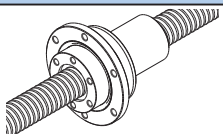
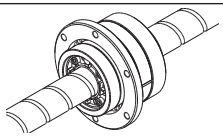
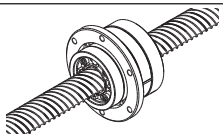
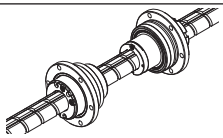
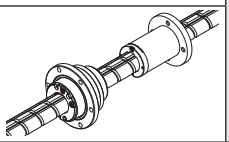
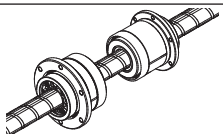
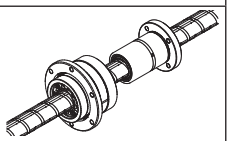
Rotary Nut Ball Screw

Series	Model		Features
Rotary nut	DIR		Nut rotation, compact, preload
	BLR		Large lead, nut rotation, no preload
	BLR (rolled)		Large lead, nut rotation, no preload
	BNS-V		Ball screw / spline, low inertia
	NS-V		
	BNS		Ball screw / spline
	NS		

	Caged Ball	Compact nut	Miniature	High load capacity	Offset preload	DN value	Shaft diameter (mm)	Lead (mm)	Page No.
		✓			✓	70,000	16 to 40	5 to 12	A15-294
						70,000	16 to 50	16 to 50	A15-296
						70,000	16 to 50	16 to 50	A15-298
		✓				100,000	16 to 25	16 to 25	A15-300
		✓							A15-306
						70,000	8 to 50	12 to 50	A15-302
									A15-308

Standard Combinations of Outer Diameters and Leads of the Screw Shafts

Shaft diameter	Lead							
	4	5	6	10	12	15	16	
8					BNS NS			
10						BNS NS		
14								
16		DIR					BLR BLR (rolled) BNS NS	
20		DIR						
25		DIR		DIR				
28								
32		DIR	DIR	DIR				
36				DIR				
40				DIR	DIR			
50								

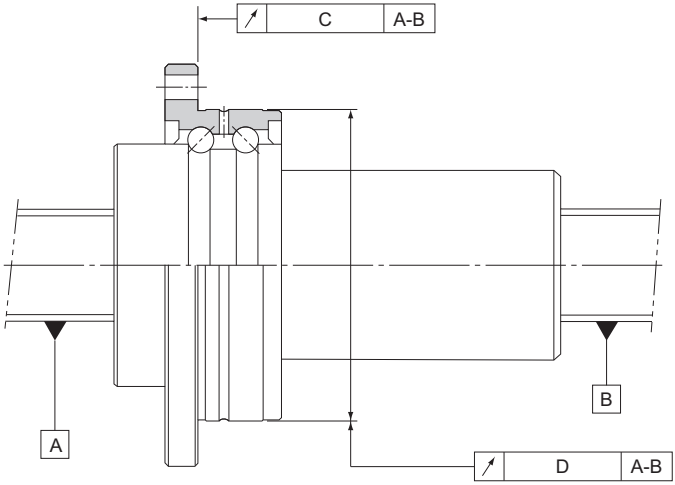
Unit: mm

	Lead						
	20	25	30	32	36	40	50
	BLR BLR (rolled) BNS NS						
		BLR BLR (rolled) BNS NS					
				BLR BLR (rolled) BNS NS			
					BLR BLR (rolled)		
						BLR BLR (rolled) BNS NS	
							BLR BLR (rolled) BNS NS

Accuracy Standards

Model DIR

The accuracy of Model DIR is compliant with the JIS standard JIS B 1192 (ISO 3408) except for the radial runout of the circumference of the ball screw nut from the screw axis (D) and the perpendicularity of the flange-mounting surface against the screw axis (C).

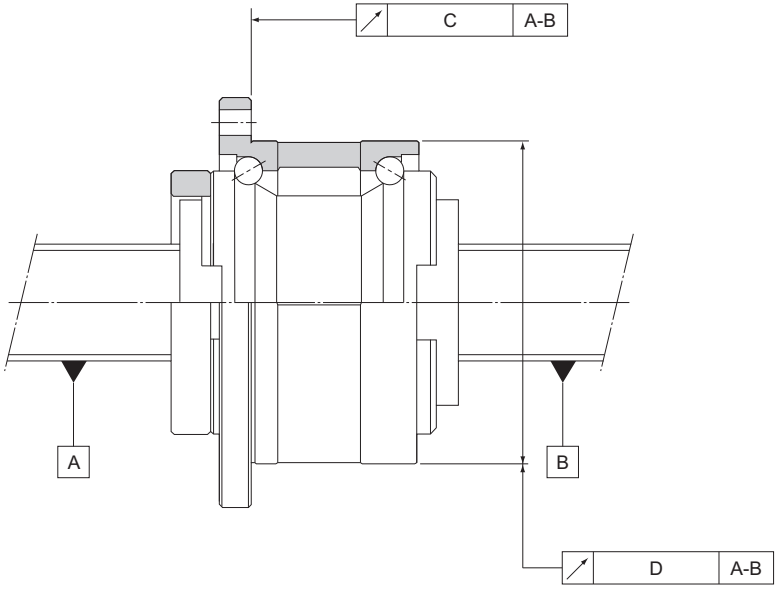


Unit: mm

Accuracy grades	C3		C5		C7	
Model No.	C	D	C	D	C	D
DIR 16□□	0.013	0.017	0.016	0.020	0.023	0.035
DIR 20□□	0.013	0.017	0.016	0.020	0.023	0.035
DIR 25□□	0.015	0.020	0.018	0.024	0.023	0.035
DIR 32□□	0.015	0.020	0.018	0.024	0.023	0.035
DIR 36□□	0.016	0.021	0.019	0.025	0.024	0.036
DIR 40□□	0.018	0.026	0.021	0.033	0.026	0.036

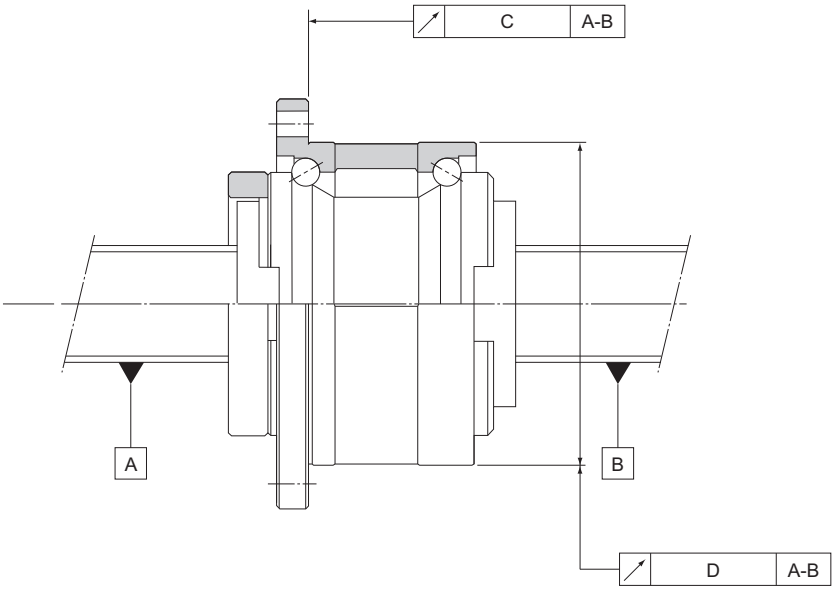
Model BLR

The accuracy of Model BLR is compliant with the JIS standard JIS B 1192 (ISO 3408) except for the radial runout of the circumference of the ball screw nut from the screw axis (D) and the perpendicularity of the flange-mounting surface against the screw axis (C).



Unit: mm

Lead angle accuracy	C3		C5		C7	
Accuracy grades	C3		C5		C7	
Model No.	C	D	C	D	C	D
BLR 1616	0.013	0.017	0.016	0.020	0.023	0.035
BLR 2020	0.013	0.017	0.016	0.020	0.023	0.035
BLR 2525	0.015	0.020	0.018	0.024	0.023	0.035
BLR 3232	0.015	0.020	0.018	0.024	0.023	0.035
BLR 3636	0.016	0.021	0.019	0.025	0.024	0.036
BLR 4040	0.018	0.026	0.021	0.033	0.026	0.046
BLR 5050	0.018	0.026	0.021	0.033	0.026	0.046



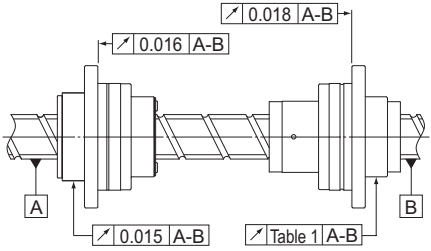
Unit: mm

Lead angle accuracy	C7, C8, C10	
Accuracy grades	C10	
Model No.	C	D
BLR 1616	0.035	0.065
BLR 2020	0.035	0.065
BLR 2525	0.035	0.065
BLR 3232	0.035	0.065
BLR 3636	0.036	0.066
BLR 4040	0.046	0.086
BLR 5050	0.046	0.086

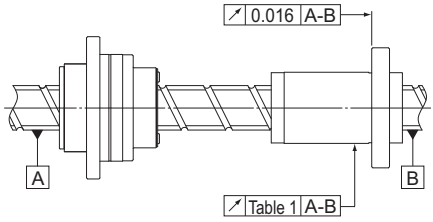
● **Model BNS-V/NS-V**
Ball screws and ball splines are manufactured with the following specifications.

Ball Screw
Axial clearance : 0 mm to 0.01 mm (G1)
Lead angle accuracy : C5
(For detailed specifications, see **A15-12**, **A15-19**.)

Ball Spline
Clearance in the rotational direction : 0 or less (CL: light preload)
(For detailed specifications, see **A3-30**.)
Accuracy grade : class H
(For detailed specifications, see **A3-34**.)



Model BNS-V



Model NS-V

Table 1: Radial Runout of the Spline Nut Outer Diameter in Relation to the Shaft Journals

Unit: mm

Overall shaft length		Shaft diameter	
Above	Up to	ø16/ø20	ø25
—	200	0.034	0.032
200	315	0.045	0.039
315	400	0.053	0.044
400	500	0.062	0.050
500	630	0.075	0.057
630	800	0.092	0.068

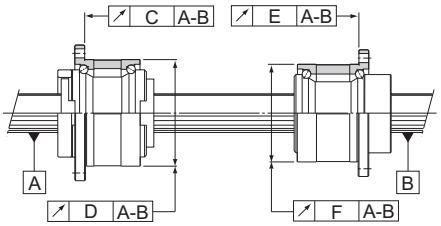
● Model BNS/NS

Ball Screw

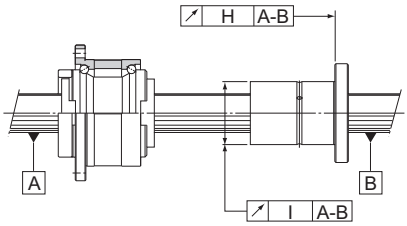
Axial clearance : 0 or less
Lead angle accuracy : C5
(For detailed specifications, see A15-12, A15-19.)

Ball Spline

Clearance in the rotational direction : 0 or less (CL: light preload)
(For detailed specifications, see A3-30.)
Accuracy grade : class H
(For detailed specifications, see A3-34.)



