MOTION & CONTROL™

NSK

LINEAR MOTION SOLUTIONS

STANDARD ITEMS

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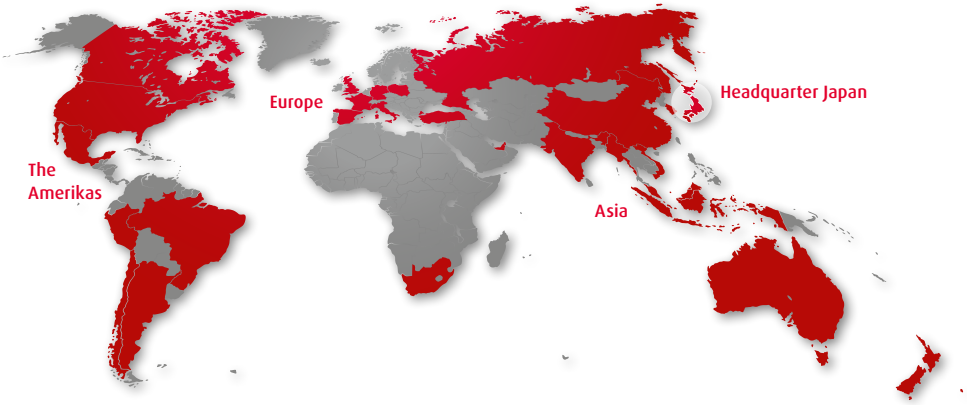
Setting the Future in Motion

We are among the leading manufacturers for rolling bearings, linear technology components and steering systems worldwide. We can be found on almost every continent – with production facilities, sales offices and technology centres – because our customers appreciate short decision-making channels, prompt deliveries and local service.



The NSK Company

NSK commenced operations as the first Japanese manufacturer of rolling bearings back in 1916. Ever since, we have been continuously expanding and improving not only our product portfolio but also our range of services for various industrial sectors. In this context our worlwide research and production facilities are linked together in a global network. Here we concentrate not only on the development of new technologies, but also on the continuous optimisation of quality – at every process stage. Among other things, our research activities include product design, simulation applications using a variety of analytical systems and the development of different steels and lubricants for rolling bearings.

Our most important product: our customers' satisfaction

One thing keeps us moving: we want to help you increase the reliability of your vehicles and equipment, not only with excellent products, but above all with excellent service. Our experienced engineers have a deep understanding of systems – together with you, they work to optimise products and processes and develop solutions for the future. The goal that we are dedicated to every day is ensuring that you remain competitive over the long run.

More about NSK on www.nskeurope.com

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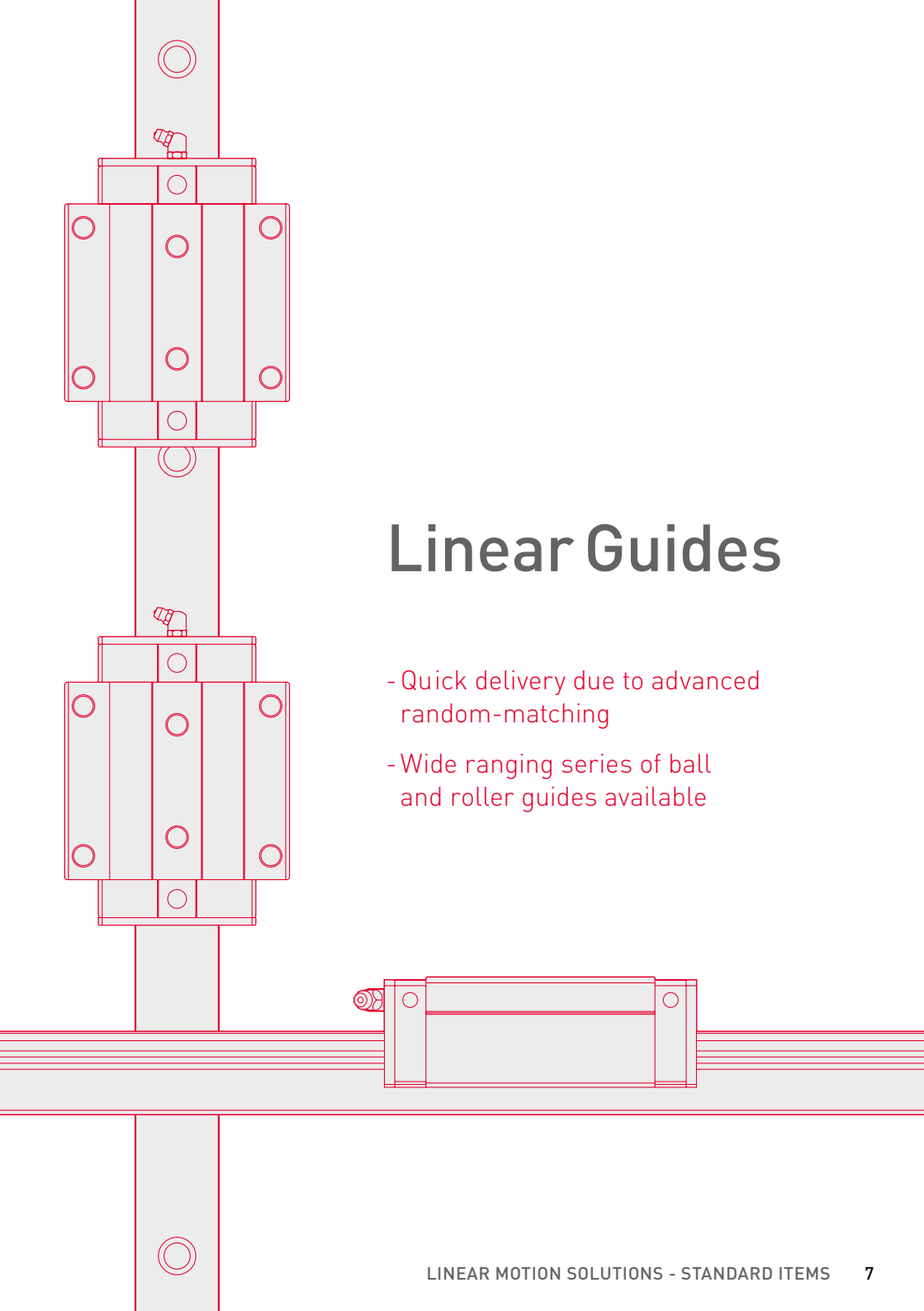
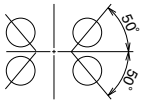
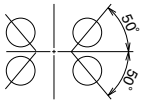
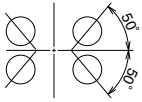
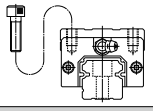
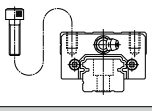
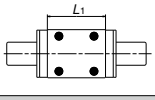
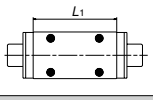
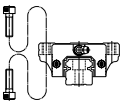
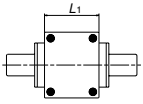
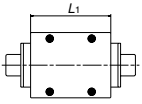


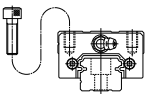
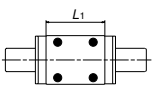
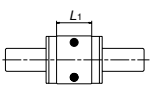
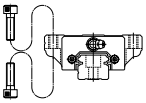
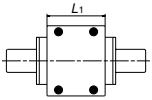
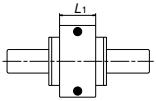
Linear Guides

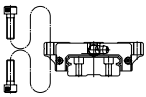
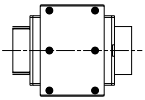
- Quick delivery due to advanced random-matching
- Wide ranging series of ball and roller guides available

1. Types of NSK Linear Rolling Guides

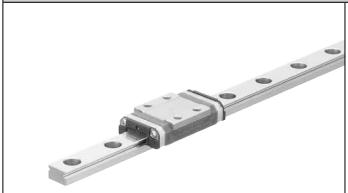
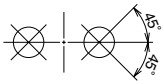
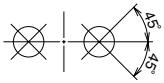
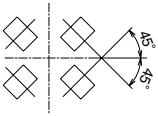
Series		Features
NH Series		
		The NH series is applicable to a wide range of uses from general industrial use to high-accuracy application. Random-matching of rails and ball slides is available as a standard. › The contact angle between the ball and ball groove is set at 50 degrees. This design increases the load carrying capacity against the vertical directions, which is the main load acting direction in most operations. › The DF contact structure greatly absorbs the installation error in the perpendicular direction to the rail. › Balls make contact at two points thanks to the offset Gothic arch groove. This keeps friction to a minimum. › High resistance against shock load due to the unique load-carrying structure. › Standardized random-matching type allows separate purchase of rails and ball slides. › Stainless steel standard type is also available for small sizes (NH15 to NH30).
NS Series		
		The NS series is low in height, and is applicable to a wide range of uses from general industrial use to high-accuracy application. Random-matching of rails and ball slides is available as a standard. › Compact and low profile. › The contact angle between the ball and the groove is set at 50 degrees. This design increases the load carrying capacity against vertical directions, which is the main load direction prevalent in most operations. › The DF contact structure greatly absorbs the installation error in the perpendicular direction of the rail. › Thanks to the offset Gothic arch groove, balls make contacts at two points. This keeps friction to a minimum. › High resistance against shock load due to the unique load carrying structure. › Standardized random-matching type allows separate purchase of rails and ball slides. › Stainless steel type is also available.
LW Series		
		High-moment rigidity and low profile products are most suited for a single rail linear guideway system. Random-matching of rails and ball slides is available as a standard. › The wide rail contributes to a high rolling moment carrying capacity and to great moment rigidity of a single rail linear guideway system. › Balls contact at two points in the Gothic arch groove, thus keeping friction to a minimum. › High resistance against shock load › Standardized random-matching type allows separate purchase of rails and ball slides.

Ball slide model				Size & Preload		Dimension table
AN, BN	AL, BL	AN, AL	BN, BL	Size	Preload	
				NH15 NH20 NH25 NH30 NH35 NH45 NH55 NH65	Slight preload ZZ	Page 30-45
EM, GM		EM	GM			
						

AL, CL	AL	CL	Size	Preload	
			NS15 NS20	Slight preload ZZ	Page 46-59
EM, JM	EM	JM	NS25 NS30 NS35		
					

EL	EL	Size	Preload	
		LW17 LW21 LW27 LW35 LW50	Slight preload ZZ	Page 60-69

1. Types of NSK Linear Rolling Guides

Series		Features
PU Series		Low inertia and low dust generation miniature series. › Low dust generation and highly smooth operation › Super-compact size › Stainless steel is the standard material. › A ball retainer is a standard equipment. › Standardized random-matching type allows separate purchase of rails and ball slides.
		
PE Series		Wide rail miniature with low inertia and low dust generation. › Low dust generation and highly smooth operation › Super-compact size › Stainless steel is the standard material. › A ball retainer is a standard equipment. › Standardized random-matching type allows separate purchase of rails and ball slides.
		
RA Series		The RA series roller guides have realized the world highest load capacity. Super-high rigidity and smooth motion contribute to higher performance of machine tools. › Unique and optimum design of rollers and other component facilitate the high-load capacity and high rigidity. › High-performance seals, a standard feature in the roller guides, maintain the initial performance for a prolonged time. › The installation of retaining piece achieves smooth motion. › Standardized random-matching type (RA25 to RA65) allows separate purchase of rails and roller slides.
		

Ball slide model			Size & Preload		Dimension table
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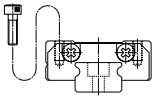
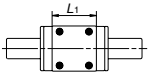
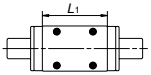
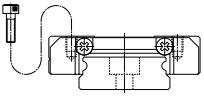
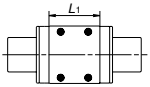
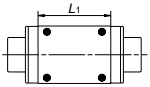
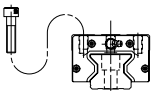
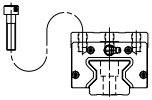
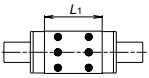
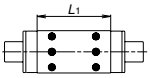
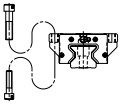
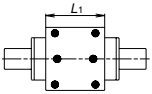
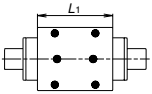
			PU05 PU07 PU09 PU12 PU15	Maximum clearance 5µm ZT	Page 70-79
AR, TR, UR, BR	AR, TR	BR, UR	Size	Preload	
			PE05 PE07 PE09 PE12 PE15	Maximum clearance 5µm ZT	Page 80-89
AL, BL	AN, BN	AL, AN	BL, BN	Size	Preload	
				RA15 RA20 RA25 RA30 RA35 RA45 RA55 RA65	High preload ZH	Page 90-107
EM, GM		EM	GM			
						

2. Accuracy

1. Accuracy Standard

› **Table 1, Figure 1** and **Figure 2** show accuracy characteristics.

Table 1 Definition of accuracy

Characteristics	Definition (Figures 1, 2)
Mounting height *H*	Distance from A (rail bottom datum face) to C (slide top surface)
Variation of *H*	Variation of H in slides assembled to the rails of a set of linear guides
Mounting width W_2 or W_3	Distance from B (rail side datum surface) to D (slide side datum surface). Applicable only to the reference linear guide.
Variation of W_2 or W_3	Difference of the width (W_2 or W_3) between the assembled ball slides, which are installed in the same rail. Applicable only to the reference linear guide.
Running parallelism of ball slide, face C to face A	Variation of C (slide top surface) to A (rail bottom datum surface) when ball slide is moving
Running parallelism of ball slide, face D to face B	Variation of D (slide side datum surface) to B (rail side datum surface) when ball slide is moving

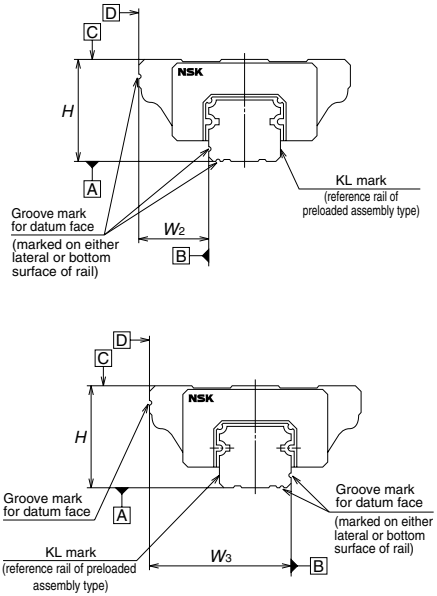


Fig. 1 Assembled accuracy (height and width)

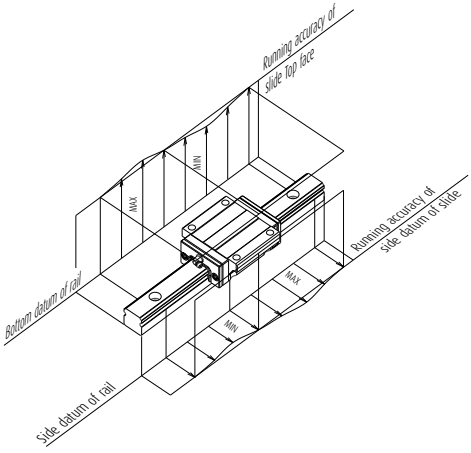


Fig. 2 Running parallelism of ball slide

Table 2 Assembly dimension tolerance of random-matching type

Unit: μm

Series	NH Series		NS Series	LW Series	PU/PE Series	RA Series
Size	15 – 35	45 – 65	15 – 35	17 – 50	05 – 15	15 – 65
Mounting height *H*	±20	±30	±20	±20	±20	±20
Variation of mounting height *H*	15*1 30*2	20*1 35*2	15*1 30*2	15*1 30*2	15*1 30*2	15*1 25*2
Mounting width W_2 or W_3	±30	±35	±30	±30	±20	±25
Variation of Mounting width W_2 or W_3	25	30	25	25	20	20

*1 Variation of mounting height *H* is specified on one rail.
*2 Variation of mounting height *H* is specified on multiple rails.

Table 3 Running parallelism tolerance of random-matching type: A//C or B//D

Unit: μm

Rail length (mm) over or under	Random-matching type		
	High precision grade PH	Normal grade PC	RA Series/High precision grade PH
– 50	2	6	4.5
50 – 80	3	6	5
80 – 125	3.5	6.5	5.5
125 – 200	4	7	6
200 – 250	5	8	7
250 – 315	5	9	8
315 – 400	6	11	9
400 – 500	6	12	10
500 – 630	7	14	12
630 – 800	8	16	14
800 – 1 000	9	18	16
1 000 – 1 250	10	20	17
1 250 – 1 600	11	23	19
1 600 – 2 000	13	26	21
2 000 – 2 500	15	29	22
2 500 – 3 150	17	32	25
3 150 – 4 000	23	34	30

Table 4 Available rail length (max. length)

Unit: mm

Series	NH Series		NS Series		PU Series	PE Series	RA Series
Size	Std. steel	Stainless	Std. steel	Stainless	Stainless	Stainless	Std. steel
05	–	–	–	–	210	150	–
07	–	–	–	–	375	600	–
09	–	–	–	–	600	380	–
12	–	–	–	–	800	790	–
15	3 980	1 780	2 920	1 800	1 000	1 200	2 000
20	3 960	3 460	3 960	3 500	–	–	3 000
25	3 960	3 460	3 960	3 500	–	–	3 900
30	4 000	3 500	4 000	3 500	–	–	3 900
35	4 000	–	4 000	3 500	–	–	3 900
45	3 990	–	–	–	–	–	3 650
55	3 960	–	–	–	–	–	3 600
65	3 900	–	–	–	–	–	3 600

Unit: mm

LW Series	
Size	Std. steel
17	1 000
21	1 600
27	2 000
35	2 000
50	2 000

3. Accessories

1. Double Seal and Protector

› Double seal (a combination of two end seals) to enhance seal function.
› Protector (a steel plate added on end seal) to prevent high temperature fine particles, such as welding spatter and other foreign matter, from entering the ball slide.
› When a double seal or protector is installed, the ball slide becomes longer by the sizes shown in Tables 1 and 2.
› When attaching a grease fitting to the end-cap after the double seal or protector is equipped, a connector, shown in Fig. 1, is required. Please specify the connector set when ordering.

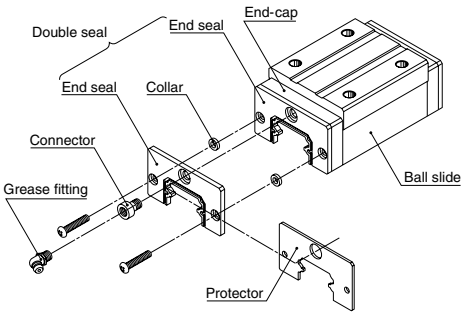


Fig. 1

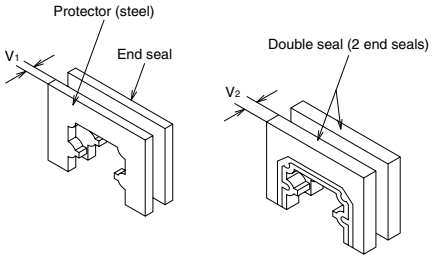


Fig. 2

Table 1 Double-seal set Unit: mm

Model No.	Part No.		Increased thickness V_2
	Without connector	With connector	
NH15	LH15WS-01	***	2.5
NH20	LH20WS-01	LH20WSC-01	2.5
NH25	LH25WS-01	LH25WSC-01	2.8
NH30	LH30WS-01	LH30WSC-01	3.6
NH35	LH35WS-01	LH35WSC-01	3.6
NH45	LH45WS-01	LH45WSC-01	4.3
NH55	LH55WS-01	LH55WSC-01	4.3
NH65	LH65WS-01	LH65WSC-01	4.9
NS15	LS15WS-01	***	2.8
NS20	LS20WS-01	LS20WSC-01	2.5
NS25	LS25WS-01	LS25WSC-01	2.8
NS30	LS30WS-01	LS30WSC-01	3.6
NS35	LS35WS-01	LS35WSC-01	3.6
LW17	LW17WS-01	***	2.6
LW21	LW21WS-01	LW21WSC-01	2.8
LW27	LW27WS-01	LW27WSC-01	2.5
LW35	LW35WS-01	LW35WSC-01	3
LW50	LW50WS-01	LW50WSC-01	3.6

*** Consult with NSK when attaching a connector to a drive-in type grease fitting.

Table 2 Protector set Unit: mm

Model No.	Part No.		Increased thickness V_1
	Without connector	With connector	
NH15	LH15PT-01	***	2.7
NH20	LH20PT-01	LH20PTC-01	2.9
NH25	LH25PT-01	LH25PTC-01	3.2
NH30	LH30PT-01	LH30PTC-01	4.2
NH35	LH35PT-01	LH35PTC-01	4.2
NH45	LH45PT-01	LH45PTC-01	4.9
NH55	LH55PT-01	LH55PTC-01	4.9
NH65	LH65PT-01	LH65PTC-01	5.5
NS15	LS15PT-01	***	3
NS20	LS20PT-01	LS20PTC-01	2.7
NS25	LS25PT-01	LS25PTC-01	3.2
NS30	LS30PT-01	LS30PTC-01	4.2
NS35	LS35PT-01	LS35PTC-01	4.2
LW17	LW17PT-01	***	3.2
LW21	LW21PT-01	LW21PTC-01	3.2
LW27	LW27PT-01	LW27PTC-01	2.9
LW35	LW35PT-01	LW35PTC-01	3.6
LW50	LW50PT-01	LW50PTC-01	4.2

2. Cap to Cover Bolt Hole for Rail Mounting

› After the rail is mounted to the machine base, a cap is used to cover the bolt hole to prevent foreign matter from clogging up the hole or from entering the ball slide (Fig. 3).

› The cap for the bolt hole is made of synthetic resin, which is superb in its resistance to oil and wear.

› Table 3 shows sizes of the bolts for each model number as well as reference numbers of caps.

› To insert a cap into the rail bolt hole, use a flat tool (Fig. 4). Pound the cap gradually until its top becomes flush with the rail top face.

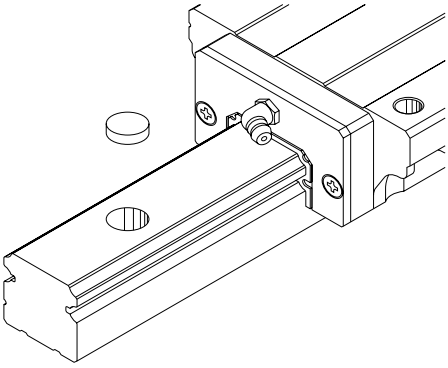


Fig. 3

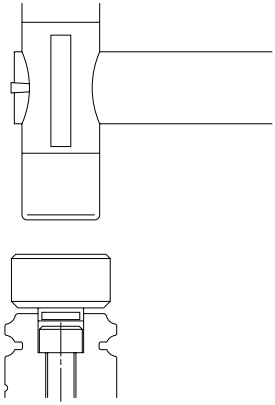


Fig. 4

Table 3 Caps to cover rail bolt hole

Model No.	Bolt to secure rail	Cap Part No.	Quantity/ case
NS15 (for M3) PU09 (TR, UR) PU12 (TR, UR) PU15 PE09 (TR, UR)	M3	LG-CAP/M3	20
NH15 NS15 (for M4) RA15 LW17 LW21 LW27	M4	LG-CAP/M4	20
NH20 NS20 RA20	M5	LG-CAP/M5	20
NH25 NS25 NS30 RA25 LW35	M6	LG-CAP/M6	20
NH30 NH35 NS35 RA30 RA35 LW50	M8	LG-CAP/M8	20
NH45 RA45	M12	LG-CAP/M12	20
NH55 RA55	M14	LG-CAP/M14	20
NH65 RA65	M16	LG-CAP/M16	20

4. Arrangement and Mounting of Linear Guide

1. Arrangement

› For NSK linear guides, the datum surfaces of the rail and of the slide are either marked with a "datum surface groove" or with an "arrow."

› In case that two or more linear guides are used together, one linear guide is designated as a reference side guide, and the rest is adjusting side guide(s). The reference side linear guide has its reference number, serial number, and "KL" mark on the opposite side of the datum surface (**Fig. 1**).

› When the datum surfaces of the reference side rail and slides are pressed to their mounting datum surfaces respectively, the variation of distance (mounting width W_2 or W_3) between the datum surfaces of the rails and that of the slides must be a minimum and therefore, it is specified as the standard. (**Figs. 2** and **3**)

› The ways to indicate the datum surfaces of each series are shown in **Table 1**.

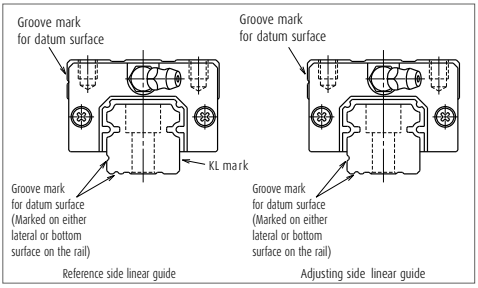


Fig. 1 Datum surface

Example of arrangement

› The arrangement of the linear guides must be determined taking into account the table mounting position (horizontal, vertical, inclined, or upside-down), strokes and the size of the machine base to which the table is mounted. **Table 2** shows common arrangement examples and their properties (features/precautions).

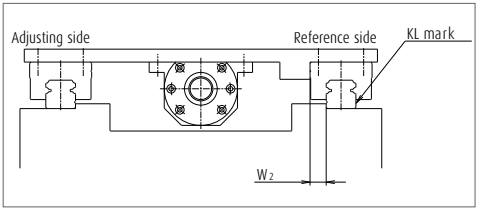


Fig. 2 Most common setting of the reference side rail

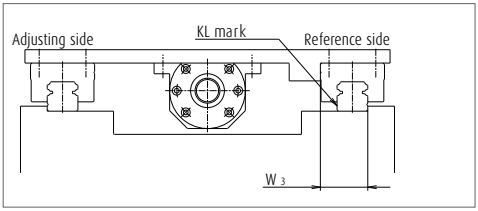


Fig. 3 Setting of the reference side rail in certain occasions

Table 1 Marks on the rail datum surfaces in each series

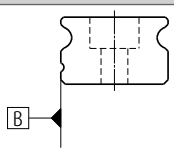
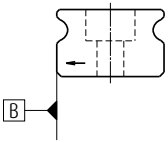
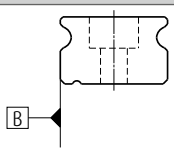
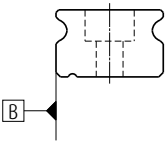
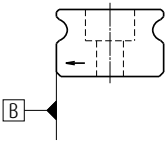
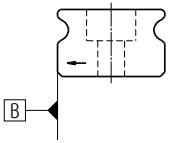
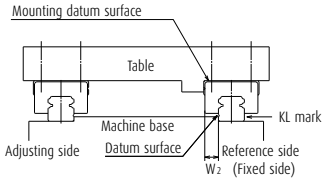
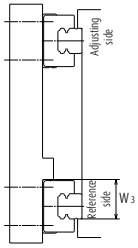
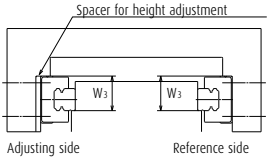
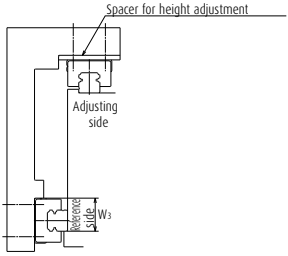
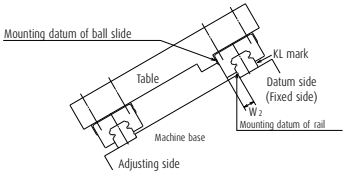
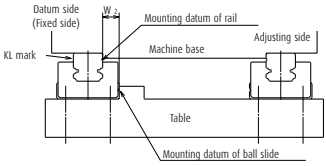
Material \ Model No.	Standard	LU05, 07, 09 PU05, 09, 12, 15 LE07, 09, 12	LU12, 15, NH15, NS15	PU07 LE05, 15 LE09, 12 (with a ball retainer) PE series LH08, 10, 12 LW17, 21 RA15
Special high carbon steel				
Stainless steel				

Table 2 Arrangement example

Arrangement	Features/Precautions
	› Easy for a highly-accurate installation (recommended arrangement)
	› Easy in highly-accurate installation › The lubricant oil may not be supplied to slides. When oil lubricant is used, special care is required to design the oil supply routing.
	› Slightly difficult for a highly-accurate installation › The life of the linear guides is affected by the mounting accuracy. › When oil lubricant is used, special care is required to design the oil supply routing.
	› Difficult for a highly-accurate installation › When oil lubricant is used, special care is required to design the oil supply routing.
	› Rather easy for a highly-accurate installation › When oil lubricant is used, special care is required to design the oil supply routing.
	› Easy in highly-accurate installation if the linear guides are installed to the machine base first, and then hung them upside down along with the machine base. › The slide may detach from the rail and fall down if the linear guide is damaged and rolling elements in the slide fall out. It is necessary to take preventive measures against the falling of the ball slide.

2. Mounting accuracy

(1) Accuracy of the mounting base of machine

› The mounting accuracy of linear guide usually copies the accuracy of the machine base.

› However, when two or more slides are assembled to each rail, the table stroke becomes shorter than the mounting surface. This, along with the fact that the mounting error is evenly spread, contributes to a higher table accuracy than the mounting surface accuracy, reducing the error to about 1/3 in average (**Fig. 4**).

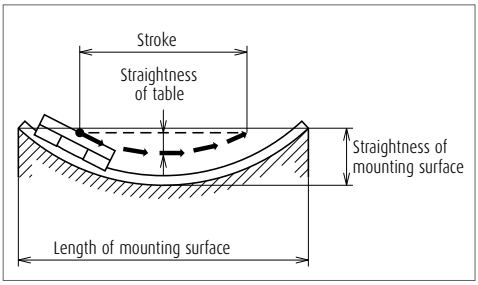
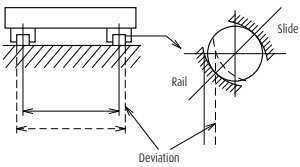
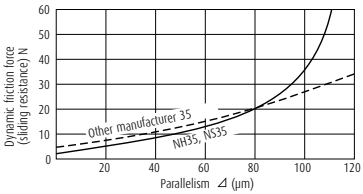
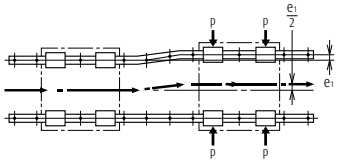


Fig. 4

(2) Installation error

› Mounting error affects mainly three factors: life, friction and accuracy (**Table 3**).

Table 3 Influence of mounting error

Factor	Influence	
Life		› Large mounting error generates a force which twists the slide and reduces its life. › It also distorts the contact point of the ball and the groove, and changes contact angle, thus lowering the table rigidity.
Friction		› NH and NS Series are affected very little by mounting error thanks to their small friction. (self aligning capability) › However, because of off-set Gothic arch grooves, their friction suddenly soars once the mounting error exceeds a certain level. › The mounting error severely affects friction of LA Series with heavy preload.
Accuracy		› When the rigidity of four slides is equal, the theoretical straightness becomes 1/2 of the installation error "e1". › However, this value becomes slightly larger due to the deformation of the rail and the machine base.

(3) Permissible values of mounting error

› Among the three factors of life, friction, and accuracy, which are affected by the mounting error, NSK focuses on the life factor to determine the permissible mounting accuracy. The specifications are based on the following conditions.

For ball linear guides

› The permissible load per ball slide due to the mounting error is 10% of the basic dynamic load rating C_{50}.

› The rated life is 5 000 km.

› The rigidity of the machine base is infinite.

For roller linear guide

› The permissible load per roller slide due to the mounting error is 10% of the basic dynamic load rating C_{100}.

› The rated life is 10 000 km.

› The rigidity of the machine base is infinite.

C_{50} ; Basic dynamic load rating for 50 km rated fatigue life
C_{100} ; Basic dynamic load rating for 100 km rated fatigue life

› **Figs. 5** and **6** are representing the mounting errors of e_1 and e_2. Their permissible values are shown in the description of the installation of each series.

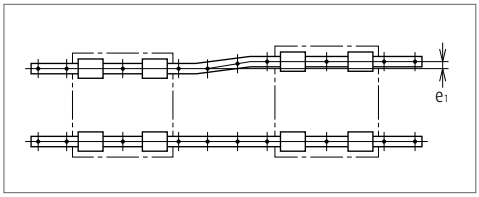


Fig. 5

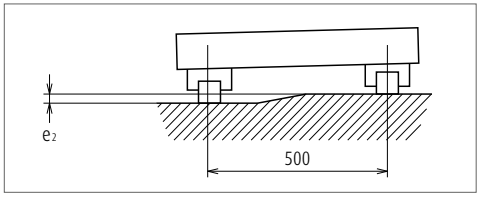


Fig. 6

(4) Running accuracy and the influence of even-off effect

› When mounting on a machine base, the linear guide is affected by the flatness of the mounting surface. However, in the case of two-rail/four-slide specification, which is most widely used, the straightness as a table unit is generally less than the straightness as a single component. This is due to the even-off effect generated by the shorter table stroke, compared to the rail length, as well as by interaction between the rails and slides.

› **Fig. 9** shows an actually measured straightness of the table which uses NSK linear guides. In this case, the final straightness of the table is about 1/5 of the straightness of the mounting surface.

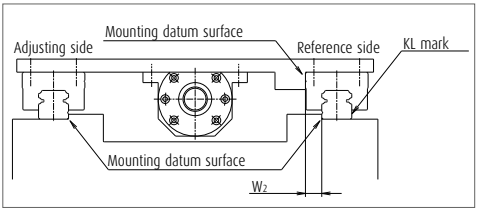


Fig. 7

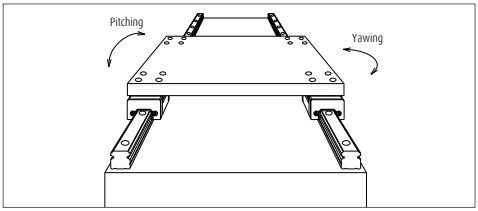


Fig. 8

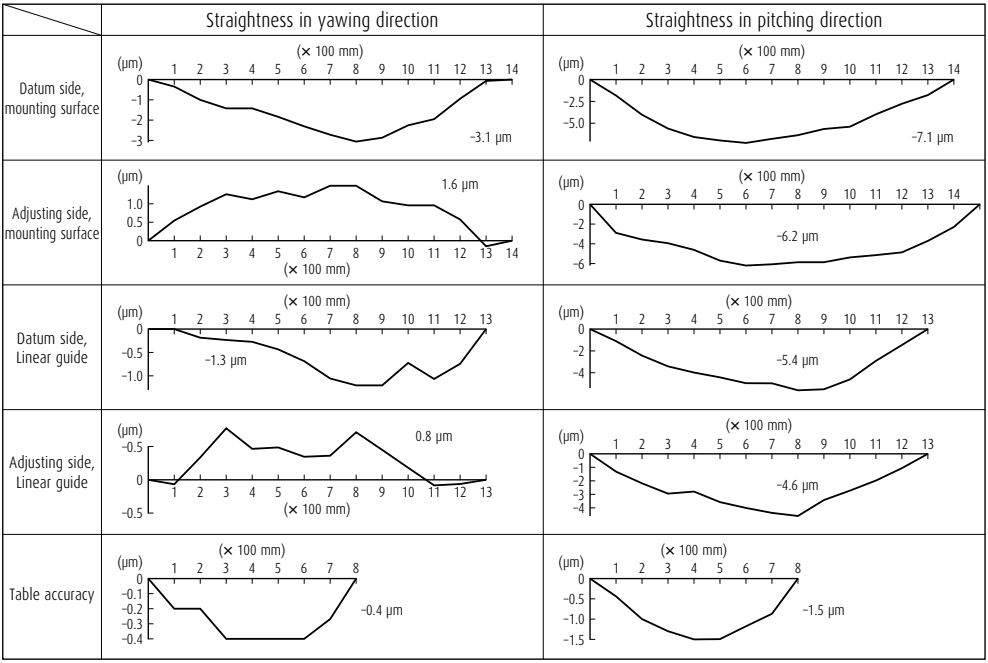


Fig. 9 Straightness of the table equipped with linear guide

3. Installation

(1) Shoulder height of the mounting surface of the machine base and corner radius r

› **Figs. 10** and **11**, show shoulder height of the mounting surface of the machine base and the size of corner radius. These figures are relevant when the linear guide is pressed to the shoulder of the machine base or table (the raised section from where the mounting surface begins), and horizontally secured to it. Recommended sizes are shown in the clause of "Shoulder height and corner radius r" of each series introduction.

› The shoulder should be thick (wide) enough, so it is not deformed by the pressing force.

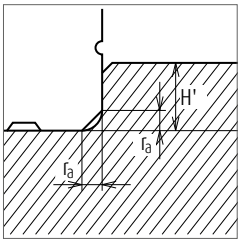


Fig. 10 Shoulder for the rail datum face

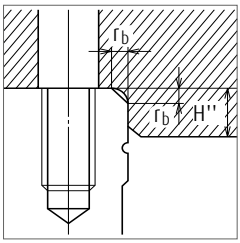


Fig. 11 Shoulder for the slide datum face

(2) Tightening torque of the bolt

› **Table 4** shows tightening torque of the bolt when the rail is secured to the fixture of race way grinding machine.

› Apply same torque in this table when securing the rail to the machine base. Equal accuracy at the time of grinding can be obtained.

Table 4 Bolt tightening torque (Bolt material: High carbon chromium steel)

Unit: N·m

Bolt size	Tightening torque	Bolt size	Tightening torque
M2	0.27	M8	22
M2.3	0.38	M10	43
M2.5	0.58	M12	76
M3	1.06	M14	122
M4	2.5	M16	196
M5	5.1	M18	265
M6	8.6	M22	520

(3) Installation procedures

› There are two installation ways depending on the accuracy requirement.
  a. Installation with high accuracy
  b. Accuracy is not high, but easy to install

› For both methods, wipe off the rust preventive oil applied to the linear guide. Remove burrs and small bumps on the machine base and table mounting surface with an oilstone (**Fig. 12**).

› Apply machine oil or similar oil with low viscosity to the mounting surface to increase the rust preventive effect.

› Linear guides are precision products. Handle them with care.

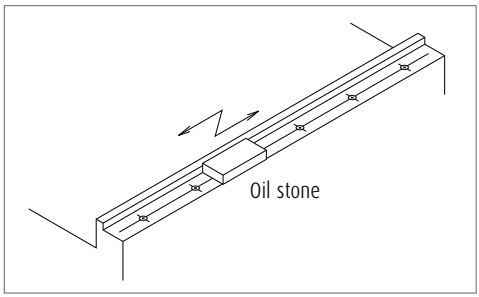


Fig. 12

1) Highly accurate installation

A) Rail installation procedures

a) When the machine base has a shoulder for the reference side rail.

[1] Confirm that the rail is reference side rail, and the datum surface of the rail comes to face to face with the shoulder of the machine base. Keep the slides on the rail, and carefully place the rail on the machine base on its mounting surface. Loosely tighten the bolts.

At this time, press the rail from sideways to make the rail tightly contact to the shoulder of the machine base. When using a shoulder plate, refer to **Table 4** for the bolt tightening torque (**Fig. 13**).

Refer to "**4. Various methods to press linear guide sideways.**"

[2] For final tightening of the bolts to secure the rail, tighten the bolt on either end of the rail, then proceed to other end.

If the datum surface is on the left side as shown in **Fig. 14**, tighten the bolt at the farthest end first, then proceed to the near end.

This way, creates a bolt rotating force that presses the rail against the shoulder. (Therefore, the rail is pressed sufficiently tight against the shoulder by merely pressing the rail by hand. However, if there is a possibility applying a lateral impact load, it is necessary to use a shoulder plate to prevent the rail from slipping.)

[3] If the mounting surface of the machine base where the adjusting side rail is installed also has a shoulder, repeat the steps **[1] - [2]**.

[4] If there is no shoulder on the mounting surface of the machine base for the adjusting side rail: Secure a measuring table to the slides of the reference side rail (**Fig. 15**). Use this to adjust the parallelism of the adjusting side rail. Check parallelism of the adjusting side rail with a dial indicator from one end of the rail, tightening the bolts one by one.

The measuring table is more stable if secured to two slides, but one slides is sufficient.

Parallelism between two rails can also be checked by the same method in **Fig. 15** when there is a shoulder on the surface where the adjusting side rail is installed.

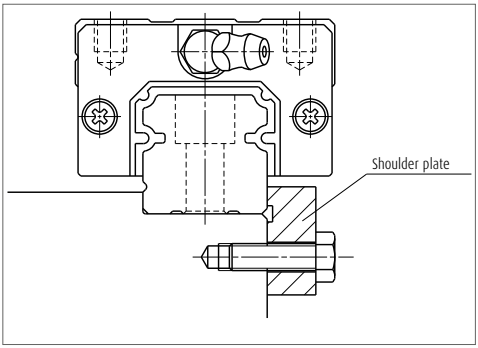


Fig. 13 Pressing the rail from sideways

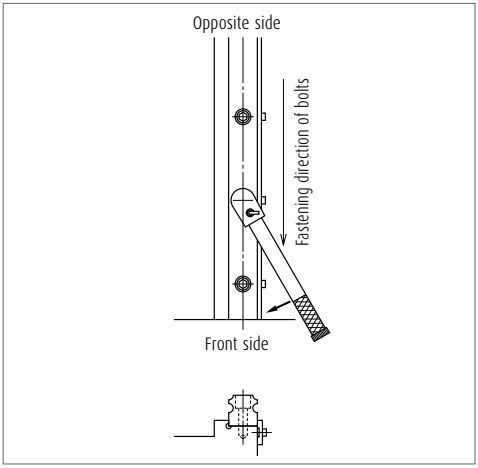


Fig. 14 Rail installation

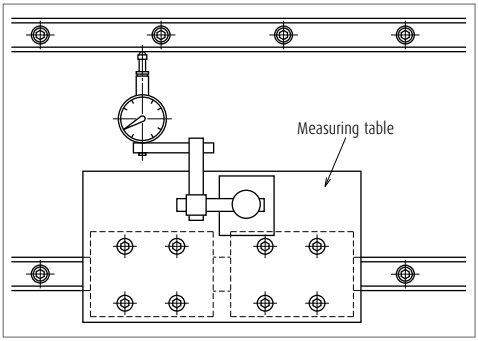


Fig. 15 Measuring parallelism

b) When the machine base does not have a shoulder on the side where the reference side rail is installed

[1] Carefully place the reference side rail on its mounting surface of the machine base. Loosely tighten the bolts. Do not tighten the bolts all the way, but stop tightening when the bolt enters halfway into the bolt hole. This makes the proceeding steps easier.

[2] Place the straight edge almost parallel to the reference side rail which is temporarily secured by the bolts. (At both ends of the rail and straight edge, the distance between them shall be almost same.)

[3] Once the position of the straight edge is determined, use it as the reference. With a dial indicator, check parallelism with the rail, and adjust the rail if necessary. Then tighten the bolts.

Ensure that the straight edge does not move while the bolts are being tightened.

This procedure should be carried out starting from one end of the rail to the other end (**Fig. 16**).

[4] Finally tighten all bolts with specified torque.

[5] There are two ways for installation of adjusting side rail:

1. Based on the straight edge which is used for reference side rail installation
2. Based on the reference side rail which is installed prior to the adjusting side rail.

In both cases, use a dial indicator to measure parallelism.

Other procedures are the same as **[1] - [4]** above, and the **[4]** for the case where there is a shoulder on the machine base.

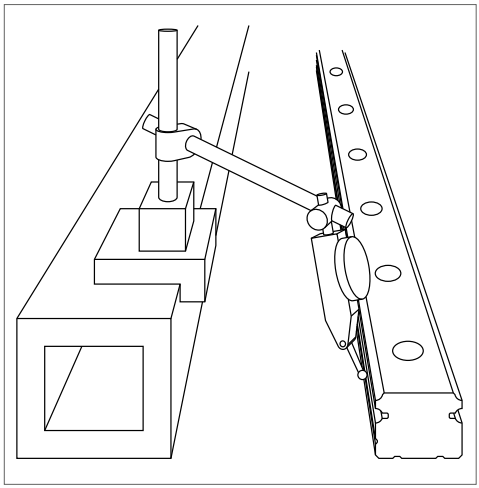


Fig. 16

B) Procedures for slide installation

a) When the table has a shoulder

[1] Arrange the slides so that locations match to their mounting section of the table. Carefully place the table on the slides. Loosely tighten all bolts.

[2] While pressing the table from sideways, further tighten the bolts which secure the slides on the reference side, so the table shoulder and the slide's mounting datum surface are sufficiently tightly pressed.

If a shoulder plate is provided, first tighten the bolts of the plate, then further tighten the bolts to the slides (**Fig. 17**).

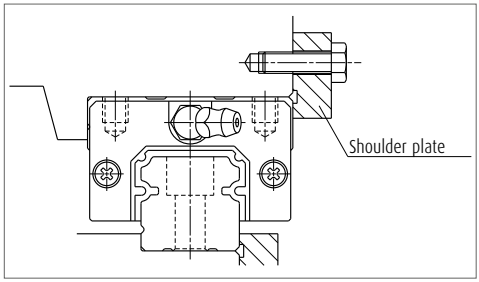


Fig. 17 Pressing slide from sideways

[3] Then, further tighten the bolts for slides on the adjusting side rail.

Move the table by hand to confirm that there is no abnormality such as excessive friction force during stroking. (This confirms that the correct installation steps were taken.)

[4] Finally, tighten all bolts with standard torque.

b) When table does not have a shoulder

[1] Arrange the slides so that locations match to their mounting section of the table. Carefully place the table on the slides. Loosely tighten bolts to secure the slides.

[2] Since the table does not have a shoulder, immediately tighten the bolts further to secure slides.

[3] Move the table by hand to confirm that there is no abnormality. Finally, tighten all bolts with the specified torque.

2) Easy installation

[1] Carefully place the reference side rail on the machine base. Then tighten the bolts to the specified torque.

[2] Loosely tighten the bolts on the adjusting side rail.

[3] Tighten the slides on the reference side rail and one slide on the adjustment side rail with the specified torque. Leave the rest of the slide on the adjusting side rail loosely tightened (**Fig. 18**).

[4] While moving the table with each pitch of the bolt for rail: With the specified torque, tighten the rail mounting bolt which is located immediately adjacent to the slide on the adjusting side rail that had been firmly tightened.

Take this procedure from one end to the other.

[5] Return the table to the original position once. Then, tighten the rest of the slides on the adjusting side to the specified torque. By the same procedure as in [4], tighten the rest of the rail mounting bolts to the specified torque. Move the table to check any abnormality such as large friction force.

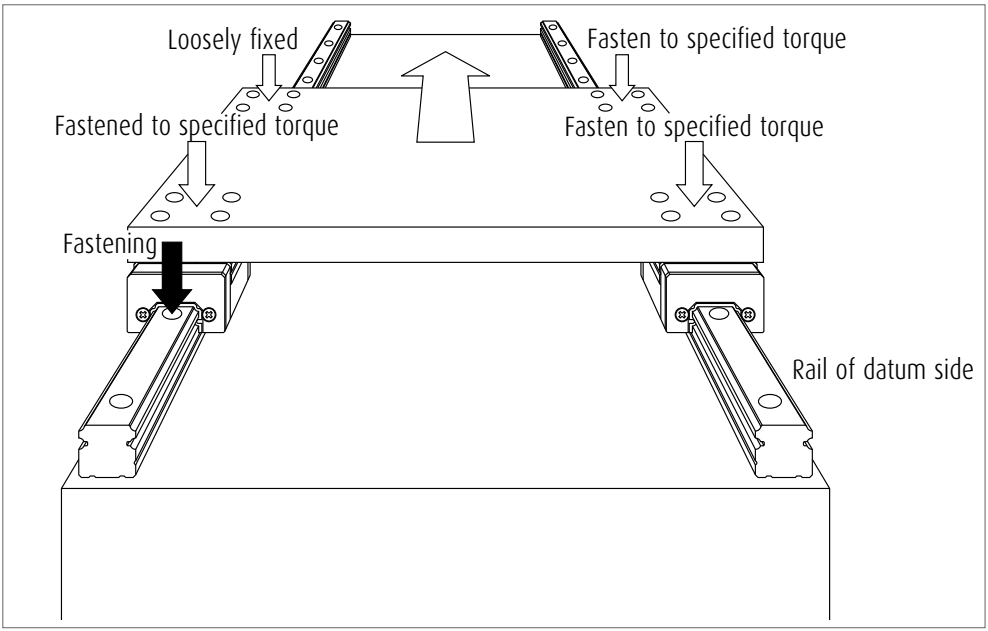


Fig. 18 Easy installation

(4) Various methods to press linear guide sideways

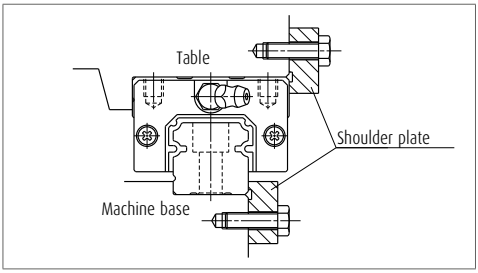


Fig. 19 Recommended method

› This method is most widely used, and generally recommended. The slides and the rail should protrude slightly from the sides of the table and the machine base. The shoulder plate should have a recess, so that the corners of the rail and slide do not touch the shoulder plate.

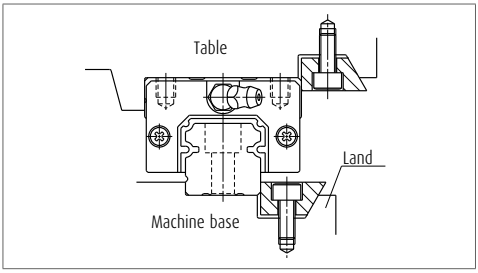


Fig. 20 Installation that requires caution

› A tapered block is squeezed in. However, the slightest tightening of the bolt generates a large pressing force to the side. Too much tightening may cause the rail to deform, or the land (shown in the figure left) to warp to the right. This method requires caution.

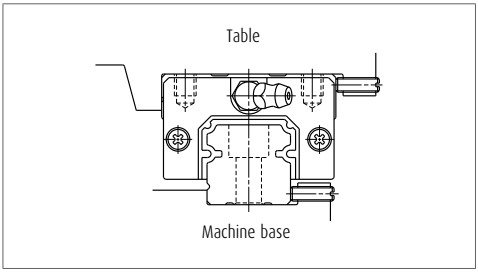


Fig. 21

› The bolt that presses rail must be thin due to limited space.

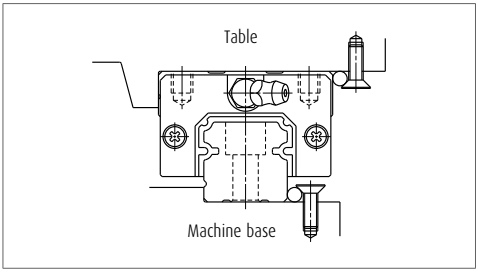


Fig. 22

› Press a needle roller with a taper section of the head of a slotted pan head screw. Watch out for the position of the screw.

4. Assembly random-matching type linear guide

› Slides of random-matching type are assembled on a provisional rail (an inserting tool) when it is delivered (**Fig. 23**).

› NSK standard grease is packed into the slide, allowing immediate use.

Assembly procedures of a random-matching type linear guide

Follow steps as described below.

(1) Wipe off the rust preventive oil from the rail and slide.

(2) Please match a groove mark for the datum surface of slide and rail to set a desired assembling state W_2 or W_3.

(3) Align the provisional rail to the rail in the bottom and side surfaces. Press the provisional rail lightly against the rail, and move the slide over the rail (**Fig. 23**).

5. Butting rail specification

› A rail which requires the length that exceeds the machine capacity manufactured maximum length comes in butting specification.

› The rails with butting specification are marked with alphabet (A, B, C ...) and an arrow on the opposite side of the mounting datum surface. Use the alphabets and arrows for assembly order and direction of the rail (**Fig. 25**).

The random-matching rails for butting specification are only marked with the arrows.

› The pitch of the rail mounting hole on the butting section should be as F in **Fig. 26**. When two rails are used in parallel, the butted sections should not align. This is to avoid change in the running accuracy of the table at the butted sections.

› We recommend shifting the butting sections more than the length of a slide. If the higher running accuracy is required, consider installing the slides into the table so that they do not simultaneously pass the butting sections.

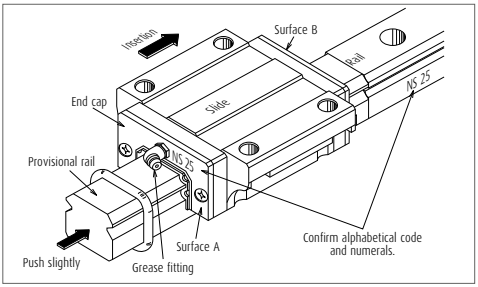


Fig. 23 Inserting slide into the rail

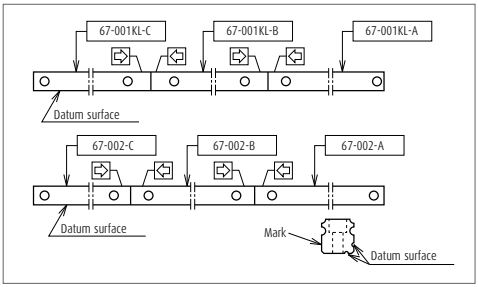


Fig. 25

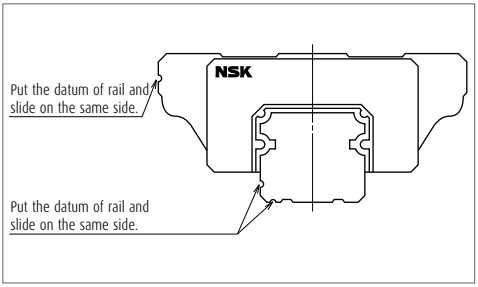


Fig. 24

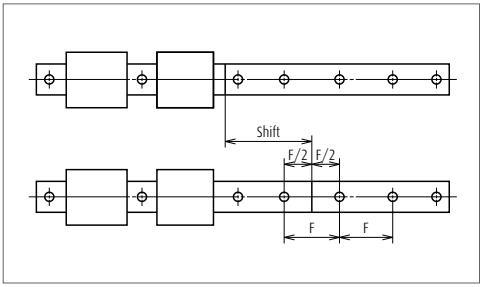


Fig. 26

6. Handling preloaded assembly

› In case of the preloaded assembly (not random-matching type), do not remove slides from the rail as a general rule.

› If it is unavoidable to remove slides from the rail, make certain to use a provisional rail (a jig used to insert a slide to the rail) as shown in **Fig. 27**.

› The provisional rails for each series and sizes are available.

› Pay due attention to the assembly mark when returning the slide back to the rail. Follow the cautions described below.

Mark for assembling ball slide and rail

› Rails of preloaded assembly (not random-matching type) are marked with a reference number and a serial number on the opposite of the datum surface.

› Slides to be combined are also marked with the same serial number (the reference number is not marked).

› Furthermore, slides are marked with an arrow. Slides should be positioned with their arrows facing each other.

› In case that the slides had to be removed from the rail, confirm their serial numbers and the directions of arrows for re-assembly (**Fig. 28**).

› When two or more rails are used in a single set, serial numbers are in sequence if their reference numbers are the same. The linear guide with smallest serial number has the "KL" mark (**Fig. 29**).

› When two or more rails of different reference number are used in a single set, the rails and slides have the same serial number. In this case, when slides are removed from the rail, it is unclear which rail each slide was previously installed on. When removing ball slides from the rail for an unavoidable reason (**Fig. 30**), sufficient precaution is required.

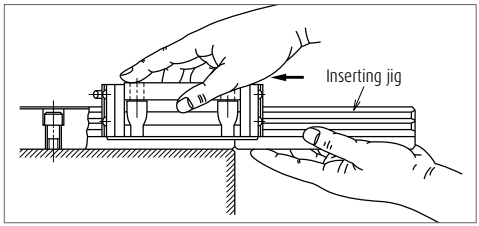


Fig. 27

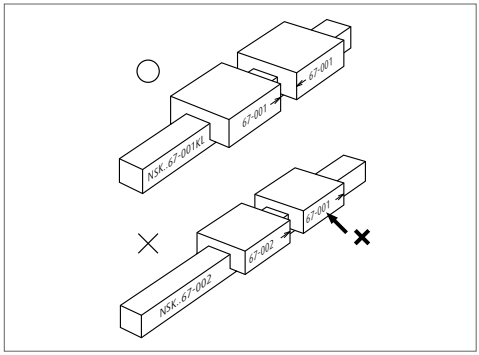


Fig. 28

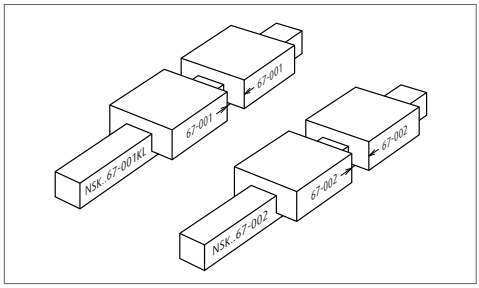


Fig. 29 When two rails have the same reference number

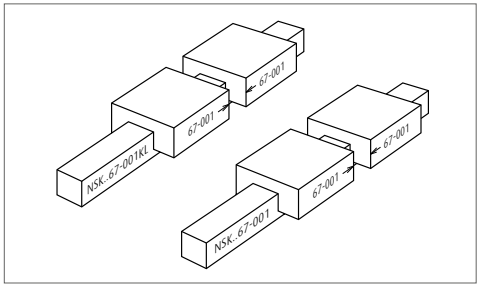


Fig. 30 When two rails have different reference number

5. Handling Precautions of Linear Guides

1. Handling Precautions

NSK linear guides are high quality and are easy to use. NSK places importance on safety in design. For maximum safety, please follow precautions as outlined below.

(1) Lubrication

Confirm lubrication.

a. If your linear guide is rust prevention specification, thoroughly wipe the rust prevention oil and put lubricant inside of slide before using. For seal lubrication products, put lubricant on the rail.

b. Do not mix greases of different brands.

c. If your linear guide is rust prevention specification, put lubricant inside of slide before using.

(2) Handling

Handle with care.

Do not disassemble.

Do not drop.

Do not give impact.

a. Slides for random-matching are mounted on a provisional rail when they leave the factory. Handle the slide with care during installation on the rail.

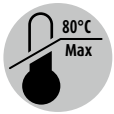
b. Do not disassemble the linear guide unless absolutely necessary. Not only does it allow dust to enter, but it lessens precision.

c. The slide may move by simply tilting the rail. Make sure that the slide does not disengage from the rail.

d. Standard end cap is made of plastic. Striking it or hitting it against an object may cause damage.

(3) Precautions in use

Do not contaminate.



Temperature limitation.

Do not hang upside down.

a. Make every effort not to allow dust and foreign objects to enter.

b. Please apply splash guard or bellows to the linear guide to prevent sticking resolvent or coolant when it contains corrosive material.

c. The temperature of the place where linear guides are used should not exceed 80°C (excluding heat-resistant type linear guides). A higher temperature may damage the plastic end cap.

d. If the user cuts the rail, thoroughly remove burrs and sharp edges on the cut surface.

e. When hanging upside-down (e.g. the rail is installed upside-down on the ceiling in which the slide faces downward), should the end cap be damaged, causing the balls or rollers to fall out, the slide may be detached from the rail and fall. For such use, take measures including installing a safety device.

(4) Storage

Store in the correct position.

a. Linear guide may bend if the rail is stored in inappropriate position. Place it on a suitable surface, and store it in a flat position.

2. Design Precautions

The following points must be heeded in examining the life.

In case of oscillating stroke

- If the balls or rollers do not rotate all the way, but only halfway, and if this minute stroke is repeated, lubricant disappears from the contact surface of balls or rollers and raceways. This generates "fretting," a premature wear. Fretting cannot be entirely prevented in such a case but it can be mitigated.
- We recommend anti-fretting grease for oscillating stroke operations. Even in a case using a standard grease, the life can be markedly prolonged by adding a normal stroke travel (about the slide length) once every several thousand cycles.

When applying pitching or yawing moment

- Load applied to the ball or roller rows inside the slide is inconsistent if pitching or yawing moment load is applied. Loads are heavy on the balls or rollers on each end of the row.
- In such a case, a heavy load lubricant grease or oil is recommended. Another countermeasure is using one size larger model of linear guide to reduce the load per ball or roller.
- Moment load is insignificant for 2-rail, 4-slide combination which is commonly used.

When an extraordinary large load is applied during stroke

- If an extraordinary large load is applied at certain position of the stroke, calculate not only the life based on the mean effective load, but also the life based on the load in this range.
- When an extraordinary heavy load is applied and thus the application of high tensile stress to fixing bolts of the rails and slides is foreseen, the strength of the bolts should be considered.

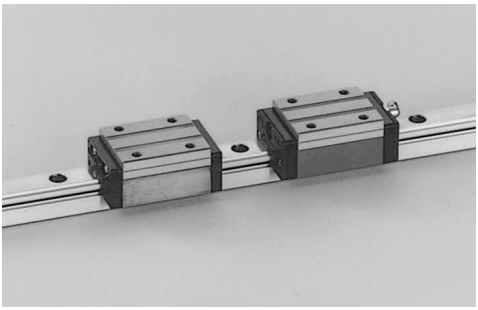
When calculated life is extraordinarily short

(Less than 3000 km in calculated life.)

- In such a case, the contact pressure to the balls or rollers and the rolling contact surface is extraordinarily high.
- When a linear guide is operated under such state continually, the life is significantly affected by the loss of lubrication and the presence of dust, and thus the actual life becomes shorter than calculated.
- It is necessary to reconsider the number of slides, the arrangement of slides, and the type of model in order to reduce the load to the slide.
- It is necessary to consider preload for calculation of rating life when selecting Z3 (medium preload) or Z4 (heavy preload) as a preload. Please consult NSK for details.

Application at high speed

- The standard maximum allowable speed of a linear guide under normal conditions is 100 m/min. However, the maximum allowable speed can be affected by accuracy of installation, temperature, external loading etc.
- The end cap with high speed specification must be used when operating speed exceeds the permissible speed. In such a case, please consult NSK.



1. Features

(1) Improve rating life dramatically

Based on the LH series characterized by reliability and performance, a significant increase in durability has been attained. New ball groove geometry is introduced, which has been developed by utilizing NSK's state-of-the-art tribological and analytical technologies. Due to the optimized distribution of contact surface pressures, the rating life has dramatically increased.

As compared with the LH Series, the load rating capacity of the NH series has increased by 1.3 times, while the life span has increased doubled*1. These features enable you to design a machine with a longer life and downsize the machine. Thus, your design capability is greatly enhanced.

*1: Representative values of series.

(2) Ball circulation path with excellent high-speed property

By reexamining the design practice for the ball circulation path, we have attained smooth ball circulation and reduced noise level. So, NH series is suited for high-speed applications compared with the LH Series.

(3) All mounting dimensions are the same as those for the LH and SH Series

Regarding the mounting dimensions, such as the mounting height, mounting width, mounting hole diameter/pitch of the linear guide, etc., the mounting dimensions of the NH Series remain the same as those of the conventional LH series and SH series. So, the new NH Series linear guides can be used without making any design changes.

(4) High self-aligning capability (rolling direction)

Same as the DF combination in angular contact bearings, self-aligning capability is high because the cross point of the contact lines of balls and grooves comes inside, and thus reducing moment rigidity.

This increases the capacity to absorb errors in installation.

(5) High load carrying capacity in vertical direction

The contact angle is set at 50 degrees, and thus increasing load carrying capacity as well as rigidity in vertical direction.

(6) High resistance against impact load

The bottom ball groove is formed in Gothic arch and the center of the top and bottom grooves are offset as shown in **Fig. 2**. The vertical load is generally carried by the top ball rows, where balls are contacting at two points. Because of this design, the bottom ball rows will carry load when a large impact load is applied vertically as shown in **Fig. 3**. This assures high resistance to the impact load.

(7) High accuracy

As showing in **Fig. 4**, fixing the master rollers to the ball grooves is easy thanks to the Gothic arch groove. This makes easy and accurate measuring of ball grooves.

(8) Easy to handle, and designed with safety in mind.

Balls are retained in the retainer, therefore they do not fall out when the ball slide is withdrawn from the rail.

(9) Abundant models and sizes

Each size of NH Series has various models of ball slides, rendering the linear guide available for numerous uses.

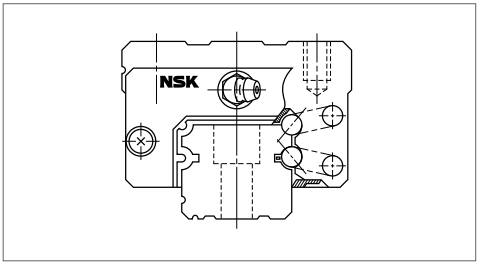


Fig. 1 NH Series

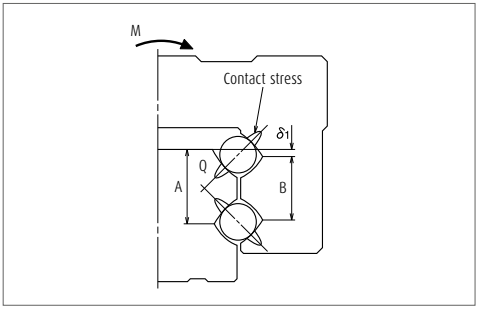


Fig. 2 Enlarged illustration of the offset Gothic arch groove

Note For customers who have used the former LH or SH series, NH series is recommended as a substitute. Please confirm the correlation between NH series and former ones on the comparative table at page 108.

(10) Fast delivery

Lineup of random-matching rails and ball slides supports and facilitates fast delivery.

High precision grade and medium preload types are also available in randam matching. (Special high-carbon steel products)

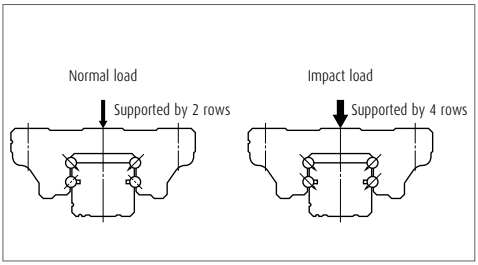


Fig. 3 When load is applied

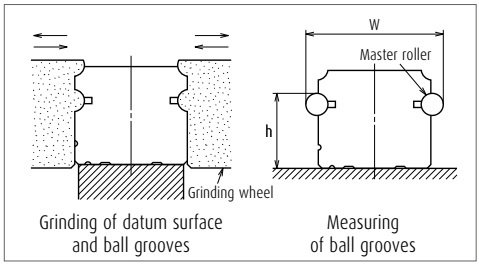
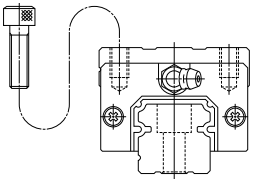
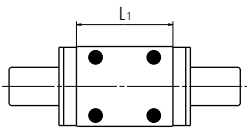
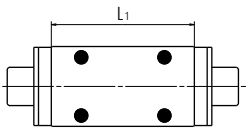
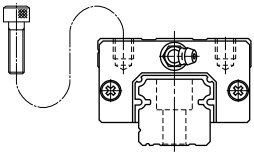
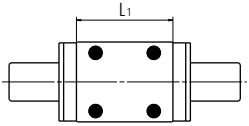
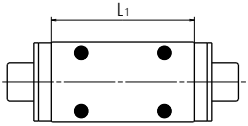
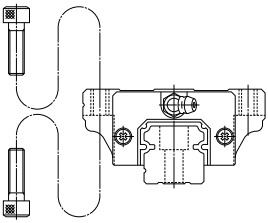
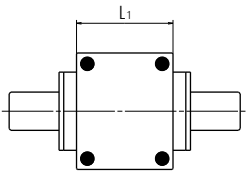
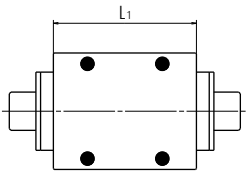


Fig. 4 Rail grinding and measuring

2. Ball slide shape

Ball slide Model	Shape/installation method	Type	
		High-load type	Super-high-load type
		Standard	Long
AN BN		AN 	BN 
AL BL		AL 	BL 
EM GM		EM 	GM 

3. Accuracy and preload

(1) Running parallelism of ball slide

Table 1

Unit: μm

Rail over all length (mm) over	or less	Preloaded assembly (not random matching) Ultra precision P3	Super precision P4	High precision P5	Precision grade P6	Normal grade PN	Random-matching type High precision PH	Normal grade PC
–	50	2	2	2	4.5	6	2	6
50	80	2	2	3	5	6	3	6
80	125	2	2	3.5	5.5	6.5	3.5	6.5
125	200	2	2	4	6	7	4	7
200	250	2	2.5	5	7	8	5	8
250	315	2	2.5	5	8	9	5	9
315	400	2	3	6	9	11	6	11
400	500	2	3	6	10	12	6	12
500	630	2	3.5	7	12	14	7	14
630	800	2	4.5	8	14	16	8	16
800	1000	2.5	5	9	16	18	9	18
1 000	1 250	3	6	10	17	20	10	20
1 250	1 600	4	7	11	19	23	11	23
1 600	2 000	4.5	8	13	21	26	13	26
2 000	2 500	5	10	15	22	29	15	29
2 500	3 150	6	11	17	25	32	17	32
3 150	4 000	9	16	23	30	34	23	34

(2) Accuracy standard

The preloaded assembly has five accuracy grades; Ultra precision P3, Super precision P4, High precision P5, Precision P6 and Normal PN grades, while the random-matching type has High precision PH and Normal PC grade.

› **Tolerance of preloaded assembly**

Table 2

Unit: μm

Characteristics \ Accuracy grade	Ultra precision P3	Super precision P4	High precision P5	Precision grade P6	Normal grade PN
Mounting height H Variation of H (All ball slides on a set of rails)	±10 3	±10 5	±20 7	±40 15	±80 25
Mounting width W_2 or W_3 Variation of W_2 or W_3 (All ball slides on reference rail)	±15 3	±15 7	±25 10	±50 20	±100 30
Running parallelism of surface C to surface A Running parallelism of surface D to surface B	Shown in **Table 1**, **Fig. 5** and **Fig. 6**				

› **Tolerance of random-matching type**

Table 3

Unit: μm

Accuracy grade	High precision grade PH		Normal grade PC	
Characteristics \ Model No.	NH15, 20, 25, 30, 35	NH45, 55, 65	NH15, 20, 25, 30, 35	NH45, 55, 65
Mounting height H	±20	±30	±20	±30
Variation of mounting height H	15(1) 30(2)	20(1) 35(2)	15(1) 30(2)	20(1) 35(2)
Mounting width W_2 or W_3	±30	±35	±30	±35
Variation of mounting width W_2 or W_3	25	30	25	30
Running parallelism of surface C to surface A Running parallelism of surface D to surface B	See **Table 1**, **Fig. 5** and **Fig. 6**			

Notes ① Variation on the same rail ② Variation on multiple rails

(3) Combinations of accuracy and preload

Table 4

		Accuracy grade						
		Ultra precision	Super precision	High precision	Precision grade	Normal grade	High precision	Normal grade
Without NSK K1 lubrication unit		P3	P4	P5	P6	PN	PH	PC
With NSK K1 lubrication unit		K3	K4	K5	K6	KN	KH	KC
With NSK K1-L lubrication unit		L3	L4	L5	L6	LN	LH	LC
With NSK K1 for food and medical equipment		F3	F4	F5	F6	FN	FH	FC
Preload	Fine clearance Z0	○	○	○	○	○	–	–
	Slight preload Z1	○	○	○	○	○	–	–
	Medium preload Z3	○	○	○	○	–	–	–
	Random-matching type with fine clearance ZT	–	–	–	–	–	–	○
	Random-matching type with slight preload ZZ	–	–	–	–	–	○	○
	Random-matching type with medium preload ZH	–	–	–	–	–	○	○

(4) Assembled accuracy

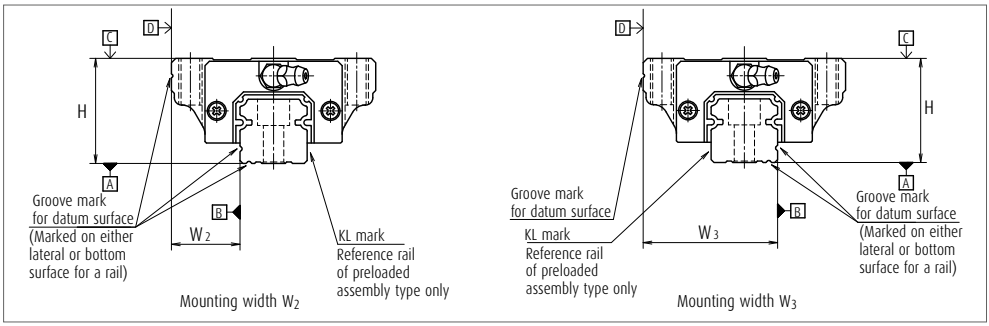


Fig. 5 Special high carbon steel

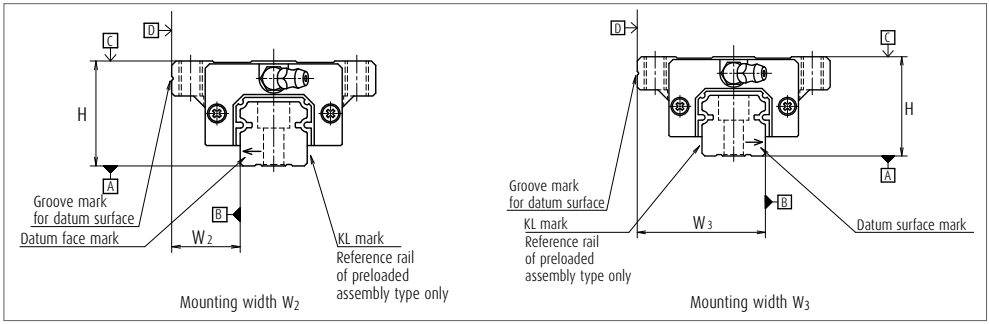


Fig. 6 Stainless steel

(5) Preload and rigidity

We offer six levels of preload: Slight preload Z1, Medium preload Z3 and Fine clearance Z0, along with random-matching type of Medium preload ZH, Slight preload ZZ and Fine clearance ZT.

› **Preload and rigidity of preloaded assembly**

Table 5

	Model No.	Preload (N)		Rigidity (N/μm)			
				Vertical direction		Lateral direction	
		Slight preload (Z1)	Medium preload (Z3)	Slight preload (Z1)	Medium preload (Z3)	Slight preload (Z1)	Medium preload (Z3)
High-load type	NH15 AN, EM	78	490	137	226	98	186
	NH20 AN, EM	147	835	186	335	137	245
	NH25 AL, AN, EM	196	1 270	206	380	147	284
	NH30 AL, AN	245	1 570	216	400	157	294
	NH30 EM	294	1 770	265	480	186	355
	NH35 AL, AN, EM	390	2 350	305	560	216	390
	NH45 AL, AN, EM	635	3 900	400	745	284	540
	NH55 AL, AN, EM	980	5 900	490	910	345	645
	NH65 AN, EM	1 470	8 900	580	1 070	400	755
Super-high-load type	NH15 BN, GM	98	685	196	345	137	284
	NH20 BN, GM	196	1 080	265	480	196	355
	NH25 BL, BN, GM	245	1 570	294	560	216	400
	NH30 BL, BN, GM	390	2 260	360	665	265	480
	NH35 BL, BN, GM	490	2 940	430	795	305	570
	NH45 BL, BN, GM	785	4 800	520	960	370	695
	NH55 BL, BN, GM	1 180	7 050	635	1 170	440	835
	NH65 BN, GM	1 860	11 300	805	1 480	550	1 040

Note Clearance for Fine clearance Z0 is 0 to 3μm. Therefore, preload is zero. However, Z0 of PN grade is 0 to 15μm.

› **Clearance and preload of random-matching type**

Table 6

Unit : μm

Model No.	Fine clearance ZT	Slight preload ZZ	Medium preload ZH
NH15	−4 – 15	-4 – 0	-7 – -3
NH20		-5 – 0	-8 – -3
NH25		-5 – 0	-9 – -4
NH30		-7 – 0	-12 – -5
NH35	−5 – 15	-7 – 0	-12 – -5
NH45		-7 – 0	-14 – -7
NH55		-9 – 0	-18 – -9
NH65		-9 – 0	-19 – -10

Note Minus sign denotes that a value is an amount of preload (elastic deformation of balls).

4. Maximum rail length

Table 7 shows the limitations of rail length (maximum length). However, the limitations vary by accuracy grades.

Table 7 Length limitations of rails

Unit : mm

Series	Size / Material	15	20	25	30	35	45	55	65
NH	Special high carbon steel	2 980	3 960	3 960	4 000	4 000	3 990	3 960	3 900
	Stainless steel	1 800	3 500	3 500	3 500				

Note Rails can be butted if user requirement exceeds the rail length shown in the table. Please consult NSK.

5. Installation

(1) Permissible values of mounting error

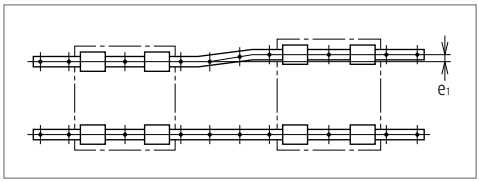


Fig. 7

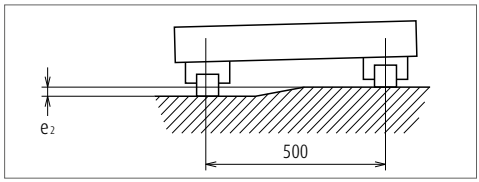


Fig. 8

Table 8

Unit : μm

Value	Preload	Model No.							
		NH15	NH20	NH25	NH30	NH35	NH45	NH55	NH65
Permissible values of parallelism in two rails e_1	Z0, ZT	22	30	40	45	55	65	80	110
	Z1, ZZ	18	20	25	30	35	45	55	70
	Z3, ZH	13	15	20	25	30	40	45	60
Permissible values of parallelism (height) in two rails e_2	Z0, ZT	375 μm/500 mm							
	Z1, ZZ, Z3, ZH	330 μm/500 mm							

(2) Shoulder height of the mounting surface and corner radius r

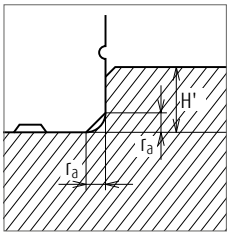


Fig. 9 Shoulder for the rail datum face

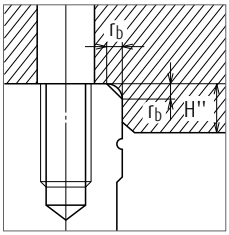


Fig. 10 Shoulder for the ball slide datum face

Table 9

Unit : mm

Model No.	Corner radius (maximum)		Shoulder height	
	r_a	r_b	H'	H"
NH15	0.5	0.5	4	4
NH20	0.5	0.5	4.5	5
NH25	0.5	0.5	5	5
NH30	0.5	0.5	6	6
NH35	0.5	0.5	6	6
NH45	0.7	0.7	8	8
NH55	0.7	0.7	10	10
NH65	1	1	11	11

6. Maximum allowable speed

An indication of the standard maximum allowable speed aiming at 10,000km operation with NH series under normal conditions is shown in Table 10. However, the maximum allowable speed can be affected by accuracy of installation, operating temperature, external load, etc. If the operation is made exceeding the permissible distance and speed, please consult NSK.

Table 10 Maximum allowable speed

Unit : m/min

Size \ Series	15	20	25	30	30	35	45	55
NH	300					200		150

7. Dust proof components

(1) Standard specification

The NH Series can be readily used as they have a dust protection means for normal conditions. As the standard equipment, the ball slides have an end seal on both ends, and bottom seals at the bottom.

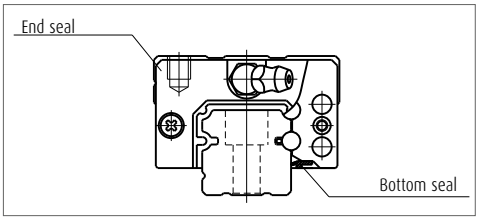


Fig. 11

Table 11 Seal friction per ball slide (maximum value)

Unit : N

Size \ Series	15	20	25	30	35	45	55	65
NH	8	9	10	10	12	17	22	29

(2) NSK K1-L lubrication unit

Table 12 shows the dimension of linear guides equipped with the NSK K1-L lubrication unit.

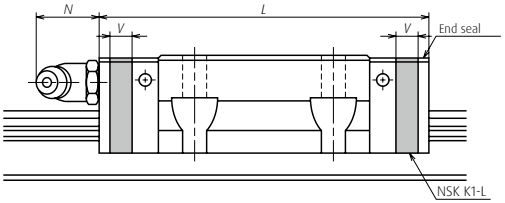


Table 12

Model No.	Ball slide length	Ball slide model	Standard ball slide length	Ball slide length installed with two NSK K1-L	NSK K1-L thickness V	Protruding area of the grease fitting N
NH15	Standard	AN, EM	55	65.6	5.3	(5)
	Long	BN, GM	74	84.6	5.3	(5)
NH20	Standard	AN, EM	69.8	80.4	5.3	(14)
	Long	BN, GM	91.8	102.4	5.3	(14)
NH25	Standard	AL, AN, EM	79	90.6	5.8	(14)
	Long	BL, BN, GM	107	118.6	5.8	(14)
NH30	Standard	AL, AN	85.6	97.6	6	(14)
	Standard	EM	98.6	110.6	6	(14)
	Long	BL, BN, GM	124.6	136.6	6	(14)
NH35	Standard	AL, AN, EM	109	122	6.5	(14)
	Long	BL, BN, GM	143	156	6.5	(14)
NH45	Standard	AL, AN, EM	139	154	7.5	(15)
	Long	BL, BN, GM	171	186	7.5	(15)
NH55	Standard	AL, AN, EM	163	178	7.5	(15)
	Long	BL, BN, GM	201	216	7.5	(15)
NH65	Standard	AN, EM	193	211	9	(16)
	Long	BN, GM	253	271	9	(16)

Notes 1) NSK K1 for food and medical equipment are available for NH15-35.
2) Ball slide length equipped with NSK K1-L = (Standard ball slide length) + (Thickness of NSK K1-L, V)

(3) Double seal

Use a double seal set as showing in **Table 13**, when installing an extra seal to completed standard products. **(Fig. 12)**

When installing a grease fitting after the installation of double seals, a connector as showing in **Fig.12** is required.

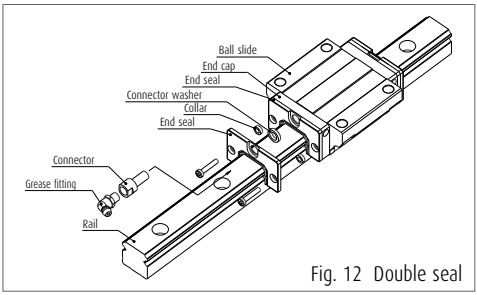


Fig. 12 Double seal

(4) Protector

Use a protector set as showing **Table 13**, when installing a protector to completed standard products. **(Fig.13)**

When installing a grease fitting after the installation of protectors, a connector as showing in **Fig.13** is required.

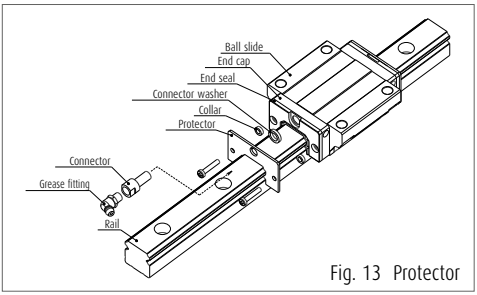


Fig. 13 Protector

Table 13 Double-seal set

Model No.	Reference No.		Increased thickness V_3 (mm)
	Without connector	With connector	
NH15	LH15WS-01	*	2.5
NH20	LH20WS-01	LH20WSC-01	2.5
NH25	LH25WS-01	LH25WSC-01	2.8
NH30	LH30WS-01	LH30WSC-01	3.6
NH35	LH35WS-01	LH35WSC-01	3.6
NH45	LH45WS-01	LH45WSC-01	4.3
NH55	LH55WS-01	LH55WSC-01	4.3
NH65	LH65WS-01	LH65WSC-01	4.9

Table 14 Protector set

Model No.	Reference No.		Increased thickness V_4 (mm)
	Without connector	With connector	
NH15	LH15PT-01	*	2.7
NH20	LH20PT-01	LH20PTC-01	2.9
NH25	LH25PT-01	LH25PTC-01	3.2
NH30	LH30PT-01	LH30PTC-01	4.2
NH35	LH35PT-01	LH35PTC-01	4.2
NH45	LH45PT-01	LH45PTC-01	4.9
NH55	LH55PT-01	LH55PTC-01	4.9
NH65	LH65PT-01	LH65PTC-01	5.5

*) For installation of a connector to a drive-in type grease fitting, contact NSK.

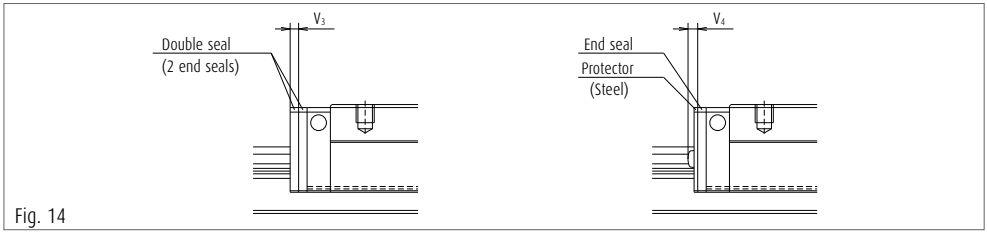


Fig. 14

(5) Cap to plug the rail mounting bolt hole

Table 15 Caps to plug rail bolt hole

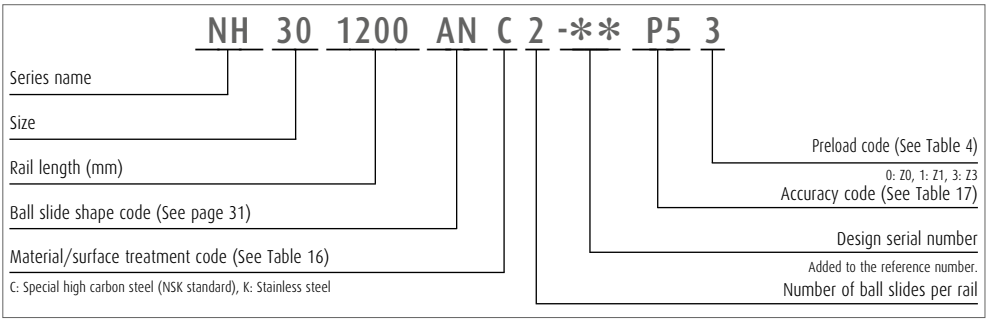
Modell No.	Bolt to secure rail	Cap reference No.	Quantity/case
NH15	M4	LG-CAP/M4	20
NH20	M5	LG-CAP/M5	20
NH25	M6	LG-CAP/M6	20
NH30, NH35	M8	LG-CAP/M8	20
NH45	M12	LG-CAP/M12	20
NH55	M14	LG-CAP/M14	20
NH65	M16	LG-CAP/M16	20

8. Reference number

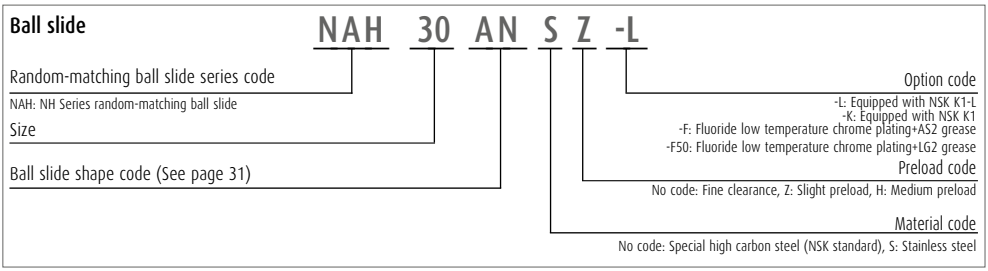
Reference numbers shall be set to individual NSK linear guide when its specifications are finalized, and it is indicated on its specification drawing.

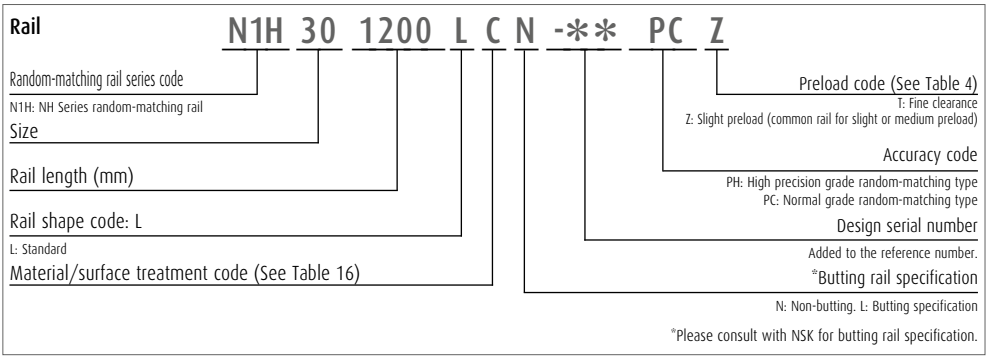
Please specify the reference number, except design serial number, to identify the product when ordering, requiring estimates, or inquiring about specifications from NSK.

(1) Reference number for preloaded assembly



(2) Reference number for random-matching type





The reference number coding for the assembly of random-matching type is the same as that of the preloaded assembly.
However, only preload codes of "fine clearance T", "slight preload Z" and "medium preload H" are available (See Table 4, page 33).

Click!Speedy NSK Linear Guide Quick Delivery System uses a new numbering system. For details, please refer to the Click!Speedy general catalog CAT. No. E3191.

Table 16 Material/surface treatment code

Code	Description
C	Special high carbon steel (NSK standard)
K	Stainless steel (NH15 to NH30 only)
D	Special high carbon steel with surface treatment
H	Stainless steel with surface treatment
Z	Other, special

Note High-precision grade and medium preload of random-matching type are not available in stainless steel.

Table 17 Accuracy code

Accuracy	Standard (Without NSK K1)	With NSK K1	With NSK K1-L	With NSK K1 for food and medical equipment
Ultra precision grade	P3	K3	L3	F3
Super precision grade	P4	K4	L4	F4
High precision grade	P5	K5	L5	F5
Precision grade	P6	K6	L6	F6
Normal grade	PN	KN	LN	FN
High precision grade (random-matching type)	PH	KH	LH	FH
Normal grade (random-matching type)	PC	KC	LC	FC

Note Refer to pages 454 to 460 for NSK K1/K1-L lubrication unit.

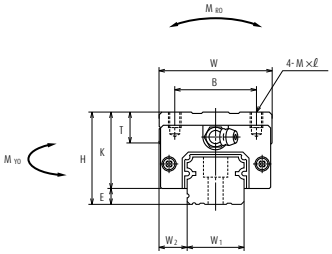
9. Dimensions

NH-AN (High-load type / Standard)
NH-BN (Super-high-load type / Long)

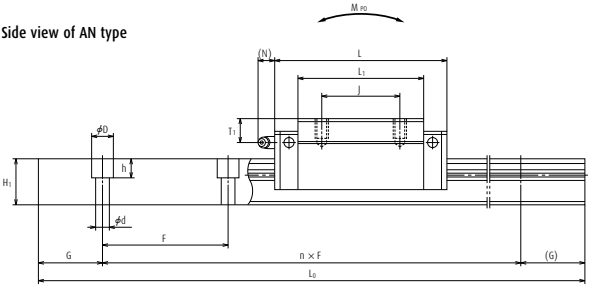
NH 30 1200 AN C 2 - ** PC Z**

- Series name
- Size
- Rail length (mm)
- Ball slide shape code (See page 31)
- Material/surface treatment code (See Table 16)
  C: Special high carbon steel (NSK standard), K: Stainless steel
- Number of ball slides per rail
- Design serial number
  Added to the reference number.
- Accuracy code (See Table 17)
- Preload code (See Table 4)
  0: Z0, 1: Z1, 3: Z3, T: ZT, Z: ZZ, H: ZH

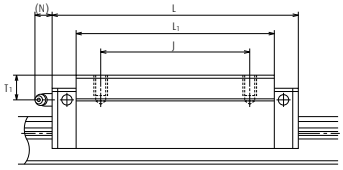
Front view of AN and BN types



Side view of AN type



Side view of BN type



Model No.	Assembly			Ball slide									Grease fitting			Width	Height
	Height			Width	Length	Mounting hole											
	H	E	W_2	W	L	B	J	M × pitch × ℓ	L_1	K	T	Hole size	T_1	N	W_1	H_1
NH15AN	28	4.6	9.5	34	55	26	26	M4×0.7×6	39	23.4	8	φ 3	8.5	3.3	15	15
NH15BN	28	4.6	9.5	34	74	26	26	M4×0.7×6	58	23.4	8	φ 3	8.5	3.3	15	15
NH20AN	30	5	12	44	69.8	32	36	M5×0.8×6	50	25	12	M6×0.75	5	11	20	18
NH20BN	30	5	12	44	91.8	32	50	M5×0.8×6	72	25	12	M6×0.75	5	11	20	18
NH25AN	40	7	12.5	48	79	35	35	M6×1×9	58	33	12	M6×0.75	10	11	23	22
NH25BN	40	7	12.5	48	107	35	50	M6×1×9	86	33	12	M6×0.75	10	11	23	22
NH30AN	45	9	16	60	85.6	40	40	M8×1.25×10	59	36	14	M6×0.75	10	11	28	26
NH30BN	45	9	16	60	124.6	40	60	M8×1.25×10	98	36	14	M6×0.75	10	11	28	26
NH35AN	55	9.5	18	70	109	50	50	M8×1.25×12	80	45.5	15	M6×0.75	15	11	34	29
NH35BN	55	9.5	18	70	143	50	72	M8×1.25×12	114	45.5	15	M6×0.75	15	11	34	29
NH45AN	70	14	20.5	86	139	60	60	M10×1.5×17	105	56	17	Rc1/8	20	13	45	38
NH45BN	70	14	20.5	86	171	60	80	M10×1.5×17	137	56	17	Rc1/8	20	13	45	38
NH55AN	80	15	23.5	100	163	75	75	M12×1.75×18	126	65	18	Rc1/8	21	13	53	44
NH55BN	80	15	23.5	100	201	75	95	M12×1.75×18	164	65	18	Rc1/8	21	13	53	44
NH65AN	90	16	31.5	126	193	76	70	M16×2×20	147	74	23	Rc1/8	19	13	63	53
NH65BN	90	16	31.5	126	253	76	120	M16×2×20	207	74	23	Rc1/8	19	13	63	53

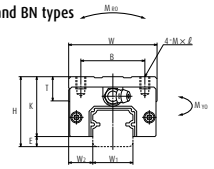
Notes 1) External appearance of stainless steel ball slides differs from those of carbon steel ball slides.

Reference number for ball slide of random-matching type

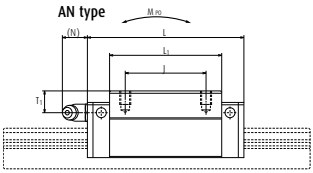
Ball slide NAH 30 AN S Z -L

- Random-matching ball slide series code — NAH: NH Series random-matching ball slide
- Size
- Ball slide shape code (See page 31)
- Material code — No code: Special high carbon steel (NSK standard), S: Stainless steel
- Preload code — No code: Fine clearance, Z: Slight preload, H: Medium preload
- Option code — -L: Equipped with NSK K1-L; -K: Equipped with NSK K1; -F: Fluoride low temperature chrome plating+AS2 grease; -F50: Fluoride low temperature chrome plating+LG2 grease

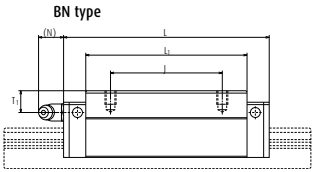
AN and BN types



AN type



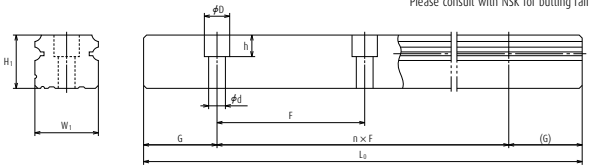
BN type



Reference number for rail of random-matching type

Rail N1H 30 1200 L C N -** PC Z

- Random-matching rail series code — N1H: NH Series random-matching rail
- Size
- Rail length (mm)
- Rail shape code: L — L: Standard
- Material/surface treatment code (See Table 16)
- *Butting rail specification — N: Non-butting, L: Butting specification; *Please consult with NSK for butting rail specification.
- Design serial number — Added to the reference number.
- Accuracy code — PH: High precision grade, PC: Normal grade
- Preload code (See Table 4) — T: Fine clearance, Z: Slight preload (common rail for medium preload)



Unit: mm

Rail				Basic load rating								Weight	
Pitch	Mounting bolt hole	G	Maximum length	2) Dynamic		Static	Static moment (N·m)					Ball slide	Rail
								M_{PO}		M_{YO}			
F	d × D × h	(reference)	L_{0max} ( ) for stainless	[50km] C_{50}(N)	[100km] C_{100}(N)	C_0 (N)	M_{RO}	One slide	Two slides	One slide	Two slides	(kg)	(kg/m)
60	4.5×7.5×5.3	20	2 980	14 200	11 300	20 700	108	94.5	575	79.5	480	0.18	1.6
60	4.5×7.5×5.3	20	(1 800)	18 100	14 400	32 000	166	216	1 150	181	965	0.26	1.6
60	6×9.5×8.5	20	3 960	23 700	18 800	32 500	219	185	1 140	155	955	0.33	2.6
60	6×9.5×8.5	20	(3 500)	30 000	24 000	50 500	340	420	2 230	355	1 870	0.48	2.6
60	7×11×9	20	3 960	33 500	26 800	46 000	360	320	1 840	267	1 540	0.55	3.6
60	7×11×9	20	(3 500)	45 500	36 500	71 000	555	725	3 700	610	3 100	0.82	3.6
80	9×14×12	20	4 000	41 000	32 500	51 500	490	350	2 290	292	1 920	0.77	5.2
80	9×14×12	20	(3 500)	61 000	48 500	91 500	870	1 030	5 600	865	4 700	1.3	5.2
80	9×14×12	20	4 000	62 500	49 500	80 500	950	755	4 500	630	3 800	1.5	7.2
80	9×14×12	20	4 000	81 000	64 500	117 000	1 380	1 530	8 350	1 280	7 000	2.1	7.2
105	14×20×17	22.5	3 990	107 000	84 500	140 000	2 140	1 740	9 750	1 460	8 150	3.0	12.3
105	14×20×17	22.5	3 990	131 000	104 000	187 000	2 860	3 000	15 600	2 520	13 100	3.9	12.3
120	16×23×20	30	3 960	158 000	125 000	198 000	3 600	3 000	16 300	2 510	13 700	4.7	16.9
120	16×23×20	30	3 960	193 000	153 000	264 000	4 850	5 150	26 300	4 350	22 100	6.1	16.9
150	18×26×22	35	3 900	239 000	190 000	281 000	6 150	4 950	27 900	4 150	23 400	7.7	24.3
150	18×26×22	35	3 900	310 000	246 000	410 000	8 950	10 100	51 500	8 450	43 500	10.8	24.3

2) The basic load rating comply with the ISO standard. (ISO 14728-1, 14728-2)
C_{50}; the basic dynamic load rating for 50 km rated fatigue life C_{100}; the basic dynamic load rating for 100 km rated fatigue life
The basic static load rating shows static permissible load.

3) High-precision grade and medium preload of random-matching type are available for high-carbon steel products.

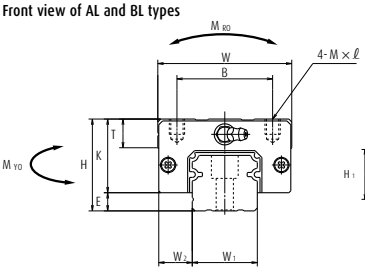
6. NH-Series: Linear Ball Guides

NH-AL (High-load type / Standard)
NH-BL (Super-high-load type / Long)

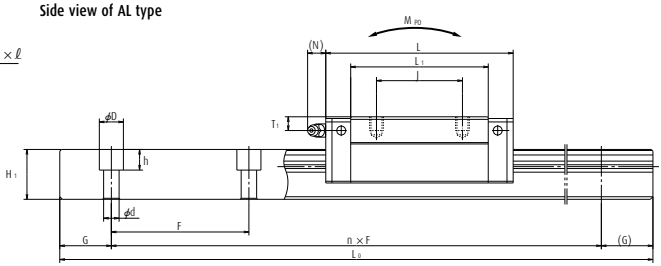
NH 30 1200 AL C 2 - ** PC Z**

- Series name
- Size
- Rail length (mm)
- Ball slide shape code (See page 31)
- Material/surface treatment code (See Table 16)
  C: Special high carbon steel (NSK standard), K: Stainless steel
- Number of ball slides per rail
- Added to the reference number.
- Design serial number
- Accuracy code (See Table 17)
- Preload code (See Table 4)
  0: Z0, 1: Z1, 3: Z3, T: ZT, Z: ZZ, H: ZH

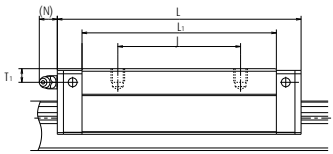
Front view of AL and BL types



Side view of AL type



Side view of BL type



Model No.	Assembly			Ball slide												Width	Height
	Height			Width	Length	Mounting hole						Grease fitting					
	H	E	W_2	W	L	B	J	M × pitch × ℓ	L_1	K	T	Hole size	T_1	N	W_1	H_1
NH25AL	36	7	12.5	48	79	35	35	M6×1×6	58	29	12	M6×0.75	6	11	23	22
NH25BL	36	7	12.5	48	107	35	50	M6×1×6	86	29	12	M6×0.75	6	11	23	22
NH30AL	42	9	16	60	85.6	40	40	M8×1.25×8	59	33	14	M6×0.75	7	11	28	26
NH30BL	42	9	16	60	124.6	40	60	M8×1.25×8	98	33	14	M6×0.75	7	11	28	26
NH35AL	48	9.5	18	70	109	50	50	M8×1.25×8	80	38.5	15	M6×0.75	8	11	34	29
NH35BL	48	9.5	18	70	143	50	72	M8×1.25×8	114	38.5	15	M6×0.75	8	11	34	29
NH45AL	60	14	20.5	86	139	60	60	M10×1.5×10	105	46	17	Rc1/8	10	13	45	38
NH45BL	60	14	20.5	86	171	60	80	M10×1.5×10	137	46	17	Rc1/8	10	13	45	38
NH55AL	70	15	23.5	100	163	75	75	M12×1.75×13	126	55	15	Rc1/8	11	13	53	44
NH55BL	70	15	23.5	100	201	75	95	M12×1.75×13	164	55	15	Rc1/8	11	13	53	44

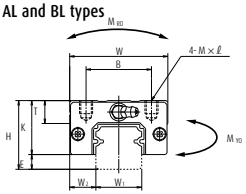
Notes 1) External appearance of stainless steel ball slides differs from those of carbon steel ball slides.

Reference number for ball slide of random-matching type

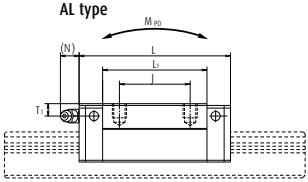
Ball slide NAH 30 AL S Z -L

- Random-matching ball slide series code — NAH: NH Series random-matching ball slide
- Size
- Ball slide shape code (See page 31)
- Material code — No code: Special high carbon steel (NSK standard), S: Stainless steel
- Preload code — No code: Fine clearance, Z: Slight preload, H: Medium preload
- Option code — -L: Equipped with NSK K1-L; -K: Equipped with NSK K1; -F: Fluoride low temperature chrome plating+AS2 grease; -F50: Fluoride low temperature chrome plating+LG2 grease

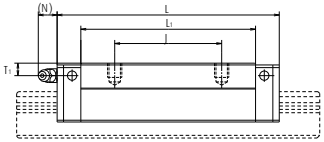
AL and BL types



AL type



BL type

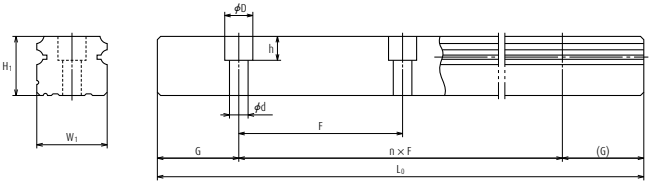


Reference number for rail of random-matching type

Rail N1H 30 1200 L C N -** PC Z

- Random-matching rail series code — N1H: NH Series random-matching rail
- Size
- Rail length (mm)
- Rail shape code: L — L: Standard
- Material/surface treatment code (See Table 16)
- *Butting rail specification — N: Non-butting, L: Butting specification
- Design serial number — Added to the reference number.
- Accuracy code — PH: High precision grade, PC: Normal grade
- Preload code (See Table 4) — T: Fine clearance, Z: Slight preload (common rail for medium preload)

*Please consult with NSK for butting rail specification.



Unit: mm

Rail				Basic load rating									Weight	
Pitch F	Mounting bolt hole d × D × h	G (reference)	Maximum length L_{0max} ( ) for stainless	2) Dynamic [50km] C_{50}(N)	2) Dynamic [100km] C_{100}(N)	Static C_0 (N)	Static moment (N·m) M_{RO}	M_{PO} One slide	M_{PO} Two slides	M_{YO} One slide	M_{YO} Two slides		Ball slide (kg)	Rail (kg/m)
60	7×11×9	20	3 960	33 500	26 800	46 000	360	320	1 840	267	1 540		0.46	3.6
60	7×11×9	20	(3 500)	45 500	36 500	71 000	555	725	3 700	610	3 100		0.69	3.6
80	9×14×12	20	4 000	41 000	32 500	51 500	490	350	2 290	292	1 920		0.69	5.2
80	9×14×12	20	(3 500)	61 000	48 500	91 500	870	1 030	5 600	865	4 700		1.16	5.2
80	9×14×12	20	4 000	62 500	49 500	80 500	950	755	4 500	630	3 800		1.2	7.2
80	9×14×12	20	4 000	81 000	64 500	117 000	1 380	1 530	8 350	1 280	7 000		1.7	7.2
105	14×20×17	22.5	3 990	107 000	84 500	140 000	2 140	1 740	9 750	1 460	8 150		2.2	12.3
105	14×20×17	22.5	3 990	131 000	104 000	187 000	2 860	3 000	15 600	2 520	13 100		2.9	12.3
120	16×23×20	30	3 960	158 000	125 000	198 000	3 600	3 000	16 300	2 510	13 700		3.7	16.9
120	16×23×20	30	3 960	193 000	153 000	264 000	4 850	5 150	26 300	4 350	22 100		4.7	16.9

2) The basic load rating comply with the ISO standard. (ISO 14728-1, 14728-2)
C_{50}; the basic dynamic load rating for 50 km rated fatigue life C_{100}; the basic dynamic load rating for 100 km rated fatigue life
The basic static load rating shows static permissible load.
3) High-precision grade and medium preload of random-matching type are available for high-carbon steel products.

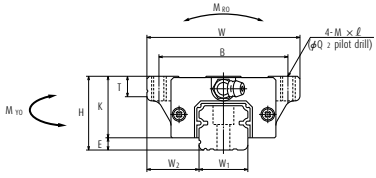
6. NH-Series: Linear Ball Guides

NH-EM (High-load type / Standard)
NH-GM (Super-high-load type / Long)

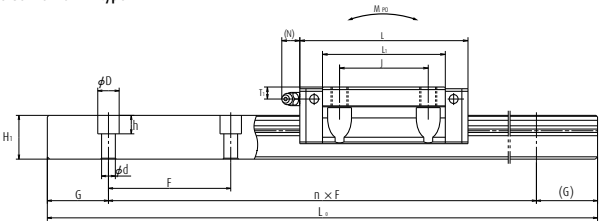
NH 30 1200 EM C 2 - ** PC Z**

- Series name
- Size
- Rail length (mm)
- Ball slide shape code (See page 31)
- Material/surface treatment code (See Table 16)
  C: Special high carbon steel (NSK standard), K: Stainless steel
- Number of ball slides per rail
- Design serial number
  Added t the reference number.
- Accuracy code (See Table 17)
- Preload code (See Table 4)
  0: Z0, 1: Z1, 3: Z3, T: ZT, Z: ZZ, H: ZH

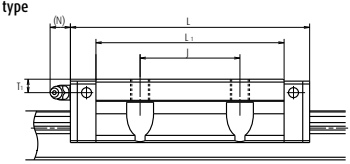
Front view of EM and GM types



Side view of EM type



Side view of GM type



Model No.	Assembly			Ball slide									Grease fitting			Width	Height
	Height			Width	Length	Mounting hole											
	H	E	W_2	W	L	B	J	M × pitch × ℓ	Q_2	L_1	K	T	Hole size	T_1	N	W_1	H_1
NH15EM	24	4.6	16	47	55	38	30	M5×0.8×7	4.4	39	19.4	8	φ 3	4.5	3.3	15	15
NH15GM	24	4.6	16	47	74	38	30	M5×0.8×7	4.4	58	19.4	8	φ 3	4.5	3.3	15	15
NH20EM	30	5	21.5	63	69.8	53	40	M6×1×9.5	5.3	50	25	10	M6×0.75	5	11	20	18
NH20GM	30	5	21.5	63	91.8	53	40	M6×1×9.5	5.3	72	25	10	M6×0.75	5	11	20	18
NH25EM	36	7	23.5	70	79	57	45	M8×1.25×10	6.8	58	29	11	M6×0.75	6	11	23	22
NH25GM	36	7	23.5	70	107	57	45	(M8×1.25×11.5)	6.8	86	29	(12)	M6×0.75	6	11	23	22
NH30EM	42	9	31	90	98.6	72	52	M10×1.5×12	8.6	72	33	11	M6×0.75	7	11	28	26
NH30GM	42	9	31	90	124.6	72	52	(M10×1.5×14.5)	8.6	98	33	(15)	M6×0.75	7	11	28	26
NH35EM	48	9.5	33	100	109	82	62	M10×1.5×13	8.6	80	38.5	12	M6×0.75	8	11	34	29
NH35GM	48	9.5	33	100	143	82	62	M10×1.5×13	8.6	114	38.5	12	M6×0.75	8	11	34	29
NH45EM	60	14	37.5	120	139	100	80	M12×1.75×15	10.5	105	46	13	Rc1/8	10	13	45	38
NH45GM	60	14	37.5	120	171	100	80	M12×1.75×15	10.5	137	46	13	Rc1/8	10	13	45	38
NH55EM	70	15	43.5	140	163	116	95	M14×2×18	12.5	126	55	15	Rc1/8	11	13	53	44
NH55GM	70	15	43.5	140	201	116	95	M14×2×18	12.5	164	55	15	Rc1/8	11	13	53	44
NH65EM	90	16	53.5	170	193	142	110	M16×2×24	14.6	147	74	23	Rc1/8	19	13	63	53
NH65GM	90	16	53.5	170	253	142	110	M16×2×24	14.6	207	74	23	Rc1/8	19	13	63	53

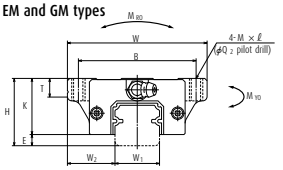
Notes
1) Parenthesized dimensions are for items made of stainless steel.
2) External appearance of stainless steel ball slides differs from those of carbon steel ball slides.

Reference number for ball slide of random-matching type

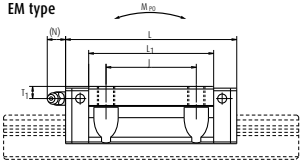
Ball slide NAH 30 EM S Z -L

- Random-matching ball slide series code
  - NAH: NH Series random-matching ball slide
- Size
- Ball slide shape code (See page 31)
- Material code
  - No code: Special high carbon steel (NSK standard), S: Stainless steel
- Preload code
  - No code: Fine clearance, Z: Slight preload, H: Medium preload
- Option code
  - -L: Equipped with NSK K1-L
  - -K: Equipped with NSK K1
  - -F: Fluoride low temperature chrome plating+AS2 grease
  - -F50: Fluoride low temperature chrome plating+LG2 grease

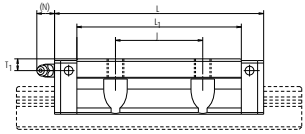
EM and GM types



EM type



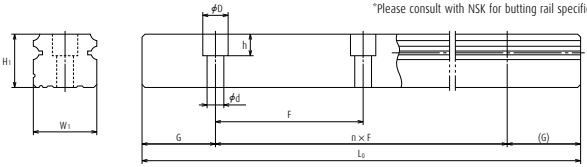
GM type



Reference number for rail of random-matching type

Rail N1H 30 1200 L C N -** PC Z

- Random-matching rail series code
  - N1H: NH Series random-matching rail
- Size
- Rail length (mm)
- Rail shape code: L
  - L: Standard
- Material/surface treatment code (See Table 16)
- *Butting rail specification
  - N: Non-butting. L: Butting specification
  - *Please consult with NSK for butting rail specification.
- Design serial number
  - Added to the reference number.
- Accuracy code
  - PH: High precision grade
  - PC: Normal grade
- Preload code (See Table 4)
  - T: Fine clearance.
  - Z: Slight preload (common rail for medium preload)

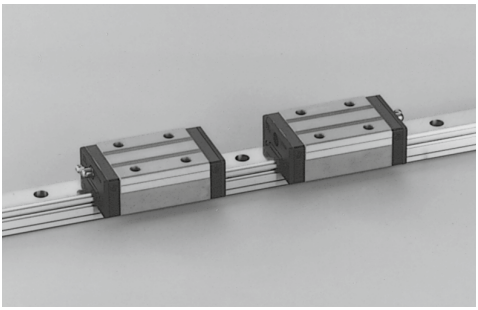


Unit: mm

Rail				Basic load rating							Weight	
Pitch	Mounting bolt hole	G	Maximum length	3) Dynamic		Static	Static moment (N·m)				Ball slide	Rail
								M_{PO}		M_{YO}		
F	d × D × h	(reference)	L_{0max} ( ) for stainless	[50km] C_{50}(N)	[100km] C_{100}(N)	C_0 (N)	M_{RO}	One slide	Two slides	One slide	Two slides	(kg)	(kg/m)
60	4.5×7.5×5.3	20	2 980	14 200	11 300	20 700	108	94.5	575	79.5	480	0.17	1.6
60	4.5×7.5×5.3	20	(1 800)	18 100	14 400	32 000	166	216.0	1 150	181.0	965	0.25	1.6
60	6×9.5×8.5	20	3 960	23 700	18 800	32 500	219	185.0	1 140	155.0	955	0.45	2.6
60	6×9.5×8.5	20	(3 500)	30 000	24 000	50 500	340	420.0	2 230	355.0	1 870	0.65	2.6
60	7×11×9	20	3 960	33 500	26 800	46 000	360	320.0	1 840	267.0	1 540	0.63	3.6
60	7×11×9	20	(3 500)	45 500	36 500	71 000	555	725.0	3 700	610.0	3 100	0.93	3.6
80	9×14×12	20	4 000	47 000	37 500	63 000	600	505.0	3 150	425.0	2 650	1.2	5.2
80	9×14×12	20	(3 500)	61 000	48 500	91 500	870	1 030.0	5 600	865.0	4 700	1.6	5.2
80	9×14×12	20	4 000	62 500	49 500	80 500	950	755.0	4 500	630.0	3 800	1.7	7.2
80	9×14×12	20	4 000	81 000	64 500	117 000	1 380	1 530.0	8 350	1 280.0	7 000	2.4	7.2
105	14×20×17	22.5	3 990	107 000	84 500	140 000	2 140	1 740.0	9 750	1 460.0	8 150	3	12.3
105	14×20×17	22.5	3 990	131 000	104 000	187 000	2 860	3 000.0	15 600	2 520.0	13 100	3.9	12.3
120	16×23×20	30	3 960	158 000	125 000	198 000	3 600	3 000.0	16 300	2 510.0	13 700	5	16.9
120	16×23×20	30	3 960	193 000	153 000	264 000	4 850	5 150.0	26 300	4 350.0	22 100	6.5	16.9
150	18×26×22	35	3 900	239 000	190 000	281 000	6 150	4 950.0	27 900	4 150.0	23 400	10	24.3
150	18×26×22	35	3 900	310 000	246 000	410 000	8 950	10 100.0	51 500	8 450.0	43 500	14.1	24.3

3) The basic load rating comply with the ISO standard. (ISO 14728-1, 14728-2)
C_{50}; the basic dynamic load rating for 50 km rated fatigue life C_{100}; the basic dynamic load rating for 100 km rated fatigue life
The basic static load rating shows static permissible load.

4) High-precision grade and medium preload of random-matching type are available for high-carbon steel products.



1. Features

(1) Improve rating life dramatically

Based on the LS series characterized by reliability and performance, a significant increase in durability has been attained. New ball groove geometry is introduced, which has been developed by utilizing NSK's state-of-the-art tribological and analytical technologies. Due to the optimized distribution of contact surface pressures, the rating life has dramatically increased.

As compared with the LS Series, the load rating capacity of the NS series has increased to 1.3 times, while the life span has increased to twice*1). These features enable you to design a machine with a longer life and downsize the machine. Thus, your design capability is greatly enhanced.

*1): Representative values of series.

(2) Ball circulation path with excellent high-speed property

By reexamining the design practice for the ball circulation path, we have attained smooth ball circulation and reduced noise level. So, NS series is suited for high-speed applications compared with the LS Series.

(3) All mounting dimensions are the same as those for the LS and SS Series

Regarding the mounting dimensions (mounting parts' dimensions), such as the mounting height, mounting width, mounting hole diameter/pitch of the linear guide, etc., the mounting dimensions of the NS Series remain the same as those of the conventional LS series and SS series. So, the new NS Series linear guides can be used without making any design changes.

(4) High self aligning capability (rolling direction)

Same as the DF combination in angular contact bearings, self-aligning capability is high because the cross point of the contact lines of balls and grooves comes inside, and thus reducing moment rigidity. This increases the capacity to absorb errors in installation.

(5) High load carrying capacity to vertical direction

The contact angle is set at 50 degrees, and thus increasing load carrying capacity as well as rigidity against the load in vertical direction.

(6) High resistance against impact load

The bottom ball groove is formed in Gothic arch and the center of the top and bottom grooves are offset as shown in **Fig. 2**. The vertical load is usually carried by top 2 rows, where balls are contacting at two points. Because of this design, the bottom rows will carry the load when a large impact load is applied as shown in **Fig. 3**. This assures high resistance to the impact load.

(7) High accuracy

As showing in **Fig. 4**, fixing the measuring rollers to the ball grooves is simple thanks to the Gothic arch groove. This makes easy and accurate measuring of ball grooves.

(8) Easy to handle, and designed with safety in mind.

Balls are retained in the retainer and do not fall out when the ball slide is withdrawn from the rail.

(9) Abundant models and sizes come in series.

Each size of NS Series has several ball slide models, rendering the linear guide available for numerous uses. The NS Series also has standardized long stainless-steel rail (maximum 3 500 mm).

(10) Fast delivery

Lineup of random-matching rails and ball slides supports and facilitates fast delivery.

High precision grade and medium preload types are also available in random matching. (Special high-carbon steel products)

Note: For customers who have used the former LS or SS series, NS series is recommended as a substitute. Please confirm the correlation between NS series and former ones on the comparative table at page 108.

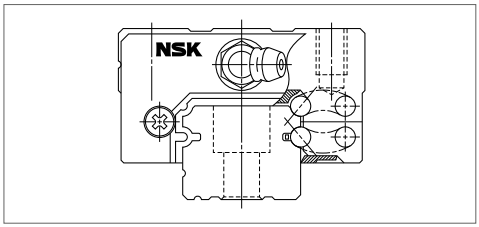


Fig. 1 NS Series

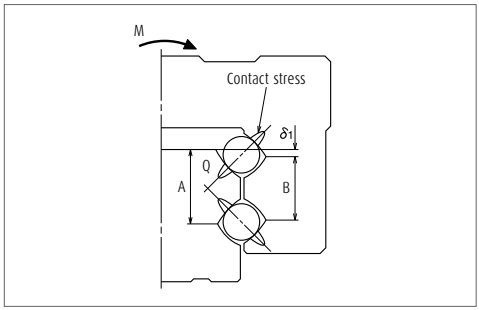


Fig. 2 Enlarged illustration of the offset Gothic arch groove

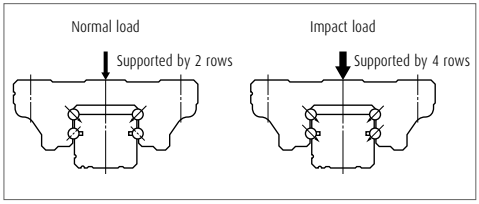


Fig. 3 When load is applied

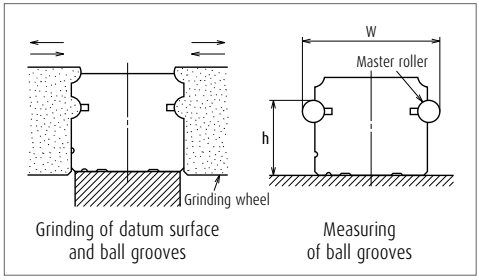
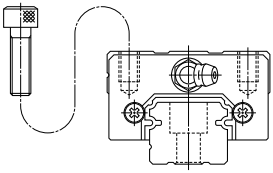
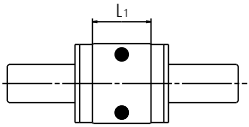
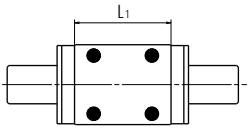
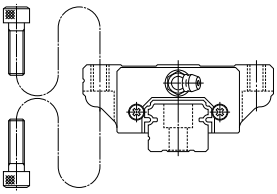
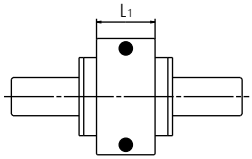
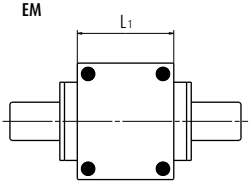


Fig. 4 Rail-grinding and measuring

2. Ball slide shape

Ball slide Model	Shape/installation method	Type (Upper row, Rating: Lower row, Ball slide length)	
		Medium-load type	High-load type
		Standard	Long
AL CL		CL 	AL 
EM JM		JM 	EM 

Note High-precision grade and medium preload of random-matching type are not applicable to EL, JL, FL and KL models.
Not applicable to EM and JM models.

3. Accuracy and preload

(1) Running parallelism of ball slide

Table 1

Unit: μm

Rail length (mm) over	or less	Preloaded assembly (not random matching) Ultra precision P3	Super precision P4	High precision P5	Precision grade P6	Normal grade PN	Random-matching type High precision PH	Normal grade PC
–	50	2	2	2	4.5	6	2	6
50	80	2	2	3	5	6	3	6
80	125	2	2	3.5	5.5	6.5	3.5	6.5
125	200	2	2	4	6	7	4	7
200	250	2	2.5	5	7	8	5	8
250	315	2	2.5	5	8	9	5	9
315	400	2	3	6	9	11	6	11
400	500	2	3	6	10	12	6	12
500	630	2	3.5	7	12	14	7	14
630	800	2	4.5	8	14	16	8	16
800	1000	2.5	5	9	16	18	9	18
1 000	1 250	3	6	10	17	20	10	20
1 250	1 600	4	7	11	19	23	11	23
1 600	2 000	4.5	8	13	21	26	13	26
2 000	2 500	5	10	15	22	29	15	29
2 500	3 150	6	11	17	25	32	17	32
3 150	4 000	9	16	23	30	34	23	34

(2) Accuracy standard

The preloaded assembly has five accuracy grades; Ultra precision P3, Super precision P4, High precision P5, Precision P6 and Normal PN grades, while the random-matching type has High-precision PH and Normal PC grade.

› Tolerance of preloaded assembly

Table 2

Unit : μm

Characteristics \ Accuracy grade	Ultra precision P3	Super precision P4	High precision P5	Precision grade P6	Normal grade PN
Mounting height H	±10	±10	±20	±40	±80
Variation of H	3	5	7	15	25
(All ball slides on a set of rails)					
Mounting width W_2 or W_3	±15	±15	±25	±50	±100
Variation of W_2 or W_3	3	7	10	20	30
(All ball slides on reference rail)					
Running parallelism of surface C to surface A Running parallelism of surface D to surface B	See **Table 1**, **Fig. 5** and **Fig. 6**				

› Tolerance of random-matching type

Table 3

Unit : μm

Characteristics \ Model No.	High precision grade PH	Normal grade PC
Mounting height H	±20	±20
Variation of mounting height H	15 ① 30 ②	15 ① 30 ②
Mounting width W_2 or W_3	±30	±30
Variation of mounting width W_2 or W_3	20	25
Running parallelism of surface C to surface A Running parallelism of surface D to surface B	See **Table 1**, **Fig. 5** and **Fig. 6**	

Notes: ① Variation on the same rail / ② Variation on multiple rails

(3) Combinations of accuracy and preload

Table 4

		Accuracy grade						
		Ultra precision	Super precision	High precision	Precision grade	Normal grade	High precision	Normal grade
Without NSK K1 lubrication unit		P3	P4	P5	P6	PN	PH	PC
With NSK K1 lubrication unit		K3	K4	K5	K6	KN	KH	KC
With NSK K1-L lubrication unit		L3	L4	L5	L6	LN	LH	LC
With NSK K1 for food and medical equipment		F3	F4	F5	F6	FN	FH	FC
Preload	Fine clearance Z0	○	○	○	○	○	—	—
	Slight preload Z1	○	○	○	○	○	—	—
	Medium preload Z3	○	○	○	○	—	—	—
	Random-matching type with fine clearance ZT	—	—	—	—	—	—	○
	Random-matching type with slight preload ZZ	—	—	—	—	—	○	○
	Random-matching type with medium preload ZH	—	—	—	—	—	○	○

(4) Assembled accuracy

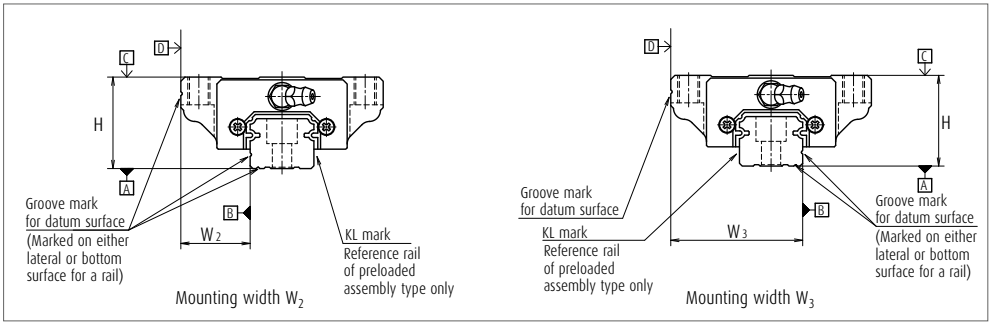


Fig. 5 Special high carbon steel

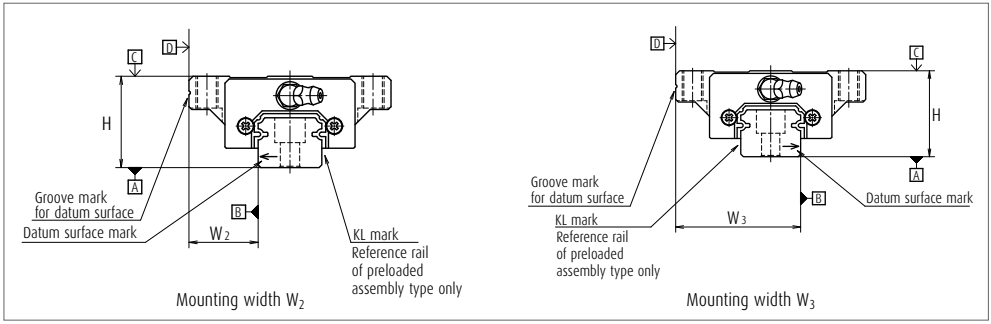


Fig. 6 Stainless steel

(5) Preload and rigidity

We offer six levels of preload: Slight preload Z1, Medium preload Z3 and Fine clearance Z0, along with random-matching type of Medium preload ZH, Fine clearance ZT and Slight preload ZZ.

› Preload and rigidity of preloaded assembly

Table 5

	Model No.	Preload (N)		Rigidity (N/μm)			
				Vertical direction		Lateral direction	
		Slight preload Z1	Medium preload Z3	Slight preload Z1	Medium preload Z3	Slight preload Z1	Medium preload Z3
High-load type	NS15 AL, EM	69	390	127	226	88	167
	NS20 AL, EM	88	540	147	284	108	206
	NS25 AL, EM	147	880	206	370	147	275
	NS30 AL, EM	245	1 370	255	460	186	345
	NS35 AL, EM	345	1 960	305	550	216	400
Medium-load type	NS15 CL, JM	49	294	78	147	59	108
	NS20 CL, JM	69	390	108	186	78	137
	NS25 CL, JM	98	635	127	235	88	177
	NS30 CL, JM	147	980	147	275	108	206
	NS35 CL, JM	245	1 370	186	335	137	245

Note Clearance for Fine clearance Z0 is 0 to 3μm. Therefore, preload is zero. However, Z0 of PN grade is 0 to 15μm.

› Clearance and preload of random-matching type

Table 6

Unit : μm

Model No.	Fine clearance ZT	Slight preload ZZ	Medium preload ZH
NS15	−4 — 15	−4 — 0	−7 — −3
NS20	−4 — 15	−4 — 0	−7 — −3
NS25	−5 — 15	−5 — 0	−9 — −4
NS30	−5 — 15	−5 — 0	−9 — −4
NS35	−5 — 15	−6 — 0	−10 — −4

Note Minus sign denotes that a value is an amount of preload (elastic deformation of balls).

4. Maximum rail length

Table 7 shows the limitations of rail length (maximum length). However, the limitations vary by accuracy grade.

Table 7 Length limitations of rails

Unit : mm

Series	Size / Material	15	20	25	30	35
NS	Special high carbon steel	2 920	3 960	3 960	4 000	4 000
	Stainless steel	1 700	3 500	3 500	3 500	3 500

Note Rails can be butted if user requirement exceeds the rail length shown in the table. Please consult NSK

5. Installation

(1) Permissible values of mounting error

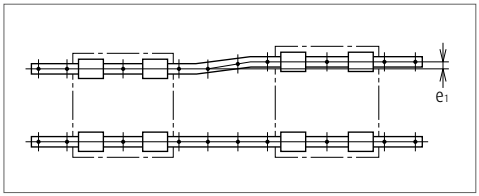


Fig. 7

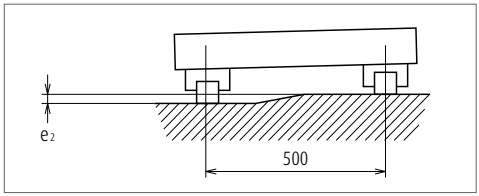


Fig. 8

Table 8

Unit : μm

Value	Preload	Model No.				
		NS15	NS20	NS25	NS30	NS35
Permissible values of parallelism in two rails e_1	Z0, ZT	20	22	30	35	40
	Z1, ZZ	15	17	20	25	30
	Z3, ZH	12	15	15	20	25
Permissible values of parallelism (height) in two rails e_2	Z0, ZT	375 μm/500 mm				
	Z1, ZZ, Z3, ZH	330 μm/500 mm				

(2) Shoulder height of the mounting surface and corner radius r

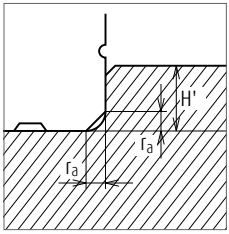


Fig. 9 Shoulder for the rail datum face

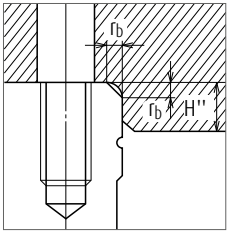


Fig. 10 Shoulder for the ball slide datum face

Table 9

Unit : mm

Model No.	Corner radius (maximum)		Shoulder height	
	r_a	r_b	H'	H"
NS15	0.5	0.5	4	4
NS20	0.5	0.5	4.5	5
NS25	0.5	0.5	5	5
NS30	0.5	0.5	6	6
NS35	0.5	0.5	6	6

6. Maximum allowable speed

An indication of the standard maximum allowable speed aiming at 10,000km operation with NS series under normal conditions is shown in Table 10. However, the maximum allowable speed can be affected by accuracy of installation, operating temperature, external load, etc. If the operation is made exceeding the permissible distance and speed, please consult NSK.

Table 10 Maximum allowable speed

Unit : m/min

Size \ Series	15	20	25	30	30	35
NS	300					

7. Dust proof components

(1) Standard specification

The NS Series can be readily used as they have a dust protection for normal conditions. As the standard equipment, the ball slides have an end seal on both ends, and bottom seals at the bottom.

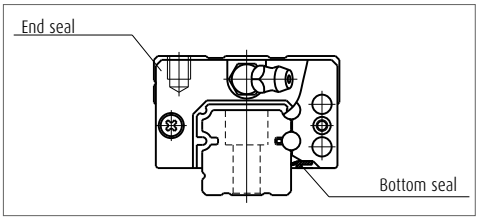


Fig. 11

Table 11 Seal friction per ball slide (maximum value)

Unit : N

Size \ Series	15	20	25	30	35
NS	8	9	9	9	10

(2) NSK K1-L lubrication unit

Table 12 shows the dimension of linear guides equipped with the NSK K1-L lubrication unit.

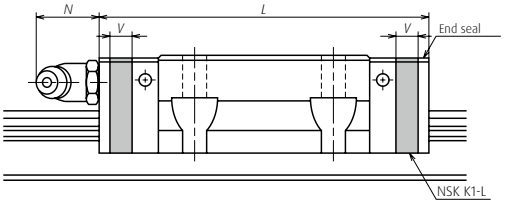


Table 12

Model No.	Ball slide length	Ball slide model	Standard ball slide length	Ball slide length installed with two NSK K1-L	NSK K1-L thickness V	Protruding area of the grease fitting N
NS15	Standard	AL, EM	56.8	66.4	4.8	(5)
	Short	CL, JM	40.4	50		
NS20	Standard	AL, EM	65.2	75.8	5.3	(14)
	Short	CL, JM	47.2	57.8		
NS25	Standard	AL, EM	81.6	92.2	5.3	(14)
	Short	CL, JM	59.6	70.2		
NS30	Standard	AL, EM	96.4	108.4	6	(14)
	Short	CL, JM	67.4	79.4		
NS35	Standard	AL, EM	108	121	6.5	(14)
	Short	CL, JM	77	90		

Notes 1) NSK K1 for food and medical equipment are available for NS15-35.
2) Ball slide length equipped with NSK K1-L = (Standard ball slide length) + (Thickness of NSK K1-L, V)

(3) Double seal

Use a double seal set as shown in **Table 13**, when installing an extra seal to completed standard products. **(Fig. 12)**

When installing a grease fitting after the installation of double seals, a connector as shown in **Fig.12** is required.

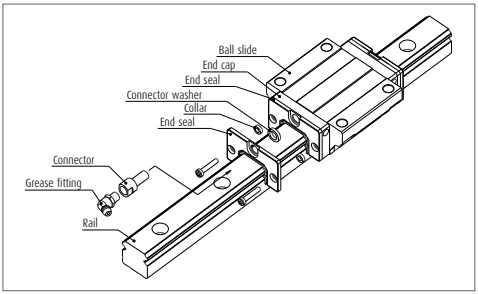


Fig. 12 Double seal

(4) Protector

Use a protector set as shown in **Table 14**, when installing a protector to completed standard products. **(Fig.13)**

When installing a grease fitting after the installation of protectors, a connector as shown in **Fig.13** is required.

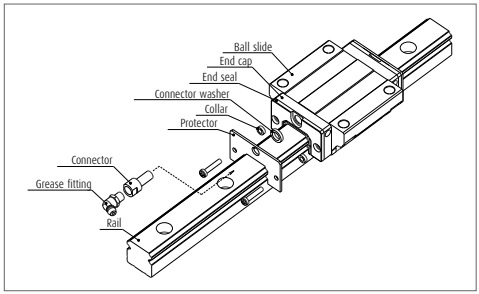


Fig. 13 Protector

Table 13 Double-seal set

Model No.	Reference No.		Increased thickness V_3 (mm)
	Without connector	With connector	
NS15	LS15WS-01	*	2.8
NS20	LS20WS-01	LS20WSC-01	2.5
NS25	LS25WS-01	LS25WSC-01	2.8
NS30	LS30WS-01	LS30WSC-01	3.6
NS35	LS35WS-01	LS35WSC-01	3.6

Table 14 Protector set

Model No.	Reference No.		Increased thickness V_4 (mm)
	Without connector	With connector	
NS15	LS15PT-01	*	3
NS20	LS20PT-01	LS20PTC-01	2.7
NS25	LS25PT-01	LS25PTC-01	3.2
NS30	LS30PT-01	LS30PTC-01	4.2
NS35	LS35PT-01	LS35PTC-01	4.2

*) For installation of a connector to a drive-in type grease fitting, contact NSK.

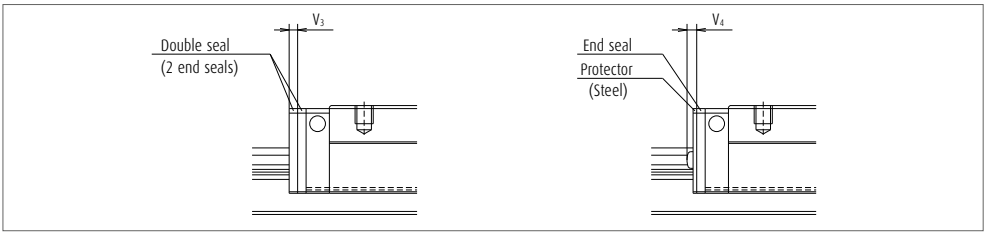


Fig. 14

(5) Cap to plug the rail mounting bolt hole

Table 15 Caps to plug rail bolt hole

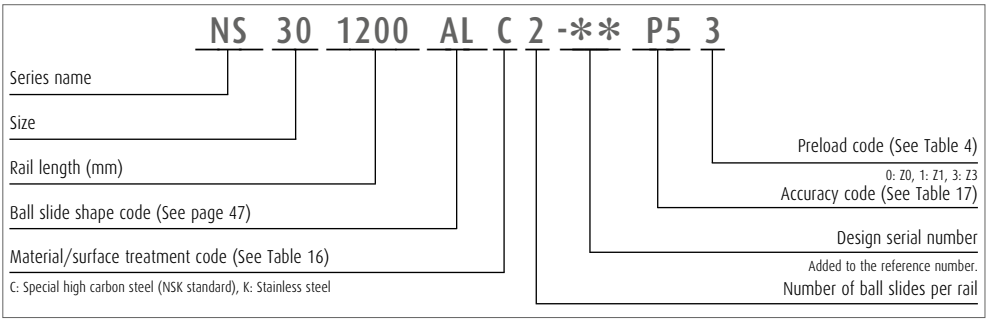
Modell No.	Bolt to secure rail	Cap reference No.	Quantity/case
NS15	M3	LG-CAP/M3	20
NS15	M4	LG-CAP/M4	20
NS20	M5	LG-CAP/M5	20
NS25, NS30	M6	LG-CAP/M6	20
NS35	M8	LG-CAP/M8	20

8. Reference number

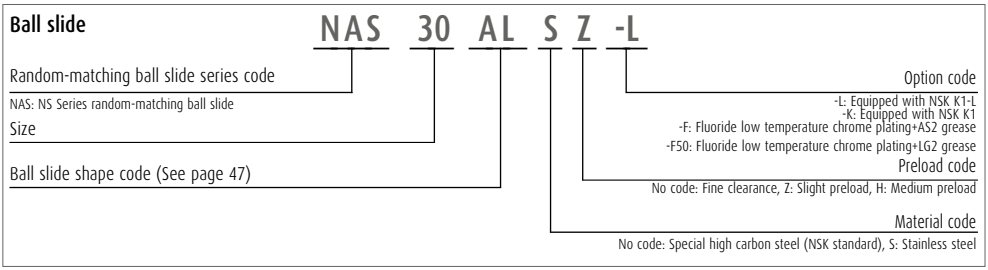
Reference numbers shall be set to individual NSK linear guide when its specifications are finalized, and it is indicated on its specification drawing.

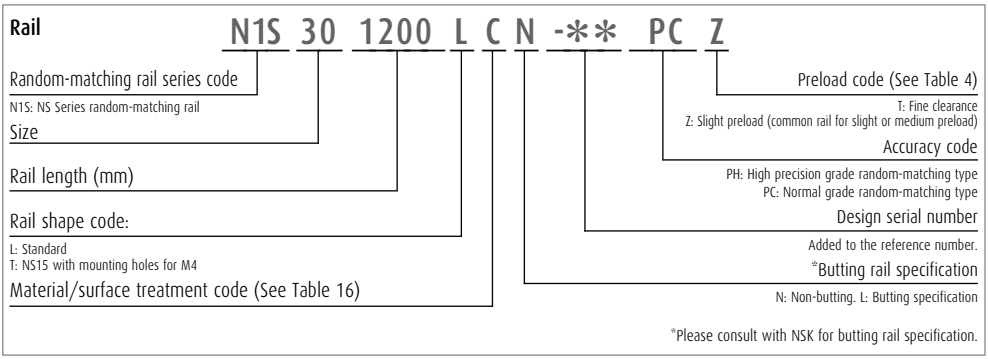
Please specify the reference number, except design serial number, to identify the product when ordering, requiring estimates, or inquiring about specifications from NSK.

(1) Reference number for preloaded assembly



(2) Reference number for random-matching type





The reference number coding for the assembly of random-matching type is the same as that of the preloaded assembly. However, only preload codes of "fine clearance T" and "slight preload Z" are available (See Table 4, page 49).

Click!Speedy NSK Linear Guide Quick Delivery System uses a new numbering system. For details, please refer to the Click!Speedy general catalog CAT. No. E3191.

Table 16 Material/surface treatment code

Code	Description
C	Special high carbon steel (NSK standard)
K	Stainless steel
D	Special high carbon steel with surface treatment
H	Stainless steel with surface treatment
Z	Other, special

Note High-precision grade and medium preload of random-matching type are not available in stainless steel.

Table 17 Accuracy code

Accuracy	Standard (Without NSK K1)	With NSK K1	With NSK K1-L	With NSK K1 for food and medical equipment
Ultra precision grade	P3	K3	L3	F3
Super precision grade	P4	K4	L4	F4
High precision grade	P5	K5	L5	F5
Precision grade	P6	K6	L6	F6
Normal grade	PN	KN	LN	FN
High precision grade (random-matching type)	PH	KH	LH	FH
Normal grade (random-matching type)	PC	KC	LC	FC

Note Refer to pages 454 to 460 for NSK K1/K1-L lubrication unit.

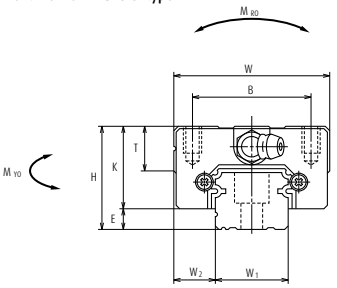
9. Dimensions

NS-CL (Medium-load type / Short)
NS-AL (High-load type / Standard)

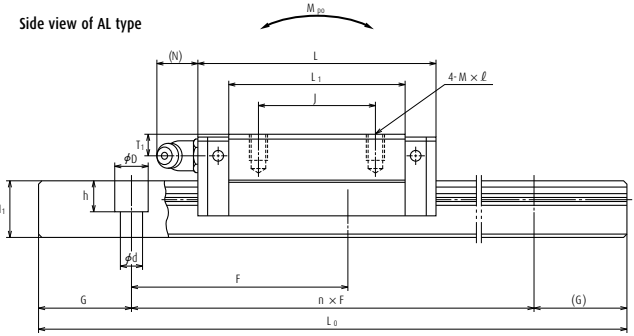
NS 30 1200 AL C 2 -** PC Z

- Series name
- Size
- Rail length (mm)
- Ball slide shape code (See page 47)
- Material/surface treatment code (See Table 16)
  C: Special high carbon steel (NSK standard), K: Stainless steel
- Number of ball slides per rail
- Design serial number
  Added to the reference number.
- Accuracy code (See Table 17)
  0: Z0, 1: Z1, 3: Z3, T: ZT, Z: ZZ, H: ZH
- Preload code (See Table 4)

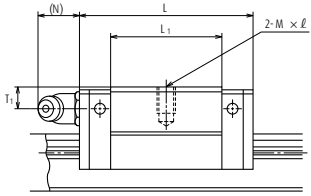
Front view of AL and CL type



Side view of AL type



Side view of CL type



Model No.	Assembly			Ball slide												Width	Height
	Height			Width	Length	Mounting hole						Grease fitting					
	H	E	W_2	W	L	B	J	M × pitch × ℓ	L_1	K	T	Hole size	T_1	N		W_1	H_1
NS15CL	24	4.6	9.5	34	40.4	26	–	M4×0.7×6	23.6	19.4	10	φ 3	6	3		15	12.5
NS15AL	24	4.6	9.5	34	56.8	26	26	M4×0.7×6	40	19.4	10	φ 3	6	3		15	12.5
NS20CL	28	6	11	42	47.2	32	–	M5×0.8×7	30	22	12	M6×0.75	5.5	11		20	15.5
NS20AL	28	6	11	42	65.2	32	32	M5×0.8×7	48	22	12	M6×0.75	5.5	11		20	15.5
NS25CL	33	7	12.5	48	59.6	35	–	M6×1×9	38	26	12	M6×0.75	7	11		23	18
NS25AL	33	7	12.5	48	81.6	35	35	M6×1×9	60	26	12	M6×0.75	7	11		23	18
NS30CL	42	9	16	60	67.4	40	–	M8×1,25×12	42	33	13	M6×0.75	8	11		28	23
NS30AL	42	9	16	60	96.4	40	40	M8×1,25×12	71	33	13	M6×0.75	8	11		28	23
NS35CL	48	10.5	18	70	77	50	–	M8×1,25×12	49	37.5	14	M6×0.75	8.5	11		34	27.5
NS35AL	48	10.5	18	70	108	50	50	M8×1,25×12	80	37.5	14	M6×0.75	8.5	11		34	27.5

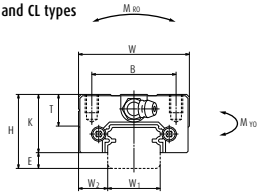
Notes 1) External appearance of stainless steel ball slides differs from those of carbon steel ball slides.

Reference number for ball slide of random-matching type

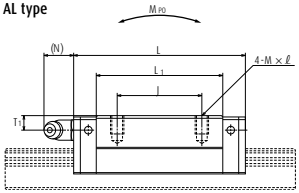
Ball slide NAS 30 AL S Z -L

- Random-matching ball slide series code — NAS: NS Series random-matching ball slide
- Size
- Ball slide shape code (See page 47)
- Material code — No code: Special high carbon steel (NSK standard), S: Stainless steel
- Preload code — No code: Fine clearance, Z: Slight preload, H: Medium preload
- Option code — -L: Equipped with NSK K1-L, -K: Equipped with NSK K1, -F: Fluoride low temperature chrome plating+AS2 grease, -F50: Fluoride low temperature chrome plating+LG2 grease

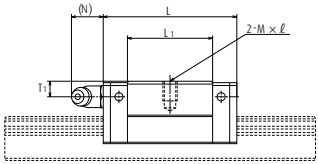
AL and CL types



AL type



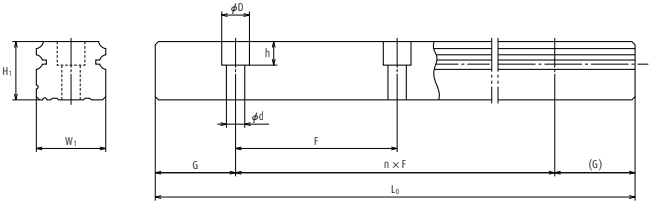
CL type



Reference number for rail of random-matching type

Rail N1S 30 1200 L C N -** PC Z

- Random-matching rail series code — N1S: NS Series random-matching rail
- Size
- Rail length (mm)
- Rail shape code — L: Standard, T: NS15 with mounting holes for M4
- Material/surface treatment code (See Table 16)
- Preload code (See Table 4) — T: Fine clearance, Z: Slight preload (common rail for medium preload)
- Accuracy code — PH: High precision grade. PC: Normal grade
- Design serial number — Added to the reference number.
- *Butting rail specification — N: Non-butting. L: Butting specification
- *Please consult with NSK for butting rail specification.



Unit: mm

Rail				Basic load rating								Weight	
Pitch	Mounting bolt hole	G	Maximum length	2) Dynamic		Static	Static moment (N·m)					Ball slide	Rail
								M_{PO}		M_{YO}			
F	d × D × h	(reference)	L_{0max} ( ) for stainless	[50km] C_{50}(N)	[100km] C_{100}(N)	C_0 (N)	M_{RO}	One slide	Two slides	One slide	Two slides	(kg)	(kg/m)
60	*3.5×6×4.5	20	2 920	7 250	5 750	9 100	45.5	24.5	196	20.5	165	0.14	1.4
60	4.5×7.5×5.3	20	(1 700)	11 200	8 850	16 900	84.5	77	470	64.5	395	0.20	1.4
60	6×9.5×8.5	20	3 960	10 600	8 400	13 400	91.5	46.5	330	39	279	0.19	2.3
60	6×9.5×8.5	20	(3 500)	15 600	12 400	23 500	160	133	755	111	630	0.28	2.3
60	7×11×9	20	3 960	17 700	14 000	20 800	164	91	655	76	550	0.34	3.1
60	7×11×9	20	(3 500)	26 100	20 700	36 500	286	258	1 470	217	1 230	0.51	3.1
80	7×11×9	20	4 000	24 700	19 600	29 600	282	139	1 080	116	905	0.58	4.8
80	7×11×9	20	(3 500)	38 000	30 000	55 000	520	435	2 650	365	2 220	0.85	4.8
80	9×14×12	20	4 000	34 500	27 300	40 000	465	220	1 670	185	1 400	0.86	7.0
80	9×14×12	20	(3 500)	52 500	42 000	74 500	865	695	4 000	580	3 350	1.3	7.0

2) The basic load rating comply with the ISO standard. (ISO 14728-1, 14728-2)
C_{50}; the basic dynamic load rating for 50 km rated fatigue life C_{100}; the basic dynamic load rating for 100 km rated fatigue life
The basic static load rating shows static permissible load.

3) High-precision grade and medium preload of random-matching type are available for special high carbon steel products.

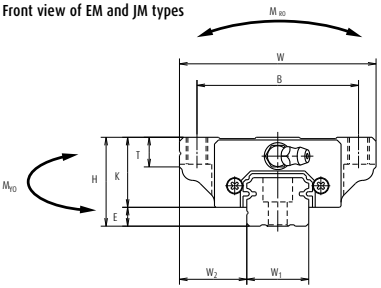
* Standard mounting hole of NS15 rail is for M4 bolts (Hole size: 4.5 × 7.5 × 5.3).
If you require mounting hole for M3 bolts (Hole size: 3.5 × 6 × 4.5), please specify when ordering.

NS-JM (Medium-load type / Short)
NS-EM (High-load type / Standard)

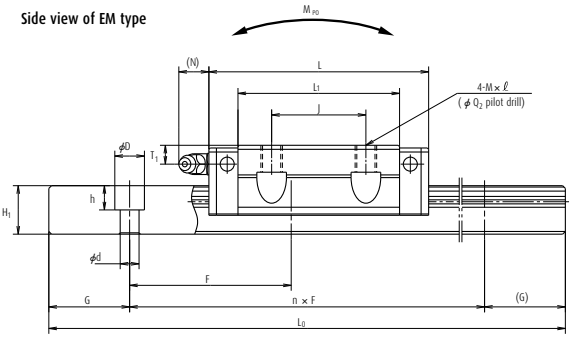
NS 30 1200 EM C 2 - ** PC Z**

- Series name
- Size
- Rail length (mm)
- Ball slide shape code (See page 47)
- Material/surface treatment code (See Table 16)
  C: Special high carbon steel (NSK standard), K: Stainless steel
- Number of ball slides per rail
- Design serial number
  Added to the reference number.
- Accuracy code (See Table 17)
- Preload code (See Table 4)
  0: Z0, 1: Z1, 3: Z3, T: ZT, Z: ZZ, H: ZH

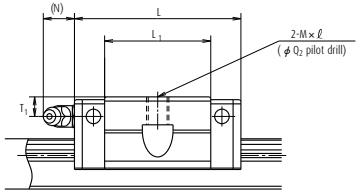
Front view of EM and JM types



Side view of EM type



Side view of JM type



Model No.	Assembly			Ball slide													Grease fitting			Width	Height
	Height			Width	Length	Mounting hole				L_1	K	T	Hole size	T_1	N	W_1	H_1				
	H	E	W_2	W	L	B	J	M × pitch × ℓ	Q_2												
NS15JM	24	4.6	18.5	52	40.4	41	–	M5×0.8×7	4.4	23.6	19.4	8	ϕ 3	6	3	15	12.5				
NS15EM	24	4.6	18.5	52	56.8	41	26	M5×0.8×7	4.4	40	19.4	8	ϕ 3	6	3	15	12.5				
NS20JM	28	6	19.5	59	47.2	49	–	M6×1×9	5.3	30	22	10	M6×0.75	5.5	11	20	15.5				
NS20EM	28	6	19.5	59	65.2	49	32	(M6×1×9.5)	5.3	48	22	10	M6×0.75	5.5	11	20	15.5				
NS25JM	33	7	25	73	59.6	60	–	M8×1.25×10	6.8	38	26	11	M6×0.75	7	11	23	18				
NS25EM	33	7	25	73	81.6	60	35	(M8×1.25×11.5)	6.8	60	26	(12)	M6×0.75	7	11	23	18				
NS30JM	42	9	31	90	67.4	72	–	M10×1.5×12	8.6	42	33	11	M6×0.75	8	11	28	23				
NS30EM	42	9	31	90	96.4	72	40	(M10×1.5×14.5)	8.6	71	33	(15)	M6×0.75	8	11	28	23				
NS35JM	48	10.5	33	100	77	82	–	M10×1.5×13	8.6	49	37.5	12	M6×0.75	8.5	11	34	27.5				
NS35EM	48	10.5	33	100	108	82	50	(M10×1.5×14.5)	8.6	80	37.5	(15)	M6×0.75	8.5	11	34	27.5				

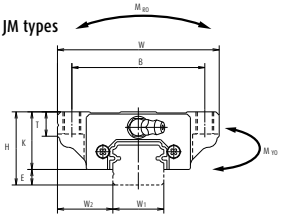
Notes
1) External appearance of stainless steel ball slides differs from those of carbon steel ball slides.
2) Parenthesized dimensions are for items made of stainless steel.

Reference number for ball slide of random-matching type

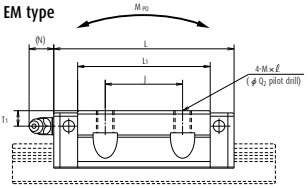
Ball slide NAS 30 EM S Z -L

- Random-matching ball slide series code — NAS: NS Series random-matching ball slide
- Size
- Ball slide shape code (See page 47)
- Material code — No code: Special high carbon steel (NSK standard), S: Stainless steel
- Preload code — No code: Fine clearance, Z: Slight preload, H: Medium preload
- Option code — -L: Equipped with NSK K1-L; -K: Equipped with NSK K1; -F: Fluoride low temperature chrome plating+AS2 grease; -F50: Fluoride low temperature chrome plating+LG2 grease

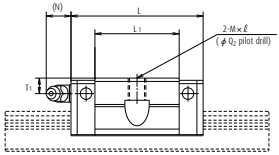
EM and JM types



EM type



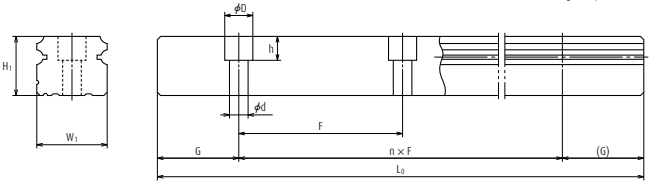
JM type



Reference number for rail of random-matching type

Rail N1S 30 1200 L C N -** PC Z

- Random-matching rail series code — N1S: NS Series random-matching rail
- Size
- Rail length (mm)
- Rail shape code — L: Standard; T: N515 with mounting holes for M4
- Material/surface treatment code (See Table 16)
- *Butting rail specification — N: Non-butting, L: Butting specification. *Please consult with NSK for butting rail specification.
- Design serial number — Added to the reference number.
- Accuracy code — PH: High precision grade; PC: Normal grade
- Preload code (See Table 4) — T: Fine clearance; Z: Slight preload (common rail for medium preload)

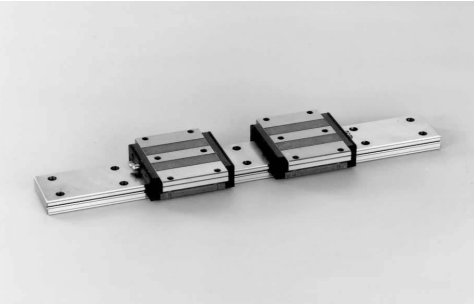


Unit: mm

Rail				Basic load rating								Weight	
Pitch	Mounting bolt hole	G	Maximum length	3) Dynamic		Static	Static moment (N·m)					Ball slide	Rail
								M_{PO}		M_{YO}			
F	d × D × h	(reference)	L_{0max} ( ) for stainless	[50km] C_{50}(N)	[100km] C_{100}(N)	C_0 (N)	M_{RO}	One slide	Two slides	One slide	Two slides	(kg)	(kg/m)
60	*3.5×6×4.5	20	2 920	7 250	5 750	9 100	45.5	24.5	196	20.5	165	0.17	1.4
60	4.5×7.5×5.3	20	(1 700)	11 200	8 850	16 900	84.5	77	470	64.5	395	0.26	1.4
60	6×9.5×8.5	20	3 960	10 600	8 400	13 400	91.5	46.5	330	39	279	0.24	2.3
60	6×9.5×8.5	20	(3 500)	15 600	12 400	23 500	160	133	755	111	630	0.35	2.3
60	7×11×9	20	3 960	17 700	14 000	20 800	164	91	655	76	550	0.44	3.1
60	7×11×9	20	(3 500)	26 100	20 700	36 500	286	258	1 470	217	1 230	0.66	3.1
80	7×11×9	20	4 000	24 700	19 600	29 600	282	139	1 080	116	905	0.76	4.8
80	7×11×9	20	(3 500)	38 000	30 000	55 000	520	435	2 650	365	2 220	1.2	4.8
80	9×14×12	20	4 000	34 500	27 300	40 000	465	220	1 670	185	1 400	1.2	7.0
80	9×14×12	20	(3 500)	52 500	42 000	74 500	865	695	4 000	580	3 350	1.7	7.0

3) The basic load rating comply with the ISO standard. (ISO 14728-1, 14728-2)
C_{50}; the basic dynamic load rating for 50 km rated fatigue life C_{100}; the basic dynamic load rating for 100 km rated fatigue life
The basic static load rating shows static permissible load.
4) High-precision grade and medium preload of random-matching type are available for special high carbon steel products.
* Standard mounting hole of NS15 rail is for M4 bolts (Hole size: 4.5 × 7.5 × 5.3).
If you require mounting hole for M3 bolts (Hole size: 3.5 × 6 × 4.5), please specify when ordering.

