
Double nut		
Large lead		

[DN Value]

The permissible rotational speed of the Ball Screw must be obtained from the critical speed of the screw shaft and the DN value. The permissible rotational speed determined by the DN value is obtained using the equations (8) to (17) below.

Model No.				Permissible rotational speed determined by the DN value N_2	Guideline for maximum rotational speed
Precision	Caged Ball	Model SBK (SBK3636, SBK4040, and SBK5050)	Large lead	$N_2 = \frac{210000}{D}$ ·····(8-1)	5000
		Model SBK (Other than the above model numbers and the small size model SBK*)		$N_2 = \frac{160000}{D}$ ·····(8-2)	4230
		Models SBN-V (Medium), HBN-V	Standard lead	$N_2 = \frac{160000}{D}$ ·····(9-1)	5000
		Models SBN-V (Small), HBN, and SBKH		$N_2 = \frac{130000}{D}$ ·····(9-2)	5000
		Models HBN-K and HBN-KA		$N_2 = \frac{120000}{D}$ ·····(9-3)	1810
		Models SDAN-V and SDA-V	Standard lead/ Large lead	$N_2 = \frac{160000}{D}$ ·····(10)	5000
	Full-Complement Ball	Models SDAN-VX and SDA-VZ (shaft diameters ϕ28 to 63)	Standard lead/ Large lead	$N_2 = \frac{130000}{D}$ ·····(11-1)	4480
		Model SDA-VZ (shaft diameters ϕ10 to 25)		$N_2 = \frac{100000}{D}$ ·····(11-2)	5000
		Model WHF	Super lead	$N_2 = \frac{120000}{D}$ ·····(12-1)	5000
		Model WGF		$N_2 = \frac{70000}{D}$ ·····(12-2)	5000
		Models BLW, BLK, BLR, BNS, BNS-B, BNS-A, and NS	Large lead	$N_2 = \frac{70000}{D}$ ·····(13)	5000
		Models BIF-V (Medium), BNFN-V (Medium), and BNF-V (Medium)	Standard lead	$N_2 = \frac{130000}{D}$ ·····(14-1)	4950
		Models BIF-V (Small), BNFN-V (Small), and BNF-V (Small)		$N_2 = \frac{100000}{D}$ ·····(14-2)	5000
		Models BIF, DIK, BNFN, DKN, BNF, BNT, DK, MDK, MBF, BNK, and DIR		$N_2 = \frac{70000}{D}$ ·····(14-3)	5000
	Full-Complement Ball (DIN Standard Compliant)	Models EPB-V, EBB-V (2806 to 8020)	Standard lead	$N_2 = \frac{130000}{D}$ ·····(14-4)	4480
		Models EPB-V, EBB-V (1605 to 2512)			5000
Rolled	Full-Complement Ball	Models WTF and CNF	Super lead	$N_2 = \frac{70000}{D}$ ·····(15)	4440
		Models BLK and BLR	Large lead	$N_2 = \frac{70000}{D}$ ·····(16)	4440
		Model BTK-V	Standard lead	$N_2 = \frac{100000}{D}$ ·····(17-1)	5000
		Models JPF, BNT, and MTF		$N_2 = \frac{50000}{D}$ ·····(17-2)	5000

N_2 : Permissible rotational speed determined by the DN value (min^{-1})

D : Ball center-to-center diameter
(indicated in the specification tables of the respective model number)

When considering the rotational speed, the permissible rotational speed is regarded as the lower of the following maximum rotational speed guidelines: the critical speed of the screw shaft (N_1) or the permissible rotational speed determined by the DN value (N_2).

If the service rotational speed exceeds the guidelines for maximum rotational speed, contact THK.

