Precision Ball Screw/Spline

Models BNS-A, BNS, NS-A and NS
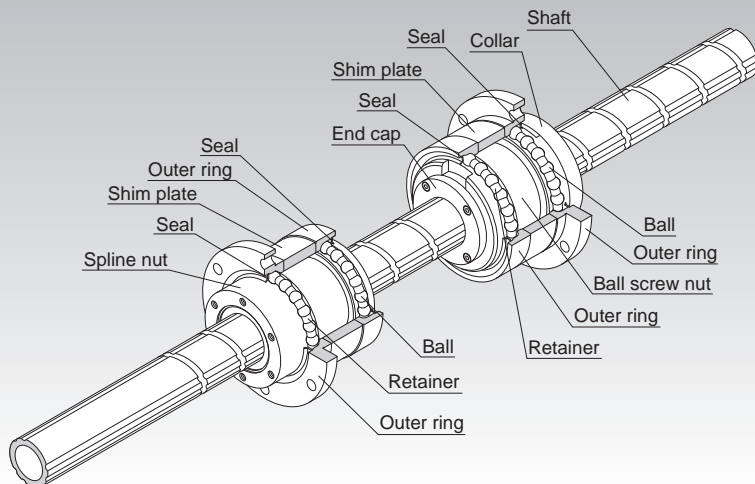
Point of Selection	A15-8
Options	A15-336
Model No.	A15-353
Precautions on Use	A15-358
Accessories for Lubrication	A24-1
Mounting Procedure and Maintenance	B15-104

DN Value	A15-33
Accuracy Standards	A15-249
Action Patterns	A15-250
Example of Assembly	A15-253
Example of Use	A15-254
Precautions on Use	A15-255

Precision Ball Screw/Spline

Structure and Features

The Ball Screw/Spline contains the Ball Screw grooves and the Ball Spline groove crossing one another. The nuts of the Ball Screw and the Ball Spline have dedicated support bearings directly embedded on the circumference of the nuts.

The Ball Screw/Spline is capable of performing three (rotational, linear and spiral) modes of motion with a single shaft by rotating or stopping the spline nut.

It is optimal for machines using a combination of rotary and straight motions, such as scholar robot's Z-axis, assembly robot, automatic loader, and machining center's ATC equipment.

[**Zero Axial Clearance**]
The Ball Spline has an angular-contact structure that causes no backlash in the rotational direction, enabling highly accurate positioning.

[**Lightweight and Compact**]
Since the nut and the support bearing are integrated, highly accurate, compact design is achieved. In addition, small inertia because of the lightweight ball screw nut ensures high responsiveness.

[**Easy Installation**]
The Ball Spline nut is designed so that balls do not fall off even if the spline nut is removed from the shaft, making installation easy. The Ball Screw/Spline can easily be mounted simply by securing it to the housing with bolts. (For the housing's inner-diameter tolerance, H7 is recommended.)

[**Smooth Motion with Low Noise**]
As the Ball Screw is based on an end cap mechanism, smooth motion with low noise is achieved.

[**Highly Rigid Support Bearing**]
The support bearing on the Ball Screw has a contact angle of 60° in the axial direction while that on the Ball Spline has a contact angle of 30° in the moment direction, thus to provide a highly rigid shaft support.

In addition, a dedicated rubber seal is attached as standard to prevent entry of foreign materials.
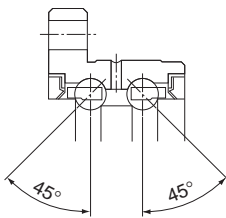
Ball Screw

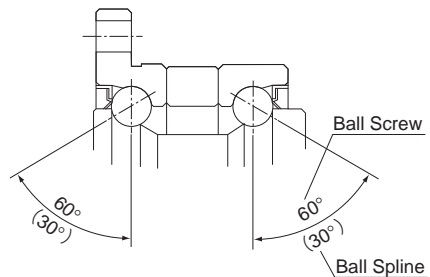Fig.1 Structure of Support Bearing Model BNS-A   Fig.2 Structure of Support Bearing Model BNS
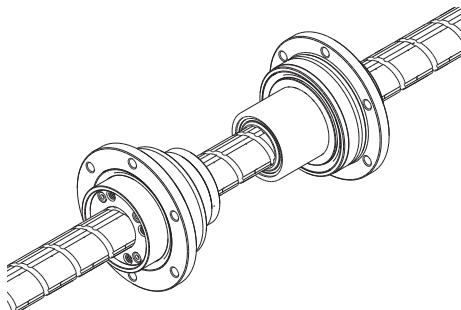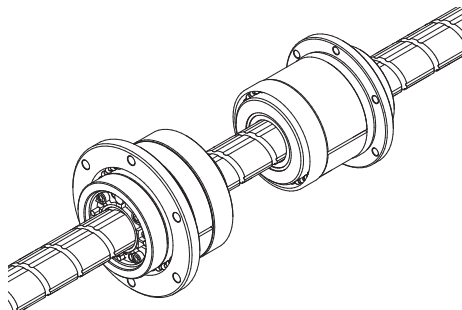
Type