8. LW-Series: Linear Wide Body Ball Guides



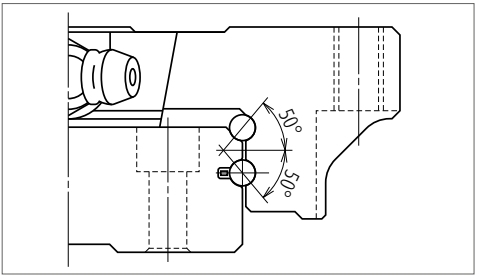


Fig. 1 Balls in contact

1. Features

(1) Ideal for use of single rail

Thanks to the wide rail, rigidity and load carrying capacity are high against moment load from rolling direction. This makes the LW Series ideal for a single rail, compact linear guideway system.

(2) High load carrying capacity to vertical direction

The contact angle is set at 50 degrees, increasing load carrying capacity as well as rigidity in vertical direction.

(3) High resistance against impact load

Same as the NH and NS series, the offset Gothic arch grooves support a large load, such as an impact, by four rows.

(4) High accuracy

Fixing master rollers to ball grooves is easy thanks to the Gothic arch groove. This makes easy and accurate measuring of ball grooves.

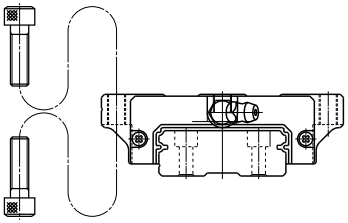
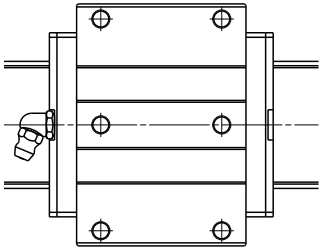
(5) Easy to handle, and designed with safety in mind

Balls are retained in the retainer and do not fall out when a ball slide is withdrawn from the rail.

(6) Fast delivery

Lineup of random-matching rails and ball slides supports and facilitates fast delivery.

2. Ball slide shape

Ball slide Model	Shape/installation method	Type
EL		EL 

3. Accuracy and preload

(1) Running parallelism of ball slide

Table 1

Unit: μm

Rail length (mm) over	or less	Preloaded assembly (not random matching) High precision P5	Precision grade P6	Normal grade PN	Random-matching type Normal grade PC
–	50	2	4.5	6	6
50	80	3	5	6	6
80	125	3.5	5.5	6.5	6.5
125	200	4	6	7	7
200	250	5	7	8	8
250	315	5	8	9	9
315	400	6	9	11	11
400	500	6	10	12	12
500	630	7	12	14	14
630	800	8	14	16	16
800	1 000	9	16	18	18
1 000	1 250	10	17	20	20
1 250	1 600	11	19	23	23
1 600	2 000	13	21	26	26
2 000	2 500	15	22	29	29
2 500	3 150	17	25	32	32
3 150	4 000	23	30	34	34

(2) Accuracy standard

The preloaded assembly has three accuracy grades; High precision P5, Precision P6, and Normal PN grades, while the random-matching type has Normal PC grade only.

› Tolerance of preloaded assembly type

Table 2

Unit: μm

Characteristics \ Accuracy grade	High precision P5	Precision grade P6	Normal grade PN
Mounting height H	±20	±40	±80
Variation of H (All ball slides on a set of rails)	7	15	25
Mounting width W_2 or W_3	±25	±50	±100
Variation of W_2 or W_3 (All ball slides on reference rail)	10	20	30
Running parallelism of surface C to surface A Running parallelism of surface D to surface B	Shown in **Table 1** and **Fig. 2**		

› Tolerance of random-matching type: Normal grade PC

Table 3

Unit: μm

Characteristics \ Model No.	LW17, 21, 27, 35, 50
Mounting height H	±20
Variation of mounting height H	15 ① 30 ②
Mounting width W_2 or W_3	±30
Variation of mounting width W_2 or W_3	25
Running parallelism of surface C to surface A Running parallelism of surface D to surface B	See **Table 1** and **Fig. 2**

Notes ① Variation on the same rail / ② Variation on multiple rails

(3) Combinations of accuracy and preload

Table 4

		Accuracy grade			
		High precision	Precision grade	Normal grade	Normal grade
Without NSK K1 lubrication unit		P5	P6	PN	PC
With NSK K1 lubrication unit		K5	K6	KN	KC
With NSK K1 for food and medical equipment		F5	F6	FN	FC
Preload	Fine clearance Z0	○	○	○	—
	Slight preload Z1	○	○	○	—
	Medium preload Z3	○	○	—	—
	Random-matching type with fine clearance ZT	—	—	—	○
	Random-matching type with slight preload ZZ	—	—	—	○

Note Z3 medium preload is only applicable to models of LW35 and LW50.

(4) Assembled accuracy

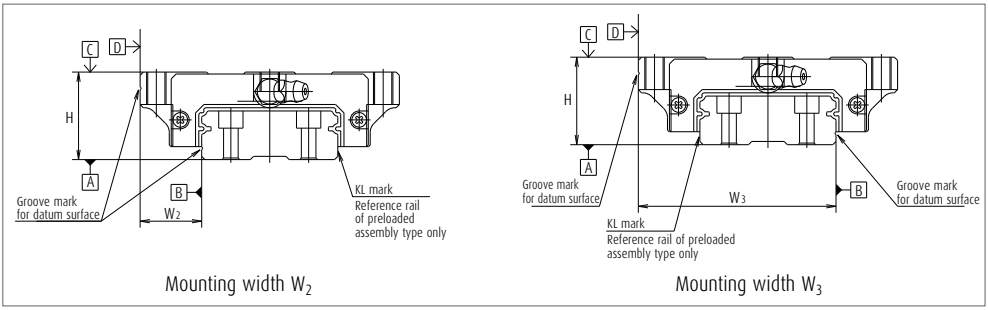


Fig. 2

(5) Preload and rigidity

We offer five levels of preload: Slight preload Z1, Medium preload Z3 and Fine clearance Z0, along with Random-matching type of Fine clearance ZT and Slight preload ZZ. Rigidities are for the median of the preload range.

› Preload and rigidity of preloaded assembly

Table 5

Model No.	Preload (N)		Rigidity (N/μm)			
			Vertical direction		Lateral direction	
	Slight preload Z1	Medium preload Z3	Slight preload Z1	Medium preload Z3	Slight preload Z1	Medium preload Z3
LW17 EL	0 - 245	—	156	—	112	—
LW21 EL	0 - 294	—	181	—	130	—
LW27 EL	0 - 390	—	226	—	167	—
LW35 EL	0 - 490	785	295	440	213	315
LW50 EL	0 - 590	1 470	345	600	246	425

Note Clearance for Fine clearance Z0 is 0 to 3μm. Therefore, preload is zero.
However, Z0 of PN grade is 0 to 15μm.

› Clearance and preload of random-matching type

Table 6

Unit: μm

Model No.	Fine clearance ZT	Slight preload ZZ
LW17	−3 — 15	−3.5 — 0
LW21	−3 — 15	−3.5 — 0
LW27	−4 — 15	−4 — 0
LW35	−5 — 15	−5 — 0
LW50	−5 — 15	−7 — 0

Note Minus sign denotes elastic deformation of balls representing.

4. Maximum rail length

Table 7 shows the limitations of rail length (maximum length). However, the limitations vary by accuracy grade.

Table 7 Length limitations of rails

Unit: mm

Model No.	Size / Material	17	21	27	35	50
LW	Special high carbon steel	1 000	1 600	2 000	2 000	2 000

Note Rails can be butted if user requirement exceeds the rail length shown in the table. Please consult NSK.

5. Installation

(1) Permissible values of mounting error

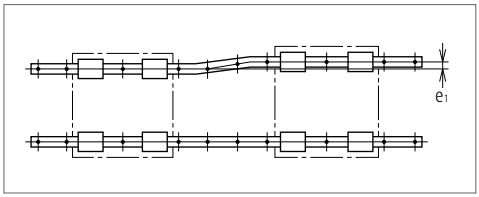


Fig. 3

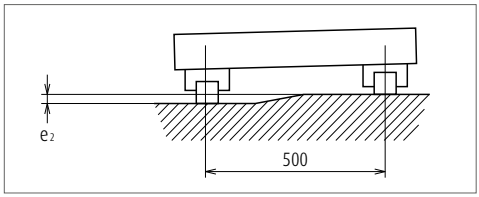


Fig. 4

Table 8

Unit: μm

Value	Preload	Model No.				
		LW17	LW21	LW27	LW35	LW50
Permissible values of parallelism in two rails e_1	Z0, ZT	20	20	25	38	50
	Z1, ZZ	9	9	13	23	34
Permissible values of parallelism (height) in two rails e_2	Z0, ZT	100 μm/500 mm				
	Z1, ZZ	45 μm/500 mm				

(2) Shoulder height of the mounting surface and corner radius r

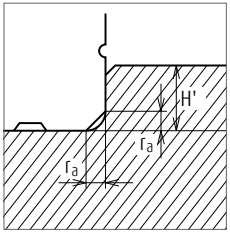


Fig. 5 Shoulder for the rail datum face

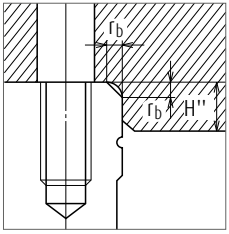


Fig. 6 Shoulder for the ball slide datum face

Table 9

Unit: mm

Model No.	Corner radius (maximum)		Shoulder height	
	r_a	r_b	H'	H''
LW17	0.3	0.3	2.2	4
LW21	0.3	0.3	2.5	5
LW27	0.5	0.5	3.5	5
LW35	0.5	0.8	3.5	5
LW50	0.8	0.8	4	6

7. Dust-proof components

(1) Standard specification

The LW Series can be readily used as they have a dust protection means for normal conditions. As the standard equipment, the series has an end seal on both ends and bottom seals at the bottom.

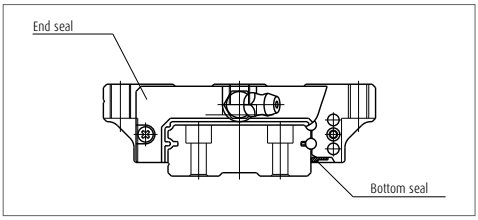


Fig. 13

Table 11 Seal friction per ball slide (maximum value)

Unit: N

Size \ Series	17	21	27	35	50
LW	6	8	12	16	20

(2) NSK K1 lubrication unit

Table 12 shows the dimension of linear guides equipped with the NSK K1 lubrication unit.

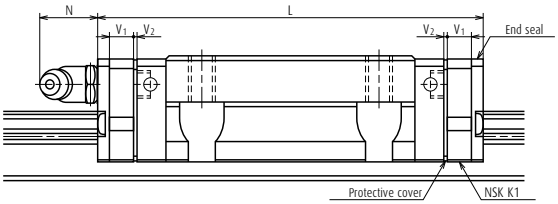


Table 12

Unit: mm

Model No.	Ball slide length	Ball slide model	Standard ball slide length	Ball slide length installed with two NSK K1 L	Per NSK K1 thickness V_1	Protective cover thickness V_2	Protruding area of the grease fitting N
LW17	Standard	EL	51.4	61.6	4.5	0.6	(5)
LW21	Standard	EL	58.8	71.4	5.5	0.8	(13)
LW27	Standard	EL	74	86.6	5.5	0.8	(13)
LW35	Standard	EL	108	123	6.5	1.0	(13)
LW50	Standard	EL	140.6	155.6	6.5	1.0	(14)

Note 1) NSK K1 for food and medical equipments are available for the models of LW17 to LW35.
2) Ball slide length equipped with NSK K1 = (Standard ball slide length) + (Thickness of NSK K1, $V_1 \times$ Number of NSK K1) + (Thickness of the protective cover, $V_2 \times 2$)

(3) Double seal

Use a double seal set as showing in **Table 13**, when installing an extra seal to completed standard products. **(Fig. 10)**

When installing a grease fitting after the installation of double seals, a connector as showing **Fig.10** is required.

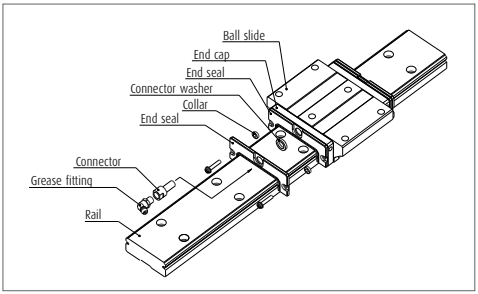


Fig. 10 Double seal

(4) Protector

Use a protector set as showing **Table 14**, when installing a protector to completed standard products. **(Fig.11)**

When installing a grease fitting after the installation of protectors, a connector as showing **Fig.11** is required.

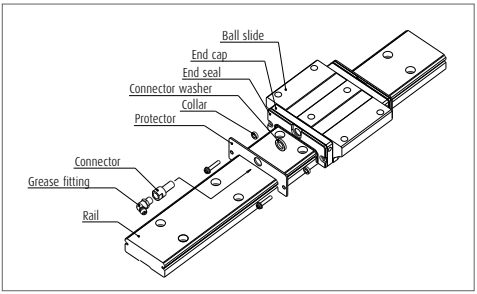


Fig. 11 Protector seal

Table 13 Double-seal set

Model No.	Reference No.		Increased thickness V_3 (mm)
	Without connector	With connector	
LW17	LW17WS-01	*	2.6
LW21	LW21WS-01	LW21WSC-01	2.8
LW27	LW27WS-01	LW27WSC-01	2.5
LW35	LW35WS-01	LW35WSC-01	3
LW50	LW50WS-01	LW50WSC-01	3.6

Table 14 Protector set

Model No.	Reference No.		Increased thickness V_4 (mm)
	Without connector	With connector	
LW17	LW17PT-01	*	3.2
LW21	LW21PT-01	LW21PTC-01	3.2
LW27	LW27PT-01	LW27PTC-01	2.9
LW35	LW35PT-01	LW35PTC-01	3.6
LW50	LW50PT-01	LW50PTC-01	4.2

*) For installation of a connector to a drive-in type grease fitting, contact NSK.

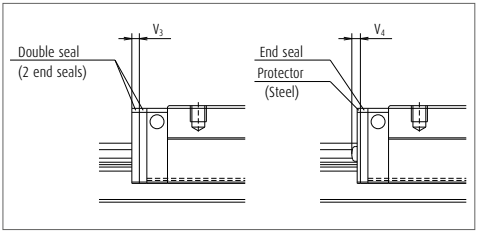


Fig. 12

(5) Cap to plug the rail mounting bolt hole

Table 15 Caps to plug rail bolt hole

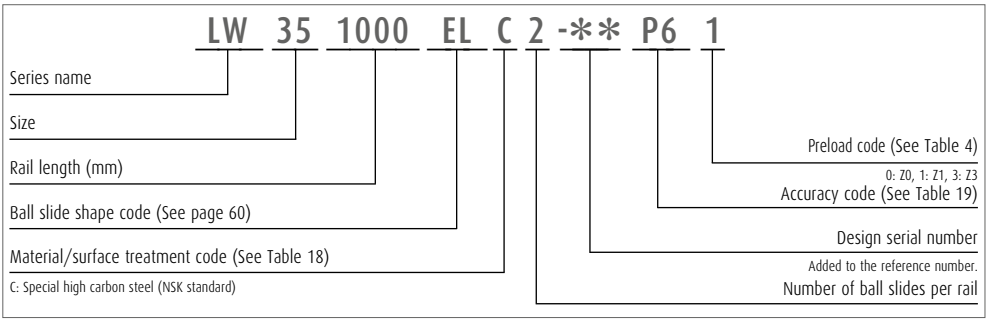
Modell No.	Bolt to secure rail	Cap reference No.	Quantity/case
LW17, LW21, LW27	M4	LG-CAP/M4	20
LW35	M6	LG-CAP/M6	20
LW50	M8	LG-CAP/M8	20

8. Reference number

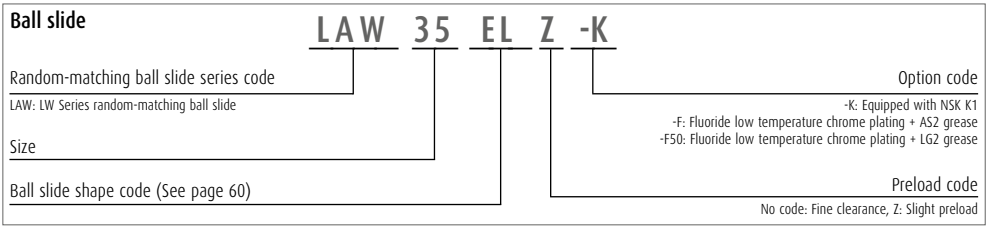
Reference numbers shall be set to individual NSK linear guide when its specifications are finalized, and it is indicated on its specification drawing.

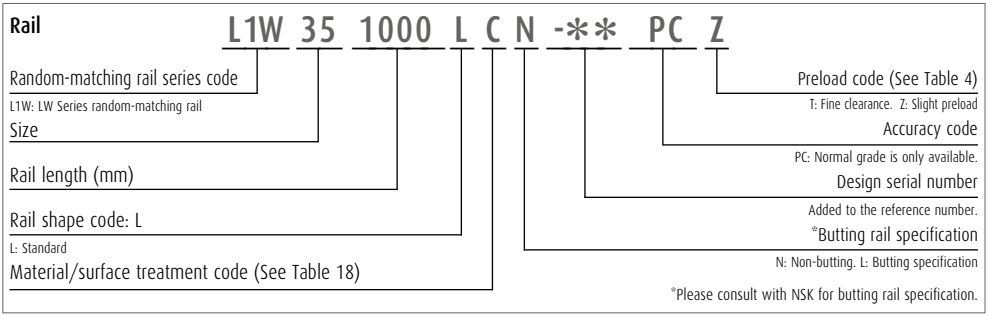
Please specify the reference number, except design serial number, to identify the product when ordering, requiring estimates, or inquiring about specifications from NSK.

(1) Reference number for preloaded assembly



(2) Reference number for random-matching type





The reference number coding for the assembly of random-matching type is the same as that of preloaded assembly. However, only preload codes of "fine clearance T" and "slight preload Z" are available (See Table 4, page 62).

Click!Speedy NSK Linear Guide Quick Delivery System uses a new numbering system. For details, please refer to the Click!Speedy general catalog CAT. No. E3191.

Table 18 Material/surface treatment code

Code	Description
C	Special high carbon steel (NSK standard)
D	Special high carbon steel with surface treatment
Z	Other, special

Table 19 Accuracy code

Accuracy	Standard (Without NSK K1)	With NSK K1	With NSK K1 for food and medical equipment
High precision grade	P5	K5	F5
Precision grade	P6	K6	F6
Normal grade	PN	KN	FN
Normal grade (random-matching type)	PC	KC	FC

Note Refer to pages 454 to 459 for NSK K1 lubrication unit.

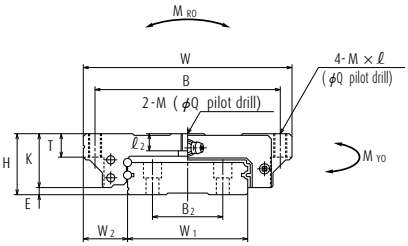
(9) Dimensions

LW-EL

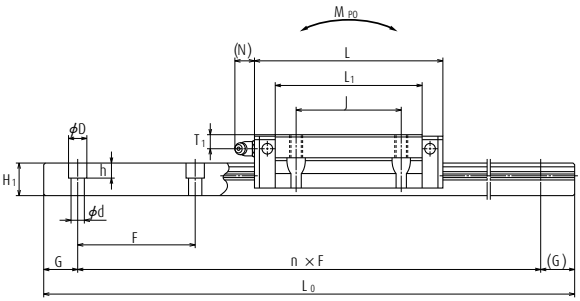
LW 35 1000 EL C 2 -** PC Z

- Series name
- Size
- Rail length (mm)
- Ball slide shape code (See page 60)
- Material/surface treatment code (See Table 18)
  C: Special high carbon steel (NSK standard)
- Number of ball slides per rail
- Design serial number
  Added to the reference number.
- Accuracy code (See Table 19)
  0: Z0, 1: Z1, 3: Z3, T: ZT, Z: ZZ
- Preload code (See Table 4)

Front view



Side view

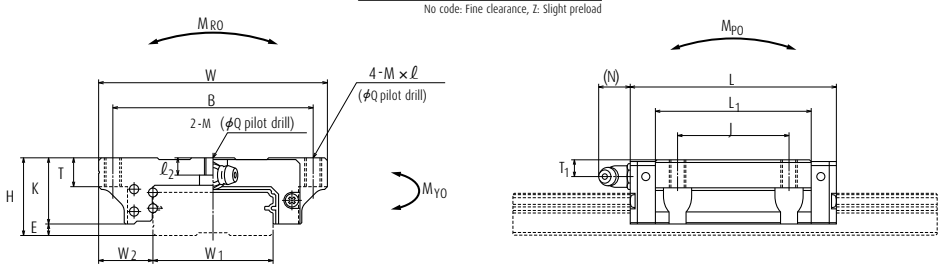


Model No.	Assembly			Ball slide														Width	Height
	Height			Width	Length	Mounting hole					Grease fitting								
	H	E	W_2	W	L	B	J	M × pitch × ℓ	ℓ_2	Q	L_1	K	T	Hole size	T_1	N	W_1	H_1
LW17EL	17	2.5	13.5	60	51.4	53	26	M4×0.7×6	3.2	3.3	35	14.5	6	ϕ 3	4	3	33	8.7
LW21EL	21	3	15.5	68	58.8	60	29	M5×0.8×8	3.7	4.4	41	18	8	M6×0.75	4.5	11	37	10.5
LW27EL	27	4	19	80	74	70	40	M6×1×10	6	5.3	56	23	10	M6×0.75	6	11	42	15
LW35EL	35	4	25.5	120	108	107	60	M8×1.25×14	9	6.8	84	31	14	M6×0.75	8	11	69	19
LW50EL	50	4.5	36	162	140.6	144	80	M10×1.5×18	14	8.6	108	45.5	18	Rc1/8	14	14	90	24

Reference number for ball slide of random-matching type

LAW 35 EL Z -K

- Random-matching ball slide series code — LAW: LW Series random-matching ball slide
- Size
- Ball slide shape code (See page 60)
- Preload code — No code: Fine clearance, Z: Slight preload
- Option code — -K: Equipped with NSK K1; -F: Fluoride low temperature chrome plating + AS2 grease; -F50: Fluoride low temperature chrome plating + LG2 grease

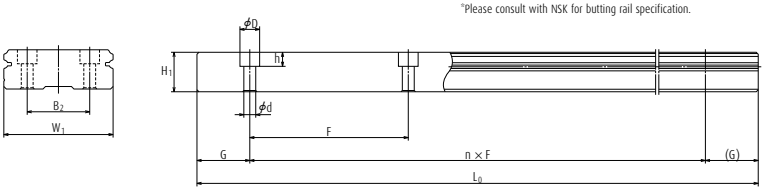


Reference number for rail of random-matching type

Rail L1W 35 1000 L C N - PC Z**

- Random-matching rail series code — L1W: LW Series random-matching rail
- Size
- Rail length (mm)
- Rail shape code: L — L: Standard
- Material/surface treatment code (See Table 18)
- *Butting rail specification — N: Non-butting, L: Butting specification
- Design serial number — Added to the reference number.
- Accuracy code: PC — PC: Normal grade is only available.
- Preload code (See Table 4) — T: Fine clearance, Z: Slight preload

*Please consult with NSK for butting rail specification.

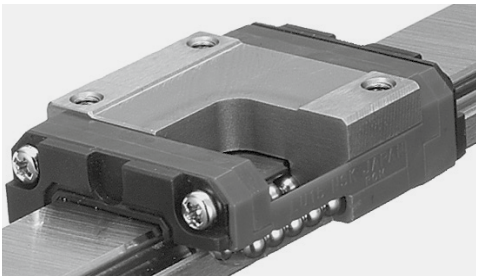


Unit: mm

Rail					Basic load rating								Weight	
	Pitch	Mounting bolt hole	G	Maximum length	1) Dynamic		Static	Static moment (N·m)					Ball slide	Rail
									M_{PO}		M_{YO}			
B_2	F	d × D × h	(reference)	L_{0max} ( ) for stainless	[50km] C_{50}(N)	[100km] C_{100}(N)	C_0 (N)	M_{RO}	One slide	Two slides	One slide	Two slides	(kg)	(kg/m)
18	40	4.5×7.5×5.3	15	1 000	5 600	4 450	11 300	135	44	288	37	242	0.2	2.1
22	50	4.5×7.5×5.3	15	1 600	6 450	5 150	13 900	185	65.5	400	55	335	0.3	2.9
24	60	4.5×7.5×5.3	20	2 000	12 800	10 200	26 900	400	171	970	143	815	0.5	4.7
40	80	7×11×9	20	2 000	33 000	26 400	66 500	1 690	645	3 550	545	2 990	1.5	9.6
60	80	9×14×12	20	2 000	61 500	48 500	117 000	3 900	1 530	8 200	1 280	6 900	4.0	15.8

Note The basic load rating comply with the ISO standard. (ISO 14728-1, 14728-2)
C_{50}: the basic dynamic load rating for 50 km rated fatigue life C_{100}: the basic dynamic load rating for 100 km rated fatigue life

9. PU-Series: Miniature Linear Ball Guides



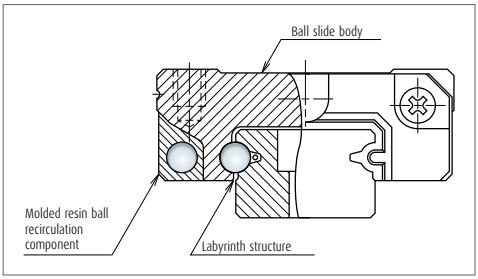


Fig. 1

1. Features

(1) Motion performance

Newly designed recirculation component facilitates smooth circulation of steel balls.

(2) Lightweight

The ball slide is fabricated to be approximately 20% lighter than LU Series by the application of resin to a part of its body.

(3) Reduced noise intensity

Resin components applied in ball circulating circuits reduce collision noise between steel balls and the inner wall of circulating circuits.

(4) Low dust generation

The structure is designed to prevent dust generation.

(5) Excellent dust-proofing

It is designed to minimize the clearance between the side of rails and the inner walls of the slide, and prevent foreign matters from entering the ball slide.

(6) High corrosion resistance

High corrosion-resistant martensite stainless steel is incorporated as a standard feature to provides excellent corrosion resistance.

(7) Easy to handle

Safety design includes a retainer that prevents steel balls from dropping out of the ball slide even when the slide is removed from the rail.

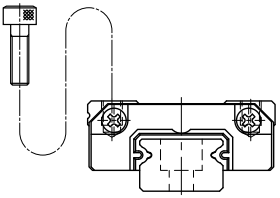
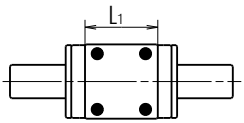
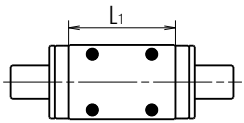
(8) Long-term maintenance-free

Superb features of NSK K1 Lubrication unit realize a long-term, maintenance-free operation.

(9) Fast delivery

Lineup of random-matching rails and ball slides facilitates fast delivery. (PU09 to PU15)

2. Ball slide shape

Ball slide Model	Shape/installation method	Type (Upper row, Rating: Lower row, Ball slide length)	
		Standard type	High-load type
		Standard	Long
AR TR AL UR BL BR		TR, AR, AL 	UR, BL 

3. Accuracy and preload

(1) Running parallelism of ball slide

Table 1

Unit: μm

Rail length (mm)		Preloaded assembly (not random matching)				Random-matching type
over	or less	Super precision P4	High precision P5	Precision grade P6	Normal grade PN	Normal grade PC
–	50	2	2	4.5	6	6
50	80	2	3	5	6	6
80	125	2	3.5	5.5	6.5	6.5
125	200	2	4	6	7	7
200	250	2.5	5	7	8	8
250	315	2.5	5	8	9	9
315	400	3	6	9	11	11
400	500	3	6	10	12	12
500	630	3.5	7	12	14	14
630	800	4.5	8	14	16	16
800	1 000	5	9	16	18	18
1 000	1 250	6	10	17	20	20

(2) Accuracy standard

The preloaded assembly has four accuracy grades; Super precision P4, High precision P5, Precision grade P6, and normal grade PN, while the random-matching type has Normal grade PC only.

Table 2 shows the accuracy standard for the preloaded assembly type while **Table 3** shows the accuracy standard for the random-matching types.

› Tolerance of preloaded assembly type

Table 2

Unit: µm

Characteristics \ Accuracy grade	Super precision P4	High precision P5	Precision grade P6	Normal grade PN
Mounting height H	±10	±15	±20	±40
Variation of H	5	7	15	25
(All ball slides on a set of rails)				
Mounting width W_2 or W_3	±15	±20	±30	±50
Variation of W_2 or W_3	7	10	20	30
(All ball slides on reference rail)				
Running parallelism of surface C to surface A Running parallelism of surface D to surface B	Shown in **Table 1** and **Fig. 2**			

› Tolerance of random-matching type: Normal grade PC

Table 3

Unit: µm

Characteristics \ Model No.	PU09, 12 and 15
Mounting height H	±20
Variation of mounting height H	15 ① 30 ②
Mounting width W_2 or W_3	±20
Variation of mounting width W_2 or W_3	20
Running parallelism of surface C to surface A Running parallelism of surface D to surface B	Shown in **Table 1** and **Fig. 2**

Notes ① Variation on the same rail / ② Variation on multiple rails

(3) Assembled accuracy

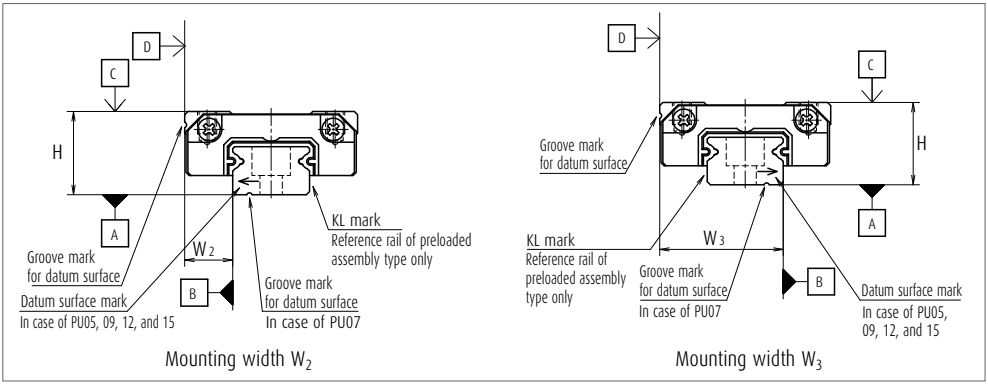


Fig. 2

Note Please refer to page 16 for marks on the datum surfaces.

(4) Preload and rigidity

We offer three levels of preload: Slight preload Z1 and Fine clearance Z0 for preloaded assembly type, along with Fine clearance ZT for random-matching type. Values for preload and rigidity of the preloaded assembly type are shown in **Table 4**. Rigidities are for the median of the preload range.

› Preload and rigidity of preloaded assembly

Table 4

Model No.		Preload (N)	Rigidity (N/μm)
		Slight preload (Z1)	Slight preload (Z1)
Standard type	PU05TR	0 – 3	17
	PU07AR	0 – 8	22
	PU09TR	0 – 10	30
	PU12TR	0 – 17	33
	PU15AL	0 – 33	45
High-load type	PU09UR	0 – 14	46
	PU12UR	0 – 25	52
	PU15BL	0 – 51	75

Note Clearance of Fine clearance Z0 is 0 to 3 μm. Therefore, preload is zero.

› Clearance of random-matching type

Table 5

Unit : μm

Model No.		Fine clearance ZT
Standard type	PU09TR	3 or less
	PU12TR	
	PU15AL	
High-load typ	PU09UR	5 or less
	PU12UR	
	PU15BL	

4. Maximum rail length

Table 6 shows the limitations of rail length (maximum length). However, the limitations vary by accuracy grade.

Table 6 Length limitations of rails

Unit: mm

Series	Size / Material	05	07	09	12	15
PU	Stainless steel	210	375	600	800	1 000

Note Rails can be butted if user requirement exceeds the rail length shown in the table. Please consult NSK.

5. Installation

(1) Permissible values of mounting error

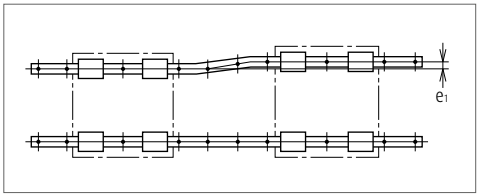


Fig. 3

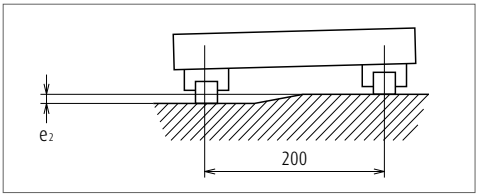


Fig. 4

Table 7

Unit: μm

Value	Preload	Model No.				
		PU05	PU07	PU09	PU12	PU15
Permissible values of parallelism in two rails e_1	Z0, ZT	10	12	15	20	25
	Z1	7	10	13	15	21
Permissible values of parallelism (height) in two rails e_2	Z0, ZT	150 μm/200 mm				
	Z1	90 μm/200 mm				

(2) Shoulder height of the mounting surface and corner radius r

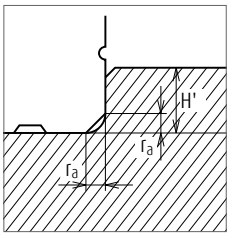


Fig. 5 Shoulder for the rail datum face

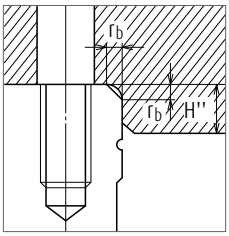


Fig. 6 Shoulder for the ball slide datum face

Table 8

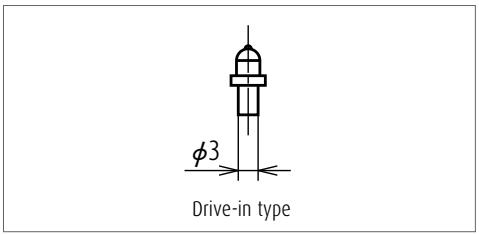
Unit: mm

Model No.	Corner radius (maximum)		Shoulder height	
	r_a	r_b	H'	H"*
PU05	0.2	0.2	0.7	2.3
PU07	0.2	0.3	1.2	2.5
PU09	0.3	0.3	1.9	2.6
PU12	0.3	0.3	2.5	3.4
PU15	0.3	0.5	3.5	4.4

*) H" is the minimum recommended value based on the dimension T in dimension table.

6. Lubrication accessory

Model of PU15 can select drive-in type grease fitting as an option.
For the models of PU05 to PU12, apply grease directly to the ball grooves of rail using a point nozzle.



Drive-in type

7. Dust-proof components

(1) Standard specification

An end seal provided to both ends of a ball slide as a standard feature.

Seal friction per standard ball slide is shown in **Table 9**.

Table 9 Seal friction per ball slide (maximum value)

Unit: N

Size \ Series	05	07	09	12	15
PU	0.3	0.3	0.5	0.5	0.5

(2) NSK K1 lubrication unit

Table 10 shows the dimension of linear guides equipped with the NSK K1 lubrication unit.

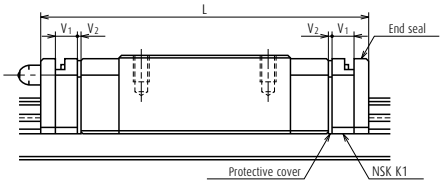


Table 10

Unit: mm

Model No.	Ball slide length	Ball slide model	Standard ball slide length	Ball slide length installed with two NSK K1 L	Thickness of NSK K1, V_1	Thickness of protective cover, V_2
PU05	Standard	TR	19.4	24.4	2	0.5
PU07	Standard	AR	23.4	29.4	2.5	0.5
PU09	Standard	TR	30	36.4	2.7	0.5
PU09	Long	UR	41	47.4	2.7	0.5
PU12	Standard	TR	35	42	3	0.5
PU12	Long	UR	48.7	55.7	3	0.5
PU15	Standard	AL	43	51.2	3.5	0.6
PU15	Long	BL	61	69.2	3.5	0.6

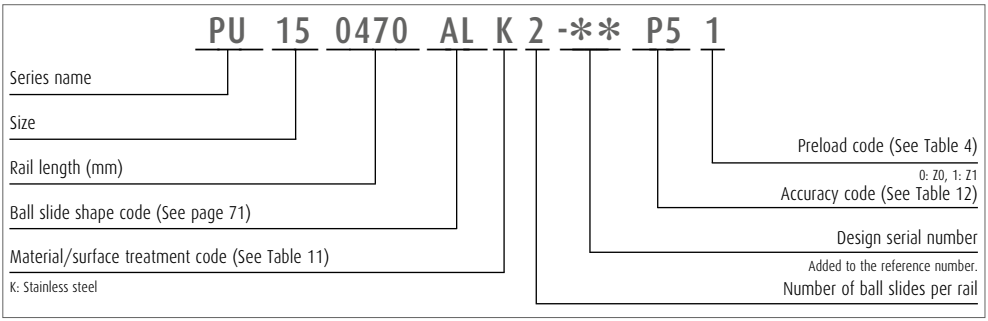
Note Ball slide length equipped with NSK K1 = (Standard ball slide length) + (Thickness of NSK K1, V1 × Number of NSK K1) + (Thickness of the protective cover $V_2 \times 2$)

8. Reference number

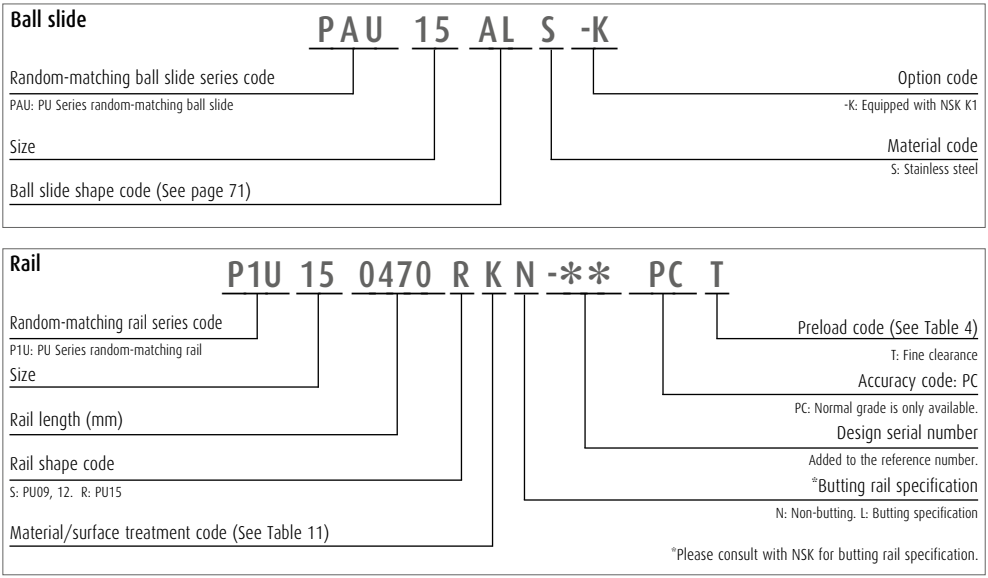
Reference numbers shall be set to individual NSK linear guide when its specifications are finalized, and it is indicated on its specification drawing.

Please specify the reference number, except design serial number, to identify the product when ordering, requiring estimates, or inquiring about specifications from NSK.

(1) Reference number for preloaded assembly



(2) Reference number for random-matching type



The reference number coding for the assembly of random-matching type is the same as that of preloaded assembly. However, only preload code of "fine clearance T" is available (See Table 4, page 73).

Click!Speedy NSK Linear Guide Quick Delivery System uses a new numbering system. For details, please refer to the Click!Speedy general catalog CAT. No. E3191.

Table 11 Material/surface treatment code

Code	Description
K	Stainless steel
H	Stainless steel with surface treatment
Z	Other, special

Table 12 Accuracy code

Accuracy	Standard (Without NSK K1)	With NSK K1	With NSK K1 for food and medical equipment
Super precision grade	P4	K4	F4
High precision grade	P5	K5	F5
Precision grade	P6	K6	F6
Normal grade	PN	KN	FN
Normal grade (random-matching type)	PC	KC	FC

Note Refer to pages 454 to 459 for NSK K1 lubrication unit.

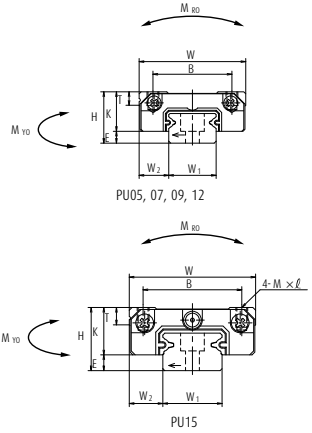
9. Dimensions

PU-TR, AR, AL (Standard type / Standard)
PU-UR, BL (High-load type / Long)

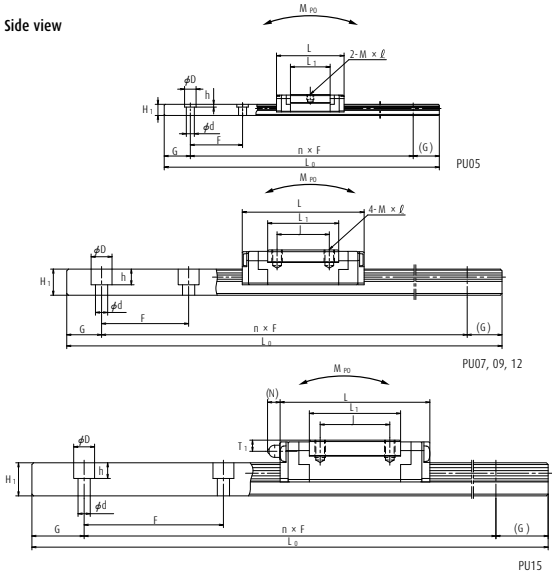
PU 15 0470 AL K 2 - ** PC T**

- Series name
- Size
- Rail length (mm)
- Ball slide shape code (See page 71)
- Material/surface treatment code (See Table 11)
  K: Stainless steel
- Number of ball slides per rail
- Design serial number
  Added to the reference number.
- Accuracy code (See Table 12)
- Preload code (See Table 4)
  0: Z0, 1: Z1, 1: ZT

Front view



Side view



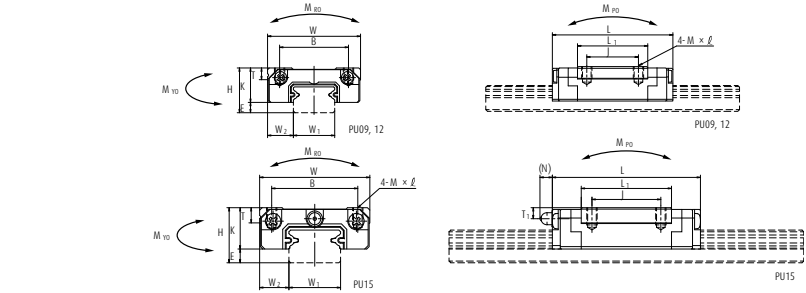
Model No.	Assembly			Ball slide											Width	Height
	Height			Width	Length	Mounting hole						Oil hole				
	H	E	W_2	W	L	B	J	M × pitch × ℓ	L_1	K	T	Hole size	T_1	N	W_1	H_1
PU05TR	6	1	3.5	12	19.4	8	–	M2×0.4×1.5	11.4	5	2.3	φ 0.9	1.5	–	5	3.2
PU07AR	8	1.5	5	17	23.4	12	8	M2×0.4×2.4	13.3	6.5	2.45	φ 1.5	1.8	–	7	4.7
PU09TR	10	2.2	5.5	20	30	15	10	M3×0.5×3	19.6	7.8	2.6	–	–	–	9	5.5
PU09UR	10	2.2	5.5	20	41	15	16	M3×0.5×3	30.6	7.8	2.6	–	–	–	9	5.5
PU12TR	13	3	7.5	27	35	20	15	M3×0.5×3.5	20.4	10	3.4	–	–	–	12	7.5
PU12UR	13	3	7.5	27	48.7	20	20	M3×0.5×3.5	34.1	10	3.4	–	–	–	12	7.5
PU15AL	16	4	8.5	32	43	25	20	M3×0.5×5	26.2	12	4.4	φ 3	3.2	(3.6)	15	9.5
PU15BL	16	4	8.5	32	61	25	25	M3×0.5×5	44.2	12	4.4	φ 3	3.2	(3.6)	15	9.5

Notes 1) The ball slide of PU05TR has only two mounting tap holes in the center.

Reference number for ball slide of random-matching type

PAU 15 AL S -K

- Random-matching ball slide series code — PAU: PU Series random-matching ball slide
- Size — 15
- Ball slide shape code (See page 71) — AL
- Material code — S: Stainless steel
- Option code — -K: Equipped with NSK K1

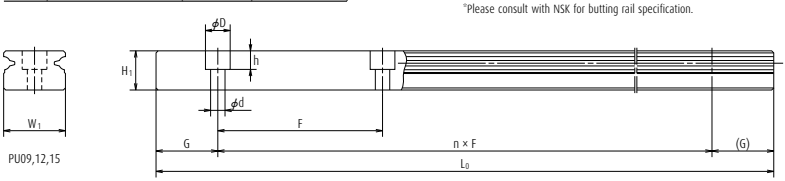


Reference number for rail of random-matching type

Rail **P1U 15 0470 R K N -** ** **PC T**

- Random-matching rail series code — P1U: PU Series random-matching rail
- Size — 15
- Rail length (mm) — 0470
- Rail shape code — S: PU09, 12. R: PU15
- Material/surface treatment code (See Table 11) — K
- *Butting rail specification — N: Non-butting. L: Butting specification
- Design serial number — Added to the reference number.
- Accuracy code: PC — PC: Normal grade is only available.
- Preload code (See Table 4) — T: Fine clearance

*Please consult with NSK for butting rail specification.



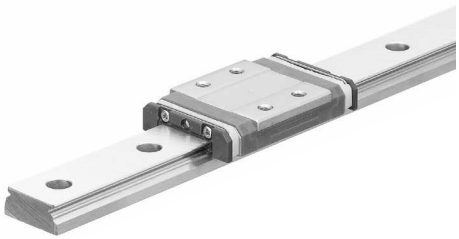
Unit: mm

Rail				Basic load rating								Weight	
Pitch	Mounting bolt hole	G	Maximum length	2) Dynamic		Static	Static moment (N·m)					Ball slide	Rail
				[50km]	[100km]		M_{RO}	M_{PO}		M_{YO}			
F	d × D × h	(reference)	L_{0max}	C_{50}(N)	C_{100}(N)	C_0 (N)		One slide	Two slides	One slide	Two slides	(g)	(g/100mm)
15	2.3×3.3×0.8	5	210	520	410	775	2.06	1.28	9.90	1.28	9.90	4	11
15	2.4×4.2×2.3	5	375	1 090	860	1 370	5.20	2.70	21.8	2.70	21.8	8	23
20	3.5×6×4.5	7.5	600	1 490	1 180	2 150	9.90	6.10	41.0	6.10	41.0	16	35
20	3.5×6×4.5	7.5	600	2 100	1 670	3 500	16.2	15.6	88.0	15.6	88.0	25	35
25	3.5×6×4.5	10	800	2 830	2 250	3 500	21.1	11.4	73.5	11.4	73.5	32	65
25	3.5×6×4.5	10	800	4 000	3 150	5 700	34.5	28.3	174	28.3	174	53	65
40	3.5×6×4.5	15	1 000	5 550	4 400	6 600	49.5	25.6	190	25.6	190	59	105
40	3.5×6×4.5	15	1 000	8 100	6 400	11 300	84.5	69.5	435	69.5	435	100	105

2) The basic load rating comply with the ISO standard. (ISO 14728-1, 14728-2)
C_{50}; the basic dynamic load rating for 50 km rated fatigue life C_{100}; the basic dynamic load rating for 100 km rated fatigue life

3) To fix rail of PU05TR, use M2 × 0.4 cross-recessed pan head machine screw for precision instrument.
(JCIS 10-70 No. 0 pan head machine screw No.1.)
(JCIS: Japanese Camera Industrial Standard.)

10. PE-Series: Miniature Linear Wide Body Ball Guides



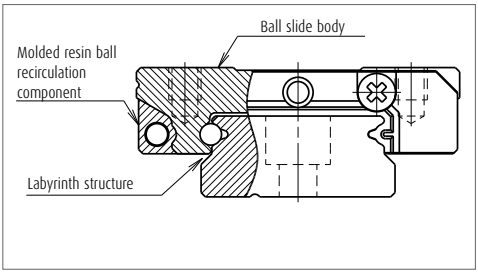


Fig. 1

1. Features

(1) Ideal for use of single rail

The PE Series linear guides are miniature and wide rail type. Thanks to the wide rail, load carrying capacity is high against moment load from rolling direction.

(2) Motion performance

Newly designed recirculation component facilitates smooth circulation of steel balls.

(3) Lightweight

The ball slide is fabricated to be approximately 20% lighter than that of the LE Series by the application of resin to a part of its body.

(4) Reduced noise intensity

Resin components applied in ball circulating circuits reduce collision noise between steel balls and the inner wall of circulating circuits.

(5) Low dust generation

The structure is designed to prevent dust generation.

(6) Excellent dust-proofing

It is designed to minimize the clearance between the side of rails and the inner walls of the slide, and prevent foreign matters from entering the ball slide.

(7) High corrosion resistance

High corrosion-resistant martensite stainless steel incorporated as a standard feature provides excellent resistance to corrosion.

(8) Easy to handle

Safety design includes a retainer that prevents steel balls from dropping out of the ball slide even when the slide is removed from the rail.

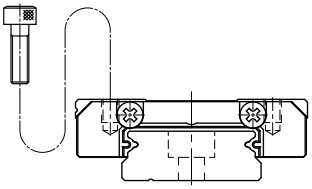
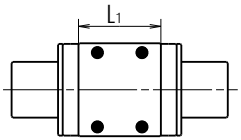
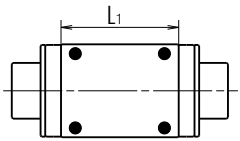
(9) Long-term maintenance-free

Equipped with NSK K1 Lubrication Unit realizes long-term, maintenance-free use.

(10) Fast delivery

Lineup of random-matching rails and ball slides in the series supports random matching and facilitates fast delivery. (PE09 to PE15)

2. Ball slide shape

Ball slide Model	Shape/installation method	Type (Upper row, Rating: Lower row, Ball slide length)	
		Standard type	High-load type
		Standard	Long
AR TR UR BR		AR, TR 	UR, BR 

3. Accuracy and preload

(1) Running parallelism of ball slide

Table 1

Unit: μm

Rail length (mm) over	Rail length (mm) or less	Preloaded assembly type (not random matching) Super precision P4	High precision P5	Precision grade P6	Normal grade PN	Random-matching type Normal grade PC
–	50	2	2	4.5	6	6
50	80	2	3	5	6	6
80	125	2	3.5	5.5	6.5	6.5
125	200	2	4	6	7	7
200	250	2.5	5	7	8	8
250	315	2.5	5	8	9	9
315	400	3	6	9	11	11
400	500	3	6	10	12	12
500	630	3.5	7	12	14	14
630	800	4.5	8	14	16	16
800	1 000	5	9	16	18	18
1 000	1 250	6	10	17	20	20

(2) Accuracy standard

The preloaded assembly type has four accuracy grades; Super precision P4, High precision P5, Precision P6, and Normal PN grades, while the random-matching type has Normal grade PC only.

Table 2 shows the accuracy standard for the preloaded assembly type while **Table 3** shows the accuracy standard for the random-matching types.

› Tolerance of preloaded assembly

Table 2

Unit: μm

Characteristics \ Accuracy grade	Super precision P4	High precision P5	Precision grade P6	Normal grade PN
Mounting height H Variation of H (All ball slides on a set of rails)	±10 5	±15 7	±20 15	±40 25
Mounting width W_2 or W_3 Variation of W_2 or W_3 (All ball slides on reference rail)	±15 7	±20 10	±30 20	±50 30
Running parallelism of surface C to surface A Running parallelism of surface D to surface B	Shown in **Table 1** and **Fig. 2**			

› Tolerance of random-matching type: Normal grade PC

Table 3

Unit: μm

Characteristics \ Model No.	PE09, 12 and 15
Mounting height H	±20
Variation of mounting height H	15① 30②
Mounting width W_2 or W_3	±20
Variation of mounting width W_2 or W_3	20
Running parallelism of surface C to surface A Running parallelism of surface D to surface B	Shown in **Table 1** and **Fig. 2**

Note ① Variation on the same rail ② Variation on multiple rails

(3) Assembled accuracy

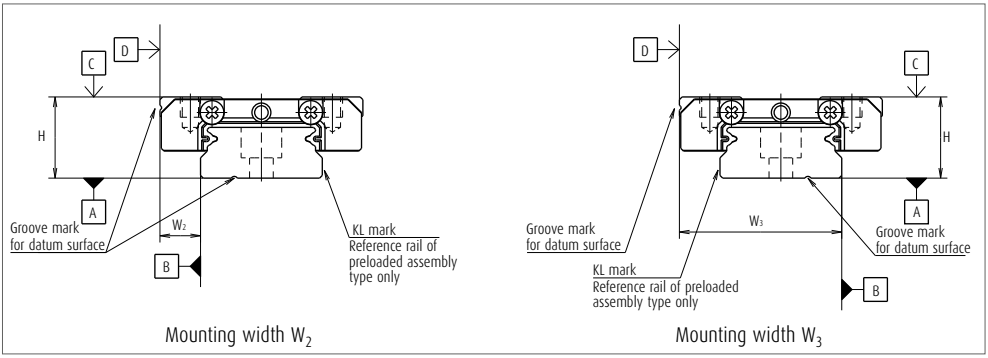


Fig. 2

(4) Preload and rigidity

We offer three levels of preload: Slight preload Z1 and Fine clearance Z0, along with random-matching type of Fine clearance ZT. Values for preload and rigidity of the preloaded assembly types are shown in **Table 4**. Rigidities are for the median of the preload range.

› Preload and rigidity of preloaded assembly

Table 4

Model No.		Preload (N)	Rigidity (N/μm)
		Slight preload (Z1)	Slight preload (Z1)
Standard type	PE05AR	0 – 28	45
	PE07TR	0 – 29	46
	PE09TR	0 – 37	61
	PE12AR	0 – 40	63
	PE15AR	0 – 49	66
High-load type	PE09UR	0 – 54	86
	PE12BR	0 – 59	97
	PE15BR	0 – 75	114

Note Clearance of Fine clearance Z0 is 0 to 3 μm. Therefore, preload is zero.

› Clearance of random-matching typ

Table 5

Unit: μm

Model No.		Fine clearance ZT
Standard type	PE09TR	3 or less
	PE12AR	3 or less
	PE15AR	3 or less
High-load type	PE09UR	5 or less
	PE12BR	5 or less
	PE15BR	5 or less

4. Maximum rail length

Table 6 shows the limitations of rail length.
However, the limitations vary by accuracy grades.

Table 6 Length limitation of rails

Unit: mm

Series	Size / Material	05	07	09	12	15
PE	Stainless steel	150	600	800	1 000	1 200

Note Rails can be butted if user requirement exceeds the rail length shown in the table. Please consult NSK.

5. Installation

(1) Permissible values of mounting error

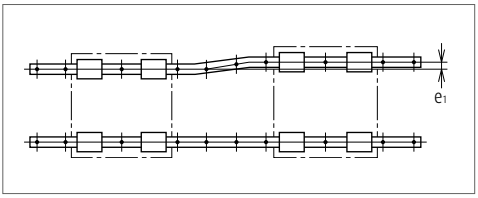


Fig. 3

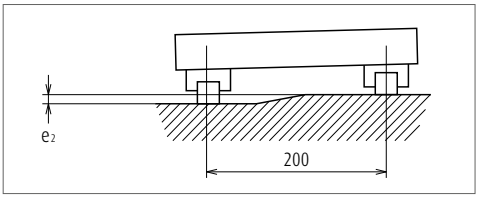


Fig. 4

Table 7

Unit: μm

Value	Preload	Model No.				
		PE05	PE07	PE09	PE12	PE15
Permissible values of parallelism in two rails e_1	Z0, ZT	10	12	15	18	22
	Z1	5	7	10	13	17
Permissible values of parallelism (height) in two rails e_2	Z0, ZT	50 μm/200 mm				
	Z1	35 μm/200 mm				

(2) Shoulder height of the mounting surface and corner radius r

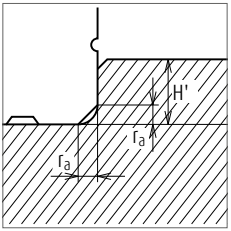


Fig. 5 Shoulder for the rail datum surface

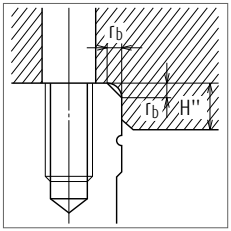


Fig. 6 Shoulder for the ball slide datum surface

Table 8

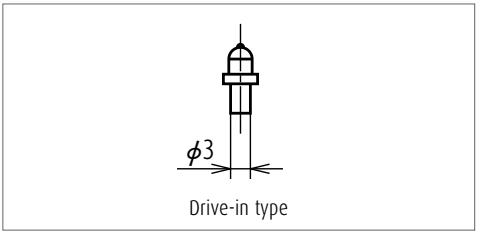
Unit: mm

Model No.	Corner radius (maximum)		Shoulder height	
	r_a	r_b	H′	H″*
PE05	0.2	0.2	1.1	2.5
PE07	0.2	0.3	1.7	3
PE09	0.3	0.3	3.5	2.8
PE12	0.3	0.3	3.5	3.2
PE15	0.3	0.5	3.5	4.1

*) H″ is the minimum recommended value based on the dimension T in dimension table.

6. Lubrication accessory

Model of PE15 can select drive-in type grease fitting as an option.
For the model of PE05 to PE12, apply grease directly to the ball grooves of rail using a point nozzle.



7. Dust-proof components

(1) Standard specification

End seal: Provided to both ends of the ball slide as a standard feature.
Seal friction per standard ball slide is shown in **Table 9**.

Table 9 Seal friction per ball slide (maximum value)

Unit: N

Series \ Size	05	07	09	12	15
PE	0.4	0.4	0.8	1	1.2

(2) NSK K1 lubrication unit

Table 10 shows the dimension of linear guides equipped with the NSK K1 lubrication unit.

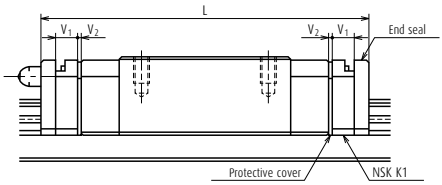


Table 10

Unit: mm

Model No.	Ball slide length	Ball slide model	Standard ball slide length	Ball slide length equipped with two NSK K1 L	Thickness of NSK K1, V_1	Thickness of protective cover, V_2
PE05	Standard	AR	24.1	28.9	2	0.4
PE07	Standard	TR	31.1	37.1	2.5	0.5
PE09	Standard	TR	39.8	46.8	3	0.5
PE09	Long	UR	51.2	58.2	3	0.5
PE12	Standard	AR	45	53	3.5	0.5
PE12	Long	BR	60	68	3.5	0.5
PE15	Standard	AR	56.6	66.2	4	0.8
PE15	Long	BR	76	85.6	4	0.8

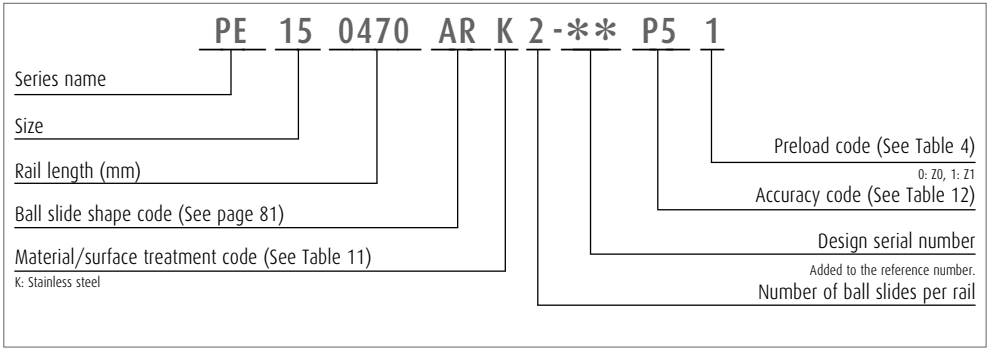
Note Ball slide length equipped with NSK K1 =
(Standard ball slide length) + (Thickness of NSK K1, V_1 × Number of NSK K1) +
(Thickness of the protective cover V_2 × 2)

8. Reference number

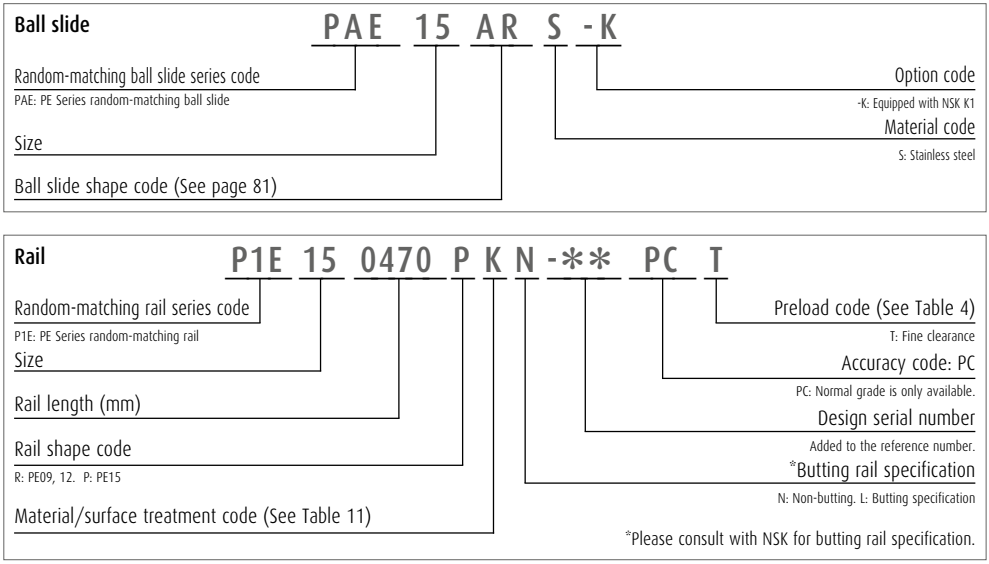
Reference numbers shall be set to individual NSK linear guide when its specifications are finalized, and it is indicated on its specification drawing.

Please specify the reference number, except design serial number, to identify the product when ordering, requiring estimates, or inquiring about specifications from NSK.

(1) Reference number for preloaded assembly



(2) Reference number for random-matching type



Reference number coding for the assembly of random-matching type is the same as that of the preloaded assembly. However, only preload code of "Fine clearance T" is available (See Table 4, page 83).

Click!Speedy NSK Linear Guide Quick Delivery System uses a new numbering system. For details, please refer to the Click!Speedy general catalog CAT. No. E3191.

Table 11 Material/surface treatment code

Code	Description
K	Stainless steel
H	Stainless steel with surface treatment
Z	Other, special

Table 12 Accuracy code

Accuracy	Standard (Without NSK K1)	With NSK K1	With NSK K1 for food and medical equipment
Super precision grade	P4	K4	F4
High precision grade	P5	K5	F5
Precision grade	P6	K6	F6
Normal grade	PN	KN	FN
Normal grade (random-matching type)	PC	KC	FC

Note Refer to pages 454 to 459 for NSK K1 lubrication unit.

9. Dimensions

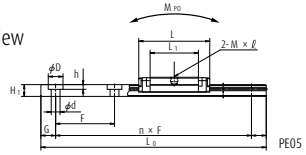
PE-AR, TR (Standard type / Standard)
PE-UR, BR (High-load type / Long)

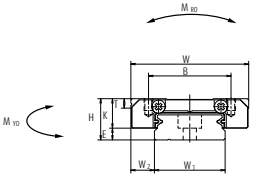
PE 15 0470 AR K 2 -** PC T

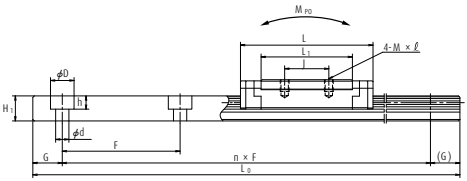
- Series name
- Size
- Rail length (mm)
- Ball slide shape code (See page 81)
- Material/surface treatment code (See Table 11)
  K: Stainless steel
- Number of ball slides per rail
- Design serial number
  Added to the reference number.
- Accuracy code (See Table 12)
- Preload code (See Table 4)
  0: Z0, 1: Z1, T: ZT

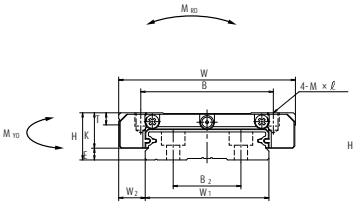
Front view

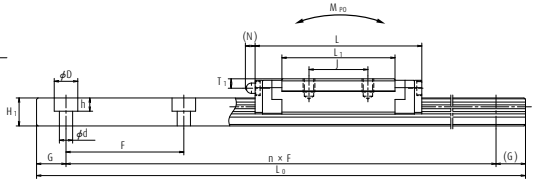
Side view











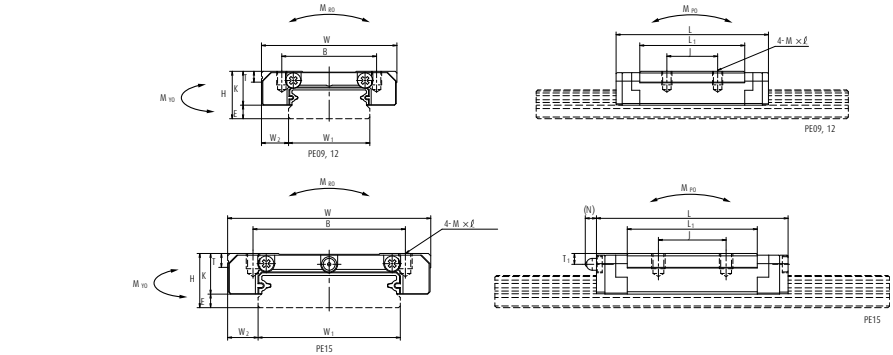
Model No.	Assembly			Ball slide											Width	Height
	Height			Width	Length	Mounting hole			L_1	K	T	Oil hole			W_1	H_1
	H	E	W_2	W	L	B	J	M × pitch × ℓ				Hole size	T_1	N		
PE05AR	6.5	1.4	3.5	17	24.1	13	—	M2.5×0.45×1.5	16.4	5.1	2.5	ϕ 0.9	1.3	—	10	4
PE07TR	9	2	5.5	25	31.1	19	10	M3×0.5×2.8	20.8	7	3	ϕ 1.9	1.9	—	14	5.2
PE09TR	12	4	6	30	39.8	21	12	M3×0.5×3	26.6	8	2.8	ϕ 2	2.3	—	18	7.5
PE09UR	12	4	6	30	51.2	23	24	M3×0.5×3	38	8	2.8	ϕ 2	2.3	—	18	7.5
PE12AR	14	4	8	40	45	28	15	M3×0.5×4	31	10	3.2	ϕ 2.5	2.7	—	24	8.5
PE12BR	14	4	8	40	60	28	28	M3×0.5×4	46	10	3.2	ϕ 2.5	2.7	—	24	8.5
PE15AR	16	4	9	60	56.6	45	20	M4×0.7×4.5	38.4	12	4.1	ϕ 3	3.2	(3.3)	42	9.5
PE15BR	16	4	9	60	76	45	35	M4×0.7×4.5	57.8	12	4.1	ϕ 3	3.2	(3.3)	42	9.5

Notes 1) Ball slide of PE05AR has only two mounting tap holes in the center.

Reference number for ball slide of random-matching type

PAE 15 AR S -K

- Random-matching ball slide series code — PAE: PE Series random-matching ball slide
- Size
- Ball slide shape code (See page 81)
- Material code — S: Stainless steel
- Option code — -K: Equipped with NSK K1

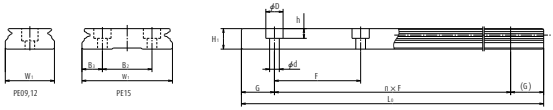


Reference number for rail of random-matching type

P1E 15 0470 P K N -** PC T

- Random-matching rail series code — P1E: PE Series random-matching rail
- Size
- Rail length (mm)
- Rail shape code — R: PE09, 12. P: PE15
- Material/surface treatment code (See Table 11)
- Design serial number — Added to the reference number.
- *Butting rail specification — N: Non-butting. L: Butting specification
- Accuracy code: PC — PC: Normal grade is only available.
- Preload code (See Table 4) — T: Fine clearance

*Please consult with NSK for butting rail specification.



Unit: mm

Rail					Basic load rating								Weight	
					2) Dynamic		Static	Static moment (N·m)					Ball slide	Rail
								M_{RO}	M_{PO}		M_{YO}			
B_2	F	Mounting bolt hole d × D × h	G (reference)	Maximum length L_{0max}	[50km] C_{50}(N)	[100km] C_{100}(N)	C_0 (N)		One slide	Two slides	One slide	Two slides	(g)	(g/100 mm)
—	20	3×5×1.6	7.5	150	690	550	1 160	6.00	2.75	17.5	2.75	17.5	7	34
—	30	3.5×6×3.2	10	600	1 580	1 260	2 350	16.7	7.20	46.0	7.20	46.0	19	55
—	30	3.5×6×4.5	10	800	3 000	2 390	4 500	36.5	17.3	113	17.3	113	35	95
—	30	3.5×6×4.5	10	800	4 000	3 150	6 700	54.5	37.5	210	37.5	210	50	95
—	40	4.5×8×4.5	15	1 000	4 350	3 450	6 350	70.5	29.3	180	29.3	180	66	140
—	40	4.5×8×4.5	15	1 000	5 800	4 600	9 550	106	63.5	345	63.5	345	98	140
23	40	4.5×8×4.5	15	1 200	7 600	6 050	10 400	207	59.0	370	59.0	370	140	275
23	40	4.5×8×4.5	15	1 200	10 300	8 200	16 000	320	135	740	135	740	211	275

2) The basic load rating comply with the ISO standard. (ISO 14728-1, 14728-2)
C_{50}: the basic dynamic load rating for 50 km rated fatigue life C_{100}: the basic dynamic load rating for 100 km rated fatigue life

5) To fix rail of PE05AR, use M2.5 × 0.45 cross-recessed pan head machine screw for precision instrument.
(JCIS 10-70 No. 0 pan head machine screw No.3.)
(JCIS: Japanese Camera Industrial Standard.)

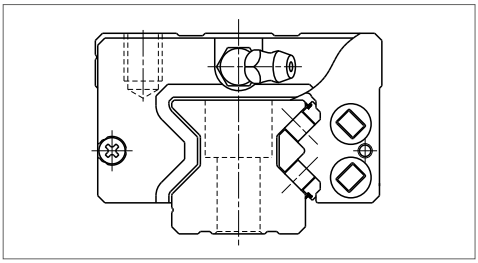


Fig. 1 RA Series

1. Features

(1) Super-high load capacity

By installing rollers that are the largest possible diameter and length within the existing standard cross-section dimension in a rational layout based on our advanced analysis technology, we have realized the world's highest load capacity,* far superior to conventional roller guides. Super-long life is achieved and impact load can be sufficiently handled.

* As of September 1, 2003; NSK's research and comparison on the existing products of the same sizes.

(2) Super-high rigidity

Using NSK's advanced analysis technology, we pursued a complete, optimal design, down to the detailed shape of roller slides and rails, thereby realizing super-high rigidity superior to that of competitor's roller guides.

(3) Super-high motion accuracy

NSK has developed its own unique method of simulating rolling element passage vibration and method of designing optimal roller slide specifications for damping roller passage vibration. These developments have dramatically enhanced roller slide motion accuracy for the RA series.

(4) Smooth motion

Installation of a retaining piece between rollers restrains the roller skew peculiar to roller slides, thereby achieving smooth motion.

(5) Low friction

Using rollers for rolling elements helps minimize dynamic friction.

(6) Random matching

Random-matching of rails and roller slides are available. (RA25 to RA65)

(7) Specification with highly dustproof V1 seal

Specification with newly developed, highly dustproof V1 seal which is the end seal with enhanced abrasion resistance is also available. (RA35 – 55)

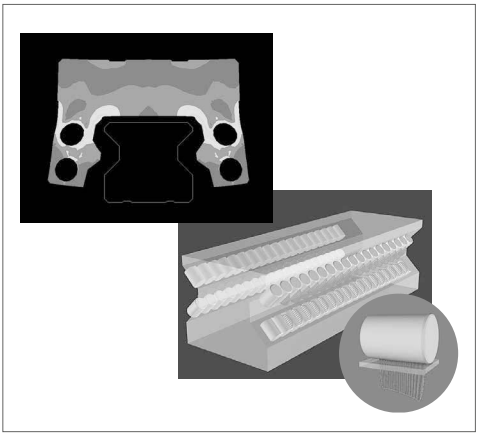


Fig. 2 Analysis example

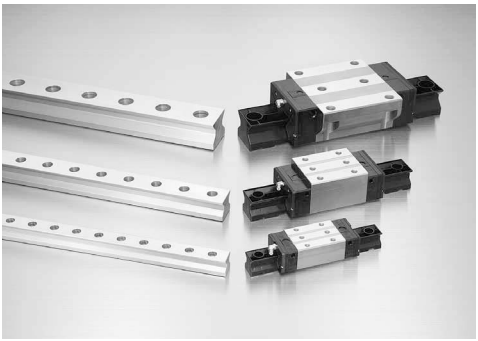
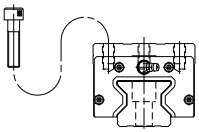
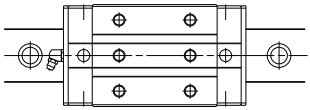
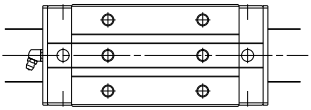
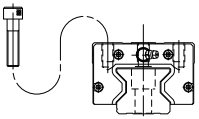
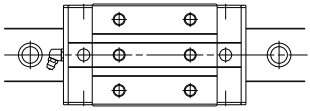
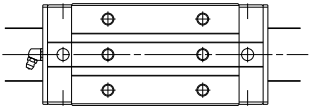
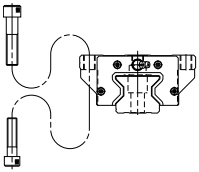
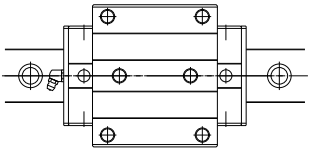
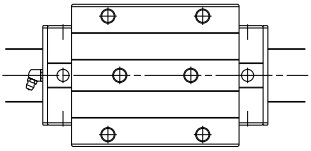


Fig. 3 Random-matching type

2. Roller slide shape

Roller slide model	Shape/installation method	Type (Upper row, Rating: Lower row, Roller slide length)	
		High-load type	Super-high-load type
		Standard	Long
AN BN		AN 	BN 
AL BL		AL 	BL 
EM GM		EM 	GM 

3. Accuracy and preload

(1) Running parallelism of roller slide

Table 1

Unit: μm

Rail length (mm)	Ultra precision P3	Super precision P4	High precision P5	Precision grade P6
	Preloaded assembly	Preloaded assembly	Preloaded assembly Random-matching type	Preloaded assembly
– 50	2	2	2	4.5
50 – 80	2	2	3	5
80 – 125	2	2	3.5	5.5
125 – 200	2	2	4	6
200 – 250	2	2.5	5	7
250 – 315	2	2.5	5	8
315 – 400	2	3	6	9
400 – 500	2	3	6	10
500 – 630	2	3.5	7	12
630 – 800	2	4	8	14
800 – 1 000	2.5	4.5	9	16
1 000 – 1 250	3	5	10	17
1 250 – 1 600	4	6	11	19
1 600 – 2 000	4.5	7	13	21
2 000 – 2 500	5	8	15	22
2 500 – 3 150	6	9.5	17	25
3 150 – 3 900	9	16	23	30

(2) Accuracy standard

The preloaded assembly has four accuracy grades; Ultra precision P3, Super precision P4, High precision P5, and Precision P6 grades, while the random-matching type has High precision PH grade only.

› Tolerance of preloaded assembly

Table 2

Unit: μm

Characteristics \ Accuracy grade	Ultra precision P3	Super precision P4	High precision P5	Precision grade P6
Mounting height H Variation of H (All ball slides on a set of rails)	±8 3	±10 5	±20 7	±40 15
Mounting width W_2 or W_3 Variation of W_2 or W_3 (All ball slides on reference rail)	±10 3	±15 7	±25 10	±50 20
Running parallelism of surface C to surface A Running parallelism of surface D to surface B	Shown in **Table 1** and **Fig. 4**			

› Tolerance of random-matching type

Table 3

Unit: μm

Characteristics \ Accuracy grade	High precision PH
Mounting height H	±20
Variation of mounting height H	15① 25②
Mounting width W_2 or W_3	±25
Variation of mounting width W_2 or W_3	20
Running parallelism of surface C to surface A Running parallelism of surface D to surface B	See **Table 1** and **Fig. 4**

Note ① Variation on the same rail ② Variation on multiple rails

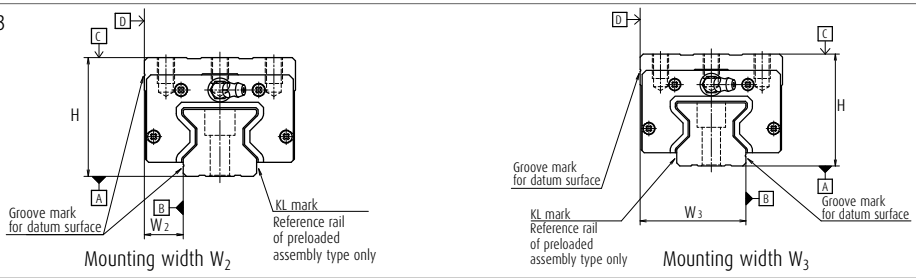
(3) Combination of accuracy and preload

Table 4

		Accuracy grade				
		Ultra precision	Super precision	High precision	Precision grade	High precision
Without NSK K1 lubrication unit		P3	P4	P5	P6	PH
With NSK K1 lubrication unit		K3	K4	K5	K6	KH
With NSK K1-L lubrication unit		L3	L4	L5	L6	LH
Preload	Slight preload Z1	○	○	○	○	–
	Medium preload Z3	○	○	○	○	–
	Random-matching type with slight preload ZZ	–	–	–	–	○
	Random-matching type with medium preload ZH	–	–	–	–	○

(4) Assembled accuracy

Fig. 3



(5) Preload and rigidity

Four types of preload are available: Medium preload Z3 and Slight preload Z1 for preloaded assembly, and Medium preload ZH and slight preload ZZ for Random-matching type.

› **Preload of preloaded assembly**

Table 5

	Model No.	Preload (N)	
		Slight preload (Z1)	Medium preload (Z3)
High-load type	RA15 AN, AL, EM	—	1 030
	RA20 AN, EM	—	1 920
	RA25 AN, AL, EM	880	2 920
	RA30 AN, AL, EM	1 170	3 890
	RA35 AN, AL, EM	1 600	5 330
	RA45 AN, AL, EM	2 780	9 280
	RA55 AN, AL, EM	3 870	12 900
	RA65 AN, EM	6 300	21 000
Super-high-load type	RA15 BN, BL, GM	—	1 300
	RA20 BN, GM	—	2 400
	RA25 BN, BL, GM	1 060	3 540
	RA30 BN, BL, GM	1 430	4 760
	RA35 BN, BL, GM	2 020	6 740
	RA45 BN, BL, GM	3 480	11 600
	RA55 BN, BL, GM	5 040	16 800
	RA65 BN, GM	8 640	28 800

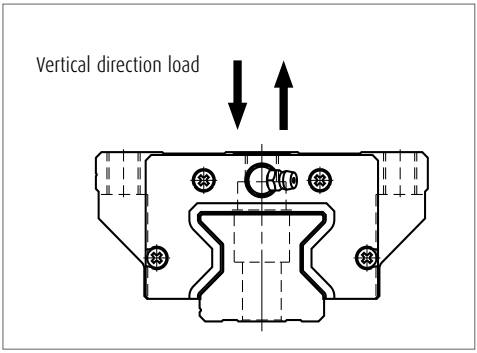
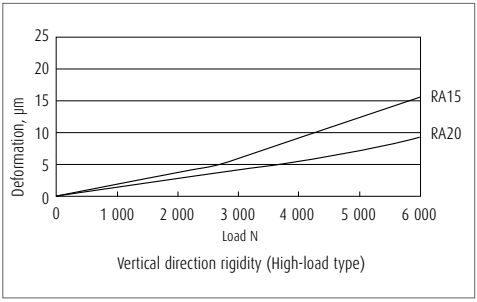
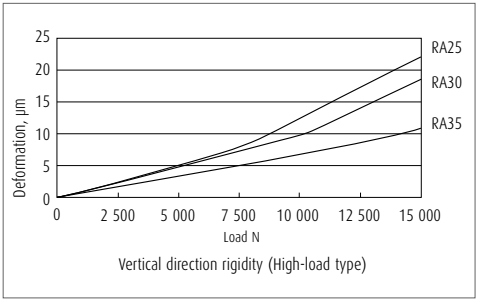


Fig. 5 Direction of load

› Rigidity of medium preload





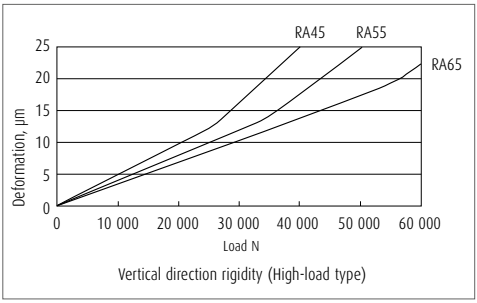
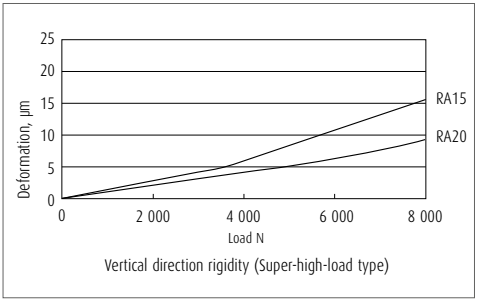
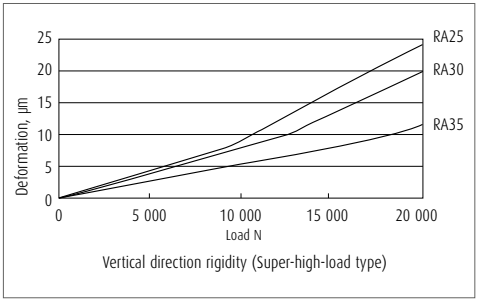


Fig. 6 Vertical direction theoretical rigidity line:
High-load type (Roller slide shape: AN, AL, EM)





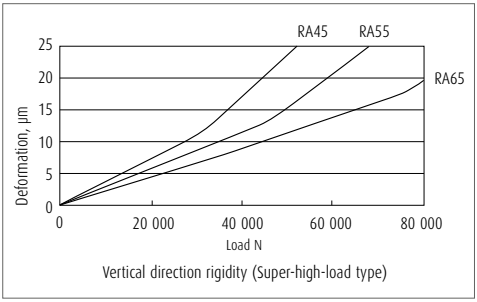


Fig. 7 Vertical direction theoretical rigidity line:
Super-high-load type (Roller slide shape: BN, BL, GM)

4. Maximum rail length

Table 5 shows the limitations of rail length (maximum length). However, the limitations vary by accuracy grades.

Table 6 Length limitation of rails

Unit: mm

Series \ Size	15	20	25	30	35	45	55	65
RA	2 000	3 000	3 900	3 900	3 900	3 650	3 600	3 600

Note Rails can be butted if user requirement exceeds the rail length shown in the table. Please consult NSK.

5. Installation

(1) Permissible values of mounting error

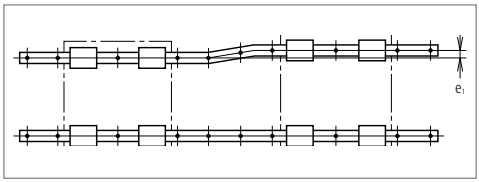


Fig. 8

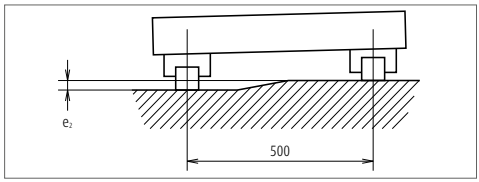


Fig. 9

Table 7

Unit : μm

Value	Preload	Model No.							
		RA15	RA20	RA25	RA30	RA35	RA45	RA55	RA65
Permissible values of parallelism in two rails e_1	Z1, ZZ	—	—	14	18	21	27	31	49
	Z3 , ZH	5	7	9	11	13	17	19	30
Permissible values of parallelism (height) in two rails e_2	Z1, ZZ	—		290 μm / 500 mm					
	Z3 , ZH	150 μm / 500 mm							

(2) Shoulder height of the mounting surface and corner radius r

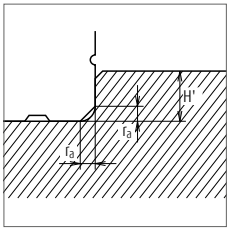


Fig. 10 Shoulder for the rail datum surface

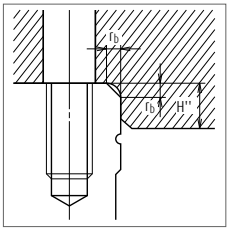


Fig. 11 Shoulder for the roller slide datum surface

Table 8

Unit : mm

Model No.	Corner radius (maximum)		Shoulder height	
	r_a	r_b	H'	H"
RA15	0.5	0.5	3	4
RA20	0.5	0.5	4	5
RA25	0.5	1	4	5
RA30	1	1	5	6
RA35	1	1	5	6
RA45	1.5	1	6	8
RA55	1.5	1.5	7	10
RA65	1.5	1.5	11	11

6. Lubrication components

Refer to pages 432 and 444 for the lubrication of linear guides.

(1) Mounting position of lubrication accessories

› The standard position of grease fittings and tube fittings is the end face of roller slide. We can mount them on a side of end cap for an option. (**Fig. 12**) Please consult NSK for installation of grease or tube fittings to the roller slide body or the side of end cap.

› A lubrication hole can also be provided on the top of the end cap. **Fig.13, Table 9** and **Table 10** show the mounting position. A spacer is required for AN and BN shape roller slides. The spacers are available from NSK.

› When using a piping unit with thread of M6 × 1, you require a connector to connect it to a grease fitting mounting hole with M6 × 0.75. The connectors are available from NSK.

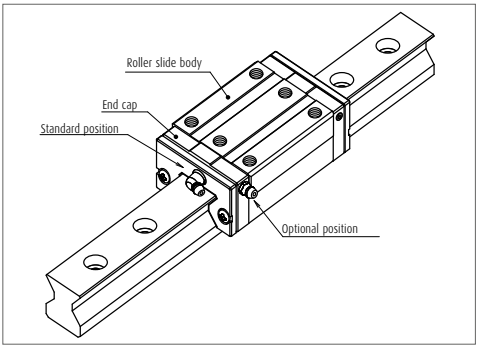


Fig. 12 Mounting position of lubrication accessories

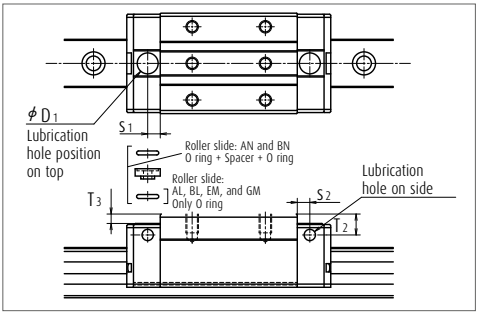


Fig.13 Top and side lubrication hole positions

Table 9 Top and side lubrication hole positions

Unit : mm

Model No.	Roller slide model	Grease fitting size	S_2	T_2	O ring (JIS)	Spacer	D_1	S_1	T_3
RA15	AN, BN	φ 3	4	7	P5	Necessary	8.2	4.4	4.2
RA20	AN, BN	φ 3	4	4	P6	—	9.2	5.4	0.2
RA25	AN, BN	M6×0.75	6	10	P7+P5	Necessary	10.0	6	4.5
RA30	AN, BN	M6×0.75	5	10	P7+P5	Necessary	10.4	6	3.5
RA35	AN, BN	M6×0.75	5.5	15	P7+P5	Necessary	10.4	7	7.4
RA45	AN, BN	Rc 1/8	7.2	20	P7+P5	Necessary	10.4	7.2	10.4
RA55	AN, BN	Rc 1/8	7.2	21	P7	Necessary	10.4	7.2	10.4
RA65	AN, BN	Rc 1/8	7.2	19	P7	—	10.4	7.2	0.4

Table 10 Top and side lubrication hole positions

Unit : mm

Model No.	Roller slide model	Grease fitting size	S_2	T_2	O ring (JIS)	D_1	S_1	T_3
RA15	AL, BL, EM, GM	φ 3	4	3	P5	8.2	4.4	0.2
RA20	EM, GM	φ 3	4	4	P6	9.2	5.4	0.2
RA25	AL, BL, EM, GM	M6×0.75	6	6	P7	10.0	6	0.4
RA30	AL, BL, EM, GM	M6×0.75	5	7	P7	10.4	6	0.4
RA35	AL, BL, EM, GM	M6×0.75	5.5	8	P7	10.4	7	0.4
RA45	AL, BL, EM, GM	Rc 1/8	7.2	10	P7	10.4	7.2	0.4
RA55	AL, BL, EM, GM	Rc 1/8	7.2	11	P7	10.4	7.2	0.4
RA65	EM, GM	Rc 1/8	7.2	19	P7	10.4	7.2	0.4

7. Dust-proof components

(1) Standard specification

The RA series is equipped with end, inner* and bottom seals to prevent foreign matter from entering the inside of the roller slide. Under normal applications, the RA series can be used without modification.
For severe usage conditions, optional rail covers** are available. Contact NSK for information on how to mount the cover.

*) Inner seals for the models of RA15 and RA20 are available as options.
**) The rail cover is available to the models of RA25 to RA65.

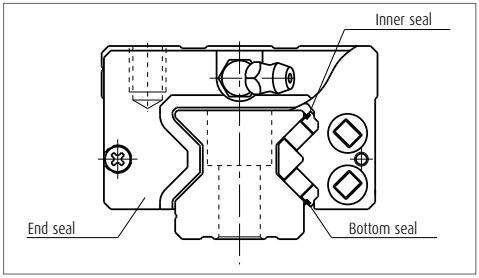


Fig. 14

Fig. 15 Rail cover

Table 11 Seal friction per roller side (maximum value)

Unit: N

Series \ Size	15	20	25	30	35	45	55	65
RA	4	5.5	5	5	6	8	8	14

(2) NSK K1-L lubrication unit

Table 12 shows the dimension of linear guides equipped with the NSK K1-L lubrication unit.

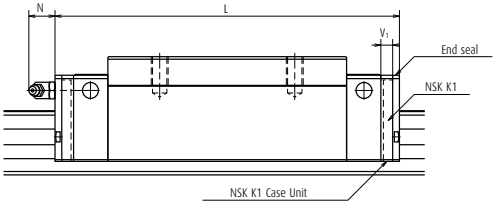


Table 12

Unit: mm

Model No.	Roller slide length	Roller slide model	Standard roller slide length	With two NSK K1	Thickness of NSK K1 and NSK K1-L	Protruding area of the grease fitting N
RA15	Standard	AN, AL, EM	70	79	4.5	(3)
RA15	Long	BN, BL, GM	85.4	94.4	4.5	(3)
RA20	Standard	AN, EM	86.5	95.5	4.5	(3)
RA20	Long	BN, GM	106.3	115.3	4.5	(3)
RA25	Standard	AN, AL, EM	97.5	107.5	5	(11)
RA25	Long	BN, BL, GM	115.5	125.5	5	(11)
RA30	Standard	AN, AL, EM	110.8	122.8	6	(11)
RA30	Long	BN, BL, GM	135.4	147.4	6	(11)
RA35	Standard	AN, AL, EM	123.8	136.8	6.5	(11)
RA35	Long	BN, BL, GM	152	165	6.5	(11)
RA45	Standard	AN, AL, EM	154	168	7	(14)
RA45	Long	BN, BL, GM	190	204	7	(14)
RA55	Standard	AN, AL, EM	184	198	7	(14)
RA55	Long	BN, BL, GM	234	248	7	(14)
RA65	Standard	AN, EM	228.4	243.4	7.5	(14)
RA65	Long	BN, GM	302.5	317.5	7.5	(14)

Note 1) Roller slide length equipped with NSK K1 = (Standard roller slide length) + (Thickness of NSK K1 Case Unit × Number of NSK K1 Case Unit)
2) Roller slide length equipped with NSK K1-L = (Standard roller slide length) + (Thickness of NSK K1-L Case Unit x Number of NSK K1-L Case Unit).

(3) Double seal and protector

For RA Series, double seal and protector can be installed only before shipping from the factory.
Table 13 shows the increased thickness when end seal and protector are installed.

Table 13

Unit: mm

Modell No.	Thickness of end seal V_3	Thickness of protector V_4
RA15	3	2.7
RA20	3	3.3
RA25	3.2	3.3
RA30	3.4	3.6
RA35	3.4	3.6
RA45	4	4.2
RA55	4	4.2
RA65	5	5.5

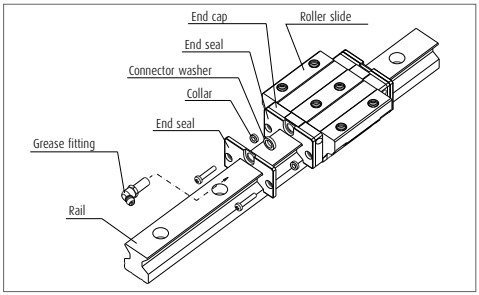


Fig. 16 Double seal

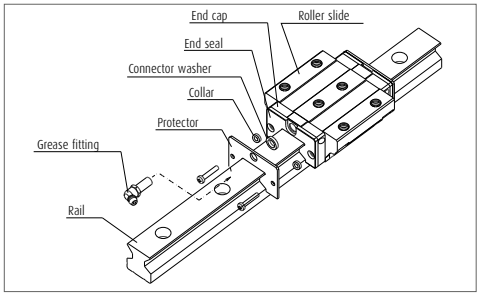


Fig. 17 Protector

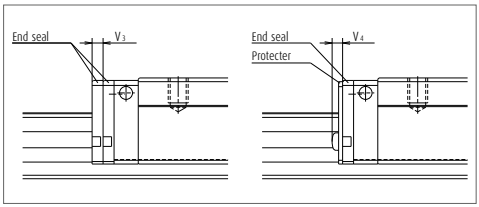


Fig. 18

(4) Rail cover

When the rail cover is used, use the cover bracket to secure the rail cover. **Fig.19** shows the dimensions for the cover bracket. The required room at the end of the rail is:

- Inside: 10.5 mm or less
- Outside: 4 mm or less (Common to the models of RA25 to RA65)
  Please confirm the interference with your machine at the stroke end.
- Machine stroke
- Room for the end of the rail

The height of the rail with the rail cover is shown in **Table 14**.

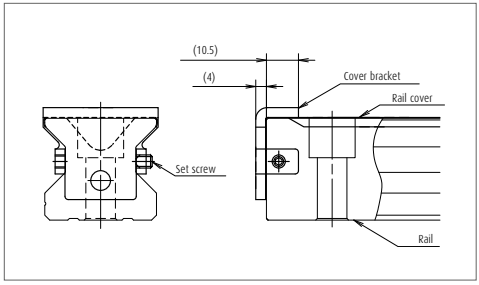


Fig. 19 End configuration of rail equipped with the rail cover

Table 14 Height of rails equipped with rail cover

Unit: mm

Modell No.	Standard height H1	Cover installation
RA25	24	24.2
RA30	28	28.2
RA35	31	31.25
RA45	38	38.3
RA55	43.5	43.8
RA65	55	55.3

(5) Cap to plug the rail mounting bolt hole

Table 15 Caps to plug rail bolt hole

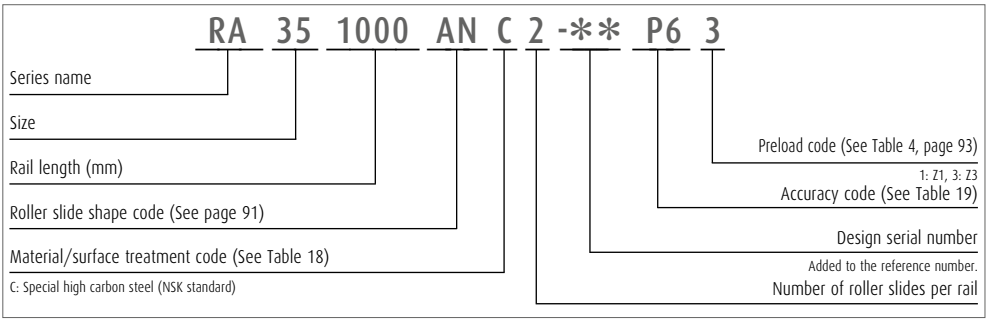
Modell No.	Bolt to secure rail	Cap reference No.	Quantity /case
RA15	M4	LG-CAP/M4	20
RA20	M5	LG-CAP/M5	20
RA25	M6	LG-CAP/M6	20
RA30, RA35	M8	LG-CAP/M8	20
RA45	M12	LG-CAP/M12	20
RA55	M14	LG-CAP/M14	20
RA65	M16	LG-CAP/M16	20

9. Reference number

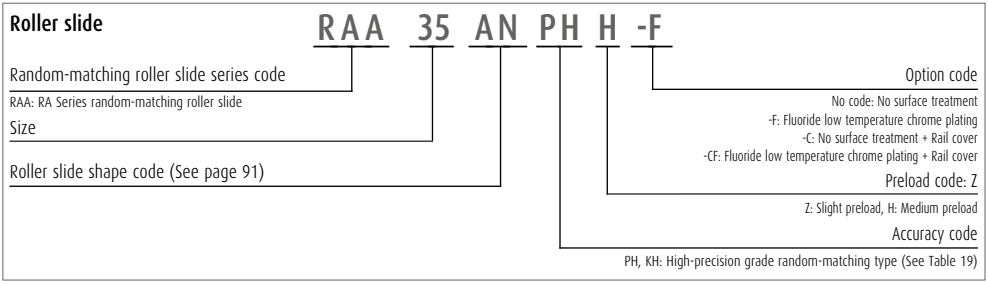
Reference numbers shall be set to individual NSK linear guide when its specifications are finalized, and it is indicated on its specification drawing.

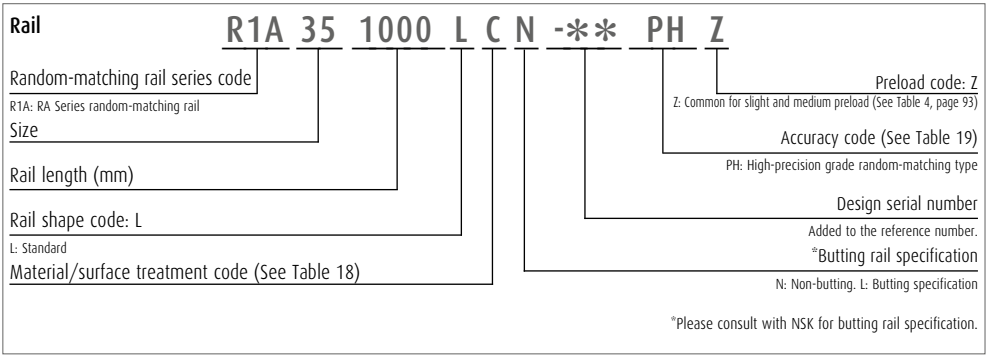
Please specify the reference number, except design serial number, to identify the product when ordering, requiring estimates, or inquiring about specifications from NSK.

(1) Reference number for preloaded assembly



(2) Reference number for random-matching type





The reference number coding for the assembly of random-matching type is the same as that of the preloaded assembly. However, the applicable preload codes are "slight preload Z" and "medium preload H" (See Table 4, page 93).

Click!Speedy NSK Linear Guide Quick Delivery System uses a new numbering system. For details, please refer to the Click!Speedy general catalog CAT. No. E3191.

Table 18 Material/surface treatment code

Code	Description
C	Special high carbon steel (NSK standard)
D	Special high carbon steel with surface treatment
P	Special high carbon steel with V1 seal
R	Special high carbon steel with surface treatment and V1 seal
Z	Other, special

Note P and R are not available for randommatching slides and rails.

Table 19 Accuracy code

Accuracy	Standard (Without NSK K1)	With NSK K1	With NSK K1-L
Ultra precision grade	P3	K3	L3
Super precision grade	P4	K4	L4
High precision grade	P5	K5	L5
Precision grade	P6	K6	L6
High precision grade (random-matching type)	PH	KH	LH

Note Refer to pages 454 to 460 for NSK K1/K1-L lubrication unit.

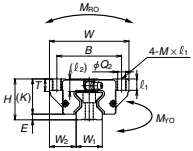
10. Dimensions

RA-AN (High-load type / Standard)
RA-BN (Super-high-load type / Long)

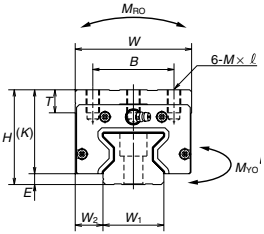
RA 35 1000 AN C 2 - ** PH H**

- Series name
- Size
- Rail length (mm)
- Roller slide shape code (See page 91)
- Material/surface treatment code (See Table 18)
  C: Special high carbon steel (NSK standard)
- Number of ball slides per rail
- Design serial number
  Added to the reference number.
- Accuracy code (See Table 19)
- Preload code (See Table 4, page 93)
  1: Z1, 3: Z3, Z: ZZ, H: ZH

Front view of EM and GM types

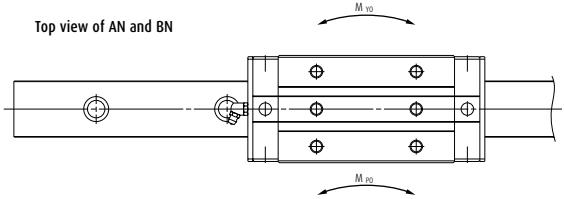


RA15, 20, 25, 30

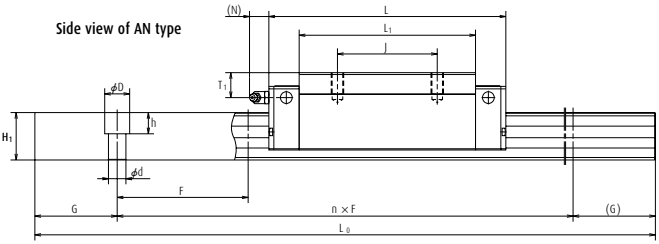


RA35, 45, 55, 65

Top view of AN and BN



Side view of AN type



Model No.	Assembly			Ball slide											Width	Height
	Height			Width	Length	Mounting hole						Grease fitting				
	H	E	W_2	W	L	B	J	M × pitch × ℓ	L_1	K	T	Hole size	T_1	N	W_1	H_1
RA15AN	28	4	9.5	34	70	26	26	M4×0.7×6	44.8	24	8	ϕ 3	8	3	15	16.3
RA15BN	28	4	9.5	34	85.4	26	26	M4×0.7×6	60.2	24	8	ϕ 3	8	3	15	16.3
RA20AN	30	5	12	44	86.5	32	36	M5×0.8×6	57.5	25	12	ϕ 3	4	3	20	20.8
RA20BN	30	5	12	44	106.3	32	50	M5×0.8×6	77.3	25	12	ϕ 3	4	3	20	20.8
RA25AN	40	5	12.5	48	97.5	35	35	M6×1×9	65.5	35	12	M6×0.75	10	11	23	24
RA25BN	40	5	12.5	48	115.5	35	50	M6×1×9	83.5	35	12	M6×0.75	10	11	23	24
RA30AN	45	6.5	16	60	110.8	40	40	M8×1.25×11	74	38.5	14	M6×0.75	10	11	28	28
RA30BN	45	6.5	16	60	135.4	40	60	M8×1.25×11	98.6	38.5	14	M6×0.75	10	11	28	28
RA35AN	55	6.5	18	70	123.8	50	50	M8×1.25×12	83.2	48.5	15	M6×0.75	15	11	34	31
RA35BN	55	6.5	18	70	152	50	72	M8×1.25×12	111.4	48.5	15	M6×0.75	15	11	34	31
RA45AN	70	8	20.5	86	154	60	60	M10×1.5×17	105.4	62	17	Rc1/8	20	14	45	38
RA45BN	70	8	20.5	86	190	60	80	M10×1.5×17	141.4	62	17	Rc1/8	20	14	45	38
RA55AN	80	9	23.5	100	184	75	75	M12×1.75×18	128	71	18	Rc1/8	21	14	53	43.5
RA55BN	80	9	23.5	100	234	75	95	M12×1.75×18	178	71	18	Rc1/8	21	14	53	43.5
RA65AN	90	13	31.5	126	228.4	76	70	M16×2×20	155.4	77	22	Rc1/8	19	14	63	55
RA65BN	90	13	31.5	126	302.5	76	120	M16×2×20	229.5	77	22	Rc1/8	19	14	63	55

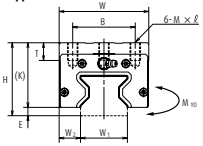
Notes 1) Select either one of two F dimensions, the standard or the parenthesized semi-standard dimension, for the pitch of rail fixing bolt holes. If not specified, the standard dimension of F is applied.

Reference number for roller slide of random-matching type

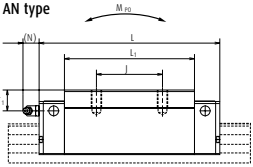
Ball slide RAA 35 AN PH H -F

- Random-matching roller slide series code
  RAA: RA Series random-matching roller slide
- Size
- Roller slide shape code (See page 91)
- Option code
  No code: No surface treatment
  -F: Fluoride low temperature chrome plating
  -C: No surface treatment + Rail cover
  -CF:Fluoride low temperature chrome plating + Rail cover
- Preload code: Z
  Z: Slight preload, H: Medium preload
- Accuracy code
  PH, KH: High-precision grade random-matching type (See Table 19)

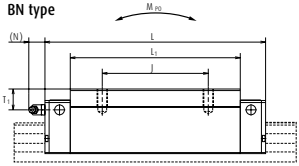
AN and BN types



AN type



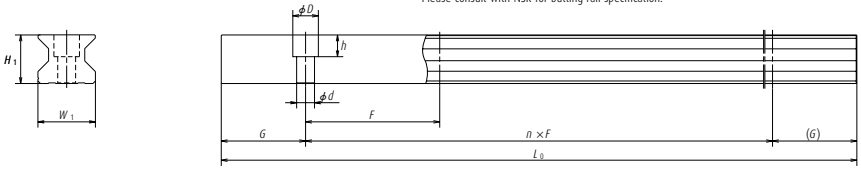
BN type



Reference number for rail of random-matching type

Rail R1A 35 1000 L C N -** PH Z

- Random-matching rail series code
  R1A: RA Series random-matching rail
- Size
- Rail length (mm)
- Rail shape code: L
  L: Standard
- Material/surface treatment code (See Table 18)
- Preload code: Z
  Z: Common for slight and medium preload (See Table 4, page 93)
- Accuracy code
  PH: High-precision grade random-matching type
- Design serial number
  Added to the reference number.
- *Butting rail specification
  N: Non-butting, L: Butting specification
  *Please consult with NSK for butting rail specification.



Unit: mm

Rail				Basic load rating									Weight	
Pitch	Mounting bolt hole	G	Maximum length	3) Dynamic		Static	Static moment (N·m)						Ball slide	Rail
								M_{PO}		M_{YO}				
F	d × D × h	(reference)	L_{0max}	[50km] C_{50}(N)	[100km] C_{100}(N)	C_0 (N)	M_{RO}	One slide	Two slides	One slide	Two slides		(kg)	(kg/m)
60	4.5×7.5×5.3	20	2 000	12 600	10 300	27 500	260	210	1 320	210	1 320		0.21	1.6
(30)	4.5×7.5×5.3	20	2 000	16 000	13 000	37 000	350	375	2 130	375	2 130		0.30	1.6
60	6×9.5×8.5	20	3 000	23 600	19 200	52 500	665	505	3 100	505	3 100		0.38	2.6
(30)	6×9.5×8.5	20	3 000	29 500	24 000	70 000	890	900	5 000	900	5 000		0.50	2.6
30	7×11×9	20	3 900	36 000	29 200	72 700	970	760	4 850	760	4 850		0.60	3.4
(60)	7×11×9	20	3 900	43 500	35 400	92 900	1 240	1 240	7 200	1 240	7 200		0.91	3.4
40	9×14×12	20	3 900	47 800	38 900	93 500	1 670	1 140	7 100	1 140	7 100		1.0	4.9
(80)	9×14×12	20	3 900	58 500	47 600	121 000	2 170	1 950	11 500	1 950	11 500		1.3	4.9
40	9×14×12	20	3 900	65 500	53 300	129 000	2 810	1 800	11 000	1 800	11 000		1.6	6.8
(80)	9×14×12	20	3 900	82 900	67 400	175 000	3 810	3 250	17 800	3 250	17 800		2.1	6.8
52.5	14×20×17	22.5	3 650	114 000	92 800	229 000	6 180	4 080	24 000	4 080	24 000		3.0	10.9
(105)	14×20×17	22.5	3 650	143 000	116 000	305 000	8 240	7 150	39 000	7 150	39 000		4.1	10.9
60	16×23×20	30	3 600	159 000	129 000	330 000	10 200	7 060	41 000	7 060	41 000		4.9	14.6
(120)	16×23×20	30	3 600	207 000	168 000	462 000	14 300	13 600	72 000	13 600	72 000		6.7	14.6
75	18×26×22	35	3 600	259 000	210 000	504 000	19 200	12 700	78 500	12 700	78 500		9.3	22.0
(150)	18×26×22	35	3 600	355 000	288 000	756 000	28 700	28 600	153 000	28 600	153 000		12.2	22.0

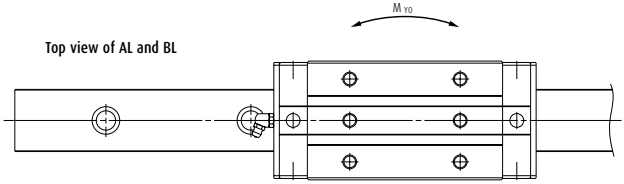
2) The random-matching type is available for the models of RA25 to RA65.
3) The basic load rating comply with the ISO standard. (ISO 14728-1, 14728-2)
C_{50}; the basic dynamic load rating for 50 km rated fatigue life
C_{100}; the basic dynamic load rating for 100 km rated fatigue life

RA-AL (High-load type / Standard)
RA-BL (Super-high-load type / Long)

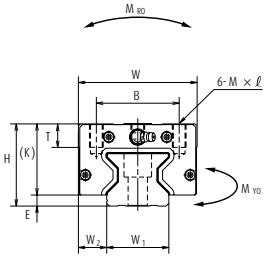
RA 35 1000 AL C 2 - ** PH H**

- Series name
- Size
- Rail length (mm)
- Roller slide shape code (See page 91)
- Material/surface treatment code (See Table 18)
  C: Special high carbon steel (NSK standard)
- Number of roller slides per rail
- Design serial number
  Added to the reference number.
- Accuracy code (See Table 19)
- Preload code (See Table 4, page 93)
  1: Z1, 3: Z3, Z: ZZ, H: ZH

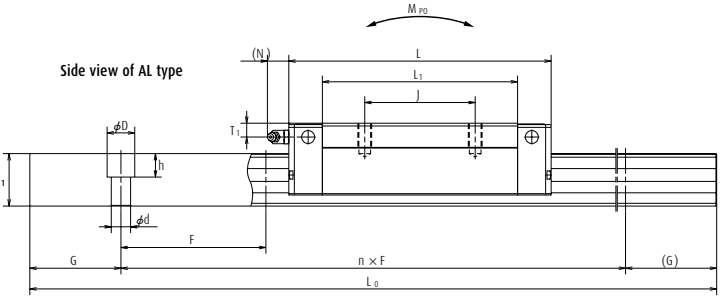
Top view of AL and BL



Front view of AL and BL types



Side view of AL type



Model No.	Assembly			Ball slide											Grease fitting			Width	Height
	Height			Width	Length	Mounting hole													
	H	E	W_2	W	L	B	J	M × pitch × ℓ	L_1	K	T	Hole size	T_1	N	W_1	H_1
RA15AL	24	4	9.5	34	70	26	26	M4×0.7×5.5	44.8	20	8	ϕ 3	4	3	15	16.3
RA15BL	24	4	9.5	34	85.4	26	26	M4×0.7×5.5	60.2	20	8	ϕ 3	4	3	15	16.3
RA25AL	36	5	12.5	48	97.5	35	35	M6×1×8	65.5	31	12	M6×0.75	6	11	23	24
RA25BL	36	5	12.5	48	115.5	35	50	M6×1×8	83.5	31	12	M6×0.75	6	11	23	24
RA30AL	42	6.5	16	60	110.8	40	40	M8×1.25×11	74	35.5	14	M6×0.75	7	11	28	28
RA30BL	42	6.5	16	60	135.4	40	60	M8×1.25×11	98.6	35.5	14	M6×0.75	7	11	28	28
RA35AL	48	6.5	18	70	123.8	50	50	M8×1.25×12	83.2	41.5	15	M6×0.75	8	11	34	31
RA35BL	48	6.5	18	70	152	50	72	M8×1.25×12	111.4	41.5	15	M6×0.75	8	11	34	31
RA45AL	60	8	20.5	86	154	60	60	M10×1.5×16	105.4	52	17	Rc1/8	10	14	45	38
RA45BL	60	8	20.5	86	190	60	80	M10×1.5×16	141.4	52	17	Rc1/8	10	14	45	38
RA55AL	70	9	23.5	100	184	75	75	M12×1.75×18	128	61	18	Rc1/8	11	14	53	43.5
RA55BL	70	9	23.5	100	234	75	95	M12×1.75×18	178	61	18	Rc1/8	11	14	53	43.5

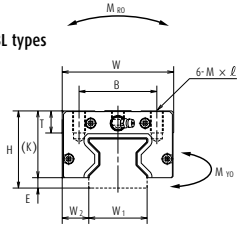
Notes 1) Select either one of two F dimensions, the standard or the parenthesized semi-standard dimension, for the pitch of rail fixing bolt holes. If not specified, the standard dimension of F is applied.

Reference number for roller slide of random-matching type

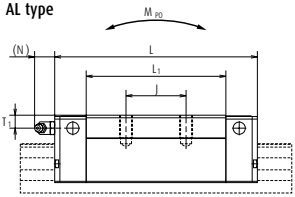
Ball slide RAA 35 AL PH H -F

- Random-matching roller slide series code
  - RAA: RA Series random-matching roller slide
- Size
- Roller slide shape code (See page 91)
- Accuracy code
  - PH, KH: High-precision grade random-matching type (See Table 19)
- Preload code: Z
  - Z: Slight preload, H: Medium preload
- Option code
  - No code: No surface treatment
  - -F: Fluoride low temperature chrome plating
  - -C: No surface treatment + Rail cover
  - -CF: Fluoride low temperature chrome plating + Rail cover

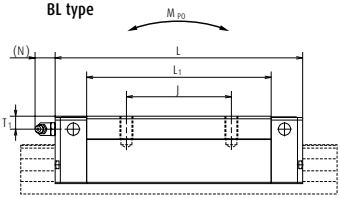
AL and BL types



AL type



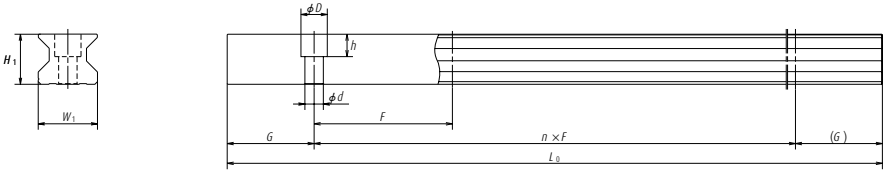
BL type



Reference number for rail of random-matching type

Rail R1A 35 1000 L C N -** PH Z

- Random-matching rail series code
  - R1A: RA Series random-matching rail
- Size
- Rail length (mm)
- Rail shape code: L
  - L: Standard
- Material/surface treatment code (See Table 18)
- *Butting rail specification
  - N: Non-butting, L: Butting specification
  - *Please consult with NSK for butting rail specification.
- Design serial number
  - Added to the reference number.
- Accuracy code
  - PH: High-precision grade random-matching type.
- Preload code: Z
  - Z: Common for slight and medium preload (See Table 4, page 93)



Unit: mm

Rail				Basic load rating								Weight	
Pitch	Mounting bolt hole	G	Maximum length	3) Dynamic		Static	Static moment (N·m)					Ball slide	Rail
							M_{RO}	M_{PO}		M_{YO}			
F	d × D × h	(reference)	L_{0max}	[50km] C_{50}(N)	[100km] C_{100}(N)	C_0 (N)		One slide	Two slides	One slide	Two slides	(kg)	(kg/m)
60	4.5×7.5×5.3	20	2 000	12 600	10 300	27 500	260	210	1 320	210	1 320	0.17	1.6
(30)	4.5×7.5×5.3	20	2 000	16 000	13 000	37 000	350	375	2 130	375	2 130	0.25	1.6
30	7×11×9	20	3 900	36 000	29 200	72 700	970	760	4 850	760	4 850	0.45	3.4
(60)	7×11×9	20	3 900	43 500	35 400	92 900	1 240	1 240	7 200	1 240	7 200	0.80	3.4
40	9×14×12	20	3 900	47 800	38 900	93 500	1 670	1 140	7 100	1 140	7 100	0.85	4.9
(80)	9×14×12	20	3 900	58 500	47 600	121 000	2 170	1 950	11 500	1 950	11 500	1.1	4.9
40	9×14×12	20	3 900	65 500	53 300	129 000	2 810	1 800	11 000	1 800	11 000	1.2	6.8
(80)	9×14×12	20	3 900	82 900	67 400	175 000	3 810	3 250	17 800	3 250	17 800	1.7	6.8
52.5	14×20×17	22.5	3 650	114 000	92 800	229 000	6 180	4 080	24 000	4 080	24 000	2.5	10.9
(105)	14×20×17	22.5	3 650	143 000	116 000	305 000	8 240	7 150	39 000	7 150	39 000	3.4	10.9
60	16×23×20	30	3 600	159 000	129 000	330 000	10 200	7 060	41 000	7 060	41 000	4.1	14.6
(120)	16×23×20	30	3 600	207 000	168 000	462 000	14 300	13 600	72 000	13 600	72 000	5.7	14.6

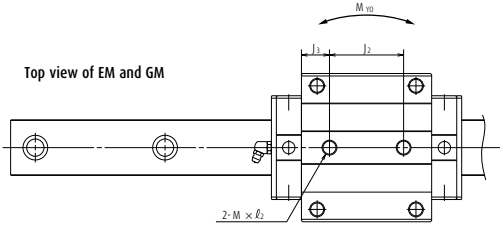
2) The random-matching type is available for the models of RA25 to RA55.
3) The basic load rating comply with the ISO standard. (ISO 14728-1, 14728-2)
C_{50}; the basic dynamic load rating for 50 km rated fatigue life
C_{100}; the basic dynamic load rating for 100 km rated fatigue life

RA-EM (High-load type / Standard)
RA-GM (Super-high-load type / Long)

RA 35 1000 EM C 2 - PH H**

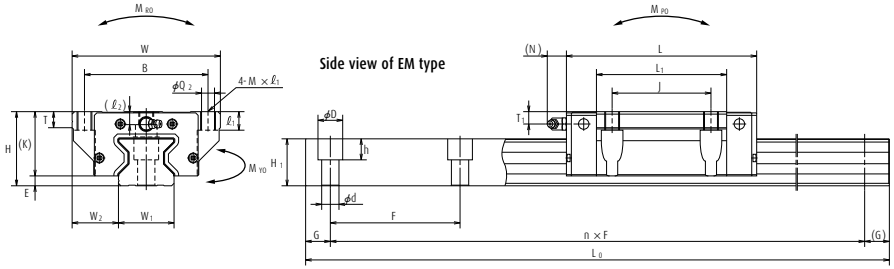
- RA — Series name
- 35 — Size
- 1000 — Rail length (mm)
- EM — Roller slide shape code (See page 91)
- C — Material/surface treatment code (See Table 18)
  - C: Special high carbon steel (NSK standard)
- 2 — Number of roller slides per rail
- ** — Design serial number
  - Added to the reference number.
- PH — Accuracy code (See Table 19)
- H — Preload code (See Table 4, page 93)
  - 1: Z1, 3: Z3, Z: ZZ, H: ZH

Top view of EM and GM



Front view of EM and GM types

Side view of EM type



Model No.	Assembly			Ball slide													
	Height			Width	Length	Mounting hole								Grease fitting		
	H	E	W_2	W	L	B	J	J_2	M × pitch × $\ell_1(\ell_2)$	O_2	L_1	K	T	Hole size	T_1	N
RA15EM	24	4	16	47	70	38	30	26	M5×0.8×8.5 (6.5)	4.4	44.8	20	8	φ 3	4	3
RA15GM	24	4	16	47	85.4	38	30	26	M5×0.8×8.5 (6.5)	4.4	60.2	20	8	φ 3	4	3
RA20EM	30	5	21.5	63	86.5	53	40	35	M6×1×9.5 (8)	5.3	57.5	25	10	φ 3	4	3
RA20GM	30	5	21.5	63	106.3	53	40	35	M6×1×9.5 (8)	5.3	77.3	25	10	φ 3	4	3
RA25EM	36	5	23.5	70	97.5	57	45	40	M8×1.25×10 (11)	6.8	65.5	31	11	M6×0.75	6	11
RA25GM	36	5	23.5	70	115.5	57	45	40	M8×1.25×10 (11)	6.8	83.5	31	11	M6×0.75	6	11
RA30EM	42	6.5	31	90	110.8	72	52	44	M10×1.5×12 (12.5)	8.6	74	35.5	11	M6×0.75	7	11
RA30GM	42	6.5	31	90	135.4	72	52	44	M10×1.5×12 (12.5)	8.6	98.6	35.5	11	M6×0.75	7	11
RA35EM	48	6.5	33	100	123.8	82	62	52	M10×1.5×13 (7)	8.6	83.2	41.5	12	M6×0.75	8	11
RA35GM	48	6.5	33	100	152	82	62	52	M10×1.5×13 (7)	8.6	111.4	41.5	12	M6×0.75	8	11
RA45EM	60	8	37.5	120	154	100	80	60	M12×1.75×15 (10.5)	10.5	105.4	52	13	Rc1/8	10	14
RA45GM	60	8	37.5	120	190	100	80	60	M12×1.75×15 (10.5)	10.5	141.4	52	13	Rc1/8	10	14
RA55EM	70	9	43.5	140	184	116	95	70	M14×2×18 (13)	12.5	128	61	15	Rc1/8	11	14
RA55GM	70	9	43.5	140	234	116	95	70	M14×2×18 (13)	12.5	178	61	15	Rc1/8	11	14
RA65EM	90	13	53.5	170	228.4	142	110	82	M16×2×24 (18.5)	14.6	155.4	77	22	Rc1/8	19	14
RA65GM	90	13	53.5	170	302.5	142	110	82	M16×2×24 (18.5)	14.6	229.5	77	22	Rc1/8	19	14

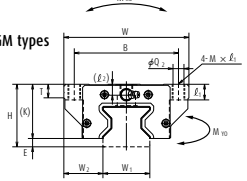
Notes 1) Select either one of two F dimensions, the standard or the parenthesized semi-standard dimension, for the pitch of rail fixing bolt holes. If not specified, the standard dimension of F is applied.

Reference number for roller slide of random-matching type

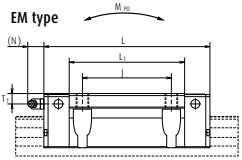
Ball slide RAA 35 EM PH H -F

- Random-matching roller slide series code
  - RAA: RA Series random-matching roller slide
- Size
- Roller slide shape code (See page 91)
- Accuracy code
  - PH, KH: High-precision grade random-matching type (See table 19)
- Preload code: Z
  - Z: Slight preload, H: Medium preload.
- Option code
  - No code: No surface treatment
  - -F: Fluoride low temperature chrome plating
  - -C: No surface treatment + Rail cover
  - -CF: Fluoride low temperature chrome plating + Rail cover

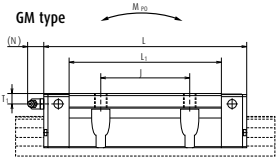
EM and GM types



EM type



GM type

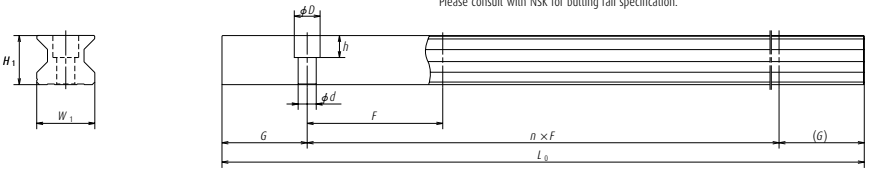


Reference number for rail of random-matching type

Rail R1A 35 1000 L C N -** PH Z

- Random-matching rail series code
  - R1A: RA Series random-matching rail
- Size
- Rail length (mm)
- Rail shape code: L
  - L: Standard
- Material/surface treatment code (See Table 18)
- Preload code: Z
  - Z: Common for slight and medium preload (See Table 4, page 93)
- Accuracy code
  - PH: High-precision grade random-matching type.
- Design serial number
  - Added to the reference number.
- *Butting rail specification
  - N: Non-butting. L: Butting specification

*Please consult with NSK for butting rail specification.



Unit: mm

Rail						Basic load rating									Weight	
Width	Height	Pitch	Mounting bolt hole	G	Maximum length	3) Dynamic		Static	Static moment (N·m)						Ball slide	Rail
									M_{RO}	M_{PO}		M_{YO}				
W_1	H_1	F	d × D × h	(reference)	L_{0max}	[50km] C_{50}(N)	[100km] C_{100}(N)	C_0 (N)		One slide	Two slides	One slide	Two slides	(kg)	(kg/m)
15	16.3	60	4.5×7.5×5.3	20	2 000	12 600	10 300	27 500	260	210	1 320	210	1 320	0.21	1.6
15	16.3	(30)	4.5×7.5×5.3	20	2 000	16 000	13 000	37 000	350	375	2 130	375	2 130	0.28	1.6
20	20.8	60	6×9.5×8.5	20	3 000	23 600	19 200	52 500	665	505	3 100	505	3 100	0.45	2.6
20	20.8	(30)	6×9.5×8.5	20	3 000	29 500	24 000	70 000	890	900	5 000	900	5 000	0.65	2.6
23	24	30	7×11×9	20	3 900	36 000	29 200	72 700	970	760	4 850	760	4 850	0.80	3.4
23	24	(60)	7×11×9	20	3 900	43 500	35 400	92 900	1 240	1 240	7 200	1 240	7 200	1.1	3.4
28	28	40	9×14×12	20	3 900	47 800	38 900	93 500	1 670	1 140	7 100	1 140	7 100	1.3	4.9
28	28	(80)	9×14×12	20	3 900	58 500	47 600	121 000	2 170	1 950	11 500	1 950	11 500	1.7	4.9
34	31	40	9×14×12	20	3 900	65 500	53 300	129 000	2 810	1 800	11 000	1 800	11 000	1.7	6.8
34	31	(80)	9×14×12	20	3 900	82 900	67 400	175 000	3 810	3 250	17 800	3 250	17 800	2.3	6.8
45	38	52.5	14×20×17	22.5	3 650	114 000	92 800	229 000	6 180	4 080	24 000	4 080	24 000	3.2	10.9
45	38	(105)	14×20×17	22.5	3 650	143 000	116 000	305 000	8 240	7 150	39 000	7 150	39 000	4.3	10.9
53	43.5	60	16×23×20	30	3 600	159 000	129 000	330 000	10 200	7 060	41 000	7 060	41 000	5.4	14.6
53	43.5	(120)	16×23×20	30	3 600	207 000	168 000	462 000	14 300	13 600	72 000	13 600	72 000	7.5	14.6
63	55	75	18×26×22	35	3 600	259 000	210 000	504 000	19 200	12 700	78 500	12 700	78 500	12.2	22.0
63	55	(150)	18×26×22	35	3 600	355 000	288 000	756 000	28 700	28 600	153 000	28 600	153 000	16.5	22.0

2) The random-matching type is available for the models of RA25 to RA65.

3) The basic load rating comply with the ISO standard. (ISO 14728-1, 14728-2)

C_{50}; the basic dynamic load rating for 50 km rated fatigue life

C_{100}; the basic dynamic load rating for 100 km rated fatigue life

12. The Comparative Table of Old and New Series

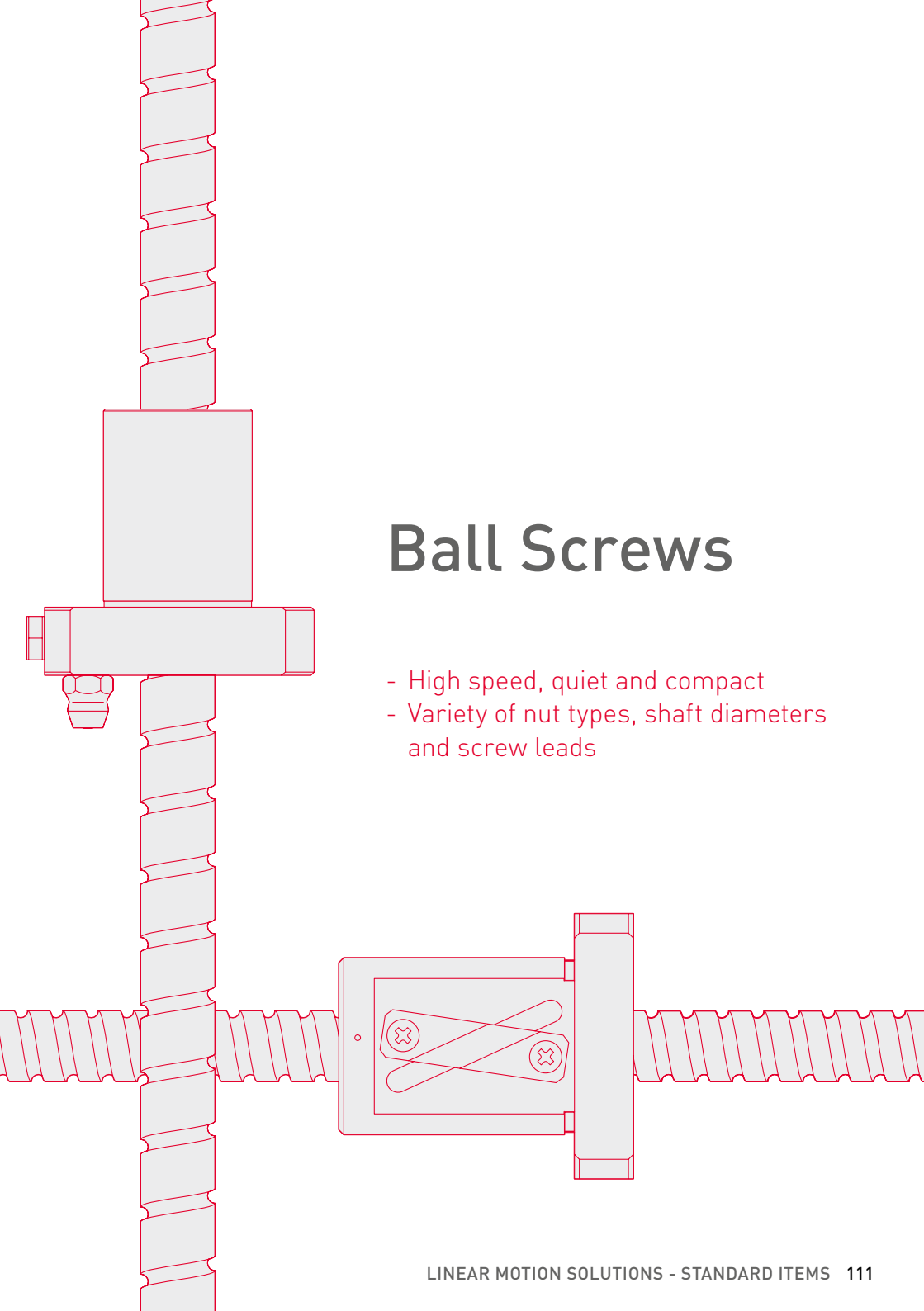
New Series			Former series					
Model No.	Ball slide mounting hole dimension M×pitch×ℓ <Q_2> [mm]	Dynamic load rating C_{50} [N]	Model No.	Ball slide mounting hole dimension M×pitch×ℓ <Q_2> Q_1×ℓ [mm]	Dynamic load rating C_{50} [N]	Model No.	Ball slide mounting hole dimension M×pitch×ℓ <Q_2> Q_1×ℓ [mm]	Dynamic load rating C_{50} [N]
NH15AN	M4×0.7×6	14 200	LH15AN	M4×0.7×6	10 800	SH15AN	M4×0.7×6	10 100
NH15BN	M4×0.7×6	18 100	LH15BN	M4×0.7×6	14 600	SH15BN	M4×0.7×6	13 400
			LH15EL	M5×0.8×8	10 800	SH15EL	M5×0.8×8	10 100
NH15EM	M5×0.8×7 <4.4>	14 200	LH15EM	M5×0.8×7 <4.4>	10 800	SH15EM	M5×0.8×7 <4.4>	10 100
			LH15FL	4.5×7	10 800	SH15FL	4.5×7	10 100
			LH15GL	M5×0.8×8	14 600	SH15GL	M5×0.8×8	13 400
NH15GM	M5×0.8×7 <4.4>	18 100	LH15GM	M5×0.8×7 <4.4>	14 600	SH15GM	M5×0.8×7 <4.4>	13 400
			LH15HL	4.5×7	14 600	SH15HL	4.5×7	13 400
NH20AN	M5×0.8×6	23 700	LH20AN	M5×0.8×6	17 400	SH20AN	M5×0.8×6	16 300
NH20BN	M5×0.8×6	30 000	LH20BN	M5×0.8×6	23 500	SH20BN	M5×0.8×6	21 600
			LH20EL	M6×1×10	17 400	SH20EL	M6×1×10	16 300
NH20EM	M6×1×9.5 <5.3>	23 700	LH20EM	M6×1×9.5 <5.3>	17 400	SH20EM	M6×1×9.5 <5.3>	16 300
			LH20FL	6×9.5	17 400	SH20FL	6×9.5	16 300
			LH20GL	M6×1×10	23 500	SH20GL	M6×1×10	21 600
NH20GM	M6×1×9.5 <5.3>	30 000	LH20GM	M6×1×9.5 <5.3>	23 500	SH20GM	M6×1×9.5 <5.3>	21 600
			LH20HL	6×9.5	23 500	SH20HL	6×9.5	21 600
NH25AL	M6×1×6	33 500	LH25AL	M6×1×6	25 600	SH25AL	M6×1×6	22 400
NH25AN	M6×1×9	33 500	LH25AN	M6×1×9	25 600	SH25AN	M6×1×9	22 400
NH25BL	M6×1×6	45 500	LH25BL	M6×1×6	34 500	SH25BL	M6×1×6	32 000
NH25BN	M6×1×9	45 500	LH25BN	M6×1×9	34 500	SH25BN	M6×1×9	32 000
			LH25EL	M8×1.25×16(12)	25 600	SH25EL	M8×1.25×16(12)	22 400
NH25EM	M8×1.25×10(11.5) <6.8>	33 500	LH25EM	M8×1.25×10(11.5) <6.8>	25 600	SH25EM	M8×1.25×10(11.5) <6.8>	22 400
			LH25FL	7×10(11.5)	25 600	SH25FL	7×10(11.5)	22 400
			LH25GL	M8×1.25×16(12)	34 500	SH25GL	M8×1.25×16(12)	32 000
NH25GM	M8×1.25×10(11.5) <6.8>	45 500	LH25GM	M8×1.25×10(11.5) <6.8>	34 500	SH25GM	M8×1.25×10(11.5) <6.8>	32 000
			LH25HL	7×10(11.5)	34 500	SH25HL	7×10(11.5)	32 000
NH30AL	M8×1.25×8	41 000	LH30AL	M8×1.25×8	31 000	SH30AL	M8×1.25×8	31 000
NH30AN	M8×1.25×10	41 000	LH30AN	M8×1.25×10	31 000	SH30AN	M8×1.25×10	31 000
NH30BL	M8×1.25×8	61 000	LH30BL	M8×1.25×8	46 000	SH30BL	M8×1.25×8	46 000
NH30BN	M8×1.25×10	61 000	LH30BN	M8×1.25×10	46 000	SH30BN	M8×1.25×10	46 000
			LH30EL	M10×1.5×18(15)	35 500	SH30EL	M10×1.5×18(15)	35 500
NH30EM	M10×1.5×12(14.5) <8.6>	47 000	LH30EM	M10×1.5×12(14.5) <8.6>	35 500	SH30EM	M10×1.5×12(14.5) <8.6>	35 500
			LH30FL	9×12(14.5)	35 500	SH30FL	9×12(14.5)	35 500
			LH30GL	M10×1.5×18(15)	46 000	SH30GL	M10×1.5×18(15)	46 000
NH30GM	M10×1.5×12(14.5) <8.6>	61 000	LH30GM	M10×1.5×12(14.5) <8.6>	46 000	SH30GM	M10×1.5×12(14.5) <8.6>	46 000
			LH30HL	9×12(14.5)	46 000	SH30HL	9×12(14.5)	46 000
NH35AL	M8×1.25×8	62 500	LH35AL	M8×1.25×8	47 500	SH35AL	M8×1.25×8	47 500
NH35AN	M8×1.25×12	62 500	LH35AN	M8×1.25×12	47 500	SH35AN	M8×1.25×12	47 500
NH35BL	M8×1.25×8	81 000	LH35BL	M8×1.25×8	61 500	SH35BL	M8×1.25×8	61 500
NH35BN	M8×1.25×12	81 000	LH35BN	M8×1.25×12	61 500	SH35BN	M8×1.25×12	61 500
			LH35EL	M10×1.5×20	47 500	SH35EL	M10×1.5×20	47 500
NH35EM	M10×1.5×13 <8.6>	62 500	LH35EM	M10×1.5×13 <8.6>	47 500	SH35EM	M10×1.5×13 <8.6>	47 500
			LH35FL	9×13	47 500	SH35FL	9×13	47 500
			LH35GL	M10×1.5×20	61 500	SH35GL	M10×1.5×20	61 500
NH35GM	M10×1.5×13 <8.6>	81 000	LH35GM	M10×1.5×13 <8.6>	61 500	SH35GM	M10×1.5×13 <8.6>	61 500
			LH35HL	9×13	61 500	SH35HL	9×13	61 500
NH45AL	M10×1.5×10	107 000	LH45AL	M10×1.5×10	81 000	SH45AL	M10×1.5×10	76 500
NH45AN	M10×1.5×17	107 000	LH45AN	M10×1.5×17	81 000	SH45AN	M10×1.5×17	76 500
NH45BL	M10×1.5×10	131 000	LH45BL	M10×1.5×10	99 000	SH45BL	M10×1.5×10	94 500
NH45BN	M10×1.5×17	131 000	LH45BN	M10×1.5×17	99 000	SH45BN	M10×1.5×17	94 500
			LH45EL	M12×1.75×24	81 000	SH45EL	M12×1.75×24	76 500
NH45EM	M12×1.75×15 <10.5>	107 000	LH45EM	M12×1.75×15 <10.5>	81 000	SH45EM	M12×1.75×15 <10.5>	76 500
			LH45FL	11×15	81 000	SH45FL	11×15	76 500
			LH45GL	M12×1.75×24	99 000	SH45GL	M12×1.75×24	94 500
NH45GM	M12×1.75×15 <10.5>	131 000	LH45GM	M12×1.75×15 <10.5>	99 000	SH45GM	M12×1.75×15 <10.5>	94 500
			LH45GM	11×15	99 000	SH45HL	11×15	94 500
NH55AL	M12×1.75×13	158 000	LH55AL	M12×1.75×13	119 000	SH55AL	M12×1.75×13	113 000
NH55AN	M12×1.75×18	158 000	LH55AN	M12×1.75×18	119 000	SH55AN	M12×1.75×18	113 000
NH55BL	M12×1.75×13	193 000	LH55BL	M12×1.75×13	146 000	SH55BL	M12×1.75×13	140 000
NH55BN	M12×1.75×18	193 000	LH55BN	M12×1.75×18	146 000	SH55BN	M12×1.75×18	140 000
			LH55EL	M14×2×18	119 000	SH55EL	M14×2×18	113 000
NH55EM	M14×2×18 <12.5>	158 000	LH55EM	M14×2×18 <12.5>	119 000	SH55EM	M14×2×18 <12.5>	113 000
			LH55FL	14×18	119 000	SH55FL	14×18	113 000
			LH55GL	M14×2×18	146 000	SH55GL	M14×2×18	140 000
NH55GM	M14×2×18 <12.5>	193 000	LH55GM	M14×2×18 <12.5>	146 000	SH55GM	M14×2×18 <12.5>	140 000
			LH55HL	14×18	146 000	SH55HL	14×18	140 000
NH65AN	M16×2×20	239 000	LH65AN	M16×2×20	181 000			
NH65BN	M16×2×20	310 000	LH65BN	M16×2×20	235 000			
			LH65EL	M16×2×24	181 000			
NH65EM	M16×2×24 <14.6>	239 000	LH65EM	M16×2×24 <14.6>	181 000			
			LH65FL	16×24	181 000			
			LH65GL	M16×2×24	235 000			
NH65GM	M16×2×24 <14.6>	310 000	LH65GM	M16×2×24 <14.6>	235 000			
			LH65GM	M16×24	235 000			

Notes 1) Parenthesized dimensions are for items made of stainless steel.
2) Basic dynamic load rating is a load that allows for a 50-km rating fatigue life and is a vertical and constant load on the ball slide mounting surface.

New Series			Former series					
Model No.	Ball slide mounting hole dimension M×pitch×ℓ <Q_2> [mm]	Dynamic load rating C_{50} [N]	Model No.	Ball slide mounting hole dimension M×pitch×ℓ <Q_2> Q_1×ℓ [mm]	Dynamic load rating C_{50} [N]	Model No.	Ball slide mounting hole dimension M×pitch×ℓ <Q_2> Q_1×ℓ [mm]	Dynamic load rating C_{50} [N]
NS15CL	M4×0.7×6	7 250	**LS15CL**	M4×0.7×6	5 400	**SS15CL**	M4×0.7×6	4 900
NS15AL	M4×0.7×6	11 200	**LS15AL**	M4×0.7×6	8 350	**SS15AL**	M4×0.7×6	7 900
NS15JM	M5×0.8×7 <4.4>	7 250	**LS15JL**	M5×0.8×8	5 400	**SS15JL**	M5×0.8×8	4 900
			LS15JM	M5×0.8×7 <4.4>	5 400	**SS15JM**	M5×0.8×7 <4.4>	4 900
			LS15KL	4.5×7	5 400	**SS15KL**	4.5×7	4 900
NS15EM	M5×0.8×7 <4.4>	11 200	**LS15EL**	M5×0.8×8	8 350	**SS15EL**	M5×0.8×8	7 900
			LS15EM	M5×0.8×7 <4.4>	8 350	**SS15EM**	M5×0.8×7 <4.4>	7 900
			LS15FL	4.5×7	8 350	**SS15FL**	4.5×7	7 900
NS20CL	M5×0.8×7	10 600	**LS20CL**	M5×0.8×7	7 900	**SS20CL**	M5×0.8×7	7 250
NS20AL	M5×0.8×7	15 600	**LS20AL**	M5×0.8×7	11 700	**SS20AL**	M5×0.8×7	11 100
NS20JM	M6×1×9(9.5) <5.3>	10 600	**LS20JL**	M6×1×10	7 900	**SS20JL**	M6×1×10	7 250
			LS20JM	M6×1×9(9.5) <5.3>	7 900	**SS20JM**	M6×1×9(9.5) <5.3>	7 250
			LS20KL	5.5×9(9.5)	7 900	**SS20KL**	5.5×9(9.5)	7 250
NS20EM	M6×1×9(9.5) <5.3>	15 600	**LS20EL**	M6×1×10	11 700	**SS20EL**	M6×1×10	11 100
			LS20EM	M6×1×9(9.5) <5.3>	11 700	**SS20EM**	M6×1×9(9.5) <5.3>	11 100
			LS20FL	5.5×9(9.5)	11 700	**SS20FL**	5.5×9(9.5)	11 100
NS25CL	M6×1×9	17 700	**LS25CL**	M6×1×9	12 700	**SS25CL**	M6×1×9	12 700
NS25AL	M6×1×9	26 100	**LS25AL**	M6×1×9	18 800	**SS25AL**	M6×1×9	17 900
NS25JM	M8×1.25×10(11.5) <6.8>	17 700	**LS25JL**	M8×1.25×12	12 700	**SS25JL**	M8×1.25×12	12 700
			LS25JM	M8×1.25×10(11.5) <6.8>	12 700	**SS25JM**	M8×1.25×10(11.5) <6.8>	12 700
			LS25KL	7×10(11.5)	12 700	**SS25KL**	7×10(11.5)	12 700
NS25EM	M8×1.25×10(11.5) <6.8>	26 100	**LS25EL**	M8×1.25×12	18 800	**SS25EL**	M8×1.25×12	17 900
			LS25EM	M8×1.25×10(11.5) <6.8>	18 800	**SS25EM**	M8×1.25×10(11.5) <6.8>	17 900
			LS25FL	7×10(11.5)	18 800	**SS25FL**	7×10(11.5)	17 900
NS30CL	M8×1.25×12	24 700	**LS30CL**	M8×1.25×12	18 700	**SS30CL**	M8×1.25×12	18 700
NS30AL	M8×1.25×12	38 000	**LS30AL**	M8×1.25×12	28 800	**SS30AL**	M8×1.25×12	27 300
NS30JM	M10×1.5×12(14.5) <8.6>	24 700	**LS30JL**	M10×1.5×18(15)	18 700	**SS30JL**	M10×1.5×18(15)	18 700
			LS30JM	M10×1.5×12(14.5) <8.6>	18 700	**SS30JM**	M10×1.5×12(14.5) <8.6>	18 700
			LS30KL	9×12(14.5)	18 700	**SS30KL**	9×12(14.5)	18 700
NS30EM	M10×1.5×12(14.5) <8.6>	38 000	**LS30EL**	M10×1.5×18(15)	28 800	**SS30EL**	M10×1.5×18(15)	27 300
			LS30EM	M10×1.5×12(14.5) <8.6>	28 800	**SS30EM**	M10×1.5×12(14.5) <8.6>	27 300
			LS30FL	9×12(14.5)	28 800	**SS30FL**	9×12(14.5)	27 300
NS35CL	M8×1.25×12	34 500	**LS35CL**	M8×1.25×12	26 000	**SS35CL**	M8×1.25×12	26 000
NS35AL	M8×1.25×12	52 500	**LS35AL**	M8×1.25×12	40 000	**SS35AL**	M8×1.25×12	38 000
NS35JM	M10×1.5×13(14.5) <8.6>	34 500	**LS35JL**	M10×1.5×20(15)	26 000	**SS35JL**	M10×1.5×20(15)	26 000
			LS35JM	M10×1.5×13(14.5) <8.6>	26 000	**SS35JM**	M10×1.5×13(14.5) <8.6>	26 000
			LS35KL	9×13(14.5)	26 000	**SS35KL**	9×13(14.5)	26 000
NS35EM	M10×1.5×13(14.5) <8.6>	52 500	**LS35EL**	M10×1.5×20(15)	40 000	**SS35EL**	M10×1.5×20(15)	38 000
			LS35EM	M10×1.5×13(14.5) <8.6>	40 000	**SS35EM**	M10×1.5×13(14.5) <8.6>	38 000
			LS35FL	9×13(14.5)	40 000	**SS35FL**	9×13(14.5)	38 000

Notes 1) Parenthesized dimensions are for items made of stainless steel.
2) Basic dynamic load rating is a load that allows for a 50-km rating fatigue life and is a vertical and constant load on the ball slide mounting surface.

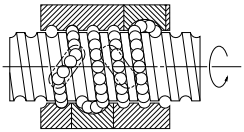
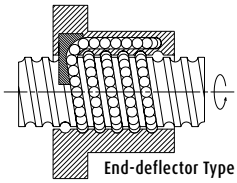
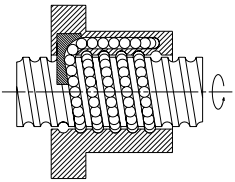
In VH series, the slide types in flange shape are focused.

