

# High-speed and Low-noise Ball Screws

## BSS Model

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





# BSS Model—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 model 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 model 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>.

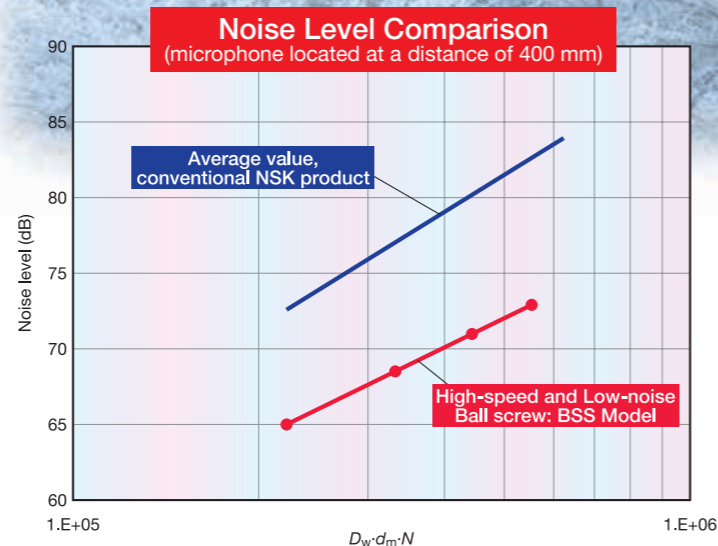
Please consult NSK if maximum rotational speed exceed 5 000 min<sup>-1</sup> or d·n exceed 180 000.

### 30% smaller

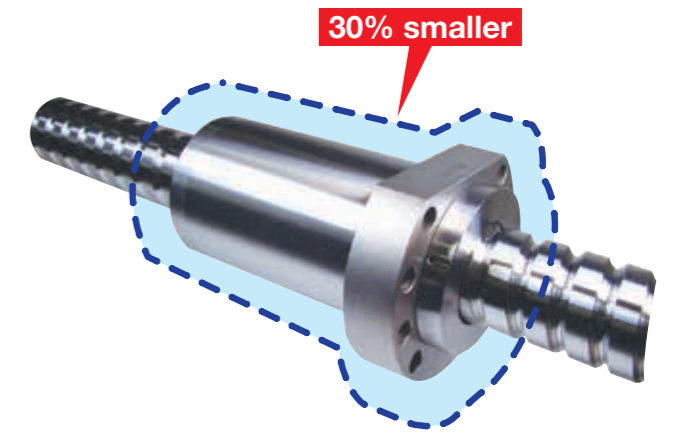
The external diameter of the ball nut is 30% smaller than our conventional models. Compact configurations are possible for low-profile XY tables as well as for other devices and equipment.

### Grease fitting provided as standard equipment

The ball screws with shaft diameters of φ10 from 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.

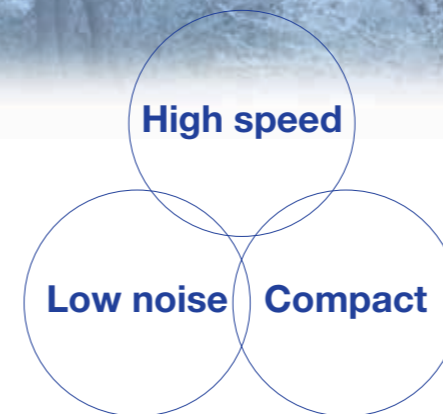


# High-speed and Low-noise Ball Screws BSS Model



*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.

Unit: mm

Shaft diameter	Lead															
	5	8	10	12	15	16	20	25	30	32	40	50	60	64	80	100
6		●		●												
8			●	●	●											
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

The ball screws with shaft diameters of 6mm and 8mm : Less than or equal to 0.005mm (code T). Shaft diameter of 10mm or over : Adopts oversized ball preload (P preload). Or 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.

