

B-I-8.1 MF Series (Ball screw equipped with "NSK K1™" Lubrication Unit)

(1) Structure of Ball Screw equipped with "NSK K1™" Lubrication Unit

The structure makes it possible to have a stable contact between the NSK K1 and outside of a ball screw with moderate force by a garter spring which fits onto outside of the NSK K1.



(2) Features

"NSK K1™" is a new, efficient lubrication unit. Equipped with "NSK K1™", the ball screws demonstrate a superb performance as shown below.

● Long-term, maintenance-free usage

In mechanical environments where lubrication is difficult to apply, long-term running efficiency is maintained by using the "NSK K1™" in combination with grease.

For automotive component processing lines, etc.

● Does not pollute the environment

A very small volume of grease combined with NSK K1 Seal can provide sufficient lubrication in the environment where grease is undesirable as well as in the environment where high cleanliness is required.

Food processing/medical equipment, liquid crystal display/semiconductor manufacturing equipment, etc.

● Fits right in the environment where lubricant is washed away

Used with grease, life of the machine is prolonged even when the machine is washed entirely by water, or in an environment where the machine is exposed to rain or wind.

Food processing equipment, housing/construction machines, etc.

● Maintains efficiency in dusty environment

In environment where oil- and grease-absorbing dust is produced, long-term efficiency in lubrication and prevention from foreign inclusions are maintained by using the "NSK K1™" in combination with grease.

Woodworking machines, etc.

(3) Performances

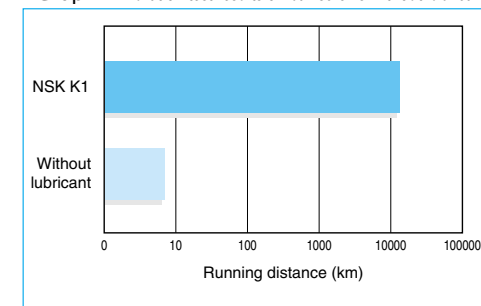
◇ Comparative duration test of samples with and without NSK K1 and testing conditions

Ball screw	Shaft dia. 20mm, lead 20mm
Lubrication	Comparison with only NSK K1 against no lubrication
Speed	4 000rpm (80m/min)
Stroke	600mm

◇ Test results

Without lubricant, operation became impossible after running 8.6 km. With NSK K1 alone, it was possible to continue running exceeding 10,000 km.

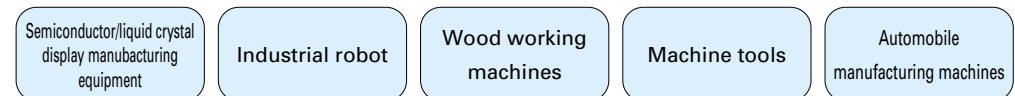
Graph 1 Duration test results on ball screws without lubricant



NSK conducts various tests under different conditions. Please consult NSK.

(4) Application examples

Ball screws equipped with NSK K1 are maintenance-free for a long period of time. Its application is expanding in various industries.



Precautions for handling

To extend high functions of NSK K1 Seal, please observe the following precautions.

- Temperature range for use: Maximum temperature for use: 50°C
Momentary maximum temperature in use: 80°C
- Chemicals that should not come to contact:
Do not leave K1 Seal in organic solvent, white kerosene such as hexane, thinner which removes oil, and rust preventive oil which contains white kerosene.

Note: Water-type cutting oil, oil-type cutting oil, grease such as mineral-type AV2 and ester-type PS2 do not damage K1 Seal.

(5) Specifications and reference number

① MF Series: Custom made ball screws (Specifications and reference number)

● Specifications

* Ball screw is equipped with "NSK K1[™]" Lubrication Unit.

NSK K1 is installed between the ball screw nut and the labyrinth seal. Therefore, the overall nut length is slightly longer than other types.

* Combination of NSK standard grease (factory-packed in the nut) and NSK K1 is standard specifications.

* Accuracy grade, clearance, preload specifications remain unchanged. There is a slight increase in torque due to the equipped NSK K1.

Optional specifications

Please consult NSK for mounting NSK K1 on ball screws other than MF Series (in respect to size and accuracy rate), those with stainless steel specifications, and those with surface treatment.

● Reference number

Reference number(example) : **W2003 - 1P K1 - C5Z10**
 NSK K1-equipped ball screw

* "K1" is added at the end of "nut model code" and "specifications number".

② MF Series: Standardized ball screws in stock; WFA Series: Specifications and reference number

● Specifications

* Ball screw is equipped with "NSK K1[™]" Lubrication Unit.

NSK K1 is installed between the ball screw nut and the labyrinth seal in standard specifications. Therefore, overall nut length is slightly longer than other types.

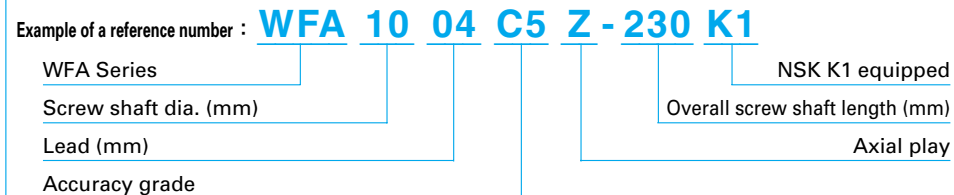
* Combination of NSK standard grease (factory-packed in the nut) and NSK K1 is the standard specifications.

* Accuracy grade and preload specifications

Accuracy grade	Preload code
JIS C5	Z (clearance 0)

*There is a slight increase in dynamic friction torque due to the equipped NSK K1. (See Note for ball screw specifications list in pages B441-B454.)

● Reference number



* "K1" is added at the end of "nut model code" and "specifications number."

Table I-8.1 MF Series Standardized ball screws in stock WFA Series

Reference numbers (combinations of "stroke" and "shaft dia. x lead")

(Unit: mm)

Shaft dia. x lead (Pages to be referred)		φ10×04 B441	φ12×05 B443	φ12×10 B445	φ15×10 B447	φ15×20 B449	φ20×10 B451	φ20×20 B453
Stroke (nominal)	Max. stroke							
80	83			WFA1210C5Z-230K1				
	94		WFA1205C5Z-230K1					
	98.5	WFA1004C5Z-230K1						
190	198.5	WFA1004C5Z-330K1						
	205					WFA1520C5Z-371K1		
210	213				WFA1510C5Z-371K1			
230	233			WFA1210C5Z-380K1				
	244		WFA1205C5Z-380K1					
290	298.5	WFA1004C5Z-430K1						
400	411						WFA2010C5Z-599K1	
430	433			WFA1210C5Z-580K1				
	444		WFA1205C5Z-580K1					
600	605					WFA1520C5Z-771K1		
	613				WFA1510C5Z-771K1			
	626						WFA2020C5Z-820K1	
700	711					WFA2010C5Z-899K1		
1000	1005					WFA1520C5Z-1171K1		
	1013				WFA1510C5Z-1171K1			
	1026						WFA2020C5Z-1220K1	
1200	1211					WFA2010C5Z-1399K1		
1400	1426						WFA2020C5Z-1620K1	
Reference numbers of the recommended support units (on fixed side)	WBK10-01A	○	○	○				
	WBK10-10	○	○	○				
	WBK12-01A				○	○		
	WBK12-11				○	○		
	WBK15-01A						○	○
	WBK15-11						○	○

"K1 Kit" can be equipped on NSK standard ball screws

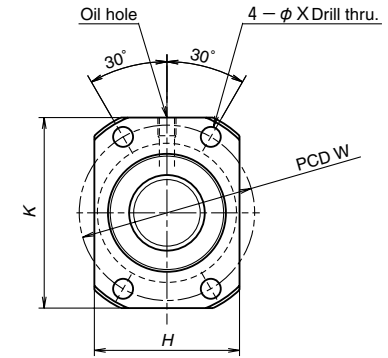
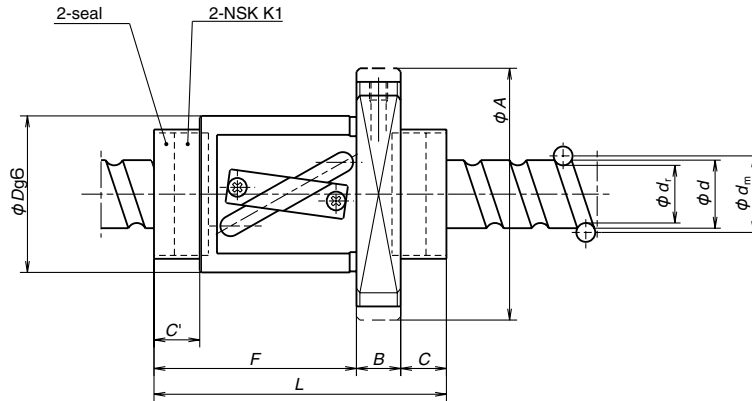
"K1 Kit" is a lubrication unit which can be equipped on NSK standardized ball screws in stock. Ball screws compatible with "K1 Kit: Ball screws in A Series. Their reference numbers contain "FA" as shown below.

Example of a reference number : **W2507 FA -3P - C5Z25**

NSK installs "K1 Kit" for customers. Please consult NSK for details.