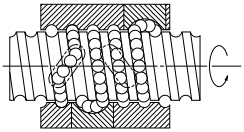
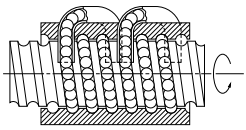
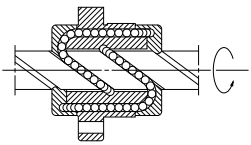


Ball Screws

- High speed, quiet and compact
- Variety of nut types, shaft diameters and screw leads

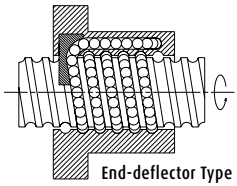
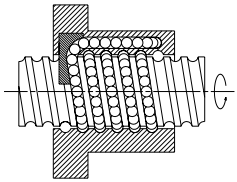
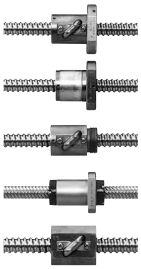
13. Types of Ball Screws

<table>
<tr><th colspan="2">Series
DIN Ball Screw</th><th>Features</th></tr>
<tr><td>  </td><td> 
Deflector Type
 
End-deflector Type</td><td>› High speed capability
› High load capacity
› Low torque variation
› Low noise
› Dimensions according DIN-Norm
› Available from stock for prototypes</td></tr>
<tr><th colspan="2">Compact FA Series</th><td rowspan="2">› Easy-to-implement and ready-to-use ball screw with finished shaft-end
› Quiet and compact, newly designed series 6 dB noise reduction, 10-30% smaller nut
› High-speed operation of up to 5 000 min^{-1}
› New type of contact seal is equipped.
› Low-profile designed support unit (bearing) is available.
PSS Series: Basic series
FSS Series: Transportation series</td></tr>
<tr><td>  </td><td> 
End-deflector Type</td></tr>
<tr><th colspan="2">A and S Series</th><td rowspan="3">› Easy-to-implement and ready-to-use ball screw with finished shaft-end
› Variety of shaft diameter and lead combinations available

› MA Series: Miniature automation series
› FA Series: Factory automation series
› KA Series: Stainless automation series
› SS Series: Blank shaft-end series</td></tr>
<tr><td>  </td><td> 
Deflector Type</td></tr>
<tr><td>  </td><td> 
Tube Type
 
End-cap Type</td></tr>
</table>

Type	Specifications						Dimension table
	Accuracy grade	Nut system	Shaft dia.	Lead	Stroke (nominal)	Preload	
DIN (ZSD)	C5	Deflector Type	32	10	1 200	Z-preload	Page 318 – 323
			32	15	1 200		
			32	20	1 200		
			40	10	1 200		
			40	15	1 200		
			50	10	1 200		
			50	15	1 200		
			50	20	1 100		
			63	10	1 200		
			63	15	1 100		
			63	20	1 100		
			63	30	1 000		
DIN (ZSS)	C5	End Deflector Type	32	20	1 200	Z-preload	
			40	20	1 200		
			40	25	1 200		
			40	30	1 200		
			40	40	1 200		
			50	25	1 200		
			50	30	1 200		
			50	40	1 200		
FSS	Ct7	End-deflector	12	10	750	P-preload	Page 176 – 183
			15	10, 20	1 300		
			20	10, 20	1 250		
			25	10, 20, 25	1 250		
PSS	C5	End-deflector	6	8, 12	80		Page 184 – 207
			8	10, 15	60		
			10	5, 10	400		
			12	5, 10, 20, 30	500		
			15	5, 10, 20, 30	1 000		
			20	5, 10, 20, 30, 40, 60	2 000		
			25	5, 10, 20, 25, 30, 50	2 000		
MA	C3	Deflector Type	4	1	70	P-preload	Page 208 – 229
			6	1	100		
			8	1, 1.5, 2	150		
			10	2, 2.5	200		
			12	2, 2.5	250		
			16	2, 2.5	300		
FA	C3	Tube Type	10	4	300	P-preload	Page 230 – 265
	C3, C5		12	5, 10	450		
			14	5, 8	700		
	C5	Tube/End-Cap	15	10, 20	1 000		
			16	5, 16, 32	1 200		
			20	10, 20, 40	1 600		
			25	20, 25, 50	2 000		
		Tube Type	32	25, 32	2 600		
KA	C3	Deflector Type	6	1	100	P-preload	Page 266 – 289
			8	1, 2	150		
		Deflector/Tube	10	2, 4	300		
	C3, C5		12	2, 5, 10	450		
	C5	Tube/End-Cap	15	10, 20	1 000		
		Deflector Type	16	2	300		
		Tube Type	20	20	1 000		
SS	C5	Tube Type	20	4, 5	900	P-preload	Page 290 – 317
			25	4, 5, 6, 10	1 400		
		Deflector Type	25	5, 10	1 400	Z-preload	
		Tube Type	28	5, 6	1 100	P-preload	
			32	5, 6, 8, 10	1 600	P/Z/D-preload	
		Deflector Type	32	5, 10,	1 650	Z-preload	
		Tube Type	36	10	1 850	Z/D-preload	
			40	5, 8, 10, 12	2 250		
		Deflector Type	40	10	2 250	Z-preload	
		Tube Type	45	10	2 350		
			50	10	2 400		
		Deflector Type	50	10	2 450		

13. Types of Ball Screws

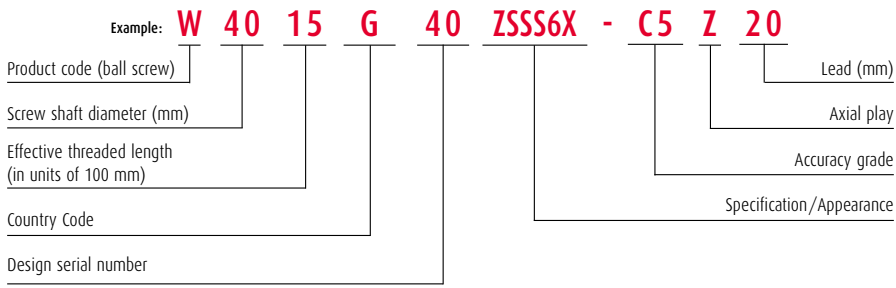
Series	Features
Precision Interchangeable Ball Screw	
  End-deflector Type	› Nut and shaft are completely interchangeable › 100% DIN-compliant › High-speed/low-noise nut design (d·n = 160.000, max 5000 1/min) › NSK provides the support bearing units which go with the ball screw shafts
PR Series/LPR Series	
  End-deflector Type	› Saves assembly space › Suitable for rotating ball nut application because of its low inertia and balanced design › Assists clean environment maintenance due to minimum grease scattering › Superb sealing capabilities in contaminated environments
R Series (Rolled Ball Screw)	
  RNFTL RNFBL RNCT RNFCL RNSTL	› General accuracy grade (Ct10) rolled ball screw series › Compatible with a variety of nut mounting styles › Low-cost and short delivery › Interchangeable screw shaft and ball nut

Type	Specifications						Dimension table
	Accuracy grade	Nut system	Shaft dia.	Lead	Stroke (nominal)	Preload	
FCS/ FCN	Ct7	End-deflector	12	5, 10	550	Clearance max. 0.02	Page 166 – 175
			15	5, 10, 20	1 200		
			20	5, 10, 20	1 200		
			25	5, 10, 20, 25	1 200		
			32	5, 10, 20	1 150		
			40	10	1 200		
VSP(PR)	Ct7	Deflector Type	12	5	400	P-preload	Page 154 – 165
			15	5	500		
			15	10	450		
			20	5	650		
			20	10	650		
			25	5	2 300		
			25	10	2 300		
			32	10	2 300		
			32	20	2 250		
			40	10	1 350		
VSP(LPR)	Ct7	Deflector Type	20	20	1 400	P-preload	
			25	25	3 000		
			32	32	2 950		
			40	40	4 200		
			50	50	4 200		

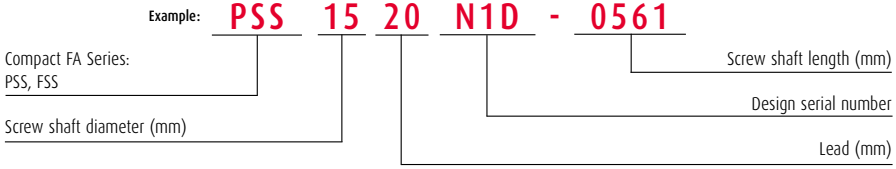
Shaft dia.	Lead						
	RNFTL	RNFBL	RNCT	RNFCL	RNSTL		
10	3, 6	6	3	–	–	Clearance 0.1 – 0.25	Page 138 - 153
12	8, 12	8	–	12	–		
14	4, 5	4, 5	4, 5	–	4, 5		
15	–	–	–	20	–		
16	10, 16	–	–	16, 32	–		
18	8	8	8	–	8		
20	5, 10, 20	5, 10	5	20, 40	5, 10		
25	5, 10, 25	5, 10	5, 10	25, 50	5, 10		
28	6	6	6	–	6		
32	10, 32	10	10	32, 64	10		
36	10	10	10	–	10		
40	10, 40	10	10	40, 80	–		
45	12	–	12	–	12		
50	10, 16	–	10, 16	50	–		

14. Part Number for Ball Screws

Part number for DIN ball screw



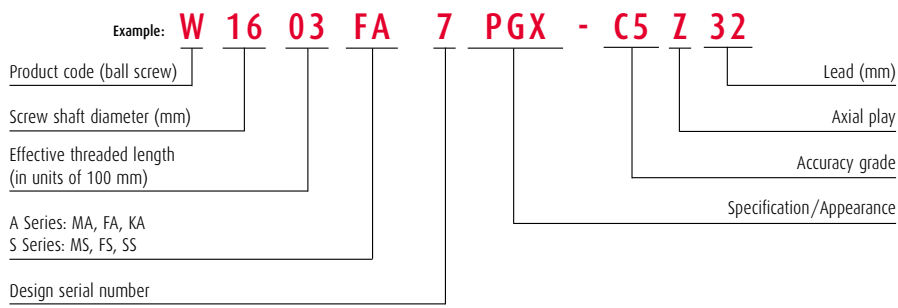
Part number for Compact FA Series ball screw



PSS: Compact , low noise and high speed

FSS: Compact FA for transportation

Part number for A and S Series ball screw



MA: Miniature ball screw

FA: Ball screw for factory automation

KA: Stainless steel ball screw

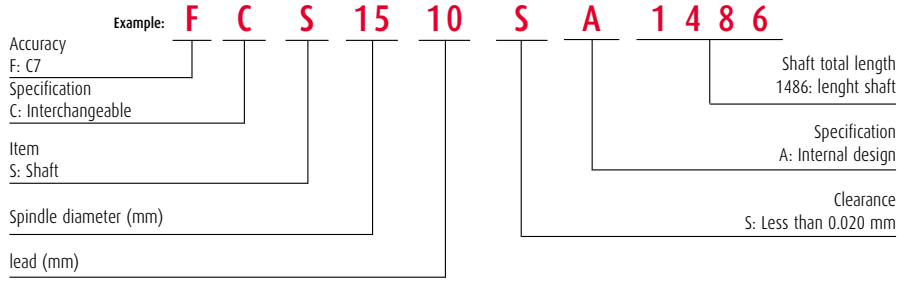
MS: MA series with blank shaft-end

FS: FA series with blank shaft-end

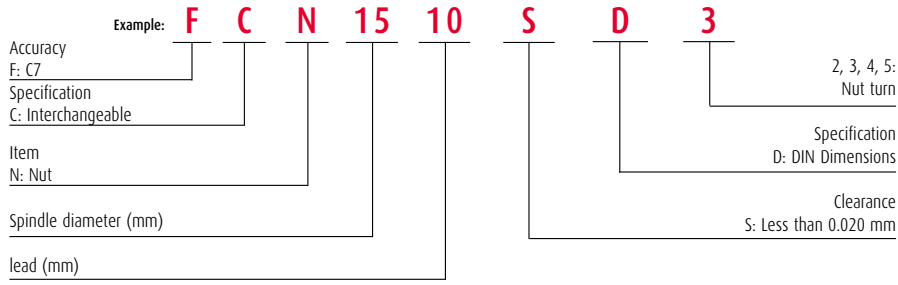
SS: Ball screw for machine tools with blank shaft-end

Part number for Precision Interchageable ball screws

Please use the following designation, if you order a **shaft**:

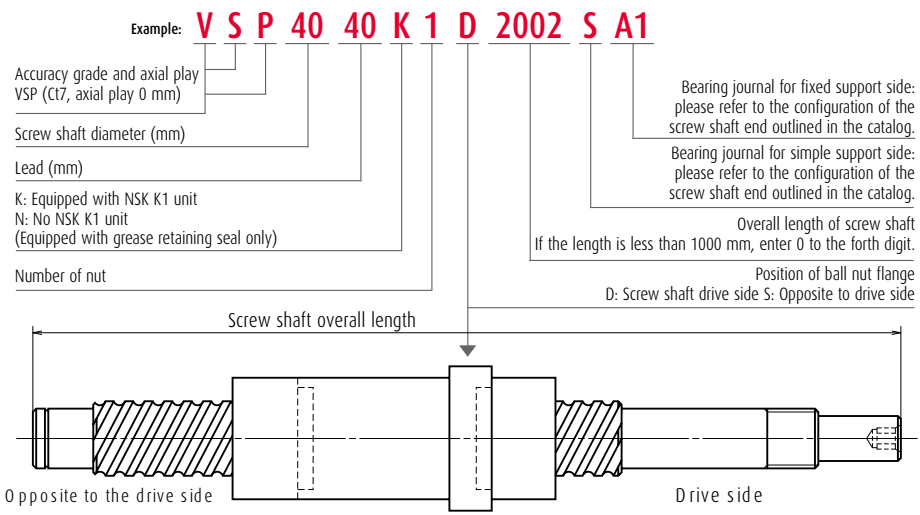


Please use the following designation, if you order a **nut**:



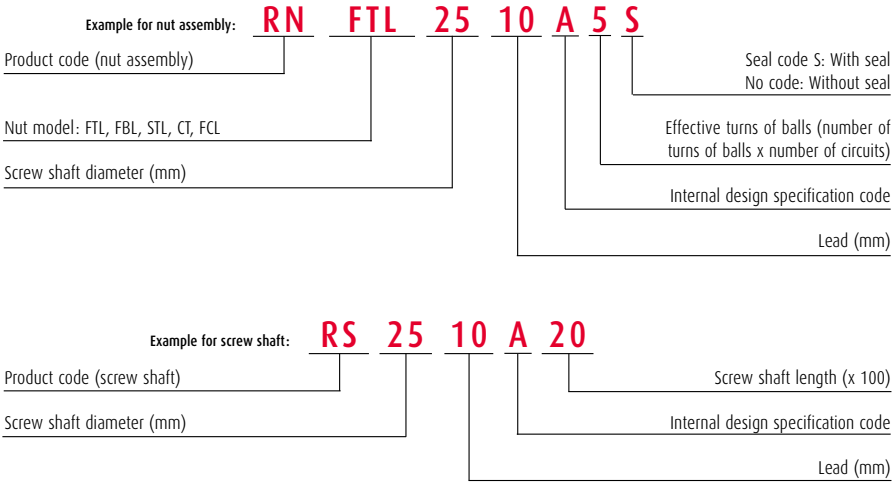
14. Part Number for Ball Screws

Part number for VSP Series ball screw



Please indicate the nut assembly and screw shaft part number when ordering.

Part number for R Series rolled ball screw



FTL: Flanged tube type

FBL: Flanged tube type (circular)

STL: Square tube type

CT: V-thread (no flange) tube type

FCL: Flanged end-cap type

Shaft Diameter and Lead Matrices

NSK provides a variety of standard ball screw series, shown in the following matrices.

Standard ball screws: Shaft diameter and lead matrix

Shaft dia.	Lead								
	1	1.5	2	2.5	4	5	6	8	10
4	P 208 (MA)								
6	P 210 (MA)							P 184 (PSS)	
8	P 212 (MA)	P 214 (MA)	P 216 (MA)						P 186 (PSS)
10			P 218 (MA)	P 220 (MA)	P 230 (FA)	P 188 (PPS)			P 188 (PSS)
12			P 222 (MA)	P 224 (MA)		P 156 (VSP) P 168 (FCN) P 190 (PSS) P 232 (FA)			P 168 (FCN) P 176 (FSS) P 190 (PSS) P 234 (FA)
14						P 236 (FA)		P 238 (FA)	
15						P 156 (VSP) P 168 (FCN) P 192 (PSS)			P 156 (VSP) P 168 (FCN) P 178 (FSS) P 192 (PSS) P 240 (FA)
16			P 226 (MA)	P 228 (MA)		P 244 (FA)			
20					P 290 (SS)	P 156 (VSP) P 168 (FCN) P 196 (PSS) P 290 (SS)			P 156 (VSP) P 168 (FCN) P 180 (FSS) P 196 (PSS) P 250 (FA)
25					P 292 (SS)	P 156 (VSP) P 168 (FCN) P 202 (PSS) P 292,294 (SS)	P 292 (SS)		P 156 (VSP) P 168 (FCN) P 182 (FSS) P 202 (PSS) P 250 (FA) P 294,296 (SS)
28						P 296,298 (SS)	P 296,298 (SS)		
30									
32						P 168 (FCN) P 300,302,304 (SS)	P 300,302 (SS)	P 302 (SS)	P 156 (VSP) P 168 (FCN) P 304,306,308 (SS) P 323 (ZSD)
36									P 306,308 (SS)
40						P 306 (SS)		P 310 (SS) P 323 (ZSD)	P 156 (VSP) P 168 (FCN) P 310,312,314 (SS) P 323 (ZSD)
45									P 316 (SS)
50									P 314,316 (SS) P 323 (ZSD)
63									P 323 (ZSD)

KA Series shaft diameter and lead matrix

Unit: mm

Shaft dia.	Lead					
	1	2	4	5	10	20
6	P 266					
8	P 268	P 270				
10		P 272	P 274			
12		P 276		P 278	P 280	
15					P 282	P 284
16		P 286				
20						P 288

Unit: mm

Lead									
12	15	16	20	25	30	32	40	50	60
P 184 (PSS)									
	P 186 (SS)								
			P 190 (PSS)		P 190 (PSS)				
			P 168 (FCN) P 178 (FSS) P 194 (PSS) P 242 (FA)		P 194 (PSS)				
		P 246 (FA)				P 248 (FA)			
			P 156 (LPR) P 168 (FCN) P 180 (FSS) P 198 (PSS) P 252 (FA)		P 198 (PSS)		P 200 (PSS) P 254 (FA)		P 200 (PSS)
			P 168 (FCN) P 182 (FSS) P 204 (PSS) P 256 (FA)	P 156 (LPR) P 168 (FCN) P 182 (FSS) P 204 (PSS) P 258 (FA)	P 206 (PSS)			P 206 (PSS) P 260 (FA)	
	P 323 (ZSD/ZSS)		P 156 (VSP) P 323 (ZSD/ZSS)	P 262 (FA)		P 156 (LPR) P 264 (FA)			
P 310,312 (SS)	P 323 (ZSD)		P 323 (ZSS)	P 323 (ZSS)	P 323 (ZSS)		P 156 (LPR) P 323 (ZSS)		
	P 323 (ZSD)		P 323 (ZSD)	P 323 (ZSS)	P 323 (ZSS)		P 323 (ZSS)	P 156 (LPR)	
	P 323 (ZSD)		P 323 (ZSD)		P 323 (ZSD)				

15. Standard Ball Screw Series

R Series shaft diameter and lead matrix

Shaft dia.	3	4	5	6	8	10	12	
10	P 138,146			P 138,144				
12					P 138,144		P 142,148	
14		P 138,144,146,152	P 138,144,146,152					
15								
16						P 138		
18					P 138,144,146,152			
20			P 138,144,146,152			P 138,144,152		
25			P 138,144,146,152			P 138,144,146,152		
28				P 140,144,146,152				
32						P 140,144,146,152		
36						P 140,144,146,152		
40						P 140,144,146		
45							P 140,146,152	
50						P 140,146		

Unit: mm

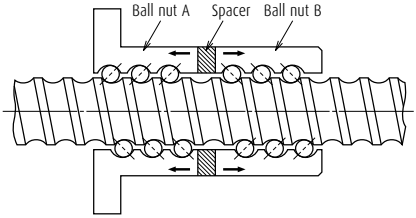
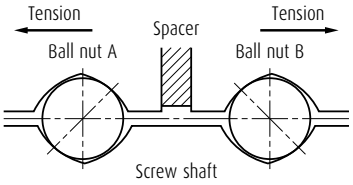
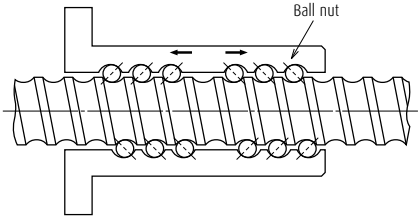
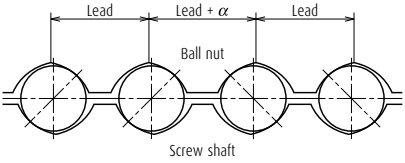
Lead							
16	20	25	32	40	50	64	80
	P 148						
P 142,148			P 150				
	P 142,148			P 150			
		P 142,148			P 150		
			P 142,148			P 150	
				P 142,148			P 150
P 146					P 148		

16. Structure of a Ball Screw

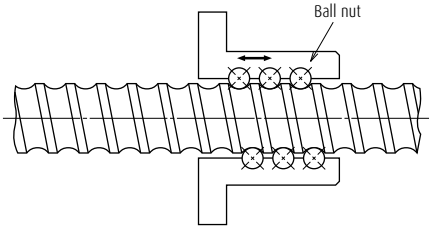
1. Preload system

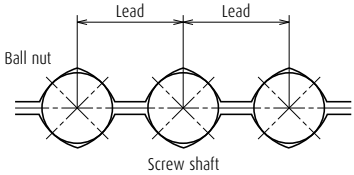
There are three systems to apply preload to NSK ball screws depending on the application.

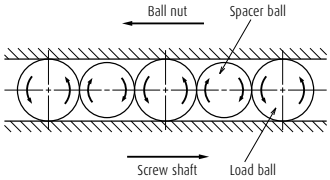
Table 1. Preload system for ball screws

Preload system	Double nut preload (D-Preload)	Offset preload (Z-Preload)
Structure	 	 
Description	Uses two nuts, and inserts a spacer between them to apply the preload. In general, a spacer is thicker (by the deformation equivalent to the preload) than the actual space between two nuts. However, a thin spacer is inserted in some cases.	To apply preload, the lead near the center of the nut is offset by the volume equivalent to preload (α). This method is like to creating a preload system similar to the double nut preload (D-preload) by a single ball nut, thus enabling a compact nut design.
Nut length	Long	Medium
Torque characteristics	○	○
Rigidity	◎	◎

Oversize ball preload (P-Preload)







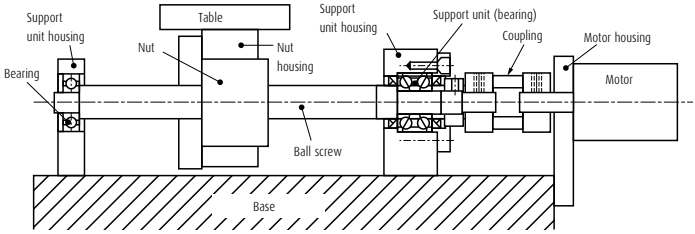
Balls slightly larger than the ball groove space (over-size balls) are inserted to allow them to contact at four points.
Provides better torque characteristics in the low torque range.

Short
○
○

17. Installation of Ball Screw

1. Installation

The following simplified component drawing shows a representative example of a single-axis table.



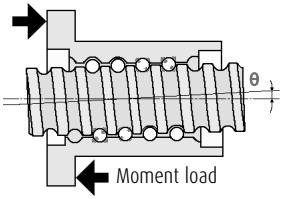
The screw shaft of the ball screw is supported by a nut and bearings, and it is driven by a motor.

It is critically important to complete the centering work to ensure the predetermined operation life, functionality and accuracy of the ball screw. In general, the following accuracy is recommended for precision-class applications.

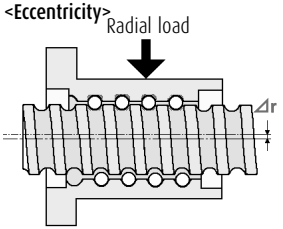
Inclination of center line: 1/2 000 or less (Target: 1/5 000 or less)

Eccentricity: 0.020 mm or less

<Inclination of center line>



<Eccentricity>



The following problems could occur if an installation error negatively affected the ball screw:

(1) Effects on durability:

→ Lowered flaking life or wearing life.

(2) Effects on torque characteristics:

→ Increased friction torque or torque variations.

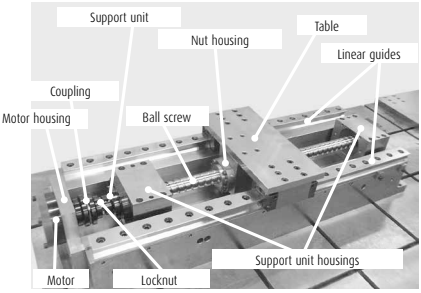
(3) Effects on feed rate:

→ Decreased accuracy in motion.

Overall View of Assembled Body

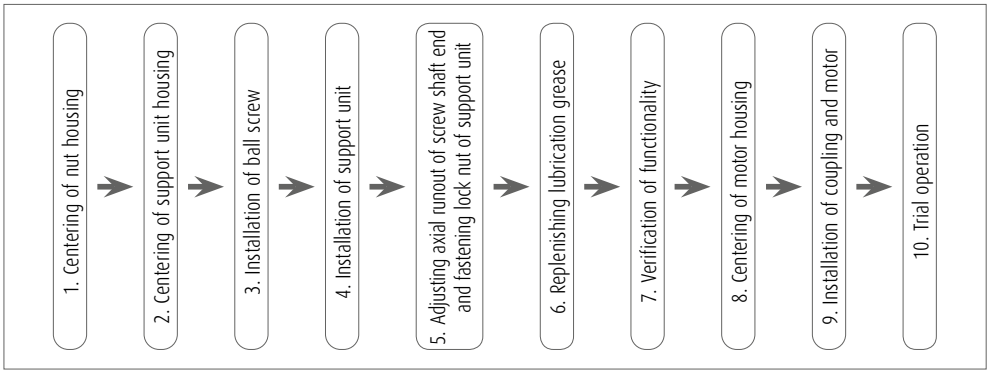
Explanations of the assembling procedure are given below, using the single-axis table as an example:

In this explanation, two different installation procedures are provided: one for machine tools, where high installation accuracy is required, and another for general industrial machinery.



2. Installation Procedure for Machine Tools, Where High Installation Accuracy Is Required

The single-axis table shall be installed according to the following procedure:

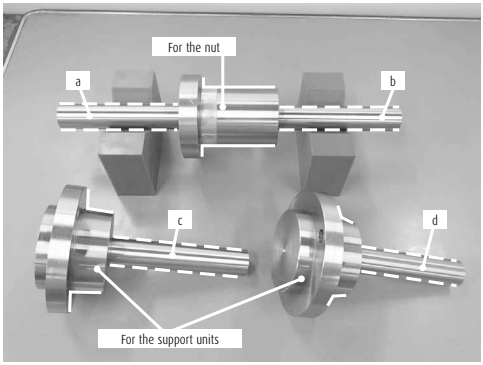


I. Jigs required for installation

Test bars:

(For the nut: one piece; for the support units: two pieces)

⇒ For centering and measurement of axial runout. The portions onto which the housing is installed (marked with the solid line) and the portions subject to measurement (a, b, c and d, marked with the broken line) shall be finished to high precision.



II. Installation of assembled body

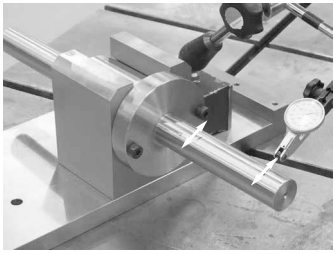
1. Centering of nut housing

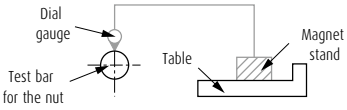
1-1

Turn the table over and mount the nut housing and test bar for the nut onto it.

Set up a magnet stand with a dial gauge attached, taking the rear side of the table as reference. Measure two spots at the top of the test bar for the nut by moving the magnetic stand around to check the inclination in the vertical direction.

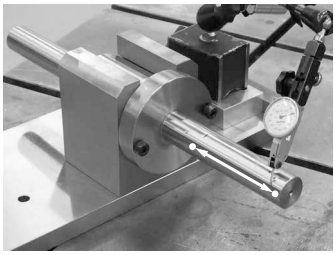
If inclination of center line is observed, adjust the surfaces on which the nut housing is installed.

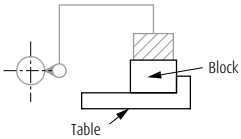




1-2

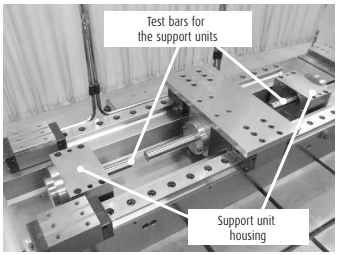
Fix the magnetic stand, with the dial gauge attached, onto a block. While pressing the block toward the reference surface of the table, move the magnet stand around. Measure the side surface of the test bar for the nut, check the inclination in the horizontal direction. If inclination of center line is observed, adjust the portion where the nut housing is installed onto the table.





2. Centering of support unit housing

Install the linear guides onto a machine base, and then install the table, which has already been centered. (For installation of linear guides, please refer to page 16.)



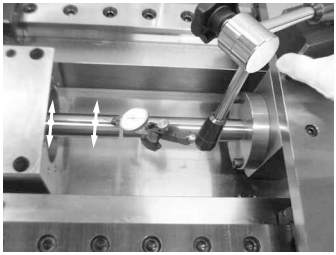
2-1

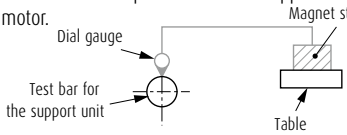
Install the test bar for the support unit onto the support unit housing.

2-2

Install the magnet stand, with the dial gauge attached, using the table as reference. While moving the table, measure the two spots at the top of the test bar for the motor-side support unit to check the inclination in the vertical direction. If inclination of center line is observed, adjust the mounting surfaces of the support unit housing.

Follow the same procedure for the opposite side of the motor.



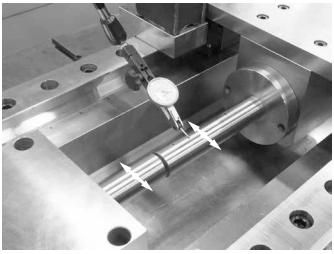


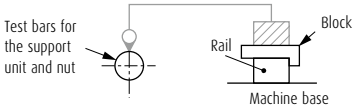
2-3

Fix the magnet stand, with the dial gauge attached, onto a block, and install the block onto the top surface of the linear guide rail. Measure the top points of the test bar for the nut and the support unit to check for eccentricity in the vertical direction.

If eccentricity is observed, adjust the mounting surface of the support unit housing.

Follow the same procedure for the opposite side of the motor.

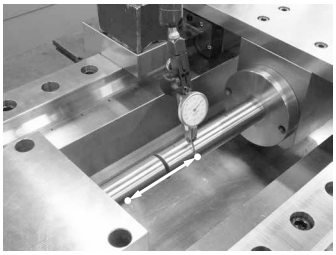


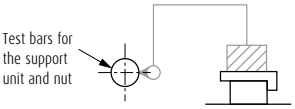


2-4

Fix the magnet stand, with the dial gauge attached, onto a block. While pressing the block toward the top surface of the linear guide rail as reference and moving it, take measurements of the side surfaces of the test bars for the nut and support unit to check for eccentricity in the horizontal direction. If eccentricity is observed, adjust the mounting surface of the support unit housing.

Follow the same procedure for the opposite side of the motor.



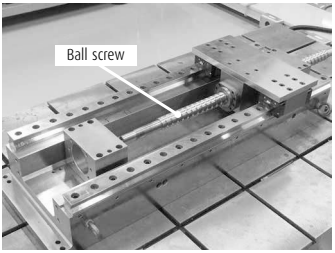


3. Installation of ball screw

Remove all test bars from the housing.

Clean the outside diameter surface of the nut and the inside diameter surface of the housing using a cloth, and install the ball screw.

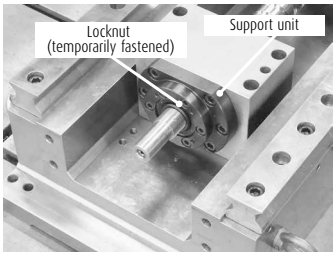
Apply grease to spots with metal-to-metal contact to avoid any scratches or dents. While doing this, be careful not to drop the ball screw or hit it with anything, which might cause malfunction. If the housing must be removed in order to mount the ball screw, use a positioning pin so that the housing can be mounted back in its original position.



4. Installation of support unit

Insert the screw shaft into the support unit housing and mount the support units on both shaft ends. Fix the motor-side support unit to the housing. Fasten the locknut temporarily.

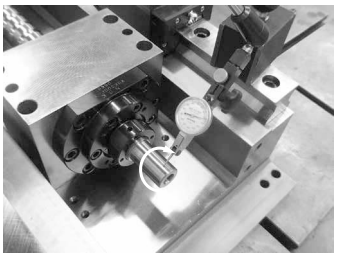
Follow the same procedure for the opposite side of the motor.



5. Adjusting axial runout of screw shaft end and fastening lock nut of support unit

Bring the dial gauge into contact with the top of the shaft end. Then, while rotating the screw shaft, measure the runout of the shaft end. While adjusting the shaft end runout, fasten the locknut to attain the required fastening torque.

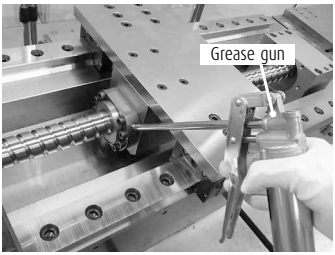
Follow the same procedure for the opposite side of the motor.



6. Replenishing lubrication grease

Wipe away the antirust oil from the empty ball screw, to which grease has not been applied, and supply grease through the grease hole to fill the inside. (Supply the grease while rotating the ball screw in the direction that moves grease toward the inside of the nut. This will lubricate the ball screw evenly.)

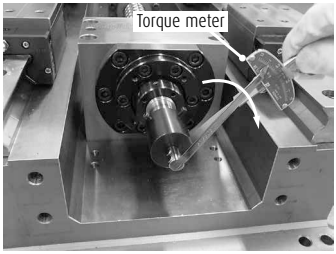
If you use a ball screw already filled with grease, it is not necessary to add more.



7. Verification of functionality

To check whether the ball screw has been installed accurately, verify its functionality. Measure the driving torque with a torque meter over the entire movable range of the screw.

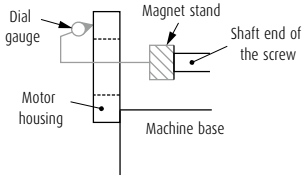
Confirm (including by touch) that there are no abnormalities.



8. Centering of motor housing

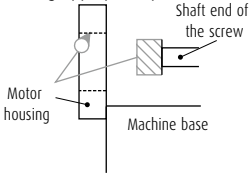
8-1

Install the motor housing, and mount the dial gauge onto the shaft end of the ball screw. Rotate the screw shaft to check the inclination of the motor housing, with the stylus of the dial gauge in contact with the end face of the motor housing. If inclination of the end surface of the motor housing is observed, adjust the mounting surface of the motor housing.



8-2

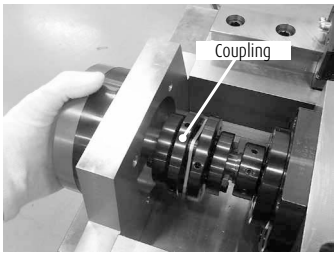
Set up the dial gauge onto the end face of the ball screw. Rotate the screw shaft to check eccentricity, with the stylus touching the inside diameter surface of the motor housing. If eccentricity is observed, adjust it by installing the motor housing appropriately.



9. Installation of coupling and motor

Mount the coupling onto the shaft end of screw, and install motor.

Fasten the bolts of the coupling to connect the shaft end with motor shaft.



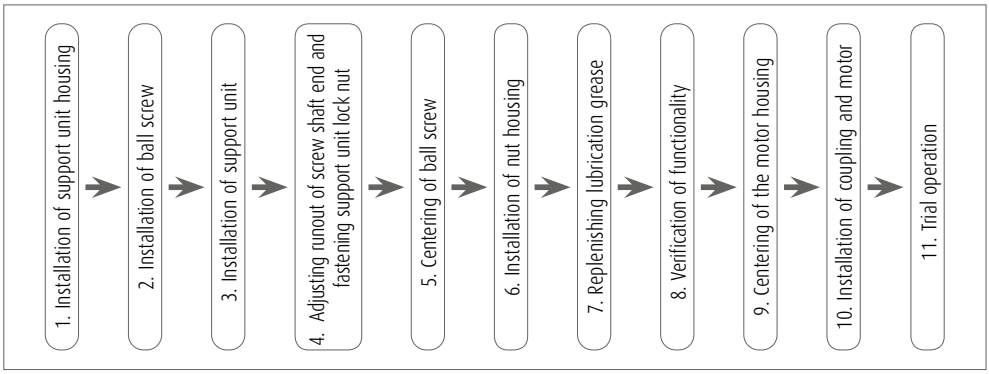
10. Trial operation

At the beginning, run the assembly at low speed to check for vibrations and noise. Then, run it at moderate speed, and finally at high speed and check for abnormalities. Then run it continuously for approximately two hours, carry out a running-in operation and at the same time check for any abnormalities. During this running-in operation, the excessive grease inside of the nut is pushed out of the nut. Wipe it away.

3. Installation Procedure for General Industrial Machinery

In this procedure, the ball screw is installed with the accuracy required for the linear guide. The centering of nut and table are adjusted by installing the nut housing appropriately. Since no test bars are required and the inside diameter of the nut housing does not need to be fit with the nut, the ball screw can be installed relatively easily and cheaply.

The installation procedure used for the single-axis table is shown below:



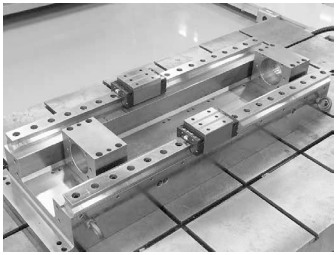
I. Installation of assembled body

1. Installation of support unit housing

Install the linear guide onto the machine base.

(For installation procedure for linear guide, please refer to page 16.)

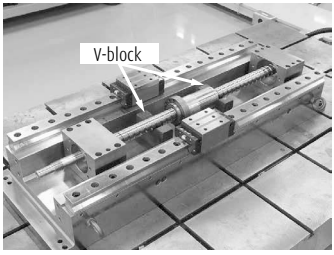
Place the support unit housing at the predetermined position and fasten it temporarily.



2. Installation of ball screw

While doing this, be careful not to drop the ball screw or hit it with anything, which might cause malfunction.

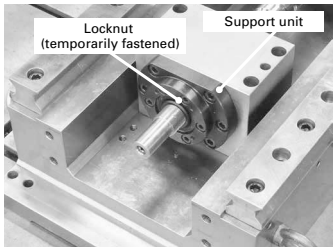
Conduct this task using a V-block to prevent scratches and dents.



3. Installation of support unit

Insert the screw shaft into support unit housing and mount support units on both shaft ends. Fix the motor-side support unit to the housing. Fasten the locknut temporarily.

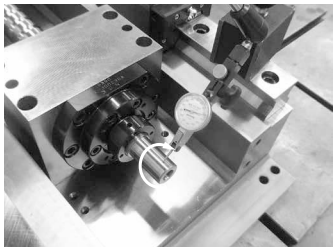
Follow the same procedure for the opposite side of the motor.



4. Adjusting runout of screw shaft end and fastening support unit locknut

Bring the dial gauge into contact with the top of the shaft end. Then, while rotating the screw shaft, measure the runout of the shaft end. While adjusting the shaft end runout, fasten the locknut to attain the required fastening torque.

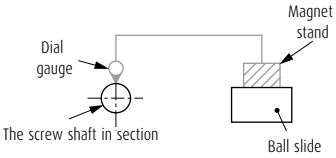
Follow the same procedure for the opposite side of the motor.

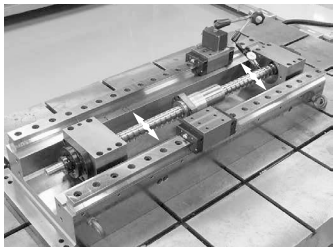


5. Centering of ball screw

5-1

Set up a magnet stand with a dial gauge attached, using the ball slide of the linear guide as reference. Measure the top of the screw shaft in the vicinity of the support unit housing both on the motor and opposite sides to check the inclination in the vertical direction. If inclination of center line is observed, adjust the mounting surface of the support unit housing.

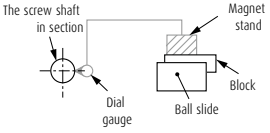


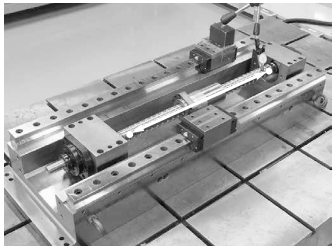


5-2

Fix the magnet stand, with the dial gauge attached, onto a block. While pressing the block toward the ball slide of the linear guide, move the block. Measure the side surface of the screw shaft in the vicinity of the support unit housing both on the motor and opposite sides to check the inclination in the horizontal direction. If inclination of center line is observed, adjust by installing support unit housing appropriately.

After the adjustment, fix the support unit housings of the motor side and the opposite side.



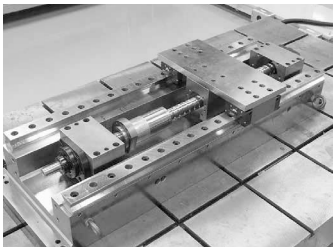


6. Installation of nut housing

6-1

Temporarily fasten the nut housing onto the table, and fasten the table, using the ball slide of the linear guide as reference surface.

To minimize the bending of the screw shaft caused by the self-weight of the nut, move the nut toward the support unit housing at the shaft end.

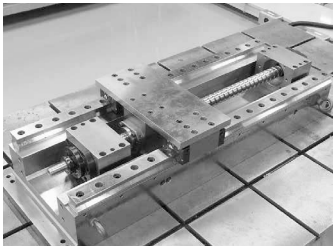


6-2

Move the table toward the nut, and fasten the nut to the nut housing.

Loosen the bolts that fasten the table to the nut housing, and re-fasten them.

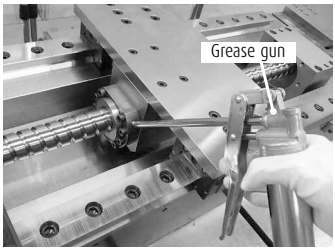
Loosen the bolts that fasten the nut housing and the nut, and re-fasten them.



7. Replenishing lubrication grease

Wipe away the antirust oil from the empty ball screw, to which grease has not been applied, and supply grease through the grease hole to fill the inside. (Supply grease while rotating the ball screw in the direction that moves grease toward the inside of the nut. This will lubricate the ball screw evenly.)

If you use a ball screw already filled with grease, it is not necessary to add more.

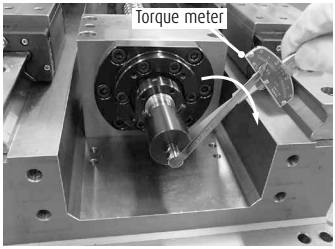


8. Verification of functionality

To check whether the ball screw has been installed accurately, verify its functionality. Measure the driving torque with a torque meter over the entire movable range of the screw.

Confirm (including by touch) that there are no abnormalities.

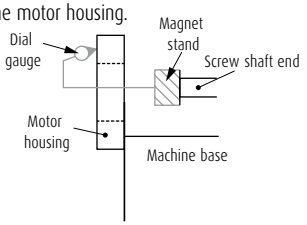
Follow the same procedure for the opposite side of the motor.



9. Installation of nut housing

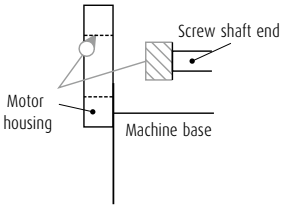
9-1

Install the motor housing, and mount the dial gauge onto the end face of the ball screw. Rotate the screw shaft to check the inclination of the motor housing, with the stylus of the dial gauge in contact with the end face of the motor housing. If inclination of center line is observed, adjust the mounting surface of the motor housing.



9-2

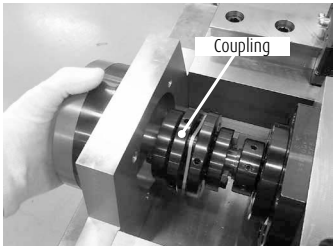
Set up the dial gauge onto the end face of the screw shaft. Rotate the screw shaft to check eccentricity, with the stylus touching the inside-diameter surface of the motor housing. If eccentricity is observed, adjust it by installing the motor housing appropriately.



10. Installation of coupling and motor

Mount the coupling onto the shaft end, and install the motor.

Fasten the bolts of the coupling to connect the shaft end with the motor shaft.



11. Trial operation

At the beginning, run the assembly at low speed to check for vibrations and noise. Then, run it at moderate speed, and finally at high speed and check for abnormalities. Then run it continuously for approximately two hours, carry out a running-in operation and at the same time check for any abnormalities. During this running-in operation, the excessive grease inside of the nut is pushed out of the nut. Wipe it away.

18. Precautions When Handling Ball Screws

Ball screws are precision products. They require careful handling as described below.

Confirm lubrication

Lubrication

1. Confirm the state of lubrication before use. Insufficient lubrication causes loss of ball screw functions in a short period.
2. Do not apply any lubrication if grease is already applied to the ball screws. Remove dust or swarf if they stuck to the greased surface during handling. Wipe the surface with clean white kerosene, and then apply the same type of new lubricant before use. Avoid using different types of grease at the same time.

   Consult NSK for special oil lubricant if it is required to your application.
3. Check the grease after two to three months of operation. Wipe off the old grease if it is excessively contaminated, and apply sufficient volume of a fresh coat of grease. After the initial check, check and replenish the grease approximately every year. Check more often if environment requires.

Note: Refer to page 442 for lubrication.

Do not disassemble

Do not reassemble

Watch out for falling objects

Handle with care

Do not apply shock

Handling

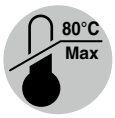
1. Never disassemble ball screw. It invites dust to enter, and lowers precision, or may cause an accident.
2. User should never reassemble ball screw by himself. Loss of ball screw function is apt to occur if a mistake is made. Please send ball screw to NSK for repair or re-assembly. It will be reworked at the minimum service charge.
3. Ball screw shaft or nut may fall due to its own weight. Watch out for such falling object. If it falls, the ball groove or ball recirculation component may be damaged and the function might have been lost. Make certain to return such item to NSK for check. There will be the minimum charge for this service.
4. If the recirculation component, the shaft outside, or the ball groove is scratched or damaged by impact, recirculation operation becomes deficient, and may cause a loss of function.

Note: Refer to page 126 for assembling components.

Prevent dust

Rotational speed limitation

Do not overrun



Temperature limitation

Precautions in use

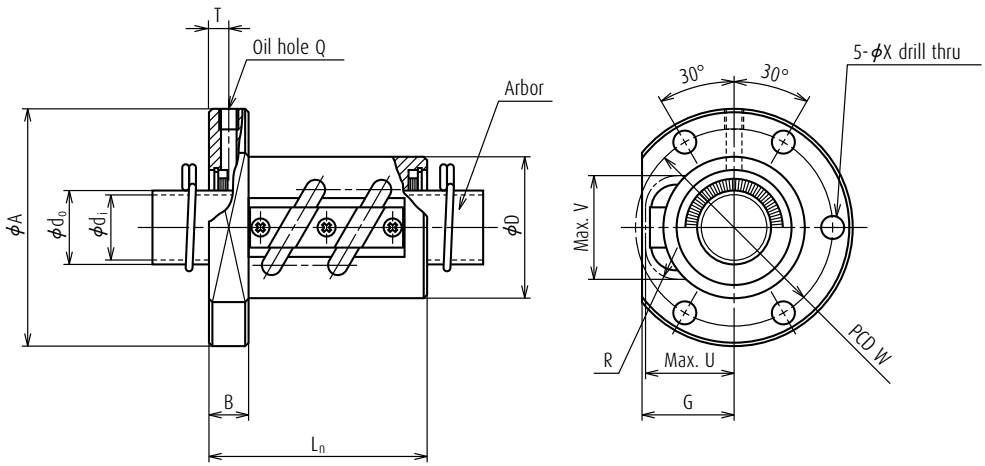
1. Ball screws should be used in a clean environment. Use a dust cover to keep dust and swarf from entering into the system. Insufficient dust protection causes not only the ball screw function to deteriorate but also brings about damage to the recirculation components if dust plugs the system. This may result in more serious accident such as a fall of the table.
2. For rotational speed in operation, refer to the applicable section in this catalog which describes permissible rotational speeds, or to specification drawing furnished by NSK. Exceeding permissible rotational speed damages recirculation components, and may cause the table to fall. A precaution system such as a safety nut is recommended in vertical use of ball screw. Please consult NSK for safety system.
3. Overrunning ball nut (removed from the ball thread) causes the balls to fall out, damages recirculation components, and dent ball groove, resulting in insufficient operation. Continued use under such conditions may cause premature wear, and damages recirculation components. For these reasons, avoid overrun by all means. If overrun occurs, please request NSK to check. There will be a minimum charge for this service.
4. Ball screws are designed to be used at a temperature of less than 80°C. Do not operate at temperatures higher than this limit. Use at a higher temperature may damage recirculation and seal components. Please consult NSK if it is necessary to use at a temperature higher than the limit.
   When using NSK K1 lubrication unit, the operating temperature should be 50°C or less. (Momentary maximum temperature in use: 80°C)

Store in the correct position

Storage

1. Store in the original NSK package. Do not unwrap or tear the inner wrapping if it is not necessary. This allows dust to enter and rust to set in, and may deteriorate functions.
2. The following position is recommended when storing ball screws.
   2.1 Keep in the NSK original package, and place it flat.
   2.2 Place flatly on supports; store in a clean area.
   2.3 Hang vertically in a clean place.

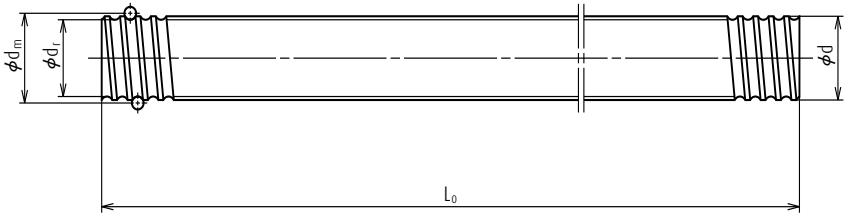
19. Ball screws for transfer equipment Tube type, Flanged nut (Fine, Medium lead)



Ball nut No.	Shaft dia. d	Lead l	Ball dia. D_w	Ball circle dia. d_m	Root dia. d_r	Effective balls turns	Basic load rating (N)		Axial play Max.	Ball nut dimensions
						Turns × Circuits	Dynamic C_a	Static C_{0a}		Outside dia. D
RNFTL 1003A3.5	10	3	2.381	10.65	8.1	3.5 × 1	4 440	6 700	0.10	20
RNFTL 1006A2.5S	10	6	2.381	10.65	8.1	2.5 × 1	3 280	4 730	0.10	20
RNFTL 1208A2.5S	12	8	2.778	12.65	9.6	2.5 × 1	4 290	6 610	0.10	25
RNFTL 1404A3.5S	14	4	2.778	14.5	11.5	3.5 × 1	6 310	10 800	0.10	25
RNFTL 1405A2.5S	14	5	3.175	14.5	11.0	2.5 × 1	6 170	9 940	0.10	30
RNFTL 1610A2.5	16	10	3.175	16.75	13.3	2.5 × 1	6 810	11 600	0.10	30
RNFTL 1610A2.5S	16	10	3.175	16.75	13.3	2.5 × 1	6 810	11 600	0.10	30
RNFTL 1808A3.5	18	8	4.762	18.5	13.6	3.5 × 1	15 500	26 200	0.15	34
RNFTL 1808A3.5S	18	8	4.762	18.5	13.6	3.5 × 1	15 500	26 200	0.15	34
RNFTL 2005A2.5	20	5	3.175	20.5	17.0	2.5 × 1	7 500	14 200	0.10	40
RNFTL 2005A2.5S	20	5	3.175	20.5	17.0	2.5 × 1	7 500	14 200	0.10	40
RNFTL 2010A2.5	20	10	4.762	21.25	16.2	2.5 × 1	12 700	21 600	0.15	40
RNFTL 2010A2.5S	20	10	4.762	21.25	16.2	2.5 × 1	12 700	21 600	0.15	40
RNFTL 2505A5	25	5	3.175	25.5	22.0	2.5 × 2	15 100	36 300	0.10	42
RNFTL 2505A5S	25	5	3.175	25.5	22.0	2.5 × 2	15 100	36 300	0.10	42
RNFTL 2510A2.5	25	10	6.35	26	19.0	2.5 × 1	20 500	34 900	0.20	44
RNFTL 2510A2.5S	25	10	6.35	26	19.0	2.5 × 1	20 500	34 900	0.20	44
RNFTL 2510A5	25	10	6.35	26	19.0	2.5 × 2	37 300	69 800	0.20	44
RNFTL 2510A5S	25	10	6.35	26	19.0	2.5 × 2	37 300	69 800	0.20	44

Notes

1. Protruding portion of tube does not interfere with ball nut housing if its dimensions corresponding to U and V are large enough.
2. Actual screw shaft length may become slightly longer than nominal length L_0 due to manufacturing tolerance.
3. Only ball nut part numbers ending "S" are equipped with seals. External dimensions of those with seals are the same as those without. In ball nut side view drawing, above the center line there is a seal, and beneath it there is no seal. Seal for those with shaft diameter of 14 mm or less is made of synthetic resin. Seal for those of 16 mm or more is a "Brush" seal.
4. Nut assembly with arbor and screw shaft are separate at time of delivery.

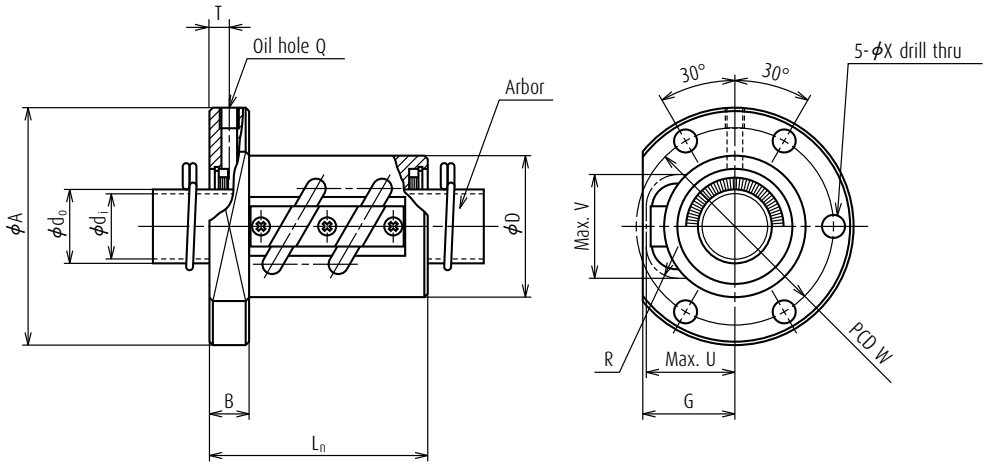


Unit: mm

Ball nut dimensions											Nut Mass.	Arbor		Screw shaft				Shaft mass/m	Internal spatial volume of nut	Standard volume of grease replenishing
Flange			Length	Bolt hole		Oil hole		Projecting tube				Out-side dia.	Bore	Standard length			Screw shaft No.			
A	G	B	L_n	W	X	Q	T	U	V	R	(kg)	d_0	d_1	L_0				(kg)	(cm^3)	(cm^3)
40	15	6	34	30	4.5	M3×0.5	3.0	15	15	7	0.092	8.1	6.1	400	400	–	RS1003A··	0.50	–	–
40	15	6	36	30	4.5	M3×0.5	3.5	15	15	5	0.095	8.1	6.1	400	800	–	RS1006A··	0.56	1.1	0.6
45	19	8	46	35	4.5	M3×0.5	5.5	19	18	7	0.18	9.6	7.6	400	800	–	RS1208A··	0.74	1.8	0.9
50	19	10	43	40	4.5	M6 × 1	5.0	19	20	7	0.20	11.5	9.5	500	1 000	–	RS1404A··	1.02	2.0	1.0
50	22	10	45	40	4.5	M6 × 1	5.0	22	21	8	0.26	11.0	9.0	500	1 000	–	RS1405A··	1.00	2.4	1.2
53	23	10	54	41	5.5	M6 × 1	5.5	23	22.5	8	0.28	13.3	11.3	500	1 000	1 500	RS1610A··	1.37	2.7	1.4
63	27	12	58	49	6.6	M6 × 1	6.0	27	27	8	0.43	13.6	11.6	500	1 000	1 500	RS1808A··	1.60	5.2	2.6
60	28	10	46	50	4.5	M6 × 1	5.0	28	27	10	0.42	17.0	14.6	500	1 000	2 000	RS2005A··	2.17	3.5	1.8
67	30	12	59	53	6.6	M6 × 1	6.0	30	29	12	0.55	16.2	13.8	500	1 000	2 000	RS2010A··	2.18	7.1	3.6
71	28	12	66	57	6.6	M6 × 1	6.0	28	31	10	0.62	22.0	19.6	1 000	2 000	2 500	RS2505A··	3.47	6.5	3.3
80	34	15	62	62	9	M6 × 1	7.5	34	37	17	0.75	19.0	16.6	1 000	2 000	2 500	RS2501A··	3.13	13	6.5
80	34	15	92	62	9	M6 × 1	7.5	34	37	17	0.75	19.0	16.6	1 000	2 000	2 500	RS2501A··	3.13	18	9.0

5. Value obtained by diving standard screw shaft length by 100 mm will be entered at end of the part number where marked with ··.
6. Items in stock do not have surface treatment. For details of standard stock products, contact NSK.
7. Only rust preventive agent is applied at time of delivery. Please apply lubricant (oil or grease) before use.
8. Internal spatial volume of nut and volume of grease to be replenished are values for ball screws with seals. Recommended amount for replenishing is approximately 50% of nut's internal space. For ball screws without seals, apply grease to screw shaft surface or move ball nut by hand while filling them with grease so that grease permeates all areas. See page 445 for details.

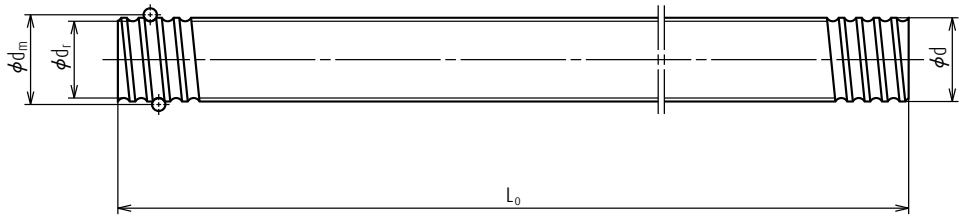
19. Ball screws for transfer equipment Tube type, Flanged nut (Fine, Medium lead)



Ball nut No.	Shaft dia. d	Lead l	Ball dia. D_w	Ball circle dia. d_m	Root dia. d_r	Effective balls turns	Basic load rating (N)		Axial play Max.	Ball nut dimensions
						Turns × Circuits	Dynamic C_a	Static C_{0a}		Outside dia. D
RNFTL 2806A2.5	28	6	3.175	28.5	25.0	2.5 × 1	8 760	20 200	0.10	50
RNFTL 2806A2.5S	28	6	3.175	28.5	25.0	2.5 × 1	8 760	20 200	0.10	50
RNFTL 2806A5	28	6	3.175	28.5	25.0	2.5 × 2	15 900	40 500	0.10	50
RNFTL 2806A5S	28	6	3.175	28.5	25.0	2.5 × 2	15 900	40 500	0.10	50
RNFTL 3210A5	32	10	6.35	33.75	27.0	2.5 × 2	42 000	91 800	0.20	55
RNFTL 3210A5S	32	10	6.35	33.75	27.0	2.5 × 2	42 000	91 800	0.20	55
RNFTL 3610A2.5	36	10	6.35	37	30.0	2.5 × 1	24 700	50 800	0.20	60
RNFTL 3610A2.5S	36	10	6.35	37	30.0	2.5 × 1	24 700	50 800	0.20	60
RNFTL 3610A5	36	10	6.35	37	30.0	2.5 × 2	44 900	102 000	0.20	60
RNFTL 3610A5S	36	10	6.35	37	30.0	2.5 × 2	44 900	102 000	0.20	60
RNFTL 4010A7	40	10	6.35	41.75	35.0	3.5 × 2	63 100	164 000	0.20	65
RNFTL 4010A7S	40	10	6.35	41.75	35.0	3.5 × 2	63 100	164 000	0.20	65
RNFTL 4512A5	45	12	7.144	46.5	39.0	2.5 × 2	58 500	147 000	0.23	70
RNFTL 4512A5S	45	12	7.144	46.5	39.0	2.5 × 2	58 500	147 000	0.23	70
RNFTL 5010A7	50	10	6.35	51.75	45.0	3.5 × 2	70 100	205 000	0.20	80
RNFTL 5010A7S	50	10	6.35	51.75	45.0	3.5 × 2	70 100	205 000	0.20	80
RNFTL 5016A5	50	16	9.525	52	42.0	2.5 × 2	117 000	299 000	0.23	85
RNFTL 5016A5S	50	16	9.525	52	42.0	2.5 × 2	117 000	299 000	0.23	85

Notes

1. Protruding portion of tube does not interfere with ball nut housing if its dimensions corresponding to U and V are large enough.
2. Actual screw shaft length may become slightly longer than nominal length L_0 due to manufacturing tolerance.
3. Only ball nut part numbers ending "S" are equipped with seals. External dimensions of those with seals are the same as those without.
   In ball nut side view drawing, above the center line there is a seal, and beneath it there is no seal.
   Seal for those with shaft diameter of 14 mm or less is made of synthetic resin. Seal for those of 16 mm or more is a "Brush" seal.
4. Nut assembly with arbor and screw shaft are separate at time of delivery.

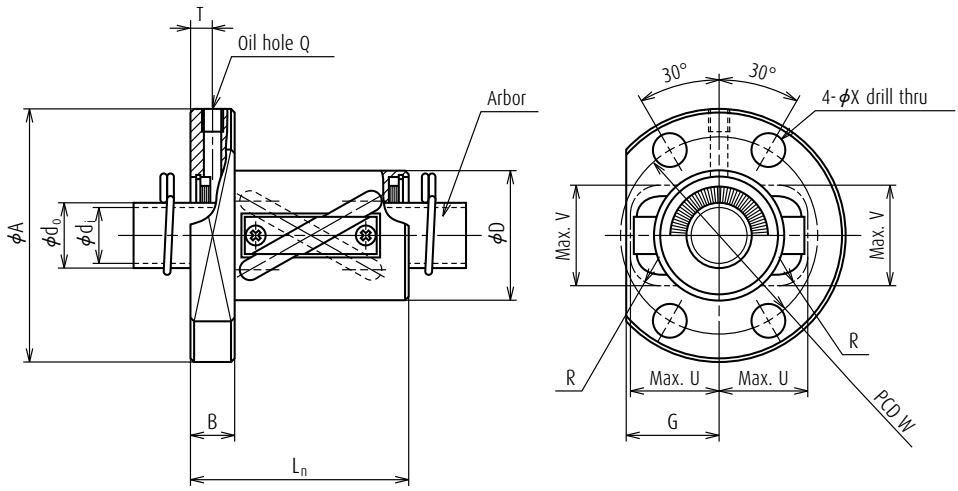


Unit: mm

Ball nut dimensions											Nut Mass.	Arbor		Screw shaft				Shaft mass/m	Internal spatial volume of nut	Standard volume of grease replenishing
Flange			Length	Bolt hole		Oil hole		Projecting tube				Out-side dia.	Bore	Standard length			Screw shaft No.			
A	G	B	L_n	W	X	Q	T	U	V	R	(kg)	d_0	d_1	L_0				(kg)	(cm^3)	(cm^3)
79	33	15	55	65	6.6	M6 × 1	7.5	33	34	10	0.85	25.0	22.6	1 000	2 000	2 500	RS2806A··	4.47	5.9	3.0
79	33	15	55	65	6.6	M6 × 1	7.5	33	34	10	0.85	25.0	22.6	1 000	2 000	2 500	RS2806A··	4.47	5.9	3.0
79	33	15	79	65	6.6	M6 × 1	7.5	33	34	10	1.07	25.0	22.6	1 000	2 000	2 500	RS2806A··	4.47	8.4	4.2
79	33	15	79	65	6.6	M6 × 1	7.5	33	34	10	1.07	25.0	22.6	1 000	2 000	2 500	RS2806A··	4.47	8.4	4.2
97	39	18	97	75	11	M6 × 1	9.0	39	42	17	1.55	27.0	24.6	1 000	2 000	3 000	RS3210A··	5.53	29	15
97	39	18	97	75	11	M6 × 1	9.0	39	42	17	1.55	27.0	24.6	1 000	2 000	3 000	RS3210A··	5.53	29	15
102	42	18	68	80	11	M6 × 1	9.0	42	46	17	1.47	30.0	27.6	1 000	2 000	3 000	RS3601A··	6.91	21	11
102	42	18	68	80	11	M6 × 1	9.0	42	46	17	1.47	30.0	27.6	1 000	2 000	3 000	RS3601A··	6.91	21	11
102	42	18	98	80	11	M6 × 1	9.0	42	46	17	1.80	30.0	27.6	1 000	2 000	3 000	RS3601A··	6.91	33	17
102	42	18	98	80	11	M6 × 1	9.0	42	46	17	1.80	30.0	27.6	1 000	2 000	3 000	RS3601A··	6.91	33	17
114	44	20	120	90	14	M6 × 1	10.0	44	50	20	2.49	35.0	31.8	2 000	3 000	4 000	RS4010A··	8.87	42	21
114	44	20	120	90	14	M6 × 1	10.0	44	50	20	2.49	35.0	31.8	2 000	3 000	4 000	RS4010A··	8.87	42	21
130	47	22	116	100	18	M6 × 1	11.0	47	55	20	3.07	39.0	35.8	2 000	3 000	4 000	RS4512A··	11.16	49	25
130	47	22	116	100	18	M6 × 1	11.0	47	55	20	3.07	39.0	35.8	2 000	3 000	4 000	RS4512A··	11.16	49	25
140	52	22	122	110	18	M6 × 1	11.0	52	59	20	4.06	45.0	41.8	2 000	3 000	4 000	RS5010A··	14.15	53	27
140	52	22	122	110	18	M6 × 1	11.0	52	59	20	4.06	45.0	41.8	2 000	3 000	4 000	RS5010A··	14.15	53	27
163	57	28	146	125	22	M6 × 1	14.0	57	63	25	6.42	42.0	38.8	2 000	3 000	4 000	RS5016A··	13.48	94	47
163	57	28	146	125	22	M6 × 1	14.0	57	63	25	6.42	42.0	38.8	2 000	3 000	4 000	RS5016A··	13.48	94	47

5. Value obtained by diving standard screw shaft length by 100 mm will be entered at end of the part number where marked with ··.
6. Items in stock do not have surface treatment. For details of standard stock products, contact NSK.
7. Only rust preventive agent is applied at time of delivery. Please apply lubricant (oil or grease) before use.
8. Internal spatial volume of nut and volume of grease to be replenished are values for ball screws with seals. Recommended amount for replenishing is approximately 50% of nut's internal space. For ball screws without seals, apply grease to screw shaft surface or move ball nut by hand while filling them with grease so that grease permeates all areas. See page 445 for details.

19. Ball screws for transfer equipment Tube type, Flanged nut (Medium, High helix lead)



Ball nut No.	Shaft dia. d	Lead l	Ball dia. D_w	Ball circle dia. d_m	Root dia. d_r	Effective balls turns	Basic load rating (N)		Axial play Max.	Ball nut dimensions
						Turns × Circuits	Dynamic C_a	Static C_{0a}		Outside dia. D
RNFTL 1212A3	12	12	2.381	12.65	10.1	1.5 × 2	3 900	6 250	0.10	24
RNFTL 1616A3	16	16	2.778	16.65	13.6	1.5 × 2	5 440	9 550	0.10	30
RNFTL 1616A3S	16	16	2.778	16.65	13.6	1.5 × 2	5 440	9 550	0.10	30
RNFTL 2020A3	20	20	3.175	20.75	17.3	1.5 × 2	8 080	15 700	0.10	35
RNFTL 2020A3S	20	20	3.175	20.75	17.3	1.5 × 2	8 080	15 700	0.10	35
RNFTL 2525A3	25	25	3.969	26	22.0	1.5 × 2	12 100	24 500	0.12	45
RNFTL 2525A3S	25	25	3.969	26	22.0	1.5 × 2	12 100	24 500	0.12	45
RNFTL 3232A3	32	32	4.762	33.25	28.0	1.5 × 2	17 600	37 700	0.15	55
RNFTL 3232A3S	32	32	4.762	33.25	28.0	1.5 × 2	17 600	37 700	0.15	55
RNFTL 4040A3	40	40	6.35	41.75	35.0	1.5 × 2	28 100	62 900	0.20	70
RNFTL 4040A3S	40	40	6.35	41.75	35.0	1.5 × 2	28 100	62 900	0.20	70

Notes

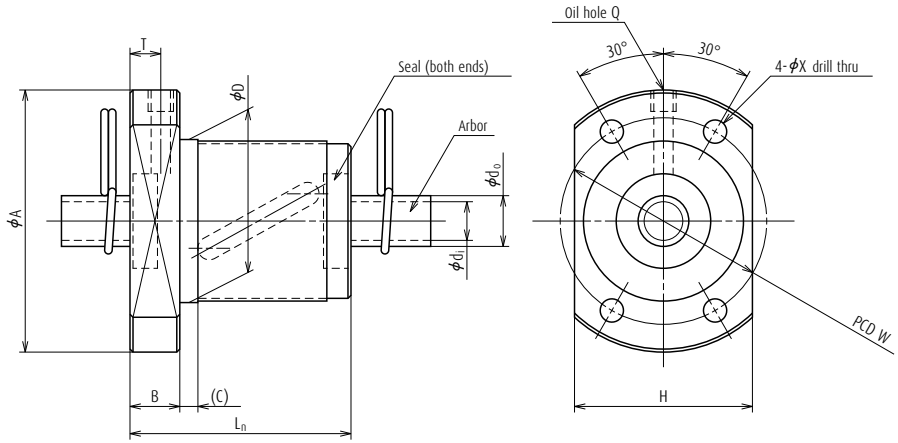
1. Protruding portion of tube does not interfere with ball nut housing if its dimensions corresponding to U and V are large enough.
2. Actual screw shaft length may become slightly longer than nominal length L_0 due to manufacturing tolerance.
3. Only ball nut part numbers ending "S" are equipped with seals. External dimensions of those with seals are the same as those without. In ball nut side view drawing, above the center line there is a seal, and beneath it there is no seal. Seal for those with shaft diameter of 14 mm or less is made of synthetic resin. Seal for those of 16 mm or more is a "Brush" seal.
4. Nut assembly with arbor and screw shaft are separate at time of delivery.

Unit: mm

Ball nut dimensions											Nut Mass.	Arbor		Screw shaft				Shaft mass/m	Internal spatial volume of nut	Standard volume of grease replenishing
Flange			Length	Bolt hole		Oil hole		Projecting tube				Out-side dia.	Bore	Standard length			Screw shaft No.			
A	G	B	L_n	W	X	Q	T	U	V	R	(kg)	d_0	d_1	L_0				(kg)	(cm^3)	(cm^3)
44	17	8	44	34	4.5	M6 × 0.5	4.0	17	16	5	0.16	10.1	8.1	400	800	–	RS1212A··	0.74	1.7	0.9
55	22	10	50	43	6.6	M6 × 1	5.0	22	22	7	0.29	13.6	11.6	500	1 000	1 500	RS1616A··	1.37	2.8	1.4
55	22	10	50	43	6.6	M6 × 1	5.0	22	22	7	0.29	13.6	11.6	500	1 000	1 500	RS1616A··	1.37	2.8	1.4
68	25	12	59	52	9	M6 × 1	6.0	25	27	8	0.49	17.3	14.9	500	1 000	2 000	RS2020A··	2.19	4.9	2.5
68	25	12	59	52	9	M6 × 1	6.0	25	27	8	0.49	17.3	14.9	500	1 000	2 000	RS2020A··	2.19	4.9	2.5
80	31	12	69	63	9	M6 × 1	6.0	31	32	10	0.80	22.0	19.6	1 000	2 000	2 500	RS2525A··	3.43	9.1	4.6
80	31	12	69	63	9	M6 × 1	6.0	31	32	10	0.80	22.0	19.6	1 000	2 000	2 500	RS2525A··	3.43	9.1	4.6
100	37	15	84	80	11	M6 × 1	7.5	37	40	12	1.46	28.0	25.6	1 000	2 000	3 000	RS3232A··	5.71	19	9.5
100	37	15	84	80	11	M6 × 1	7.5	37	40	12	1.46	28.0	25.6	1 000	2 000	3 000	RS3232A··	5.71	19	9.5
120	46	18	103	95	14	M6 × 1	9.0	46	49	15	2.69	35.0	31.8	2 000	3 000	4 000	RS4040A··	8.82	39	20
120	46	18	103	95	14	M6 × 1	9.0	46	49	15	2.69	35.0	31.8	2 000	3 000	4 000	RS4040A··	8.82	39	20

5. Value obtained by diving standard screw shaft length by 100 mm will be entered at end of the part number where marked with ··.
6. Items in stock do not have surface treatment. For details of standard stock products, contact NSK.
7. Only rust preventive agent is applied at time of delivery. Please apply lubricant (oil or grease) before use.
8. Internal spatial volume of nut and volume of grease to be replenished are values for ball screws with seals. Recommended amount for replenishing is approximately 50% of nut's internal space. For ball screws without seals, apply grease to screw shaft surface or move ball nut by hand while filling them with grease so that grease permeates all areas. See page 445 for details.

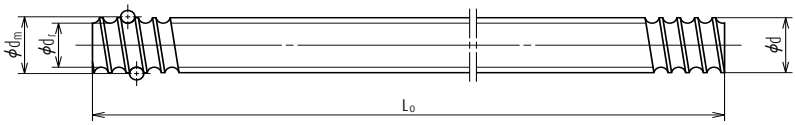
19. Ball screws for transfer equipment
Tube type, embedded -tube, Flanged (Fine, Medium lead)



Ball nut No.	Shaft dia. d	Lead l	Ball dia. D_w	Ball circle dia. d_m	Root dia. d_r	Effective balls turns	Basic load rating (N)		Axial play Max.	Ball nut dimensions
						Turns × Circuits	Dynamic C_a	Static C_{0a}		Outside dia. D
RNFBL 1006A2.5S	10	6	2.381	10.65	8.1	2.5 × 1	3 280	4 730	0.10	26
RNFBL 1208A2.5S	12	8	2.778	12.65	9.6	2.5 × 1	4 290	6 610	0.10	29
RNFBL 1404A3.5S	14	4	2.778	14.5	11.5	3.5 × 1	6 310	10 800	0.10	31
RNFBL 1405A2.5S	14	5	3.175	14.5	11.0	2.5 × 1	6 170	9 940	0.10	32
RNFBL 1808A3.5S	18	8	4.762	18.5	13.6	3.5 × 1	15 500	26 200	0.15	50
RNFBL 2005A2.5S	20	5	3.175	20.5	17.0	2.5 × 1	7 500	14 200	0.10	40
RNFBL 2010A2.5S	20	10	4.762	21.25	16.2	2.5 × 1	12 700	21 600	0.15	52
RNFBL 2505A2.5S	25	5	3.175	25.5	22.0	2.5 × 1	8 340	18 100	0.10	43
RNFBL 2505A5S	25	5	3.175	25.5	22.0	2.5 × 2	15 100	36 300	0.10	43
RNFBL 2510A2.5S	25	10	6.35	26	19.0	2.5 × 1	20 500	34 900	0.20	60
RNFBL 2510A5S	25	10	6.35	26	19.0	2.5 × 2	37 300	69 800	0.20	60
RNFBL 2806A2.5S	28	6	3.175	28.5	25.0	2.5 × 1	8 760	20 200	0.10	50
RNFBL 2806A5S	28	6	3.175	28.5	25.0	2.5 × 2	15 900	40 500	0.10	50
RNFBL 3210A2.5S	32	10	6.35	33.75	27.0	2.5 × 1	23 100	45 900	0.20	67
RNFBL 3210A5S	32	10	6.35	33.75	27.0	2.5 × 2	42 000	91 800	0.20	67
RNFBL 3610A2.5S	36	10	6.35	37	30.0	2.5 × 1	24 700	50 800	0.20	70
RNFBL 3610A5S	36	10	6.35	37	30.0	2.5 × 2	44 900	102 000	0.20	70
RNFBL 4010A5S	40	10	6.35	41.75	35.0	2.5 × 2	47 200	116 000	0.20	76

Notes

1. Actual screw shaft length may become slightly longer than nominal length L_0 due to manufacturing tolerance.
2. Nut assembly with arbor and screw shaft are separate at time of delivery.
3. Value obtained by diving standard screw shaft length by 100 mm will be entered at end of the part number where marked with ··.

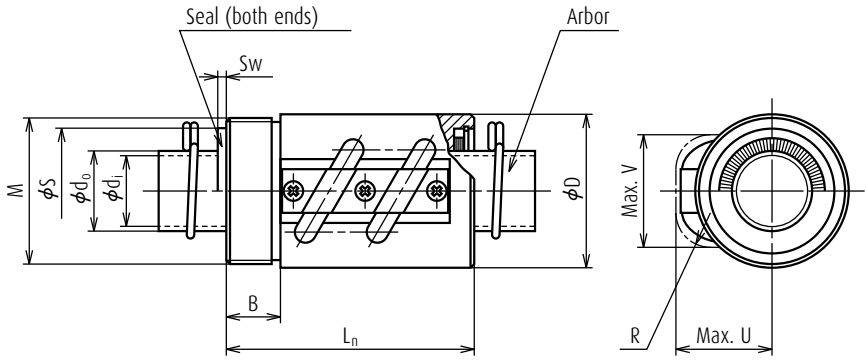


Unit: mm

Ball nut dimensions									Nut Mass.	Arbor		Screw shaft				Shaft mass/m	Internal spatial volume of nut	Standard volume of grease re-plenishing
Flange			Overall length		Bolt hole		Oil hole			Outside dia.	Bore	Standard length			Screw shaft No.			
A	H	B	L_n	(C)	W	X	Q	T	(kg)	d_0	d_1	L_0				(kg)	(cm^3)	(cm^3)
42	29	8	36	3	34	4.5	M3×0.5	5.0	0.16	8.1	6.1	400	800	–	RS1006A··	0.56	1.1	0.6
45	32	8	44	3	37	4.5	M3×0.5	5.5	0.21	9.6	7.6	400	800	–	RS1208A··	0.81	1.6	0.8
50	37	10	40	4	40	4.5	M6 × 1	5.0	0.25	11.5	9.5	500	1 000	–	RS1404A··	1.02	2.4	1.2
50	38	10	40	4	40	4.5	M6 × 1	5.0	0.26	11.0	9.0	500	1 000	–	RS1405A··	1.00	1.9	1.0
80	60	12	61	4	65	6.6	M6 × 1	6.0	1.00	13.6	11.6	500	1 000	1 500	RS1808A··	1.60	5.8	2.9
60	46	10	40	4	50	4.5	M6 × 1	5.0	0.37	17.0	14.6	500	1 000	2 000	RS2005A··	2.17	2.8	1.4
82	64	12	61	5	67	6.6	M6 × 1	6.0	1.05	16.2	13.8	500	1 000	2 000	RS2010A··	2.18	7.6	3.8
67	50	10	40	4	55	5.5	M6 × 1	5.0	0.40	22.0	19.6	1 000	2 000	2 500	RS2505A··	3.47	3.5	1.8
67	50	10	55	4	55	5.5	M6 × 1	5.0	0.50	22.0	19.6	1 000	2 000	2 500	RS2505A··	3.47	4.7	2.4
96	72	15	66	5	78	9.0	M6 × 1	7.5	1.52	19.0	16.6	1 000	2 000	2 500	RS2510A··	3.13	14	7.0
96	72	15	96	5	78	9.0	M6 × 1	7.5	1.99	19.0	16.6	1 000	2 000	2 500	RS2510A··	3.13	19	9.5
80	60	12	47	5	65	6.6	M6 × 1	6.0	0.70	25.0	22.6	1 000	2 000	2 500	RS2806A··	4.47	4.5	2.3
80	60	12	65	5	65	6.6	M6 × 1	6.0	0.87	25.0	22.6	1 000	2 000	2 500	RS2806A··	4.47	7.6	3.8
103	78	15	67	5	85	9.0	M6 × 1	7.5	1.72	27.0	24.6	1 000	2 000	3 000	RS3210A··	5.53	20	10
103	78	15	97	5	85	9.0	M6 × 1	7.5	2.25	27.0	24.6	1 000	2 000	3 000	RS3210A··	5.53	28	14
110	82	17	69	5	90	11.0	M6 × 1	8.5	1.97	30.0	27.6	1 000	2 000	3 000	RS3610A··	6.91	21	11
110	82	17	99	5	90	11.0	M6 × 1	8.5	2.53	30.0	27.6	1 000	2 000	3 000	RS3610A··	6.91	29	15
116	88	17	99	5	96	11.0	M6 × 1	8.5	2.86	35.0	31.8	2 000	3 000	4 000	RS4010A··	8.87	36	18

4. Items in stock do not have surface treatment. For details of standard stock products, contact NSK.
5. Seal for those with shaft diameter of 14 mm or less is made of synthetic resin. Seal for those of 16 mm or more is a "Brush" seal.
6. Only rust preventive agent is applied at time of delivery. Please apply lubricant (oil or grease) before use.
7. Recommended quantity of grease is about 50% of ball nut's internal space. See page 445 for details.

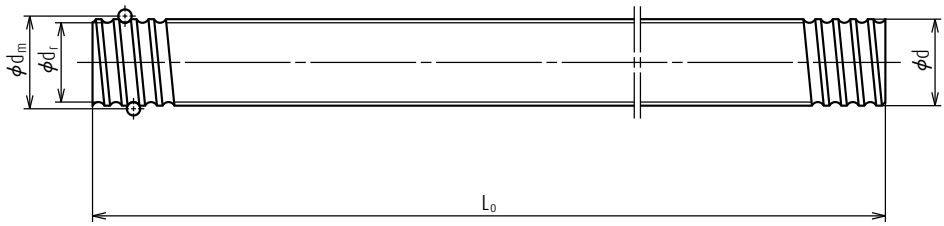
19. Ball screws for transfer equipment
Return tube type, Nut with V-thread, (Fine lead)



Ball nut No.	Shaft dia. d	Lead l	Ball dia. D_w	Ball circle dia. d_m	Root dia. d_r	Effective balls turns	Basic load rating (N)		Axial play Max.	Ball nut dimensions
						Turns × Circuits	Dynamic C_a	Static C_{0a}		Outside dia. D
RNCT 1003A3.5	10	3	2.381	10.65	8.1	3.5 × 1	4 440	6 700	0.10	20
RNCT 1404A3.5S	14	4	2.778	14.5	11.5	3.5 × 1	6 310	10 800	0.10	25
RNCT 1405A2.5S	14	5	3.175	14.5	11.0	2.5 × 1	6 170	9 940	0.10	30
RNCT 1808A3.5	18	8	4.762	18.5	13.6	3.5 × 1	15 500	26 200	0.15	34
RNCT 1808A3.5S	18	8	4.762	18.5	13.6	3.5 × 1	15 500	26 200	0.15	34
RNCT 2005A2.5	20	5	3.175	20.5	17.0	2.5 × 1	7 500	14 200	0.10	40
RNCT 2005A2.5S	20	5	3.175	20.5	17.0	2.5 × 1	7 500	14 200	0.10	40
RNCT 2505A5	25	5	3.175	25.5	22.0	2.5 × 2	15 100	36 300	0.10	42
RNCT 2505A5S	25	5	3.175	25.5	22.0	2.5 × 2	15 100	36 300	0.10	42
RNCT 2510A5	25	10	6.35	26	19.0	2.5 × 2	37 300	69 800	0.20	44
RNCT 2510A5S	25	10	6.35	26	19.0	2.5 × 2	37 300	69 800	0.20	44
RNCT 2806A5	28	6	3.175	28.5	25.0	2.5 × 2	15 900	40 500	0.10	50
RNCT 2806A5S	28	6	3.175	28.5	25.0	2.5 × 2	15 900	40 500	0.10	50
RNCT 3210A5	32	10	6.35	33.75	27.0	2.5 × 2	42 000	91 800	0.20	55
RNCT 3210A5S	32	10	6.35	33.75	27.0	2.5 × 2	42 000	91 800	0.20	55
RNCT 3610A5	36	10	6.35	37	30.0	2.5 × 2	44 900	102 000	0.20	60
RNCT 3610A5S	36	10	6.35	37	30.0	2.5 × 2	44 900	102 000	0.20	60
RNCT 4010A7	40	10	6.35	41.75	35.0	3.5 × 2	63 100	164 000	0.20	65
RNCT 4010A7S	40	10	6.35	41.75	35.0	3.5 × 2	63 100	164 000	0.20	65
RNCT 4512A5	45	12	7.144	46.5	39.0	2.5 × 2	58 500	147 000	0.23	70
RNCT 4512A5S	45	12	7.144	46.5	39.0	2.5 × 2	58 500	147 000	0.23	70
RNCT 5010A7	50	10	6.35	51.75	45.0	3.5 × 2	70 100	205 000	0.20	80
RNCT 5010A7S	50	10	6.35	51.75	45.0	3.5 × 2	70 100	205 000	0.20	80
RNCT 5016A5	50	16	9.525	52	42.0	2.5 × 2	117 000	299 000	0.23	85
RNCT 5016A5S	50	16	9.525	52	42.0	2.5 × 2	117 000	299 000	0.23	85

Notes

1. Protruding portion of tube does not interfere with ball nut housing if its dimensions corresponding to U and V are large enough.
2. Actual screw shaft length may become slightly longer than nominal length L_0 due to manufacturing tolerance.
3. Only ball nut part numbers ending "S" are equipped with seals. External dimensions of those with seals are the same as those without.
   In ball nut side view drawing, above the center line there is a seal, and beneath it there is no seal.
   Seal for those with shaft diameter of 14 mm or less is made of synthetic resin. Seal for those of 16 mm or more is a "Brush" seal.
4. Nut assembly with arbor and screw shaft are separate at time of delivery.

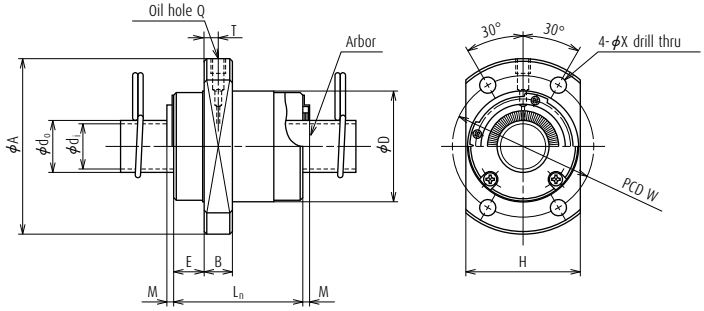


Unit: mm

Ball nut dimensions						Nut Mass.	Seal dimensions		Arbor		Screw shaft			Screw shaft No.	Shaft mass/m	Internal spatial volume of nut	Standard volume of grease re-plenishing
V-thread		Length	Projecting tube				Dia-meter	Thick-ness	Outside dia.	Bore	Standard length						
M	B	L_n	U	V	R	(kg)	S	S_W	d_0	d_1	L_0				(kg)	(cm^3)	(cm^3)
M18 × 1	10	38	15	15	7	0.049	–	–	8.1	6.1	400	800	–	RS1003A··	0.50	–	–
M24 × 1	10	43	19	20	7	0.083	–	–	11.5	9.5	500	1 000	–	RS1404A··	1.02	2.7	1.4
M26 × 1.5	10	45	22	21	8	0.15	–	–	11.0	9.0	500	1 000	–	RS1405A··	1.00	3.1	1.6
M32 × 1.5	12	58	27	27	8	0.21	28.5	2.5	13.6	11.6	500	1 000	1 500	RS1808A··	1.60	6.6	3.3
M32 × 1.5	12	58	27	27	8	0.21	28.5	2.5	13.6	11.6	500	1 000	1 500	RS1808A··	1.60	6.6	3.3
M36 × 1.5	12	48	28	27	10	0.28	29.5	2.5	17.0	14.6	500	1 000	2 000	RS2005A··	2.17	4.8	2.4
M36 × 1.5	12	48	28	27	10	0.28	29.5	2.5	17.0	14.6	500	1 000	2 000	RS2005A··	2.17	4.8	2.4
M40 × 1.5	15	69	28	31	10	0.38	34.5	2.5	22.0	19.6	1 000	2 000	2 500	RS2505A··	3.47	8.4	4.2
M40 × 1.5	15	69	28	31	10	0.38	34.5	2.5	22.0	19.6	1 000	2 000	2 500	RS2505A··	3.47	8.4	4.2
M42 × 1.5	15	92	34	37	17	0.49	38.5	2.5	19.0	16.6	1 000	2 000	2 500	RS2510A··	3.13	21	1
M42 × 1.5	15	92	34	37	17	0.49	38.5	2.5	19.0	16.6	1 000	2 000	2 500	RS2510A··	3.13	21	1
M45 × 1.5	15	79	33	34	10	0.68	37.5	2.5	25.0	22.6	1 000	2 000	2 500	RS2806A··	4.47	9.7	4.9
M45 × 1.5	15	79	33	34	10	0.68	37.5	2.5	25.0	22.6	1 000	2 000	2 500	RS2806A··	4.47	9.7	4.9
M50 × 1.5	18	97	39	42	17	0.79	45.5	2.5	27.0	24.6	1 000	2 000	3 000	RS3210A··	5.53	32	16
M50 × 1.5	18	97	39	42	17	0.79	45.5	2.5	27.0	24.6	1 000	2 000	3 000	RS3210A··	5.53	32	16
M55 × 2	18	98	42	46	17	0.97	50.5	3.0	30.0	27.6	1 000	2 000	3 000	RS3610A··	6.91	32	16
M55 × 2	18	98	42	46	17	0.97	50.5	3.0	30.0	27.6	1 000	2 000	3 000	RS3610A··	6.91	32	16
M60 × 2	25	125	44	50	20	1.37	54.5	3.0	35.0	31.8	2 000	3 000	4 000	RS4010A··	8.87	51	26
M60 × 2	25	125	44	50	20	1.37	54.5	3.0	35.0	31.8	2 000	3 000	4 000	RS4010A··	8.87	51	26
M65 × 2	30	124	47	55	20	1.42	60.5	3.0	39.0	35.8	2 000	3 000	4 000	RS4512A··	11.16	60	30
M65 × 2	30	124	47	55	20	1.42	60.5	3.0	39.0	35.8	2 000	3 000	4 000	RS4512A··	11.16	60	30
M75 × 2	40	140	52	59	20	2.41	64.5	3.0	45.0	41.8	2 000	3 000	4 000	RS5010A··	14.15	76	38
M75 × 2	40	140	52	59	20	2.41	64.5	3.0	45.0	41.8	2 000	3 000	4 000	RS5010A··	14.15	76	38
M80 × 2	40	158	57	63	25	3.14	68.5	3.0	42.0	38.8	2 000	3 000	4 000	RS5016A··	13.48	114	57
M80 × 2	40	158	57	63	25	3.14	68.5	3.0	42.0	38.8	2 000	3 000	4 000	RS5016A··	13.48	114	57

5. Value obtained by diving standard screw shaft length by 100 mm will be entered at end of the part number where marked with ··.
6. Items in stock do not have surface treatment. For details of standard stock products, contact NSK.
7. Only rust preventive agent is applied at time of delivery. Please apply lubricant (oil or grease) before use.
8. Internal spatial volume of nut and volume of grease to be replenished are values for ball screws with seals. Recommended amount for replenishing is approximately 50% of nut's internal space. For ball screws without seals, apply grease to screw shaft surface or move ball nut by hand while filling them with grease so that grease permeates all areas. See page 445 for details.

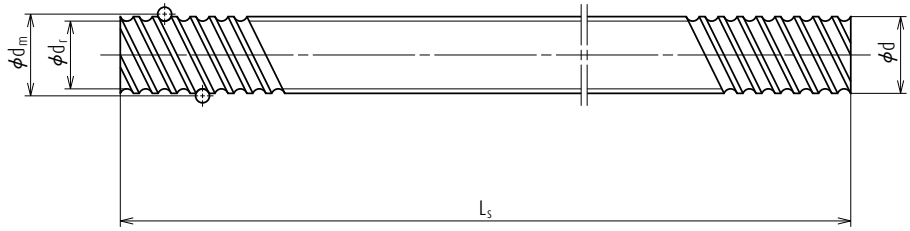
19. Ball screws for transfer equipment
End cap type, Flanged nut (Medium, High helix lead)



Ball nut No.	Shaft dia. d	Lead l	Ball dia. D_w	Ball circle dia. d_m	Root dia. d_r	Effective balls turns	Basic load rating (N)		Axial play Max.	Ball nut dimensions
						Turns × Circuits	Dynamic C_a	Static C_{0a}		Outside dia. D
RNFCL 1212A3	12	12	2.381	12.65	10.1	1.7 × 2	4 350	6 580	0.10	26
RNFCL 1212A6	12	12	2.381	12.65	10.1	1.7 × 4	7 890	13 200	0.10	26
RNFCL 1520A3	15	20	3.175	15.5	12.2	1.7 × 2	7 510	12 300	0.10	33
RNFCL 1520A3S	15	20	3.175	15.5	12.2	1.7 × 2	7 510	12 300	0.10	33
RNFCL 1616A3	16	16	2.778	16.65	13.5	1.7 × 2	6 060	10 300	0.10	32
RNFCL 1616A3S	16	16	2.778	16.65	13.5	1.7 × 2	6 060	10 300	0.10	32
RNFCL 1616A6	16	16	2.778	16.65	13.5	2.5 × 1	11 000	20 500	0.10	32
RNFCL 1616A6S	16	16	2.778	16.65	13.5	2.5 × 2	11 000	20 500	0.10	32
RNFCL 2020A3	20	20	3.175	20.75	17.3	1.7 × 2	9 000	16 700	0.10	39
RNFCL 2020A3S	20	20	3.175	20.75	17.3	1.7 × 2	9 000	16 700	0.10	39
RNFCL 2020A6	20	20	3.175	20.75	17.3	1.7 × 4	16 300	33 400	0.10	39
RNFCL 2020A6S	20	20	3.175	20.75	17.3	1.7 × 4	16 300	33 400	0.10	39
RNFCL 2525A3	25	25	3.969	26	22.0	1.7 × 2	13 400	26 100	0.12	47
RNFCL 2525A3S	25	25	3.969	26	22.0	1.7 × 2	13 400	26 100	0.12	47
RNFCL 2525A6	25	25	3.969	26	22.0	1.7 × 4	24 400	52 200	0.12	47
RNFCL 2525A6S	25	25	3.969	26	22.0	1.7 × 4	24 400	52 200	0.12	47
RNFCL 3232A3	32	32	4.762	33.25	28.0	1.7 × 2	19 600	39 800	0.15	58
RNFCL 3232A3S	32	32	4.762	33.25	28.0	1.7 × 2	19 600	39 800	0.15	58
RNFCL 3232A6	32	32	4.762	33.25	28.0	1.7 × 4	35 600	79 600	0.15	58
RNFCL 3232A6S	32	32	4.762	33.25	28.0	1.7 × 4	35 600	79 600	0.15	58
RNFCL 4040A3	40	40	6.35	41.75	35.0	1.7 × 2	31 300	66 800	0.20	73
RNFCL 4040A3S	40	40	6.35	41.75	35.0	1.7 × 2	31 300	66 800	0.20	73
RNFCL 4040A6	40	40	6.35	41.75	35.0	1.7 × 4	56 900	134 000	0.20	73
RNFCL 4040A6S	40	40	6.35	41.75	35.0	1.7 × 4	56 900	134 000	0.23	73
RNFCL 5050A3	50	50	7.938	52.25	44.0	1.7 × 2	46 800	104 000	0.25	90
RNFCL 5050A3S	50	50	7.938	52.25	44.0	1.7 × 2	46 800	104 000	0.25	90
RNFCL 5050A6	50	50	7.938	52.25	44.0	1.7 × 4	85 000	209 000	0.25	90
RNFCL 5050A6S	50	50	7.938	52.25	44.0	1.7 × 4	85 000	209 000	0.25	90

Notes

1. Actual screw shaft length may become slightly longer than nominal length L_0 due to manufacturing tolerance.
2. Nut assembly with arbor and screw shaft are separate at time of delivery.
3. Value obtained by diving the standard screw shaft length by 100 mm will be entered at end of the part number where marked with · · .
4. Items in stock do not have surface treatment. For details of standard stock products, contact NSK.

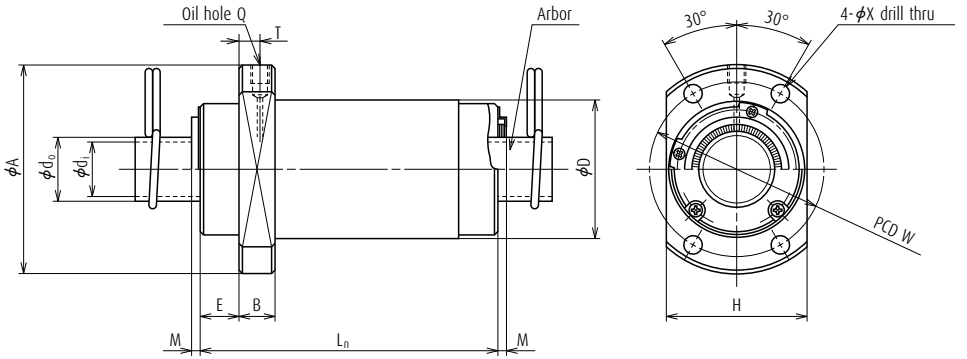


Unit: mm

Ball nut dimensions										Nut Mass.	Arbor		Screw shaft				Shaft mass/m	Internal spatial volume of nut	Standard volume of grease re-plenishing
V-thread			Length			Bolt hole		Oil hole			Outside dia.	Bore	Standard length			Screw shaft No.			
A	H	B	E	L_n	M	W	X	Q	T	(kg)	d_0	d_1	L_0				(kg)	(cm^3)	(cm^3)
44	28	6	9	30	–	35	4.5	M3 × 0.5	3.0	0.12	10.1	8.1	400	800	–	RS1212A··	0.74	–	–
44	28	6	9	30	–	35	4.5	M3 × 0.5	3.0	0.12	10.1	8.1	400	800	–	RS1212A··	0.74	–	–
51	35	10	11	45	–	42	4.5	M6 × 1	5.0	0.28	12.2	10.2	500	1 000	1 500	RS1520A··	1.15	3.3	1.7
51	35	10	11	45	3	42	4.5	M6 × 1	5.0	0.28	12.2	10.2	500	1 000	1 500	RS1520A··	1.15	3.3	1.7
53	34	10	10	38	–	42	4.5	M6 × 1	5.0	0.23	13.5	11.5	500	1 000	1 500	RS1616A··	1.37	2.6	1.3
53	34	10	10	38	3	42	4.5	M6 × 1	5.0	0.23	13.5	11.5	500	1 000	1 500	RS1616A··	1.37	2.6	1.3
53	34	10	10	38	–	42	4.5	M6 × 1	5.0	0.23	13.5	11.5	500	1 000	1 500	RS1616A··	1.37	2.6	1.3
53	34	10	10	38	3	42	4.5	M6 × 1	5.0	0.23	13.5	11.5	500	1 000	1 500	RS1616A··	1.37	2.6	1.3
62	41	10	11.5	46	–	50	5.5	M6 × 1	5.0	0.37	17.3	14.9	500	1 000	2 000	RS2020A··	2.19	4.4	2.2
62	41	10	11.5	46	3	50	5.5	M6 × 1	5.0	0.37	17.3	14.9	500	1 000	2 000	RS2020A··	2.19	4.4	2.2
62	41	10	11.5	46	–	50	5.5	M6 × 1	5.0	0.37	17.3	14.9	500	1 000	2 000	RS2020A··	2.19	4.9	2.5
62	41	10	11.5	46	3	50	5.5	M6 × 1	5.0	0.37	17.3	14.9	500	1 000	2 000	RS2020A··	2.19	4.9	2.5
74	49	12	13	55	–	60	6.6	M6 × 1	6.0	0.62	22.0	19.6	1 000	2 000	2 500	RS2806A··	3.43	8.2	4.1
74	49	12	13	55	3	60	6.6	M6 × 1	6.0	0.62	22.0	19.6	1 000	2 000	2 500	RS3210A··	3.43	8.2	4.1
74	49	12	13	55	–	60	6.6	M6 × 1	6.0	0.62	22.0	19.6	1 000	2 000	2 500	RS2525A··	3.43	8.9	4.5
74	49	12	13	55	3	60	6.6	M6 × 1	6.0	0.62	22.0	19.6	1 000	2 000	2 500	RS2525A··	3.43	8.9	4.5
92	60	12	16	70	–	74	9	M6 × 1	5.5	1.10	28.0	25.6	1 000	2 000	3 000	RS3232A··	5.71	16	8.0
92	60	12	16	70	3	74	9	M6 × 1	5.5	1.10	28.0	25.6	1 000	2 000	3 000	RS3232A··	5.71	16	8.0
92	60	12	16	70	–	74	9	M6 × 1	5.5	1.10	28.0	25.6	1 000	2 000	3 000	RS3232A··	5.71	17	8.5
92	60	12	16	70	3	74	9	M6 × 1	5.5	1.10	28.0	25.6	1 000	2 000	3 000	RS3232A··	5.71	17	8.5
114	75	15	19.5	85	–	93	11	M6 × 1	6.5	2.09	35.0	31.8	2 000	3 000	4 000	RS4040A··	8.82	32	16
114	75	15	19.5	85	3.5	93	11	M6 × 1	6.5	2.09	35.0	31.8	2 000	3 000	4 000	RS4040A··	8.82	32	16
114	75	15	19.5	85	–	93	11	M6 × 1	6.5	2.09	35.0	31.8	2 000	3 000	4 000	RS4040A··	8.82	33	17
114	75	15	19.5	85	3.5	93	11	M6 × 1	6.5	2.09	35.0	31.8	2 000	3 000	4 000	RS4040A··	8.82	33	17
135	92	20	21.5	107	–	112	14	M6 × 1	7.0	3.90	44.0	40.8	2 000	3 000	4 000	RS5050A··	13.81	64	32
135	92	20	21.5	107	3.5	112	14	M6 × 1	7.0	3.90	44.0	40.8	2 000	3 000	4 000	RS5050A··	13.81	64	32
135	92	20	21.5	107	–	112	14	M6 × 1	7.0	3.90	44.0	40.8	2 000	3 000	4 000	RS5050A··	13.81	68	34
135	92	20	21.5	107	3.5	112	14	M6 × 1	7.0	3.90	44.0	40.8	2 000	3 000	4 000	RS5050A··	13.81	68	34

5. Length of nut becomes longer (2 × M) for those with "brush" seals.
6. Only rust preventive agent is applied at time of delivery. Please apply lubricant (oil or grease) before use.
7. Internal spatial volume of nut and volume of grease to be replenished are values for ball screws with seals. Recommended amount for replenishing is approximately 50% of nut's internal space. For ball screws without seals, apply grease to screw shaft surface or move ball nut by hand while filling them with grease so that grease permeates all areas. See page 445 for details.

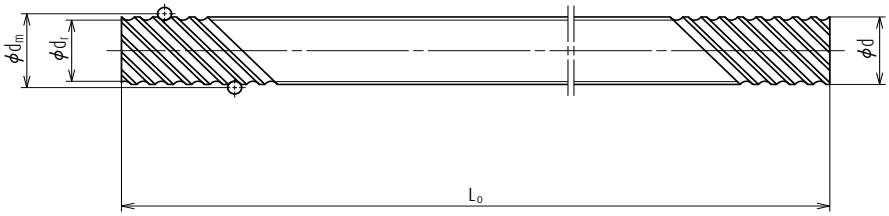
19. Ball screws for transfer equipment
End cap type, Flanged nut (Ultra high helix lead)



Ball nut No.	Shaft dia. d	Lead l	Ball dia. D_w	Ball circle dia. d_m	Root dia. d_r	Effective balls turns: Turns × Circuits	Basic load rating (N): Dynamic C_a	Basic load rating (N): Static C_{0a}	Axial play Max.	Ball nut dimensions: Outside dia. D
RNFCL 1632A2	16	32	2.778	16.65	13.5	0.7 × 4	4 880	8 330	0.10	32
RNFCL 1632A2S	16	32	2.778	16.65	13.5	0.7 × 4	4 880	8 330	0.10	32
RNFCL 1632A3	16	32	2.778	16.65	13.5	1.7 × 2	5 760	10 300	0.10	32
RNFCL 1632A3S	16	32	2.778	16.65	13.5	1.7 × 2	5 760	10 300	0.10	32
RNFCL 1632A6	16	32	2.778	16.65	13.5	1.7 × 4	10 500	20 500	0.10	32
RNFCL 1632A6S	16	32	2.778	16.65	13.5	1.7 × 4	10 500	20 500	0.10	32
RNFCL 2040A2	20	40	3.175	20.75	17.3	0.7 × 4	7 170	13 200	0.10	38
RNFCL 2040A2S	20	40	3.175	20.75	17.3	0.7 × 4	7 170	13 200	0.10	38
RNFCL 2040A3	20	40	3.175	20.75	17.3	1.7 × 2	8 480	16 500	0.10	38
RNFCL 2040A3S	20	40	3.175	20.75	17.3	1.7 × 2	8 480	16 500	0.10	38
RNFCL 2040A6	20	40	3.175	20.75	17.3	1.7 × 4	15 400	33 100	0.10	38
RNFCL 2040A6S	20	40	3.175	20.75	17.3	1.7 × 4	15 400	33 100	0.10	38
RNFCL 2550A2	25	50	3.969	26	22.0	0.7 × 4	10 700	20 700	0.12	46
RNFCL 2550A2S	25	50	3.969	26	22.0	0.7 × 4	10 700	20 700	0.12	46
RNFCL 2550A3	25	50	3.969	26	22.0	1.7 × 2	12 700	26 500	0.12	46
RNFCL 2550A3S	25	50	3.969	26	22.0	1.7 × 2	12 700	26 500	0.12	46
RNFCL 2550A6	25	50	3.969	26	22.0	1.7 × 4	23 000	53 000	0.12	46
RNFCL 2550A6S	25	50	3.969	26	22.0	1.7 × 4	23 000	53 000	0.12	46
RNFCL 3264A3	32	64	4.762	33.25	28.0	1.7 × 2	17 900	40 200	0.15	58
RNFCL 3264A3S	32	64	4.762	33.25	28.0	1.7 × 2	17 900	40 200	0.15	58
RNFCL 3264A6	32	64	4.762	33.25	28.0	1.7 × 4	32 400	80 300	0.15	58
RNFCL 3264A6S	32	64	4.762	33.25	28.0	1.7 × 4	32 400	80 300	0.15	58
RNFCL 4080A3	40	80	6.350	41.75	35.0	1.7 × 2	29 500	67 900	0.20	73
RNFCL 4080A3S	40	80	6.350	41.75	35.0	1.7 × 2	29 500	67 900	0.20	73
RNFCL 4080A6	40	80	6.350	41.75	35.0	1.7 × 4	53 600	136 000	0.20	73
RNFCL 4080A6S	40	80	6.350	41.75	35.0	1.7 × 4	53 600	136 000	0.20	73

Notes

1. Actual screw shaft length may become slightly longer than nominal length L0 due to manufacturing tolerance.
2. Nut assembly with arbor and screw shaft are separate at time of delivery.
3. Value obtained by diving the standard screw shaft length by 100 mm will be entered at end of the part number where marked with ···.
4. Items in stock do not have surface treatment. For details of standard stock products, contact NSK.

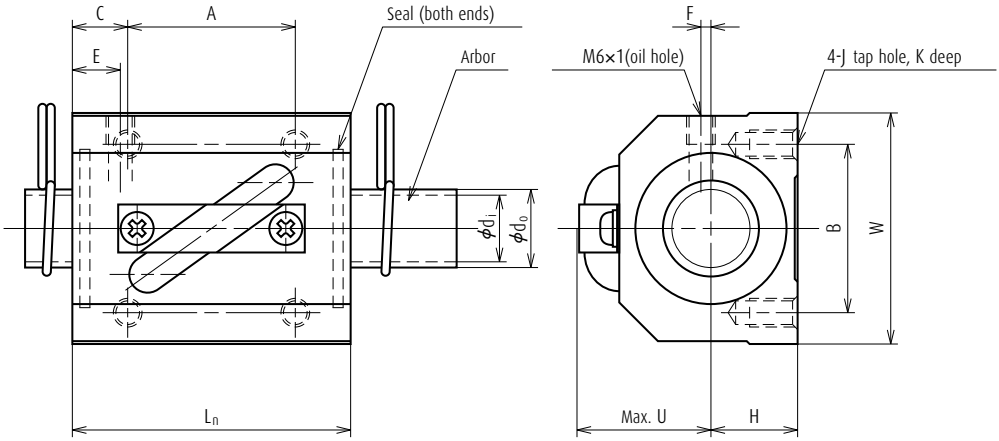


Unit: mm

Ball nut dimensions										Nut Mass.	Arbor		Screw shaft					Shaft mass/m	Internal spatial volume of nut	Standard volume of grease re-plenishing
V-thread			Length			Bolt hole		Oil hole			Outside dia.	Bore	Standard length				Screw shaft No.			
A	H	B	E	L_n	M	W	X	Q	T	(kg)	d_0	d_1	L_0					(kg)	(cm^3)	(cm^3)
50	34	10	10	34	–	41	4.5	M6 × 1	5.5	0.21	13.5	11.5	500	1 000	1 500	–	RS1632A· ·	1.34	2.4	1.2
50	34	10	10	34	3	41	4.5	M6 × 1	5.5	0.21	13.5	11.5	500	1 000	1 500	–	RS1632A· ·	1.34	2.4	1.2
50	34	10	10	66	–	41	4.5	M6 × 1	5.5	0.33	13.5	11.5	500	1 000	1 500	–	RS1632A· ·	1.34	3.9	2.0
50	34	10	10	66	3	41	4.5	M6 × 1	5.5	0.33	13.5	11.5	500	1 000	1 500	–	RS1632A· ·	1.34	3.9	2.0
50	34	10	10	66	–	41	4.5	M6 × 1	5.5	0.33	13.5	11.5	500	1 000	1 500	–	RS1632A· ·	1.34	4.1	2.1
50	34	10	10	66	3	41	4.5	M6 × 1	5.5	0.33	13.5	11.5	500	1 000	1 500	–	RS1632A· ·	1.34	4.1	2.1
58	40	10	11	41	–	48	5.5	M6 × 1	5.5	0.31	17.3	14.9	500	1 000	1 500	2 000	RS2040A· ·	2.15	4.1	2.1
58	40	10	11	41	3	48	5.5	M6 × 1	5.5	0.31	17.3	14.9	500	1 000	1 500	2 000	RS2040A· ·	2.15	4.1	2.1
58	40	10	11	81	–	48	5.5	M6 × 1	5.5	0.53	17.3	14.9	500	1 000	1 500	2 000	RS2040A· ·	2.15	6.3	3.2
58	40	10	11	81	3	48	5.5	M6 × 1	5.5	0.53	17.3	14.9	500	1 000	1 500	2 000	RS2040A· ·	2.15	6.3	3.2
58	40	10	11	81	–	48	5.5	M6 × 1	5.5	0.53	17.3	14.9	500	1 000	1 500	2 000	RS2040A· ·	2.15	7.0	3.5
58	40	10	11	81	3	48	5.5	M6 × 1	5.5	0.53	17.3	14.9	500	1 000	1 500	2 000	RS2040A· ·	2.15	7.0	3.5
70	48	12	13	50	–	58	6.6	M6 × 1	7.0	0.53	22.0	19.6	1 000	2 000	2 500	–	RS2550A· ·	3.37	8.4	4.2
70	48	12	13	50	3	58	6.6	M6 × 1	7.0	0.53	22.0	19.6	1 000	2 000	2 500	–	RS2550A· ·	3.37	8.4	4.2
70	48	12	13	100	–	58	6.6	M6 × 1	7.0	0.91	22.0	19.6	1 000	2 000	2 500	–	RS2550A· ·	3.37	14	7.0
70	48	12	13	100	3	58	6.6	M6 × 1	7.0	0.91	22.0	19.6	1 000	2 000	2 500	–	RS2550A· ·	3.37	14	7.0
70	48	12	13	100	–	58	6.6	M6 × 1	7.0	0.91	22.0	19.6	1 000	2 000	2 500	–	RS2550A· ·	3.37	15	7.5
70	48	12	13	100	3	58	6.6	M6 × 1	7.0	0.91	22.0	19.6	1 000	2 000	2 500	–	RS2550A· ·	3.37	15	7.5
92	60	12	15.5	126	–	74	9	M6 × 1	7.5	1.76	28.0	25.6	1 000	2 000	3 000	4 000	RS3264A· ·	5.63	24	12
92	60	12	15.5	126	3	74	9	M6 × 1	7.5	1.76	28.0	25.6	1 000	2 000	3 000	4 000	RS3264A· ·	5.63	24	12
92	60	12	15.5	126	–	74	9	M6 × 1	7.5	1.76	28.0	25.6	1 000	2 000	3 000	4 000	RS3264A· ·	5.63	26	13
92	60	12	15.5	126	3	74	9	M6 × 1	7.5	1.76	28.0	25.6	1 000	2 000	3 000	4 000	RS3264A· ·	5.63	26	13
114	75	15	19	158	–	93	11	M6 × 1	10.0	3.44	35.0	31.8	2 000	3 000	4 000	5 000	RS4080A· ·	8.69	52	26
114	75	15	19	158	3.5	93	11	M6 × 1	10.0	3.44	35.0	31.8	2 000	3 000	4 000	5 000	RS4080A· ·	8.69	52	26
114	75	15	19	158	–	93	11	M6 × 1	10.0	3.44	35.0	31.8	2 000	3 000	4 000	5 000	RS4080A· ·	8.69	55	28
114	75	15	19	158	3.5	93	11	M6 × 1	10.0	3.44	35.0	31.8	2 000	3 000	4 000	5 000	RS4080A· ·	8.69	55	28

5. Length of nut becomes longer (2 × M) for those with "brush" seals.
6. Only rust preventive agent is applied at time of delivery. Please apply lubricant (oil or grease) before use.
7. Internal spatial volume of nut and volume of grease to be replenished are values for ball screws with seals. Recommended amount for replenishing is approximately 50% of nut's internal space. For ball screws without seals, apply grease to screw shaft surface or move ball nut by hand while filling them with grease so that grease permeates all areas. See page 445 for details.

19. Ball screws for transfer equipment
Return tube type, Square nut (Fine, Medium lead)

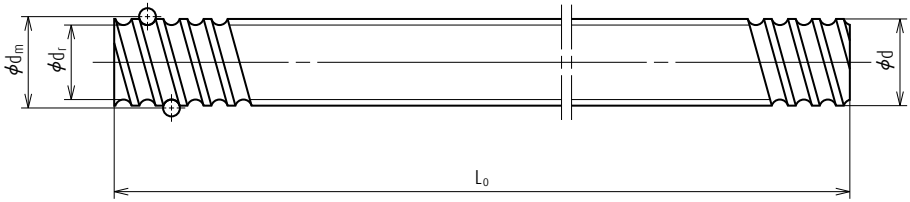


Ball nut No.	Shaft dia. d	Lead l	Ball dia. D_w	Ball circle dia. d_m	Root dia. d_r	Effective balls turns	Basic load rating (N)		Axial play Max.	Ball nut dimensions
						Turns × Circuits	Dynamic C_a	Static C_{0a}		Length L_n
RNSTL 1404A3.5S	14	4	2.778	14.5	11.5	3.5 × 1	6 310	10 800	0.10	38
RNSTL 1405A2.5S	14	5	3.175	14.5	11.0	2.5 × 1	6 170	9 940	0.10	38
RNSTL 1808A3.5S	18	8	4.762	18.5	13.6	3.5 × 1	15 500	26 200	0.15	56
RNSTL 2005A2.5S	20	5	3.175	20.5	17.0	2.5 × 1	7 500	14 200	0.10	38
RNSTL 2010A2.5S	20	10	4.762	21.25	16.2	2.5 × 1	12 700	21 600	0.15	58
RNSTL 2505A2.5S	25	5	3.175	25.5	22.0	2.5 × 1	8 340	18 100	0.10	35
RNSTL 2510A5S	25	10	6.35	26	19.0	2.5 × 2	37 300	69 800	0.20	94
RNSTL 2806A2.5S	28	6	3.175	28.5	25.0	2.5 × 1	8 760	20 200	0.10	42
RNSTL 2806A5S	28	6	3.175	28.5	25.0	2.5 × 2	15 900	40 500	0.10	67
RNSTL 3210A2.5S	32	10	6.35	33.75	27.0	2.5 × 1	23 100	45 900	0.20	64
RNSTL 3210A5S	32	10	6.35	33.75	27.0	2.5 × 2	42 000	91 800	0.20	94
RNSTL 3610A2.5S	36	10	6.35	37	30.0	2.5 × 1	24 700	50 800	0.20	64
RNSTL 3610A5S	36	10	6.35	37	30.0	2.5 × 2	44 900	102 000	0.20	96
RNSTL 4512A5S	45	12	7.144	46.5	39.0	2.5 × 2	58 500	147 000	0.23	115

Notes

1. Actual screw shaft length may become slightly longer than nominal length L_0 due to manufacturing tolerance.
2. Nut assembly with arbor and screw shaft are separate at time of delivery.
3. Value obtained by diving the standard screw shaft length by 100 mm will be entered at end of the part number where marked with ··.

R series RNSTL type



Unit: mm

Ball nut dimensions										Nut Mass.	Arbor		Screw shaft				Shaft mass/m	Internal spatial volume of nut	Standard volume of grease replenishing
Width	Center height	Bolt hole					Oil hole				Outside dia.	Bore	Standard length			Screw shaft No.			
W	H	A	B	C	J	K	E	F	U	(kg)	d_0	d_1	L_0				(kg)	(cm^3)	(cm^3)
34	13	22	26	8	M4	7	7	3	20	0.20	11.5	9.5	500	1 000	–	RS1404A··	1.02	1.6	0.8
34	13	22	26	8	M4	7	7	3	21	0.20	11.0	9.0	500	1 000	–	RS1405A··	1.00	1.8	0.9
48	17	35	35	10.5	M6	10	8	3	26	0.31	13.6	11.6	500	1 000	1 500	RS1808A··	1.60	3.4	1.7
48	17	22	35	8	M6	9	6	2	27	0.24	17.0	14.6	500	1 000	2 000	RS2005A··	2.17	2.5	1.3
48	18	35	35	11.5	M6	10	10	2	28	0.35	16.2	13.8	500	1 000	2 000	RS2010A··	2.18	6.3	3.2
60	20	22	40	6.5	M8	10	6	0	27	0.31	22.0	19.6	1 000	2 000	2 500	RS2505A··	3.47	2.6	1.3
60	23	60	40	17	M8	12	10	0	32	1.32	19.0	16.6	1 000	2 000	2 500	RS2510A··	3.13	18	9.0
60	22	18	40	12	M8	12	8	0	32	0.65	25.0	22.6	1 000	2 000	2 500	RS2806A··	4.47	3.5	1.8
60	22	40	40	13.5	M8	12	8	0	32	1.04	25.0	22.6	1 000	2 000	2 500	RS2806A··	4.47	7.0	3.5
70	26	45	50	9.5	M8	12	10	0	38	1.12	27.0	24.6	1 000	2 000	3 000	RS3210A··	5.53	18	9.0
70	26	45	50	17	M8	12	10	0	38	1.75	27.0	24.6	1 000	2 000	3 000	RS3210A··	5.53	27	14
86	29	45	60	9.5	M10	16	11	0	41	1.76	30.0	27.6	1 000	2 000	3 000	RS3610A··	6.91	18	9.0
86	29	60	60	18	M10	16	11	0	41	2.64	30.0	27.6	1 000	2 000	3 000	RS3610A··	6.91	27	14
100	36	75	75	20	M12	20	13	0	46	1.22	39.0	35.8	2 000	3 000	4 000	RS4512A··	11.16	47	24

4. Items in stock do not have surface treatment. For details of standard stock products, contact NSK.
5. Seal for those with shaft diameter of 14 mm or less is made of synthetic resin. Seal for those of 16 mm or more is a "Brush" seal.
6. Only rust preventive agent is applied at time of delivery. Please apply lubricant (oil or grease) before use.
7. Recommended quantity of grease is about 50% of ball nut's internal space. See page 445 for details.

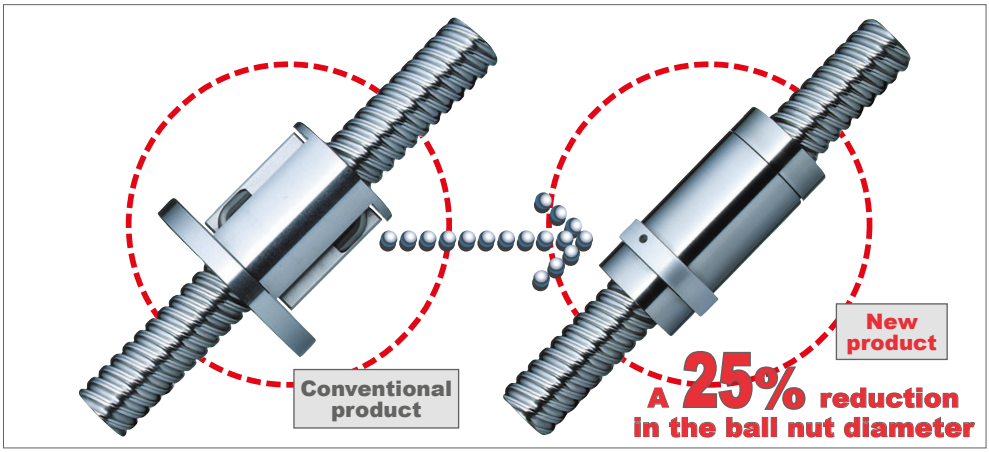
Compact ball nut heralding in the next generation standard. Extended maintenance free operation with NSK K1 lubrication unit and new grease retaining seal. Suitable for high speed and long stroke operation.

A 25% reduction in the ball nut diameter compared to the current series

No backslash, high speed and long stroke operation is possible.
Extended maintenance free operation achieved with **NSK K1** lubrication unit and new grease retaining seal, thus contributing to total cost reduction.

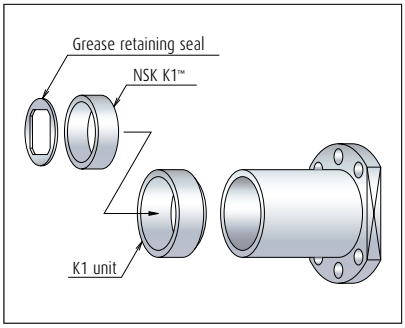
Compact ball nut

› Saves assembly space
› Suitable for rotating ball nut application because of its low inertia and balanced design



Remarkable improvement in sealing performance (introduction of grease retaining seal)

› Grease retention capabilities substantially enhanced
› Assists clean environment maintenance due to minimum grease scattering
› Superb sealing capabilities in contaminated environments

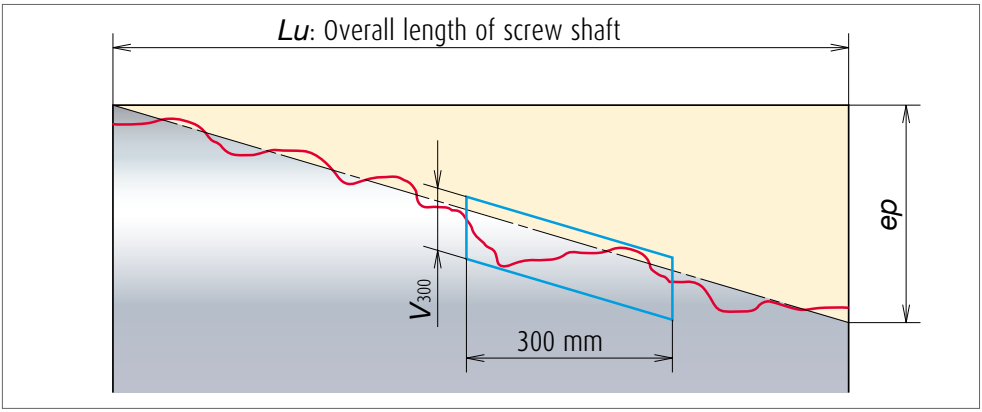


Maintenance free (equipped with NSK K1 lubrication unit as a standard feature)

NSK K1 lubrication unit, that is molded from resin and is impregnated with lubrication oil, supplies fresh oil onto the ball rolling surfaces.
In unison with grease it retains the lubricating ability for an extended period of time. Since its first appearance on the market in 1996, it has been widely accepted in many industrial fields.

Accuracy Grade

Accuracy grade of Ct7 is available.



Grade	Ct7
ep: Tolerance on specified travel	$ep = \pm \frac{2 \cdot Lu}{300} \cdot V_{300}$ (mm) *Lu*: Overall length of screw shaft
Travel variation in a 300 mm range (anywhere in useful travel)	0.052 mm

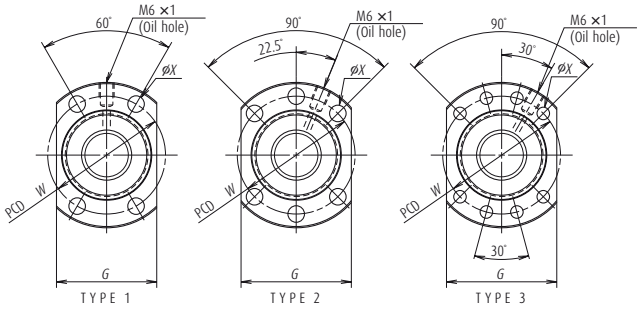
Options

Support unit (sold separately)
NSK provides the support bearing units to accompany the ball screw shafts.
For further details, please refer to the NSK catalog: Precision Machine Components (CAT. No. E3162h).
The bearing journal configurations of the screw shaft are provided on the following pages.

Applications

Woodworking machines, general transporting equipment, feeders, robots, etc.

20. Precision Rolled Ball Screws



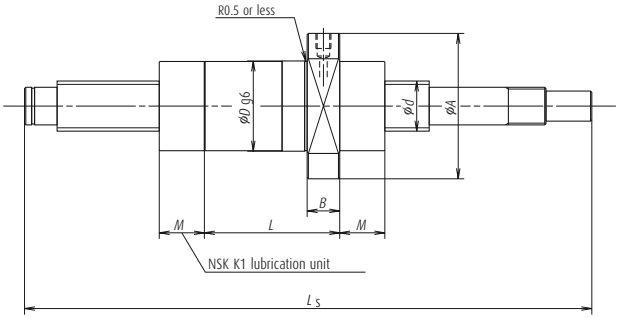
Shaft diameter:
ø12mm

Shaft diameter:
ø15, ø20, ø25 and ø32mm

Shaft diameter:
ø40 and ø50mm

Modell-No.	Shaft dia. d	Lead l	Effective turns of balls	Basic load rating (N)		Dimensions				
				Dynamic load rating C_a	Static load rating C_{0a}	D	A	G	B	L
PR1205	12	5	2.7x1	3200	5860	24	40	26	11	30
PR1505	15	5	2.7x1	5460	10200	28	48	40	11	30
PR1510	15	10	2.7x1	5460	10200	28	48	40	11	43
PR2005	20	5	2.7x1	8790	18500	36	58	44	13	31
PR2010	20	10	2.7x1	8790	18500	36	58	44	13	45
PR2505	25	5	4.7x1	15700	40900	40	62	48	12	42
PR2510	25	10	3.7x1	12800	32300	40	62	48	12	56
PR3210	32	10	3.7x1	19000	51500	50	80	62	12	59
PR3220	32	20	3.7x1	19000	51500	50	80	62	12	98
PR4010	40	10	3.7x1	33800	89900	63	93	70	14	60

Modell-No.	Shaft dia. d	Lead l	Effective turns of balls	Basic load rating (N)		Dimensions				
				Dynamic load rating C_a	Static load rating C_{0a}	D	A	G	B	L
LPR2020	20	20	1.7x2	9890	21600	36	58	44	13	54
LPR2525	25	25	1.7x2	11000	27500	40	62	48	12	63
LPR3232	32	32	1.7x2	16300	43900	50	80	62	14	79
LPR4040	40	40	1.7x2	29000	76200	63	93	70	16	94
LPR5050	50	50	1.7x2	32200	96200	75	110	85	18	115



Unit: mm

Dimensions				Maximum screw shaft length	
				Ct7	
Type	W	X	M	Standard	On request
1	32	4.5	(18)	200 - 900	-1500
2	38	5.5	(18)	200 - 1200	-1500
2	38	5.5	(18)	200 - 1200	-1500
2	47	6.6	(18)	300 - 1600	-2000
2	47	6.6	(18)	300 - 1600	-2000
2	51	6.6	(21)	300 - 3200	-
2	51	6.6	(21)	300 - 3200	-
2	65	9	(21)	300 - 3200	-4000
2	65	9	(21)	300 - 3200	-4000
3	78	9	(21)	500 - 3200	-

Unit: mm

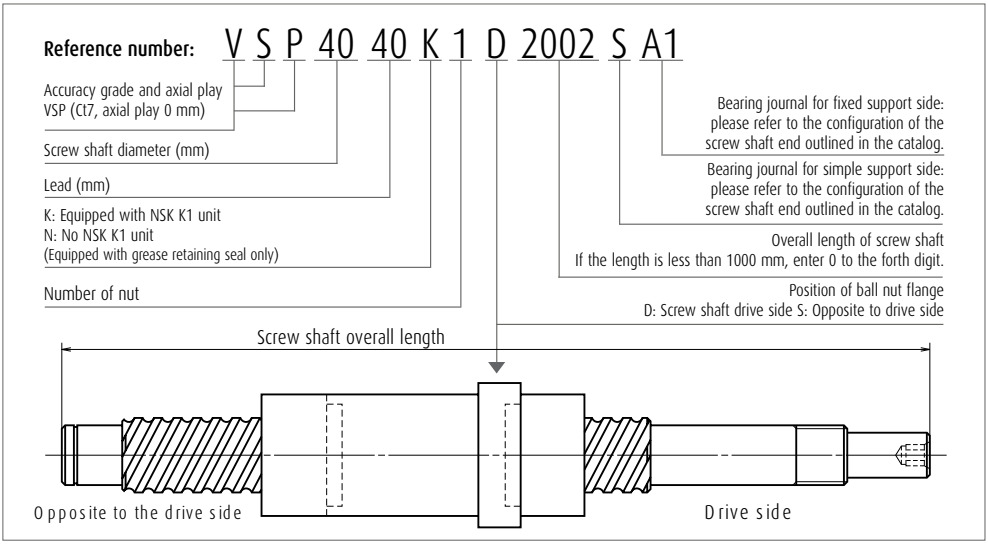
Dimensions				Maximum screw shaft length	
				Ct7	
Type	W	X	M	Standard	On request
2	47	6.6	(18)	300 - 1600	-2000
2	51	6.6	(21)	300 - 3200	-
2	65	9	(21)	300 - 3200	-4000
3	78	9	(21)	500 - 4500	-6500
3	93	11	(21)	500 - 4500	-6500

20. Precision Rolled Ball Screws

1. Precision Rolled Ball Screws PR Series/LPR Series

1.1 Specification number

For ordering, please quote the specification number.



1.2 Permissible rotational speed of precision rolled ball screws

We strongly recommend reviewing the allowable speed of the screw shaft.

The allowable rotational speed of the ball screw shall be checked on the following:

› **Permissible d·n value**

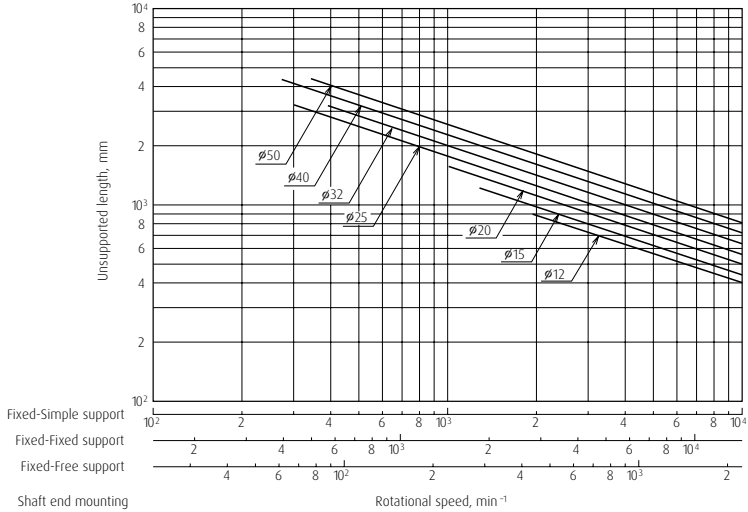
d·n value, which is involved in damaging the ball re-circulation components
(where, d: shaft diameter measured in mm, n: rotational speed measured in min^{-1})
Preferably d·n ≦150 000. Please consult with NSK if your ball screw exceeds the limitation.

› **Critical speed**

Critical speed of the screw shaft (caused by the resonance of the screw shaft)
See the chart below. For detailed calculations, please refer to the catalog: Precision Machine Components
(CAT No. E3162h).

Please consult NSK if the maximum rotational speed exceeds 5 000 min^{-1}, even both the critical speed of the screw shaft rotation and the d·n value are in ranges of the allowable limit.

Permissible rotational speed vs. critical speed.

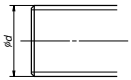


2. Recommendation of Screw Shaft End Configuration

2.1 Opposite to drive side shaft end: P

Unit: mm

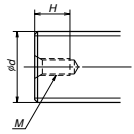
Screw shaft Diameter d
12
15
20
25
32
40
50



2.2 Opposite to drive side shaft end: R

Unit: mm

Screw shaft Diameter d	Tap hole Size M	Tap hole Depth H
12	M3x0.5	9
15	M4x0.7	10
20	M6x1	12
25	M6x1	12
32	M6x1	12
40	M8x1.25	16
50	M8x1.25	16

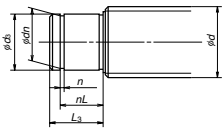


2.3 Opposite to drive side shaft end: S

Unit: mm

Support unit Reference No.	Screw shaft Diameter d	Bearing journal Diameter d_3 g6	Bearing journal Length L_3	Snap ring groove Width n Tolerance	Snap ring groove Diameter dn Tolerance	Snap ring groove Position nL
WBK08S-01	12	6	9	$0.8^{+0.1}_{0}$	$5.7^{0}_{-0.06}$	6.8
WBK12S-01	15	10	12	$1.15^{+0.14}_{0}$	$9.6^{0}_{-0.09}$	9.15
WBK15S-01	20	15	13	$1.15^{+0.14}_{0}$	$14.3^{0}_{-0.11}$	10.15
WBK20S-01	25	20	19	$1.35^{+0.14}_{0}$	$19^{0}_{-0.21}$	15.35
WBK25S-01	32	25	20	$1.35^{+0.14}_{0}$	$23.9^{0}_{-0.21}$	16.35
(6206)	40	30	22	$1.75^{+0.14}_{0}$	$28.6^{0}_{-0.21}$	17.75
(6207)	50	35	25	$1.75^{+0.14}_{0}$	$33^{0}_{-0.21}$	18.75

( ): Reference number of bearing



2.4 Opposite to drive side shaft end: T

Unit: mm

Support unit	Screw shaft	Bearing journal		Snap ring groove			Tap hole	
Reference No.	Diameter d	Diameter d_3 g6	Length L_3	Width n Tolerance	Diameter dn Tolerance	Position nL	Size M	Depth H
WBK08S-01	12	6	9	$0.8^{+0.1}_{0}$	$5.7^{0}_{-0.06}$	6.8	-	-
WBK12S-01	15	10	12	$1.15^{+0.14}_{0}$	$9.6^{0}_{-0.09}$	9.15	M3x0.5	9
WBK15S-01	20	15	13	$1.15^{+0.14}_{0}$	$14.3^{0}_{-0.11}$	10.15	M5x0.8	10
WBK20S-01	25	20	19	$1.35^{+0.14}_{0}$	$19^{0}_{-0.21}$	15.35	M6x1	12
WBK25S-01	32	25	20	$1.35^{+0.14}_{0}$	$23.9^{0}_{-0.21}$	16.35	M6x1	12
(6206)	40	30	22	$1.75^{+0.14}_{0}$	$28.6^{0}_{-0.21}$	17.75	M8x1.25	16
(6207)	50	35	25	$1.75^{+0.14}_{0}$	$33^{0}_{-0.21}$	18.75	M8x1.25	16

( ): Reference number of bearing

2.5 Opposite to drive side shaft end: U

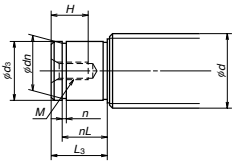
Unit: mm

Support unit		Spacer	Screw shaft	Bearing journal	
Reference No.		Reference No.	Diameter d	Diameter d_3 g6	Length L_3
WBK08-01A	WBK08-11	WBK08K	12	8	32
WBK12-01A	WBK12-11	WBK12K	15	12	35
WBK15-01A	WBK15-11	WBK15K	20	15	50
WBK20-01	WBK20-11	WBK20K	25	20	64
WBK25-01	WBK25-11	WBK25K	32	25	76
WBK30DF-31		–	40	30	89
WBK35DF-31		–	50	35	92

2.6 Opposite to drive side shaft end: V

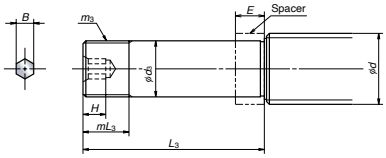
Unit: mm

Support unit		Screw shaft	Bearing journal	
Reference No.		Diameter d	Diameter d_3 g6	Length L_3
WBK08-01A	WBK08-11	12	8	32
WBK12-01A	WBK12-11	15	12	35
WBK15-01A	WBK15-11	20	15	50
WBK20-01	WBK20-11	25	20	64
WBK25-01	WBK25-11	32	25	76
WBK30DF-31		40	30	89
WBK35DF-31		50	35	92



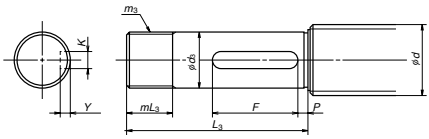
Unit: mm

Lock nut thread		Hexagon hole	
Nominal m_3	Length mL_3	Width across the flats $B^{+0.2}_{0}$	Depth H
M8x1	9	-	-
M12x1	10	4	6
M15x1	15	5	7
M20x1	16	6	8
M25x1.5	20	8	10
M30x1.5	26	10	12
M35x1.5	30	12	14



Unit: mm

Lock nut thread		Key seat			
Nominal m_3	Length mL_3	Width K N9	Position P	Depth $Y^{+0.1}_{0}$	Length F
M8x1	9	2	3	1.2	14
M12x1	10	4	3	2.5	20
M15x1	15	5	3	3	25
M20x1	16	6	4	3.5	30
M25x1.5	20	8	4	4	40
M30x1.5	26	8	5	4	40
M35x1.5	30	10	5	5	50



2.7 Drive side shaft end: A1

Unit: mm

Support unit		Spacer	Screw shaft	Bearing journal		Lock nut thread	
Reference No.		Reference No.	Diameter d	Diameter d_1 g6	Length L_1	Nominal m_1	Length mL_1
WBK08-01A	WBK08-11	WBK08K	12	8	32	M8x1	9
WBK12-01A	WBK12-11	WBK12K	15	12	35	M12x1	10
WBK15-01A	WBK15-11	WBK15K	20	15	50	M15x1	15
WBK20-01	WBK20-11	WBK20K	25	20	64	M20x1	16
WBK25-01	WBK25-11	WBK25K	32	25	76	M25x1.5	20
WBK30DF-31		–	40	30	89	M30x1.5	26
WBK35DF-31		–	50	35	92	M35x1.5	30

2.8 Drive side shaft end: A3

Unit: mm

Support unit		Spacer	Screw shaft	Bearing journal		Lock nut thread		Drive section		D	
Reference No.		Reference No.	Diameter d	Diameter d_1 g6	Length L_1	Nominal m_1	Length mL_1	Diameter d_2 h_7	Length L_2	Position P	Depth W
WBK08-01A	WBK08-11	WBK08K	12	8	32	M8x1	9	6	10	2	5.5
WBK12-01A	WBK12-11	WBK12K	15	12	35	M12x1	10	10	15	3	9
WBK15-01A	WBK15-11	WBK15K	20	15	50	M15x1	15	12	20	3	11
WBK20-01	WBK20-11	WBK20K	25	20	64	M20x1	16	15	27	4	14
WBK25-01	WBK25-11	WBK25K	32	25	76	M25x1.5	20	20	33	4	19
WBK30DF-31		–	40	30	89	M30x1.5	26	25	61	5	24
WBK35DF-31		–	50	35	92	M35x1.5	30	30	63	5	29

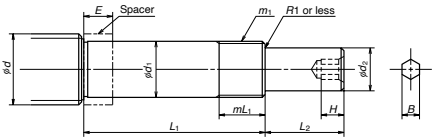
2.9 Drive side shaft end: A4

Unit: mm

Support unit		Spacer	Screw shaft	Bearing journal		Lock nut thread		Drive section		Key seat		
Reference No.		Reference No.	Diameter d	Diameter d_1 g6	Length L_1	Nominal m_1	Length mL_1	Diameter d_2 h_7	Length L_2	Width K N9	Position P	Depth $Y^{+0.1}_{0}$
WBK08-01A	WBK08-11	WBK08K	12	8	32	M8x1	9	6	10	-	-	-
WBK12-01A	WBK12-11	WBK12K	15	12	35	M12x1	10	10	15	2	3	1.2
WBK15-01A	WBK15-11	WBK15K	20	15	50	M15x1	15	12	20	4	3	2.5
WBK20-01	WBK20-11	WBK20K	25	20	64	M20x1	16	15	27	5	4	3
WBK25-01	WBK25-11	WBK25K	32	25	76	M25x1.5	20	20	33	6	4	3.5
WBK30DF-31		–	40	30	89	M30x1.5	26	25	61	8	5	4
WBK35DF-31		–	50	35	92	M35x1.5	30	30	63	8	5	4

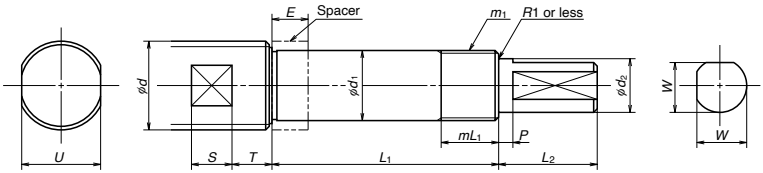
Unit: mm

Drive section		Hexagon hole	
Diameter d_2 h_7	Length L_2	Width across the flats $B^{+0.2}_{0}$	Depth H
6	10	-	-
10	15	4	6
12	20	5	7
15	27	6	8
20	33	8	10
25	61	10	12
30	63	12	14



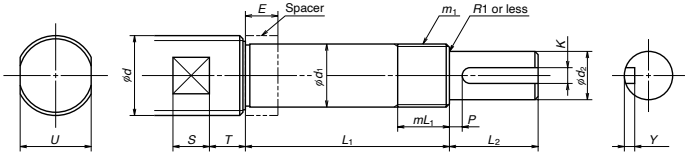
Unit: mm

Wrench flats		
Width across the flats U Tolerance	Position T	Length S
10 $^{0}_{-0.2}$	4	5.5
12 $^{0}_{-0.25}$	6	6.5
17 $^{0}_{-0.25}$	6	8.5
22 $^{0}_{-0.3}$	10	11
32 $^{0}_{-0.3}$	10	15
36 $^{0}_{-0.3}$	16	16
41 $^{0}_{-0.3}$	16	18



Unit: mm

Wrench flats		
Width across the flats U Tolerance	Position T	Length S
10 $^{0}_{-0.2}$	4	5.5
12 $^{0}_{-0.25}$	6	6.5
17 $^{0}_{-0.25}$	6	8.5
22 $^{0}_{-0.3}$	10	11
32 $^{0}_{-0.3}$	10	15
36 $^{0}_{-0.3}$	16	16
41 $^{0}_{-0.3}$	16	18



2.10 Drive side shaft end: A5

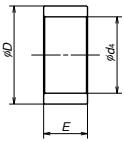
Unit: mm

Support unit		Spacer	Screw shaft	Bearing journal		Lock nut thread		Drive section	
Reference No.		Reference No.	Diameter d	Diameter d_1 g6	Length L_1	Nominal m_1	Length mL_1	Diameter d_2 h_7	Length L_2
WBK08-01A	**WBK08-11**	**WBK08K**	12	8	32	M8x1	9	6	10
WBK12-01A	**WBK12-11**	**WBK12K**	15	12	35	M12x1	10	10	15
WBK15-01A	**WBK15-11**	**WBK15K**	20	15	50	M15x1	15	12	20
WBK20-01	**WBK20-11**	**WBK20K**	25	20	64	M20x1	16	15	27
WBK25-01	**WBK25-11**	**WBK25K**	32	25	76	M25x1.5	20	20	33
WBK30DF-31		–	40	30	89	M30x1.5	26	25	61
WBK35DF-31		–	50	35	92	M35x1.5	30	30	63

2.11 Spacer

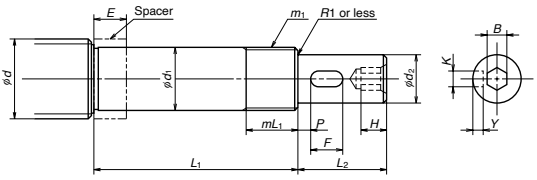
Unit: mm

Reference No.	Bearing journal	Spacer dimensions		
	Diameter d	Bore d_4	Diameter D	Width E
WBK08K	8	8	11.5	5.5
WBK12K	12	12	14.5	5.5
WBK15K	15	15	19.5	10
WBK20K	20	20	25.5	11
WBK25K	25	25	32	14



Unit: mm

Key seat				Wrench flats	
Width *K* N9	Position *P*	Depth $Y^{+0.1}_{0}$	Length *F*	Width across the flats $B^{+0.2}_{0}$	Depth *H*
-	-	-	-	-	-
-	-	-	-	4	6
4	3	2.5	7	5	7
5	4	3	10	6	8
6	4	3.5	15	8	10
8	5	4	40	10	12
8	5	4	40	12	14



21. Ball Screws – Interchangeable

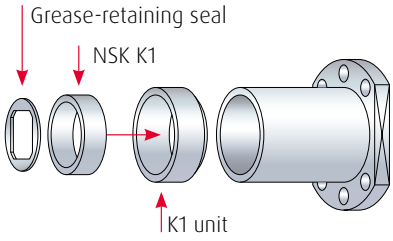
NSK developed the 'Ball screws – interchangeable' series based on many years of experience and with the help of the most advanced technology. The series complies 100% with DIN 69051. The spindle nut and spindle shaft are available separately and are universally exchangeable. The new 'Ball screws – interchangeable' series features an extreme reduction in noise and can be used in high-speed applications. As an option, the NSK K1 lubrication unit, proven in use over many years, can be integrated.

Features

- Nut and shaft are completely interchangeable
- 100% DIN-compliant
- High-speed/low-noise nut design (d·n = 160.000, max 5000 1/min)

Remarkable improvement in sealing performance (introduction of grease-retaining seal)

- Grease retention capabilities substantially enhanced
- Assists clean environment maintenance due to minimum grease scattering
- Superb sealing capabilities in contaminated environments

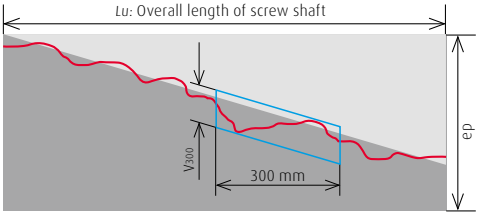


Maintenance-free long-term with NSK K1 lubrication unit (sold separately)

- NSK K1 is a lubrication unit which combines oil and resin in a single unit
- The porous resin contains a large amount of lubrication oil
- The NSK K1 contacts the shaft raceway, giving a constant supply of fresh oil which seeps from the resin
- NSK K1 lubrication has been accepted in many industrial fields since 1996

Accuracy grade

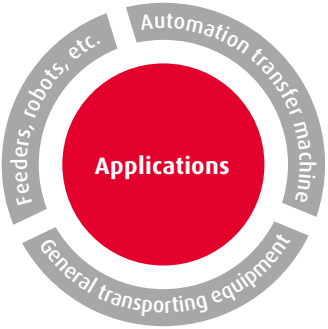
- An accuracy grade of Ct7 is available



ep: Tolerance on specified travel	$ep = \pm \frac{Lu}{300} \cdot V_{300}$ (mm) Lu: Overall length of screw shaft
Travel variation in a 300 mm range (anywhere in useful travel)	0.052 mm
Clearance	0.020 mm

Options

- NSK provides the support bearing units which go with the ball screw shafts, which are sold separately.
- Possible bearing journal configurations of the shaft are provided on the following pages as suggestion



New Product

Please use the following designation, if you order a **shaft**:

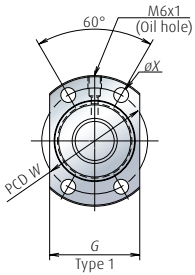
Reference No.:	F	C	S	15	10	S	A	1 4 8 6
	Accuracy F: C7	Specification C: Interchangeable	Item S: Shaft	Spindle diameter (mm)	lead (mm)	Clearance S: Less than 0.020 mm	Specification A: Internal design	Shaft total length 1486: lenght shaft

Please use the following designation, if you order a **nut**:

Reference No.:	F	C	N	15	10	S	D	3
	Accuracy F: C7	Specification C: Interchangeable	Item N: Nut	Spindle diameter (mm)	lead (mm)	Clearance S: Less than 0.020 mm	Specification D: DIN Dimensions	2, 3, 4, 5: Nut turn

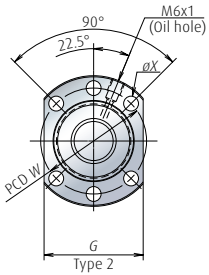
21. Ball Screws – Interchangeable

Ball nut dimensions



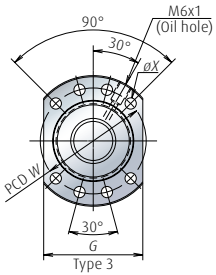
Type 1

Shaft diameter:
ø12 mm



Type 2

Shaft diameter:
ø15, ø20 ø25 and ø32 mm

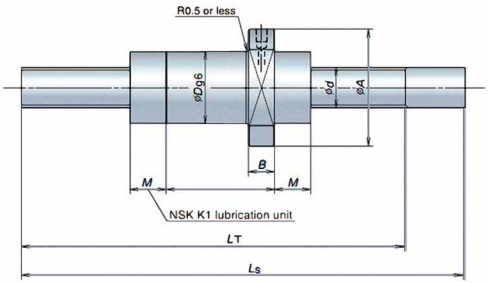


Type 3

Shaft diameter:
ø40 and ø50 mm

Specification number

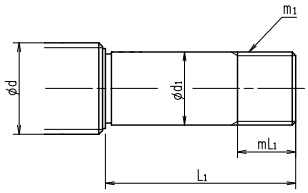
Model No.	Shaft OD [mm]	lead [mm]	Turns	Ca [N]	Coa [N]	D [mm]	A [mm]	G [mm]	B [mm]	L [mm]
FCN1205	12	5	3	3 750	5 810	24	40	26	11	30
FCN1210	12	10	3	3 750	5 780	24	40	26	11	43
FCN1505	15	5	3	6 410	10 100	28	48	40	11	30
FCN1510	15	10	3	6 530	10 200	28	48	40	11	43
FCN1520	15	20	2	5 660	8 700	32	48	40	11	51
FCN2005	20	5	3	10 400	18 500	36	58	44	13	31
FCN2010	20	10	3	10 200	18 600	36	58	44	13	45
FCN2020	20	20	2	6 790	11 800	36	58	44	13	54
FCN2505	25	5	5	18 500	40 900	40	62	48	12	42
FCN2510	25	10	4	15 000	32 400	40	62	48	12	56
FCN2520	25	20	2	7 650	14 800	40	62	48	12	54
FCN2525	25	25	2	7 490	14 600	40	62	48	12	63
FCN3205	32	5	4	16 800	41 700	50	80	62	12	41
FCN3210	32	10	4	23 000	51 300	50	80	62	12	59
FCN3220	32	20	4	22 600	51 100	50	80	62	12	98
FCN4010	40	10	4	39 800	90 700	63	93	70	14	60



Type	W	X	M	Short Version (on stock available)		Long Version (on demand)	
No.	[mm]	[mm]	[mm]	Thread length LT	Total length LS	Thread length LT	Total length LS
1	32	4.5	(18)	617	800	–	–
1	32	4.5	(18)	617	800	–	–
2	38	5.5	(18)	1303	1486	1760	1900
2	38	5.5	(18)	1303	1486	1760	1900
2	42	5.5	(18)	1293	1476	1760	1900
2	47	6.6	(18)	1303	1486	1760	1900
2	47	6.6	(18)	1303	1486	1760	1900
2	47	6.6	(18)	1293	1476	1760	1900
2	51	6.6	(21)	1303	1486	1760	1900
2	51	6.6	(21)	1303	1486	1760	1900
2	51	6.6	(21)	1293	1476	1760	1900
2	51	6.6	(21)	1288	1471	1760	1900
2	65	9	(21)	1303	1486	1760	1900
2	65	9	(21)	1303	1486	1760	1900
2	65	9	(21)	1293	1476	1760	1900
3	78	9	(21)	1303	1486	1760	1900

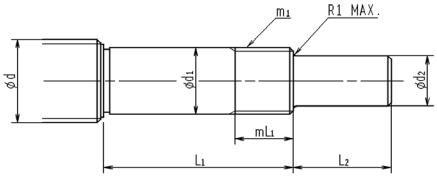
21. Ball Screws – Interchangeable

Basic 1



to use WBK							
Screw shaft d	lead l	Support unit		Bearing journal		Lock nut thread	
		fix side	support side	d_1 g6	L_1	m_1	mL_1
12	all	WBK08-01A	WBK08-11	8	27	M8x1	9
15	all	WBK12-01A	WBK12-11	12	30	M12x1	10
20	all	WBK15-01A	WBK15-11	15	40	M15x1	15
25	all	WBK20-01	WBK20-11	20	53	M20x1	16
32	all	WBK25-01	WBK25-11	25	89	M25x1.5	20
40	10	WBK30DFD-31H	6206	30	104	M30x1.5	30

Basic 2

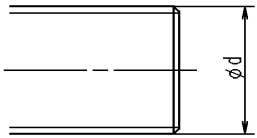


to use WBK							
Screw shaft d	lead l	Support unit		Bearing journal		Lock nut thread	
		fix side	support side	d_1 g6	L_1	m_1	mL_1
12	all	WBK08-01A	WBK08-11	8	27	M8x1	9
15	all	WBK12-01A	WBK12-11	12	30	M12x1	10
20	all	WBK15-01A	WBK15-11	15	40	M15x1	15
25	all	WBK20-01	WBK20-11	20	53	M20x1	16
32	all	WBK25-01	WBK25-11	25	89	M25x1.5	20
40	10	WBK30DFD-31H	6206	30	104	M30x1.5	30

to use BSBD						
Screw shaft d	lead l	Bearing journal			Lock nut thread	
		d_1 g6	L_1 (single BSF/BSN)	L_1 (DT BSF/BSN)	m_1	mL_1
12	all	–	–	–	–	–
15	all	12	33	–	M12x1	10
20	all	15	38	–	M15x1	15
25	all	20	42	–	M20x1	16
32	all	25	46	–	M25x1.5	20
40	10	30	52	80	M30x1.5	26

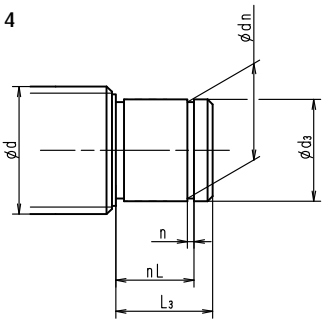
to use BSBD								
Screw shaft d	lead l	Bearing journal			Lock nut thread		Drive section	
		d_1 g6	L_1 (single BSF/BSN)	L_1 (DT BSF/BSN)	m_1	mL_1	d_2 h7	L_2
12	all	–	–	–	–	–	–	–
15	all	12	33	–	M12x1	10	10	15
20	all	15	38	–	M15x1	15	12	20
25	all	20	42	–	M20x1	16	15	27
32	all	25	46	–	M25x1.5	20	20	33
40	10	30	52	80	M30x1.5	26	25	61

Basic 3



Screw shaft d
12
15
20
25
32
40

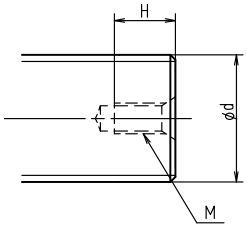
Basic 4



Screw shaft	Snap ring groove			Bearing journal	
d	n	dn	nL	d_3 g6	L_3
12	$0.8\ ^{+0.1}_{0}$	$5.7\ ^{0}_{-0.06}$	6.8	6	9
15	$1.15\ ^{+0.14}_{0}$	$9.6\ ^{0}_{-0.09}$	9.15	10	12
20	$1.15\ ^{+0.14}_{0}$	$14.3\ ^{0}_{-0.11}$	10.15	15	13
25	$1.35\ ^{+0.14}_{0}$	$19\ ^{0}_{-0.21}$	15.35	20	19
32	$1.35\ ^{+0.14}_{0}$	$23.9\ ^{0}_{-0.21}$	16.35	25	20
40	$1.75\ ^{+0.14}_{0}$	$28.6\ ^{0}_{-0.21}$	17.75	30	22

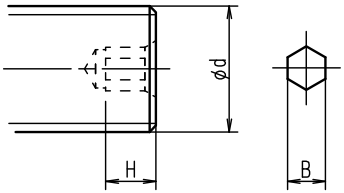
Recommended screw shaft end configuration

Option 1



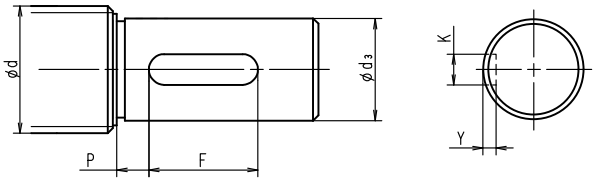
d	M	H
12	M3x0.5	9
15	M4x0.7	10
20	M6x1	12
25	M6x1	12
32	M6x1	12
40	M8x1.25	16

Option 2



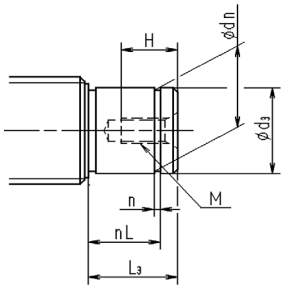
Screw shaft	Hexagon hole	
d	$B\ ^{+0.2}_{0}$	H
12	–	–
15	4	6
20	5	7
25	6	8
32	8	10
40	10	12

Option 3



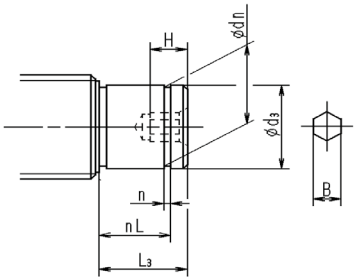
Screw shaft	Key way				
d	K N9	$P\ ^{+0.1}_{0}$	Y	F	d_3 g6
12	–	–	–	–	–
15	4	3	2.5	20	12
20	5	3	3	25	15
25	6	4	3.5	30	20
32	8	4	4	40	25
40	8	5	4	40	30

Option 4



Screw shaft	Bearing journal	Snap ring groove			Tap hole		
d	d_3 g6	n	dn	nL	M	H	L_3
12	6	$0.8^{+0.1}_{0}$	$5.7^{0}_{-0.06}$	6.8	M3x0.5	9	9
15	10	$1.15^{+0.14}_{0}$	$9.6^{0}_{-0.09}$	9.15	M4x0.7	10	12
20	15	$1.15^{+0.14}_{0}$	$14.3^{0}_{-0.11}$	10.15	M6x1	12	13
25	20	$1.35^{+0.14}_{0}$	$19^{0}_{-0.21}$	15.35	M6x1	12	19
32	25	$1.35^{+0.14}_{0}$	$23.9^{0}_{-0.21}$	16.35	M6x1	12	20
40	30	$1.75^{+0.14}_{0}$	$28.6^{0}_{-0.21}$	17.75	M8x1.25	16	22

Option 5



Screw shaft	Bearing Journal	Snap ring groove			Hexagon hole		
d	d_3 g6	n	dn	nL	$B^{+0.2}_{0}$	H	L_3
12	6	$0.8^{+0.1}_{0}$	$5.7^{0}_{-0.06}$	6.8	–	–	9
15	10	$1.15^{+0.14}_{0}$	$9.6^{0}_{-0.09}$	9.15	4	6	12
20	15	$1.15^{+0.14}_{0}$	$14.3^{0}_{-0.11}$	10.15	5	7	13
25	20	$1.35^{+0.14}_{0}$	$19^{0}_{-0.21}$	15.35	6	8	19
32	25	$1.35^{+0.14}_{0}$	$23.9^{0}_{-0.21}$	16.35	8	10	20
40	30	$1.75^{+0.14}_{0}$	$28.6^{0}_{-0.21}$	17.75	10	12	22

Recommended screw shaft end configuration

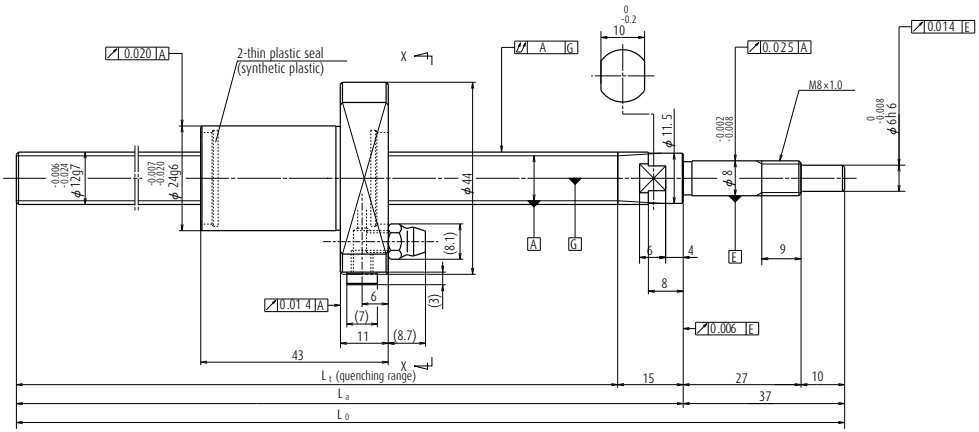
Screw shaft end configuration service

It is possible to have customised modifications of our ball screws implemented quickly and reliably by our service.

The following services can be provided as an alternative:

- Modification of ball screws based on a desired configuration
- End machining
- Change in preload
- Fitting of wipers and lubrication systems
- Fit holes
- Tap holes
- Coatings
- Special packing
- Production even in the smallest lot sizes of 1–50 units
- Individual and special production

Please request these optional services from NSK separately.



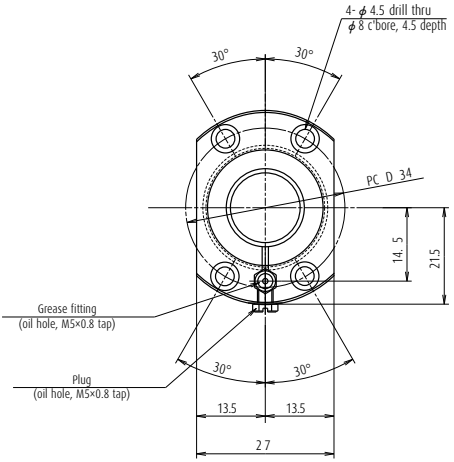
Ball screw No.	Screw shaft diameter d	Lead l	Basic load ratings (N)		Stroke		Nut length	Screw shaft dimensiones			
			Dynamic C_a	Static C_{0a}	Nominal	Max.	L	L_t	L_a	L_o	L_1
FSS1210N1D0400	12	10	3 760	5 780	250	287	43	348	363	400	15
FSS1210N1D0600	12	10	3 760	5 780	450	487	43	548	563	600	15
FSS1210N1D0900	12	10	3 760	5 780	750	787	43	848	863	900	15

Notes

1. Indicates ball screw preload control value. Approximately 2.0 N·cm of torque is added due to thin plastic seals.
2. Service temperature range is 0 to 80°C.
3. Use of NSK support unit is recommended. Refer to page 324 for details.

