

# High-speed and Low-noise Ball Screws BSS Series

Quiet and compact, with unparalleled high speed performance. Reduced-noise BSS Series ball screws for an extensive range of uses, from machine tools to transportation equipment.

Patent Pending





# BSS Series—Next-generation ball screws with quiet, high-speed performance in a compact size, the result of joining NSK's advanced technology with an innovative recirculation method

A new series has joined the NSK ball screws lineup that delivers unrivaled precision. Developed with the advanced technology NSK has gained over years of earning customer trust with proven performance, this series represents a groundbreaking achievement in reduced noise and high-speed operation in an amazingly compact size. The quiet performance is especially appreciated in machine tools, medical equipment, semiconductor-manufacturing equipment, LCD manufacturing equipment, and chip mounting equipment.

## Features

### Quieter by 6 dB; nearly silent in typical applications

The average noise level is reduced by more than 6 dB compared with our conventional products. At low-speed rotation, the ball screws are nearly silent, while the lowest noise level is achieved at high-speed rotation\*.

\*Noise level measured with a microphone at a distance of 400 mm.

### High-speed operation of up to 180 000 d·n

Realizes high-speed operation at a maximum of d·n 180 000—outstanding for ball screws and far surpassing the 100 000 d·n maximum performance of conventional return tube type products. For high lead ball screws, high-speed operation at over 200m/min is also possible.

Allowable maximum rotational speed is 5 000 min<sup>-1</sup>.

Please consult NSK if maximum rotational speed exceed 5 000 min<sup>-1</sup> or d·n exceed 180 000.

### 30% smaller

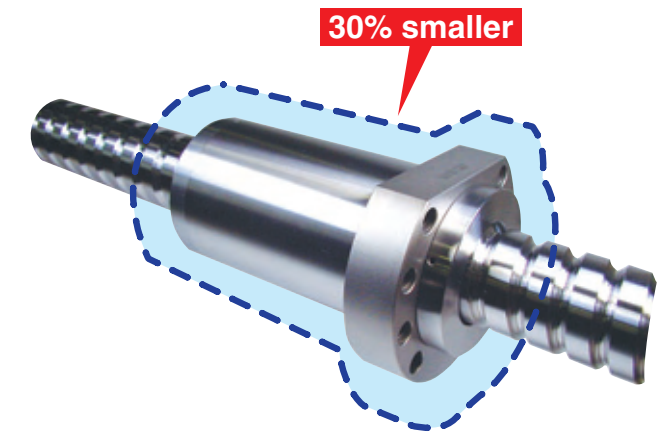
The external diameter of the ball nut is 30% smaller than our conventional models. Compact configurations are possible for low-profile XY tables as well as for other devices and equipment.

### Grease fitting provided as standard equipment

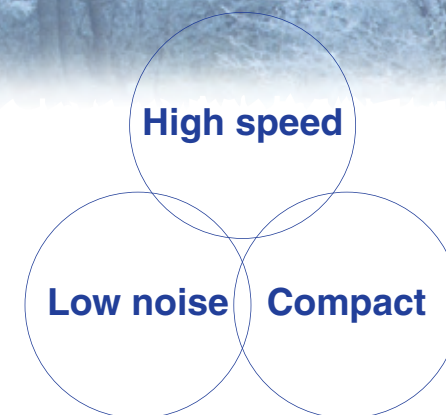
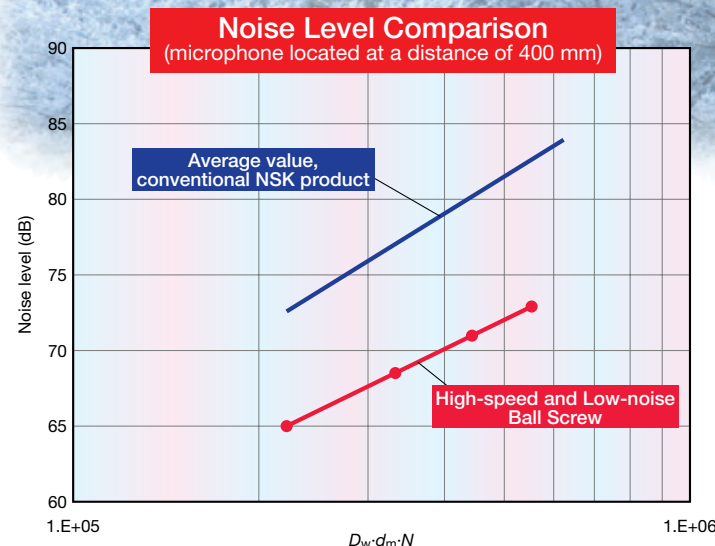
The ball screws with shaft diameters of less than φ25 are standardly equipped with a grease fitting (M5 × 0.8). Lubrication ports are provided in 2 places to facilitate maintenance. The ball screws can be easily connected to an integrated lubrication system.