Model BNS



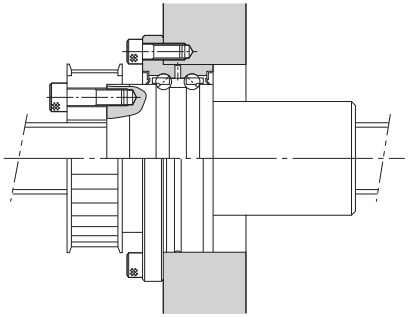
Model NS

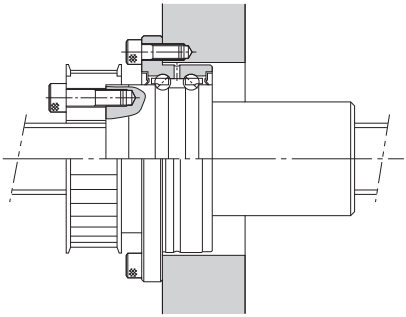
Unit: mm

Model No.	C	D	E	F	H	I
BNS 0812 NS 0812	0.014	0.016	0.014	0.017	0.010	0.013
BNS 1015 NS 1015	0.014	0.016	0.014	0.017	0.010	0.013
BNS 1616 NS 1616	0.016	0.020	0.018	0.021	0.013	0.016
BNS 2020 NS 2020	0.016	0.020	0.018	0.021	0.013	0.016
BNS 2525 NS 2525	0.018	0.024	0.021	0.021	0.016	0.016
BNS 3232 NS 3232	0.018	0.024	0.021	0.021	0.016	0.016
BNS 4040 NS 4040	0.021	0.033	0.025	0.025	0.019	0.019
BNS 5050 NS 5050	0.021	0.033	0.025	0.025	0.019	0.019

Assembly Examples

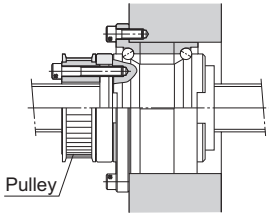
Example of Mounting Ball Screw Nut Model DIR



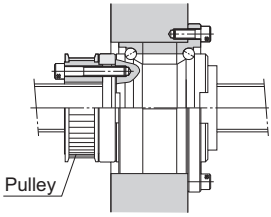


Installation to the housing can be performed on the end face of the outer ring flange.

Example of Mounting Ball Screw Nut Model BLR



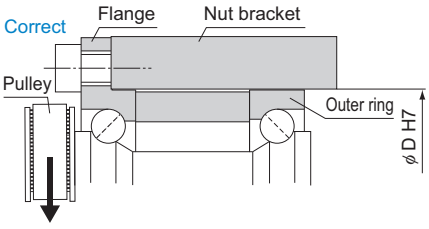
Standard installation method

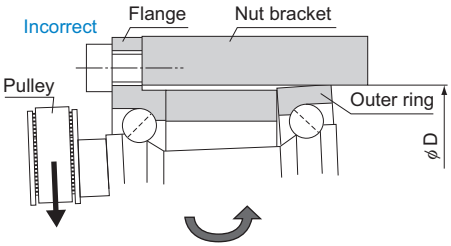


Inverted flange

Note: If the flange is to be inverted, indicate “K” in the model number (applicable only to model BLR).
Example: BLR 2020-3.6 K UU
Inverted flange symbol (no symbol for standard flange)

Important Note Concerning Model BLR





Note: Since the outer rings are separable, it is necessary to include an internal diameter tolerance in the nut bracket so that the outer ring on the side opposite from the flange does not shift. (H7 is recommended.)

Example of Mounting Model BLR on a Table

(1) Screw shaft free, ball screw nut fixed
(Suitable for a long table)

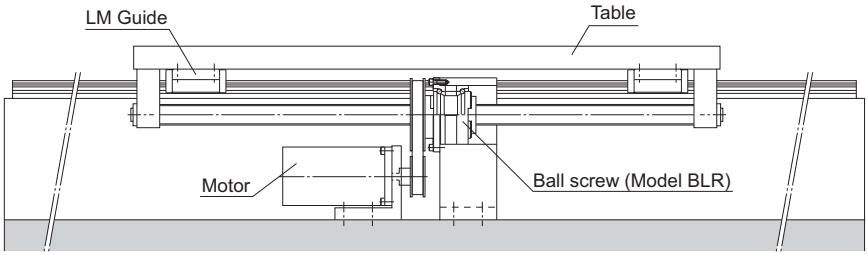


Fig. 1: Example of Installation on a Table (Ball Screw Nut Fixed)

(2) Ball screw nut free, screw shaft fixed
(Suitable for a short table and a long stroke)

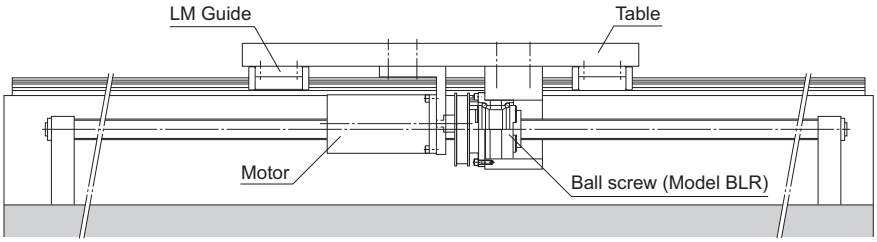
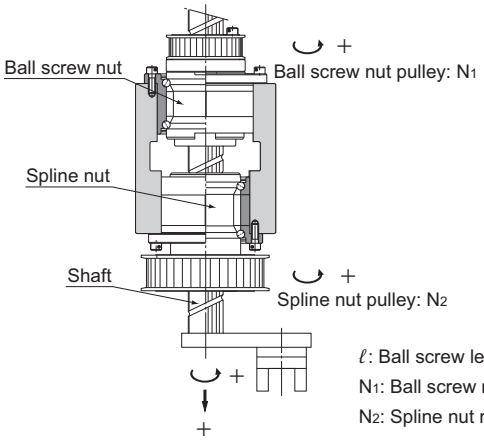


Fig. 2: Example of Installation on a Table (Screw Shaft Fixed)

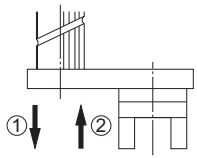
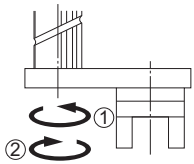
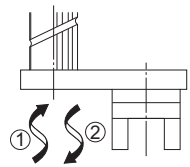
Note: A design incorporating a tension mechanism is needed when using a timing belt. For belt tensions, see the belt manufacturer's catalog. When used with a long stroke, apply tension to the screw shaft to reduce oscillations.

Action Patterns

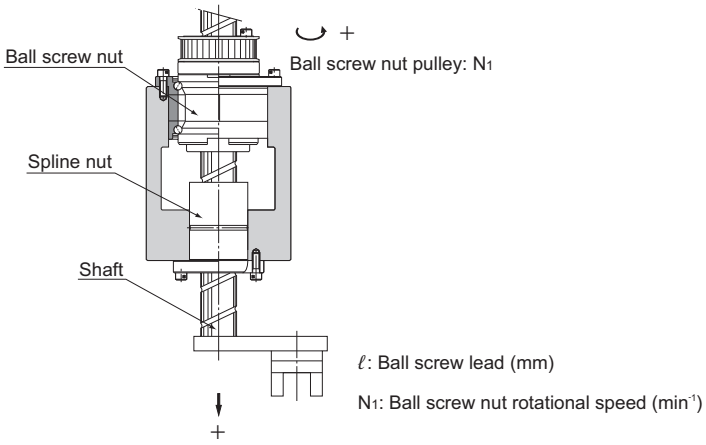
Model BNS Basic Actions

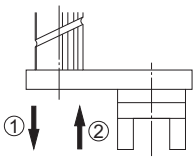


ℓ: Ball screw lead (mm)
N_1: Ball screw nut rotational speed (min^{-1})
N_2: Spline nut rotational speed (min^{-1})

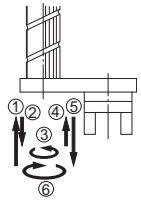
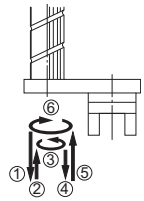
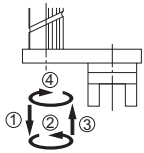
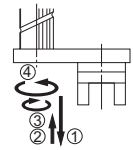
Motion		Action direction	Input		Shaft motion	
			Ball screw pulley	Ball spline pulley	Vertical direction (speed)	Rotational direction (rotational speed)
1. Vertical 	(1)	Vertical direction→down Rotational direction→0	N_1 (Forward)	0	$V=N_1 \cdot \ell$ ($N_1 \neq 0$)	0
	(2)	Vertical direction→up Rotational direction→0	$-N_1$ (Reverse)	0	$V=-N_1 \cdot \ell$ ($N_1 \neq 0$)	0
2. Rotation 	(1)	Vertical direction→0 Rotational direction→forward	N_1	N_2 (Forward)	0	N_2 (Forward) ($N_1=N_2 \neq 0$)
	(2)	Vertical direction→0 Rotational direction→reverse	$-N_1$	$-N_2$ (Reverse)	0	$-N_2$ (Reverse) ($-N_1=-N_2 \neq 0$)
3. Spiral 	(1)	Vertical direction→up Rotational direction→forward	0	N_2 ($N_2 \neq 0$)	$V=N_2 \cdot \ell$	N_2 (Forward)
	(2)	Vertical direction→down Rotational direction→reverse	0	$-N_2$ ($-N_2 \neq 0$)	$V=-N_2 \cdot \ell$	$-N_2$ (Reverse)

Model NS Basic Actions

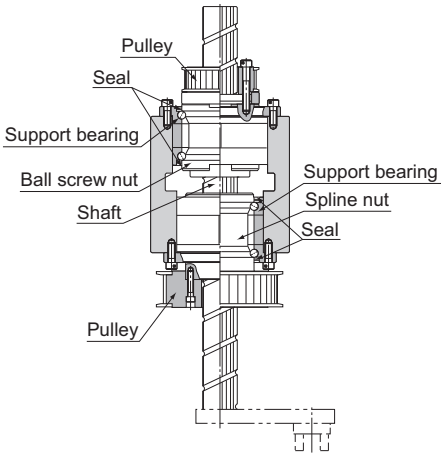


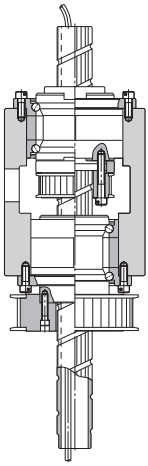
Motion		Action direction	Input	Shaft motion
			Ball screw pulley	Vertical direction (speed)
1. Vertical 	(1)	Vertical direction →down	N_1 (Forward)	$V=N_1 \cdot \ell$ ($N_1 \neq 0$)
	(2)	Vertical direction →up	$-N_1$ (Reverse)	$V=-N_1 \cdot \ell$ ($N_1 \neq 0$)

Model BNS Extended Actions

Motion		Action direction	Input		Shaft motion	
			Ball screw pulley	Ball spline pulley	Vertical direction (speed)	Rotational direction (rotational speed)
1. Up→down→forward →up→down→reverse 	(1)	Vertical direction→up	$-N_1$ (Reverse)	0	$V=-N_1 \cdot \ell$ ($N_1 \neq 0$)	0
	(2)	Vertical direction→down	N_1 (Forward)	0	$V=N_1 \cdot \ell$ ($N_1 \neq 0$)	0
	(3)	Rotational direction→forward	N_1	N_2 (Forward)	0	N_2 (Forward) ($N_1=N_2 \neq 0$)
	(4)	Vertical direction→up	$-N_1$	0	$V=-N_1 \cdot \ell$ ($N_1 \neq 0$)	0
	(5)	Vertical direction→down	N_1	0	$V=N_1 \cdot \ell$ ($N_1 \neq 0$)	0
	(6)	Rotational direction→reverse	$-N_1$	$-N_2$ (Reverse)	0	$-N_2$ (Reverse) ($-N_1=N_2 \neq 0$)
2. Down→up→forward →down→up→reverse 	(1)	Vertical direction→down	N_1	0	$V=N_1 \cdot \ell$ ($N_1 \neq 0$)	0
	(2)	Vertical direction→up	$-N_1$	0	$V=-N_1 \cdot \ell$ ($N_1 \neq 0$)	0
	(3)	Rotational direction→forward	N_1	N_2	0	N_2 ($N_1=N_2 \neq 0$)
	(4)	Vertical direction→down	N_1	0	$V=N_1 \cdot \ell$ ($N_1 \neq 0$)	0
	(5)	Vertical direction→up	$-N_1$	0	$V=-N_1 \cdot \ell$ ($N_1 \neq 0$)	0
	(6)	Rotational direction→reverse	$-N_1$	$-N_2$	0	$-N_2$ ($-N_1=N_2 \neq 0$)
3. Down→forward →up→reverse 	(1)	Vertical direction→down	N_1	0	$V=N_1 \cdot \ell$ ($N_1 \neq 0$)	0
	(2)	Rotational direction→forward	N_1	N_2	0	N_2 ($N_1=N_2 \neq 0$)
	(3)	Vertical direction→up	$-N_1$	0	$V=-N_1 \cdot \ell$ ($N_1 \neq 0$)	0
	(4)	Rotational direction→reverse	$-N_1$	$-N_2$	0	$-N_2$ ($-N_1=N_2 \neq 0$)
4. Down→up →reverse→forward 	(1)	Vertical direction→down	N_1	0	$V=N_1 \cdot \ell$ ($N_1 \neq 0$)	0
	(2)	Vertical direction→up	$-N_1$	0	$V=-N_1 \cdot \ell$ ($N_1 \neq 0$)	0
	(3)	Rotational direction→reverse	$-N_1$	$-N_2$	0	$-N_2$ ($-N_1=N_2 \neq 0$)
	(4)	Rotational direction→forward	N_1	N_2	0	N_2 ($N_1=N_2 \neq 0$)

