

**B-3-3.12 Equipped with "NSK K1™" Lubrication Unit**

This product is being applied for a patent.

**1. 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.

[ex.] For automotive component processing lines, etc.

- Does not pollute the environment

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

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

- Good for environments where lubricant is washed away

When 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.

[ex.] 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.

[ex.] Woodworking machines, etc.

- Comparative duration test of samples with and without NSK K1

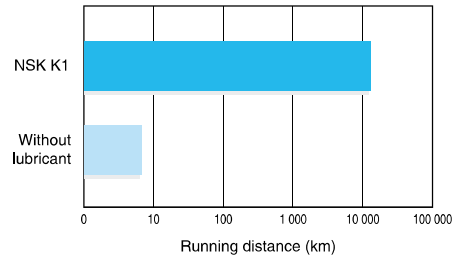
Sample, testing conditions and test result are shown in **Table 1** and **Fig. 1**.

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

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

**Table 1 Sample and testing conditions**

Ball screw	Shaft dia. 20 mm, lead 20 mm
Lubrication	Comparison with only NSK K1 against no lubrication
Speed	4 000 min <sup>-1</sup> (80 m/min)
Stroke	600 mm



**Fig. 1 Duration test results on ball screws without lubricant**

**2. Specifications**

**(1) Structure**

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.

NSK K1 is installed between the ball screw nut and the labyrinth seal. The overall nut length is slightly longer than that of the standard ball screw.

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



**Fig. 2 NSK K1**

**(2) Accuracy grade and axial play**

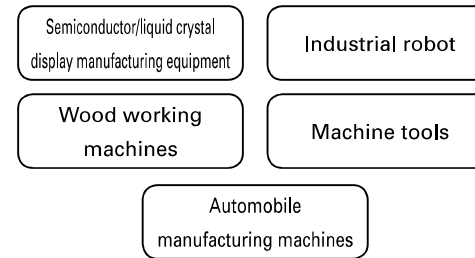
Accuracy grades, clearance and preload specifications remain unchanged from the existing products. There is a slight increase in torque due to the equipped NSK K1.

**(3) Overall nut length after equipped with NSK K1™**

The nut length becomes longer than that of standard ball screws after equipped with NSK K1. The nut length after equipped with K1 is shown in pages B577 to B580 for each type of ball recirculation. NSK K1 can be installed on other types not listed in the dimension table. Please consult with NSK if you require the K1 for a special ball nut.

**(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.



◇Reference number for ball screw equipped with NSK K1

**W1401 -\*\* P K1 - C3 Z10**

NSK K1 equipped type ball screw code

**3. Precautions for use**

Temperature range for use: Maximum temperature: 50°C  
Momentary maximum temperature: 80°C

Chemicals that should not come to contact with K1:

Do not leave NSK K1 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 AS2 and ester-type PS2 do not damage K1 Seal.

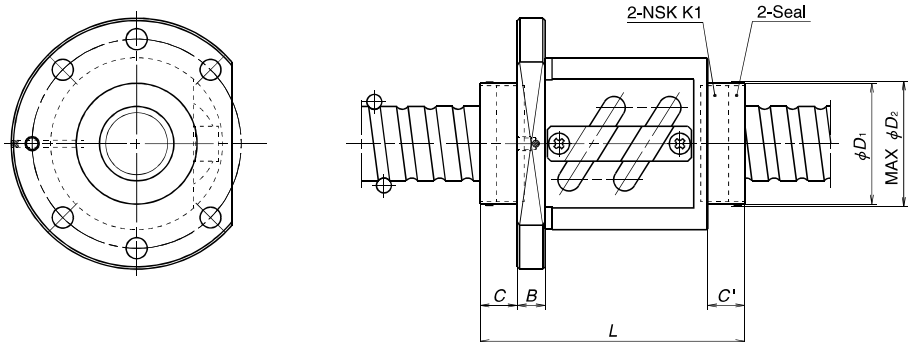
Note: NSK K1 is not applicable to the Compact FA series.

**4. Example of reference number**

A structure of "Reference number for ball screw" is as follows.

Note: "K1" is added at the end of "nut model code" and "Specifications number".