[No Preload Type]

Model BNS-A
Specification Table⇒🅐15-256
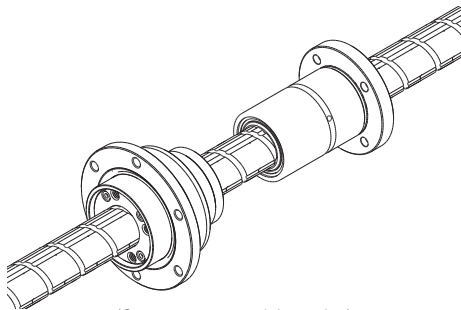
(Compact type: linear-rotary motion)

Model BNS
Specification Table⇒🅐15-258
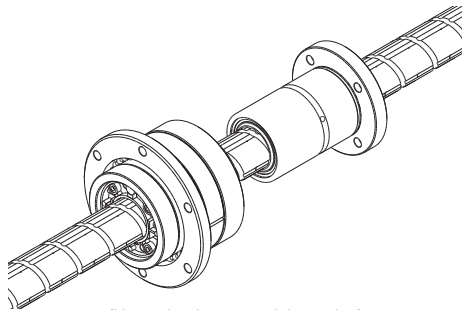
(Heavy-load type: linear-rotary motion)

Model NS-A
Specification Table⇒🅐15-260

(Compact type: straight motion)

Model NS
Specification Table⇒🅐15-262

(Heavy-load type: straight motion)

Accuracy Standards

The Ball Screw/Spline is manufactured with the following specifications.

[**Ball Screw**]
Axial clearance   : 0 or less
Lead angle accuracy   : C5
(For detailed specifications, see Ⓐ**15-12**, Ⓐ**15-19**.)

[**Ball Spline**]
Clearance in the rotational direction : 0 or less (CL: light preload)
(For detailed specifications, see Ⓐ**3-30**.)
Accuracy grade   : class H
(For detailed specifications, see Ⓐ**3-34**.)

Model BNS   Model NS
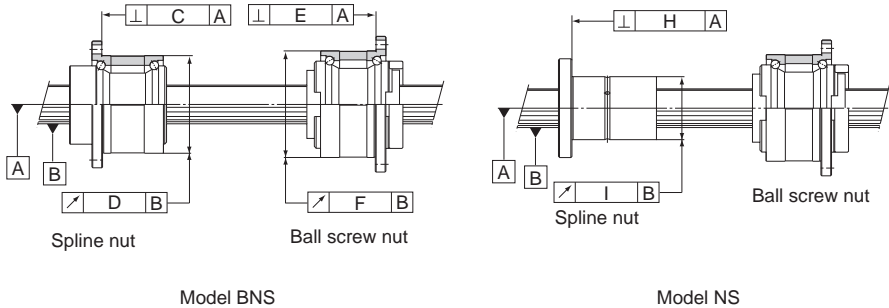
Unit: mm

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

Ball Screw

Action Patterns

[Model BNS Basic Actions]

Ball screw nut

Ball screw nut pulley: N_1

Spline nut

Shaft

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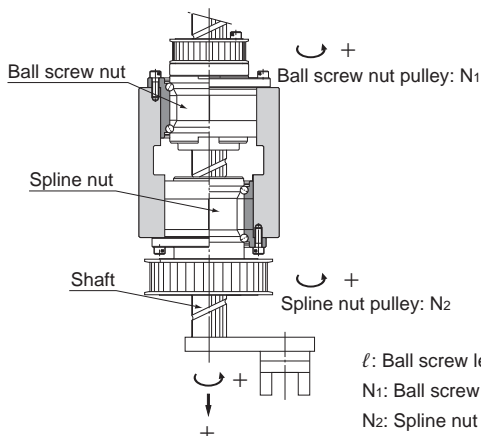
ℓ: Ball screw lead (mm)
N_1: Ball screw nut rotational speed (min^{-1})
N_2: Spline nut rotational speed (min^{-1})

