MOTION & CONTROL
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Precision Machine Components

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MOTION & CONTROL
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Precision Machine Components

- Linear Guides
- Ball Screws
- Monocarrier
- Megatorque Motors PS

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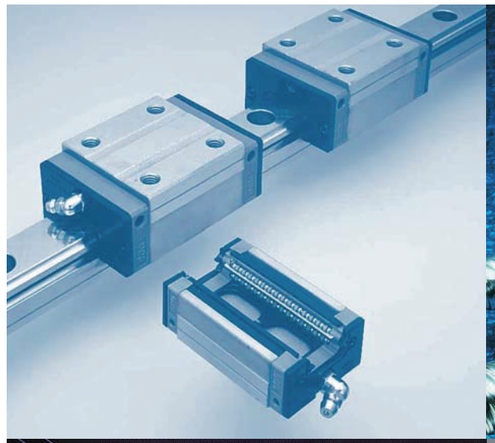

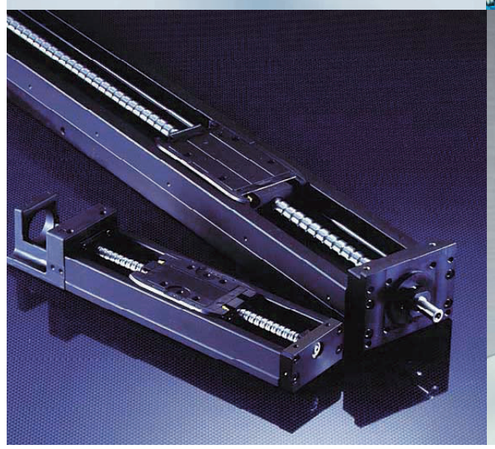

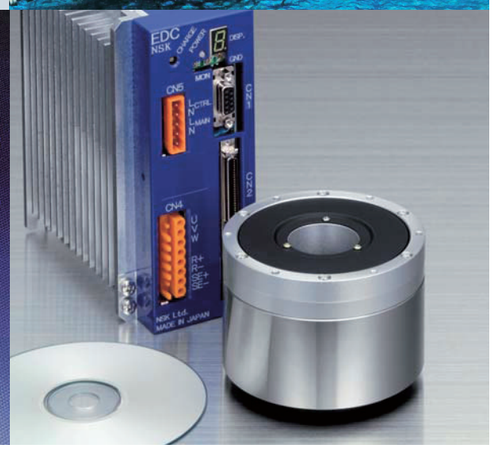

Edition 2008/01

NSK

Precision Machine Components

- Linear Guides
- Ball Screws
- Monocarrier
- Megatorque Motors PS

Specifications are subject to change without notice and without any obligation on the part of the manufacturer.
Every care has been taken to ensure accuracy of the data contained in this catalog, but no liability can be accepted for any loss or damage suffered through errors or omission.
We will gratefully acknowledge any additons or corrections.

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Dear customer,

We would like to thank you for choosing NSK products. This catalogue compiles the standard linear guides, ball screws, NSK Monocarrier, and NSK Megatorque motor that are available in stock for prompt delivery.

In the case of the linear guides, this document includes technical information, dimensions and load ratings for the interchangeable types. Interchangeable types enable random matching of rails and ball slides for prompt delivery from stock. For other linear guide specification, please refer to the general catalogue or to the specific flyers.

The ball screws types included in this document belong to the two rolled series of NSK ball screws. For the grinded types, please refer to the general catalogue or to the specific flyers. In this catalogue we present the new Compact FA series, part of the grinded ballscrews. The R-Series ball screws are our interchangeable clearance type ball screws, and our PR / LPR Series are our precision rolled type, which has no clearance and allows high-speed operation among other advantages.

The NSK Monocarrier integrates in one unit the guiding and driving functions, by combining in one axis a linear guide, a ball screw, and a support bearing unit. These linear actuators are designed to save design and installation time.

This catalogue includes a chapter for the Megatorque motors that is one of our Mechatronic components. The Megatorque motor is a servomotor that equips a position detector for fully closed loop control. It is capable to drive the load directly without using a mechanical speed reducer, and accordingly, it realizes highly accurate positioning without backlash and lost motion.

Technical description linear guides

1

- **Reference numbers**
- **Accuracy**
- **Preload and stiffness**
- **Installation**
- **Lubrication**

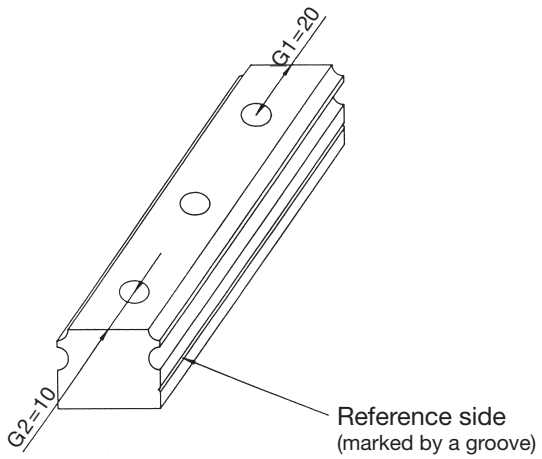
Part numbering

This catalogue covers the interchangeable linear guides. The interchangeable linear guides have separate part numbers for the slider and for the rail. It is possible to write part numbers for the assembly of sliders and rails. The maximum length of the rails is stated in the corresponding tables, but it is always possible to assemble rails up to an unlimited length.

When ordering a rail, together with the total length of the rail it is needed to provide the G dimensions from the centre of the last fixing hole to the end of the rail (see figure).

In case of special G dimensions a sketch is needed in order to avoid any ambiguity.

If the linear guide is formed by different rails butted one next to the other, a sketch for each of the rails forming the total guide is needed.



Reference number for the rail

L1 H 25 0500 L C N G** P C Z

Interchangeable rail code
L1: rail code for ball guides
R1: rail code for roller guides
P1: rail code for PU/PE series

Series
H = LH or SH, S = LS or SS,
W = LW, U = LU, E = LE, A = RA

Size

Rail length (mm)

Rail execution
L or ~ = standard
T = In LU09 and LU12: fixing hole M3
In LS15: fixing hole M4
R = In LU09 and LU12: with groove for ball retainer
S = In LU09 and LU12: with groove for ball retainer and fixing hole M3

Material / surface treatment code
C or – = special high carbon steel (NSK standard)
K = stainless steel
D = special high carbon steel with black chrome plating

V = bottom thread hole mounting
W = black chrome plated plus bottom thread hole mounting

Code for cutting of the rail
N or – = no butting rail
L = butting rail (guide made of butted rails)

or Y Internal drawing code

Accuracy grade. PC or – : interchangeable

Z = with preload

Reference number for the Translide rail

Example: T1S 30 2400 L P N T– ** PL S

Translide: Interchangeable rail

Model number

Rail length (mm))