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(6) MF Series: Dimension Table of custom made ball screws



Model No.	Screw shaft dia. <i>d</i>	Lead <i>l</i>	Ball dia. <i>D_w</i>	Ball circle dia. <i>d_m</i>	Root dia. <i>d_r</i>	Effective turns of balls Turns × Circuit number	Basic load rating (N)	
							Dynamic <i>C_a</i>	Static <i>C_{0a}</i>
PFT1004-2.5	10	4	2.000	10.3	8.2	2.5×1	1730	2230
PFT1205-2.5	12	5	2.381	12.3	9.8	2.5×1	2370	3160
LPFT1210-2.5	12	10	2.381	12.5	10.0	2.5×1	2360	3240
PFT1405-2.5	14	5	3.175	14.5	11.2	2.5×1	4280	5840
LPFT1510-2.5	15	10	3.175	15.5	12.2	2.5×1	4450	6380
PFT1605-2.5	16	5	3.175	16.5	13.2	2.5×1	4620	6750
PFT2005-5	20	5	3.175	20.5	17.2	2.5×2	9410	17100
LPFT2010-2.5	20	10	3.969	21.0	16.9	2.5×1	6880	10800
LPFT2020-1.5	20	20	3.969	21.0	16.9	1.5×1	5370	8450

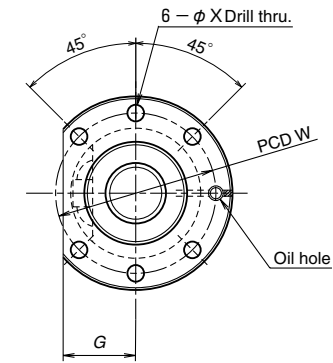
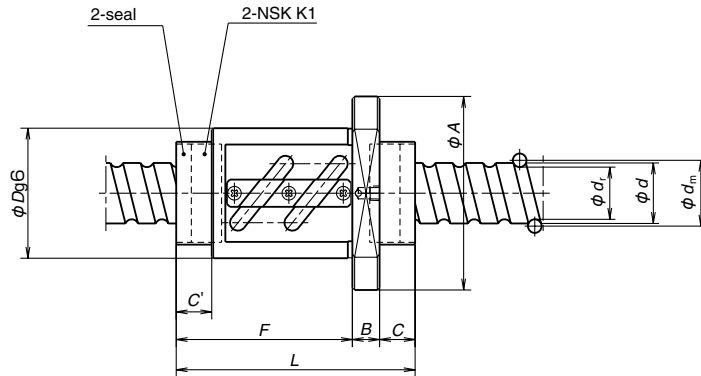
* Sizes not listed in the Table are also available. Please consult NSK.

* "NSK K1" can be installed on other types not listed in the Table. Please consult NSK.

* Rigidity in the Table is theoretical value obtained from the elastic deformation between screw groove and ball when the preload is 5% of the dynamic load rating (Ca), and an axial load is applied to it. Refer to "Technical description" (B521) if preload differs from the conditions above, or when considering change in the deformation of the ball nut itself.

Axial play hardness <i>K</i> (N/μm)	Ball nut dimensions										
	<i>D</i>	<i>A</i>	<i>H</i>	<i>K</i>	<i>B</i>	<i>F</i>	<i>L</i>	<i>W</i>	<i>X</i>	<i>C</i>	<i>C'</i>
76	26	46	28	42	10	37.5	61.5	36	4.5	14	15
89	30	50	32	45	10	42	66	40	4.5	14	15
90	30	50	32	45	10	55	79	40	4.5	14	17
116	34	57	34	50	10	41	65	45	5.5	14	15
127	34	57	34	50	10	52	76	45	5.5	14	15
137	40	63	40	55	10	43	67	51	5.5	14	15
311	44	67	46	59	10	57	81	55	5.5	14	14
169	46	74	46	66	10	54	78	59	6.6	14	14
137	46	74	46	66	10	60	84	59	6.6	14	14

Unit: mm



Model No.	Screw shaft dia.	Lead	Ball dia.	Ball circle dia.	Root dia.	Effective turns of balls Turns × Circuit number	Basic load rating (N)	
	<i>d</i>						<i>l</i>	Dynamic <i>C_a</i>
PFT2506-5	25	6	3.969	25.5	21.4	2.5×2	14100	26800
PFT2510-2.5	25	10	4.762	25.5	20.5	2.5×1	9940	16000
PFT2810-2.5	28	10	4.762	28.5	23.5	2.5×1	10500	18000
PFT3206-5	32	6	3.969	32.5	28.4	2.5×2	15500	34700
PFT3210-5	32	10	6.35	33.0	26.4	2.5×2	29200	54000
PFT3212-3	32	12	6.35	33.0	26.4	1.5×2	18800	32400
PFT3610-5	36	10	6.35	37.0	30.4	2.5×2	31100	61300
PFT4008-5	40	8	4.762	40.5	35.5	2.5×2	22000	51600
PFT4012-5	40	12	7.144	41.5	34.1	2.5×2	38400	77500

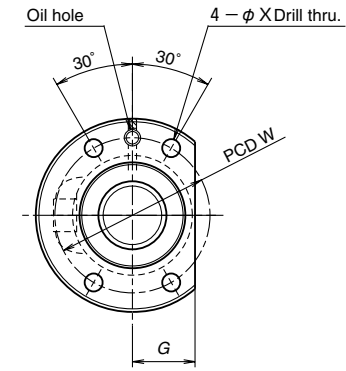
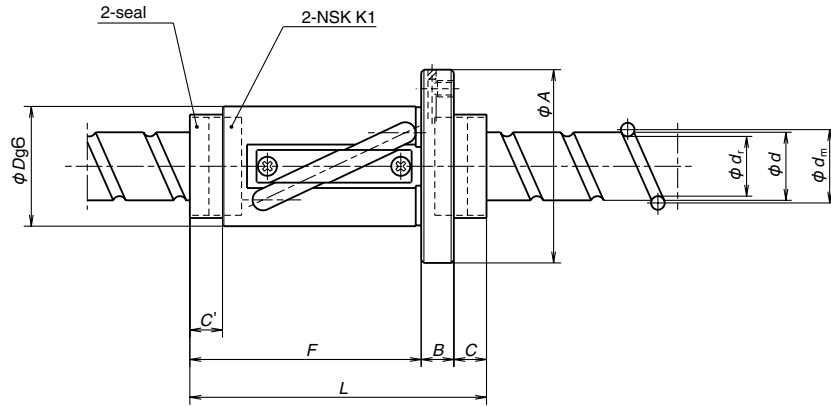
* Sizes not listed in the Table are also available. Please consult NSK.

* "NSK K1" can be installed on other types not listed in the Table. Please consult NSK.

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Axial play hardness <i>K</i> (N/μm)	Ball nut dimensions									
	<i>D</i>	<i>A</i>	<i>G</i>	<i>B</i>	<i>F</i>	<i>L</i>	<i>W</i>	<i>X</i>	<i>C</i>	<i>C'</i>
383	53	76	29	12	65	93	64	5.5	16	17
203	58	85	32	12	61	89	71	6.6	16	17
220	60	94	36	12	62	90	76	9	16	17
468	62	89	34	12	65	93	75	6.6	16	17
494	74	108	41	12	94	122	90	9	16	17
303	74	108	41	12	86	114	90	9	16	17
537	75	120	45	15	97	131	98	11	19	20
570	74	108	41	16	82	117	90	9	19	20
600	86	128	48	16	109	144	106	11	19	20

Unit: mm



Model No.	Screw shaft dia.	Lead	Ball dia.	Ball circle dia.	Root dia.	Effective turns of balls Turns × Circuit number	Basic load rating (N)	
	<i>d</i>	<i>l</i>	<i>D_w</i>	<i>d_m</i>	<i>d_r</i>		Dynamic <i>C_a</i>	Static <i>C_{0a}</i>
LPFT2520-2.5	25	20	4.762	26.25	21.3	2.5×1	9900	16400
LPFT2525-1.5	25	25	4.762	26.25	21.3	1.5×1	6380	9540
LPFT3225-2.5	32	25	4.762	33.25	28.3	2.5×1	11300	20900
LPFT3232-1.5	32	32	4.762	33.25	28.3	1.5×1	7280	12400
LPFT4032-2.5	40	32	6.35	41.75	35.1	2.5×1	18000	35000
LPFT4040-1.5	40	40	6.35	41.75	35.1	1.5×1	11600	20600

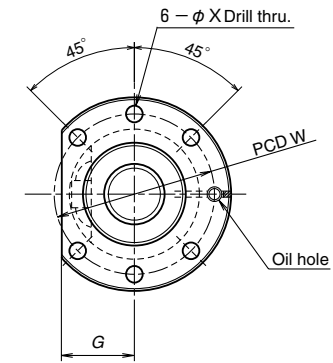
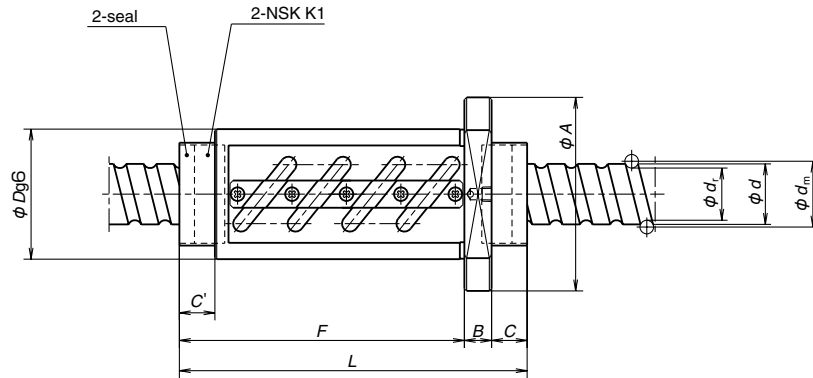
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* "NSK K1" can be installed on other types not listed in the Table. Please consult NSK.