Screw shaft ϕ12
Lead 10

Unit: mm



Ball screw specification	
Ball diameter/ screw shaft root diameter	2.000 / 10.2
Accuracy grade/axial play	Ct7 / 0.010 or less
Factory-packed grease	NSK grease LR3

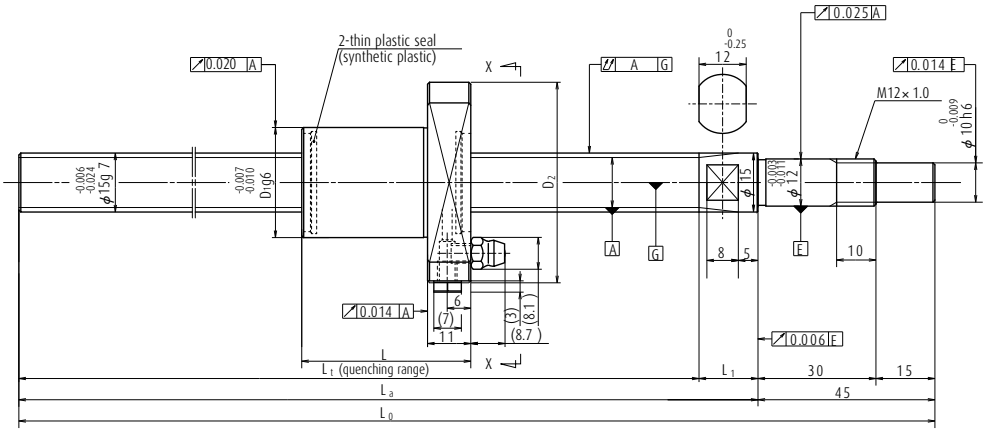
Recommended support unit

For drive side (Fixed)	For opposite to drive side (Simple)
WBK08-01B (low-profile, square)	WBK12SF-01B (low-profile, square)

Unit: mm

Lead accuracy			Shaft run-out	Dynamic preload torque	Mass	Permissible rotational speed (min^{-1}) *5	Internal spatial volume of nut	Standard volume of grease replenishing
Target value T	Error e_p	Variation V_{300}	A	(N·cm)	(kg)	Fixed-Simple	(cm^3)	(cm^3)
0	0.120	0.052	0.080	—	0.5	5 000	1.0	0.5
0	0.195	0.052	0.120	—	0.7	5 000	1.0	0.5
0	0.310	0.052	0.180	—	1.0	2 300	1.0	0.5

4. The stroke and permissible rotational speed shown in the table are the values when the support unit recommended by NSK is used and Fixed-Supported (ball screw mounting method) is selected.
5. Permissible rotational speed varies when using cut screw shaft. It is necessary to calculate two items below, and whichever smaller is the permissible rotational speed.
   *Maximum rotational speed 5 000 min^{-1}



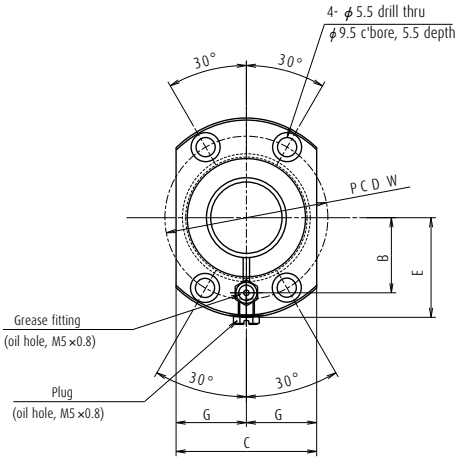
Ball screw No.	Screw shaft diameter d	Lead l	Basic load ratings (N)		Stroke		Screw shaft dimensiones				Lead accuracy		
			Dynamic C_a	Static C_{0a}	Nominal	Max.	L_t	L_a	L_0	L_1	Target value T	Error e_p	Variation V_{300}
FSS1510N1D0500	15	10	6 530	10 200	440	379	440	455	500	15	0	0.155	0.052
FSS1510N1D1000	15	10	6 530	10 200	850	879	940	955	1 000	15	0	0.310	0.052
FSS1510N1D1450	15	10	6 530	10 200	1 300	1 390	1 390	1 405	1 450	15	0	0.490	0.052
FSS1520N1D0500	15	20	5 660	8 700	350	437	437	455	500	18	0	0.155	0.052
FSS1520N1D1000	15	20	5 660	8 700	850	937	937	955	1 000	18	0	0.310	0.052
FSS1520N1D1450	15	20	5 660	8 700	1 300	1 387	1 387	1 405	1 450	18	0	0.490	0.052

Notes

1. Indicates ball screw preload control value. Approximately 2.0 N·cm of torque is added due to thin plastic seals.
2. Service temperature range is 0 to 80˚C.
3. Use of NSK support unit is recommended. Refer to page 324 for details.

Screw shaft ϕ15
Lead 10, 20

Unit: mm



Ball screw specification		
Lead	10	20
Ball diameter/ screw shaft root diameter	2.778 / 12.6	3.175 / 12.2
Accuracy grade/axial play	Ct7 / 0.010 or less	
Factory-packed grease	NSK grease LR3	

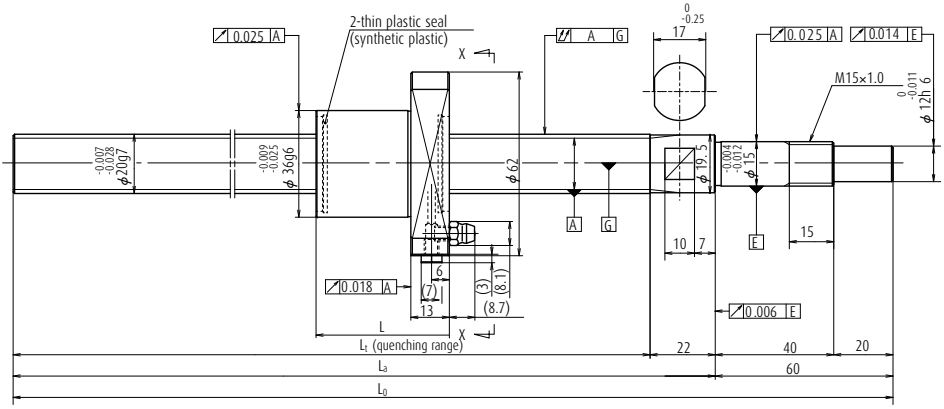
Recommended support unit

For drive side (Fixed)	For opposite to drive side (Simple)
WBK12-01B (low-profile, square)	WBK15SF-01B (low-profile, square)

Unit: mm

Nut dimensions								Shaft run-out	Dynamic preload torque	Mass	Permissible rotational speed (min^{-1}) *5	Internal spatial volume of nut (cm^3)	Standard volume of grease replenishing (cm^3)
L	D_1	D_2	W	B	C	E	G	C	(N·cm)	(kg)	Fixed-Simple		
43	28	51	39	18	31	25	15.5	0.070	—	0.9	5 000	2.0	1.0
43	28	51	39	18	31	25	15.5	0.125	—	1.7	2 300	2.0	1.0
43	28	51	39	18	31	25	15.5	0.200	—	2.3	1 020	2.0	1.0
51	32	55	43	20	33	27	16.5	0.070	—	1.0	5 000	2.8	1.4
51	32	55	43	20	33	27	16.5	0.125	—	1.7	2 260	2.8	1.4
51	32	55	43	20	33	27	16.5	0.200	—	2.3	1 000	2.8	1.4

4. The stroke and permissible rotational speed shown in the table are the values when the support unit recommended by NSK is used and Fixed-Supported (ball screw mounting method) is selected.
5. Permissible rotational speed varies when using cut screw shaft. It is necessary to calculate two items below, and whichever smaller is the permissible rotational speed.
   *Maximum rotational speed 5 000 min^{-1}



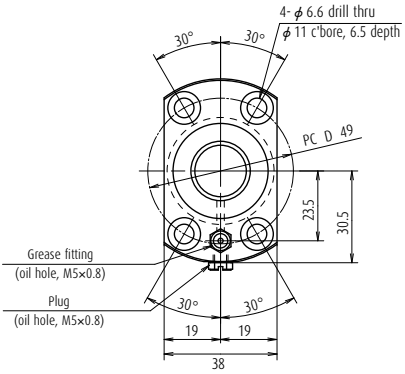
Ball screw No.	Screw shaft diameter d	Lead l	Basic load ratings (N)		Stroke		Nut length	Screw shaft dimensiones			
			Dynamic C_a	Static C_{0a}	Nominal	Max.	L	L_t	L_a	L_0	L_1
FSS2010N1D0600	20	10	10 200	18 600	400	451	45	518	540	600	22
FSS2010N1D1000	20	10	10 200	18 600	800	851	45	918	940	1 000	22
FSS2010N1D1450	20	10	10 200	18 600	1 250	1 301	45	1 368	1 390	1 450	22
FSS2020N1D0600	20	20	6 790	11 800	400	442	54	518	540	600	22
FSS2020N1D1000	20	20	6 790	11 800	800	842	54	918	940	1 000	22
FSS2020N1D1450	20	20	6 790	11 800	1 250	1 292	54	1 368	1 390	1 450	22

Notes

1. Indicates ball screw preload control value. Approximately 2.0 N·cm of torque is added due to thin plastic seals.
2. Service temperature range is 0 to 80˚C.
3. Use of NSK support unit is recommended. Refer to page 324 for details.

Screw shaft ϕ20
Lead 10, 20

Unit: mm



Ball screw specification	
Ball diameter/ screw shaft root diameter	3.175 / 17.2
Accuracy grade/axial play	Ct7 / 0.010 or less
Factory-packed grease	NSK grease LR3

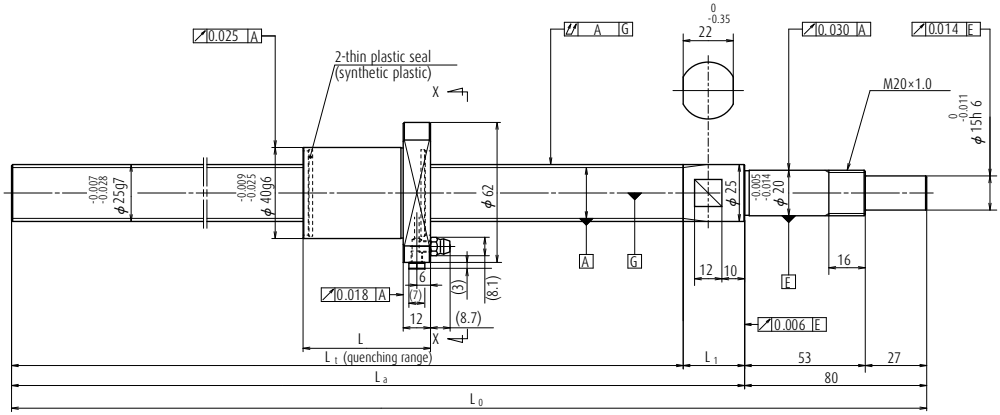
Recommended support unit

For drive side (Fixed)	For opposite to drive side (Simple)
WBK15-01B (low-profile, square)	WBK20SF-01B (low-profile, square)

Unit: mm

Lead accuracy			Shaft run-out	Dynamic preload torque	Mass	Permissible rotational speed (min^{-1}) *5	Internal spatial volume of nut	Standard volume of grease replenishing
Target value T	Error e_p	Variation V_{300}	C	(N·cm)	(kg)	Fixed-Simple	(cm^3)	(cm^3)
0	0.195	0.052	0.085	—	1.7	5 000	3.2	1.6
0	0.310	0.052	0.125	—	2.6	3 310	3.2	1.6
0	0.490	0.052	0.200	—	3.6	1 450	3.2	1.6
0	0.195	0.052	0.085	—	1.8	5 000	3.2	1.6
0	0.310	0.052	0.125	—	2.7	3 350	3.2	1.6
0	0.490	0.052	0.200	—	3.8	1 460	3.2	1.6

4. The stroke and permissible rotational speed shown in the table are the values when the support unit recommended by NSK is used and Fixed-Supported (ball screw mounting method) is selected.
5. Permissible rotational speed varies when using cut screw shaft. It is necessary to calculate two items below, and whichever smaller is the permissible rotational speed.
*Maximum rotational speed 5 000 min^{-1}



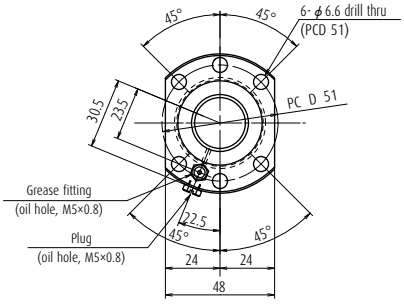
Ball screw No.	Screw shaft diameter d	Lead l	Basic load ratings (N)		Stroke		Nut length	Screw shaft dimensiones			
			Dynamic C_a	Static C_{0a}	Nominal	Max.	L	L_t	L_a	L_o	L_1
FSS2510N1D0600	25	10	15 000	32 400	400	415	56	493	520	600	27
FSS2510N1D1000	25	10	15 000	32 400	800	815	56	893	920	1 000	27
FSS2510N1D1450	25	10	15 000	32 400	1 250	1 265	56	1 343	1 370	1 450	27
FSS2520N1D0600	25	20	7 650	14 800	400	418	54	494	520	600	26
FSS2520N1D1000	25	20	7 650	14 800	800	818	54	894	920	1 000	26
FSS2520N1D1450	25	20	7 650	14 800	1 250	1 268	54	1 344	1 370	1 450	26
FSS2525N1D0600	25	25	7 490	14 600	400	405	63	490	520	600	30
FSS2525N1D1000	25	25	7 490	14 600	800	805	63	890	920	1 000	30
FSS2525N1D1450	25	25	7 490	14 600	1 250	1 255	63	1 340	1 370	1 450	30

Notes

1. Indicates ball screw preload control value. Approximately 2.0 N·cm of torque is added due to thin plastic seals.
2. Service temperature range is 0 to 80˚C.
3. Use of NSK support unit is recommended. Refer to page 324 for details.

Screw shaft ϕ25
Lead 10, 20, 25

Unit: mm



Ball screw specification	
Ball diameter/ screw shaft root diameter	3.175 / 22.2
Accuracy grade/axial play	Ct7 / 0.010 or less
Factory-packed grease	NSK grease LR3

Recommended support unit

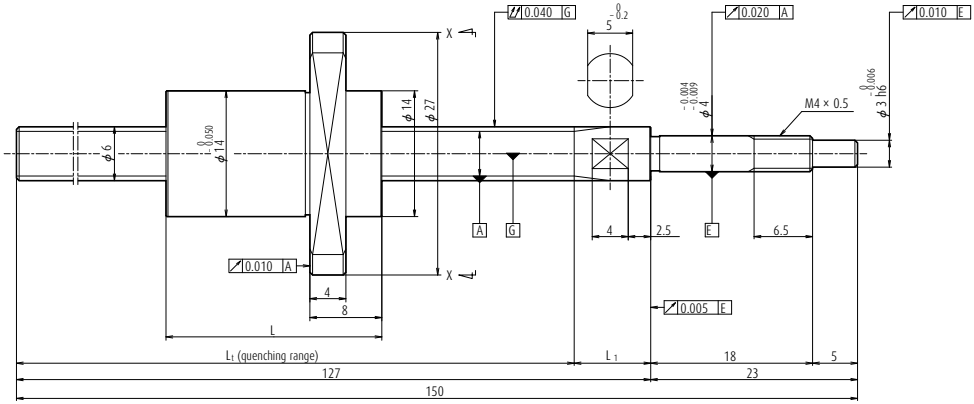
For drive side (Fixed)	For opposite to drive side (Simple)
WBK20-01 (square)	WBK25SF-01 (square)

Unit: mm

Lead accuracy			Shaft run-out	Dynamic preload torque	Mass	Permissible rotational speed (min^{-1}) *5	Internal spatial volume of nut	Standard volume of grease replenishing
Target value T	Error e_p	Variation V_{300}	C	(N·cm)	(kg)	Fixed-Simple	(cm^3)	(cm^3)
0	0.155	0.052	0.065	—	2.6	5 000	4.7	2.4
0	0.310	0.052	0.090	—	4.0	4 590	4.7	2.4
0	0.490	0.052	0.130	—	5.8	1 970	4.7	2.4
0	0.155	0.052	0.065	—	2.6	5 000	3.9	2.0
0	0.310	0.052	0.090	—	4.0	4 570	3.9	2.0
0	0.490	0.052	0.130	—	5.8	1 960	3.9	2.0
0	0.155	0.052	0.065	—	2.6	5 000	4.3	2.2
0	0.310	0.052	0.090	—	4.1	4 660	4.3	2.2
0	0.490	0.052	0.130	—	5.8	1 990	4.3	2.2

4. The stroke and permissible rotational speed shown in the table are the values when the support unit recommended by NSK is used and Fixed-Supported (ball screw mounting method) is selected.
5. Permissible rotational speed varies when using cut screw shaft. It is necessary to calculate two items below, and whichever smaller is the permissible rotational speed.
*Maximum rotational speed 5 000 min^{-1}

23. Compact FA PSS Type

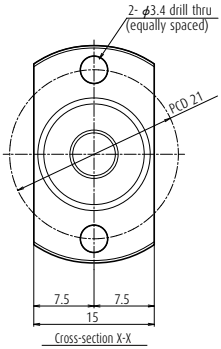


Ball screw No.	Screw shaft diameter d	Lead l	Effective tums of balls	Basic load ratings (N)		Maximum stroke	Nut length L	Screw shaft dimensiones	
				Dynamic C_a	Static C_{0a}			L_t	L_1
PSS0608NAD0150	6	8	2	690	805	97.5	16	118.5	8.5
PSS0608NBD0150	6	8	4	1 480	1 940	89.5	24	118.5	8.5
PSS0612NAD0150	6	12	2	665	800	92	20	117	10
PSS0612NBD0150	6	12	4	1 430	1 970	80	32	117	10

Note 1. Contact NSK if permissible rotational speed is to be exceeded.

Screw shaft ϕ6
Lead 8, 12

Unit: mm



Ball screw specification	
Ball diameter/screw shaft root diameter	1.2 / 4.9
Ball circle dia.	6.2
Accuracy grade/axial play	C5 / 0.005 or less
Factory-packed grease	NSK grease PS2

Recommended

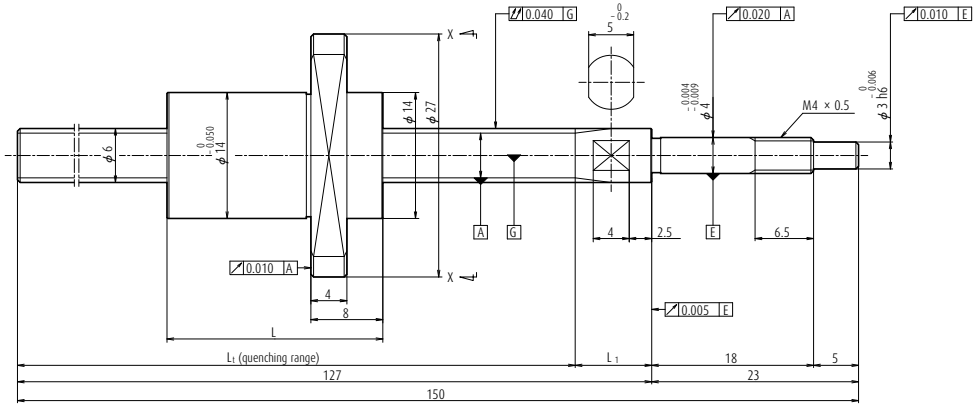
For drive side (Fixed)
WBK04-01M (square)
WBK04-11M (round)

Unit: mm

Lead accuracy			Dynamic preload torque	Mass	Permissible rotational speed	Internal spatial volume of nut	Standard volume of grease replenishing
Target value T	Error e_p	Variation v_u	(N·cm)	(kg)	(min^{-1}) *1	(cm^3)	(cm^3)
0	0.020	18	~0.5	0.06	5 000	0.2	0.1
0	0.020	18	~0.5	0.06	5 000	0.3	0.2
0	0.020	18	~0.5	0.06	5 000	0.2	0.1
0	0.020	18	~0.5	0.07	5 000	0.3	0.2

2. Service temperature range is 0 to 80°C.
3. Use of NSK support unit is recommended. Refer to page 324 for details.

23. Compact FA PSS Type

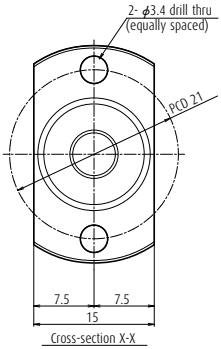


Ball screw No.	Screw shaft diameter d	Lead l	Effective tums of balls	Basic load ratings (N)		Maximum stroke	Nut length L	Screw shaft dimensiones	
				Dynamic C_a	Static C_{0a}			L_t	L_1
PSS0810NAD0150	8	10	2	1 150	1 420	86.5	18	109.5	10.5
PSS0810NBD0150	8	10	4	2 470	3 430	76.5	28	109.5	10.5
PSS0815NAD0150	8	15	2	1 130	1 430	80	22	107	13
PSS0815NBD0150	8	15	4	2 410	3 520	65	37	107	13

Note 1. Contact NSK if permissible rotational speed is to be exceeded.

Screw shaft ϕ8
Lead 10, 15

Unit: mm



Ball screw specification	
Ball diameter/screw shaft root diameter	1.588 / 6.6
Ball circle dia.	8.3
Accuracy grade/axial play	C5 / 0.005 or less
Factory-packed grease	NSK grease PS2

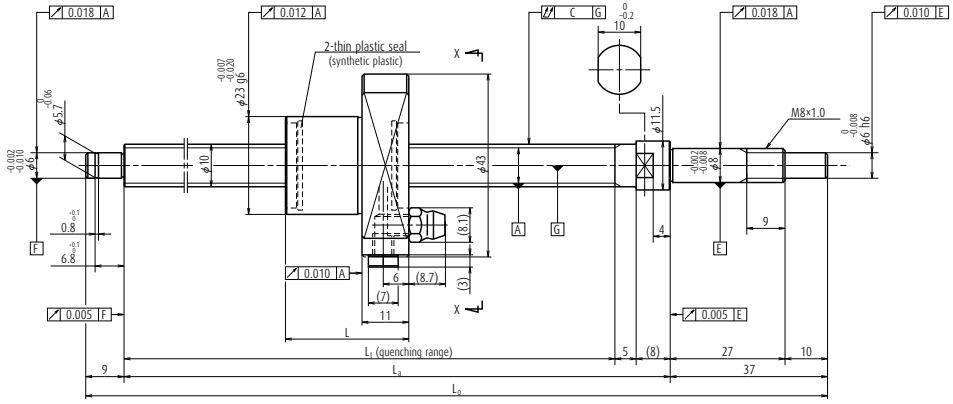
Recommended

For drive side (Fixed)
WBK06-01M (square)
WBK06-11M (round)

Unit: mm

Lead accuracy			Dynamic preload torque	Mass	Permissible rotational speed	Internal spatial volume of nut	Standard volume of grease replenishing
Target value T	Error e_p	Variation v_u	(N·cm)	(kg)	(min^{-1}) *1	(cm^3)	(cm^3)
0	0.020	18	~0.5	0.09	5 000	0.4	0.2
0	0.020	18	~0.5	0.11	5 000	0.5	0.3
0	0.020	18	~0.5	0.1	5 000	0.4	0.2
0	0.020	18	~0.5	0.12	5 000	0.6	0.3

2. Service temperature range is 0 to 80˚C.
3. Use of NSK support unit is recommended. Refer to page 324 for details.



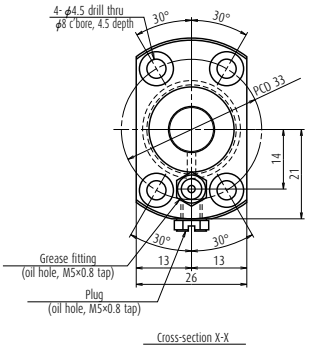
Ball screw No.	Screw shaft diameter d	Lead l	Basic load ratings (N)		Stroke		Nut length L	Screw shaft dimensiones		
			Dynamic C_a	Static C_{0a}	Nominal	MAX.		L_t	L_a	L_o
PSS1005N1D0171	10	5	3 420	4 840	50	78	29	112	125	171
PSS1005N1D0221	10	5	3 420	4 840	100	128	29	162	175	221
PSS1005N1D0321	10	5	3 420	4 840	200	228	29	262	275	321
PSS1005N1D0421	10	5	3 420	4 840	300	328	29	362	375	421
PSS1005N1D0521	10	5	3 420	4 840	400	428	29	462	475	521
PSS1010N1D0221	10	10	2 290	2 980	100	125	32	162	175	221
PSS1010N1D0321	10	10	2 290	2 980	200	225	32	262	275	321
PSS1010N1D0421	10	10	2 290	2 980	300	325	32	362	375	421
PSS1010N1D0521	10	10	2 290	2 980	400	425	32	462	475	521

Notes

1. Indicates ball screw preload control value. Approximately 2.0 N·cm of torque is added due to thin plastic seals.
2. Contact NSK if permissible rotational speed is to be exceeded.
3. Service temperature range is 0 to 80˚C.

Screw shaft ϕ10
Lead 5, 10

Unit: mm



Ball screw specification	
Preload type	Oversize ball preload (P-preload)
Ball diameter/screw shaft root diameter	2.000 / 8.2
Ball circle dia.	10.3
Accuracy grade/axial play	C5 / 0
Factory-packed grease	NSK grease PS2

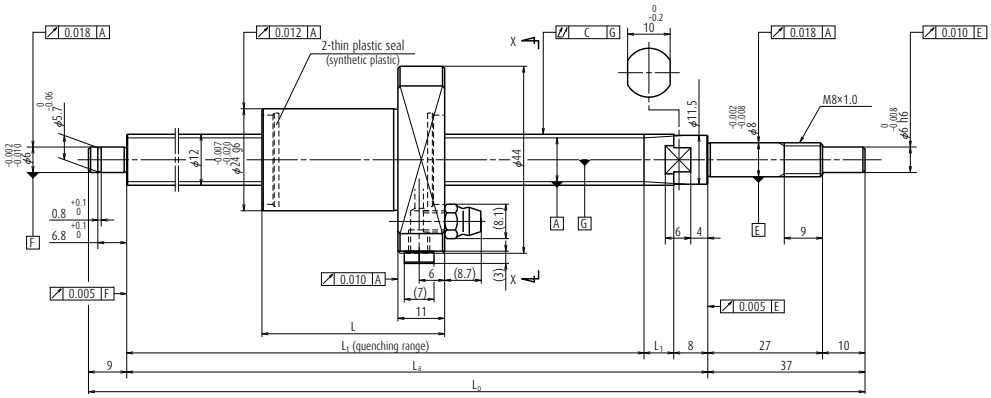
Recommended support unit

For drive side (Fixed)	For opposite to drive side (Simple)
WBK08-01B (low-profile, square)	WBK08S-01B (low-profile, square)
WBK08-11 (round)	
WBK08-11B (round, light load)	

Unit: mm

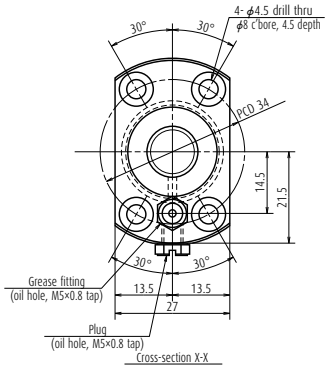
Lead accuracy			Shaft run-out	Dynamic preload torque	Mass	Permissible rotational speed (min^{-1}) *2	Internal spatial volume of nut	Standard volume of grease replenishing
Target value	Error	Variation						
T	e_p	v_u	C	(N·cm) *1	(kg)	Fixed-Simple	(cm^3)	(cm^3)
0	0.020	0.018	0.030	0.7 – 3.3	0.3	5 000	0.8	0.4
0	0.020	0.018	0.045	0.7 – 3.3	0.3	5 000	0.8	0.4
0	0.023	0.018	0.060	0.6 – 4.3	0.3	5 000	0.8	0.4
0	0.025	0.020	0.070	0.6 – 4.3	0.4	5 000	0.8	0.4
0	0.027	0.020	0.085	0.4 – 4.9	0.5	5 000	0.8	0.4
0	0.020	0.018	0.045	0.7 – 3.3	0.3	5 000	0.7	0.4
0	0.023	0.018	0.060	0.6 – 4.3	0.4	5 000	0.7	0.4
0	0.025	0.020	0.070	0.6 – 4.3	0.4	5 000	0.7	0.4
0	0.027	0.020	0.085	0.4 – 4.9	0.5	5 000	0.7	0.4

4. Use of NSK support unit is recommended. Refer to page 324 for details.
5. Recommended quantity of grease is about 50% of ball nut's internal space. See page 445 for details.



Ball screw No.	Screw shaft diameter d	Lead l	Basic load ratings (N)		Stroke		Nut length L	Screw shaft dimensiones			
			Dynamic C_a	Static C_{0a}	Nominal	MAX.		L_t	L_a	L_o	L_1
PSS1205N1D0171	12	5	3 750	5 810	50	75	30	110	125	171	7
PSS1205N1D0221	12	5	3 750	5 810	100	125	30	160	175	221	7
PSS1205N1D0321	12	5	3 750	5 810	200	225	30	260	275	321	7
PSS1205N1D0421	12	5	3 750	5 810	300	325	30	360	375	421	7
PSS1205N1D0521	12	5	3 750	5 810	400	425	30	460	475	521	7
PSS1205N1D0621	12	10	3 750	5 810	500	525	30	560	575	621	7
PSS1210N1D0221	12	10	3 760	5 780	100	112	43	160	175	221	7
PSS1210N1D0321	12	10	3 760	5 780	200	212	43	260	275	321	7
PSS1210N1D0421	12	10	3 760	5 780	300	312	43	360	375	421	7
PSS1210N1D0521	12	10	3 760	5 780	400	412	43	460	475	521	7
PSS1210N1D0621	12	10	3 760	5 780	500	512	43	560	575	621	7
PSS1220N1D0271	12	20	2 330	3 600	100	153	50	208	225	271	9
PSS1220N1D0371	12	20	2 330	3 600	200	253	50	308	325	371	9
PSS1220N1D0471	12	20	2 330	3 600	300	353	50	408	425	471	9
PSS1220N1D0571	12	20	2 330	3 600	400	453	50	508	525	571	9
PSS1220N1D0671	12	20	2 330	3 600	500	553	50	608	625	671	9
PSS1230N1D0271	12	30	2 190	3 650	100	128	70	203	225	271	14
PSS1230N1D0371	12	30	2 190	3 650	200	228	70	303	325	371	14
PSS1230N1D0471	12	30	2 190	3 650	300	328	70	403	425	471	14
PSS1230N1D0571	12	30	2 190	3 650	400	428	70	503	525	571	14
PSS1230N1D0671	12	30	2 190	3 650	500	528	70	603	625	671	14

Notes
1. Indicates ball screw preload control value. Approximately 2.0 N·cm of torque is added due to thin plastic seals.
2. Contact NSK if permissible rotational speed is to be exceeded.
3. Service temperature range is 0 to 80°C.



Screw shaft ϕ12
Lead 5, 10, 20, 30

Unit: mm

Ball screw specification	
Preload type	Oversize ball preload (P-preload)
Ball diameter/screw shaft root diameter	2.000 / 10.2
Ball circle dia.	12.3
Accuracy grade/axial play	C5 / 0
Factory-packed grease	NSK grease PS2

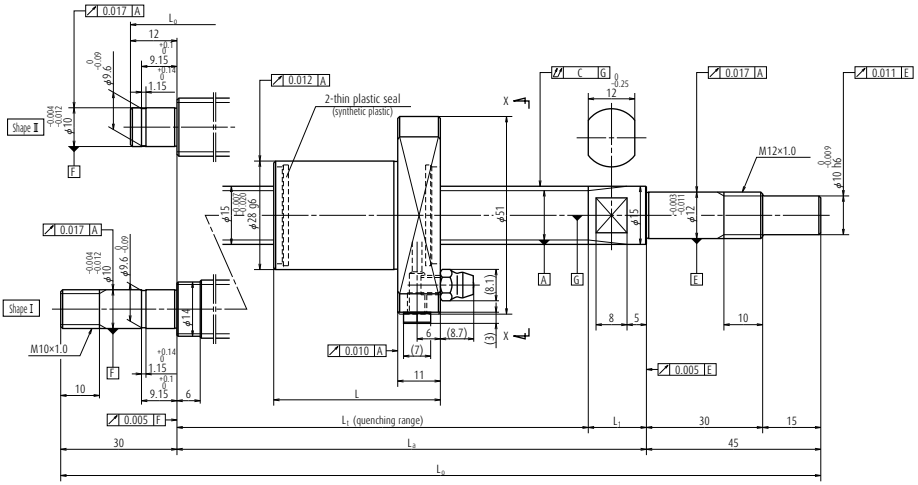
Recommended support unit

For drive side (Fixed)	For opposite to drive side (Simple)
WBK08-01B (low-profile, square)	WBK08S-01B (low-profile, square)
WBK08-11 (round)	
WBK08-11B (round, light load)	

Unit: mm

Lead accuracy			Shaft run-out	Dynamic preload torque	Mass	Permissible rotational speed (min^{-1}) *2	Internal spatial volume of nut	Standard volume of grease replenishing
Target value T	Error e_p	Variation v_u	C	(N·cm) *1	(kg)	Fixed-Simple	(cm^3)	(cm^3)
0	0.020	0.018	0.030	0.7 – 3.3	0.3	5 000	1.0	0.5
0	0.020	0.018	0.045	0.7 – 3.3	0.3	5 000	1.0	0.5
0	0.023	0.018	0.060	0.6 – 4.3	0.3	5 000	1.0	0.5
0	0.025	0.020	0.070	0.6 – 4.3	0.4	5 000	1.0	0.5
0	0.027	0.020	0.085	0.6 – 4.3	0.5	5 000	1.0	0.5
0	0.030	0.023	0.085	0.4 – 4.9	0.3	5 000	1.0	0.5
0	0.020	0.018	0.045	0.7 – 3.3	0.4	5 000	1.0	0.5
0	0.023	0.020	0.060	0.6 – 4.3	0.5	5 000	1.0	0.5
0	0.025	0.020	0.070	0.6 – 4.3	0.5	5 000	1.0	0.5
0	0.027	0.020	0.085	0.6 – 4.3	0.6	5 000	1.0	0.5
0	0.030	0.023	0.085	0.4 – 4.9	0.7	5 000	1.0	0.5
0	0.023	0.018	0.045	1.4 – 4.5	0.4	5 000	1.2	0.6
0	0.023	0.018	0.060	0.9 – 4.9	0.5	5 000	1.2	0.6
0	0.027	0.020	0.070	0.9 – 4.9	0.6	5 000	1.2	0.6
0	0.030	0.023	0.085	0.6 – 5.9	0.7	5 000	1.2	0.6
0	0.030	0.023	0.110	0.6 – 5.9	0.8	4 480	1.2	0.6
0	0.023	0.018	0.045	1.4 – 4.5	0.5	5 000	1.5	0.8
0	0.023	0.018	0.060	0.9 – 4.9	0.6	5 000	1.5	0.8
0	0.027	0.020	0.070	0.9 – 4.9	0.7	5 000	1.5	0.8
0	0.030	0.023	0.085	0.6 – 5.9	0.7	5 000	1.5	0.8
0	0.030	0.023	0.110	0.6 – 5.9	0.8	4 720	1.5	0.8

4. Use of NSK support unit is recommended. Refer to page 324 for details.
5. Recommended quantity of grease is about 50% of ball nut's internal space. See page 445 for details.



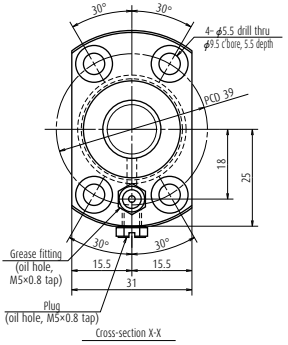
Ball screw No.	Screw shaft diameter d	Lead l	Basic load ratings (N)		Stroke		Nut length L	Screw shaft dimensions			
			Dynamic C_a	Static C_{0a}	Nominal	MAX.		L_t	L_a	L_o	L_1
PSS1505N1D0211	15	5	6 410	10 100	50	103	30	139	154	211	15
PSS1505N1D0261	15	5	6 410	10 100	100	153	30	189	204	261	15
PSS1505N1D0361	15	5	6 410	10 100	200	253	30	289	304	361	15
PSS1505N1D0461	15	5	6 410	10 100	300	353	30	389	404	461	15
PSS1505N1D0561	15	5	6 410	10 100	400	453	30	489	504	561	15
PSS1505N1D0661	15	5	6 410	10 100	500	553	30	589	604	661	15
PSS1505N1D0761	15	5	6 410	10 100	600	653	30	689	704	761	15
PSS1510N1D0261	15	10	6 530	10 200	100	140	43	189	204	261	15
PSS1510N1D0361	15	10	6 530	10 200	200	240	43	289	304	361	15
PSS1510N1D0461	15	10	6 530	10 200	300	340	43	389	404	461	15
PSS1510N1D0561	15	10	6 530	10 200	400	440	43	489	504	561	15
PSS1510N1D0661	15	10	6 530	10 200	500	540	43	589	604	661	15
PSS1510N1D0761	15	10	6 530	10 200	600	640	43	689	704	761	15
PSS1510N1D0879	15	10	6 530	10 200	700	740	43	789	804	879	15
PSS1510N1D0979	15	10	6 530	10 200	800	846	43	889	904	979	15
PSS1510N1D1179	15	10	6 530	10 200	1 000	1 040	43	1 089	1 104	1 179	15

Notes

1. Indicates ball screw preload control value. Approximately 2.0 N·cm of torque is added due to thin plastic seals.
2. Contact NSK if permissible rotational speed is to be exceeded.
3. Service temperature range is 0 to 80˚C.

Screw shaft ϕ 15
Lead 5, 10

Unit: mm



Ball screw specification	
Preload type	Oversize ball preload (P-preload)
Ball diameter/screw shaft root diameter	2.778 / 12.6
Ball circle dia.	15.5
Accuracy grade/axial play	C5 / 0
Factory-packed grease	NSK grease LR3

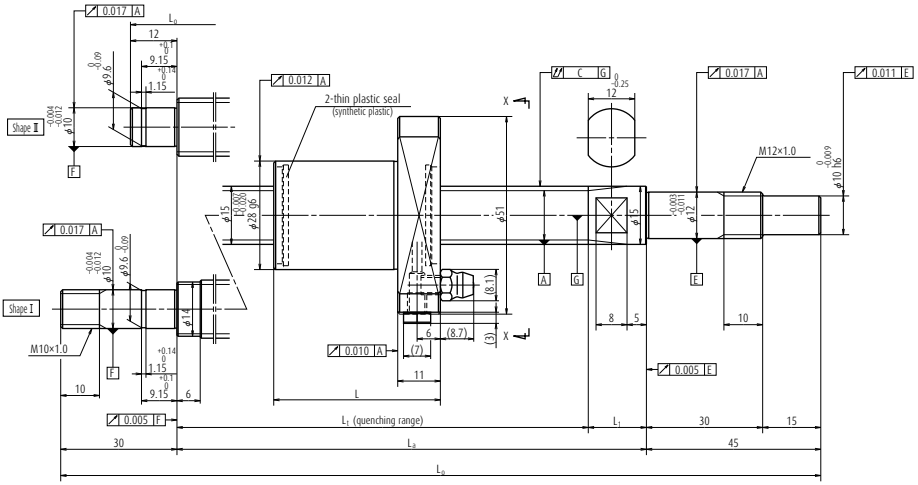
Recommended support unit

For drive side (Fixed)	For opposite to drive side	
	(Fixed)	(Simple)
WBK12-01B (low-profile, square)	WBK10-01B (low-profile, square)	WBK12S-01B (low-profile, square)
WBK12-11B (round)	WBK10-11 (round)	

Unit: mm

Left shaft end (opposite driven side)	Lead accuracy			Shaft run-out	Dynamic preload torque	Mass	Permissible rotational speed (min^{-1}) *2		Internal spatial volume of nut (cm^3)	Standard volume of grease replenishing (cm^3)
	Target value T	Error e_p	Variation v_u	C	(N·cm) *1	(kg)	Fixed-Simple	Fixed-Fixed		
Ⅱ	0	0.020	0.018	0.035	0.2 – 6.9	0.5	5 000	–	2.0	1.0
Ⅱ	0	0.020	0.018	0.035	0.2 – 6.9	0.5	5 000	–	2.0	1.0
Ⅱ	0	0.023	0.018	0.045	0.2 – 6.9	0.6	5 000	–	2.0	1.0
Ⅱ	0	0.025	0.020	0.050	0.4 – 9.8	0.8	5 000	–	2.0	1.0
Ⅱ	0	0.027	0.020	0.060	0.4 – 9.8	0.9	5 000	–	2.0	1.0
Ⅱ	0	0.030	0.023	0.075	0.4 – 9.8	1.0	5 000	–	2.0	1.0
Ⅱ	0	0.035	0.025	0.075	0.4 – 11.8	1.1	4 130	–	2.0	1.0
Ⅱ	0	0.020	0.018	0.035	0.6 – 7.4	0.6	5 000	–	2.0	1.0
Ⅱ	0	0.023	0.018	0.045	0.6 – 7.4	0.7	5 000	–	2.0	1.0
Ⅱ	0	0.025	0.020	0.050	0.4 – 9.8	0.8	5 000	–	2.0	1.0
Ⅱ	0	0.027	0.020	0.060	0.4 – 9.8	1.0	5 000	–	2.0	1.0
Ⅱ	0	0.030	0.023	0.075	0.4 – 9.8	1.1	5 000	–	2.0	1.0
Ⅱ	0	0.035	0.025	0.075	0.4 – 11.8	1.2	4 210	–	2.0	1.0
Ⅰ	0	0.035	0.025	0.095	0.4 – 11.8	1.4	3 190	4 410	2.0	1.0
Ⅰ	0	0.040	0.027	0.095	0.4 – 11.8	1.5	2 500	3 470	2.0	1.0
Ⅰ	0	0.046	0.030	0.120	0.4 – 11.8	1.7	1 650	2 320	2.0	1.0

4. Use of NSK support unit is recommended. Refer to page 324 for details.
5. Recommended quantity of grease is about 50% of ball nut's internal space. See page 445 for details.



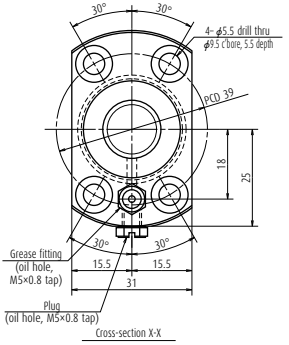
Ball screw No.	Screw shaft diameter d	Lead l	Basic load ratings (N)		Stroke		Nut length L	Screw shaft dimensiones			
			Dynamic C_a	Static C_{0a}	Nominal	MAX.		L_t	L_a	L_o	L_1
PSS1520N1D0261	15	20	5 660	8 700	100	129	51	186	204	261	18
PSS1520N1D0361	15	20	5 660	8 700	200	229	51	286	304	361	18
PSS1520N1D0461	15	20	5 660	8 700	300	329	51	386	404	461	18
PSS1520N1D0561	15	20	5 660	8 700	400	429	51	486	504	561	18
PSS1520N1D0661	15	20	5 660	8 700	500	529	51	586	604	661	18
PSS1520N1D0761	15	20	5 660	8 700	600	629	51	686	704	761	18
PSS1520N1D0879	15	20	5 660	8 700	700	729	51	786	804	879	18
PSS1520N1D0979	15	20	5 660	8 700	800	829	51	886	904	979	18
PSS1520N1D1179	15	20	5 660	8 700	1 000	1 029	51	1 086	1 104	1 179	18
PSS1530N1D0311	15	30	5 500	8 580	100	153	71	230	254	311	24
PSS1530N1D0411	15	30	5 500	8 580	200	253	71	330	354	411	24
PSS1530N1D0511	15	30	5 500	8 580	300	353	71	430	454	511	24
PSS1530N1D0611	15	30	5 500	8 580	400	453	71	530	554	611	24
PSS1530N1D0711	15	30	5 500	8 580	500	553	71	630	654	711	24
PSS1530N1D0811	15	30	5 500	8 580	600	653	71	730	754	811	24
PSS1530N1D0929	15	30	5 500	8 580	700	753	71	830	854	929	24
PSS1530N1D1029	15	30	5 500	8 580	800	853	71	930	954	1 029	24
PSS1530N1D1229	15	30	5 500	8 580	1 000	1 053	71	1 130	1 154	1 229	24

Notes

1. Indicates ball screw preload control value. Approximately 2.0 N·cm of torque is added due to thin plastic seals.
2. Contact NSK if permissible rotational speed is to be exceeded.
3. Service temperature range is 0 to 80˚C.

Screw shaft ϕ 15
Lead 20, 30

Unit: mm



Ball screw specification	
Preload type	Oversize ball preload (P-preload)
Ball diameter/screw shaft root diameter	3.175 / 12.2
Ball circle dia.	15.5
Accuracy grade/axial play	C5 / 0
Factory-packed grease	NSK grease LR3

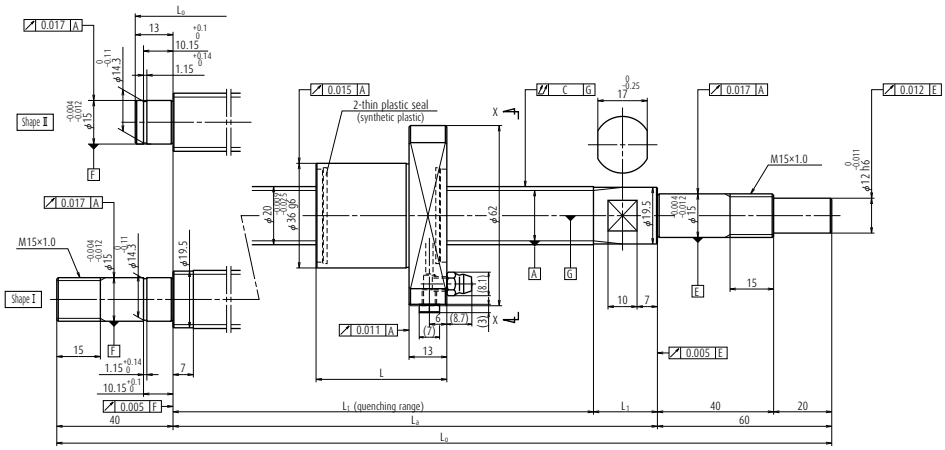
Recommended support unit

For drive side (Fixed)	For opposite to drive side	
	(Fixed)	(Simple)
WBK12-01B (low-profile, square)	WBK10-01B (low-profile, square)	WBK12S-01B (low-profile, square)
WBK12-11 (round)	WBK10-11 (round)	

Unit: mm

Left shaft end (opposite driven side)	Lead accuracy			Shaft run-out	Dynamic preload torque	Mass	Permissible rotational speed (min^{-1}) *2		Internal spatial volume of nut (cm^3)	Standard volume of grease replenishing (cm^3)
	Target value T	Error e_p	Variation v_u	C	(N·cm) *1	(kg)	Fixed-Simple	Fixed-Fixed		
Ⅱ	0	0.020	0.018	0.035	0.8 – 8.8	0.7	5 000	—	2.8	1.4
Ⅱ	0	0.023	0.018	0.045	0.8 – 8.8	0.8	5 000	—	2.8	1.4
Ⅱ	0	0.025	0.020	0.050	0.8 – 10.8	0.9	5 000	—	2.8	1.4
Ⅱ	0	0.027	0.020	0.060	0.8 – 10.8	1.1	5 000	—	2.8	1.4
Ⅱ	0	0.030	0.023	0.075	0.8 – 10.8	1.2	5 000	—	2.8	1.4
Ⅱ	0	0.035	0.025	0.075	0.8 – 13.8	1.3	4 170	—	2.8	1.4
Ⅰ	0	0.035	0.025	0.095	0.8 – 13.8	1.5	3 150	4 310	2.8	1.4
Ⅰ	0	0.040	0.027	0.095	0.8 – 13.8	1.6	2 460	3 390	2.8	1.4
Ⅰ	0	0.046	0.030	0.120	0.8 – 13.8	1.9	1 620	2 260	2.8	1.4
Ⅱ	0	0.023	0.018	0.035	1.2 – 9.3	0.8	5 000	—	3.4	1.7
Ⅱ	0	0.025	0.020	0.050	0.8 – 10.8	1.0	5 000	—	3.4	1.7
Ⅱ	0	0.027	0.020	0.060	0.8 – 10.8	1.1	5 000	—	3.4	1.7
Ⅱ	0	0.030	0.023	0.060	0.8 – 10.8	1.2	5 000	—	3.4	1.7
Ⅱ	0	0.030	0.023	0.075	0.8 – 13.8	1.4	5 000	—	3.4	1.7
Ⅱ	0	0.035	0.025	0.095	0.8 – 13.8	1.5	3 770	—	3.4	1.7
Ⅰ	0	0.040	0.027	0.095	0.8 – 13.8	1.6	2 880	3 910	3.4	1.7
Ⅰ	0	0.040	0.027	0.120	0.8 – 13.8	1.8	2 310	3 110	3.4	1.7
Ⅰ	0	0.046	0.030	0.120	0.8 – 13.8	2.0	1 540	2 100	3.4	1.7

4. Use of NSK support unit is recommended. Refer to page 324 for details.
5. Recommended quantity of grease is about 50% of ball nut's internal space. See page 445 for details.



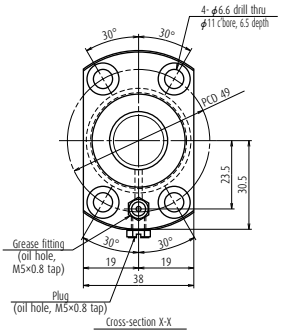
Ball screw No.	Screw shaft diameter d	Lead I	Basic load ratings (N)		Stroke		Nut length L	Screw shaft dimensiones			
			Dynamic C_a	Static C_{0a}	Nominal	MAX.		L_t	L_a	L_o	L_1
PSS2005N1D0323	20	5	10 400	18 500	150	191	31	228	250	323	22
PSS2005N1D0373	20	5	10 400	18 500	200	241	31	278	300	373	22
PSS2005N1D0473	20	5	10 400	18 500	300	341	31	378	400	473	22
PSS2005N1D0573	20	5	10 400	18 500	400	441	31	478	500	573	22
PSS2005N1D0673	20	5	10 400	18 500	500	541	31	578	600	673	22
PSS2005N1D0773	20	5	10 400	18 500	600	641	31	678	700	773	22
PSS2005N1D0873	20	5	10 400	18 500	700	741	31	778	800	873	22
PSS2005N1D1000	20	5	10 400	18 500	800	839	31	878	900	1 000	22
PSS2010N1D0387	20	10	10 200	18 600	200	241	45	292	314	387	22
PSS2010N1D0487	20	10	10 200	18 600	300	341	45	392	414	487	22
PSS2010N1D0587	20	10	10 200	18 600	400	441	45	492	514	587	22
PSS2010N1D0687	20	10	10 200	18 600	500	541	45	592	614	687	22
PSS2010N1D0787	20	10	10 200	18 600	600	641	45	692	714	787	22
PSS2010N1D0887	20	10	10 200	18 600	700	741	45	792	814	887	22
PSS2010N1D1014	20	10	10 200	18 600	800	839	45	892	914	1 014	22
PSS2010N1D1214	20	10	10 200	18 600	1 000	1 039	45	1 092	1 114	1 214	22
PSS2010N1D1414	20	10	10 200	18 600	1 200	1 239	45	1 292	1 314	1 414	22

Notes

1. Indicates ball screw preload control value. Approximately 2.0 N·cm of torque is added due to thin plastic seals.
2. Contact NSK if permissible rotational speed is to be exceeded.
3. Service temperature range is 0 to 80˚C.

Screw shaft ϕ20
Lead 5, 10

Unit: mm



Ball screw specification	
Preload type	Oversize ball preload (P-preload)
Ball diameter/screw shaft root diameter	3.175 / 17.2
Ball circle dia.	20.5
Accuracy grade/axial play	C5 / 0
Factory-packed grease	NSK grease LR3

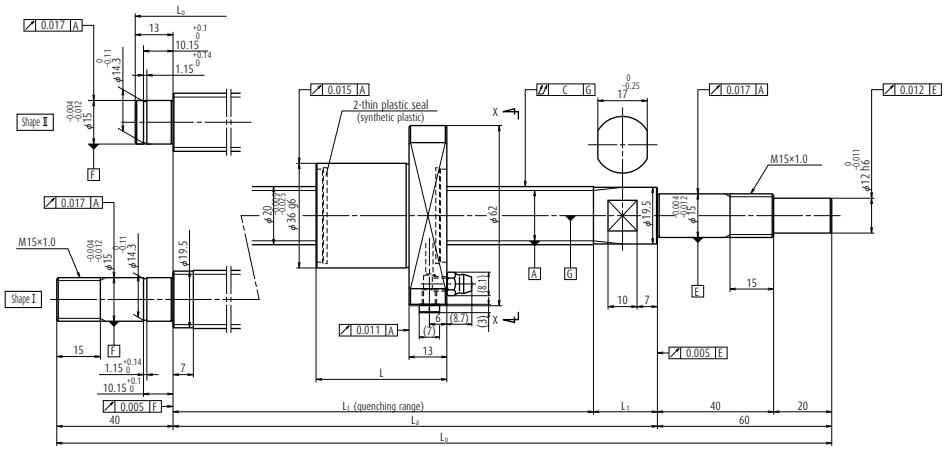
Recommended support unit

For drive side (Fixed)	For opposite to drive side	
	(Fixed)	(Simple)
WBK15-01B (low-profile, square)	WBK15-01B (low-profile, square)	WBK15S-01B (low-profile, square)
WBK15-11 (round)	WBK15-11 (round)	

Unit: mm

Left shaft end (opposite driven side)	Lead accuracy			Shaft run-out	Dynamic preload torque	Mass	Permissible rotational speed (min^{-1}) *2		Internal spatial volume of nut (cm^3)	Standard volume of grease replenishing (cm^3)
	Target value T	Error e_p	Variation v_u	C	(N·cm) *1	(kg)	Fixed-Simple	Fixed-Fixed		
Ⅱ	0	0.023	0.018	0.045	0.6 – 7.4	1.0	5 000	—	3.4	1.7
Ⅱ	0	0.023	0.018	0.045	0.6 – 7.4	1.1	5 000	—	3.4	1.7
Ⅱ	0	0.025	0.020	0.050	0.6 – 7.4	1.3	5 000	—	3.4	1.7
Ⅱ	0	0.027	0.020	0.060	0.4 – 9.8	1.5	5 000	—	3.4	1.7
Ⅱ	0	0.030	0.023	0.075	0.4 – 9.8	1.7	5 000	—	3.4	1.7
Ⅱ	0	0.035	0.025	0.075	0.4 – 9.8	1.9	5 000	—	3.4	1.7
Ⅱ	0	0.035	0.025	0.095	0.4 – 9.8	2.2	4 410	—	3.4	1.7
Ⅰ	0	0.040	0.027	0.095	0.4 – 11.8	2.4	3 450	4 710	3.4	1.7
Ⅱ	0	0.023	0.018	0.045	1.2 – 9.3	1.2	5 000	—	3.2	1.6
Ⅱ	0	0.025	0.020	0.050	1.2 – 9.3	1.4	5 000	—	3.2	1.6
Ⅱ	0	0.027	0.020	0.060	0.8 – 10.8	1.7	5 000	—	3.2	1.6
Ⅱ	0	0.030	0.023	0.075	0.8 – 10.8	1.9	5 000	—	3.2	1.6
Ⅱ	0	0.035	0.025	0.075	0.8 – 10.8	2.1	5 000	—	3.2	1.6
Ⅱ	0	0.035	0.025	0.095	0.8 – 10.8	2.4	4 330	—	3.2	1.6
Ⅰ	0	0.040	0.027	0.120	0.8 – 13.8	2.6	3 400	4 640	3.2	1.6
Ⅰ	0	0.046	0.030	0.120	0.8 – 13.8	3.1	2 250	3 110	3.2	1.6
Ⅰ	0	0.054	0.035	0.160	0.8 – 13.8	3.6	1 600	2 220	3.2	1.6

4. Use of NSK support unit is recommended. Refer to page 324 for details.
5. Recommended quantity of grease is about 50% of ball nut's internal space. See page 445 for details.



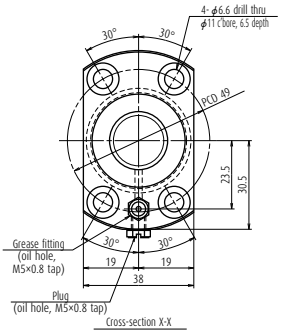
Ball screw No.	Screw shaft diameter d	Lead l	Basic load ratings (N)		Stroke		Nut length L	Screw shaft dimensiones			
			Dynamic C_a	Static C_{0a}	Nominal	MAX.		L_t	L_a	L_o	L_1
PSS2020N1D0508	20	20	6 790	11 800	300	353	54	413	435	508	22
PSS2020N1D0608	20	20	6 790	11 800	400	453	54	513	535	608	22
PSS2020N1D0708	20	20	6 790	11 800	500	553	54	613	635	708	22
PSS2020N1D0808	20	20	6 790	11 800	600	653	54	713	735	808	22
PSS2020N1D0908	20	20	6 790	11 800	700	753	54	813	835	908	22
PSS2020N1D1035	20	20	6 790	11 800	800	851	54	913	935	1 035	22
PSS2020N1D1235	20	20	6 790	11 800	1 000	1 051	54	1 113	1 135	1 235	22
PSS2020N1D1435	20	20	6 790	11 800	1 200	1 251	54	1 313	1 335	1 435	22
PSS2020N1D1835	20	20	6 790	11 800	1 600	1 651	54	1 713	1 735	1 835	22
PSS2030N1D0408	20	30	6 550	11 800	200	228	74	308	335	408	27
PSS2030N1D0508	20	30	6 550	11 800	300	328	74	408	435	508	27
PSS2030N1D0608	20	30	6 550	11 800	400	428	74	508	535	608	27
PSS2030N1D0708	20	30	6 550	11 800	500	528	74	608	635	708	27
PSS2030N1D0808	20	30	6 550	11 800	600	628	74	708	735	808	27
PSS2030N1D0908	20	30	6 550	11 800	700	728	74	808	835	908	27
PSS2030N1D1035	20	30	6 550	11 800	800	826	74	908	935	1 035	27
PSS2030N1D1235	20	30	6 550	11 800	1 000	1 026	74	1 108	1 135	1 235	27
PSS2030N1D1435	20	30	6 550	11 800	1 200	1 226	74	1 308	1 335	1 435	27

Notes

1. Indicates ball screw preload control value. Approximately 2.0 N·cm of torque is added due to thin plastic seals.
2. Contact NSK if permissible rotational speed is to be exceeded.
3. Service temperature range is 0 to 80˚C.

Screw shaft ϕ20
Lead 20, 30

Unit: mm



Ball screw specification	
Preload type	Oversize ball preload (P-preload)
Ball diameter/screw shaft root diameter	3.175 / 17.2
Ball circle dia.	20.5
Accuracy grade/axial play	C5 / 0
Factory-packed grease	NSK grease LR3

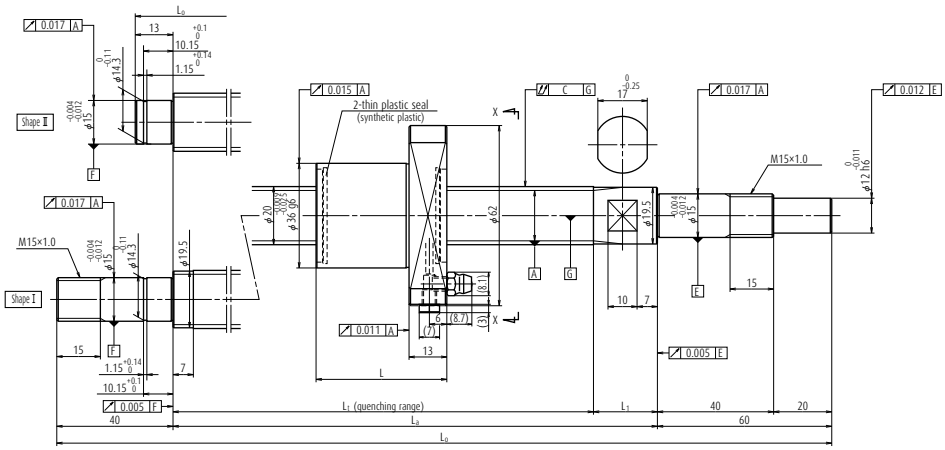
Recommended support unit

For drive side (Fixed)	For opposite to drive side	
	(Fixed)	(Simple)
WBK15-01B (low-profile, square)	WBK15-01B (low-profile, square)	WBK15S-01B (low-profile, square)
WBK15-11 (round)	WBK15-11 (round)	

Unit: mm

Left shaft end (opposite driven side)	Lead accuracy			Shaft run-out	Dynamic preload torque	Mass	Permissible rotational speed (min^{-1}) *2		Internal spatial volume of nut (cm^3)	Standard volume of grease replenishing (cm^3)
	Target value T	Error e_p	Variation v_u	C	(N·cm) *1	(kg)	Fixed-Simple	Fixed-Fixed		
II	0	0.027	0.020	0.060	1.4 – 11.8	1.6	5 000	—	3.2	1.6
II	0	0.030	0.023	0.060	1.4 – 11.8	1.8	5 000	—	3.2	1.6
II	0	0.030	0.023	0.075	1.4 – 11.8	2.0	5 000	—	3.2	1.6
II	0	0.035	0.025	0.095	1.4 – 11.8	2.3	5 000	—	3.2	1.6
II	0	0.040	0.027	0.095	0.8 – 13.8	2.5	4 150	—	3.2	1.6
I	0	0.040	0.027	0.120	0.8 – 13.8	2.8	3 270	4 470	3.2	1.6
I	0	0.046	0.030	0.120	0.8 – 13.8	3.3	2 180	3 010	3.2	1.6
I	0	0.054	0.035	0.160	0.8 – 13.8	3.8	1 550	2 170	3.2	1.6
I	0	0.065	0.040	0.200	0.8 – 13.8	4.7	900	1 270	3.2	1.6
II	0	0.023	0.018	0.050	1.6 – 9.8	1.4	5 000	—	4.6	2.3
II	0	0.027	0.020	0.060	1.4 – 11.8	1.7	5 000	—	4.6	2.3
II	0	0.030	0.023	0.060	1.4 – 11.8	1.9	5 000	—	4.6	2.3
II	0	0.030	0.023	0.075	1.4 – 11.8	2.1	5 000	—	4.6	2.3
II	0	0.035	0.025	0.095	1.4 – 11.8	2.4	5 000	—	4.6	2.3
II	0	0.040	0.027	0.095	0.8 – 13.8	2.6	4 310	—	4.6	2.3
I	0	0.040	0.027	0.120	0.8 – 13.8	2.9	3 380	4 570	4.6	2.3
I	0	0.046	0.030	0.120	0.8 – 13.8	3.4	2 240	3 070	4.6	2.3
I	0	0.054	0.035	0.160	0.8 – 13.8	3.9	1 590	2 200	4.6	2.3

4. Use of NSK support unit is recommended. Refer to page 324 for details.
5. Recommended quantity of grease is about 50% of ball nut's internal space. See page 445 for details.



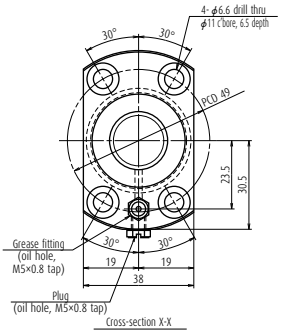
Ball screw No.	Screw shaft diameter d	Lead l	Basic load ratings (N)		Stroke		Nut length L	Screw shaft dimensiones			
			Dynamic C_a	Static C_{0a}	Nominal	MAX.		L_t	L_a	L_o	L_1
PSS2040N1D0658	20	40	6 380	11 600	400	455	92	553	585	658	32
PSS2040N1D0758	20	40	6 380	11 600	500	555	92	653	685	758	32
PSS2040N1D0858	20	40	6 380	11 600	600	655	92	753	785	858	32
PSS2040N1D0958	20	40	6 380	11 600	700	755	92	853	885	958	32
PSS2040N1D1085	20	40	6 380	11 600	800	853	92	953	985	1 085	32
PSS2040N1D1285	20	40	6 380	11 600	1 000	1 053	92	1 153	1 185	1 285	32
PSS2040N1D1485	20	40	6 380	11 600	1 200	1 253	92	1 353	385	1 485	32
PSS2040N1D1885	20	40	6 380	11 600	1 600	1 653	92	1 753	1 785	1 885	32
PSS2040N1D2285	20	40	6 380	11 600	2 000	2 053	92	2 153	2 185	2 285	32
PSS2060N1D0708	20	60	5 680	11 800	400	458	129	593	635	708	42
PSS2060N1D0808	20	60	5 680	11 800	500	558	129	693	735	808	42
PSS2060N1D0908	20	60	5 680	11 800	600	658	129	793	835	908	42
PSS2060N1D1008	20	60	5 680	11 800	700	758	129	893	935	1 008	42
PSS2060N1D1135	20	60	5 680	11 800	800	856	129	993	1 035	1 135	42
PSS2060N1D1335	20	60	5 680	11 800	1 000	1 056	129	1 193	1 235	1 335	42
PSS2060N1D1535	20	60	5 680	11 800	1 200	1 256	129	1 393	1 435	1 535	42
PSS2060N1D1935	20	60	5 680	11 800	1 600	1 656	129	1 793	1 835	1 935	42
PSS2060N1D2335	20	60	5 680	11 800	2 000	2 056	129	2 193	2 235	2 335	42

Notes

1. Indicates ball screw preload control value. Approximately 2.0 N·cm of torque is added due to thin plastic seals.
2. Contact NSK if permissible rotational speed is to be exceeded.
3. Service temperature range is 0 to 80˚C.

Screw shaft ϕ 20
Lead 40, 60

Unit: mm



Ball screw specification	
Preload type	Oversize ball preload (P-preload)
Ball diameter/screw shaft root diameter	3.175 / 17.2
Ball circle dia.	20.5
Accuracy grade/axial play	C5 / 0
Factory-packed grease	NSK grease LR3

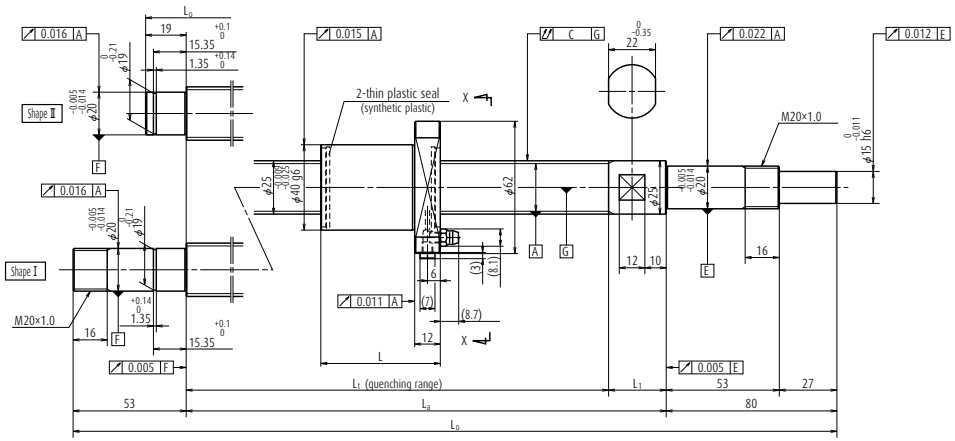
Recommended support unit

For drive side (Fixed)	For opposite to drive side	
	(Fixed)	(Simple)
WBK15-01B (low-profile, square)	WBK15-01B (low-profile, square)	WBK15S-01B (low-profile, square)
WBK15-11 (round)	WBK15-11 (round)	

Unit: mm

Left shaft end (opposite driven side)	Lead accuracy			Shaft run-out	Dynamic preload torque	Mass	Permissible rotational speed (min^{-1}) *2		Internal spatial volume of nut (cm^3)	Standard volume of grease replenishing (cm^3)
	Target value T	Error e_p	Variation v_u	C	(N·cm) *1	(kg)	Fixed-Simple	Fixed-Fixed		
Ⅱ	0	0.030	0.023	0.075	2.2 - 12.8	2.1	5 000	—	5.3	2.7
Ⅱ	0	0.035	0.025	0.075	2.2 - 12.8	2.4	5 000	—	5.3	2.7
Ⅱ	0	0.035	0.025	0.095	2.2 - 12.8	2.6	5 000	—	5.3	2.7
Ⅱ	0	0.040	0.027	0.095	1.8 - 14.8	2.8	3 940	—	5.3	2.7
Ⅰ	0	0.040	0.027	0.120	1.8 - 14.8	3.1	3 120	4 190	5.3	2.7
Ⅰ	0	0.046	0.030	0.160	1.8 - 14.8	3.6	2 100	2 850	5.3	2.7
Ⅰ	0	0.054	0.035	0.160	1.8 - 14.8	4.1	1 500	2 070	5.3	2.7
Ⅰ	0	0.065	0.040	0.200	1.8 - 14.8	5.1	880	1 230	5.3	2.7
Ⅰ	0	0.077	0.046	0.240	1.8 - 14.8	6.0	580	810	5.3	2.7
Ⅱ	0	0.030	0.023	0.075	2.7 - 13.8	2.4	5 000	—	7.0	3.5
Ⅱ	0	0.035	0.025	0.095	2.7 - 13.8	2.6	5 000	—	7.0	3.5
Ⅱ	0	0.035	0.025	0.095	2.7 - 13.8	2.9	4 830	—	7.0	3.5
Ⅱ	0	0.040	0.027	0.120	1.8 - 14.8	3.1	3 740	—	7.0	3.5
Ⅰ	0	0.040	0.027	0.120	1.8 - 14.8	3.4	2 980	3 920	7.0	3.5
Ⅰ	0	0.046	0.030	0.160	1.8 - 14.8	3.9	2 020	2 700	7.0	3.5
Ⅰ	0	0.054	0.035	0.160	1.8 - 14.8	4.4	1 460	1 970	7.0	3.5
Ⅰ	0	0.065	0.040	0.200	1.8 - 14.8	5.4	860	1 180	7.0	3.5
Ⅰ	0	0.077	0.046	0.240	1.8 - 14.8	6.3	570	790	7.0	3.5

4. Use of NSK support unit is recommended. Refer to page 324 for details.
5. Recommended quantity of grease is about 50% of ball nut's internal space. See page 445 for details.



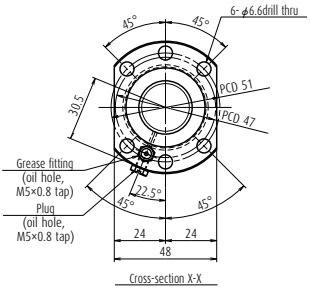
Ball screw No.	Screw shaft diameter d	Lead l	Basic load ratings (N)		Stroke		Nut length L	Screw shaft dimensiones			
			Dynamic C_a	Static C_{0a}	Nominal	MAX.		L_t	L_a	L_o	L_1
PSS2505N1D0349	25	5	11 500	23 500	150	185	32	223	250	658	27
PSS2505N1D0399	25	5	11 500	23 500	200	235	32	273	300	758	27
PSS2505N1D0499	25	5	11 500	23 500	300	335	32	373	400	858	27
PSS2505N1D0599	25	5	11 500	23 500	400	435	32	473	500	958	27
PSS2505N1D0699	25	5	11 500	23 500	500	535	32	573	600	1 085	27
PSS2505N1D0899	25	5	11 500	23 500	700	735	32	773	800	1 285	27
PSS2505N1D0999	25	5	11 500	23 500	800	835	32	873	900	1 485	27
PSS2505N1D1233	25	5	11 500	23 500	1 000	1 027	32	1 073	1 100	1 885	27
PSS2510N1D0549	25	10	15 000	32 400	300	361	56	423	450	2 285	27
PSS2510N1D0649	25	10	15 000	32 400	400	461	56	523	550	708	27
PSS2510N1D0749	25	10	15 000	32 400	500	561	56	623	650	808	27
PSS2510N1D0849	25	10	15 000	32 400	600	661	56	723	750	908	27
PSS2510N1D0949	25	10	15 000	32 400	700	761	56	823	850	1 008	27
PSS2510N1D1049	25	10	15 000	32 400	800	861	56	923	950	1 135	27
PSS2510N1D1283	25	10	15 000	32 400	1 000	1 053	56	1 123	1 150	1 335	27
PSS2510N1D1883	25	10	15 000	32 400	1 600	1 653	56	1 723	1 750	1 535	27

Notes

1. Indicates ball screw preload control value. Approximately 2.0 N·cm of torque is added due to thin plastic seals.
2. Contact NSK if permissible rotational speed is to be exceeded.
3. Service temperature range is 0 to 80˚C.

Screw shaft ϕ25
Lead 5, 10

Unit: mm



Ball screw specification	
Preload type	Oversize ball preload (P-preload)
Ball diameter/screw shaft root diameter	3.175 / 22.2
Ball circle dia.	25.5
Accuracy grade/axial play	C5 / 0
Factory-packed grease	NSK grease LR3

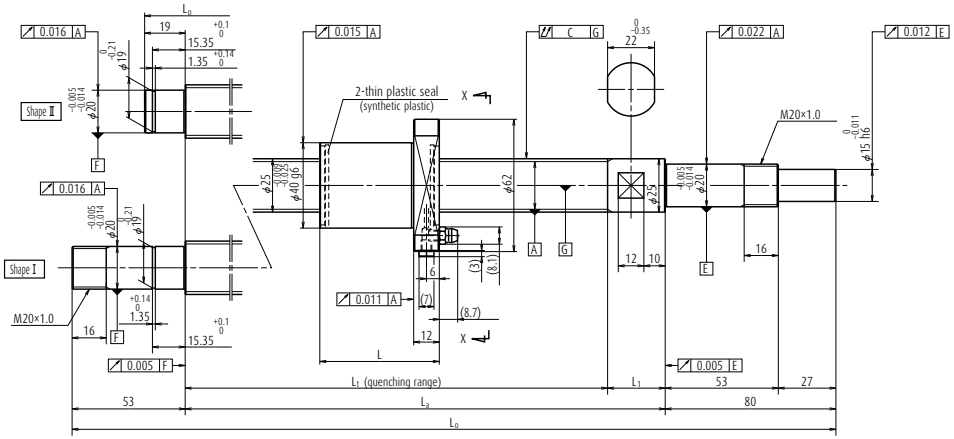
Recommended support unit

For drive side (Fixed)	For opposite to drive side	
	(Fixed)	(Simple)
WBK20-01 (square)	WBK20-01 (square)	WBK20S-01 (square)
WBK20-11 (round)	WBK20-11 (round)	

Unit: mm

Left shaft end (opposite driven side)	Lead accuracy			Shaft run-out	Dynamic preload torque	Mass	Permissible rotational speed (min^{-1}) *2		Internal spatial volume of nut (cm^3)	Standard volume of grease replenishing (cm^3)
	Target value T	Error e_p	Variation v_u	C	(N·cm) *1	(kg)	Fixed-Simple	Fixed-Fixed		
Ⅱ	0	0.023	0.018	0.035	1.2 – 9.3	1.5	5 000	—	4.4	2.2
Ⅱ	0	0.023	0.018	0.035	1.2 – 9.3	1.6	5 000	—	4.4	2.2
Ⅱ	0	0.025	0.020	0.040	1.2 – 9.3	2.0	5 000	—	4.4	2.2
Ⅱ	0	0.027	0.020	0.045	1.2 – 9.3	2.3	5 000	—	4.4	2.2
Ⅱ	0	0.030	0.023	0.055	0.8 – 10.8	2.7	5 000	—	4.4	2.2
Ⅱ	0	0.035	0.025	0.065	0.8 – 10.8	3.4	5 000	—	4.4	2.2
Ⅱ	0	0.040	0.027	0.065	0.8 – 10.8	3.7	4 490	—	4.4	2.2
Ⅰ	0	0.046	0.030	0.080	0.8 – 13.8	4.5	2 960	4 060	4.4	2.2
Ⅱ	0	0.027	0.020	0.045	3.1 – 11.8	2.4	5 000	—	4.7	2.4
Ⅱ	0	0.030	0.023	0.055	2.2 – 12.8	2.7	5 000	—	4.7	2.4
Ⅱ	0	0.030	0.023	0.055	2.2 – 12.8	3.1	5 000	—	4.7	2.4
Ⅱ	0	0.035	0.025	0.065	2.2 – 12.8	3.5	5 000	—	4.7	2.4
Ⅱ	0	0.040	0.027	0.065	2.2 – 12.8	3.8	5 000	—	4.7	2.4
Ⅰ	0	0.040	0.027	0.080	2.2 – 12.8	4.2	4 120	—	4.7	2.4
Ⅰ	0	0.046	0.030	0.100	1.8 – 14.8	5.0	2 760	3 790	4.7	2.4
Ⅰ	0	0.065	0.040	0.130	1.8 – 14.8	7.2	1 150	1 620	4.7	2.4

4. Use of NSK support unit is recommended. Refer to page 324 for details.
5. Recommended quantity of grease is about 50% of ball nut's internal space. See page 445 for details.



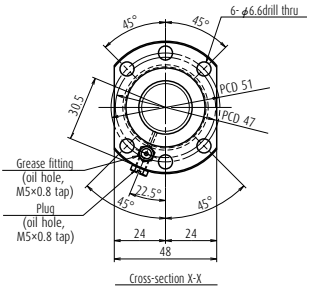
Ball screw No.	Screw shaft diameter d	Lead l	Basic load ratings (N)		Stroke		Nut length L	Screw shaft dimensiones			
			Dynamic C_a	Static C_{0a}	Nominal	MAX.		L_t	L_a	L_o	L_1
PSS2520N1D0729	25	20	7 650	14 800	500	544	54	604	630	729	26
PSS2520N1D0829	25	20	7 650	14 800	600	644	54	704	730	829	26
PSS2520N1D0929	25	20	7 650	14 800	700	744	54	804	830	929	26
PSS2520N1D1029	25	20	7 650	14 800	800	844	54	904	930	1 029	26
PSS2520N1D1263	25	20	7 650	14 800	1 000	1 036	54	1 104	1 130	1 263	26
PSS2520N1D1463	25	20	7 650	14 800	1 200	1 236	54	1 304	1 330	1 463	26
PSS2520N1D1863	25	20	7 650	14 800	1 600	1 636	54	1 704	1 730	1 863	26
PSS2520N1D2263	25	20	7 650	14 800	2 000	2 036	54	2 104	2 130	2 263	26
PSS2525N1D0779	25	25	7 490	14 600	500	581	63	650	680	779	30
PSS2525N1D0879	25	25	7 490	14 600	600	681	63	750	780	879	30
PSS2525N1D0979	25	25	7 490	14 600	700	781	63	850	880	979	30
PSS2525N1D1079	25	25	7 490	14 600	800	887	63	950	890	1 079	30
PSS2525N1D1313	25	25	7 490	14 600	1 000	1 073	63	1 150	1 180	1 313	30
PSS2525N1D1513	25	25	7 490	14 600	1 200	1 273	63	1 350	1 380	1 513	30
PSS2525N1D1913	25	25	7 490	14 600	1 600	1 673	63	1 750	1 780	1 913	30
PSS2525N1D2313	25	25	7 490	14 600	2 000	2 073	63	2 150	2 180	2 313	30

Notes

1. Indicates ball screw preload control value. Approximately 2.0 N·cm of torque is added due to thin plastic seals.
2. Contact NSK if permissible rotational speed is to be exceeded.
3. Service temperature range is 0 to 80˚C.

Screw shaft ϕ25
Lead 20, 25

Unit: mm



Ball screw specification	
Preload type	Oversize ball preload (P-preload)
Ball diameter/screw shaft root diameter	3.175 / 22.2
Ball circle dia.	25.5
Accuracy grade/axial play	C5 / 0
Factory-packed grease	NSK grease LR3

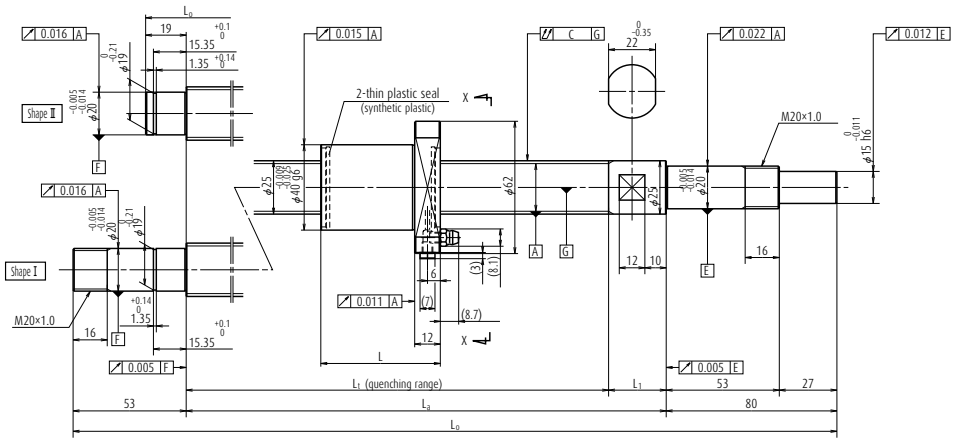
Recommended support unit

For drive side (Fixed)	For opposite to drive side	
	(Fixed)	(Simple)
WBK20-01 (square)	WBK20-01 (square)	WBK20S-01 (square)
WBK20-11 (round)	WBK20-11 (round)	

Unit: mm

Left shaft end (opposite driven side)	Lead accuracy			Shaft run-out	Dynamic preload torque	Mass	Permissible rotational speed (min^{-1}) *2		Internal spatial volume of nut (cm^3)	Standard volume of grease replenishing (cm^3)
	Target value T	Error e_p	Variation v_u	C	(N·cm) *1	(kg)	Fixed-Simple	Fixed-Fixed		
Ⅱ	0	0.030	0.023	0.055	2.2 – 12.8	3.1	5 000	—	3.9	2.0
Ⅱ	0	0.035	0.025	0.065	2.2 – 12.8	3.4	5 000	—	3.9	2.0
Ⅱ	0	0.040	0.027	0.065	2.2 – 12.8	3.8	5 000	—	3.9	2.0
Ⅱ	0	0.040	0.027	0.080	2.2 – 12.8	4.2	4 280	—	3.9	2.0
Ⅰ	0	0.046	0.030	0.100	1.8 – 14.8	5.0	2 850	3 920	3.9	2.0
Ⅰ	0	0.054	0.035	0.100	1.8 – 14.8	5.8	2 030	2 820	3.9	2.0
Ⅰ	0	0.065	0.040	0.130	1.8 – 14.8	7.3	1 180	1 650	3.9	2.0
Ⅰ	0	0.077	0.046	0.170	1.8 – 14.8	8.8	770	1 080	3.9	2.0
Ⅱ	0	0.035	0.025	0.055	2.7 – 13.8	3.3	5 000	—	4.3	2.2
Ⅱ	0	0.035	0.025	0.065	2.7 – 13.8	3.7	5 000	—	4.3	2.2
Ⅱ	0	0.040	0.027	0.065	2.7 – 13.8	4.1	4 910	—	4.3	2.2
Ⅱ	0	0.040	0.027	0.080	2.7 – 13.8	4.4	3 910	—	4.3	2.2
Ⅰ	0	0.046	0.030	0.100	1.8 – 14.8	5.3	2 640	3 620	4.3	2.2
Ⅰ	0	0.054	0.035	0.100	1.8 – 14.8	6.0	1 900	2 630	4.3	2.2
Ⅰ	0	0.065	0.040	0.130	1.8 – 14.8	7.5	1 120	1 570	4.3	2.2
Ⅰ	0	0.077	0.046	0.170	1.8 – 14.8	9.1	740	1 040	4.3	2.2

4. Use of NSK support unit is recommended. Refer to page 324 for details.
5. Recommended quantity of grease is about 50% of ball nut's internal space. See page 445 for details.



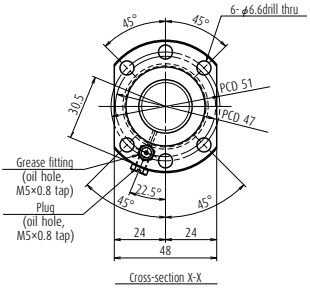
Ball screw No.	Screw shaft diameter d	Lead l	Basic load ratings (N)		Stroke		Nut length L	Screw shaft dimensiones			
			Dynamic C_a	Static C_{0a}	Nominal	MAX.		L_t	L_a	L_o	L_1
PSS2530N1D0779	25	30	7 490	14 600	500	570	74	650	680	779	30
PSS2530N1D0879	25	30	7 490	14 600	600	670	74	750	780	879	30
PSS2530N1D0979	25	30	7 490	14 600	700	770	74	850	880	979	30
PSS2530N1D1079	25	30	7 490	14 600	800	870	74	950	980	1 079	30
PSS2530N1D1313	25	30	7 490	14 600	1 000	1 062	74	1 150	1 180	1 313	30
PSS2530N1D1513	25	30	7 490	14 600	1 200	1 262	74	1 350	1 380	1 513	30
PSS2530N1D1913	25	30	7 490	14 600	1 600	1 662	74	1 750	1 780	1 913	30
PSS2530N1D2313	25	30	7 490	14 600	2 000	2 062	74	2 150	2 180	2 313	30
PSS2550N1D0829	25	50	6 910	14 700	500	570	114	690	730	829	40
PSS2550N1D0929	25	50	6 910	14 700	600	670	114	790	830	929	40
PSS2550N1D1029	25	50	6 910	14 700	700	770	114	890	930	1 029	40
PSS2550N1D1129	25	50	6 910	14 700	800	870	114	990	1 030	1 129	40
PSS2550N1D1363	25	50	6 910	14 700	1 000	1 062	114	1 190	1 230	1 363	40
PSS2550N1D1563	25	50	6 910	14 700	1 200	1 262	114	1 390	1 430	1 563	40
PSS2550N1D1963	25	50	6 910	14 700	1 600	1 662	114	1 790	1 830	1 963	40
PSS2550N1D2363	25	50	6 910	14 700	2 000	2 062	114	2 190	2 230	2 363	40

Notes

1. Indicates ball screw preload control value. Approximately 2.0 N·cm of torque is added due to thin plastic seals.
2. Contact NSK if permissible rotational speed is to be exceeded.
3. Service temperature range is 0 to 80˚C.

Screw shaft ϕ25
Lead 30, 50

Unit: mm



Ball screw specification	
Preload type	Oversize ball preload (P-preload)
Ball diameter/screw shaft root diameter	3.175 / 22.2
Ball circle dia.	25.5
Accuracy grade/axial play	C5 / 0
Factory-packed grease	NSK grease LR3

Recommended support unit

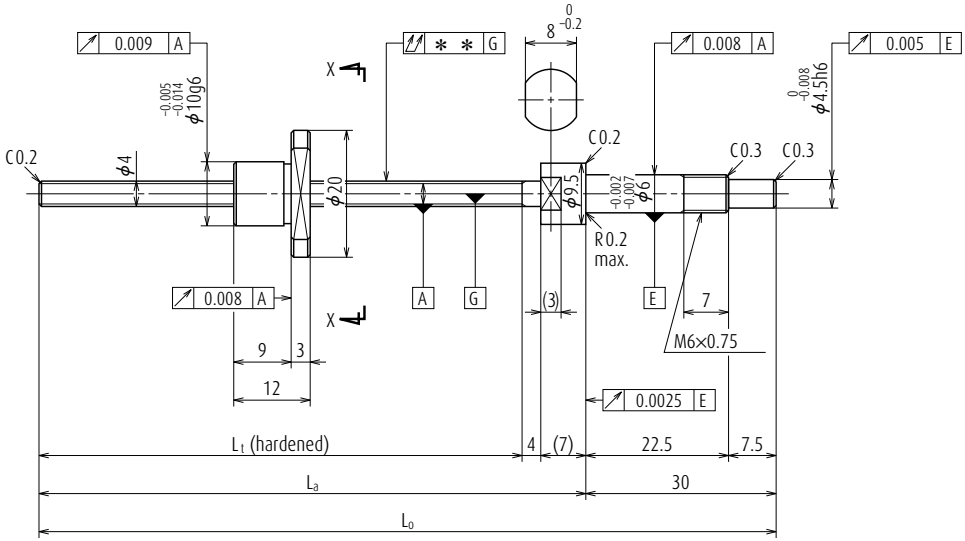
For drive side (Fixed)	For opposite to drive side	
	(Fixed)	(Simple)
WBK20-01 (square)	WBK20-01 (square)	WBK20S-01 (square)
WBK20-11 (round)	WBK20-11 (round)	

Unit: mm

Left shaft end (opposite driven side)	Lead accuracy			Shaft run-out	Dynamic preload torque	Mass	Permissible rotational speed (min^{-1}) *2		Internal spatial volume of nut (cm^3)	Standard volume of grease replenishing (cm^3)
	Target value T	Error e_p	Variation v_u	C	(N·cm) *1	(kg)	Fixed-Simple	Fixed-Fixed		
Ⅱ	0	0.035	0.025	0.055	2.7 - 13.8	3.4	5 000	—	5.5	2.8
Ⅱ	0	0.035	0.025	0.065	2.7 - 13.8	3.7	5 000	—	5.5	2.8
Ⅱ	0	0.040	0.027	0.065	2.7 - 13.8	4.1	4 980	—	5.5	2.8
Ⅱ	0	0.040	0.027	0.080	2.7 - 13.8	4.5	3 960	—	5.5	2.8
Ⅰ	0	0.046	0.030	0.100	1.8 - 14.8	5.3	2 670	3 650	5.5	2.8
Ⅰ	0	0.054	0.035	0.100	1.8 - 14.8	6.1	1 920	2 650	5.5	2.8
Ⅰ	0	0.065	0.040	0.130	1.8 - 14.8	7.6	1 130	1 580	5.5	2.8
Ⅰ	0	0.077	0.046	0.170	1.8 - 14.8	9.1	740	1 040	5.5	2.8
Ⅱ	0	0.035	0.025	0.065	5.4 - 17.6	3.8	5 000	—	7.7	3.9
Ⅱ	0	0.035	0.025	0.065	5.4 - 17.6	4.1	5 000	—	7.7	3.9
Ⅱ	0	0.040	0.027	0.080	5.4 - 17.6	4.5	4 750	—	7.7	3.9
Ⅱ	0	0.040	0.027	0.080	5.4 - 17.6	4.9	3 790	—	7.7	3.9
Ⅰ	0	0.046	0.030	0.100	4.1 - 19.6	5.8	2 570	3 470	7.7	3.9
Ⅰ	0	0.054	0.035	0.100	4.1 - 19.6	6.5	1 860	2 540	7.7	3.9
Ⅰ	0	0.065	0.040	0.130	4.1 - 19.6	8.0	1 100	1 520	7.7	3.9
Ⅰ	0	0.077	0.046	0.170	4.1 - 19.6	9.6	730	1 020	7.7	3.9

4. Use of NSK support unit is recommended. Refer to page 324 for details.
5. Recommended quantity of grease is about 50% of ball nut's internal space. See page 445 for details.

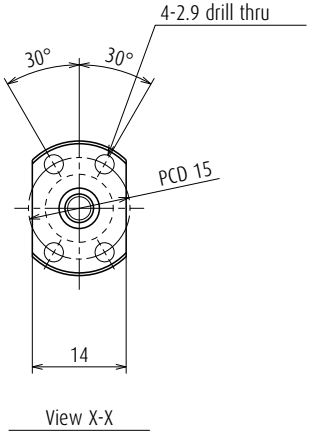
24. Finished shaft end MA Type (Fine lead)



Ball screw No.		Stroke	
Preloaded (MPFD)	Precise clearance (MSFD)	Nominal	Maximum
W0400MA-1PY-C3Z1	W0400MA-2Y-C3T1	20	32
W0400MA-3PY-C3Z1	W0400MA-4Y-C3T1	40	52
W0401MA-1PY-C3Z1	W0401MA-2Y-C3T1	70	82

Notes

1. We recommend NSK support unit. See page 324 for details.
2. Use of NSK grease PS2 is recommended. Apply to screw shaft surface when replenishing. See page 445 for details.
3. Ball nut does not have seal.
4. Contact NSK if the permissible rotational speed is to be exceeded.



View X-X

Screw shaft ϕ4
Lead 1

Unit: mm

Ball screw specifications			
Product classification		Preloaded	Precise clearance
Shaft dia. × Lead / Direction of turn		4 × 1 / Right	
Preload / Ball recirculation		P-preload / Deflector (bridge type)	
Ball dia. / Ball circle dia.		0.800 / 4.2	
Screw shaft root diameter		3.2	
Effective turns of balls		1 × 2	
Accuracy grade / Preload / Axial play		C3 / Z	C3 / T
Basic load rating (N)	Dynamic C_a	370	
	Static C_{0a}	370	
Axial play		0	0.005 or less
Preload (N)		19.6	–
Dynamic friction torque, (N·cm)		1.0 or less	0.3 or less
Spacer ball		None	
Factory-packed grease		NSK grease PS2	

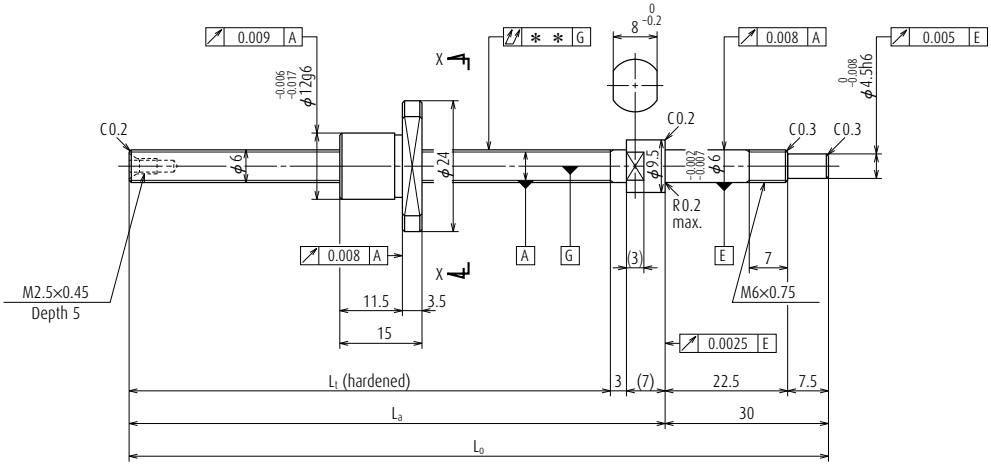
Recommended support unit

For drive side (Fixed)
WBK06-01A (square)
WBK06-11 (round)

Unit: mm

Screw shaft length			Lead accuracy			Shaft run-out **	Mass (kg)	Permissible rotational speed N (min^{-1})
								Supporting condition
L_t	L_a	L_o	T	e_p	v_u			Fixed - Free
44	55	85	0	0.008	0.008	0.015	0.024	3 000
64	75	105	0	0.008	0.008	0.020	0.026	3 000
94	105	135	0	0.008	0.008	0.025	0.028	3 000

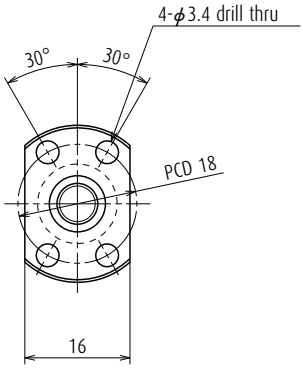
24. Finished shaft end MA Type (Fine lead)



Ball screw No.		Stroke	
Preloaded (MPFD)	Precise clearance (MSFD)	Nominal	Maximum
W0600MA-1PY-C3Z1	W0600MA-2Y-C3T1	40	50
W0601MA-1PY-C3Z1	W0601MA-2Y-C3T1	70	80
W0601MA-3PY-C3Z1	W0601MA-4Y-C3T1	100	110

Notes

1. We recommend NSK support unit. See page 324 for details.
2. Use of NSK grease PS2 is recommended. Apply to screw shaft surface when replenishing. See page 445 for details.
3. Ball nut does not have seal.
4. Contact NSK if the permissible rotational speed is to be exceeded.



View X-X

Screw shaft ϕ6
Lead 1

Unit: mm

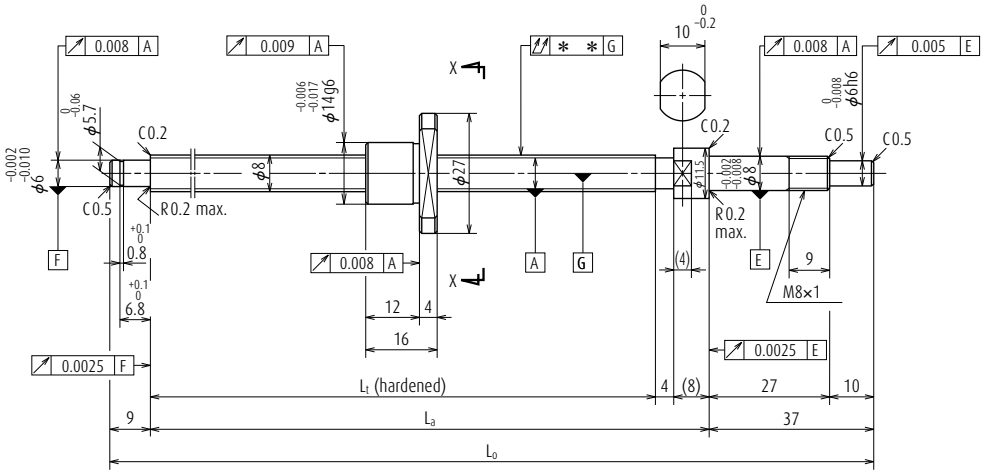
Ball screw specifications			
Product classification		Preloaded	Precise clearance
Shaft dia. × Lead / Direction of turn		6 × 1 / Right	
Preload / Ball recirculation		P-preload / Deflector (bridge)	
Ball dia. / Ball circle dia.		0.800 / 6.2	
Screw shaft root diameter		5.2	
Effective turns of balls		1 × 3	
Accuracy grade / Preload / Axial play		C3 / Z	C3 / T
Basic load rating (N)	Dynamic C_a	680	
	Static C_{0a}	920	
Axial play		0	0.005 or less
Preload (N)		24.5	–
Dynamic friction torque, (N·cm)		1.3 or less	0.3 or less
Spacer ball		None	
Factory-packed grease		NSK grease PS2	

Recommended support unit

For drive side (Fixed)
WBK06-01A (square)
WBK06-11 (round)

Unit: mm

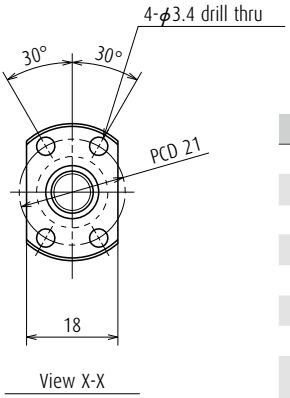
Screw shaft length			Lead accuracy			Shaft run-out **	Mass (kg)	Permissible rotational speed N (min^{-1})
								Supporting condition
L_t	L_a	L_0	T	e_p	v_u			Fixed - Free
65	75	105	0	0.008	0.008	0.015	0.039	3 000
95	105	135	0	0.008	0.008	0.020	0.045	3 000
125	135	165	0	0.010	0.008	0.025	0.051	3 000



Ball screw No.		Stroke	
Preloaded (MPFD)	Precise clearance (MSFD)	Nominal	Maximum
W0800MA-1PY-C3Z1	W0800MA-2Y-C3T1	40	59
W0801MA-1PY-C3Z1	W0801MA-2Y-C3T1	70	89
W0801MA-3PY-C3Z1	W0801MA-4Y-C3T1	100	119
W0802MA-1PY-C3Z1	W0802MA-2Y-C3T1	150	169

Notes

1. We recommend NSK support unit. See page 324 for details.
2. Use of NSK grease PS2 is recommended. Apply to screw shaft surface when replenishing. See page 445 for details.
3. Ball nut does not have seal.
4. Contact NSK if the permissible rotational speed is to be exceeded.



Screw shaft ϕ8
Lead 1

Unit: mm

Ball screw specifications			
Product classification		Preloaded	Precise clearance
Shaft dia. × Lead / Direction of turn		8 × 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 × 3	
Accuracy grade / Preload / Axial play		C3 / Z	C3 / T
Basic load rating (N)	Dynamic C_a	790	
	Static C_{0a}	1 290	
Axial play		0	0.005 or less
Preload (N)		29.4	–
Dynamic friction torque, (N·cm)		1.8 or less	0.5 or less
Spacer ball		None	
Factory-packed grease		NSK grease PS2	

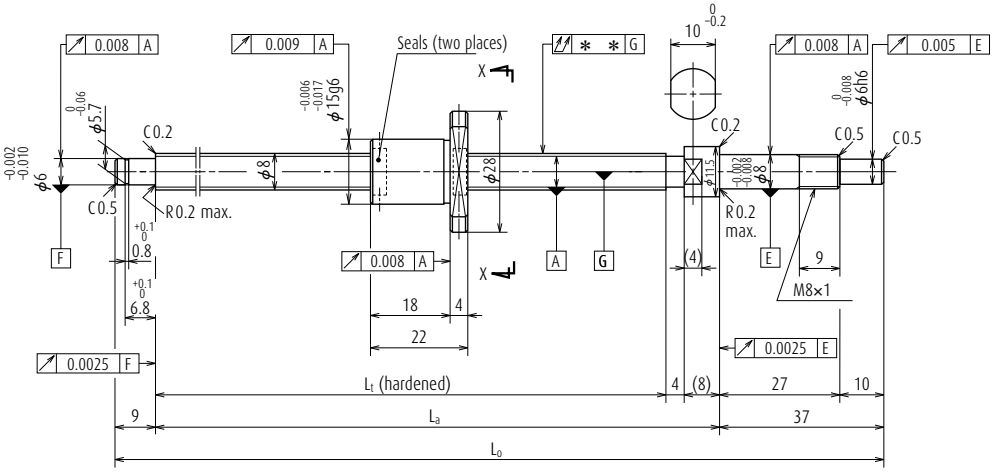
Recommended support unit

For drive side (Fixed)	For opposite to drive side (Simple)
WBK08-01A (square)	WBK08S-01 (square)
WBK08-11 (round)	

Unit: mm

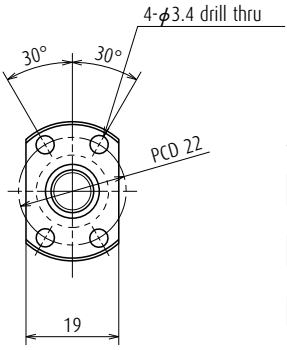
Screw shaft length			Lead accuracy			Shaft run-out **	Mass (kg)	Permissible rotational speed N (min^{-1})
								Supporting condition
L_t	L_a	L_0	T	e_p	v_u			Fixed - Simple support
80	92	138	0	0.008	0.008	0.025	0.073	3 000
110	122	168	0	0.010	0.008	0.030	0.084	3 000
140	152	198	0	0.010	0.008	0.030	0.095	3 000
190	202	248	0	0.010	0.008	0.035	0.11	3 000

24. Finished shaft end MA Type (Fine lead)



Ball screw No.		Stroke	
Preloaded (MPFD)	Precise clearance (MSFD)	Nominal	Maximum
W0800MA-3PY-C3Z1.5	W0800MA-4Y-C3T1.5	40	53
W0801MA-5PY-C3Z1.5	W0801MA-6Y-C3T1.5	70	83
W0801MA-7PY-C3Z1.5	W0801MA-8Y-C3T1.5	100	113
W0802MA-3PY-C3Z1.5	W0802MA-4Y-C3T1.5	150	163

Notes
1. We recommend NSK support unit. See page 324 for details.
2. Use of NSK grease PS2 is recommended. Apply to screw shaft surface when replenishing. See page 445 for details.
3. Contact NSK if the permissible rotational speed is to be exceeded.



View X-X

Screw shaft ϕ 8
Lead 1.5

Unit: mm

Ball screw specifications			
Product classification		Preloaded	Precise clearance
Shaft dia. × Lead / Direction of turn		8 × 1.5 / Right	
Preload / Ball recirculation		P-preload / Deflector (bridge)	
Ball dia. / Ball circle dia.		1.000 / 8.3	
Screw shaft root diameter		7.0	
Effective turns of balls		1 × 3	
Accuracy grade / Preload / Axial play		C3 / Z	C3 / T
Basic load rating (N)	Dynamic C_a	1 270	
	Static C_{0a}	1 970	
Axial play		0	0.005 or less
Preload (N)		49.0	–
Dynamic friction torque, (N·cm)		2.0 or less	0.5 or less
Spacer ball		None	
Factory-packed grease		NSK grease PS2	

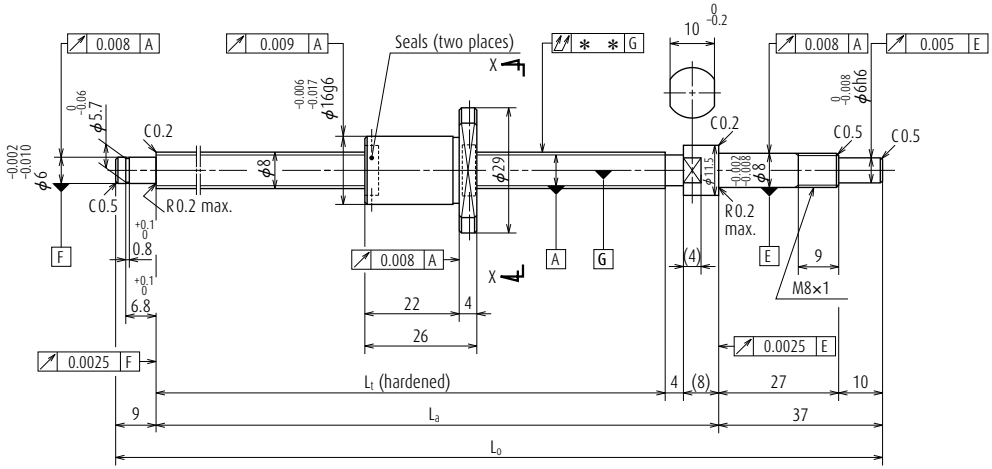
Recommended support unit

For drive side (Fixed)	For opposite to drive side (Simple)
WBK08-01A (square)	WBK08S-01 (square)
WBK08-11 (round)	

Unit: mm

Screw shaft length			Lead accuracy			Shaft run-out **	Mass (kg)	Permissible rotational speed N (min^{-1})
								Supporting condition
L_t	L_a	L_o	T	e_p	v_u			Fixed - Simple support
80	92	138	0	0.008	0.008	0.025	0.082	3 000
110	122	168	0	0.010	0.008	0.030	0.093	3 000
140	152	198	0	0.010	0.008	0.030	0.10	3 000
190	202	248	0	0.010	0.008	0.035	0.12	3 000

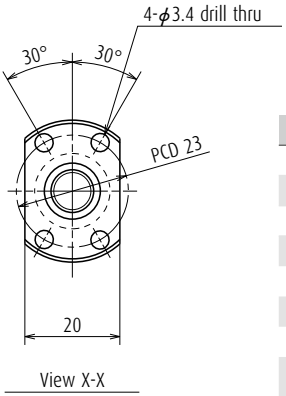
24. Finished shaft end MA Type (Fine lead)



Ball screw No.		Stroke	
Preloaded (MPFD)	Precise clearance (MSFD)	Nominal	Maximum
W0800MA-5PY-C3Z2	W0800MA-6Y-C3T2	40	49
W0801MA-9PY-C3Z2	W0801MA-10Y-C3T2	70	79
W0801MA-11PY-C3Z2	W0801MA-12Y-C3T2	100	109
W0802MA-5PY-C3Z2	W0802MA-6Y-C3T2	150	159

Notes

1. We recommend NSK support unit. See page 324 for details.
2. Use of NSK grease PS2 is recommended. Apply to screw shaft surface when replenishing. See page 445 for details.
3. Contact NSK if the permissible rotational speed is to be exceeded.



Screw shaft ϕ8
Lead 2

Unit: mm

Ball screw specifications			
Product classification		Preloaded	Precise clearance
Shaft dia. × Lead / Direction of turn		8 × 2 / Right	
Preload / Ball recirculation		P-preload / Deflector (bridge)	
Ball dia. / Ball circle dia.		1.200 / 8.3	
Screw shaft root diameter		6.9	
Effective turns of balls		1 × 3	
Accuracy grade / Preload / Axial play		C3 / Z	C3 / T
Basic load rating (N)	Dynamic C_a	1 560	
	Static C_{0a}	2 200	
Axial play		0	0.005 or less
Preload (N)		49.0	–
Dynamic friction torque, (N·cm)		2.0 or less	0.5 or less
Spacer ball		None	
Factory-packed grease		NSK grease PS2	

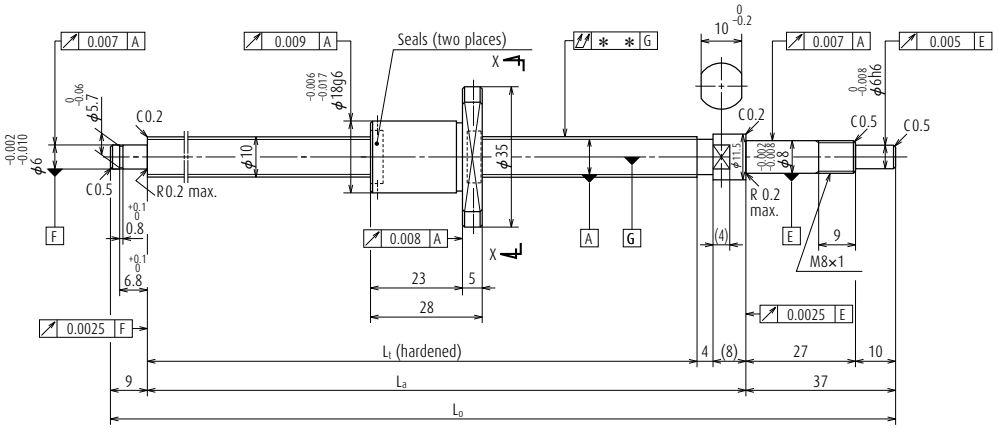
Recommended support unit

For drive side (Fixed)	For opposite to drive side (Simple)
WBK08-01A (square)	WBK08S-01 (square)
WBK08-11 (round)	

Unit: mm

Screw shaft length			Lead accuracy			Shaft run-out **	Mass (kg)	Permissible rotational speed N (min^{-1})
								Supporting condition
L_t	L_a	L_o	T	e_p	v_u			Fixed - Simple support
80	92	138	0	0.008	0.008	0.025	0.09	3 000
110	122	168	0	0.010	0.008	0.030	0.10	3 000
140	152	198	0	0.010	0.008	0.030	0.11	3 000
190	202	248	0	0.010	0.008	0.035	0.13	3 000

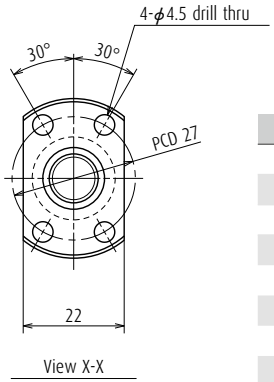
24. Finished shaft end MA Type (Fine lead)



Ball screw No.		Stroke	
Preloaded (MPFD)	Precise clearance (MSFD)	Nominal	Maximum
W1001MA-1PY-C3Z2	W1001MA-2Y-C3T2	50	67
W1001MA-3PY-C3Z2	W1001MA-4Y-C3T2	100	117
W1002MA-1PY-C3Z2	W1002MA-2Y-C3T2	150	167
W1002MA-3PY-C3Z2	W1002MA-4Y-C3T2	200	217

Notes

1. We recommend NSK support unit. See page 324 for details.
2. Use of NSK grease PS2 is recommended. Apply to screw shaft surface when replenishing. See page 445 for details.
3. Contact NSK if the permissible rotational speed is to be exceeded.



Screw shaft ϕ10
Lead 2

Unit: mm

Ball screw specifications			
Product classification		Preloaded	Precise clearance
Shaft dia. × 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 / Axial play		C3 / Z	C3 / T
Basic load rating (N)	Dynamic C_a	1 800	
	Static C_{0a}	2 970	
Axial play		0	0.005 or less
Preload (N)		58.8	–
Dynamic friction torque, (N·cm)		0.1 – 2.4	0.5 or less
Spacer ball		None	
Factory-packed grease		NSK grease PS2	

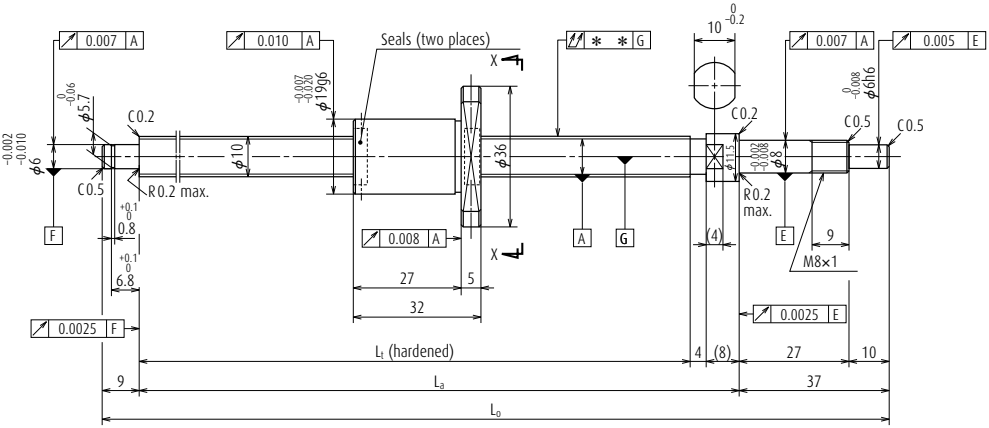
Recommended support unit

For drive side (Fixed)	For opposite to drive side (Simple)
WBK08-01A (square)	WBK08S-01 (square)
WBK08-11 (round)	

Unit: mm

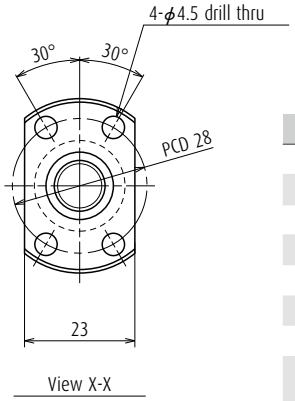
Screw shaft length			Lead accuracy			Shaft run-out **	Mass (kg)	Permissible rotational speed N (min^{-1})
								Supporting condition
L_t	L_a	L_o	T	e_p	v_u			Fixed - Simple support
100	112	158	0	0.008	0.008	0.020	0.13	3 000
150	162	208	0	0.010	0.008	0.030	0.16	3 000
200	212	258	0	0.010	0.008	0.030	0.19	3 000
250	262	308	0	0.012	0.008	0.035	0.22	3 000

24. Finished shaft end MA Type (Fine lead)



Ball screw No.		Stroke	
Preloaded (MPFD)	Precise clearance (MSFD)	Nominal	Maximum
W1001MA-5PY-C3Z2.5	W1001MA-6Y-C3T2.5	50	63
W1001MA-7PY-C3Z2.5	W1001MA-8Y-C3T2.5	100	113
W1002MA-5PY-C3Z2.5	W1002MA-6Y-C3T2.5	150	163
W1002MA-7PY-C3Z2.5	W1002MA-8Y-C3T2.5	200	213

Notes
1. We recommend NSK support unit. See page 324 for details.
2. Use of NSK grease PS2 is recommended. Apply to screw shaft surface when replenishing. See page 445 for details.
3. Contact NSK if the permissible rotational speed is to be exceeded.



Screw shaft ϕ10
Lead 2.5

Unit: mm

Ball screw specifications			
Product classification		Preloaded	Precise clearance
Shaft dia. × Lead / Direction of turn		10 × 2.5 / Right	
Preload / Ball recirculation		P-preload / Deflector (bridge)	
Ball dia. / Ball circle dia.		1.588 / 10.4	
Screw shaft root diameter		8.6	
Effective turns of balls		1 × 3	
Accuracy grade / Preload / Axial play		C3 / Z	C3 / T
Basic load rating (N)	Dynamic C_a	2 500	
	Static C_{0a}	3 630	
Axial play		0	0.005 or less
Preload (N)		98.1	–
Dynamic friction torque, (N·cm)		0.2 – 2.9	0.5 or less
Spacer ball		None	
Factory-packed grease		NSK grease PS2	

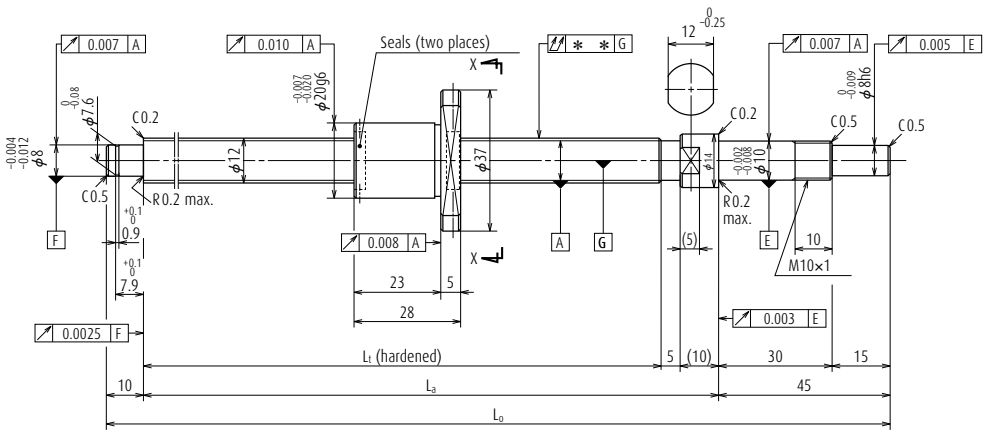
Recommended support unit

For drive side (Fixed)	For opposite to drive side (Simple)
WBK08-01A (square)	WBK08S-01 (square)
WBK08-11 (round)	

Unit: mm

Screw shaft length			Lead accuracy			Shaft run-out **	Mass (kg)	Permissible rotational speed N (min^{-1})
								Supporting condition
L_t	L_a	L_0	T	e_p	v_u			Fixed - Simple support
100	112	158	0	0.008	0.008	0.020	0.14	3 000
150	162	208	0	0.010	0.008	0.030	0.17	3 000
200	212	258	0	0.010	0.008	0.030	0.20	3 000
250	262	308	0	0.012	0.008	0.030	0.23	3 000

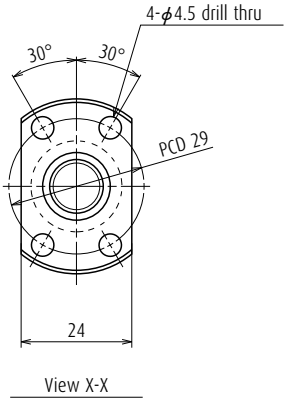
24. Finished shaft end MA Type (Fine lead)



Ball screw No.		Stroke	
Preloaded (MPFD)	Precise clearance (MSFD)	Nominal	Maximum
W1201MA-1PY-C3Z2	W1201MA-2Y-C3T2	50	75
W1201MA-3PY-C3Z2	W1201MA-4Y-C3T2	100	125
W1202MA-1PY-C3Z2	W1202MA-2Y-C3T2	150	175
W1202MA-3PY-C3Z2	W1202MA-4Y-C3T2	200	225
W1203MA-1PY-C3Z2	W1203MA-2Y-C3T2	250	275

Notes

1. We recommend NSK support unit. See page 324 for details.
2. Use of NSK grease PS2 is recommended. Apply to screw shaft surface when replenishing. See page 445 for details.
3. Contact NSK if the permissible rotational speed is to be exceeded.



Screw shaft ϕ12
Lead 2

Unit: mm

Ball screw specifications			
Product classification		Preloaded	Precise clearance
Shaft dia. × Lead / Direction of turn		12 × 2 / Right	
Preload / Ball recirculation		P-preload / Deflector (bridge)	
Ball dia. / Ball circle dia.		1.200 / 12.3	
Screw shaft root diameter		10.9	
Effective turns of balls		1 × 3	
Accuracy grade / Preload / Axial play		C3 / Z	C3 / T
Basic load rating (N)	Dynamic C_a	1 960	
	Static C_{0a}	3 620	
Axial play		0	0.005 or less
Preload (N)		98.1	–
Dynamic friction torque, (N·cm)		0.4 – 3.4	1.0 or less
Spacer ball		None	
Factory-packed grease		NSK grease PS2	

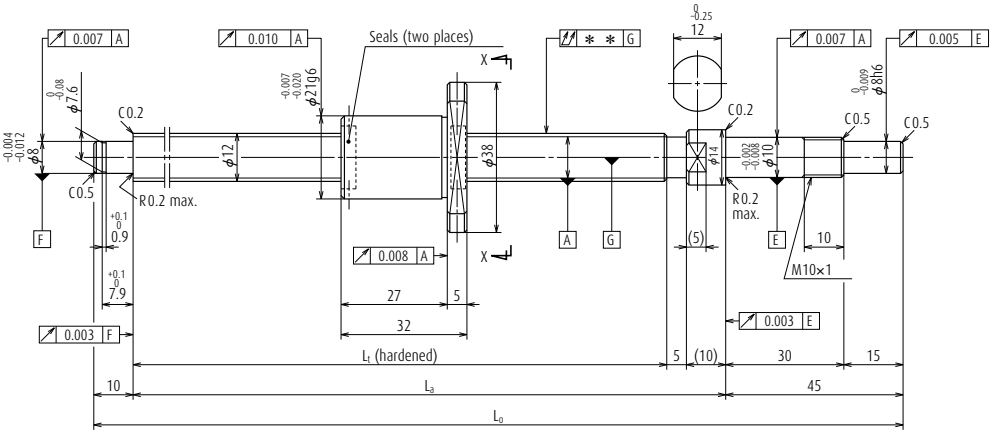
Recommended support unit

For drive side (Fixed)	For opposite to drive side (Simple)
WBK10-01A (square)	WBK10S-01 (square)
WBK10-11 (round)	

Unit: mm

Screw shaft length			Lead accuracy			Shaft run-out **	Mass (kg)	Permissible rotational speed N (min^{-1})
								Supporting condition
L_t	L_a	L_0	T	e_p	v_u			Fixed - Simple support
110	125	180	0	0.010	0.008	0.020	0.20	3 000
160	175	230	0	0.010	0.008	0.030	0.24	3 000
210	225	280	0	0.012	0.008	0.030	0.28	3 000
260	275	330	0	0.012	0.008	0.040	0.32	3 000
310	325	380	0	0.012	0.008	0.040	0.36	3 000

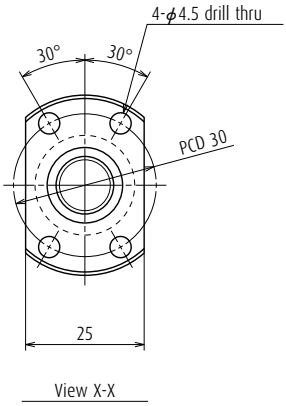
24. Finished shaft end MA Type (Fine lead)



Ball screw No.		Stroke	
Preloaded (MPFD)	Precise clearance (MSFD)	Nominal	Maximum
W1201MA-5PY-C3Z2.5	W1201MA-6Y-C3T2.5	50	71
W1201MA-7PY-C3Z2.5	W1201MA-8Y-C3T2.5	100	121
W1202MA-5PY-C3Z2.5	W1202MA-6Y-C3T2.5	150	171
W1202MA-7PY-C3Z2.5	W1202MA-8Y-C3T2.5	200	221
W1203MA-3PY-C3Z2.5	W1203MA-4Y-C3T2.5	250	271

Notes

1. We recommend NSK support unit. See page 324 for details.
2. Use of NSK grease PS2 is recommended. Apply to screw shaft surface when replenishing. See page 445 for details.
3. Contact NSK if the permissible rotational speed is to be exceeded.



View X-X

Screw shaft ϕ 12
Lead 2.5

Unit: mm

Ball screw specifications			
Product classification		Preloaded	Precise clearance
Shaft dia. × Lead / Direction of turn		12 × 2.5 / Right	
Preload / Ball recirculation		P-preload / Deflector (bridge)	
Ball dia. / Ball circle dia.		1.588 / 12.4	
Screw shaft root diameter		10.6	
Effective turns of balls		1 × 3	
Accuracy grade / Preload / Axial play		C3 / Z	C3 / T
Basic load rating (N)	Dynamic C_a	2 790	
	Static C_{0a}	4 530	
Axial play		0	0.005 or less
Preload (N)		98.1	–
Dynamic friction torque, (N·cm)		0.4 – 3.4	1.0 or less
Spacer ball		None	
Factory-packed grease		NSK grease PS2	

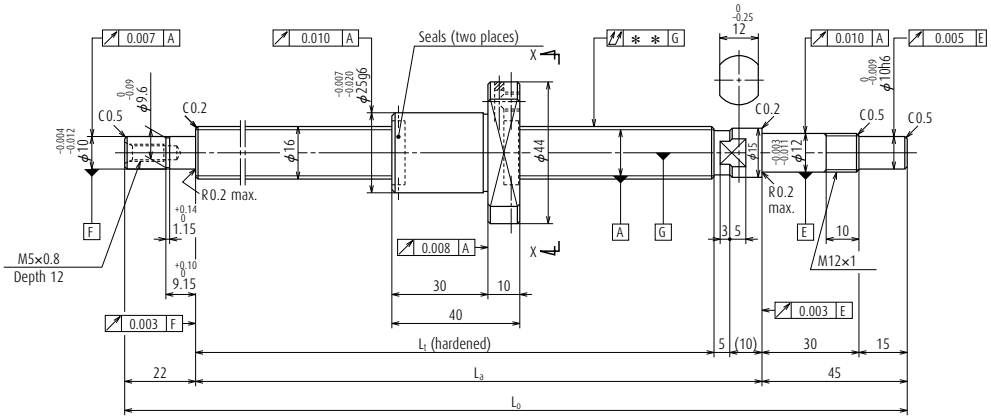
Recommended support unit

For drive side (Fixed)	For opposite to drive side (Simple)
WBK10-01A (square)	WBK10S-01 (square)
WBK10-11 (round)	

Unit: mm

Screw shaft length			Lead accuracy			Shaft run-out **	Mass (kg)	Permissible rotational speed N (min^{-1})
								Supporting condition
L_t	L_a	L_0	T	e_p	v_u			Fixed - Simple support
110	125	180	0	0.010	0.008	0.020	0.21	3 000
160	175	230	0	0.010	0.008	0.030	0.25	3 000
210	225	280	0	0.012	0.008	0.030	0.29	3 000
260	275	330	0	0.012	0.008	0.040	0.33	3 000
310	325	380	0	0.012	0.008	0.040	0.37	3 000

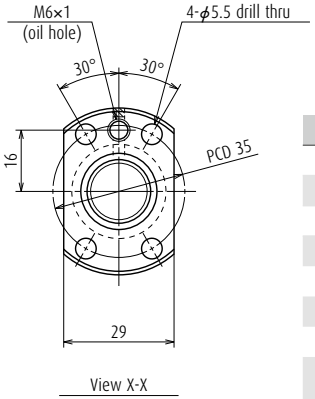
24. Finished shaft end MA Type (Fine lead)



Ball screw No.		Stroke	
Preloaded (MPFD)	Precise clearance (MSFD)	Nominal	Maximum
W1601MA-1PY-C3Z2	W1601MA-2Y-C3T2	50	93
W1601MA-3PY-C3Z2	W1601MA-4Y-C3T2	100	143
W1602MA-1PY-C3Z2	W1602MA-2Y-C3T2	150	193
W1602MA-3PY-C3Z2	W1602MA-4Y-C3T2	200	243
W1603MA-1PY-C3Z2	W1603MA-2Y-C3T2	300	343

Notes

1. We recommend NSK support unit. See page 324 for details.
2. Use of NSK grease PS2 is recommended. Recommended quantity of grease is about 50% of ball nut's internal space. See page 445 for details.
3. Contact NSK if the permissible rotational speed is to be exceeded.
4. If Fixed is used for opposite driven side, configuration of support bearing area is designed by the customer.



Screw shaft ϕ16
Lead 2

Unit: mm

Ball screw specifications			
Product classification		Preloaded	Precise clearance
Shaft dia. × Lead / Direction of turn		16 × 2 / Right	
Preload / Ball recirculation		P-preload / Deflector (bridge)	
Ball dia. / Ball circle dia.		1.588 / 16.4	
Screw shaft root diameter		14.6	
Effective turns of balls		1 × 4	
Accuracy grade / Preload / Axial play		C3 / Z	C3 / T
Basic load rating (N)	Dynamic C_a	4 150	
	Static C_{0a}	8 450	
Axial play		0	0.005 or less
Preload (N)		147	–
Dynamic friction torque, (N·cm)		0.5 – 4.9	1.5 or less
Spacer ball		None	
Factory-packed grease		NSK grease PS2	
Internal spatial volume of nut (cm^3)		1.6	
Standard volume of grease replenishing (cm^3)		0.8	

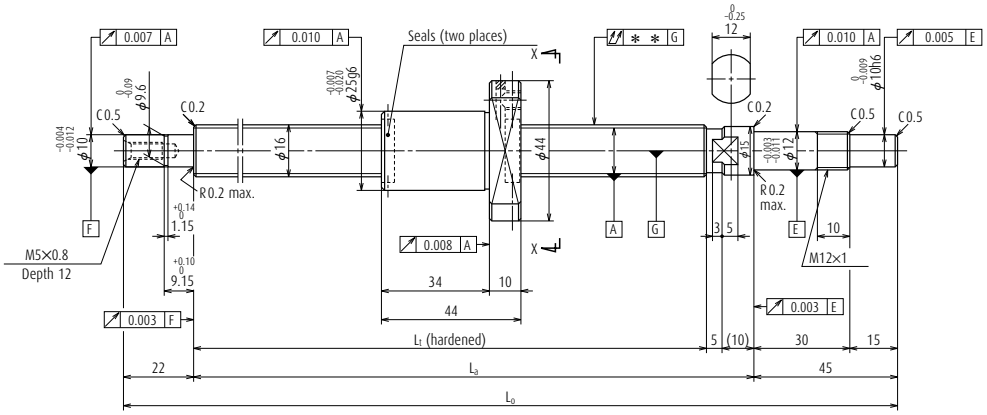
Recommended support unit

For drive side (Fixed)	For opposite to drive side (Simple)
WBK12-01A (square)	WBK12S-01 (square)
WBK12-11 (round)	

Unit: mm

Screw shaft length			Lead accuracy			Shaft run-out **	Mass (kg)	Permissible rotational speed N (min^{-1})	
								Supporting condition	
L_t	L_a	L_0	T	e_p	v_u			Fixed - Simple support	Fixed - Fixed
139	154	221	0	0.010	0.008	0.020	0.41	3 000	3 000
189	204	271	0	0.010	0.008	0.030	0.48	3 000	3 000
239	254	321	0	0.012	0.008	0.030	0.55	3 000	3 000
289	304	371	0	0.012	0.008	0.030	0.62	3 000	3 000
389	404	471	0	0.013	0.010	0.035	0.77	3 000	3 000

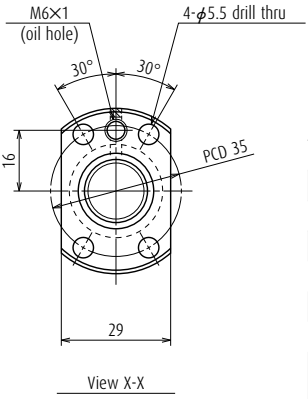
24. Finished shaft end MA Type (Fine lead)



Ball screw No.		Stroke	
Preloaded (MPFD)	Precise clearance (MSFD)	Nominal	Maximum
W1601MA-5PY-C3Z2.5	W1601MA-6Y-C3T2.5	50	89
W1601MA-7PY-C3Z2.5	W1601MA-8Y-C3T2.5	100	139
W1602MA-5PY-C3Z2.5	W1602MA-6Y-C3T2.5	150	189
W1602MA-7PY-C3Z2.5	W1602MA-8Y-C3T2.5	200	239
W1603MA-3PY-C3Z2.5	W1603MA-4Y-C3T2.5	300	339

Notes

1. We recommend NSK support unit. See page 324 for details.
2. Use of NSK grease PS2 is recommended. Recommended quantity of grease is about 50% of ball nut's internal space. See page 445 for details.
3. Contact NSK if the permissible rotational speed is to be exceeded.
4. If Fixed is used for opposite driven side, configuration of support bearing area is designed by the customer.



Screw shaft ϕ16
Lead 2.5

Unit: mm

Ball screw specifications			
Product classification		Preloaded	Precise clearance
Shaft dia. × Lead / Direction of turn		16 × 2.5 / Right	
Preload / Ball recirculation		P-preload / Deflector (bridge)	
Ball dia. / Ball circle dia.		1.588 / 16.4	
Screw shaft root diameter		14.6	
Effective turns of balls		1 × 4	
Accuracy grade / Preload / Axial play		C3 / Z	C3 / T
Basic load rating (N)	Dynamic C_a	4 150	
	Static C_{0a}	8 440	
Axial play		0	0.005 or less
Preload (N)		147	–
Dynamic friction torque, (N·cm)		0.5 – 4.9	1.5 or less
Spacer ball		None	
Factory-packed grease		NSK grease PS2	
Internal spatial volume of nut (cm^3)		1.6	
Standard volume of grease replenishing (cm^3)		0.8	

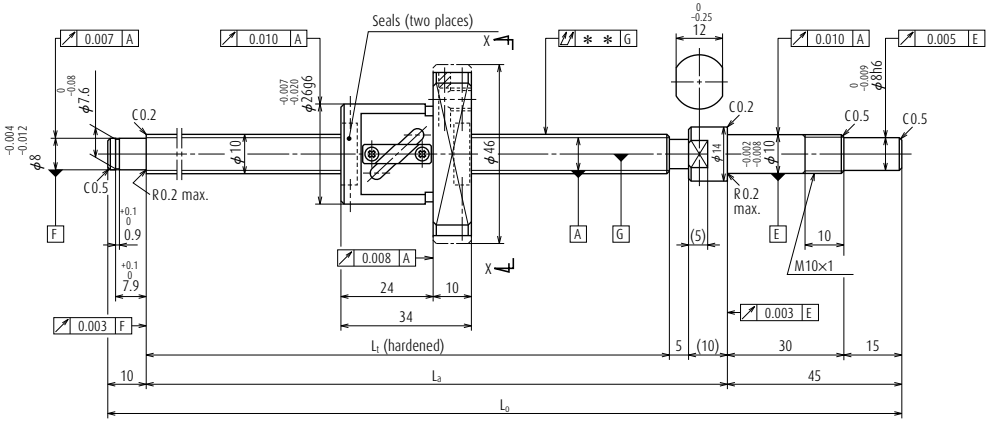
Recommended support unit

For drive side (Fixed)	For opposite to drive side (Simple)
WBK12-01A (square)	WBK12S-01 (square)
WBK12-11 (round)	

Unit: mm

Screw shaft length			Lead accuracy			Shaft run-out **	Mass (kg)	Permissible rotational speed N (min^{-1})	
								Supporting condition	
L_t	L_a	L_0	T	e_p	v_u			Fixed - Simple support	Fixed - Fixed
139	154	221	0	0.010	0.008	0.020	0.42	3 000	3 000
189	204	271	0	0.010	0.008	0.020	0.49	3 000	3 000
239	254	321	0	0.012	0.008	0.030	0.57	3 000	3 000
289	304	371	0	0.012	0.008	0.030	0.64	3 000	3 000
389	404	471	0	0.013	0.010	0.035	0.79	3 000	3 000

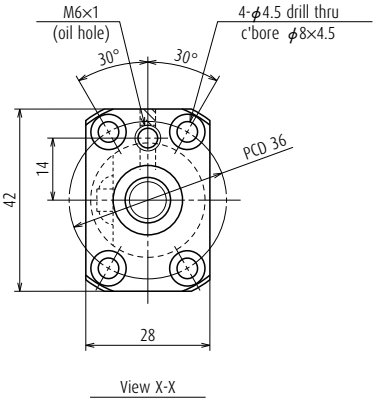
24. Finished shaft end FA Type (Fine lead)



Ball screw No.		Stroke	
Preloaded (PFT)	Precise clearance (SFT)	Nominal	Maximum
W1001FA-1P-C3Z4	W1001FA-2-C3T4	50	69
W1001FA-3P-C3Z4	W1001FA-4-C3T4	100	119
W1002FA-1P-C3Z4	W1002FA-2-C3T4	150	169
W1002FA-3P-C3Z4	W1002FA-4-C3T4	200	219
W1003FA-1P-C3Z4	W1003FA-2-C3T4	250	269
W1003FA-3P-C3Z4	W1003FA-4-C3T4	300	319

Notes

1. We recommend NSK support unit. See page 324 for details.
2. Use of NSK grease PS2 is recommended. Recommended quantity of grease is about 50% of ball nut's internal space. See page 445 for details.
3. Contact NSK if the permissible rotational speed is to be exceeded.



Screw shaft ϕ10
Lead 4

Unit: mm

Ball screw specifications			
Product classification		Preloaded	Precise clearance
Shaft dia. × Lead / Direction of turn		10 × 4 / Right	
Preload / Ball recirculation		P-preload / Return tube	
Ball dia. / Ball circle dia.		2.000 / 10.3	
Screw shaft root diameter		8.2	
Effective turns of balls		2.5 × 1	
Accuracy grade / Preload / Axial play		C3 / Z	C3 / T
Basic load rating (N)	Dynamic C_a	2 020	3 210
	Static C_{0a}	2 210	4 420
Axial play		0	0.005 or less
Preload (N)		98.1	–
Dynamic friction torque, (N·cm)		0.5 – 3.9	1.0 or less
Spacer ball		Yes	None
Factory-packed grease		NSK grease PS2	
Internal spatial volume of nut (cm^3)		0.8	
Standard volume of grease replenishing (cm^3)		0.4	

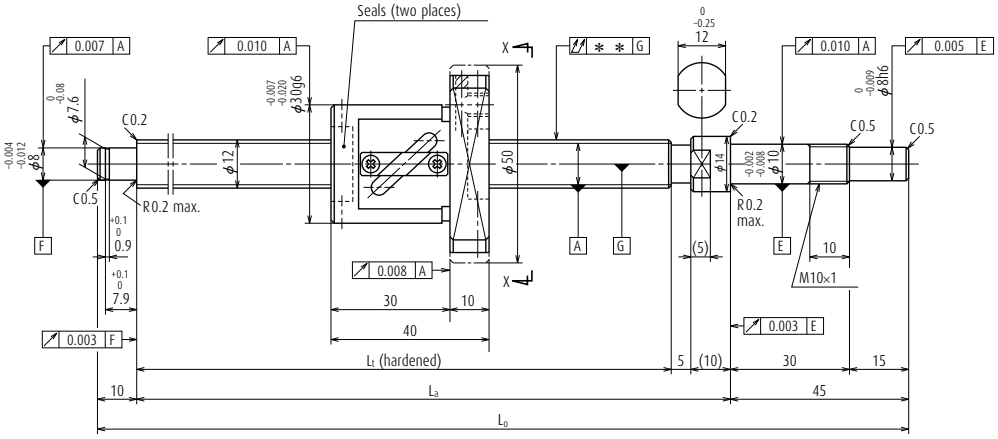
Recommended support unit

For drive side (Fixed)	For opposite to drive side (Simple)
WBK10-01A (square)	WBK10S-01 (square)
WBK10-11 (round)	

Unit: mm

Screw shaft length			Lead accuracy			Shaft run-out **	Mass (kg)	Permissible rotational speed N (min^{-1})
								Supporting condition
L_t	L_a	L_0	T	e_p	v_u			Fixed - Simple support
110	125	180	0	0.010	0.008	0.020	0.26	3 000
160	175	230	0	0.010	0.008	0.030	0.28	3 000
210	225	280	0	0.012	0.008	0.030	0.31	3 000
260	275	330	0	0.012	0.008	0.040	0.34	3 000
310	325	380	0	0.012	0.008	0.040	0.37	3 000
360	375	430	0	0.013	0.010	0.050	0.39	3 000

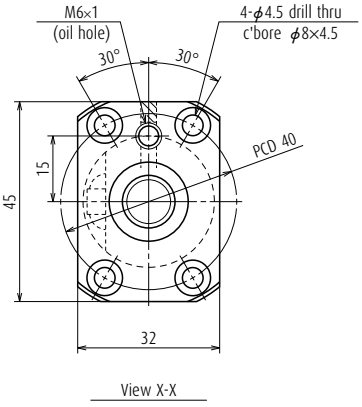
24. Finished shaft end FA Type (Fine lead)



Ball screw No.		Stroke	
Preloaded (PFT)	Precise clearance (SFT)	Nominal	Maximum
W1201FA-1P-C3Z5	W1201FA-2-C3T5	50	63
W1201FA-3P-C3Z5	W1201FA-4-C3T5	100	113
W1202FA-1P-C3Z5	W1202FA-2-C3T5	150	163
W1202FA-3P-C3Z5	W1202FA-4-C3T5	200	213
W1203FA-1P-C3Z5	W1203FA-2-C3T5	250	263
W1204FA-1P-C3Z5	W1204FA-2-C3T5	350	363
W1205FA-1P-C3Z5	W1205FA-2-C3T5	450	463

Notes

1. We recommend NSK support unit. See page 324 for details.
2. Use of NSK grease PS2 is recommended. Recommended quantity of grease is about 50% of ball nut's internal space. See page 445 for details.
3. Contact NSK if the permissible rotational speed is to be exceeded.



Screw shaft ϕ 12
Lead 5

Unit: mm

Ball screw specifications			
Product classification		Preloaded	Precise clearance
Shaft dia. × Lead / Direction of turn		12 × 5 / Right	
Preload / Ball recirculation		P-preload / Return tube	
Ball dia. / Ball circle dia.		2.381 / 12.3	
Screw shaft root diameter		9.8	
Effective turns of balls		2.5 × 1	
Accuracy grade / Preload / Axial play		C3 / Z	C3 / T
Basic load rating (N)	Dynamic C_a	2 770	4 390
	Static C_{0a}	3 130	6 260
Axial play		0	0.005 or less
Preload (N)		98.1	–
Dynamic friction torque, (N·cm)		1.0 – 4.4	1.0 or less
Spacer ball		Yes	None
Factory-packed grease		NSK grease PS2	
Internal spatial volume of nut (cm^3)		1.2	
Standard volume of grease replenishing (cm^3)		0.6	

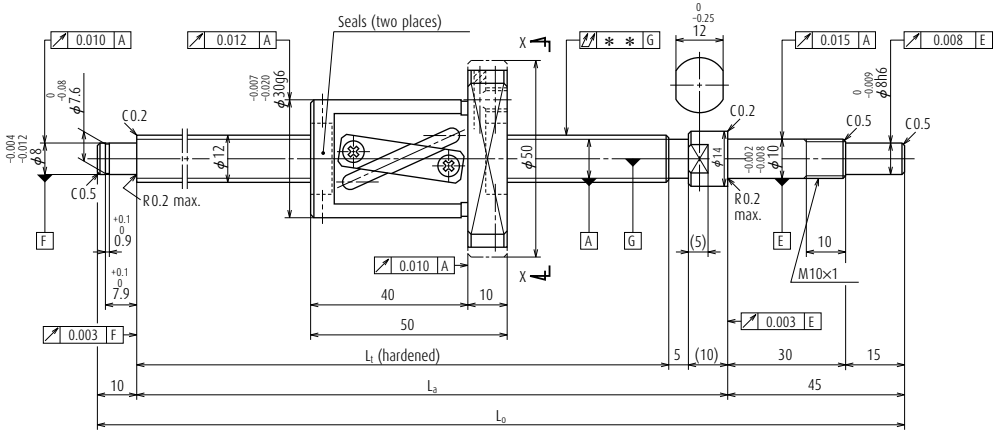
Recommended support unit

For drive side (Fixed)	For opposite to drive side (Simple)
WBK10-01A (square)	WBK10S-01 (square)
WBK10-11 (round)	

Unit: mm

Screw shaft length			Lead accuracy			Shaft run-out **	Mass (kg)	Permissible rotational speed N (min^{-1})
								Supporting condition
L_t	L_a	L_0	T	e_p	v_u			Fixed - Simple support
110	125	180	0	0.010	0.008	0.020	0.35	3 000
160	175	230	0	0.010	0.008	0.030	0.38	3 000
210	225	280	0	0.012	0.008	0.030	0.42	3 000
260	275	330	0	0.012	0.008	0.040	0.46	3 000
310	325	380	0	0.012	0.008	0.040	0.50	3 000
410	425	480	0	0.015	0.010	0.050	0.58	3 000
510	525	580	0	0.016	0.012	0.065	0.66	3 000

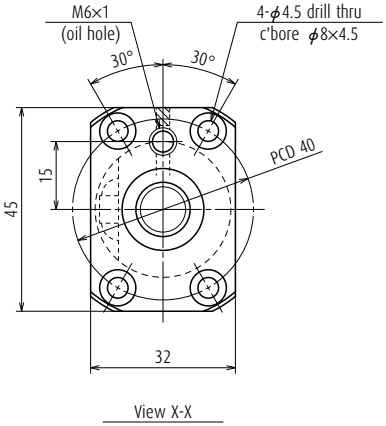
24. Finished shaft end FA Type (Medium lead)



Ball screw No.		Stroke	
Preloaded (LPFT)	Precise clearance (LSFT)	Nominal	Maximum
W1201FA-5P-C5Z10	W1201FA-6-C5T10	100	103
W1202FA-5P-C5Z10	W1202FA-6-C5T10	150	153
W1203FA-3P-C5Z10	W1203FA-4-C5T10	250	253
W1204FA-3P-C5Z10	W1204FA-4-C5T10	350	353
W1205FA-3P-C5Z10	W1205FA-4-C5T10	450	453

Notes

1. We recommend NSK support unit. See page 324 for details.
2. Use of NSK grease LR3 is recommended. Recommended quantity of grease is about 50% of ball nut's internal space. See page 445 for details.
3. Contact NSK if the permissible rotational speed is to be exceeded.



Screw shaft ϕ12
Lead 10

Unit: mm

Ball screw specifications			
Product classification		Preloaded	Precise clearance
Shaft dia. × Lead / Direction of turn		12 ×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 × 1	
Accuracy grade / Preload / Axial play		C3 / Z	C3 / T
Basic load rating (N)	Dynamic C_a	2 790	4 430
	Static C_{0a}	3 220	6 430
Axial play		0	0.005 or less
Preload (N)		98.1	–
Dynamic friction torque, (N·cm)		1.0 – 4.9	1.5 or less
Spacer ball		Yes	None
Factory-packed grease		NSK grease LR3	
Internal spatial volume of nut (cm^3)		1.4	
Standard volume of grease replenishing (cm^3)		0.7	

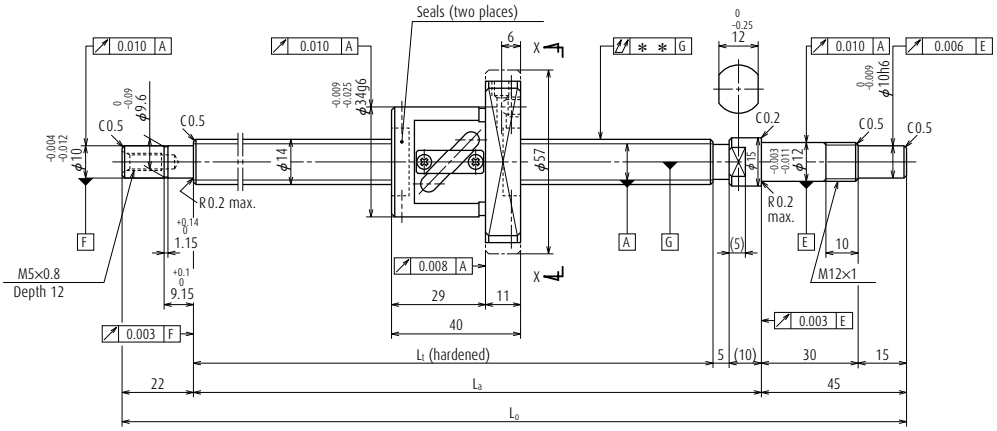
Recommended support unit

For drive side (Fixed)	For opposite to drive side (Simple)
WBK10-01A (square)	WBK10S-01 (square)
WBK10-11 (round)	

Unit: mm

Screw shaft length			Lead accuracy			Shaft run-out **	Mass (kg)	Permissible rotational speed N (min^{-1})
								Supporting condition
L_t	L_a	L_0	T	e_p	v_u			Fixed - Simple support
160	175	230	0	0.020	0.018	0.035	0.43	3 000
210	225	280	0	0.023	0.018	0.035	0.47	3 000
310	325	380	0	0.023	0.018	0.050	0.56	3 000
410	425	480	0	0.027	0.020	0.060	0.64	3 000
510	525	580	0	0.030	0.023	0.075	0.72	3 000

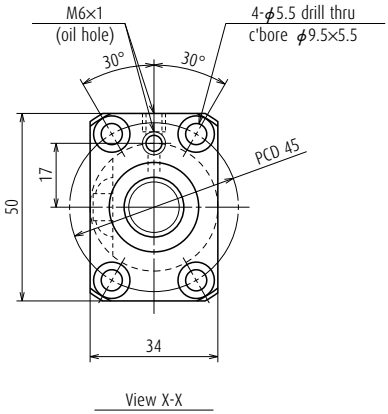
24. Finished shaft end FA Type (Fine lead)



Ball screw No.		Stroke	
Preloaded (PFT)	Precise clearance (SFT)	Nominal	Maximum
W1401FA-1P-C3Z5	W1401FA-2-C3T5	100	143
W1402FA-1P-C3Z5	W1402FA-2-C3T5	150	193
W1403FA-1P-C3Z5	W1403FA-2-C3T5	250	293
W1404FA-1P-C3Z5	W1404FA-2-C3T5	350	393
W1405FA-1P-C3Z5	W1405FA-2-C3T5	450	493
W1406FA-1P-C3Z5	W1406FA-2-C3T5	600	643

Notes

1. We recommend NSK support unit. See page 324 for details.
2. Use of NSK grease PS2 is recommended. Recommended quantity of grease is about 50% of ball nut's internal space. See page 445 for details.
3. Contact NSK if the permissible rotational speed is to be exceeded.



Screw shaft ϕ 14
Lead 5

Unit: mm

Ball screw specifications			
Product classification		Preloaded	Precise clearance
Shaft dia. × Lead / Direction of turn		14 × 5 / Right	
Preload / Ball recirculation		P-preload / Return tube	
Ball dia. / Ball circle dia.		3.175 / 14.5	
Screw shaft root diameter		11.2	
Effective turns of balls		2.5 × 1	
Accuracy grade / Preload / Axial play		C3 / Z	C3 / T
Basic load rating (N)	Dynamic C_a	5 020	7 970
	Static C_{0a}	5 970	11 900
Axial play		0	0.005 or less
Preload (N)		147	–
Dynamic friction torque, (N·cm)		1.5 – 6.9	2.0 or less
Spacer ball		Yes	None
Factory-packed grease		NSK grease LR3	
Internal spatial volume of nut (cm^3)		2.2	
Standard volume of grease replenishing (cm^3)		1.1	

Recommended support unit

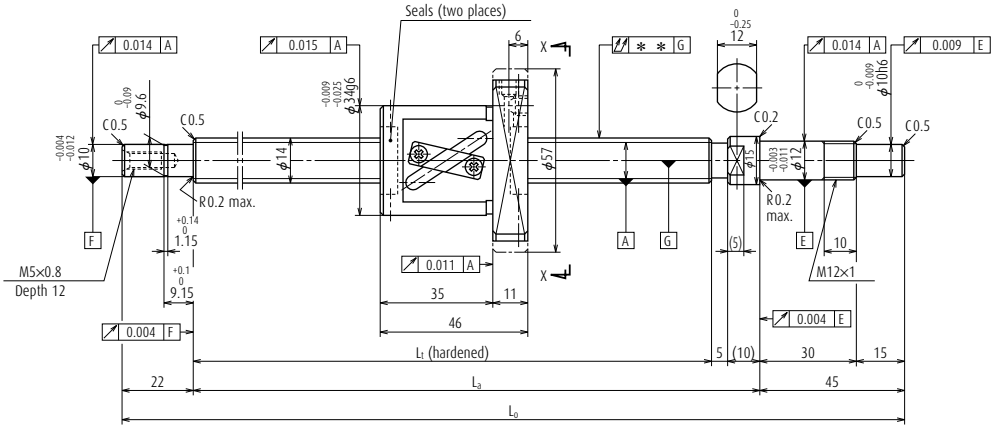
For drive side (Fixed)	For opposite to drive side (Simple)
WBK12-01A (square)	WBK12S-01 (square)
WBK12-11 (round)	

Unit: mm

Screw shaft length			Lead accuracy			Shaft run-out **	Mass (kg)	Permissible rotational speed N (min^{-1})	
								Supporting condition	
L_t	L_a	L_0	T	e_p	v_u			Fixed - Simple support	Fixed - Fixed
189	204	271	0	0.010	0.008	0.020	0.52	3 000	3 000
239	254	321	0	0.012	0.008	0.030	0.57	3 000	3 000
339	354	421	0	0.013	0.010	0.035	0.67	3 000	3 000
439	454	521	0	0.015	0.010	0.045	0.77	3 000	3 000
539	554	621	0	0.016	0.012	0.045	0.87	3 000	3 000
689	704	771	0	0.018	0.013	0.055	1.0	3 000	3 000

Notes 4. If Fixed is used for opposite driven side, configuration of support bearing area is designed by the customer.

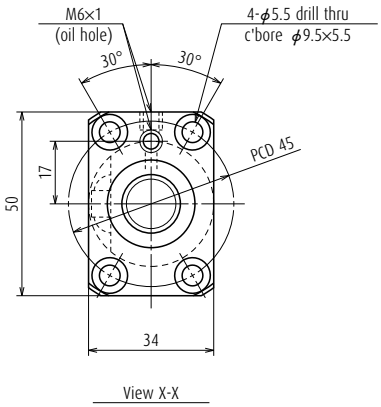
24. Finished shaft end FA Type (Medium lead)



Ball screw No.		Stroke	
Preloaded (LPFT)	Precise clearance (LSFT)	Nominal	Maximum
W1401FA-3P-C5Z8	W1401FA-4-C5T8	100	137
W1402FA-3P-C5Z8	W1402FA-4-C5T8	150	187
W1402FA-5P-C5Z8	W1402FA-6-C5T8	200	237
W1403FA-3P-C5Z8	W1403FA-4-C5T8	250	287
W1403FA-5P-C5Z8	W1403FA-6-C5T8	300	337
W1404FA-3P-C5Z8	W1404FA-4-C5T8	350	387
W1404FA-5P-C5Z8	W1404FA-6-C5T8	400	437
W1405FA-3P-C5Z8	W1405FA-4-C5T8	450	487
W1405FA-5P-C5Z8	W1405FA-6-C5T8	500	537
W1406FA-3P-C5Z8	W1406FA-4-C5T8	550	587
W1406FA-5P-C5Z8	W1406FA-6-C5T8	600	637
W1407FA-1P-C5Z8	W1407FA-2-C5T8	700	737

Notes

1. We recommend NSK support unit. See page 324 for details.
2. Use of NSK grease LR3 is recommended. Recommended quantity of grease is about 50% of ball nut's internal space. See page 445 for details.
3. Contact NSK if the permissible rotational speed is to be exceeded.