Surface treatment/Rail design code
P: No surface treatment/Counterbores on a rail top face (Type I)
V: No surface treatment/Tapped holes on a rail bottom face (Type II)
R: Fluoride low temperature chrome plating/ Counterbores on a rail top face (Type I)
W: Fluoride low temperature chrome plating/ Tapped holes on a rail bottom face (Type II)

Clearance code S: Clearance of 60 µm or less

Accuracy grade PL: Normal grade for transportation

Design serial number

Butting rail code
N: No butting
L: Rail for butting

Reference number for interchangeable slider

LA H 25 AN S Z - F

LA – slider for linear guide
SA – slider for linear guide with S1
RA – slider for roller guide
Series
H = LH or SH, S = LS or SS, W = LW, U = LU, E = LE, A = RA
Size

Slider shape code

Material / surface treatment code
No code = special high carbon steel (NSK standard)
S = stainless steel

Preload code
Z = with light preload
H = with high preload

Options code
No code = no special options
– F = fluoride low temperature chrome plating
– K = equipped with NSK K1

Reference number for the Translide slider

Example: TAS 30 AN – F

Translide: Interchangeable ball slide

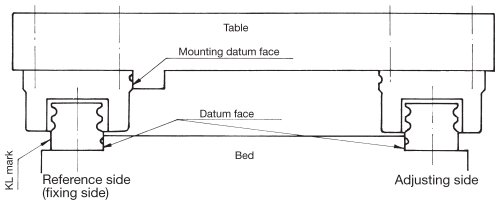
Model number

Shape code of ball slide

No code: No surface treatment + AV2 Grease
F: Fluoride low temperature chrome plating + AV2 Grease
F50: Fluoride low temperature chrome plating + LG2 Grease

2. Assembly type
The specification for assembled types must include a sketch, in which is shown if the reference surfaces (marked with a groove) of the sliders and of the rail are on the same side, or the other way around.

In case that the reference surfaces of the rail and of the sliders are they are on the same side, the mounting arrangement is called W2. Otherwise, if the reference surfaces of the rail and of the sliders are in opposite sides, the mounting arrangement is called W3.



The datum faces of the rails and of the sliders are marked with a groove.

Interchangeable type assembly

LH 30 0800 AL C 2 G** PC Z

- Series: LH, SH, LS, SS, LW, LU, LE, PU, PE, RA
- Size
- Rail length (mm) (for lengths above 9999 use: -example- X128 = 12800 mm long)
- Slider shape code
- Material / surface treatment code: C or blank = special high carbon steel (NSK standard); D = special high carbon steel with black chrome plating; K = stainless steel
- Number of sliders per rail
- or Y Internal design code
- Accuracy grade: PC for interchangeable type
- Preload code: Z = with light preload; H = with high preload

Reference number for a Translide assembly

Example: TS 30 2400 AN P 2 – * * KL S

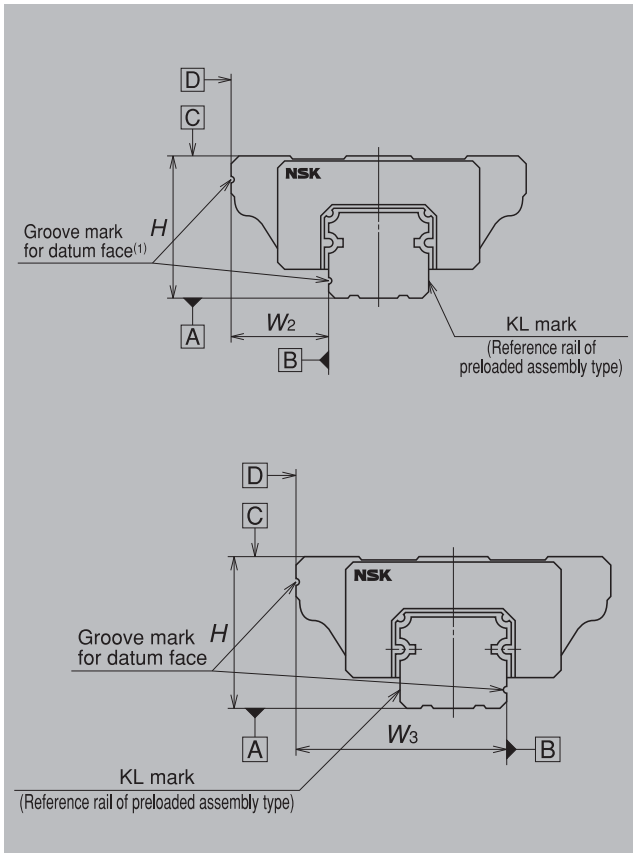
- Translide
- Model number
- Rail length (mm)
- Shape code of ball slide
- Surface treatment / Rails design code
  - P: No surface treatment / Counterbores on a rail top face (Type I)
  - V: No surface treatment / Tapped holes on a rail bottom face (Type II)
  - R: Fluoride low temperature chrome plating / Counterbores on the top face of rail (Type I)
  - W: Fluoride low temperature chrome plating / Tapped holes on the bottom face of rail (Type II)
- Number of ball sliders assembled to a rail
- Design serial number
- Accuracy grade KL: Normal grade for transportation
- Preload code S: Clearance of 60 µm or less

Accuracy

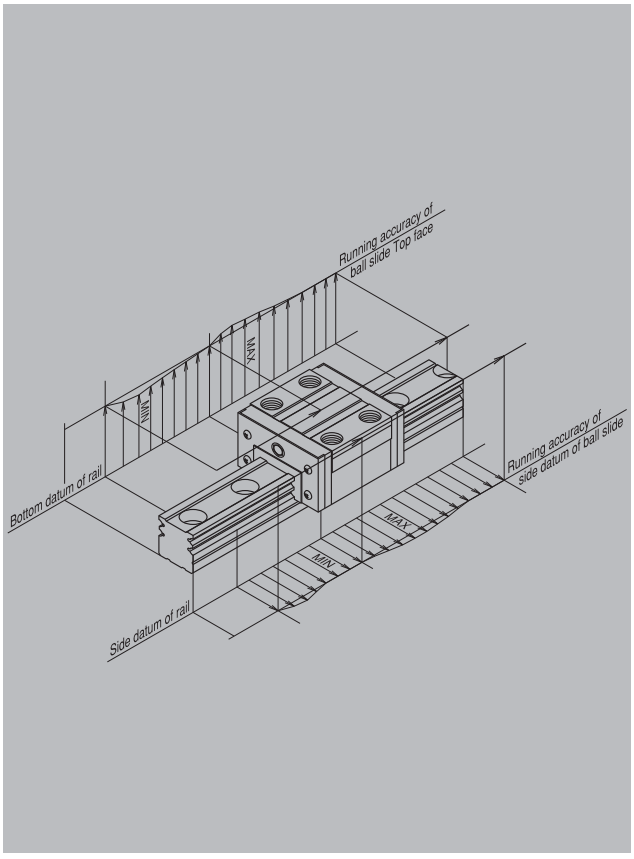
Accuracy Standard

Definition of accuracy

Characteristics	Definition
Mounting height *H*	Distance from A (rail bottom datum face) to C (ball slide top face)
Variation of *H*	Variation of *H* in ball slides assembled to the rails of a set of linear guide
Mounting width W_2 or W_3	Distance from B (rail side datum face) to D (ball slide side datum face). 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 (ball slide top face) to A (rail bottom datum face) when ball slide is moving.
Running parallelism of ball slide, face D to face B	Variation of D (ball slide side datum face) to B (rail side datum face) when a ball slide is moving.