# High-speed and Low-noise Ball Screws BSS Series

*High speed,  
extremely low noise*



# Silent



## Application

Combinations of shaft diameter and lead of the high-speed and low-noise ball screws are shown in the table.

Shaft diameter	Lead													
	5	10	12	16	20	25	30	32	40	50	60	64	80	100
10	•	•												
12	•	•			•		•							
15	•	•			•		•							
20	•	•			•		•		•		•			
25	•	•			•	•	•			•				
32	•	•	•	•	•			•				•		
36	•	•	•	•	•									
40	•	•	•	•	•	•	•		•				•	
45		•	•	•	•	•	•							
50		•	•	•	•	•	•			•				•

## Specifications

### Recirculation method

A new internal ball recirculation method is applied for simpler, more compact ball nuts.

### Preload and axial play

Adopts oversized ball preload, suitable for compact devices. Axial play can be selected from less than or equal to 0.005 mm (code T), 0.020 mm (code S), or 0.050 mm (code N). For more information, please see the general catalog of precision machine components.

### Sealing

Adopts a new compact design high performance sealing. Minimal grease scattering contributes to maintenance of a clean environment.

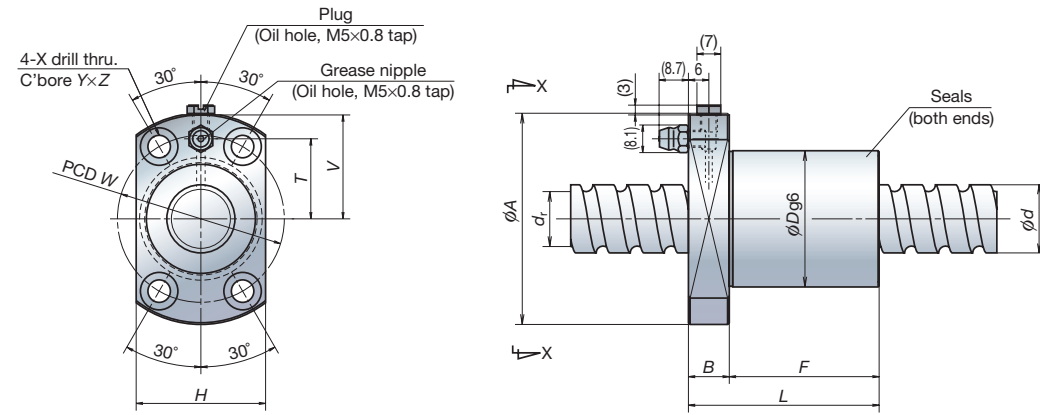
### Options

- Optional NSK K1™ lubrication unit, molded from resin and impregnated with lubrication oil, supplies fresh oil onto ball rolling surfaces, ensuring long-term, maintenance-free usage. Please contact NSK when using NSK K1.
- Please contact NSK about hollow shaft ball screws that are compatible with the forced cooling of the shaft center, which are effective for stabilizing positioning accuracy and shortening the warm-up period.

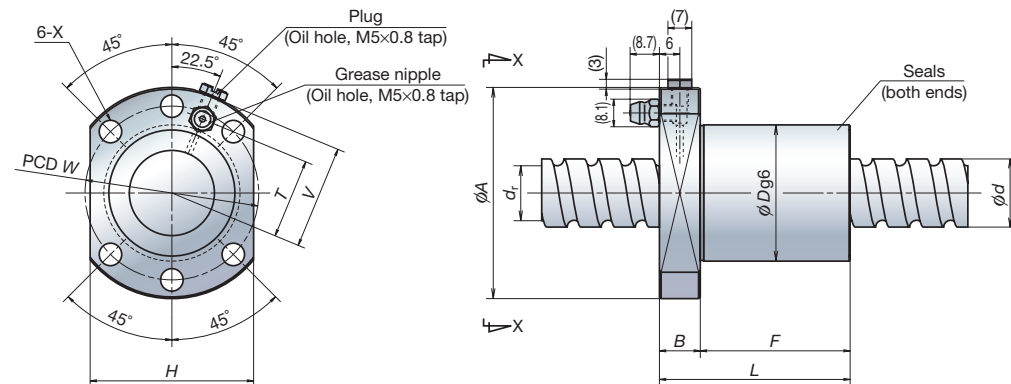


# Dimensions of BSS Series

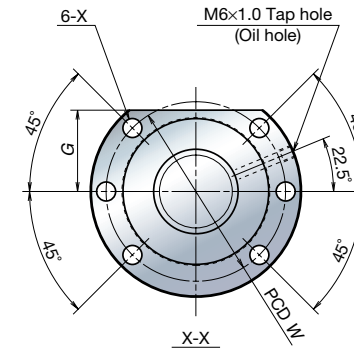
# High-speed and Low-noise Ball Screws BSS Series