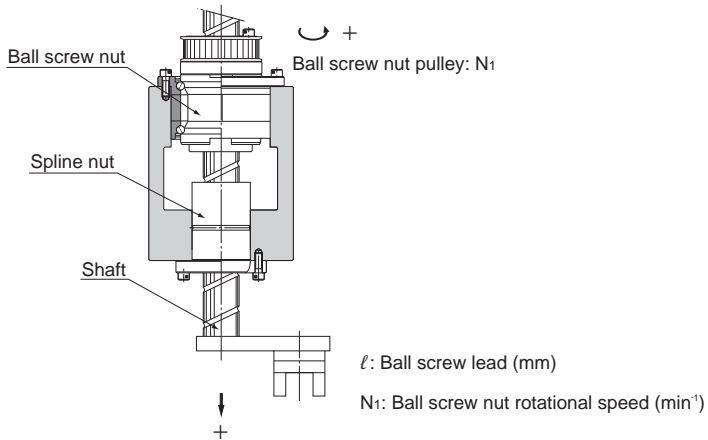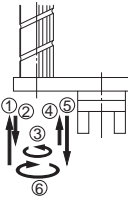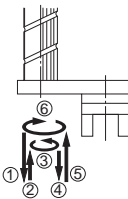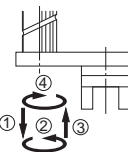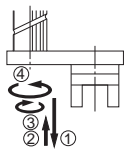| Motion		Action direction		Input		Shaft motion	
				Ball screw pulley	Ball spline pulley	Vertical direction (speed)	Rotational direction (rotation speed)
1. Vertical		(1)	Vertical direction→down	N_1 (Forward)	0	$V=N_1 \cdot \ell$ ($N_1 \neq 0$)	0
			Rotational direction→0				
		(2)	Vertical direction→up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

Precision Ball Screw/Spline

[**Model NS Basic Actions**]

Ball screw nut

Ball screw nut pulley: N_1

Spline nut

Shaft

ℓ: Ball screw lead (mm)

N_1: Ball screw nut rotational speed (min^{-1})

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

Ball Screw

THK Ⓐ**15-251**

[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 ($N_1=N_2 \neq 0$)

Precision Ball Screw/Spline

Example of Assembly

Pulley
Seal
Support bearing
Ball screw nut
Shaft
Support bearing
Spline nut
Seal
Pulley
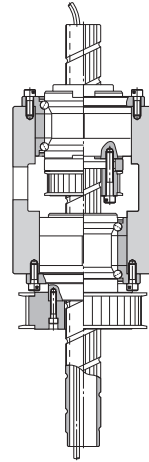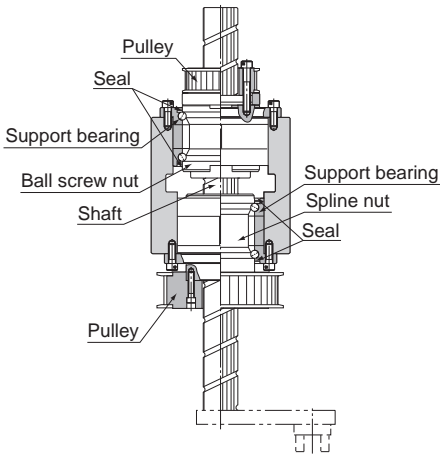
●Example of installing the ball screw nut input pulley and the spline nut input pulley, both outside the housing. The housing length is minimized.

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

Fig.3 Example of Assembling Model BNS

Pulley
Seal
Support bearing
Ball screw nut
Shaft
Spline nut
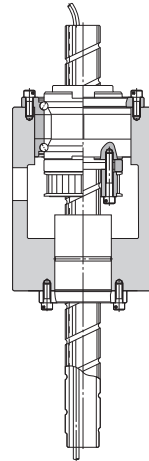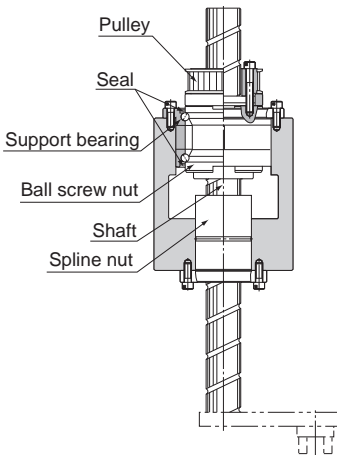
●Example of installing the ball screw nut pulley outside the housing.
The housing length is minimized.