Selecting a Nut

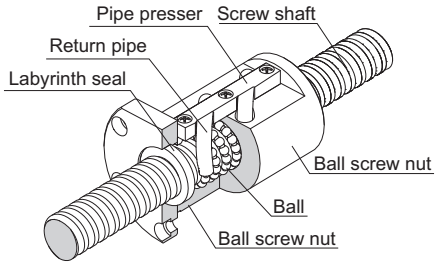
Types of Nuts

The nuts of the Ball Screws are categorized by the ball circulation method into the return-pipe type, the deflector type and end the cap type. These three nut types are described as follows.
In addition to the circulation methods, the Ball Screws are categorized also by the preloading method.

[Types by Ball Circulation Method]

- **Return-Pipe Type**
  (Models SBN-V (Medium), BIF-V (Medium), BIF, BNF-V (Medium), BNF, BNFN-V (Medium), BNFN, BNT, BTK-V), Return-Piece Type
  (Models SBN-V (Small), HBN, BIF-V (Small), BNF-V (Small), BNFN-V (Small))

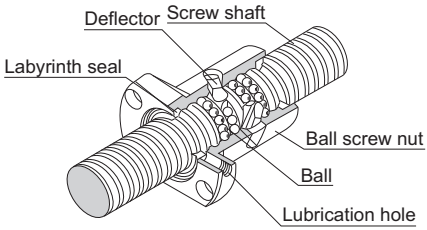
These are the most common types of nuts, which use a return pipe for ball circulation. The return pipe allows balls to be picked up, pass through the pipe and return piece, and return to their original positions to circulate endlessly.



Example of Structure of Return-Pipe Nut

- **Deflector Type**
  (Models EBB-V, EPB-V, DK, DKN, DIK, JPF, DIR and MDK)

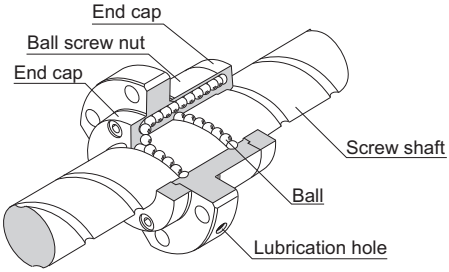
These are the most compact type of nut. The balls change their traveling direction with a deflector, pass over the circumference of the screw shaft, and return to their original positions to complete an infinite motion.



Example of Structure of Simple Nut

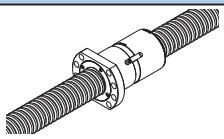
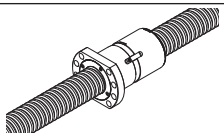
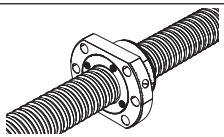
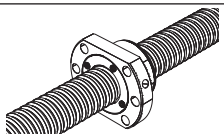
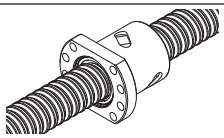
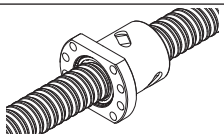
- **End-cap Type: Large lead Nut**
  (Models SBK, SBKH, WHF, BLK, WGF, BLW, WTF, CNF and BLR)

These nuts are most suitable for the fast feed. The balls are picked up with an end cap, pass through the through hole of the nut, and return to their original positions to complete an infinite motion.



Example of Structure of Large lead Nut

Positioning, ISO 3408 compliant

Series	Type		Features	
Positioning	SDAN-V		Double-nut, Compact Nut, high DN value	
	SDAN-VX		Double-nut, Compact Nut, high DN value	
	SDA-V		Compact Nut, high DN value	
	SDA-VZ		Compact Nut, high DN value	
	EPB-V		Compact nut	
	EBB-V		Compact nut	