* Rigidity in the Table is theoretical value obtained from the elastic deformation between screw groove and ball when the preload is 5% of the dynamic load rating (Ca), and an axial load is applied to it. Refer to "Technical description" (B521) if preload differs from the conditions above, or when considering change in the deformation of the ball nut itself.

Axial play hardness <i>K</i> (N/μm)	Ball nut dimensions									
	<i>D</i>	<i>A</i>	<i>G</i>	<i>B</i>	<i>F</i>	<i>L</i>	<i>W</i>	<i>X</i>	<i>C</i>	<i>C'</i>
210	44	71	23	12	85	109	57	6.6	12	12
127	44	71	23	12	74	98	57	6.6	12	12
251	51	85	26	12	98	122	67	9.0	12	12
161	51	85	26	12	85	109	67	9.0	12	12
315	64	106	33	16	119	151	84	11	14	14
199	64	106	33	16	101	133	84	11	14	14

Unit: mm



Model No.	Screw shaft dia. <i>d</i>	Lead <i>l</i>	Ball dia. <i>D_w</i>	Ball circle dia. <i>d_m</i>	Root dia. <i>d_r</i>	Effective turns of balls Turns × Circuit number	Basic load rating (N)	
							Dynamic <i>C_a</i>	Static <i>C_{0a}</i>
ZFT2505-10	25	5	3.175	25.5	22.2	2.5×2	16600	43700
ZFT2510-6	25	10	4.763	25.5	20.5	1.5×2	18500	38100
ZFT3206-10	32	6	3.969	32.5	28.4	2.5×2	24700	69400
ZFT3210-5	32	10	6.35	33.0	26.4	2.5×1	25500	54000
ZFT4008-10	40	8	4.762	40.5	35.5	2.5×2	34900	103000
ZFT4010-7	40	10	6.35	41.0	34.4	3.5×1	38300	96000
ZFT5010-10	50	10	6.35	51.0	44.4	2.5×2	57700	175000
ZFT5016-5	50	16	7.938	51.5	43.2	2.5×1	42800	107000

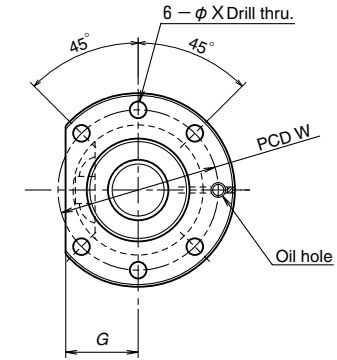
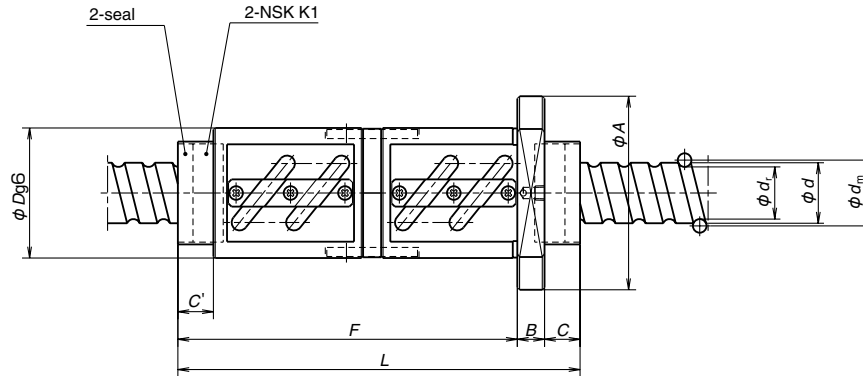
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* "NSK K1" can be installed on other types not listed in the Table. Please consult NSK.

* Rigidity in the Table is theoretical value obtained from the elastic deformation between screw groove and ball when the preload is 10% of the dynamic load rating (*C_a*), and an axial load is applied to it. Refer to "Technical description" (B521) if preload differs from the conditions above, or when considering change in the deformation of the ball nut itself.

Axial play hardness <i>K</i> (N/μm)	Ball nut dimensions									
	<i>D</i>	<i>A</i>	<i>G</i>	<i>B</i>	<i>F</i>	<i>L</i>	<i>W</i>	<i>X</i>	<i>C</i>	<i>C'</i>
876	50	73	28	10	89	115	61	5.5	16	17
562	58	85	32	12	75	103	71	6.6	16	17
1090	62	89	34	12	101	129	75	6.6	16	17
594	74	108	41	12	94	122	90	9	16	17
1330	74	108	41	16	130	165	90	9	19	20
988	82	124	47	16	117	152	102	11	19	20
1677	93	135	51	18	157	194	113	11	19	20
883	100	146	55	18	135	172	122	14	19	20

Unit: mm



Model No.	Screw shaft dia.	Lead	Ball dia.	Ball circle dia.	Root dia.	Effective turns of balls Turns × Circuit number	Basic load rating (N)	
	<i>d</i>						<i>l</i>	Dynamic <i>C_a</i>
DFT2805-5	28	5	3.175	28.5	25.2	2.5×2	17400	48800
DFT2810-3	28	10	4.762	28.5	23.5	1.5×2	19500	43000
DFT3210-5	32	10	6.35	33.0	26.4	2.5×2	46300	108000
DFT3212-3	32	12	6.35	33.0	26.4	1.5×2	29900	64800
DFT3610-5	36	10	6.35	37.0	30.4	2.5×2	49300	123000
DFT4010-5	40	10	6.35	41.0	34.4	2.5×2	52000	137000
DFT4012-5	40	12	7.144	41.5	34.1	2.5×2	61000	155000
DFT4510-5	45	10	6.35	46.0	39.4	2.5×2	54200	155000
DFT4512-5	45	12	7.144	46.5	39.1	2.5×2	64200	177000
DFT5012-5	50	12	7.938	51.5	43.2	2.5×2	77600	214000
DFT5016-5	50	16	7.938	51.5	43.2	2.5×2	77600	214000
DFT5516-5	55	16	7.938	56.5	48.2	2.5×2	81300	237000
DFT6316-5	63	16	9.525	65.0	55.2	2.5×2	144000	455000
DFT6320-5	63	20	9.525	65.0	55.2	2.5×2	144000	455000

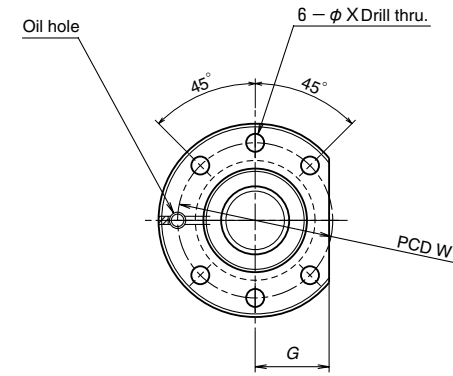
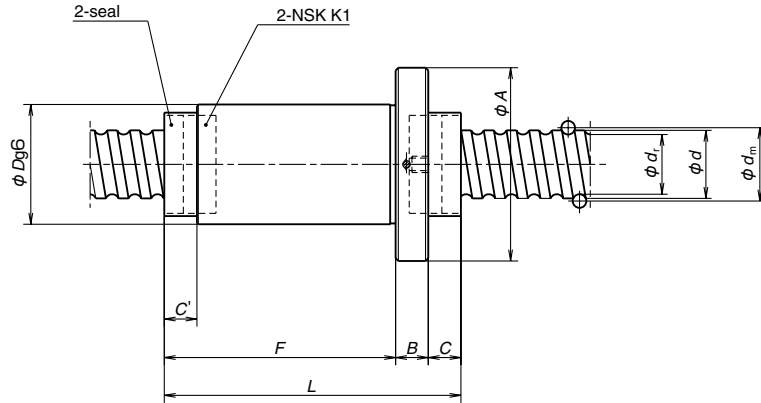
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Unit: mm

Axial play hardness <i>K</i> (N/μm)	Ball nut dimensions									
	<i>D</i>	<i>A</i>	<i>G</i>	<i>B</i>	<i>F</i>	<i>L</i>	<i>W</i>	<i>X</i>	<i>C</i>	<i>C'</i>
959	55	85	31	12	109	137	69	6.6	16	17
618	60	94	36	12	146	174	76	9	16	17
1150	74	108	41	12	184	212	90	9	16	16
707	74	108	41	12	170	198	90	9	16	16
1270	75	120	45	15	187	221	98	11	19	19
1390	82	124	47	16	187	222	102	11	19	19
1420	86	128	48	16	217	252	106	11	19	19
1520	88	132	50	16	187	222	110	11	19	19
1570	90	132	50	16	219	254	110	11	19	19
1710	100	146	55	18	219	256	122	14	19	19
1710	100	146	55	18	263	300	122	14	19	19
1970	108	150	58	18	138	178	128	11	22	22
2710	122	180	69	18	282	322	150	18	22	22
2710	122	180	69	18	322	362	150	18	22	22



Model No.	Screw shaft dia.	Lead	Ball dia.	Ball circle dia.	Root dia.	Effective turns of balls Turns × Circuit number	Basic load rating (N)	
	d	l	D_w	d_m	d_r		Dynamic C_a	Static C_{0a}
ZFD2005-6	20	5	3.175	20.75	17.4	1×3	8620	17500
ZFD2506-6	25	6	3.969	26.0	21.9	1×3	12900	27300
ZFD2510-4	25	10	4.762	26.25	21.3	1×2	11400	21400
ZFD3208-8	32	8	4.762	33.25	28.3	1×4	23500	55800
ZFD3210-6	32	10	6.35	33.75	27.1	1×3	25900	52800
ZFD3212-6	32	12	6.35	33.75	27.1	1×3	25900	52800
ZFD4010-8	40	10	6.35	41.75	35.1	1×4	38400	93300
ZFD4012-8	40	12	6.35	41.75	35.1	1×4	38400	93300
ZFD5010-8	50	10	6.35	51.75	45.1	1×4	43600	120000
ZFD5012-6	50	12	7.938	52.25	44.0	1×3	44800	109000