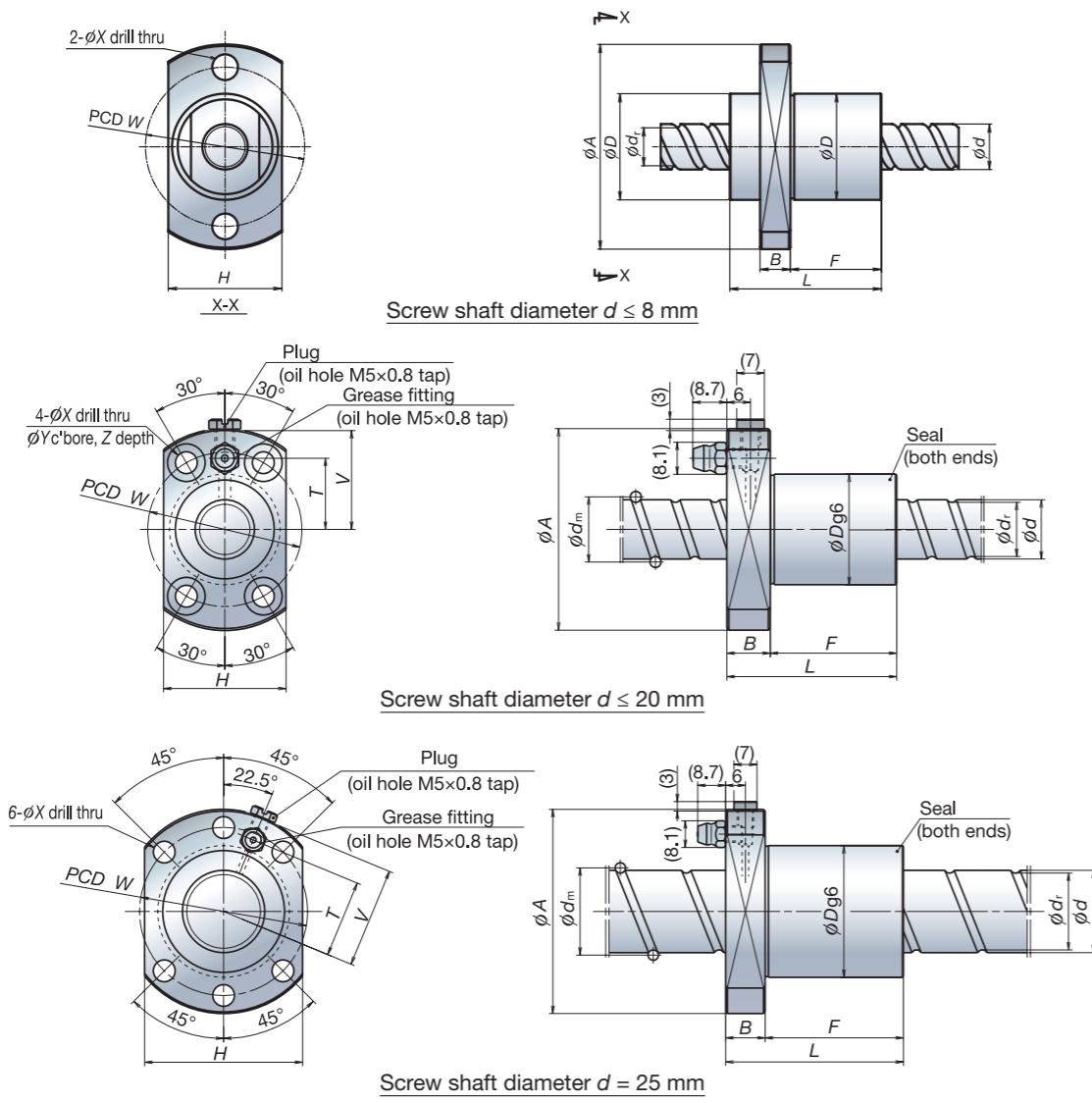
### Options

- 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 Model

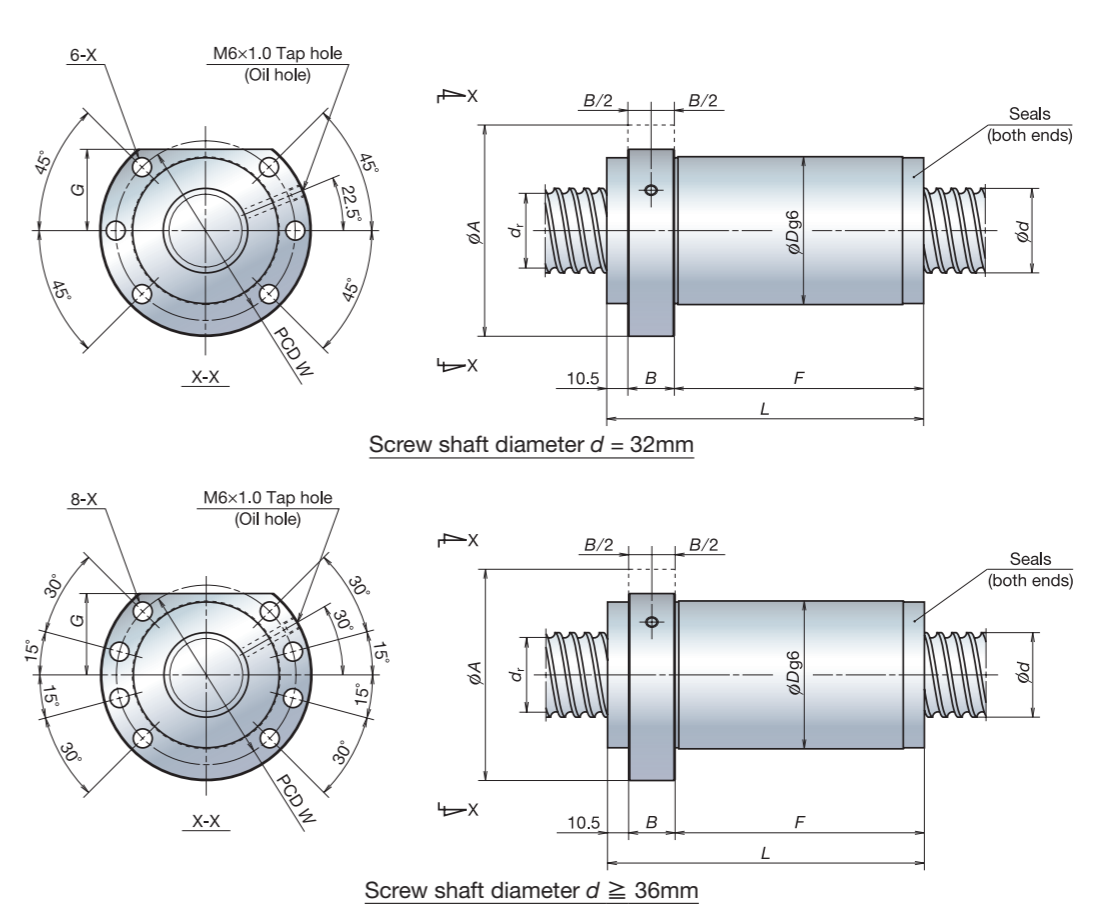
# High-speed and Low-noise Ball Screws BSS Model



Unit: mm

Model No.	Screw shaft diameter $d$	Lead $l$	Ball dia. $D_w$	Ball circle dia. $d_m$	Root dia. $d_r$	Effective turns of balls	Basic load rating			Axial rigidity (N/ $\mu$ m)	Ball nut dimensions														
							Dynamic $C_a$ (N)	Static $C_{oa}$ (N)			$D$	$A$	$L$	$B$	$F$	$H$	$V$	$W$	$T$	$X$	$Y$	$Z$			
BSS0608-2E	6	8	1.2	6.2	4.9	2	690	805	32	14	27	16	4	8	15	—	21	—	3.4	—	—	—	—		
BSS0608-4E		4				1 480	1 940	75	24															16	(10)
BSS0612-2E		12				2	665	800	29															20	12
BSS0612-4E	8	10	1.588	8.3	6.6	4	1 430	1 970	69	18	31	18	4	10	19	—	25	—	3.4	—	—	—			
BSS0810-2E						2	1 150	1 420	43														28	20	(13)
BSS0810-4E						4	2 470	3 430	99														22	14	
BSS0815-2E	10	15	2.000	10.3	8.2	2	1 130	1 430	40	23	43	29	11	18	26	21	33	14	4.5	8	4.5	—			
BSS0815-4E						4	2 410	3 520	93														37	29	
BSS1005-3E						3	3 420	4 840	133														32	21	
BSS1010-2E	12	10	2.000	12.3	10.2	2	2 290	2 980	81	24	44	43	11	32	27	21.5	34	14.5	4.5	8	4.5	—			
BSS1205-3E						3	3 750	5 810	154														30	19	
BSS1210-3E						3	3 760	5 780	150														43	32	