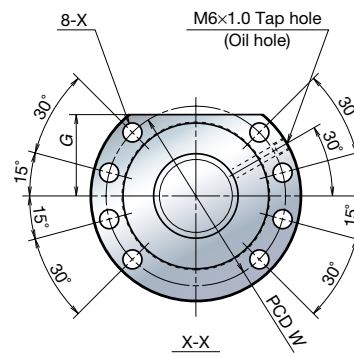
Type I Flange



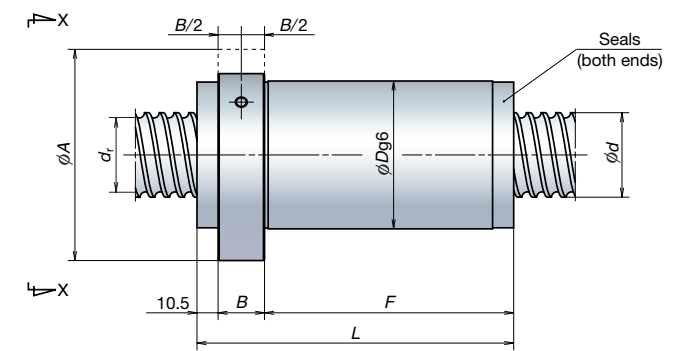
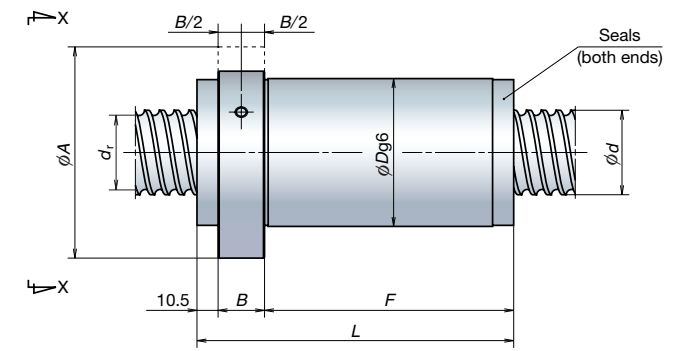
Type II Flange



Type III Flange



Type IV Flange



Unit: mm

Model No.	Screw shaft diameter <i>d</i>	Lead <i>l</i>	Ball dia. <i>D<sub>w</sub></i>	Ball circle dia. <i>d<sub>m</sub></i>	Root dia. <i>d<sub>r</sub></i>	Effective turns of balls	Basic load rating		Axial rigidity (N/μm)	Ball nut dimensions																											
							Dynamic <i>C<sub>a</sub></i> (N)	Static <i>C<sub>oa</sub></i> (N)		<i>D</i>	<i>A</i>	<i>L</i>	<i>B</i>	<i>F</i>	<i>H</i> × <i>V</i>	TYPE	<i>W</i>	<i>T</i>	<i>X</i>	<i>Y</i>	<i>Z</i>																
BSS1005-3E	10	5	2.000	10.3	8.2	3	2 930	4 790	126	23	43	29	11	18	26×21	I	33	14	4.5	8	4.5																
BSS1010-2E		2				1 970	3 010	77	21																												
BSS1205-3E	12	5	2.000	12.3	10.2	3	3 200	5 860	146	24	44	30	11	19	27×21.5	I	34	14.5	4.5	8	4.5																
BSS1210-3E		10				3	3 200	5 860	142													43	32														
BSS1220-2E		20				2	2 150	3 610	83													50	39														
BSS1230-2E	30	2	2 150	3 610	75	70	59																														
BSS1505-3E	15	5	2.778	15.5	12.6	3	5 460	10 200	183	28	51	30	11	19	31×25	I	39	18	5.5	9.5	5.5																
BSS1510-3E		10				3	5 460	10 200	181													43	32														
BSS1520-2E		20				2	5 070	8 730	127													51	40														
BSS1530-2E		30				2	5 070	8 730	116													60	60														
BSS2005-3E	20	5	3.175	20.5	17.2	3	8 790	18 500	268	36	62	31	13	18	38×30.5	I	49	23.5	6.6	11	6.6																
BSS2010-3E		10				3	8 790	18 500	268													45	32														
BSS2020-2E		20				2	5 900	11 700	167													54	41														
BSS2030-2E		30				2	5 900	11 700	159													74	61														
BSS2040-2E		40				2	5 900	11 700	147													92	79														
BSS2060-2E		60				2	5 900	11 700	128													129	116														
BSS2505-3E	25	5	3.175	25.5	22.2	3	9 760	23 600	325	40	62	32	12	20	48×30.5	II	51	23.5	6.6	—	—																
BSS2510-4E		10				4	12 800	32 300	437													56	44														
BSS2520-2E		20				2	6 560	14 600	203													54	42														
BSS2525-2E		25				2	6 560	14 600	197													63	51														
BSS2530-2E		30				2	6 560	14 600	194													74	62														
BSS2550-2E		50				2	6 560	14 600	177													114	102														