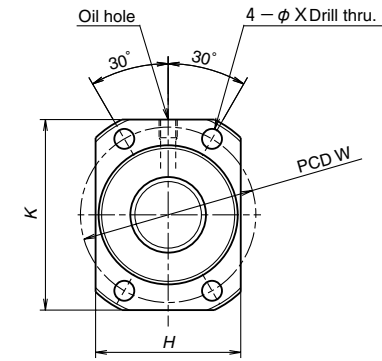
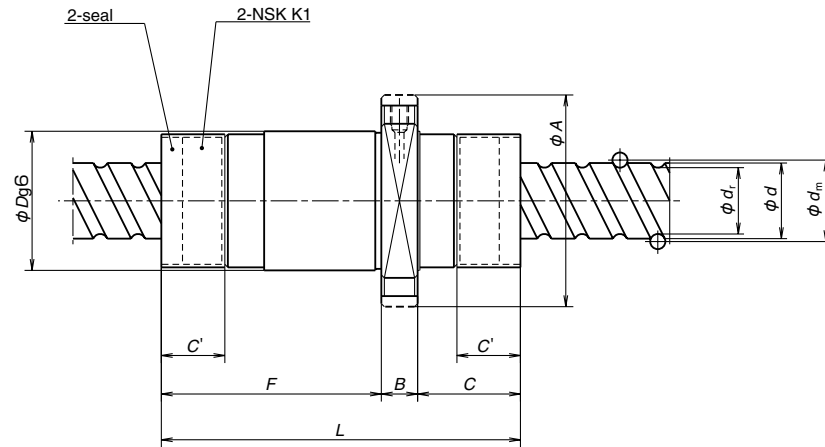
* Sizes not listed in the Table are also available. Please consult NSK.

* "NSK K1" can be installed on other types not listed in the Table. Please consult NSK.

* Rigidity in the Table is theoretical value obtained from the elastic deformation between screw groove and ball when the preload is 10% of the dynamic load rating (C_a), and an axial load is applied to it. Refer to "Technical description" (B521) if preload differs from the conditions above, or when considering change in the deformation of the ball nut itself.

Axial play hardness K (N/ μ m)	Ball nut dimensions									
	D	A	G	B	F	L	W	X	C	C'
382	35	58	22.5	12	66	87	46	5.5	9	9
470	40	63	24	12	78	102	51	5.5	12	—
323	42	69	26	12	82	106	55	6.6	12	12
774	50	84	32	12	112	136	66	9	12	12
588	54	88	34	12	114	138	70	9	12	12
588	54	88	34	12	129	153	70	9	12	12
970	62	104	40	16	137	167	82	11	14	14
970	62	104	40	16	159	189	82	11	14	14
1200	72	114	44	18	137	169	92	11	14	14
906	75	121	47	18	135	167	97	14	14	14

Unit: mm



Model No.	Screw shaft dia.	Lead	Ball dia.	Ball circle dia.	Root dia.	Effective turns of balls Turns × Circuit number	Basic load rating (N)	
	<i>d</i>						<i>l</i>	Dynamic <i>C_a</i>
UPFC1520-1.5	15	20	3.175	15.50	12.20	1.7×1	5070	8730
UPFC2040-1	20	40	3.175	20.75	17.40	0.7×2	4490	8640
UPFC2550-1	25	50	3.969	26.0	21.9	0.7×2	6700	13500
UPFC3264-1	32	64	4.763	33.25	28.3	0.7×2	9800	20900
LPFC1616-3	16	16	2.778	16.65	13.7	1.7×2	6380	12500
LPFC2020-3	20	20	3.175	20.75	17.4	1.7×2	9620	21000
LPFC2525-3	25	25	3.969	26.0	21.9	1.7×2	14400	32800
LPFC3232-3	32	32	4.762	33.25	28.3	1.7×2	21000	51600
LPFC4040-3	40	40	6.35	41.75	35.2	1.7×2	33500	86500
LPFC5050-3	50	50	7.938	52.25	44.1	1.7×2	50000	135000

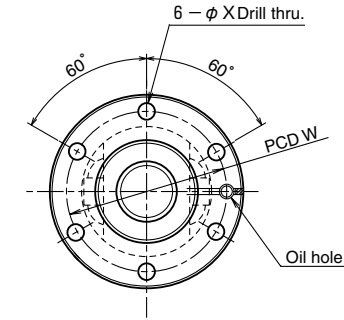
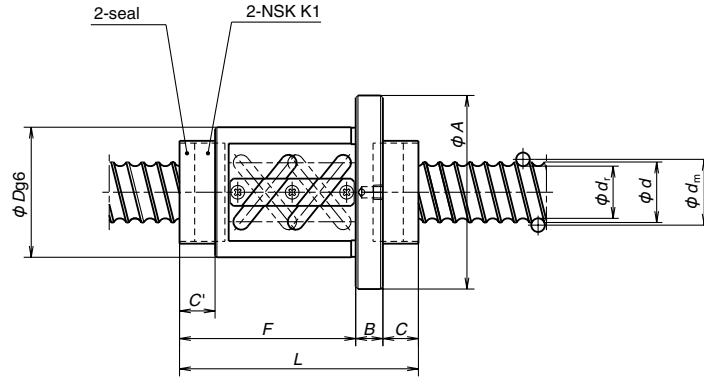
* Sizes not listed in the Table are also available. Please consult NSK.

* "NSK K1" can be installed on other types not listed in the Table. Please consult NSK.

* Rigidity in the Table is theoretical value obtained from the elastic deformation between screw groove and ball when the preload is 5% of the dynamic load rating (Ca), and an axial load is applied to it. Refer to "Technical description" (B521) if preload differs from the conditions above, or when considering change in the deformation of the ball nut itself.

Axial play hardness <i>K</i> (N/μm)	Ball nut dimensions										
	<i>D</i>	<i>A</i>	<i>H</i>	<i>K</i>	<i>B</i>	<i>F</i>	<i>L</i>	<i>W</i>	<i>X</i>	<i>C</i>	<i>C'</i>
176	34	55	36	50	10	42	81	45	5.5	29	18
191	38	58	40	52	10	38	77	48	5.5	29	18
234	46	70	48	63	12	46	92	58	6.6	34	21
305	58	92	60	82	12	55.5	104	74	9.0	36.5	21
293	32	53	34	46	10	36	74	42	4.5	28	18
404	39	62	41	56	10	42.5	82	50	5.5	29.5	18
499	47	74	49	66	12	51	97	60	6.6	34	21
623	58	92	60	82	12	63	112	74	9	37	21
773	73	114	75	102	15	74.5	133	93	11	93.5	24
952	90	135	92	122	20	89.5	155	112	14	45.5	24

Unit: mm



Model No.	Screw shaft dia.	Lead	Ball dia.	Ball circle dia.	Root dia.	Effective turns of balls Turns × Circuit number	Basic load rating (N)	
	d						l	Dynamic C_a
HZF3616-5	36	16	4.762	36.5	31.7	2.5×2	40200	102000
HZF3620-3.5	36	20	6.35	37	30.6	3.5×1	44000	98500
HZF4016-5	40	16	4.762	40.5	35.7	2.5×2	41200	112000
HZF4020-5	40	20	6.35	41	34.6	2.5×2	62600	153000
HZF4520-5	45	20	6.35	46	39.6	2.5×2	64700	170000
HZF5020-5	50	20	6.35	51	44.6	2.5×2	68500	191000
HZF5025-5	50	25	7.144	51.5	44.3	2.5×2	80100	216000
HZF5520-5	55	20	6.35	56	49.6	2.5×2	70200	208000
HZF5525-5	55	25	7.144	56.5	49.3	2.5×2	85000	238000

* Sizes not listed in the Table are also available. Please consult NSK.

* "NSK K1" can be installed on other types not listed in the Table. Please consult NSK.