(1) Tube type



Tube type

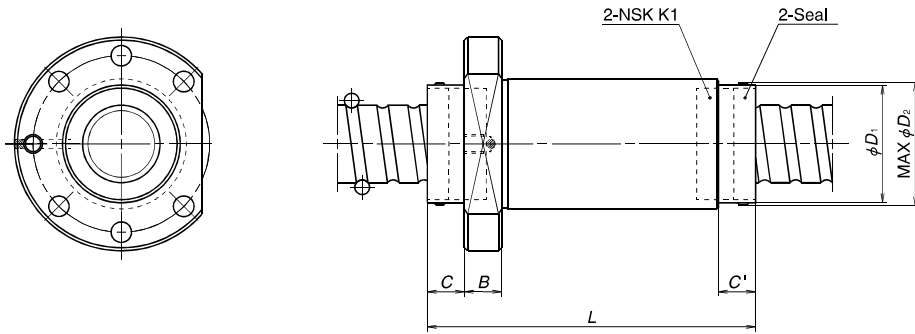
Model No.	Screw shaft dia. <i>d</i>	Lead <i>l</i>	K1 installing dimension		Frange width <i>B</i>	Overall length when equipped K1 <i>L</i>	K1 cap dimension		
			<i>C</i>	<i>C'</i>			Cap dia. $\phi D_1$	Protruding dimension $\phi D_2$	
PFT1004-2.5	10	4	14	15	10	61.5	$\phi 22$	MAX $\phi 24$	
PFT1205-2.5	12	5	14	15	10	66	$\phi 26.5$	MAX $\phi 29$	
LPFT1210-2.5		10		17		79			
PFT1405-2.5	14	5	14	15	10	65	$\phi 30$	MAX $\phi 32$	
LPFT1510-2.5	15	10	14	15	10	76	$\phi 30$	MAX $\phi 32$	
PFT1605-2.5	16	5	14	15	10	67	$\phi 32$	MAX $\phi 34$	
PFT2005-5	20	5	14	14	10	81	$\phi 38$	MAX $\phi 40$	
LPFT2010-2.5		10				78			
LPFT2020-1.5		20				84			
ZFT2505-10	25	5	16	17	10	115	$\phi 44$	MAX $\phi 46$	
PFT2506-5		6	16	17	12	93	$\phi 44$	MAX $\phi 46$	
PFT2510-2.5		10	16	17	12	89	$\phi 44$	MAX $\phi 46$	
ZFT2510-3						103			
LPFT2520-2.5		20	12	12	12	109	$\phi 38$	MAX $\phi 40$	
LPFT2525-1.5		25	12	12	12	98	$\phi 38$	MAX $\phi 40$	
DFT2805-5		28	5	16	17	12	137	$\phi 48$	MAX $\phi 50$
PFT2810-2.5			10				90		
DFT2810-3	174								
PFT3206-5	32	6	16	17	12	93	$\phi 52$	MAX $\phi 54$	
ZFT3206-10						129			
PFT3210-5						17			122
ZFT3210-5		10	16	17	17	122	$\phi 52$	MAX $\phi 54$	
DFT3210-5						16			212
PFT3212-3		12	16	17	17	114	$\phi 52$	MAX $\phi 54$	
DFT3212-3						16			198
LPFT3225-2.5		25	12	12		122	$\phi 46$	MAX $\phi 48$	
LPFT3232-1.5		32	12	12		109	$\phi 46$	MAX $\phi 48$	

Notes: 1. NSK K1 can be installed in other types not listed in the table. Please consult NSK.  
2. C, C' and L are the dimensions when one NSK K1 is equipped to both ends of the nut.

Model No.	Screw shaft dia. <i>d</i>	Lead <i>l</i>	K1 installing dimension		Frange width <i>B</i>	Overall length when equipped K1 <i>L</i>	K1 cap dimension					
			<i>C</i>	<i>C'</i>			Cap dia. $\phi D_1$	Protruding dimension $\phi D_2$				
PFT3610-5	36	10	19	20	15	131	$\phi 56$	MAX $\phi 58$				
DFT3610-5				19		221						
HZF3616-5		16	19	163								
HZF3620-3.5		20	19	146								
PFT4008-5	40	8	19	20	16	117	$\phi 62$	MAX $\phi 64$				
ZFT4008-10				165								
ZFT4010-7		10	19	20		152	$\phi 62$	MAX $\phi 64$				
DFT4010-5				19		222	$\phi 61$					
PFT4012-5		12	19	19		20	144	$\phi 62$	MAX $\phi 64$			
DFT4012-5						19	252	$\phi 61$				
HZF4016-5						16	19	19		164	$\phi 61$	MAX $\phi 64$
HZF4020-5						20	19	19		189	$\phi 61$	MAX $\phi 64$
LPFT4032-2.5						32	14	14		151	$\phi 54$	MAX $\phi 56$
LPFT4040-1.5						40	14	14		133	$\phi 54$	MAX $\phi 56$
DFT4510-5		45	10	19		19	16	222	$\phi 72$	MAX $\phi 75$		
DFT4512-5	12		19		18	254						
HZF4520-5	20		19		18	190						
ZFT5010-10	50	10	19	20	18	194	$\phi 73$	MAX $\phi 76$				
DFT5012-5		12		19		256						
ZFT5016-5		16		20		172						
DFT5016-5				19		300						
HZF5020-5		20		19		192						
HZF5025-5		25		19		221						
DFT5516-5		55		16		22			22	18	178	MAX $\phi 87$
HZF5520-5	20		22	18	198		MAX $\phi 81$					
HZF5525-5	25		22	18	227		MAX $\phi 81$					
DFT6316-5	63	16	22	22	18	322	$\phi 89$	MAX $\phi 95$				
DFT6320-5		20		22		18			362			

