

B-3-1.4 Finished Shaft End Ball Screws Made of Stainless Steel KA Type

1. Order of the dimension tables

The tables begin with the smallest shaft diameter ball screw, and proceeds to larger sizes. If ball screws have the same shaft diameter, those with smaller leads appear first. Page numbers of shaft diameter and lead combinations are shown in **Table 1**.

2. Dimension tables

The dimension tables show shapes/sizes as well as specification factors of each shaft diameter/lead combination. Tables also contain data as follows:

●Stroke

Nominal stroke : A reference for your use.
Maximum stroke: The stroke limit that the nut can move.

●Lead accuracy

Lead accuracy is C3 and C5 grades.

- T : Travel compensation
- e_p : Tolerance on specified travel
- v_v : Travel variation

See "Technical Description: Lead Accuracy" (page B37) for details of the codes.

●Permissible rotational speed

$d \cdot n$: Limited by the relative peripheral speed between screw shaft and nut.

Critical speed: Limited by the natural frequency of a ball screw shaft. Critical speed depends on the supporting condition of screw shaft.

The lower of the two criteria, the $d \cdot n$ and critical speed, will determine the overall permissible rotational speed of the ball screw. For details, see "Technical Description: Permissible Rotational Speed" (page B47).

3. Material

A martensitic stainless steel is used. A special heat treatment technology provides the ball groove section with sufficient hardness which produces high load carrying capacity and durability.

4. Other

Seal of the ball screw, ball recirculating deflector, and end cap are made of synthetic resin. Consult NSK when using the ball screws under extreme environments or special environments, or using special lubricant or oil.

For special environments, see pages B70 and D2. See pages B67 and D13 for lubricants.

Note: For details of standard stock products, contact NSK.

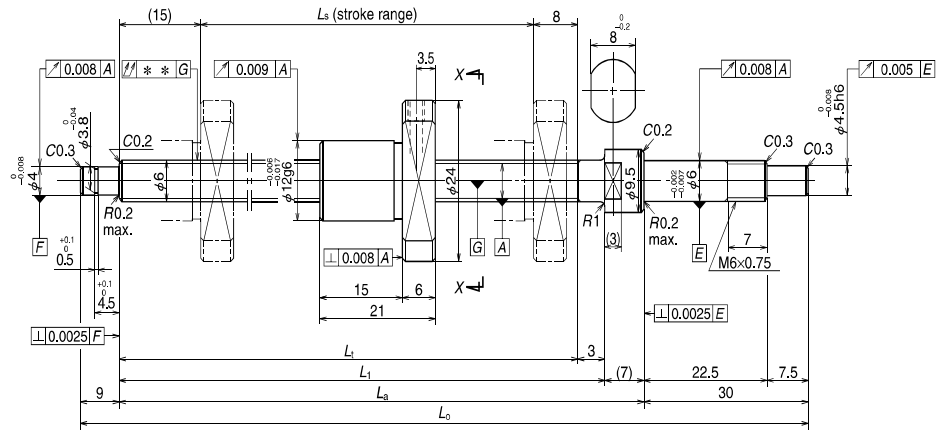
Table 1 Combinations of screw shaft diameter and lead

Screw shaft diameter (mm)	Lead (mm)	
	1	2
6	B275	
8	B277	B279
10		B281
12		B285
15		
16		B295
20		

4	5	10	20
B283			
	B287	B289	
		B291	B293
			B297

Finished shaft end stainless steel product KA Type

(Fine lead)