Assembly Examples

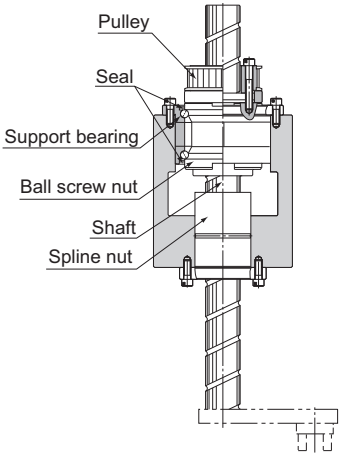


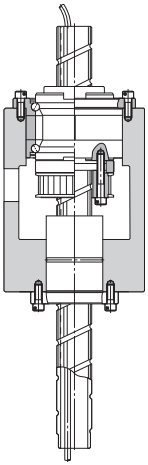


●Example of installing the ball screw nut input pulley and the spline nut input pulley, both outside the housing. The housing length is minimized.

●Example of installing the ball screw nut pulley inside the housing.

Fig. 3: Example of Assembling Model BNS





●Example of installing the ball screw nut pulley outside the housing. The housing length is minimized.

●Example of installing the ball screw nut pulley inside the housing.

Fig. 4: Example of Assembling Model NS

Example Application

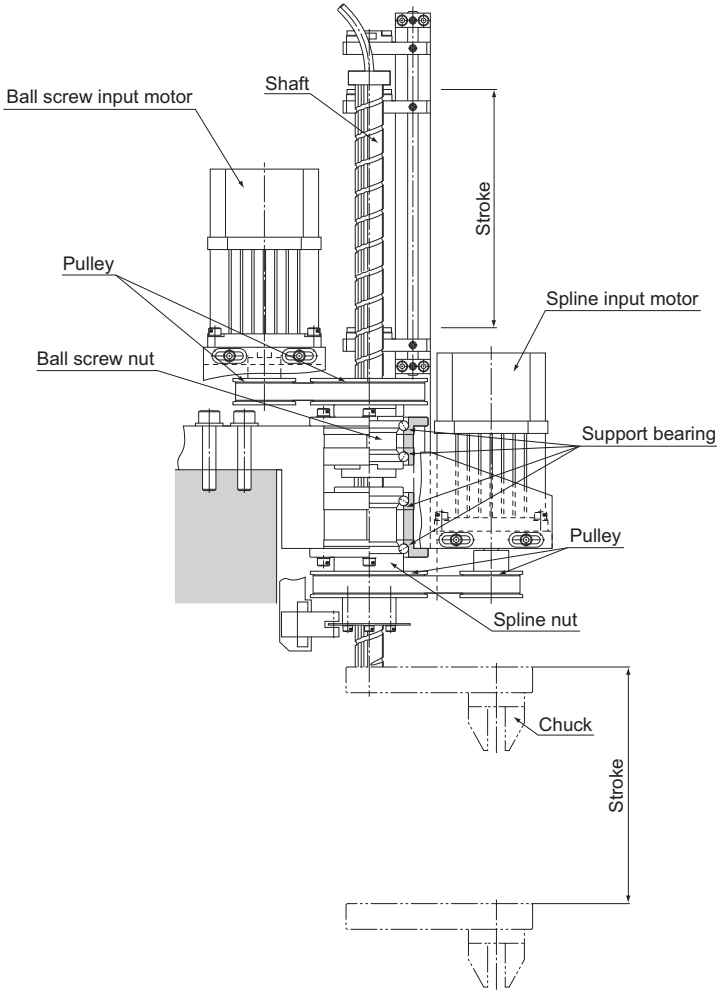
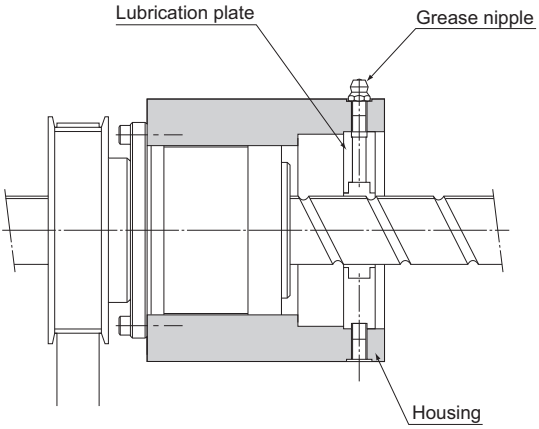


Fig. 5: Example of Using Model BNS

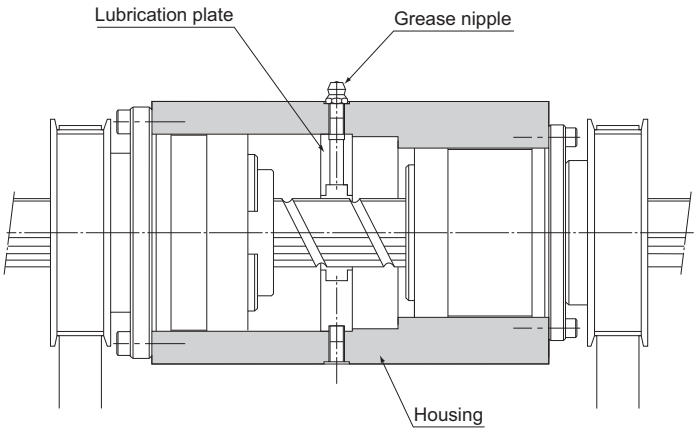
Lubrication

When lubricating the rotary ball screw, attach the lubrication plate to the housing in advance.



Lubrication Methods

When lubricating a ball screw or a ball spline, attach the lubrication plate to the housing in advance.



Lubrication Methods

Permissible Rotational Speeds for Rotary Ball Screws

The permissible rotational speed for models DIR and BLR are whichever is lowest of the critical speed of the rotary ball screw, a DN value of (70,000), or the permissible rotational speed of the support bearing. When using the product, do not exceed the permissible rotational speed.

Table 1: Model DIR Permissible Rotational Speed

Unit: min^{-1}

Model No.	Permissible rotational speed			
	Ball screw unit		Support bearing	
	Calculated using shaft length	Calculated using DN value	Grease lubrication	Oil lubrication
DIR1605	see A15-32.	4,170	4,000	5,400
DIR2005		3,370	3,500	4,700
DIR2505		2,710	2,900	3,900
DIR2510		2,690	2,900	3,900
DIR3205		2,130	2,400	3,300
DIR3206		2,120	2,400	3,300
DIR3210		2,070	2,400	3,300
DIR3610		1,850	2,100	2,800
DIR4010		1,670	1,900	2,600
DIR4012		1,670	1,900	2,600

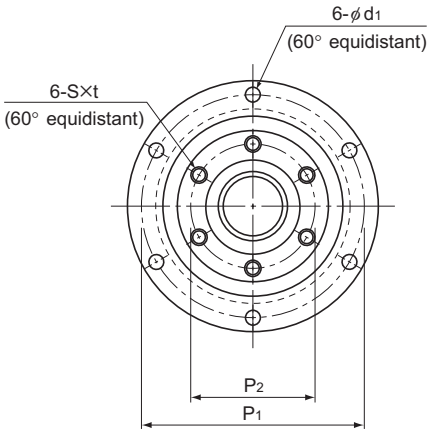
Table 2: Model BLR Permissible Rotational Speed

Unit: min^{-1}

Model No.	Permissible rotational speed			
	Ball screw unit		Support bearing	
	Calculated using shaft length	Calculated using DN value	Grease lubrication	Oil lubrication
BLR1616	see A15-32.	4,200	4,000	5,400
BLR2020		3,370	3,200	4,300
BLR2525		2,690	2,800	3,700
BLR3232		2,100	2,400	3,300
BLR3636		1,870	2,000	2,700
BLR4040		1,670	1,600	2,200
BLR5050		1,340	1,400	2,000

DIR
With Preload

DN value	70,000



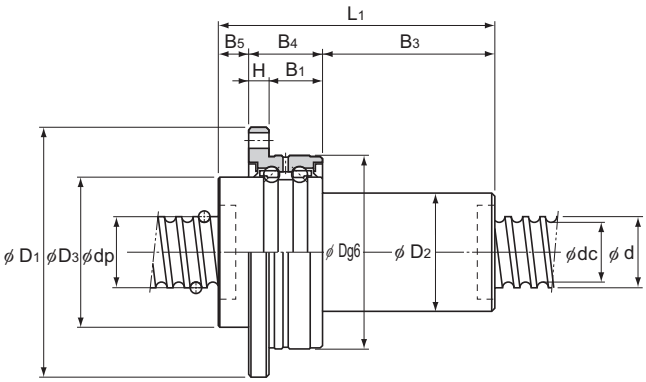
Model No.	Screw shaft outer diameter	Thread minor diameter	Lead	Ball center-to-center diameter	Basic load rating		Rigidity				
					Ca	C0a	K	Outer diameter	Flange diameter	Overall length	D3
	d	dc	Ph	dp	kN	kN	N/μm	D	D1	L1	h7
DIR 1605-6	16	13.2	5	16.75	7.4	13	310	48	64	79	36
DIR 2005-6	20	17.2	5	20.75	8.5	17.3	310	56	72	80	43.5
DIR 2505-6	25	22.2	5	25.75	9.7	22.6	490	66	86	88	52
DIR 2510-4	25	21.6	10	26	9	18	330	66	86	106	52
DIR 3205-6	32	29.2	5	32.75	11.1	30.2	620	78	103	86	63
DIR 3206-6	32	28.4	6	33	14.9	37.1	630	78	103	97	63
DIR 3210-6	32	26.4	10	33.75	25.7	52.2	600	78	103	131	63
DIR 3610-6	36	30.5	10	37.75	28.8	63.8	710	92	122	151	72
DIR 4010-6	40	34.7	10	41.75	29.8	69.3	750	100	130	142	79.5
DIR 4012-6	40	34.4	12	41.75	30.6	72.3	790	100	130	167	79.5

Model number coding

DIR2005-6 RR G0 +520L C1

- DIR2005-6: Model number
- RR: Seal symbol (*1)
- G0: Symbol for clearance in the axial direction (*2)
- +520L: Overall screw shaft length (in mm)
- C1: Accuracy symbol (*3)

(*1) See A15-354. (*2) See A15-19. (*3) See A15-12.