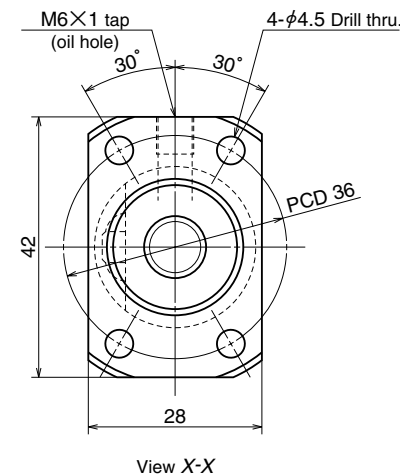
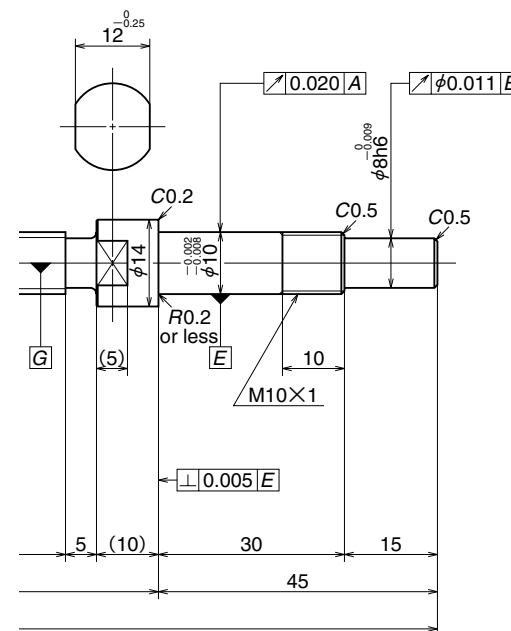
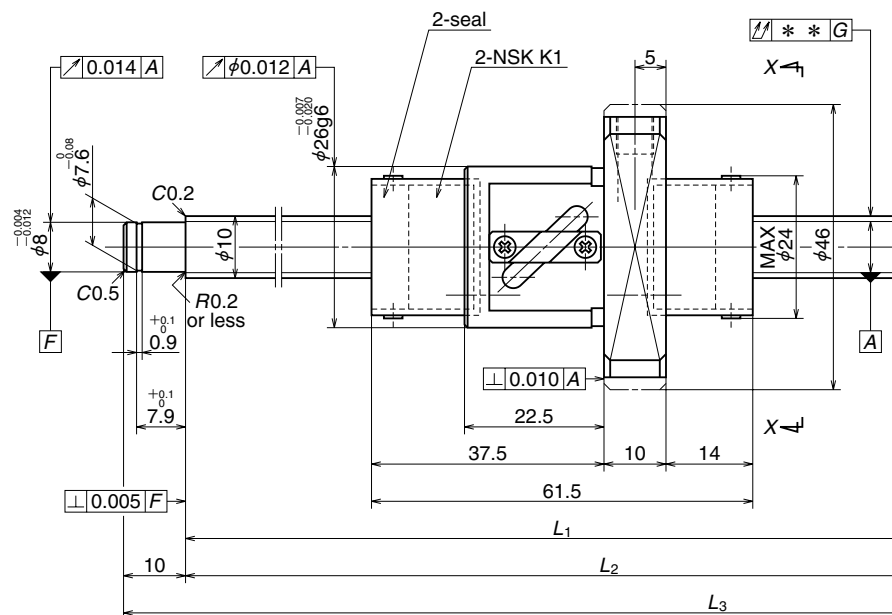
* Rigidity in the Table is theoretical value obtained from the elastic deformation between screw groove and ball when the preload is 10% of the dynamic load rating (C_a), and an axial load is applied to it. Refer to "Technical description" (B521) if preload differs from the conditions above, or when considering change in the deformation of the ball nut itself.

Axial play hardness K (N/ μ m)	Ball nut dimensions								
	D	A	B	F	L	W	X	C	C'
1420	78	120	15	129	163	98	11	19	19
1050	94	136	15	112	146	114	11	19	19
1550	79	121	16	129	164	99	11	19	19
1590	96	138	16	154	189	116	11	19	19
1740	98	140	16	155	190	118	11	19	19
1910	101	143	18	155	192	121	11	19	19
1940	103	145	18	184	221	123	11	19	19
2050	103	145	18	158	198	123	11	22	22
2120	105	147	18	187	227	125	11	22	22

Unit: mm

(7) Standardized stock ball screws WFA Series dimension table

Screw shaft dia. $\phi 10$, lead 4



Ball screw No.	Stroke		Screw shaft length		
	Nominal	Maximum (L ₁ - Nut length)	L ₁	L ₂	L ₃
WFA1004C5Z-230K1	80	98.5	160	175	230
WFA1004C5Z-330K1	190	198.5	260	275	330
WFA1004C5Z-430K1	290	298.5	360	375	430

Note: 1. We recommend using the following NSK Support Units.
WBK10-01A (Fixed support side, square type), WBK10S-01 (Simple support side), and WBK10-11 (Fixed support side, round type)

Lead accuracy			Shaft run out**	Mass (kg)
T	e _p	v _u		
0	0.020	0.018	0.045	0.28
0	0.023	0.018	0.060	0.33
0	0.025	0.020	0.080	0.39

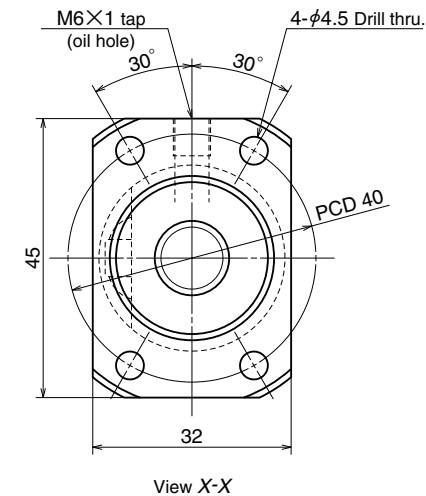
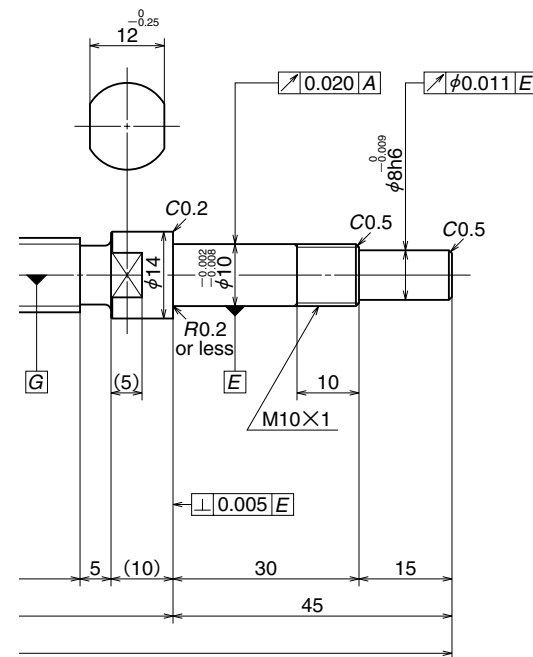
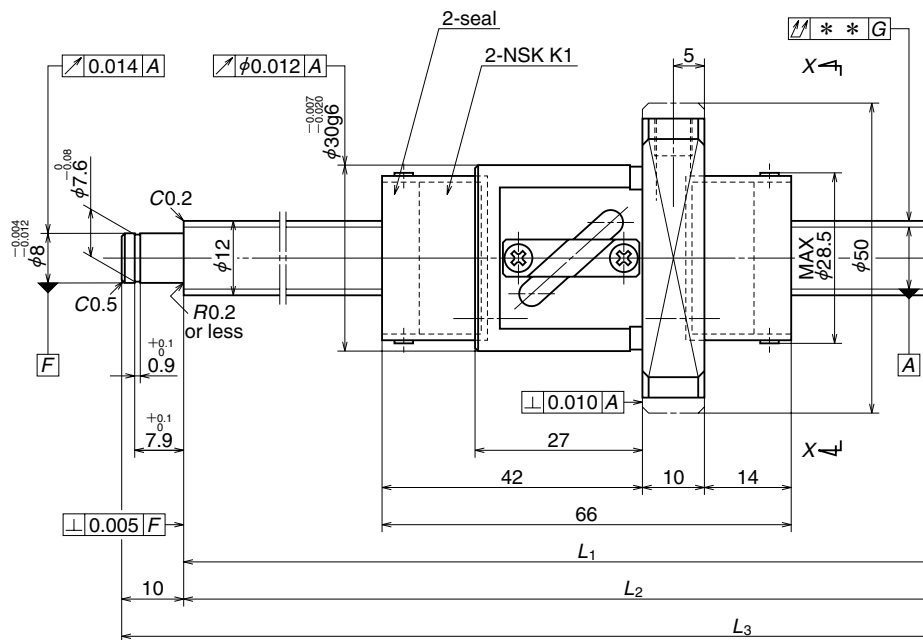
Unit: mm

Ball screw specifications

Shaft dia. x lead/Direction of turn	10 x 4 / Right
Ball recirculation	Return tube
Ball dia.	2.000
Effective turns of balls	2.5 x 1
Accuracy grade/Axial play	C5 / Z
Basic dynamic load rating (N)	1730
Basic static load rating (N)	2230
Axial play	0
Dynamic friction torque (N·cm)	0.2~3.3*
Spacer ball	Yes
Factory packed grease	NSK Grease PS2

* Indicates torque control value of the ball screw. Also, torque increases approximately 0.5N·cm due to NSK K1.