Standard combinations of outer diameters and leads of the screw shafts

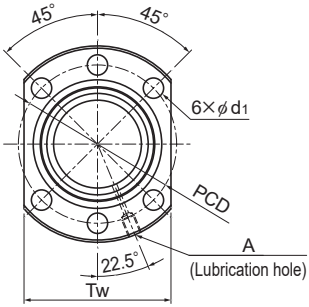
Shaft diameter	Lead							
	4	5	6	8	10	12	16	
10	SDA-VZ	SDA-VZ			SDA-VZ			
12		SDA-VZ			SDA-VZ			
14		SDA-V						
15		SDA-V			SDA-V			
16		SDA-V EBB-V EPB-V			SDA-V		SDA-V	
20	SDA-V EBB-V EPB-V	SDA-V EBB-V EPB-V	EBB-V EPB-V	EBB-V EPB-V	SDA-V EBB-V EPB-V	EBB-V EPB-V		
25	EBB-V EPB-V	SDA-V EBB-V EPB-V	EBB-V EPB-V	EBB-V EPB-V	SDA-V EBB-V EPB-V	EBB-V EPB-V		
28			SDA-V EBB-V EPB-V					
31					SDA-V SDAN-V	SDA-V SDAN-V	SDA-V SDAN-V	
32	EBB-V EPB-V	SDA-V SDAN-V EBB-V EPB-V	SDAN-V EBB-V EPB-V	SDAN-V EBB-V EPB-V	SDA-V SDAN-V EBB-V EPB-V	SDAN-V	SDAN-V	
36	EBB-V EPB-V		SDAN-V EBB-V EPB-V	EBB-V EPB-V	SDA-V SDAN-V	SDA-V SDAN-V	SDA-V SDAN-V	
38					SDA-V SDAN-V	SDA-V SDAN-V	SDA-V SDAN-V	
40	EBB-V EPB-V	EBB-V EPB-V	EBB-V EPB-V	SDAN-VX EBB-V EPB-V	SDAN-V EBB-V EPB-V	SDAN-V EBB-V EPB-V	SDAN-V	
45					SDA-V SDAN-V	SDA-V SDAN-V	SDA-V SDAN-V	
50		EBB-V EPB-V		EBB-V EPB-V	SDA-V SDAN-V EBB-V EPB-V	SDA-V SDAN-V	SDA-V SDAN-V	
55					SDAN-VX	SDAN-VX	SDAN-VX	
63					SDAN-VX EBB-V EPB-V	SDAN-VX EBB-V	SDAN-VX EBB-V	
80					EBB-V	EBB-V	EBB-V	

Unit: mm

	Lead						
	20	25	30	32	36	40	50
	SDA-VZ		SDA-VZ				
	SDA-V		SDA-V				
	SDA-V		SDA-V			SDA-V	
	SDA-V	SDA-V	SDA-V				SDA-V
	SDA-V SDAN-V			SDA-V			
	SDAN-V						
	SDA-V SDAN-V				SDA-V		
	SDA-V SDAN-V	SDA-V	SDA-V			SDA-V	
	SDAN-V EBB-V						
	SDA-V SDAN-V	SDA-V	SDA-V			SDA-V	
	SDA-V SDAN-V EBB-V	SDA-V SDAN-V	SDA-V SDAN-V			SDA-V SDAN-V	SDA-V
	SDAN-VX						
	SDAN-VX EBB-V	SDAN-VX	SDAN-VX			SDAN-VX	
	EBB-V						