Unit: mm

Ball screw dimensions											Support bearing basic load rating		Nut inertial moment	Nut mass	Shaft mass	Permissible rotational speed
	D_2	B_5	B_4	B_3	P_1	P_2	H	B_1	S	t	d_1	Ca kN	C_0a kN	$kg \cdot m^2$	kg	kg/m	min^{-1}
	30	8	21	50	56	30	6	15	M4	6	4.5	8.7	10.5	6.10×10^{-5}	0.49	1.24	4,170
	34	9	21	50	64	36	6	15	M5	8	4.5	9.7	13.4	1.18×10^{-4}	0.68	2.05	3,370
	40	13	25	50	75	43	7	18	M6	10	5.5	12.7	18.2	2.65×10^{-4}	1.07	3.34	2,710
	40	11	25	70	75	43	7	18	M6	10	5.5	12.7	18.2	2.84×10^{-4}	1.16	3.52	2,690
	46	11	25	50	89	53	8	17	M6	10	6.6	13.6	22.3	5.10×10^{-4}	1.39	5.67	2,130
	48	11	25	61	89	53	8	17	M6	10	6.6	13.6	22.3	5.68×10^{-4}	1.54	5.47	2,120
	54	11	25	95	89	53	8	17	M6	10	6.6	13.6	22.3	8.13×10^{-4}	2.16	4.98	2,070
	58	14	33	104	105	61	10	23	M8	12	9	20.4	32.3	1.47×10^{-3}	3.25	6.51	1,850
	62	14	33	95	113	67	10	23	M8	12	9	21.5	36.8	2.06×10^{-3}	3.55	8.22	1,670
	62	14	33	120	113	67	10	23	M8	12	9	21.5	36.8	2.25×10^{-3}	3.9	8.5	1,670

Note) The rigidity values in the table represent spring constants, each obtained from the load and the elastic deformation when providing a preload equal to 10% of the basic axial dynamic load rating (Ca) and applying an axial load three times greater than the pre-load.
These values do not include the rigidity of the components related to mounting the ball screw nut. Therefore, it is normally appropriate to regard roughly 80% of the value in the table as the actual value.
If the applied preload (Fa_0) is not 10% of Ca, the rigidity value (K_N) is obtained from the following equation.

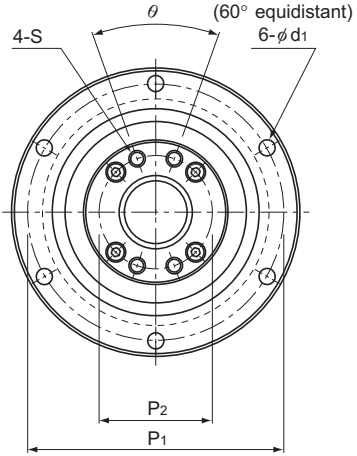
$$K_N = K \left(\frac{Fa_0}{0.1Ca} \right)^{\frac{1}{3}}$$

K: Rigidity value in the dimensional table

Options⇒A15-353

BLR (Precision Ball Screw) No Preload

DN value	70,000



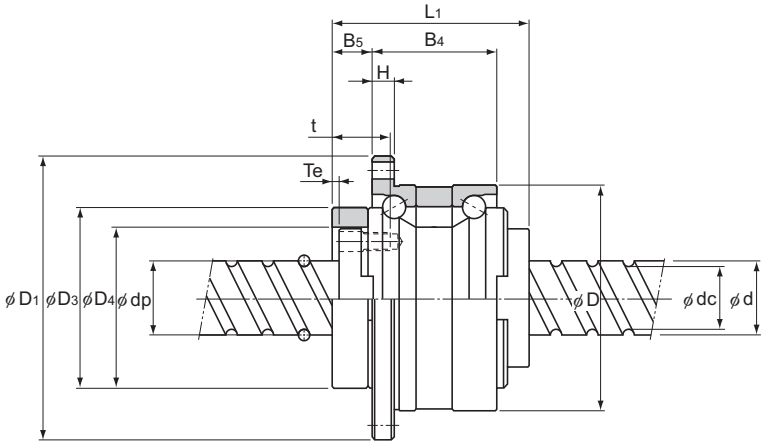
Model No.	Screw shaft outer diameter	Thread minor diameter	Lead	Ball center-to-center diameter	Basic load rating					
					Ca	C0a	Outer diameter	Flange diameter	Overall length	
	d	dc	Ph	dp	kN	kN	D	D1	L1	D3
BLR 1616-3.6	16	13.7	16	16.65	7.1	14.3	52 0 −0.007	68	43.5	40 0 −0.025
BLR 2020-3.6	20	17.5	20	20.75	11.1	24.7	62 0 −0.007	78	54	50 0 −0.025
BLR 2525-3.6	25	21.9	25	26	16.6	38.7	72 0 −0.007	92	65	58 0 −0.03
BLR 3232-3.6	32	28.3	32	33.25	23.7	59.5	80 0 −0.007	105	80	66 0 −0.03
BLR 3636-3.6	36	31.7	36	37.4	30.8	78	100 0 −0.008	130	93	80 0 −0.03
BLR 4040-3.6	40	35.2	40	41.75	38.7	99.2	110 0 −0.008	140	98	90 0 −0.035
BLR 5050-3.6	50	44.1	50	52.2	57.8	155	120 0 −0.008	156	126	100 0 −0.035

Model number coding

BLR2020-3.6 K UU G1 +1000L C5

- BLR2020-3.6: Model number
- K: Flange orientation symbol
- UU: Symbol for support bearing seal (*1)
- G1: Symbol for clearance in the axial direction (*2)
- +1000L: Overall screw shaft length (in mm)
- C5: Accuracy symbol (*3)

(*1) UU: Seal attached on both ends No symbol: Without seal. (*2) See A15-19. (*3) See A15-12.



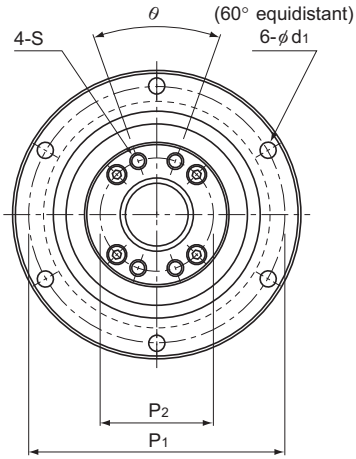
Unit: mm

Ball screw dimensions												Support bearing basic load rating		Nut inertial moment	Nut mass	Shaft mass	Permissible rotational speed
	D_4	H	B_4	B_5	Te	P_1	P_2	S	t	d_1	θ°	Ca	C_0a				
												kN	kN	kg·m²	kg	kg/m	min⁻¹
	32 +0.025 0	5	27.5	9	2	60	25	M4	12	4.5	40	19.4	19.2	4.80×10^{-5}	0.38	1.41	4,200
	39 +0.025 0	6	34	11	2	70	31	M5	16	4.5	40	26.8	29.3	1.44×10^{-4}	0.68	2.25	3,370
	47 +0.025 0	8	43	12.5	3	81	38	M6	19	5.5	40	28.2	33.3	3.23×10^{-4}	1.1	3.52	2,690
	58 +0.03 0	9	55	14	3	91	48	M6	19	6.6	40	30	39	6.74×10^{-4}	1.74	5.83	2,100
	66 +0.03 0	11	62	17	3	113	54	M8	22	9	40	56.4	65.2	1.68×10^{-3}	3.2	7.34	1,870
	73 +0.03	11	68	16.5	3	123	61	M8	22	9	50	59.3	74.1	2.79×10^{-3}	3.95	9.01	1,670
	90 +0.035 0	12	80	25	4	136	75	M10	28	11	50	62.2	83	5.82×10^{-3}	6.22	14.08	1,340

Options⇒A15-353

BLR (Rolled Ball Screw) No Preload

DN value	70,000



Model No.	Screw shaft outer diameter d	Thread minor diameter dc	Lead Ph	Ball center-to-center diameter dp	Basic load rating Ca kN	Basic load rating C0a kN	Outer diameter D	Flange diameter D1	Overall length L1	D3
BLR 1616-3.6	16	13.7	16	16.65	5.8	12.9	52 $^{0}_{-0.007}$	68	43.5	40 $^{0}_{-0.025}$
BLR 2020-3.6	20	17.5	20	20.75	7.7	22.3	62 $^{0}_{-0.007}$	78	54	50 $^{0}_{-0.025}$
BLR 2525-3.6	25	21.9	25	26	12.1	35	72 $^{0}_{-0.007}$	92	65	58 $^{0}_{-0.03}$
BLR 3232-3.6	32	28.3	32	33.25	17.3	53.9	80 $^{0}_{-0.007}$	105	80	66 $^{0}_{-0.03}$
BLR 3636-3.6	36	31.7	36	37.4	22.4	70.5	100 $^{0}_{-0.008}$	130	93	80 $^{0}_{-0.03}$
BLR 4040-3.6	40	35.2	40	41.75	28.1	89.8	110 $^{0}_{-0.008}$	140	98	90 $^{0}_{-0.035}$
BLR 5050-3.6	50	44.1	50	52.2	42.1	140.4	120 $^{0}_{-0.008}$	156	126	100 $^{0}_{-0.035}$

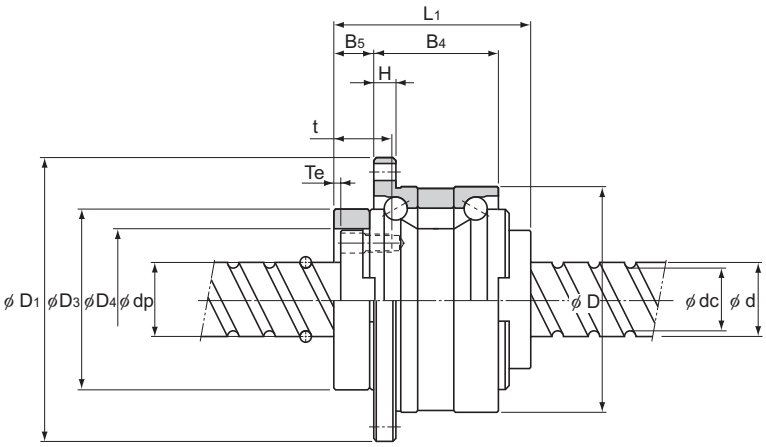
Model number coding

BLR2020-3.6 K UU +1000L C7 T

- BLR2020-3.6: Model number
- K: Flange orientation symbol
- UU: Symbol for support bearing seal (*1)
- +1000L: Overall screw shaft length (in mm)
- C7: Accuracy symbol (*2)
- T: Symbol for rolled Ball Screw

(*1) UU: seal attached on both ends; No symbol: without seal. (*2) See A15-12.

Note) For clearance in the axial direction, see A15-19.