Screw shaft dia. $\phi 12$, lead 5



Unit: mm

Ball screw No.	Stroke		Screw shaft length		
	Nominal	Maximum (L ₁ —Nut length)	L ₁	L ₂	L ₃
WFA1205C5Z-230K1	80	94	160	175	230
WFA1205C5Z-380K1	230	244	310	325	380
WFA1205C5Z-580K1	430	444	510	525	580

Note: 1. We recommend using the following NSK Support Units. WBK10-01A (Fixed support side, square type), WBK10S-01 (Simple support side), and WBK10-11 (Fixed support side, round type)

Unit: mm

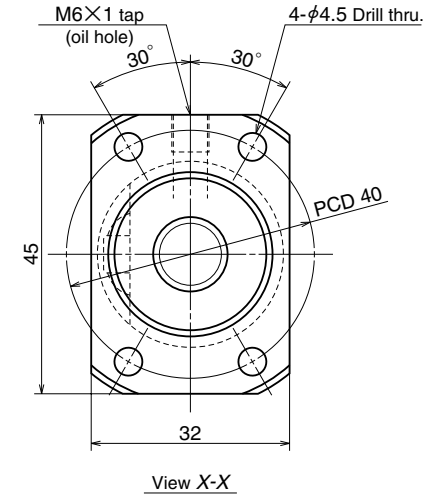
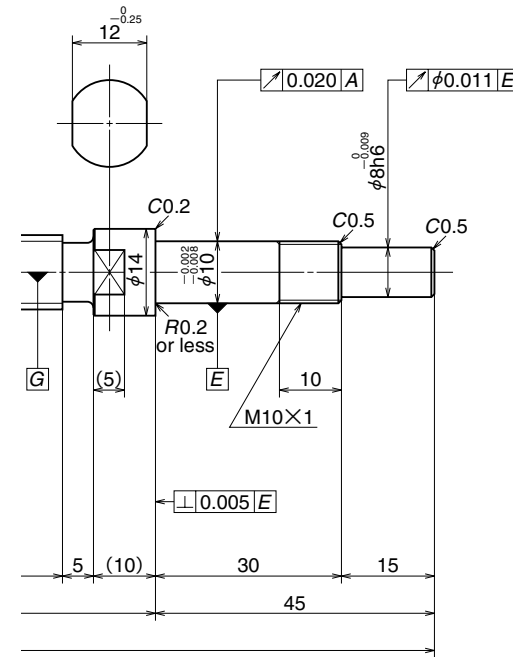
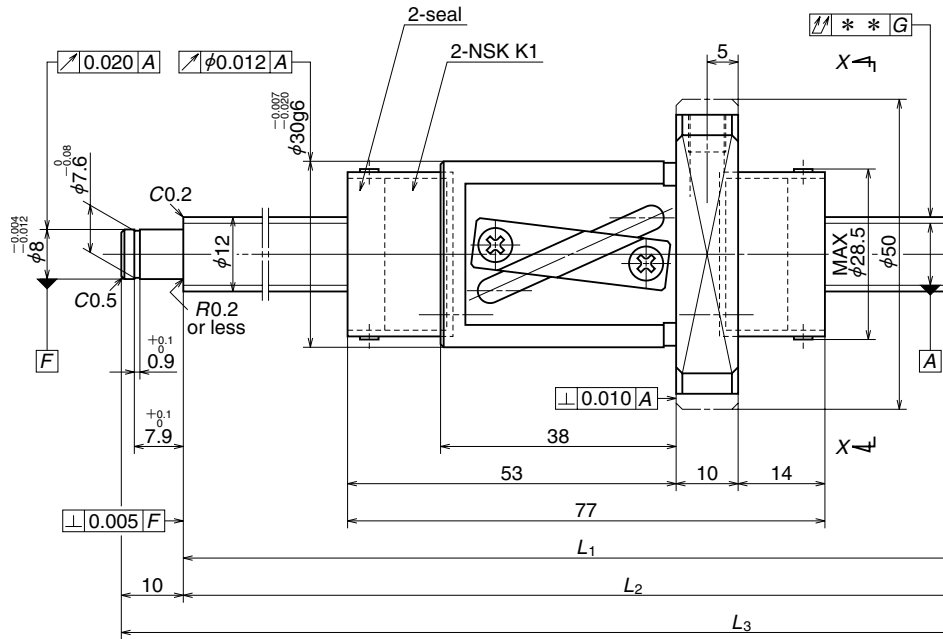
Lead accuracy			Shaft run out**	Mass (kg)
T	e _p	v _u		
0	0.020	0.018	0.045	0.37
0	0.023	0.018	0.060	0.49
0	0.030	0.023	0.100	0.65

Ball screw specifications

Shaft dia. x lead/Direction of turn	12 × 5 / Right
Ball recirculation	Return tube
Ball dia.	2.381 (3 / 32)
Effective turns of balls	2.5 × 1
Accuracy grade/Axial play	C5 / Z
Basic dynamic load rating (N)	2370
Basic static load rating (N)	3160
Axial play	0
Dynamic friction torque (N·cm)	0.4~4.9*
Spacer ball	Yes
Factory packed grease	NSK Grease PS2

* Indicates torque control value of the ball screw. Also, torque increases approximately 0.6N·cm due to NSK K1.

Screw shaft dia. $\phi 12$, lead 10



Ball screw No.	Stroke		Screw shaft length		
	Nominal	Maximum (L_1 - Nut length)	L_1	L_2	L_3
WFA1210C5Z-230K1	80	83	160	175	230
WFA1210C5Z-380K1	230	233	310	325	380
WFA1210C5Z-580K1	430	433	510	525	580

Note: 1. We recommend using the following NSK Support Units.
WBK10-01A (Fixed support side, square type), WBK10S-01 (Simple support side), and WBK10-11 (Fixed support side, round type)

Lead accuracy			Unit: mm	
T	e_p	v_u	Shaft run out**	Mass (kg)
0	0.020	0.018	± 0.045	0.42
0	0.023	0.018	0.060	0.55
0	0.030	0.023	0.100	0.72

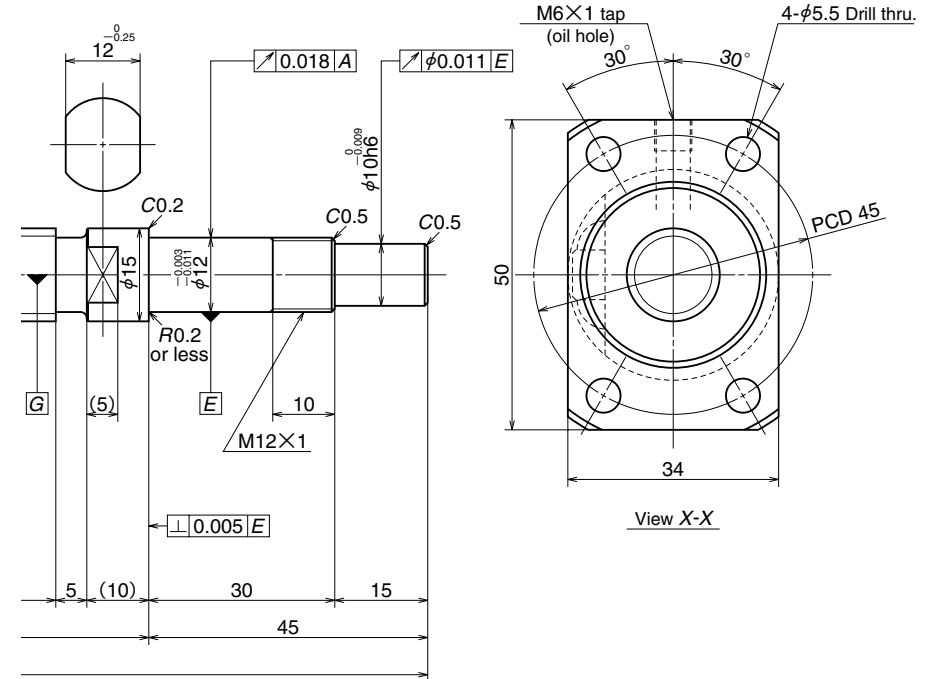
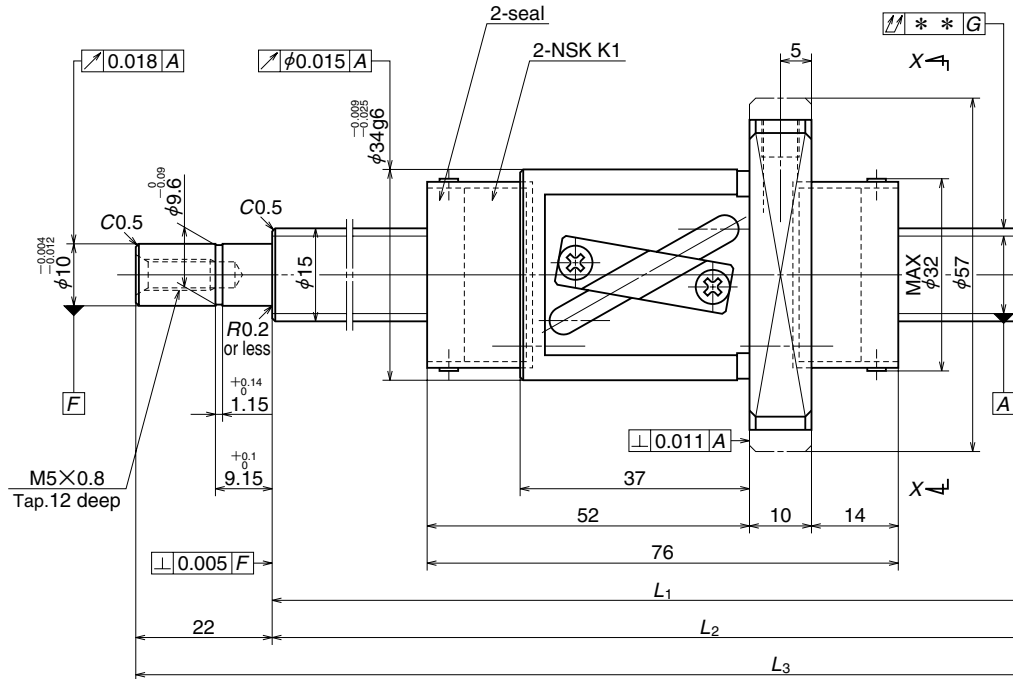
Unit: mm

Ball screw specifications

Shaft dia. x lead/Direction of turn	12 x 10 / Right
Ball recirculation	Return tube
Ball dia.	2.381 (3 / 32)
Effective turns of balls	2.5 x 1
Accuracy grade/Axial play	C5/Z
Basic dynamic load rating (N)	2360
Basic static load rating (N)	3240
Axial play	0
Dynamic friction torque (N·cm)	0.4~4.9*
Spacer ball	Yes
Factory packed grease	NSK Grease LR3

* Indicates torque control value of the ball screw. Also, torque increases approximately 0.6N·cm due to NSK K1.