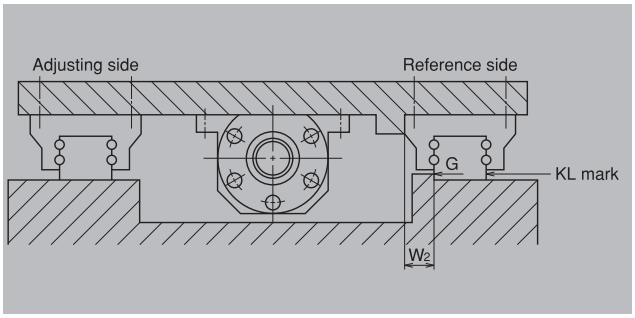
Assembled accuracy (Height and width)



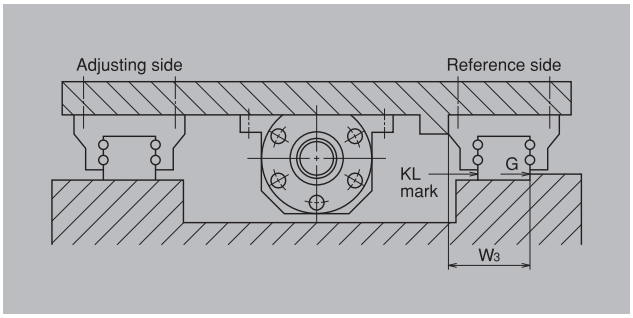
Running parallelism of ball slide

Mounting width: W_2, W_3

• Mounting width differs depending on the arrangement of the datum faces of the rail and ball slide on the reference linear guide (indicated as KL on the rail).



Mounting width W_2



Mounting width W_3

1.2 Running Parallelism of Ball Slide

• Running parallelism of ball slide is common in all series. Specifications of the accuracy grades are shown in Table below. However, applicable accuracy grades differ by series. Please refer to tables on pages 13 and 14.

Running parallelism of ball slide

Unit: μm

Rail over all length (mm)		Interchangeable type	
over	or less	Normal Grade PC	Precision Grade P6
	~ 50	6	4.5
50~	80	6	5
80~	125	6.5	5.5
125~	200	7	6
200~	250	8	7
250~	315	9	8
315~	400	11	9
400~	500	12	10
500~	630	14	12
630~	800	16	14
800~	1000	18	16
1000~	1250	20	17
1250~	1600	23	19
1600~	2000	26	21
2000~	2500	29	22
2500~	3150	32	25
3150~	4000	34	30

Accuracy Standard in Interchangeable Types

LH, LS, SH, SS, LW Series

The tables below show the accuracy standards of the LH, LS, SH, SS, LW Series.

Tolerance of LH and SH Series interchangeable type: Normal grade PC Unit: μm

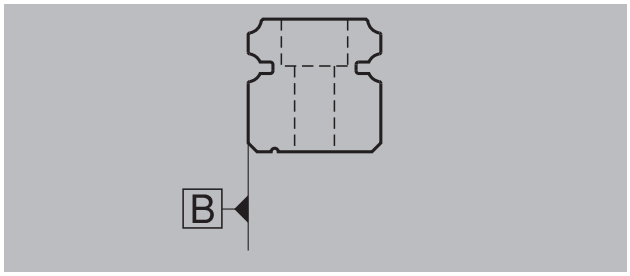
	Characteristics \ Model No.	LH15, 20, 25, 30, 35	LH45, 55, 65
Interchangeable type with clearance	Mounting height *H*	±20	±30
	Variation of mounting height *H*	15① 30②	20① 35②
	Mounting width W_2 or W_3	±30	±35
	Variation of mounting width W_2 or W_3	25	30
	Running parallelism of ball slide, face A to face C Running parallelism of ball slide, face B to face D	See Fig. page 11, table page 12	
Interchangeable type with preload	Mounting height *H*	±20	±30
	Variation of mounting height *H*	15① 30②	20① 35②
	Mounting width W_2 or W_3	±30	±35
	Variation of mounting width W_2 or W_3	25	30
	Running parallelism of ball slide, face A to face C Running parallelism of ball slide, face B to face D	See Fig. page 11, table page 12	

Tolerance of LS, SS and LW Series interchangeable type: Normal grade PC Unit: μm

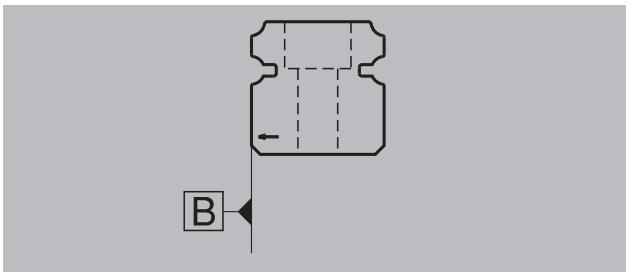
Characteristics \ Model No.	LS15, 20, 25, 30, 35 LW17, 21, 27, 35, 50
Mounting height H	±20
Variation of mounting height *H*	15① 30②
Mounting width W2 or W3	±30
Variation of mounting width W_2 or W_3	25
Running parallelism of ball slide, face A to face C Running parallelism of ball slide, face B to face D	See Fig. Ⅱ-1o1 and Table Ⅱ-1-2.

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

Indication of rail datum face of in LH, SH, LS, SS and LW series.



For special high carbon steel (NSK standard material)



For stainless steel

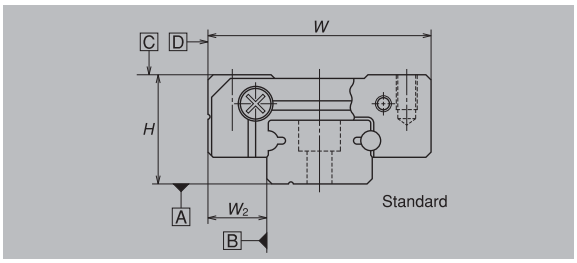
PU, PE Series

The table below shows tolerance of PU and PE Series interchangeable type.