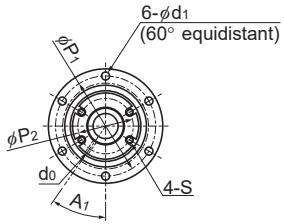
Unit: mm

Ball screw dimensions												Support bearing basic load rating		Nut inertial moment	Nut mass	Shaft mass	Permissible rotational speed
	D_4	H	B_4	B_5	Te	P_1	P_2	S	t	d_1	θ°	Ca kN	C_{0a} kN	kg·m²	kg	kg/m	min⁻¹
	32 +0.025 0	5	27.5	9	2	60	25	M4	12	4.5	40	19.4	19.2	4.80×10^{-5}	0.38	1.35	4,200
	39 +0.025 0	6	34	11	2	70	31	M5	16	4.5	40	26.8	29.3	1.44×10^{-4}	0.68	2.17	3,370
	47 +0.025 0	8	43	12.5	3	81	38	M6	19	5.5	40	28.2	33.3	3.23×10^{-4}	1.1	3.41	2,690
	58 +0.03 0	9	55	14	3	91	48	M6	19	6.6	40	30	39	6.74×10^{-4}	1.74	5.69	2,100
	66 +0.03 0	11	62	17	3	113	54	M8	22	9	40	56.4	65.2	1.68×10^{-3}	3.2	7.12	1,870
	73 +0.03	11	68	16.5	3	123	61	M8	22	9	50	59.3	74.1	2.79×10^{-3}	3.95	8.76	1,670
	90 +0.035 0	12	80	25	4	136	75	M10	28	11	50	62.2	83	5.82×10^{-3}	6.22	13.79	1,340

Options⇒A15-353

BNS-V Low-Inertia Type: Linear-Rotary Motion No Preload

DN value	100,000



Ball screw unit

Ball screw unit

Model No.	Screw shaft outer diameter	Screw shaft inner diameter	Lead	Ball screw dimensions										
				Basic load rating		Ball center-to-center diameter	Thread minor diameter	Outer diameter	Flange diameter	Overall length	D_3			
				Ca	C_0a			D						
	d	db	Ph	kN	kN	dp	dc	g6	D_1	L_1	h7	AE	BE	H
BNS 1616V	16	11	16	4.6	6.8	16.65	13.7	42	54	38	32.5	31	31	4
BNS 2020V	20	14	20	7.3	11.7	20.75	17.5	48	64	45	39.5	37	36	6
BNS 2525V	25	18	25	8	14.4	25.35	22.1	56	72	55	43.5	42	41.6	6

Ball spline

Model No.	Ball spline dimensions											
	Basic load rating		Static permissible moment	Basic torque rating		Outer diameter	Flange diameter	Overall length	D_6			
	C	C_0	M_A	C_T	C_{0T}	D_7	D_5	L_2	h7	AE_1	BE_1	H_1
	kN	kN	N·m	N·m	N·m	g6						
BNS 1616V	8.4	13.4	77.4	42.9	68.6	42	54	46.4	32.5	27.5	28	4
BNS 2020V	10.5	18.6	144	66.4	117.2	48	64	59	36	31.5	32	6
BNS 2525V	15.9	26.2	230	125.3	207	56	72	67	43.5	39.5	40	6

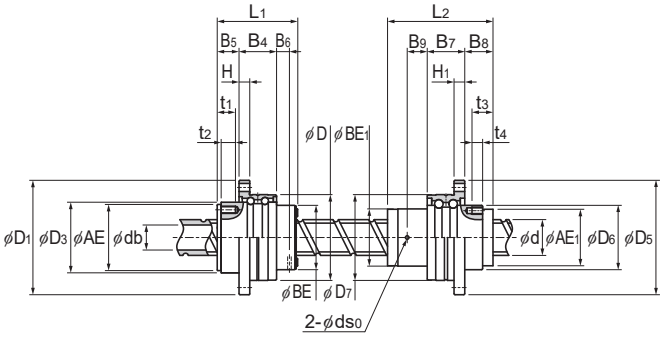
Notes: For K hollow shaft, please refer to the db dimension for the inner bore diameter of the shaft.
A solid shaft is also available upon request. See "Ball Spline" **A3-118** for details.

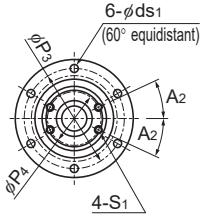
Model number coding

BNS2020V +500L C5

- BNS2020V: Model number
- +500L: Overall shaft length (in mm)
- C5: Accuracy symbol (*1)

(*1) See **A15-12**.





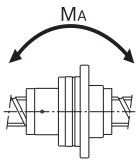
Ball spline

Unit: mm

											Support bearing basic load rating		Nut inertial moment	Screw shaft inertial moment	Nut mass	Shaft mass	Permissible rotational speed
B_4	B_5	P_1	P_2	S	t_1	t_2	d_1	B_6	d_0	A_1	Ca kN	C_0a kN	kg·m²	kg·m²/mm	kg	kg/m	min^{-1}
18	9.7	48	25.5	M3	8.2	6	3.4	5.8	2	35°	6.7	8.6	2.00×10^{-5}	3.21×10^{-8}	0.21	0.8	5,000
21	12.2	56	31	M4	10.2	8	4.5	7.2	2	35°	7.3	10.6	6.50×10^{-5}	8.04×10^{-8}	0.39	1.21	4,810
21	13.2	64	36	M5	10.2	8	4.5	15.3	3	35°	9.7	13.4	1.02×10^{-4}	1.91×10^{-7}	0.51	1.79	3,940

Unit: mm

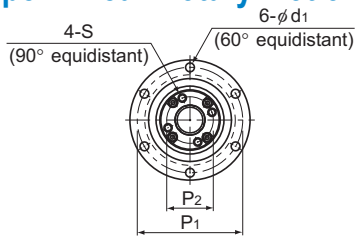
											Support bearing basic load rating		Nut inertial moment	Nut mass
B_7	B_8	P_3	P_4	S_1	t_3	t_4	ds_1	A_2	B_9	ds_0	Ca kN	C_0 kN	kg·m²	kg
18	13	48	25	M3	11.5	6	3.4	20°	5	2	5.2	5.1	1.80×10^{-5}	0.19
21	15.8	56	30	M4	11.8	6	4.5	25°	5.4	2	6.7	6.4	4.20×10^{-5}	0.33
21	19.2	64	36	M5	15.2	8	4.5	25°	7.6	3	7.4	7.8	9.80×10^{-5}	0.49



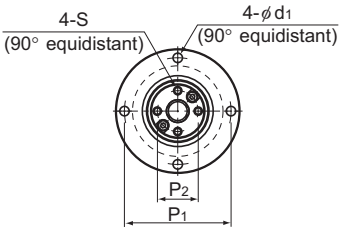
Options⇒A15-353

BNS-A Compact Type: Linear-Rotary Motion
No Preload

DN value	70,000



Ball screw unit (Models BNS 1616A to 4040A)



Ball screw unit (Models BNS 0812A and 1015A)

Ball screw unit

Model No.	Screw shaft outer diameter	Screw shaft inner diameter	Lead	Ball screw dimensions								
				Basic load rating		Ball center-to-center diameter	Thread minor diameter	Outer diameter	Flange diameter	Overall length	D_3	D_4
				Ca	C_0a			D				
	d	db	Ph	kN	kN	dp	dc	g6	D_1	L_1	h7	H7
BNS 0812A	8	—	12	1.1	1.8	8.4	6.6	32	44	28.5	22	19
BNS 1015A	10	—	15	1.7	2.7	10.5	8.3	36	48	34.5	26	23
BNS 1616A	16	11	16	3.9	7.2	16.65	13.7	48	64	40	36	32
BNS 2020A	20	14	20	6.1	12.3	20.75	17.5	56	72	48	43.5	39
BNS 2525A	25	18	25	9.1	19.3	26	21.9	66	86	58	52	47
BNS 3232A	32	23	32	13	29.8	33.25	28.3	78	103	72	63	58
BNS 4040A	40	29	40	21.4	49.7	41.75	35.2	100	130	88	79.5	73

Ball spline

Model No.	Ball spline dimensions									
	Basic load rating		Static permissible moment	Basic torque rating		Outer diameter	Flange diameter	Overall length	D_6	
	C	C_0	M_A	C_T	C_{0T}	D_7	D_5	L_2	h7	BE_1
	kN	kN	N·m	N·m	N·m	g6				
BNS 0812A	1.5	2.6	5.9	2	2.9	32	44	25	24	16
BNS 1015A	2.7	4.9	15.7	3.9	7.8	36	48	33	28	21
BNS 1616A	7.1	12.6	67.6	31.4	34.3	48	64	50	36	31
BNS 2020A	10.2	17.8	118	56.8	55.8	56	72	63	43.5	35
BNS 2525A	15.2	25.8	210	105	103	66	86	71	52	42
BNS 3232A	20.5	34	290	180	157	78	103	80	63	52
BNS 4040A	37.8	60.5	687	418	377	100	130	100	79.5	64

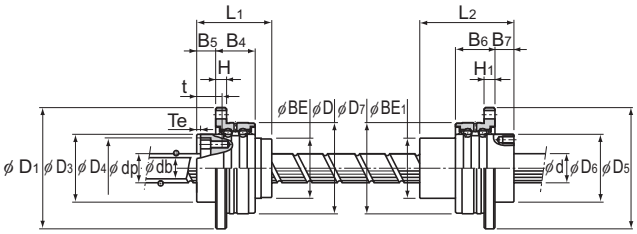
Notes: For K hollow shaft, please refer to the db dimension for the inner bore diameter of the shaft.
A solid shaft is also available upon request. See “Ball Spline” **A3-118** for details.

Model number coding

BNS2020A +500L C5

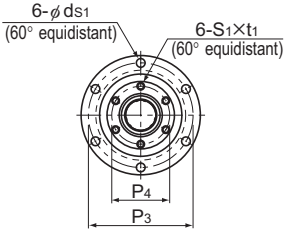
Model number | Overall shaft length (in mm) | Accuracy symbol (*1)

(*1) See **A15-12**.

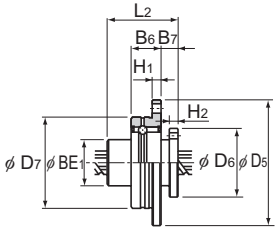


Ball screw unit (Models BNS 0812A to 4040A)

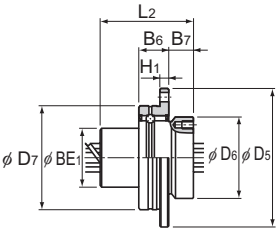
Ball spline (Models BNS 1616A to 4040A)



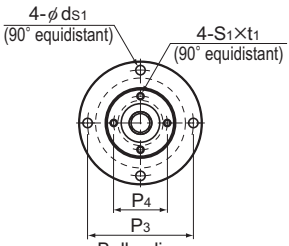
Ball spline (Models BNS 1616A to 4040A)



Ball spline (Model BNS 0812A)



Ball spline (Model BNS 1015A)



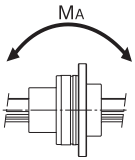
Ball spline (Models BNS 0812A and 1015A)

Unit: mm

BE	H	B_4	B_5	Te	P_1	P_2	S	t	d_1	Support bearing basic load rating Ca kN	Support bearing basic load rating C_0a kN	Nut inertial moment kg·m²	Screw shaft inertial moment kg·m²/mm	Nut mass kg	Shaft mass kg/m	Permissible rotational speed min⁻¹
19	3	10.5	7	1.5	38	14.5	M2.6	10	3.4	0.8	0.5	3.00×10^{-6}	3.16×10^{-9}	0.08	0.35	3,500
23	3	10.5	8	1.5	42	18	M3	11.5	3.4	0.9	0.7	8.00×10^{-6}	7.71×10^{-9}	0.15	0.52	3,500
32	6	21	10	2	56	25	M4	13.5	4.5	8.7	10.5	3.50×10^{-5}	3.92×10^{-8}	0.31	0.8	4,200
39	6	21	11	2.5	64	31	M5	16.5	4.5	9.7	13.4	8.50×10^{-5}	9.37×10^{-8}	0.54	1.21	3,370
47	7	25	13	3	75	38	M6	20	5.5	12.7	18.2	2.12×10^{-4}	2.20×10^{-7}	0.88	1.79	2,690
58	8	25	14	3	89	48	M6	21	6.6	13.6	22.3	5.42×10^{-4}	5.92×10^{-7}	1.39	2.96	2,100
73	10	33	16.5	3	113	61	M8	24.5	9	21.5	36.8	1.72×10^{-3}	1.43×10^{-6}	3.16	4.51	1,670

Unit: mm

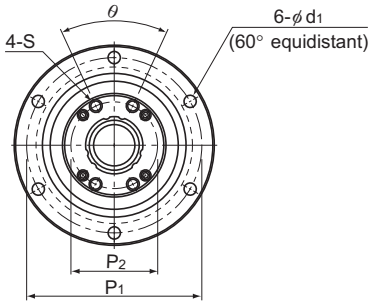
H_1	B_6	B_7	H_2	P_3	P_4	$S_1\times t_1$	ds_1	Support bearing basic load rating C kN	Support bearing basic load rating C_0 kN	Nut inertial moment kg·m²	Nut mass kg
3	10.5	6	3	38	19	M2.6×3	3.4	0.69	0.24	3.00×10^{-6}	0.08
3	10.5	9	—	42	23	M3×4	3.4	0.77	0.3	8.00×10^{-6}	0.13
6	21	10	—	56	30	M4×6	4.5	6.7	6.4	4.40×10^{-5}	0.35
6	21	12	—	64	36	M5×8	4.5	7.4	7.8	9.90×10^{-5}	0.51
7	25	13	—	75	44	M5×8	5.5	9.7	10.6	2.20×10^{-4}	0.79
8	25	17	—	89	54	M6×10	6.6	10.5	12.5	5.17×10^{-4}	1.25
10	33	20	—	113	68	M6×10	9	16.5	20.7	1.61×10^{-3}	2.51