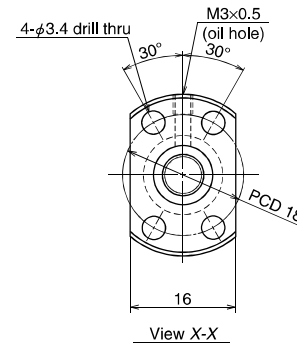
Nut model: MPFD

NSK

Screw shaft ø6

Lead 1

Unit: mm



Ball screw specifications

Shaft dia. x Lead / Direction of turn	6 × 1 / Right	
Preload / Ball recirculation	P-preload / Deflector (bridge)	
Ball dia. / Ball circle dia.	0.800 / 6.2	
Screw shaft root diameter	5.2	
Effective turns of balls	1 × 3	
Accuracy grade / Preload	C3 / Z	
Basic load rating (N)	Dynamic C_d	470
	Static C_{0e}	680
Axial play	0	
Preload (N)	24.5	
Dynamic friction torque, (N·cm)	1.3 or less	
Spacer ball	None	
Factory-packed grease	Refer to Notes 1.	

Unit: mm

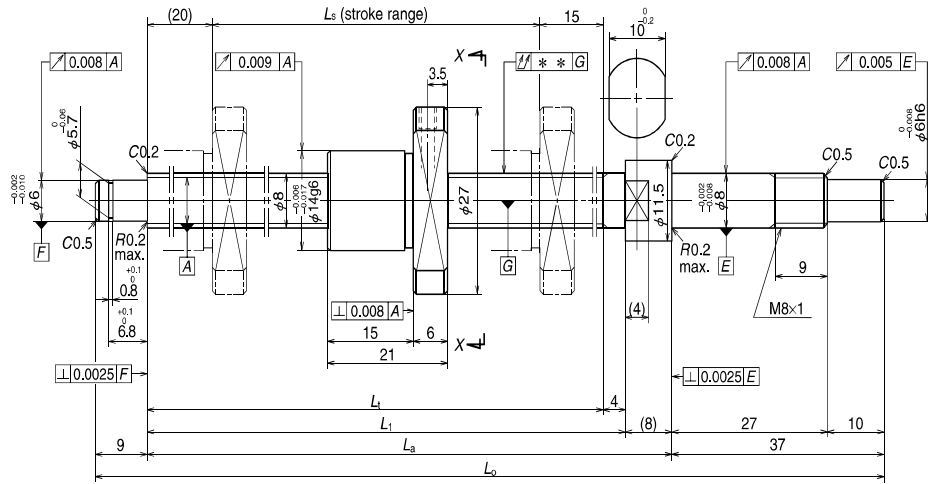
Ball screw No.	Stroke L_s		Thread length			
	Nominal	Maximum	L_1	L_1	L_s	L_0
W0601KA-3PY-C3Z1	100	102	125	128	135	174

Lead accuracy			Shaft run-out **	Mass (kg)	Permissible rotational speed N (min ⁻¹)
T	e_p	v_u			Supporting condition
0	0.010	0.008	0.025	0.06	Fixed - Simple support 3 000

- Notes:
- 1. Only rust preventive agent is applied at time of delivery. Please apply lubricant (oil or grease) before use.**
See page D13 for details.
Use of NSK Clean Grease LG2 is recommended.
 - Ball nut does not have seal.
 - Contact NSK if the permissible rotational speed is to be exceeded.

Finished shaft end stainless steel product KA Type

(Fine lead)



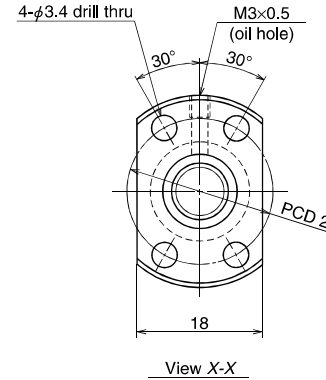
Nut model: MPFD

NSK

Screw shaft ø8

Lead 1

Unit: mm



Ball screw specifications

Shaft dia. x Lead / Direction of turn	8 x 1 / Right	
Preload / Ball recirculation	P-preload / Deflector (bridge)	
Ball dia. / Ball circle dia.	0.800 / 8.2	
Screw shaft root diameter	7.2	
Effective turns of balls	1 x 3	
Accuracy grade / Preload	C3 / Z	
Basic load rating (N)	Dynamic C_d	545
	Static C_{0e}	955
Axial play	0	
Preload (N)	29.4	
Dynamic friction torque, (N·cm)	1.8 or less	
Spacer ball	None	
Factory-packed grease	Refer to Notes 1.	