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

Fig.4 Example of Assembling Model NS

Ball Screw

Example of Use

Ball screw input motor

Shaft

Stroke

Pulley

Spline input motor

Ball screw nut

Support bearing

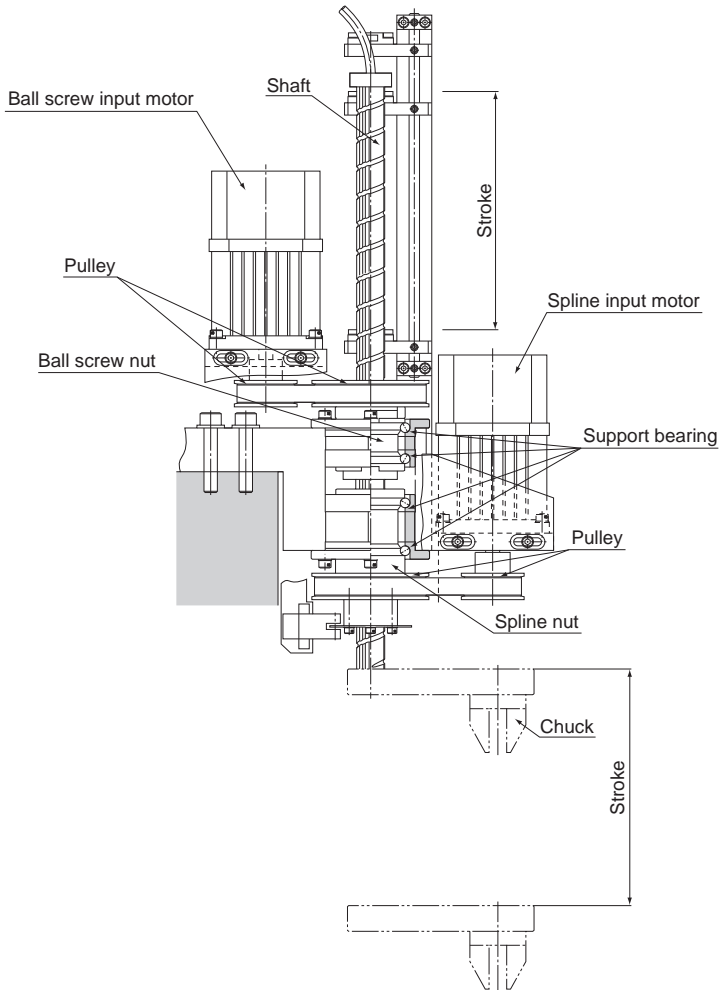Pulley

Spline nut

Chuck

Stroke

Fig.5 Example of Using Model BNS

Precautions on Use

[**Lubrication**]
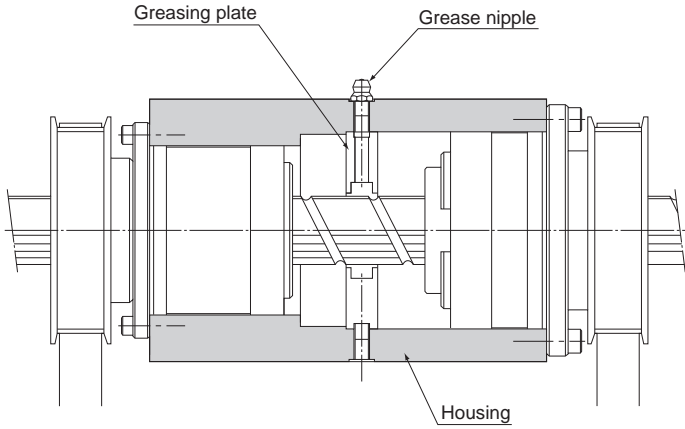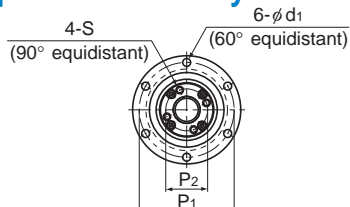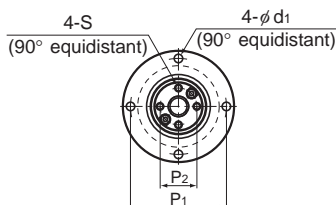When lubricating the Ball Screw/Spline, attach the greasing plate to the housing in advance.

Greasing plate   Grease nipple

Housing

Fig.6 Lubrication Methods

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

DN value	70000

4-S
(90° equidistant)

6-φ d1
(60° equidistant)

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

4-S
(90° equidistant)

4-φ d1
(90° equidistant)

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 D	Flange diameter	Overall length	D₃	D₄
				Ca	C₀a							
	d	db	Ph	kN	kN	dp	dc	g6	D₁	L₁	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