Screw shaft dia. $\phi 15$, lead 10



Ball screw No.	Stroke		Screw shaft length		
	Nominal	Maximum (L ₁ - Nut length)	L ₁	L ₂	L ₃
WFA1510C5Z-371K1	210	213	289	304	372
WFA1510C5Z-771K1	600	613	689	704	771
WFA1510C5Z-1171K1	1000	1013	1089	1104	1171

Note: 1. We recommend using the following NSK Support Units.
 WBK12-01A (Fixed support side, square type), WBK12S-01 (Simple support side), and WBK12-11 (Fixed support side, round type)

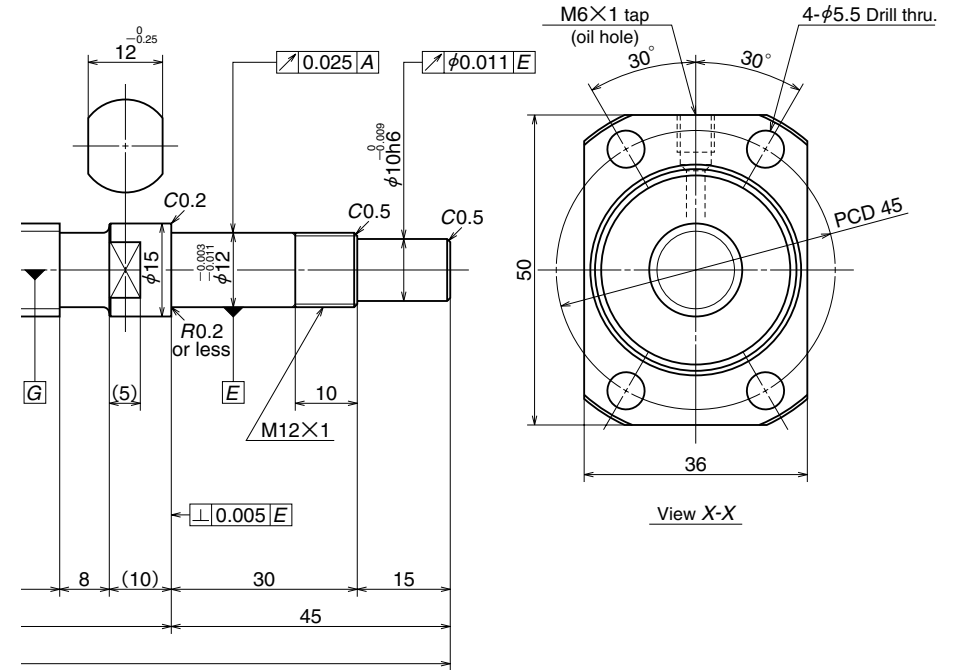
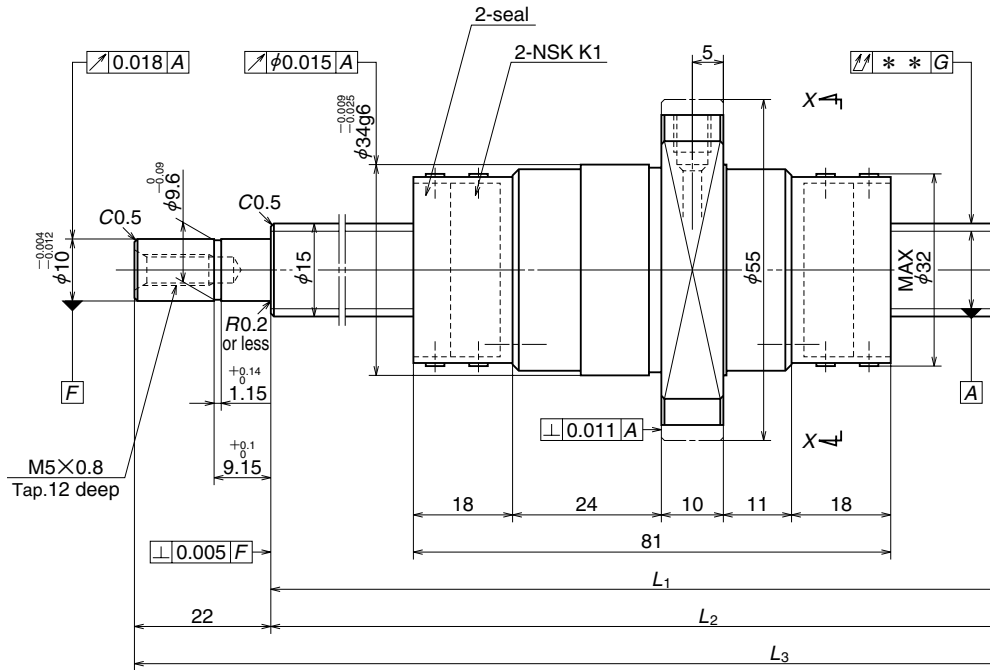
Lead accuracy			Shaft run out**	Mass (kg)
T	e _p	v _u		
0	0.023	0.018	0.045	0.72
0	0.035	0.025	0.085	1.20
0	0.046	0.030	0.140	1.70

Unit: mm

Ball screw specifications	
Shaft dia. x lead/Direction of turn	15 x 10 / Right
Ball recirculation	Return tube
Ball dia.	3.175 (1 / 8)
Effective turns of balls	2.5 x 1
Accuracy grade/Axial play	C5 / Z
Basic dynamic load rating (N)	4450
Basic static load rating (N)	6380
Axial play	0
Dynamic friction torque (N·cm)	0.9~5.4*
Spacer ball	Yes
Factory packed grease	NSK Grease LR3

* Indicates torque control value of the ball screw. Also, torque increases approximately 0.75N•cm due to NSK K1.

Screw shaft dia. $\phi 15$, lead 20



Ball screw No.	Stroke		Screw shaft length		
	Nominal	Maximum (L ₁ —Nut length)	L ₁	L ₂	L ₃
WFA1520C5Z-371K1	190	205	286	304	371
WFA1520C5Z-771K1	600	605	686	704	771
WFA1520C5Z-1171K1	1000	1005	1086	1104	1171

Note: 1. We recommend using the following NSK Support Units.
 WBK12-01A (Fixed support side, square type), WBK12S-01 (Simple support side), and WBK12-11 (Fixed support side, round type)

Lead accuracy			Shaft run out**	Mass (kg)
T	e _p	v _u		
0	0.023	0.018	0.045	0.75
0	0.035	0.025	0.085	1.30
0	0.046	0.030	0.140	1.80

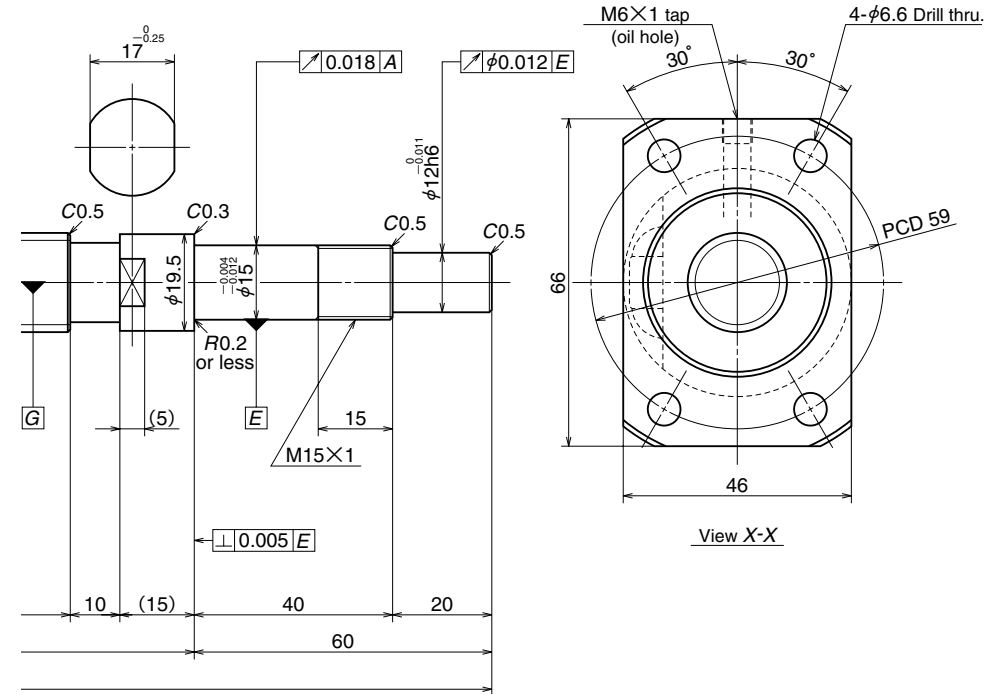
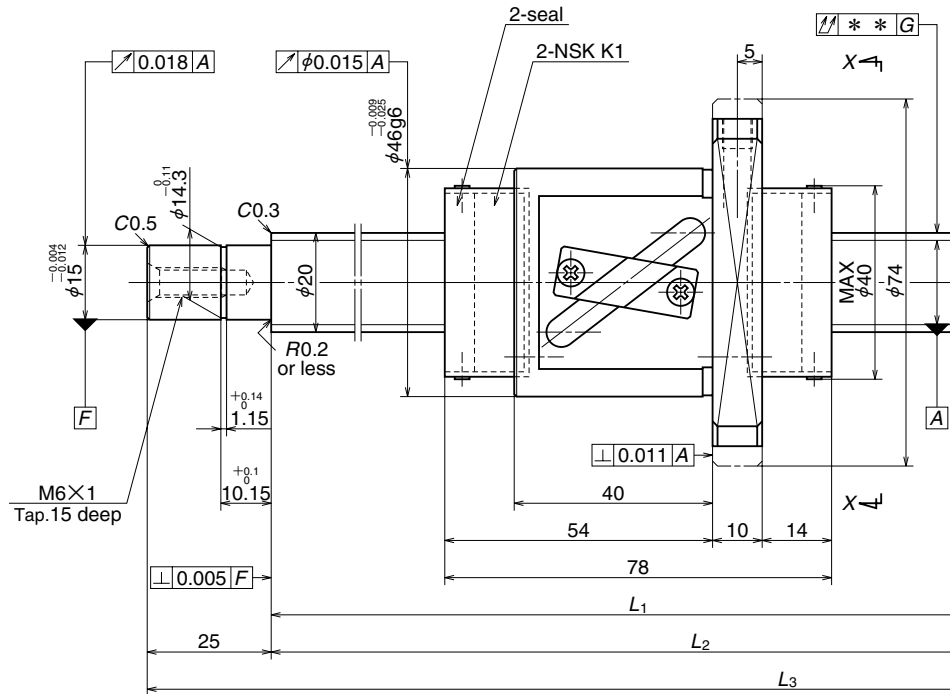
Unit: mm