Recommended support unit

For drive side (Fixed)	For opposite to drive side (Free)
WBK08-01C (square, clean)	WBK08S-01C (square, clean)
WBK08-11C (round, clean)	

Unit: mm

Ball screw No.	Stroke L_s		Thread length			
	Nominal	Maximum	L_1	L_1	L_s	L_0
W0802KA-1PY-C3Z1	150	155	190	194	202	248

Lead accuracy			Shaft run-out **	Mass (kg)	Permissible rotational speed N (min ⁻¹)
T	e_p	v_u			Supporting condition
0	0.010	0.008	0.035	0.12	Fixed - Simple support 3 000

Notes: **1. Only rust preventive agent is applied at time of delivery. Please apply lubricant (oil or grease) before use.**

See page D13 for details.

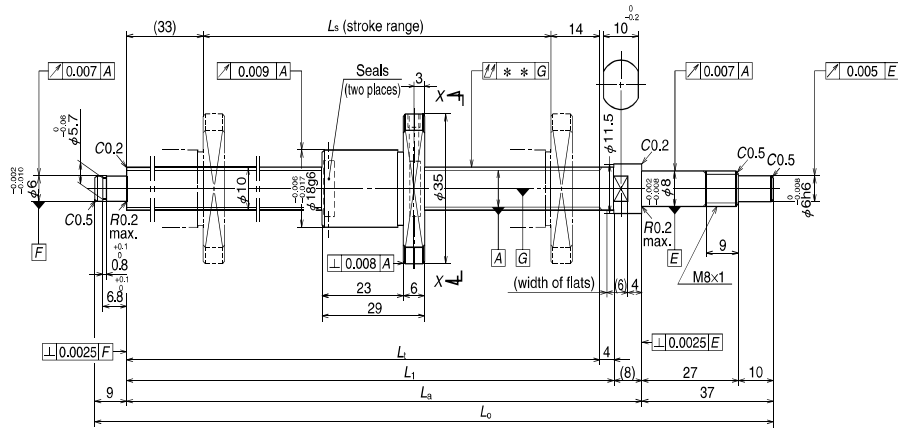
Use of NSK Clean Grease LG2 is recommended.

2. Ball nut does not have seal.

3. Contact NSK if the permissible rotational speed is to be exceeded.

Finished shaft end stainless steel product KA Type

(Fine lead)



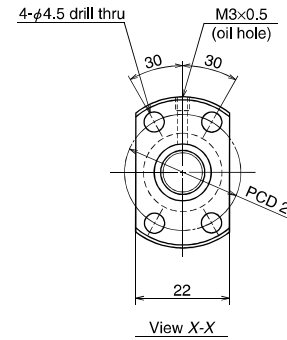
Nut model: MPFD

NSK

Screw shaft ø10

Lead 2

Unit: mm



Ball screw specifications

Shaft dia. x Lead / Direction of turn	10 × 2 / Right	
Preload / Ball recirculation	P-preload / Deflector (bridge)	
Ball dia. / Ball circle dia.	1.200 / 10.3	
Screw shaft root diameter	8.9	
Effective turns of balls	1 × 3	
Accuracy grade / Preload	C3 / Z	
Basic load rating (N)	Dynamic C_d	1 210
	Static C_{0e}	2 110
Axial play	0	
Preload (N)	58.8	
Dynamic friction torque, (N·cm)	0.10 – 2.5	
Spacer ball	None	
Factory-packed grease	Refer to Notes 1.	
Internal spatial volume of nut (cm ³)	0.44	
Standard volume of grease replenishing (cm ³)	0.22	