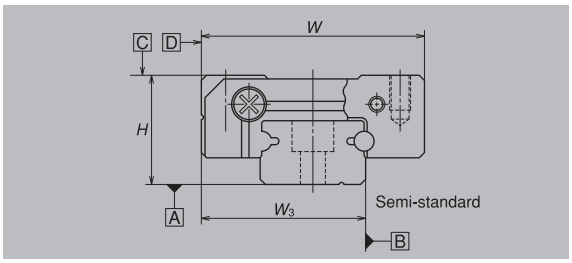
Tolerance of interchangeable type in PU and PE Series Normal grade (PC)

Unit: μm

Characteristic \ Model No.	PU09, 12, 15 PE09, 12, 15
Mounting height *H* Variation of *H*	±20 40
Mounting width W_2 or W_3 Variation of width W_2 or W_3	±20 40
Running parallelism of ball slide, face C to face A Running parallelism of ball slide, face D to face B	Refer to table page 12 See Fig. below

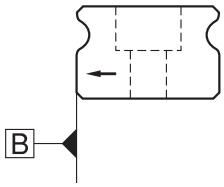
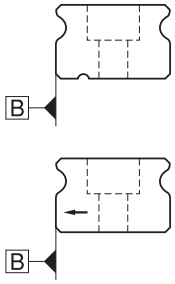
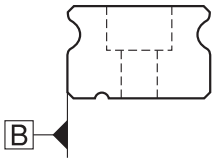


Mounting width (W_2)



Mounting width (W_3)

Indication of rail datum face in PE and PU Series

Material \ Model No.	PU05, 07, 09 PE07, 09, 12	PU12, 15	PE09, 12, 15
Special high carbon steel			
Stainless steel			

Rating Life

Rating Life and Basic Load Rating

Life

Although used in appropriate conditions, the linear guide deteriorates after a certain period of operation, and eventually becomes unusable. In broad definition, the period until the linear guide becomes unusable is called „life.“ There are „fatigue life“ caused by flaking, and „life of accuracy deterioration“ which is caused by wear.

Rating fatigue life

When the linear guide runs under load, the balls and the rolling contact surface of the grooves are exposed to repetitive load. This brings about fatigue to the material, and generates flaking. Flaking is scale-like damage to the surface of the ball groove. Total running distance until first appearance of flaking is called „fatigue life.“ This is „life“ in the narrow sense. Fatigue life varies significantly even in linear guides produced in the same lot, and even when they are operated under the same conditions. This is attributable to the inherent variation of the fatigue of the material itself. „Rating fatigue life“ is the total running distance which allows 90% of the group of linear guides of the same reference number to run without causing flaking when they are independently run under the same conditions. Rating fatigue life is sometimes indicated by total operating hours when the linear guides run at a certain speed.

Revised basic load ratings in compliance with ISO standard

NSK has revised the basic load ratings in compliance with the FDIS (Final Draft International Standard) of ISO.
The basic load ratings as listed in chapters 2 to 9 comply with the following ISO standards.
- Basic dynamic load rating : ISO/FDIS 14728-1
- Basic static load rating : ISO/DFIS 14728-2

Basic dynamic load rating

- Basic dynamic load rating, which indicates load carrying capacity of the linear guide, is a load whose direction and volume do not change, and which furnishes 50 km of rating fatigue life.
- In case of linear guide, it is a constant load applied to downward direction to the center of the ball slide.
- Value of basic dynamic load rating C is shown in chapters 2 to 9.
- NSK defines the basic dynamic load rating as the load that furnishes 50 km of rated fatigue life.
  However some linear guide manufacturers in Europe and the United States define the load for the basic fatigue life of 100 km as the basic dynamic load ratings.

- The following formula may be used to convert the basic dynamic load rating C50 the dynamic load rating for 100 km rated fatigue life.

For balls as rolling element : $C_{100}=C/1.26$ (N)
For rollers as rolling element : $C_{100}=C/1.23$ (N)

Calculation of rating fatigue life

- In general, rating fatigue life „L“ can be calculated from basic dynamic load rating „C“ and the load „F“ to ball slide using the following formula.

For balls as rolling element $L=50\times\left(\frac{C}{F}\right)^3$

L: Rating fatigue life (km)
C: Basic dynamic load rating (N) (50km)
F: Load to a ball slide (N)
(dynamic equivalent load)

- The rating fatigue life L for 100 km can be obtained from the following formulas using the dynamic load rating C_{100}..

For rollers as rolling element $L=100\times\left(\frac{C_{100}}{F}\right)^{\frac{10}{3}}$

L: Rating fatigue life(km)
C_{100}: Dynamic load rating for 100 km
F: Load to ball slide(dynamic equivalent load)

Dynamic equivalent load

- Load applied to the linear guide (ball slide load) comes from various directions up/down and right/left directions and/or as moment load. Sometimes more than one type of load is applied simultaneously. Sometimes volume and direction of the load may change.
  Varying load cannot be used as it is to calculate life of linear guide. Therefore, it is necessary to use a hypothetical load to ball slide with a constant volume which would generate a value equivalent to an actual fatigue life. This is called „dynamic equivalent load.“ For actual calculation, refer to **„A-II-3.2 (4) How to calculate dynamic equivalent load“, in the general catalogue E3161.**

Basic static load rating

- When an excessive load or a momentary large impact is applied to the linear guide, local permanent deformation takes place to the balls and to the rolling contact surface. After exceeding a certain level, the deformation hampers smooth linear guide operation.
- Basic static load rating is a static load when: [Permanent deformation of the balls] + [permanent deformation of the rolling contact surfaces] becomes 0.0001 times of the ball diameter.
- In case of linear guide, it is a load which is applied downward direction to the center of the ball slide.
- Values of basic static load rating C0 are shown in chapters 2 to 9.

Basic static moment load rating

- Generally, NSK linear guide uses a set of two rails and four ball slides for the guide way of one axis. Under some operating condition, static moment load should be taken into account. „M0,“ which is the limit of static moment load in such use is shown in chapters 2 to 9.

Basic load rating by load direction

• The basic load rating is considered to be a downward load to the ball slide and is indicated in the dimension tables as the dynamic load rating C and the static load rating C_0 respectively. However, the load may be applied to a ball slide in upward or lateral directions in actual use. In such a case the basic load rating shall be compensated as shown in Table below. The basic dynamic load rating of the RA Series is the same in C and C_0 for all load directions, up, down and lateral, while the LH Series has different basic load ratings by the load direction as shown in the table.

Basic load ratings by load direction

Load rating / Load direction / Series	Basic dynamic load rating			Basic static load rating		
	Downward	Upward	Lateral	Downward	Upward	Lateral
LH,SH,LS,SS,LW	C	C	$0.88C$	C_0	$0.75C_0$	$0.63C_0$
RA,TS,PU,PE	C	C	C	C_0	C_0	C_0

Lubrication

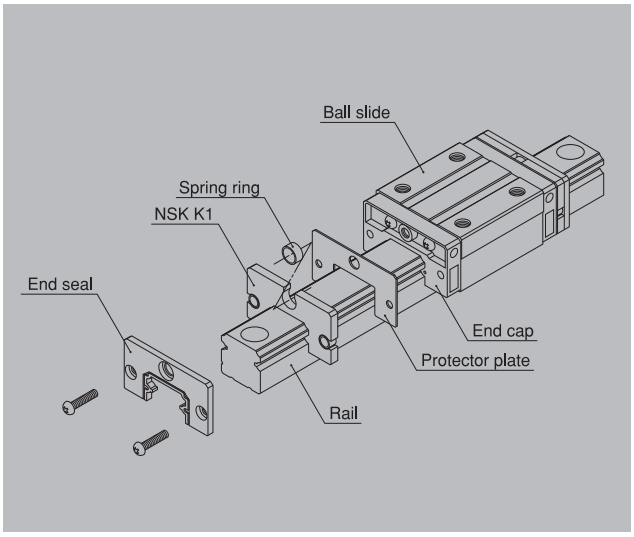
The NSK linear guides LH, SH, LS, SS, LW, and RA series are greased from origin with grease AV2 from Shell. The series LU, PU and PE are greased from origin with grease PS2 from Kyodoyushi. The recommended replenishment intervals are every 3 or 6 months, depending on the working conditions, or every 400 km, as another reference value. The LU, PU, and PE series do not include a grease nipple for replenishment, please apply grease directly on the rail grooves when needed.