Options⇒A15-353

BNS Heavy Load Type: Linear-Rotary Motion No Preload

DN value	70,000



Ball screw unit

Ball screw unit

Model No.	Screw shaft outer diameter	Screw shaft inner diameter	Lead	Ball screw dimensions							
				Basic load rating		Ball center-to-center diameter	Thread minor diameter	Outer diameter	Flange diameter	Overall length	D_3
	d	db	Ph	Ca kN	C_0a kN	dp	dc	D	D_1	L_1	h7
BNS 1616	16	11	16	3.9	7.2	16.65	13.7	$52\ ^{0}_{-0.007}$	68	43.5	40
BNS 2020	20	14	20	6.1	12.3	20.75	17.5	$62\ ^{0}_{-0.007}$	78	54	50
BNS 2525	25	18	25	9.1	19.3	26	21.9	$72\ ^{0}_{-0.007}$	92	65	58
BNS 3232	32	23	32	13	29.8	33.25	28.3	$80\ ^{0}_{-0.007}$	105	80	66
BNS 4040	40	29	40	21.4	49.7	41.75	35.2	$110\ ^{0}_{-0.008}$	140	98	90
BNS 5050	50	36	50	31.8	77.6	52.2	44.1	$120\ ^{0}_{-0.008}$	156	126	100

Ball spline

Model No.	Ball spline dimensions							
	Basic load rating		Static permissible moment	Basic torque rating		Outer diameter	Flange diameter	Overall length
	C kN	C_0 kN	M_A N·m	C_T N·m	C_{0T} N·m	D_7	D_5	L_2
BNS 1616	7.1	12.6	67.6	31.4	34.3	$52\ ^{0}_{-0.007}$	68	50
BNS 2020	10.2	17.8	118	56.8	55.8	$56\ ^{0}_{-0.007}$	72	63
BNS 2525	15.2	25.8	210	105	103	$62\ ^{0}_{-0.007}$	78	71
BNS 3232	20.5	34	290	180	157	$80\ ^{0}_{-0.007}$	105	80
BNS 4040	37.8	60.5	687	418	377	$100\ ^{0}_{-0.008}$	130	100
BNS 5050	60.9	94.5	1,340	842	768	$120\ ^{0}_{-0.008}$	156	125

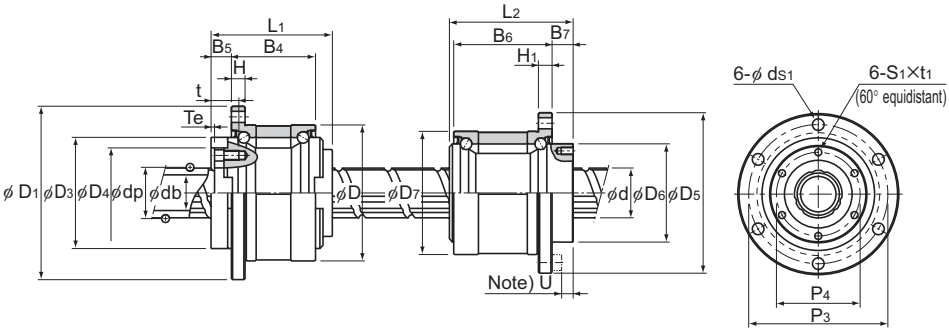
Note) Dimension U indicates the length from the head of the hexagonal-socket-head type bolt to the ball screw nut end.
For K hollow shaft, please refer to the db dimension for the inner bore diameter of the shaft.
A solid shaft is also available upon request. See “Ball Spline” A3-118 for details.

Model number coding

BNS2525 +600L C5

Model number | Overall shaft length (in mm) | Accuracy symbol (*1)

(*1) See A15-12.



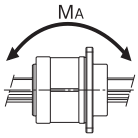
Ball screw unit　　Ball spline　　Ball spline

Unit: mm

D4 H7	H	B4	B5	Te	P1	P2	S	t	d1	θ°	Support bearing basic load rating Ca kN	Support bearing basic load rating C0a kN	Nut inertial moment kg·m²	Screw shaft inertial moment kg·m²/mm	Nut mass kg	Shaft mass kg/m	Permissible rotational speed min⁻¹
32	5	27.5	9	2	60	25	M4	12	4.5	40	19.4	19.2	4.80×10^{-5}	3.92×10^{-8}	0.38	0.8	4,200
39	6	34	11	2	70	31	M5	16	4.5	40	26.8	29.3	1.44×10^{-4}	9.37×10^{-8}	0.68	1.21	3,370
47	8	43	12.5	3	81	38	M6	19	5.5	40	28.2	33.3	3.23×10^{-4}	2.20×10^{-7}	1.1	1.79	2,690
58	9	55	14	3	91	48	M6	19	6.6	40	30	39	6.74×10^{-4}	5.92×10^{-7}	1.74	2.96	2,100
73	11	68	16.5	3	123	61	M8	22	9	50	59.3	74.1	2.79×10^{-3}	1.43×10^{-6}	3.95	4.51	1,670
90	12	80	25	4	136	75	M10	28	11	50	62.2	83	5.82×10^{-3}	3.52×10^{-6}	6.22	7.16	1,340

Unit: mm

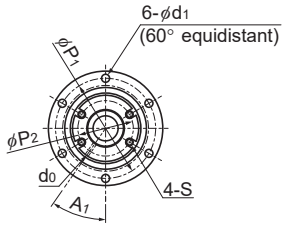
D6 h7	H1	B6	B7	P3	P4	S1×t1	ds1	U	Support bearing basic load rating C kN	Support bearing basic load rating C0 kN	Nut inertial moment kg·m²	Nut mass kg
39.5	5	37	10	60	32	M5×8	4.5	5	12.7	11.8	5.20×10^{-5}	0.51
43.5	6	48	12	64	36	M5×8	4.5	7	16.3	15.5	8.70×10^{-5}	0.7
53	6	55	13	70	45	M6×8	4.5	8	17.6	18	1.72×10^{-4}	0.93
65.5	9	60	17	91	55	M6×10	6.6	10	20.1	24	5.61×10^{-4}	1.8
79.5	11	74	23	113	68	M6×10	9	13	37.2	42.5	1.47×10^{-3}	3.9
99.5	12	97	25	136	85	M10×15	11	13	41.7	54.1	6.25×10^{-3}	6.7



Options⇒A15-353

NS-V Low-Inertia Type: Linear Motion No Preload

DN value	100,000



Ball screw unit

Ball screw unit

Model No.	Screw shaft outer diameter	Screw shaft inner diameter	Lead	Ball screw dimensions										
				Basic load rating		Ball center-to-center diameter	Thread minor diameter	Outer diameter	Flange diameter	Overall length	D_3			
				Ca	$C_{0}a$			D						
	d	db	Ph	kN	kN	dp	dc	g6	D_1	L_1	h7	AE	BE	H
NS 1616V	16	11	16	4.6	6.8	16.65	13.7	42	54	38	32.5	31	31	4
NS 2020V	20	14	20	7.3	11.7	20.75	17.5	48	64	45	39.5	37	36	6
NS 2525V	25	18	25	8	14.4	25.35	22.1	56	72	55	43.5	42	41.6	6

Ball spline

Model No.	Ball spline dimensions						
	Basic load rating		Static permissible moment	Basic torque rating		Outer diameter	Flange diameter
	C	C_0	M_A	C_T	C_{0T}		
	kN	kN	N·m	N·m	N·m	D_7	D_5
NS 1616V	8.4	13.4	77.4	42.9	68.6	$28\ {}^{0}_{-0.013}$	48
NS 2020V	10.5	18.6	144	66.4	117.2	$32\ {}^{0}_{-0.016}$	54
NS 2525V	15.9	26.2	230	125.3	207	$40\ {}^{0}_{-0.016}$	62

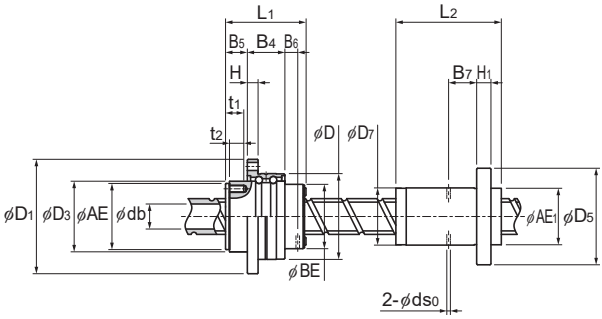
Notes: For K hollow shaft, please refer to the db dimension for the inner bore diameter of the shaft.
A solid shaft is also available upon request. See “Ball Spline” A3-118 for details.

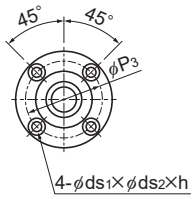
Model number coding

NS2020V +500L C5

Model number | Overall shaft length (in mm) | Accuracy symbol (*1)

(*1) See A15-12.





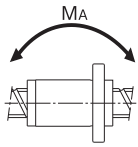
Ball spline

Unit: mm

											Support bearing basic load rating		Nut inertial moment	Screw shaft inertial moment	Nut mass	Shaft mass	Permissible rotational speed
											Ca	C_0a					
B_4	B_5	P_1	P_2	S	t_1	t_2	d_1	B_6	d_0	A_1	kN	kN	kg·m²	kg·m²/mm	kg	kg/m	min^{-1}
18	9.7	48	25.5	M3	8.2	6	3.4	5.8	2	35°	6.7	8.6	2.00×10^{-5}	3.21×10^{-8}	0.21	0.8	5,000
21	12.2	56	31	M4	10.2	8	4.5	7.2	2	35°	7.3	10.6	6.50×10^{-5}	8.04×10^{-8}	0.39	1.21	4,810
21	13.2	64	36	M5	10.2	8	4.5	15.3	3	35°	9.7	13.4	1.02×10^{-4}	1.91×10^{-7}	0.51	1.79	3,940

Unit: mm

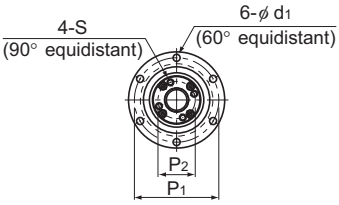
						Mounting hole			Nut mass
Overall length									
L_2	H_1	B_7	ds_0	P_3	ds_1	ds_2	h	kg
46.4	6	11.7	2	38	4.5	8	4.4	0.13
59	8	15.7	2	43	5.5	9.5	5.4	0.21
67	8	18.3	3	51	5.5	9.5	5.4	0.34



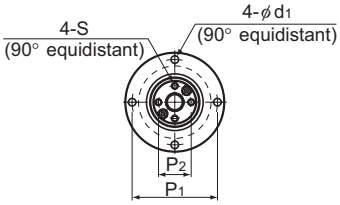
Options⇒A15-353

NS-A Compact Type: Linear Motion
No Preload

DN value	70,000



Ball screw unit (Models NS 1616A to 4040A)



Ball screw unit (Models NS 0812A and 1015A)

Ball screw unit

Model No.	Screw shaft outer diameter	Screw shaft inner diameter	Lead	Ball screw dimensions								
				Basic load rating		Ball center-to-center diameter	Thread minor diameter	Outer diameter	Flange diameter	Overall length	D_3	D_4
				Ca	C_0a			D				
	d	db	Ph	kN	kN	dp	dc	g6	D_1	L_1	h7	H7
NS 0812A	8	—	12	1.1	1.8	8.4	6.6	32	44	28.5	22	19
NS 1015A	10	—	15	1.7	2.7	10.5	8.3	36	48	34.5	26	23
NS 1616A	16	11	16	3.9	7.2	16.65	13.7	48	64	40	36	32
NS 2020A	20	14	20	6.1	12.3	20.75	17.5	56	72	48	43.5	39
NS 2525A	25	18	25	9.1	19.3	26	21.9	66	86	58	52	47
NS 3232A	32	23	32	13	29.8	33.25	28.3	78	103	72	63	58
NS 4040A	40	29	40	21.4	49.7	41.75	35.2	100	130	88	79.5	73