Recommended support unit

For drive side (Fixed)	For opposite to drive side (Free)
WBK08-01C (square, clean)	WBK08S-01C (square, clean)
WBK08-11C (round, clean)	

Unit: mm

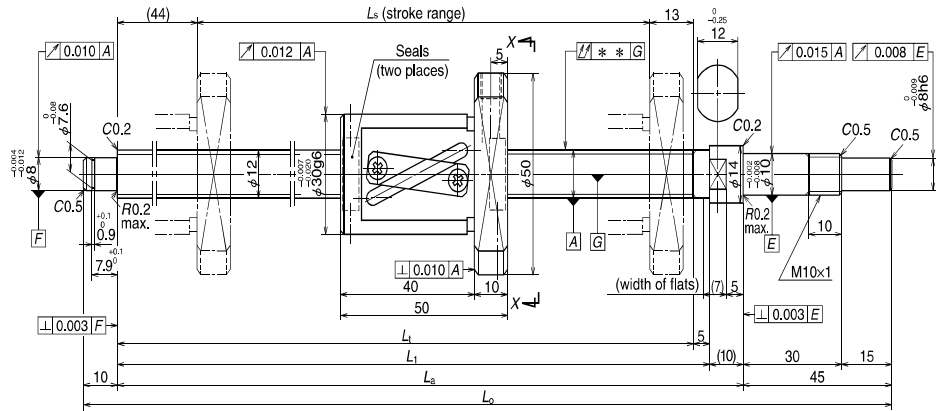
Ball screw No.	Stroke L_s		Thread length			
	Nominal	Maximum	L_1	L_1	L_a	L_0
W1002KA-3PY-C3Z2	200	203	250	254	262	308

Lead accuracy			Shaft run-out **	Mass (kg)	Permissible rotational speed N (min ⁻¹)
T	e_p	v_u			Supporting condition
0	0.012	0.008	0.030	0.22	Fixed - Simple support 3 000

- Notes:
- 1. Only rust preventive agent is applied at time of delivery. Please apply lubricant (oil or grease) before use.**
See page D13 for details.
Use of NSK Clean Grease LG2 is recommended.
 - 2. Contact NSK if the permissible rotational speed is to be exceeded.**

Finished shaft end stainless steel product KA Type

(Medium lead)



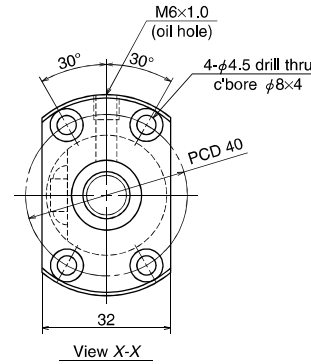
Nut model: LPFT

NSK

Screw shaft ø12

Lead 10

Unit: mm



Ball screw specifications

Shaft dia. x Lead / Direction of turn	12 x 10 / Right	
Preload / Ball recirculation	P-preload / Return tube	
Ball dia. / Ball circle dia.	2.381 / 12.5	
Screw shaft root diameter	10.0	
Effective turns of balls	2.5 x 1	
Accuracy grade / Preload	C5 / Z	
Basic load rating (N)	Dynamic C_d	3 070
	Static C_{0e}	4 790
Axial play	0	
Preload (N)	98.1	
Dynamic friction torque, (N·cm)	1.0 – 4.9	
Spacer ball	None	
Factory-packed grease	Refer to Notes 1.	
Internal spatial volume of nut (cm ³)	1.4	
Standard volume of grease replenishing (cm ³)	0.7	

Recommended support unit

For drive side (Fixed)	For opposite to drive side (Free)
WBK10-01C (square, clean)	WBK10S-01C (square, clean)
WBK10-11C (round, clean)	