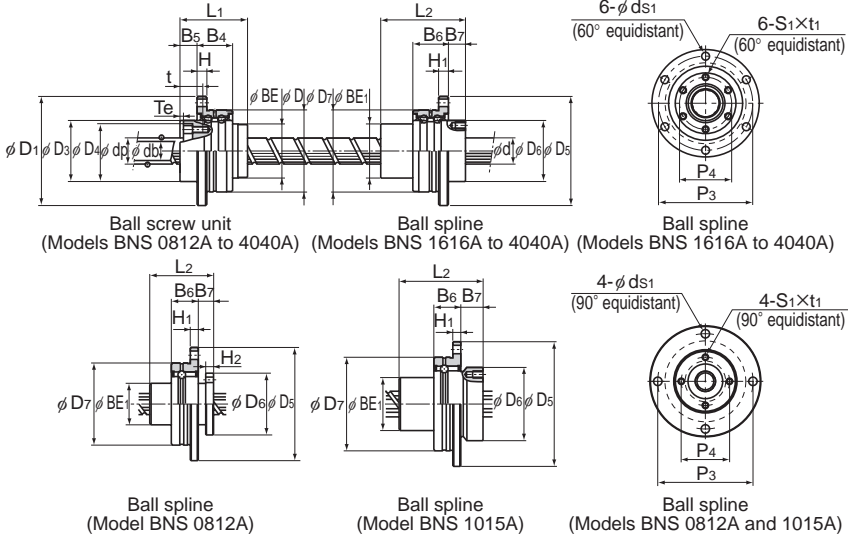| Model No.	Basic load rating		Static permissible moment Mₐ	Basic torque rating		Outer diameter D₇	Flange diameter	Overall length	D₆	
	C	C₀		Cᴛ	C₀ᴛ					
	kN	kN	N-m	N-m	N-m	g6	D₅	L₂	h7	BE₁
BNS 0812A	1.5	2.6	5.9	2	2.9	32	44	25	24	16
BNS 1015A	2.7	4.9	15.7	3.9	7.8	36	48	33	28	21
BNS 1616A	7.1	12.6	67.6	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

Note) For K hollow shaft, please refer to the db dimension for the inner bore diameter of the shaft. If requested solid shaft is also available. See "Ball Spline" A3-112 for details.

Model number coding

BNS2020A +500L

Model number   Overall shaft length (in mm)

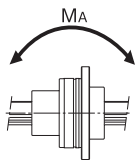Download data by searching for the corresponding model number on the Technical Support site.

https://tech.thk.com

Precision Ball Screw/Spline

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		Nut inertial moment	Screw shaft inertial moment/mm	Nut mass	Shaft mass
										Ca	C_0a				
										kN	kN	kg-cm²	J kg-cm²/mm	kg	kg/m
19	3	10.5	7	1.5	38	14.5	M2.6	10	3.4	0.8	0.5	0.03	3.16×10^{-5}	0.08	0.35
23	3	10.5	8	1.5	42	18	M3	11.5	3.4	0.9	0.7	0.08	7.71×10^{-5}	0.15	0.52
32	6	21	10	2	56	25	M4	13.5	4.5	8.7	10.5	0.35	3.92×10^{-4}	0.31	0.8
39	6	21	11	2.5	64	31	M5	16.5	4.5	9.7	13.4	0.85	9.37×10^{-4}	0.54	1.21
47	7	25	13	3	75	38	M6	20	5.5	12.7	18.2	2.12	2.2×10^{-3}	0.88	1.79
58	8	25	14	3	89	48	M6	21	6.6	13.6	22.3	5.42	5.92×10^{-3}	1.39	2.96
73	10	33	16.5	3	113	61	M8	24.5	9	21.5	36.8	17.2	1.43×10^{-2}	3.16	4.51

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		Nut inertial moment	Nut mass
								C	C_0		
								kN	kN	kg-cm²	kg
3	10.5	6	3	38	19	M2.6×3	3.4	0.6	0.2	0.03	0.08
3	10.5	9	—	42	23	M3×4	3.4	0.8	0.3	0.08	0.13
6	21	10	—	56	30	M4×6	4.5	6.7	6.4	0.44	0.35
6	21	12	—	64	36	M5×8	4.5	7.4	7.8	0.99	0.51
7	25	13	—	75	44	M5×8	5.5	9.7	10.6	2.2	0.79
8	25	17	—	89	54	M6×10	6.6	10.5	12.5	5.17	1.25
10	33	20	—	113	68	M6×10	9	16.5	20.7	16.1	2.51