It is also possible to do lubrication by oil, but in this case it is needed to install a central lubrication system, and replace the standard grease fittings with adaptors for oil lubrication. Please, consult NSK in this case.

"NSK K1®" Lubrication Unit

What is K1 Lubrication Unit

- This is a lubrication unit made of porous plastic (polyurethane) which contains a large volume of lubrication oil, and is formed into seal.
- NSK K1 Lubrication Unit is not a simple dust prevention seal. This remarkable seal also serves as a lubrication unit by seeping oil from the plastic.
- Along with the protection plate, an NSK K1 Lubrication Unit is installed between the end cap and the end seal at both ends of the linear guide. KI Lubrication Unit is already equipped at the time of delivery.



K1 Lubrication unit

Functions of NSK K1 Lubrication Unit

This unit is markedly effective as a lubrication oil cup in the following occasions.

- Use it when sealed lubricant runs out ····· For production line system (maintenance-free)
- When only a small amount of oil is allowed ····· For clean facility, medical equipment
- When oil is washed away ····· For food processing machines
- When oil-absorbing dust is present ····· For woodworking machines

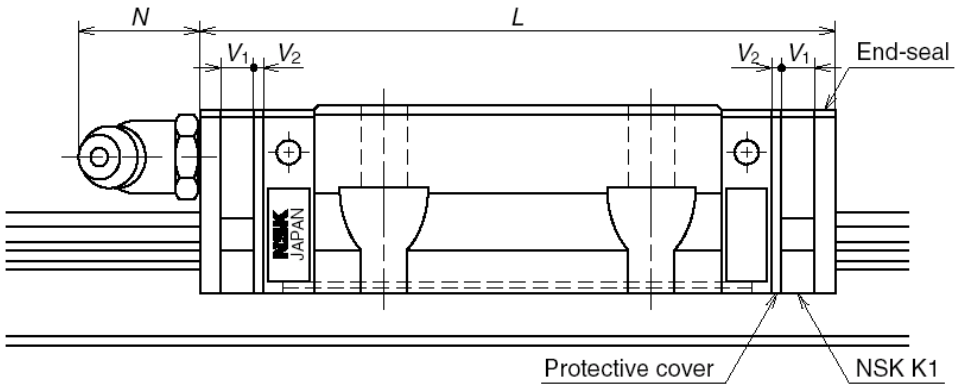
A-Ⅱ-5.3 Dust proof components

NSK has the following items. Select a suitable type for the operating environment.

Table Ⅱ-5•3 Optional dust proof components

Name	Purpose
NSK K1 lubrication unit	Made of oil impregnated resin. Enhances lubricating functions.
Double seal	Combines two end seals, enhancing sealing function.
Protector	Protect end seal from hot and hard contamination.
Rail cap	Prevents foreign matters such as swarf generated in cutting operation from clogging the rail-mounting hole.

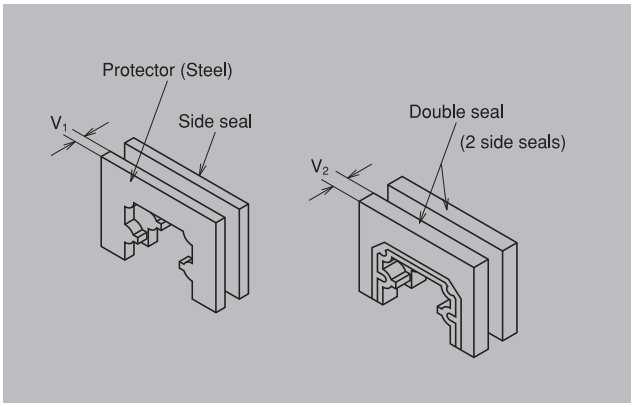
Length of sliders with K1



Model No.	Slider type (length)	Slider type (shape)			Slider length with two NSK K1 *L* (mm)
LAH15	Standard		AN	EM	65.6
SAH15	Long		BN	GM	84.6
LAH20	Standard		AN	EM	80.4
SAH20	Long		BN	GM	102.4
LAH25	Standard	AL	AN	EM	90.6
SAH25	Long	BL	BN	GM	118.6
LAH30 SAH30	Standard	AL	AN		97.6
	Flange			EM	110.6
	Long	BL	BN	GM	136.6
LAH35	Standard	AL	AN	EM	122
SAH35	Long	BL	BN	GM	156
LAH45	Standard		AN	EM	154
	Long		BN	GM	186
LAH55	Standard		AN	EM	178
	Long		BN	GM	216
LAH65	Standard		AN	EM	211
	Long		BN	GM	271
LAS15	Standard	AL		EM	67.4
SAS15	Short	CL		JM	51
LAS20	Standard	AL		EM	75.8
SAS20	Short	CL		JM	57.8
LAS25	Standard	AL		EM	92
SAS25	Short	CL		JM	70
LAS30	Standard	AL		EM	108.4
SAS30	Short	CL		JM	79.4
LAS35	Standard	AL		EM	121
SAS35	Short	CL		JM	90
LAW17	Standard			EL	61.6
LAW21	Standard			EL	71.4
LAW27	Standard			EL	86.6
LAW35	Standard			EL	123
LAU15	Standard	AL			51.8
PAU05	Standard	TR			24.4
PAU07	Standard	AR			29.4
PAU09	Standard	TR			36.4
PAU12	Standard	TR			42
PAU15	Standard	AL			51.2
PAE05	Standard	AR			28.9
PAE07	Standard	TR			37.1
PAE09	Standard	TR			46.8
PAE12	Standard	AR			53
PAE15	Standard	AR			66.2

Double seal

- A combination of two end seals to enhance seal function.
- When a double seal is installed, the end seal section becomes thicker than the standard item by the size shown in the tables below. Take this thickness into consideration in determining the stroke and the size of section in which a ball slide is going to be installed.
- Double-seal set: Can be installed to a completed standard item later on request. It comprises two end seals, a collar, and a small screw for installation (Figure on page 20).
- When attaching a grease fitting to the end cap after the double seal is equipped, you require a connector shown in Figure on page 20. Please specify the connector set when ordering linear guides.