Unit: mm

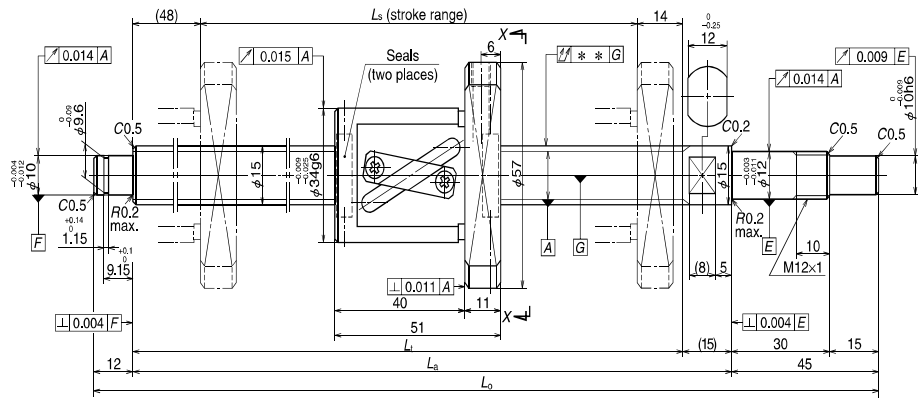
Ball screw No.	Stroke L_s		Thread length			
	Nominal	Maximum				
			L_t	L_1	L_a	L_o
W1203KA-3P-C5Z10	250	253	310	315	325	380
W1205KA-3P-C5Z10	450	453	510	515	525	580

Lead accuracy			Shaft run-out **	Mass (kg)	Permissible rotational speed N (min ⁻¹)
T	e_p	v_{ti}			Supporting condition
0	0.023	0.018	0.050	0.56	Fixed - Simple support 3 000
0	0.030	0.023	0.075	0.72	3 000

- Notes:
1. Only rust preventive agent is applied at time of delivery. Please apply lubricant (oil or grease) before use. See page D13 for details. Use of NSK Clean Grease LG2 is recommended.
 2. Contact NSK if the permissible rotational speed is to be exceeded.

Finished shaft end stainless steel product KA Type

(Medium lead)



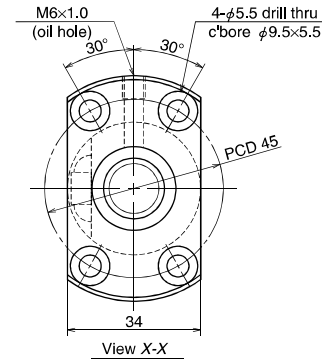
Nut model: LPFT

NSK

Screw shaft ø15

Lead 10

Unit: mm



Ball screw specifications

Shaft dia. x Lead / Direction of turn	15 x 10 / Right	
Preload / Ball recirculation	P-preload / Return tube	
Ball dia. / Ball circle dia.	3.175 / 15.5	
Screw shaft root diameter	12.2	
Effective turns of balls	2.5 x 1	
Accuracy grade / Preload	C5 / Z	
Basic load rating (N)	Dynamic C ₀	5 780
	Static C _{0e}	9 430
Axial play	0	
Preload (N)	147	
Dynamic friction torque, (N·cm)	1.5 – 7.9	
Spacer ball	None	
Factory-packed grease	Refer to Notes 1.	
Internal spatial volume of nut (cm ³)	2.3	
Standard volume of grease replenishing (cm ³)	1.4	

Recommended support unit

For drive side (Fixed)	For opposite to drive side (Free)
WBK12-01C (square, clean)	WBK12S-01C (square, clean)
WBK12-11C (round, clean)	