Ball Screw

M_A

BNS Heavy Load Type: Linear-Rotary Motion No Preload

DN value	70000

(60° equidistant)
6-ϕ d$_1$
θ
4-S
P$_2$
P$_1$

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	db	Ph	kN	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.	Basic load rating		Static permissible moment	Basic torque rating		Ball spline dimensions		
	C	C$_0$	M$_A$	C$_T$	C$_{0T}$	Outer diameter	Flange diameter	Overall length
	kN	kN	N-m	N-m	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	1340	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.
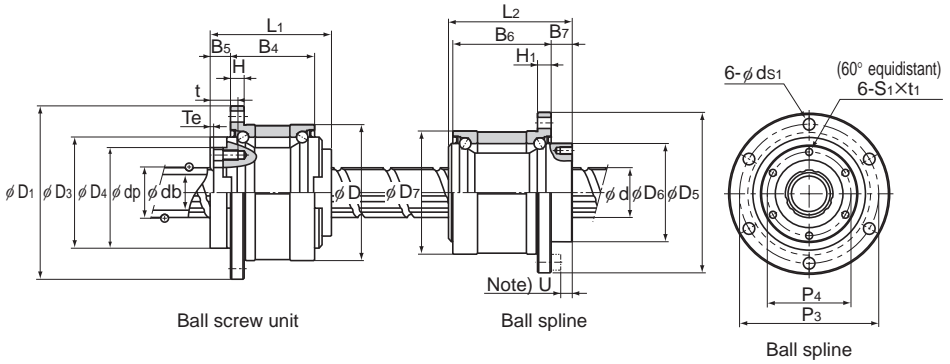For K hollow shaft, please refer to the db dimension for the inner bore diameter of the shaft. If requested solid shaft is also available. See "Ball Spline" Ⓐ3-112 for details.

Model number coding

BNS2525 +600L

Model number   Overall shaft length (in mm)

Download data by searching for the corresponding model number on the Technical Support site.

https://tech.thk.com

Precision Ball Screw/Spline

Ball screw unit

Ball spline

Note) U

Ball spline

Unit: mm

D₄ H7	H	B₄	B₅	Te	P₁	P₂	S	t	d₁	θ°	Support bearing basic load rating Ca kN	C₀a kN	Nut inertial moment kg-cm²	Screw shaft inertial moment/mm J kg-cm²/mm	Nut mass kg	Shaft mass kg/m
32	5	27.5	9	2	60	25	M4	12	4.5	40	19.4	19.2	0.48	3.92×10^{-4}	0.38	0.8
39	6	34	11	2	70	31	M5	16	4.5	40	26.8	29.3	1.44	9.37×10^{-4}	0.68	1.21
47	8	43	12.5	3	81	38	M6	19	5.5	40	28.2	33.3	3.23	2.2×10^{-3}	1.1	1.79
58	9	55	14	3	91	48	M6	19	6.6	40	30	39	6.74	5.92×10^{-3}	1.74	2.96
73	11	68	16.5	3	123	61	M8	22	9	50	59.3	74.1	27.9	1.43×10^{-2}	3.95	4.51
90	12	80	25	4	136	75	M10	28	11	50	62.2	83	58.2	3.52×10^{-2}	6.22	7.16

Unit: mm

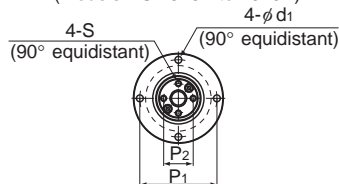| D₆ h7	H₁	B₆	B₇	P₃	P₄	S₁×t₁	d_s1	U	Support bearing basic load rating C kN	C₀ kN	Nut inertial moment kg-cm²	Nut mass kg
39.5	5	37	10	60	32	M5×8	4.5	5	12.7	11.8	0.52	0.51
43.5	6	48	12	64	36	M5×8	4.5	7	16.2	15.5	0.87	0.7
53	6	55	13	70	45	M6×8	4.5	8	17.6	18	1.72	0.93
65.5	9	60	17	91	55	M6×10	6.6	10	20.1	24	5.61	1.8
79.5	11	74	23	113	68	M6×10	9	13	37.2	42.5	14.7	3.9
99.5	12	97	25	136	85	M10×15	11	13	41.6	54.1	62.5	6.7

M_A
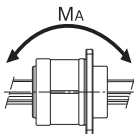
Ball Screw

NS-A Compact Type: Linear Motion No Preload

DN value	70000
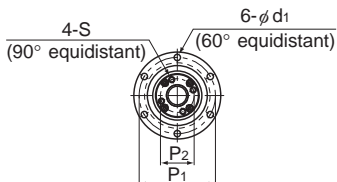
Ball screw unit
(Models NS 1616A to 4040A)

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 D	Flange diameter	Overall length	D_3	D_4
				Ca	C0a							
	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