Ball spline

Model No.	Ball spline dimensions						
	Basic load rating		Static permissible moment	Basic torque rating		Outer diameter	Flange diameter
	C	C_0	M_A	C_T	C_{0T}	D_7	D_5 $^{0}_{-0.2}$
	kN	kN	N·m	N·m	N·m		
NS 0812A	1.5	2.6	5.9	2	2.9	16 $^{0}_{-0.011}$	32
NS 1015A	2.8	4.9	15.7	3.9	7.8	21 $^{0}_{-0.013}$	42
NS 1616A	7.1	12.6	67.6	31.4	34.3	31 $^{0}_{-0.013}$	51
NS 2020A	10.2	17.8	118	56.8	55.8	35 $^{0}_{-0.016}$	58
NS 2525A	15.2	25.8	210	105	103	42 $^{0}_{-0.016}$	65
NS 3232A	20.5	34	290	180	157	49 $^{0}_{-0.016}$	77
NS 4040A	37.8	60.5	687	418	377	64 $^{0}_{-0.019}$	100

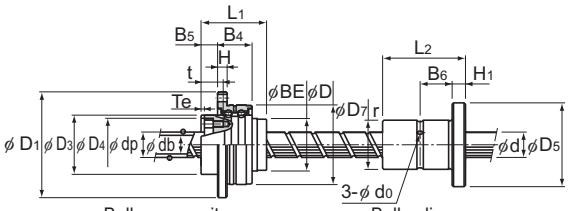
Notes: For K hollow shaft, please refer to the db dimension for the inner bore diameter of the shaft.
A solid shaft is also available upon request. See “Ball Spline” A3-118 for details.

Model number coding

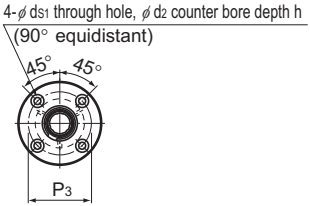
NS2020A +500L C5

Model number | Overall shaft length (in mm) | Accuracy symbol (*1)

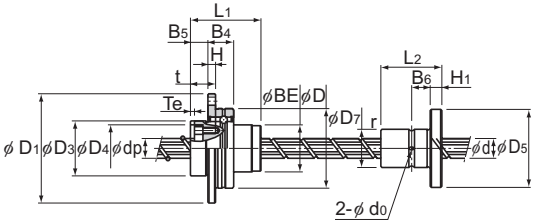
(*1) See A15-12.



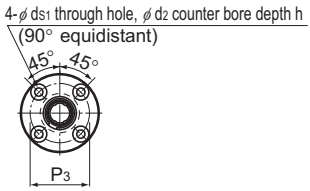
Ball screw unit
(Models NS 1616A to 4040A)



Ball spline
(Models NS 1616A to 4040A)



Ball screw unit
(Models NS 0812A and 1015A)



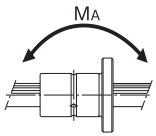
Ball spline
(Models NS 0812A and 1015A)

Unit: mm

BE	H	B_4	B_5	Te	P_1	P_2	S	t	d_1	Support bearing basic load rating Ca kN	Support bearing basic load rating C_0a kN	Nut inertial moment kg·m²	Screw shaft inertial moment kg·m²/mm	Nut mass kg	Shaft mass kg/m	Permissible rotational speed min⁻¹
19	3	10.5	7	1.5	38	14.5	M2.6	10	3.4	0.8	0.5	3.00×10^{-6}	3.16×10^{-9}	0.08	0.35	3,500
23	3	10.5	8	1.5	42	18	M3	11.5	3.4	0.9	0.7	8.00×10^{-6}	7.71×10^{-9}	0.15	0.52	3,500
32	6	21	10	2	56	25	M4	13.5	4.5	8.7	10.5	3.50×10^{-5}	3.92×10^{-8}	0.31	0.8	4,200
39	6	21	11	2.5	64	31	M5	16.5	4.5	9.7	13.4	8.50×10^{-5}	9.37×10^{-8}	0.54	1.21	3,370
47	7	25	13	3	75	38	M6	20	5.5	12.7	18.2	2.12×10^{-4}	2.20×10^{-7}	0.88	1.79	2,690
58	8	25	14	3	89	48	M6	21	6.6	13.6	22.3	5.42×10^{-4}	5.92×10^{-7}	1.39	2.96	2,100
73	10	33	16.5	3	113	61	M8	24.5	9	21.5	36.8	1.72×10^{-3}	1.43×10^{-6}	3.16	4.51	1,670

Unit: mm

Overall length L_2	H_1	B_6	r	Lubrication hole d_0	P_3	Mounting hole ds_1	Mounting hole d_2	Mounting hole h	Nut mass kg
25	5	7.5	0.5	1.5	24	3.4	6.5	3.3	0.04
33	6	10.5	0.5	1.5	32	4.5	8	4.4	0.09
$50\ ^{0}_{-0.2}$	7	18	0.5	2	40	4.5	8	4.4	0.23
$63\ ^{0}_{-0.2}$	9	22.5	0.5	2	45	5.5	9.5	5.4	0.33
$71\ ^{0}_{-0.3}$	9	26.5	0.5	3	52	5.5	9.5	5.4	0.45
$80\ ^{0}_{-0.3}$	10	30	0.5	3	62	6.6	11	6.5	0.58
$100\ ^{0}_{-0.3}$	14	36	0.5	4	82	9	14	8.6	1.46



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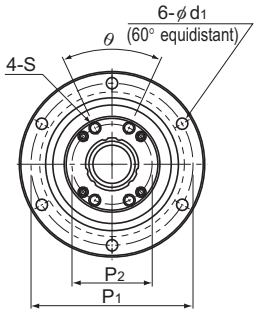
NS Heavy Load Type: Linear Motion No Preload

DN value	70,000



Ball screw unit

Ball screw unit

Model No.	Screw shaft outer diameter	Screw shaft inner diameter	Lead	Ball screw dimensions							
				Basic load rating		Ball center-to-center diameter	Thread minor diameter	Outer diameter	Flange diameter	Overall length	D_3
				Ca	C₀a						
	d	db	Ph	kN	kN	dp	dc	D	D_1	L_1	h7
NS 1616	16	11	16	3.9	7.2	16.65	13.7	52 $^{0}_{-0.007}$	68	43.5	40
NS 2020	20	14	20	6.1	12.3	20.75	17.5	62 $^{0}_{-0.007}$	78	54	50
NS 2525	25	18	25	9.1	19.3	26	21.9	72 $^{0}_{-0.007}$	92	65	58
NS 3232	32	23	32	13	29.8	33.25	28.3	80 $^{0}_{-0.007}$	105	80	66
NS 4040	40	29	40	21.4	49.7	41.75	35.2	110 $^{0}_{-0.008}$	140	98	90
NS 5050	50	36	50	31.8	77.6	52.2	44.1	120 $^{0}_{-0.008}$	156	126	100

Ball spline

Model No.	Ball spline dimensions					
	Basic load rating		Static permissible moment	Basic torque rating		Outer diameter
	C	C_0	M_A	C_T	C_{0T}	D_7
	kN	kN	N·m	N·m	N·m	
NS 1616	7.1	12.6	67.6	31.4	34.3	31 $^{0}_{-0.013}$
NS 2020	10.2	17.8	118	56.9	55.9	35 $^{0}_{-0.016}$
NS 2525	15.2	25.8	210	105	103	42 $^{0}_{-0.016}$
NS 3232	20.5	34	290	180	157	49 $^{0}_{-0.016}$
NS 4040	37.8	60.5	687	419	377	64 $^{0}_{-0.019}$
NS 5050	60.9	94.5	1,340	842	769	80 $^{0}_{-0.019}$

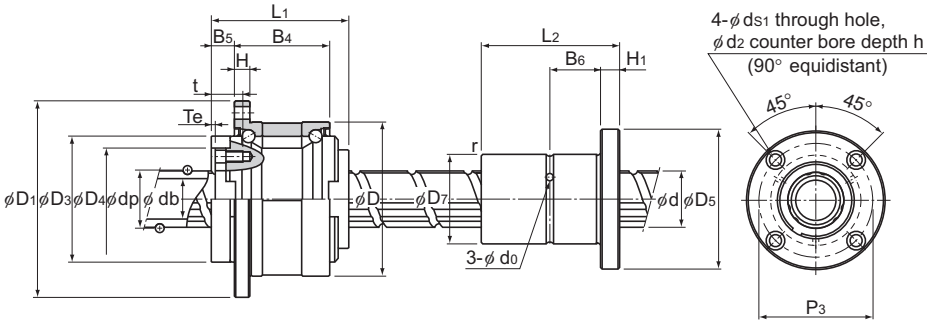
Notes: For K hollow shaft, please refer to the db dimension for the inner bore diameter of the shaft.
A solid shaft is also available upon request. See “Ball Spline” A3-118 for details.

Model number coding

NS2525 +600L C5

Model number | Overall shaft length (in mm) | Accuracy symbol (*1)

(*1) See A15-12.



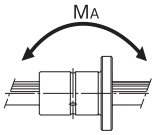
Ball screw unit　　Ball spline　　Ball spline

Unit: mm

D_4 H7	H	B_4	B_5	Te	P_1	P_2	S	t	d_1	θ°	Support bearing basic load rating Ca kN	Support bearing basic load rating C_0a kN	Nut inertial moment kg·m²	Screw shaft inertial moment kg·m²/mm	Nut mass kg	Shaft mass kg/m	Permissible rotational speed min⁻¹
32	5	27.5	9	2	60	25	M4	12	4.5	40	19.4	19.2	4.80×10^{-5}	3.92×10^{-8}	0.38	0.8	4,200
39	6	34	11	2	70	31	M5	16	4.5	40	26.8	29.3	1.44×10^{-4}	9.37×10^{-8}	0.68	1.21	3,370
47	8	43	12.5	3	81	38	M6	19	5.5	40	28.2	33.3	3.23×10^{-4}	2.20×10^{-7}	1.1	1.79	2,690
58	9	55	14	3	91	48	M6	19	6.6	40	30	39	6.74×10^{-4}	5.92×10^{-7}	1.74	2.96	2,100
73	11	68	16.5	3	123	61	M8	22	9	50	59.3	74.1	2.79×10^{-3}	1.43×10^{-6}	3.95	4.51	1,670
90	12	80	25	4	136	75	M10	28	11	50	62.2	83	5.82×10^{-3}	3.52×10^{-6}	6.22	7.16	1,340

Unit: mm

Flange diameter D_5	Overall length L_2	H_1	B_6	r	Lubrication hole d_0	P_3	Mounting hole ds_1	Mounting hole d_2	Mounting hole h	Nut mass kg
51	$50\ ^{0}_{-0.2}$	7	18	0.5	2	40	4.5	8	4.4	0.23
58	$63\ ^{0}_{-0.2}$	9	22.5	0.5	2	45	5.5	9.5	5.4	0.33
65	$71\ ^{0}_{-0.3}$	9	26.5	0.5	3	52	5.5	9.5	5.4	0.45
77	$80\ ^{0}_{-0.3}$	10	30	0.5	3	62	6.6	11	6.5	0.58
100	$100\ ^{0}_{-0.3}$	14	36	0.5	4	82	9	14	8.6	1.46
124	$125\ ^{0}_{-0.3}$	16	46.5	1	4	102	11	17.5	11	2.76



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Ball Screw/Spline Permissible Rotational Speeds

The permissible rotational speed of the ball screw/spline is limited by the lower of the critical speed of the ball screw, the DN value, or the permissible speed of the support bearing. Do not exceed the permissible rotational speed when operating.