EBB-V
Oversized-ball Preload / No Preload

DN value	130000



Model No.	Screw shaft outer diameter d	Lead Ph	Ball center-to-center diameter dp	Thread minor diameter d_c	Loaded circuits Rows x turns	Basic load rating Ca kN	Basic load rating C_0a kN	Rigidity K N/μm
EBB 1605V-4	16	5	16.75	13.49	4×1	11.9	17.4	207
EBB 2004V-8	20	4	20.5	18.06	8×1	14.9	30.9	487
EBB 2005V-3	20	5	20.75	17.49	3×1	10.6	17.3	198
EBB 2006V-6	20	6	21	16.93	6×1	25.0	40.8	376
EBB 2008V-6	20	8	21	16.93	6×1	24.9	40.8	375
EBB 2010V-6	20	10	21.25	16.36	6×1	31.4	49.0	385
EBB 2504V-8	25	4	25.5	23.06	8×1	16.4	39.0	583
EBB 2505V-3	25	5	25.75	22.49	3×1	12.1	22.6	245
EBB 2506V-6	25	6	26	21.93	6×1	29.0	54.1	472
EBB 2508V-6	25	8	26	21.93	6×1	28.9	54.1	472
EBB 2510V-3	25	10	26	21.93	3×1	15.9	27.0	243
EBB 2510V-4	25	10	26	21.93	4×1	20.9	37.6	320
EBB 2512V-4	25	12	26.25	21.36	4×1	25.4	42.3	322
EBB 2806V-6	28	6	29	24.93	6×1	31.7	64.1	542
EBB 3204V-10	32	4	32.5	30.06	10×1	22.3	63.9	892
EBB 3205V-3	32	5	32.75	29.49	3×1	13.9	30.2	308
EBB 3205V-4	32	5	32.75	29.49	4×1	17.8	40.3	405
EBB 3205V-6	32	5	32.75	29.49	6×1	25.1	60.4	597
EBB 3206V-8	32	6	33	28.93	8×1	43.3	98.9	800
EBB 3208V-8	32	8	33.25	28.36	8×1	52.9	110.5	772
EBB 3210V-3	32	10	33.75	27.24	3×1	32.1	52.2	301
EBB 3210V-4	32	10	33.75	27.24	4×1	41.3	69.7	396
EBB 3604V-6	36	4	36.5	34.04	6×1	15.3	44.3	616
EBB 3606V-8	36	6	37	32.93	8×1	45.8	112.4	885
EBB 3608V-8	36	8	37.25	32.36	8×1	57.4	129.7	879

Note) When the QZ Lubricator and W wiper ring are attached, the overall length of the nut dimensions will increase.Contact THK for details.

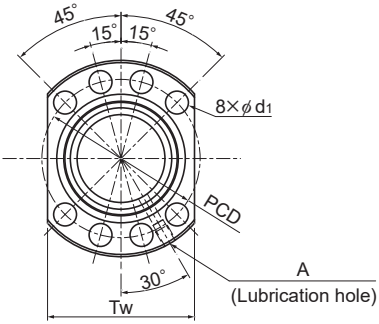
Model number coding

EBB3205V-6 RR G0 +650L C3

- EBB3205V-6: Model No.
- RR: Seal symbol (RR : Labyrinth seal, WW : Wiper ring.)
- G0: Clearance symbol
- +650L: Ball screw shaft length (mm)
- C3: Accuracy symbol

EBB-V
Oversized-ball Preload / No Preload

DN value	130000



Model No.	Screw shaft outer diameter d	Lead Ph	Ball center-to-center diameter dp	Thread minor diameter d_c	Loaded circuits Rows x turns	Basic load rating Ca kN	Basic load rating C_0a kN	Rigidity K N/μm
EBB 4004V-6	40	4	40.5	38.06	6×1	15.9	49.4	670
EBB 4005V-6	40	5	40.75	37.49	6×1	26.6	77.5	727
EBB 4006V-12	40	6	41	36.93	12×1	68.1	188.7	1423
EBB 4008V-8	40	8	41.25	36.36	8×1	61.3	148.9	982
EBB 4010V-3	40	10	41.75	35.24	3×1	37.3	69.3	378
EBB 4010V-4	40	10	41.75	35.24	4×1	47.6	92.4	497
EBB 4012V-8	40	12	41.75	35.2	8×1	86.4	184.8	963
EBB 4020V-3	40	20	41.75	35.24	3×1	36.8	69.3	376
EBB 5005V-12	50	5	50.75	47.49	12×1	56.0	198.3	1708
EBB 5008V-8	50	8	51.25	46.36	8×1	67.5	187.7	1177
EBB 5010V-4	50	10	51.75	45.24	4×1	54.3	120.5	617
EBB 5020V-3	50	20	52.25	44.11	3×1	55.3	108.8	465
EBB 6310V-4	63	10	64.75	58.2	4×1	61.9	161.0	775
EBB 6312V-4	63	12	65.25	57.1	4×1	80.9	189.1	759
EBB 6316V-4	63	16	65.7	56.0	4×1	134.0	306.4	970
EBB 6320V-3	63	20	65.7	56.0	3×1	104.4	229.3	736
EBB 8010V-4	80	10	81.75	75.2	4×1	68.6	206.9	943
EBB 8012V-4	80	12	82.25	74.1	4×1	92.1	251.7	953
EBB 8016V-4	80	16	82.7	73.0	4×1	154.7	413.2	1233
EBB 8020V-4	80	20	82.7	73.0	4×1	154.5	413.2	1232