Screw shaft ϕ14
Lead 8

Unit: mm

Ball screw specifications			
Product classification		Preloaded	Precise clearance
Shaft dia. × Lead / Direction of turn		14 × 8 / Right	
Preload / Ball recirculation		P-preload / Return tube	
Ball dia. / Ball circle dia.		3.175 / 14.5	
Screw shaft root diameter		11.2	
Effective turns of balls		2.5 × 1	
Accuracy grade / Preload / Axial play		C5 / Z	C5 / T
Basic load rating (N)	Dynamic C_a	4 960	7 880
	Static C_{0a}	5 920	11 800
Axial play		0	0.005 or less
Preload (N)		147	–
Dynamic friction torque, (N·cm)		1.5 – 7.8	2.4 or less
Spacer ball		Yes	None
Factory-packed grease		NSK grease LR3	
Internal spatial volume of nut (cm³)		2.1	
Standard volume of grease replenishing (cm³)		1.1	

Recommended support unit

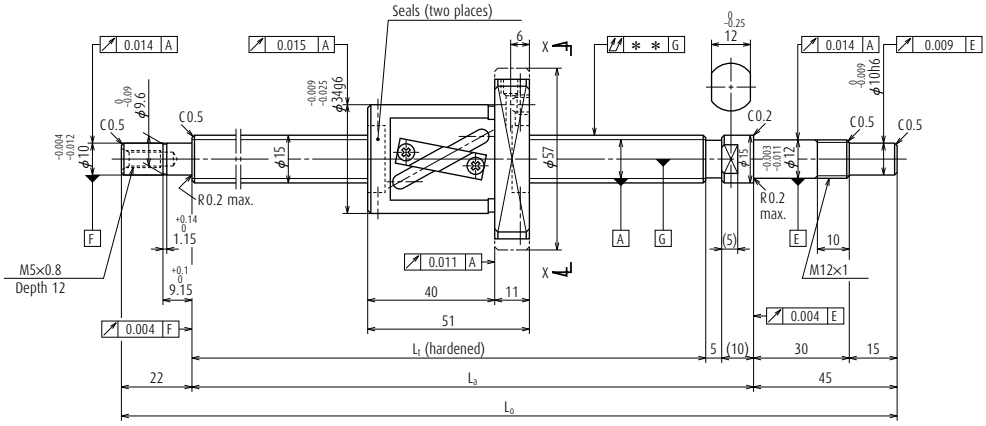
For drive side (Fixed)	For opposite to drive side (Simple)
WBK12-01A (square)	WBK12S-01 (square)
WBK12-11 (round)	

Unit: mm

Screw shaft length			Lead accuracy			Shaft run-out **	Mass (kg)	Permissible rotational speed N (min⁻¹)	
								Supporting condition	
L_t	L_a	L_0	T	e_p	v_u			Fixed - Simple support	Fixed - Fixed
189	204	271	0	0.020	0.018	0.025	0.56	3 000	3 000
239	254	321	0	0.023	0.018	0.035	0.61	3 000	3 000
289	304	371	0	0.023	0.018	0.035	0.67	3 000	3 000
339	354	421	0	0.025	0.020	0.040	0.72	3 000	3 000
389	404	471	0	0.025	0.020	0.040	0.78	3 000	3 000
439	454	521	0	0.027	0.020	0.050	0.83	3 000	3 000
489	504	571	0	0.027	0.020	0.050	0.88	3 000	3 000
539	554	621	0	0.030	0.023	0.050	0.94	3 000	3 000
589	604	671	0	0.030	0.023	0.065	0.99	3 000	3 000
639	654	721	0	0.035	0.025	0.065	1.0	3 000	3 000
689	704	771	0	0.035	0.025	0.065	1.1	3 000	3 000
789	804	871	0	0.035	0.025	0.085	1.2	2 830	3 000

Notes 4. If Fixed is used for opposite driven side, configuration of support bearing area is designed by the customer.

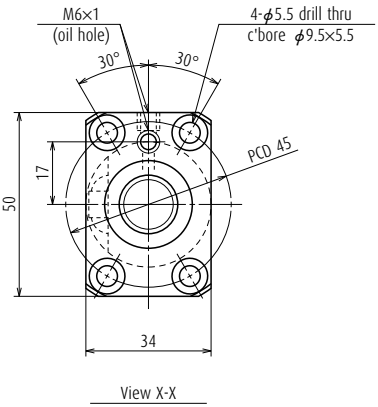
24. Finished shaft end FA Type (Medium lead)



Ball screw No.		Stroke	
Preloaded (LPFT)	Precise clearance (LSFT)	Nominal	Maximum
W1501FA-1P-C5Z10	W1501FA-2-C5T10	100	132
W1502FA-1P-C5Z10	W1502FA-2-C5T10	150	182
W1502FA-3P-C5Z10	W1502FA-4-C5T10	200	232
W1503FA-1P-C5Z10	W1503FA-2-C5T10	250	282
W1503FA-3P-C5Z10	W1503FA-4-C5T10	300	332
W1504FA-1P-C5Z10	W1504FA-2-C5T10	350	382
W1504FA-3P-C5Z10	W1504FA-4-C5T10	400	432
W1505FA-1P-C5Z10	W1505FA-2-C5T10	450	482
W1505FA-3P-C5Z10	W1505FA-4-C5T10	500	532
W1506FA-1P-C5Z10	W1506FA-2-C5T10	550	582
W1506FA-3P-C5Z10	W1506FA-4-C5T10	600	632
W1507FA-1P-C5Z10	W1507FA-2-C5T10	700	732
W1508FA-1P-C5Z10	W1508FA-2-C5T10	800	832
W1510FA-1P-C5Z10	W1510FA-2-C5T10	1 000	1 032

Notes

1. We recommend NSK support unit. See page 324 for details.
2. Use of NSK grease LR3 is recommended. Recommended quantity of grease is about 50% of ball nut's internal space. See page 445 for details.
3. Contact NSK if the permissible rotational speed is to be exceeded.



Screw shaft ϕ 15
Lead 10

Unit: mm

Ball screw specifications			
Product classification		Preloaded	Precise clearance
Shaft dia. × Lead / Direction of turn		15 × 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 × 1	
Accuracy grade / Preload / Axial play		C5 / Z	C5 / T
Basic load rating (N)	Dynamic C_a	5 130	8 140
	Static C_{0a}	6 420	12 800
Axial play		0	0.005 or less
Preload (N)		147	–
Dynamic friction torque, (N·cm)		1.5 – 7.8	2.4 or less
Spacer ball		Yes	None
Factory-packed grease		NSK grease LR3	
Internal spatial volume of nut (cm^3)		2.3	
Standard volume of grease replenishing (cm^3)		1.2	

Recommended support unit

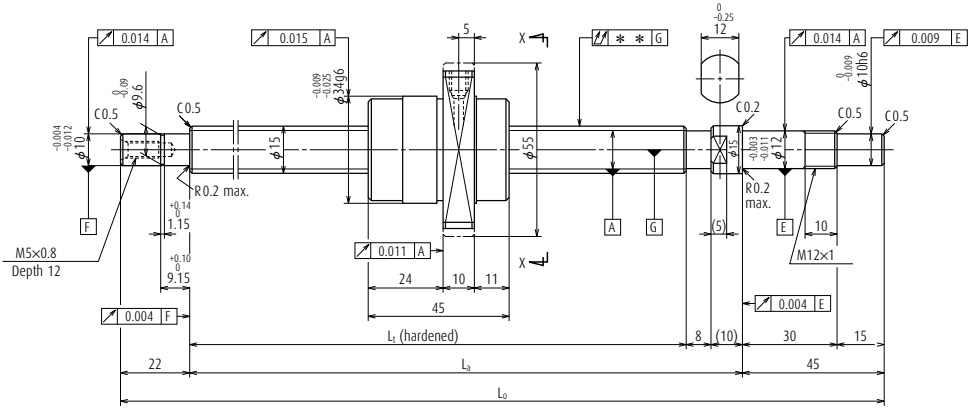
For drive side (Fixed)	For opposite to drive side (Simple)
WBK12-01A (square)	WBK12S-01 (square)
WBK12-11 (round)	

Unit: mm

Screw shaft length			Lead accuracy			Shaft run-out **	Mass (kg)	Permissible rotational speed N (min^{-1})	
								Supporting condition	
L_t	L_a	L_0	T	e_p	v_u			Fixed - Simple support	Fixed - Fixed
189	204	271	0	0.020	0.018	0.025	0.61	3 000	3 000
239	254	321	0	0.023	0.018	0.035	0.67	3 000	3 000
289	304	371	0	0.023	0.018	0.035	0.74	3 000	3 000
339	354	421	0	0.025	0.020	0.040	0.80	3 000	3 000
389	404	471	0	0.025	0.020	0.040	0.86	3 000	3 000
439	454	521	0	0.027	0.020	0.050	0.93	3 000	3 000
489	504	571	0	0.027	0.020	0.050	1.0	3 000	3 000
539	554	621	0	0.030	0.023	0.050	1.1	3 000	3 000
589	604	671	0	0.030	0.023	0.065	1.1	3 000	3 000
639	654	721	0	0.035	0.025	0.065	1.2	3 000	3 000
689	704	771	0	0.035	0.025	0.065	1.2	3 000	3 000
789	804	871	0	0.035	0.025	0.085	1.4	3 000	3 000
889	904	971	0	0.040	0.027	0.085	1.5	2 430	3 000
1 089	1 104	1 171	0	0.046	0.030	0.110	1.8	1 600	2 250

Notes 4. If Fixed is used for opposite driven side, configuration of support bearing area is designed by the customer.

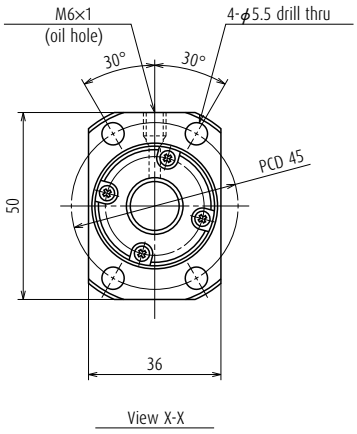
24. Finished shaft end FA Type (Medium lead)



Ball screw No.		Stroke	
Preloaded (UPFC)	Precise clearance (USFC)	Nominal	Maximum
W1501FA-3PG-C5Z20	W1501FA-4G-C5T20	100	135
W1502FA-5PG-C5Z20	W1502FA-6G-C5T20	150	185
W1502FA-7PG-C5Z20	W1502FA-8G-C5T20	200	235
W1503FA-5PG-C5Z20	W1503FA-6G-C5T20	250	285
W1503FA-7PG-C5Z20	W1503FA-8G-C5T20	300	335
W1504FA-5PG-C5Z20	W1504FA-6G-C5T20	350	385
W1504FA-7PG-C5Z20	W1504FA-8G-C5T20	400	435
W1505FA-5PG-C5Z20	W1505FA-6G-C5T20	450	485
W1505FA-7PG-C5Z20	W1505FA-8G-C5T20	500	535
W1506FA-5PG-C5Z20	W1506FA-6G-C5T20	550	585
W1506FA-7PG-C5Z20	W1506FA-8G-C5T20	600	635
W1507FA-3PG-C5Z20	W1507FA-4G-C5T20	700	735
W1508FA-3PG-C5Z20	W1508FA-4G-C5T20	800	835
W1510FA-3PG-C5Z20	W1510FA-4G-C5T20	1 000	1 035

Notes

1. We recommend NSK support unit. See page 324 for details.
2. Use of NSK grease LR3 is recommended. Recommended quantity of grease is about 50% of ball nut's internal space. See page 445 for details.
3. Contact NSK if the permissible rotational speed is to be exceeded.



Screw shaft ϕ 15
Lead 20

Unit: mm

Ball screw specifications			
Product classification		Preloaded	Precise clearance
Shaft dia. × Lead / Direction of turn		15 × 20 / 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		1.7 × 1	
Accuracy grade / Preload / Axial play		C5 / Z	C5 / T
Basic load rating (N)	Dynamic C_a	4 320	5 660
	Static C_{0a}	5 800	8 700
Axial play		0	0.005 or less
Preload (N)		147	–
Dynamic friction torque, (N·cm)		1.5 – 7.8	2.4 or less
Spacer ball		Yes	None
Factory-packed grease		NSK grease LR3	
Internal spatial volume of nut (cm³)		1.9	
Standard volume of grease replenishing (cm³)		1.0	

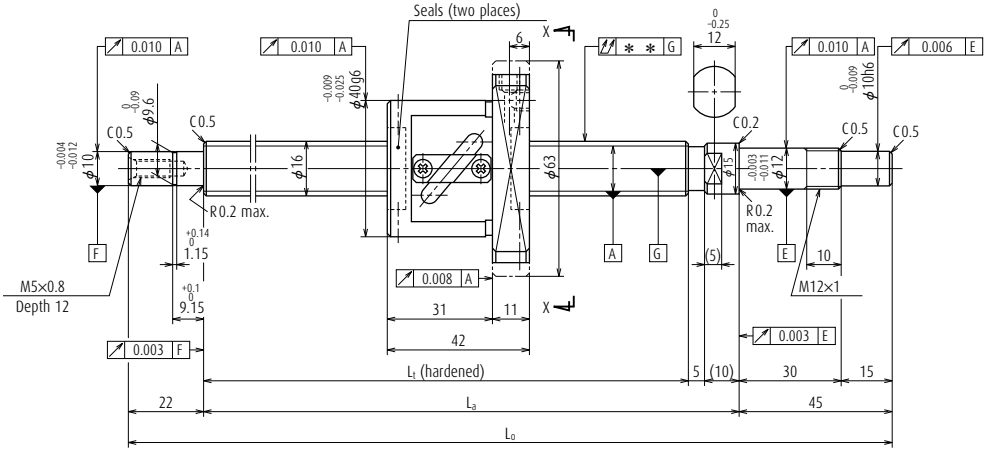
Recommended support unit

For drive side (Fixed)	For opposite to drive side (Simple)
WBK12-01A (square)	WBK12S-01 (square)
WBK12-11 (round)	

Unit: mm

Screw shaft length			Lead accuracy			Shaft run-out **	Mass (kg)	Permissible rotational speed N (min⁻¹)	
								Supporting condition	
L_t	L_a	L_0	T	e_p	v_u			Fixed - Simple support	Fixed - Fixed
186	204	271	0	0.020	0.018	0.025	0.61	3 000	3 000
236	254	321	0	0.023	0.018	0.035	0.68	3 000	3 000
286	304	371	0	0.023	0.018	0.035	0.75	3 000	3 000
336	354	421	0	0.025	0.020	0.040	0.81	3 000	3 000
386	404	471	0	0.025	0.020	0.040	0.88	3 000	3 000
436	454	521	0	0.027	0.020	0.050	0.95	3 000	3 000
486	504	571	0	0.027	0.020	0.050	1.0	3 000	3 000
536	554	621	0	0.030	0.023	0.050	1.1	3 000	3 000
586	604	671	0	0.030	0.023	0.065	1.1	3 000	3 000
636	654	721	0	0.035	0.025	0.065	1.2	3 000	3 000
686	704	771	0	0.035	0.025	0.065	1.3	3 000	3 000
786	804	871	0	0.035	0.025	0.085	1.4	3 000	3 000
886	904	971	0	0.040	0.027	0.085	1.5	2 440	3 000
1 086	1 104	1 171	0	0.046	0.030	0.110	1.8	1 610	2 240

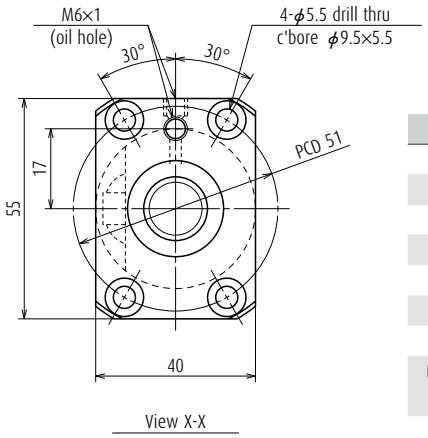
Notes 4. If Fixed is used for opposite driven side, configuration of support bearing area is designed by the customer.



Ball screw No.		Stroke	
Preloaded (PFT)	Precise clearance (SFT)	Nominal	Maximum
W1601FA-1P-C3Z5	W1601FA-2-C3T5	100	141
W1602FA-1P-C3Z5	W1602FA-2-C3T5	200	241
W1603FA-1P-C3Z5	W1603FA-2-C3T5	300	341
W1604FA-1P-C3Z5	W1604FA-2-C3T5	400	441
W1606FA-1P-C3Z5	W1606FA-2-C3T5	600	641
W1608FA-1P-C3Z5	W1608FA-2-C3T5	800	841

Notes

1. We recommend NSK support unit. See page 324 for details.
2. Use of NSK grease LR3 is recommended. Recommended quantity of grease is about 50% of ball nut's internal space. See page 445 for details.
3. Contact NSK if the permissible rotational speed is to be exceeded.



Screw shaft ϕ16
Lead 5

Unit: mm

Ball screw specifications			
Product classification		Preloaded	Precise clearance
Shaft dia. × Lead / Direction of turn		16 × 5 / Right	
Preload / Ball recirculation		P-preload / Return tube	
Ball dia. / Ball circle dia.		3.175 / 16.5	
Screw shaft root diameter		13.2	
Effective turns of balls		2.5 × 1	
Accuracy grade / Preload / Axial play		C3 / Z	C3 / T
Basic load rating (N)	Dynamic C_a	5 430	8 620
	Static C_{0a}	6 890	13 800
Axial play		0	0.005 or less
Preload (N)		147	–
Dynamic friction torque, (N·cm)		1.5 – 7.8	2.0 or less
Spacer ball		Yes	None
Factory-packed grease		NSK grease LR3	
Internal spatial volume of nut (cm^3)		2.6	
Standard volume of grease replenishing (cm^3)		1.3	

Recommended support unit

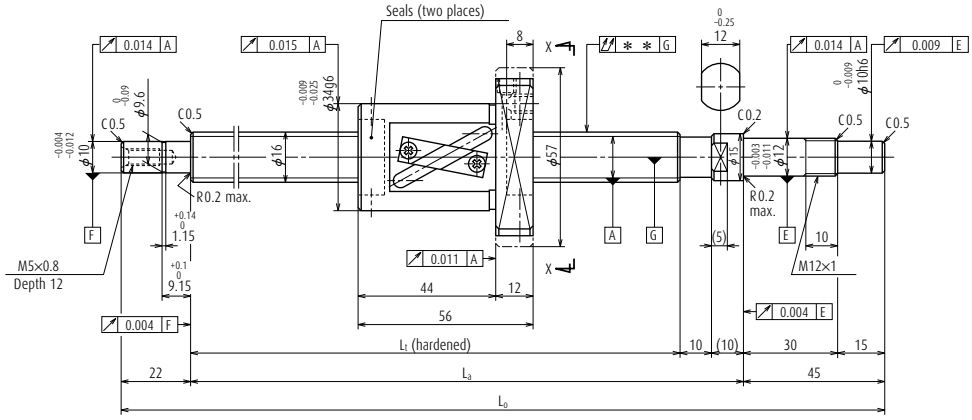
For drive side (Fixed)	For opposite to drive side (Simple)
WBK12-01A (square)	WBK12S-01 (square)
WBK12-11 (round)	

Unit: mm

Screw shaft length			Lead accuracy			Shaft run-out **	Mass (kg)	Permissible rotational speed N (min^{-1})	
								Supporting condition	
L_t	L_a	L_0	T	e_p	v_u			Fixed - Simple support	Fixed - Fixed
189	204	271	0	0.010	0.008	0.020	0.70	3 000	3 000
289	304	371	0	0.012	0.008	0.030	0.83	3 000	3 000
389	404	471	0	0.013	0.010	0.035	0.97	3 000	3 000
489	504	571	0	0.015	0.010	0.045	1.1	3 000	3 000
689	704	771	0	0.018	0.013	0.055	1.4	3 000	3 000
889	904	971	0	0.021	0.015	0.075	1.6	2 570	3 000

Notes 4. If Fixed is used for opposite driven side, configuration of support bearing area is designed by the customer.

24. Finished shaft end FA Type (High helix lead)



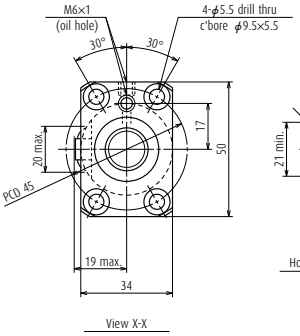
Ball screw No.		Stroke	
Preloaded (LPFT)	Precise clearance (LSFT)	Nominal	Maximum
W1601FA-3P-C5Z16	W1601FA-4-C5T16	100	122
W1602FA-3P-C5Z16	W1602FA-4-C5T16	150	172
W1602FA-5P-C5Z16	W1602FA-6-C5T16	200	222
W1603FA-3P-C5Z16	W1603FA-4-C5T16	250	272
W1603FA-5P-C5Z16	W1603FA-6-C5T16	300	322
W1604FA-3P-C5Z16	W1604FA-4-C5T16	350	372
W1604FA-5P-C5Z16	W1604FA-6-C5T16	400	422
W1605FA-1P-C5Z16	W1605FA-2-C5T16	450	472
W1605FA-3P-C5Z16	W1605FA-4-C5T16	500	522
W1606FA-3P-C5Z16	W1606FA-4-C5T16	550	572
W1606FA-5P-C5Z16	W1606FA-6-C5T16	600	622
W1607FA-1P-C5Z16	W1607FA-2-C5T16	700	722
W1608FA-3P-C5Z16	W1608FA-4-C5T16	800	822
W1610FA-1P-C5Z16	W1610FA-2-C5T16	1 000	1 022

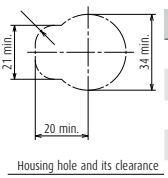
Notes

1. We recommend NSK support unit. See page 324 for details.
2. Use of NSK grease LR3 is recommended. Recommended quantity of grease is about 50% of ball nut's internal space. See page 445 for details.
3. Contact NSK if the permissible rotational speed is to be exceeded.

Screw shaft ϕ 16
Lead 16

Unit: mm





Housing hole and its clearance

Ball screw specifications			
Product classification		Preloaded	Precise clearance
Shaft dia. × Lead / Direction of turn		16 × 16 / Right	
Preload / Ball recirculation		P-preload / Return tube	
Ball dia. / Ball circle dia.		3.175 / 16.75	
Screw shaft root diameter		13.4	
Effective turns of balls		1.5 × 1	
Accuracy grade / Preload / Axial play		C5 / Z	C5 / T
Basic load rating (N)	Dynamic C_a	4 180	5 480
	Static C_{0a}	5 390	8 080
Axial play		0	0.005 or less
Preload (N)		147	–
Dynamic friction torque, (N·cm)		1.5 – 7.8	2.4 or less
Spacer ball		Yes	None
Factory-packed grease		NSK grease LR3	
Internal spatial volume of nut (cm³)		2.1	
Standard volume of grease replenishing (cm³)		1.1	

Recommended support unit

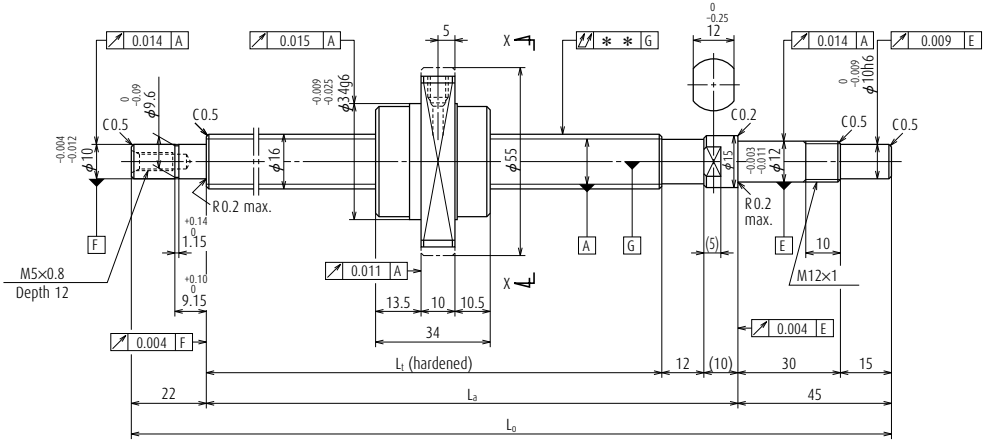
For drive side (Fixed)	For opposite to drive side (Simple)
WBK12-01A (square)	WBK12S-01 (square)
WBK12-11 (round)	

Unit: mm

Screw shaft length			Lead accuracy			Shaft run-out **	Mass (kg)	Permissible rotational speed N (min⁻¹)	
								Supporting condition	
L_t	L_a	L_0	T	e_p	U_u			Fixed - Simple support	Fixed - Fixed
184	204	271	0	0.020	0.018	0.025	0.69	3 000	3 000
234	254	321	0	0.023	0.018	0.035	0.77	3 000	3 000
284	304	371	0	0.023	0.018	0.035	0.84	3 000	3 000
334	354	421	0	0.025	0.020	0.040	0.92	3 000	3 000
384	404	471	0	0.025	0.020	0.040	0.99	3 000	3 000
434	454	521	0	0.027	0.020	0.050	1.1	3 000	3 000
484	504	571	0	0.027	0.020	0.050	1.1	3 000	3 000
534	554	621	0	0.030	0.023	0.050	1.2	3 000	3 000
584	604	671	0	0.030	0.023	0.065	1.3	3 000	3 000
634	654	721	0	0.035	0.025	0.065	1.4	3 000	3 000
684	704	771	0	0.035	0.025	0.065	1.4	3 000	3 000
784	804	871	0	0.035	0.025	0.085	1.6	3 000	3 000
884	904	971	0	0.040	0.027	0.085	1.7	2 720	3 000
1 084	1 104	1 171	0	0.046	0.030	0.110	2.0	1 790	2 480

Notes 4. If Fixed is used for opposite driven side, configuration of support bearing area is designed by the customer.

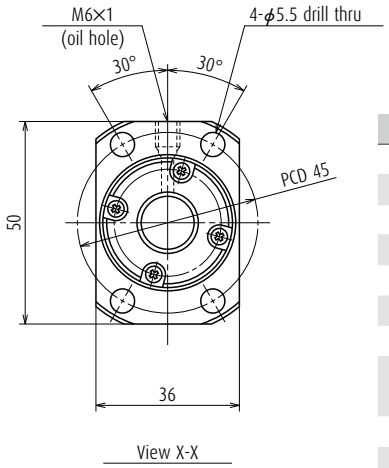
24. Finished shaft end FA Type (Ultra high helix lead)



Ball screw No.		Stroke	
Preloaded (UPFC)	Precise clearance (USFC)	Nominal	Maximum
W1603FA-7PGX-C5Z32	W1603FA-8GX-C5T32	300	342
W1605FA-5PGX-C5Z32	W1605FA-6GX-C5T32	500	542
W1608FA-5PGX-C5Z32	W1608FA-6GX-C5T32	800	842
W1612FA-1PGX-C5Z32	W1612FA-2GX-C5T32	1 200	1 242

Notes

1. We recommend NSK support unit. See page 324 for details.
2. Use of NSK grease LR3 is recommended. Recommended quantity of grease is about 50% of ball nut's internal space. See page 445 for details.
3. Ball nut does not have seal.
4. Contact NSK if the permissible rotational speed is to be exceeded.



Screw shaft ϕ16
Lead 32

Unit: mm

Ball screw specifications			
Product classification		Preloaded	Precise clearance
Shaft dia. × Lead / Direction of turn		16 × 32 / Right	
Preload / Ball recirculation		P-preload / Return tube	
Ball dia. / Ball circle dia.		3.175 / 16.75	
Screw shaft root diameter		13.4	
Effective turns of balls		0.7 × 2	
Accuracy grade / Preload / Axial play		C5 / Z	C5 / T
Basic load rating (N)	Dynamic C_a	4 800	
	Static C_{0a}	7 510	
Axial play		0	0.005 or less
Preload (N)		118	–
Dynamic friction torque, (N·cm)		1.5 – 9.8	2.4 or less
Spacer ball		Yes	None
Factory-packed grease		NSK grease LR3	
Internal spatial volume of nut (cm^3)		2.0	
Standard volume of grease replenishing (cm^3)		1.0	

Recommended support unit

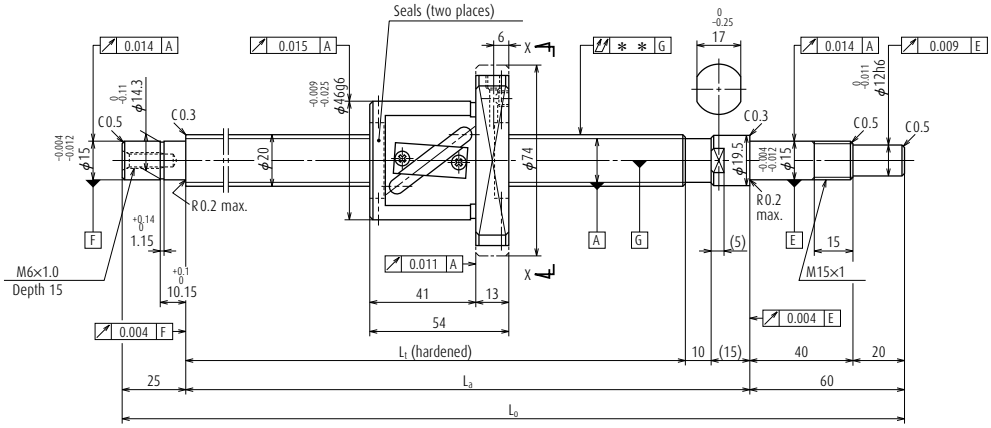
For drive side (Fixed)	For opposite to drive side (Simple)
WBK12-01A (square)	WBK12S-01 (square)
WBK12-11 (round)	

Unit: mm

Screw shaft length			Lead accuracy			Shaft run-out **	Mass	Permissible rotational speed N (min^{-1})	
								Supporting condition	
L_t	L_a	L_0	T	e_p	v_u			Fixed - Simple support	Fixed - Fixed
382	404	471	0	0.025	0.020	0.040	0.90	3 000	3 000
582	604	671	0	0.030	0.023	0.065	1.2	3 000	3 000
882	904	971	0	0.040	0.027	0.085	1.7	2 670	3 000
1 282	1 304	1 371	0	0.054	0.035	0.150	2.3	1 250	1 740

Notes 5. If Fixed is used for opposite driven side, configuration of support bearing area is designed by the customer.

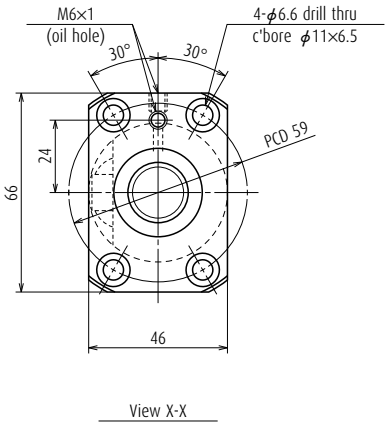
24. Finished shaft end FA Type (Medium lead)



Ball screw No.		Stroke	
Preloaded (LPFT)	Precise clearance (LSFT)	Nominal	Maximum
W2002FA-1P-C5Z10	W2002FA-2-C5T10	200	229
W2003FA-1P-C5Z10	W2003FA-2-C5T10	300	329
W2004FA-1P-C5Z10	W2004FA-2-C5T10	400	429
W2005FA-1P-C5Z10	W2005FA-2-C5T10	500	529
W2006FA-1P-C5Z10	W2006FA-2-C5T10	600	629
W2007FA-1P-C5Z10	W2007FA-2-C5T10	700	729
W2008FA-1P-C5Z10	W2008FA-2-C5T10	800	829
W2009FA-1P-C5Z10	W2009FA-2-C5T10	900	929
W2010FA-1P-C5Z10	W2010FA-2-C5T10	1 000	1 029
W2011FA-1P-C5Z10	W2011FA-2-C5T10	1 100	1 129
W2012FA-1P-C5Z10	W2012FA-2-C5T10	1 200	1 229

Notes

1. We recommend NSK support unit. See page 324 for details.
2. Use of NSK grease LR3 is recommended. Recommended quantity of grease is about 50% of ball nut's internal space. See page 445 for details.
3. Contact NSK if the permissible rotational speed is to be exceeded.



Screw shaft ϕ20
Lead 10

Unit: mm

Ball screw specifications			
Product classification		Preloaded	Precise clearance
Shaft dia. × Lead / Direction of turn		20 × 10 / 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		2.5 × 1	
Accuracy grade / Preload / Axial play		C5 / Z	C5 / T
Basic load rating (N)	Dynamic C_a	8 350	13 300
	Static C_{0a}	11 000	21 900
Axial play		0	0.005 or less
Preload (N)		196	–
Dynamic friction torque, (N·cm)		2.0 – 11.8	2.9 or less
Spacer ball		Yes	None
Factory-packed grease		NSK grease LR3	
Internal spatial volume of nut (cm^3)		4.7	
Standard volume of grease replenishing (cm^3)		2.4	

Recommended support unit

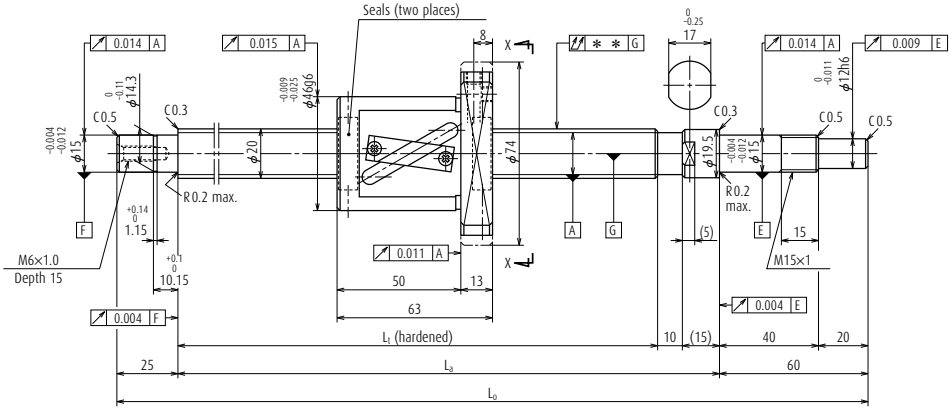
For drive side (Fixed)	For opposite to drive side (Simple)
WBK15-01A (square)	WBK15S-01 (square)
WBK15-11 (round)	

Unit: mm

Screw shaft length			Lead accuracy			Shaft run-out **	Mass (kg)	Permissible rotational speed N (min^{-1})	
								Supporting condition	
L_t	L_a	L_0	T	e_p	v_u			Fixed - Simple support	Fixed - Fixed
289	314	399	0	0.023	0.018	0.035	1.4	3 000	3 000
389	414	499	0	0.025	0.020	0.040	1.6	3 000	3 000
489	514	599	0	0.027	0.020	0.050	1.9	3 000	3 000
589	614	699	0	0.030	0.023	0.065	2.1	3 000	3 000
689	714	799	0	0.035	0.025	0.065	2.3	3 000	3 000
789	814	899	0	0.035	0.025	0.085	2.5	3 000	3 000
889	914	999	0	0.040	0.027	0.085	2.8	3 000	3 000
989	1 014	1 099	0	0.040	0.027	0.110	3.0	2 710	3 000
1 089	1 114	1 199	0	0.046	0.030	0.110	3.2	2 220	3 000
1 189	1 214	1 299	0	0.046	0.030	0.150	3.4	1 860	2 570
1 289	1 314	1 399	0	0.054	0.035	0.150	3.7	1 580	2 190

Notes 4. If Fixed is used for opposite driven side, configuration of support bearing area is designed by the customer.

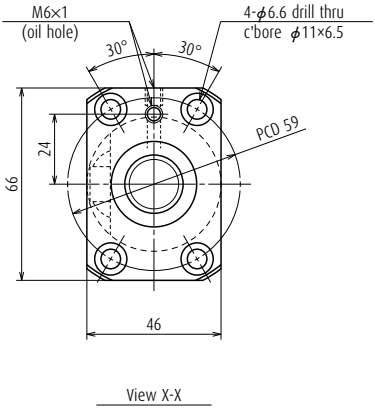
24. Finished shaft end FA Type (High helix lead)



Ball screw No.		Stroke	
Preloaded (LPFT)	Precise clearance (LSFT)	Nominal	Maximum
W2003FA-3P-C5Z20	W2003FA-4-C5T20	200	241
W2004FA-3P-C5Z20	W2004FA-4-C5T20	300	341
W2005FA-3P-C5Z20	W2005FA-4-C5T20	400	441
W2006FA-3P-C5Z20	W2006FA-4-C5T20	500	541
W2007FA-3P-C5Z20	W2007FA-4-C5T20	600	641
W2008FA-3P-C5Z20	W2008FA-4-C5T20	700	741
W2009FA-3P-C5Z20	W2009FA-4-C5T20	800	841
W2010FA-3P-C5Z20	W2010FA-4-C5T20	900	941
W2011FA-3P-C5Z20	W2011FA-4-C5T20	1 000	1 041
W2012FA-3P-C5Z20	W2012FA-4-C5T20	1 100	1 141
W2015FA-1P-C5Z20	W2015FA-2-C5T20	1 400	1 441

Notes

1. We recommend NSK support unit. See page 324 for details.
2. Use of NSK grease LR3 is recommended. Recommended quantity of grease is about 50% of ball nut's internal space. See page 445 for details.
3. Contact NSK if the permissible rotational speed is to be exceeded.



Screw shaft ϕ20
Lead 20

Unit: mm

Ball screw specifications			
Product classification		Preloaded	Precise clearance
Shaft dia. × Lead / Direction of turn		20 × 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 × 1	
Accuracy grade / Preload / Axial play		C5 / Z	C5 / T
Basic load rating (N)	Dynamic C_a	6 250	8 190
	Static C_{0a}	8 760	13 100
Axial play		0	0.005 or less
Preload (N)		196	–
Dynamic friction torque, (N·cm)		2.0 – 11.8	2.9 or less
Spacer ball		Yes	None
Factory-packed grease		NSK grease LR3	
Internal spatial volume of nut (cm^3)		4.2	
Standard volume of grease replenishing (cm^3)		2.1	

Recommended support unit

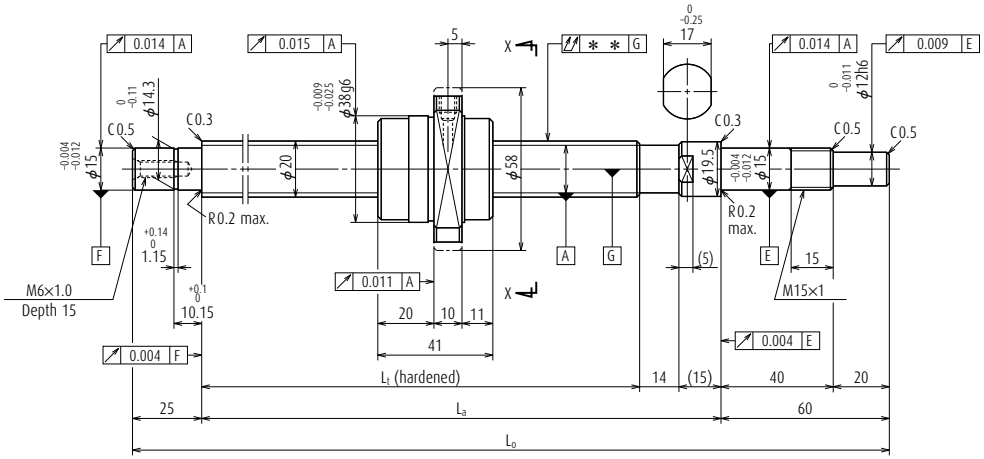
For drive side (Fixed)	For opposite to drive side (Simple)
WBK15-01A (square)	WBK15S-01 (square)
WBK15-11 (round)	

Unit: mm

Screw shaft length			Lead accuracy			Shaft run-out **	Mass (kg)	Permissible rotational speed N (min^{-1})	
								Supporting condition	
L_t	L_a	L_0	T	e_p	v_u			Fixed - Simple support	Fixed - Fixed
310	335	420	0	0.023	0.018	0.040	1.6	3 000	3 000
410	435	520	0	0.027	0.020	0.050	1.8	3 000	3 000
510	535	620	0	0.030	0.023	0.050	2.0	3 000	3 000
610	635	720	0	0.030	0.023	0.065	2.3	3 000	3 000
710	735	820	0	0.035	0.025	0.085	2.5	3 000	3 000
810	835	920	0	0.040	0.027	0.085	2.7	3 000	3 000
910	935	1 020	0	0.040	0.027	0.110	3.0	3 000	3 000
1 010	1 035	1 120	0	0.046	0.030	0.110	3.2	2 630	3 000
1 110	1 135	1 220	0	0.046	0.030	0.110	3.4	2 160	2 970
1 210	1 235	1 320	0	0.046	0.030	0.150	3.7	1 810	2 500
1 510	1 535	1 620	0	0.054	0.035	0.180	4.4	1 150	1 610

Notes 4. If Fixed is used for opposite driven side, configuration of support bearing area is designed by the customer.

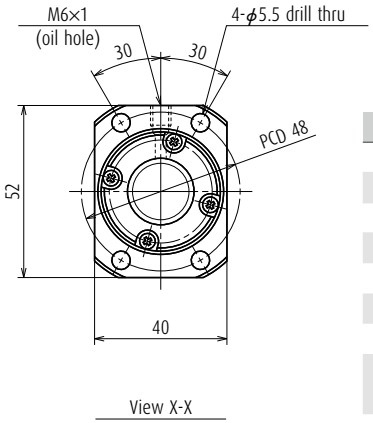
24. Finished shaft end FA Type (Ultra high helix lead)



Ball screw No.		Stroke	
Preloaded (UPFC)	Precise clearance (USFC)	Nominal	Maximum
W2005FA-5PGX-C5Z40	W2005FA-6GX-C5T40	400	459
W2007FA-5PGX-C5Z40	W2007FA-6GX-C5T40	600	659
W2009FA-5PGX-C5Z40	W2009FA-6GX-C5T40	800	859
W2011FA-5PGX-C5Z40	W2011FA-6GX-C5T40	1 000	1 059
W2013FA-1PGX-C5Z40	W2013FA-2GX-C5T40	1 200	1 259
W2017FA-1PGX-C5Z40	W2017FA-2GX-C5T40	1 600	1 659

Notes

1. We recommend NSK support unit. See page 324 for details.
2. Use of NSK grease LR3 is recommended. Recommended quantity of grease is about 50% of ball nut's internal space. See page 445 for details.
3. Ball nut does not have seal.
4. Contact NSK if the permissible rotational speed is to be exceeded.



Screw shaft ϕ20
Lead 40

Unit: mm

Ball screw specifications			
Product classification		Preloaded	Precise clearance
Shaft dia. × Lead / Direction of turn		20 × 40 / Right	
Preload / Ball recirculation		P-preload / End cap	
Ball dia. / Ball circle dia.		3.175 / 20.75	
Screw shaft root diameter		17.4	
Effective turns of balls		0.7 × 2	
Accuracy grade / Preload / Axial play		C5 / Z	C5 / T
Basic load rating (N)	Dynamic C_a	5 410	
	Static C_{0a}	9 360	
Axial play		0	0.005 or less
Preload (N)		148	–
Dynamic friction torque, (N·cm)		2.0 - 11.8	2.9 or less
Spacer ball		Yes	None
Factory-packed grease		NSK grease LR3	
Internal spatial volume of nut (cm^3)		2.8	
Standard volume of grease replenishing (cm^3)		1.4	

Recommended support unit

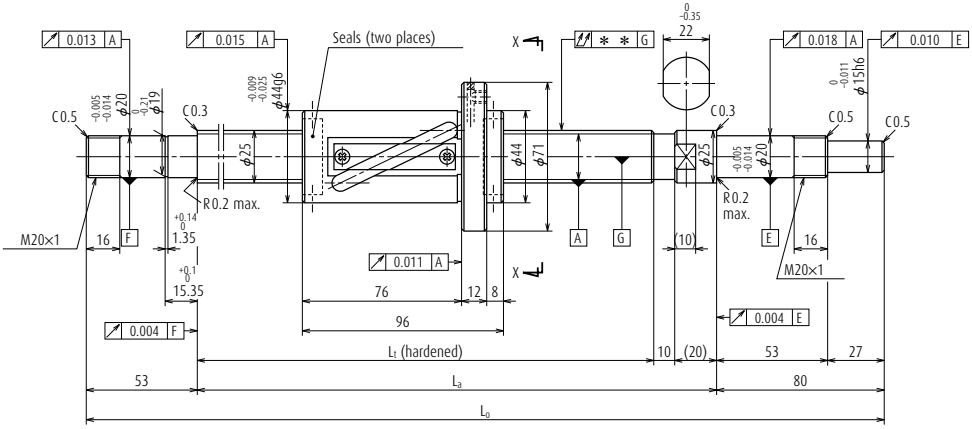
For drive side (Fixed)	For opposite to drive side (Simple)
WBK15-01A (square)	WBK15S-01 (square)
WBK15-11 (round)	

Unit: mm

Screw shaft length			Lead accuracy			Shaft run-out **	Mass (kg)	Permissible rotational speed N (min^{-1})	
								Supporting condition	
L_t	L_a	L_0	T	e_p	v_u			Fixed - Simple support	Fixed - Fixed
506	535	620	0	0.030	0.023	0.050	1.7	3 000	3 000
706	735	820	0	0.035	0.025	0.085	2.2	3 000	3 000
906	935	1 020	0	0.040	0.027	0.110	2.7	3 000	3 000
1 106	1 135	1 220	0	0.046	0.030	0.110	3.1	2 210	3 000
1 306	1 335	1 420	0	0.054	0.035	0.150	3.6	1 570	2 160
1 706	1 735	1 820	0	0.065	0.040	0.230	4.6	910	1 270

Notes 5. If Fixed is used for opposite driven side, configuration of support bearing area is designed by the customer.

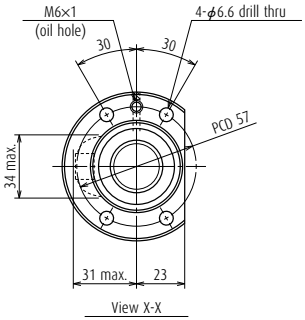
24. Finished shaft end FA Type (Medium lead)

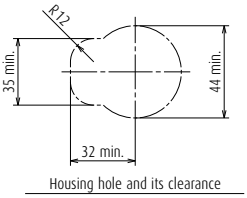


Ball screw No.		Stroke	
Preloaded (LPFT)	Precise clearance (LSFT)	Nominal	Maximum
W2507FA-1P-C5Z20	W2507FA-2-C5T20	600	640
W2509FA-1P-C5Z20	W2509FA-2-C5T20	800	840
W2511FA-1P-C5Z20	W2511FA-2-C5T20	1 000	1 040
W2513FA-1P-C5Z20	W2513FA-2-C5T20	1 200	1 240
W2515FA-1P-C5Z20	W2515FA-2-C5T20	1 400	1 440
W2517FA-1P-C5Z20	W2517FA-2-C5T20	1 600	1 640
W2521FA-1P-C5Z20	W2521FA-2-C5T20	2 000	2 040

Notes

1. We recommend NSK support unit. See page 324 for details.
2. Use of NSK grease LR3 is recommended. Recommended quantity of grease is about 50% of ball nut's internal space. See page 445 for details.
3. Contact NSK if the permissible rotational speed is to be exceeded.





Screw shaft ϕ25
Lead 20

Unit: mm

Ball screw specifications			
Product classification		Preloaded	Precise clearance
Shaft dia. × Lead / Direction of turn		25 × 20 / Right	
Preload / Ball recirculation		P-preload / Return tube	
Ball dia. / Ball circle dia.		4.762 / 26.25	
Screw shaft root diameter		21.3	
Effective turns of balls		2.5 × 1	
Accuracy grade / Preload / Axial play		C5 / Z	C5 / T
Basic load rating (N)	Dynamic C_a	11 700	18 600
	Static C_{0a}	16 300	32 600
Axial play		0	0.005 or less
Preload (N)		343	–
Dynamic friction torque, (N·cm)		3.9 – 24.5	4.9 or less
Spacer ball		Yes	None
Factory-packed grease		NSK grease LR3	
Internal spatial volume of nut (cm^3)		12	
Standard volume of grease replenishing (cm^3)		6	

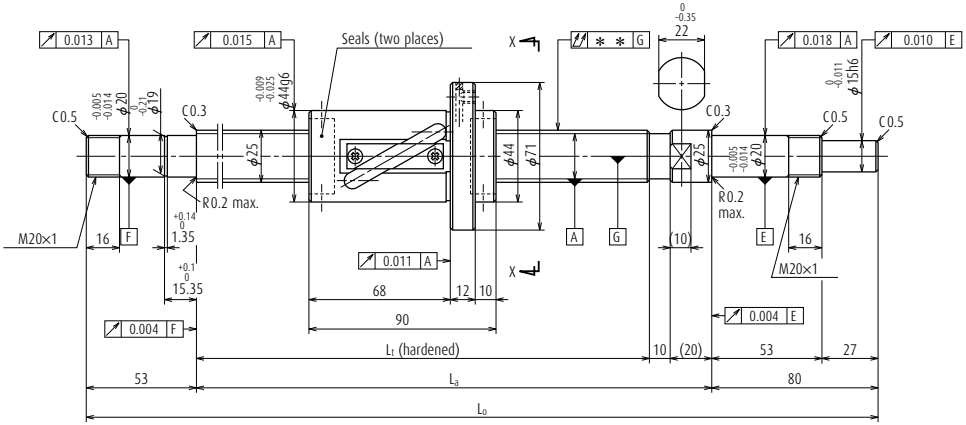
Recommended support unit

For drive side (Fixed)	For opposite to drive side	
	(Fixed)	(Simple)
WBK20-01 (square)	WBK20-01 (square)	WBK20S-01 (square)
WBK20-11 (round)	WBK20-11 (round)	

Unit: mm

Screw shaft length			Lead accuracy			Shaft run-out **	Mass (kg)	Permissible rotational speed N (min^{-1})	
								Supporting condition	
L_t	L_a	L_o	T	e_p	v_u			Fixed - Simple support	Fixed - Fixed
750	780	913	0	0.035	0.025	0.055	4.0	2 800	2 800
950	980	1 113	0	0.040	0.027	0.070	4.7	2 800	2 800
1 150	1 180	1 313	0	0.046	0.030	0.090	5.4	2 590	2 800
1 350	1 380	1 513	0	0.054	0.035	0.090	6.2	1 860	2 550
1 550	1 580	1 713	0	0.054	0.035	0.120	6.9	1 400	1 940
1 750	1 780	1 913	0	0.065	0.040	0.120	7.6	1 090	1 520
2 150	2 180	2 313	0	0.077	0.046	0.160	9.1	720	1 000

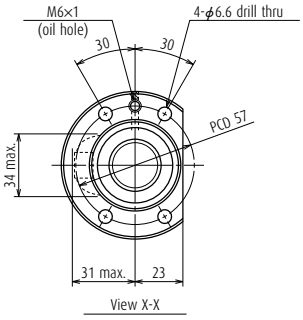
24. Finished shaft end FA Type (High helix lead)

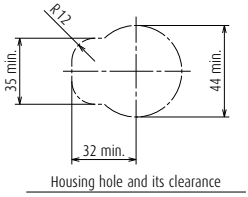


Ball screw No.		Stroke	
Preloaded (LPFT)	Precise clearance (LSFT)	Nominal	Maximum
W2507FA-3P-C5Z25	W2507FA-4-C5T25	600	646
W2509FA-3P-C5Z25	W2509FA-4-C5T25	800	846
W2511FA-3P-C5Z25	W2511FA-4-C5T25	1 000	1 046
W2513FA-3P-C5Z25	W2513FA-4-C5T25	1 200	1 246
W2515FA-3P-C5Z25	W2515FA-4-C5T25	1 400	1 446
W2517FA-3P-C5Z25	W2517FA-4-C5T25	1 600	1 646
W2521FA-3P-C5Z25	W2521FA-4-C5T25	2 000	2 046

Notes

1. We recommend NSK support unit. See page 324 for details.
2. Use of NSK grease LR3 is recommended. Recommended quantity of grease is about 50% of ball nut's internal space. See page 445 for details.
3. Contact NSK if the permissible rotational speed is to be exceeded.





Screw shaft ϕ 25
Lead 25

Unit: mm

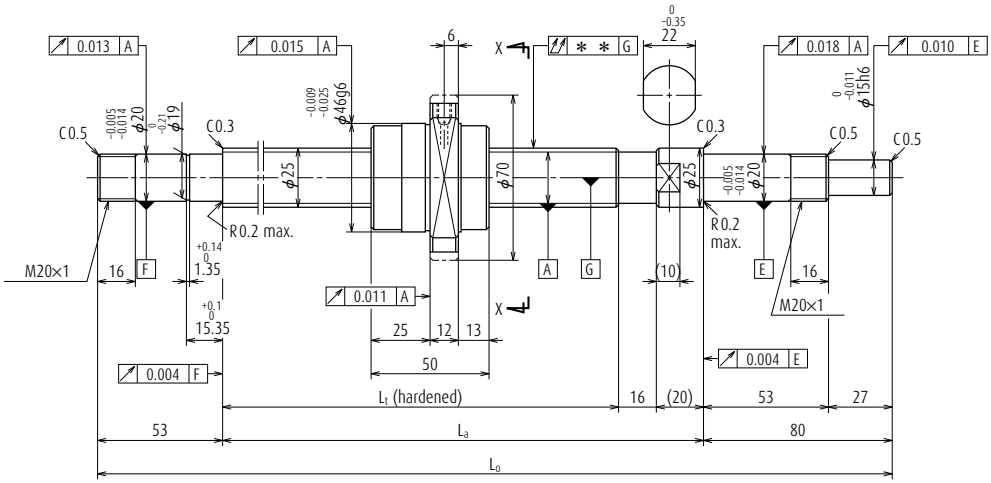
Ball screw specifications			
Product classification		Preloaded	Precise clearance
Shaft dia. × Lead / Direction of turn		25 × 25 / Right	
Preload / Ball recirculation		P-preload / Return tube	
Ball dia. / Ball circle dia.		4.762 / 26.25	
Screw shaft root diameter		21.3	
Effective turns of balls		1.5 × 1	
Accuracy grade / Preload / Axial play		C5 / Z	C5 / T
Basic load rating (N)	Dynamic C_a	8 970	11 700
	Static C_{0a}	13 100	19 700
Axial play		0	0.005 or less
Preload (N)		294	–
Dynamic friction torque, (N·cm)		3.9 – 24.5	4.9
Spacer ball		Yes	None
Factory-packed grease		NSK grease LR3	
Internal spatial volume of nut (cm^3)		7.5	
Standard volume of grease replenishing (cm^3)		3.8	

Recommended support unit

For drive side (Fixed)	For opposite to drive side	
	(Fixed)	(Simple)
WBK20-01 (square)	WBK20-01 (square)	WBK20S-01 (square)
WBK20-11 (round)	WBK20-11 (round)	

Unit: mm

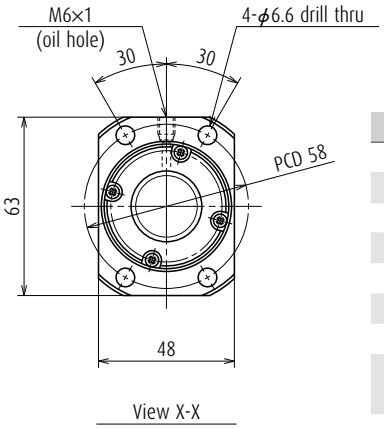
Screw shaft length			Lead accuracy			Shaft run-out **	Mass (kg)	Permissible rotational speed N (min^{-1})	
								Supporting condition	
L_t	L_a	L_0	T	e_p	v_u			Fixed - Simple support	Fixed - Fixed
750	780	913	0	0.035	0.025	0.055	4.0	2 800	2 800
950	980	1 113	0	0.040	0.027	0.070	4.7	2 800	2 800
1 150	1 180	1 313	0	0.046	0.030	0.090	5.4	2 580	2 800
1 350	1 380	1 513	0	0.054	0.035	0.090	6.2	1 850	2 540
1 550	1 580	1 713	0	0.054	0.035	0.120	7.0	1 400	1 930
1 750	1 780	1 913	0	0.065	0.040	0.120	7.7	1 090	1 510
2 150	2 180	2 313	0	0.077	0.046	0.160	9.1	710	1 000



Ball screw No.		Stroke	
Preloaded (UPFC)	Precise clearance (USFC)	Nominal	Maximum
W2508FA-1PGX-C5Z50	W2508FA-2GX-C5T50	700	780
W2511FA-5PGX-C5Z50	W2511FA-6GX-C5T50	1 000	1 080
W2516FA-1PGX-C5Z50	W2516FA-2GX-C5T50	1 500	1 580
W2521FA-5PGX-C5Z50	W2521FA-6GX-C5T50	2 000	2 080

Notes

1. We recommend NSK support unit. See page 324 for details.
2. Use of NSK grease LR3 is recommended. Recommended quantity of grease is about 50% of ball nut's internal space. See page 445 for details.
3. Ball nut does not have seal.
4. Contact NSK if the permissible rotational speed is to be exceeded.



Screw shaft ϕ25
Lead 50

Unit: mm

Ball screw specifications			
Product classification		Preloaded	Precise clearance
Shaft dia. × Lead / Direction of turn		25 × 50 / Right	
Preload / Ball recirculation		P-preload / Return tube	
Ball dia. / Ball circle dia.		3.969 / 26	
Screw shaft root diameter		21.9	
Effective turns of balls		0.7 × 2	
Accuracy grade / Preload / Axial play		C5 / Z	C5 / T
Basic load rating (N)	Dynamic C_a	8 090	
	Static C_{0a}	14 600	
Axial play		0	0.005 or less
Preload (N)		196	–
Dynamic friction torque, (N·cm)		2.9 – 21.5	4.9 or less
Spacer ball		Yes	None
Factory-packed grease		NSK grease LR3	
Internal spatial volume of nut (cm^3)		4.2	
Standard volume of grease replenishing (cm^3)		2.1	

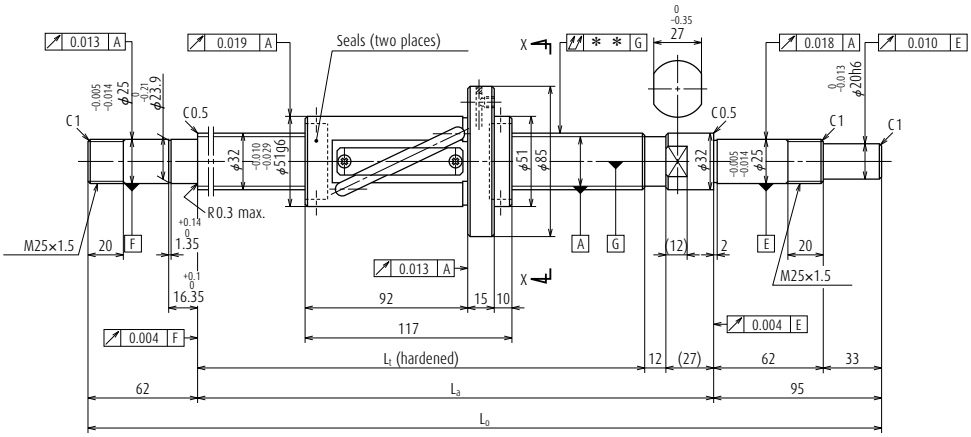
Recommended support unit

For drive side (Fixed)	For opposite to drive side	
	(Fixed)	(Simple)
WBK20-01 (square)	WBK20-01 (square)	WBK20S-01 (square)
WBK20-11 (round)	WBK20-11 (round)	

Unit: mm

Screw shaft length			Lead accuracy			Shaft run-out **	Mass (kg)	Permissible rotational speed N (min^{-1})	
								Supporting condition	
L_t	L_a	L_0	T	e_p	v_u			Fixed - Simple support	Fixed - Fixed
844	880	1 013	0	0.040	0.027	0.070	4.1	2 800	2 800
1 144	1 180	1 313	0	0.046	0.030	0.090	5.3	2 600	2 800
1 644	1 680	1 813	0	0.065	0.040	0.120	7.2	1 250	1 710
2 144	2 180	2 313	0	0.077	0.046	0.160	9.1	730	1 010

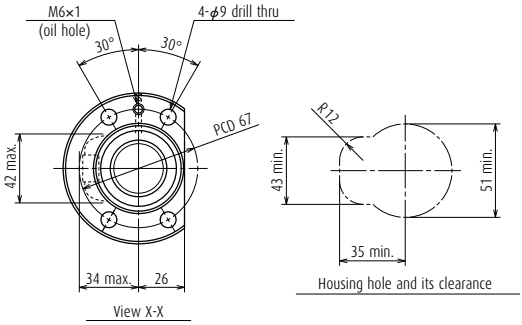
24. Finished shaft end FA Type (Medium lead)



Ball screw No.		Stroke	
Preloaded (UPFC)	Precise clearance (USFC)	Nominal	Maximum
W3211FA-1P-C5Z25	W3211FA-2-C5T25	1 000	1 046
W3216FA-1P-C5Z25	W3216FA-2-C5T25	1 500	1 546
W3221FA-1P-C5Z25	W3221FA-2-C5T25	2 000	2 046
W3227FA-1P-C5Z25	W3227FA-2-C5T25	2 600	2 646

Notes

1. We recommend NSK support unit. See page 324 for details.
2. Use of NSK grease LR3 is recommended. Recommended quantity of grease is about 50% of ball nut's internal space. See page 445 for details.
3. Contact NSK if the permissible rotational speed is to be exceeded.



Screw shaft ϕ 32
Lead 25

Unit: mm

Ball screw specifications			
Product classification		Preloaded	Precise clearance
Shaft dia. × Lead / Direction of turn		32 × 25 / Right	
Preload / Ball recirculation		P-preload / Return tube	
Ball dia. / Ball circle dia.		4.762 / 33.25	
Screw shaft root diameter		28.3	
Effective turns of balls		2.5 × 1	
Accuracy grade / Preload / Axial play		C5 / Z	C5 / T
Basic load rating (N)	Dynamic C_a	12 900	20 400
	Static C_{0a}	21 100	42 200
Axial play		0	0.005 or less
Preload (N)		441	–
Dynamic friction torque, (N·cm)		6.8 – 31.5	7.8 or less
Spacer ball		Yes	None
Factory-packed grease		NSK grease LR3	
Internal spatial volume of nut (cm³)		17.5	
Standard volume of grease replenishing (cm³)		8.8	

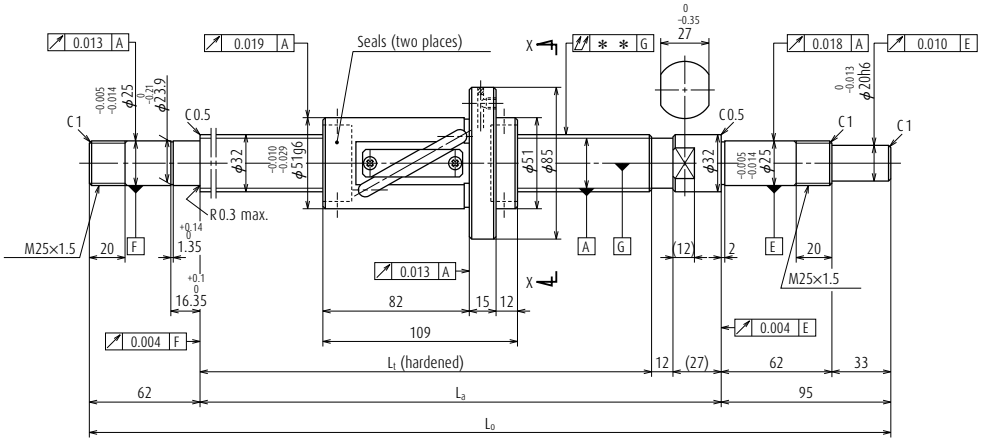
Recommended support unit

For drive side (Fixed)	For opposite to drive side	
	(Fixed)	(Simple)
WBK25-01W (square)	WBK25-01W (square)	WBK25S-01W (square)
WBK25-11 (round)	WBK25-11 (round)	

Unit: mm

Screw shaft length			Lead accuracy			Shaft run-out **	Mass (kg)	Permissible rotational speed N (min⁻¹)	
								Supporting condition	
L_t	L_a	L_o	T	e_p	v_u			Fixed - Simple support	Fixed - Fixed
1 180	1 219	1 376	0	0.046	0.030	0.090	9.3	2 180	2 180
1 680	1 719	1 876	0	0.065	0.040	0.120	12.3	1 600	2 180
2 180	2 219	2 376	0	0.077	0.046	0.160	15.4	930	1 300
2 780	2 819	2 976	0	0.093	0.054	0.200	19.1	570	800

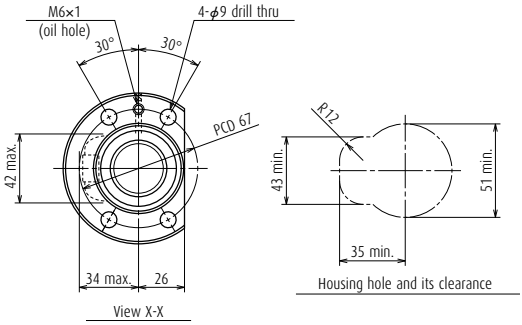
24. Finished shaft end FA Type (High helix lead)



Ball screw No.		Stroke	
Preloaded (LPFT)	Precise clearance (LSFT)	Nominal	Maximum
W3211FA-3P-C5Z32	W3211FA-4-C5T32	1 000	1 054
W3216FA-3P-C5Z32	W3216FA-4-C5T32	1 500	1 554
W3221FA-3P-C5Z32	W3221FA-4-C5T32	2 000	2 054
W3227FA-3P-C5Z32	W3227FA-4-C5T32	2 600	2 654

Notes

1. We recommend NSK support unit. See page 324 for details.
2. Use of NSK grease LR3 is recommended. Recommended quantity of grease is about 50% of ball nut's internal space. See page 445 for details.
3. Contact NSK if the permissible rotational speed is to be exceeded.



Screw shaft ϕ 32
Lead 32

Unit: mm

Ball screw specifications			
Product classification		Preloaded	Precise clearance
Shaft dia. × Lead / Direction of turn		32 × 32 / Right	
Preload / Ball recirculation		P-preload / Return tube	
Ball dia. / Ball circle dia.		4.762 / 33.25	
Screw shaft root diameter		28.3	
Effective turns of balls		1.5 × 1	
Accuracy grade / Preload / Axial play		C5 / Z	C5 / T
Basic load rating (N)	Dynamic C_a	10 100	13 300
	Static C_{0a}	16 800	25 200
Axial play		0	0.005 or less
Preload (N)		392	–
Dynamic friction torque, (N·cm)		6.9 – 31.5	7.8 or less
Spacer ball		Yes	None
Factory-packed grease		NSK grease LR3	
Internal spatial volume of nut (cm^3)		14	
Standard volume of grease replenishing (cm^3)		7	

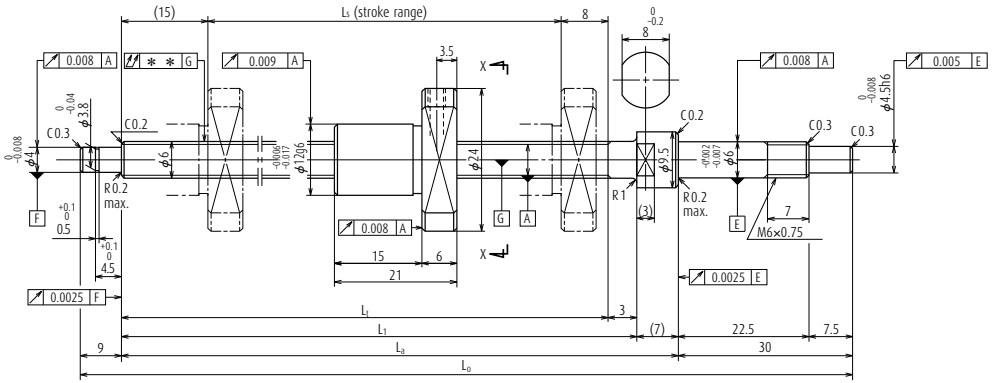
Recommended support unit

For drive side (Fixed)	For opposite to drive side	
	(Fixed)	(Simple)
WBK25-01W (square)	WBK25-01W (square)	WBK25S-01W (square)
WBK25-11 (round)	WBK25-11 (round)	

Unit: mm

Screw shaft length			Lead accuracy			Shaft run-out **	Mass (kg)	Permissible rotational speed N (min^{-1})	
								Supporting condition	
L_t	L_a	L_o	T	e_p	v_u			Fixed - Simple support	Fixed - Fixed
1 180	1 219	1 376	0	0.046	0.030	0.090	9.3	2 180	2 180
1 680	1 719	1 876	0	0.065	0.040	0.120	12.3	1 590	2 180
2 180	2 219	2 376	0	0.077	0.046	0.160	15.4	930	1 290
2 780	2 819	2 976	0	0.093	0.054	0.200	19.1	570	790

25. Finished shaft end stainless steel product KA Type (Fine lead)



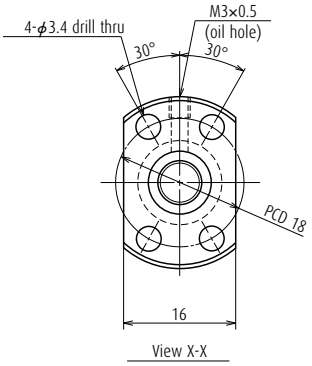
Ball screw No.	Stroke L_s		Thread length			
	Nominal	Maximum	L_t	L_1	L_a	L_o
W0601KA-3PY-C3Z1	100	102	125	128	135	174

Notes

1. **Only rust preventive agent is applied at time of delivery. Please apply lubricant (oil or grease) before use.**
   See page 442 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.

Screw shaft ϕ 6
Lead 1

Unit: mm

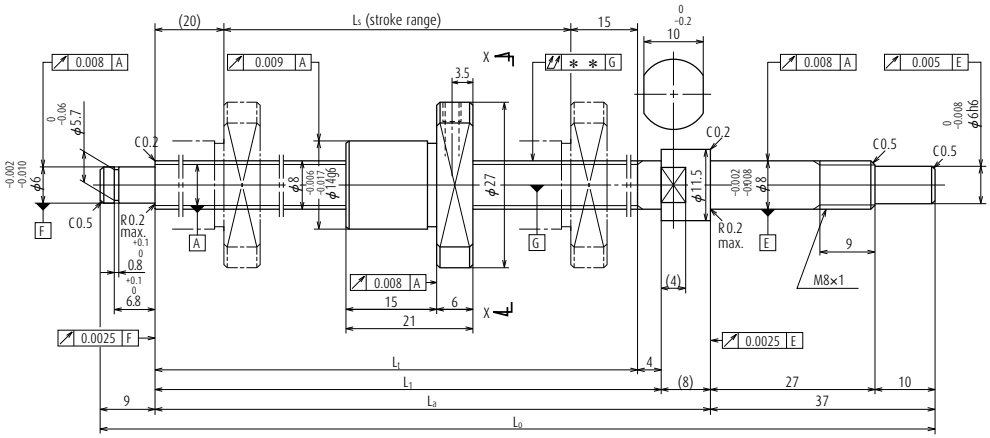


Ball screw specifications		
Shaft dia. × Lead / Direction of turn		6 × 1 / Right
Preload / Ball recirculation		P-preload / Deflector (bridge)
Ball dia. / Ball circle dia.		0.800 / 6.2
Screw shaft root diameter		5.2
Effective turns of balls		1 × 3
Accuracy grade / Preload		C3 / Z
Basic load rating (N)	Dynamic C_a	555
	Static C_{0a}	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

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

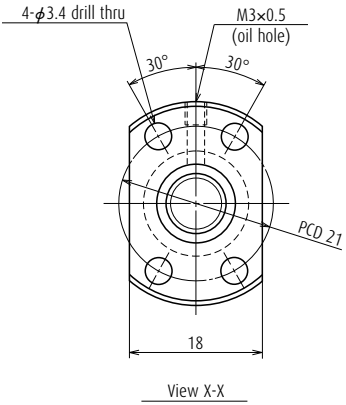
25. Finished shaft end stainless steel product KA Type (Fine lead)



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

Notes

1. **Only rust preventive agent is applied at time of delivery. Please apply lubricant (oil or grease) before use.**
   See page 442 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.



View X-X

Screw shaft ϕ 8
Lead 1

Unit: mm

Ball screw specifications		
Shaft dia. × Lead / Direction of turn		8 × 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 × 3
Accuracy grade / Preload		C3 / Z
Basic load rating (N)	Dynamic C_a	645
	Static C_{0a}	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.**

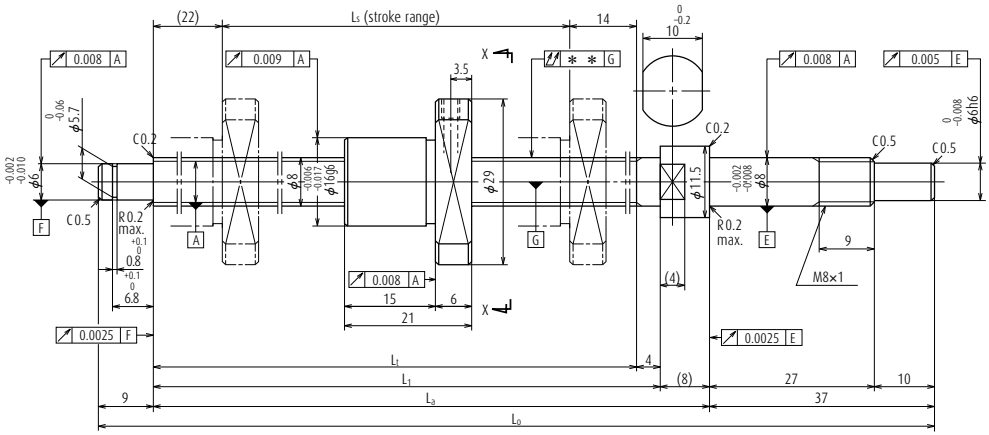
Recommended support unit

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

Unit: mm

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

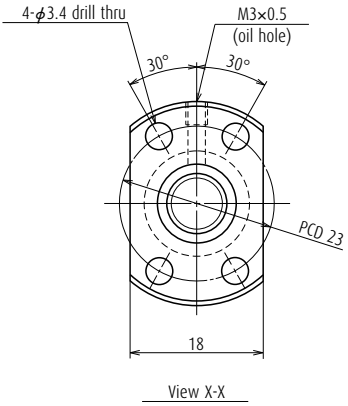
25. Finished shaft end stainless steel product KA Type (Fine lead)



Ball screw No.	Stroke L_s		Thread length			
	Nominal	Maximum	L_t	L_1	L_a	L_o
W0802KA-5PY-C3Z2	150	154	190	194	202	248

Notes

1. **Only rust preventive agent is applied at time of delivery. Please apply lubricant (oil or grease) before use.**
   See page 442 for details.
   Use of NSK Clean Grease LG2 is recommended.
2. Contact NSK if the permissible rotational speed is to be exceeded.



Screw shaft ϕ 8
Lead 2

Unit: mm

Ball screw specifications		
Shaft dia. × Lead / Direction of turn		8 × 2 / Right
Preload / Ball recirculation		P-preload / Deflector (bridge)
Ball dia. / Ball circle dia.		1.200 / 8.3
Screw shaft root diameter		6.9
Effective turns of balls		1 × 3
Accuracy grade / Preload		C3 / Z
Basic load rating (N)	Dynamic C_a	1 270
	Static C_{0a}	1 630
Axial play		0
Preload (N)		49.0
Dynamic friction torque, (N·cm)		2.0 or less
Spacer ball		None
Factory-packed grease		**Refer to Notes 1.**
Internal spatial volume of nut (cm³)		0.34
Standard volume of grease replenishing (cm³)		0.17

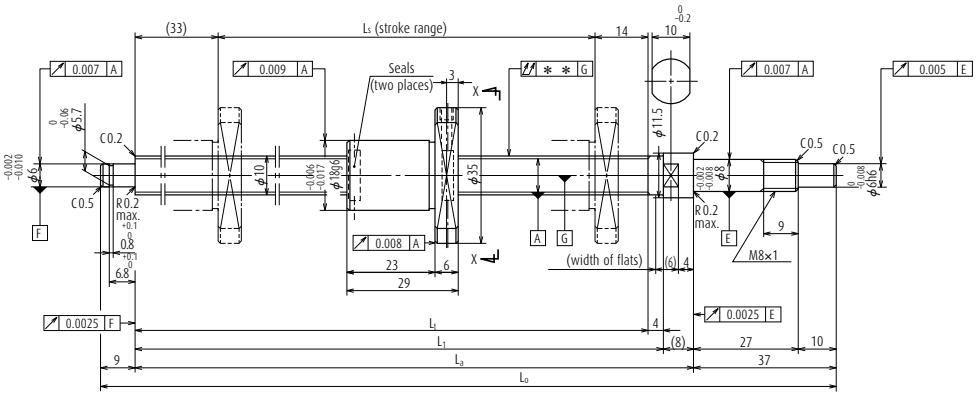
Recommended support unit

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

Unit: mm

Lead accuracy			Shaft run-out **	Mass (kg)	Permissible rotational speed N (min⁻¹)
					Supporting condition
T	e_p	v_u	↗↗		Fixed - Simple Support
0	0.010	0.008	0.035	0.13	3 000

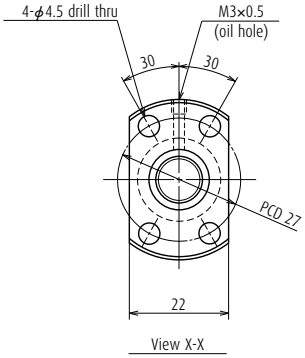
25. Finished shaft end stainless steel product KA Type (Fine lead)



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

Notes

1. **Only rust preventive agent is applied at time of delivery. Please apply lubricant (oil or grease) before use.**
   See page 442 for details.
   Use of NSK Clean Grease LG2 is recommended.
2. Contact NSK if the permissible rotational speed is to be exceeded.



Screw shaft ϕ 10
Lead 2

Unit: mm

Ball screw specifications		
Shaft dia. × 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_a	1 470
	Static C_{0a}	2 190
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 (cm³)		0.44
Standard volume of grease replenishing (cm³)		0.22

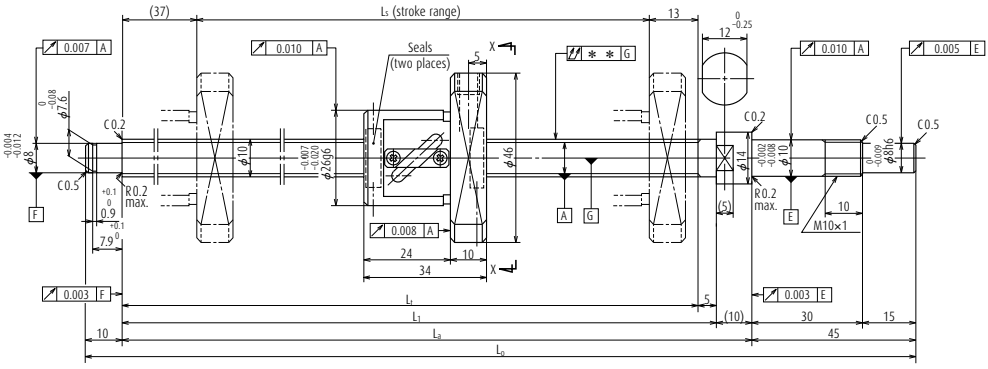
Recommended support unit

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

Unit: mm

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

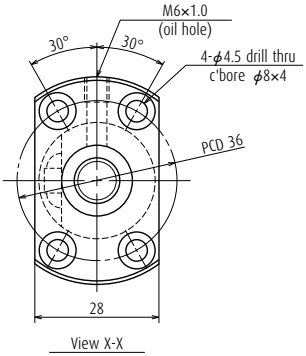
25. Finished shaft end stainless steel product KA Type (Fine lead)



Ball screw No.	Stroke L_s		Thread length			
	Nominal	Maximum	L_t	L_1	L_a	L_o
W1001KA-3P-C3Z4	100	110	160	165	175	230
W1003KA-3P-C3Z4	300	310	360	365	375	430

Notes

1. **Only rust preventive agent is applied at time of delivery. Please apply lubricant (oil or grease) before use.**
   See page 442 for details.
   Use of NSK Clean Grease LG2 is recommended.
2. Contact NSK if the permissible rotational speed is to be exceeded.



Screw shaft ϕ 10
Lead 4

Unit: mm

Ball screw specifications		
Shaft dia. × Lead / Direction of turn		10 × 4 / Right
Preload / Ball recirculation		P-preload / Return tube
Ball dia. / Ball circle dia.		2.000 / 10.3
Screw shaft root diameter		8.2
Effective turns of balls		2.5 × 1
Accuracy grade / Preload		C3 / Z
Basic load rating (N)	Dynamic C_a	2 630
	Static C_{0a}	3 270
Axial play		0
Preload (N)		98.1
Dynamic friction torque, (N·cm)		0.5 – 3.9
Spacer ball		None
Factory-packed grease		**Refer to Notes 1.**
Internal spatial volume of nut (cm³)		0.8
Standard volume of grease replenishing (cm³)		0.4

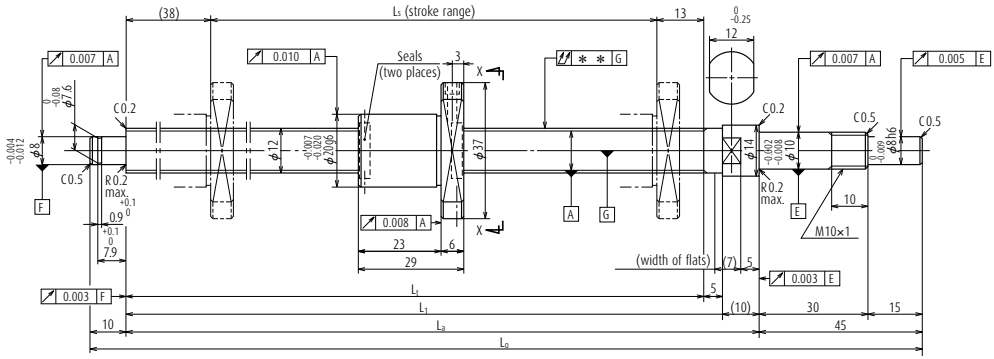
Recommended support unit

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

Unit: mm

Lead accuracy			Shaft run-out **	Mass (kg)	Permissible rotational speed N (min⁻¹)
T	e_p	v_u	↑↑		Supporting condition: Fixed - Simple Support
0	0.010	0.008	0.030	0.29	3 000
0	0.013	0.008	0.050	0.39	3 000

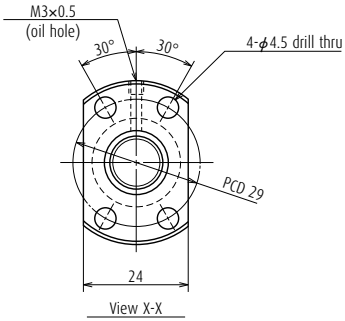
25. Finished shaft end stainless steel product KA Type (Fine lead)



Ball screw No.	Stroke L_s		Thread length			
	Nominal	Maximum	L_t	L_1	L_a	L_o
W1201KA-3PY-C3Z2	100	109	160	165	175	230
W1203KA-1PY-C3Z2	250	259	310	315	325	380

Notes

1. **Only rust preventive agent is applied at time of delivery. Please apply lubricant (oil or grease) before use.**
   See page 442 for details.
   Use of NSK Clean Grease LG2 is recommended.
2. Contact NSK if the permissible rotational speed is to be exceeded.



Screw shaft ϕ 12
Lead 2

Unit: mm

Ball screw specifications		
Shaft dia. × Lead / Direction of turn		12 × 2 / Right
Preload / Ball recirculation		P-preload / Deflector (bridge)
Ball dia. / Ball circle dia.		1.200 / 12.3
Screw shaft root diameter		10.9
Effective turns of balls		1 × 3
Accuracy grade / Preload		C3 / Z
Basic load rating (N)	Dynamic C_a	1 600
	Static C_{0a}	2 670
Axial play		0
Preload (N)		98.1
Dynamic friction torque, (N·cm)		0.4 – 3.4
Spacer ball		None
Factory-packed grease		**Refer to Notes 1.**
Internal spatial volume of nut (cm³)		0.53
Standard volume of grease replenishing (cm³)		0.27

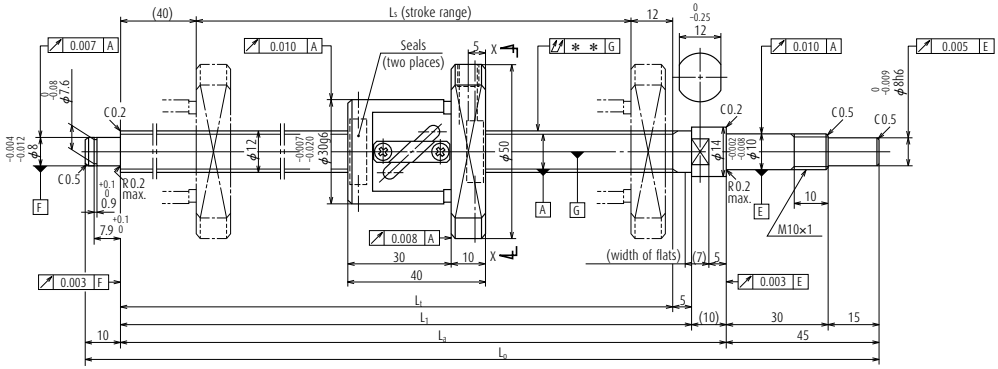
Recommended support unit

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

Unit: mm

Lead accuracy			Shaft run-out **	Mass (kg)	Permissible rotational speed N (min⁻¹)
					Supporting condition
T	e_p	U_U	↑↑		Fixed - Simple Support
0	0.010	0.008	0.030	0.24	3 000
0	0.012	0.008	0.040	0.36	3 000

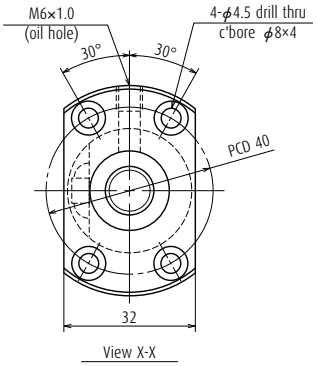
25. Finished shaft end stainless steel product KA Type (Fine lead)



Ball screw No.	Stroke L_s		Thread length			
	Nominal	Maximum	L_t	L_1	L_a	L_o
W1202KA-3P-C3Z5	200	208	260	265	275	330
W1205KA-1P-C3Z5	450	458	510	515	525	580

Notes

1. Only rust preventive agent is applied at time of delivery. Please apply lubricant (oil or grease) before use.
See page 442 for details.
Use of NSK Clean Grease LG2 is recommended.
2. Contact NSK if the permissible rotational speed is to be exceeded.



Screw shaft ϕ 12
Lead 5

Unit: mm

Ball screw specifications		
Shaft dia. × Lead / Direction of turn		12 × 5 / Right
Preload / Ball recirculation		P-preload / Return tube
Ball dia. / Ball circle dia.		2.381 / 12.3
Screw shaft root diameter		9.8
Effective turns of balls		2.5 × 1
Accuracy grade / Preload		C3 / Z
Basic load rating (N)	Dynamic C_a	3 590
	Static C_{0a}	4 630
Axial play		0
Preload (N)		98.1
Dynamic friction torque, (N·cm)		1.0 – 4.4
Spacer ball		None
Factory-packed grease		**Refer to Notes 1.**
Internal spatial volume of nut (cm³)		1.2
Standard volume of grease replenishing (cm³)		0.6

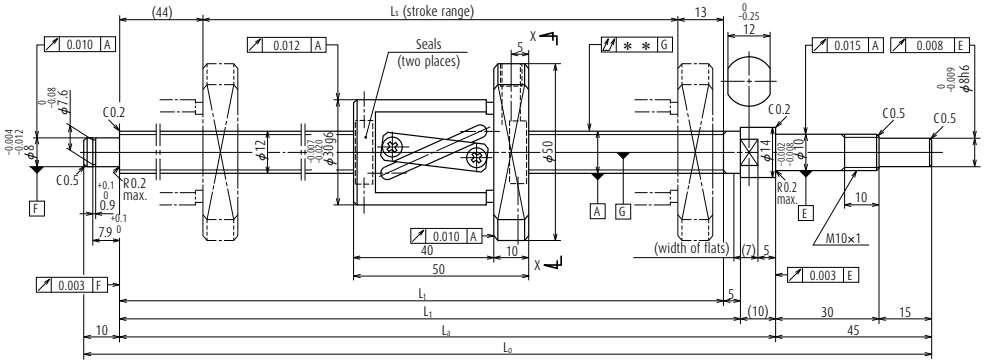
Recommended support unit

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

Unit: mm

Lead accuracy			Shaft run-out **	Mass (kg)	Permissible rotational speed N (min⁻¹)
					Supporting condition
T	e_p	U_u	↗↗		Fixed - Simple Support
0	0.012	0.008	0.040	0.47	3 000
0	0.016	0.012	0.065	0.66	3 000

25. Finished shaft end stainless steel product KA Type (Medium lead)

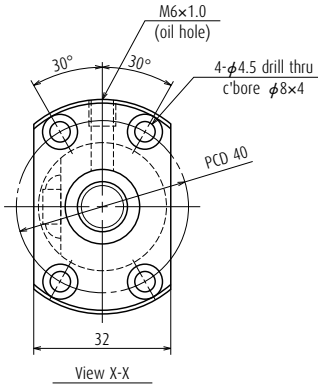


Ball screw No.	Stroke L_s		Thread length			
	Nominal	Maximum	L_t	L_1	L_a	L_o
W1203KA-3P-C5Z10	250	253	310	315	325	380
W1205KA-3P-C5Z10	450	453	510	515	525	580

Notes

1. Only rust preventive agent is applied at time of delivery. Please apply lubricant (oil or grease) before use.
See page 442 for details.
Use of NSK Clean Grease LG2 is recommended.

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



Screw shaft ϕ 12
Lead 10

Unit: mm

Ball screw specifications		
Shaft dia. × Lead / Direction of turn		12 × 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 × 1
Accuracy grade / Preload		C5 / Z
Basic load rating (N)	Dynamic C_a	3 620
	Static C_{0a}	4 750
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 (cm³)		1.4
Standard volume of grease replenishing (cm³)		0.7

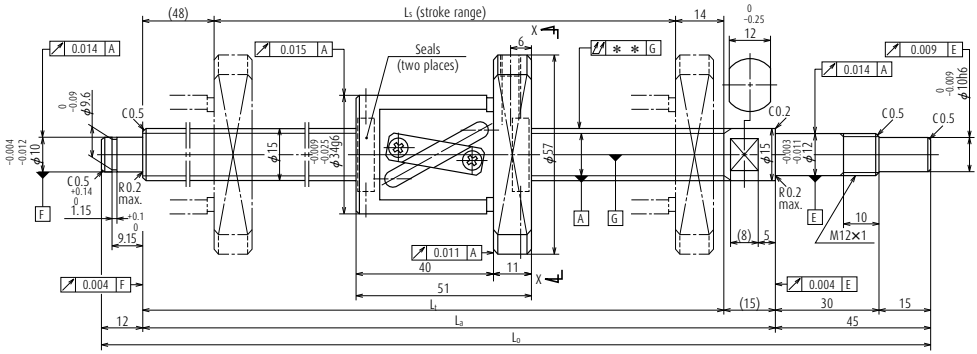
Recommended support unit

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

Unit: mm

Lead accuracy			Shaft run-out **	Mass (kg)	Permissible rotational speed N (min⁻¹)
T	e_p	v_u	↗↗		Supporting condition: Fixed - Simple Support
0	0.023	0.018	0.050	0.56	3 000
0	0.030	0.023	0.075	0.72	3 000

25. Finished shaft end stainless steel product KA Type (Medium lead)

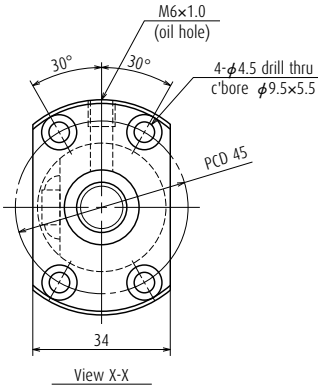


Ball screw No.	Stroke L_s		Thread length		
	Nominal	Maximum	L_t	L_a	L_o
W1504KA-3P-C5Z10	400	427	489	504	561
W1506KA-3P-C5Z10	600	627	689	704	761
W1510KA-1P-C5Z10	1 000	1 027	1 089	1 104	1 161

Notes

1. **Only rust preventive agent is applied at time of delivery. Please apply lubricant (oil or grease) before use.**
   See page 442 for details.
   Use of NSK Clean Grease LG2 is recommended.
2. Contact NSK if the permissible rotational speed is to be exceeded.

Nut model: LPFT



Screw shaft ϕ 15
Lead 10

Unit: mm

Ball screw specifications		
Shaft dia. × Lead / Direction of turn		15 × 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 × 1
Accuracy grade / Preload		C5 / Z
Basic load rating (N)	Dynamic C_a	6 660
	Static C_{0a}	9 480
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

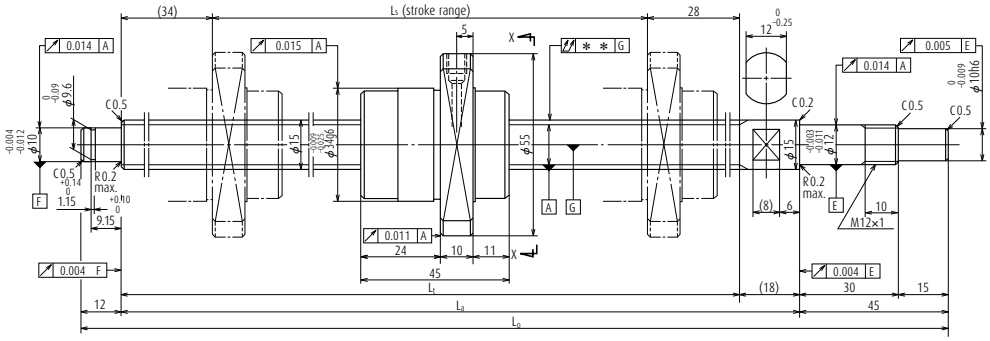
Recommended support unit

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

Unit: mm

Lead accuracy			Shaft run-out **	Mass (kg)	Permissible rotational speed N (min^{-1})
T	e_p	v_u			Supporting condition: Fixed - Simple Support
0	0.027	0.020	0.050	0.99	3 000
0	0.035	0.025	0.065	1.2	3 000
0	0.046	0.030	0.110	1.7	1 610

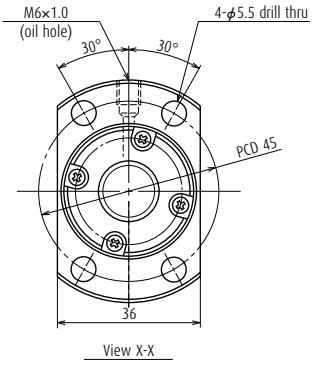
25. Finished shaft end stainless steel product KA Type (Medium lead)



Ball screw No.	Stroke L_s		Thread length		
	Nominal	Maximum	L_t	L_a	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

Notes

1. **Only rust preventive agent is applied at time of delivery. Please apply lubricant (oil or grease) before use.**
   See page 442 for details.
   Use of NSK Clean Grease LG2 is recommended.
2. Contact NSK if the permissible rotational speed is to be exceeded.



Screw shaft ϕ 15
Lead 20

Unit: mm

Ball screw specifications		
Shaft dia. × 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_a	4 630
	Static C_{0a}	6 430
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)		1.9
Standard volume of grease replenishing (cm^3)		1.0

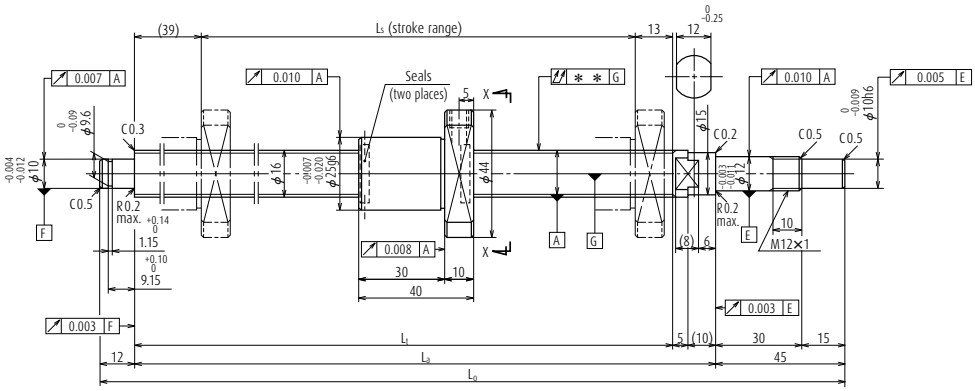
Recommended support unit

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

Unit: mm

Lead accuracy			Shaft run-out **	Mass (kg)	Permissible rotational speed N (min^{-1})
					Supporting condition
T	e_p	U_u	↑↑		Fixed - Simple Support
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

25. Finished shaft end stainless steel product KA Type (Fine lead)



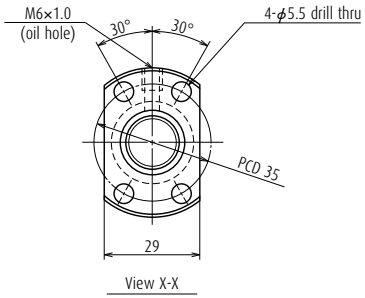
Ball screw No.	Stroke L_s		Thread length		
	Nominal	Maximum	L_t	L_a	L_o
W1601KA-3PY-C3Z2	100	137	189	204	261
W1603KA-1PY-C3Z2	300	337	389	404	461

Notes

1. **Only rust preventive agent is applied at time of delivery. Please apply lubricant (oil or grease) before use.**
   See page 442 for details.
   Use of NSK Clean Grease LG2 is recommended.
2. Contact NSK if the permissible rotational speed is to be exceeded.

Screw shaft ϕ 16
Lead 2

Unit: mm



Ball screw specifications		
Shaft dia. × Lead / Direction of turn		16 × 2 / Right
Preload / Ball recirculation		P-preload / Deflector (bridge)
Ball dia. / Ball circle dia.		1.588 / 16.4
Screw shaft root diameter		14.6
Effective turns of balls		1 × 4
Accuracy grade / Preload		C3 / Z
Basic load rating (N)	Dynamic C_a	3 400
	Static C_{0a}	6 240
Axial play		0
Preload (N)		147
Dynamic friction torque, (N·cm)		0.5 – 4.9
Spacer ball		None
Factory-packed grease		**Refer to Notes 1.**
Internal spatial volume of nut (cm^3)		1.6
Standard volume of grease replenishing (cm^3)		0.8

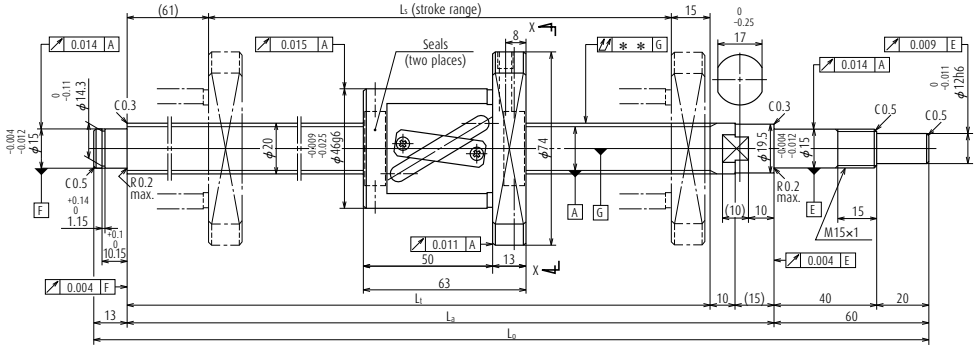
Recommended support unit

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

Unit: mm

Lead accuracy			Shaft run-out **	Mass (kg)	Permissible rotational speed N (min^{-1})
					Supporting condition
T	e_p	v_u			Fixed - Simple Support
0	0.010	0.008	0.020	0.46	3 000
0	0.013	0.010	0.035	0.75	3 000

25. Finished shaft end stainless steel product KA Type (High helix lead)

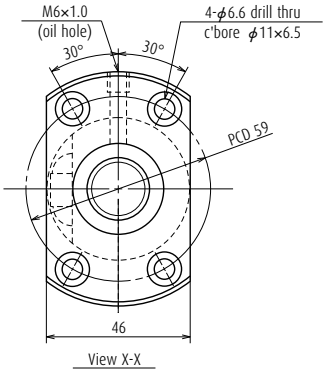


Ball screw No.	Stroke L_s		Thread length		
	Nominal	Maximum	L_t	L_a	L_o
W2005KA-3P-C5Z20	400	434	510	535	608
W2007KA-3P-C5Z20	600	634	710	735	808
W2011KA-3P-C5Z20	1 000	1 034	1 110	1 135	1 208

Notes

1. **Only rust preventive agent is applied at time of delivery. Please apply lubricant (oil or grease) before use.**
   See page 442 for details.
   Use of NSK Clean Grease LG2 is recommended.
2. Contact NSK if the permissible rotational speed is to be exceeded.

Nut model: LPFT



Screw shaft ϕ 20
Lead 20

Unit: mm

Ball screw specifications		
Shaft dia. × Lead / Direction of turn		20 × 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 × 1
Accuracy grade / Preload		C5 / Z
Basic load rating (N)	Dynamic C_a	6 700
	Static C_{0a}	9 710
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 (cm³)		4.2
Standard volume of grease replenishing (cm³)		2.1

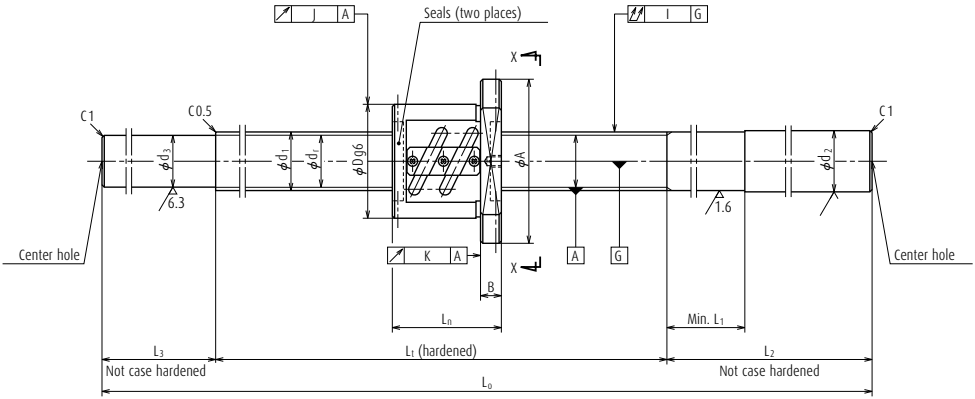
Recommended support unit

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

Unit: mm

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

26. Blank shaft end SS type (Fine lead: Tube type)



Nut type code: PFT

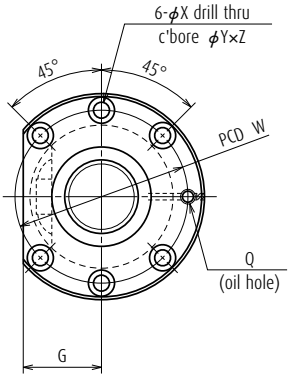
Ball screw No.	Stroke Max. L_t-L_n	Screw shaft dia. d_1	Lead l	Ball dia. D_w	Ball circle dia. d_m	Root dia. d_r	Effective ball turns Turns × Circuits	Basic load rating (N) Dynamic C_a	Basic load rating (N) Static C_{0a}	Preload (N)	Dynamic friction torque, median (N·cm)	Nut Outside dia. D	Nut Flange A	Nut Flange G	Nut Flange B	Nut Overall length L_n	Nut Bolt hole W	Nut Bolt hole X
W2003SS-1P-C5Z4	251	20	4	2.381	20.3	17.8	2.5×2	6 550	10 900	290	3.9	40	63	24	11	49	51	5.5
W2005SS-1P-C5Z4	451	20	4	2.381	20.3	17.8	2.5×2	6 550	10 900	290	3.9	40	63	24	11	49	51	5.5
W2008SS-1P-C5Z4	751	20	4	2.381	20.3	17.8	2.5×2	6 550	10 900	290	3.9	40	63	24	11	49	51	5.5
W2003SS-2P-C5Z5	244	20	5	3.175	20.5	17.2	2.5×2	11 100	17 100	490	7.8	44	67	26	11	56	55	5.5
W2005SS-2P-C5Z5	444	20	5	3.175	20.5	17.2	2.5×2	11 100	17 100	490	7.8	44	67	26	11	56	55	5.5
W2007SS-1P-C5Z5	644	20	5	3.175	20.5	17.2	2.5×2	11 100	17 100	490	7.8	44	67	26	11	56	55	5.5
W2010SS-1P-C5Z5	944	20	5	3.175	20.5	17.2	2.5×2	11 100	17 100	490	7.8	44	67	26	11	56	55	5.5

Notes

1. Use of NSK support unit is recommend. See page 324 for details.
2. **Only rust preventive agent is applied at time of delivery. Please apply lubricant (oil or grease) before use.** See page 442 for details.
3. The permissible rotational speed is determined by d·n value, critical speed and maximum rotational speed. The permissible rotational speed shown in the table is the value when the ball screw mounting method is fixed-fixed.

Nut model: PFT

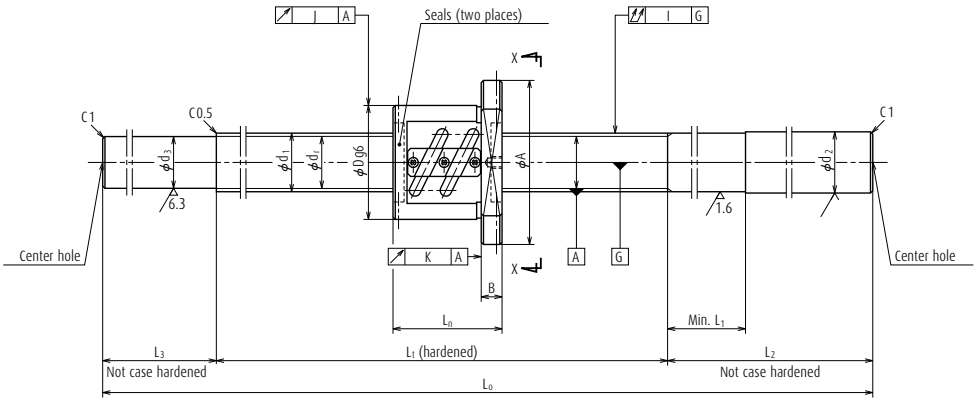
Screw shaft ϕ 20
Lead 4, 5



View X-X

Unit: mm

dimensions			Screw shaft dimensions							Lead accuracy			Run-out			Mass	Per-missible rotational speed	Internal spatial volume of nut	Standard volume of grease replenishing
Bolt hole		Oil hole	Threaded length	Shaft end right			Shaft end left		Overall length	Travel compen-sation	Deviation	Variation	Shaft straight-ness	Radial run-out					
Y	Z	Q	L_t	d_2	L_1	L_2	d_3	L_3	L_0	T	e_p	υ_u	I	J	K	(kg)	N (min^{-1})	(cm^3)	(cm^3)
9.5	5.5	M6×1	300	20.2	40	150	17.8	—	450	-0.007	0.023	0.018	0.055	0.015	0.011	1.5	3 000	2.7	1.4
9.5	5.5	M6×1	500	20.2	40	150	17.8	50	700	-0.012	0.027	0.020	0.085	0.015	0.011	2.0	3 000	2.7	1.4
9.5	5.5	M6×1	800	20.2	40	200	17.8	100	1 100	-0.019	0.035	0.025	0.140	0.015	0.011	2.9	3 000	2.7	1.4
9.5	5.5	M6×1	300	20.2	40	150	17.2	—	450	-0.007	0.023	0.018	0.055	0.015	0.011	1.6	3 000	4.3	2.2
9.5	5.5	M6×1	500	20.2	40	150	17.2	50	700	-0.012	0.027	0.020	0.085	0.015	0.011	2.2	3 000	4.3	2.2
9.5	5.5	M6×1	700	20.2	40	200	17.2	100	1 000	-0.017	0.035	0.025	0.110	0.015	0.011	2.8	3 000	4.3	2.2
9.5	5.5	M6×1	1 000	20.2	40	200	17.2	100	1 300	-0.024	0.040	0.027	0.180	0.015	0.011	3.5	3 000	4.3	2.2



Nut type code: PFT

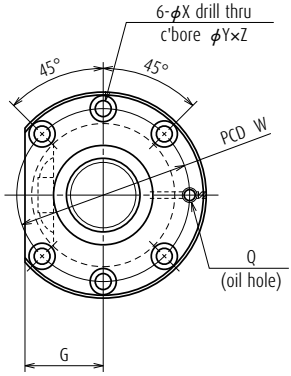
Ball screw No.	Stroke Max. L_t-L_n	Screw shaft dia. d_1	Lead l	Ball dia. D_w	Ball circle dia. d_m	Root dia. d_r	Effective ball turns Turns × Circuits	Basic load rating (N) Dynamic C_a	Basic load rating (N) Static C_{0a}	Preload (N)	Dynamic friction torque, median (N·cm)	Nut Outside dia. D	Nut Flange A	Nut Flange G	Nut Flange B	Nut Overall length L_n	Nut Bolt hole W	Nut Bolt hole X
W2503SS-1P-C5Z4	252	25	4	2.381	25.3	22.8	2.5×2	7 110	13 600	290	4.9	46	69	26	11	48	57	5.5
W2506SS-1P-C5Z4	552	25	4	2.381	25.3	22.8	2.5×2	7 110	13 600	290	4.9	46	69	26	11	48	57	5.5
W2510SS-1P-C5Z4	952	25	4	2.381	25.3	22.8	2.5×2	7 110	13 600	290	4.9	46	69	26	11	48	57	5.5
W2503SS-2P-C5Z5	245	25	5	3.175	25.5	22.2	2.5×2	12 300	21 800	540	8.8	50	73	28	11	55	61	5.5
W2505SS-1P-C5Z5	445	25	5	3.175	25.5	22.2	2.5×2	12 300	21 800	540	8.8	50	73	28	11	55	61	5.5
W2508SS-1P-C5Z5	745	25	5	3.175	25.5	22.2	2.5×2	12 300	21 800	540	8.8	50	73	28	11	55	61	5.5
W2512SS-1P-C5Z5	1 145	25	5	3.175	25.5	22.2	2.5×2	12 300	21 800	540	8.8	50	73	28	11	55	61	5.5
W2504SS-1P-C5Z6	338	25	6	3.969	25.5	21.4	2.5×2	16 600	26 700	690	13.8	53	76	29	11	62	64	5.5
W2508SS-2P-C5Z6	738	25	6	3.969	25.5	21.4	2.5×2	16 600	26 700	690	13.8	53	76	29	11	62	64	5.5
W2512SS-2P-C5Z6	1 138	25	6	3.969	25.5	21.4	2.5×2	16 600	26 700	690	13.8	53	76	29	11	62	64	5.5

Notes

1. Use of NSK support unit is recommend. See page 324 for details.
2. **Only rust preventive agent is applied at time of delivery. Please apply lubricant (oil or grease) before use.** See page 442 for details.
3. The permissible rotational speed is determined by d·n value, critical speed and maximum rotational speed. The permissible rotational speed shown in the table is the value when the ball screw mounting method is fixed-fixed.

Nut model: PFT

Screw shaft ϕ 25
Lead 4, 5, 6

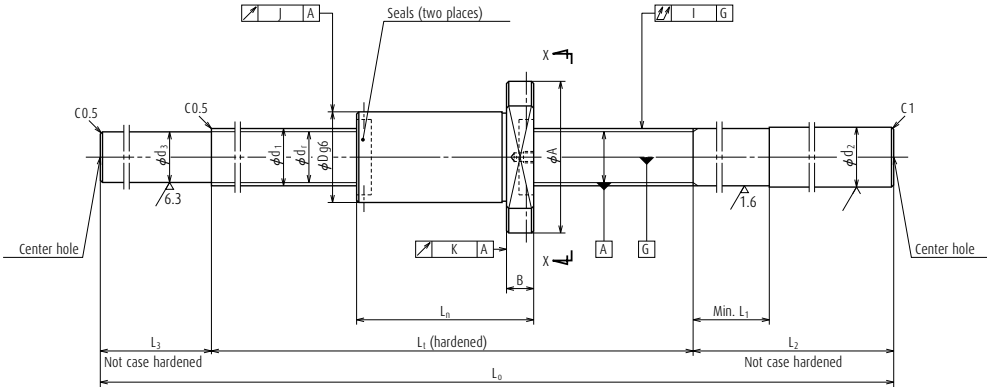


View X-X

Unit: mm

dimensions			Screw shaft dimensions							Lead accuracy			Run-out			Mass	Per-missible rotational speed	Internal spatial volume of nut	Standard volume of grease replenishing
Bolt hole		Oil hole	Threaded length	Shaft end right			Shaft end left		Overall length	Travel compen-sation	Deviation	Variation	Shaft straight-ness	Radial run-out					
Y	Z	Q	L_t	d_2	L_1	L_2	d_3	L_3	L_0	T	e_p	υ_u	I	J	K	(kg)	N (min^{-1})	(cm^3)	(cm^3)
9.5	5.5	M6×1	300	25.2	40	150	22.8	—	450	-0.007	0.023	0.018	0.040	0.015	0.011	2.2	2 800	3.2	1.6
9.5	5.5	M6×1	600	25.2	40	200	22.8	100	900	-0.014	0.030	0.023	0.075	0.015	0.011	3.8	2 800	3.2	1.6
9.5	5.5	M6×1	1 000	25.2	40	200	22.8	100	1 300	-0.024	0.040	0.027	0.120	0.015	0.011	5.2	2 800	3.2	1.6
9.5	5.5	M6×1	300	25.2	40	200	22.2	—	500	-0.007	0.023	0.018	0.040	0.015	0.011	2.5	2 800	5.2	2.6
9.5	5.5	M6×1	500	25.2	40	200	22.2	50	750	-0.012	0.027	0.020	0.060	0.015	0.011	3.4	2 800	5.2	2.6
9.5	5.5	M6×1	800	25.2	40	250	22.2	100	1 150	-0.019	0.035	0.025	0.090	0.015	0.011	4.8	2 800	5.2	2.6
9.5	5.5	M6×1	1 200	25.2	40	300	22.2	100	1 600	-0.029	0.046	0.030	0.120	0.015	0.011	6.3	2 800	5.2	2.6
9.5	5.5	M6×1	400	25.2	40	200	21.4	—	600	-0.010	0.025	0.020	0.050	0.019	0.013	3.0	2 800	7.0	3.5
9.5	5.5	M6×1	800	25.2	40	250	21.4	100	1 150	-0.019	0.035	0.025	0.090	0.019	0.013	4.8	2 800	7.0	3.5
9.5	5.5	M6×1	1 200	25.2	40	300	21.4	100	1 600	-0.029	0.046	0.030	0.120	0.019	0.013	6.3	2 800	7.0	3.5

26. Blank shaft end SS type (Fine lead: Deflector (bridge) type)



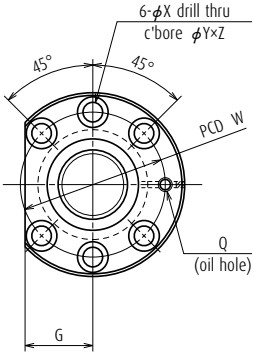
Nut type code: ZFD

Ball screw No.	Stroke Max. L_t-L_n	Screw shaft dia. d_1	Lead l	Ball dia. D_w	Ball circle dia. d_m	Root dia. d_r	Effective ball turns Turns × Circuits	Basic load rating (N) Dynamic C_a	Basic load rating (N) Static C_{0a}	Preload (N)	Dynamic friction torque, median (N·cm)	Nut Outside dia. D	Nut Flange A	Nut Flange G	Nut Flange B	Nut Overall length L_n	Nut Bolt hole W	Nut Bolt hole X
W2502SS-1ZY-C5Z5	184	25	5	3.175	25.75	22.4	1×3	11 600	22 900	740	13.8	40	63	24	11	66	51	5.5
W2504SS-3ZY-C5Z5	334	25	5	3.175	25.75	22.4	1×3	11 600	22 900	740	13.8	40	63	24	11	66	51	5.5
W2506SS-2ZY-C5Z5	534	25	5	3.175	25.75	22.4	1×3	11 600	22 900	740	13.8	40	63	24	11	66	51	5.5
W2509SS-1ZY-C5Z5	834	25	5	3.175	25.75	22.4	1×3	11 600	22 900	740	13.8	40	63	24	11	66	51	5.5
W2512SS-3ZY-C5Z5	1 134	25	5	3.175	25.75	22.4	1×3	11 600	22 900	740	13.8	40	63	24	11	66	51	5.5
W2504SS-4ZY-C5Z10	312	25	10	4.762	26.25	21.3	1×2	13 300	21 200	880	21.5	42	69	26	15	88	55	6.6
W2506SS-3ZY-C5Z10	512	25	10	4.762	26.25	21.3	1×2	13 300	21 200	880	21.5	42	69	26	15	88	55	6.6
W2508SS-3ZY-C5Z10	712	25	10	4.762	26.25	21.3	1×2	13 300	21 200	880	21.5	42	69	26	15	88	55	6.6
W2511SS-1ZY-C5Z10	1 012	25	10	4.762	26.25	21.3	1×2	13 300	21 200	880	21.5	42	69	26	15	88	55	6.6
W2515SS-2ZY-C5Z10	1 412	25	10	4.762	26.25	21.3	1×2	13 300	21 200	880	21.5	42	69	26	15	88	55	6.6

Notes

1. Use of NSK support unit is recommend. See page 324 for details.
2. **Only rust preventive agent is applied at time of delivery. Please apply lubricant (oil or grease) before use.** See page 442 for details.
3. The permissible rotational speed is determined by d·n value, critical speed and maximum rotational speed. The permissible rotational speed shown in the table is the value when the ball screw mounting method is fixed-fixed.

Screw shaft ϕ 25
Lead 5, 10

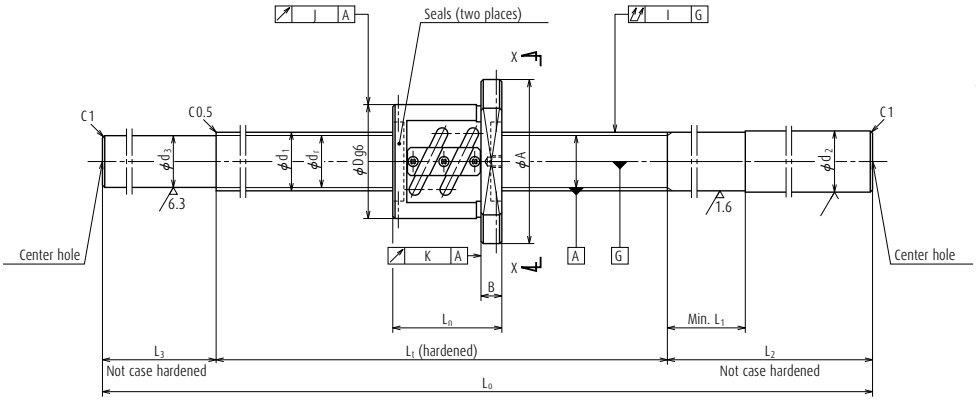


View X-X

Unit: mm

dimensions			Screw shaft dimensions							Lead accuracy			Run-out			Mass	Per-missible rotational speed	Internal spatial volume of nut	Standard volume of grease replenishing
Bolt hole		Oil hole	Threaded length	Shaft end right			Shaft end left		Overall length	Travel compen-sation	Deviation	Variation	Shaft straight-ness	Radial run-out					
Y	Z	Q	L_t	d_2	L_1	L_2	d_3	L_3	L_0	T	e_p	υ_u	I	J	K	(kg)	N (min^{-1})	(cm^3)	(cm^3)
9.5	5.5	M6×1	250	25.2	40	200	22.4	—	450	-0.005	0.023	0.018	0.040	0.015	0.011	2.1	2 800	5.4	2.7
9.5	5.5	M6×1	400	25.2	40	200	22.4	50	650	-0.009	0.025	0.020	0.060	0.015	0.011	2.8	2 800	5.4	2.7
9.5	5.5	M6×1	600	25.2	40	250	22.4	100	950	-0.013	0.030	0.023	0.075	0.015	0.011	3.9	2 800	5.4	2.7
9.5	5.5	M6×1	900	25.2	40	250	22.4	100	1 250	-0.021	0.040	0.027	0.090	0.015	0.011	4.9	2 800	5.4	2.7
9.5	5.5	M6×1	1 200	25.2	40	300	22.4	100	1 600	-0.028	0.046	0.030	0.120	0.015	0.011	6.2	2 800	5.4	2.7
11	6.5	M6×1	400	25.2	60	200	21.3	50	650	-0.008	0.025	0.020	0.060	0.015	0.011	3.0	2 800	9.0	4.5
11	6.5	M6×1	600	25.2	60	250	21.3	100	950	-0.012	0.030	0.023	0.075	0.015	0.011	4.1	2 800	9.0	4.5
11	6.5	M6×1	800	25.2	60	250	21.3	100	1 150	-0.017	0.035	0.025	0.090	0.015	0.011	4.8	2 800	9.0	4.5
11	6.5	M6×1	1 100	25.2	60	300	21.3	100	1 500	-0.024	0.046	0.030	0.120	0.015	0.011	6.0	2 800	9.0	4.5
11	6.5	M6×1	1 500	25.2	60	300	21.3	100	1 900	-0.034	0.054	0.035	0.150	0.015	0.011	7.4	2 800	9.0	4.5

26. Blank shaft end SS type (Fine lead: Tube type)



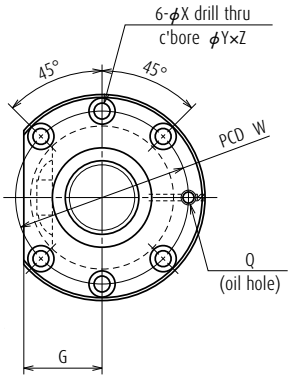
Nut type code: PFT

Ball screw No.	Stroke Max. L_t-L_n	Screw shaft dia. d_1	Lead l	Ball dia. D_w	Ball circle dia. d_m	Root dia. d_r	Effective ball turns Turns × Circuits	Basic load rating (N) Dynamic C_a	Basic load rating (N) Static C_{0a}	Preload (N)	Dynamic friction torque, median (N·cm)	Nut Outside dia. D	Nut Flange A	Nut Flange G	Nut Flange B	Nut Overall length L_n	Nut Bolt hole W	Nut Bolt hole X
W2504SS-2P-C5Z10	319	25	10	4.762	25.5	20.5	1.5×2	13 600	18 900	590	13.8	58	85	32	15	81	71	6.6
W2507SS-1P-C5Z10	619	25	10	4.762	25.5	20.5	1.5×2	13 600	18 900	590	13.8	58	85	32	15	81	71	6.6
W2510SS-2P-C5Z10	919	25	10	4.762	25.5	20.5	1.5×2	13 600	18 900	590	13.8	58	85	32	15	81	71	6.6
W2515SS-1P-C5Z10	1 419	25	10	4.762	25.5	20.5	1.5×2	13 600	18 900	590	13.8	58	85	32	15	81	71	6.6
W2804SS-1P-C5Z5	344	28	5	3.175	28.5	25.2	2.5×2	13 000	24 400	540	9.8	55	85	31	12	56	69	6.6
W2806SS-1P-C5Z5	544	28	5	3.175	28.5	25.2	2.5×2	13 000	24 400	540	9.8	55	85	31	12	56	69	6.6
W2808SS-1P-C5Z5	744	28	5	3.175	28.5	25.2	2.5×2	13 000	24 400	540	9.8	55	85	31	12	56	69	6.6
W2812SS-1P-C5Z5	1 144	28	5	3.175	28.5	25.2	2.5×2	13 000	24 400	540	9.8	55	85	31	12	56	69	6.6
W2804SS-3P-C5Z6	337	28	6	3.175	28.5	25.2	2.5×2	12 900	24 300	540	10.8	55	85	31	12	63	69	6.6
W2806SS-3P-C5Z6	537	28	6	3.175	28.5	25.2	2.5×2	12 900	24 300	540	10.8	55	85	31	12	63	69	6.6
W2808SS-3P-C5Z6	737	28	6	3.175	28.5	25.2	2.5×2	12 900	24 300	540	10.8	55	85	31	12	63	69	6.6
W2812SS-3P-C5Z6	1 137	28	6	3.175	28.5	25.2	2.5×2	12 900	24 300	540	10.8	55	85	31	12	63	69	6.6

Notes

1. Use of NSK support unit is recommend. See page 324 for details.
2. **Only rust preventive agent is applied at time of delivery. Please apply lubricant (oil or grease) before use.** See page 442 for details.
3. The permissible rotational speed is determined by d·n value, critical speed and maximum rotational speed. The permissible rotational speed shown in the table is the value when the ball screw mounting method is fixed-fixed.

Nut model: PFT



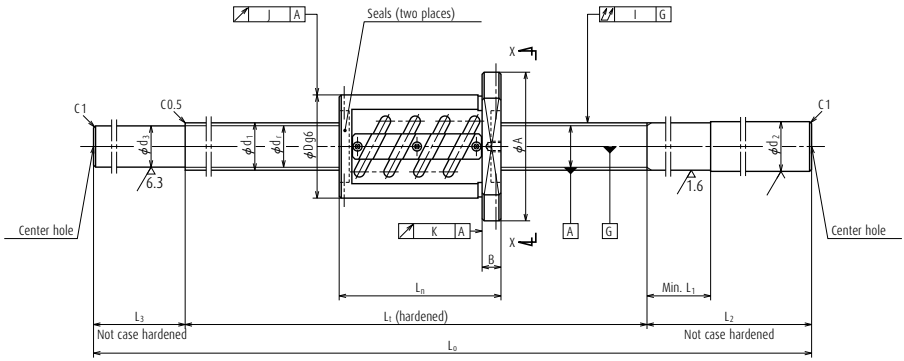
View X-X

Screw shaft ϕ 25
Lead 5, 10
Screw shaft ϕ 28
Lead 5, 6

Unit: mm

dimensions			Screw shaft dimensions							Lead accuracy			Run-out			Mass	Per-missible rotational speed	Internal spatial volume of nut	Standard volume of grease replenishing
Bolt hole		Oil hole	Threaded length	Shaft end right			Shaft end left		Overall length	Travel compen-sation	Deviation	Variation	Shaft straight-ness	Radial run-out					
Y	Z	Q	L_t	d_2	L_1	L_2	d_3	L_3	L_0	T	e_p	υ_u	I	J	K	(kg)	N (min^{-1})	(cm^3)	(cm^3)
11	6.5	M6×1	400	25.2	60	200	20.5	50	650	-0.010	0.025	0.020	0.060	0.019	0.013	3.8	2 800	9.7	4.9
11	6.5	M6×1	700	25.2	60	250	20.5	100	1 050	-0.017	0.035	0.025	0.090	0.019	0.013	5.1	2 800	9.7	4.9
11	6.5	M6×1	1 000	25.2	60	250	20.5	100	1 350	-0.024	0.040	0.027	0.120	0.019	0.013	6.1	2 800	9.7	4.9
11	6.5	M6×1	1 500	25.2	60	300	20.5	100	1 900	-0.036	0.054	0.035	0.150	0.019	0.013	8.0	2 050	9.7	4.9
11	6.5	M6×1	400	28.2	40	200	25.2	—	600	-0.010	0.025	0.020	0.050	0.019	0.013	3.7	2 500	6.1	3.1
11	6.5	M6×1	600	28.2	40	250	25.2	100	950	-0.014	0.030	0.023	0.075	0.019	0.013	5.2	2 500	6.1	3.1
11	6.5	M6×1	800	28.2	40	250	25.2	100	1 150	-0.019	0.035	0.025	0.090	0.019	0.013	6.1	2 500	6.1	3.1
11	6.5	M6×1	1 200	28.2	40	300	25.2	100	1 600	-0.029	0.046	0.030	0.120	0.019	0.013	8.1	2 500	6.1	3.1
11	6.5	M6×1	400	28.2	40	200	25.2	—	600	-0.010	0.025	0.020	0.050	0.019	0.013	3.8	2 500	6.1	3.1
11	6.5	M6×1	600	28.2	40	250	25.2	100	950	-0.014	0.030	0.023	0.075	0.019	0.013	5.3	2 500	6.1	3.1
11	6.5	M6×1	800	28.2	40	250	25.2	100	1 150	-0.019	0.035	0.025	0.090	0.019	0.013	6.2	2 500	6.1	3.1
11	6.5	M6×1	1 200	28.2	40	300	25.2	100	1 600	-0.029	0.046	0.030	0.120	0.019	0.013	8.2	2 500	6.1	3.1

26. Blank shaft end SS type (Fine lead: Tube type)



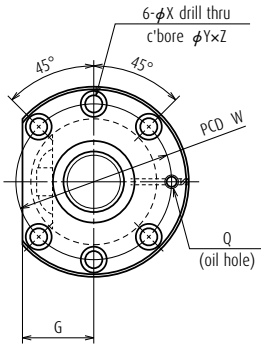
Nut type code: ZFT

Ball screw No.	Stroke Max. L_t-L_n	Screw shaft dia. d_1	Lead l	Ball dia. D_w	Ball circle dia. d_m	Root dia. d_r	Effective ball turns Turns × Circuits	Basic load rating (N) Dynamic C_a	Basic load rating (N) Static C_{0a}	Preload (N)	Dynamic friction torque, median (N·cm)	Nut Outside dia. D	Nut Flange A	Nut Flange G	Nut Flange B	Nut Overall length L_n	Nut Bolt hole W	Nut Bolt hole X
W2804SS-2Z-C5Z5	314	28	5	3.175	28.5	25.2	2.5×2	20 600	48 700	1 225	21.5	55	85	31	12	86	69	6.6
W2806SS-2Z-C5Z5	514	28	5	3.175	28.5	25.2	2.5×2	20 600	48 700	1 225	21.5	55	85	31	12	86	69	6.6
W2808SS-2Z-C5Z5	714	28	5	3.175	28.5	25.2	2.5×2	20 600	48 700	1 225	21.5	55	85	31	12	86	69	6.6
W2812SS-2Z-C5Z5	1 114	28	5	3.175	28.5	25.2	2.5×2	20 600	48 700	1 225	21.5	55	85	31	12	86	69	6.6
W2804SS-4Z-C5Z6	301	28	6	3.175	28.5	25.2	2.5×2	20 600	48 700	1 225	22.5	55	85	31	12	99	69	6.6
W2806SS-4Z-C5Z6	501	28	6	3.175	28.5	25.2	2.5×2	20 600	48 700	1 225	22.5	55	85	31	12	99	69	6.6
W2808SS-4Z-C5Z6	701	28	6	3.175	28.5	25.2	2.5×2	20 600	48 700	1 225	22.5	55	85	31	12	99	69	6.6
W2812SS-4Z-C5Z6	1 101	28	6	3.175	28.5	25.2	2.5×2	20 600	48 700	1 225	22.5	55	85	31	12	99	69	6.6

Notes

1. Use of NSK support unit is recommend. See page 324 for details.
2. **Only rust preventive agent is applied at time of delivery. Please apply lubricant (oil or grease) before use.** See page 442 for details.
3. The permissible rotational speed is determined by d·n value, critical speed and maximum rotational speed. The permissible rotational speed shown in the table is the value when the ball screw mounting method is fixed-fixed.

Screw shaft ϕ 28
Lead 5, 6

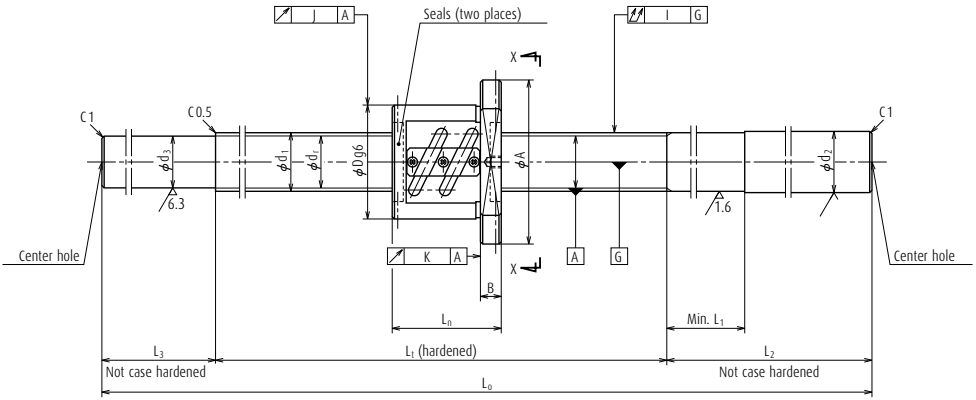


View X-X

Unit: mm

dimensions			Screw shaft dimensions							Lead accuracy			Run-out			Mass	Per-missible rotational speed	Internal spatial volume of nut	Standard volume of grease replenishing
Bolt hole		Oil hole	Threaded length	Shaft end right			Shaft end left		Overall length	Travel compen-sation	Deviation	Variation	Shaft straight-ness	Radial run-out					
Y	Z	Q	L_t	d_2	L_1	L_2	d_3	L_3	L_0	T	e_p	υ_u	I	J	K	(kg)	N (min^{-1})	(cm^3)	(cm^3)
11	6.5	M6×1	400	28.2	40	200	25.2	—	600	-0.010	0.025	0.020	0.050	0.019	0.013	4.7	2 500	9.2	4.6
11	6.5	M6×1	600	28.2	40	250	25.2	100	950	-0.014	0.030	0.023	0.075	0.019	0.013	5.5	2 500	9.2	4.6
11	6.5	M6×1	800	28.2	40	250	25.2	100	1 150	-0.019	0.035	0.025	0.090	0.019	0.013	6.4	2 500	9.2	4.6
11	6.5	M6×1	1 200	28.2	40	300	25.2	100	1 600	-0.029	0.046	0.030	0.120	0.019	0.013	8.4	2 500	9.2	4.6
11	6.5	M6×1	400	28.2	40	200	25.2	—	600	-0.010	0.025	0.020	0.050	0.019	0.013	4.2	2 500	9.5	4.8
11	6.5	M6×1	600	28.2	40	250	25.2	100	950	-0.014	0.030	0.023	0.075	0.019	0.013	5.7	2 500	9.5	4.8
11	6.5	M6×1	800	28.2	40	250	25.2	100	1 150	-0.019	0.035	0.025	0.090	0.019	0.013	6.6	2 500	9.5	4.8
11	6.5	M6×1	1 200	28.2	40	300	25.2	100	1 600	-0.029	0.046	0.030	0.120	0.019	0.013	8.6	2 500	9.5	4.8

26. Blank shaft end SS type (Fine lead: Tube type)



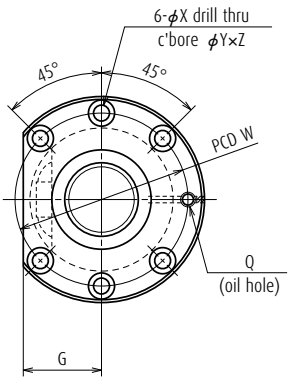
Nut type code: PFT

Ball screw No.	Stroke Max. L_t-L_n	Screw shaft dia. d_1	Lead l	Ball dia. D_w	Ball circle dia. d_m	Root dia. d_r	Effective ball turns Turns × Circuits	Basic load rating (N) Dynamic C_a	Basic load rating (N) Static C_{0a}	Preload (N)	Dynamic friction torque, median (N·cm)	Nut Outside dia. D	Nut Flange A	Nut Flange G	Nut Flange B	Nut Overall length L_n
W3204SS-1P-C5Z5	344	32	5	3.175	32.5	29.2	2.5×2	13 700	28 000	590	10.8	58	85	32	12	56
W3206SS-1P-C5Z5	544	32	5	3.175	32.5	29.2	2.5×2	13 700	28 000	590	10.8	58	85	32	12	56
W3208SS-1P-C5Z5	744	32	5	3.175	32.5	29.2	2.5×2	13 700	28 000	590	10.8	58	85	32	12	56
W3212SS-1P-C5Z5	1 144	32	5	3.175	32.5	29.2	2.5×2	13 700	28 000	590	10.8	58	85	32	12	56
W3215SS-1P-C5Z5	1 144	32	5	3.175	32.5	29.2	2.5×2	13 700	28 000	590	10.8	58	85	32	12	56
W3206SS-3P-C5Z6	537	32	6	3.969	32.5	28.4	2.5×2	18 300	34 700	780	15.6	62	89	34	12	63
W3210SS-1P-C5Z6	937	32	6	3.969	32.5	28.4	2.5×2	18 300	34 700	780	15.6	62	89	34	12	63
W3215SS-3P-C5Z6	1 437	32	6	3.969	32.5	28.4	2.5×2	18 300	34 700	780	15.6	62	89	34	12	63

Notes

1. Use of NSK support unit is recommend. See page 324 for details.
2. **Only rust preventive agent is applied at time of delivery. Please apply lubricant (oil or grease) before use.** See page 442 for details.
3. The permissible rotational speed is determined by d·n value, critical speed and maximum rotational speed. The permissible rotational speed shown in the table is the value when the ball screw mounting method is fixed-fixed.

Screw shaft ϕ 32
Lead 5, 6

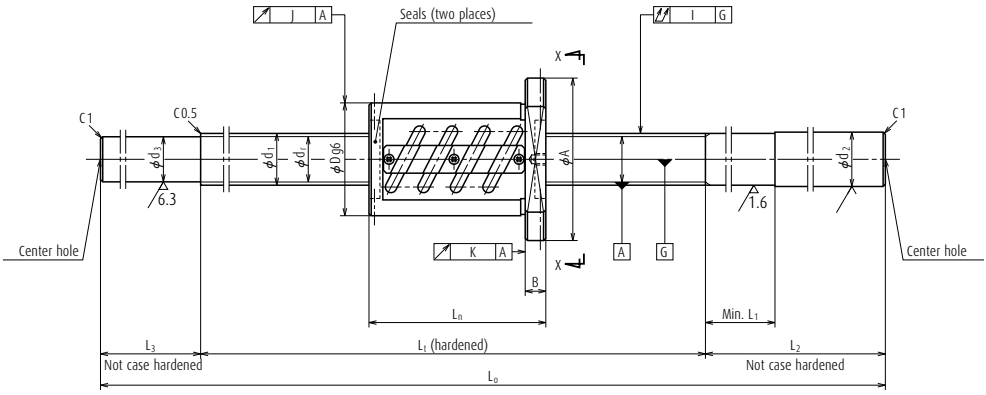


View X-X

Unit: mm

dimensions					Screw shaft dimensions							Lead accuracy			Run-out			Mass	Permissible rotational speed	Internal spatial volume of nut	Standard volume of grease replenishing
Bolt hole				Oil hole	Threaded length	Shaft end right			Shaft end left		Overall length	Travel compensation	Deviation	Variation	Shaft straightness	Radial run-out					
W	X	Y	Z	Q	L_t	d_2	L_1	L_2	d_3	L_3	L_0	T	e_p	υ_u	I	J	K	(kg)	N (min^{-1})	(cm^3)	(cm^3)
71	6.6	11	6.5	M6×1	400	32.3	40	200	29.2	50	650	-0.010	0.025	0.020	0.060	0.019	0.013	4.8	2 180	6.9	3.5
71	6.6	11	6.5	M6×1	600	32.3	40	250	29.2	100	950	-0.014	0.030	0.023	0.075	0.019	0.013	6.5	2 180	6.9	3.5
71	6.6	11	6.5	M6×1	800	32.3	40	250	29.2	100	1 150	-0.019	0.035	0.025	0.090	0.019	0.013	7.7	2 180	6.9	3.5
71	6.6	11	6.5	M6×1	1 200	32.3	40	300	29.2	100	1 600	-0.029	0.046	0.030	0.120	0.019	0.013	10.3	2 180	6.9	3.5
71	6.6	11	6.5	M6×1	1 500	32.3	40	300	29.2	100	1 900	-0.036	0.054	0.035	0.150	0.019	0.013	12.1	2 180	6.9	3.5
75	6.6	11	6.5	M6×1	600	32.3	40	250	28.4	100	950	-0.014	0.030	0.023	0.075	0.019	0.013	6.7	2 180	9.4	4.7
75	6.6	11	6.5	M6×1	1 000	32.3	40	300	28.4	100	1 400	-0.024	0.040	0.027	0.120	0.019	0.013	9.2	2 180	9.4	4.7
75	6.6	11	6.5	M6×1	1 500	32.3	40	300	28.4	100	1 900	-0.036	0.054	0.035	0.150	0.019	0.013	12.1	2 180	9.4	4.7

26. Blank shaft end SS type (Fine lead: Tube type)



Nut type code: ZFT

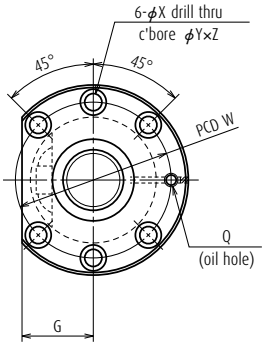
Ball screw No.	Stroke Max. L_t-L_n	Screw shaft dia. d_1	Lead l	Ball dia. D_w	Ball circle dia. d_m	Root dia. d_r	Effective ball turns Turns × Circuits	Basic load rating (N) Dynamic C_a	Basic load rating (N) Static C_{0a}	Preload (N)	Dynamic friction torque, median (N·cm)	Nut Outside dia. D	Nut Flange A	Nut Flange G	Nut Flange B	Nut Overall length L_n
W3204SS-2Z-C5Z5	314	32	5	3.175	32.5	29.2	2.5×2	21 800	56 000	1 270	22.5	58	85	32	12	86
W3206SS-2Z-C5Z5	514	32	5	3.175	32.5	29.2	2.5×2	21 800	56 000	1 270	22.5	58	85	32	12	86
W3208SS-2Z-C5Z5	714	32	5	3.175	32.5	29.2	2.5×2	21 800	56 000	1 270	22.5	58	85	32	12	86
W3212SS-2Z-C5Z5	1 114	32	5	3.175	32.5	29.2	2.5×2	21 800	56 000	1 270	22.5	58	85	32	12	86
W3215SS-2Z-C5Z5	1 414	32	5	3.175	32.5	29.2	2.5×2	21 800	56 000	1 270	22.5	58	85	32	12	86
W3206SS-4Z-C5Z6	501	32	6	3.969	32.5	28.4	2.5×2	29 100	69 300	1 720	34.5	62	89	34	12	99
W3210SS-2Z-C5Z6	901	32	6	3.969	32.5	28.4	2.5×2	29 100	69 300	1 720	34.5	62	89	34	12	99
W3215SS-4Z-C5Z6	1 401	32	6	3.969	32.5	28.4	2.5×2	29 100	69 300	1 720	34.5	62	89	34	12	99
W3206SS-5Z-C5Z8	518	32	8	4.762	32.5	27.5	2.5×1	20 600	40 900	1 320	30.5	66	100	38	15	82
W3210SS-3Z-C5Z8	918	32	8	4.762	32.5	27.5	2.5×1	20 600	40 900	1 320	30.5	66	100	38	15	82
W3215SS-5Z-C5Z8	1 418	32	8	4.762	32.5	27.5	2.5×1	20 600	40 900	1 320	30.5	66	100	38	15	82

Notes

1. Use of NSK support unit is recommend. See page 324 for details.
2. **Only rust preventive agent is applied at time of delivery. Please apply lubricant (oil or grease) before use.** See page 442 for details.
3. The permissible rotational speed is determined by d·n value, critical speed and maximum rotational speed. The permissible rotational speed shown in the table is the value when the ball screw mounting method is fixed-fixed.

Nut model: ZFT

Screw shaft ϕ 32
Lead 5, 6, 8

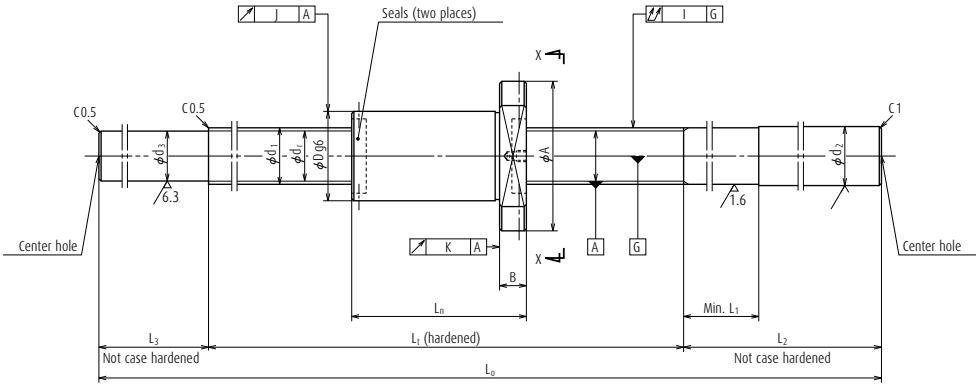


View X-X

Unit: mm

dimensions					Screw shaft dimensions							Lead accuracy			Run-out			Mass	Permissible rotational speed	Internal spatial volume of nut	Standard volume of grease replenishing
Bolt hole				Oil hole	Threaded length	Shaft end right			Shaft end left		Overall length	Travel compensation	Deviation	Variation	Shaft straightness	Radial run-out					
W	X	Y	Z	Q	L_t	d_2	L_1	L_2	d_3	L_3	L_0	T	e_p	υ_u	I	J	K	(kg)	N (min^{-1})	(cm^3)	(cm^3)
71	6.6	11	6.5	M6×1	400	32.3	40	200	29.2	50	650	-0.010	0.025	0.020	0.060	0.019	0.013	5.1	2 180	10	5.0
71	6.6	11	6.5	M6×1	600	32.3	40	250	29.2	100	950	-0.014	0.030	0.023	0.075	0.019	0.013	6.9	2 180	10	5.0
71	6.6	11	6.5	M6×1	800	32.3	40	250	29.2	100	1 150	-0.019	0.035	0.025	0.090	0.019	0.013	8.0	2 180	10	5.0
71	6.6	11	6.5	M6×1	1 200	32.3	40	300	29.2	100	1 600	-0.029	0.046	0.030	0.120	0.019	0.013	10.1	2 180	10	5.0
71	6.6	11	6.5	M6×1	1 500	32.3	40	300	29.2	100	1 900	-0.036	0.054	0.035	0.150	0.019	0.013	12.4	2 180	10	5.0
75	6.6	11	6.5	M6×1	600	32.3	40	250	28.4	—	950	-0.014	0.030	0.023	0.075	0.019	0.013	7.1	2 180	15	7.5
75	6.6	11	6.5	M6×1	1 000	32.3	40	300	28.4	100	1 400	-0.024	0.040	0.027	0.120	0.019	0.013	9.7	2 180	15	7.5
75	6.6	11	6.5	M6×1	1 500	32.3	40	300	28.4	—	1 900	-0.036	0.054	0.035	0.150	0.019	0.013	12.6	2 180	15	7.5
82	9	14	8.5	M6×1	600	32.3	50	250	27.5	—	950	-0.014	0.030	0.023	0.075	0.019	0.013	7.3	2 180	7.9	4.0
82	9	14	8.5	M6×1	1 000	32.3	50	300	27.5	100	1 400	-0.024	0.040	0.027	0.120	0.019	0.013	9.8	2 180	7.9	4.0
82	9	14	8.5	M6×1	1 500	32.3	50	300	27.5	—	1 900	-0.036	0.054	0.035	0.150	0.019	0.013	12.6	2 180	7.9	4.0

26. Blank shaft end SS type (Fine lead: Deflector (bridge) type)



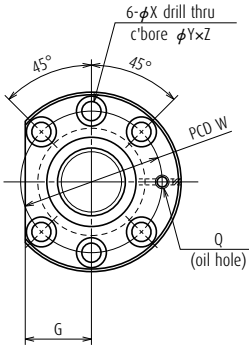
Nut type code: ZFD

Ball screw No.	Stroke Max. L_t-L_n	Screw shaft dia. d_1	Lead l	Ball dia. D_w	Ball circle dia. d_m	Root dia. d_r	Effective ball turns Turns × Circuits	Basic load rating (N) Dynamic C_a	Basic load rating (N) Static C_{0a}	Preload (N)	Dynamic friction torque, median (N·cm)	Nut Outside dia. D	Nut Flange A	Nut Flange G	Nut Flange B	Nut Overall length L_n
W3204SS-3ZY-C5Z5	323	32	5	3.175	32.75	29.4	4	16 800	40 600	1 080	19.6	48	75	29	12	77
W3206SS-6ZY-C5Z5	523	32	5	3.175	32.75	29.4	4	16 800	40 600	1 080	19.6	48	75	29	12	77
W3209SS-1ZY-C5Z5	823	32	5	3.175	32.75	29.4	4	16 800	40 600	1 080	19.6	48	75	29	12	77
W3212SS-3ZY-C5Z5	1 123	32	5	3.175	32.75	29.4	4	16 800	40 600	1 080	19.6	48	75	29	12	77
W3216SS-1ZY-C5Z5	1 523	32	5	3.175	32.75	29.4	4	16 800	40 600	1 080	19.6	48	75	29	12	77
W3205SS-3ZY-C5Z10	380	32	10	6.35	33.75	27.1	3	30 500	52 500	1 860	49.0	54	88	34	15	120
W3207SS-3ZY-C5Z10	580	32	10	6.35	33.75	27.1	3	30 500	52 500	1 860	49.0	54	88	34	15	120
W3210SS-6ZY-C5Z10	880	32	10	6.35	33.75	27.1	3	30 500	52 500	1 860	49.0	54	88	34	15	120
W3214SS-3ZY-C5Z10	1 280	32	10	6.35	33.75	27.1	3	30 500	52 500	1 860	49.0	54	88	34	15	120
W3218SS-3ZY-C5Z10	1 680	32	10	6.35	33.75	27.1	3	30 500	52 500	1 860	49.0	54	88	34	15	120

Notes

1. Use of NSK support unit is recommend. See page 324 for details.
2. **Only rust preventive agent is applied at time of delivery. Please apply lubricant (oil or grease) before use.** See page 442 for details.
3. The permissible rotational speed is determined by d·n value, critical speed and maximum rotational speed. The permissible rotational speed shown in the table is the value when the ball screw mounting method is fixed-fixed.

Screw shaft ϕ 32
Lead 5, 10

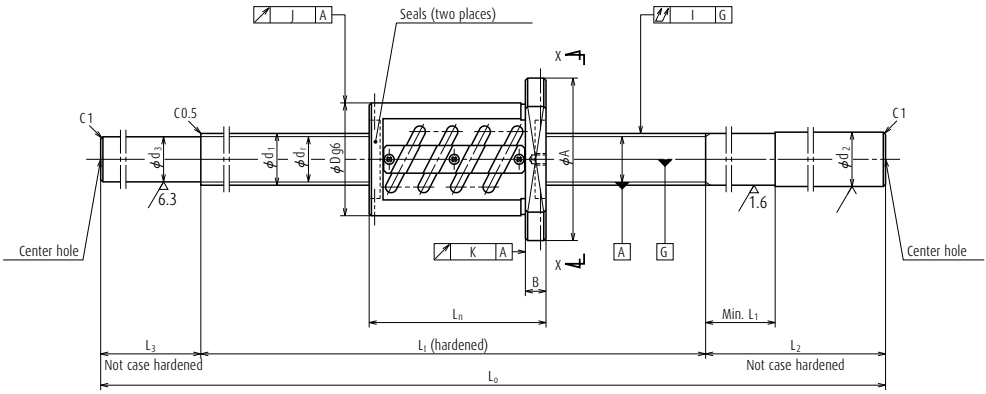


View X-X

Unit: mm

dimensions					Screw shaft dimensions							Lead accuracy			Run-out			Mass	Permissible rotational speed	Internal spatial volume of nut	Standard volume of grease replenishing
Bolt hole				Oil hole	Threaded length	Shaft end right			Shaft end left		Overall length	Travel compensation	Deviation	Variation	Shaft straightness	Radial run-out					
W	X	Y	Z	Q	L_t	d_2	L_1	L_2	d_3	L_3	L_0	T	e_p	υ_u	I	J	K	(kg)	N (min^{-1})	(cm^3)	(cm^3)
61	6.6	11	6.5	M6×1	400	32.3	40	200	29.4	50	650	-0.009	0.025	0.020	0.060	0.015	0.011	4.6	2 180	22	11
61	6.6	11	6.5	M6×1	600	32.3	40	250	29.4	100	950	-0.013	0.030	0.023	0.075	0.015	0.011	6.4	2 180	22	11
61	6.6	11	6.5	M6×1	900	32.3	40	250	29.4	100	1 250	-0.021	0.040	0.027	0.090	0.015	0.011	8.1	2 180	22	11
61	6.6	11	6.5	M6×1	1 200	32.3	40	300	29.4	100	1 600	-0.028	0.046	0.030	0.120	0.015	0.011	10.2	2 180	22	11
61	6.6	11	6.5	M6×1	1 600	32.3	40	300	29.4	100	2 000	-0.037	0.054	0.035	0.150	0.015	0.011	12.6	2 180	22	11
70	9	14	8.5	M6×1	500	32.3	60	250	27.1	100	850	-0.010	0.027	0.020	0.075	0.019	0.013	6.2	2 180	23	12
70	9	14	8.5	M6×1	700	32.3	60	250	27.1	100	1 050	-0.015	0.035	0.025	0.090	0.019	0.013	7.3	2 180	23	12
70	9	14	8.5	M6×1	1 000	32.3	60	300	27.1	100	1 400	-0.022	0.040	0.027	0.120	0.019	0.013	9.3	2 180	23	12
70	9	14	8.5	M6×1	1 400	32.3	60	350	27.1	120	1 870	-0.032	0.054	0.035	0.150	0.019	0.013	11.9	2 180	23	12
70	9	14	8.5	M6×1	1 800	32.3	60	350	27.1	120	2 270	-0.041	0.065	0.040	0.200	0.019	0.013	14.1	2 180	23	12

26. Blank shaft end SS type (Fine lead: Tube type)



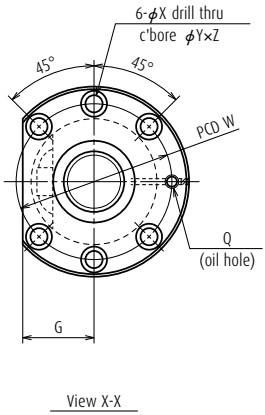
Nut type code: ZFT

Ball screw No.	Stroke Max. L_t-L_n	Screw shaft dia. d_1	Lead l	Ball dia. D_w	Ball circle dia. d_m	Root dia. d_r	Effective ball turns Turns × Circuits	Basic load rating (N) Dynamic C_a	Basic load rating (N) Static C_{0a}	Preload (N)	Dynamic friction torque, median (N·cm)	Nut Outside dia. D	Nut Flange A	Nut Flange G	Nut Flange B	Nut Overall length L_n
W3205SS-1Z-C5Z10	400	32	10	6.350	33	26.4	2.5×1	30 000	55 100	1 960	50	74	108	41	15	100
W3207SS-1Z-C5Z10	600	32	10	6.350	33	26.4	2.5×1	30 000	55 100	1 960	50	74	108	41	15	100
W3210SS-4Z-C5Z10	900	32	10	6.350	33	26.4	2.5×1	30 000	55 100	1 960	50	74	108	41	15	100
W3214SS-1Z-C5Z10	1 300	32	10	6.350	33	26.4	2.5×1	30 000	55 100	1 960	50	74	108	41	15	100
W3218SS-1Z-C5Z10	1 700	32	10	6.350	33	26.4	2.5×1	30 000	55 100	1 960	50	74	108	41	15	100
W3607SS-1Z-C5Z10	597	36	10	6.350	37	30.4	2.5×1	32 000	61 100	2 060	56	75	120	45	18	103
W3612SS-1Z-C5Z10	1 097	36	10	6.350	37	30.4	2.5×1	32 000	61 100	2 060	56	75	120	45	18	103
W3620SS-1Z-C5Z10	1 897	36	10	6.350	37	30.4	2.5×1	32 000	61 100	2 060	56	75	120	45	18	103
W4006SS-1Z-C5Z5	511	40	5	3.175	40.5	37.2	2.5×2	23 900	70 500	1 420	28.5	67	101	39	15	89
W4010SS-1Z-C5Z5	911	40	5	3.175	40.5	37.2	2.5×2	23 900	70 500	1 420	28.5	67	101	39	15	89
W4016SS-1Z-C5Z5	1 511	40	5	3.175	40.5	37.2	2.5×2	23 900	70 500	1 420	28.5	67	101	39	15	89

Notes

1. Use of NSK support unit is recommend. See page 324 for details.
2. **Only rust preventive agent is applied at time of delivery. Please apply lubricant (oil or grease) before use.** See page 442 for details.
3. The permissible rotational speed is determined by d·n value, critical speed and maximum rotational speed. The permissible rotational speed shown in the table is the value when the ball screw mounting method is fixed-fixed.