Table 1: Permissible Rotational Speed for Model BNS-V

Unit: min^{-1}

Model No.	Ball screw		Support bearing			
			Ball screw		Ball spline	
	Calculated from shaft length	Calculated from DN value	Grease lubrication	Oil lubrication	Grease lubrication	Oil lubrication
BNS1616V	see A15-32.	5,000	4,400	6,100	4,400	6,100
BNS2020V		4,810	3,900	5,100	4,000	5,400
BNS2525V		3,940	3,500	4,700	3,500	4,700

Table 2: Permissible Rotational Speed for Model BNS-A

Unit: min^{-1}

Model No.	Ball screw		Support bearing			
			Ball screw		Ball spline	
	Calculated from shaft length	Calculated from DN value	Grease lubrication	Oil lubrication	Grease lubrication	Oil lubrication
BNS0812A	see A15-32.	3,500	—	—	6,900	9,300
BNS1015A		3,500	—	—	5,900	7,900
BNS1616A		4,200	4,000	5,400	4,000	5,400
BNS2020A		3,370	3,500	4,700	3,500	4,700
BNS2525A		2,690	2,900	3,900	2,900	3,900
BNS3232A		2,100	2,400	3,300	2,400	3,300
BNS4040A		1,670	1,900	2,600	1,900	2,600

Table 3: Permissible Rotational Speed for Model BNS

Unit: min^{-1}

Model No.	Ball screw		Support bearing			
			Ball screw		Ball spline	
	Calculated from shaft length	Calculated from DN value	Grease lubrication	Oil lubrication	Grease lubrication	Oil lubrication
BNS1616	see A15-32.	4,200	4,000	5,600	4,000	5,400
BNS2020		3,370	3,200	4,300	3,600	4,900
BNS2525		2,690	2,800	3,700	3,200	4,300
BNS3232		2,100	2,400	3,300	2,400	3,300
BNS4040		1,670	1,800	2,400	2,000	2,700
BNS5050		1,340	1,600	2,200	1,600	2,200

Table 4: Permissible Rotational Speed for Model NS-V

Unit: min^{-1}

Model No.	Ball screw		Support bearing	
			Ball screw	
	Calculated from shaft length	Calculated from DN value	Grease lubrication	Oil lubrication
NS1616V	see A15-32.	5,000	4,400	6,100
NS2020V		4,810	3,900	5,100
NS2525V		3,940	3,500	4,700

Table 5: Permissible Rotational Speed for Model NS-A

Unit: min^{-1}

Model No.	Ball screw		Support bearing	
			Ball screw	
	Calculated from shaft length	Calculated from DN value	Grease lubrication	Oil lubrication
NS0812A	see A15-32.	3,500	—	—
NS1015A		3,500	—	—
NS1616A		4,200	4,000	5,400
NS2020A		3,370	3,500	4,700
NS2525A		2,690	2,900	3,900
NS3232A		2,100	2,400	3,300
NS4040A		1,670	1,900	2,600

Table 6: Permissible Rotational Speed for Model NS

Unit: min^{-1}

Model No.	Ball screw		Support bearing	
			Ball screw	
	Calculated from shaft length	Calculated from DN value	Grease lubrication	Oil lubrication
NS1616	see A15-32.	4,200	4,000	5,600
NS2020		3,370	3,200	4,300
NS2525		2,690	2,800	3,700
NS3232		2,100	2,400	3,300
NS4040		1,670	1,800	2,400
NS5050		1,340	1,600	2,200

Maximum Manufacturing Lengths of Screw Shafts

Table 1, Table 2, and Table 3 show the maximum manufacturing lengths of precision ball screws by accuracy grade. Table 5, Table 6, Table 7, and Table 8 show the maximum manufacturing lengths of rolled ball screws by accuracy grade.

Table 1: Maximum Manufacturing Lengths of Precision Ball Screws by Accuracy Grade

Unit: mm

Screw shaft outer diameter	Overall screw shaft length					
	C0	C1	C2	C3	C5	C7
4	90	110	120	120	120	120
6	150	170	210	210	210	210
8	230	270	340	340	340	340
10	350	400	500	500	500	500
12	440	500	630	680	680	680
13	440	500	630	680	680	680
14	530	620	770	870	890	890
15	570	670	830	950	980	1,100
16	620	730	900	1,050	1,100	1,400
18	720	840	1,050	1,220	1,350	1,600
20	820	950	1,200	1,400	1,600	1,800
25	1,100	1,400	1,600	1,800	2,000	2,400
28	1,300	1,600	1,900	2,100	2,350	2,700
30	1,450	1,700	2,050	2,300	2,570	2,950
32	1,600	1,800	2,200	2,500	2,800	3,200
36	2,000	2,100	2,550	2,950	3,250	3,650
40	2,000	2,400	2,900	3,400	3,700	4,300
45	2,000	2,750	3,350	3,950	4,350	5,050
50	2,000	3,100	3,800	4,500	5,000	5,800
55	2,000	3,450	4,150	5,300	6,050	6,500
63	2,000	4,000	5,200	5,800	6,700	7,700
70	2,000	4,000	6,300	6,450	7,650	9,000
80	2,000	4,000	6,300	7,900	9,000	11,000
100	2,000	4,000	6,300	11,000	11,000	11,000

*For ball screw models HBN-V, HBN-K, HBN-KA, HBN, and SBKH, the standard maximum length of the screw shaft is 3,000 mm. For lengths greater than this, please contact THK.

Table 2: Maximum Manufacturing Lengths of Precision Ball Screws (Model MBF without Preload) by Model Number

Unit: mm

Screw shaft outer diameter	C0	C1	C2	C3	C5	C7
MBF0401-3.7	90	110	120	120	120	120
MBF0601-3.7	150	170	210	210	210	210
MBF0602-2.7	140	160	—	230	280	290
MBF0602.5-2.7	140	160	—	230	280	290
MBF0801.5-3.7	200	250	—	330	350	350
MBF0802-3.7	230	270	340	340	340	340
MBF0802.5-3.7	200	200	—	320	320	320
MBF0803-2.7	200	200	—	320	320	320
MBF0804-2.7	200	200	—	320	320	320
MBF1001-3.7	260	260	—	460	460	460
MBF1001.5-3.7	260	260	—	460	460	460
MBF1002-3.7	350	400	500	500	500	500
MBF1002.5-3.7	260	260	—	380	420	500
MBF1003-3.7	260	260	—	380	420	500
MBF1005-2.7	260	260	—	380	420	500
MBF1202-3.7	440	500	630	680	680	680
MBF1202.5-3.7	320	350	—	510	510	510
MBF1203-3.7	320	450	—	600	620	680
MBF1204-3.7	320	450	—	600	620	680
MBF1402-3.7	530	620	770	870	890	890
MBF1404-3.7	530	620	770	870	890	890

Table 3: Maximum Manufacturing Lengths of Precision Ball Screws (Model BLK without Preload) by Model Number

Unit: mm

Screw shaft outer diameter	C0	C1	C2	C3	C5	C7
BLK0808-3.2	—	—	—	300	410	410
BLK1510-5.6	570	670	830	950	980	1,100
BLK1616-2.8	620	730	900	1,050	1,100	1,400
BLK1616-3.6	620	730	900	1,050	1,100	1,400
BLK2020-2.8	820	950	1,200	1,400	1,600	1,800
BLK2020-3.6	820	950	1,200	1,400	1,600	1,800
BLK2525-2.8	1,100	1,400	1,600	1,800	2,000	2,400
BLK2525-3.6	1,100	1,400	1,600	1,800	2,000	2,400
BLK3232-2.8	1,600	1,800	2,200	2,500	2,800	3,200
BLK3232-3.6	1,600	1,800	2,200	2,500	2,800	3,200
BLK3620-5.6	2,000	2,100	2,550	2,950	3,250	3,650
BLK3624-5.6	2,000	2,100	2,550	2,950	3,250	3,650
BLK3636-2.8	2,000	2,100	2,550	2,950	3,250	3,650
BLK3636-3.6	2,000	2,100	2,550	2,950	3,250	3,650
BLK4040-2.8	2,000	2,400	2,900	3,400	3,700	4,300
BLK4040-3.6	2,000	2,400	2,900	3,400	3,700	4,300
BLK5050-2.8	2,000	3,100	3,800	4,500	5,000	5,800
BLK5050-3.6	2,000	3,100	3,800	4,500	5,000	5,800

* BLK0808-3.2 is only compatible with accuracy grades C3, C5, and C7. Contact THK if you would like to use accuracy grades C0 or C1.

Table 4: Maximum Manufacturing Lengths of Precision Ball Screws (DIN Standard-Compliant Ball Screws)

Unit: mm

Shaft diameter	Ground shaft			CES shaft			
	C3	C5	C7	Cp3	Cp5	Ct5	Ct7
16	1,050	1,100	1,400	1,050	1,100	1,100	1,400
20	1,400	1,600	1,800	1,400	1,600	1,600	1,800
25	1,800	2,000	2,400	1,800	2,000	2,000	2,400
32	2,500	2,800	3,200	2,500	2,800	2,800	3,200
40	3,400	3,700	4,300	3,400	3,700	3,700	4,300
50	4,500	5,000	5,800	—	—	—	—
63	5,800	6,700	7,700	—	—	—	—

Table 5: Maximum Manufacturing Lengths of Rolled Ball Screws by Accuracy Grade

Unit: mm

Screw shaft outer diameter	Overall screw shaft length		
	C7	C8	C10
6 to 8	320	320	—
10 to 12	500	1,000	—
14 to 15	1,500	1,500	1,500
16 to 18	1,500	1,800	1,800
20	2,000	2,200	2,200
25	2,000	3,000	3,000
28	3,000	3,000	3,000
30	3,000	3,000	4,000
32 to 36	3,000	4,000	4,000
40	3,000	5,000	5,000
45	3,000	5,500	5,500
50	3,000	6,000	6,000

Table 6: Maximum Manufacturing Lengths of Rolled Ball Screws (Model JPF with Preload) by Model Number

Unit: mm

Model	Overall screw shaft length
JPF1404-4	1,000
JPF1405-4	
JPF1605-4	
JPF2005-6	2,000
JPF2505-6	
JPF2510-4	
JPF2805-6	
JPF2806-6	3,000
JPF3210-6	
JPF3610-6	
JPF4010-6	

Table 7: Maximum Manufacturing Lengths of Rolled Ball Screws (Model MTF with Preload) by Model Number

Unit: mm

Screw shaft outer diameter	C7	C8	C10
MTF0601-3.7	320	320	—
MTF0801-3.7	320	—	450
MTF0802-3.7	320	320	—
MTF0805-2.7	320	—	450
MTF1002-3.7	500	1,000	—
MTF1004-2.7	500	—	650
MTF1202-3.7	500	1,000	—
MTF1402-3.7	700	—	700

Table 8: Maximum Manufacturing Lengths of Rolled Ball Screws (Model BLK with Preload) by Model Number

Unit: mm

Screw shaft outer diameter	C7	C8	C10
BLK0808-3.2	320	—	450
BLK1010-3.2	500	—	650
BLK1510-5.6	1,500	1,500	1,500
BLK1616-3.6	1,500	1,800	1,800
BLK1616-7.2	1,500	1,800	1,800
BLK2020-3.6	2,000	2,200	2,200
BLK2020-7.2	2,000	2,200	2,200
BLK2525-3.6	2,000	3,000	3,000
BLK2525-7.2	2,000	3,000	3,000
BLK3232-3.6	3,000	4,000	4,000
BLK3232-7.2	3,000	4,000	4,000
BLK3620-5.6	3,000	4,000	4,000
BLK3624-5.6	3,000	4,000	4,000
BLK3636-3.6	3,000	4,000	4,000
BLK3636-7.2	3,000	4,000	4,000
BLK4040-3.6	3,000	5,000	5,000
BLK4040-7.2	3,000	5,000	5,000
BLK5050-3.6	3,000	6,000	6,000
BLK5050-7.2	3,000	6,000	6,000