BSS1220-2E	15	10	2.778	15.5	12.6	2	2 330	3 600	86	28	51	43	11	32	31	25	39	18	—	5.5	9.5	5.5			
BSS1230-2E						2	2 190	3 650	75														70	59	
BSS1505-3E						3	6 410	10 100	193														51	40	
BSS1510-3E	20	15	3.175	20.5	17.2	2	5 660	8 700	132	32	55	51	11	40	33	27	43	20	—	—	—	—			
BSS1520-2E						2	5 500	8 580	119														71	60	
BSS1530-2E						2	5 680	11 800	126														31	18	
BSS2005-3E	25	10	2.778	15.5	12.6	3	10 400	18 500	284	36	62	45	13	41	38	30.5	49	23.5	6.6	11	6.6	—			
BSS2010-3E						3	10 200	18 600	281														32	20	
BSS2020-2E						2	6 790	11 800	175														54	41	
BSS2030-2E	30	15	3.175	20.5	17.2	2	6 550	11 800	164	40	62	54	12	42	48	30.5	51	23.5	6.6	—	—	—			
BSS2040-2E						2	6 380	11 600	151														74	61	
BSS2060-2E						2	6 380	11 600	151														92	79	
BSS2505-3E	30	15	3.175	25.5	22.2	2	5 680	11 800	126	40	62	54	12	42	48	30.5	51	23.5	6.6	—	—	—			
BSS2510-4E						3	11 500	23 500	343														32	20	
BSS2510-2E						4	15 000	32 400	460														56	44	
BSS2520-2E	40	20	3.175	25.5	22.2	2	7 650	14 800	214	40	62	54	12	42	48	30.5	51	23.5	6.6	—	—	—			
BSS2525-2E						2	7 490	14 600	206														63	51	
BSS2530-2E						2	7 490	14 600	203														74	62	
BSS2550-2E	50	25	3.175	25.5	22.2	2	6 910	14 700	180	40	62	114	102	—	—	—	—	—	—	—	—	—			
BSS2550-2E						2	6 910	14 700	180														114	102	