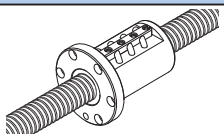
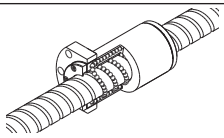
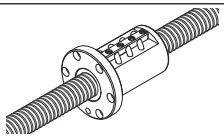
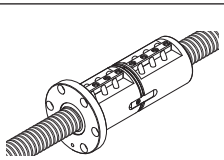
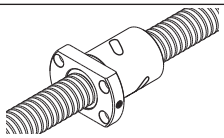
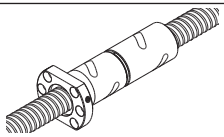
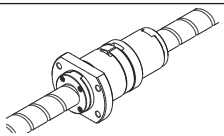
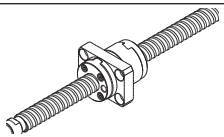
Note) When the QZ Lubricator and W wiper ring are attached, the overall length of the nut dimensions will increase.Contact THK for details.

Model number coding

EBB4005V-6 RR G0 +650L C3

- EBB4005V-6: Model No.
- RR: Seal symbol (RR : Labyrinth seal, WW : Wiper ring.)
- G0: Clearance symbol
- +650L: Ball screw shaft length (mm)
- C3: Accuracy symbol

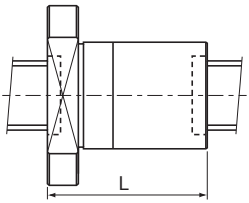
Positioning Ball Screw

Series	Type		Features	
Positioning	SBN-V		Caged Ball, Single nut, high DN value	
	SBK		High DN value, large lead	
	BIF-V		Single nut, high DN value	
	BNFN-V		Double nut, high DN value	
	BNFN		Double nut, large	
	DIK		Compact nut, preload	
	DKN		Compact nut	
	BLW		Large lead	
	BNK Standardized finished shaft end		Standard to Super Lead	

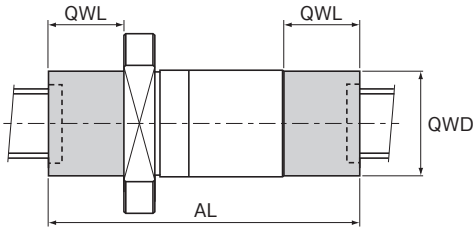
	Caged ball	Compact nut	Miniature	High load capacity	Offset Preload	Double-nut Preload	DN Value	Shaft diameter (mm)	Lead (mm)	Page No.
	✓				✓		130000	16 to 32	4 to 10	A15-106
							160000	25 to 50	8 to 20	A15-108
	✓				✓		210000	36 to 50	36 to 50	A15-110
							160000	15 to 55	10 to 36	A15-112
					✓		100000	16 to 32	4 to 6	A15-114
							130000	25 to 50	8 to 20	A15-116
				✓		✓	100000	16 to 32	5 to 6	A15-120
							130000	28 to 50	10 to 16	A15-120
						✓	70000	55 to 100	10 to 20	A15-122
		✓			✓		70000	14 to 63	4 to 16	A15-126
		✓		✓		✓	70000	40 to 63	20	A15-132
						✓	70000	15 to 50	10 to 50	A15-134
					✓		70000	4 to 25	1 to 20	A15-136

Dimensions of Each Model with an Option Attached

Dimensions of the Ball Screw Nut Attached with Wiper Ring W and QZ Lubricator



With WW (without QZ)



With QZ and WW

Note) For models BLW, BLK (precision and rolled), WGF, BNK1510 or higher (excluding BNK2010), WTF, and CNF, a wiper ring is attached to the outside of the nut.