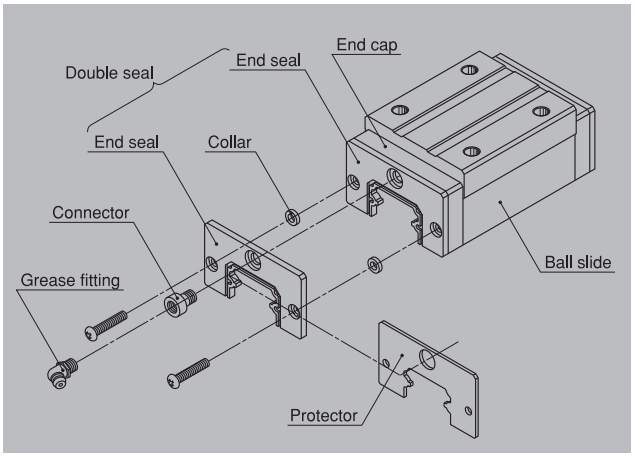
Double seal

Double-seal set

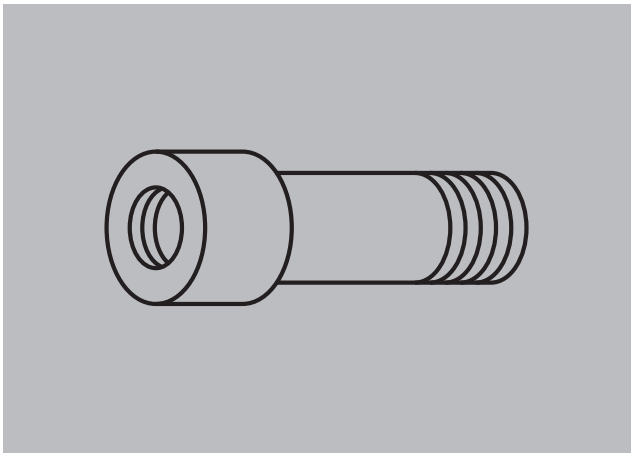
Unit: mm

Model No.	Reference No.		Increased thickness V_2
	Without connector	With connector	
LH15	LH15WS-01	* * *	2.5
LH20	LH20WS-01	LH20WSC-01	2.5
LH25	LH25WS-01	LH25WSC-01	2.8
LH30	LH30WS-01	LH30WSC-01	3.6
LH35	LH35WS-01	LH35WSC-01	3.6
LH45	LH45WS-01	LH45WSC-01	4.3
LH55	LH55WS-01	LH55WSC-01	4.3
LH65	LH65WS-01	LH65WSC-01	4.9
LS15	LS15WS-01	* * *	2.8
LS20	LS20WS-01	LS20WSC-01	2.5
LS25	LS25WS-01	LS25WSC-01	2.8
LS30	LS30WS-01	LS25WSC-01	3.6
LS35	LS35WS-01	LS35WSC-01	3.6

Model No.	Reference No.		Increased thickness V_2
	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



Double seal installation



Connector

Metal protector

- A protector is usually installed outside the end seal to prevent high-temperature fine particles such as welding spatter and other hard foreign matters from entering the ball slide.
- Same as the case with a double seal, when a protector is installed, the ball slide becomes longer by the size shown in the table below. Protector is available as a set.
- When attaching a grease fitting to the end cap after the protector is equipped, you require a connector Please specify the connector set when ordering linear guides.

Protector set

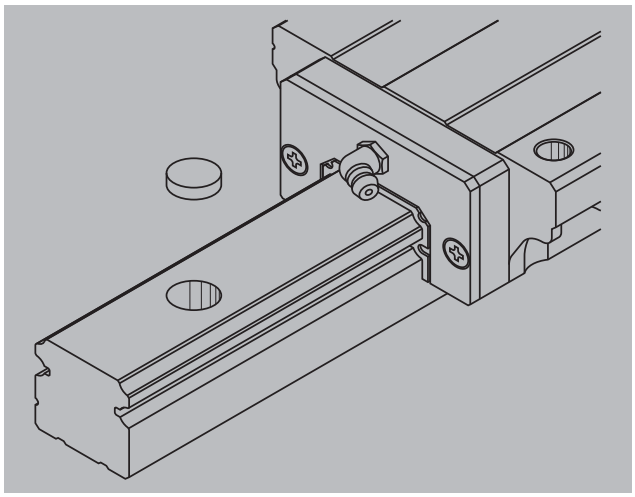
Unit: mm

Model No.	Reference No.		Increased thickness V_1
	Without connector	With connector	
LH15	LH15PT-01	* * *	2.7
LH20	LH20PT-01	LH20PTC-01	2.9
LH25	LH25PT-01	LH25PTC-01	3.2
LH30	LH30PT-01	LH30PTC-01	4.2
LH35	LH35PT-01	LH35PTC-01	4.2
LH45	LH45PT-01	LH45PTC-01	4.9
LH55	LH55PT-01	LH55PTC-01	4.9
LH65	LH65PT-01	LH65PTC-01	5.5
LS15	LS15PT-01	* * *	3
LS20	LS20PT-01	LS20PTC-01	2.7
LS25	LS25PT-01	LS25PTC-01	3.2
LS30	LS30PT-01	LS30PTC-01	4.2
LS35	LS35PT-01	LS35PTC-01	4.2

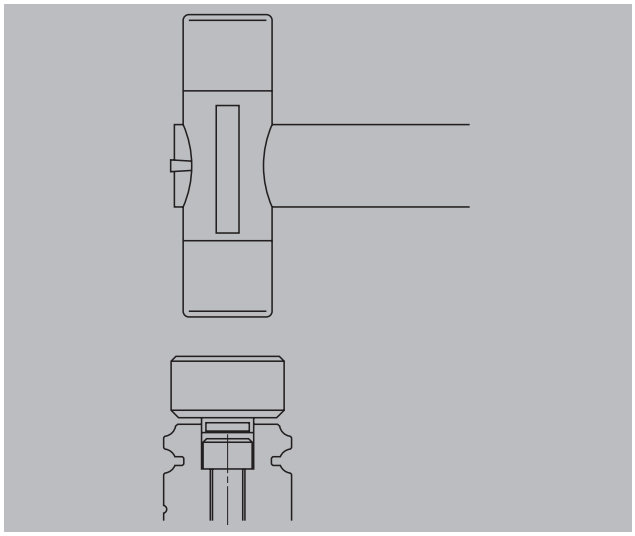
Model No.	Reference No.		Increased thickness V_1
	Without connector	With connector	
LW17	LW17PT-01	* * *	3.2
LW21	LW21PT-01	LW21PTC-01	3.2
LW27	LW27PT-01	LW27PTC-01	2.9
LW35	LW35PT-01	LW35PTC-01	3.6
LW50	LW50PT-01	LW50PTC-01	4.2

Cap to cover the 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 matters from clogging up the hole or from entering into the ball slide.
- The cap for the bolt hole is made of synthetic resin which is superb in its resistance to oil and wear.
- The table below shows sizes of the bolts for the each model number as well as reference number of the cap.
- To insert a cap into the rail bolt hole, use a flat tool. Pound the cap gradually until its height becomes flush with the rail top face. (see figure)
- Caps are alternatively available as made of brass.