Unit: mm

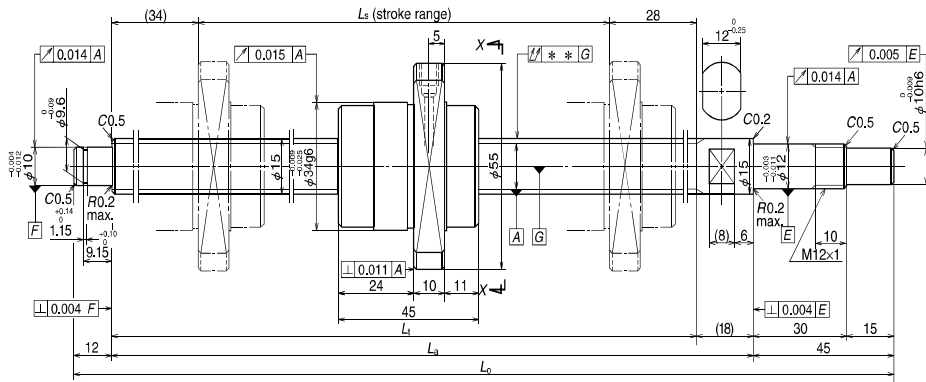
Ball screw No.	Stroke L _s		Thread length		
	Nominal	Maximum	L _t	L _a	L _o
W1504KA-3P-C5Z10	400	427	489	504	561
W1506KA-3P-C5Z10	600	627	689	704	761
W1510KA-1P-C5Z10	1 000	1 027	1 089	1 104	1 161

Lead accuracy			Shaft run-out **	Mass (kg)	Permissible rotational speed N (min ⁻¹)
T	e _p	v _i			Supporting condition
0	0.027	0.020	0.050	0.99	Fixed - Simple support 3 000
0	0.035	0.025	0.065	1.2	3 000
0	0.046	0.030	0.110	1.7	1 610

- Notes: **1. Only rust preventive agent is applied at time of delivery. Please apply lubricant (oil or grease) before use.**
 See page D13 for details.
 Use of NSK Clean Grease LG2 is recommended.
2. Contact NSK if the permissible rotational speed is to be exceeded.

Finished shaft end stainless steel product KA Type

(Medium lead)



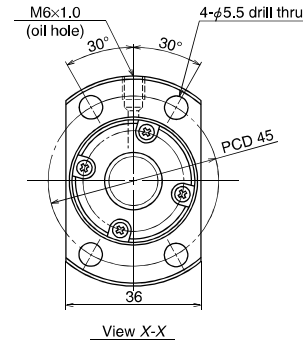
Nut model: UPFC

NSK

Screw shaft ø15

Lead 20

Unit: mm



Ball screw specifications

Shaft dia. x Lead / Direction of turn	15 × 20 / Right	
Preload / Ball recirculation	P-preload / End cap	
Ball dia. / Ball circle dia.	3.175 / 15.5	
Screw shaft root diameter	12.2	
Effective turns of balls	1.7 × 1	
Accuracy grade / Preload	C5 / Z	
Basic load rating (N)	Dynamic C_d	4 150
	Static C_{0e}	6 450
Axial play	0	
Preload (N)	147	
Dynamic friction torque, (N·cm)	1.5 – 7.9	
Spacer ball	None	
Factory-packed grease	Refer to Notes 1.	
Internal spatial volume of nut (cm ³)	1.9	
Standard volume of grease replenishing (cm ³)	1.0	

Recommended support unit

For drive side (Fixed)	For opposite to drive side (Free)
WBK12-01C (square, clean)	WBK12S-01C (square, clean)
WBK12-11C (round, clean)	