Unit: mm

Note: Rigidity values in this table are theoretical values derived from elastic displacement between screw grooves and balls when axial load is applied to a ball nut for which preload is set at 3% of the basic dynamic load rating (*C<sub>a</sub>*).  
The shape and dimension of ball screws with shaft diameters less than φ25 are the same as NSK ball screws held in standard stock as the Compact FA Series.

Model No.	Screw shaft diameter <i>d</i>	Lead <i>l</i>	Ball dia. <i>D<sub>w</sub></i>	Ball circle dia. <i>d<sub>m</sub></i>	Root dia. <i>d<sub>r</sub></i>	Effective turns of balls	Basic load rating <i>C<sub>a</sub></i> (N)	Static <i>C<sub>oa</sub></i> (N)	Axial rigidity (N/μm)	Ball nut dimensions													
										<i>D</i>	<i>A</i>	<i>L</i>	<i>B</i>	<i>F</i>	<i>G</i>	TYPE	<i>W</i>	<i>X</i>					
BSS3205-5E	32	5	3.175	32.5	29.2	5	17 500	52 900	672	56	86	60	12	37.5	34	III	71	9	—	—			
BSS3210-6E		6				43 300	111 000	865	104												75.5		
BSS3212-5E		12				5	36 700	90 800	716												103	74.5	
BSS3216-5E		16				5	36 700	90 800	716												122	18	93.5
BSS3220-5E		20				5	36 700	90 800	708												141	112.5	
BSS3232-2E		32				2	15 300	32 400	261												94	65.5	
BSS3264-2E	64	2	15 300	32 400	232	153	124.5																
BSS3605-5E	36	5	6.35	37	30.4	5	18 400	59 500	740	65	95	60	12	37.5	36	IV	80	9	—	—			
BSS3610-6E		6				55 200	142 000	970	109												76.5		
BSS3612-6E		12				6	55 200	142 000	967												120	22	87.5
BSS3616-6E		16				6	55 200	142 000	961												143	110.5	
BSS3620-6E		20				6	55 200	142 000	959												166	133.5	
BSS4010-6E		10				6	58 200	158 000	1 060												109	76.5	
BSS4012-6E	12	6	58 200	158 000	1 050	120	87.5																
BSS4016-6E	16	6	58 200	158 000	1 050	143	110.5																
BSS4020-6E	20	6	58 200	158 000	1 050	166	133.5																
BSS4025-4E	25	4	40 100	103 000	686	145	112.5																
BSS4030-3E	30	3	30 600	74 000	505	134	101.5																
BSS4040-2E	40	2	20 600	46 600	319	110	77.5																
BSS4080-2E	80	2	20 600	46 600	286	184	151.5																
BSS4510-6E	45	10	6.35	46	39.4	6	60 700	178 000	1 160	75	110	109	22	76.5	43	IV	93	11	—	—			
BSS4512-6E		12				6	60 700	178 000	1 160												120	87.5	
BSS4516-6E		16				6	60 700	178 000	1 160												143	110.5	
BSS4520-6E		20				6	60 700	178 000	1 150												166	133.5	
BSS4525-5E		25				5	51 400	146 000	954												170	137.5	
BSS4530-4E		30				4	41 800	116 000	752												164	131.5	
BSS5010-6E	50	10	6.35	51	44.4	6	64 600	198 000	1 270	82	118	109	22	76.5	46	IV	100	11	—	—			
BSS5012-6E		12				6	64 600	198 000	1 270												120	87.5	
BSS5016-6E		16				6	64 600	198 000	1 270												143	110.5	
BSS5020-6E		20				6	64 600	198 000	1 260												166	133.5	
BSS5025-5E		25				5	54 700	164 000	1 040												170	137.5	
BSS5030-5E		30				5	54 700	164 000	1 040												194	161.5	
BSS5050-2E	50	2	22 800	58 300	383	130	97.5																
BSS50100-2E	100	2	22 800	58 300	342	224	191.5																

Note: Rigidity values in this table are theoretical values derived from elastic displacement between screw grooves and balls when axial load is applied to a ball nut for which preload is set at 3% of the basic dynamic load rating (*C<sub>a</sub>*).

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