Cap for rail bolt holes



Insertion of the cap into the bolt hole
Tool not supplied by NSK

Caps to cover rail bolt hole

Model No.	Bolt to secure rail	Cap reference No.
SS15(for M3) LS15(for M3) PU09, PU12, PU15 PE09, PE12, PE15	M3	LG-CAP/M3
SH15 SS15(for M4) LH15 LS15(for M4) RA15 LW17 LW21 LW27 TS15	M4	LG-CAP/M4
SH20 SS20 LH20 LS20 RA20 TS20	M5	LG-CAP/M5
SH25 SS25 SS30 LH25 LS25 LS30 RA30 RA25 LW35 TS25	M6	LG-CAP/M6
SH30 SH35 SS35 LH30 LH35 LS35 LA30 LA35 LY30 LY35 LW50 TS30 TS35	M8	LG-CAP/M8
LH45 RA45	M12	LG-CAP/M12
LH55 RA55	M14	LG-CAP/M14
LH65 RA65	M16	LG-CAP/M16

Rust Prevention and Surface Treatment

Rust Prevention (Stainless steel)

NSK linear guide is also available in stainless steel standard series.

○ Stainless steel standard series

LH Series
LS Series
PU Series
PE Series

Select from the above when using in the environment which invites rust.

Surface Treatment

Types of surface treatment

The following are common types of treatment.

○ Electrolytic rust prevention black film treatment (low temperature chrome plating)
- Used to prevent corrosion and light reflection, and for cosmetic purpose.

○ Fluoride low temperature chrome plating
- Fluoroplastic coating is provided following the electrolytic rust prevention black film treatment.
- Resistance to corrosion is higher than electrolytic rust prevention film treatment.

Recommended surface treatment

Among the surface treatments mentioned above, we recommend "electrolytic rust prevention black film treatment" and "fluoride low temperature chrome plating" for rust prevention because of the result of humidity chamber test for antirust characteristics and their cost-effectiveness.

However, never apply any organic solvent for degreasing because it has adverse effect on antirust characteristics.

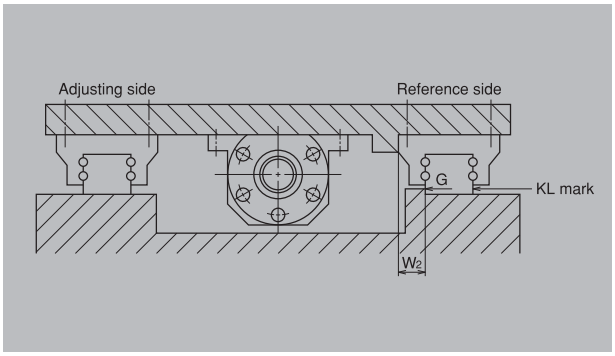
Arrangement and Mounting of Linear Guide

Arrangement

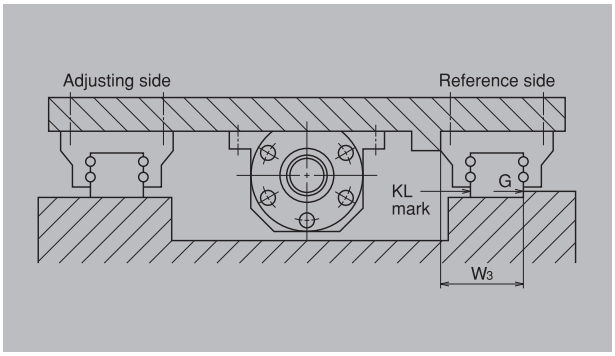
- For NSK linear guide, the datum face of the rail and of the ball slide are marked with either an "datum face groove" or with an "arrow."
- When the datum faces of the reference side rail and ball slides are pressed to their mounting datum faces respectively, the variation of distance (mounting width W_2 or W_3) between the datum faces of the rails and that of the ball slides must be a minimum and therefore, it is specified as the standard. (See figures on the right)
- The ways to indicate the datum faces of PU and PE Series are shown in the table below.

Example of arrangement

- Arrangement of the linear guide must be determined taking into account the table position, its direction (horizontal, vertical, inclined, hanging from the ceiling), stroke, the size of bed and the table in the equipment as a whole. Table on page 24 shows a common arrangement examples, and features/precautions for each case.

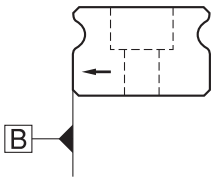
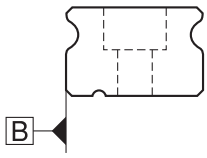
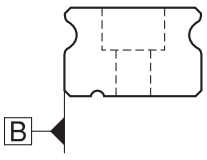
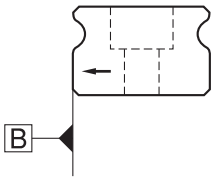


Most common setting of the reference side rail (W_2 mounting)

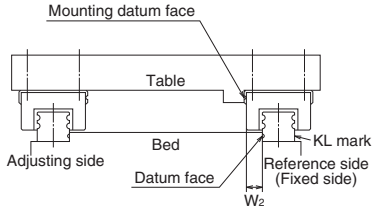
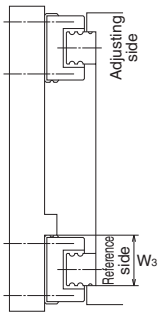
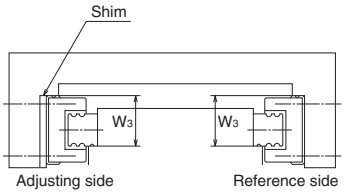
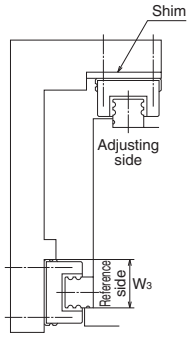
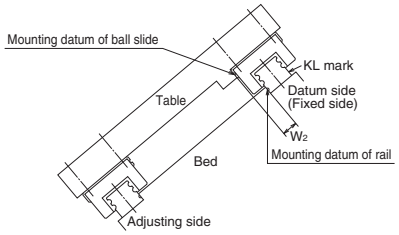
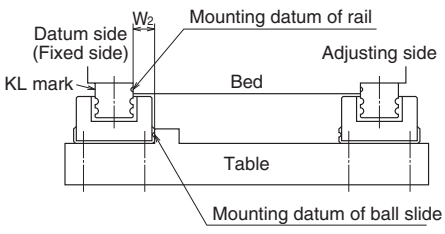


Setting of the reference side rail in certain occasions (W_3 mounting)

Marks on the rail datum faces in PU, PE Series

Model No. / Material	PU05, 07, 09 PE05, 07, 09, 12	PU12, 15	PE09, 12, 15
Special high carbon steel			
Stainless steel			

Arrangement example

Arrangement	Features/Precautions
	• Easy in highly-accurate installation (recommended arrangement)
	• Easy in highly-accurate installation • Lubricant oil may not be supplied to ball slide. Precaution is required in the oil supply design.
	• Slightly difficult for highly-accurate installation • Life of linear guide is affected by mounting accuracy. • When oil lubricant is used, precaution is required in oil supply design.
	• Difficult for highly-accurate installation • For a linear guide mounted in sideways, precaution is required in oil supply design if oil lubricant is used.
	• Rather easy in highly-accurate installation • When oil lubricant is used, precaution is required in oil supply design.
	• Easy in highly-accurate installation if the linear guide is installed to the machine base first, then hang upside down along with the machine base. • Ball slide may detach from the rail and fall down if the linear guide is damaged and all the balls in the ball slide fall out. It is necessary to take preventive measures against the falling of the ball slide.