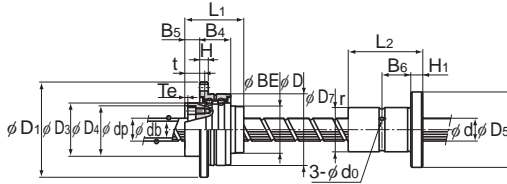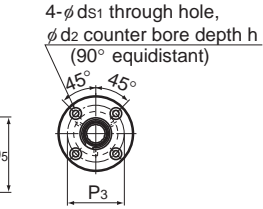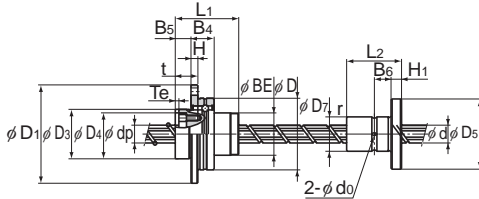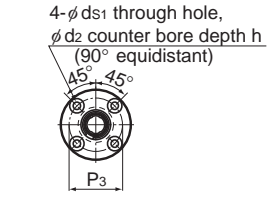| Model No.	Ball spline dimensions						
	Basic load rating		Static permissible moment	Basic torque rating		Outer diameter	Flange diameter
	C	C_0	M_A	C_T	C_{0T}		
	kN	kN	N-m	N-m	N-m	D_7	D_5 $^0_{-0.2}$
NS 0812A	1.5	2.6	5.9	2	2.9	16 $^0_{-0.011}$	32
NS 1015A	2.8	4.9	15.7	3.9	7.8	21 $^0_{-0.013}$	42
NS 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

Note) For K hollow shaft, please refer to the db dimension for the inner bore diameter of the shaft. If requested solid shaft is also available. See "Ball Spline" A3-112 for details.

Model number coding

NS2020A +500L

Model number   Overall shaft length (in mm)

Download data by searching for the corresponding model number on the Technical Support site.

https://tech.thk.com

Precision Ball Screw/Spline
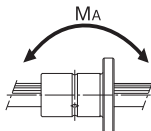

4-∅ds1 through hole,
∅d2 counter bore depth h
(90° equidistant)

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

Ball spline
(Models NS 1616A to 4040A)

Ball spline
(Models NS 1616A to 4040A)

4-∅ds1 through hole,
∅d2 counter bore depth h
(90° equidistant)

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

Ball spline
(Models NS 0812A and 1015A)

Ball spline
(Models NS 0812A and 1015A)

Unit: mm

BE	H	B₄	B₅	Te	P₁	P₂	S	t	d₁	Support bearing basic load rating Ca kN	Support bearing basic load rating C₀a kN	Nut inertial moment kg-cm²	Screw shaft inertial moment/mm J kg-cm²/mm	Nut mass kg	Shaft mass kg/m
19	3	10.5	7	1.5	38	14.5	M2.6	10	3.4	0.8	0.5	0.03	3.16×10^{-5}	0.08	0.35
23	3	10.5	8	1.5	42	18	M3	11.5	3.4	0.9	0.7	0.08	7.71×10^{-5}	0.15	0.52
32	6	21	10	2	56	25	M4	13.5	4.5	8.7	10.5	0.35	3.92×10^{-4}	0.31	0.8
39	6	21	11	2.5	64	31	M5	16.5	4.5	9.7	13.4	0.85	9.37×10^{-4}	0.54	1.21
47	7	25	13	3	75	38	M6	20	5.5	12.7	18.2	2.12	2.2×10^{-3}	0.88	1.79
58	8	25	14	3	89	48	M6	21	6.6	13.6	22.3	5.42	5.92×10^{-3}	1.39	2.96
73	10	33	16.5	3	113	61	M8	24.5	9	21.5	36.8	17.2	1.43×10^{-2}	3.16	4.51

Unit: mm

Overall length L₂	H₁	B₆	r	Greasing hole d₀	P₃	Mounting hole ds1	Mounting hole d₂	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 $_{-0.2}^{0}$	7	18	0.5	2	40	4.5	8	4.4	0.23
63 $_{-0.2}^{0}$	9	22.5	0.5	2	45	5.5	9.5	5.4	0.33
71 $_{-0.3}^{0}$	9	26.5	0.5	3	52	5.5	9.5	5.4	0.45
80 $_{-0.3}^{0}$	10	30	0.5	3	62	6.6	11	6.5	0.58
100 $_{-0.3}^{0}$	14	36	0.5	4	82	9	14	8.6	1.46

Ball Screw

MA

NS Heavy Load Type: Linear Motion No Preload

DN value	70000

(60° equidistant)
6-ϕd$_1$
θ
4-S
P$_2$
P$_1$

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	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 $_{-0.007}^{0}$	68	43.5	40
NS 2020	20	14	20	6.1	12.3	20.75	17.5	62 $_{-0.007}^{0}$	78	54	50
NS 2525	25	18	25	9.1	19.3	26	21.9	72 $_{-0.007}^{0}$	92	65	58
NS 3232	32	23	32	13	29.8	33.25	28.3	80 $_{-0.007}^{0}$	105	80	66
NS 4040	40	29	40	21.4	49.7	41.75	35.2	110 $_{-0.008}^{0}$	140	98	90
NS 5050	50	36	50	31.8	77.6	52.2	44.1	120 $_{-0.008}^{0}$	156	126	100