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 ( $C_a$ ).  
The shape and dimension of ball screws with shaft diameters less than  $\phi 25$  are the same as NSK ball screws held in standard stock as the Compact FA Model.



Unit: mm

Model No.	Screw shaft diameter $d$	Lead $l$	Ball dia. $D_w$	Ball circle dia. $d_m$	Root dia. $d_r$	Effective turns of balls	Basic load rating			Axial rigidity (N/ $\mu$ m)	Ball nut dimensions													
							Dynamic $C_a$ (N)	Static $C_{oa}$ (N)			$D$	$A$	$L$	$B$	$F$	$G$	$W$	$X$						
BSS3205-4E	32	5	3.175	32.5	29.2	4	16 800	41 700	566	56	86	55	12	32.5	—	—	—	—	—	—	—	—		
BSS3210-6E		6				50 900	110 000	907	104														75.5	
BSS3212-5E		12				5	43 000	91 300	755														103	74.5
BSS3216-5E		16				5	44 300	90 800	756														122	93.5
BSS3220-5E		20				5	43 900	91 200	752														141	112.5
BSS3232-2E		32				2	17 700	32 900	274														94	65.5
BSS3264-2E	64	2	16 800	32 900	240	153	124.5																	
BSS3605-3E	36	5	3.175	36.5	33.2	3	13 500	34 100	459	65	95	50	12	27.5	—	—	—	—	—	—	—			
BSS3610-6E		6				65 000	141 000	1 018	109													76.5		
BSS3612-6E		12				6	64 800	141 000	1 014													120	87.5	
BSS3616-6E		16				6	64 500	142 000	1 012													143	110.5	
BSS3620-6E	20	6	64 000	141 000	1 001	166	133.5																	
BSS4010-5E	40	10	6.35	41	34.4	5	58 100	130 000	924	70	100	99	22	66.5	—	—	—	—	—	—	—			
BSS4012-5E		12				5	58 000	130 000	922													108	75.5	
BSS4016-5E		16				5	57 700	131 000	921													127	94.5	
BSS4020-5E		20				5	57 400	130 000	913													146	113.5	
BSS4025-4E		25				4	46 300	102 000	720													145	112.5	
BSS4030-3E		30				3	36 100	74 800	533													134	101.5	
BSS4040-2E	40	2	23 700	47 100	334	110	77.5																	
BSS4080-2E	80	2	22 200	46 600	289	184	151.5																	
BSS4510-5E	45	10	6.35	46	39.4	5	62 400	147 000	1 026	75	110	99	22	66.5	—	—	—	—	—	—	—			
BSS4512-5E		12				5	62 300	147 000	1 023													108	75.5	
BSS4516-5E		16				5	62 100	147 000	1 018													127	94.5	
BSS4520-5E		20				5	61 800	146 000	1 011													146	113.5	
BSS4525-5E		25				5	61 400	147 000	1 006													170	137.5	
BSS4530-4E		30				4	49 600	115 000	790													164	131.5	
BSS5010-4E	50	10	6.35	51	44.4	4	52 600	129 000	883	82	118	89	22	56.5	—	—	—	—	—	—	—			
BSS5012-4E		12				4	52 500	129 000	881													96	63.5	
BSS5016-4E		16				4	52 400	128 000	878													111	78.5	
BSS5020-4E		20				4	52 200	129 000	879													126	93.5	
BSS5025-4E		25				4	51 900	129 000	871													145	112.5	
BSS5030-4E		30				4	51 500	128 000	861													164	131.5	
BSS5050-2E		50				2	26 100	58 300	394													130	97.5	
BSS50100-2E		100				2	24 100	58 900	343													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 ( $C_a$ ).

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< As of July 2022 >

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