Unit: mm

Model No.		WW availability	QZ availability	Dimensions including WW	Length of protrusion with QZ attached	Outer diameter of protrusion with QZ attached	Dimensions including QZ and WW
				L	QWL	QWD	AL
	1605V-4	○	○	55	25	27	111
	2004V-8	○	×	69	—	—	—
	2005V-3	○	○	50	26.5	33	109
	2006V-6	○	○	74	30	34	139
	2008V-6	○	○	88	25	34	143
	2010V-6	×	×	—	—	—	—
	2504V-8	○	○	70	34	37	134
	2505V-3	○	○	50	27.6	39	102.2
	2506V-6	○	○	74	28.3	39	127.6
	2508V-6	○	○	90	29.6	39	143.2
	2510V-3	○	○	73	31.6	39	131.2
	2510V-4	○	○	85	31.6	39	143.2
	2512V-4	×	×	—	—	—	—
	2806V-6	×	○	—	31	42	135
	3204V-10	○	×	82	—	—	—
	3205V-3	○	○	52	35	45	118
	3205V-4	○	○	57	35	45	123
	3205V-6	○	○	67	35	45	133
	3206V-8	○	○	96	35	47	160
EBB	3208V-8	○	×	119	—	—	—
	3210V-3	○	○	82	40	49	154
	3210V-4	○	○	94	40	49	166
	3604V-6	×	×	—	—	—	—
	3606V-8	×	×	—	—	—	—
	3608V-8	×	×	—	—	—	—
	4004V-6	×	×	—	—	—	—
	4005V-6	○	○	65	28.5	61	122
	4006V-12	○	×	124	—	—	—
	4008V-8	×	×	—	—	—	—
	4010V-3	○	○	83	44	61	166
	4010V-4	○	○	94	44	61	177
	4012V-8	○	○	163	44	61	251
	4020V-3	○	○	129	47	61	213
	5005V-12	○	×	111	—	—	—
	5008V-8	○	×	123	—	—	—
	5010V-4	○	○	96	37	71	163
	5020V-3	○	○	129	40	71	197
	6310V-4	○	○	92	39	84	169
	6312V-4	○	○	109	32	89	170

Unit: mm

Model No.		WW availability	QZ availability	Dimensions including WW	Length of protrusion with QZ attached	Outer diameter of protrusion with QZ attached	Dimensions including QZ and WW
				L	QWL	QWD	AL
	6316V-4	×	×	—	—	—	—
	6320V-3	○	○	133	30.5	94	184
EBB	8010V-4	×	×	—	—	—	—
	8012V-4	×	×	—	—	—	—
	8016V-4	×	×	—	—	—	—
	8020V-4	×	×	—	—	—	—
	1605V-6	○	○	65	25	27	121
	2004V-8	○	×	69	—	—	—
	2005V-6	○	○	65	26.5	33	124
	2006V-6	○	○	74	30	34	139
	2008V-6	○	○	88	25	34	143
	2010V-6	×	×	—	—	—	—
	2504V-8	○	○	70	34	37	134
	2505V-6	○	○	66	27.6	39	118.2
	2506V-6	○	○	74	28.3	39	127.6
	2508V-6	○	○	90	29.6	39	143.2
	2510V-4	○	○	85	31.6	39	143.2
	2512V-4	×	×	—	—	—	—
	2806V-6	×	○	—	31	42	135
EPB	3204V-10	○	×	82	—	—	—
	3205V-6	○	○	67	35	45	133
	3205V-8	○	○	78	35	45	144
	3206V-8	○	○	96	35	47	160
	3208V-8	○	×	119	—	—	—
	3210V-6	○	○	112	40	49	185
	3604V-6	×	×	—	—	—	—
	3606V-8	×	×	—	—	—	—
	3608V-8	×	×	—	—	—	—
	4004V-6	×	×	—	—	—	—
	4005V-6	○	○	65	28.5	61	122
	4006V-12	○	×	124	—	—	—
	4008V-8	×	×	—	—	—	—
	4010V-6	○	○	114	44	61	197
	4010V-8	○	○	138	44	61	221

○ : Available △ : Available per request × : Not available
*Please contact THK for more information regarding the model numbers that do not support WW and QZ.
Parentheses indicate the dimensions with QZ but without WW.