Nut model: ZFT



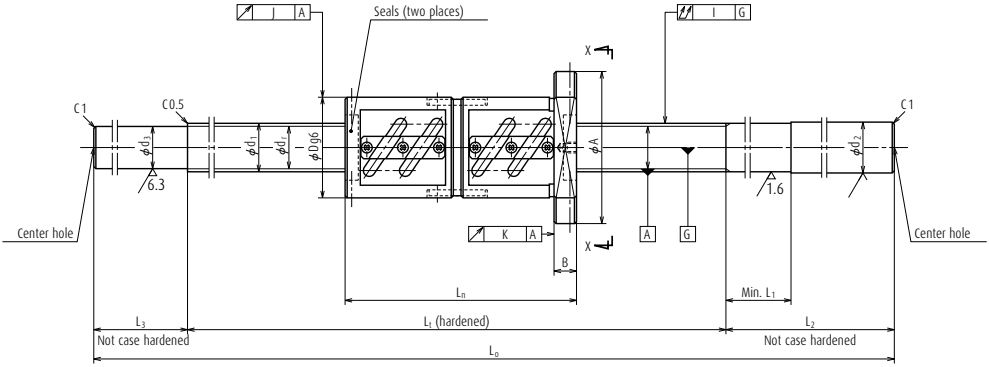
View X-X

Screw shaft ϕ 32, ϕ 36
Lead 10
Screw shaft ϕ 40
Lead 5

Unit: mm

dimensions					Screw shaft dimensions							Lead accuracy			Run-out			Mass	Permissible rotational speed	Internal spatial volume of nut	Standard volume of grease replenishing
Bolt hole				Oil hole	Threaded length	Shaft end right			Shaft end left		Overall length	Travel compensation	Deviation	Variation	Shaft straightness	Radial run-out					
W	X	Y	Z	Q	L_t	d_2	L_1	L_2	d_3	L_3	L_0	T	e_p	U_u	I	J	K	(kg)	N (min^{-1})	(cm^3)	(cm^3)
90	9	14	8.5	M6×1	500	32.3	60	250	26.4	100	850	-0.012	0.027	0.020	0.075	0.019	0.013	7.5	2 180	22	11
90	9	14	8.5	M6×1	700	32.3	60	250	26.4	100	1 050	-0.017	0.035	0.025	0.090	0.019	0.013	8.5	2 180	22	11
90	9	14	8.5	M6×1	1 000	32.3	60	300	26.4	100	1 400	-0.024	0.040	0.027	0.120	0.019	0.013	10.5	2 180	22	11
90	9	14	8.5	M6×1	1 400	32.3	60	350	26.4	120	1 870	-0.034	0.054	0.035	0.150	0.019	0.013	13.1	2 180	22	11
90	9	14	8.5	M6×1	1 800	32.3	60	350	26.4	120	2 270	-0.043	0.065	0.040	0.200	0.019	0.013	15.2	1 820	22	11
98	11	17.5	11	M6×1	700	36.3	60	300	30.4	100	1 100	-0.017	0.035	0.025	0.065	0.019	0.013	10.9	1 940	27	14
98	11	17.5	11	M6×1	1 200	36.3	60	350	30.4	120	1 670	-0.029	0.046	0.030	0.100	0.019	0.013	14.9	1 940	27	14
98	11	17.5	11	M6×1	2 000	36.3	60	350	30.4	120	2 470	-0.048	0.065	0.040	0.130	0.019	0.013	20.4	1 940	27	14
83	9	14	8.5	Rc1/8	600	40.3	50	300	37.2	100	1 000	-0.014	0.030	0.023	0.050	0.019	0.013	11.1	1 750	14	7.0
83	9	14	8.5	Rc1/8	1 000	40.3	50	300	37.2	100	1 400	-0.024	0.040	0.027	0.080	0.019	0.013	14.8	1 750	14	7.0
83	9	14	8.5	Rc1/8	1 600	40.3	50	350	37.2	100	2 050	-0.038	0.054	0.035	0.130	0.019	0.013	20.8	1 750	14	7.0

26. Blank shaft end SS type (Fine lead: Tube type)



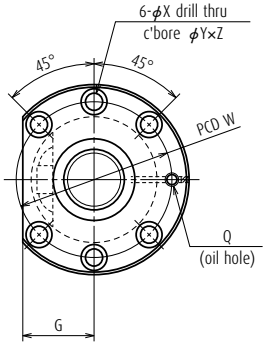
Nut type code: DFT

Ball screw No.	Stroke Max. L_t-L_n	Screw shaft dia. d_1	Lead l	Ball dia. D_w	Ball circle dia. d_m	Root dia. d_r	Effective ball turns Turns × Circuits	Basic load rating (N) Dynamic C_a	Basic load rating (N) Static C_{0a}	Preload (N)	Dynamic friction torque, median (N·cm)	Nut Outside dia. D	Nut Flange A	Nut Flange G	Nut Flange B	Nut Overall length L_n
W3205SS-2D-C5Z10	310	32	10	6.350	33	26.4	2.5×2	54 500	110 000	3 240	83	74	108	41	15	190
W3207SS-2D-C5Z10	510	32	10	6.350	33	26.4	2.5×2	54 500	110 000	3 240	83	74	108	41	15	190
W3210SS-5D-C5Z10	810	32	10	6.350	33	26.4	2.5×2	54 500	110 000	3 240	83	74	108	41	15	190
W3214SS-2D-C5Z10	1 210	32	10	6.350	33	26.4	2.5×2	54 500	110 000	3 240	83	74	108	41	15	190
W3218SS-2D-C5Z10	1 610	32	10	6.350	33	26.4	2.5×2	54 500	110 000	3 240	83	74	108	41	15	190
W3607SS-2D-C5Z10	507	36	10	6.350	37	30.4	2.5×2	58 000	122 000	3 430	93	75	120	45	18	193
W3612SS-2D-C5Z10	1 007	36	10	6.350	37	30.4	2.5×2	58 000	122 000	3 430	93	75	120	45	18	193
W3620SS-2D-C5Z10	1 807	36	10	6.350	37	30.4	2.5×2	58 000	122 000	3 430	93	75	120	45	18	193

Notes

1. Use of NSK support unit is recommend. See page 324 for details.
2. **Only rust preventive agent is applied at time of delivery. Please apply lubricant (oil or grease) before use.** See page 442 for details.
3. The permissible rotational speed is determined by d·n value, critical speed and maximum rotational speed. The permissible rotational speed shown in the table is the value when the ball screw mounting method is fixed-fixed.

Screw shaft ϕ 32, ϕ 36
Lead 10

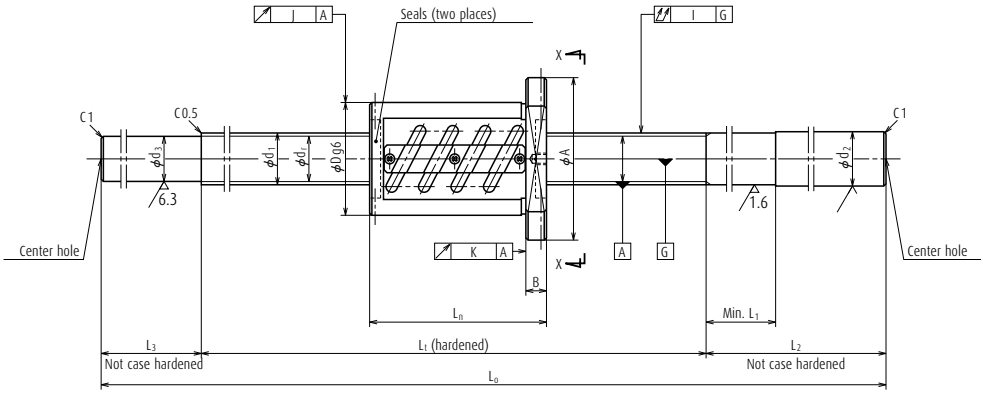


View X-X

Unit: mm

dimensions					Screw shaft dimensions							Lead accuracy			Run-out			Mass	Permissible rotational speed	Internal spatial volume of nut	Standard volume of grease replenishing
Bolt hole				Oil hole	Threaded length	Shaft end right			Shaft end left		Overall length	Travel compensation	Deviation	Variation	Shaft straightness	Radial run-out					
W	X	Y	Z	Q	L_t	d_2	L_1	L_2	d_3	L_3	L_0	T	e_p	υ_u	I	J	K	(kg)	N (min^{-1})	(cm^3)	(cm^3)
90	9	14	8.5	M6×1	500	32.3	60	250	26.4	100	850	-0.012	0.027	0.020	0.075	0.019	0.013	9.5	2 180	57	29
90	9	14	8.5	M6×1	700	32.3	60	250	26.4	100	1 050	-0.017	0.035	0.025	0.090	0.019	0.013	10.6	2 180	57	29
90	9	14	8.5	M6×1	1 000	32.3	60	300	26.4	100	1 400	-0.024	0.040	0.027	0.120	0.019	0.013	12.5	2 180	57	29
90	9	14	8.5	M6×1	1 400	32.3	60	350	26.4	120	1 870	-0.034	0.054	0.035	0.150	0.019	0.013	15.1	2 180	57	29
90	9	14	8.5	M6×1	1 800	32.3	60	350	26.4	120	2 270	-0.043	0.065	0.040	0.200	0.019	0.013	17.2	1 910	57	29
98	11	17.5	11	M6×1	700	36.3	60	300	30.4	100	1 100	-0.017	0.035	0.025	0.065	0.019	0.013	12.8	1 940	67	34
98	11	17.5	11	M6×1	1 200	36.3	60	350	30.4	120	1 670	-0.029	0.046	0.030	0.100	0.019	0.013	16.8	1 940	67	34
98	11	17.5	11	M6×1	2 000	36.3	60	350	30.4	120	2 470	-0.048	0.065	0.040	0.130	0.019	0.013	22.3	1 940	67	34

26. Blank shaft end SS type (Fine lead: Tube type)



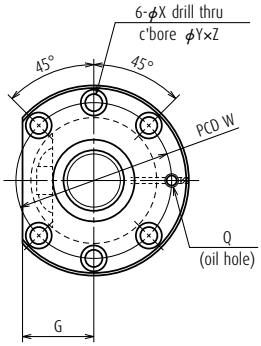
Nut type code: ZFT

Ball screw No.	Stroke Max. L_t-L_n	Screw shaft dia. d_1	Lead l	Ball dia. D_w	Ball circle dia. d_m	Root dia. d_r	Effective ball turns Turns × Circuits	Basic load rating (N) Dynamic C_a	Basic load rating (N) Static C_{0a}	Preload (N)	Dynamic friction torque, median (N·cm)	Nut Outside dia. D	Nut Flange A	Nut Flange G	Nut Flange B	Nut Overall length L_n
W4007SS-1Z-C5Z8	570	40	8	4.762	40.5	35.5	2.5×2	41 100	103 000	2 450	64	74	108	41	15	130
W4012SS-1Z-C5Z8	1 070	40	8	4.762	40.5	35.5	2.5×2	41 100	103 000	2 450	64	74	108	41	15	130
W4018SS-1Z-C5Z8	1 670	40	8	4.762	40.5	35.5	2.5×2	41 100	103 000	2 450	64	74	108	41	15	130
W4007SS-2Z-C5Z10	597	40	10	6.350	41	34.4	2.5×1	33 700	68 300	2 160	64	82	124	47	18	103
W4010SS-2Z-C5Z10	897	40	10	6.350	41	34.4	2.5×1	33 700	68 300	2 160	64	82	124	47	18	103
W4014SS-1Z-C5Z10	1 297	40	10	6.350	41	34.4	2.5×1	33 700	68 300	2 160	64	82	124	47	18	103
W4018SS-2Z-C5Z10	1 697	40	10	6.350	41	34.4	2.5×1	33 700	68 300	2 160	64	82	124	47	18	103
W4024SS-1Z-C5Z10	2 297	40	10	6.350	41	34.4	2.5×1	33 700	68 300	2 160	64	82	124	47	18	103
W4010SS-4Z-C5Z12	883	40	12	7.144	41.5	34.1	2.5×1	39 500	77 200	2 550	83	86	128	48	18	117
W4016SS-2Z-C5Z12	1 483	40	12	7.144	41.5	34.1	2.5×1	39 500	77 200	2 550	83	86	128	48	18	117
W4025SS-1Z-C5Z12	2 383	40	12	7.144	41.5	34.1	2.5×1	39 500	77 200	2 550	83	86	128	48	18	117

Notes

1. Use of NSK support unit is recommend. See page 324 for details.
2. **Only rust preventive agent is applied at time of delivery. Please apply lubricant (oil or grease) before use.** See page 442 for details.
3. The permissible rotational speed is determined by d·n value, critical speed and maximum rotational speed. The permissible rotational speed shown in the table is the value when the ball screw mounting method is fixed-fixed.

Screw shaft ϕ 40
Lead 8, 10, 12

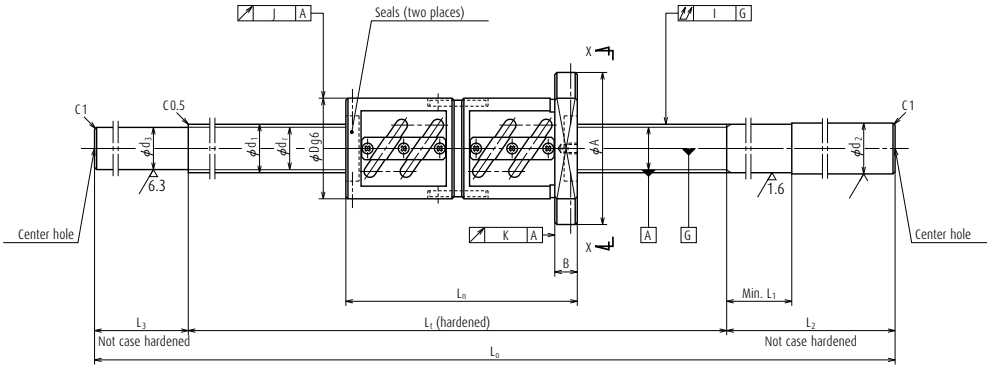


View X-X

Unit: mm

dimensions					Screw shaft dimensions							Lead accuracy			Run-out			Mass	Permissible rotational speed	Internal spatial volume of nut	Standard volume of grease replenishing
Bolt hole				Oil hole	Threaded length	Shaft end right			Shaft end left		Overall length	Travel compensation	Deviation	Variation	Shaft straightness	Radial run-out					
W	X	Y	Z	Q	L_t	d_2	L_1	L_2	d_3	L_3	L_0	T	e_p	υ_u	I	J	K	(kg)	N (min^{-1})	(cm^3)	(cm^3)
90	9	14	8.5	Rc1/8	700	40.3	50	300	35.5	100	1 100	-0.017	0.035	0.025	0.065	0.019	0.013	13.0	1 750	27	14
90	9	14	8.5	Rc1/8	1 200	40.3	50	350	35.5	100	1 650	-0.029	0.046	0.030	0.100	0.019	0.013	18.0	1 750	27	14
90	9	14	8.5	Rc1/8	1 800	40.3	50	350	35.5	120	2 270	-0.043	0.065	0.040	0.130	0.019	0.013	23.5	1 750	27	14
102	11	17.5	11	Rc1/8	700	40.3	60	300	34.4	100	1 100	-0.017	0.035	0.025	0.065	0.025	0.015	13.3	1 750	30	15
102	11	17.5	11	Rc1/8	1 000	40.3	60	300	34.4	100	1 400	-0.024	0.040	0.027	0.080	0.025	0.015	15.9	1 750	30	15
102	11	17.5	11	Rc1/8	1 400	40.3	60	350	34.4	120	1 870	-0.034	0.054	0.035	0.100	0.025	0.015	20.0	1 750	30	15
102	11	17.5	11	Rc1/8	1 800	40.3	60	350	34.4	120	2 270	-0.043	0.065	0.040	0.130	0.025	0.015	23.4	1 750	30	15
102	11	17.5	11	Rc1/8	2 400	40.3	60	400	34.4	150	2 950	-0.058	0.077	0.046	0.170	0.025	0.015	29.4	1 750	30	15
106	11	17.5	11	Rc1/8	1 000	40.3	70	300	34.1	100	1 400	-0.024	0.040	0.027	0.080	0.025	0.015	16.7	1 750	35	18
106	11	17.5	11	Rc1/8	1 600	40.3	70	350	34.1	150	2 100	-0.038	0.054	0.035	0.130	0.025	0.015	22.9	1 750	35	18
106	11	17.5	11	Rc1/8	2 500	40.3	70	400	34.1	150	3 050	-0.060	0.077	0.046	0.170	0.025	0.015	31.1	1 220	35	18

26. Blank shaft end SS type (Fine lead: Tube type)



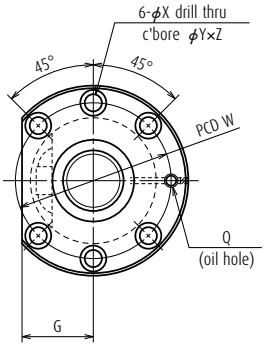
Nut type code: DFT

Ball screw No.	Stroke Max. L_t-L_n	Screw shaft dia. d_1	Lead l	Ball dia. D_w	Ball circle dia. d_m	Root dia. d_r	Effective ball turns Turns × Circuits	Basic load rating (N) Dynamic C_a	Basic load rating (N) Static C_{0a}	Preload (N)	Dynamic friction torque, median (N·cm)	Nut Outside dia. D	Nut Flange A	Nut Flange G	Nut Flange B	Nut Overall length L_n
W4007SS-3D-C5Z10	507	40	10	6.350	41	34.4	2.5×2	61 200	137 000	3 630	108	82	124	47	18	193
W4010SS-3D-C5Z10	807	40	10	6.350	41	34.4	2.5×2	61 200	137 000	3 630	108	82	124	47	18	193
W4014SS-2D-C5Z10	1 207	40	10	6.350	41	34.4	2.5×2	61 200	137 000	3 630	108	82	124	47	18	193
W4018SS-3D-C5Z10	1 607	40	10	6.350	41	34.4	2.5×2	61 200	137 000	3 630	108	82	124	47	18	193
W4024SS-2D-C5Z10	2 207	40	10	6.350	41	34.4	2.5×2	61 200	137 000	3 630	108	82	124	47	18	193
W4010SS-5D-C5Z12	775	40	12	7.144	41.5	34.1	2.5×2	71 700	154 000	4 310	138	86	128	48	18	225
W4016SS-3D-C5Z12	1 375	40	12	7.144	41.5	34.1	2.5×2	71 700	154 000	4 310	138	86	128	48	18	225
W4025SS-2D-C5Z12	2 275	40	12	7.144	41.5	34.1	2.5×2	71 700	154 000	4 310	138	86	128	48	18	225

Notes

1. Use of NSK support unit is recommend. See page 324 for details.
2. **Only rust preventive agent is applied at time of delivery. Please apply lubricant (oil or grease) before use.** See page 442 for details.
3. The permissible rotational speed is determined by d·n value, critical speed and maximum rotational speed. The permissible rotational speed shown in the table is the value when the ball screw mounting method is fixed-fixed.

Screw shaft ϕ 40
Lead 10, 12

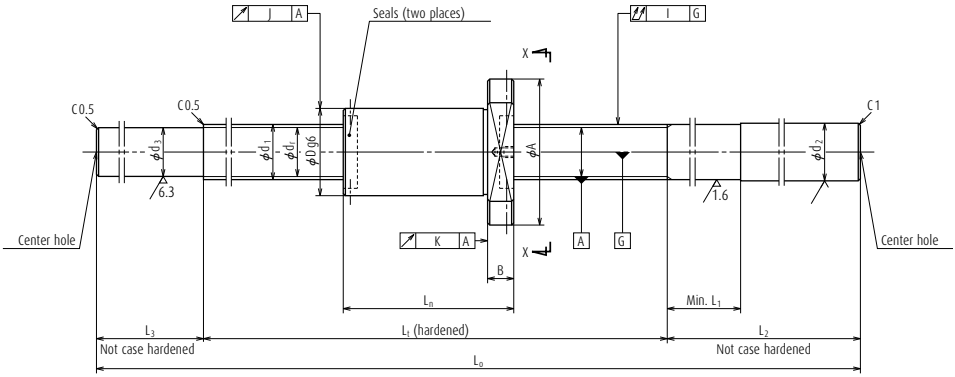


View X-X

Unit: mm

dimensions					Screw shaft dimensions							Lead accuracy			Run-out			Mass	Permissible rotational speed	Internal spatial volume of nut	Standard volume of grease replenishing
Bolt hole				Oil hole	Threaded length	Shaft end right			Shaft end left		Overall length	Travel compensation	Deviation	Variation	Shaft straightness	Radial run-out					
W	X	Y	Z	Q	L_t	d_2	L_1	L_2	d_3	L_3	L_0	T	e_p	U_u	I	J	K	(kg)	N (min^{-1})	(cm^3)	(cm^3)
102	11	17.5	11	Rc1/8	700	40.3	60	300	34.4	100	1 100	-0.017	0.035	0.025	0.065	0.025	0.015	15.5	1 750	74	37
102	11	17.5	11	Rc1/8	1 000	40.3	60	300	34.4	100	1 400	-0.024	0.040	0.027	0.080	0.025	0.015	18.1	1 750	74	37
102	11	17.5	11	Rc1/8	1 400	40.3	60	350	34.4	120	1 870	-0.034	0.054	0.035	0.100	0.025	0.015	22.5	1 750	74	37
106	11	17.5	11	Rc1/8	1 800	40.3	60	350	34.4	120	2 270	-0.043	0.065	0.040	0.130	0.025	0.015	25.6	1 750	74	37
106	11	17.5	11	Rc1/8	2 400	40.3	60	400	34.4	150	2 950	-0.058	0.077	0.046	0.170	0.025	0.015	31.6	1 370	74	37
106	11	17.5	11	Rc1/8	1 000	40.3	70	300	34.1	100	1 400	-0.024	0.040	0.027	0.080	0.025	0.015	19.7	1 750	93	47
106	11	17.5	11	Rc1/8	1 600	40.3	70	350	34.1	150	2 100	-0.038	0.054	0.035	0.130	0.025	0.015	25.8	1 750	93	47
106	11	17.5	11	Rc1/8	2 500	40.3	70	400	34.1	150	3 050	-0.060	0.077	0.046	0.170	0.025	0.015	34.0	1 260	93	47

26. Blank shaft end SS type (Fine lead: Deflector (bridge) type)



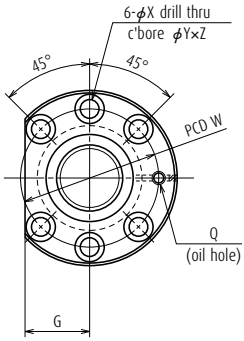
Nut type code: ZFD

Ball screw No.	Stroke Max.	Screw shaft dia.	Lead	Ball dia.	Ball circle dia.	Root dia.	Effective ball turns	Basic load rating (N)		Preload	Dynamic friction torque, median	Nut				
								Dynamic	Static			Outside dia.	Flange			Overall length
	L_t-L_n	d_1	l	D_w	d_m	d_r		C_a	C_{0a}	(N)	(N·cm)	D	A	G	B	L_n
W4007SS-4ZY-C5Z10	557	40	10	6.350	41.75	35.1	4	45 200	93 100	2 840	83	62	104	40	18	143
W4010SS-6ZY-C5Z10	857	40	10	6.350	41.75	35.1	4	45 200	93 100	2 840	83	62	104	40	18	143
W4014SS-3ZY-C5Z10	1 257	40	10	6.350	41.75	35.1	4	45 200	93 100	2 840	83	62	104	40	18	143
W4018SS-4ZY-C5Z10	1 657	40	10	6.350	41.75	35.1	4	45 200	93 100	2 840	83	62	104	40	18	143
W4024SS-3ZY-C5Z10	2 257	40	10	6.350	41.75	35.1	4	45 200	93 100	2 840	83	62	104	40	18	143
W5007SS-1ZY-C5Z10	557	50	10	6.350	51.75	45.1	4	51 500	122 000	3 240	108	72	114	44	18	143
W5010SS-3ZY-C5Z10	857	50	10	6.350	51.75	45.1	4	51 500	122 000	3 240	108	72	114	44	18	143
W5015SS-3ZY-C5Z10	1 357	50	10	6.350	51.75	45.1	4	51 500	122 000	3 240	108	72	114	44	18	143
W5020SS-3ZY-C5Z10	1 857	50	10	6.350	51.75	45.1	4	51 500	122 000	3 240	108	72	114	44	18	143
W5026SS-3ZY-C5Z10	2 457	50	10	6.350	51.75	45.1	4	51 500	122 000	3 240	108	72	114	44	18	143

Notes

1. Use of NSK support unit is recommend. See page 324 for details.
2. **Only rust preventive agent is applied at time of delivery. Please apply lubricant (oil or grease) before use.** See page 442 for details.
3. The permissible rotational speed is determined by d·n value, critical speed and maximum rotational speed. The permissible rotational speed shown in the table is the value when the ball screw mounting method is fixed-fixed.

Screw shaft ϕ 40, ϕ 50
Lead 10

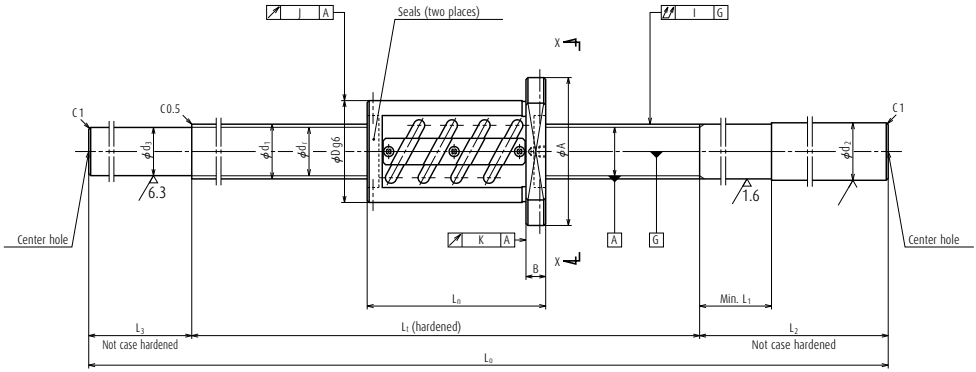


View X-X

Unit: mm

dimensions					Screw shaft dimensions							Lead accuracy			Run-out			Mass	Permissible rotational speed	Internal spatial volume of nut	Standard volume of grease replenishing
Bolt hole				Oil hole	Threaded length	Shaft end right			Shaft end left		Overall length	Travel compensation	Deviation	Variation	Shaft straightness	Radial run-out					
W	X	Y	Z	Q	L_t	d_2	L_1	L_2	d_3	L_3	L_0	T	e_p	U_u	I	J	K	(kg)	N (min^{-1})	(cm^3)	(cm^3)
82	11	17.5	11	Rc1/8	700	40.3	60	300	35.1	100	1 100	-0.015	0.035	0.025	0.065	0.019	0.013	12.1	1 750	32	16
82	11	17.5	11	Rc1/8	1 000	40.3	60	300	35.1	100	1 400	-0.022	0.040	0.027	0.080	0.019	0.013	14.7	1 750	32	16
82	11	17.5	11	Rc1/8	1 400	40.3	60	350	35.1	120	1 870	-0.032	0.054	0.035	0.100	0.019	0.013	18.9	1 750	32	16
82	11	17.5	11	Rc1/8	1 800	40.3	60	350	35.1	120	2 270	-0.041	0.065	0.040	0.130	0.019	0.013	22.5	1 750	32	16
82	11	17.5	11	Rc1/8	2 400	40.3	60	400	35.1	150	2 950	-0.056	0.077	0.046	0.170	0.019	0.013	28.5	1 320	32	16
92	11	17.5	11	Rc1/8	700	50.3	60	300	45.1	100	1 100	-0.015	0.035	0.025	0.065	0.019	0.013	18.3	1 400	39	20
92	11	17.5	11	Rc1/8	1 000	50.3	60	300	45.1	100	1 400	-0.022	0.040	0.027	0.080	0.019	0.013	22.5	1 400	39	20
92	11	17.5	11	Rc1/8	1 500	50.3	60	400	45.1	150	2 050	-0.034	0.054	0.035	0.130	0.019	0.013	31.8	1 400	39	20
92	11	17.5	11	Rc1/8	2 000	50.3	60	400	45.1	150	2 550	-0.046	0.065	0.040	0.170	0.019	0.013	38.9	1 400	39	20
92	11	17.5	11	Rc1/8	2 600	50.3	60	500	45.1	200	3 300	-0.060	0.093	0.054	0.220	0.019	0.013	49.5	1 400	39	20

26. Blank shaft end SS type (Fine lead: Tube type)



Nut type code: ZFT

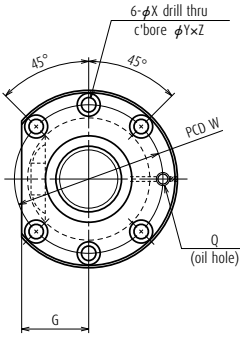
Ball screw No.	Stroke Max. L_t-L_n	Screw shaft dia. d_1	Lead l	Ball dia. D_w	Ball circle dia. d_m	Root dia. d_r	Effective ball turns Turns × Circuits	Basic load rating (N) Dynamic C_a	Basic load rating (N) Static C_{0a}	Preload (N)	Dynamic friction torque, median (N·cm)	Nut Outside dia. D	Nut Flange A	Nut Flange G	Nut Flange B	Nut Overall length L_n
W4510SS-1Z-C5Z10	897	45	10	6.350	46	39.4	2.5×1	36 300	78 500	2 260	69	88	132	50	18	103
W4516SS-1Z-C5Z10	1 497	45	10	6.350	46	39.4	2.5×1	36 300	78 500	2 260	69	88	132	50	18	103
W4525SS-1Z-C5Z10	2 397	45	10	6.350	46	39.4	2.5×1	36 300	78 500	2 260	69	88	132	50	18	103
W5010SS-1Z-C5Z10	897	50	10	6.350	51	44.4	2.5×1	37 500	87 200	2 450	78	93	135	51	18	103
W5015SS-1Z-C5Z10	1 397	50	10	6.350	51	44.4	2.5×1	37 500	87 200	2 450	78	93	135	51	18	103
W5020SS-1Z-C5Z10	1 897	50	10	6.350	51	44.4	2.5×1	37 500	87 200	2 450	78	93	135	51	18	103
W5026SS-1Z-C5Z10	2 497	50	10	6.350	51	44.4	2.5×1	37 500	87 200	2 450	78	93	135	51	18	103
W5010SS-2Z-C5Z10	837	50	10	6.350	51	44.4	2.5×2	68 100	174 000	4 020	138	93	135	51	18	163
W5015SS-2Z-C5Z10	1 337	50	10	6.350	51	44.4	2.5×2	68 100	174 000	4 020	138	93	135	51	18	163
W5020SS-2Z-C5Z10	1 837	50	10	6.350	51	44.4	2.5×2	68 100	174 000	4 020	138	93	135	51	18	163
W5026SS-2Z-C5Z10	2 437	50	10	6.350	51	44.4	2.5×2	68 100	174 000	4 020	138	93	135	51	18	163

Notes

1. Use of NSK support unit is recommend. See page 324 for details.
2. **Only rust preventive agent is applied at time of delivery. Please apply lubricant (oil or grease) before use.** See page 442 for details.
3. The permissible rotational speed is determined by d·n value, critical speed and maximum rotational speed. The permissible rotational speed shown in the table is the value when the ball screw mounting method is fixed-fixed.

Nut model: ZFT

Screw shaft ϕ 45, ϕ 50
Lead 10



View X-X

Unit: mm

dimensions					Screw shaft dimensions							Lead accuracy			Run-out			Mass	Permissible rotational speed	Internal spatial volume of nut	Standard volume of grease replenishing
Bolt hole				Oil hole	Threaded length	Shaft end right			Shaft end left		Overall length	Travel compensation	Deviation	Variation	Shaft straightness	Radial run-out					
W	X	Y	Z	Q	L_t	d_2	L_1	L_2	d_3	L_3	L_0	T	e_p	v_u	I	J	K	(kg)	N (min^{-1})	(cm^3)	(cm^3)
110	11	17.5	11	Rc1/8	1 000	45.3	60	300	39.4	100	1 400	-0.024	0.040	0.027	0.080	0.025	0.015	19.7	1 550	34	17
110	11	17.5	11	Rc1/8	1 600	45.3	60	400	39.4	150	2 150	-0.038	0.054	0.035	0.130	0.025	0.015	28.1	1 550	34	17
110	11	17.5	11	Rc1/8	2 500	45.3	60	450	39.4	150	3 100	-0.060	0.077	0.046	0.170	0.025	0.015	38.8	1 400	34	17
113	11	17.5	11	Rc1/8	1 000	50.3	60	300	44.4	100	1 400	-0.024	0.040	0.027	0.080	0.025	0.015	23.8	1 400	37	19
113	11	17.5	11	Rc1/8	1 500	50.3	60	400	44.4	150	2 050	-0.036	0.054	0.035	0.130	0.025	0.015	32.9	1 400	37	19
113	11	17.5	11	Rc1/8	2 000	50.3	60	400	44.4	150	2 550	-0.048	0.065	0.040	0.170	0.025	0.015	39.8	1 400	37	19
113	11	17.5	11	Rc1/8	2 600	50.3	60	450	44.4	150	3 200	-0.062	0.093	0.054	0.220	0.025	0.015	48.9	1 400	37	19
113	11	17.5	11	Rc1/8	1 000	50.3	60	300	44.4	100	1 400	-0.024	0.040	0.027	0.080	0.025	0.015	25.5	1 400	59	30
113	11	17.5	11	Rc1/8	1 500	50.3	60	400	44.4	150	2 050	-0.036	0.054	0.035	0.130	0.025	0.015	34.6	1 400	59	30
113	11	17.5	11	Rc1/8	2 000	50.3	60	400	44.4	150	2 550	-0.048	0.065	0.040	0.170	0.025	0.015	41.5	1 400	59	30
113	11	17.5	11	Rc1/8	2 600	50.3	60	450	44.4	150	3 200	-0.062	0.093	0.054	0.220	0.025	0.015	50.7	1 400	59	30

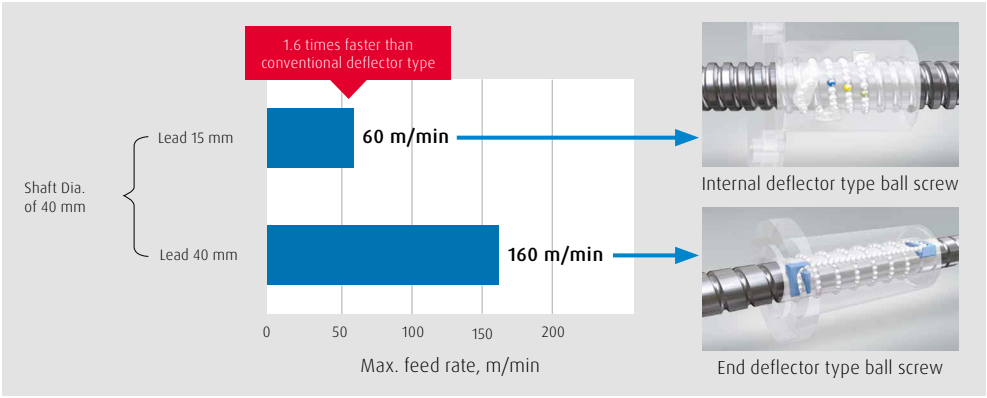
27. DIN Ball Screws for Machine Tool Industry

Features

- High speed capability
- High load capacity
- Low torque variation
- Low noise
- Dimensions according DIN-Norm
- Available from stock for prototypes

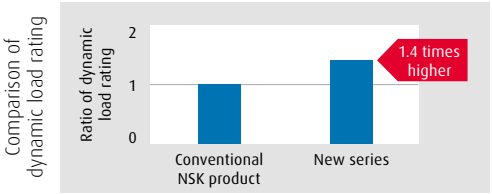
High-speed operation

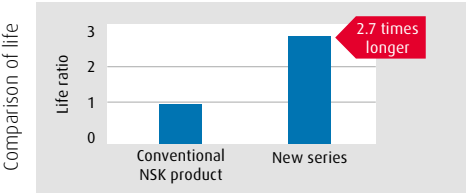
Depending on shaft diameter and lead combination, two types of recirculation system are used.
One option is the newly developed internal deflector which is chosen for smaller leads (10 – 30 mm).
The other is the end-deflector for higher leads between 20 and 40 mm.
Both allow a high d·n value of 150.000 ~ 160.000.



High load capacity

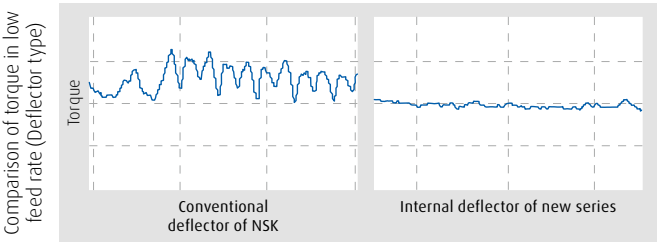
1.4 times dynamic load rating is achieved by applying special TF bearing steel with dedicated heat treatment to ball screws for machine tools. This TF material has already been applied in the bearing industry several years ago and as well as to our high load capacity ball screws for injection molding machines. It contributes to high cycle operation with long life of ball screws.

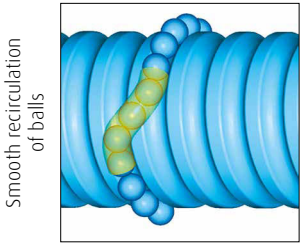




Newly developed internal deflector for low torque variation

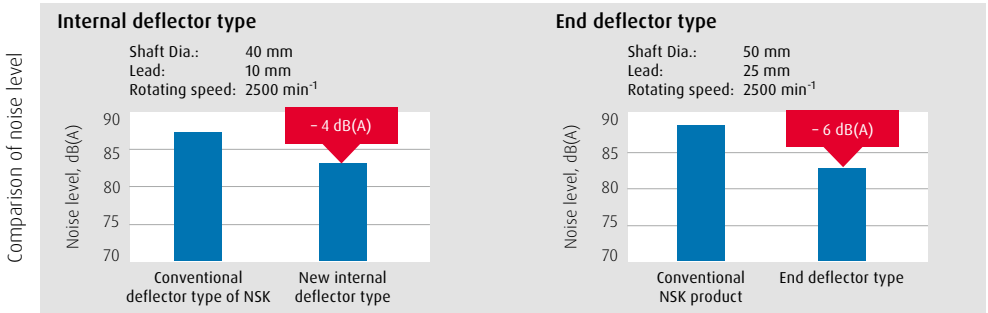
By using our own simulation technology for ball motion NSK has developed improved ball recirculation systems. The low torque variation contributes to the improvement of the surface profile of machined work pieces.





Low noise

Low noise technology that has previously been used for the end deflector type has now been applied to the new internal deflector type. Other low noise technology that reduces the noise from raceway can be applied to this series when the specified accuracy grade is C3 or higher. Please contact NSK when this feature is needed for accuracy grade C5.



TF Steel technology now used for BS series

We are applying our existing TF bearing steel technology to increase the robustness and lifespan of our new DIN ball screw series. Using this material enables us to extend our ball screw life by avoiding external early flaking due to stress at impressions.

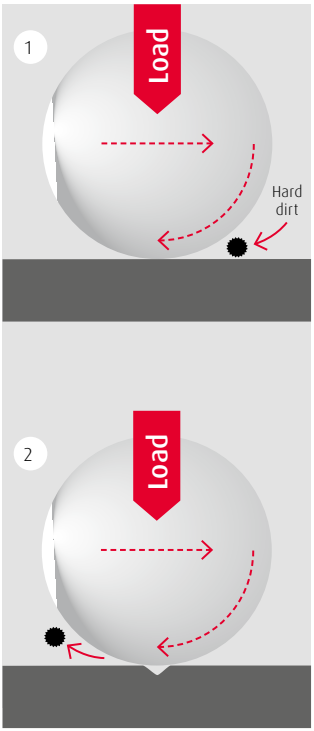
Properties of the TF material

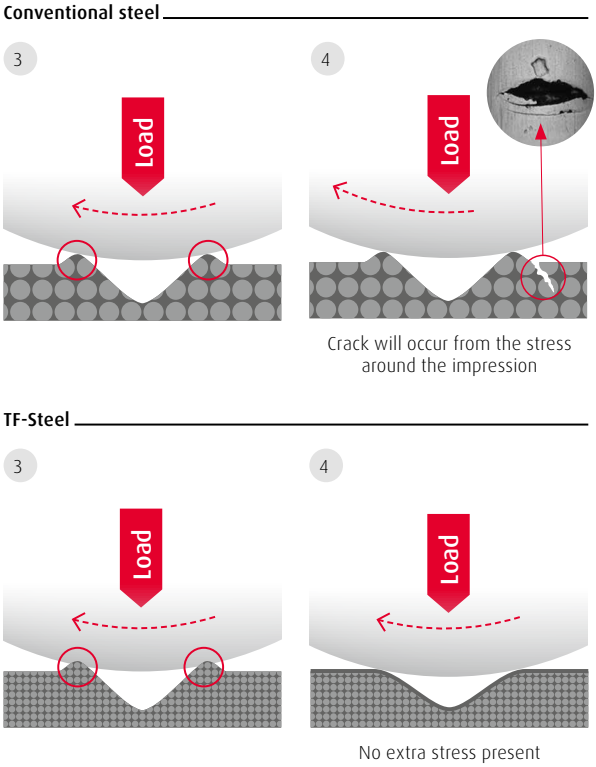
- Fine distribution of carbides and carbonatite particles
- Remaining austenite is checked properly to have the best combination of hardness and strength
- Due to this fact, excess material can be pushed back into the surface and thus avoids recurring tensions

Advantages of the TF material

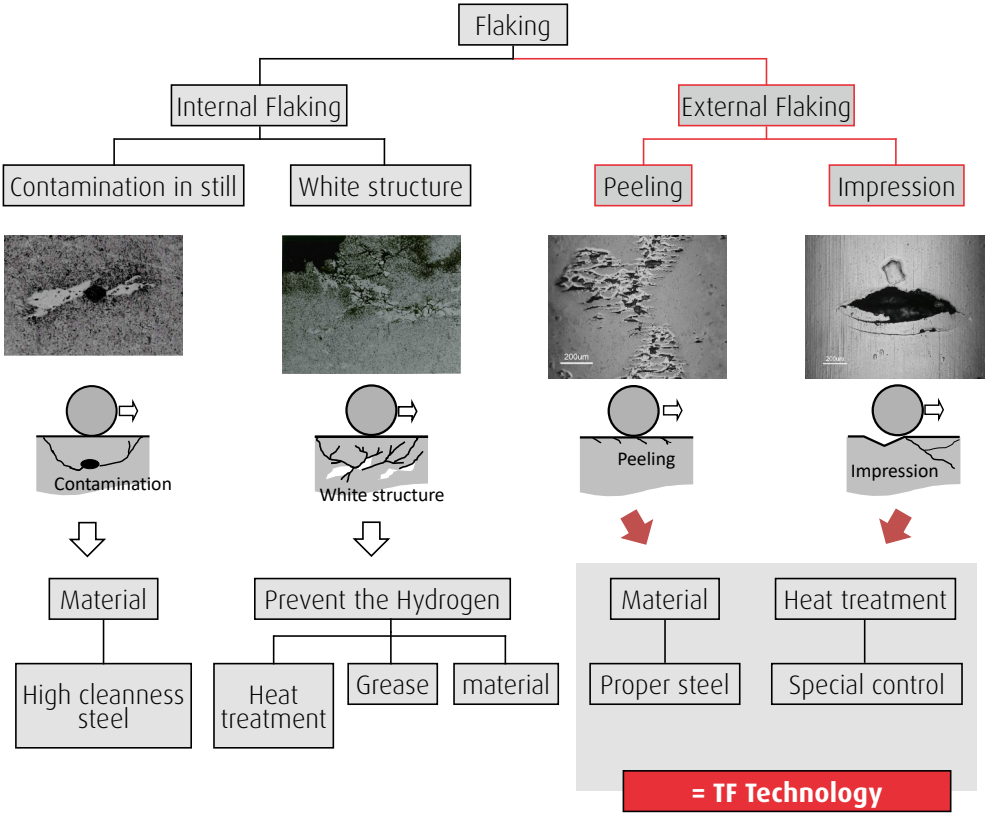
- Far better lifespan in polluted environments
- Longer life even under normal conditions
- Better resistance against surface damage
- Reduced failure caused by broken parts released from impressions

TF steel relieves the stress concentration due to hardness and toughness





Theory of decreasing the stress concentration around the impression



~ Long life technology by material and heat treatment ~

27. DIN Ball Screws for Machine Tool Industry

Series range and allowable feed rate

DIN standard nut Dia. range

Unit: m/min

Shaft Diameter	Lead					
	10 mm	15 mm	20 mm	25 mm	30 mm	40 mm
32 mm	50	75	100	—	—	—
40 mm	40	60	80	100	120	160
50 mm	32	48	64	—	—	—
63 mm	23	35	47	—	71	—

DIN extended nut Dia. range

Unit: m/min

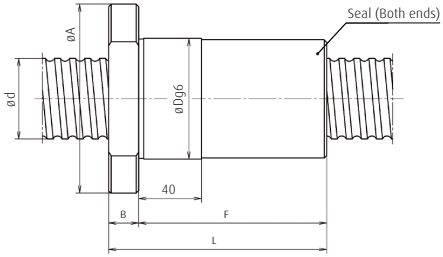
Shaft Diameter	Lead					
	10 mm	15 mm	20 mm	25 mm	30 mm	40 mm
32 mm	—	—	100	—	—	—
40 mm	—	—	80	100	120	160
50 mm	—	—	—	80	96	128
63 mm	—	—	—	—	—	—

Remarks Maximum allowable feed rate (m/min) is calculated from allowable rotating speed. Review of critical speed is required. Please contact NSK when the speed exceeds the maximum allowable d·n value Ø 32 ~ Ø 50: 160.000, Ø 63: 150.000.

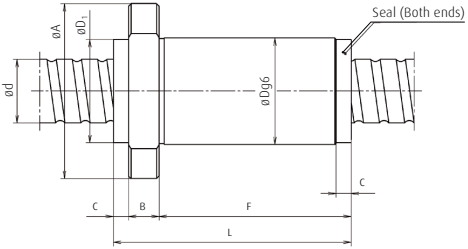
Preload system

The standard preload system is offset preload.

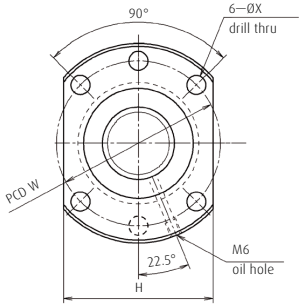
Dimensions



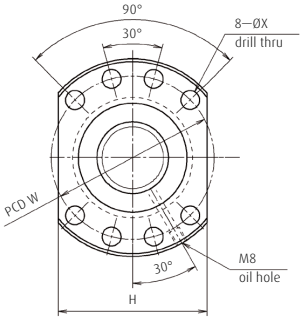
ZSD (Internal deflector type)



ZSS (End deflector type)



Shape **I** (Shaft Dia. = 32)



Shape **II** (Shaft Dia. > 32)

Unit: mm

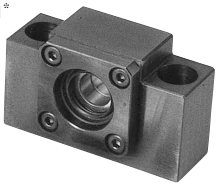
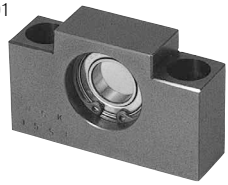
Model No.	Shaft dia. d	Lead l	Effective ball turns Turns × Circuits	Basic load rating (N)		Ball nut dimensions										DIN standard nut Dia.	DIN extended nut Dia.
				Dynamic Ca	Static C0a	L	D	D1	A	B	C	F	W	X	H		
ZSD3210-10	32	10	1×5	58700	83 200	156	50	-	80	12	-	144	65	9	62	•	
ZSD3215-6	32	15	1×3	37500	49 700	148	50	-	80	12	-	136	65	9	62	•	
ZSD3220-4	32	20	1×2	26200	32 900	132	50	-	80	12	-	120	65	9	62	•	
ZSS3220-4E	32	20	3.7×1	50000	71 800	121	56	55	86	14	10,5	96,5	71	9	65		•
ZSD4010-8	40	10	1×4	73400	103 000	137	63	-	93	14	-	123	78	9	70	•	
ZSD4015-6	40	15	1×3	57000	77 100	155	63	-	93	14	-	141	78	9	70	•	
ZSS4020-4ES	40	20	3.7×1	55000	89 900	102	63	62	93	14	5	83	78	9	70	•	
ZSS4020-4E	40	20	3.7×1	65400	102 000	126	70	69	100	14	10,5	101,5	85	9	75		•
ZSS4025-4ES	40	25	3.7×1	54600	90 300	122	63	-	93	14	5	103	78	9	70	•	
ZSS4025-4E	40	25	3.7×1	64900	102 000	145	70	69	100	14	10,5	120,5	85	9	75		•
ZSS4030-4ES	40	30	3.7×1	55500	90 700	141	63	-	93	14	5	122	78	9	70	•	
ZSS4030-4E	40	30	3.7×1	66300	103 000	164	70	69	100	14	10,5	139,5	85	9	75		•
ZSS4040-3ES	40	40	2.7×1	41300	65 700	134	63	-	93	14	-	120	78	9	70	•	
ZSS4040-3E	40	40	2.7×1	49300	74 600	150	70	69	100	14	10,5	125,5	85	9	75		•
ZSD5010-8	50	10	1×4	82700	133 000	140	75	-	110	16	-	124	93	11	85	•	
ZSD5015-8	50	15	1×4	94400	145 000	191	75	-	110	16	-	175	93	11	85	•	
ZSD5020-8	50	20	1×4	94000	145 000	240	75	-	110	16	-	224	93	11	85	•	
ZSS5025-4E	50	25	3.7×1	72600	129 000	145	82	81	118	16	10,5	118,5	100	11	92		•
ZSS5030-4E	50	30	3.7×1	72100	128 000	164	82	81	118	16	10,5	137,5	100	11	92		•
ZSS5040-3E	50	40	2.7×1	55500	94 200	142	82	81	118	16	10,5	115,5	100	11	92		•
ZSD6310-10	63	10	1×5	115000	220 000	164	90	-	125	18	-	146	108	11	95	•	
ZSD6315-8	63	15	1×4	177000	309 000	198	95	-	135	20	-	178	115	13,5	100	•	
ZSD6320-10	63	20	1×5	214000	385 000	286	95	-	135	20	-	266	115	13,5	100	•	
ZSD6330-6	63	30	1×3	137000	230 000	269	95	-	135	20	-	249	115	13,5	100	•	

28. Types of Support Units

1. Accessories

Accessories to use with NSK ball screws are available.

Table 1 Support unit categories

Application		Shape	Support side	Bearing in use	Bearing bore, Bearing seat diameter	Page
Small equipment, light load	Square	WBK**-01* 	Fixed support side	Angular contact ball bearing	ϕ4 - ϕ25	330
Small equipment, light load	Square	WBK**S-01* 	Simple support side	Deep groove ball bearing	ϕ6 - ϕ25	334
Small equipment, light load	Square	WBK**SF-01 	Simple support side	Deep groove ball bearing	ϕ12, ϕ15 (exclusive for VFA type)	334

(1) Classification

Ball screw support units are classified into categories by their shape (Table 1). Select the type that best suits your particular needs.

(2) Features

› Bearings and seals
On the fixed support side, the angular contact ball bearing is used. It has great rigidity and low friction torque, which match the rigidity of the ball screw. The thrust angular contact ball bearing with high precision and great rigidity is another choice for the fixed support side.
An oil seal is installed to the fixed support side used with an angular contact ball bearing. Fine clearance may occur with this seal.
A deep-groove ball bearing with a shield on both sides is used on the simple support side.

› Lock nut is provided.
A lock nut with fine grade finish is provided to fix the bearing with high precision.
The lock nuts are designed to be difficult to loosen, but they can still loosen if subjected to strong mechanical vibration. If necessary, this should be prevented by applying threadlocking adhesive or taking similar precautions.

Application		Shape	Support side	Bearing in use	Bearing bore, Bearing seat diameter	Page
Small equipment, light load	Round	WBK**R-11 (Support kit) 	Fixed support side	Deep groove ball bearing (arranged to have angular contact)	ϕ4, ϕ6 (exclusive for RMA and RMS types)	336
Small equipment, light load	Round	WBK**-11* 	Fixed support side	Angular contact ball bearing	ϕ4 - ϕ25	332
Machine tools, high speed, heavy load	Round	WBK**DF*-31H 	Fixed support side	Thrust angular contact ball bearing	ϕ17 - ϕ40	340

2. Reference number coding

(For light load)

Example: WBK 08 S - 01 A

Product code for support unit

Nominal size code*

Mounting code
- No code: Fixed support unit
- S: Simple support unit
- SF: Simple support unit (for FSS and VFA)
- R: Fixed support unit (support kit for miniature ball screws)

No code or A: For general use
- B: Low-profile type (only for square type)
- C: For clean environment use
- M: Miniature general-purpose use
- W: Lost-wax product

01: Square type
11: Round type

*) In case of simple support unit, please note that the nominal size code of 12 or less does not strictly represent internal bore of bearing in millimeters. Please refer to the dimensional table for internal bore of bearing.

(For high speed and heavy load)

Example: WBK 25 DF - 31 H

Product code for support unit

Nominal size code (internal bore of bearing)

H:High speed type

Bearing combination code
- DF: Face to face duplex combination
- DFD: Face to face triplex combination
- DFF: Face to face quadruplex combination

(1) Support Units for Light Load and Small Equipment

Support units for light load and small equipment provide both fixed and support side bearing assemblies to support screw shafts. They provide all required parts such as bearing locknuts so that you can mount them directly to NSK standard ball screws, of which shaft ends are machined. Please refer to the dimensions listed on the dimension table for the configuration of standard screw shaft ends for NSK standard ball screws with blank shaft ends. For ball screws for transfer equipment, you require optional spacers when mounting fixed support side support units.

(a) Features

› Prompt delivery
Support units are standard products.

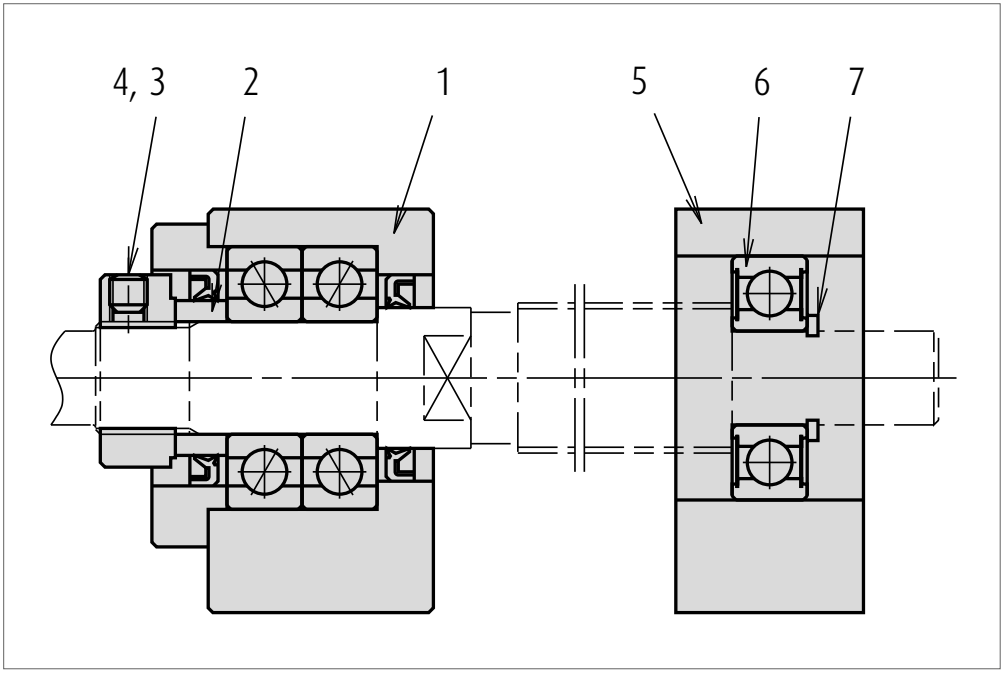
› Best selection of bearings for your application
General use support units for fixed support side are equipped with highly rigid angular contact ball bearings that have been assembled with proper preload, and packed with the appropriate volume of grease. On the other hand, clean support units for fixed support side uses low dust emission grease, and low torque special bearings. Sealed deep groove ball bearings are used for simple support side units for both general and clean environment use.

28. Types of Support Units

› Accessories

Support units provide everything necessary for mounting ball screws to machines.
(Please refer to the table below.)

* Do not disassemble fixed support side units as they are equipped with bearings and oil seals.



› Antirust treatment
The table on the right shows the surface treatment for the bearing housing, and material of small parts.

Fixed support side		Simple support side	
Part No.	Name of parts	Part No.	Name of parts
1	Bearing housing	5	Bearing housing
2	Spacer	6	Bearing
3	Locknut	7	Snap ring
4	Set screw with brass pad		

	General support unit
Bearings and grease	Angular contact ball bearings, PS2
Surface treatment	Black oxide
Screws and snap rings	Standard material

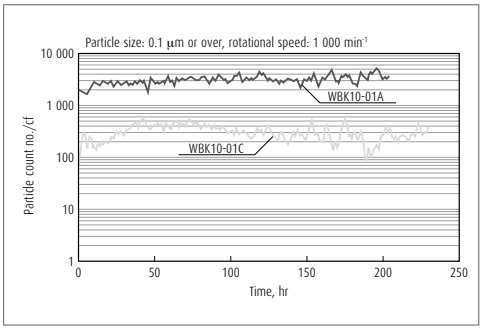
(b) Features of Clean Support Unit

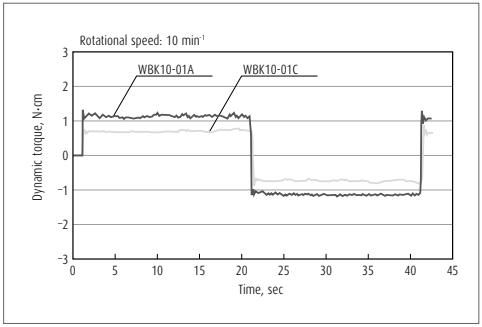
› Outstanding low dust emission
Clean support unit uses "NSK clean grease LG2" which has a proven feature of low dust emission. It reduces dust emission to 1/10 of general support units.

› Low torque
It features low torque characteristics because of special bearings. (50% lower than general support unit.)

› High antirust specification
Low temperature chrome plating is applied to bearing housings, retaining plates, locknuts and spacers to improve antirust properties. Moreover, bolts and snap rings are made of stainless steel.
The table below shows the surface treatment of the bearing housing and material of small parts.

	Clean support unit
Bearing • grease	Special bearings, LG2
Surface treatment	Low temperature chrome plating
Set screw and snap ring material	Stainless steel

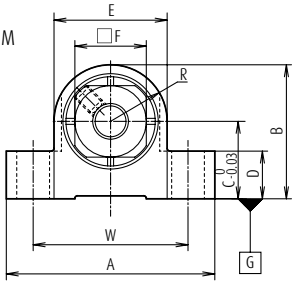


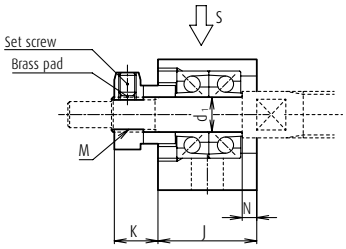


29. WBK-Series

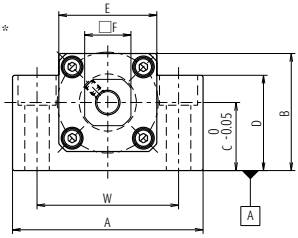
1. Support Units for Light Load and Small Equipment

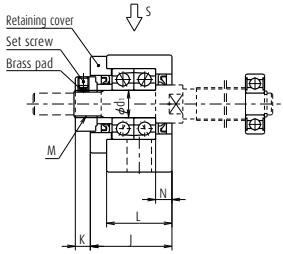
WBK**-01M





WBK**-01*



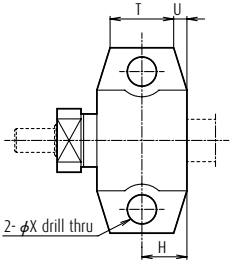


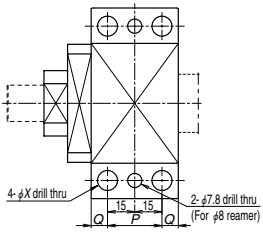
Fixed support side support unit (square type)

Reference No.	Use	d_1	A	B	C	D	E	F	L	J	K	R
WBK04-01M	General	4	27	17	10	6	14	10	—	14	5.5	7
WBK06-01M	General	6	35	22.5	13	8	19	12	—	17	7.5	9.5
WBK06-01A*1	General	6	42	25	13	20	18	12	20	20	5.5	—
WBK08-01A*1	General	8	52	32	17	26	25	14	23	23	7	—
WBK08-01B	Low type	8	62	31	15.5	31	—	14	21.5	25.5	4.5	—
WBK08-01C*1	Clean environment	8	52	32	17	26	25	14	23	23	7	—
WBK10-01A	General	10	70	43	25	35	36	17	24	30	5.5	—
WBK10-01B	Low type	10	70	38	20	38	—	17	24	30	5.5	—
WBK10-01C	Clean environment	10	70	43	25	35	36	17	24	30	5.5	—
WBK12-01A	General	12	70	43	25	35	36	19	24	30	5.5	—
WBK12-01B	Low type	12	70	38	20	38	—	19	24	30	5.5	—
WBK12-01C	Clean environment	12	70	43	25	35	36	19	24	30	5.5	—
WBK15-01A	General	15	80	50	30	40	41	22	25	31	12	—
WBK15-01B	Low type	15	80	42	22	42	—	22	25	31	12	—
WBK15-01C	Clean environment	15	80	50	30	40	41	22	25	31	12	—
WBK17-01A	General	17	86	64	39	55	50	24	35	44	7	—
WBK20-01	General	20	95	58	30	45	56	30	42	52	10	—
WBK25-01W	General	25	105	68	35	25	66	36	48	61	13	—

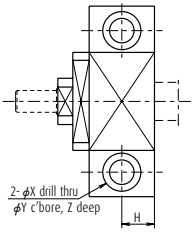
Notes

1. Use datum surface A for mounting to machine base.
2. Tighten set screw after locknut has been adjusted and tightened.
3. Insert brass pad provided with unit into locknut set screw hole, then insert and tighten the set screw.
4. Deep groove ball bearing and snap ring are also provided for simple support side.
   (except WBK04-01M, WBK06-01M and WBK06-01A)

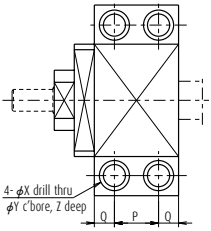




View S (WBK25)



View S (WBK06 - 15)



View S (WBK17 - 20)

Reference No.	Tightening torque (reference) [N·cm]	
	Locknut	Set screw
WBK04-**	100	69 (M3)
WBK06-**	190	69 (M3)
WBK08-**	230	69 (M3)
WBK10-**	280	147 (M4)
WBK12-**	630	147 (M4)
WBK15-**	790	147 (M4)
WBK17-**	910	147 (M4)
WBK20-**	1670	147 (M4)
WBK25-**	2060	490 (M6)

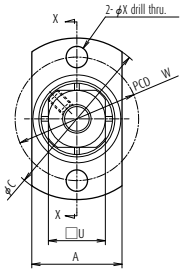
Unit: mm

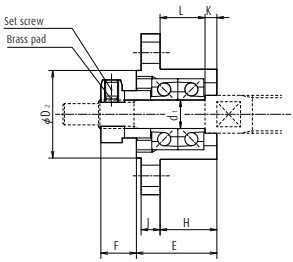
T	U	N	Counterbore dimensions							Mass	Locknut screw	Attached bearing for support side
			H	P	Q	W	X	Y	Z	(kg)	M	
9	2.5	2	7	—	—	21	3.5	—	—	0.03	M4×0.5	—
12	2.5	2.5	8.5	—	—	26	5.5	—	—	0.05	M6×0.75	—
—	—	3.5	10	—	—	30	5.5	9.5	11	0.15	M6×0.75	—
—	—	4	11.5	—	—	38	6.6	11	12	0.25	M8×1	606ZZ
—	—	3.5	11	—	—	46	9	14	18	0.3	M8×1	606ZZ
—	—	4	11.5	—	—	38	6.6	11	12	0.25	M8×1	606ZZ
—	—	6	12	—	—	52	9	14	11	0.5	M10×1	608ZZ
—	—	6	12	—	—	52	9	14	19	0.45	M10×1	608ZZ
—	—	6	12	—	—	52	9	14	11	0.5	M10×1	608VV
—	—	6	12	—	—	52	9	14	11	0.5	M12×1	6000ZZ
—	—	6	12	—	—	52	9	14	19	0.4	M12×1	6000ZZ
—	—	6	12	—	—	52	9	14	11	0.5	M12×1	6000VV
—	—	5	12.5	—	—	60	11	17	15	0.7	M15×1	6002ZZ
—	—	5	12.5	—	—	60	11	17	23	0.6	M15×1	6002ZZ
—	—	5	12.5	—	—	60	11	17	15	0.7	M15×1	6002VV
—	—	7	—	19	8	68	9	14	11	1.3	M17×1	6203ZZ
—	—	10	—	22	10	75	11	17	15	1.4	M20×1	6204ZZ
—	—	14	—	30	9	85	11	—	—	1.9	M25×1.5	6205ZZ

5. Bearings for WBK04-01M and WBK06-01M are equipped with non-contact metal shield.
*1) For retaining cover side of WBK06-01A, WBK08-01A, and WBK08-01C, there are no seals.
6. Contact NSK if the rotational speed is 50 min^{-1} and below.

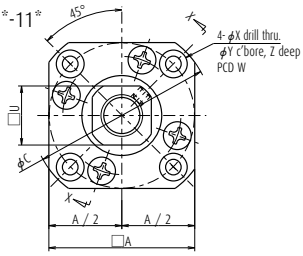
29. WBK-Series

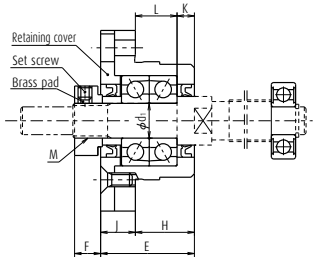
WBK**-11M





WBK**-11*





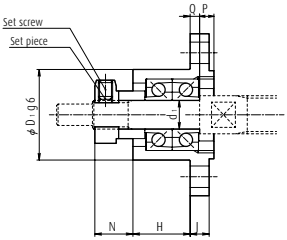
View X-X (example 1)

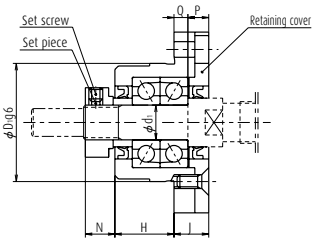
Fixed support side support unit (round type)

Reference No.	Use	d_1	A	C	D_1	D_2	E	H	L	K	F	N
WBK04-11M	General	4	14	26	14	14	13.5	8.5	7	1.5	5.5	6.6
WBK06-11M	General	6	19	34	19	18.5	17	12	9.5	2.5	7.5	8
WBK06-11*	General	6	28	35	22	—	20	13	9.5	3.5	5.5	6.5
WBK08-11B	High-load type	8	42	52	34	—	25.5	15.5	12	3.5	4.5	7
WBK08-11*	General	8	35	43	28	—	23	14	10	4	7	8
WBK08-11C*	Clean environment	8	35	43	28	—	23	14	10	4	7	8
WBK10-11	General	10	42	52	34	—	27	17	12	5	7.5	8.5
WBK10-11C	Clean environment	10	42	52	34	—	27	17	12	5	7.5	8.5
WBK12-11	General	12	44	54	36	—	27	17	12	5	7.5	8.5
WBK12-11C	Clean environment	12	44	54	36	—	27	17	12	5	7.5	8.5
WBK15-11	General	15	52	63	40	—	32	17	11	6	12	14
WBK15-11C	Clean environment	15	52	63	40	—	32	17	11	6	12	14
WBK20-11	General	20	68	85	57	—	52	30	20	10	10	14
WBK25-11	General	25	79	98	63	—	57	30	20	10	13	20

Notes

1. Tighten set screw after locknut has been adjusted and tightened.
2. Insert brass pad provided with unit into locknut set screw hole, then insert and tighten the set screw.
3. Deep groove ball bearing and snap ring are also provided for simple support side.
   (except WBK04-11M, WBK06-11M and WBK06-11)





(example 2)

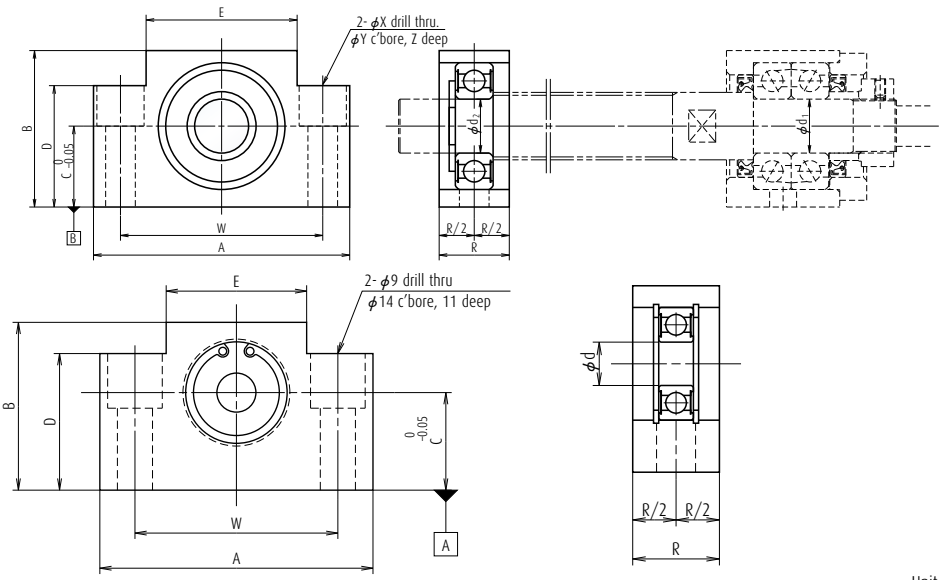
Reference No.	Tightening torque (reference) [N·cm]	
	Locknut	Set screw
WBK04-**	100	69 (M3)
WBK06-**	190	69 (M3)
WBK08-**	230	69 (M3)
WBK10-**	280	147 (M4)
WBK12-**	630	147 (M4)
WBK15-**	790	147 (M4)
WBK17-**	910	147 (M4)
WBK20-**	1670	147 (M4)
WBK25-**	2060	490 (M6)

Unit: mm

U	P	Q	Counterbore dimensions					Mass	Locknut screw	Attached bearing for support side
			J	W	X	Y	Z	(kg)	M	
0	2.6	2.4	3	20	3.5	—	—	0.02	M4×0.5	—
12	3	2	4	26	4.5	—	—	0.04	M6×0.75	—
12	4.5	2.5	7	28	2.9	5.5	3.5	0.1	M6×0.75	—
14	6	4	10	42	4.5	8	4	0.2	M8×1	606ZZ
14	5	4	9	35	3.4	6.5	4	0.15	M8×1	606ZZ
14	5	4	9	35	3.4	6.5	4	0.15	M8×1	606VV
17	6	4	10	42	4.5	8	4	0.2	M10×1	608ZZ
17	6	4	10	42	4.5	8	4	0.2	M10×1	608VV
19	6	4	10	44	4.5	8	4	0.25	M12×1	6000ZZ
19	6	4	10	44	4.5	8	4	0.25	M12×1	6000VV
22	8	7	15	50	5.5	9.5	6	0.4	M15×1	6002ZZ
22	8	7	15	50	5.5	9.5	6	0.4	M15×1	6002VV
30	14	8	22	70	6.6	11	10	1.1	M20×1	6204ZZ
36	17	10	27	80	9	15	13	1.5	M25×1.5	6205ZZ

4. Bearings for WBK04-01M and WBK06-01M are equipped with non-contact metal shield.
   *For retaining cover side of WBK06-01A, WBK08-01A, and WBK08-01C, there are no seals.
5. Contact NSK if the rotational speed is 50 min^{-1} and below.

29. WBK-Series



Simple support side support unit (square type)

Unit: mm

Reference No.	Use	d_2	A	B	C	D	E	R	Counterbore dimensions				Mass
									W	X	Y	Z	(kg)
WBK08S-01	General	6	52	32	17	26	25	15	38	6.6	11	12	0.15
WBK08S-01B	Low type	6	62	31	15.5	31	—	16	46	9	14	18	0.2
WBK08S-01C	Clean environment	6	52	32	17	26	25	15	38	6.6	11	12	0.15
WBK10S-01	General	8	70	43	25	35	36	20	52	9	14	11	0.4
WBK10S-01C	Clean environment	8	70	43	25	35	36	20	52	9	14	11	0.4
WBK12S-01	General	10	70	43	25	35	36	20	52	9	14	11	0.35
WBK12S-01B	Low type	10	70	38	20	38	—	20	52	9	14	19	0.4
WBK12S-01C	Clean environment	10	70	43	25	35	36	20	52	9	14	11	0.35
WBK12SF-01*2	General	12	70	43	25	35	36	20	52	9	14	11	0.3
WBK12SF-01B*1	Low type	12	62	31	15.5	31	—	18	46	9	14	18	0.2
WBK15S-01	General	15	80	50	30	40	41	20	60	9	14	11	0.45
WBK15S-01B	Low type	15	80	42	22	42	—	20	60	9	14	23	0.4
WBK15S-01C	Clean environment	15	80	50	30	40	41	20	60	9	14	11	0.45
WBK15SF-01*2	General	15	70	43	25	35	36	20	52	9	14	11	0.3
WBK15SF-01B*1	Low type	15	70	38	20	38	—	18	52	9	14	19	0.3
WBK17S-01	General	17	86	64	39	55	50	23	68	9	14	11	0.8
WBK20S-01	General	20	95	58	30	45	56	26	75	11	17	15	0.8
WBK20SF-01B	Low type	20	80	42	22	42	—	22	60	11	17	23	0.4
WBK25S-01W	General	25	105	68	35	25	66	30	85	11	—	—	0.9
WBK25SF-01*1	General	25	95	58	30	45	56	22	75	11	17	15	0.55

Notes

1. Use datum surface B for mounting to machine base.
2. For reference No. 12 or lower numbers, note that the reference numbers and inner dimensions of the bearing are different.
3. WBK ** SF is a type supporting screw shaft OD.
4. See page 335 for bearing reference number and the basic dynamic load rating in the radial direction.
5. *1 is exclusive for FSS type.
6. *2 is exclusive for VFA type.

Specifications of support unit

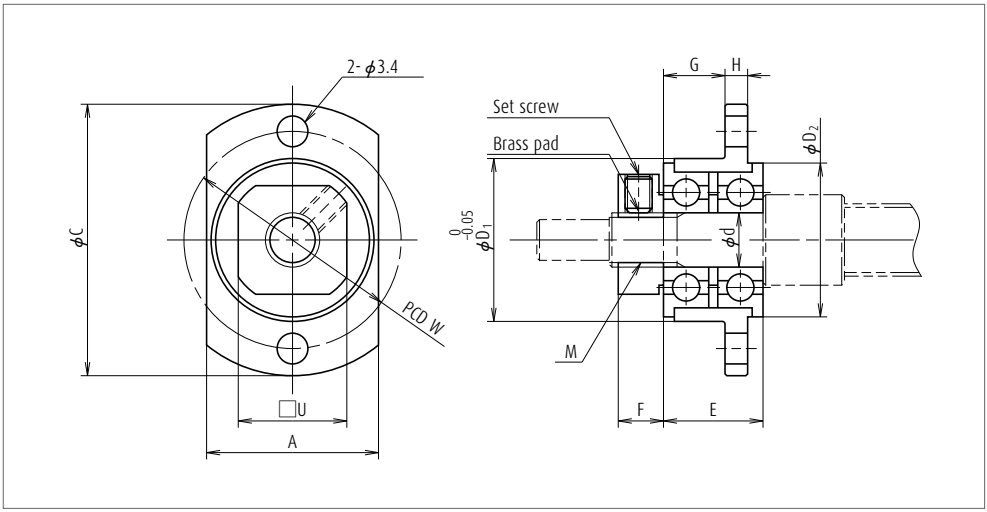
Fixed support side support unit								
Reference No.	Use	Axial direction			Maximum starting torque [N·cm]	Reference No.	Bearing reference No.	Radial direction Basic dynamic load rating C [N]
		Basic dynamic load rating Ca [N]	Load limit [N]	Rigidity [N/μm]				
WBK04-01M	General	1 470	464	39	0.2	—	—	—
WBK04-11M	General	1 470	464	39	0.2	—	—	—
WBK06-01A	General	2 670	1 040	28	0.49	—	—	—
WBK06-01M	General	2 760	854	60	0.35	—	—	—
WBK06-11	General	2 670	1 040	28	0.49	—	—	—
WBK06-11M	General	2 760	854	60	0.35	—	—	—
WBK08-01A	General	4 400	1 450	49	0.88	WBK08S-01	606ZZ	2 260
WBK08-01B	Low type	6 600	2 730	94	1.9	WBK08S-01B	606ZZ	2 260
WBK08-01B	Low type	6 600	2 730	94	1.9	WBK12SF-01B*1	6801ZZ	1 920
WBK08-01C	Clean environment	3 100	1 100	36	0.52	WBK08S-01C	606VV	2 260
WBK08-11	General	4 400	1 450	49	0.88	WBK08S-01	606ZZ	2 260
WBK08-11B	High load	6 600	2 730	94	1.9	—	606ZZ	2 260
WBK08-11C	Clean environment	3 100	1 100	36	0.52	WBK08S-01C	606VV	2 260
WBK10-01A	General	6 600	2 730	94	1.9	WBK10S-01	608ZZ	3 300
WBK10-01A	General	6 600	2 730	94	1.9	WBK12SF-01*2	6001ZZ	5 100
WBK10-01B	Low type	6 600	2 730	94	1.9	—	608ZZ	3 300
WBK10-01C	Clean environment	4 250	1 364	50	1.1	WBK10S-01C	608VV	3 300
WBK10-11	General	6 600	2 730	94	1.9	WBK10S-01	608ZZ	3 300
WBK10-11C	Clean environment	4 250	1 364	50	1.1	WBK10S-01C	608VV	3 300
WBK12-01A	General	7 100	3 040	104	2.1	WBK12S-01	6000ZZ	4 550
WBK12-01A	General	7 100	3 040	104	2.1	WBK15SF-01*2	6902ZZ	4 350
WBK12-01B	Low type	7 100	3 040	104	2.1	WBK12S-01B	6000ZZ	4 550
WBK12-01B	Low type	7 100	3 040	104	2.1	WBK15SF-01B*1	6902ZZ	4 350
WBK12-01C	Clean environment	4 700	2 443	57	1.2	WBK12S-01C	6000VV	4 550
WBK12-11	General	7 100	3 040	104	2.1	WBK12S-01	6000ZZ	4 550
WBK12-11C	Clean environment	4 700	2 443	57	1.2	WBK12S-01C	6000VV	4 550
WBK15-01A	General	7 600	3 380	113	2.4	WBK15S-01	6002ZZ	5 600
WBK15-01B	Low type	7 600	3 380	113	2.4	WBK15S-01B	6002ZZ	5 600
WBK15-01B	Low type	7 600	3 380	113	2.4	WBK20SF-01B*1	6804ZZ	4 000
WBK15-01C	Clean environment	5 100	2 757	63	1.3	WBK15S-01C	6002VV	5 600
WBK15-11	General	7 600	3 380	113	2.4	WBK15S-01	6002ZZ	5 600
WBK15-11C	Clean environment	5 100	2 757	63	1.3	WBK15S-01C	6002VV	5 600
WBK17-01A	General	13 400	5 800	120	3.5	WBK17S-01	6203ZZ	9 550
WBK20-01	General	17 900	8 240	155	6.2	WBK20S-01	6204ZZ	12 800
WBK20-01	General	17 900	8 240	155	6.2	WBK25SF-01*1	6005ZZ	10 100
WBK20-11	General	17 900	8 240	155	6.2	WBK20S-01	6204ZZ	12 800
WBK25-01W	General	20 200	10 000	192	7.2	WBK25S-01W	6205ZZ	14 000
WBK25-11	General	20 200	10 000	192	7.2	WBK25S-01W	6205ZZ	14 000
WBK04R-11	General	615	490	6.5	0.59	—	—	—
WBK06R-11	General	1 280	930	9	0.59	—	—	—

1. *1: Exclusive for FSS type.
2. *2: Exclusive for VFA type.
3. Permissible axial load is 0.7 times of limiting axial load.

2. Support kits for ball screws for transfer equipment

Support kits are for RMA type ball screw.

In case of RMA1002 or larger rolled ball screws, please use support units for general use.



Units: mm

Reference No.	A	C	d	D_1	D_2	E	F	G	H	W	U	M	Mass (kg)
WBK04R-11	14	25	4	13	12.5	9	5	5	2.5	19	10	M4×0.5	0.13
WBK06R-11	19	30	6	18	17	11	5	6.8	2.5	24	12	M6×0.75	0.23

Reference No.	Applicable ball screw	Locknut tightening torque (reference) [N·cm]	Set screw tightening torque (reference) [N·cm]
WBK04R-11	RMA0601	100	38 (M2.5)
WBK06R-11	RMA0801	190	69 (M3)
WBK06R-11	RMA0801.5	190	69 (M3)
WBK06R-11	RMA0802	190	69 (M3)

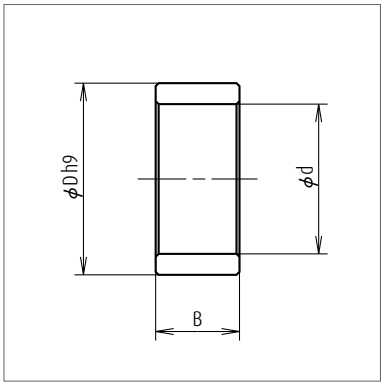
Notes

1. Oscillate bearings slowly so that they fall into place in which run-out of mounting surface is minimal, and then tighten locknut.
2. Support kit is on provisional shaft (bolt) during shipping.
3. When securing support unit on shaft, insert brass pad that is provided with support unit into lock nut hole, and then tighten set screw.

3. Spacer

When using a fixed support unit, it may require an optional spacer to have an effective shoulder surface at where the ball thread is threaded to the end of the shoulder. This is common for the R series for transporting ball screws.

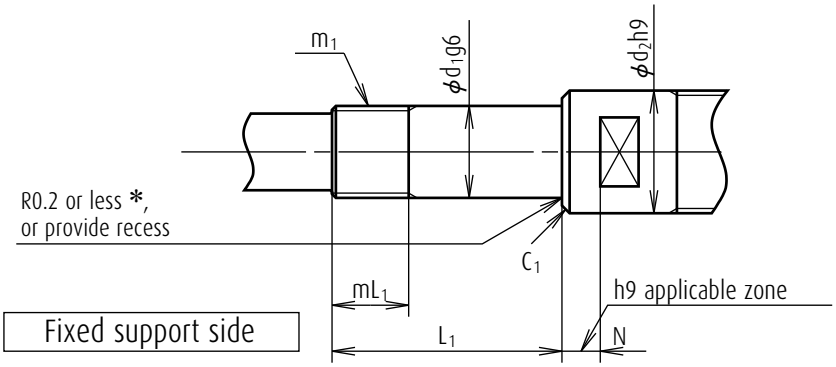
Units: mm



Reference No.	Internal diameter, d	Outside diameter, d	Width B	Mass (g)	Applicable support unit
WBK06K	6	9.5	5.0	2	WBK06-**
WBK08K	8	11.5	5.5	2	WBK08-**
WBK10K	10	14.5	5.5	4	WBK10-**
WBK12K	12	15.0	5.6	3	WBK12-**
WBK15K	15	19.5	10.0	10	WBK15-**
WBK17K	17	24.4	7.0	13	WBK17-**
WBK20K	20	25.5	11.0	17	WBK20-**
WBK25K	25	32.0	14.0	34	WBK25-**

4. Screw shaft end configuration

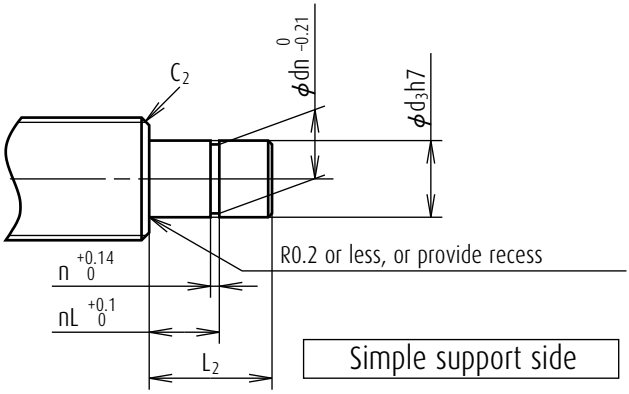
Dimensions of the shaft end configurations for light load and small equipment support units are shown in the table below. When using a spacer with a ball screw for transporting equipment, add the width of the spacer (B from the table of spacer dimensions on page 337) to L_1 dimension below.



Radius marked with * above is 0.15 or less for WBK04R-11 and WBK06R-11.

Units: mm

Fixed support side							
Reference No.	Bearing journal		Locknut thread		Sealing part		Chamfer
	d_1	L_1	m_1	mL_1	d_2	N	C_1
WBK06-**	6	22.5	M6×0.75	7	9.5	3.5	0.2
WBK08-**	8	27	M8×1	9	11.5	4	0.2
WBK10-**	10	30	M10×1	10	14	6	0.2
WBK12-**	12	30	M12×1	10	15	6	0.2
WBK15-**	15	40	M15×1	15	19.5	5	0.3
WBK17-**	17	46	M17×1	17	24	7	0.3
WBK20-**	20	53	M20×1	16	25	10	0.3
WBK25-**	25	62	M25×1.5	20	32	14	0.5
WBK04R-11	4	15	M4×0.5	7.5	—	—	0.3
WBK06R-11	6	17	M6×0.75	7.5	—	—	0.3

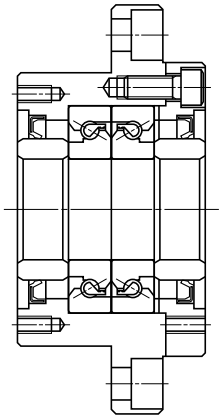


Units: mm

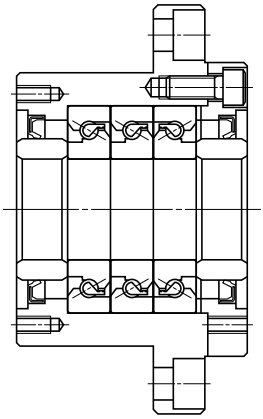
Simple support side						
Reference No.	Bearing journal		Locknut thread			Chamfer
	d_3	L_2	n	dn	nL	C_2
————	—	—	—	—	—	—
WBK08S-**	6	9	0.8	5.7	6.8	0.2
WBK10S-**	8	10	0.9	7.6	7.9	0.2
WBK12S-**	10	22	1.15	9.6	9.15	0.5
WBK15S-**	15	25	1.15	14.3	10.15	0.5
WBK17S-**	17	16	1.15	16.2	13.15	0.5
WBK20S-**	20	19	1.35	19	15.35	0.5
WBK25S-**	25	20	1.35	23.9	16.35	0.5

5. Dimensions of support unit for ball screws for high-speed and heavy-load machine tools

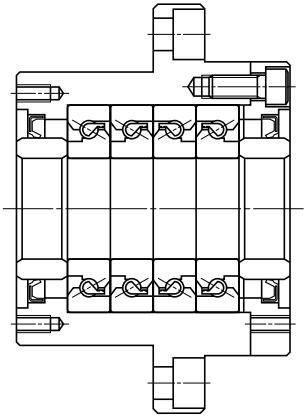
Support units for high-speed and heavy-load machine tools use the ball screw support bearings NSKHPS BSBD series.
This series has very suitable functions and structure as a ball screw support bearing. There are three bearing combinations as shown below.



DF combination

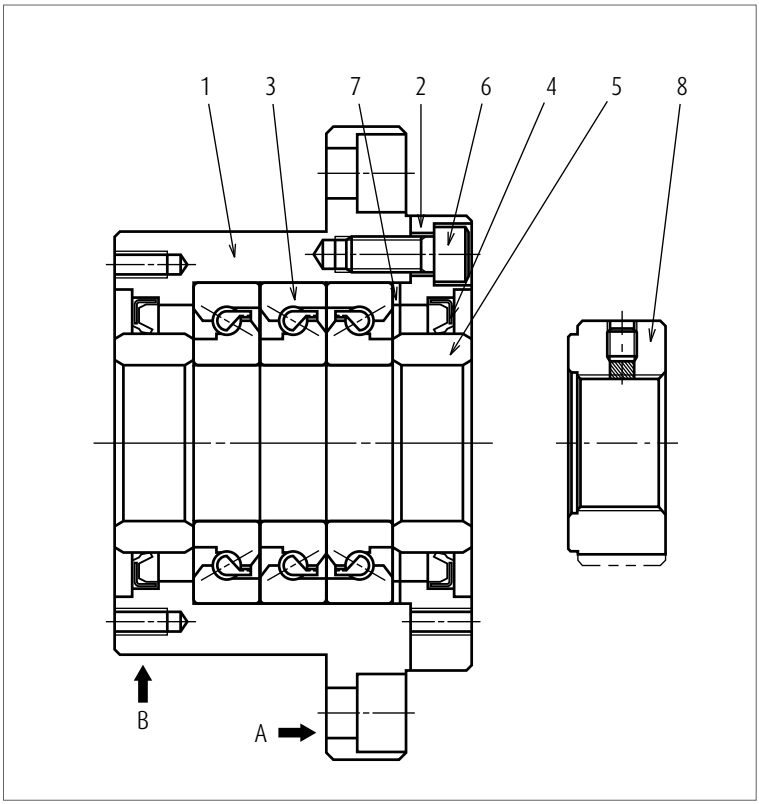


DFD combination



DFF combination

Support Unit (For high-speed and heavy-load machine tools)



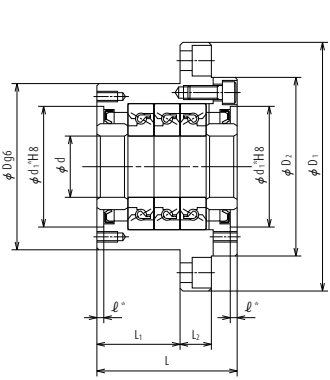
Parts list

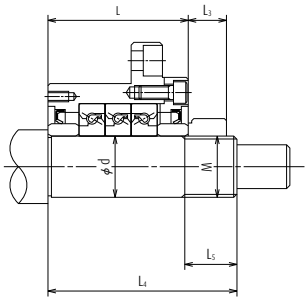
Part No.	Part name	Quantity
1	Housing	1
2	Retaining cover	1
3	High accuracy thrust angular contact ball bearing	One set
4	Dust seal	2
5	Collar	2
6	Preload bolt	6 or 8
7	Shim	One set
8	Lock nut	1

Notes

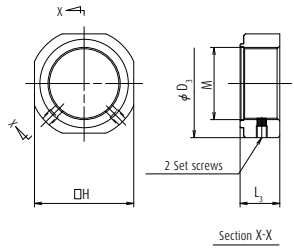
1. Surface A and B are the datum surfaces to mount a support unit to machine housing.
2. NSK support units are precisely preloaded and adjusted. Do not disassemble the components 1, 2, 3, 4, 5, 6 and 7.
3. Grease is packed into the bearings.
4. Lock nut 8 is exclusively prepared for ball screws. End surface of nut is in strict control being precisely perpendicular to the V thread. Secure lock nut using set screw. Lock nut is also available as accessory. (See page 344)

29. WBK-Series





Dimension of bearing seat



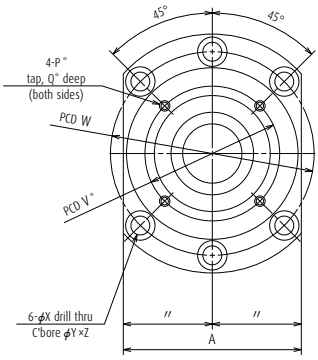
Lock nut

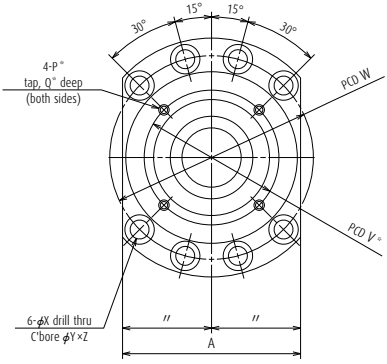
Support unit No.	Support unit																	Basic dynamic load rating	Limiting axial load
	d	D	D_1	D_2	L	L_1	L_2	A	W	X	Y	Z	d_1*	*	V*	P*	Q*	C_a [N]	[N]
WBK17DF-31H	17	70	106	72	60	32	15	80	88	9	14	8.5	45	3	58	M5	10	23 000	26 600
WBK20DF-31H	20	70	106	72	60	32	15	80	88	9	14	8.5	45	3	58	M5	10	23 000	26 600
WBK25DF-31H	25	85	130	90	66	33	18	100	110	11	17.5	11	57	4	70	M6	12	29 900	40 500
WBK25DFD-31H	25	85	130	90	81	48	18	100	110	11	17.5	11	57	4	70	M6	12	48 500 (29 900)	81 500 (40 500)
WBK30DF-31H	30	85	130	90	66	33	18	100	110	11	17.5	11	57	4	70	M6	12	30 500	43 000
WBK30DFD-31H	30	85	130	90	81	48	18	100	110	11	17.5	11	57	4	70	M6	12	50 000 (30 500)	86 000 (43 000)
WBK35DF-31H	35	95	142	102	66	33	18	106	121	11	17.5	11	69	4	80	M6	12	32 500	50 000
WBK35DFD-31H	35	95	142	102	81	48	18	106	121	11	17.5	11	69	4	80	M6	12	53 000 (32 500)	100 000 (50 000)
WBK35DFF-31H	35	95	142	102	96	48	18	106	121	11	17.5	11	69	4	80	M6	12	53 000	100 000
WBK40DF-31H	40	95	142	102	66	33	18	106	121	11	17.5	11	69	4	80	M6	12	33 500	52 000
WBK40DFD-31H	40	95	142	102	81	48	18	106	121	11	17.5	11	69	4	80	M6	12	54 000 (33 500)	104 000 (52 000)
WBK40DFF-31H	40	95	142	102	96	48	18	106	121	11	17.5	11	69	4	80	M6	12	54 000	104 000

Notes

1. Rigidity
   Values in the table are theoretical values obtained from the elastic deformation between ball groove and balls.
2. Starting torque
   Starting torque indicates torque due to the preload of the bearing. It does not include seal torque.
3. The tolerance of the shaft bearing seat
   We recommend h5 class of the fits tolerance.
4. Values in parentheses of basic dynamic load rating and permissible axial load are the values when axial load is applied in a line.

Support Unit (For high-speed and heavy-load machine tools)





Unit: mm

Preload	Axial rigidity	Starting torque	Lock nut					Bearing seat for unit			Permissible rotational speed	Mass
			Dimension				Screwing torque					
C_a [N]	[N/μm]	[N · cm]	M	H	D_3	L_3	[N · cm]	d	L_4	L_5	[min^{-1}]	[kg]
1 450	630	14	M17×1.0	32	37	18	4 100	17	81	23	6 900	1.9
1 450	630	14	M17×1.0	36	40	18	4 500	20	81	23	6 900	1.9
2 280	850	21	M25×1.5	41	45	20	8 500	25	89	26	5 200	3.1
3 100	1 250	28	M25×1.5	41	45	20	8 500	25	104	26	5 200	3.4
2 400	890	23	M30×1.5	46	50	20	10 100	30	89	26	4 900	3.0
3 260	1 310	30	M30×1.5	46	50	20	10 100	30	104	26	4 900	3.3
2 750	1 030	27	M35×1.5	50	55	22	13 800	35	92	30	4 100	3.4
3 740	1 500	34	M35×1.5	50	55	22	13 800	35	107	30	4 100	4.3
5 490	2 060	43	M35×1.5	50	55	22	13 800	35	122	30	4 100	5.0
2 860	1 080	28	M40×1.5	55	60	22	15 500	40	92	30	4 100	3.6
3 900	1 590	36	M40×1.5	55	60	22	15 500	40	107	30	4 100	4.2
5 730	2 150	46	M40×1.5	55	60	22	15 500	40	122	30	4 100	4.7

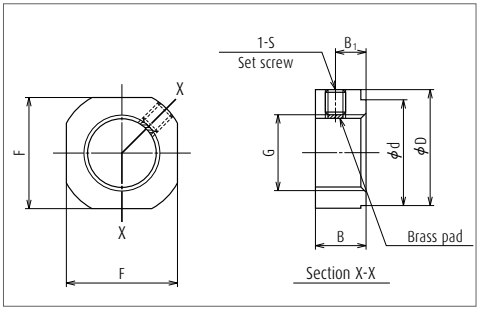
5. Dimensions with * (asterisk) mark
   *Pilot diameter and tapped screws marked with asterisk are used for seal unit installation for NSK standard hollow shaft ball screws. They also can be used for dust cover and damper installation.
6. Grease is packed into bearing. It is not necessary to apply grease before use.
7. Allowable axial load is 0.7 times of load limit.
8. Contact NSK if the rotational speed is 50 min^{-1} and below.

29. WBK-Series

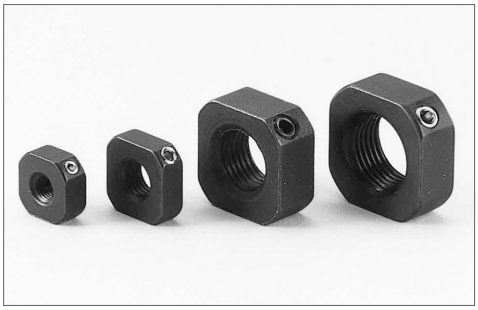
In addition to the support units, NSK has other components for ball screws as shown below.

6. Lock nuts

Ball screw support bearings must be installed with minimum inclination against ball screw center.
NSK lock nuts exclusive for ball screw support bearings help to reduce this inclination.



Light load Shapes and dimensions



Light load lock nuts

Light load lock nuts

Unit: mm

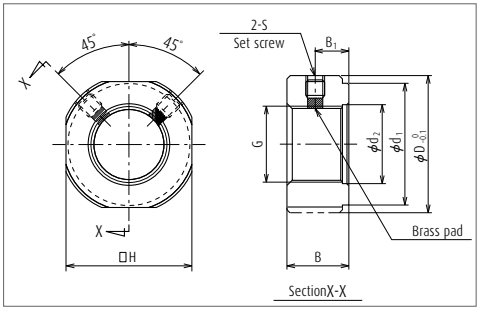
Lock nut reference No.	G	D	F	B	d
WBK04L-01	M4×0.5	11.5	10	5	6
WBK06L-01	M6×0.75	14.5	12	5	10
WBK08L-01	M8×1	17	14	6.5	13
WBK10L-01	M10×1	20	17	8	16
WBK12L-01	M12×1	22	19	8	17
WBK15L-01	M15×1	25	22	10	21
WBK17L-01	M17×1	29	24	13	24
WBK20L-01	M20×1	35	30	13	26
WBK25L-01	M25×1.5	42	36	16	34

Note Insert brass pad and then tighten securing set screw.

High speed and heavy load lock nuts

Unit: mm

Lock nut reference No.	G	$D^{0,-0.1}$	B	d_1	d_2
WBK17L-31H	M17×1	37	18	30	18
WBK20L-31H	M20×1	40	18	30	21
WBK25L-31H	M25×1.5	45	20	40	26
WBK30L-31H	M30×1.5	50	20	40	31
WBK35L-31H	M35×1.5	55	22	49	36
WBK40L-31H	M40×1.5	60	22	49	41



High speed and heavy load Shapes and dimensions

High speed and heavy load lock nuts

Unit: mm

B_1	S	Tightening torque (reference) [N · cm]	Set screw tightening torque (reference) [N · cm]	Mass (g)
2.75	M3, with a brass pad	100	69 (M2.5)	3.0
2.75	M3, with a brass pad	190	69 (M3)	3.8
4	M3, with a brass pad	230	69 (M3)	6.4
5	M4, with a brass pad	280	147 (M4)	11.2
5	M4, with a brass pad	630	147 (M4)	12.8
6	M4, with a brass pad	790	147 (M4)	20.0
8	M4, with a brass pad	910	147 (M4)	33.1
8	M4, with a brass pad	1 670	147 (M4)	50.0
10	M6, with a brass pad	2 060	490 (M6)	87.0

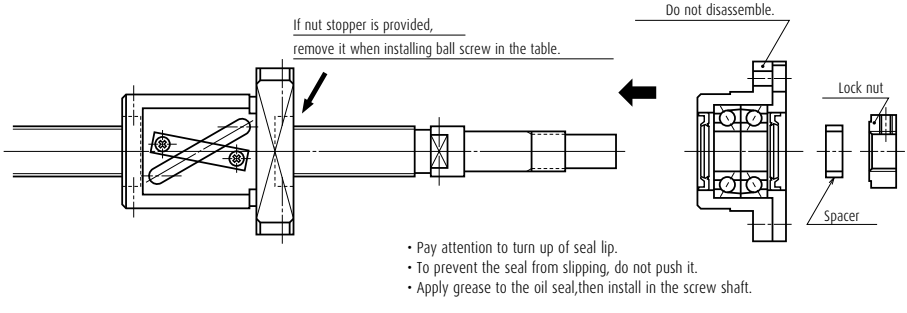
Unit: mm

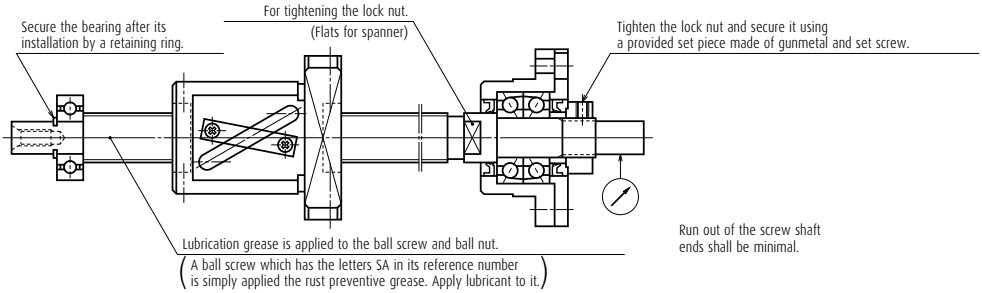
B_1	H	S	Tightening torque (reference) [N · cm]	Set screw tightening torque (reference) [N · cm]	Mass (g)
10	32	M6	4 100	490 (M6)	100.9
10	36	M6	4 500	490 (M6)	117.3
11	41	M6	8 500	490 (M6)	163.8
11	46	M6	10 100	490 (M6)	186.7
12	50	M6	13 800	490 (M6)	233.4
12	55	M6	15 500	490 (M6)	258.8

7. Installation of Ball Screw and Support Unit

The illustrations below show typical installation procedures for a standard ball screw and a support unit.

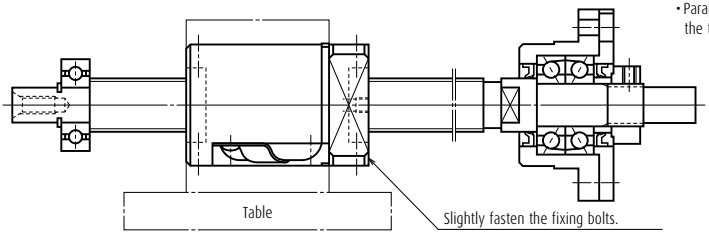
1) Assembly of support unit





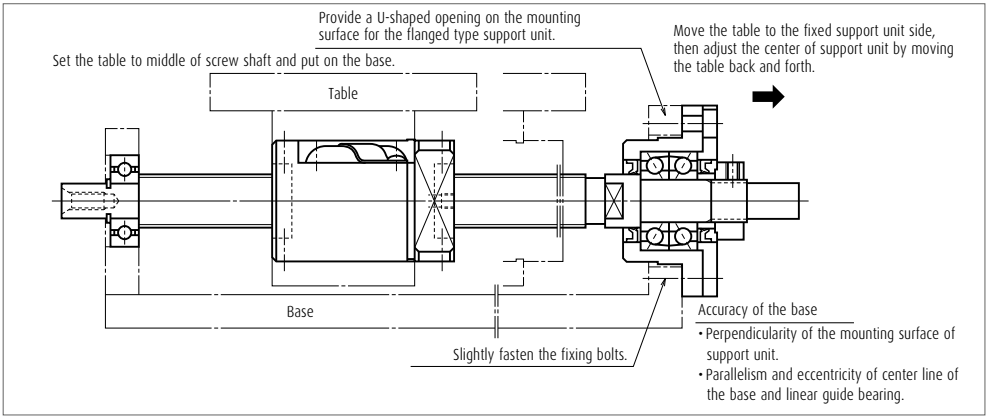
2) Installation of ball nut to the table

Installation example: Turn the table upside down, and install the ball screw.

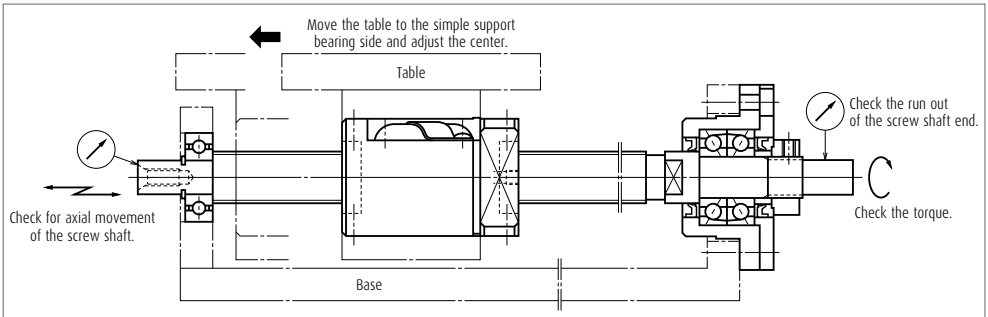


Accuracy of table
- Perpendicularity of nut housing
- Parallelism and center height deviation between the table center and the guide way bearings.

3) Base and the support unit installation on the fixed support side

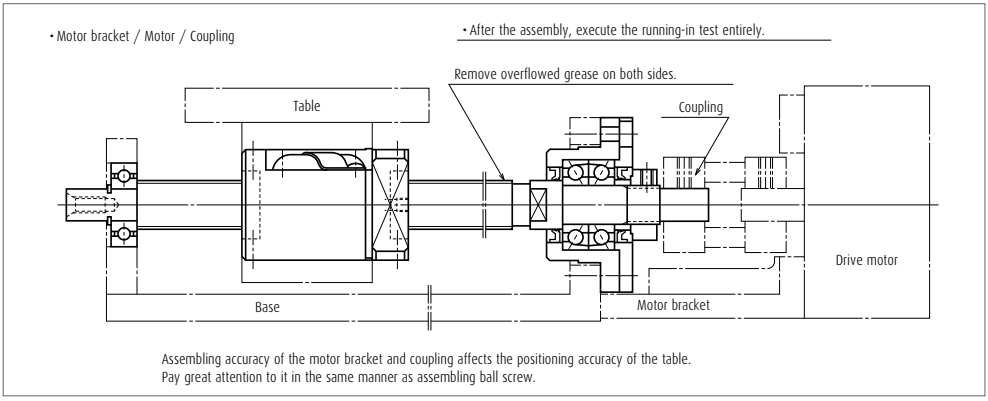


4) Base and bearing installation on simple support side, and confirming assembling accuracy.



Adjust the center line by moving the table back and forth. Check for smooth operation of the table.
Repeat the same procedures described above if the table is not moving smoothly.
Tighten the fixing bolts checking the assembly accuracy.

5) Assembly completed.



Assembling accuracy of the motor bracket and coupling affects the positioning accuracy of the table.
Pay great attention to it in the same manner as assembling ball screw.

NSKHPS BSBD Series

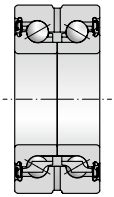
The BSBD Series are double-row bearing units for the support of ball screws that can accurately and quickly position a work piece or a spindle unit.

Features

The bearings of this series are double-row angular contact thrust ball bearings with a 60° contact angle and a single outer ring. The specifications are the same as those of the NSKTAC bearings, both series being optimized for the support of ball screws in machine tools. All BSBD Series bearings are equipped with a rubber contact seal and prepacked with high performance grease.

› BSN Type

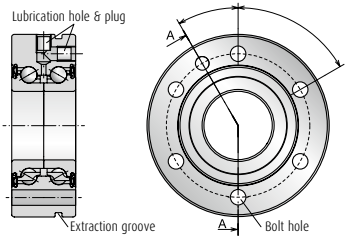
The BSN type of ball screw support bearings are double row angular contact thrust ball bearings in a back-to-back arrangement, with a single outer ring. The bearings are prepacked with high performance grease. Lubrication holes allow for relubrication during operation if necessary. The contact seal offers minimized friction and temperature rise while providing excellent sealing performance.



› BSF Type

The BSF type of bearings is equivalent to the BSN range of bearings, with bolt holes on the outer ring for easy direct mounting. Two lubrication holes – one in the outer surface and one in the face of the outer ring – allow for relubrication during operation if required. If not used, these holes are closed off with set screws. An extraction groove on the outer surface of the outer ring aids removal of the bearing.

Note: BSF type bearings are supplied with seal and set screws included. Mounting bolts are not included.



BSN Type Single product

Unit: mm

Bearing Numbers	Boundry Dimensions (mm)					Dimensions (mm)		Contact Angle (°)	Basic Load Rating (kN)		Limiting(1) Axial Load (kN)	Preload (N)	Axial Rigidity (N/μm)	Mass (kg)	Allowable rotating speed (min^{-1})	Starting torque (N·m)	Recommended nut tightening force (N)
	d	D	B	r (min)	r_1 (min)	ϕd_a (min)	ϕd_b (max)		C_a (Dynamic)	C_{oa} (Static)					Greased	H(2)	
BSN1242	12	42	25	0.6	0.3	15	33	60	18.5	24.0	17.6	720	375	0.20	8 000	0.038	4 030
BSN1545	15	45	25	0.6	0.3	19	35	60	19.4	26.9	19.4	675	400	0.22	7 100	0.034	4 050
BSN1747	17	47	25	0.6	0.6	21	37	60	20.3	29.7	21.2	880	450	0.23	6 700	0.05	4 400
BSN2052	20	52	28	0.6	0.6	24	43	60	26.4	41.0	29.3	1 885	650	0.31	5 800	0.13	7 600
BSN2557	25	57	28	0.6	0.6	29	48	60	28.3	48.0	34.0	2 245	750	0.36	5 100	0.16	8 100
BSN3062	30	62	28	0.6	0.6	34	53	60	30.0	55.5	38.5	2 625	850	0.40	4 500	0.19	8 600
BSN3072	30	72	38	0.6	0.6	35	64	60	60.5	94.0	66.5	4 855	950	0.74	3 900	0.59	11 100
BSN3572	35	72	34	0.6	0.6	40	62	60	42.0	77.5	52.0	2 630	900	0.66	3 800	0.21	13 500
BSN4075	40	75	34	0.6	0.6	46	67	60	44.5	88.0	58.5	3 065	1 000	0.65	3 500	0.24	14 100
BSN4090	40	90	46	0.6	0.6	46	80	60	78.5	135	91.0	7 220	1 200	1.38	3 100	1.02	18 700
BSN5090	50	90	34	0.6	0.6	56	82	60	48.0	110	71.5	4 020	1 250	0.93	2 800	0.33	15 400
BSN50110	50	110	54	0.6	0.6	57	98	60	116	219	149	7 435	1 400	2.46	2 500	1.06	19 100
BSN60110	60	110	45	0.6	0.6	68	100	60	86.5	187	126	4 780	1 300	1.82	2 400	0.50	20 900

Notes

1. Permissible axial load is 0.7 times of limiting axial load.
2. The values indicate starting torque of preloaded bearings, not including seal torque.

NSKHPS BSBD Series

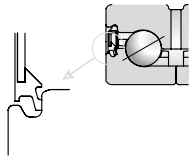
Bearing number Example: BS F 30 80 DDU H P2B DT

- Bearing type
- F: Flange type / N: No Flange type
- Bore diameter
- Outer diameter
- Seal type
- Preload
- Accuracy
- Arrangement

Note: P2B is an accuracy class specific to the BSBD Series, indicating the following:
Running accuracy:
ISO Class 2
Others: NSK-specific

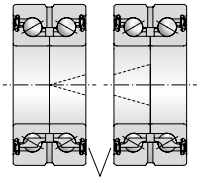
› Seal

Rubber contact seal on both sides. Triple lip structure provides high grease sealing performance and dust resistance.

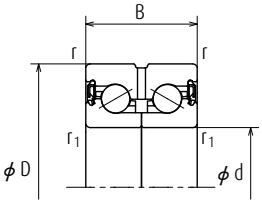


› Matched DT pairs

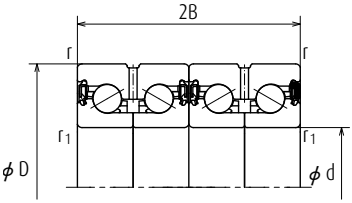
BSBD bearings are available in matched DT pairs for applications with large external loads or where high rigidity and long life are required. The mating surfaces of the 2- row bearing set are controlled for offset, so as to have no impact on the preload of each individual bearing.



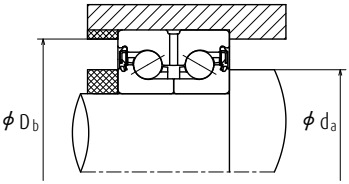
Distance between mating surfaces has been adjusted.



Single product



Matched DT pairs



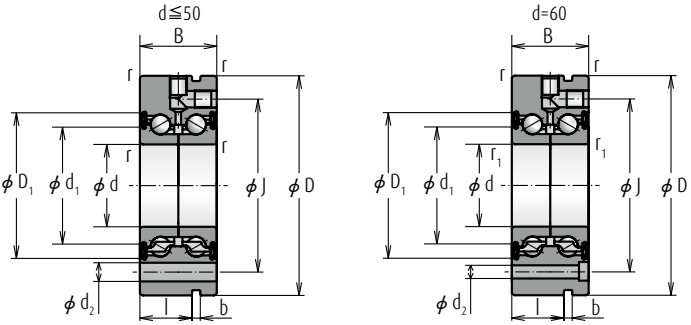
BSN Type matched DT pairs

Bearing Numbers	Boundry Dimensions (mm)					Dimensions (mm)		Contact Angle (°)	Basic Load Rating (kN)		Limiting(1) Axial Load (kN)	Axial Rigidity (N/μm)	Mass (kg)	Allowable rotating speed (min-1)	Starting torque (N·m)	Recommended nut tightening force (N)
	d	D	2B	r (min)	r1 (min)	φ da (min)	φ Db (max)		Ca (Dynamic)	Coa (Static)				Greased	H(2)	
BSN1747-DT	17	47	50	0.6	0.6	21	37	60	33.0	59.5	42.5	790	0.46	6 700	0.10	4 400
BSN2052-DT	20	52	56	0.6	0.6	24	43	60	43.0	82.0	58.5	1 180	0.62	5 800	0.26	7 600
BSN2557-DT	25	57	56	0.6	0.6	29	48	60	46.0	96.0	68.0	1 370	0.71	5 100	0.32	8 100
BSN3062-DT	30	62	56	0.6	0.6	34	53	60	49.0	111	77.0	1 580	0.80	4 500	0.37	8 600
BSN3072-DT	30	72	76	0.6	0.6	35	64	60	98.0	188	133	1 800	1.47	3 900	1.17	11 100
BSN3572-DT	35	72	68	0.6	0.6	40	62	60	68.0	155	104	1 630	1.32	3 800	0.41	13 500
BSN4075-DT	40	75	68	0.6	0.6	46	67	60	72.0	176	117	1 850	1.30	3 500	0.49	14 100
BSN4090-DT	40	90	92	0.6	0.6	46	80	60	128	269	182	2 300	2.76	3 100	2.03	18 700
BSN5090-DT	50	90	68	0.6	0.6	56	82	60	78.0	220	143	2 330	1.86	2 800	0.66	15 400
BSN50110-DT	50	110	108	0.6	0.6	57	98	60	188	440	299	2 690	4.92	2 500	2.11	19 100

3. Inner rings can be separable easily. Please push or pull bearings by clamping innerring at mounting and dismounting.
4. Abutment and fillet dimensions are recommendable values for the use of standard Machine tool applications. For heavy load applications, please ask NSK.

30. BSBD-Series

BSBD Series



(BSF60145 Only)

BSF Type Single product

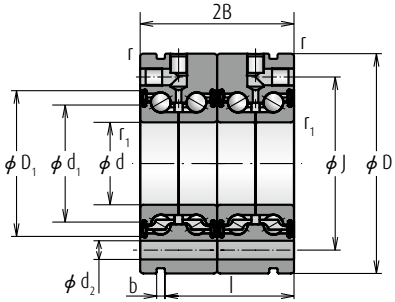
Bearing Numbers	Boundry Dimensions (mm)					Basic Load Rating (kN)		Limiting(1) Axial Load (kN)	Axial Rigidity (N/μm)	Mass (kg)	Allowable rotating speed (min^{-1})
	d	D	B	r (min)	r_1 (min)	C_a (Dynamic)	C_{oa} (Static)				Grease Lubrication
BSF1255	12	55	25	0.6	0.3	18.5	24.0	17.6	375	0.37	8 000
BSF1560	15	60	25	0.6	0.3	19.4	26.9	19.4	400	0.44	7 100
BSF1762	17	62	25	0.6	0.6	20.3	29.7	21.2	450	0.46	6 700
BSF2068	20	68	28	0.6	0.6	26.4	41.0	29.3	650	0.61	5 800
BSF2575	25	75	28	0.6	0.6	28.3	48.0	34.0	750	0.73	5 100
BSF3080	30	80	28	0.6	0.6	30.0	55.5	38.5	850	0.79	4 500
BSF30100	30	100	38	0.6	0.6	60.5	94	66.5	950	1.71	3 900
BSF3590	35	90	34	0.6	0.6	42.0	77.5	52.0	900	1.20	3 800
BSF40100	40	100	34	0.6	0.6	44.5	88.0	58.5	1 000	1.49	3 500
BSF40115	40	115	46	0.6	0.6	78.5	135	91.0	1 200	2.56	3 100
BSF50115	50	115	34	0.6	0.6	48.0	110	71.5	1 250	1.89	2 800
BSF50140	50	140	54	0.6	0.6	116	219	149	1 400	4.46	2 500
BSF60145	60	145	45	0.6	0.6	86.5	187	126	1 300	4.06	2 400

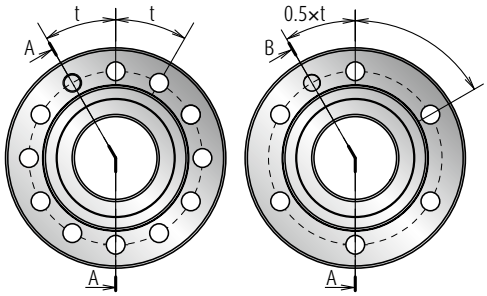
BSF Type matched pairs

Bearing Numbers	Boundry Dimensions (mm)					Basic Load Rating (kN)		Limiting(1) Axial Load (kN)	Axial Rigidity (N/μm)	Mass (kg)	Allowable rotating speed (min^{-1})
	d	D	2B	r (min)	r_1 (min)	C_a (Dynamic)	C_{oa} (Static)				Grease Lubrication
BSF1762-DT	17	62	50	0.6	0.6	33.0	59.5	42.5	790	0.890	6 700
BSF2068-DT	20	68	56	0.6	0.6	43.0	82.0	58.5	1 180	1.17	5 800
BSF2575-DT	25	75	56	0.6	0.6	46.0	96.0	68.0	1 370	1.46	5 100
BSF3080-DT	30	80	56	0.6	0.6	49.0	111	77.0	1 580	1.58	4 500
BSF30100-DT	30	100	76	0.6	0.6	98.0	188	133	1 800	3.41	3 900
BSF3590-DT	35	90	68	0.6	0.6	68.0	155	104	1 630	2.30	3 800
BSF40100-DT	40	100	68	0.6	0.6	72.0	176	117	1 850	2.88	3 500
BSF40115-DT	40	115	92	0.6	0.6	128	269	182	2 300	5.12	3 100
BSF50115-DT	50	115	68	0.6	0.6	78.0	220	143	2 330	3.78	2 800
BSF50140-DT	50	140	108	0.6	0.6	188	440	299	2 690	8.92	2 500

Notes

1. Permissible axial load equals 0.7 times of limiting axial load.
   The values refer to the limiting load of the bearing only, without taking the mounting bolts into account.
2. The values indicate starting torque of preloaded bearings, not including seal torque.
3. Inner rings can be separable easily. Please push or pull bearings by clamping inner ring at mounting and dismounting.





Type Ⅰ　　Type Ⅱ

Reference Dimensions (mm)							Type	Mounting Bolts		Preload (N)	Starting torque(2) (N·m)	Recommended nut Clamping Force (N)
d	D_1	J	d_2	l	b	t		Bolt Dia.	Number of Bolts		H	
23.7	32.7	42	6.8	17	3	3 × 120°	Ⅱ	M6	3	720	0.038	4 030
26.7	35.7	46	6.8	17	3	3 × 120°	Ⅱ	M6	3	675	0.034	4 050
28.1	37.7	48	6.8	17	3	3 × 120°	Ⅱ	M6	3	890	0.05	4 400
32.6	43	53	6.8	19	3	4 × 90°	Ⅱ	M6	4	1 885	0.13	7 600
37.6	48	58	6.8	19	3	4 × 90°	Ⅱ	M6	4	2 245	0.16	8 100
42.6	53	63	6.8	19	3	6 × 60°	Ⅱ	M6	6	2 625	0.19	8 600
49.1	64.4	80	8.8	30	3	8 × 45°	Ⅱ	M8	8	4 855	0.59	11 100
53.1	62.2	75	8.8	25	3	4 × 90°	Ⅱ	M8	4	2 630	0.21	13 500
55.1	67.2	80	8.8	25	3	4 × 90°	Ⅱ	M8	4	3 065	0.24	14 100
63.1	80.1	94	8.8	36	3	12 × 30°	Ⅱ	M8	12	7 220	1.02	18 700
70.1	82.2	94	8.8	25	3	6 × 60°	Ⅱ	M8	6	4 020	0.33	15 400
78.1	97.5	113	11	45	3	12 × 30°	Ⅱ	M10	12	7 435	1.06	19 100
83.1	99.3	120	8.8	35	3	8 × 45°	Ⅱ	M8	8	4 780	0.50	20 900

Reference Dimensions (mm)							Type	Mounting Bolts		Starting torque(2) (N·m)	Recommended nut Clamping Force (N)
d	D_1	J	d_2	l	b	t		Bolt Dia.	Number of Bolts	H	
28.1	37.7	48	6.8	42	3	6 × 60°	Ⅰ	M6	5	0.10	4 400
32.6	43	53	6.8	47	3	8 × 45°	Ⅰ	M6	7	0.26	7 600
37.6	48	58	6.8	47	3	8 × 45°	Ⅰ	M6	7	0.32	8 100
42.6	53	63	6.8	47	3	12 × 30°	Ⅰ	M6	11	0.37	8 600
49.1	64.4	80	8.8	68	3	8 × 45°	Ⅱ	M8	8	1.17	11 100
53.1	62.2	75	8.8	59	3	8 × 45°	Ⅰ	M8	7	0.41	13 500
55.1	67.2	80	8.8	59	3	8 × 45°	Ⅰ	M8	7	0.49	14 100
63.1	80.1	94	8.8	82	3	12 × 30°	Ⅱ	M8	12	2.03	18 700
70.1	82.2	94	8.8	59	3	12 × 30°	Ⅰ	M8	11	0.66	15 400
78.1	97.5	113	11	99	3	12 × 30°	Ⅱ	M10	12	2.11	19 100

Monocarrier

Features

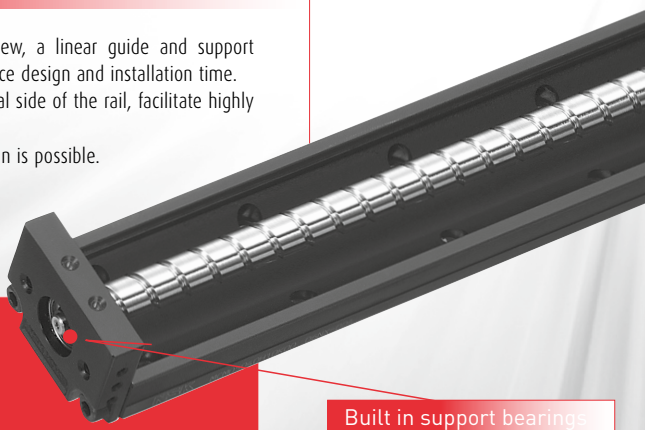
NSK's Monocarrier is the culmination of technology and innovation in linear motion. This lightweight, compact single axis linear actuator integrates quality NSK ball screw, linear guide and support bearings into one unit.

1 Light weight, compact design

› Available in two different shapes of cross-section, depending on application.
Light weight type: MCM Series
Rigid type: MCH Series

2 All -in-one structure

› The all-in-one structure integrates a ball screw, a linear guide and support bearings into a single unit to significantly reduce design and installation time.
› Multiple datum planes, the bottom and a lateral side of the rail, facilitate highly accurate installation.
› Immediate operation after installation and run-in is possible.
› A wide selection of fine to high helix leads are available.



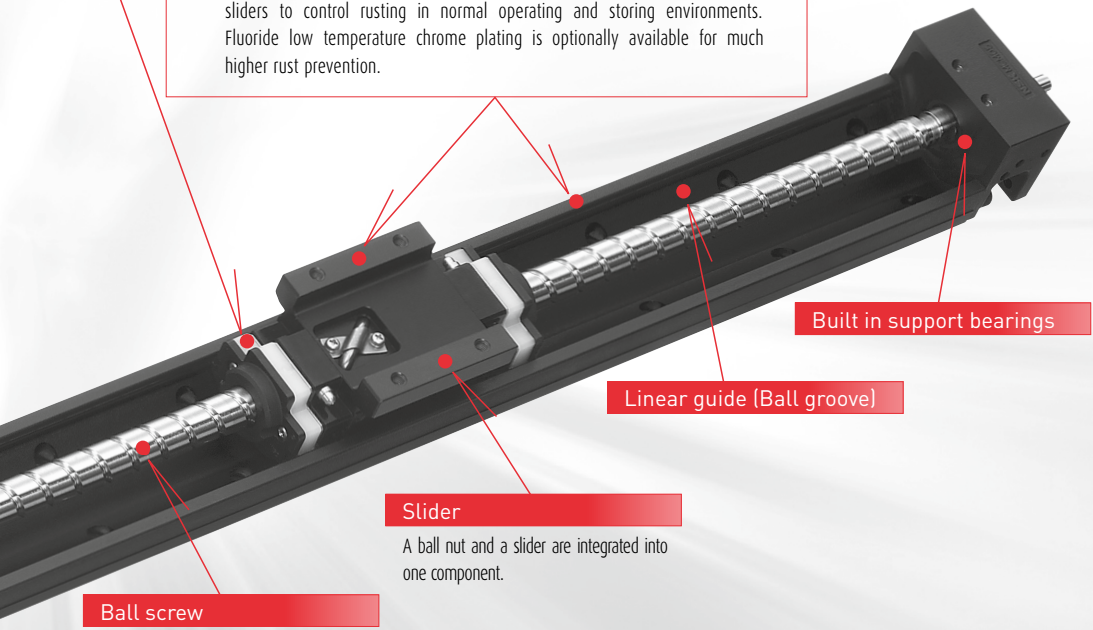
MONOC

4 Long term maintenance free

- Use of NSK K1 Lubrication Units and grease maintains a smooth lubricating performance for long periods in mechanical environments where lubrication is difficult to apply, where use of oil is not permitted because of hygienic issues, or where the mechanical equipment is subjected to frequent wash downs.
- NSK K1 lubrication unit is available for food processing machines and medical equipment.
- Grease for clean environments and for general machinery is available.

3 Superb antirust capability

- Low temperature chrome plating is a standard feature for the bodies and sliders to control rusting in normal operating and storing environments. Fluoride low temperature chrome plating is optionally available for much higher rust prevention.



Built in support bearings

Linear guide (Ball groove)

Slider

A ball nut and a slider are integrated into one component.

Ball screw

A wide variety of leads, from fine leads to high helix leads, is available.

5 Quick Delivery

ARRIER

31. Monocarriers

1. Classification and Series

Table 1

	Light Weight	Beam Rigidity	Moment Rigidity
MCM Series	◎	○	○
MCH Series	○	◎	○

◎: Excellent ○: Suitable in use

[MCM Series Cross-sections]

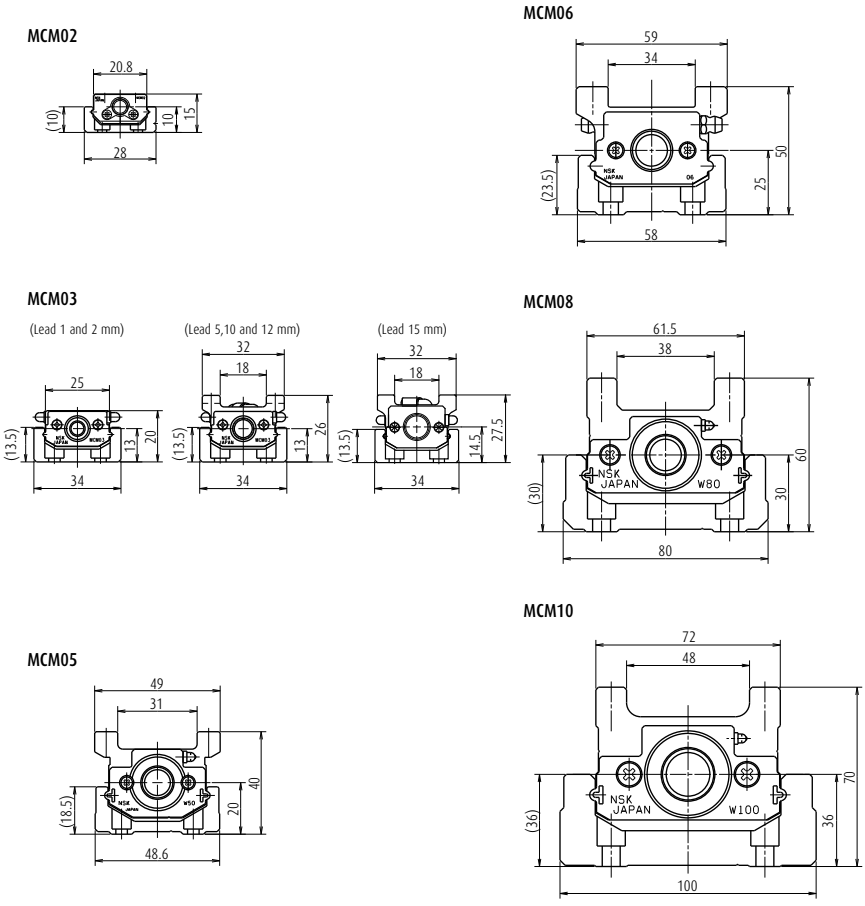


Fig. 1

Accuracy	Long Stroke	Size Variation
◎	○	◎
◎	◎	○

[MCH Series Cross-sections]

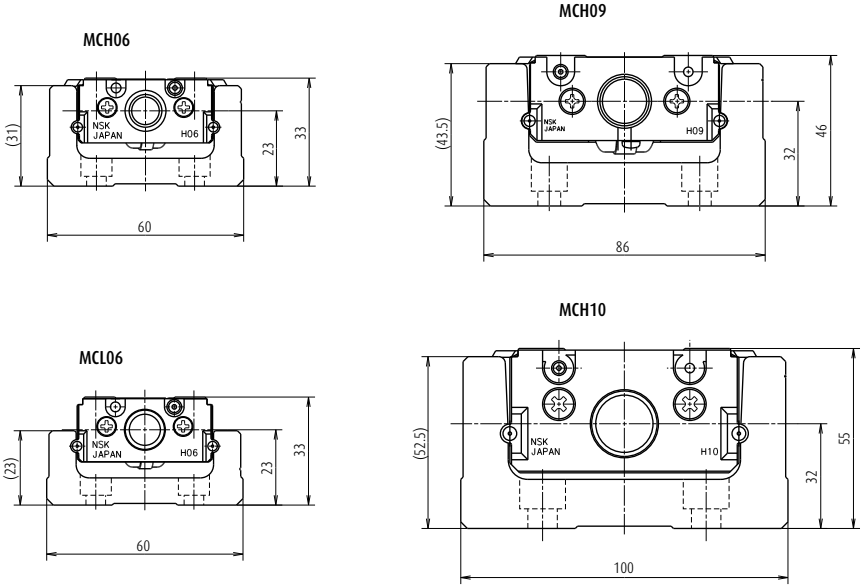


Fig. 2

2. Accessories

(1) MCM Series

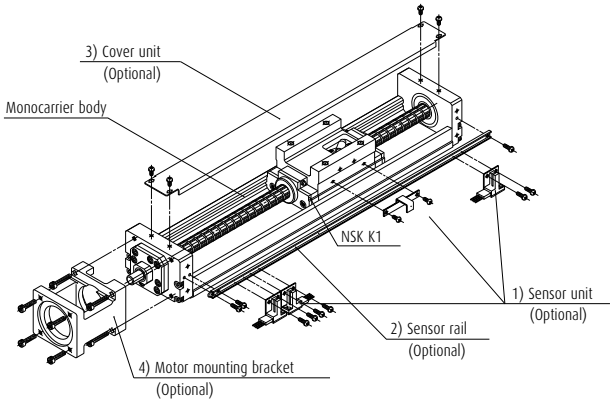


Fig. 3 Assembly: Accessories for MCM10 (example)

1) Sensor unit: Sensors, sensor mounting parts and a sensor dog are available in a set.
* When a sensor unit is used, the full cover unit cannot be used.

2) Sensor rail: Rail for sensor mounting is available.

3) Cover unit: Top cover or full cover (included top cover and side cover) is available.

4) Motor bracket for motor mounting: Available for a variety of models.

Note: We assemble accessories upon request.

(2) MCH Series

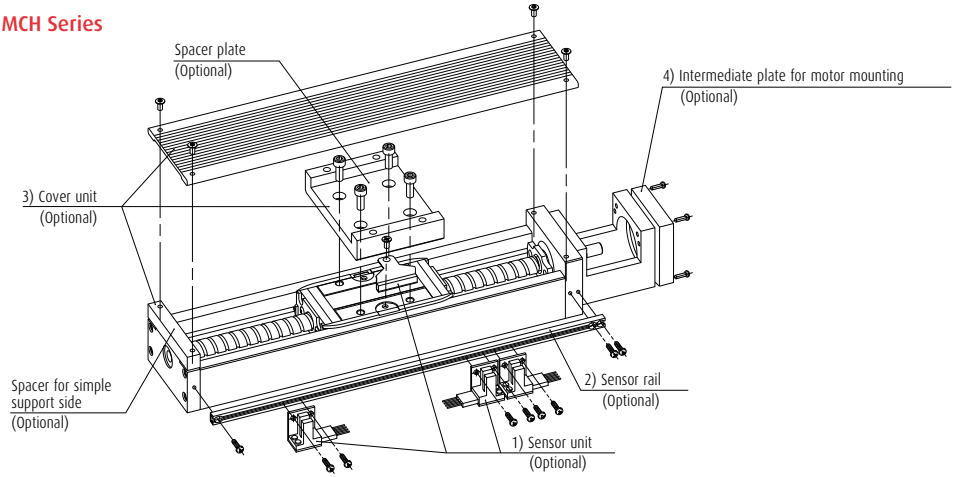


Fig. 4 Assembly: Accessories for MCH10 (example)

1) Sensor unit: Sensors, sensor mounting parts and a sensor dog are available in a set.

2) Sensor rail: Rail for sensor mounting is available.

3) Cover unit: Top cover (included spacer plate and spacer for simple support side) is available.

4) Intermediate plate for motor mounting: Available for a variety of models.

Note: We assemble accessories upon request.

3. Selection of Monocarrier

(1) Procedures for Selecting Monocarrier

Select a model number of Monocarrier based on stroke and rigidity (refer to **Figs. 6** and **7**).

Select a ball screw lead referring to **"4. Maximum Speed"** so that the rotational speed does not exceed the limit.

Study the loads to be applied to the linear guide and obtain the equivalent load (Fe). Obtain the mean effective load (Fm), then calculate the life.

Study the loads to be applied to the ball screw and support unit. Obtain the mean effective load (Fm) then calculate the life.

(2) Rigidity

Rigidity of rail

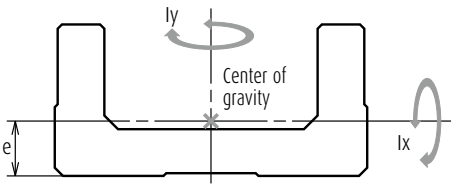


Fig. 5

Table 2 Rigidity of rail

Model No.	Geometrical moment of inertia ×10⁴ (mm⁴)		Center of gravity (mm)	Mass (kg/100 mm)
	Ix	Iy	e	w
MCM02	0.097	1.32	3.3	0.11
MCM03	0.30	3.3	4.5	0.18
MCM05	0.78	11.4	6.0	0.31
MCM06	2.14	26.1	7.0	0.57
MCM08	5.90	81.0	9.2	0.88
MCM10	15.6	219	12.2	1.52
MCH06	6.5	38.2	10.8	0.67
MCL06	2.58	29.6	7.8	0.56
MCH09	28.7	172	15.5	1.48
MCH10	54.0	307	18	1.93

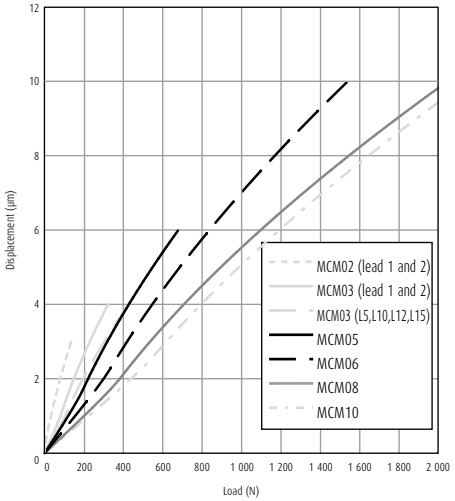


Fig. 6 MCM Series rigidity in radial direction

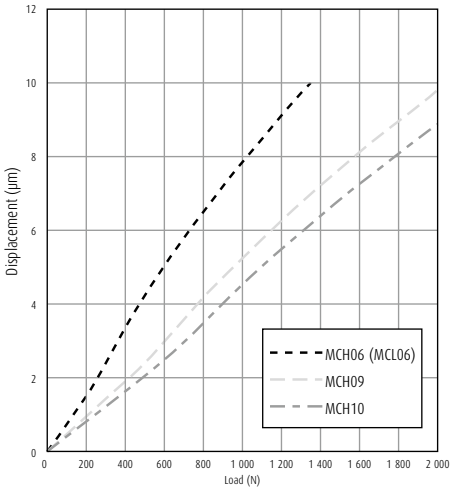


Fig. 7 MCH Series rigidity in radial direction

4. Maximum Speed

(1) Maximum Speed of MCM Series

Maximum speed of Monocarrier is determined by critical speed of ball screw shaft and d • n value.
Do not exceed maximum speeds on the table below.

Table 3

	Ball screw lead	Stroke (mm)	Rail length L2 (mm)	Maximum speed (mm/s)
MCM02 Single slider	1	50	100	50
		100	150	
		150	200	
	2	50	100	100
		100	150	
		150	200	
MCM03 Single slider	1	50	115	50
		100	190	
		150	240	
	2	50	115	100
		100	190	
		150	240	
	5	50 to 250	140 to 340	410
	10	50 to 250	140 to 340	830
	12	50 to 250	140 to 340	1 000
	15	50 to 250	140 to 340	1 250
MCM05 Single slider	5	50 to 250	180 to 530	410
		500	630	370
		600	730	270
	10	50 to 250	180 to 530	830
		500	630	750
		600	730	540
	20	50 to 250	180 to 530	1 660
		500	630	1 470
		600	730	1 070
	30	50 to 250	180 to 530	2 500
		500	630	2 160
		600	730	1 570

	Ball screw lead	Stroke (mm)	Rail length L2 (mm)	Maximum speed (mm/s)
MCM05 Double slider	10	60 to 410	280 to 630	830
		510	730	710
	20	60 to 410	280 to 630	1 660
		510	730	1 460
MCM06 Single slider	5	50 to 500	190 to 640	410
		600	740	330
		700	840	250
		800	940	190
	10	50 to 500	190 to 640	830
		600	740	650
		700	840	500
		800	940	390
	20	50 to 500	190 to 640	1 660
		600	740	1 300
		700	840	990
		800	940	780
MCM06 Double slider	5	110 to 410	340 to 640	410
	10	110 to 510	190 to 640	830
		610	740	660
		710	840	500
	20	210 to 510	440 to 640	1 660
		610	740	1 310
		710	940	1 000

Notes: 1) Please consult NSK before operating Monocarrier near maximum speed.
2) Maximum rotational speed is (5000 min^{-1}). (For lead 5,10,12,15,20,30)
3) Refer to the above table for maximum speed for each stroke.

	Ball screw lead	Stroke (mm)	Rail length L2 (mm)	Maximum speed (mm/s)
MCM08 Single slider	5	50 to 500	220 to 670	410
		600	770	320
		700	870	250
		800	970	190
	10	50 to 500	220 to 670	830
		600	770	640
		700	870	490
		800	970	380
	20	50 to 500	220 to 670	1 660
		600	770	1 280
		700	870	980
		800	970	770
	30	400	570	2 500
		500	670	2 480
		600	770	1 830
		700	870	1 400
MCM08 Double slider	10	80 to 380	370 to 670	830
		480	770	810
		580	870	630
		680	970	500
	20	180 to 380	470 to 670	1 660
		480	770	1 640
		580	870	1 270
		680	970	1 010

	Ball screw lead	Stroke (mm)	Rail length L2 (mm)	Maximum speed (mm/s)
MCM10 Single slider	10	50 to 600	280 to 780	830
		700	880	660
		800	980	520
		900	1 080	420
		1 000	1 180	340
	20	50 to 600	280 to 780	1 660
		700	880	1 310
		800	980	1 030
		900	1 080	840
		1 000	1 180	690
	30	500	680	2 500
		800	780	2 430
		900	880	1 870
		1 000	980	1 480
MCM10 Double slider	10	70 to 570	380 to 880	830
		670	980	660
		870	1 180	450
	20	170 to 570	480 to 880	1 660
		670	980	1 340
		870	1 180	910

Notes: 1) Please consult NSK before operating Monocarrier near maximum speed.
2) Maximum rotational speed is (5000 min^{-1}). (For lead 5,10,12,15,20,30)
3) Refer to the above table for maximum speed for each stroke.

(2) Maximum Speed of MCH Series

Maximum speed of Monocarrier is determined by critical speed of ball screw shaft and d • n value.
Do not exceed maximum speeds on the table below.

Table 4

	Ball screw lead	Stroke (mm)	Rail length L2 (mm)	Maximum speed (mm/s)
MCH06 MCL06 Single slider	5	50 to 500	150 to 600	410
	10	50 to 500	150 to 600	830
	20	50 to 400	150 to 500	1 660
		500	600	1 610
MCH06 Double slider	5	100 to 300	300 to 500	410
	10	100 to 400	300 to 600	830
	20	400	600	1 660
MCH09 Single slider	5	100 to 500	240 to 640	410
		600	740	360
		700	840	270
		800	940	210
	10	100 to 500	240 to 640	830
		600	740	710
		700	840	530
		800	940	410
	20	100 to 500	240 to 640	1 660
		600	740	1 410
		700	840	1 060
		800	940	830
MCH09 Double slider	5	150 to 350	440 to 640	410
	10	150 to 450	440 to 740	830
		650	940	530
	20	450	740	1 660
		650	940	1 080

	Ball screw lead	Stroke (mm)	Rail length L2 (mm)	Maximum speed (mm/s)
MCH10 Single slider	10	50 to 600	280 to 780	830
		700	880	670
		800	980	530
		900	1 080	420
		1 000	1 180	350
		1 100	1 280	290
		1 200	1 380	250
	20	50 to 600	280 to 780	1 660
		700	880	1 330
		800	980	1 050
		900	1 080	840
		1 000	1 180	700
		1 100	1 280	580
		1 200	1 380	490
MCH10 Double slider	10	250 to 550	580 to 880	830
		650	980	660
	20	250 to 550	580 to 880	1 660
		650	980	1 340
		750	1 080	1 100
		850	1 180	910
		950	1 280	760
		1 050	1 380	630

Notes: 1) Please consult NSK before operating Monocarrier near maximum speed.
2) Maximum rotational speed is (5000 min^{-1}). (For lead 5,10,12,15,20,30)
3) Refer to the above table for maximum speed for each stroke.

5. Accuracy Grade

The accuracy grade of Monocarrier standard series is high grade (H), except for lead 1 and 2 mm of MCM02, and MCM03. When you require strokes longer than 1 200 mm, please consult NSK about the accuracy grade.

Table 5

Unit : μm

Accuracy	High grade (H)			Precision (P)			
Stroke (mm)	Repeatability	Running Parallelism (vertical)	Backlash	Repeatability	Positioning accuracy	Running Parallelism (vertical)	Backlash
– 200	±10	14	20 or less	±3	20	8	3 or less
– 400	±10	16	20 or less	±3	25	10	3 or less
– 600	±10	20	20 or less	±3	30	12	3 or less
– 700	±10	23	20 or less	±3	30	15	3 or less
– 1 000	±10	23	20 or less	±3	35	15	3 or less
– 1 200	±10	30	20 or less	±3	40	20	3 or less

6. Stroke and Ball Screw Lead

(1) MCM Series Standard Combinations of Stroke and Ball Screw Lead

Table 6 Single slider

Unit : mm

Model No.	MCM02		MCM03						MCM05				MCM06			MCM08			MCM10		
Lead / Stroke	1	2	1	2	5	10	12	15	5	10	20	30	5	10	20	5	10	20	30	10	20	30
50	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓		✓	✓	✓	✓	✓					
100	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓		✓	✓	✓	✓	✓	✓		✓	✓	
150	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓		✓	✓	✓	✓	✓	✓		✓	✓	
200					✓	✓	✓	✓	✓	✓	✓		✓	✓	✓	✓	✓	✓		✓	✓	
250					✓	✓	✓	✓	✓	✓	✓		✓	✓	✓	✓	✓	✓		✓	✓	
300									✓	✓	✓	✓	✓	✓	✓	✓	✓	✓		✓	✓	
400									✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	
500									✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
600									✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
700													✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
800													✓	✓	✓	✓	✓	✓		✓	✓	✓
900																				✓	✓	
1 000																				✓	✓	

Table 7 Double slider

Unit : mm

Model No.	MCM05		MCM06			MCM08		MCM10	
Lead / Stroke	10	20	5	10	20	10	20	10	20
60	✓								
70								✓	
80						✓			
110	✓		✓	✓					
160	✓								
170								✓	✓
180						✓	✓		
210	✓	✓	✓	✓	✓				
270								✓	✓
280						✓	✓		
310	✓	✓	✓	✓	✓				
370								✓	✓
380						✓	✓		
410	✓	✓	✓	✓	✓				
470								✓	✓
480						✓	✓		
510	✓	✓		✓	✓				
570								✓	✓
580						✓	✓		
610				✓	✓				
670								✓	✓
680						✓	✓		
710				✓	✓				
870								✓	✓

Note Please consult NSK about double slider of MCM02 and MCM03.

(2) MCH Series Standard Combinations of Stroke and Ball Screw Lead

Table 8 Single slider

Unit : mm

Model No.	MCH06			MCH09			MCH10	
Lead / Stroke	5	10	20	5	10	20	10	20
50	✓	✓	✓					
100	✓	✓	✓	✓	✓	✓	✓	✓
200	✓	✓	✓	✓	✓	✓	✓	✓
300	✓	✓	✓	✓	✓	✓	✓	✓
400	✓	✓	✓	✓	✓	✓	✓	✓
500	✓	✓	✓	✓	✓	✓	✓	✓
600				✓	✓	✓	✓	✓
700				✓	✓	✓	✓	✓
800				✓	✓	✓	✓	✓
900							✓	✓
1 000							✓	✓
1 100							✓	✓
1 200							✓	✓

Table 9 Double slider

Unit : mm

Model No.	MCH06			MCH09			MCH10	
Lead / Stroke	5	10	20	5	10	20	10	20
100	✓	✓						
150				✓	✓			
200	✓	✓						
250				✓	✓		✓	✓
300	✓	✓						
350				✓	✓		✓	✓
400		✓	✓					
450					✓	✓	✓	✓
550							✓	✓
650					✓	✓	✓	✓
750								✓
850								✓
950								✓
1 050								✓

Table 10 Limitations

	Model No.	Lead (mm)	Slider	Stroke (mm)
MCM series	MCM02	1,2	Single	150
	MCM03	1,2	Single	150
	MCM03	5,10,12,15	Single	350
	MCM05	5,10,20,30*	Single	900
	MCM05	5,10,20,30*	Double	810
	MCM06	5,10,20	Single	1 000
	MCM06	5,10,20	Double	910
	MCM08	5,10,20,30*	Single	1 000
	MCM08	5,10,20,30*	Double	880
	MCM10	10,20,30*	Single	1 750
	MCM10	10,20,30*	Double	1 600
MCH series	MCH06	5,10,20	Single	600
	MCH06	5,10,20	Double	500
	MCH09	5,10,20	Single	1 000
	MCH09	5,10,20	Double	850
	MCH10	10,20	Single	1 750
	MCH10	10,20	Double	1 600
	MCL06	5,10,20	Single	500

*) Applicable only to single slider

7. Basic Load Rating

(1) MCM Series Basic Load Rating

Table 11 Basic Load Rating

Model No.	Lead l (mm)	Shaft dia d (mm)	Basic dynamic load rating(N)				Basic static load rating(N)		Support unit Limit load (N)
			Ball screw C_a	Linear guide C	Support unit C_a	Rated running distance L_a (km)	Ball screw C_{0a}	Linear guide C_0	
MCM02	1	ϕ 6	405(High grade)	4 910	615	1	555(High grade)	2 120	490
MCM02	1	ϕ 6	480(Precision)	4 910	615	1	615(Precision)	2 120	490
MCM02	2	ϕ 6	400(High grade)	3 900	615	2	555(High grade)	2 120	490
MCM02	2	ϕ 6	475(Precision)	3 900	615	2	610(Precision)	2 120	490
MCM03	1	ϕ 6	870	10 900	2 670	1	1 230	4 900	1 040
MCM03	2	ϕ 6	865	8 650	2 670	2	1 220	4 900	1 040
MCM03	5	ϕ 8	2 090	7 850	2 670	5	2 830	6 620	1 040
MCM03	10	ϕ 8	1 310	6 250	2 670	10	1 710	6 620	1 040
MCM03	12	ϕ 8	1 320	5 880	2 670	12	1 730	6 620	1 040
MCM03	15	ϕ 10	2 000	5 440	2 670	15	2 740	6 620	1 040
MCM05	5	ϕ 12	4 390	15 600	4 400	5	6 260	10 900	1 450
MCM05	10	ϕ 12	2 740	12 400	4 400	10	3 820	10 900	1 450
MCM05	20	ϕ 12	2 660	9 850	4 400	20	3 800	10 900	1 450
MCM05	30	ϕ 12	3 300	8 600	6 550	30	5 390	10 900	2 730
MCM06	5	ϕ 15	8 300	25 200	6 550	5	12 700	17 000	2 730
MCM06	10	ϕ 15	8 140	20 000	6 550	10	12 800	17 000	2 730
MCM06	20	ϕ 15	5 080	15 900	6 550	20	7 460	17 000	2 730
MCM08	5	ϕ 15	8 300	30 800	7 100	5	12 700	22 800	3 040
MCM08	10	ϕ 15	8 140	24 400	7 100	10	12 800	22 800	3 040
MCM08	20	ϕ 15	5 080	19 400	7 100	20	7 460	22 800	3 040
MCM08	30	ϕ 15	5 500	16 930	7 100	30	8 580	22 800	3 040
MCM10	10	ϕ 20	12 800	33 500	7 600	10	21 400	29 400	3 380
MCM10	20	ϕ 20	8 190	26 600	7 600	20	12 600	29 400	3 380
MCM10	30	ϕ 20	13 200	23 200	7 600	30	22 900	29 400	3 380

Notes › Basic dynamic and static load ratings indicate values for one slider. › Basic dynamic load rating of linear guide is load of perpendicular direction to the axis that allows 90% of a group of the same Monocarriers to operate "Rated running distance" in table, that is equivalent to 1 million revolutions of ball screw and support unit under the same conditions without causing flaking by rolling contact fatigue. › Basic dynamic load rating of ball screw is load in the axial direction that allows 90% of ball screws of a group of the same Monocarriers to rotate 1 million revolutions under the same conditions without causing flaking by rolling contact fatigue. › Basic dynamic load rating of support unit is constant load in the axial direction that allows 90% of support units of the same group of Monocarriers to rotate 1 million revolutions under the same conditions without causing flaking by rolling contact fatigue. › Basic static load rating is load that results in combined permanent deformations at contact points of balls and ball grooves of respective parts at a diameter of 0.01%.

Table 12 Basic static moment load of linear guide

Model No.	Lead (mm)	Slider	Basic static moment (N × m)		
			Rolling M_{R0}	Pitching M_{P0}	Yawing M_{Y0}
MCM02	1, 2	Single	24	8	8
MCM03	1, 2	Single	68	28	28
MCM03	5, 10, 12 ,15	Single	92	51	51
MCM05	5, 10, 20, 30*	Single	229	89	89
MCM05	5, 10, 20, 30*	Double	455	765	765
MCM06	5, 10, 20	Single	415	174	174
MCM06	5, 10, 20	Double	825	1 220	1 220
MCM08	5, 10, 20, 30*	Single	770	300	300
MCM08	5, 10, 20, 30*	Double	1 540	2 050	2 050

Table 13 Basic static moment load of linear guide

Model No.	Lead (mm)	Slider	Basic static moment (N × m)		
			Rolling M_{R0}	Pitching M_{P0}	Yawing M_{Y0}
MCM10	10, 20, 30*	Single	1 170	425	425
MCM10	10, 20, 30*	Double	2 340	2 940	2 940

Notes › Basic static moment of double slider is value when two sliders equipped with NSK K1 are butted against each other.
› Basic static moment is value when rolling contact pressure of balls exceeds 4 000 N/mm².
› If extremely heavy load is required, please consult NSK for estimation of fatigue life.
*) Applicable only to single slider

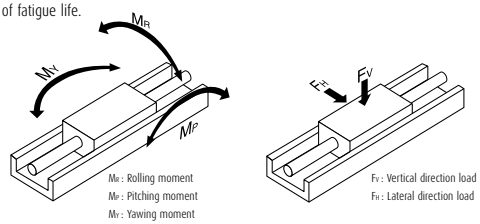


Fig. 8

(2) MCH Series Basic Load Rating

Table 14 Basic Load Rating

Model No.	Lead l (mm)	Shaft dia d (mm)	Basic dynamic load rating(N)				Basic static load rating(N)		Support unit Limit load (N)
			Ball screw C_a	Linear guide C	Support unit C_a	Rated running distance L_a (km)	Ball screw C_{0a}	Linear guide C_0	
MCH06 (MCL06)	5	ϕ 12	4 390	22 800	4 400	5	6 260	16 300	1 450
	10	ϕ 12	2 740	18 100	4 400	10	3 820	16 300	1 450
	20	ϕ 12	2 660	14 400	4 400	20	3 800	16 300	1 450
MCH09	5	ϕ 15	8 300	40 600	7 100	5	12 700	30 500	3 040
	10	ϕ 15	8 140	32 200	7 100	10	12 800	30 500	3 040
	20	ϕ 15	5 080	25 500	7 100	20	7 460	30 500	3 040
MCH10	10	ϕ 20	12 800	44 600	7 600	10	21 400	42 000	3 380
	20	ϕ 20	8 190	35 400	7 600	20	12 600	42 000	3 380

Notes › Basic dynamic and static load ratings indicate values for one slider. › Basic dynamic load rating of linear guide is load of perpendicular direction to the axis that allows 90% of a group of the same Monocarriers to operate "Rated running distance" in table, that is equivalent to 1 million revolutions of ball screw and support unit under the same conditions without causing flaking by rolling contact fatigue. › Basic dynamic load rating of ball screw is load in the axial direction that allows 90% of ball screws of a group of the same Monocarriers to rotate 1 million revolutions under the same conditions without causing flaking by rolling contact fatigue. › Basic dynamic load rating of support unit is constant load in the axial direction that allows 90% of support units of the same group of Monocarriers to rotate 1 million revolutions under the same conditions without causing flaking by rolling contact fatigue. › Basic static load rating is load that results in combined permanent deformations at contact points of balls and ball grooves of respective parts at a diameter of 0.01%.

Table 15 Basic static moment load of linear guide

Model No.	Slider	Basic static moment (N × m)		
		Rolling M_{R0}	Pitching M_{P0}	Yawing M_{Y0}
MCH06	Single	335	133	133
(MCL06)	Double	770	730	730
MCH09	Single	890	385	385
MCH09	Double	1 780	2 070	2 070
MCH10	Single	1 460	610	610
MCH10	Double	2 920	3 430	3 430

Notes › Basic static moment of double slider is value when two sliders equipped with NSK K1 are butted against each other. › Basic static moment is value when rolling contact pressure of balls exceeds 4 000 N/mm². › If extremely heavy load is required, please consult NSK for estimation of fatigue life.
*) Applicable only to single slider

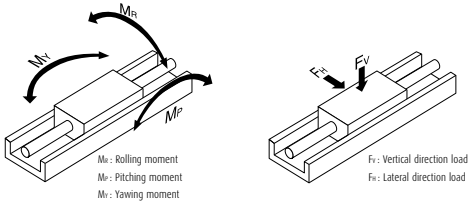


Fig. 9

1. MCM Series Reference Number Coding

[Body]

Example **MC M 08 040 H 10 K 0 0**[*1]

- MC: Monocarrier
- M: M type: MCM Series
- 08: Nominal size (rail width, Unit: 10 mm)
- 040: Stroke (Unit: 10 mm)
- H: Accuracy grade (H, high grade; P, precision grade)
- 10: Ball screw lead (mm)
- K: Slider specification K: Single slider, D: Double slider (See page 362)
- 0: Standard grease specification: 0 (AS2), Clean grease specification: B (LG2)
- 0: NSK management number (0 or 2)

Note: *1. 14th digit is control No. of NSK. Customers cannot specify a number. See the pages of each nominal number for details.

[With Accessories]

Example **MC E 08 040 H 10 K 0 0 K 0 0 0**

- E: With MCM Accessories
- K: NSK management number
- 0: Sensor unit
- 0: Cover unit
- 0: Motor bracket

Note: Accessories are available separately.

Table 1 Sensor unit (See page 388)

Reference No. code	Specification	Reference No.
0	N/A	—
1	Proximity switch (normally close contact 3 pieces)	MC – SRxx – 10
2	Proximity switch (normally open contact 3 pieces)	MC – SRxx – 11
3	Proximity switch (normally open contact 1 piece, normally close contact 2 pieces)	MC – SRxx – 12
4	Photo sensor 3 pieces	MC – SRxx – 13

Note 1) xx: Reference number 2) Sensor rail is not included in sensor unit. If you require the rail, please request separately. (See page 389)

Table 2 Cover unit (See page 392 and 393)

Reference No. code	Specification	Reference No.
0	N/A	—
1	With top cover	MC – CVxxxxx – 01 (02) *
—	Full cover	MC – CVxxxxx – 00

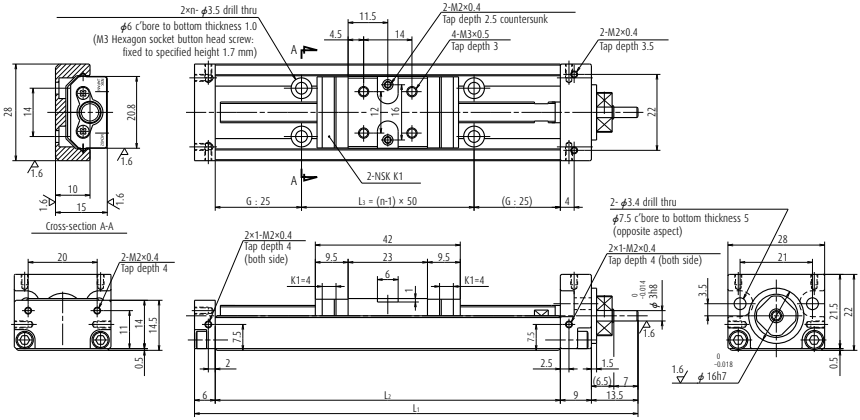
Note 1) xxxxx: Reference number and stroke number 2)*: "-02" is only used for Monocarrier MCM03. 3) When a sensor unit is used, full cover unit cannot be used.