Ball screw specifications

Shaft dia. x lead/Direction of turn	15 × 20 / Right
Ball recirculation	End cap
Ball dia.	3.175 (1 / 8)
Effective turns of balls	1.7 × 1
Accuracy grade/Axial play	C5 / Z
Basic dynamic load rating (N)	3870
Basic static load rating (N)	5280
Axial play	0
Dynamic friction torque (N · cm)	1.6~7.4*
Spacer ball	Yes
Factory packed grease	NSK Grease LR3

* Indicates torque control value of the ball screw. Also, torque increases approximately 0.75N·cm due to NSK K1.

Screw shaft dia. $\phi 20$, lead 10



Unit: mm

Ball screw No.	Stroke		Screw shaft length		
	Nominal	Maximum (L ₁ - Nut length)	L ₁	L ₂	L ₃
WFA2010C5Z-599K1	400	411	489	514	599
WFA2010C5Z-899K1	700	711	789	814	899
WFA2010C5Z-1399K1	1200	1211	1289	1314	1399

Note: 1. We recommend using the following NSK Support Units.
WBK15-01A (Fixed support side, square type), WBK15S-01 (Simple support side), and WBK15-11 (Fixed support side, round type)

Lead accuracy			Shaft run out**	Mass (kg)
T	e _p	v _u		
0	0.027	0.020	0.070	1.80
0	0.035	0.025	0.110	2.50
0	0.054	0.035	0.180	3.60

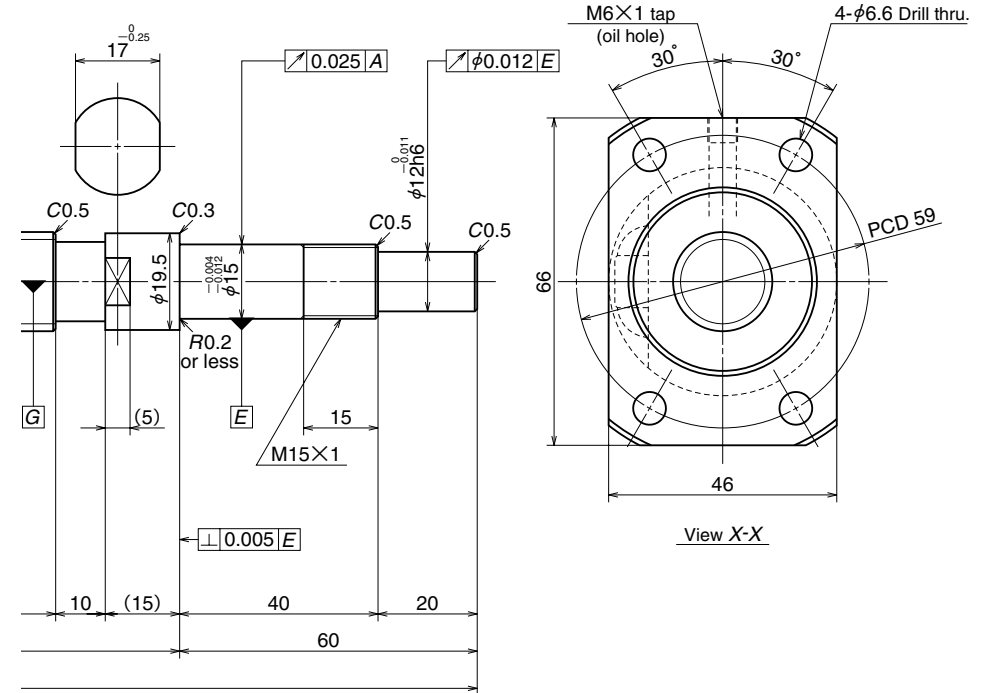
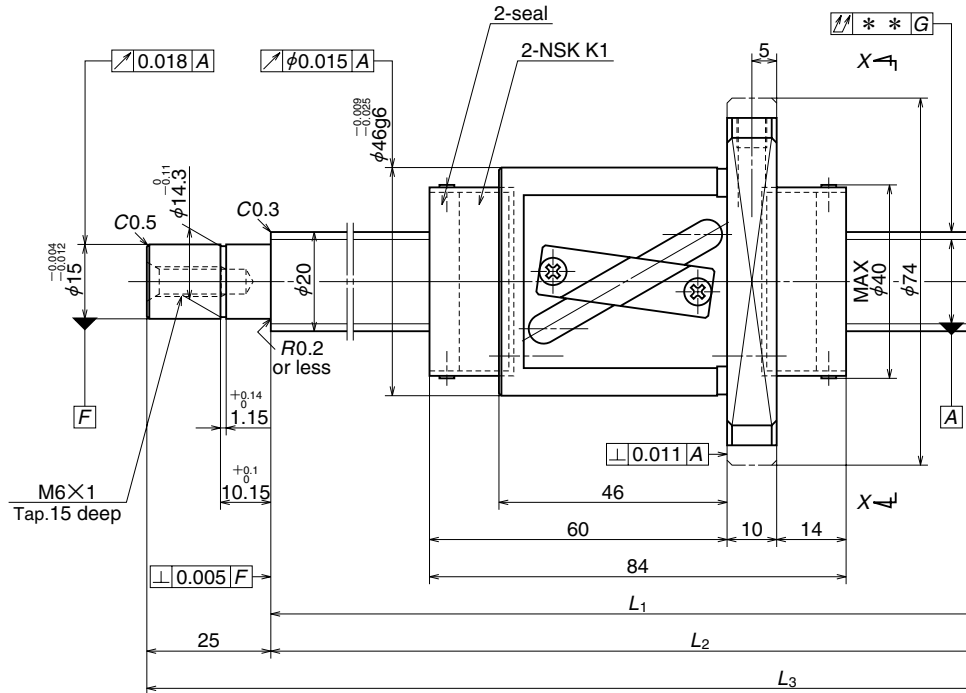
Unit: mm

Ball screw specifications

Shaft dia. x lead/Direction of turn	20 x 10 / Right
Ball recirculation	Return tube
Ball dia.	3.969 (5 / 32)
Effective turns of balls	2.5 x 1
Accuracy grade/Axial play	C5 / Z
Basic dynamic load rating (N)	6880
Basic static load rating (N)	10800
Axial play	0
Dynamic friction torque (N·cm)	2.0~8.3*
Spacer ball	Yes
Factory packed grease	NSK Grease LR3

* Indicates torque control value of the ball screw. Also, torque increases approximately 1.0N·cm due to NSK K1.

Screw shaft dia. $\phi 20$, lead 20



Ball screw No.	Stroke		Screw shaft length		
	Nominal	Maximum (L ₁ - Nut length)	L ₁	L ₂	L ₃
WFA2020C5Z-820K1	600	626	710	735	820
WFA2020C5Z-1220K1	1000	1026	1110	1135	1220
WFA2020C5Z-1620K1	1400	1426	1510	1535	1620

Note: 1. We recommend using the following NSK Support Units.
 WBK15-01A (Fixed support side, square type), WBK15S-01 (Simple support side), and WBK15-11 (Fixed support side, round type)

Unit: mm

Lead accuracy			Shaft run out**	Mass (kg)
T	e _p	v _u		
0	0.035	0.025	0.110	2.40
0	0.046	0.030	0.140	3.40
0	0.054	0.035	0.180	4.30

Ball screw specifications

Shaft dia. x lead/Direction of turn	20 x 20 / Right
Ball recirculation	Return tube
Ball dia.	3.969 (5 / 32)
Effective turns of balls	1.5 x 1
Accuracy grade/Axial play	C5 / Z
Basic dynamic load rating (N)	5370
Basic static load rating (N)	8450
Axial play	0
Dynamic friction torque (N·cm)	2.4~9.8*
Spacer ball	Yes
Factory packed grease	NSK Grease LR3

* Indicates torque control value of the ball screw. Also, torque increases approximately 1.0N·cm due to NSK K1.