Overview of THK Ball Screws

Positioning Ball Screw

A15-72

ISO 3408 compliant

Preload	Preload/ No preload
SDAN-V	**SDA-V**
Caged Ball	Caged Ball
Double nut	High speed
High speed	Various leads
Compact	Compact
SDAN-VX	**SDA-VZ**
Double nut	High speed
High speed	Various leads
Compact	Compact
EPB-V	**EBB-V**
High speed	High speed
Compact	Compact

Positioning Ball Screw

A15-98

Preload	Preload/ No preload	No preload
SBN-V	**BNK**	**MDK**
Caged Ball	Standard to super lead	**MBF**
High speed		Miniature
SBK		**BNF-V**
Caged Ball		High speed
High speed		**DK**
Large lead		Compact
BIF-V		**WHF**
High speed		High speed
BNFN-V		Large lead
Double nut		**BLK**
High speed		**WGF**
DIK		Large lead
Compact		**BNT**
DKN		Flat nut
Compact		
Double nut		
BLW		
Double nut		
Large lead		

[DN Value]

The permissible rotational speed of the Ball Screw must be obtained from the critical speed of the screw shaft and the DN value. The permissible rotational speed determined by the DN value is obtained using the equations (8) to (17) below.

Model No.				Permissible rotational speed determined by the DN value N_2	Guideline for maximum rotational speed
Precision	Caged Ball	Model SBK (SBK3636, SBK4040, and SBK5050)	Large lead	$N_2 = \frac{210000}{D}$ ·····(8-1)	5000
		Model SBK (Other than the above model numbers and the small size model SBK*)		$N_2 = \frac{160000}{D}$ ·····(8-2)	4230
		Models SBN-V (Medium), HBN-V	Standard lead	$N_2 = \frac{160000}{D}$ ·····(9-1)	5000
		Models SBN-V (Small), HBN, and SBKH		$N_2 = \frac{130000}{D}$ ·····(9-2)	5000
		Models HBN-K and HBN-KA		$N_2 = \frac{120000}{D}$ ·····(9-3)	1810
		Models SDAN-V and SDA-V	Standard lead/ Large lead	$N_2 = \frac{160000}{D}$ ·····(10)	5000
	Full-Complement Ball	Models SDAN-VX and SDA-VZ (shaft diameters ϕ28 to 63)	Standard lead/ Large lead	$N_2 = \frac{130000}{D}$ ·····(11-1)	4480
		Model SDA-VZ (shaft diameters ϕ10 to 25)		$N_2 = \frac{100000}{D}$ ·····(11-2)	5000
		Model WHF	Super lead	$N_2 = \frac{120000}{D}$ ·····(12-1)	5000
		Model WGF		$N_2 = \frac{70000}{D}$ ·····(12-2)	5000
		Models BLW, BLK, BLR, BNS, BNS-B, BNS-A, and NS	Large lead	$N_2 = \frac{70000}{D}$ ·····(13)	5000
		Models BIF-V (Medium), BNFN-V (Medium), and BNF-V (Medium)	Standard lead	$N_2 = \frac{130000}{D}$ ·····(14-1)	4950
		Models BIF-V (Small), BNFN-V (Small), and BNF-V (Small)		$N_2 = \frac{100000}{D}$ ·····(14-2)	5000
		Models BIF, DIK, BNFN, DKN, BNF, BNT, DK, MDK, MBF, BNK, and DIR		$N_2 = \frac{70000}{D}$ ·····(14-3)	5000
	Full-Complement Ball (DIN Standard Compliant)	Models EPB-V, EBB-V (2806 to 8020)	Standard lead	$N_2 = \frac{130000}{D}$ ·····(14-4)	4480
		Models EPB-V, EBB-V (1605 to 2512)			5000
Rolled	Full-Complement Ball	Models WTF and CNF	Super lead	$N_2 = \frac{70000}{D}$ ·····(15)	4440
		Models BLK and BLR	Large lead	$N_2 = \frac{70000}{D}$ ·····(16)	4440
		Model BTK-V	Standard lead	$N_2 = \frac{100000}{D}$ ·····(17-1)	5000
		Models JPF, BNT, and MTF		$N_2 = \frac{50000}{D}$ ·····(17-2)	5000