Table 3 Motor bracket (See page 394 and 408)

Reference No. code	Reference No.				
	MCM03	MCM05	MCM06	MCM08	MCM10
0	N/A	N/A	N/A	N/A	N/A
1	MC-BK03-146-00	MC-BK05-145-00	MC-BK06-145-00	MC-BK08-145-00	MC-BK10-170-00
2	MC-BK03-148-01	MC-BK05-146-00	MC-BK06-146-00	MC-BK08-146-00	MC-BK10-170-01
3	MC-BK03-231-00	MC-BK05-148-00	MC-BK06-148-00	MC-BK08-160-00	MC-BK10-190-00
4	—	MC-BK05-160-00	MC-BK06-160-00	MC-BK08-170-00	MC-BK10-270-00
5	—	MC-BK05-250-00	MC-BK06-170-00	MC-BK08-170-01	—
6	—	—	MC-BK06-170-01	MC-BK08-190-00	—
7	—	—	MC-BK06-250-00	MC-BK08-250-00	—
8	—	—	—	MC-BK08-270-00	—

N/A: Not applicable

2. MCM Series Dimension Table of Standard Products
MCM02



Dimension of MCM02 (Single slider)

Reference No.	Nominal stroke (mm)	Stroke limit (mm)	Ball screw lead (mm)	Body length (mm)			No. of mounting hole n	Inertia × 10^{-7} (kg · m^2)	Mass (kg)
				L_1	L_2	L_3			
MCM02005H01K	50	58	1	128.5	100	50	2	0.93	0.26
MCM02005P01K	50	58	1	128.5	100	50	2	0.93	0.26
MCM02005H02K	50	58	2	128.5	100	50	2	0.93	0.26
MCM02005P02K	50	58	2	128.5	100	50	2	0.93	0.26
MCM02010H01K	100	108	1	178.5	150	100	3	1.36	0.32
MCM02010P01K	100	108	1	178.5	150	100	3	1.36	0.32
MCM02010H02K	100	108	2	178.5	150	100	3	1.36	0.32
MCM02010P02K	100	108	2	178.5	150	100	3	1.36	0.32
MCM02015H01K	150	158	1	228.5	200	150	4	1.81	0.39
MCM02015P01K	150	158	1	228.5	200	150	4	1.81	0.39
MCM02015H02K	150	158	2	228.5	200	150	4	1.81	0.39
MCM02015P02K	150	158	2	228.5	200	150	4	1.81	0.39

Monocarrier dynamic torque specification (N · cm)			
		High grade	Precision
Ball screw lead (mm)	1	0.1 – 1.3	0.2 – 1.6
	2	0.1 – 1.3	0.2 – 1.6

Note

1. Frictional resistance of NSK K1 is included in dynamic torque in table.
2. Grease is packed into ball screw, linear guide parts and support unit.
3. Consult NSK for life estimates under large moment loads.
4. There is no LG2 specification for MCM02.

Basic load rating

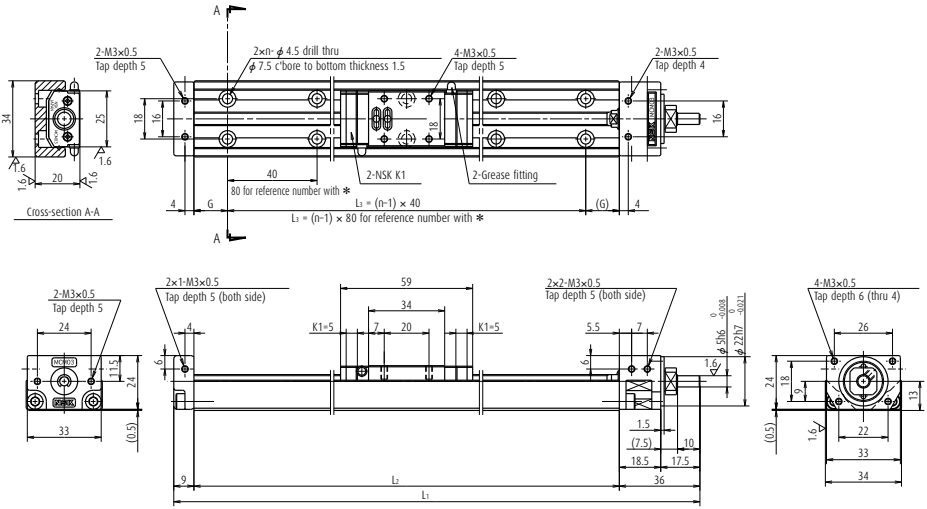
Lead	Shaft dia	Basic dynamic load rating (N)				Basic static load rating (N)		Support unit load limit (N)
l (mm)	d (mm)	Ball screw C_a	Linear guides C	Support unit C_a	Rated running distance L_a (km)	Ball screw C_{0a}	Linear guides C_0	
1	ϕ 6	405 (High grade)	4 910	615	1	555 (High grade)	2 120	490
1	ϕ 6	480 (Precision)	4 910	615	1	615 (Precision)	2 120	490
2	ϕ 6	400 (High grade)	3 900	615	2	555 (High grade)	2 120	490
2	ϕ 6	475 (Precision)	3 900	615	2	610 (Precision)	2 120	490

Slider	Basic static moment load (N · m)		
	Rolling M_{R0}	Pitching M_{P0}	Yawing M_{Y0}
Single	24	8	8

MCM03

Accuracy grade: Precision (P)

Ball screw lead 1 and 2



Dimension of MCM03 (Single slider)

Reference No.	Nominal stroke (mm)	Stroke limit (mm) (without K1)	Ball screw lead (mm)	Body length (mm)				No. of mounting hole n	Inertia × 10^{-5} (kg · m^2)	Mass (kg)
				L_1	L_2	G	L_3			
✻MCM03005P01K00	50	56	1	160	115	17.5	80	2	0.015	0.6
✻MCM03005P02K00	50	(66)	2	160	115	17.5	80	2	0.016	0.6
MCM03010P01K00	100	131	1	235	190	15	160	5	0.021	0.7
MCM03010P02K00	100	(141)	2	235	190	15	160	5	0.022	0.7
MCM03015P01K00	150	181	1	285	240	20	200	6	0.025	0.8
MCM03015P02K00	150	(191)	2	285	240	20	200	6	0.026	0.8

Note Bolt hole pitch L_3 on items marked with ✻ is 80 mm.

Monocarrier dynamic torque specification (N · cm)		
Ball screw lead (mm)	1	0.2 – 1.7
	2	0.2 – 1.7

Note

1. Frictional resistance of NSK K1 is included in dynamic torque in table.
2. Grease is packed into ball screw, linear guide parts and support unit.
3. Consult NSK for life estimates under large moment loads.
4. A spacer plate is required when using a cover unit or sensor unit for MCM03 with the lead of 1 or 2 mm. (See page 392)

Basic load rating

Lead	Shaft dia	Basic dynamic load rating (N)				Basic static load rating (N)		Support unit load limit (N)
l (mm)	d (mm)	Ball screw C_a	Linear guides C	Support unit C_a	Rated running distance L_a (km)	Ball screw C_{0a}	Linear guides C_0	
1	ϕ6	870	10 900	2 670	1	1 230	4 900	1 040
1	ϕ6	865	8 650	2 670	2	1 220	4 900	1 040

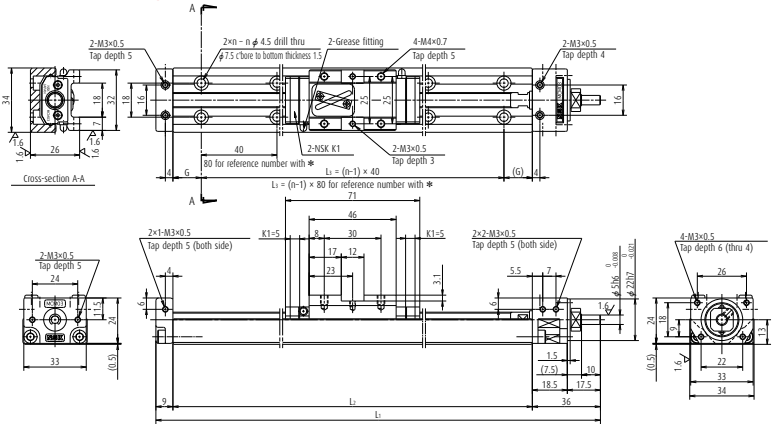
Basic static moment load of linear guide

Slider	Basic static moment load (N · m)		
	Rolling M_{R0}	Pitching M_{P0}	Yawing M_{Y0}
Single	68	28	28

MCM03

Ball screw lead 5, 10 and 12

Accuracy grade: High grade (H)



Dimension of MCM03 (Single slider)

Reference No.	Nominal stroke (mm)	Stroke limit (mm) (without K1)	Ball screw lead (mm)	Body length (mm)				No. of mounting hole n	Inertia × 10^{-5} (kg · m²)	Mass (kg)
				L_1	L_2	G	L_3			
✻MCM03005H05K00	50	69 (79)	5	185	140	30	80	2	0.057	0.6
✻MCM03005H10K00	50	69 (79)	10	185	140	30	80	2	0.080	0.6
✻MCM03005H12K00	50	69 (79)	12	185	140	30	80	2	0.097	0.6
MCM03010H05K00	100	119 (129)	5	235	190	15	160	5	0.073	0.7
MCM03010H10K00	100	119 (129)	10	235	190	15	160	5	0.092	0.7
MCM03010H12K00	100	119 (129)	12	235	190	15	160	5	0.109	0.7
MCM03015H05K00	150	169 (179)	5	285	240	20	200	6	0.089	0.8
MCM03015H10K00	150	169 (179)	10	285	240	20	200	6	0.105	0.8
MCM03015H12K00	150	169 (179)	12	285	240	20	200	6	0.122	0.8
MCM03020H05K00	200	219 (229)	5	335	290	25	240	7	0.104	0.9
MCM03020H10K00	200	219 (229)	10	335	290	25	240	7	0.118	0.9
MCM03020H12K00	200	219 (229)	12	335	290	25	240	7	0.135	0.9
MCM03025H05K00	250	269 (279)	5	385	340	30	280	8	0.120	1.0
MCM03025H10K00	250	269 (279)	10	385	340	30	280	8	0.131	1.0
MCM03025H12K00	250	269 (279)	12	385	340	30	280	8	0.147	1.0

Note Bolt hole pitch L3 on items marked with ✻ is 80 mm.

Monocarrier dynamic torque specification (N · cm)		
Ball screw lead(mm)	Accuracy grade	
	High grade	Precision
5	0.2 – 2.5	0.6 – 4.4
10 12	0.3 – 3.0	0.7 – 4.9

Note

1. Frictional resistance of NSK K1 is included in dynamic torque in table.
2. Grease is packed into ball screw, linear guide parts and support unit.
3. Consult NSK for life estimates under large moment loads.

Basic load rating

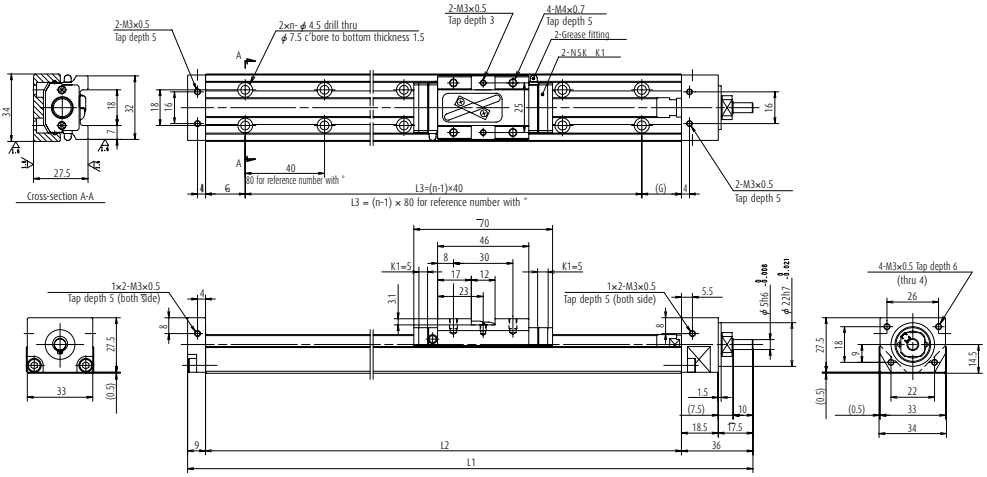
Lead	Shaft dia	Basic dynamic load rating (N)				Basic static load rating (N)		Support unit load limit (N)
l (mm)	d (mm)	Ball screw C_a	Linear guides C	Support unit C_a	Rated running distance L_a (km)	Ball screw C_{0a}	Linear guides C_0	
5	ϕ 8	2 090	7 850	2 670	5	2 830	6 620	1 040
10	ϕ 8	1 310	6 250	2 670	10	1 710	6 620	1 040
12	ϕ 8	1 320	5 880	2 670	12	1 730	6 620	1 040

Slider	Basic static moment load (N · m)		
	Rolling M_{RO}	Pitching M_{PO}	Yawing M_{YO}
Single	92	51	51

MCM03

Accuracy grade: High grade (H)

Ball screw lead 15



Dimension of MCM03 (Single slider)

Reference No.	Nominal stroke (mm)	Stroke limit (mm) (without K1)	Ball screw lead (mm)	Ball screw diameter (mm)	Body length (mm)				No. of mounting hole n	Inertia $\times 10^{-4}$ (kg · m²)	Mass (kg)
					L_1	L_2	G	L_3			
*MCM03005H15K00	50	70 (80)	15	φ10	185	140	30	80	2	0.183	0.67
MCM03010H15K00	100	120(130)	15	φ10	235	190	15	160	5	0.222	0.77
MCM03015H15K00	150	170(180)	15	φ10	285	240	20	200	6	0.260	0.87
MCM03020H15K00	200	220(230)	15	φ10	335	290	25	240	7	0.298	0.97
MCM03025H15K00	250	270(280)	15	φ10	385	340	30	280	8	0.336	1.07

Note Bolt hole pitch L_3 on items marked with * is 80 mm.

Monocarrier dynamic torque specification (N · cm)		
Ball screw lead (mm)	15	0.3 – 5.6

Note

1. Frictional resistance of NSK K1 is included in dynamic torque in table.
2. Grease is packed into ball screw, linear guide parts and support unit.
3. Consult NSK for life estimates under large moment loads.
4. When a cover unit is added, an optional spacer plate is required. (See page 392)
5. There is no P grade (precision grade) for Lead 15.

Basic load rating

Lead	Shaft dia	Basic dynamic load rating (N)				Basic static load rating (N)		Support unit load limit (N)
l (mm)	d (mm)	Ball screw C_a	Linear guides C	Support unit C_a	Rated running distance L_a (km)	Ball screw C_{0a}	Linear guides C_0	
15	φ10	2 000	5 440	2 670	15	2 740	6 620	1 040

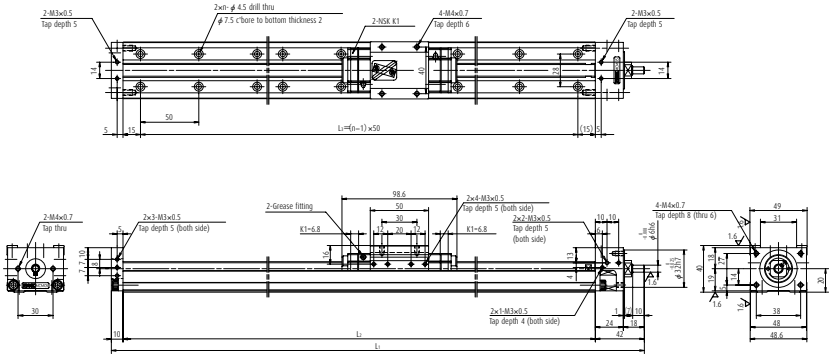
Basic static moment load of linear guide

Slider	Basic static moment load (N · m)		
	Rolling M_{R0}	Pitching M_{P0}	Yawing M_{Y0}
Single	92	51	51

MCM05

Accuracy grade: High grade (H)

Ball screw lead 5, 10 and 20



Dimension of MCM05 (Single slider)

Reference No.	Nominal stroke (mm)	Stroke limit (mm) (without K1)	Ball screw lead (mm)	Body length (mm)			No. of mounting hole n	Inertia × 10^{-5} (kg · m^2)	Mass (kg)
				L_1	L_2	L_3			
MCM05005H05K00	50	81 (95)	5	232	180	150	4	0.025	1.4
MCM05005H10K00	50	81 (95)	10	232	180	150	4	0.035	1.4
MCM05005H20K00	50	81 (95)	20	232	180	150	4	0.073	1.4
MCM05010H05K00	100	131 (145)	5	282	230	200	5	0.031	1.6
MCM05010H10K00	100	131 (145)	10	282	230	200	5	0.040	1.6
MCM05010H20K00	100	131 (145)	20	282	230	200	5	0.078	1.6
MCM05015H05K00	150	181 (195)	5	332	280	250	6	0.036	1.8
MCM05015H10K00	150	181 (195)	10	332	280	250	6	0.046	1.8
MCM05015H20K00	150	181 (195)	20	332	280	250	6	0.084	1.8
MCM05020H05K00	200	231 (245)	5	382	330	300	7	0.042	2.0
MCM05020H10K00	200	231 (245)	10	382	330	300	7	0.051	2.0
MCM05020H20K00	200	231 (245)	20	382	330	300	7	0.089	2.0
MCM05025H05K00	250	281 (295)	5	432	380	350	8	0.047	2.2
MCM05025H10K00	250	281 (295)	10	432	380	350	8	0.057	2.2
MCM05025H20K00	250	281 (295)	20	432	380	350	8	0.095	2.2

Monocarrier dynamic torque specification (N · cm)		
Ball screw lead(mm)	Accuracy grade	
	High grade	Precision
5	1.0 – 4.8	1.9 – 7.7
10	1.1 – 5.8	2.1 – 8.7
20	1.6 – 7.9	2.5 – 10.7
30	1.8 – 13.1	—

Note

1. Frictional resistance of NSK K1 is included in dynamic torque in table.
2. Grease is packed into ball screw, linear guide parts and support unit.
3. Consult NSK for life estimates under large moment loads.

Basic load rating

Lead	Shaft dia	Basic dynamic load rating (N)				Basic static load rating (N)		Support unit load limit (N)
ℓ (mm)	d (mm)	Ball screw C_a	Linear guides C	Support unit C_a	Rated running distance L_a (km)	Ball screw C_{0a}	Linear guides C_0	
5	ϕ 12	4 390	15 600	4 400	5	6 260	10 900	1 450
10	ϕ 12	2 740	12 400	4 400	10	3 820	10 900	1 450
20	ϕ 12	2 660	9 850	4 400	20	3 800	10 900	1 450
30	ϕ 12	3 300	8 600	6 550	30	5 390	10 900	2 730

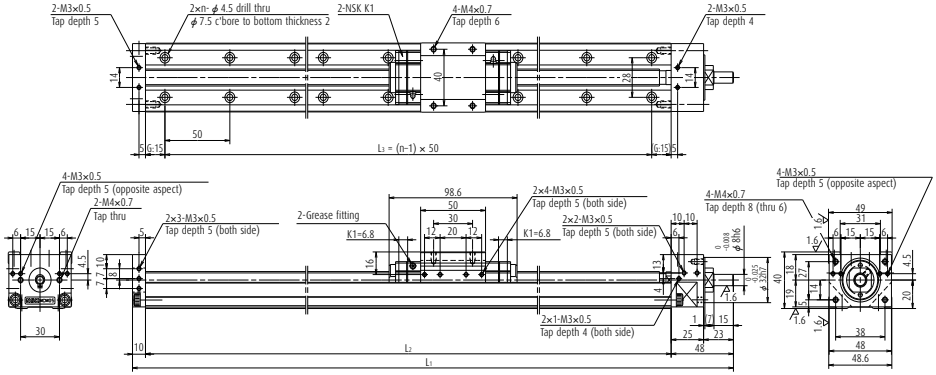
Basic static moment load of linear guide

Slider	Basic static moment load (N · m)		
	Rolling M_{R0}	Pitching M_{P0}	Yawing M_{Y0}
Single	229	89	89

MCM05

Ball screw lead 30

Accuracy grade: High grade (H)



Dimension of MCM05 (Single slider)

Reference No.	Nominal stroke (mm)	Stroke limit (mm) (without K1)	Ball screw lead (mm)	Body length (mm)			No. of mounting hole n	Inertia × 10^{-4} (kg · m^2)	Mass (kg)
				L_1	L_2	L_3			
MCM05030H05K00	300	331 (345)	5	482	430	400	9	0.053	2.3
MCM05030H10K00	300	331 (345)	10	482	430	400	9	0.063	2.3
MCM05030H20K00	300	331 (345)	20	482	430	400	9	0.101	2.3
MCM05030H30K00	300	331 (345)	30	488	430	400	9	0.164	2.3
MCM05040H05K00	400	431 (445)	5	582	530	500	11	0.064	2.7
MCM05040H10K00	400	431 (445)	10	582	530	500	11	0.074	2.7
MCM05040H20K00	400	431 (445)	20	582	530	500	11	0.112	2.7
MCM05040H30K00	400	431 (445)	30	588	530	500	11	0.175	2.8
MCM05050H05K00	500	531 (545)	5	682	630	600	13	0.076	3.1
MCM05050H10K00	500	531 (545)	10	682	630	600	13	0.085	3.1
MCM05050H20K00	500	531 (545)	20	682	630	600	13	0.123	3.1
MCM05050H30K00	500	531 (545)	30	688	630	600	13	0.186	3.2
MCM05060H05K00	600	631 (645)	5	782	730	700	15	0.087	3.5
MCM05060H10K00	600	631 (645)	10	782	730	700	15	0.096	3.5
MCM05060H20K00	600	631 (645)	20	782	730	700	15	0.134	3.5
MCM05060H30K00	600	631 (645)	30	788	730	700	15	0.198	3.6

Monocarrier dynamic torque specification (N · cm)		
Ball screw lead(mm)	Accuracy grade	
	High grade	Precision
5	1.0 – 4.8	1.9 – 7.7
10	1.1 – 5.8	2.1 – 8.7
20	1.6 – 7.9	2.5 – 10.7
30	1.8 – 13.1	—

Note

1. Frictional resistance of NSK K1 is included in dynamic torque in table.
2. Grease is packed into ball screw, linear guide parts and support unit.
3. Consult NSK for life estimates under large moment loads.

Basic load rating

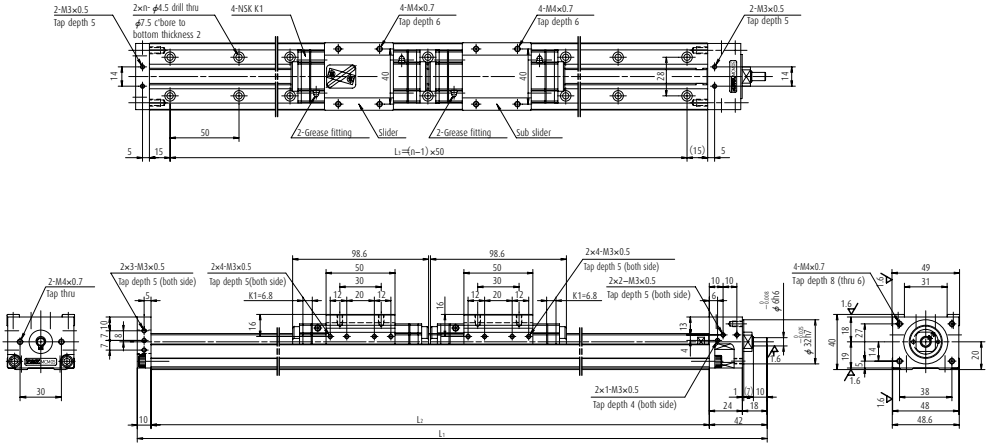
Lead	Shaft dia	Basic dynamic load rating (N)				Basic static load rating (N)		Support unit load limit (N)
ℓ (mm)	d (mm)	Ball screw C_a	Linear guides C	Support unit a	Rated running distance L_a (km)	Ball screw C_{0a}	Linear guides C_0	
5	ϕ 12	4 390	15 600	4 400	5	6 260	10 900	1 450
10	ϕ 12	2 740	12 400	4 400	10	3 820	10 900	1 450
20	ϕ 12	2 660	9 850	4 400	20	3 800	10 900	1 450
30	ϕ 12	3 300	8 600	6 550	30	5 390	10 900	2 730

Basic static moment load of linear guide

Slider	Basic static moment load (N · m)		
	Rolling M_{R0}	Pitching M_{P0}	Yawing M_{Y0}
Single	229	89	89

MCM05 (Double slider)

Accuracy grade: High grade (H)



Dimension of MCM05 (Double slider)

Reference No.	Nominal stroke (mm)	Stroke limit (mm) (without K1)	Ball screw lead (mm)	Body length (mm)			No. of mounting hole n	Inertia × 10⁻⁴ (kg · m²)	Mass (kg)
				L_1	L_2	L_3			
MCM05006H10D00	60	82 (110)	10	332	280	250	6	0.058	2.3
MCM05011H10D00	110	132 (160)	10	382	330	300	7	0.064	2.5
MCM05016H10D00	160	182 (210)	10	432	380	350	8	0.070	2.7
MCM05021H10D00	210	232 (260)	10	482	430	400	9	0.075	2.8
MCM05021H20D00	210	232 (260)	20	482	430	400	9	0.151	2.8

Monocarrier dynamic torque specification (N · cm)		
Ball screw lead(mm)	Accuracy grade	
	High grade	Precision
10	1.5 – 7.6	2.4 – 10.6
20	2.3 – 11.8	3.2 – 14.8

Note

1. Frictional resistance of NSK K1 is included in dynamic torque in table.
2. Grease is packed into ball screw, linear guide parts and support unit.
3. Consult NSK for life estimates under large moment loads.

Basic load rating

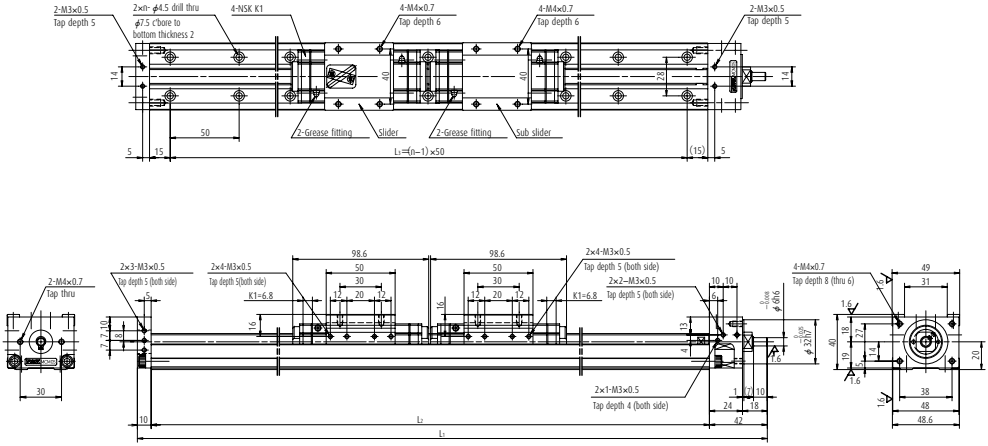
Lead	Shaft dia	Basic dynamic load rating (N)				Basic static load rating (N)		Support unit load limit (N)
ℓ (mm)	d (mm)	Ball screw C_a	Linear guides C	Support unit C_a	Rated running distance L_a (km)	Ball screw C_{0a}	Linear guides C_0	
5	φ12	4 390	15 600	4 400	5	6 260	10 900	1 450
10	φ12	2 740	12 400	4 400	10	3 820	10 900	1 450
20	φ12	2 660	9 850	4 400	20	3 800	10 900	1 450

Basic static moment load of linear guide

Slider	Basic static moment load (N · m)		
	Rolling M_{RO}	Pitching M_{PO}	Yawing M_{YO}
Double	455	765	765

MCM05 (Double slider)

Accuracy grade: High grade (H)



Dimension of MCM05 (Double slider)

Reference No.	Nominal stroke (mm)	Stroke limit (mm) (without K1)	Ball screw lead (mm)	Body length (mm)			No. of mounting hole n	Inertia x 10-4 (kg · m²)	Mass (kg)
				L_1	L_2	L_3			
MCM05031H10D00	310	332 (360)	10	582	530	500	11	0.086	3.2
MCM05031H20D00	310	332 (360)	20	582	530	500	11	0.162	3.2
MCM05041H10D00	410	432 (460)	10	682	630	600	13	0.098	3.6
MCM05041H20D00	410	432 (460)	20	682	630	600	13	0.174	3.6
MCM05051H10D00	510	532 (560)	10	782	730	700	15	0.109	4.2
MCM05051H20D00	510	532 (560)	20	782	730	700	15	0.185	4.2

Monocarrier dynamic torque specification (N · cm)		
Ball screw lead(mm)	Accuracy grade	
	High grade	Precision
10	1.5 – 7.6	2.4 – 10.6
20	2.3 – 11.8	3.2 – 14.8

Note

1. Frictional resistance of NSK K1 is included in dynamic torque in table.
2. Grease is packed into ball screw, linear guide parts and support unit.
3. Consult NSK for life estimates under large moment loads.

Basic load rating

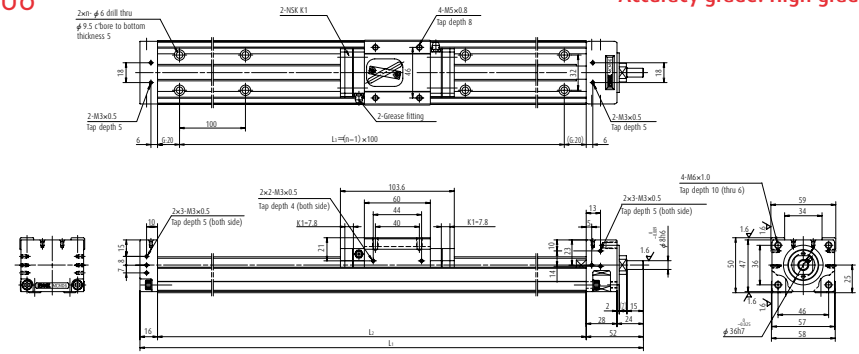
Lead	Shaft dia	Basic dynamic load rating (N)				Basic static load rating (N)		Support unit load limit (N)
ℓ (mm)	d (mm)	Ball screw C_a	Linear guides C	Support unit C_a	Rated running distance L_a (km)	Ball screw C_{0a}	Linear guides C_0	
5	ϕ 12	4 390	15 600	4 400	5	6 260	10 900	1 450
10	ϕ 12	2 740	12 400	4 400	10	3 820	10 900	1 450
20	ϕ 12	2 660	9 850	4 400	20	3 800	10 900	1 450

Basic static moment load of linear guide

Slider	Basic static moment load (N · m)		
	Rolling M_{R0}	Pitching M_{P0}	Yawing M_{Y0}
Double	455	765	765

MCM06

Accuracy grade: High grade (H)



Dimension of MCM06 (Single slider)

Reference No.	Nominal stroke (mm)	Stroke limit (mm) (without K1)	Ball screw lead (mm)	Body length (mm)			No. of mounting hole n	Inertia × 10^{-4} (kg · m²)	Mass (kg)
				L_1	L_2	L_3			
◇MCM06005H05K02	50	86 (102)	5	258	190	100	2	0.066	2.7
◇MCM06005H10K00	50	86 (102)	10	258	190	100	2	0.077	2.7
◇MCM06005H20K00	50	86 (102)	20	258	190	100	2	0.122	2.7
MCM06010H05K02	100	136 (152)	5	308	240	200	3	0.080	3.0
MCM06010H10K00	100	136 (152)	10	308	240	200	3	0.092	3.0
MCM06010H20K00	100	136 (152)	20	308	240	200	3	0.137	3.0
◇MCM06015H05K02	150	186 (202)	5	358	290	200	3	0.095	3.5
◇MCM06015H10K00	150	186 (202)	10	358	290	200	3	0.106	3.5
◇MCM06015H20K00	150	186 (202)	20	358	290	200	3	0.152	3.5
MCM06020H05K02	200	236 (252)	5	408	340	300	4	0.110	3.8
MCM06020H10K00	200	236 (252)	10	408	340	300	4	0.121	3.8
MCM06020H20K00	200	236 (252)	20	408	340	300	4	0.167	3.8
◇MCM06025H05K02	250	286 (302)	5	458	390	300	4	0.125	4.2
◇MCM06025H10K00	250	286 (302)	10	458	390	300	4	0.136	4.2
◇MCM06025H20K00	250	286 (302)	20	458	390	300	4	0.181	4.2
MCM06030H05K02	300	336 (352)	5	508	440	400	5	0.139	4.5
MCM06030H10K00	300	336 (352)	10	508	440	400	5	0.150	4.5
MCM06030H20K00	300	336 (352)	20	508	440	400	5	0.196	4.5

Note 1. Dimension G is 45 for items marked with ◇. 2. The nominal number in the above table is for high-grade grease specifications. In the case of other specifications, see the following table for the 13th and 14th digits.

Coding for columns 13 and 14

Grease	Lead	High-grade, precision-grade
Standard	5	02
	10, 20	00
LG2	5	B2
	10, 20	B0

Monocarrier dynamic torque specification (N · cm)		
Ball screw lead(mm)	Accuracy grade	
	High grade	Precision
5	1.9 – 7.4	3.4 – 12.3
10	2.2 – 8.6	3.6 – 14.0
20	2.8 – 11.0	4.2 – 16.5

Note

1. Frictional resistance of NSK K1 is included in dynamic torque in table.
2. Grease is packed into ball screw, linear guide parts and support unit.
3. Consult NSK for life estimates under large moment loads.

Basic load rating

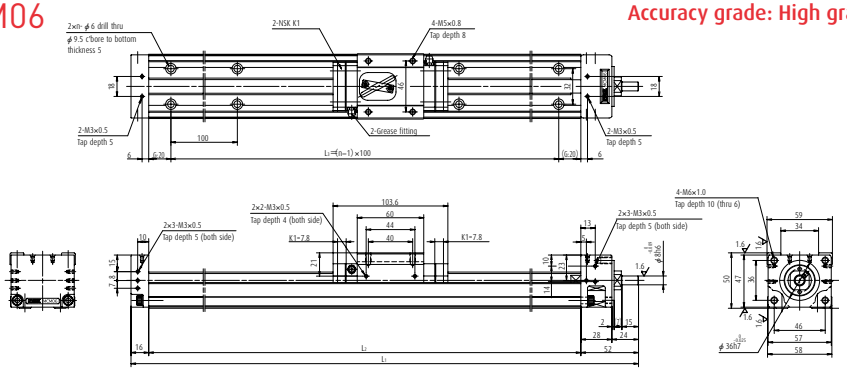
Lead	Shaft dia	Basic dynamic load rating (N)				Basic static load rating (N)		Support unit load limit (N)
ℓ (mm)	d (mm)	Ball screw C_a	Linear guides C	Support unit C_a	Rated running distance L_a (km)	Ball screw C_{0a}	Linear guides C_0	
5	φ15	8 300	25 200	6 550	5	12 700	17 000	2 730
10	φ15	8 140	20 000	6 550	10	12 800	17 000	2 730
20	φ15	5 080	15 900	6 550	20	7 460	17 000	2 730

Basic static moment load of linear guide

Slider	Basic static moment load (N · m)		
	Rolling M_{R0}	Pitching M_{P0}	Yawing M_{Y0}
Single	415	174	174

MCM06

Accuracy grade: High grade (H)



Dimension of MCM06 (Single slider)

Reference No.	Nominal stroke (mm)	Stroke limit (mm) (without K1)	Ball screw lead (mm)	Body length (mm)			No. of mounting hole	Inertia × 10^{-4} (kg · m^2)	Mass (kg)
				L_1	L_2	L_3	n		
MCM06040H05K02	400	436 (452)	5	608	540	500	6	0.169	5.2
MCM06040H10K00	400	436 (452)	10	608	540	500	6	0.180	5.2
MCM06040H20K00	400	436 (452)	20	608	540	500	6	0.225	5.2
MCM06050H05K02	500	536 (552)	5	708	640	600	7	0.198	6.0
MCM06050H10K00	500	536 (552)	10	708	640	600	7	0.209	6.0
MCM06050H20K00	500	536 (552)	20	708	640	600	7	0.255	6.0
MCM06060H05K02	600	636 (652)	5	808	740	700	8	0.228	6.7
MCM06060H10K00	600	636 (652)	10	808	740	700	8	0.239	6.7
MCM06060H20K00	600	636 (652)	20	808	740	700	8	0.284	6.7
MCM06070H05K02	700	736 (752)	5	908	840	800	9	0.257	7.4
MCM06070H10K00	700	736 (752)	10	908	840	800	9	0.268	7.4
MCM06070H20K00	700	736 (752)	20	908	840	800	9	0.314	7.4
MCM06080H05K02	800	836 (852)	5	1 008	940	900	10	0.286	8.1
MCM06080H10K00	800	836 (852)	10	1 008	940	900	10	0.298	8.1
MCM06080H20K00	800	836 (852)	20	1 008	940	900	10	0.343	8.1

Note The nominal number in the above table is for high-grade grease specifications. In the case of other specifications, see the following table for the 13th and 14th digits.

Coding for columns 13 and 14

Grease	Lead	High-grade, precision-grade
Standard	5	02
	10, 20	00
LG2	5	B2
	10, 20	B0

Monocarrier dynamic torque specification (N · cm)		
Ball screw lead(mm)	Accuracy grade	
	High grade	Precision
5	1.9 – 7.4	3.4 – 12.3
10	2.2 – 8.6	3.6 – 14.0
20	2.8 – 11.0	4.2 – 16.5

Note

1. Frictional resistance of NSK K1 is included in dynamic torque in table.
2. Grease is packed into ball screw, linear guide parts and support unit.
3. Consult NSK for life estimates under large moment loads.

Basic load rating

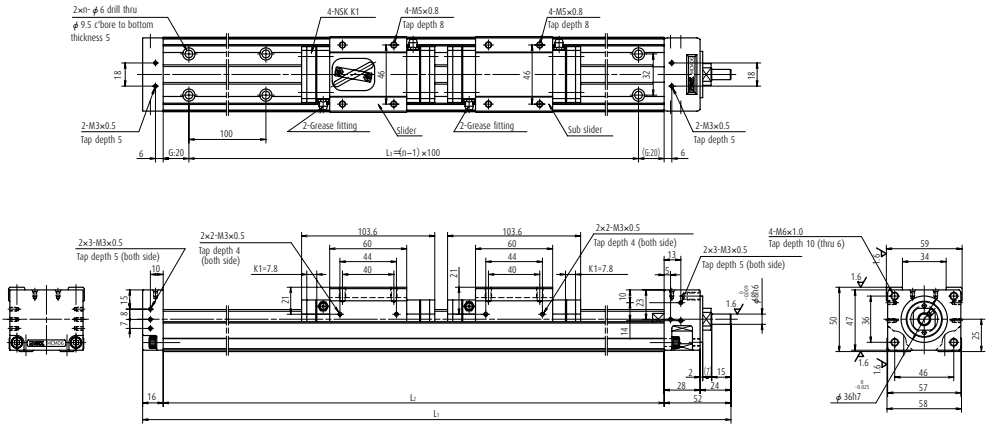
Lead	Shaft dia	Basic dynamic load rating (N)				Basic static load rating (N)		Support unit load limit (N)
ℓ (mm)	d (mm)	Ball screw C_a	Linear guides C	Support unit C_a	Rated running distance L_a (km)	Ball screw C_{0a}	Linear guides C_0	
5	ϕ 15	8 300	25 200	6 550	5	12 700	17 000	2 730
10	ϕ 15	8 140	20 000	6 550	10	12 800	17 000	2 730
20	ϕ 15	5 080	15 900	6 550	20	7 460	17 000	2 730

Basic static moment load of linear guide

Slider	Basic static moment load (N · m)		
	Rolling M_{RO}	Pitching M_{PO}	Yawing M_{YO}
Single	415	174	174

MCM06 (Double slider)

Accuracy grade: High grade (H)



Dimension of MCM06 (Double slider)

Reference No.	Nominal stroke (mm)	Stroke limit (mm) (without K1)	Ball screw lead (mm)	Body length (mm)			No. of mounting hole	Inertia × 10^{-4} (kg · m^2)	Mass (kg)
				L_1	L_2	L_3	n		
MCM06011H05D02	110	132 (164)	5	408	340	300	4	0.114	4.4
MCM06011H10D00	110	132 (164)	10	408	340	300	4	0.136	4.4
MCM06021H05D02	210	232 (264)	5	508	440	400	5	0.143	5.1
MCM06021H10D00	210	232 (264)	10	508	440	400	5	0.166	5.1
MCM06021H20D00	210	232 (264)	20	508	440	400	5	0.257	5.1
MCM06031H05D02	310	332 (364)	5	608	540	500	6	0.173	5.8
MCM06031H10D00	310	332 (364)	10	608	540	500	6	0.195	5.8
MCM06031H20D00	310	332 (364)	20	608	540	500	6	0.286	5.8

Note The nominal number in the above table is for high-grade grease specifications. In the case of other specifications, see the following table for the 13th and 14th digits.

Coding for columns 13 and 14

Grease	Lead	High-grade, precision-grade
Standard	5	02
Standard	10, 20	00
LG2	5	B2
LG2	10, 20	B0

Monocarrier dynamic torque specification (N · cm)		
Ball screw lead(mm)	Accuracy grade	
	High grade	Precision
5	2.3 – 8.5	3.7 – 13.5
10	2.7 – 10.9	4.2 – 16.4
20	4.0 – 15.9	5.5 – 21.3

Note

1. Frictional resistance of NSK K1 is included in dynamic torque in table.
2. Grease is packed into ball screw, linear guide parts and support unit.
3. Consult NSK for life estimates under large moment loads.

Basic load rating

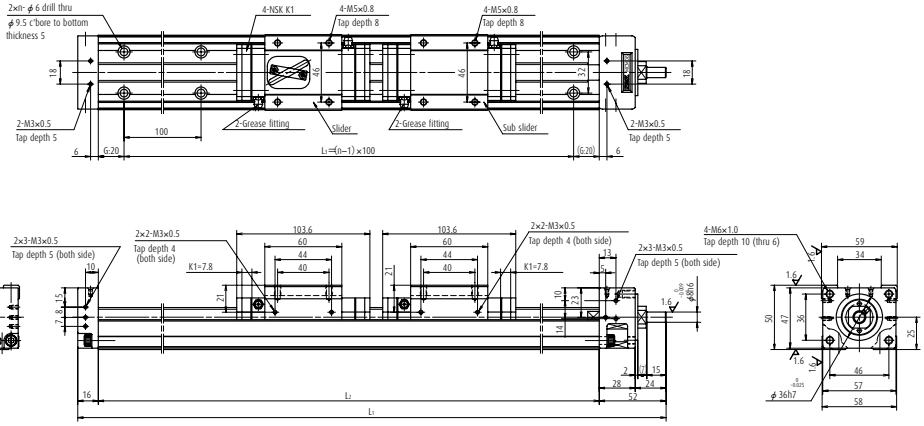
Lead	Shaft dia	Basic dynamic load rating (N)				Basic static load rating (N)		
ℓ (mm)	d (mm)	Ball screw C_a	Linear guides C	Support unit C_a	Rated running distance L_a (km)	Ball screw C_{0a}	Linear guides C_0	Support unit load limit (N)
5	ϕ15	8 300	25 200	6 550	5	12 700	17 000	2 730
10	ϕ15	8 140	20 000	6 550	10	12 800	17 000	2 730
20	ϕ15	5 080	15 900	6 550	20	7 460	17 000	2 730

Basic static moment load of linear guide

Slider	Basic static moment load (N · m)		
	Rolling M_{RO}	Pitching M_{PO}	Yawing M_{YO}
Double	825	1 220	1 220

MCM06 (Double slider)

Accuracy grade: High grade (H)



Dimension of MCM06 (Double slider)

Reference No.	Nominal stroke (mm)	Stroke limit (mm) (without K1)	Ball screw lead (mm)	Body length (mm)			No. of mounting hole	Inertia × 10^{-4} (kg · m^2)	Mass (kg)
				L_1	L_2	L_3	n		
MCM06041H05D02	410	432 (464)	5	708	640	600	7	0.202	6.6
MCM06041H10D00	410	432 (464)	10	708	640	600	7	0.224	6.6
MCM06041H20D00	410	432 (464)	20	708	640	600	7	0.316	6.6
MCM06051H10D02	510	532 (564)	10	808	740	700	8	0.254	7.3
MCM06051H20D00	510	532 (564)	20	808	740	700	8	0.345	7.3
MCM06061H10D02	610	632 (664)	10	908	840	800	9	0.283	8.0
MCM06061H20D00	610	632 (664)	20	908	840	800	9	0.375	8.0
MCM06071H10D02	710	732 (764)	10	1 008	940	900	10	0.313	8.7
MCM06071H20D00	710	732 (764)	20	1 008	940	900	10	0.404	8.7

Note The nominal number in the above table is for high-grade grease specifications. In the case of other specifications, see the following table for the 13th and 14th digits.

Coding for columns 13 and 14

Grease	Lead	High-grade, precision-grade
Standard	5	02
	10, 20	00
LG2	5	B2
	10, 20	B0

Monocarrier dynamic torque specification (N · cm)		
Ball screw lead(mm)	Accuracy grade	
	High grade	Precision
5	2.3 – 8.5	3.7 – 13.5
10	2.7 – 10.9	4.2 – 16.4
20	4.0 – 15.9	5.5 – 21.3

Note

1. Frictional resistance of NSK K1 is included in dynamic torque in table.
2. Grease is packed into ball screw, linear guide parts and support unit.
3. Consult NSK for life estimates under large moment loads.

Basic load rating

Lead	Shaft dia	Basic dynamic load rating (N)				Basic static load rating (N)		Support unit load limit (N)
ℓ (mm)	d (mm)	Ball screw C_a	Linear guides C	Support unit C_a	Rated running distance L_a (km)	Ball screw C_{0a}	Linear guides C_0	
5	ϕ 15	8 300	25 200	6 550	5	12 700	17 000	2 730
10	ϕ 15	8 140	20 000	6 550	10	12 800	17 000	2 730
20	ϕ 15	5 080	15 900	6 550	20	7 460	17 000	2 730

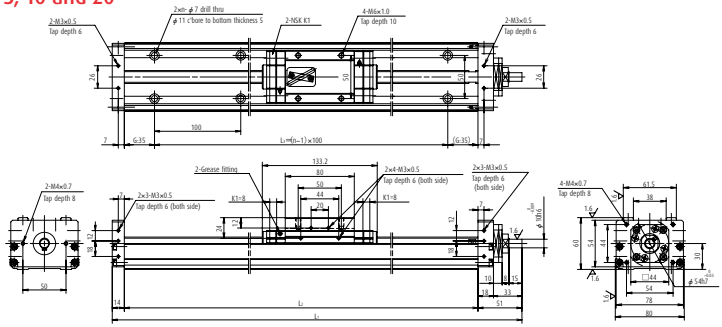
Basic static moment load of linear guide

Slider	Basic static moment load (N · m)		
	Rolling M_{R0}	Pitching M_{P0}	Yawing M_{Y0}
Double	825	1 220	1 220

MCM08

Accuracy grade: High grade (H)

Ball screw lead 5, 10 and 20



Dimension of MCM08 (Single slider)

Reference No.	Nominal stroke (mm)	Stroke limit (mm) (without K1)	Ball screw lead (mm)	Body length (mm)			No. of mounting hole	Inertia × 10^{-4} (kg · m^2)	Mass (kg)
				L_1	L_2	L_3	n		
◇MCM08005H05K02	50	86 (102)	5	285	220	100	2	0.082	4.1
◇MCM08005H10K00	50	86 (102)	10	285	220	100	2	0.100	4.1
MCM08010H05K02	100	136 (152)	5	335	270	200	3	0.097	4.6
MCM08010H10K00	100	136 (152)	10	335	270	200	3	0.114	4.6
MCM08010H20K00	100	136 (152)	20	335	270	200	3	0.190	4.6
◇MCM08015H05K02	150	186 (202)	5	385	320	200	3	0.111	5.1
◇MCM08015H10K00	150	186 (202)	10	385	320	200	3	0.129	5.1
◇MCM08015H20K00	150	186 (202)	20	385	320	200	3	0.205	5.1
MCM08020H05K02	200	236 (252)	5	435	370	300	4	0.126	5.5
MCM08020H10K00	200	236 (252)	10	435	370	300	4	0.144	5.5
MCM08020H20K00	200	236 (252)	20	435	370	300	4	0.220	5.5
◇MCM08025H05K02	250	286 (302)	5	485	420	300	4	0.141	6.0
◇MCM08025H10K00	250	286 (302)	10	485	420	300	4	0.159	6.0
◇MCM08025H20K00	250	286 (302)	20	485	420	300	4	0.235	6.0
MCM08030H05K02	300	336 (352)	5	535	470	400	5	0.156	6.5
MCM08030H10K00	300	336 (352)	10	535	470	400	5	0.173	6.5
MCM08030H20K00	300	336 (352)	20	535	470	400	5	0.249	6.5

Note 1. Dimension G is 60 for items marked with ◇. 2. The nominal number in the above table is for high-grade grease specifications. In the case of other specifications, see the following table for the 13th and 14th digits.

Coding for columns 13 and 14

Grease	Lead	High-grade, precision-grade
Standard	5	02
	10, 20	00
LG2	5	B2
	10, 20	B0

Monocarrier dynamic torque specification (N · cm)		
Ball screw lead(mm)	Accuracy grade	
	High grade	Precision
5	1.0 – 5.9	3.1 – 11.5
10	2.0 – 7.8	3.2 – 13.3
20	2.5 – 10.8	4.0 – 16.4
30	2.8 – 12.0	—

Note

1. Frictional resistance of NSK K1 is included in dynamic torque in table.
2. Grease is packed into ball screw, linear guide parts and support unit.
3. Consult NSK for life estimates under large moment loads.

Basic load rating

Lead	Shaft dia	Basic dynamic load rating (N)				Basic static load rating (N)		Support unit load limit (N)
ℓ (mm)	d (mm)	Ball screw C_a	Linear guides C	Support unit C_a	Rated running distance L_a (km)	Ball screw C_{0a}	Linear guides C_0	
5	ϕ 15	8 300	30 800	7 100	5	12 700	22 800	3 040
10	ϕ 15	8 140	24 400	7 100	10	12 800	22 800	3 040
20	ϕ 15	5 080	19 400	7 100	20	7 460	22 800	3 040
30	ϕ 15	5 500	16 930	7 100	30	8 580	22 800	3 040

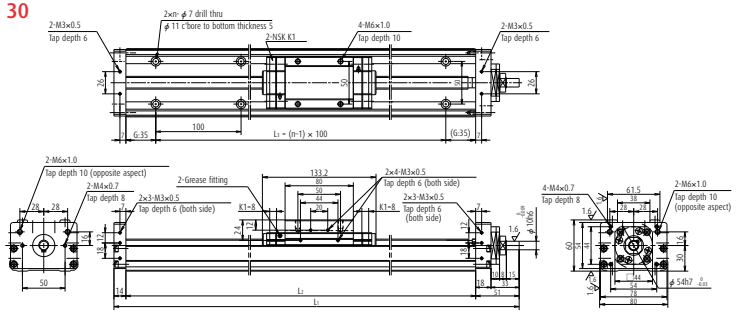
Basic static moment load of linear guide

Slider	Basic static moment load (N · m)		
	Rolling M_{RO}	Pitching M_{PO}	Yawing M_{YO}
Single	770	300	300

MCM08

Ball screw lead 30

Accuracy grade: High grade (H)



Dimension of MCM08 (Single slider)

Reference No.	Nominal stroke (mm)	Stroke limit (mm) (without K1)	Ball screw lead (mm)	Body length (mm)			No. of mounting hole	Inertia × 10^{-4} (kg · m^2)	Mass (kg)
				L_1	L_2	L_3	n		
MCM08040H05K02	400	436 (452)	5	635	570	500	6	0.185	7.4
MCM08040H10K00	400	436 (452)	10	635	570	500	6	0.203	7.4
MCM08040H20K00	400	436 (452)	20	635	570	500	6	0.279	7.4
MCM08040H30K00	400	436 (452)	30	635	570	500	6	0.405	7.4
MCM08050H05K02	500	536 (552)	5	735	670	600	7	0.214	8.4
MCM08050H10K00	500	536 (552)	10	735	670	600	7	0.232	8.4
MCM08050H20K00	500	536 (552)	20	735	670	600	7	0.308	8.4
MCM08050H30K00	500	536 (552)	30	735	670	600	7	0.435	8.4
MCM08060H05K02	600	636 (652)	5	835	770	700	8	0.244	9.3
MCM08060H10K00	600	636 (652)	10	835	770	700	8	0.262	9.3
MCM08060H20K00	600	636 (652)	20	835	770	700	8	0.338	9.3
MCM08060H30K00	600	636 (652)	30	835	770	700	8	0.464	9.3
MCM08070H05K02	700	736 (752)	5	935	870	800	9	0.273	10.5
MCM08070H10K00	700	736 (752)	10	935	870	800	9	0.291	10.5
MCM08070H20K00	700	736 (752)	20	935	870	800	9	0.367	10.5
MCM08070H30K00	700	736 (752)	30	935	870	800	9	0.494	10.5
MCM08080H05K02	800	836 (852)	5	1 035	970	900	10	0.303	11.2
MCM08080H10K00	800	836 (852)	10	1 035	970	900	10	0.320	11.2
MCM08080H20K00	800	836 (852)	20	1 035	970	900	10	0.396	11.2

Note The nominal number in the above table is for high-grade grease specifications. In the case of other specifications, see the following table for the 13th and 14th digits.

Coding for columns 13 and 14

Grease	Lead	High-grade, precision-grade
Standard	5	02
	10, 20	00
LG2	5	B2
	10, 20	B0

Monocarrier dynamic torque specification (N · cm)		
Ball screw lead(mm)	Accuracy grade	
	High grade	Precision
5	1.0 – 5.9	3.1 – 11.5
10	2.0 – 7.8	3.2 – 13.3
20	2.5 – 10.8	4.0 – 16.4
30	2.8 – 12.0	—

Note

1. Frictional resistance of NSK K1 is included in dynamic torque in table.
2. Grease is packed into ball screw, linear guide parts and support unit.
3. Consult NSK for life estimates under large moment loads.

Basic load rating

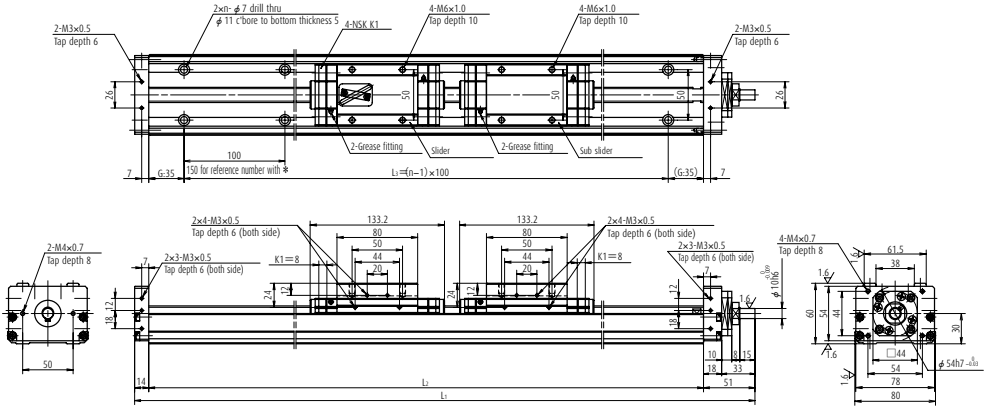
Lead	Shaft dia	Basic dynamic load rating (N)				Basic static load rating (N)		Support unit load limit (N)
ℓ (mm)	d (mm)	Ball screw C_a	Linear guides C	Support unit C_a	Rated running distance L_a (km)	Ball screw C_{0a}	Linear guides C_0	
5	ϕ15	8 300	30 800	7 100	5	12 700	22 800	3 040
10	ϕ15	8 140	24 400	7 100	10	12 800	22 800	3 040
20	ϕ15	5 080	19 400	7 100	20	7 460	22 800	3 040
30	ϕ15	5 500	16 930	7 100	30	8 580	22 800	3 040

Basic static moment load of linear guide

Slider	Basic static moment load (N · m)		
	Rolling M_{R0}	Pitching M_{P0}	Yawing M_{Y0}
Single	770	300	300

MCM08 (Double slider)

Accuracy grade: High grade (H)



Dimension of MCM08 (Double slider)

Reference No.	Nominal stroke (mm)	Stroke limit (mm) (without K1)	Ball screw lead (mm)	Body length (mm)			No. of mounting hole	Inertia × 10^{-4} (kg · m^2)	Mass (kg)
				L_1	L_2	L_3	n		
*MCM08008H10D00	80	103 (135)	10	435	370	300	3	0.169	6.5
MCM08018H10D00	180	203 (235)	10	535	470	400	5	0.199	7.5
MCM08018H20D00	180	203 (235)	20	535	470	400	5	0.351	7.5
MCM08028H10D00	280	303 (335)	10	635	570	500	6	0.228	8.4
MCM08028H20D00	280	303 (335)	20	635	570	500	6	0.380	8.4
MCM08038H10D00	380	403 (435)	10	735	670	600	7	0.257	9.4
MCM08038H20D00	380	403 (435)	20	735	670	600	7	0.409	9.4

Note 1. Bolt hole pitch L3 on item marked with * is 150 mm. 2. The nominal number in the above table is for high-grade grease specifications. In the case of other specifications, see the following table for the 13th and 14th digits.

Coding for columns 13 and 14

Grease	Lead	High-grade, precision-grade
Standard	10, 20	00
LG2	10, 20	B0

Monocarrier dynamic torque specification (N · cm)		
Ball screw lead(mm)	Accuracy grade	
	High grade	Precision
10	2.5 – 10.8	3.9 – 16.2
20	4.0 – 17.2	5.4 – 22.6

Note

1. Frictional resistance of NSK K1 is included in dynamic torque in table.
2. Grease is packed into ball screw, linear guide parts and support unit.
3. Consult NSK for life estimates under large moment loads.

Basic load rating

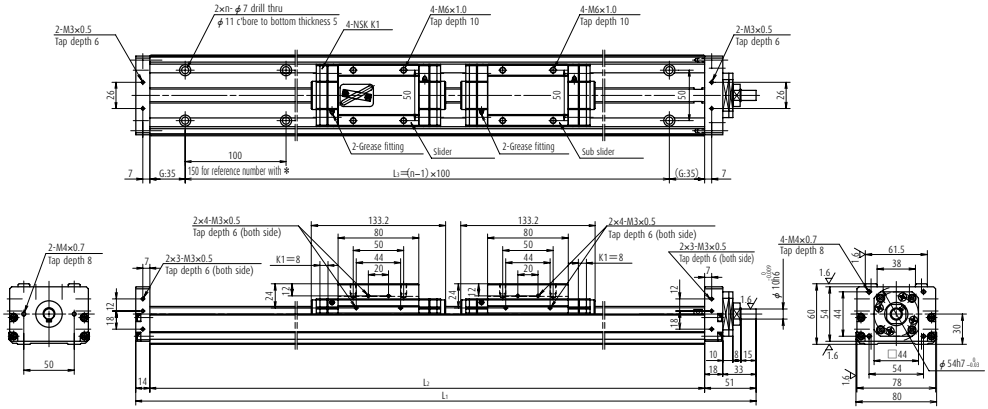
Lead	Shaft dia	Basic dynamic load rating (N)				Basic static load rating (N)		Support unit load limit (N)
ℓ (mm)	d (mm)	Ball screw C_a	Linear guides C	Support unit C_a	Rated running distance L_a (km)	Ball screw C_{0a}	Linear guides C_0	
10	φ15	8 140	24 400	7 100	10	12 800	22 800	3 040
20	φ15	5 080	19 400	7 100	20	7 460	22 800	3 040

Basic static moment load of linear guide

Slider	Basic static moment load (N · m)		
	Rolling M_{RO}	Pitching M_{PO}	Yawing M_{YO}
Double	1 540	2 050	2 050

MCM08 (Double slider)

Accuracy grade: High grade (H)



Dimension of MCM08 (Double slider)

Reference No.	Nominal stroke (mm)	Stroke limit (mm) (without K1)	Ball screw lead (mm)	Body length (mm)			No. of mounting hole	Inertia × 10^{-4} (kg · m^2)	Mass (kg)
				L_1	L_2	L_3	n		
MCM08048H10D00	480	503 (535)	10	835	770	700	8	0.287	10.3
MCM08048H20D00	480	503 (535)	20	835	770	700	8	0.439	10.3
MCM08058H10D00	580	603 (635)	10	935	870	800	9	0.316	11.5
MCM08058H20D00	580	603 (635)	20	935	870	800	9	0.468	11.5
MCM08068H10D00	680	703 (735)	10	1 035	970	900	10	0.346	12.2
MCM08068H20D00	680	703 (735)	20	1 035	970	900	10	0.498	12.2

Note The nominal number in the above table is for high-grade grease specifications. In the case of other specifications, see the following table for the 13th and 14th digits.

Coding for columns 13 and 14

Grease	Lead	High-grade, precision-grade
Standard	10, 20	00
LG2	10, 20	B0

Monocarrier dynamic torque specification (N · cm)		
Ball screw lead(mm)	Accuracy grade	
	High grade	Precision
10	2.5 – 10.8	3.9 – 16.2
20	4.0 – 17.2	5.4 – 22.6

Note

1. Frictional resistance of NSK K1 is included in dynamic torque in table.
2. Grease is packed into ball screw, linear guide parts and support unit.
3. Consult NSK for life estimates under large moment loads.

Basic load rating

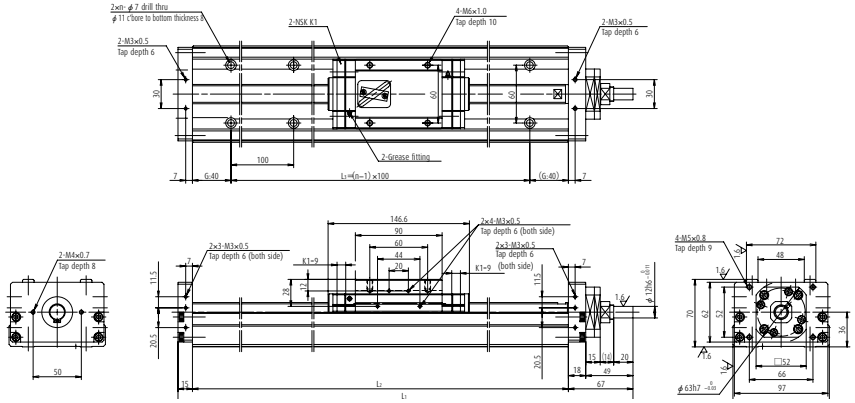
Lead	Shaft dia	Basic dynamic load rating (N)				Basic static load rating (N)		Support unit load limit (N)
ℓ (mm)	d (mm)	Ball screw C_a	Linear guides C	Support unit C_a	Rated running distance L_a (km)	Ball screw C_{0a}	Linear guides C_0	
10	φ15	8 140	24 400	7 100	10	12 800	22 800	3 040
20	φ15	5 080	19 400	7 100	20	7 460	22 800	3 040

Basic static moment load of linear guide

Slider	Basic static moment load (N · m)		
	Rolling M_{R0}	Pitching M_{P0}	Yawing M_{Y0}
Double	1 540	2 050	2 050

MCM10 Ball screw lead 10 and 20

Accuracy grade: High grade (H)



Dimension of MCM10 (Single slider)

Reference No.	Nominal stroke (mm)	Stroke limit (mm) (without K1)	Ball screw lead (mm)	Body length (mm)			No. of mounting hole	Inertia × 10^{-4} (kg · m^2)	Mass (kg)
				L_1	L_2	L_3	n		
MCM10010H10K00	100	133 (151)	10	362	280	200	2*	0.332	7.8
MCM10010H20K00	100	133 (151)	20	362	280	200	2*	0.446	7.8
◇MCM10015H10K00	150	183 (201)	10	412	330	300	4	0.378	8.7
◇MCM10015H20K00	150	183 (201)	20	412	330	300	4	0.492	8.7
MCM10020H10K00	200	233 (251)	10	462	380	300	4	0.425	9.5
MCM10020H20K00	200	233 (251)	20	462	380	300	4	0.539	9.5
◇MCM10025H10K00	250	283 (301)	10	512	430	400	5	0.472	10.4
◇MCM10025H20K00	250	283 (301)	20	512	430	400	5	0.586	10.4
MCM10030H10K00	300	333 (351)	10	562	480	400	5	0.519	11.2
MCM10030H20K00	300	333 (351)	20	562	480	400	5	0.633	11.2
MCM10040H10K00	400	433 (451)	10	662	580	500	6	0.612	13.0
MCM10040H20K00	400	433 (451)	20	662	580	500	6	0.726	13.0
MCM10050H10K00	500	533 (551)	10	762	680	600	7	0.706	14.6
MCM10050H20K00	500	533 (551)	20	762	680	600	7	0.820	14.6
MCM10050H30K00	500	533 (551)	30	762	680	600	7	1.010	14.6

Notes 1) Dimension G is 15 for items marked with ◇.
2) *: Use mounting holes on each end of the rail.

Monocarrier dynamic torque specification (N · cm)		
Ball screw lead(mm)	Accuracy grade	
	High grade	Precision
10	2.7 – 10.8	4.7 – 19.7
20	3.1 – 12.7	5.2 – 21.6
30	5.1 – 18.0	—

Notes
1. Frictional resistance of NSK K1 is included in dynamic torque in table.
2. Grease is packed into ball screw, linear guide parts and support unit.
3. Consult NSK for life estimates under large moment loads.

Basic load rating

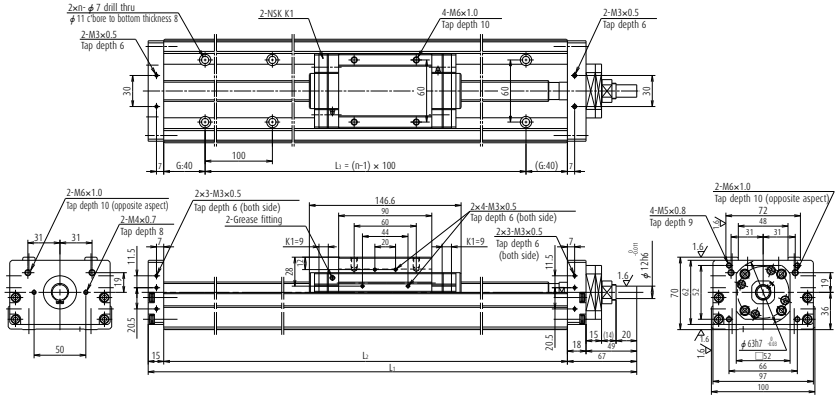
Lead	Shaft dia	Basic dynamic load rating (N)				Basic static load rating (N)		Support unit load limit (N)
ℓ (mm)	d (mm)	Ball screw C_a	Linear guides C	Support unit C_a	Rated running distance L_a (km)	Ball screw C_{0a}	Linear guides C_0	
10	ϕ 20	12 800	33 500	7 600	10	21 400	29 400	3 380
20	ϕ 20	8 190	26 600	7 600	20	12 600	29 400	3 380
30	ϕ 20	13 200	23 200	7 600	30	22 900	29 400	3 380

Basic static moment load of linear guide

Slider	Basic static moment load (N · m)		
	Rolling M_{R0}	Pitching M_{P0}	Yawing M_{Y0}
Single	1 170	425	425

MCM10 Ball screw lead 30

Accuracy grade: High grade (H)



Dimension of MCM10 (Single slider)

Reference No.	Nominal stroke (mm)	Stroke limit (mm) (without K1)	Ball screw lead (mm)	Body length (mm)			No. of mounting hole	Inertia × 10^{-4} (kg · m^2)	Mass (kg)
				L_1	L_2	L_3	n		
MCM10060H10K00	600	633 (651)	10	862	780	700	8	0.800	16.3
MCM10060H20K00	600	633 (651)	20	862	780	700	8	0.914	16.3
MCM10060H30K00	600	633 (651)	30	862	780	700	8	1.104	16.3
MCM10070H10K00	700	733 (751)	10	962	880	800	9	0.893	18.0
MCM10070H20K00	700	733 (751)	20	962	880	800	9	1.007	18.0
MCM10070H30K00	700	733 (751)	30	962	880	800	9	1.197	18.0
MCM10080H10K00	800	833 (851)	10	1 062	980	900	10	0.987	19.7
MCM10080H20K00	800	833 (851)	20	1 062	980	900	10	1.101	19.7
MCM10080H30K00	800	833 (851)	30	1 062	980	900	10	1.291	19.7
MCM10090H10K00	900	933 (951)	10	1 162	1 080	1 000	11	1.081	21.4
MCM10090H20K00	900	933 (951)	20	1 162	1 080	1 000	11	1.195	21.4
◇MCM10100H10K00	1 000	1 033 (1 051)	10	1 262	1 180	1 000	11	1.174	23.1
◇MCM10100H20K00	1 000	1 033 (1 051)	20	1 262	1 180	1 000	11	1.288	23.1

Note Dimension G is 90 for items marked with ◇.

Monocarrier dynamic torque specification (N · cm)		
Ball screw lead(mm)	Accuracy grade	
	High grade	Precision
10	2.7 – 10.8	4.7 – 19.7
20	3.1 – 12.7	5.2 – 21.6
30	5.1 – 18.0	—

Notes

1. Frictional resistance of NSK K1 is included in dynamic torque in table.
2. Grease is packed into ball screw, linear guide parts and support unit.
3. Consult NSK for life estimates under large moment loads.

Basic load rating

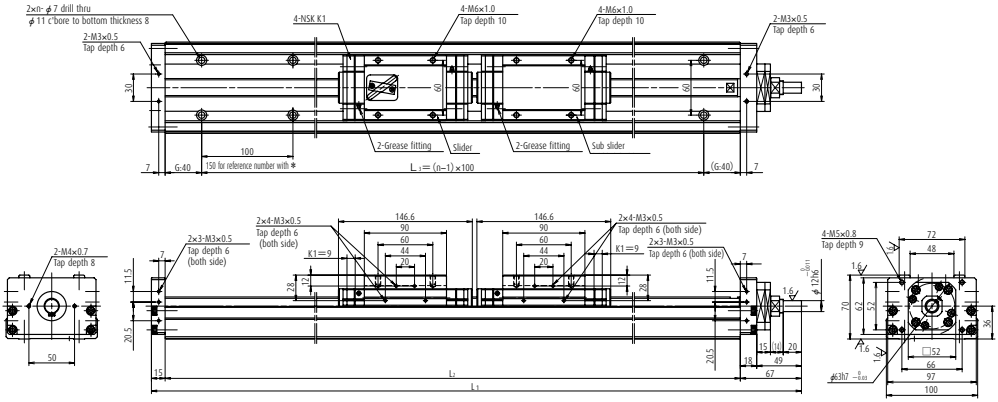
Lead	Shaft dia	Basic dynamic load rating (N)				Basic static load rating (N)		
ℓ (mm)	d (mm)	Ball screw C_a	Linear guides C	Support unit C_a	Rated running distance L_a (km)	Ball screw C_{0a}	Linear guides C_0	Support unit load limit (N)
10	ϕ 20	12 800	33 500	7 600	10	21 400	29 400	3 380
20	ϕ 20	8 190	26 600	7 600	20	12 600	29 400	3 380
30	ϕ 20	13 200	23 200	7 600	30	22 900	29 400	3 380

Basic static moment load of linear guide

Slider	Basic static moment load (N · m)		
	Rolling M_{R0}	Pitching M_{P0}	Yawing M_{Y0}
Single	1 170	425	425

MCM10 (Double slider)

Accuracy grade: High grade (H)



Dimension of MCM10 (Single slider)

Reference No.	Nominal stroke (mm)	Stroke limit (mm) (without K1)	Ball screw lead (mm)	Body length (mm)			No. of mounting hole	Inertia × 10^{-4} (kg · m^2)	Mass (kg)
				L_1	L_2	L_3	n		
*MCM10007H10D00	70	86 (122)	10	462	380	300	3	0.463	11.0
MCM10017H10D00	170	186 (222)	10	562	480	400	5	0.557	12.7
MCM10017H20D00	170	186 (222)	20	562	480	400	5	0.785	12.7
MCM10027H10D00	270	286 (322)	10	662	580	500	6	0.650	13.4
MCM10027H20D00	270	286 (322)	20	662	580	500	6	0.878	13.4
MCM10037H10D00	370	386 (422)	10	762	680	600	7	0.744	15.1
MCM10037H20D00	370	386 (422)	20	762	680	600	7	0.972	15.1
MCM10047H10D00	470	486 (522)	10	862	780	700	8	0.838	17.8
MCM10047H20D00	470	486 (522)	20	862	780	700	8	1.066	17.8

Note Bolt hole pitch L3 on item marked with * is 150 mm.

Monocarrier dynamic torque specification (N · cm)		
Ball screw lead(mm)	Accuracy grade	
	High grade	Precision
10	4.2 – 15.6	6.1 – 24.5
20	5.0 – 19.6	7.0 – 28.5

Notes

1. Frictional resistance of NSK K1 is included in dynamic torque in table.
2. Grease is packed into ball screw, linear guide parts and support unit.
3. Consult NSK for life estimates under large moment loads.

Basic load rating

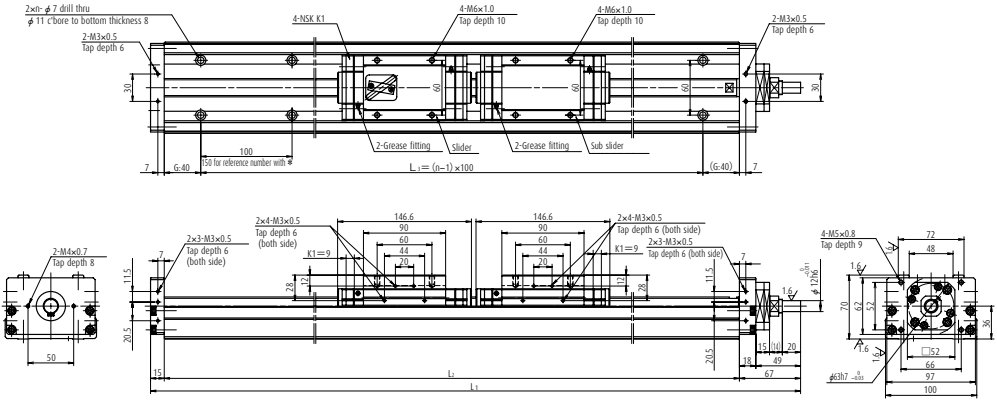
Lead	Shaft dia	Basic dynamic load rating (N)				Basic static load rating (N)		
ℓ (mm)	d (mm)	Ball screw C_a	Linear guides C	Support unit C_a	Rated running distance L_a (km)	Ball screw C_{0a}	Linear guides C_0	Support unit load limit (N)
10	ϕ 20	12 800	33 500	7 600	10	21 400	29 400	3 380
20	ϕ 20	8 190	26 600	7 600	20	12 600	29 400	3 380

Basic static moment load of linear guide

Slider	Basic static moment load (N · m)		
	Rolling M_{RO}	Pitching M_{PO}	Yawing M_{YO}
Double	2 340	2 940	2 940

MCM10 (Double slider)

Accuracy grade: High grade (H)



Dimension of MCM10 (Single slider)

Reference No.	Nominal stroke (mm)	Stroke limit (mm) (without K1)	Ball screw lead (mm)	Body length (mm)			No. of mounting hole	Inertia × 10^{-4} (kg · m^2)	Mass (kg)
				L_1	L_2	L_3	n		
MCM10057H10D00	570	586 (622)	10	962	880	800	9	0.931	19.5
MCM10057H20D00	570	586 (622)	20	962	880	800	9	1.159	19.5
MCM10067H10D00	670	686 (722)	10	1 062	980	900	10	1.025	21.2
MCM10067H20D00	670	686 (722)	20	1 062	980	900	10	1.253	21.2
◇MCM10087H10D00	870	886 (922)	10	1 262	1 180	1 000	11	1.212	23.6
◇MCM10087H20D00	870	886 (922)	20	1 262	1 180	1 000	11	1.440	23.6

Note Dimension G is 90 for items marked with ◇.

Monocarrier dynamic torque specification (N · cm)		
Ball screw lead(mm)	Accuracy grade	
	High grade	Precision
10	4.2 – 15.6	6.1 – 24.5
20	5.0 – 19.6	7.0 – 28.5

Notes

1. Frictional resistance of NSK K1 is included in dynamic torque in table.
2. Grease is packed into ball screw, linear guide parts and support unit.
3. Consult NSK for life estimates under large moment loads.

Basic load rating

Lead	Shaft dia	Basic dynamic load rating (N)				Basic static load rating (N)		Support unit load limit (N)
ℓ (mm)	d (mm)	Ball screw C_a	Linear guides C	Support unit C_a	Rated running distance L_a (km)	Ball screw C_{0a}	Linear guides C_0	
10	ϕ 20	12 800	33 500	7 600	10	21 400	29 400	3 380
20	ϕ 20	8 190	26 600	7 600	20	12 600	29 400	3 380

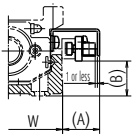
Basic static moment load of linear guide

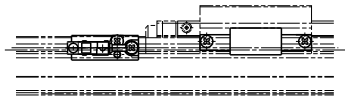
Slider	Basic static moment load (N · m)		
	Rolling M_{RO}	Pitching M_{PO}	Yawing M_{YO}
Double	2 340	2 940	2 940

3. MCM Series Accessories

(1) Sensor Unit

› Proximity switch



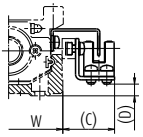


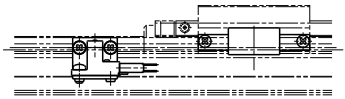
(Example of assembly)

Model No.		Reference No.			A (mm)	B (mm)	Body width W (mm)
MCM02		MC-SR02-00	MC-SR02-01	MC-SR02-02	17	2	28
MCM03		MC-SR03-10	MC-SR03-11	MC-SR03-12	17	3	34
MCM05		MC-SR05-10	MC-SR05-11	MC-SR05-12	17	15	48.6
MCM06		MC-SR06-10	MC-SR06-11	MC-SR06-12	17	19	58
MCM08		MC-SR08-10	MC-SR08-11	MC-SR08-12	16	27	80
MCM10		MC-SR10-10	MC-SR10-11	MC-SR10-12	16	35	100
Quantity	Proximity switch (normally open contact)	—	3	1	E2S-W13 (OMRON Corp.)		
Quantity	Proximity switch (normally close contact)	3	—	2	E2S-W14 (OMRON Corp.)		

Notes 1. A sensor unit consists of sensors, a sensor dog and sensor mounting parts.
2. Sensor unit for MCM02 contains two sensor dogs.
3. A spacer plate is required when using a cover unit or sensor unit for MCM03 with the lead of 1 or 2 mm. (Refer to page 392)

› Photo sensor





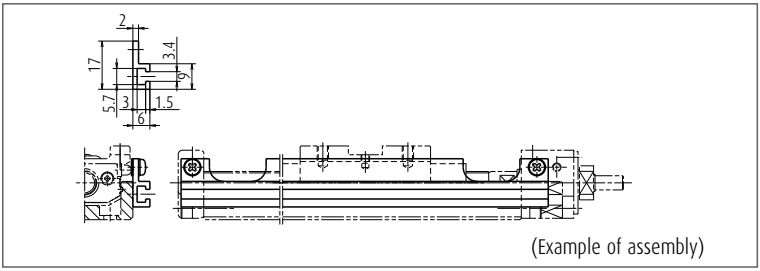
(Example of assembly)

Model No.	Reference No.	C (mm)	D (mm)	Body width W (mm)	Remarks
MCM03	MC-SR03-13	24	0.5	34	EE-SX674 (OMRON Corp.) 3 sets (EE-1001 connector attachment)
MCM05	MC-SR05-13	24	5	48.6	
MCM06	MC-SR06-13	24	9	58	
MCM08	MC-SR08-13	23	17	80	
MCM10	MC-SR10-13	22	24	100	

Notes 1. A sensor unit consists of sensors, a sensor dog and sensor mounting parts.
2. A spacer plate is required when using a cover unit or sensor unit for MCM03 with the lead of 1 or 2 mm. (Refer to page 392)

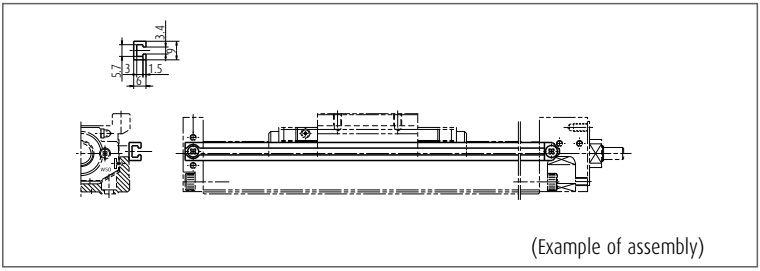
1) Sensor Rail

Sensor rail for MCM03: MC-SRL3- * * * *



(Example of assembly)

Sensor rail for MCM03: MC-SRL3- * * * *



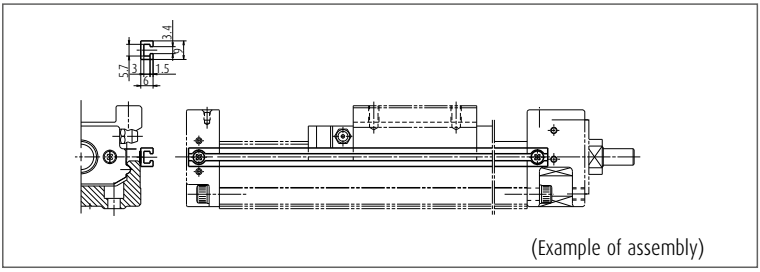
(Example of assembly)

Sensor rail for MCM02: MC-SRL2- * * * *

Sensor rail for MCM06: MC-SRL6- * * * *

Sensor rail for MCM08: MC-SRL8- * * * *

Sensor rail for MCM10: MC-SRL1- * * * *



(Example of assembly)

Notes: 1. * * * * is the same as rail dimension L_2.
2. Please assemble the attached seat between the sensor rail and the support unit for MCM03, MCM05, MCM06 and MCM08.
3. For combinations of sensors and rails, see pages 390 to 391.

4. MCM Series and Sensor Rail Combination Table

Table 4

Model No.	Body length L_2 mm	Reference No.	Sensor rail reference No.
MCM02	100	MCM02005H01K	MC-SRL2-0100※
MCM02	100	MCM02005P01K	MC-SRL2-0100※
MCM02	100	MCM02005H02K	MC-SRL2-0100※
MCM02	100	MCM02005P02K	MC-SRL2-0100※
MCM02	150	MCM02010H01K	MC-SRL2-0150
MCM02	150	MCM02010P01K	MC-SRL2-0150
MCM02	150	MCM02010H02K	MC-SRL2-0150
MCM02	150	MCM02010P02K	MC-SRL2-0150
MCM02	200	MCM02015H01K	MC-SRL2-0200
MCM02	200	MCM02015P01K	MC-SRL2-0200
MCM02	200	MCM02015H02K	MC-SRL2-0200
MCM02	200	MCM02015P02K	MC-SRL2-0200
MCM03	115	MCM03005P01K00	MC-SRL3-0115
MCM03	115	MCM03005P02K00	MC-SRL3-0115
MCM03	140	MCM03005H05K00	MC-SRL3-0140
MCM03	140	MCM03005H10K00	MC-SRL3-0140
MCM03	140	MCM03005H12K00	MC-SRL3-0140
MCM03	140	MCM03005H15K00	MC-SRL3-0140
MCM03	190	MCM03010P01K00	MC-SRL3-0190
MCM03	190	MCM03010P02K00	MC-SRL3-0190
MCM03	190	MCM03010H05K00	MC-SRL3-0190
MCM03	190	MCM03010H10K00	MC-SRL3-0190
MCM03	190	MCM03010H12K00	MC-SRL3-0190
MCM03	190	MCM03010H15K00	MC-SRL3-0190
MCM03	240	MCM03015P01K00	MC-SRL3-0240
MCM03	240	MCM03015P02K00	MC-SRL3-0240
MCM03	240	MCM03015H05K00	MC-SRL3-0240
MCM03	240	MCM03015H10K00	MC-SRL3-0240
MCM03	240	MCM03015H12K00	MC-SRL3-0240
MCM03	240	MCM03015H15K00	MC-SRL3-0240
MCM03	290	MCM03020H05K00	MC-SRL3-0290
MCM03	290	MCM03020H10K00	MC-SRL3-0290
MCM03	290	MCM03020H12K00	MC-SRL3-0290
MCM03	290	MCM03020H15K00	MC-SRL3-0290
MCM03	340	MCM03025H05K00	MC-SRL3-0340
MCM03	340	MCM03025H10K00	MC-SRL3-0340
MCM03	340	MCM03025H12K00	MC-SRL3-0340
MCM03	340	MCM03025H15K00	MC-SRL3-0340
MCM05	180	MCM05005H05K00	MC-SRL5-0180
MCM05	180	MCM05005H10K00	MC-SRL5-0180
MCM05	180	MCM05005H20K00	MC-SRL5-0180
MCM05	230	MCM05010H05K00	MC-SRL5-0230
MCM05	230	MCM05010H10K00	MC-SRL5-0230
MCM05	230	MCM05010H20K00	MC-SRL5-0230
MCM05	280	MCM05015H05K00	MC-SRL5-0280
MCM05	280	MCM05015H10K00	MC-SRL5-0280
MCM05	280	MCM05015H20K00	MC-SRL5-0280
MCM05	280	MCM05006H10D00	MC-SRL5-0280
MCM05	330	MCM05020H05K00	MC-SRL5-0330
MCM05	330	MCM05020H10K00	MC-SRL5-0330
MCM05	330	MCM05020H20K00	MC-SRL5-0330
MCM05	330	MCM05011H10D00	MC-SRL5-0330
MCM05	380	MCM05025H05K00	MC-SRL5-0380
MCM05	380	MCM05025H10K00	MC-SRL5-0380
MCM05	380	MCM05025H20K00	MC-SRL5-0380
MCM05	380	MCM05016H10D00	MC-SRL5-0380
MCM05	430	MCM05030H05K00	MC-SRL5-0430
MCM05	430	MCM05030H10K00	MC-SRL5-0430
MCM05	430	MCM05030H20K00	MC-SRL5-0430
MCM05	430	MCM05030H30K00	MC-SRL5-0430
MCM05	430	MCM05021H10D00	MC-SRL5-0430
MCM05	430	MCM05021H20D00	MC-SRL5-0430
MCM05	530	MCM05040H05K00	MC-SRL5-0530
MCM05	530	MCM05040H10K00	MC-SRL5-0530
MCM05	530	MCM05040H20K00	MC-SRL5-0530
MCM05	530	MCM05040H30K00	MC-SRL5-0530
MCM05	530	MCM05031H10D00	MC-SRL5-0530
MCM05	530	MCM05031H20D00	MC-SRL5-0530
MCM05	630	MCM05050H05K00	MC-SRL5-0630
MCM05	630	MCM05050H10K00	MC-SRL5-0630
MCM05	630	MCM05050H20K00	MC-SRL5-0630
MCM05	630	MCM05050H30K00	MC-SRL5-0630
MCM05	630	MCM05041H10D00	MC-SRL5-0630
MCM05	630	MCM05041H20D00	MC-SRL5-0630
MCM05	730	MCM05060H05K00	MC-SRL5-0730
MCM05	730	MCM05060H10K00	MC-SRL5-0730
MCM05	730	MCM05060H20K00	MC-SRL5-0730
MCM05	730	MCM05060H30K00	MC-SRL5-0730
MCM05	730	MCM05051H10D00	MC-SRL5-0730
MCM05	730	MCM05051H20D00	MC-SRL5-0730
MCM06	190	MCM06005H05K02	MC-SRL6-0190
MCM06	190	MCM06005H10K00	MC-SRL6-0190
MCM06	190	MCM06005H20K00	MC-SRL6-0190
MCM06	240	MCM06010H05K02	MC-SRL6-0240
MCM06	240	MCM06010H10K00	MC-SRL6-0240
MCM06	240	MCM06010H20K00	MC-SRL6-0240
MCM06	290	MCM06015H05K02	MC-SRL6-0290
MCM06	290	MCM06015H10K00	MC-SRL6-0290
MCM06	290	MCM06015H20K00	MC-SRL6-0290
MCM06	340	MCM06020H05K02	MC-SRL6-0340
MCM06	340	MCM06020H10K00	MC-SRL6-0340
MCM06	340	MCM06020H20K00	MC-SRL6-0340
MCM06	340	MCM06011H05D02	MC-SRL6-0340
MCM06	340	MCM06011H10D00	MC-SRL6-0340
MCM06	390	MCM06025H05K02	MC-SRL6-0390
MCM06	390	MCM06025H10K00	MC-SRL6-0390
MCM06	390	MCM06025H20K00	MC-SRL6-0390
MCM06	440	MCM06030H05K02	MC-SRL6-0440
MCM06	440	MCM06030H10K00	MC-SRL6-0440
MCM06	440	MCM06030H20K00	MC-SRL6-0440
MCM06	440	MCM06021H05D02	MC-SRL6-0440
MCM06	440	MCM06021H10D00	MC-SRL6-0440
MCM06	440	MCM06021H20D00	MC-SRL6-0440
MCM06	540	MCM06040H05K02	MC-SRL6-0540
MCM06	540	MCM06040H10K00	MC-SRL6-0540
MCM06	540	MCM06040H20K00	MC-SRL6-0540
MCM06	540	MCM06031H05D02	MC-SRL6-0540
MCM06	540	MCM06031H10D00	MC-SRL6-0540
MCM06	540	MCM06031H20D00	MC-SRL6-0540
MCM06	640	MCM06050H05K02	MC-SRL6-0640
MCM06	640	MCM06050H10K00	MC-SRL6-0640
MCM06	640	MCM06050H20K00	MC-SRL6-0640
MCM06	640	MCM06041H05D02	MC-SRL6-0640
MCM06	640	MCM06041H10D00	MC-SRL6-0640
MCM06	640	MCM06041H20D00	MC-SRL6-0640
MCM06	740	MCM06060H05K02	MC-SRL6-0740
MCM06	740	MCM06060H10K00	MC-SRL6-0740
MCM06	740	MCM06060H20K00	MC-SRL6-0740
MCM06	740	MCM06051H10D00	MC-SRL6-0740
MCM06	740	MCM06051H20D00	MC-SRL6-0740
MCM06	840	MCM06070H05K02	MC-SRL6-0840
MCM06	840	MCM06070H10K00	MC-SRL6-0840
MCM06	840	MCM06070H20K00	MC-SRL6-0840
MCM06	840	MCM06061H10D00	MC-SRL6-0840
MCM06	840	MCM06061H20D00	MC-SRL6-0840
MCM06	940	MCM06080H05K02	MC-SRL6-0940
MCM06	940	MCM06080H10K00	MC-SRL6-0940
MCM06	940	MCM06080H20K00	MC-SRL6-0940
MCM06	940	MCM06071H10D00	MC-SRL6-0940
MCM06	940	MCM06071H20D00	MC-SRL6-0940

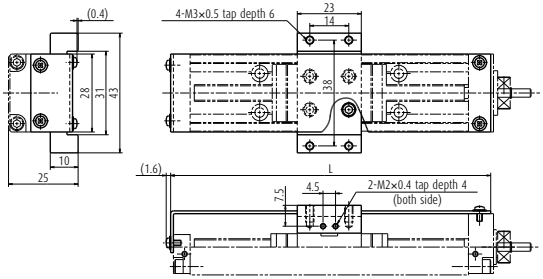
※) When using NSK standard sensors, prepare two sensor rails. Two sensor rails will also be required for another Monocarriers depending on signal points of sensors. Contact NSK for details.

Model No.	Body length L_2 mm	Reference No.	Sensor rail reference No.
MCM08	220	MCM08005H05K02	MC-SRL8-0220
MCM08	220	MCM08005H10K00	MC-SRL8-0220
MCM08	270	MCM08010H05K02	MC-SRL8-0270
MCM08	270	MCM08010H10K00	MC-SRL8-0270
MCM08	270	MCM08010H20K00	MC-SRL8-0270
MCM08	320	MCM08015H05K02	MC-SRL8-0320
MCM08	320	MCM08015H10K00	MC-SRL8-0320
MCM08	320	MCM08015H20K00	MC-SRL8-0320
MCM08	370	MCM08020H05K02	MC-SRL8-0370
MCM08	370	MCM08020H10K00	MC-SRL8-0370
MCM08	370	MCM08020H20K00	MC-SRL8-0370
MCM08	370	MCM08008H10D00	MC-SRL8-0370
MCM08	420	MCM08025H05K02	MC-SRL8-0420
MCM08	420	MCM08025H10K00	MC-SRL8-0420
MCM08	420	MCM08025H20K00	MC-SRL8-0420
MCM08	470	MCM08030H05K02	MC-SRL8-0470
MCM08	470	MCM08030H10K00	MC-SRL8-0470
MCM08	470	MCM08030H20K00	MC-SRL8-0470
MCM08	470	MCM08018H10D00	MC-SRL8-0470
MCM08	470	MCM08018H20D00	MC-SRL8-0470
MCM08	570	MCM08040H05K02	MC-SRL8-0570
MCM08	570	MCM08040H10K00	MC-SRL8-0570
MCM08	570	MCM08040H20K00	MC-SRL8-0570
MCM08	570	MCM08040H30K00	MC-SRL8-0570
MCM08	570	MCM08028H10D00	MC-SRL8-0570
MCM08	570	MCM08028H20D00	MC-SRL8-0570
MCM08	670	MCM08050H05K02	MC-SRL8-0670
MCM08	670	MCM08050H10K00	MC-SRL8-0670
MCM08	670	MCM08050H20K00	MC-SRL8-0670
MCM08	670	MCM08050H30K00	MC-SRL8-0670
MCM08	670	MCM08038H10D00	MC-SRL8-0670
MCM08	670	MCM08038H20D00	MC-SRL8-0670
MCM08	770	MCM08060H05K02	MC-SRL8-0770
MCM08	770	MCM08060H10K00	MC-SRL8-0770
MCM08	770	MCM08060H20K00	MC-SRL8-0770
MCM08	770	MCM08060H30K00	MC-SRL8-0770
MCM08	770	MCM08048H10D00	MC-SRL8-0770
MCM08	770	MCM08048H20D00	MC-SRL8-0770
MCM08	870	MCM08070H05K02	MC-SRL8-0870
MCM08	870	MCM08070H10K00	MC-SRL8-0870
MCM08	870	MCM08070H20K00	MC-SRL8-0870
MCM08	870	MCM08070H30K00	MC-SRL8-0870
MCM08	870	MCM08058H10D00	MC-SRL8-0870
MCM08	870	MCM08058H20D00	MC-SRL8-0870
MCM08	970	MCM08080H05K02	MC-SRL8-0970
MCM08	970	MCM08080H10K00	MC-SRL8-0970
MCM08	970	MCM08080H20K00	MC-SRL8-0970
MCM08	970	MCM08080H30K00	MC-SRL8-0970
MCM08	970	MCM08068H10D00	MC-SRL8-0970
MCM08	970	MCM08068H20D00	MC-SRL8-0970

Model No.	Body length L_2 mm	Reference No.	Sensor rail reference No.
MCM10	280	MCM10010H10K00	MC-SRL1-0280
MCM10	280	MCM10010H20K00	MC-SRL1-0280
MCM10	330	MCM10015H10K00	MC-SRL1-0330
MCM10	330	MCM10015H20K00	MC-SRL1-0330
MCM10	380	MCM10020H10K00	MC-SRL1-0380
MCM10	380	MCM10020H20K00	MC-SRL1-0380
MCM10	380	MCM10007H10K00	MC-SRL1-0380
MCM10	430	MCM10025H10K00	MC-SRL1-0430
MCM10	430	MCM10025H20K00	MC-SRL1-0430
MCM10	480	MCM10030H10K00	MC-SRL1-0480
MCM10	480	MCM10030H20K00	MC-SRL1-0480
MCM10	480	MCM10017H10K00	MC-SRL1-0480
MCM10	480	MCM10017H20K00	MC-SRL1-0480
MCM10	580	MCM10040H10K00	MC-SRL1-0580
MCM10	580	MCM10040H20K00	MC-SRL1-0580
MCM10	580	MCM10027H10K00	MC-SRL1-0580
MCM10	580	MCM10027H20K00	MC-SRL1-0580
MCM10	680	MCM10050H10K00	MC-SRL1-0680
MCM10	680	MCM10050H20K00	MC-SRL1-0680
MCM10	680	MCM10050H30K00	MC-SRL1-0680
MCM10	680	MCM10037H10K00	MC-SRL1-0680
MCM10	680	MCM10037H20K00	MC-SRL1-0680
MCM10	780	MCM10060H10K00	MC-SRL1-0780
MCM10	780	MCM10060H20K00	MC-SRL1-0780
MCM10	780	MCM10060H30K00	MC-SRL1-0780
MCM10	780	MCM10047H10K00	MC-SRL1-0780
MCM10	780	MCM10047H20K00	MC-SRL1-0780
MCM10	880	MCM10070H10K00	MC-SRL1-0880
MCM10	880	MCM10070H20K00	MC-SRL1-0880
MCM10	880	MCM10070H30K00	MC-SRL1-0880
MCM10	880	MCM10057H10K00	MC-SRL1-0880
MCM10	880	MCM10057H20K00	MC-SRL1-0880
MCM10	980	MCM10080H10K00	MC-SRL1-0980
MCM10	980	MCM10080H20K00	MC-SRL1-0980
MCM10	980	MCM10080H30K00	MC-SRL1-0980
MCM10	980	MCM10067H10K00	MC-SRL1-0980
MCM10	980	MCM10067H20K00	MC-SRL1-0980
MCM10	1 080	MCM10090H10K00	MC-SRL1-1080
MCM10	1 080	MCM10090H20K00	MC-SRL1-1080
MCM10	1 180	MCM10100H10K00	MC-SRL1-1180
MCM10	1 180	MCM10100H20K00	MC-SRL1-1180
MCM10	1 180	MCM10087H10K00	MC-SRL1-1180
MCM10	1 180	MCM10087H20K00	MC-SRL1-1180

5. Cover Unit

Cover Unit for MCM02



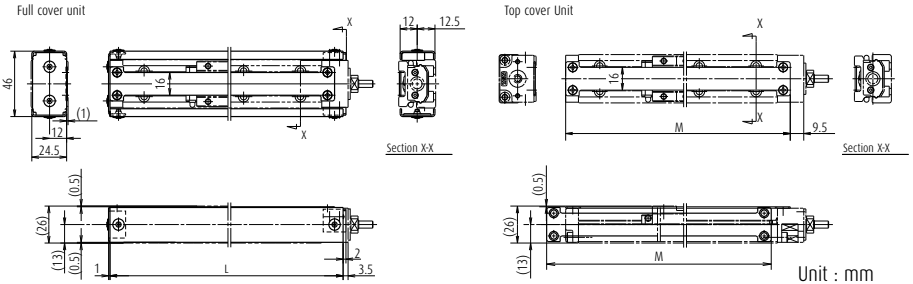
Unit : μm

Stroke	Reference No.	Length (L)
50	**MC-CV02005-00**	115
100	**MC-CV02010-00**	165
150	**MC-CV02015-00**	215

Height of screw head is not included.

Cover Unit for MCM03

Notes: 1. When the cover is used for leads 1 and 2, an optional spacer plate (nominal No.: MC-SP03-00) is required.
2. When the cover is used for lead 15, an optional spacer plate (nominal No.: MC-SP03-01) is required.
3. A full cover unit cannot be installed for lead 15.



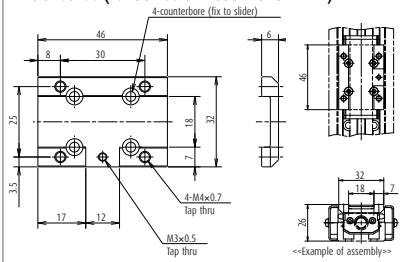
Unit : mm

Stroke	Reference No.		Cover length	
	Top cover unit	Full cover unit	Length (L)	Length (M)
50 (lead 1, 2)	MC-CV03005-02	*MC-CV03005-01	139	133
50 (lead 5, 10, 12, 15)	MC-CV03005-02A	*MC-CV03005-01A	164	158
100	MC-CV03010-02	*MC-CV03010-01	214	208
150	MC-CV03015-02	*MC-CV03015-01	264	258
200	MC-CV03020-02	*MC-CV03020-01	314	308
250	MC-CV03025-02	*MC-CV03025-01	364	358

*) The full-cover unit cannot be used when the sensor unit is used. Height of screw head is not included.

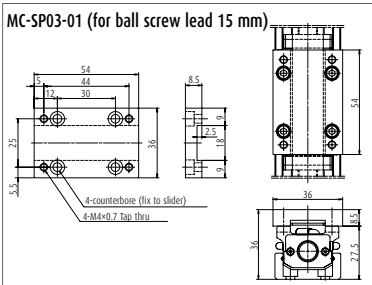
Spacer for MCM03 (Optional)

MC-SP03-00 (for ball screw lead 1 and 2 mm)



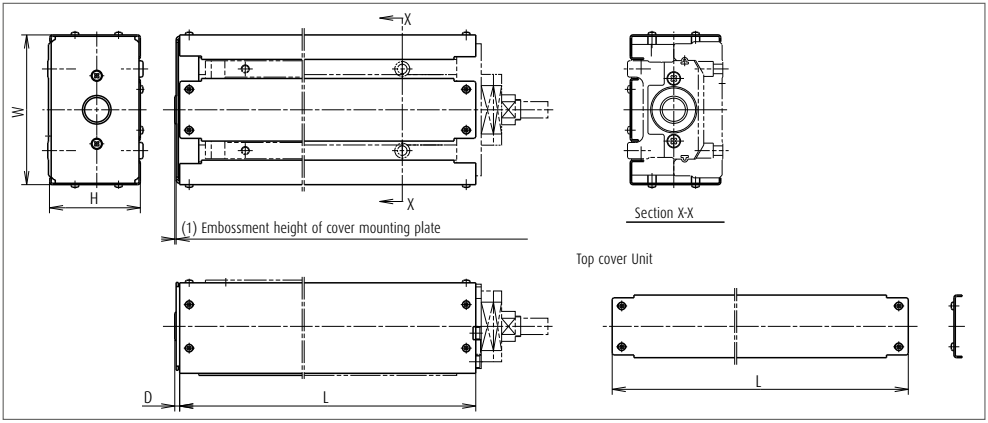
Note: Spacer is required when using sensor unit and cover unit.

MC-SP03-01 (for ball screw lead 15 mm)



Note: To use an upper surface cover, use it during assembly.

Cover unit for MCM05, 06, 08, and 10



Unit : μm

Model No.	Stroke		Cover unit reference No.		Cover length			
	Single Slider	Double Slider	Top cover Unit	Full cover Unit*1	Length (L)	Height (H)	Width (W)	End part (D)
MCM05	50	—	MC-CV05005-01	MC-CV05005-00	200	38.5	65	2.6
MCM05	100	—	MC-CV05010-01	MC-CV05010-00	250	38.5	65	2.6
MCM05	150	60	MC-CV05015-01	MC-CV05015-00	300	38.5	65	2.6
MCM05	200	110	MC-CV05020-01	MC-CV05020-00	350	38.5	65	2.6
MCM05	250	160	MC-CV05025-01	MC-CV05025-00	400	38.5	65	2.6
MCM05	300	210	MC-CV05030-01	MC-CV05030-00	450	38.5	65	2.6
MCM05	400	310	MC-CV05040-01	MC-CV05040-00	550	38.5	65	2.6
MCM05	500	410	MC-CV05050-01	MC-CV05050-00	650	38.5	65	2.6
MCM05	600	510	MC-CV05060-01	MC-CV05060-00	750	38.5	65	2.6
MCM06	50	—	MC-CV06005-01	MC-CV06005-00	225	48.5	75	—*2
MCM06	100	—	MC-CV06010-01	MC-CV06010-00	275	48.5	75	—*2
MCM06	150	—	MC-CV06015-01	MC-CV06015-00	325	48.5	75	—*2
MCM06	200	110	MC-CV06020-01	MC-CV06020-00	375	48.5	75	—*2
MCM06	250	—	MC-CV06025-01	MC-CV06025-00	425	48.5	75	—*2
MCM06	300	210	MC-CV06030-01	MC-CV06030-00	475	48.5	75	—*2
MCM06	400	310	MC-CV06040-01	MC-CV06040-00	575	48.5	75	—*2
MCM06	500	410	MC-CV06050-01	MC-CV06050-00	675	48.5	75	—*2
MCM06	600	510	MC-CV06060-01	MC-CV06060-00	775	48.5	75	—*2
MCM06	700	610	MC-CV06070-01	MC-CV06070-00	875	48.5	75	—*2
MCM06	800	710	MC-CV06080-01	MC-CV06080-00	975	48.5	75	—*2
MCM08	50	—	MC-CV08005-01	MC-CV08005-00	248	56.5	90	2.6
MCM08	100	—	MC-CV08010-01	MC-CV08010-00	298	56.5	90	2.6
MCM08	150	—	MC-CV08015-01	MC-CV08015-00	348	56.5	90	2.6
MCM08	200	80	MC-CV08020-01	MC-CV08020-00	398	56.5	90	2.6
MCM08	250	—	MC-CV08025-01	MC-CV08025-00	448	56.5	90	2.6
MCM08	300	180	MC-CV08030-01	MC-CV08030-00	498	56.5	90	2.6
MCM08	400	280	MC-CV08040-01	MC-CV08040-00	598	56.5	90	2.6
MCM08	500	380	MC-CV08050-01	MC-CV08050-00	698	56.5	90	2.6
MCM08	600	480	MC-CV08060-01	MC-CV08060-00	798	56.5	90	2.6
MCM08	700	580	MC-CV08070-01	MC-CV08070-00	898	56.5	90	2.6
MCM08	800	680	MC-CV08080-01	MC-CV08080-00	998	56.5	90	2.6
MCM10	100	—	MC-CV10010-01	MC-CV10010-00	308	66.5	110	3.6
MCM10	150	—	MC-CV10015-01	MC-CV10015-00	358	66.5	110	3.6
MCM10	200	70	MC-CV10020-01	MC-CV10020-00	408	66.5	110	3.6
MCM10	250	—	MC-CV10025-01	MC-CV10025-00	458	66.5	110	3.6
MCM10	300	170	MC-CV10030-01	MC-CV10030-00	508	66.5	110	3.6
MCM10	400	270	MC-CV10040-01	MC-CV10040-00	608	66.5	110	3.6
MCM10	500	370	MC-CV10050-01	MC-CV10050-00	708	66.5	110	3.6
MCM10	600	470	MC-CV10060-01	MC-CV10060-00	808	66.5	110	3.6
MCM10	700	570	MC-CV10070-01	MC-CV10070-00	908	66.5	110	3.6
MCM10	800	670	MC-CV10080-01	MC-CV10080-00	1008	66.5	110	3.6
MCM10	900	—	MC-CV10090-01	MC-CV10090-00	1108	66.5	110	3.6
MCM10	1000	870	MC-CV10100-01	MC-CV10100-00	1208	66.5	110	3.6

Note: The dimensions of cover shown above do not include the head height of fixing machine screws. Add the head of machine screws of approximately 2.5 mm to the outer measurement of a cover unit. Set a margin for mechanical interference with surrounding components.

*1) When using sensor unit, full-cover unit cannot be used.

*2) A cover mounting plate is not used to MCM06.

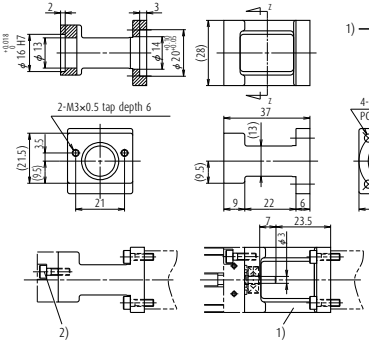
6. Motor Bracket

Motor models are subject to change at the motor manufacturers. For details, please contact the manufacturer.

Motor bracket for MCM02

› Reference number

MC-BK02-128-00

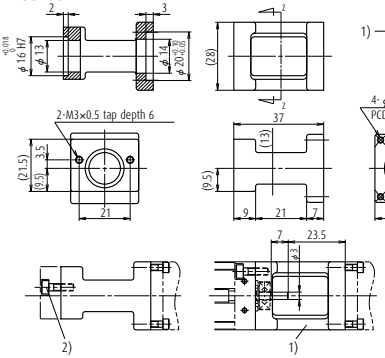


Note: Be sure to align centerlines when installing motor.

Compatible motor	
Maker	**Motor models**
YASKAWA Electric Corp.	SGMM-A1 (10W)
(Σ- mini Series)	SGMM-A2 (20W)

› Reference number

MC-BK02-133-00

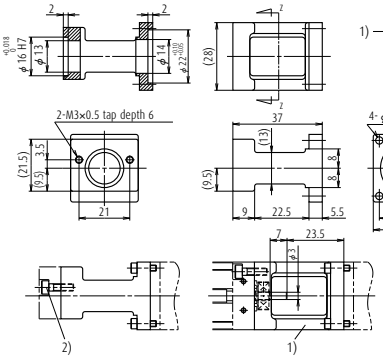


Note: Be sure to align centerlines when installing motor.

Compatible motor	
Maker	**Motor models**
Mitsubishi Electric Corp.	HC-AQ013 (10W)
(Melservo series)	HC-AQ023 (20W)

› Reference number

MC-BK02-223-00



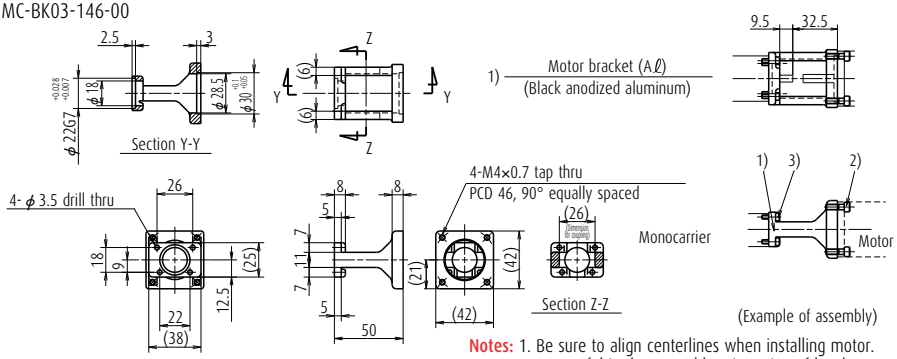
Note: Be sure to align centerlines when installing motor.

Compatible motor	
Maker	**Motor models**
ORIENTAL MOTOR Co.,Ltd.	PMU33/35 (5-phase stepping motor)
ORIENTAL MOTOR Co.,Ltd.	PMC33/35 (5-phase stepping motor)

Motor bracket for MCM03

› Reference number

MC-BK03-146-00



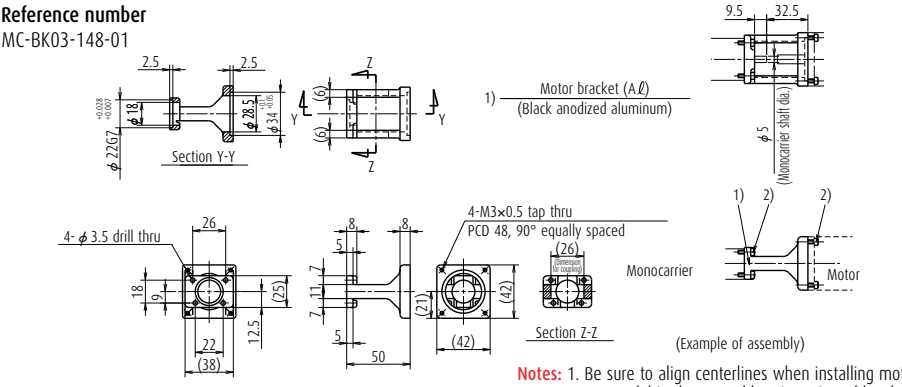
Notes: 1. Be sure to align centerlines when installing motor.
2. Be careful in the assembly orientation of bracket.
3. Because bracket is made by sand casting, external dimensions are for reference only.

Compatible motor	
Maker	**Motor models**
YASKAWA Electric Corp.	SGMAH-A3(30W), SGMJV-A5A(50W), SGMAV-A5A(50W) SGMJV-01A(100W), SGMAV-01A(100W), SGMAV-C2A(150W)
Mitsubishi Electric Corp.	HF-KP053(50W), HF-MP053(50W), HC-KFS053(50W), HC-MFS053(50W) HF-KP13(100W), HF-MP13(100W), HC-KFS13(100W), HC-MFS13(100W)
OMRON Corp.	R88M-W03(30W), R88M-W05(50W), R88M-W10(100W)
SANYO DENKI Co., Ltd.	P30B04003(30W), P30B04005(50W), P30B04010(100W)

Motor bracket for MCM03

› Reference number

MC-BK03-148-01



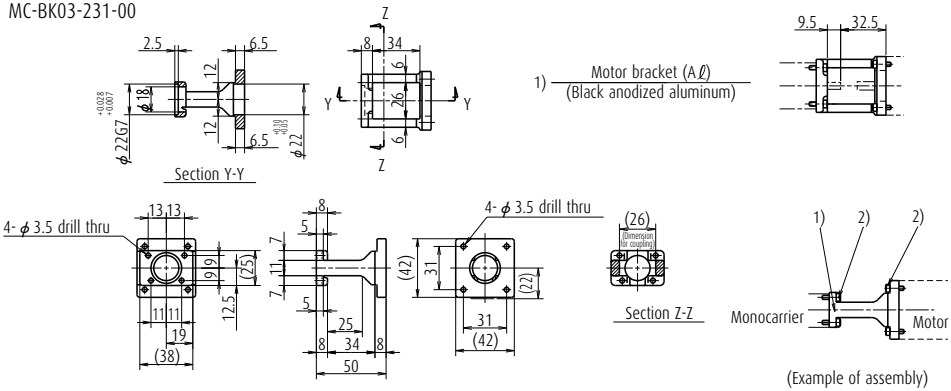
Notes: 1. Be sure to align centerlines when installing motor.
2. Be careful in the assembly orientation of bracket.
3. Because bracket is made by sand casting, external dimensions are for reference only.

Compatible motor	
Maker	**Motor models**
SANYO DENKI Co., Ltd.	P50B04006 (60W), P50B04010 (100W)

Motor bracket for MCM03

› Reference number

MC-BK03-231-00



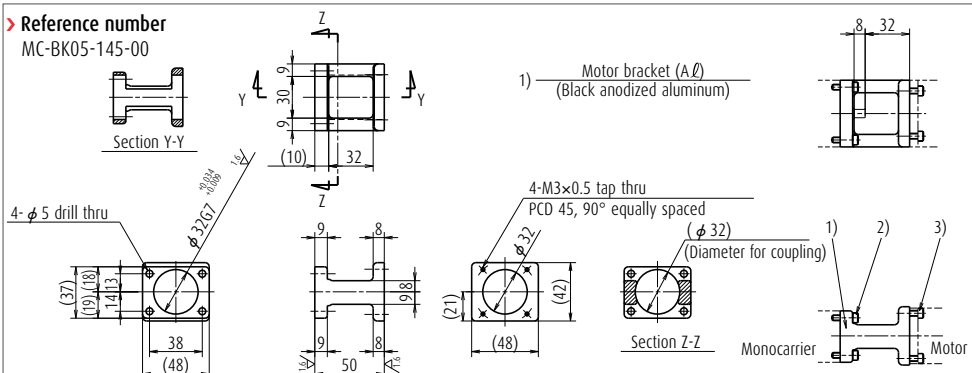
Notes: 1. Be sure to align centerlines when installing motor.
2. Be careful in the assembly orientation of bracket.
3. Because bracket is made by sand casting, external dimensions are for reference only.

Compatible motor	
Maker	**Motor models**
SANYO DENKI Co., Ltd.	PBM423xxx, 103F55xx
ORIENTAL MOTOR Co., Ltd.	AS46, ASC46, UPK54x, PK54x, CSK54x, CFK54x UMK24x, CSK24x, PK24x

Motor bracket for MCM05

› Reference number

MC-BK05-145-00

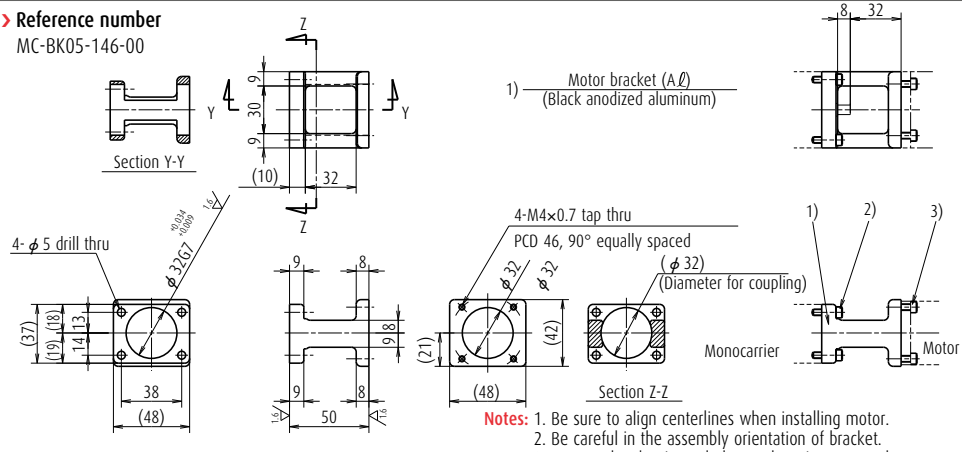


Notes: 1. Be sure to align centerlines when installing motor.
2. Be careful in the assembly orientation of bracket.
3. Because bracket is made by sand casting, external dimensions are for reference only.

Compatible motor	
Maker	**Motor models**
Panasonic Co., Ltd.	MSMD5A(50W), MSMD01(100W)

Motor bracket for MCM05

› Reference number
MC-BK05-146-00



1) Motor bracket (AℓJ) (Black anodized aluminum)

2) Hexagon socket head cap screw (M4, length 15)

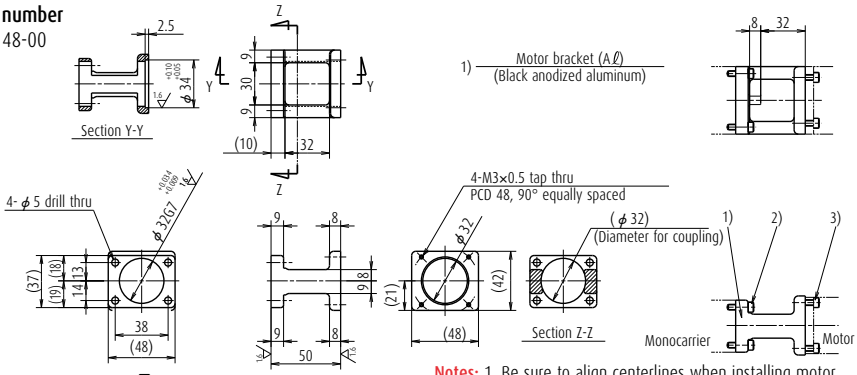
3) Hexagon socket head cap screw (M4, length 12)

Notes: 1. Be sure to align centerlines when installing motor.
2. Be careful in the assembly orientation of bracket.
3. Because bracket is made by sand casting, external dimensions are for reference only.

Compatible motor	
Maker	**Motor models**
YASKAWA Electric Corp.	SGMAH-A3(30W), SGMJV-A5A(50W), SGMAV-A5A(50W) SGMJV-01A(100W), SGMAV-01A(100W), SGMAV-C2A(150W)
Mitsubishi Electric Corp.	HF-KP053(50W), HF-MP053(50W), HC-KFS053(50W) HC-MFS053(50W), HF-KP13(100W), HF-MP13(100W), HC-KFS13(100W), HC-MFS13(100W)
OMRON Corp.	R88M-W03(30W), R88M-W05(50W), R88M-W10(100W)
SANYO DENKI Co., Ltd.	P30B04003(30W), P30B04005(50W), P30B04010(100W)

Motor bracket for MCM05

› Reference number
MC-BK05-148-00



1) Motor bracket (AℓJ) (Black anodized aluminum)

2) Hexagon socket head cap screw (M4, length 15)

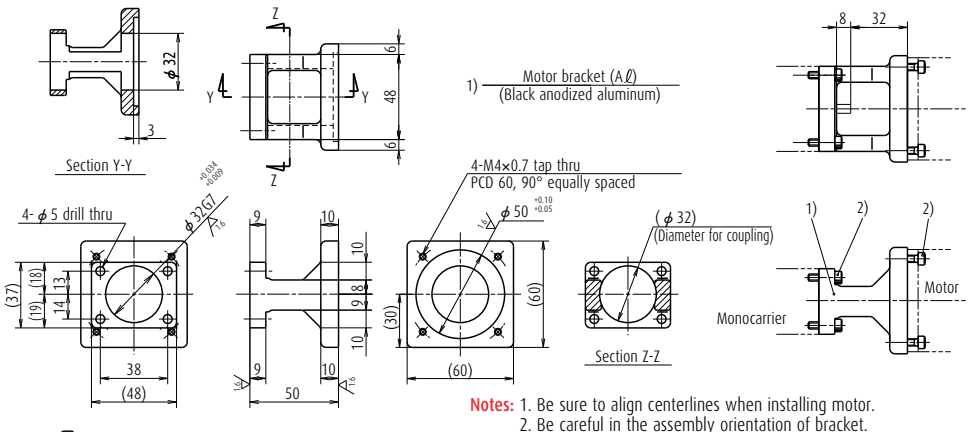
3) Hexagon socket head cap screw (M3, length 12)

Notes: 1. Be sure to align centerlines when installing motor.
2. Be careful in the assembly orientation of bracket.
3. Because bracket is made by sand casting, external dimensions are for reference only.

Compatible motor	
Maker	**Motor models**
Panasonic Co., Ltd.	MAMA01(100W)

Motor bracket for MCM05

› **Reference number**
MC-BK05-160-00

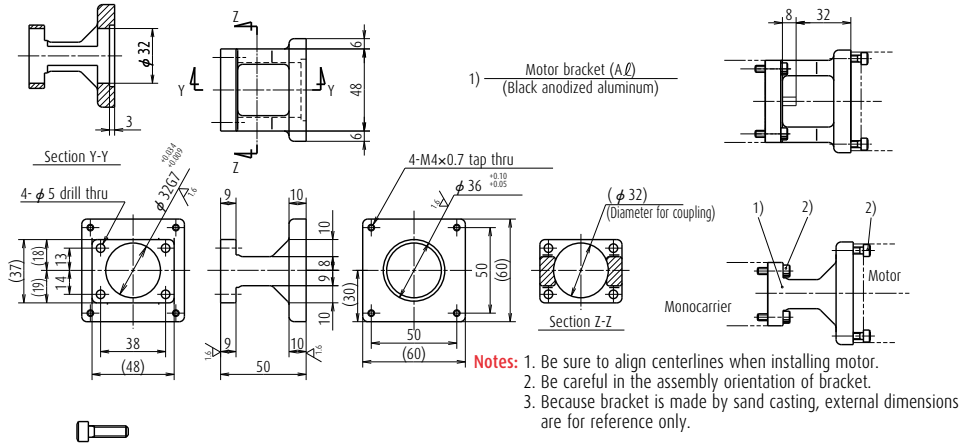


Notes: 1. Be sure to align centerlines when installing motor.
2. Be careful in the assembly orientation of bracket.
3. Because bracket is made by sand casting, external dimensions are for reference only.

Compatible motor	
Maker	**Motor models**
SANYO DENKI Co., Ltd.	P50B05005(50W), P50B05010(100W), P50B05020(200W)

Motor bracket for MCM05

› **Reference number**
MC-BK05-250-00

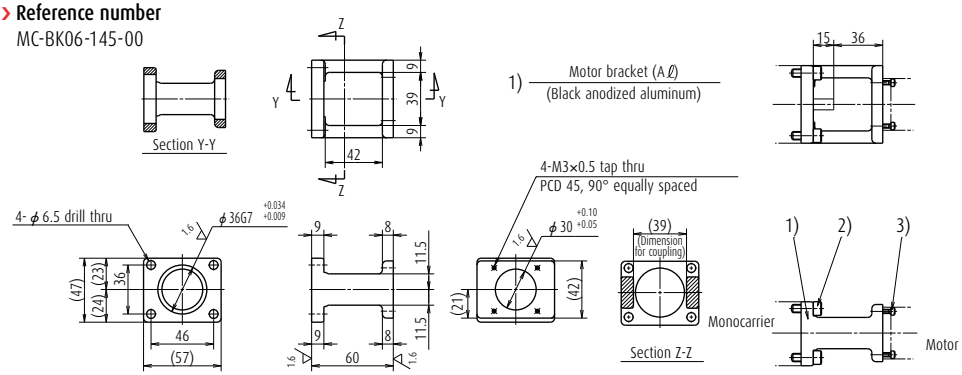


Notes: 1. Be sure to align centerlines when installing motor.
2. Be careful in the assembly orientation of bracket.
3. Because bracket is made by sand casting, external dimensions are for reference only.

Compatible motor	
Maker	**Motor models**
SANYO DENKI Co., Ltd.	PBM603xxx, PBM604xxx, 103F78xx
ORIENTAL MOTOR Co., Ltd.	AS66, ASC66, UPK56x, UFK56x, PK56x, CSK56x, CFK56x

Motor bracket for MCM06

› Reference number
MC-BK06-145-00



2) Hexagon socket head cap screw (M6, length 16)

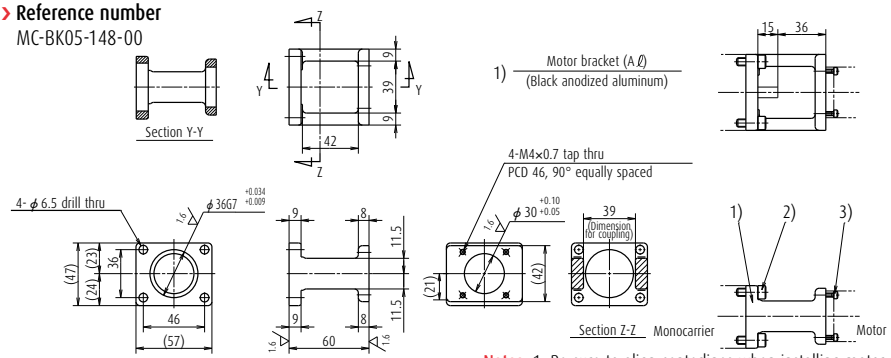
3) Hexagon socket head cap screw (M3, length 12)

Notes: 1. Be sure to align centerlines when installing motor.
2. Be careful in the assembly orientation of bracket.
3. Because bracket is made by sand casting, external dimensions are for reference only.

Compatible motor	
Maker	**Motor models**
Panasonic Co., Ltd.	MSMD5A(50W), MSMD01(100W)

Motor bracket for MCM05

› Reference number
MC-BK05-148-00



2) Hexagon socket head cap screw (M6, length 16)

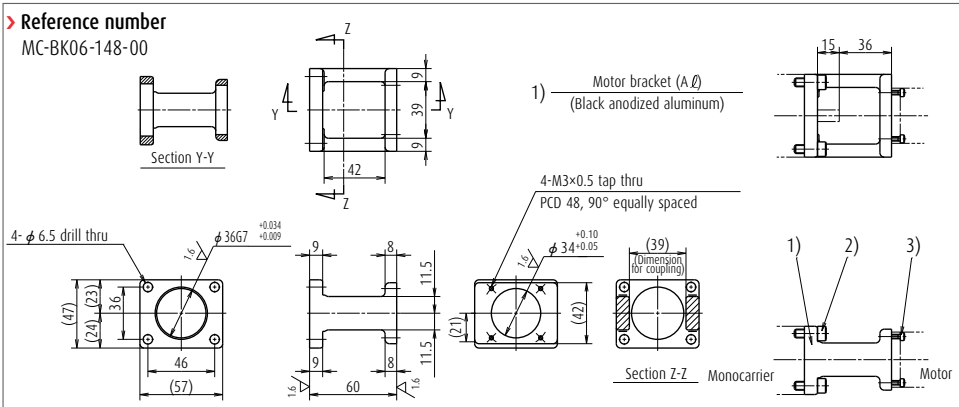
3) Hexagon socket head cap screw (M4, length 12)

Notes: 1. Be sure to align centerlines when installing motor.
2. Be careful in the assembly orientation of bracket.
3. Because bracket is made by sand casting, external dimensions are for reference only.

Compatible motor	
Maker	**Motor models**
YASKAWA Electric Corp.	SGMJV-A5A(50W), SGMAV-A5A(50W) SGMJV-01A(100W), SGMAV-01A(100W), SGMAV-C2A(150W)
Mitsubishi Electric Corp.	HF-KP053(50W), HF-MP053(50W), HC-KFS053(50W), HC-MFS053(50W), HF-KP13(100W), HF-MP13(100W), HC-KFS13(100W), HC-MFS13(100W)
OMRON Corp.	R88M-W03(30W), R88M-W05(50W), R88M-W10(100W)
SANYO DENKI Co., Ltd.	P30B04003(30W), P30B04005(50W), P30B04010(100W)

Motor bracket for MCM06

› Reference number
MC-BK06-148-00



2) Hexagon socket head cap screw (M6, length 16)

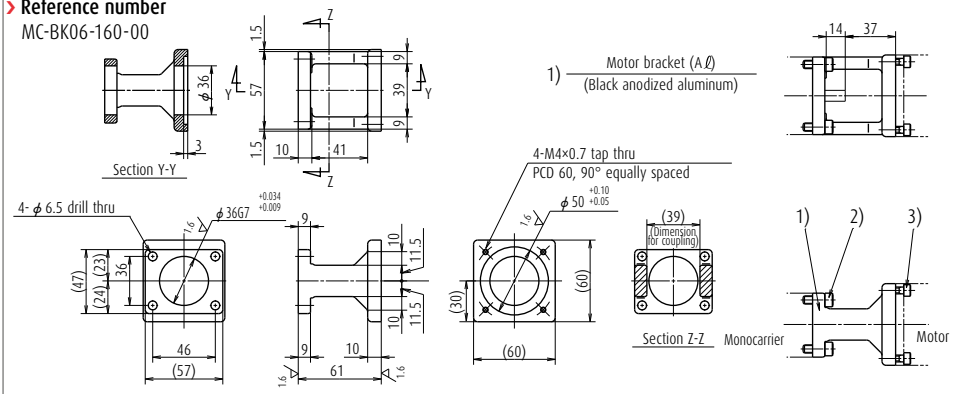
3) Hexagon socket head cap screw (M3, length 12)

Notes: 1. Be sure to align centerlines when installing motor.
2. Be careful in the assembly orientation of bracket.
3. Because bracket is made by sand casting, external dimensions are for reference only.

Compatible motor	
Maker	**Motor models**
Panasonic Co., Ltd.	MAMA01(100W)
SANYO DENKI Co., Ltd.	P50B04006(60W), P50B04010(100W)

Motor bracket for MCM06

› Reference number
MC-BK06-160-00



2) Hexagon socket head cap screw (M6, length 16)

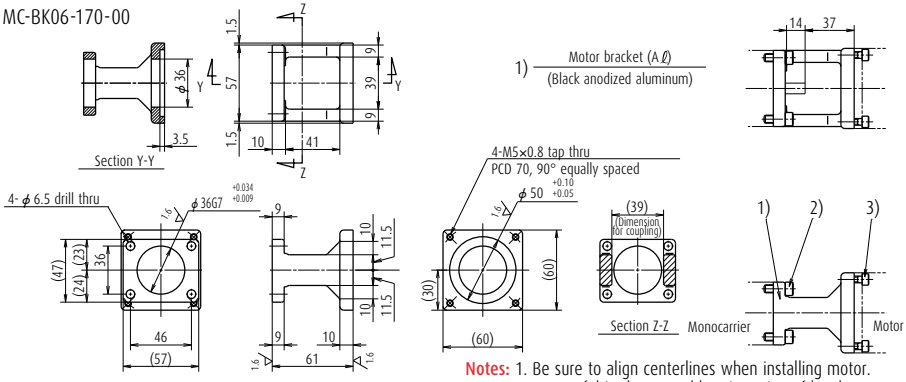
3) Hexagon socket head cap screw (M4, length 14)

Notes: 1. Be sure to align centerlines when installing motor.
2. Be careful in the assembly orientation of bracket.
3. Because bracket is made by sand casting, external dimensions are for reference only.

Compatible motor	
Maker	**Motor models**
SANYO DENKI Co., Ltd.	P50B05005(50W), P50B05010(100W), P50B05020(200W)

Motor bracket for MCM06

› **Reference number**
MC-BK06-170-00



1) Motor bracket (A ℓ) (Black anodized aluminum)

2) Hexagon socket head cap screw (M6, length 16)

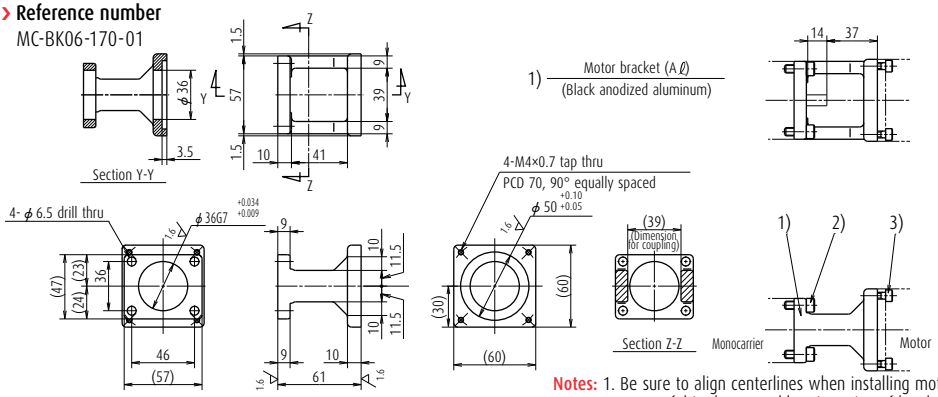
3) Hexagon socket head cap screw (M5, length 14)

Notes: 1. Be sure to align centerlines when installing motor.
2. Be careful in the assembly orientation of bracket.
3. Because bracket is made by sand casting, external dimensions are for reference only.

Compatible motor	
Maker	**Motor models**
YASKAWA Electric Corp.	SGMJV-02A(200W), SGMAV-02A(200W), SGMJV-04A(400W), SGMAV-04A(400W)
Mitsubishi Electric Corp.	HF-KP23(200W), HF-MP23(200W), HF-KP43(400W), HF-MP43(400W) HC-KFS23(200W), HC-MFS23(200W), HC-KFS43(400W), HC-MFS43(400W)
OMRON Corp.	R88M-W20(200W), R88M-W40(400W)
SANYO DENKI Co., Ltd.	P30B06020(200W), P30B06040(400W)

Motor bracket for MCM06

› **Reference number**
MC-BK06-170-01



1) Motor bracket (A ℓ) (Black anodized aluminum)

2) Hexagon socket head cap screw (M6, length 16)

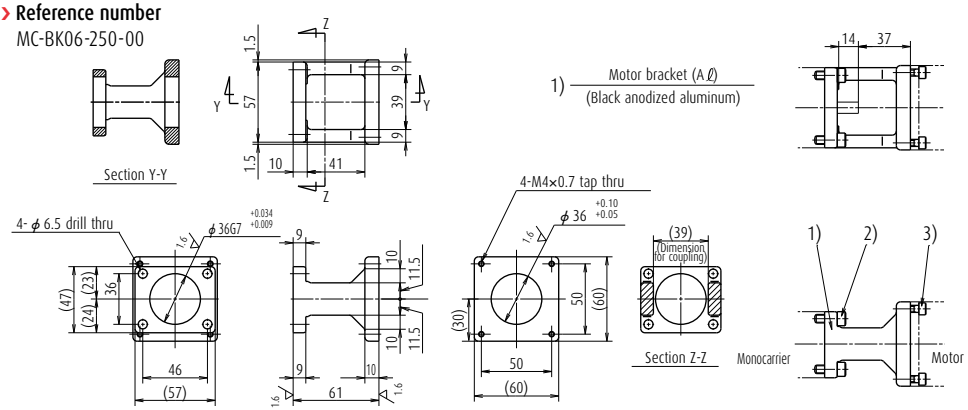
3) Hexagon socket head cap screw (M4, length 14)

Notes: 1. Be sure to align centerlines when installing motor.
2. Be careful in the assembly orientation of bracket.
3. Because bracket is made by sand casting, external dimensions are for reference only.

Compatible motor	
Maker	**Motor models**
Panasonic Co., Ltd.	MSMD02(200W), MAMA02(200W), MSMD04(400W), MAMA04(400W)

Motor bracket for MCM06

› **Reference number**
MC-BK06-250-00



1) Motor bracket (A ℓ) (Black anodized aluminum)

2) Hexagon socket head cap screw (M6, length 16)

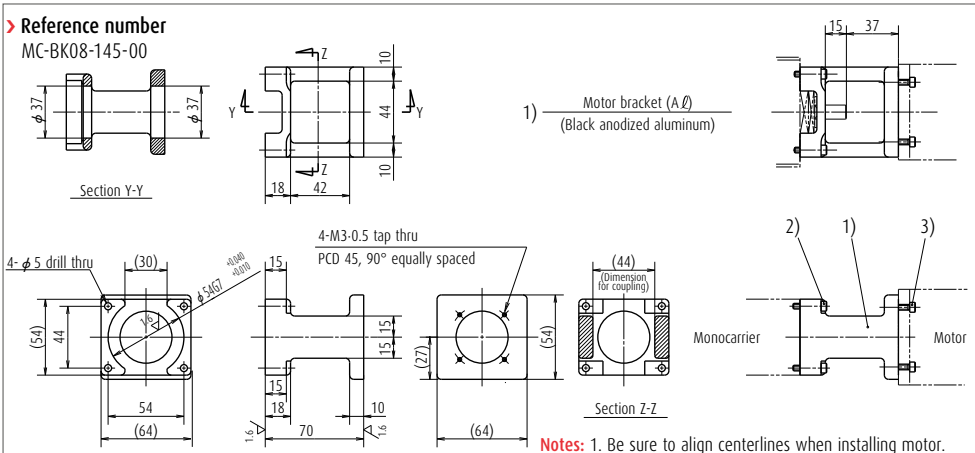
3) Hexagon socket head cap screw (M4, length 14)

Notes: 1. Be sure to align centerlines when installing motor.
2. Be careful in the assembly orientation of bracket.
3. Because bracket is made by sand casting, external dimensions are for reference only.

Compatible motor	
Maker	**Motor models**
SANYO DENKI Co., Ltd.	PBM603xxx, PBM604xxx, 103F78xx
ORIENTAL MOTOR Co., Ltd.	AS66, ASC66, UPK56x, PK56x, CSK56x CFK56x, UFK56x

Motor bracket for MCM08

› **Reference number**
MC-BK08-145-00



1) Motor bracket (A ℓ) (Black anodized aluminum)

2) Hexagon socket head cap screw (M4, length 20)

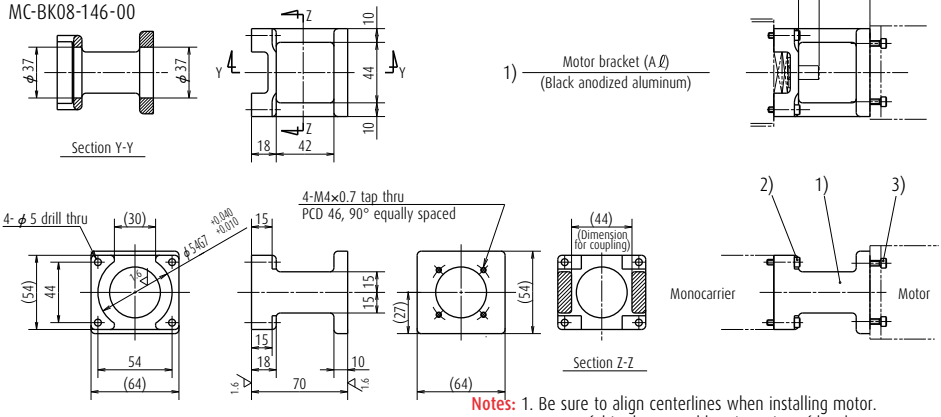
3) Hexagon socket head cap screw (M3, length 12)

Notes: 1. Be sure to align centerlines when installing motor.
2. Be careful in the assembly orientation of bracket.
3. Because bracket is made by sand casting, external dimensions are for reference only.

Compatible motor	
Maker	**Motor models**
Panasonic Co., Ltd.	MSMD01(100W)

Motor bracket for MCM08

Reference number
MC-BK08-146-00



2) Hexagon socket head cap screw (M4, length 20)

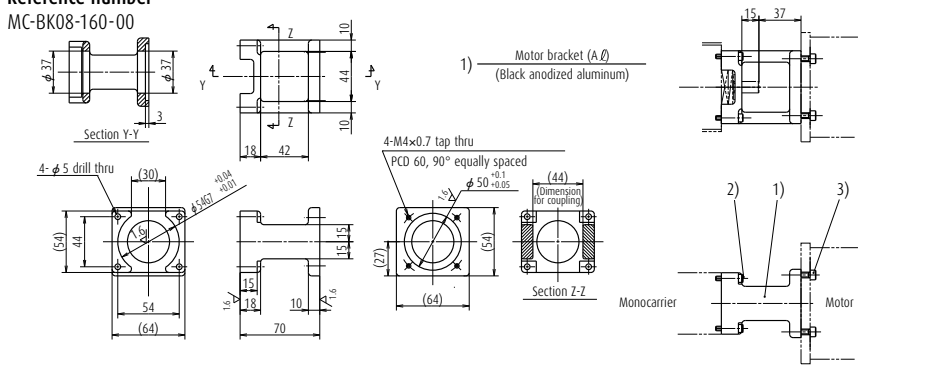
3) Hexagon socket head cap screw (M4, length 14)

Notes: 1. Be sure to align centerlines when installing motor.
2. Be careful in the assembly orientation of bracket.
3. Because bracket is made by sand casting, external dimensions are for reference only.

Compatible motor	
Maker	**Motor models**
YASKAWA Electric Corp.	SGMJV-01A(100W), SGMAV-01A(100W), SGMAV-C2A(150W)
Mitsubishi Electric Corp.	HF-KP13(100W), HF-MP13(100W), HC-KFS13(100W), HC-MFS13(100W)
SANYO DENKI Co., Ltd.	P30B04003(30W), P30B04005(50W), P30B04010(100W)

Motor bracket for MCM08

Reference number
MC-BK08-160-00



2) Hexagon socket head cap screw (M4, length 20)

3) Hexagon socket head cap screw (M4, length 14)

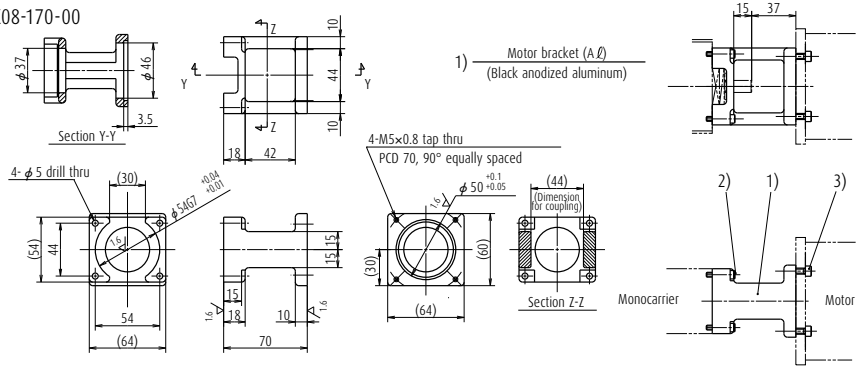
Notes: 1. Be sure to align centerlines when installing motor.
2. Be careful in the assembly orientation of bracket.
3. Because bracket is made by sand casting, external dimensions are for reference only.

Compatible motor	
Maker	**Motor models**
SANYO DENKI Co., Ltd.	P50B05005(50W), P50B05010(100W), P50B05020(200W)

Motor bracket for MCM08

› Reference number

MC-BK08-170-00



1) Motor bracket (A ℓ) (Black anodized aluminum)

2) Hexagon socket head cap screw (M4, length 20)

3) Hexagon socket head cap screw (M5, length 14)

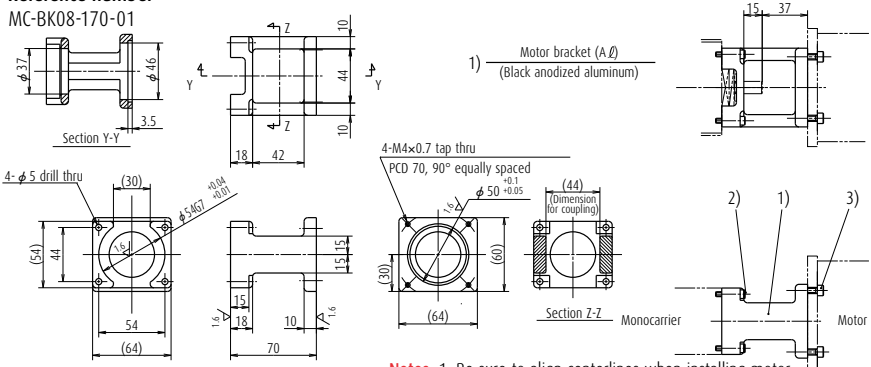
Notes: 1. Be sure to align centerlines when installing motor.
2. Be careful in the assembly orientation of bracket.
3. Because bracket is made by sand casting, external dimensions are for reference only.

Compatible motor	
Maker	**Motor models**
YASKAWA Electric Corp.	SGMJV-02A(200W), SGMAV-02A(200W), SGMJV-04A(400W), SGMAV-04A(400W)
Mitsubishi Electric Corp.	HF-KP23(200W), HF-MP23(200W), HF-KP43(400W), HF-MP43(400W) HC-KFS23(200W), HC-MFS23(200W), HC-KFS43(400W), HC-MFS43(400W)
OMRON Corp.	R88M-W20(200W), R88M-W40(400W)
SANYO DENKI Co., Ltd.	P30B06020(200W), P30B06040(400W)

Motor bracket for MCM08

› Reference number

MC-BK08-170-01



1) Motor bracket (A ℓ) (Black anodized aluminum)

2) Hexagon socket head cap screw (M4, length 20)

3) Hexagon socket head cap screw (M4, length 14)

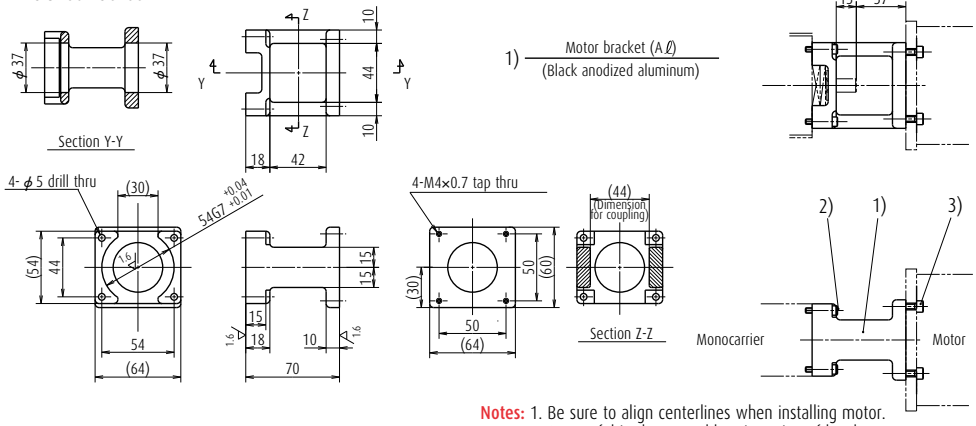
Notes: 1. Be sure to align centerlines when installing motor.
2. Be careful in the assembly orientation of bracket.
3. Because bracket is made by sand casting, external dimensions are for reference only.

Compatible motor	
Maker	**Motor models**
Panasonic Co., Ltd.	MSMD02(200W), MAMA02(200W), MSMD04(400W), MAMA04(400WW)

Motor bracket for MCM08

› **Reference number**

MC-BK08-250-00



1) Motor bracket (A ℓ) (Black anodized aluminum)

2) Hexagon socket head cap screw (M4, length 20)

3) Hexagon socket head cap screw (M4, length 14)

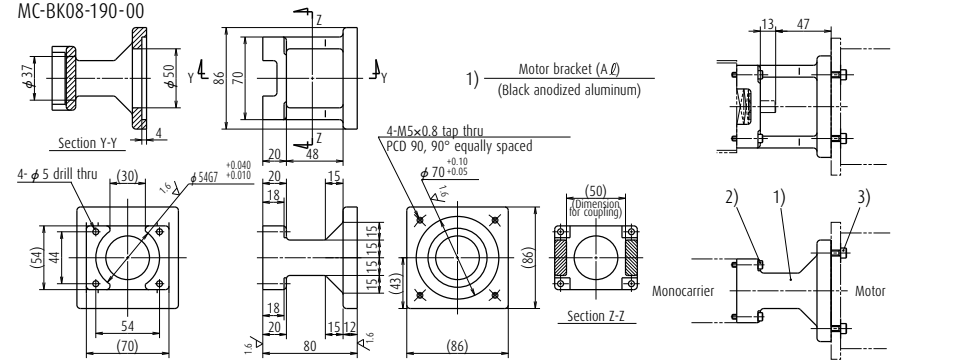
Notes: 1. Be sure to align centerlines when installing motor.
2. Be careful in the assembly orientation of bracket.
3. Because bracket is made by sand casting, external dimensions are for reference only.

Compatible motor	
Maker	**Motor models**
SANYO DENKI Co., Ltd.	PBM603xxx, PBM604xxx, 103F78xx
ORIENTAL MOTOR Co., Ltd.	AS66, ASC66, UPK56xx, PK56xx, CSK56x CFK56x, UFK56x

Motor bracket for MCM08

› **Reference number**

MC-BK08-190-00



1) Motor bracket (A ℓ) (Black anodized aluminum)

2) Hexagon socket head cap screw (M4, length 22)

3) Hexagon socket head cap screw (M5, length 16)

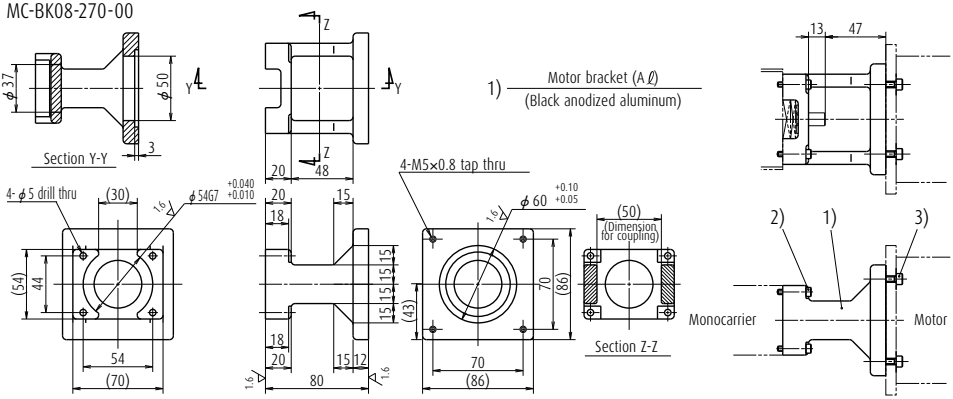
Notes: 1. Be sure to align centerlines when installing motor.
2. Be careful in the assembly orientation of bracket.
3. Because bracket is made by sand casting, external dimensions are for reference only.

Compatible motor	
Maker	**Motor models**
SANYO DENKI Co., Ltd.	P50B07020(200W), P50B07030(300W), P50B07040(400W)

Motor bracket for MCM08

› Reference number

MC-BK08-270-00



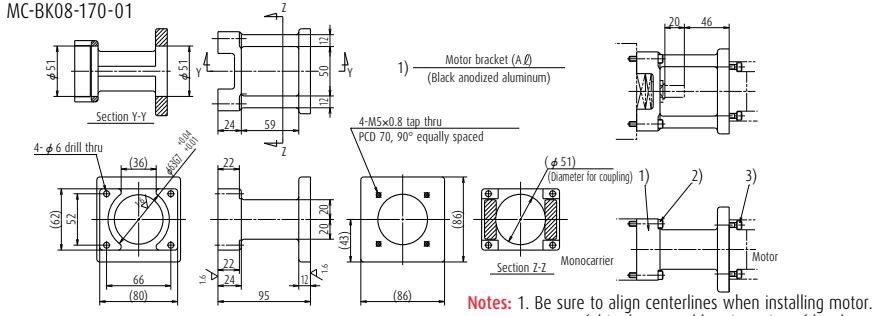
Notes: 1. Be sure to align centerlines when installing motor.
2. Be careful in the assembly orientation of bracket.
3. Because bracket is made by sand casting, external dimensions are for reference only.

Compatible motor	
Maker	**Motor models**
ORIENTAL MOTOR Co., Ltd.	AS98, UPK59x, PK59x CSK59x, CFK59x, UFK59x
SANYO DENKI Co., Ltd.	103F85xx

Motor bracket for MCM10

› Reference number

MC-BK08-170-01



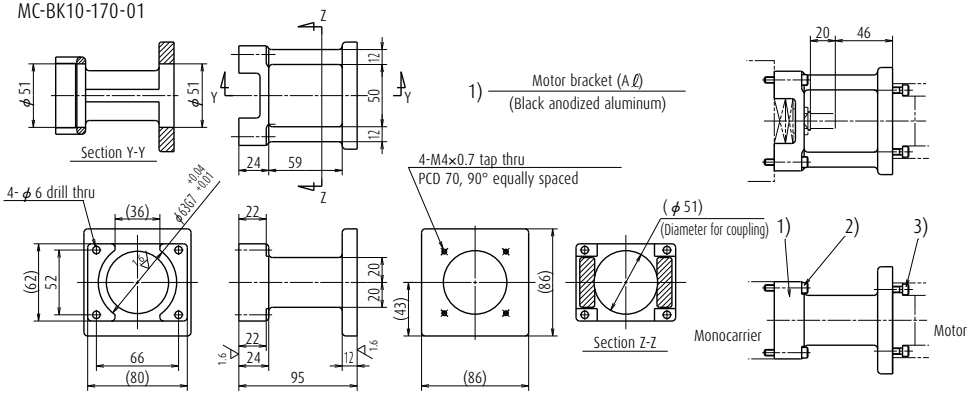
Notes: 1. Be sure to align centerlines when installing motor.
2. Be careful in the assembly orientation of bracket.
3. Because bracket is made by sand casting, external dimensions are for reference only.

Compatible motor	
Maker	**Motor models**
YASKAWA Electric Corp.	SGMJV-02A(200W), SGMAV-02A(200W), SGMJV-04A(400W), SGMAV-04A(400W)
Mitsubishi Electric Corp.	HF-KP23(200W), HF-MP23(200W), HF-KP43(400W), HF-MP43(400W) HC-KFS23(200W), HC-MFS23(200W), HC-KFS43(400W), HC-MFS43(400W)
OMRON Corp.	R88M-W20(200W), R88M-W40(400W)
SANYO DENKI Co., Ltd.	P30B06020(200W), P30B06040(400W)

Motor bracket for MCM10

› Reference number

MC-BK10-170-01



1) Motor bracket (A ℓ) (Black anodized aluminum)

2) Hexagon socket head cap screw (M5, length 30)

3) Hexagon socket head cap screw (M4, length 16)

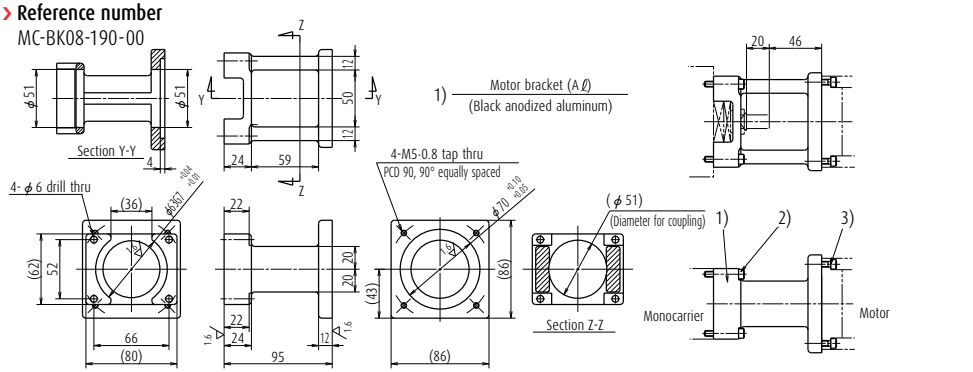
Notes: 1. Be sure to align centerlines when installing motor.
2. Be careful in the assembly orientation of bracket.
3. Because bracket is made by sand casting, external dimensions are for reference only.