Equipped with NSK K1™

(2) Deflector(bridge) type

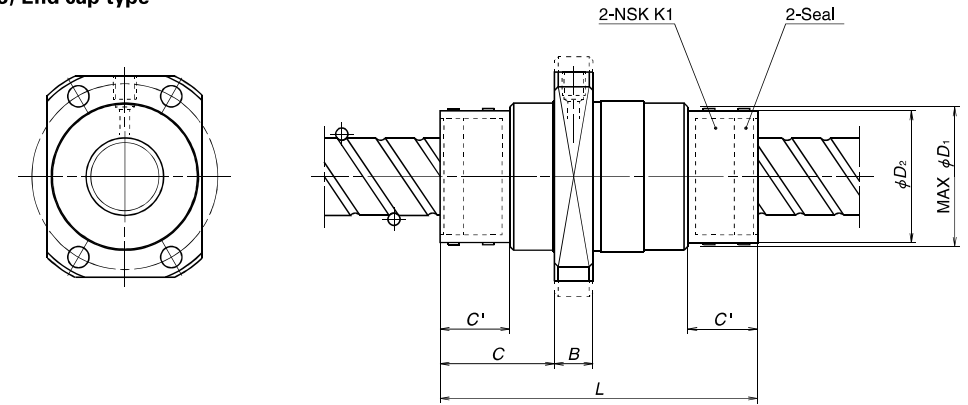


Deflector(bridge) type

Model No.	Screw shaft dia. <i>d</i>	Lead <i>l</i>	K1 installing dimension		Frange width <i>B</i>	Overall length when equipped K1 <i>L</i>	K1 cap dimension	
			<i>C</i>	<i>C'</i>			Cap dia. $\phi D_1$	Protruding dimension $\phi D_2$
ZFD2005-6	20	5	9	9	12	87	$\phi 32$	MAX $\phi 34$
ZFD2506-6	25	6	12	—	12	102	$\phi 38$	MAX $\phi 40$
ZFD2510-4		10		12		106		
ZFD3208-8	32	8	12	12	12	136	$\phi 46$	MAX $\phi 48$
ZFD3210-6		10				138		
ZFD3212-6		12				153		
ZFD4010-8	40	10	14	14	16	167	$\phi 54$	MAX $\phi 57$
ZFD4012-8		12				189		
ZFD5010-8	50	10	14	14	18	169	$\phi 64$	MAX $\phi 67$
ZFD5012-6		12				167		

Notes: 1. NSK K1 can be installed in other types not listed in the table. Please consult NSK.  
2. C, C' and L are the dimensions when one NSK K1 is equipped to both ends of the nut.

(3) End cap type



End cap type

Model No.	Screw shaft dia. <i>d</i>	Lead <i>l</i>	K1 installing dimension		Frange width <i>B</i>	Overall length when equipped K1 <i>L</i>	K1 cap dimension	
			<i>C</i>	<i>C'</i>			Cap dia. $\phi D_1$	Protruding dimension $\phi D_2$
UPFC1520-1.5	15	20	29	18	10	81	$\phi 30$	MAX $\phi 32$
LPFC1616-3	16	16	28	18	10	74	$\phi 28$	MAX $\phi 30$
LPFC2020-3	20	20	29.5	18	10	82	$\phi 34$	MAX $\phi 36$
UPFC2040-1		40	29			77	$\phi 32$	MAX $\phi 34$
LPFC2525-3	25	25	34	21	12	97	$\phi 44$	MAX $\phi 46$
UPFC2550-1		50				92		
LPFC3232-3	32	32	37	21	12	112	$\phi 52$	MAX $\phi 54$
UPFC3264-1		64	36.5			104		
LPFC4040-3	40	40	43.5	24	15	133	$\phi 62$	MAX $\phi 65$
LPFC5050-3	50	50	45.5	24	20	155	$\phi 74$	MAX $\phi 77$

Notes: 1. NSK K1 can be installed in other types not listed in the table. Please consult NSK.  
2. C, C' and L are the dimensions when one NSK K1 is equipped to both ends of the nut.