Ball spline

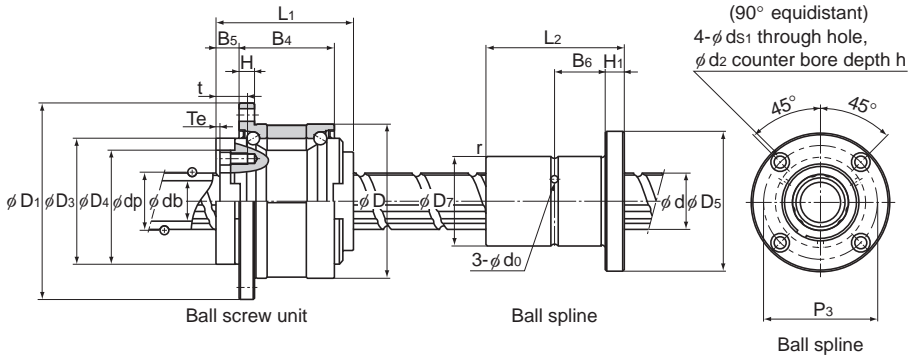| Model No.	Basic load rating		Static permissible moment	Basic torque rating		Ball spline dimensions
	C	C$_0$	M$_A$	C$_T$	C$_{0T}$	Outer diameter
	kN	kN	N-m	N-m	N-m	D$_7$
NS 1616	7.1	12.6	67.6	31.4	34.3	31 $_{-0.013}^{0}$
NS 2020	10.2	17.8	118	56.9	55.9	35 $_{-0.016}^{0}$
NS 2525	15.2	25.8	210	105	103	42 $_{-0.016}^{0}$
NS 3232	20.5	34	290	180	157	49 $_{-0.016}^{0}$
NS 4040	37.8	60.5	687	419	377	64 $_{-0.019}^{0}$
NS 5050	60.9	94.5	1340	842	769	80 $_{-0.019}^{0}$

Note) For K hollow shaft, please refer to the db dimension for the inner bore diameter of the shaft. If requested solid shaft is also available. See "Ball Spline" ▲3-112 for details.

Model number coding

NS2525 +600L

Model number   Overall shaft length (in mm)

Download data by searching for the corresponding model number on the Technical Support site.   https://tech.thk.com

Ball screw unit

Ball spline

(90° equidistant)
4-ϕ d_{s1} through hole,
ϕ d_2 counter bore depth h

Ball spline

Unit: mm

D_4 H7	H	B_4	B_5	Te	P_1	P_2	S	t	d_1	$\theta°$	Support bearing basic load rating		Nut inertial moment	Screw shaft inertial moment/mm	Nut mass	Shaft mass
											C_a kN	C_{0a} kN	kg-cm²	J kg-cm²/mm	kg	kg/m
32	5	27.5	9	2	60	25	M4	12	4.5	40	19.4	19.2	0.48	3.92×10^{-4}	0.38	0.8
39	6	34	11	2	70	31	M5	16	4.5	40	26.8	29.3	1.44	9.37×10^{-4}	0.68	1.21
47	8	43	12.5	3	81	38	M6	19	5.5	40	28.2	33.3	3.23	2.2×10^{-3}	1.1	1.79
58	9	55	14	3	91	48	M6	19	6.6	40	30	39	6.74	5.92×10^{-3}	1.74	2.96
73	11	68	16.5	3	123	61	M8	22	9	50	59.3	74.1	27.9	1.43×10^{-2}	3.95	4.51
90	12	80	25	4	136	75	M10	28	11	50	62.2	83	58.2	3.52×10^{-2}	6.22	7.16

Unit: mm

Flange diameter D_5	Overall length L_2	H_1	B_6	r	Greasing hole d_0	P_3	Mounting hole			Nut mass
							d_{S1}	d_2	h	kg
51	50 $_{-0.2}^{0}$	7	18	0.5	2	40	4.5	8	4.4	0.23
58	63 $_{-0.2}^{0}$	9	22.5	0.5	2	45	5.5	9.5	5.4	0.33
65	71 $_{-0.3}^{0}$	9	26.5	0.5	3	52	5.5	9.5	5.4	0.45
77	80 $_{-0.3}^{0}$	10	30	0.5	3	62	6.6	11	6.5	0.58
100	100 $_{-0.3}^{0}$	14	36	0.5	4	82	9	14	8.6	1.46
124	125 $_{-0.3}^{0}$	16	46.5	1	4	102	11	17.5	11	2.76

M_A

Ball Screw