Compatible motor	
Maker	**Motor models**
Panasonic Co., Ltd.	MSMD02(200W), MAMA02(200W), MSMD04(400W), MAMA04(400W)

Motor bracket for MCM10

› Reference number

MC-BK08-190-00



1) Motor bracket (A ℓ) (Black anodized aluminum)

2) Hexagon socket head cap screw (M5, length 30)

3) Hexagon socket head cap screw (M5, length 16)

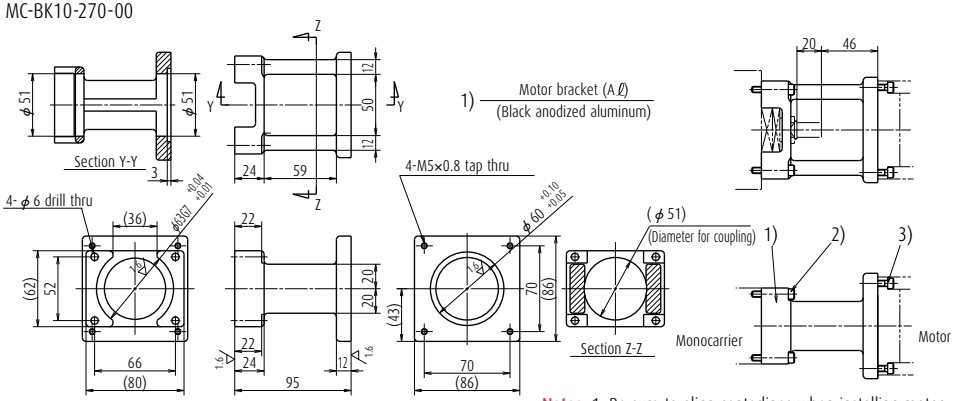
Notes: 1. Be sure to align centerlines when installing motor.
2. Be careful in the assembly orientation of bracket.
3. Because bracket is made by sand casting, external dimensions are for reference only.

Compatible motor	
Maker	**Motor models**
Panasonic Co., Ltd.	MSMD08(750W), MAMA08(750W)
SANYO DENKI Co., Ltd.	P50B07020(200W), P50B07030(300W), P50B07040(400W)

Motor bracket for MCM10

› Reference number

MC-BK10-270-00



2) Hexagon socket head cap screw (M5, length 30)

3) Hexagon socket head cap screw (M5, length 18)

Notes: 1. Be sure to align centerlines when installing motor.
2. Be careful in the assembly orientation of bracket.
3. Because bracket is made by sand casting, external dimensions are for reference only.

Compatible motor	
Maker	**Motor models**
SANYO DENKI Co., Ltd.	103F85xx
ORIENTAL MOTOR Co., Ltd.	AS98, UPK59x, PK59x, CSK59x CFK59x, UFK59x

7. Motor Availability Table of Motor Bracket for MCM Series

Table 5

Model No.	ref No. code	Motor bracket reference No.	Motor manufacturer	Stepping motor model No.	Wattage of AC servo motor										
					10	20	30	50	60	100	150	200	300	400	750
MCM02	1	MC-BK02-128-00	YASKAWA Electric Corp.		SGMM-A1	SGMM-A2									
MCM02	2	MC-BK02-133-00	Mitsubishi Electric Corp.		HC-AQ013	HC-AQ023									
MCM02	3	MC-BK02-223-00	ORIENTAL MOTOR Co., Ltd.	PMU33/35 (5-phase)											
MCM02	3	MC-BK02-223-00	ORIENTAL MOTOR Co., Ltd.	PMC33/35 (5-phase)											
MCM03	1	MC-BK03-146-00	YASKAWA Electric Corp.				SGMAH-A3	SGMJV-A5A		SGMJV-01A	SGMAV-C2A				
MCM03	1	MC-BK03-146-00	YASKAWA Electric Corp.				SGMAH-A3	SGMAV-A5A		SGMAV-01A	SGMAV-C2A				
MCM03	1	MC-BK03-146-00	Mitsubishi Electric Corp.					HF-KP053		HF-KP13					
MCM03	1	MC-BK03-146-00	Mitsubishi Electric Corp.					HF-MP053		HF-MP13					
MCM03	1	MC-BK03-146-00	Mitsubishi Electric Corp.					HC-KFS053		HC-KFS13					
MCM03	1	MC-BK03-146-00	Mitsubishi Electric Corp.					HC-MFS053		HC-MFS13					
MCM03	1	MC-BK03-146-00	OMRON Corp.				R88M-W03	R88M-W05		R88M-W10					
MCM03	1	MC-BK03-146-00	SANYO DENKI Co., Ltd.				P30B04003	P30B04005		P30B04010					
MCM03	2	MC-BK03-148-01	SANYO DENKI Co., Ltd.						P50B04006	P50B04010					
MCM03	3	MC-BK03-231-00	SANYO DENKI Co., Ltd.	PBM423xxx											
MCM03	3	MC-BK03-231-00	SANYO DENKI Co., Ltd.	103F55xx											
MCM03	3	MC-BK03-231-00	ORIENTAL MOTOR Co., Ltd.	AS46, ASC46											
MCM03	3	MC-BK03-231-00	ORIENTAL MOTOR Co., Ltd.	UPK54x, PK54x											
MCM03	3	MC-BK03-231-00	ORIENTAL MOTOR Co., Ltd.	CSK54x, CFK54x											
MCM03	3	MC-BK03-231-00	ORIENTAL MOTOR Co., Ltd.	UMK24x, CSK24x											
MCM03	3	MC-BK03-231-00	ORIENTAL MOTOR Co., Ltd.	PK24x											
MCM05	1	MC-BK05-145-00	Panasonic Co., Ltd.					MSMD5A		MSMD01					
MCM05	2	MC-BK05-146-00	YASKAWA Electric Corp.				SGMAH-A3	SGMJV-A5A		SGMJV-01A	SGMAV-C2A				
MCM05	2	MC-BK05-146-00	YASKAWA Electric Corp.				SGMAH-A3	SGMAV-A5A		SGMAV-01A	SGMAV-C2A				
MCM05	2	MC-BK05-146-00	Mitsubishi Electric Corp.					HF-KP053		HF-KP13					
MCM05	2	MC-BK05-146-00	Mitsubishi Electric Corp.					HF-MP053		HF-MP13					
MCM05	2	MC-BK05-146-00	Mitsubishi Electric Corp.					HC-KFS053		HC-KFS13					
MCM05	2	MC-BK05-146-00	Mitsubishi Electric Corp.					HC-MFS053		HC-MFS13					
MCM05	2	MC-BK05-146-00	OMRON Corp.				R88M-W03	R88M-W05		R88M-W10					
MCM05	2	MC-BK05-146-00	SANYO DENKI Co., Ltd.				P30B04003	P30B04005		P30B04010					
MCM05	3	MC-BK05-148-00	Panasonic Co., Ltd.							MAMA01					
MCM05	4	MC-BK05-160-00	SANYO DENKI Co., Ltd.					P50B05005		P50B05010		P50B05020			

Model No.	ref No. code	Motor bracket reference No.	Motor manufacturer	Stepping motor model No.	Wattage of AC servo motor										
					10	20	30	50	60	100	150	200	300	400	750
MCM05	5	MC-BK05-250-00	SANYO DENKI Co., Ltd.	PBM603xx, PBM604xx											
MCM05	5	MC-BK05-250-00	SANYO DENKI Co., Ltd.	103F78xx											
MCM05	5	MC-BK05-250-00	ORIENTAL MOTOR Co., Ltd.	AS66, ASC66											
MCM05	5	MC-BK05-250-00	ORIENTAL MOTOR Co., Ltd.	UPK56x, UFK56x											
MCM05	5	MC-BK05-250-00	ORIENTAL MOTOR Co., Ltd.	PK56x, CSK56x,											
MCM05	5	MC-BK05-250-00	ORIENTAL MOTOR Co., Ltd.	CFK56x											
MCM06	1	MC-BK06-145-00	Panasonic Co., Ltd.					MSMD5A		MSMD01					
MCM06	2	MC-BK06-146-00	YASKAWA Electric Corp.					SGMJV-A5A		SGMJV-01A	SGMAV-C2A				
MCM06	2	MC-BK06-146-00	YASKAWA Electric Corp.					SGMAV-A5A		SGMAV-01A	SGMAV-C2A				
MCM06	2	MC-BK06-146-00	Mitsubishi Electric Corp.					HF-KP053		HF-KP13					
MCM06	2	MC-BK06-146-00	Mitsubishi Electric Corp.					HF-MP053		HF-MP13					
MCM06	2	MC-BK06-146-00	Mitsubishi Electric Corp.					HC-KFS053		HC-KFS13					
MCM06	2	MC-BK06-146-00	Mitsubishi Electric Corp.					HC-MFS053		HC-MFS13					
MCM06	2	MC-BK06-146-00	OMRON Corp.				R88M-W03	R88M-W05		R88M-W10					
MCM06	2	MC-BK06-146-00	SANYO DENKI Co., Ltd.				P30B04003	P30B04005		P30B04010					
MCM06	3	MC-BK06-148-00	SANYO DENKI Co., Ltd.						P50B04006	P50B04010					
MCM06	3	MC-BK06-148-00	Panasonic Co., Ltd.							MAMA01					
MCM06	4	MC-BK06-160-00	SANYO DENKI Co., Ltd.					P50B05005		P50B05010		P50B05020			
MCM06	4	MC-BK06-160-00													
MCM06	5	MC-BK06-170-00	YASKAWA Electric Corp.									SGMJV-02A		SGMJV-04A	
MCM06	5	MC-BK06-170-00	YASKAWA Electric Corp.									SGMAV-02A		SGMAV-04A	
MCM06	5	MC-BK06-170-00	Mitsubishi Electric Corp.									HF-KP23		HF-KP43	
MCM06	5	MC-BK06-170-00	Mitsubishi Electric Corp.									HF-MP23		HF-MP43	
MCM06	5	MC-BK06-170-00	Mitsubishi Electric Corp.									HC-KFS23		HC-KFS43	
MCM06	5	MC-BK06-170-00	Mitsubishi Electric Corp.									HC-MFS23		HC-MFS43	
MCM06	5	MC-BK06-170-00	OMRON Corp.									R88M-W20		R88M-W40	
MCM06	5	MC-BK06-170-00	SANYO DENKI Co., Ltd.									P30B06020		P30B06040	
MCM06	6	MC-BK06-170-01	Panasonic Co., Ltd.									MSMD02		MSMD04	
MCM06	6	MC-BK06-170-01	Panasonic Co., Ltd.									MAMA02		MAMA04	
MCM06	7	MC-BK06-250-00	SANYO DENKI Co., Ltd.	PBM603xxx											
MCM06	7	MC-BK06-250-00	SANYO DENKI Co., Ltd.	PBM604xxx											
MCM06	7	MC-BK06-250-00	SANYO DENKI Co., Ltd.	103F78xx											
MCM06	7	MC-BK06-250-00	ORIENTAL MOTOR Co., Ltd.	AS66, ASC66											
MCM06	7	MC-BK06-250-00	ORIENTAL MOTOR Co., Ltd.	UPK56x, PK56x											
MCM06	7	MC-BK06-250-00	ORIENTAL MOTOR Co., Ltd.	CSK56x, CFK56x											
MCM06	7	MC-BK06-250-00	ORIENTAL MOTOR Co., Ltd.	UFK56x											

Model No.	ref No. code	Motor bracket reference No.	Motor manufacturer	Stepping motor model No.	Wattage of AC servo motor										
					10	20	30	50	60	100	150	200	300	400	750
MCM08	1	MC-BK08-145-00	Panasonic Co., Ltd.							MSMD01					
MCM08															
MCM08	2	MC-BK08-146-00	YASKAWA Electric Corp							SGMJV-01A	SGMAV-C2A				
MCM08	2	MC-BK08-146-00	YASKAWA Electric Corp							SGMAV-01A	SGMAV-C2A				
MCM08	2	MC-BK08-146-00	Mitsubishi Electric Corp							HF-KP13					
MCM08	2	MC-BK08-146-00	Mitsubishi Electric Corp							HF-MP13					
MCM08	2	MC-BK08-146-00	Mitsubishi Electric Corp							HC-KFS13					
MCM08	2	MC-BK08-146-00	Mitsubishi Electric Corp							HC-MFS13					
MCM08	2	MC-BK08-146-00	SANYO DENKI Co., Ltd.				P30B04003	P30B04005		P30B04010					
MCM08	3	MC-BK08-160-00	SANYO DENKI Co., Ltd.					P50B05005		P50B05010		P50B05020			
MCM08	4	MC-BK08-170-00	YASKAWA Electric Corp.									SGMJV-02A		SGMJV-04A	
MCM08	4	MC-BK08-170-00	YASKAWA Electric Corp.									SGMAV-02A		SGMAV-04A	
MCM08	4	MC-BK08-170-00	Mitsubishi Electric Corp.									HF-KP23		HF-KP43	
MCM08	4	MC-BK08-170-00	Mitsubishi Electric Corp.									HF-MP23		HF-MP43	
MCM08	4	MC-BK08-170-00	Mitsubishi Electric Corp.									HC-KFS23		HC-KFS43	
MCM08	4	MC-BK08-170-00	Mitsubishi Electric Corp.									HC-MFS23		HC-MFS43	
MCM08	4	MC-BK08-170-00	OMRON Corp.									R88M-W20		R88M-W40	
MCM08	4	MC-BK08-170-00	SANYO DENKI Co., Ltd.									P30B06020		P30B06040	
MCM08	5	MC-BK08-170-01	Panasonic Co., Ltd.									MSMD02		MSMD04	
MCM08	5	MC-BK08-170-01	Panasonic Co., Ltd.									MAMA02		MAMA04	
MCM08	6	MC-BK08-190-00	SANYO DENKI Co., Ltd.									P50B07020	P50B07030	P50B07040	
MCM08	7	MC-BK08-250-00	SANYO DENKI Co., Ltd.	PBM603xxx,			SGMAH-A3	SGMJV-A5A		SGMJV-01A	SGMAV-C2A				
MCM08	7	MC-BK08-250-00	SANYO DENKI Co., Ltd.	PBM604xxx			SGMAH-A3	SGMAV-A5A		SGMAV-01A	SGMAV-C2A				
MCM08	7	MC-BK08-250-00	SANYO DENKI Co., Ltd.	103F78xx				HF-KP053		HF-KP13					
MCM08	7	MC-BK08-250-00	Mitsubishi Electric Corp.					HF-MP053		HF-MP13					
MCM08	7	MC-BK08-250-00	Mitsubishi Electric Corp.					HC-KFS053		HC-KFS13					
MCM08	7	MC-BK08-250-00	Mitsubishi Electric Corp.					HC-MFS053		HC-MFS13					
MCM08	7	MC-BK08-250-00	OMRON Corp.				R88M-W03	R88M-W05		R88M-W10					
MCM08	8	MC-BK08-270-00	SANYO DENKI Co., Ltd.	103F85xx			P30B04003	P30B04005		P30B04010					
MCM08	8	MC-BK08-270-00	ORIENTAL MOTOR Co., Ltd.	AS98						MAMA01					
MCM08	8	MC-BK08-270-00	ORIENTAL MOTOR Co., Ltd.	UPK59x, PK59x				P50B05005		P50B05010		P50B05020			
MCM08	8	MC-BK08-270-00	ORIENTAL MOTOR Co., Ltd.	CSK59x, CFK59x											
MCM08	8	MC-BK08-270-00	ORIENTAL MOTOR Co., Ltd.	UFK59x											
MCM10	1	MC-BK10-170-00	YASKAWA Electric Corp.									SGMJV-02A		SGMJV-04A	
MCM10	1	MC-BK10-170-00	YASKAWA Electric Corp.									SGMAV-02A		SGMAV-04A	
MCM10	1	MC-BK10-170-00	Mitsubishi Electric Corp.									HF-KP23		HF-KP43	
MCM10	1	MC-BK10-170-00	Mitsubishi Electric Corp.									HF-MP23		HF-MP43	
MCM10	1	MC-BK10-170-00	Mitsubishi Electric Corp.									HC-KFS23		HC-KFS43	
MCM10	1	MC-BK10-170-00	Mitsubishi Electric Corp.									HC-MFS23		HC-MFS43	
MCM10	1	MC-BK10-170-00	OMRON Corp.									R88M-W20		R88M-W40	
MCM10	1	MC-BK10-170-00	SANYO DENKI Co., Ltd.									P30B06020		P30B06040	
MCM10	2	MC-BK10-170-01	Panasonic Co., Ltd.									MSMD02		MSMD04	
MCM10	2	MC-BK10-170-01	Panasonic Co., Ltd.									MAMA02		MAMA04	
MCM10	3	MC-BK10-190-00	Panasonic Co., Ltd.					HC-MFS053		HC-MFS13					
MCM10	3	MC-BK10-190-00	Panasonic Co., Ltd.									R88M-W20		R88M-W40	
MCM10	3	MC-BK10-190-00	SANYO DENKI Co., Ltd.									P50B07020	P50B07030	P50B07040	
MCM10	4	MC-BK10-270-00	SANYO DENKI Co., Ltd.	103F85xx											
MCM10	4	MC-BK10-270-00	ORIENTAL MOTOR Co., Ltd.	AS98											
MCM10	4	MC-BK10-270-00	ORIENTAL MOTOR Co., Ltd.	UPK59x, PK59x											
MCM10	4	MC-BK10-270-00	ORIENTAL MOTOR Co., Ltd.	CSK59x, CFK59x											
MCM10	4	MC-BK10-270-00	ORIENTAL MOTOR Co., Ltd.	UFK59x											

1. MCH Series Reference Number Coding

[Body]

Example: MC H 06 040 H 10 K (B 2)*1

- MC: Monocarrier
- H: H Type: MCH Series; L Type: MCH Series low profile rail (only for 06 size)
- 06: Nominal size (rail width, Unit: 10mm)
- 040: Stroke (Unit: 10mm)
- H: Accuracy grade (H, high grade; P, precision grade)
- 10: Ball screw lead (mm)
- K: Slider specification K: Single slider; D: Double slider (See page 363)
- (B 2): Grease specification: B (LG2) (See page 444); NSK management number (0 or 2)

14th digit is control No. of NSK. Customers cannot specify a number. See the pages of each nominal number for details.

Note: *1: These two code fields are added except for standard grease.

[With Accessories]

Example MC S 06 040 H 10 K 0 2 K 0 0 0

- S: S: With MCH Accessories; R: With MCL Accessories
- K: NSK management number
- 0: Sensor unit
- 0: Cover unit
- 0: Intermediate plate for motor

Note: Option parts are available separately.

Table 1 Sensor unit (See page 420)

Reference No. code	Specification	Reference No.
0	N/A	—
1	Proximity switch (Normally close contact 3 pieces)	MC—SRHxx—10
2	Proximity switch (Normally open contact 3 pieces)	MC—SRHxx—11
3	Proximity switch (Normally open contact 1 piece, Normally close contact 2 pieces)	MC—SRHxx—12
4	Photo sensor 3 pieces	MC—SRHxx—13

Note 1) xx: Nominal size 2) Sensor rail is not included in a sensor unit. If you require the rail, please specify upon ordering. (See page 420 to 421)

Table 2 Cover unit (See page 422 to 424)

Reference No. code	Specification	Reference No.
0	N/A	—
1	For single slider	MC—HVxxxxx—00
1	For double slider	MC—HVxxxxxD00

Note xxxxx; Nominal size and stroke number

Table 3 Intermediate plate for motor (See page 426 to 428)

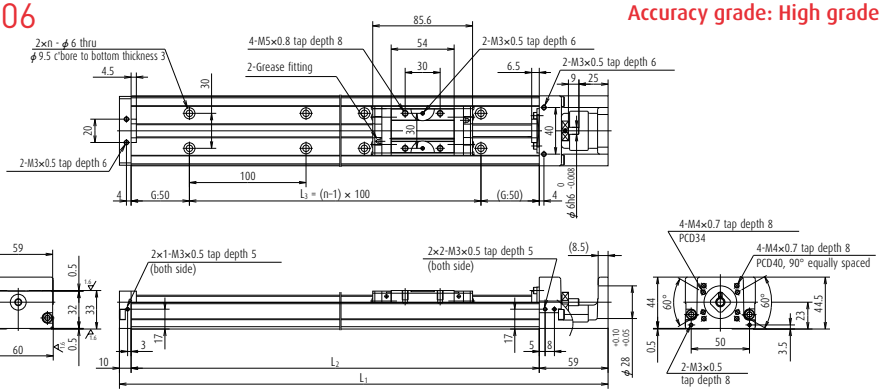
Reference No. code	Reference No.		
	MCH06 (MCL06)	MCH09	MCH10
0	N/A	N/A	N/A
1	MC-BKH06-145-00	MC-BKH09-145-00	MC-BKH10-170-00
2	MC-BKH06-146-00	MC-BKH09-146-00	MC-BKH10-170-01
3	MC-BKH06-231-00	MC-BKH09-170-00	MC-BKH10-190-00
4	MC-BKH06-250-00	MC-BKH09-170-01	MC-BKH10-190-01
5	—	MC-BKH09-231-00	MC-BKH10-250-00
6	—	MC-BKH09-250-00	MC-BKH10-270-00

N/A: Not applicable

2. MCH Series Dimension Table of Standard Products

MCL06

Accuracy grade: High grade (H)



- Rail of MCL 06 is made lighter than that of MCH 06 by lowering rail height. Weight ratio between MCH 06 and MCL 06 is 5 to 4.
- Double slider specification is also available for MCL 06.
- Combinations of stroke and ball screw lead of MCL 06 are the same as those of MCH 06.

Dimension of MCL06 (Single slider)

Reference No.	Nominal stroke (mm)	Stroke limit (mm) (without K1)	Ball screw lead (mm)	Body length (mm)				Inertia × 10⁻⁶ (kg · m²)	Mass (kg)
				L_1	L_2	L_3	n		
◇ MCL06005H05K02	50	53 (65)	5	219	150	100	2	2.38	1.0
◇ MCL06005H10K02	50	53 (65)	10	219	150	100	2	3.45	1.0
MCL06010H05K02	100	103 (115)	5	269	200	100	2	3.17	1.3
MCL06010H10K02	100	103 (115)	10	269	200	100	2	4.12	1.3
MCL06020H05K02	200	203 (215)	5	369	300	200	3	4.51	1.9
MCL06020H10K02	200	203 (215)	10	369	300	200	3	5.46	1.9
MCL06030H10K02	300	303 (315)	10	469	400	300	4	6.80	2.6
MCL06030H20K02	300	303 (315)	20	469	400	300	4	10.6	2.6
MCL06040H10K02	400	403 (415)	10	569	500	400	5	8.13	3.2
MCL06040H20K02	400	403 (415)	20	569	500	400	5	11.9	3.2
MCL06050H10K02	500	503 (515)	10	669	600	500	6	9.47	3.9
MCL06050H20K02	500	503 (515)	20	669	600	500	6	13.3	3.9

Notes: 1. Dimension G is 25 for items marked with ◇. 2. The nominal number in the above table is for high-grade grease specifications. In the case of other specifications, see the following table for the 13th and 14th digits.

Coding for columns 13 and 14

Grease	High-grade	Precision-grade
Standard	02	(None)
LG2	B2	B0

Monocarrier dynamic torque specification (N · cm)		
Ball screw lead(mm)	Accuracy grade	
	High grade	Precision
5	1.0 – 4.8	1.9 – 7.6
10	1.1 – 5.8	2.1 – 8.9
20	1.6 – 7.9	2.5 – 10.6

Notes

1. Frictional resistance of NSK K1 is included in dynamic torque in table.
2. Grease is packed into ball screw, linear guide parts and support unit.
3. Consult NSK for life estimates under large moment loads.

Basic load rating

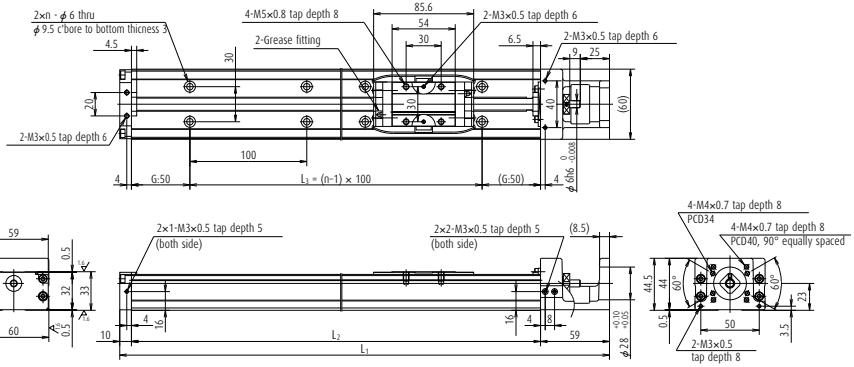
Lead ℓ (mm)	Shaft dia d (mm)	Basic dynamic load rating (N)				Basic static load rating (N)		Support unit load limit (N)
		Ball screw C_a	Linear guides C	Support unit C_a	Rated running distance L_a (km)	Ball screw C_{0a}	Linear guides C_0	
5	ϕ12	4 390	22 800	4 400	5	6 260	16 300	1 450
10	ϕ12	2 740	18 100	4 400	10	3 820	16 300	1 450
20	ϕ12	2 660	14 400	4 400	20	3 800	16 300	1 450

Basic static moment load of linear guide

Slider	Basic static moment load (N · m)		
	Rolling M_{R0}	Pitching M_{P0}	Yawing M_{Y0}
Single	335	133	133

MCH06

Accuracy grade: High grade (H)



Dimension of MCH06 (Single slider)

Reference No.	Nominal stroke (mm)	Stroke limit (mm) (without K1)	Ball screw lead (mm)	Body length (mm)				Inertia × 10⁻⁶ (kg · m²)	Mass (kg)
				L_1	L_2	L_3	n		
◇ MCH06005H05K02	50	53 (65)	5	219	150	100	2	2.38	1.8
◇ MCH06005H10K02	50	53 (65)	10	219	150	100	2	3.45	1.8
◇ MCH06005H20K02	50	53 (65)	20	219	150	100	2	7.25	1.8
MCH06010H05K02	100	103 (115)	5	269	200	100	2	3.17	2.2
MCH06010H10K02	100	103 (115)	10	269	200	100	2	4.12	2.2
MCH06010H20K02	100	103 (115)	20	269	200	100	2	7,92	2.2
MCH06020H05K02	200	203 (215)	5	369	300	200	3	4.51	3.0
MCH06020H10K02	200	203 (215)	10	369	300	200	3	5.46	3.0
MCH06020H20K02	200	203 (215)	20	369	300	200	3	9.26	3.0
MCH06030H05K02	300	303 (315)	5	469	400	300	4	5.85	3.7
MCH06030H10K02	300	303 (315)	10	469	400	300	4	6.80	3.7
MCH06030H20K02	300	303 (315)	20	469	400	300	4	10.6	3.7
MCH06040H05K02	400	403 (415)	5	569	500	400	5	7.18	4.5
MCH06040H10K02	400	403 (415)	10	569	500	400	5	8.13	4.5
MCH06040H20K02	400	403 (415)	20	569	500	400	5	11.9	4.5
MCH06050H05K02	500	503 (515)	5	669	600	500	6	8.52	5.2
MCH06050H10K02	500	503 (515)	10	669	600	500	6	9.47	5.2
MCH06050H20K02	500	503 (515)	20	669	600	500	6	13.3	5.2

Notes 1. Dimension G is 25 for items marked with ◇. 2. The nominal number in the above table is for high-grade grease specifications. In the case of other specifications, see the following table for the 13th and 14th digits.

Coding for columns 13 and 14

Grease	High-grade	Precision-grade
Standard	02	(None)
LG2	B2	B0

Monocarrier dynamic torque specification (N · cm)		
Ball screw lead(mm)	Accuracy grade	
	High grade	Precision
5	1.0 – 4.8	1.9 – 7.6
10	1.1 – 5.8	2.1 – 8.9
20	1.6 – 7.9	2.5 – 10.6

Notes

1. Frictional resistance of NSK K1 is included in dynamic torque in table.
2. Grease is packed into ball screw, linear guide parts and support unit.
3. Consult NSK for life estimates under large moment loads.

Basic load rating

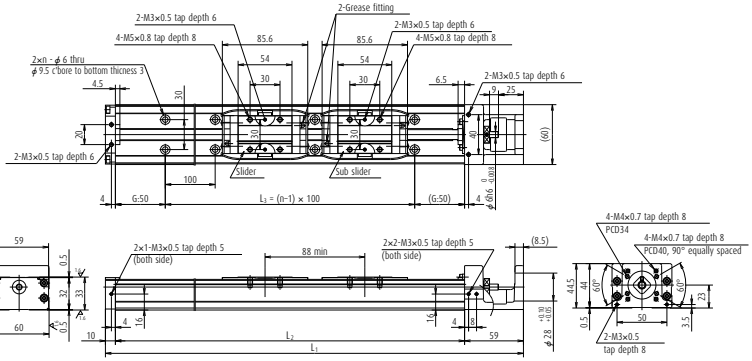
Lead ℓ (mm)	Shaft dia d (mm)	Basic dynamic load rating (N)				Basic static load rating (N)		Support unit load limit (N)
		Ball screw C_a	Linear guides C	Support unit C_a	Rated running distance L_a (km)	Ball screw C_{0a}	Linear guides C_0	
5	ϕ 12	4 390	22 800	4 400	5	6 260	16 300	1 450
10	ϕ 12	2 740	18 100	4 400	10	3 820	16 300	1 450
20	ϕ 12	2 660	14 400	4 400	20	3 800	16 300	1 450

Basic static moment load of linear guide

Slider	Basic static moment load (N · m)		
	Rolling M_{R0}	Pitching M_{P0}	Yawing M_{Y0}
Single	335	133	133

MCH06 (Double slider)

Accuracy grade: High grade (H)



Dimension of MCH06 (Double slider)

Reference No.	Nominal stroke (mm)	Stroke limit (mm) (without K1)	Ball screw lead (mm)	Body length (mm)				Inertia × 10^{-6} (kg · m^2)	Mass (kg)
				L_1	L_2	L_3	n		
MCH06010H05D02	100	115 (139)	5	369	300	200	3	4.82	3.5
MCH06010H10D02	100	115 (139)	10	369	300	200	3	6.72	3.5
MCH06020H05D02	200	215 (239)	5	469	400	300	4	8.06	4.2
MCH06020H10D02	200	215 (239)	10	469	400	300	4	15.7	4.2
MCH06030H05D02	300	315 (339)	5	569	500	400	5	9.40	5.0
MCH06030H10D02	300	315 (339)	10	569	500	400	5	17.0	5.0
MCH06040H10D02	400	415 (439)	10	669	600	500	6	10.7	5.7
MCH06040H20D02	400	415 (439)	20	669	600	500	6	18.3	5.7

Note The nominal number in the above table is for high-grade grease specifications. In the case of other specifications, see the following table for the 13th and 14th digits.

Coding for columns 13 and 14

Grease	High-grade	Precision-grade
Standard	02	(None)
LG2	B2	B0

Monocarrier dynamic torque specification (N · cm)		
Ball screw lead(mm)	Accuracy grade	
	High grade	Precision
5	1.2 – 5.2	2.1 – 8.5
10	1.5 – 9.6	2.5 – 10.7
20	2.3 – 11.8	3.4 – 14.1

Notes

1. Frictional resistance of NSK K1 is included in dynamic torque in table.
2. Grease is packed into ball screw, linear guide parts and support unit.
3. Consult NSK for life estimates under large moment loads.

Basic load rating

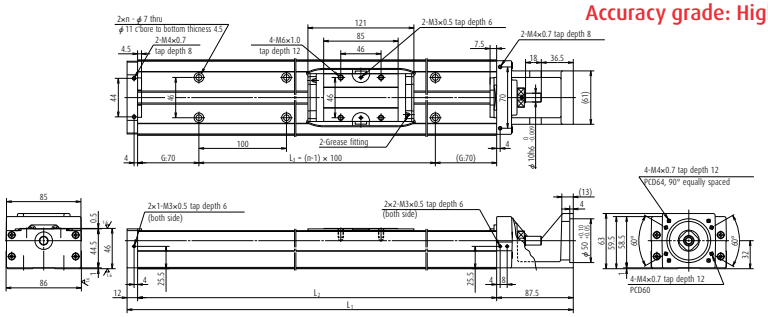
Lead	Shaft dia	Basic dynamic load rating (N)				Basic static load rating (N)		Support unit load limit (N)
ℓ (mm)	d (mm)	Ball screw C_a	Linear guides C	Support unit C_a	Rated running distance L_a (km)	Ball screw C_{0a}	Linear guides C_0	
5	ϕ12	4 390	22 800	4 400	5	6 260	16 300	1 450
10	ϕ12	2 740	18 100	4 400	10	3 820	16 300	1 450
20	ϕ12	2 660	14 400	4 400	20	3 800	16 300	1 450

Basic static moment load of linear guide

Slider	Basic static moment load (N · m)		
	Rolling M_{RO}	Pitching M_{PO}	Yawing M_{YO}
Double	770	730	730

MCH09

Accuracy grade: High grade (H)



Dimension of MCH09 (Single slider)

Reference No.	Nominal stroke (mm)	Stroke limit (mm) (without K1)	Ball screw lead (mm)	Body length (mm)				Inertia × 10⁻⁶ (kg · m²)	Mass (kg)
				L_1	L_2	L_3	n		
MCH09010H05K02	100	107 (121)	5	339.5	240	100	2	9.2	5.0
MCH09010H10K02	100	107 (121)	10	339.5	240	100	2	10.7	5.0
MCH09010H20K02	100	107 (121)	20	339.5	240	100	2	16.8	5.0
MCH09020H05K02	200	207 (221)	5	439.5	340	200	3	12.4	6.5
MCH09020H10K02	200	207 (221)	10	439.5	340	200	3	13.9	6.5
MCH09020H20K02	200	207 (221)	20	439.5	340	200	3	20.0	6.5
MCH09030H05K02	300	307 (321)	5	539.5	440	300	4	15.6	8.1
MCH09030H10K02	300	307 (321)	10	539.5	440	300	4	17.1	8.1
MCH09030H20K02	300	307 (321)	20	539.5	440	300	4	23.2	8.1
MCH09040H05K02	400	407 (421)	5	639.5	540	400	5	18.8	9.7
MCH09040H10K02	400	407 (421)	10	639.5	540	400	5	20.3	9.7
MCH09040H20K02	400	407 (421)	20	639.5	540	400	5	26.4	9.7
MCH09050H05K02	500	507 (521)	5	739.5	640	500	6	22.0	11
MCH09050H10K02	500	507 (521)	10	739.5	640	500	6	23.5	11
MCH09050H20K02	500	507 (521)	20	739.5	640	500	6	29.6	11
MCH09060H05K02	600	607 (621)	5	839.5	740	600	7	25.2	13
MCH09060H10K02	600	607 (621)	10	839.5	740	600	7	26.7	13
MCH09060H20K02	600	607 (621)	20	839.5	740	600	7	32.8	13
MCH09070H05K02	700	707 (721)	5	939.5	840	700	8	28.4	14.5
MCH09070H10K02	700	707 (721)	10	939.5	840	700	8	30.0	14.5
MCH09070H20K02	700	707 (721)	20	939.5	840	700	8	36.0	14.5
MCH09080H05K02	800	807 (821)	5	1 039.5	940	800	9	31.6	16
MCH09080H10K02	800	807 (821)	10	1 039.5	940	800	9	33.2	16
MCH09080H20K02	800	807 (821)	20	1 039.5	940	800	9	39.2	16

Note The nominal number in the above table is for high-grade grease specifications. In the case of other specifications, see the following table for the 13th and 14th digits.

Coding for columns 13 and 14

Grease	High-grade	Precision-grade
Standard	02	(None)
LG2	B2	B0

Monocarrier dynamic torque specification (N · cm)		
Ball screw lead(mm)	Accuracy grade	
	High grade	Precision
5	1.0 – 5.9	2.5 – 11.0
10	2.0 – 7.8	2.8 – 13.4
20	2.0 – 10.8	3.4 – 16.1

Note

1. Frictional resistance of NSK K1 is included in dynamic torque in table.
2. Grease is packed into ball screw, linear guide parts and support unit.
3. Consult NSK for life estimates under large moment loads.

Basic load rating

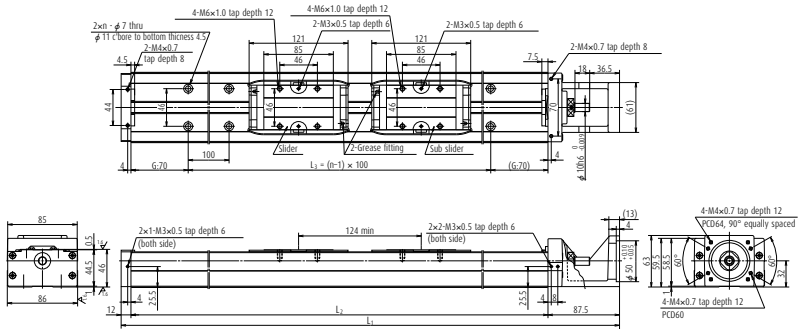
Lead	Shaft dia	Basic dynamic load rating (N)				Basic static load rating (N)		Support unit load limit (N)
ℓ (mm)	d (mm)	Ball screw C_a	Linear guides C	Support unit C_a	Rated running distance L_a (km)	Ball screw C_{0a}	Linear guides C_0	
5	φ15	8 300	40 600	7 100	5	12 700	30 500	3 040
10	φ15	8 140	32 200	7 100	10	12 800	30 500	3 040
20	φ15	5 080	25 500	7 100	20	7 460	30 500	3 040

Basic static moment load of linear guide

Slider	Basic static moment load (N · m)		
	Rolling M_{RO}	Pitching M_{PO}	Yawing M_{YO}
Single	890	385	385

MCH09 (Double slider)

Accuracy grade: High grade (H)



Dimension of MCH09 (Double slider)

Reference No.	Nominal stroke (mm)	Stroke limit (mm) (without K1)	Ball screw lead (mm)	Body length (mm)				Inertia × 10^{-6} (kg · m^2)	Mass (kg)
				L1	L2	L3	n		
MCH09015H05D02	150	183 (211)	5	539.5	440	300	4	16.1	8.9
MCH09015H10D02	150	183 (211)	10	539.5	440	300	4	19.2	8.9
MCH09025H05D02	250	283 (311)	5	639.5	540	400	5	19.3	11
MCH09025H10D02	250	283 (311)	10	639.5	540	400	5	22.4	11
MCH09035H05D02	350	383 (411)	5	739.5	640	500	6	22.5	12
MCH09035H10D02	350	383 (411)	10	739.5	640	500	6	25.6	12
MCH09045H10D02	450	483 (511)	10	839.5	740	600	7	28.8	14
MCH09045H20D02	450	483 (511)	20	839.5	740	600	7	40.9	14
MCH09065H10D02	650	683 (711)	10	1 039.5	940	800	9	35.2	17
MCH09065H20D02	650	683 (711)	20	1 039.5	940	800	9	47.3	17

Note The nominal number in the above table is for high-grade grease specifications. In the case of other specifications, see the following table for the 13th and 14th digits.

Coding for columns 13 and 14

Grease	High-grade	Precision-grade
Standard	02	(None)
LG2	B2	B0

Monocarrier dynamic torque specification (N · cm)		
Ball screw lead(mm)	Accuracy grade	
	High grade	Precision
5	1.5 – 7.0	2.8 – 12.4
10	2.5 – 10.8	3.4 – 16.2
20	4.0 – 17.2	4.5 – 21.7

Notes

1. Frictional resistance of NSK K1 is included in dynamic torque in table.
2. Grease is packed into ball screw, linear guide parts and support unit.
3. Consult NSK for life estimates under large moment loads.

Basic load rating

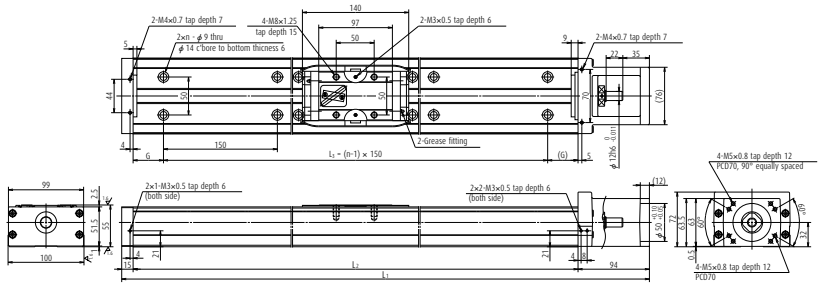
Lead	Shaft dia	Basic dynamic load rating (N)				Basic static load rating (N)		Support unit load limit (N)
ℓ (mm)	d (mm)	Ball screw C_a	Linear guides C	Support unit C_a	Rated running distance L_a (km)	Ball screw C_{0a}	Linear guides C_0	
5	ϕ15	8 300	40 600	7 100	5	12 700	30 500	3 040
10	ϕ15	8 140	32 200	7 100	10	12 800	30 500	3 040
20	ϕ15	5 080	25 500	7 100	20	7 460	30 500	3 040

Basic static moment load of linear guide

Slider	Basic static moment load (N · m)		
	Rolling M_{R0}	Pitching M_{P0}	Yawing M_{Y0}
Double	1 780	2 070	2 070

MCH10

Accuracy grade: High grade (H)



Dimension of MCH10 (Single slider)

Reference No.	Nominal stroke (mm)	Stroke limit (mm) (without K1)	Ball screw lead (mm)	Body length (mm)					Inertia × 10^{-6} (kg · m^2)	Mass (kg)
				L_1	L_2	G	L_3	n		
MCH10010H10K02	100	126 (142)	10	389	280	65	150	2	33.2	7.3
MCH10010H20K02	100	126 (142)	20	389	280	65	150	2	41.1	7.3
MCH10020H10K02	200	226 (242)	10	489	380	40	300	3	43.4	9.5
MCH10020H20K02	200	226 (242)	20	489	380	40	300	3	51.3	9.5
MCH10030H10K02	300	326 (342)	10	589	480	15	450	4	53.7	12
MCH10030H20K02	300	326 (342)	20	589	480	15	450	4	61.6	12
MCH10040H10K02	400	426 (442)	10	689	580	65	450	4	62.4	14
MCH10040H20K02	400	426 (442)	20	689	580	65	450	4	71.8	14
MCH10050H10K02	500	526 (542)	10	789	680	40	600	5	74.7	16
MCH10050H20K02	500	526 (542)	20	789	680	40	600	5	82.3	16
MCH10060H10K02	600	626 (642)	10	889	780	15	750	6	84.9	19
MCH10060H20K02	600	626 (642)	20	889	780	15	750	6	92.5	19
MCH10070H10K02	700	726 (742)	10	989	880	65	750	6	95.1	21
MCH10070H20K02	700	726 (742)	20	989	880	65	750	6	103	21
MCH10080H10K02	800	826 (842)	10	1 089	980	40	900	7	105	23
MCH10080H20K02	800	826 (842)	20	1 089	980	40	900	7	113	23
MCH10090H10K02	900	926 (942)	10	1 189	1 080	15	1 050	8	116	25
MCH10090H20K02	900	926 (942)	20	1 189	1 080	15	1 050	8	123	25
MCH10100H10K02	1 000	1 026 (1 042)	10	1 289	1 180	65	1 050	8	126	27
MCH10100H20K02	1 000	1 026 (1 042)	20	1 289	1 180	65	1 050	8	133	27
MCH10110H10K02	1 100	1 126 (1 142)	10	1 389	1 280	40	1 200	9	136	29
MCH10110H20K02	1 100	1 126 (1 142)	20	1 389	1 280	40	1 200	9	143	29
MCH10120H10K02	1 200	1 226 (1 242)	10	1 489	1 380	15	1 350	10	146	32
MCH10120H20K02	1 200	1 226 (1 242)	20	1 489	1 380	15	1 350	10	154	32

Note The nominal number in the above table is for high-grade grease specifications. In the case of other specifications, see the following table for the 13th and 14th digits.

Coding for columns 13 and 14

Grease	High-grade	Precision-grade
Standard	02	(None)
LG2	B2	B0

Monocarrier dynamic torque specification (N · cm)		
Ball screw lead(mm)	Accuracy grade	
	High grade	Precision
10	2.7 – 10.8	3.3 – 17.5
20	3.1 – 12.7	3.8 – 20.4

Notes

1. Frictional resistance of NSK K1 is included in dynamic torque in table.
2. Grease is packed into ball screw, linear guide parts and support unit.
3. Consult NSK for life estimates under large moment loads.

Basic load rating

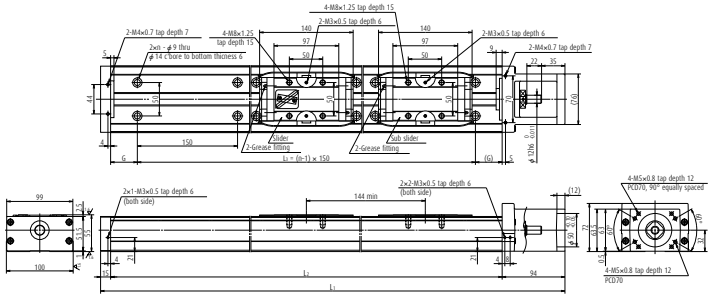
Lead	Shaft dia	Basic dynamic load rating (N)				Basic static load rating (N)		
ℓ (mm)	d (mm)	Ball screw C_a	Linear guides C	Support unit C_a	Rated running distance L_a (km)	Ball screw C_{0a}	Linear guides C_0	Support unit load limit (N)
10	φ 20	12 800	44 600	7 600	10	21 400	42 000	3 380
20	φ 20	8 190	35 400	7 600	20	12 600	42 000	3 380

Basic static moment load of linear guide

Slider	Basic static moment load (N · m)		
	Rolling M_{RO}	Pitching M_{PO}	Yawing M_{YO}
Single	1 460	610	610

MCH10

Accuracy grade: High grade (H)



Dimension of MCH10 (Double slider)

Reference No.	Nominal stroke (mm)	Stroke limit (mm) (without K1)	Ball screw lead (mm)	Body length (mm)					Inertia × 10^{-6} (kg · m^2)	Mass (kg)
				L_1	L_2	G	L_3	n		
MCH10025H10D02	250	282 (314)	10	689	580	65	450	4	67.1	15
MCH10025H20D02	250	282 (314)	20	689	580	65	450	4	82.4	15
MCH10035H10D02	350	382 (414)	10	789	680	40	600	5	77.3	17
MCH10035H20D02	350	382 (414)	20	789	680	40	600	5	92.5	17
MCH10045H10D02	450	482 (514)	10	889	780	15	750	6	87.5	20
MCH10045H20D02	450	482 (514)	20	889	780	15	750	6	103	20
MCH10055H10D02	550	582 (614)	10	989	880	65	750	6	97.7	22
MCH10055H20D02	550	582 (614)	20	989	880	65	750	6	113	22
MCH10065H10D02	650	682 (714)	10	1 089	980	40	900	7	108	24
MCH10065H20D02	650	682 (714)	20	1 089	980	40	900	7	123	24
MCH10075H20D02	750	782 (814)	20	1 189	1 080	15	1 050	8	133	26
MCH10085H20D02	850	882 (914)	20	1 289	1 180	65	1 050	8	143	28
MCH10095H20D02	950	982 (1 014)	20	1 389	1 280	40	1 200	9	154	30
MCH10105H20D02	1 050	1 082 (1 114)	20	1 489	1 380	15	1 350	10	164	33

Note: The nominal number in the above table is for high-grade grease specifications. In the case of other specifications, see the following table for the 13th and 14th digits.

Coding for columns 13 and 14

Grease	High-grade	Precision-grade
Standard	02	(None)
LG2	B2	B0

Monocarrier dynamic torque specification (N · cm)		
Ball screw lead(mm)	Accuracy grade	
	High grade	Precision
10	4.2 – 15.6	4.4 – 21.6
20	5.0 – 19.6	5.6 – 27.4

Notes
1. Frictional resistance of NSK K1 is included in dynamic torque in table.
2. Grease is packed into ball screw, linear guide parts and support unit.
3. Consult NSK for life estimates under large moment loads.

Basic load rating

Lead	Shaft dia	Basic dynamic load rating (N)				Basic static load rating (N)		Support unit load limit (N)
ℓ (mm)	d (mm)	Ball screw C_a	Linear guides C	Support unit C_a	Rated running distance L_a (km)	Ball screw C_{0a}	Linear guides C_0	
10	ϕ 20	12 800	44 600	7 600	10	21 400	42 000	3 380
20	ϕ 20	8 190	35 400	7 600	20	12 600	42 000	3 380

Basic static moment load of linear guide

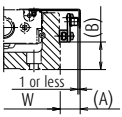
Slider	Basic static moment load (N · m)		
	Rolling M_{R0}	Pitching M_{P0}	Yawing M_{Y0}
Double	2 920	3 430	3 430

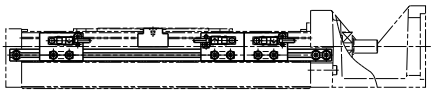
3. MCH Series Accessories

(1) Sensor Unit

› Proximity switch

Sensor rail is not included in a sensor unit.





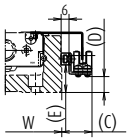
(Example of assembly)

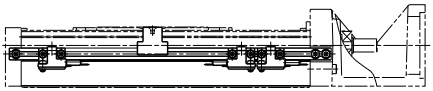
Model No.		Reference No.			A (mm)	B (mm)	Body width W (mm)
MCH06		MC-SRH06-10	MC-SRH06-11	MC-SRH06-12	17	10	60
MCH09		MC-SRH09-10	MC-SRH09-11	MC-SRH09-12	16	21	86
MCH10		MC-SRH10-10	MC-SRH10-11	MC-SRH10-12	16	16	100
Quantity	Proximity switch (normally open contact)	—	3	1	E2S-W13 (OMRON Corp.)		
	Proximity switch (normally close contact)	3	—	2	E2S-W14 (OMRON Corp.)		

Notes 1. A sensor unit consists of sensors, a sensor dog and sensor mounting parts.

› Photo sensor

Sensor rail is not included in a sensor unit.





(Example of assembly)

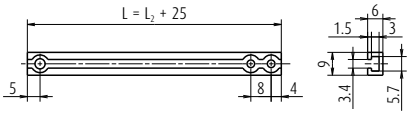
Model No.	Reference No.	C (mm)	D (mm)	E (mm)	Body width W (mm)	Remarks
MCH06	MC-SRH06-13	24	2	11	60	EE-SX674 (OMRON Corp.) 3 sets (EE-1001 connector attachment)
MCH09	MC-SRH09-13	23	12	21	86	EE-SX674 (OMRON Corp.) 3 sets (EE-1001 connector attachment)
MCH10	MC-SRH10-13	23	29	16	100	EE-SX674 (OMRON Corp.) 3 sets (EE-1001 connector attachment)

Notes 1. A sensor unit consists of sensors, a sensor dog and sensor mounting parts.

1) Sensor rail

Reference number: MC-SRL- * * * *

› * * * * is the same as rail dimension L_2.



Note: For combinations of sensors and rails, see page 421.

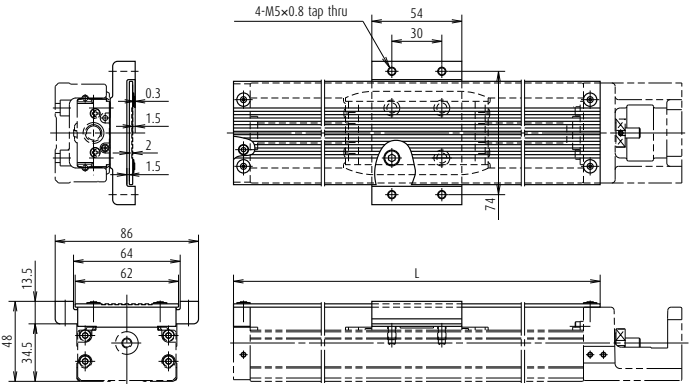
4. Body of MCH Series and Sensor Rail Combination Table

Table 4

Model No.	Body length L_2 (mm)	Reference No.	Sensor rail reference No.
MCH06	150	MCH06005H05K02	MC-SRL-0150
MCH06	150	MCH06005H10K02	MC-SRL-0150
MCH06	150	MCH06005H20K02	MC-SRL-0150
MCH06	200	MCH06010H05K02	MC-SRL-0200
MCH06	200	MCH06010H10K02	MC-SRL-0200
MCH06	200	MCH06010H20K02	MC-SRL-0200
MCH06	300	MCH06020H05K02	MC-SRL-0300
MCH06	300	MCH06020H10K02	MC-SRL-0300
MCH06	300	MCH06020H20K02	MC-SRL-0300
MCH06	300	MCH06010H05D02	MC-SRL-0300
MCH06	300	MCH06010H10D02	MC-SRL-0300
MCH06	400	MCH06030H05K02	MC-SRL-0400
MCH06	400	MCH06030H10K02	MC-SRL-0400
MCH06	400	MCH06030H20K02	MC-SRL-0400
MCH06	400	MCH06020H05D02	MC-SRL-0400
MCH06	400	MCH06020H10D02	MC-SRL-0400
MCH06	500	MCH06040H05K02	MC-SRL-0500
MCH06	500	MCH06040H10K02	MC-SRL-0500
MCH06	500	MCH06040H20K02	MC-SRL-0500
MCH06	500	MCH06030H05D02	MC-SRL-0500
MCH06	500	MCH06030H10D02	MC-SRL-0500
MCH06	600	MCH06050H05K02	MC-SRL-0600
MCH06	600	MCH06050H10K02	MC-SRL-0600
MCH06	600	MCH06050H20K02	MC-SRL-0600
MCH06	600	MCH06040H10D02	MC-SRL-0600
MCH06	600	MCH06040H20D02	MC-SRL-0600
MCL06	150	MCL06005H05K02	MC-SRL-0150
MCL06	150	MCL06005H10K02	MC-SRL-0150
MCL06	200	MCL06010H05K02	MC-SRL-0200
MCL06	200	MCL06010H10K02	MC-SRL-0200
MCL06	300	MCL06020H05K02	MC-SRL-0300
MCL06	300	MCL06020H10K02	MC-SRL-0300
MCL06	400	MCL06030H10K02	MC-SRL-0400
MCL06	400	MCL06030H20K02	MC-SRL-0400
MCL06	500	MCL06040H10K02	MC-SRL-0500
MCL06	500	MCL06040H20K02	MC-SRL-0500
MCL06	600	MCL06050H10K02	MC-SRL-0600
MCL06	600	MCL06050H20K02	MC-SRL-0600
MCH09	240	MCH09010H05K02	MC-SRL-0240
MCH09	240	MCH09010H10K02	MC-SRL-0240
MCH09	240	MCH09010H20K02	MC-SRL-0240
MCH09	340	MCH09020H05K02	MC-SRL-0340
MCH09	340	MCH09020H10K02	MC-SRL-0340
MCH09	340	MCH09020H20K02	MC-SRL-0340
MCH09	440	MCH09030H05K02	MC-SRL-0440
MCH09	440	MCH09030H10K02	MC-SRL-0440
MCH09	440	MCH09030H20K02	MC-SRL-0440
MCH09	440	MCH09015H05D02	MC-SRL-0440
MCH09	440	MCH09015H10D02	MC-SRL-0440
MCH09	540	MCH09040H05K02	MC-SRL-0540
MCH09	540	MCH09040H10K02	MC-SRL-0540
MCH09	540	MCH09040H20K02	MC-SRL-0540
MCH09	540	MCH09025H05D02	MC-SRL-0540
MCH09	540	MCH09025H10D02	MC-SRL-0540
MCH09	640	MCH09050H05K02	MC-SRL-0640
MCH09	640	MCH09050H10K02	MC-SRL-0640
MCH09	640	MCH09050H20K02	MC-SRL-0640
MCH09	640	MCH09035H05D02	MC-SRL-0640
MCH09	640	MCH09035H10D02	MC-SRL-0640
MCH09	740	MCH09060H05K02	MC-SRL-0740
MCH09	740	MCH09060H10K02	MC-SRL-0740
MCH09	740	MCH09060H20K02	MC-SRL-0740
MCH09	740	MCH09045H10D02	MC-SRL-0740
MCH09	740	MCH09045H20D02	MC-SRL-0740
MCH09	840	MCH09070H05K02	MC-SRL-0840
MCH09	840	MCH09070H10K02	MC-SRL-0840
MCH09	840	MCH09070H20K02	MC-SRL-0840
MCH09	940	MCH09080H05K02	MC-SRL-0940
MCH09	940	MCH09080H10K02	MC-SRL-0940
MCH09	940	MCH09080H20K02	MC-SRL-0940
MCH09	940	MCH09065H10D02	MC-SRL-0940
MCH09	940	MCH09065H20D02	MC-SRL-0940
MCH10	280	MCH10010H10K02	MC-SRL-0280
MCH10	280	MCH10010H20K02	MC-SRL-0280
MCH10	380	MCH10020H10K02	MC-SRL-0380
MCH10	380	MCH10020H20K02	MC-SRL-0380
MCH10	480	MCH10030H10K02	MC-SRL-0480
MCH10	480	MCH10030H20K02	MC-SRL-0480
MCH10	580	MCH10040H10K02	MC-SRL-0580
MCH10	580	MCH10025H10D02	MC-SRL-0580
MCH10	680	MCH10050H10K02	MC-SRL-0680
MCH10	680	MCH10050H20K02	MC-SRL-0680
MCH10	680	MCH10035H10D02	MC-SRL-0680
MCH10	680	MCH10035H20D02	MC-SRL-0680
MCH10	780	MCH10060H10K02	MC-SRL-0780
MCH10	780	MCH10060H20K02	MC-SRL-0780
MCH10	780	MCH10045H10D02	MC-SRL-0780
MCH10	780	MCH10045H20D02	MC-SRL-0780
MCH10	880	MCH10070H10K02	MC-SRL-0880
MCH10	880	MCH10070H20K02	MC-SRL-0880
MCH10	880	MCH10055H10D02	MC-SRL-0880
MCH10	880	MCH10055H20D02	MC-SRL-0880
MCH10	980	MCH10080H10K02	MC-SRL-0980
MCH10	980	MCH10080H20K02	MC-SRL-0980
MCH10	980	MCH10065H10D02	MC-SRL-0980
MCH10	980	MCH10065H20D02	MC-SRL-0980
MCH10	1 080	MCH10090H10K02	MC-SRL-1080
MCH10	1 080	MCH10090H20K02	MC-SRL-1080
MCH10	1 080	MCH10075H20D02	MC-SRL-1080
MCH10	1 180	MCH10100H10K02	MC-SRL-1080
MCH10	1 180	MCH10100H20K02	MC-SRL-1180
MCH10	1 180	MCH10085H20D02	MC-SRL-1080
MCH10	1 280	MCH10110H10K02	MC-SRL-1280
MCH10	1 280	MCH10110H20K02	MC-SRL-1280
MCH10	1 280	MCH10095H20D02	MC-SRL-1280
MCH10	1 380	MCH10120H10K02	MC-SRL-1380
MCH10	1 380	MCH10120H20K02	MC-SRL-1380
MCH10	1 380	MCH10105H20D02	MC-SRL-1380

5. Cover Unit

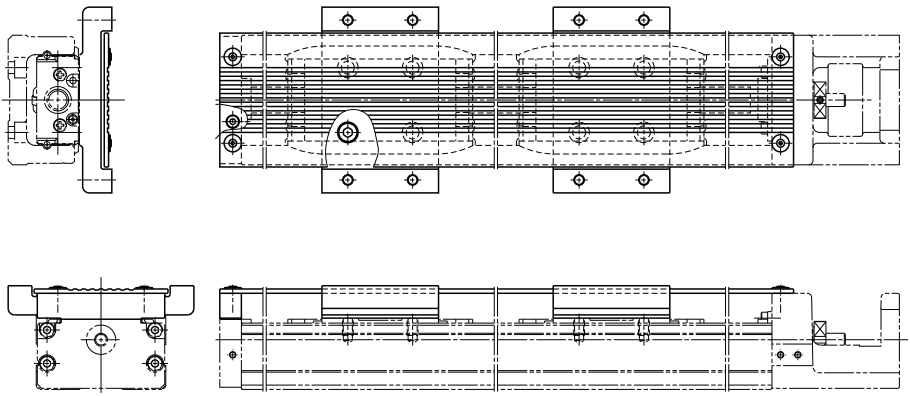
Cover unit for MCH06 and MCL06



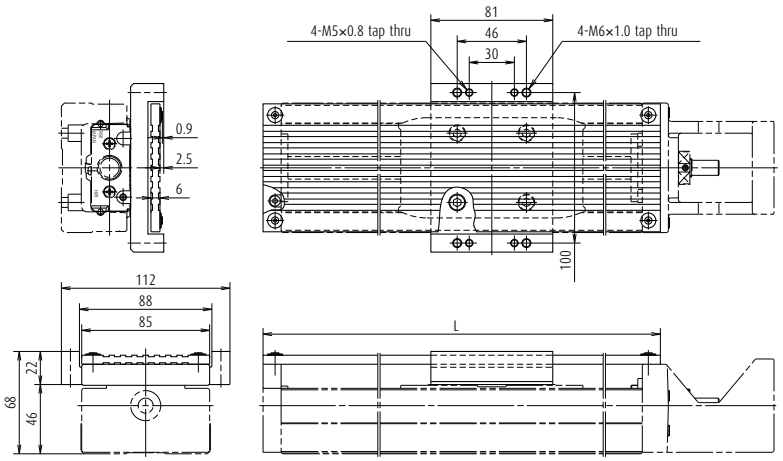
Unit: mm

Single slider		Double slider		Top cover length
Stroke	Reference No.	Stroke	Reference No.	L
50	MC-HV06005-00	–	–	170
100	MC-HV06010-00	–	–	220
200	MC-HV06020-00	100	MC-HV06010D00	320
300	MC-HV06030-00	200	MC-HV06020D00	420
400	MC-HV06040-00	300	MC-HV06030D00	520
500	MC-HV06050-00	400	MC-HV06040D00	620

› **Cover unit for double sliders**
Two spacers are provided for double slider.



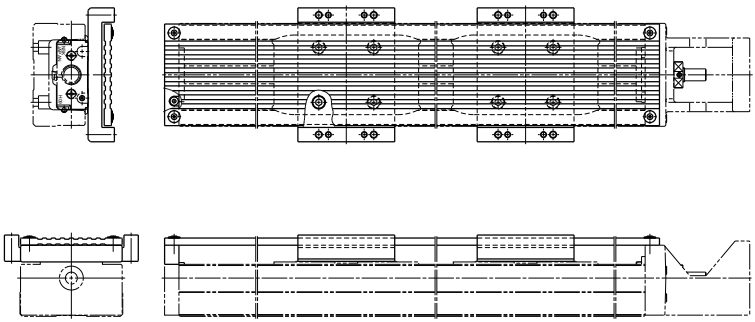
Cover unit for MCH09



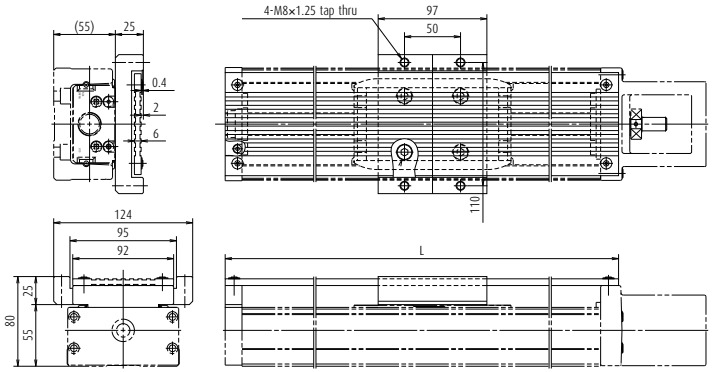
Unit: mm

Single slider		Double slider		Top cover length
Stroke	Reference No.	Stroke	Reference No.	L
100	MC-HV09010-00	–	–	264
200	MC-HV09020-00	–	–	364
300	MC-HV09030-00	150	MC-HV09015D00	464
400	MC-HV09040-00	250	MC-HV09025D00	564
500	MC-HV09050-00	350	MC-HV09035D00	664
600	MC-HV09060-00	450	MC-HV09045D00	764
700	MC-HV09070-00	–	–	864
800	MC-HV09080-00	650	MC-HV09065D00	964

› **Cover unit for double sliders**
Two spacers are provided for double slider.



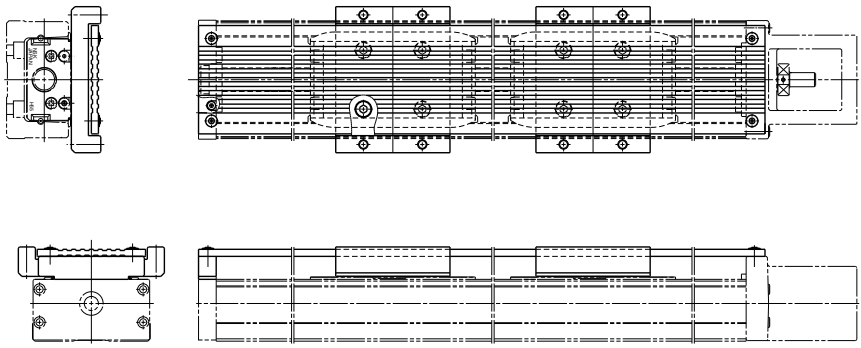
Cover unit for MCH10



Unit: mm

Single slider		Double slider		Top cover length
Stroke	Reference No.	Stroke	Reference No.	L
100	MC-HV10010-00	–	–	310
200	MC-HV10020-00	–	–	410
300	MC-HV10030-00	–	–	510
400	MC-HV10040-00	250	MC-HV10025D00	610
500	MC-HV10050-00	350	MC-HV10035D00	710
600	MC-HV10060-00	450	MC-HV10045D00	810
700	MC-HV10070-00	550	MC-HV10055D00	910
800	MC-HV10080-00	650	MC-HV10065D00	1 010
900	MC-HV10090-00	750	MC-HV10075D00	1 110
1 000	MC-HV10100-00	850	MC-HV10085D00	1 210
1 100	MC-HV10110-00	950	MC-HV10095D00	1 310
1 200	MC-HV10120-00	1 050	MC-HV10105D00	1 410

› **Cover unit for double sliders**
Two spacers are provided for double slider.

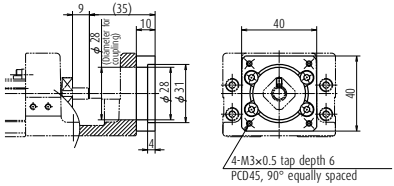


6. Intermediate Plate for Motor

› Please ask NSK about motors not listed in compatible motor list.
› In case of parallel motor mount, please consult with NSK.
› Be sure to align centerlines when installing motor.
› Motor models are subject to change at the motor manufacturers. For details, please contact the manufacturer.

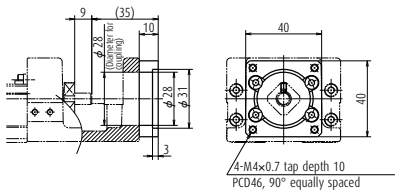
Motor Bracket for MCH06 and MCL06

Reference number: MC-BKH06-145-00



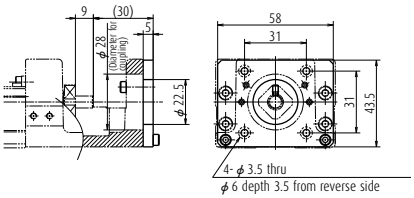
Compatible motor	
Maker	**Motor models**
Panasonic Co., Ltd.	MSMD5A(50W), MSMD01(100W)

Reference number: MC-BKH06-146-00



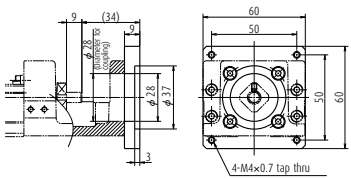
Compatible motor	
Maker	**Motor models**
YASKAWA Electric Corp.	SGMAH-A3(30W), SGMJV-A5A(50W), SGMAV-A5A(50W) SGMJV-01A(100W), SGMAV-01A(100W)
Mitsubishi Electric Corp.	HF-KP053(50W), HF-MP053(50W), HC-KFS053(50W) HC-MFS053(50W), HF-KP13(100W), HF-MP13(100W) HC-KFS13(100W), HC-MFS13(100W)
OMRON Corp.	R88M-W03(30W), R88M-W05(50W), R88M-W10(100W)
SANYO DENKI Co., Ltd.	P30B04xxx P Series

Reference number: MC-BKH06-231-00



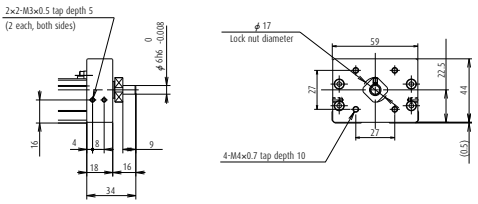
Compatible motor	
Maker	**Motor models**
ORIENTAL MOTOR Co., Ltd.	AS46, ASC46, UPK54x, PK54x, CSK54x, CFK54x, UMK24x, CSK24x, PK24x
SANYO DENKI Co., Ltd.	PBM423xxx, 103F55xx

Reference number: MC-BKH06-250-00



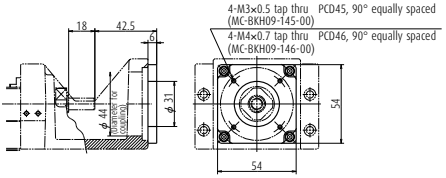
Compatible motor	
Maker	**Motor models**
ORIENTAL MOTOR Co., Ltd.	AS66, ASC66, UPK56x, UFK56x, PK56x, CSK56x, CFK56x
OMRON Corp.	MUMS02(200W), MUMS04(400W)
SANYO DENKI Co., Ltd.	PBM603xx, PBM604xx, 103F78xx

Diameter of ball screw shaft end to install a pulley for parallel motor mount of MCH06



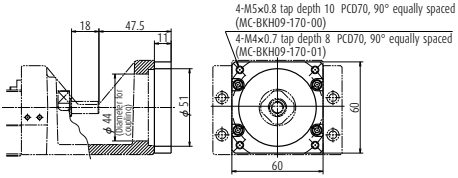
Motor Bracket for MCH09

Reference number: MC-BKH09-145-00, MC-BKH09-146-00



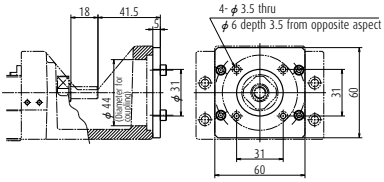
Reference No.	Compatible motor	
	Maker	Motor models
MC-BKH09-145-00	Panasonic Co., Ltd.	MSMD5A(50W), MSMD01(100W)
MC-BKH09-146-00	YASKAWA Electric Corp.	SGMJV-A5A(50W), SGMAV-A5A(50W) SGMJV-01A(100W), SGMAV-01A(100W)
MC-BKH09-146-00	Mitsubishi Electric Corp.	HF-KP053(50W), HF-MP05(50W), HC-KFS053(50W), HC-MFS053(50W), HF-KP13(100W), HF-MP13(100W) HC-KFS13(100W), HC-MFS13(100W)
MC-BKH09-146-00	OMRON Corp.	R88M-W05(50W), R88M-W10(100W)
MC-BKH09-146-00	SANYO DENKI Co., Ltd.	P30B04xxx P Series

Reference number: MC-BKH09-170-00, MC-BKH09-170-01



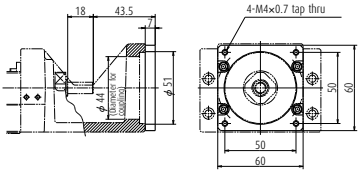
Reference No.	Compatible motor	
	Maker	Motor models
MC-BKH09-170-00	YASKAWA Electric Corp.	SGMJV-02A(200W), SGMAV-02A(200W), SGMJV-04A(400W), SGMAV-04A(400W)
MC-BKH09-170-00	Mitsubishi Electric Corp.	HF-KP23(200W), HF-MP23(200W), HF-KP43(400W), HF-MP43(400W), HC-KFS23(200W), HC-MFS23(200W), HC-KFS43(400W), HC-MFS43(400W)
MC-BKH09-170-00	OMRON Corp.	R88M-W20(200W), R88M-W40(400W)
MC-BKH09-170-00	SANYO DENKI Co., Ltd.	P30B06xxx P Series
MC-BKH09-170-01	Panasonic Co., Ltd.	MSMD02(200W), MSMA02(200W), MSMA04(400W), MSMD04(400W)

Reference number: MC-BKH09-231-00



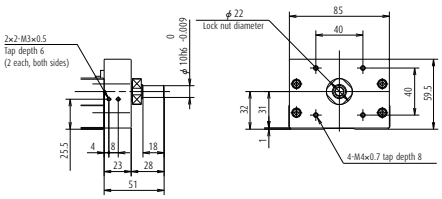
Compatible motor	
Maker	Motor models
SANYO DENKI Co., Ltd.	PBM423xxx, 103F55xx
ORIENTAL MOTOR Co., Ltd.	AS46, ASC46, UPK54x, PK54x, CSK54x, CFK54x, UMK24x, CSK24x, PK24x

Reference number: MC-BKH09-250-00



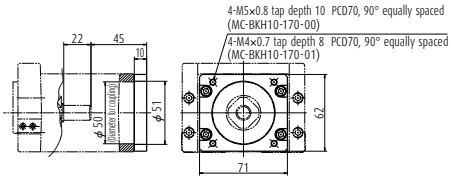
Compatible motor	
Maker	Motor models
SANYO DENKI Co., Ltd.	PBM603xx, PBM604xx, 103F78xx
ORIENTAL MOTOR Co., Ltd.	AS66, ASC66, UPK56x, UFK56x, PK56x, CSK56x, CFK56x

Diameter of ball screw shaft end to install a pulley for parallel motor mount of MCH09



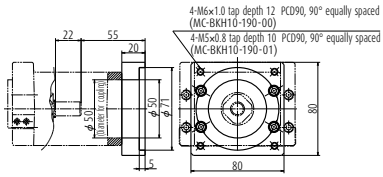
Motor Bracket for MCH10

Reference number: MC-BKH10-170-00, MC-BKH10-170-01



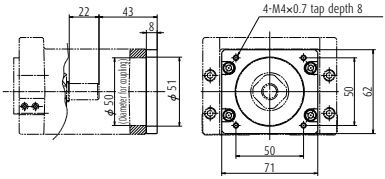
Reference No.	Compatible motor	
	Maker	Motor models
MC-BKH10-170-00	YASKAWA Electric Corp.	SGMJV-02A(200W), SGMAV-02A(200W), SGMJV-04A(400W), SGMAV-04A(400W)
MC-BKH10-170-00	Mitsubishi Electric Corp.	HF-KP23(200W), HF-MP23(200W), HF-KP43(400W), HF-MP43(400W), HC-KFS23(200W), HC-MFS23(200W), HC-KFS43(400W), HC-MFS43(400W)
MC-BKH10-170-00	OMRON Corp.	R88M-W20(200W), R88M-W40(400W)
MC-BKH10-170-00	SANYO DENKI Co., Ltd.	P30B06xxx P Series
MC-BKH10-170-01	Panasonic Co., Ltd.	MSMD02(200W), MSMA02(200W), MSMD04(400W), MSMA04(400W)

Reference number: MC-BKH10-190-00, MC-BKH10-190-01



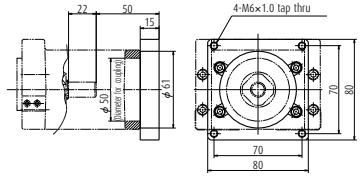
Reference No.	Compatible motor	
	Maker	Motor models
MC-BKH10-190-00	Mitsubishi Electric Corp.	HC-KFS73(750W), HC-MFS73(750W), HF-KP73(750W), HF-MP73(750W)
MC-BKH10-190-01	SANYO DENKI Co., Ltd.	P50B07xxx P Series

Reference number: MC-BKH10-250-00



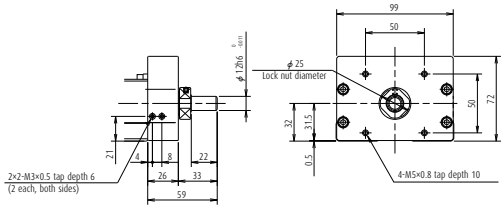
Compatible motor	
Maker	Motor models
SANYO DENKI Co., Ltd.	PBM603xx, PBM604xx, 103F78xx
ORIENTAL MOTOR Co., Ltd.	AS66, ASC66, UPK56x, PK56x, CSK56x, CFK56x, UMK56x, UFK56X

Reference number: MC-BKH10-270-00



Compatible motor	
Maker	Motor models
ORIENTAL MOTOR Co., Ltd.	AS98, ASC98, UPK59x, PK59x, CSK59x, CFK59x, UMK59x, UFK59x

Diameter of ball screw shaft end to install a pulley for parallel motor mount of MCH10



7. Motor Availability Table of Intermediate Plate for MCH Series

Table 5

Model No.	Reference No. code	Motor bracket reference No.	Motor manufacturer	Stepping motor model No.	Wattage of AC servo motor					
					30	50	100	200	400	750
	1	MC-BKH06-145-00	Panasonic Co., Ltd.			MSMD5A	MSMD01			
	2	MC-BKH06-146-00	YASKAWA Electric Corp.		SGMAH-A3	SGMJV-A5A	SGMJV-01A			
		MC-BKH06-146-00	YASKAWA Electric Corp.			SGMAV-A5A	SGMAV-01A			
		MC-BKH06-146-00	Mitsubishi Electric Corp.			HF-KP053	HF-KP13			
		MC-BKH06-146-00	Mitsubishi Electric Corp.			HF-MP053	HF-MP13			
		MC-BKH06-146-00	Mitsubishi Electric Corp.			HC-KFS053	HC-KFS13			
		MC-BKH06-146-00	Mitsubishi Electric Corp.			HC-MFS053	HC-MFS13			
		MC-BKH06-146-00	OMRON Corp.		R88M-W03	R88M-W05	R88M-W10			
		MC-BKH06-146-00	SANYO DENKI Co., Ltd.	P30B04xxx (P Series)						
	3	MC-BKH06-231-00	SANYO DENKI Co., Ltd.	PBM423xxx						
		MC-BKH06-231-00	SANYO DENKI Co., Ltd.	103F55xx						
MCH06		MC-BKH06-231-00	ORIENTAL MOTOR Co., Ltd.	AS46 , ASC46						
MCL06		MC-BKH06-231-00	ORIENTAL MOTOR Co., Ltd.	UPK54x , PK54x						
		MC-BKH06-231-00	ORIENTAL MOTOR Co., Ltd.	CSK54x , CFK54x						
		MC-BKH06-231-00	ORIENTAL MOTOR Co., Ltd.	UMK24x , CSK24x						
		MC-BKH06-231-00	ORIENTAL MOTOR Co., Ltd.	PK24x						
	4	MC-BKH06-250-00	SANYO DENKI Co., Ltd.	PBM603xx						
		MC-BKH06-250-00	SANYO DENKI Co., Ltd.	PBM604xx						
		MC-BKH06-250-00	SANYO DENKI Co., Ltd.	103F78xx						
		MC-BKH06-250-00	ORIENTAL MOTOR Co., Ltd.	AS66 , ASC66						
		MC-BKH06-250-00	ORIENTAL MOTOR Co., Ltd.	UPK56x , UFK56x						
		MC-BKH06-250-00	ORIENTAL MOTOR Co., Ltd.	PK56x , CSK56x						
		MC-BKH06-250-00	ORIENTAL MOTOR Co., Ltd.	CFK56x						
		MC-BKH06-250-00	OMRON Corp.					MUMS02	MUMS04	
	1	MC-BKH09-145-00	Panasonic Co., Ltd.			MSMD5A	MSMD01			
	2	MC-BKH09-146-00	YASKAWA Electric Corp.			SGMJV-A5A	SGMJV-01A			
		MC-BKH09-146-00	YASKAWA Electric Corp.			SGMAV-A5A	SGMAV-01A			
		MC-BKH09-146-00	Mitsubishi Electric Corp.			HF-KP053	HF-KP13			
		MC-BKH09-146-00	Mitsubishi Electric Corp.			HF-MP05	HF-MP13			
		MC-BKH09-146-00	Mitsubishi Electric Corp.			HC-KFS053	HC-KFS13			
		MC-BKH09-146-00	Mitsubishi Electric Corp.			HC-MFS053	HC-MFS13			
		MC-BKH09-146-00	OMRON Corp.			R88M-W05	R88M-W10			
		MC-BKH09-146-00	SANYO DENKI Co., Ltd.	P30B04xxx (P Series)						
	3	MC-BKH09-170-00	YASKAWA Electric Corp.					SGMJV-02A	SGMJV-04A	
		MC-BKH09-170-00	YASKAWA Electric Corp.					SGMAV-02A	SGMAV-04A	
		MC-BKH09-170-00	Mitsubishi Electric Corp.					HF-KP23	HF-KP43	
		MC-BKH09-170-00	Mitsubishi Electric Corp.					HF-MP23	HF-MP43	
		MC-BKH09-170-00	Mitsubishi Electric Corp.					HC-KFS23	HC-KFS43	
		MC-BKH09-170-00	Mitsubishi Electric Corp.					HC-MFS23	HC-MFS43	
		MC-BKH09-170-00	OMRON Corp.					R88M-W20	R88M-W40	
MCH09		MC-BKH09-170-00	SANYO DENKI Co., Ltd.	P30B06xxx (P Series)						
	4	MC-BKH09-170-01	Panasonic Co., Ltd.					MSMD02	MSMD04	
		MC-BKH09-170-01	Panasonic Co., Ltd.					MSMA02	MSMA04	
	5	MC-BKH09-231-00	SANYO DENKI Co., Ltd.	PBM423xxx						
		MC-BKH09-231-00	SANYO DENKI Co., Ltd.	103F55xx						
		MC-BKH09-231-00	ORIENTAL MOTOR Co., Ltd.	AS46 , ASC46						
		MC-BKH09-231-00	ORIENTAL MOTOR Co., Ltd.	UPK54x , PK54x						
		MC-BKH09-231-00	ORIENTAL MOTOR Co., Ltd.	CSK54x , CFK54x						
		MC-BKH09-231-00	ORIENTAL MOTOR Co., Ltd.	UMK24x , CSK24x						
		MC-BKH09-231-00	ORIENTAL MOTOR Co., Ltd.	PK24x						
	6	MC-BKH09-250-00	SANYO DENKI Co., Ltd.	PBM603xx						
		MC-BKH09-250-00	SANYO DENKI Co., Ltd.	PBM604xx						
		MC-BKH09-250-00	SANYO DENKI Co., Ltd.	103F78xx						
		MC-BKH09-250-00	ORIENTAL MOTOR Co., Ltd.	AS66 , ASC66						
		MC-BKH09-250-00	ORIENTAL MOTOR Co., Ltd.	UPK56x , UFK56x						
		MC-BKH09-250-00	ORIENTAL MOTOR Co., Ltd.	PK56x , CSK56x						
		MC-BKH09-250-00	ORIENTAL MOTOR Co., Ltd.	CFK56x						
	1	MC-BKH10-170-00	YASKAWA Electric Corp.					SGMJV-02A	SGMJV-04A	
		MC-BKH10-170-00	YASKAWA Electric Corp.					SGMAV-02A	SGMAV-04A	
		MC-BKH10-170-00	Mitsubishi Electric Corp.					HF-KP23	HF-KP43	
		MC-BKH10-170-00	Mitsubishi Electric Corp.					HF-MP23	HF-MP43	
		MC-BKH10-170-00	Mitsubishi Electric Corp.					HC-KFS23	HC-KFS43	
		MC-BKH10-170-00	Mitsubishi Electric Corp.					HC-MFS23	HC-MFS43	
		MC-BKH10-170-00	OMRON Corp.					R88M-W20	R88M-W40	
		MC-BKH10-170-00	SANYO DENKI Co., Ltd.	P30B06xxx (P Series)						
	2	MC-BKH10-170-01	Panasonic Co., Ltd.					MSMD02	MSMD04	
		MC-BKH10-170-01	Panasonic Co., Ltd.					MSMA02	MSMA04	
	3	MC-BKH10-190-00	Mitsubishi Electric Corp.							HC-KFS73
		MC-BKH10-190-00	Mitsubishi Electric Corp.							HC-MFS73
		MC-BKH10-190-00	Mitsubishi Electric Corp.							HF-KP73
MCH10		MC-BKH10-190-00	Mitsubishi Electric Corp.							HF-MP73
	4	MC-BKH10-190-01	SANYO DENKI Co., Ltd.	P50B07xxx (P Series)						
	5	MC-BKH10-250-00	SANYO DENKI Co., Ltd.	PBM603xx						
		MC-BKH10-250-00	SANYO DENKI Co., Ltd.	PBM604xx						
		MC-BKH10-250-00	SANYO DENKI Co., Ltd.	103F78xx						
		MC-BKH10-250-00	ORIENTAL MOTOR Co., Ltd.	AS66 , ASC66						
		MC-BKH10-250-00	ORIENTAL MOTOR Co., Ltd.	UPK56x , PK56x						
		MC-BKH10-250-00	ORIENTAL MOTOR Co., Ltd.	CSK56x , CFK56x						
		MC-BKH10-250-00	ORIENTAL MOTOR Co., Ltd.	UMK56x , UFK56x						
	6	MC-BKH10-270-00	ORIENTAL MOTOR Co., Ltd.	AS98 , ASC98						
		MC-BKH10-270-00	ORIENTAL MOTOR Co., Ltd.	UPK59x , PK59x						
		MC-BKH10-270-00	ORIENTAL MOTOR Co., Ltd.	CSK59x , CFK59x						
		MC-BKH10-270-00	ORIENTAL MOTOR Co., Ltd.	UMK59x , UFK59x						

1. Specifications for Special Environments

(1) Linear guide

Table 1 Linear guide specifications

Environment	Condition	NSK linear guide specifications				Technical Explanation Page No.
		Rail, slide	Steel balls/rollers	Ball recirculation component	Lubrication/surface treatment	
Clean	Atmosphere, normal temperature	Standard material	Standard material	Standard material	LG2, LGU Grease NSK K1 lubrication unit	437,439
		Martensitic stainless steel	Martensitic stainless steel	Austenitic stainless steel	LG2, LGU Grease NSK K1 lubrication unit Fluoride low temperature chrome plating	437,439, 435
	Atmosphere-Vacuum, normal temperature				Fluoride grease	
	Atmosphere-Vacuum up to 200°C					
Vacuum	Atmosphere-Vacuum, normal temperature	Martensitic stainless steel	Martensitic stainless steel	Austenitic stainless steel	Fluoride grease	
	Atmosphere-Vacuum up to 200°C					
	Atmosphere-Vacuum up to 300°C				Molybdenum disulfide	
	High vacuum up to 500°C				Special silver film	436
Corrosion resistance	Vapor, steam	Martensitic stainless steel	Martensitic stainless steel	Austenitic stainless steel		
		Standard material	Standard material	Standard material	Fluoride low temperature chrome plating	435
	Acid, alkali	Martensitic stainless steel	Martensitic stainless steel	Austenitic stainless steel		435
						435
	Acid, alkali, clean				Fluoride low temperature chrome LG2, LGU Grease plating	435 437
	Strong acid, strong alkali				Fluoride low temperature chrome Fluoride grease plating	435
	Organic solvent				Fluoride grease	
High temperature	Atmosphere up to 150°C	Standard material	Standard material	Austenitic stainless steel	ET-100K Grease	
	Atmosphere up to 200°C	Martensitic stainless steel	Martensitic stainless steel		Fluoride grease	
	Atmosphere up to 200°C, Corrosion resistant				Fluoride grease	
Low temperature	-273°C and higher	Martensitic stainless steel	Martensitic stainless steel	Austenitic stainless steel	Solid lubricant	
Radiation resistance	Atmosphere	Standard material	Standard material	Standard material	Radiation resistant grease	
		Martensitic stainless steel	Martensitic stainless steel	Austenitic stainless steel		
Foreign matters	Fine particles, wooden chips	Standard material	Standard material	Standard material	NSK K1 lubrication unit	439
		Martensitic stainless steel	Martensitic stainless steel	Austenitic stainless steel		439
	Water, under water		Standard material	Standard material		439
			Martensitic stainless steel	Austenitic stainless steel		439

(2) Ball screw

Table 2 Ball screw specifications

Environment	Condition	NSK linear guide specifications				Technical Explanation Page No.
		Rail, slide	Steel balls/rollers	Ball recirculation component	Lubrication/surface treatment	
Clean	Atmosphere, normal temperature	Standard material	Standard material	Standard material	LG2, LGU Grease NSK K1 lubrication unit	437,439
		Martensitic stainless steel	Martensitic stainless steel	Austenitic stainless steel	LG2, LGU Grease NSK K1 lubrication unit Fluoride low temperature chrome plating	437,439, 435
	Atmosphere-Vacuum, normal temperature				Fluoride grease	
	Atmosphere-Vacuum up to 200°C					
	Atmosphere-Vacuum up to 200°C, Corrosion resistant	Ceramic	Ceramic	Ceramic	Fluoride grease	
Vacuum	Atmosphere-Vacuum, normal temperature	Martensitic stainless steel	Martensitic stainless steel	Austenitic stainless steel	Fluoride grease	
	Atmosphere-Vacuum up to 200°C					
	Atmosphere-Vacuum up to 300°C				Molybdenum disulfide	
	High vacuum up to 500°C				Special silver film	436
Corrosion resistance	Acid, alkali, clean	Standard material	Standard material	Austenitic stainless steel	Fluoride low temperature chrome plating	435
		Martensitic stainless steel	Martensitic stainless steel			435
		Precipitation hardening stainless steel	Precipitation hardening stainless steel		Fluoride grease	
	Strong acid, strong alkali, clean, nonmagnetic	Ceramic	Ceramic		Fluoride grease	
Nonmagnetic	Atmosphere-Vacuum, clean	Special austenitic stainless steel	Ceramic	Austenitic stainless steel	Fluoride grease	
	Atmosphere-Vacuum, up to 200°C, clean	Ceramic			Fluoroplastic	
High temperature	Atmosphere up to 200°C	Standard material	Standard material	Austenitic stainless steel	Fluoride grease	
		Martensitic stainless steel	Martensitic stainless steel		Fluoride low temperature chrome plating	425
	Atmosphere up to 500°C, corrosion resistance	Ceramic	Ceramic		Fluoride grease	
Low temperature	-273°C and higher	Martensitic stainless steel	Martensitic stainless steel	Austenitic stainless steel	Solid lubricant	
Radiation resistance	Atmosphere	Standard material	Standard material	Standard material	Radiation resistant grease	
		Martensitic stainless steel	Martensitic stainless steel	Austenitic stainless steel		
Foreign matters	Fine particles, wooden chips	Standard material	Standard material	Standard material	NSK K1 lubrication unit	439
		Martensitic stainless steel	Martensitic stainless steel	Austenitic stainless steel		439
	Water, under water					439

2. Lubrication and Materials

(1) Lubrication

Grease can be used for high rotation and magnetic field. However, grease evaporates or solidifies in special environment such as vacuum, high temperature, and low temperature.

Solid lubricant is used when it is difficult to use grease. Functions of solid lubricant differ greatly by condition where it is used. It is important to select the most suitable solid lubrication for the environment.

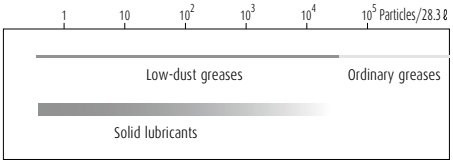


Fig. 1 Lubrication in clean environment

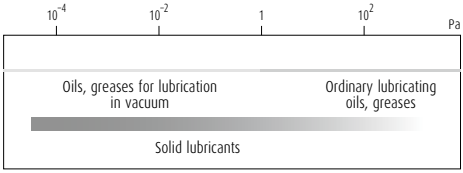


Fig. 2 Lubrication in vacuum

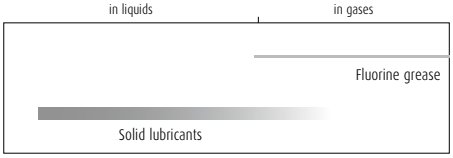


Fig. 3 Lubrication in corrosive environment

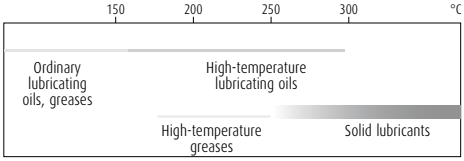


Fig. 4 Lubrication in high temperature

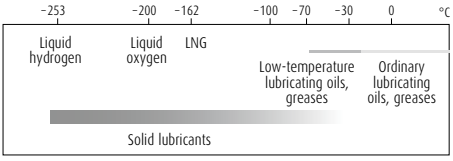


Fig. 5 Lubrication in low temperature

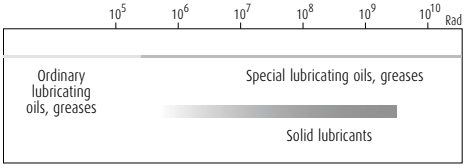


Fig. 6 Lubrication in radioactive environment

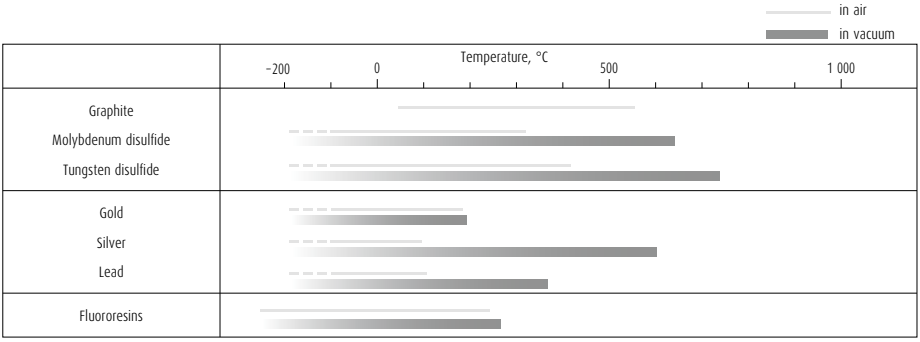


Fig. 7 Temperature range for using solid lubricants

(2) Materials

Iron type metals are used in vacuum, high temperature, and high speed environments as the basic material. We generally use nonmagnetic stainless steel for nonmagnetic materials.

Table 3 Characteristics of metal materials

Application	Type of steel	Linear expansivity $\times 10^{-6}/°C$	Young's modulus GPa	Hardness* HB
For clean environment, vacuum environment, corrosion resistance, low temperature, high temperature, radioactive resistance	Martensitic stainless steel SUS440C	10.1	200	580
	Austenitic stainless steel SUS304	16.3	193	150
	Precipitation hardening stainless steel SUS630	10.8	200	277 – 363
Nonmagnetic	Nonmagnetic stainless steel	17.0	195	420

*) Hardness of steel is usually indicated by Rockwell C Scale. For comparison, these figures are expressed by Brinell number.

3. Rust Prevention and Surface Treatment

(1) Fluoride low temperature chrome plating

The use environment of NSK linear guides ball screws, and monocarriers is expanding from general industrial machines, semiconductor and liquid crystal manufacturing systems to aerospace equipment. Among all measures to cope with environment, rust prevention is the most challenging. Such environment includes:

- Moisture for washing machines and other equipment
- Chemicals used in the wet processing of semiconductor and liquid crystal display manufacturing equipment.

NSK has developed electrolytic rust prevention black film treatment (black chrome plating) which is added by fluoro resin impregnating treatment. (Hereinafter referred as "Fluoride low temperature chrome plating".) This surface treatment methods has proved its superiority as the rust prevention of linear guides and ball screws which are used in the above equipment.

› What is "Fluoride low temperature chrome plating?"

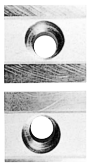
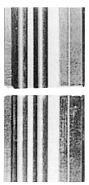
This is a type of black chrome plating which forms a black film (1 to 2 µm in thickness) on the metal surface. Fluoroplastic coating is added to the film to increase corrosion resistance.

- Accuracy control is easily manageable due to low temperature treatment and to the absence of hydrogen embrittlement.
- Product accuracy is less affected due to the thin film which has high corrosion resistance.
- This method is superior to other surface treatments in durability on the rolling surface.
- Inexpensive compared with products with other surface treatment and stainless steel products.

Do not use organic solvent because it adversely affects antirust property of the plating.

› Humidity chamber test

Table 4 Results of the humidity test

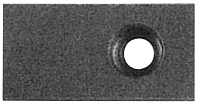
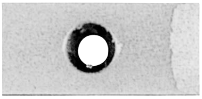
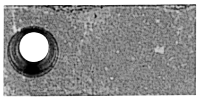
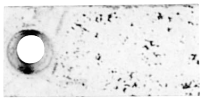
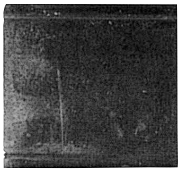
Characteristic \ Test sample			Fluoride low temperature chrome plating (recommended)	Hard chrome plating (reference)	Electroless nickel plating (reference)	Equivalent to SUS440C material	Standard steel
Corrosion-resistant property	Rusting	Top	(Ground) B	(Ground) B	(Ground) A	(Ground) C	(Ground) D
		Side	(Ground) A	(Ground) A	(Ground) A	(Ground) C	(Ground) E
		Bottom	(Ground) A	(Ground) A	(Ground) A	(Ground) C	(Ground) E
		End	(Machined) A	(Machined) C	(Machined) A	(Machined) C	(Machined) E
		Chamfer/grinding recess	(Drawn) A	(Drawn) D	(Drawn) A	(Drawn) C	(Drawn) E
	<Test conditions> **› Testing chamber: High temperature, highly moist chamber** (made by DABAI ESPEC) **› Temperature: 70°C** **› Relative humidity: 95%** **› Testing time: 96 h** Time to "ramp-up" and "ramp-down" condition of the temperature and the humidity conditions Ramp-up: 5h Ramp-down: 2h						
							
	Film thickness		5 µm	0.5 – 7 µm	10 µm	—	—

Rusting A: No rust B: Not rusted, but slightly discolored
C: Spotty rust D: slightly rusted E: Completely rusted

› Chemical corrosion resistance test

Table 5 Results of the corrosion resistance test

Test conditions Rail base material: Equivalent to SUS440C
Chemical density: 1 mol/ℓ

Fluoride low temperature chrome plating	Hard chrome plating	Hard chrome plating	None surface treatment
	Immersed in solution for 24 hrs Nitric acid		
	Immersed in solution for 24 hrs Nitric acid		
	Exposed to vapor for 72 hrs Hydrochloric acid type washing solution $HC\ell$: H_2O_2 : H_2O =1 : 1 : 8		
○	Hydrochloric acid (immersed)	○	▲
○	Sulfuric acid (immersed)	○	X
○	Ammonia or sodium hydroxide	○	△

○: Normal △: Partial surface damage ▲: Overall surface damage X: Corroded

› Surface treatment durability test

Peeling resistamce of surface treatment

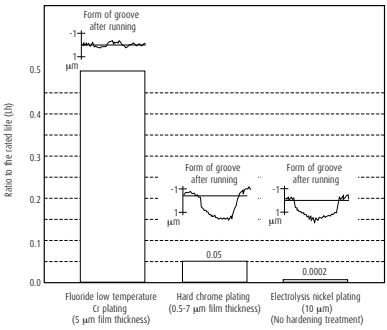


Fig. 8 Results of durability test

› Total evaluation

Table 6 Evaluation

	Available length	Rust prevention ability	Quality stability	Durability	Cost
Fluoride low temperature chrome plating	◎ (4 m)	◎	○	◎	◎
Hard chrome plating	△ (2 m)	○	X	△	△
Electroless nickel plating	◎ (4 m)	◎	△	X	△
Material equivalent to SUS440C	○ (3.5 m)	○	◎	◎	△

◎: Excellent ○: Suitable in use
△: Not so good for use X: Problem in use

4. Measures Against Special Environments

(1) In vacuum

› Silver-film plated ball screw

Ball screws that are plated by soft metal (special silver film) as a solid lubricant are developed the application for vacuum environment such as semiconductor manufacturing equipment and surface modification systems.

› Durability test in high vacuum

Test equipment and conditions

Table 7 shows ball screw specifications. **Fig. 9** is a schematic of the testing system in vacuum chamber.
Table 8 shows testing conditions.

Table 7 Ball screw specifications

Shaft diameter		12 mm
Lead		4 mm
Steel ball diameter		2.381 mm
Numbers of circuit of balls		2.5 turns, 1 circuit
Axis load (preload)		29.4 N
Maximum surface pressure (preload volume)		about 690 MPa
Material	Shaft	SUS630
	Nut	SUS440C
	Ball return tube	SUS304
	Steel balls	SUS440C
Solid lubricant		Special silver film

Table 8 Testing conditions

Rotational speed	300 min^{-1}
Vacuum chamber pressure	1.3×10^{-5} – 1.3×10^{-6} Pa
Stroke	160 mm

Evaluation method

It is understood that the rolling bearing with solid lubrication reaches end of life when the lubrication film deteriorates, resulting in sudden rise of friction torque. In this test, ball screw rotation torque was constantly measured to study durability and operation. Results were then evaluated.

Test results

Fig. 10 shows two distinctive examples obtained in the torque characteristic test.

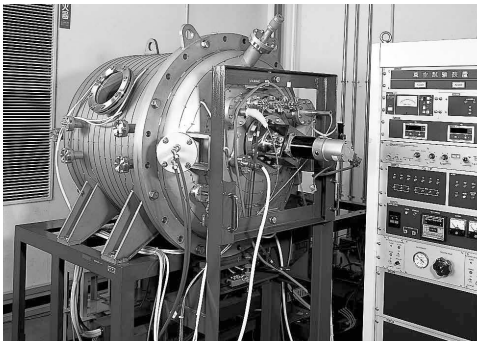


Photo 1 Vacuum testing system

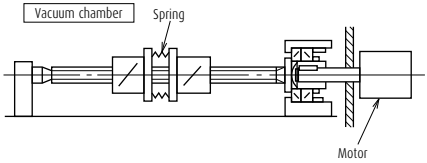


Fig. 9 Schematic of the testing system

Test results of the ball screw (a)

The torque tendency was stable until about 1×10^7 rev. Then the torque characteristics slightly deteriorated. At about 1.35×10^7 rev, the torque suddenly rose. At this point, it was determined that the ball screw reached the end of its life.

Test results of the ball screw (b)

Torque value is a little higher in the test (a). The value is also little unstable. The torque momentarily soared several times during the test (some 10 N·cm). It is thought this is attributable to the repeated peeling/sticking of the surface film made of soft metal (silver, etc.).
When the torque finally soared at 1.13×10^7 rev., it was determined that the ball screw reached the end of its life.

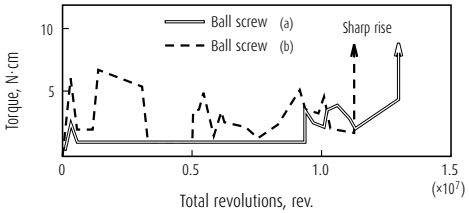


Fig. 10 Torque variation

Table 9 Ball screw durability

	Classification	Ball screw (a)	Ball screw (b)
Life	Total revolutions (rev.)	1.35×10^7	1.13×10^7
	Total traveling distance (km)	54.0	45.2
	Total traveling hours* (h)	750	628

*) Total traveling hours when operated constantly at 300 min^{-1}

Conclusion

Table 9 explains results of the two ball screw durability tests. From these results and other findings, it is estimated that a life of more than 1×10^7 rev. is possible with a load of about 29.4 N.
Torque may soar momentarily before the ball screw reaches its final life due to peeling/sticking of the surface film made of soft metal like silver. For this reason, it is recommendable to select a drive motor with extra torque capacity.

(2) Clean environment

› NSK Clean Grease LG2 and LGU

NSK Clean Grease LG2 is used in clean room for NSK linear guides, ball screws, Monocarriers, XY Modules, Megatorque motors, XY tables, etc. with low-dust emitting specifications. For its low dust emission and high durability, LG2 earns trust and high reputation of semiconductor equipment manufacturers.
LG2 is superior in many areas to fluorine greases which are commonly used in clean room.

Features

- **Remarkably low dust emission**
- **Long life -- More than ten times longer than fluoride greases, and equivalent to ordinary greases.**
- **Excellent rust prevention -- Significantly higher capacity than fluorine greases.**
- **Low and stable torque -- 20% or less than that of fluorine greases**

Table 10 Nature of Clean Grease LG2 and LGU

Name	Thickener	Base oil	Base oil kinematic viscosity mm^2/s (40°C)	Consistency	Dropping point °C
Clean Grease LG2	Lithium soap	Synthetic hydrocarbon oil + mineral oil	32	199	201
Clean Grease LGU	Diurea	Synthetic hydrocarbon oil	95.8	201	260

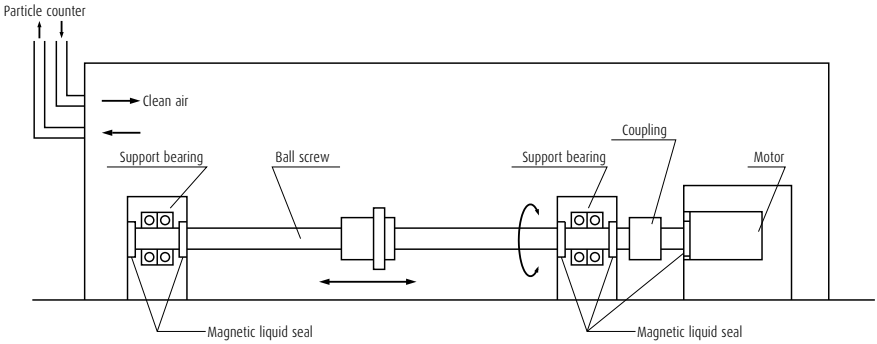


Fig. 11 Setting to measure dust generated by ball screw

› Feature 1: Remarkably low dust emission

Compared with fluoride greases, dust emission by LG2 is low and stable for long period of time.

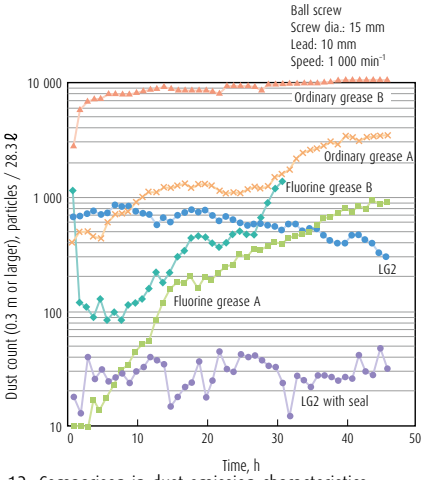


Fig. 12 Comparison in dust emission characteristics

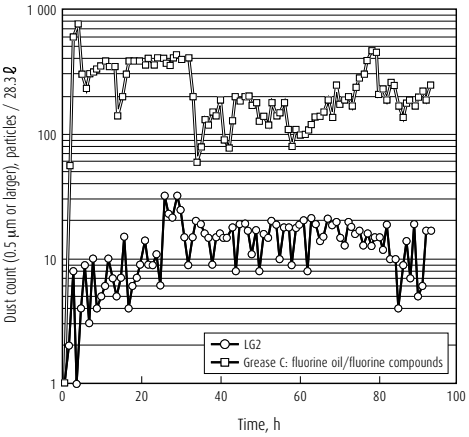


Fig. 13 Dust emission from linear guide (Linear guide: LU09)

› Feature 2: Long life

Life is ten times or longer than fluorine greases, and equivalent to ordinary greases. This stretches maintenance intervals.

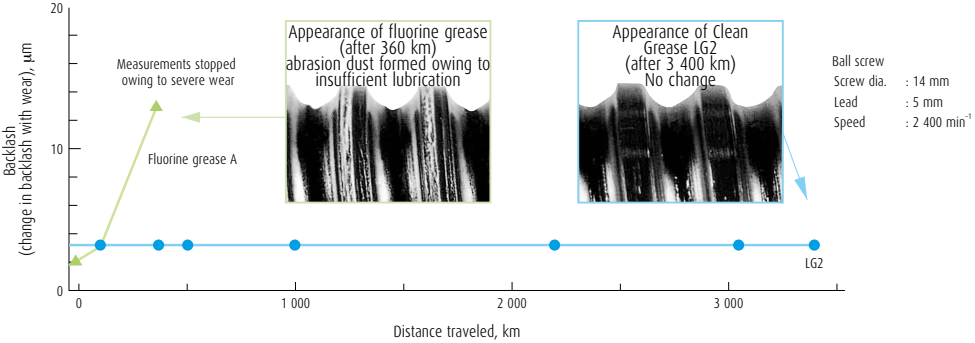
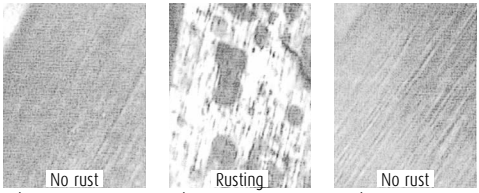


Fig. 14 Results of ball screw durability test

› Feature 3: Excellent rust prevention capacity

The rust prevention capacity is significantly higher than fluoride type greases. Handling and preparation for operation are easy.

Ball screw rust prevention test (test conditions: 96 hr at humidity 95%, temperature 70°C)



Clean Grease LG2 | Fluorine grease A | Ordinary grease A

› Feature 4: Stable torque

Torque is 20% or lower than fluorine greases.

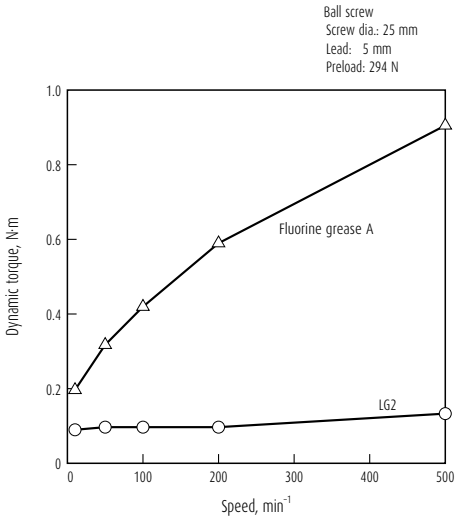


Fig. 15 Comparison of torque characteristics

Table 11 Rust prevention test on bearing

Type	Rusting after 7 days
NSK Clean Grease LG2	No rust
Fluorine grease B	Rusted

Test conditions :19 mg is sealed in ball bearing 695
:Temp. 90°C, Humidity 60%
Evaluation :Studied by microscope

› Total evaluation

Table 12 Evaluation

Characteristic	LG2	Fluorine grease	General grease
Dust generation	○	○ - △	△ - X
Torque	○	X	○ - △
Durability	○	△ - X	○
Rust prevention ability	○	△ - X	○

○: Suitable △: Not very suitable X: Problem in use

(3) Environment with foreign matters

› NSK K1 lubrication unit (linear guide and ball screw)

Molded oil is made of a lubrication oil and polyolefin which has affinity with the lubrication oil. More than 70% of the mass is lubrication oil.
Molded oil which is formed into NSK K1 lubrication unit effectively seals linear guides, continually supplying lubrication oil. NSK K1 lubrication unit has made it possible to use linear guides in water or powder dust.
NSK K1 lubrication unit for ball screws is also available.
For monocarriers, NSK K1 is equipped as a standard feature.

Features

- **Extend maintenance-free intervals**
- **No contamination of surrounding environment**
- **Prolong life of the products exposed to water**

Refer to page 454 to 460 for details of NSK K1 lubrication unit.

5. Table to Cope With Special Environments

(1) Linear guides.

Series	Model No.	Special environment which linear guide can tolerate					
		Clean	Vacuum	Corrosion	High temp.	Hygienic	High dust proofing
NH	NH15	○		○		○	
	NH20	○	○	○	○	○	
	NH25	○	○	○	○	○	
	NH30	○	○	○	○	○	
	NH35	○		○	○	○	
	NH45	○		○	○		
	NH55	○		○			
	NH65	○		○			
NS	NS15	○	○	○	○	○	
	NS20	○	○	○	○	○	
	NS25	○	○	○	○	○	
	NS30	○	○	○	○*	○	
	NS35	○		○		○	
LW	LW17	○		○	○*	○	
	LW21	○		○	○*	○	
	LW27	○		○	○	○	
	LW35	○		○		○	
	LW50	○		○			
PU	PU05	○		○			
	PU07	○		○			
	PU09	○		○		○	
	PU12	○		○		○	
	PU15	○		○		○	

*) Dust-proof parts are not applicable to high-temperature environmental use.

Series	Model No.	Special environment which linear guide can tolerate					
		Clean	Vacuum	Corrosion	High temp.	Hygienic	High dust proofing
PE	PE05	○		○			
	PE07	○		○			
	PE09	○		○		○	
	PE12	○		○		○	
	PE15	○		○		○	
RA	RA15	○		○			
	RA20	○		○			
	RA25	○		○			
	RA30	○		○			
	RA35	○		○			
	RA45	○		○			
	RA55	○		○			
	RA65	○		○			

(2) Ball screws

Series	Special environment				
	Clean	Vacuum	Rust prevention	High temp.	Foreign matters
KA Series	○	○	○		
For Contaminated environments VSS Type					○
Made-to-order ball screw	○*	○*	○*	○*	○*

*Available in the made-to-order ball screw.
Please consult NSK.

(3) Monocarriers

Please consult with NSK for special environmental use.

6. Precautions for Handling

Please observe the following precautions to maintain high functions of ball screws and linear motion guide bearings in special environment over a long period.

- Products are washed to remove oil, and wrapped in a way to protect them from moisture. Use the product as soon as possible after opening the package.
- After opening, store the ball slide (random-matching type linear guide) and ball nut (R series ball screw) in a clean, air-tight container such as desiccater with desiccating agent (e.g. silica gel). Do not apply rust preventive oil or paper or product that vaporizes rust preventive agent.
- Wear plastic gloves and handle product in clean place.

1. Lubrication

There are two types of lubricating method -- grease and oil -- for ball screws, linear guides and monocarriers.
Use a lubricant agent and method most suitable to condition requirements and purpose to optimize functions of ball screws, linear guides and monocarriers.
In general, lubricants with low base oil kinematic viscosity are used for high-speed operation, in which thermal expansion has a large impact, and in low temperatures. Lubrication with high base oil kinematic viscosity is used for oscillating operations, low speeds and high temperatures.
The following are lubrication methods using grease and oil.

(1) Grease Lubrication

Grease lubrication is widely used because it does not require a special oil supply system or piping. Grease lubricants made by NSK are:

- Various types of grease in bellows tubes that can be instantly attached to a grease pump;
- NSK Grease Unit that consists of a hand grease pump and various nozzles. They are compact and easy to use.

2. NSK grease lubricants

Table 1 shows the marketed general grease widely used for linear guides, ball screws, and monocarrier for specific uses, conditions and purposes.

Table 1 Grease lubricant for linear guides, ball screws and monocarriers

Type	Thickener	Base oil	Base oil kinematic viscosity mm^2/s (40°C)	Range of use temperature (°C)	Purpose
AS2	Lithium type	Mineral oil	130	−10 – 110	For general use at high load
PS2	Lithium type	Synthetic oil + synthetic hydrocarbon oil	15.9	−50 – 110	For low temperature and high frequency operation
LR3	Lithium type	Synthetic oil	30	−30 – 130	For high speed, medium load
LG2	Lithium type	Mineral oil + synthetic hydrocarbon oil	32	−20 – 70	For clean environment
LGU	Diurea	Synthetic hydrocarbon oil	95.8	−30 – 120	For clean environment
NF2	Urea composite type	Synthetic hydrocarbon oil	26	−40 – 100	For fretting resistance

(1) NSK Grease AS2

› Features

It is an environmentally friendly and widely used grease for high load application. It is mineral oil based grease containing lithium thickener and several additives. It is superb in load resistance as well as stability in oxidization. It not only maintains good lubrication over a long period of time, but also demonstrates superb capability in retaining water. Even containing a large amount of water, it does not lose grease when it is softened.

› Application

It is a standard grease for general NSK linear guides, ball screws and monocarriers. It is prevalently used in many applications because of its high base oil viscosity, high load resistance, and stability in oxidization.

› Nature

Thickener	Lithium soap base
Base oil	Mineral oil
Consistency	275
Dropping point	181°C
Volume of evaporation	0.24% (99°C, 22 hr)
Copper plate corrosion test	Satisfactory (Method B, 100°C, 24 hr)
Oil separation	2.8% (100°C, 24 hr)
Base oil kinematic viscosity	130 mm^2/s (40°C)

(2) NSK Grease LR3

› Features

It contains a special synthetic oil for high temperature and stability, and a carefully selected anti-oxidation agent. This grease dramatically increases lubrication life under high temperature conditions. It is used for high speed, medium load. Lubrication life exceeded 2 000 hours in the endurance test at 150°C. Its rust prevention capacity in severe conditions such as water and moist environments is further strengthened.

› Application

It is a standard grease for ball screws PSS type (shaft dia. 15 mm or over), FSS type, FA type (except shaft dia. 10 mm with lead of 4mm and shaft dia. 12 mm with lead of 5 mm) and VFA type. It is ideal for operation with medium load, at high speed such as positioning in high tact material handling equipment.

› Nature

Thickener	Lithium soap base
Base oil	Synthetic oil
Consistency	228
Dropping point	208°C
Volume of evaporation	0.58% (99°C, 22 hr)
Copper plate corrosion test	Satisfactory (Method B, 100°C, 24 hr)
Oil separation	1.9% (100°C, 24 hr)
Base oil kinematic viscosity	30 mm^2/s (40°C)

(3) NSK Grease PS2

› Features

The major base oil component is synthetic oil with mineral oil. It is an excellent lubrication especially for low temperature operation. It is for high speed and light load.

› Application

It is a standard grease for NSK miniature linear guides and ball screws. It is especially superb for low temperature operation, but also functions well in normal temperatures, making it ideal for small equipment with light load.

› Nature

Thickener	Lithium soap base
Base oil	Synthetic oil + Synthetic hydrocarbon oil
Consistency	275
Dropping point	190°C
Volume of evaporation	0.60% (99°C, 22 hr)
Copper plate corrosion test	Satisfactory (Method B, 100°C, 24 hr)
Oil separation	3.6% (100°C, 24 hr)
Base oil kinematic viscosity	15.9 mm^2/s (40°C)

(4) NSK Grease LG2

› Features

This grease was developed by NSK to be exclusively used for linear guides and ball screws in clean room. Compared to the fluorine grease which are commonly used in clean room, LG2 has several advantages such as:

- Higher in lubrication function
- Longer lubrication life
- More stable torque (resistant to wear)
- Higher rust prevention.

In dust generation, LG2 is more than equal to fluorine grease in keeping dust volume low. Since the base oil is not a special oil but a mineral oil, LG2 can be handled in the same manner as general greases.

› Application

LG2 is a lubrication grease for rolling element products such as linear guides and ball screws for semiconductor and liquid crystal display (LCD) processing equipment which require a highly clean environment. Because LG2 is exclusively for a clean environment at normal temperatures, however, it cannot be used in a vacuum environment.
Refer to "Special environment" in page D8 for detailed data on superb characteristics of NSK Grease LG2.

› Nature

Thickener	Lithium soap base
Base oil	Mineral oil + Synthetic hydrocarbon oil
Consistency	199
Dropping point	201°C
Volume of evaporation	1.40% (99°C, 22 hr)
Copper plate corrosion test	Satisfactory (Method B, 100°C, 24 hr)
Oil separation	0.8% (100°C, 24 hr)
Base oil kinematic viscosity	32 mm²/s (40°C)

(5) NSK Grease LGU

› Features

This is a proprietary urea base grease of NSK featuring low dust emission exclusively for ball screws and linear guides which are used in clean rooms.
In comparison with fluorine base grease, which has been used commonly in clean rooms, LGU has better lubricating property, longer duration of lubricant, better torque variation, much better anti-rust property, and equivalent or better dust emission. In addition, this grease can be handled in the same way as the other common grease because high-grade synthetic oil is used as the base oil.

LGU grease contains much less metallic elements compared to LG2 grease. It can be used in high temperature environment.

› Application

This is exclusive lubrication grease for ball screws and linear guides that are installed in equipment that requires cleanliness, as same as LG2 grease, and it can be used in high temperature range of −30 to 120°C. This cannot be used in vacuum.

› Nature

Thickener	Diurea
Base oil	Synthetic hydrocarbon oil
Consistency	201
Dropping point	260°C
Volume of evaporation	0.09% (99°C, 22 hr)
Copper plate corrosion test	Satisfactory (Method B, 100°C, 24 hr)
Oil separation	0.6% (100°C, 24 hr)
Base oil kinematic viscosity	95.8 mm²/s (40°C)

(6) NSK Grease NF2

› Features

It uses high-grade synthetic oil as the base oil and urea base organic compound as the thickener. It has remarkable anti-fretting corrosion property. It can be used in wide temperature range, from low to high, and has superior lubrication life.

› Application

This grease is suitable for ball screws and linear guides of which application include oscillating operations.
Allowable temperature range is −40 to 100°C.

› Nature

Thickener	Diurea
Base oil	Synthetic hydrocarbon oil
Consistency	288
Dropping point	260°C
Volume of evaporation	0.22% (99°C, 22 hr)
Copper plate corrosion test	Satisfactory (Method B, 100°C, 24 hr)
Oil separation	0.5% (100°C, 24 hr)
Base oil kinematic viscosity	26 mm²/s (40°C)

› Precautions for handling

- Wash the linear guides and ball screws to remove oil prior to applying Clean Grease LG2 or LGU, so the grease functions are fully utilized.
- Clean grease is exclusively used for clean environments at normal temperatures.

Note) Refer to NSK Grease Unit Catalog (CAT.No.3317) for details of NSK Grease.

3. Before use of NSK Precision Products

Wipe off the rust preventive oil before use for the products that the oil is applied.
If grease is not applied, apply grease, and move a ball slide or ball nut a few strokes so the grease permeates into the ball slide and inside the nut. (Move the ball slide or the ball nut 5 to 10 times with full stroke.)
Then wipe off the excess grease.

4. How to replenish grease and volume of grease to be replenished

Use grease fitting if exclusive grease supply component is not used. Supply required amount through grease fitting by a grease pump. Wipe off old grease and accumulated dust before supplying new grease. If grease fitting is not used or there is no oil filler due to the size limitation, apply grease directly to the rail or to the ball groove of the screw shaft. Remove the seal if possible, move a ball slide or ball nut a few strokes so that the grease permeates into the ball slide, nut and inside the slider.
Once grease is replenished, another supply is not required for a long time. But under some operational conditions, it is necessary to periodically replenish grease. The following are replenishing methods.

* When replenishing using a grease pump:

Use a grease pump and fill the inside of ball slide, ball nut and monocarrier slider with grease. Supply grease until it comes out from the ball slide, ball nut or monocarrier slider area. Move ball slide, ball nut or monocarrier slider by hand while filling them with grease, so the grease permeates all areas. Do not operate the machine immediately after replenishing. Always try the system a few times to spread the grease throughout the system and to remove excess grease. Trial operations are necessary because the resistance to sliding force and screw torque greatly increases immediately after replenishment (full-pack state) and may cause problems. The agitating resistance of grease is accountable for this phenomenon. Wipe off excess grease that accumulates at end of rail and screw shaft after trial runs so the grease does not move to other areas.

* When there is an exclusive grease supply system and the volume from the spout can be controlled, the criterion is:

- All at once, replenish the amount that fills about 50% of the internal space of the ball slide or the internal space of the ball nut. This method eliminates waste of grease and is efficient.

Tables 2, 3 and **4** show internal spaces of ball slide, ball nut and monocarrier slider for reference.

Table 2 Inside space of the slide of linear guide

NH Series

Unit: cm^3

Model No. \ Series	NH	
	High-load type	Ultra-high-load type
15	3	4
20	6	8
25	9	13
30	13	20
35	22	30
45	47	59
55	80	100
65	139	186

PU Series

Unit: cm^3

Model No. \ Series	PU	
	Standard type	High-load type
05	0.1	–
07	0.1	–
09	0.2	0.3
12	0.3	0.4
15	0.8	1.1

NS Series

Unit: cm^3

Model No. \ Series	NS	
	Medium-load type	High-load type
15	2	3
20	3	4
25	5	8
30	8	12
35	12	19

PE Series

Unit: cm^3

Model No. \ Series	PE	
	Standard type	High-load type
05	0.1	–
07	0.2	–
09	0.4	0.5
12	0.5	0.7
15	1.2	1.6

LW Series

Unit: cm^3

Model No. \ Series	LW
17	3
21	3
27	7
35	24
50	52

RA Series

Unit: cm^3

Model No. \ Series	RA	
	High-load type	Super-high-load type
15	1	1.5
20	2	2.5
25	3	3.5
30	5	6
35	6	8
45	10	13
55	15	20
65	33	42

Table 3 Inside space of ball nut

Return tube type (single nut)

Unit: cm³

Nut model	Inside space
1004 – 2.5	0.8
1205 – 2.5	1.2
1210 – 2.5	1.4
1405 – 2.5	2.2
1408 – 2.5	2.1
1510 – 2.5	2.3
1605 – 2.5	2.6
1616 – 1.5	2.1
2004 – 5	2.7
2005 – 5	4.3
2010 – 2.5	4.7
2020 – 1.5	4.2
2504 – 5	3.2
2505 – 5	5
2506 – 5	7
2510 – 3	9.5
2520 – 2.5	12

Unit: cm³

Nut model	Inside space
2525 – 1.5	7.5
2805 – 5	6
3205 – 5	7
3206 – 5	9.5
3210 – 5	22
3225 – 2.5	17
3232 – 1.5	15
3610 – 5	32
4005 – 10	14
4010 – 5	30
4012 – 5	34
4510 – 5	34
5010 – 5	37
5010 – 10	59

Deflector (bridge) type (single nut)

Unit: cm³

Nut model	Inside space
2505 – 6	6.5
2510 – 4	10
3205 – 8	9.5
3210 – 6	28
4010 – 8	42
5010 – 8	52

End cap type

Unit: cm³

Nut model	Inside space
1520 – 1.5	1.9
1632 – 1	2
2040 – 1	2.8
2550 – 1	4.2

Note: Nut model: shaft diameter, lead, total number of turns of balls. Please consult NSK for other specifications.

Table 4 Inside space of the monocarrier

MCM Series

Unit: cm³

Model No.	Lead (mm)	Inside space
MCM02	1	0.3
	2	0.3
MCM03	1	1
	2	0.9
	10	1.8
	12	1.7
MCM05	5	4.2
	10	4
	20	2.1
	30	2.0

Unit: cm³

Model No.	Lead (mm)	Inside space
MCM06	5	8.3
	10	6.5
	20	5.5
MCM08	5	11.6
	10	9.8
	20	8.7
	30	4.3
MCM10	10	19.4
	20	17.4
	30	8.8

MCH Series

Unit: cm³

Model No.	Lead (mm)	Inside space
MCH06 MCL06	5	2.8
	10	2.7
	20	2.7
MCH09	5	5.8
	10	5.8
	20	5.6
MCH10	10	10.9
	20	10.1

5. Intervals of checks and replenishments

Although the grease is of high quality, it gradually deteriorates and its lubrication function diminishes. Also, the grease in the ball slide and ball nut is gradually removed by stroke movement.

In some environments, the grease becomes dirty, and foreign objects may enter. Grease should be replenished depending on frequency of use. The following is a guide of grease replenishment intervals for linear guides and ball screws.

Table 5 Intervals of checks and replenishments for grease lubrication

Intervals of checks	Items to check	Intervals of replenishments
3-6 months	Dirt, foreign matters such as cutting chips	Usually once per year. Every 3 000 km for material handling system that travels more than 3 000 km per year. Replenish if checking results warrant it necessary.

Notes: 1) As a general rule, do not mix greases of different brands.
2) Grease viscosity varies by temperature. Viscosity is particular high in winter due to low temperatures. Pay attention to increases in linear guide and monocarrier sliding resistance and ball screw and monocarrier torque in such conditions.
3) When the ambient temperature is low, or in Winter, if it is difficult to pump out the grease from the container, wait until the grease is softened.
4) In locations where coolant is dispersed or scattered, emulsification of lubricants and rinsing with water may significantly deteriorate the integrity of the lubricant and efficiency of the grease. Protect the grease unit from coolant by shielding it with a cover, etc.

6. NSK Grease Unit

Supply grease to NSK linear guides and ball screws by manual type hand grease pump. Install grease in bellows tube to the pump. Several types of grease (80 g) are available.

Grease in bellows tube

(1) Composition of NSK Grease Unit

Components and grease types are shown below.

	Name	(Tube color)	Reference number
NSK Grease Unit			
NSK Grease (80 g in a bellows tube)	NSK Grease AS2	(Brown)	NSK GRS AS2
	NSK Grease PS2	(Orange)	NSK GRS PS2
	NSK Grease LR3	(Green)	NSK GRS LR3
	NSK Grease LG2	(Blue)	NSK GRS LG2
	NSK Grease LGU	(Yellow)	NSK GRS LGU
	NSK Grease NF2	(Gray)	NSK GRS NF2
NSK Hand Grease Pump Unit			
NSK Hand Grease Pump (Straight nozzle NSK HGP NZ1 -- One nozzle is provided with hand pump.)			NSK HGP
Grease nozzle (used with hand grease pump)			
	NSK straight nozzle		NSK HGP NZ1
	NSK chuck nozzle		NSK HGP NZ2
	NSK drive fitting nozzle		NSK HGP NZ3
	NSK point nozzle		NSK HGP NZ4
	NSK flexible nozzle		NSK HGP NZ5
	NSK flexible extension pipe		NSK HGP NZ6
	NSK straight extension pipe		NSK HGP NZ7
	NSK nozzle for MCH		NSK HGP NZ8

(2) NSK Greases (80 g in bellows tube)

Refer to pages 443 to 445 for their natures and details.

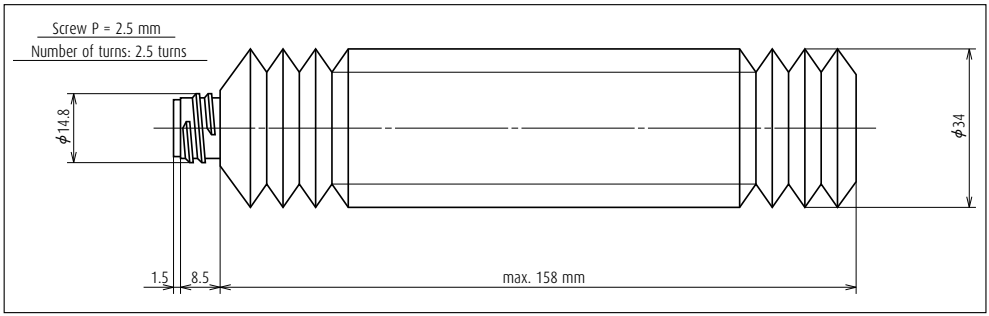


Fig. 1 Bellows tube

(3) NSK Manual Grease Pump Unit

a) NSK Hand Grease Pump

(Reference number: NSK HGP)

› Features

• Light-weight	Can be operated by one hand, yet there is no worry to make a mistake.
• Inserting by high pressure	Insert at 15 Mpa.
• No leaking	Does not leak when held upside down.
• Easy to change grease	Simply attach grease in bellows tube.
• Remaining grease	Can be confirmed through slit on tube.
• Several nozzles	Six types of nozzles to choose from.

› Specifications

• Discharge pressure	15 Mpa
• Spout volume	0.35 cc/shot
• Mass of main body	Without nozzle 240 g, Provided nozzle 90 g
• Grease tube outer diameter	φ 38.1
• Accessory	Several nozzles for a unique application can be attached

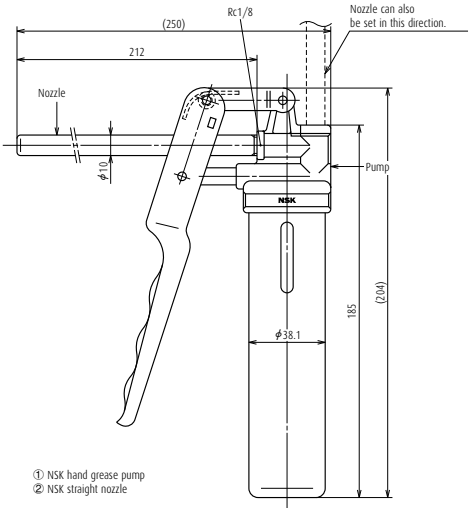


Fig. 2 NSK Hand Grease Pump with NSK straight nozzle

*Air is contained in the unopened bellows tube. Try the system tens of times when to use the hand grease pump. The tube will be use after deflated from the tube.

b) Nozzles

Table 6 Nozzles that can be attached to NSK Hand Grease Pump

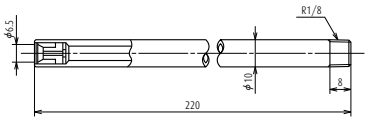
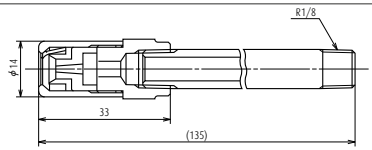
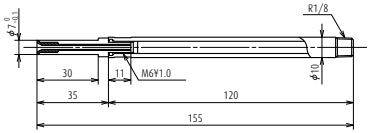
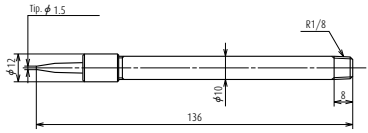
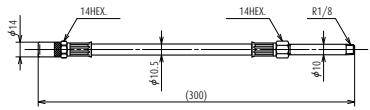
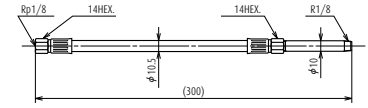
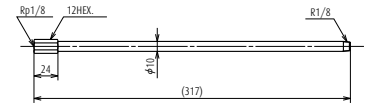
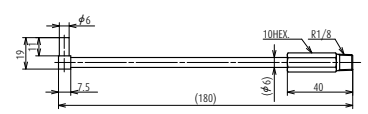
Name	Designation code	Use	Dimensions
NSK straight nozzle	NSK HGP NZ1	Can be used with grease fitting A, B, and C under JIS B1575 standard.	
NSK chuck nozzle	NSK HGP NZ2	Same as above. However, there is no need to press the hand pump because the grease fitting and the nozzle come to contact due to the chucking mechanism at the tip.	
NSK fitting nozzle	NSK HGP NZ3	Dedicated for the - φ 3 drive-in grease fitting.	
NSK point nozzle	NSK HGP NZ4	Used for linear guides and ball screws which do not have grease fitting. Supplies grease directly to the ball grooves, or through the opening of ball slide or ball slide to inside.	
NSK flexible nozzle	NSK HGP NZ5	The tip of the flexible nozzle is chuck nozzle. The straight nozzle is not available for use.	
NSK flexible extension pipe	NSK HGP NZ6	Flexible extension pipe connects the grease pump and the nozzle	
NSK straight extension pipe	NSK HGP NZ7	Straight extension pipe connects the grease pump and the nozzle.	
NSK nozzle for MCH	NSK HGP NZ8	For MCH Series grease replenishment	

Table 7 Grease fittings used for NSK linear guide

Series	Model number	Tap hole for grease fitting	Standard grease fitting	Straight nozzle NZ1	Chuck nozzles NZ2	Drive-in nipple nozzle NZ3	Point nozzle NZ4	Flexible nozzle NZ5
NH	NH15	ϕ3	Drive-in type			○		
NH	NH20, 25, 30, 35*	M6×0.75	B type	○	○			○
NH	NH45, 55, 65	Rc1/8	B type	○	○			○
NS	NS15	ϕ3	Drive-in type			○		
NS	NS20, 25, 30, 35*	M6×0.75	B type	○	○			○
LW	LW17	ϕ3	Drive-in type			○		
LW	LW21, 27, 35*	M6×0.75	B type	○	○			○
LW	LW50	Rc1/8	B type	○	○			○
PU	PU05, 07, 09, 12	–	–				○	
PU	PU15	ϕ3	Drive-in type			○		
PE	PE05, 07, 09, 12	–	–				○	
PE	PE15	ϕ3	Drive-in type			○		
RA	RA15, 20	ϕ3	Drive-in type			○		
RA	RA25, 30, 35*	M6×0.75	B type	○	○			○
RA	RA45, 55, 65	Rc1/8	B type	○	○			○

*) If using a chuck nozzle, avoid interference with table and rail.

Note: 1) For PU and PE Series, apply grease directly to ball groove, etc. using point nozzle.
2) A long threaded grease fitting is required for NSK linear guides because of dust-proof parts. Please refer to the sections pertaining to the lubrication and dust-proof parts of each series.

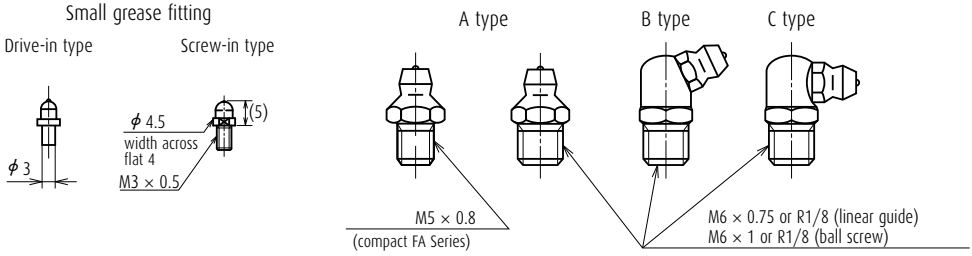


Fig. 3 Grease fittings

Table 8 Applicable grease nozzle for ball screws

Series Tap hole for grease fitting			Model no.			Standard grease fitting	Straight nozzle NZ1	Chuck nozzles NZ2	Drive-in fitting nozzle NZ3	Point nozzle NZ4	Flexible nozzle NZ5
	Compact FA	General	PSS		M5×0.8	A type	○*1	○*1		○	○*1
		Transfer equipment	FSS			A type	○*1	○*1		○	○*1
	Miniature, fine lead		MA	Shaft dia. 12 or less	–	–				○	
				Shaft dia. 16 or over	M6×1	–				○	
	Small equipment		FA		M6×1	–	○*2	○*2		○	○*2
	Stainless steel		KA	Shaft dia. 12 or less and lead 2 or less	M3×0.5	–			○	○	
				except above	M6×1	–	○*2	○*2		○	○*2
Blank shaft end	Machine tools		DIN	Shaft dia. 32	M6×1	–	○	○		○	○
				Shaft dia. 32 or over	M8×1	–	○	○		○	○
			SS	Shaft dia. 36 or less	M6×1	–	○	○		○	○
				Shaft dia. 40 or over	Rc1/8	–	○	○		○	○
	Transfer equipment		FCS	Shaft Dia. 12 or over	M6×1	–	○	○		○	○
			VSP	Shaft Dia. 12 or over	M6×1	–	○	○		○	○
			RNFTL	Shaft dia. 12 or less	M3×0.5	–			○	○	
				Shaft dia. 14 or over	M6×1	–	○	○		○	○
			RNFBL	Shaft dia. 12 or less	M3×0.5	–			○	○	
				Shaft dia. 14 or over	M6×1	–	○	○		○	○
			RNCT		–	–				○	
			RNFCL	Shaft dia. 12 or less	M3×0.5	–			○	○	
				Shaft dia. 15 or over	M6×1	–	○	○		○	○
			RNSTL		M6×1	–	○	○		○	○

*1 Unavailable for shaft dia. 25 mm *2 If using A type grease fitting, may not install the nozzle.
Notes 1) Normally, grease fitting is not provided to NSK ball screw except Compact FA Series. Ball nut has a tap hole to install a grease fitting. The user should install a grease fitting if necessary. 2) For M3 × 0.5 tap hole, small fitting (screw-in type) is available. Please contact NSK. 3) MA and RNCT types have no tap hole, apply grease directly to the screw shaft and ball grooves using point nozzle.

Table 9 Applicable grease nozzles for Monocarriers

Series	Model no.	Tap hole for grease fitting	Standard grease fitting	Straight nozzle NZ1	Chuck nozzles NZ2	Drive-in fitting nozzle NZ3	Flexible nozzle NZ5	MCH exclusive fitting nozzle NZ8
MCM	MCM02	–	–					
MCM	MCM03, 05, 08,10	ϕ 3	Drive-in type			○		○*
MCM	MCM06	M6×0.75	A type	○	○		○	
MCH	MCH06,09,10	ϕ 3	Drive-in type					○

*) Use of NZ3 is recommended.

7. Oil Lubrication

Required amount of new oil is regularly supplied by:

- Manual or automatic intermittent supply system;
- Oil mist lubricating system via piping.

Equipment for oil lubrication is more costly than grease lubrication. However, oil mist lubricating system supplies air as well as oil, raising the inner pressure of the ball slide. This prevents foreign matters from entering, and the air cools the system. Use an oil of high atomizing rate such as ISO VG 32 to 68 for the oil mist lubrication system.

ISO VG 68 to 220 are recommended for common intermittent replenishment system. Approximate volume of oil Q for a ball slide of linear guide per hour can be obtained by the following formula.

In case of ball type linear guides except the LA Series

$Q = n/150$ (cm^3/hr)

In case of LA Series, RA Series

$Q \geq n/100$ (cm^3/hr)

n: Linear guide code

e.g. When NH45 is used,

$n = 45$

Therefore,

$Q = 45/150 = 0.3$ cm^3/hr

Similarly, approximate oil supply volume Q to ball screw can be obtained by the following formula.

$Q = d/15$ (cm^3/hr)

d: Nominal shaft diameter of the ball screw

e.g. When the shaft diameter is 50,

$d = 50$

Therefore,

$Q = 50/15 = 3.3$ cm^3/hr

For oil lubrication by gravity drip, the oil supply position and installation position of the ball slide or ball nut are crucial. In case of linear guide, unless it is installed to a horizontal position, the oil flows only on the down side, and does not spread to all raceway surface. This may cause insufficient lubrication. For ball screw lubrication as well, oil does not spread if the oil orifice is installed at the bottom, causing insufficient lubrication. Please consult NSK to correct such situations prior to use. NSK has internal design which allows oil lubricant to flow throughout the system. **Table 10** shows the criterion of intervals of oil checks and replenishments.

Table 10 Intervals of checks and replenishments

Method	Intervals of checks	Items to check	Replenishment or intervals of changes
Automatic intermittent supply	Weekly	Volume of oil, dirt, etc.	Replenish at each check. Suitable volume for tank capacity.
Oil bath	Daily before operation	Oil surface	Make a suitable criterion based on consumption

Notes 1) As with grease lubrication, do not mix oil lubricant with different types.
2) Some components of the linear guide and ball screw are made of plastic. Avoid using an oil that adversely affects synthetic resin.
3) When using oil mist lubricating system, please confirm an oil supply amount at the each outlet part.

8. RoHS Compliant

(1) Linear Guides

- Linear Guides listed in the catalog except the products for special environments, are compliant with RoHS.
- Please consult NSK for RoHS of special parts and lubricant provided by customer, and customer-supplied product.

(2) Ball Screws

- Ball screws listed in the catalog except the products for special environments, are compliant with RoHS.

(3) Monocarriers

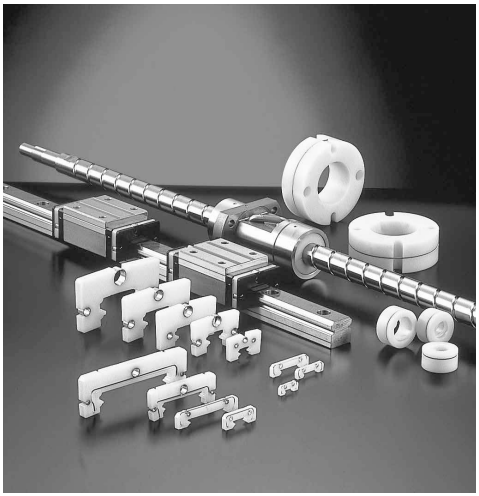
- Monocarriers listed in the catalog are compliant with RoHS.

(4) Ball Screw Support Bearings

- Ball screw support bearings listed in the catalog are compliant with RoHS.

*For details of country-specific RoHS, contact NSK.

9. NSK linear guides equipped with "NSK K1" lubrication unit



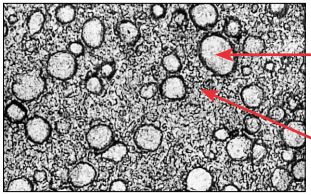
NSK K1 lowers machine operation cost, and reduces impact on the environment.

What is "long-term, maintenance-free" operation?

Ball screws and linear guides which are equipped with NSK K1 do not require maintenance for five years or up to 10 000 km operational distance.

What is NSK K1 lubrication unit?

NSK K1 is a lubrication device which combines oil and resin in a single unit. The porous resin contains a large amount of lubrication oil. Touching its surface to the raceway of a rail close to the ball contact point NSK K1 constantly supplies fresh oil which seeps from the resin.



Enlarged surface of "NSK K1" Lubrication Unit 100µm

Polyolefin

Unlike vinyl chloride products, polyolefin does not produce dioxin. Polyolefin is also being used increasingly at supermarkets for food wrapping.

Lubrication oil

It is mineral oil-based lubricant. The oil has a viscosity of 100 cSt.

Remarkable capacity with new material: NSK K1 lubrication unit information

- NSK K1 lubrication unit (referred to as NSK K1 hereafter) equipped with an NSK linear guide is an outstanding new lubrication material.
- A Newly developed porous synthetic resin contains large volume of lubricant oil that seeps out and enhances lubricating function.
- Simply install NSK K1 inside a standard end seal (rubber).
- We also provide NSK K1 lubrication unit for sanitary environments suited for food processing machinery, medical equipment and their ancillaries for the environment where hygiene control is essential. For details, refer to **458. NSK Linear Guides for Food Processing Equipment and Medical Devices for Sanitary Environment**".

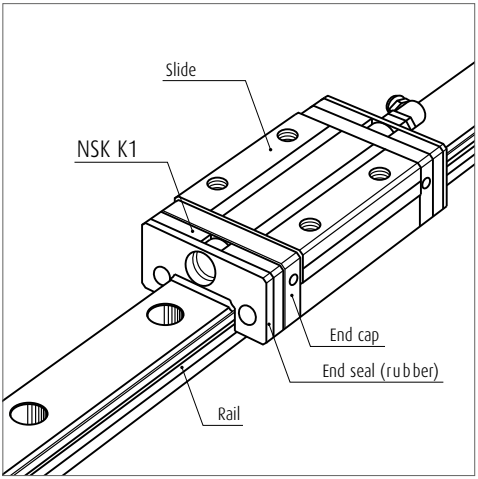


Fig. 4

(1) Features

NSK K1 comprises a part of the compact and efficient lubrication unit.

1) Maintenance is required only infrequently

Used with grease, the lubrication function lasts for a long time. Ideal for systems/environments in which replenishing is difficult.

▼

For automotive component processing lines, etc.

2) 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.

▼

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

We also provide NSK K1 lubrication unit for sanitary environment suited for food processing machinery, medical equipment and their ancillaries for the environment where hygiene control is essential. For details, refer to **458. "NSK Linear Guides for Food Processing Equipment and Medical Devices for Sanitary Environment"**.

3) Good for applications 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 environments where the machine is exposed to rain or wind.

▼

Food processing equipment, housing/construction machines, etc.

4) Maintains efficiency in dusty environments

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

▼

Woodworking machines, etc.

* Stainless steel linear guides are available for use in corrosive environments or other environments where rusting is a potential problem.

(2) Functions

NSK K1 has various superb functions. NSK's ample test data and field performances confirm NSK K1 abilities.

1) Durability test at high speed, with no other lubrication

Fig. 5 shows test results under these conditions.

The linear guide operated with no lubricant is unable to travel after a short period because breakage occurs. Equipped with NSK K1, the linear guide easily travels 25 000 km.

Conditions: Sample ; LH30AN (preload Z1)
Travel speed ; 200 m/min
Stroke ; 1 800 mm
No lubricant: Completely degreased, no lubrication
NSK K1: Completely degreased, no lubrication + NSK K1

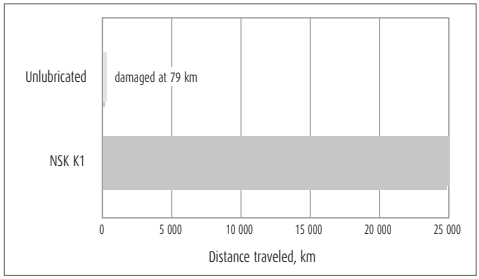


Fig. 5 Durability test at high speed, with no lubrication (lubricated by NSK K1 only)

2) Immersion test

Fig. 6 shows the test results after a linear guide is immersed in water once per week for 24 hours at a time, then traveled for 2 700 km. Without NSK K1, the ball groove sufrace wore out at an early stage and broke. With NSK K1, the wear was reduced to about 1/3 (**Table 11**). This test proves the effect of NSK K1.

Conditions: Sample ; LS30 Stainless steel (preload Z1)
Travel speed ; 24 m/min
Stroke ; 400 mm
Load ; 4 700 N/Slide
Lubricant ; Fully packed with grease (*) exclusive use for food proccesing machines
Immersing condition:
Immersed and traveled once per week for 24 hours at a time.

* Grease made in U.S.A.

Characteristic
Consistency: 280
Base oil viscosity: 580 (cSt)

Table 11 Comparison in wear of grooves and steel balls (2 700 km)

Unit: μm

Lubricating condition	Ball slide groove	Rail groove	Steel balls
With NSK K1	16 – 18	2 – 3	6 – 8
Without NSK K1	30 – 45	9 – 11	17 – 25

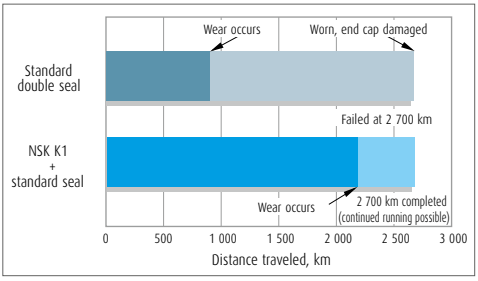


Fig. 6 Durability test immersed in water

3) Durability test with wood chips

Wood chips absorb lubricant. Maintaining lubrication in such environment is extremely difficult. **Fig. 7** shows that the life when NSK K1 is added to a standard seal is two times longer than the life when two seals are combined (standard double seal).

Conditions: Sample ; LH30AN (preload Z1)
Travel speed ; 24 m/min
Stroke ; 400 mm
Load ; 490 N/Slide
Seal specifications/lubricant:
Standard double Seal Standard double Seal + AS2 Grease
NSK K1 NSK K1 + Standard seal + AS2 Grease
Wood chip conditions: 1 Volume of wood chips: Large
2 Volume of wood chips: Medium

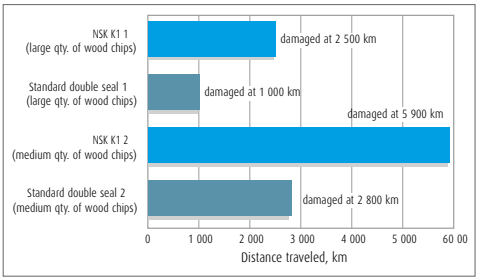


Fig. 7 Durability test with wood chips

4) Dust generation

Fig. 8 is a comparison of dust generation of NSK K1. The combination of NSK K1 and NSK Clean Grease LG2 (low dust generation grease) generates as little dust as fluorine grease (vacuum grease).

Conditions: Sample ; LS20
Travel speed ; 36 m/min

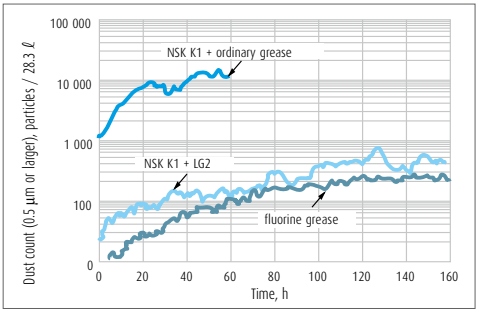


Fig. 8 Comparison of dust emission

(3) Specifications

1) Applicable series and sizes

a) Can be installed in NH, NS, LW, PU, PE and RA series.

b) Can be used with stainless steel materials and surface-treated items.

2) Standard specifications

a) NSK K1 is installed between the end seal and end cap.

For the TS series, it is installed in the end cap. (Double-seal specification, and specification with protector are also available upon request.)

b) NSK standard grease is packed inside the slide.

(You may specify the type of grease and its volume if required.)

c) Accuracy and preload classifications are the same as standard items. (Dynamic friction increases slightly due to NSK K1.)

3) Number of installed NSK K1

Normally, one NSK K1 should be installed on both ends of slides. (two K1s for one slide)

However, more NSK K1 may be required under more stringent operating conditions and environment. Please consult NSK for details in such a case.

Precautions for handling

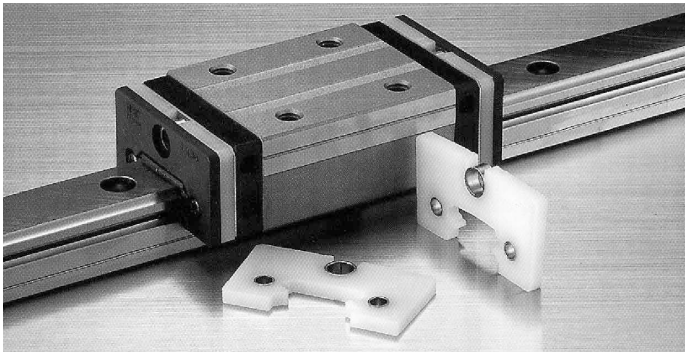
To maintain high fuctionality of the NSK K1, observe the following precautions.

1. Temperature range for use:
   Maximum temperature in use: 50°C
   Momentary maximum temperature in use: 80°C
2. Chemicals that should not come into contact with NSK K1:
   Do not leave the NSK K1 in an organic solvent, such as hexane and thinner that remove oil, or rust preventive oil that contains white kerosene.

Note: Water-type cutting oil, oil-type cutting oil, mineral-oil type grease and ester-type grease do not damage NSK K1.

10. NSK linear guides for food processing equipment and medical devices for sanitary environment

Used with NSK K1 for food processing equipment and medical devices and grease for food processing equipment.



What is "NSK K1" for food processing equipment and medical devices?

With an amazing innovation lubrication unit, the NSK K1 for food processing equipment and medical devices utilizing the US Food and Drug Administration (FDA) compliant material, provides reliability when used in food processing equipment and medical devices. The newly developed porous synthetic resin contains abundant lubricant.

With the basic function of highly praised NSK K1 lubrication unit for general industry, more sophisticated materials make it applicable in food and medical equipment.

It also offers easy installation: it is installed inside the standard end seal.

(1) Features

1) The highest grade of category H1* grease of USDA** standard is used for NSK K1 lubrication unit.

*category H1: Lubricants permitted for use where there is possibility of incidental food contact

**USDA: USDA (The United States Department of Agriculture)

Features of grease for food processing machines

- This grease is approved by USDA H1. (National Science Foundation [NSF] carries out certification for USDA.)
- Superb water resistance and antirust capability
- Superb wear resistance
- Applicable for a centralized oiling system

2) Appropriate volume of grease

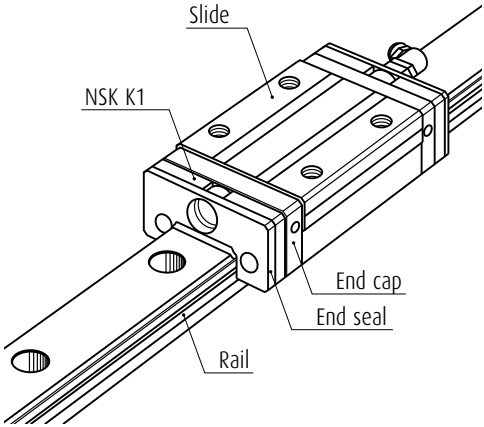
A supply of appropriate volume of grease reduces grease draining and scattering, and maintains a clean environment.

(2) Available models

Table 12 shows available models.

Table 12

NH Series	NH15, NH20, NH25, NH30 and NH35
NS Series	NS15, NS20, NS25, NS30 and NS35
LW Series	LW17, LW21, LW27 and LW35
PU Series	PU09, PU12 and PU15
PE Series	PE09, PE12 and PE15



Precautions for use

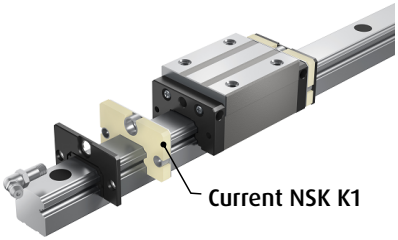
To maintain optimal performance of NSK K1 lubrication unit over a long time, please follow the instructions below:

1. Temperatures range for use:	Maximum temperature in use: 50°C Momentary maximum temperature in use: 80°C
2. Chemicals that should not come to contact:	Do not leave NSK K1 lubrication unit in organic solvent, white kerosene such as hexane, thinner which removes oil, and rust prevention oil which contains white kerosene.

Note: Water-type cutting oil, oil-type cutting oil and grease such as mineral-type and ester-type do not damage NSK K1 lubrication unit.

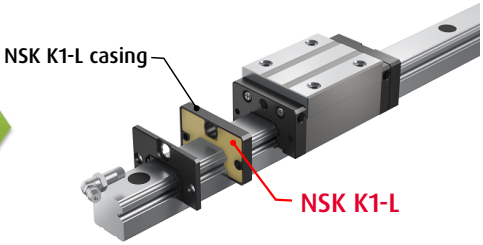
11. Introduction of New Lubrication Unit NSK K1-L for NSK Linear Guides

Current NSK K1



■ Oil content 70% in total weight

New Lubrication Unit NSK K1-L



New NSK K1-L Lubrication Unit will replace the current K1 Lubrication unit.

- Maintains lubrication by optimizing resin content ratio and achieves 85wt% oil content
- Controls amount of lubrication oil released per hour to double the oil supply period
- Increased supply of lubrication oil thanks to newly developed material
  Supply period about twice that of current material
- Casing around oil-retaining material
  Protects oiled components and prevents oil leakage

Remarques

Remarques

MOTION & CONTROL™

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