Unit: mm

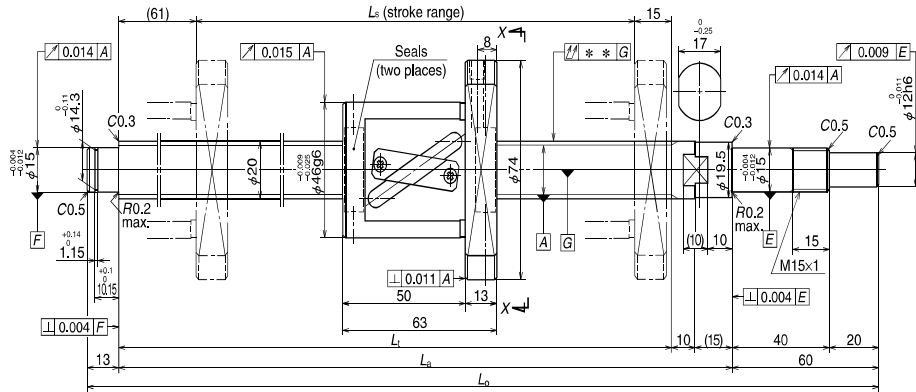
Ball screw No.	Stroke L_s		Thread length		
	Nominal	Maximum	L_c	L_s	L_o
W1504KA-7PG-C5Z20	400	424	486	504	561
W1506KA-7PG-C5Z20	600	624	686	704	761
W1510KA-3PG-C5Z20	1 000	1 024	1 086	1 104	1 161

Lead accuracy			Shaft run-out **	Mass (kg)	Permissible rotational speed N (min ⁻¹)
T	e_p	v_u			Supporting condition
0	0.027	0.020	0.050	1.0	3 000
0	0.035	0.025	0.065	1.3	3 000
0	0.046	0.030	0.110	1.8	1 610

- Notes:
1. Only rust preventive agent is applied at time of delivery. Please apply lubricant (oil or grease) before use. See page D13 for details. Use of NSK Clean Grease LG2 is recommended.
 2. Contact NSK if the permissible rotational speed is to be exceeded.

Finished shaft end stainless steel product KA Type

(High helix lead)



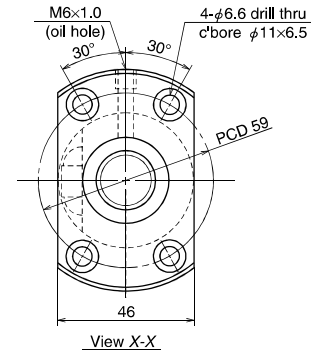
Nut model: LPFT

NSK

Screw shaft ø20

Lead 20

Unit: mm



Ball screw specifications

Shaft dia. x Lead / Direction of turn	20 x 20 / Right	
Preload / Ball recirculation	P-preload / Return tube	
Ball dia. / Ball circle dia.	3.969 / 21	
Screw shaft root diameter	16.9	
Effective turns of balls	1.5 x 1	
Accuracy grade / Preload	C5 / Z	
Basic load rating (N)	Dynamic C_d	5 760
	Static C_{0e}	9 370
Axial play	0	
Preload (N)	196	
Dynamic friction torque, (N·cm)	2.0 – 11.8	
Spacer ball	None	
Factory-packed grease	Refer to Notes 1.	
Internal spatial volume of nut (cm ³)	4.2	
Standard volume of grease replenishing (cm ³)	2.1	

Recommended support unit

For drive side (Fixed)	For opposite to drive side (Free)
WBK15-01C (square, clean)	WBK15S-01C (square, clean)
WBK15-11C (round, clean)	

Unit: mm

Ball screw No.	Stroke L_s		Thread length		
	Nominal	Maximum	L_t	L_a	L_o
W2005KA-3P-C5Z20	400	434	510	535	608
W2007KA-3P-C5Z20	600	634	710	735	808
W2011KA-3P-C5Z20	1 000	1 034	1 110	1 135	1 208

Lead accuracy			Shaft run-out **	Mass (kg)	Permissible rotational speed N (min ⁻¹)
T	e_p	v_u			Supporting condition
0	0.030	0.023	0.050	2.0	Fixed - Simple support 3 000
0	0.035	0.025	0.085	2.5	3 000
0	0.046	0.030	0.110	3.4	2 160

- Notes:
1. Only rust preventive agent is applied at time of delivery. Please apply lubricant (oil or grease) before use. See page D13 for details. Use of NSK Clean Grease LG2 is recommended.
 2. Contact NSK if the permissible rotational speed is to be exceeded.