N_2 : Permissible rotational speed determined by the DN value (min^{-1})

D : Ball center-to-center diameter
(indicated in the specification tables of the respective model number)

When considering the rotational speed, the permissible rotational speed is regarded as the lower of the following maximum rotational speed guidelines: the critical speed of the screw shaft (N_1) or the permissible rotational speed determined by the DN value (N_2).

If the service rotational speed exceeds the guidelines for maximum rotational speed, contact THK.

Selecting a Nut

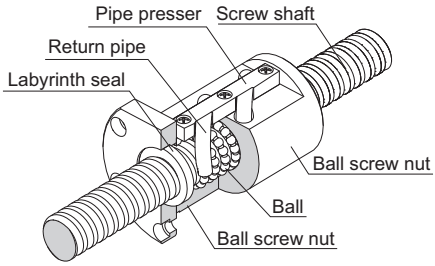
Types of Nuts

The nuts of the Ball Screws are categorized by the ball circulation method into the return-pipe type, the deflector type and end the cap type. These three nut types are described as follows.
In addition to the circulation methods, the Ball Screws are categorized also by the preloading method.

[Types by Ball Circulation Method]

- **Return-Pipe Type**
  (Models SBN-V (Medium), BIF-V (Medium), BIF, BNF-V (Medium), BNF, BNFN-V (Medium), BNFN, BNT, BTK-V), Return-Piece Type
  (Models SBN-V (Small), HBN, BIF-V (Small), BNF-V (Small), BNFN-V (Small))

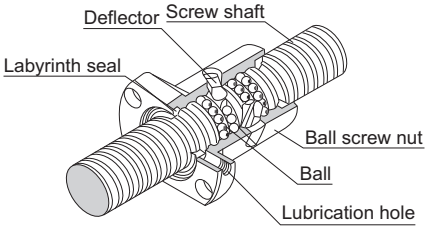
These are the most common types of nuts, which use a return pipe for ball circulation. The return pipe allows balls to be picked up, pass through the pipe and return piece, and return to their original positions to circulate endlessly.



Example of Structure of Return-Pipe Nut

- **Deflector Type**
  (Models EBB-V, EPB-V, DK, DKN, DIK, JPF, DIR and MDK)

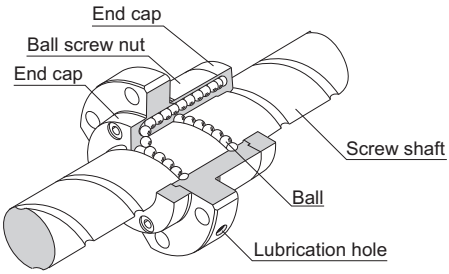
These are the most compact type of nut. The balls change their traveling direction with a deflector, pass over the circumference of the screw shaft, and return to their original positions to complete an infinite motion.



Example of Structure of Simple Nut

- **End-cap Type: Large lead Nut**
  (Models SBK, SBKH, WHF, BLK, WGF, BLW, WTF, CNF and BLR)

These nuts are most suitable for the fast feed. The balls are picked up with an end cap, pass through the through hole of the nut, and return to their original positions to complete an infinite motion.



Example of Structure of Large lead Nut