Mounting Accuracy

Accuracy of the mounting base of machine

- Mounting accuracy of linear guide usually copies the accuracy of the machine base.
- However, when two or more ball 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 face accuracy, reducing the error to about 1/3 in average. (See figure on the right)

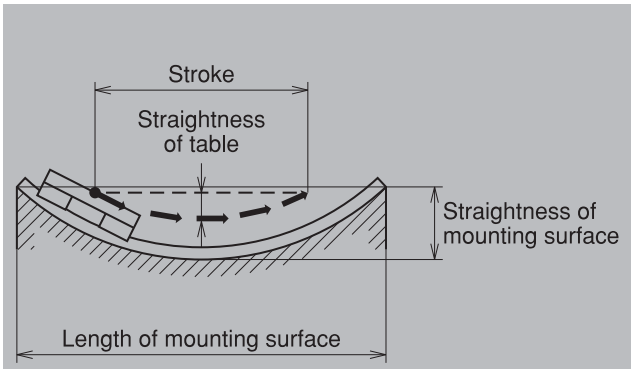
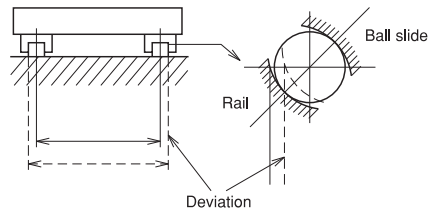
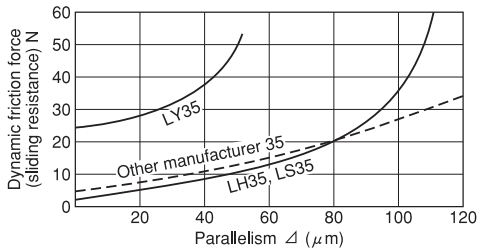
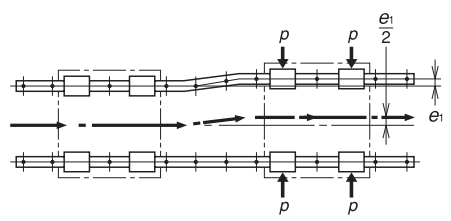


Table stroke vs. mounting surface

Installation error

- Mounting error affects mainly three factors: life, friction and accuracy (Table below).

Influence of mounting error

Factor	Influence	
Life		• Large mounting error generates a force which twists the ball slide and reduces its life. • It also distorts the contact point of the ball and the groove and changes contact angle, lowering rigidity.
Friction		• LH and LS Series are affected very little by mounting error thanks to their small friction. (self alignment) • However, because of off-set gothic arch grooves, their friction suddenly soars once the mounting error exceeds a certain level. • Mounting error severely affects friction of LY Series with heavy preload.
Accuracy		• When rigidity of four ball slides are equal, the theoretical straightness becomes 1/2 of the installation error e_1. • However, this value becomes slightly larger due to deformation of the rail and the machine base.

Assemble Interchangeable Linear Guide

- Interchangeable ball slide is assembled on a provisional rail (an inserting tool) when it is delivered (see figure).
- NSK standard grease is packed into the ball slide, allowing immediate use.

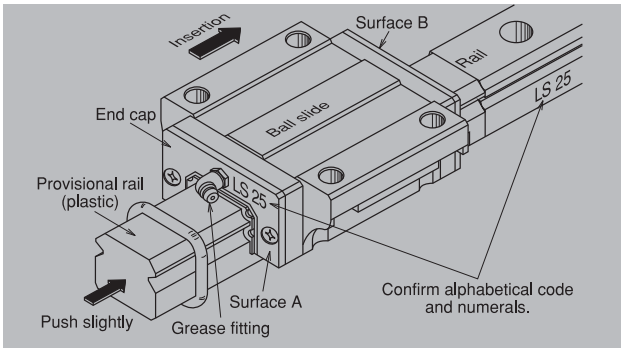
Assembly procedures of interchangeable linear guide

Follow steps as described below.

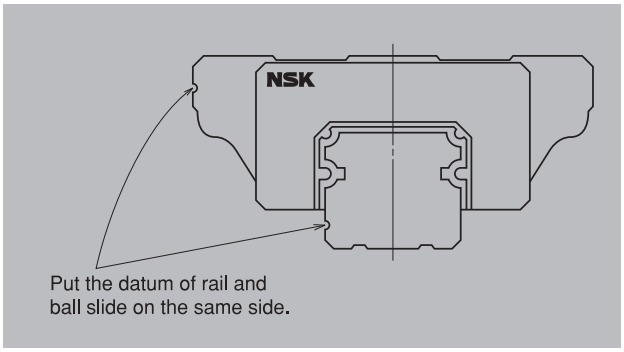
① Wipe off the rust preventive oil from the rail and ball slide.

② Match the datum face of rail and the ball slide (groove for installation) as shown in the figure.

③ Align the provisional rail to the rail in the bottom and side faces. Press the provisional rail lightly against the rail, and move the ball slide over the rail.



Inserting interchangeable ball slide into the rail



Assembly and Installation of NSK Linear Guides

General Industrial Machine

Thank you for choosing NSK linear guides. This manual briefly describes the recommended handling and installation of NSK linear guides for general industrial use. There are two ways installing the linear guides into general industrial machines. One of them provides a datum shoulder on the mounting base of the machine for accurate horizontal alignment the same as the way for machine tools, while the other is not required a datum shoulder. The installation procedure described in this manual assumes that the datum shoulder is not required for horizontal alignment.

NSK recommends interchangeable LH and LS Series linear guides for general industrial application because they feature self-aligning capability better suited to tolerate some misalignment, interchangeability between the rails and ball slides for ease of addition of number of ball slides and their replacement, and standardized stock for short delvery times.

For interchangeable LH and LS Series linear guides, the ball slides and the rails are stocked separately. The ball slides are mounted on plastic provisional rails that allows for easy transfer of the ball slide to and from the steel rail.

The ball slides are designed with retaining wires to prevent the balls from falling out when they are removed from the rail. However, NSK recommends that the ball slide should be stored on a provisional rail prior to installation to prevent contamination from dust and other foreign objects.

The following is a description of how the ball slide should be removed from and replaced on the linear guide rail.

The ball slide is held on the provisional rail using a rubber band. The rubber band should catch the bottom channel in the provisional rail and then twist around to secure the ball slide.

When transferring the ball slide from the provisional rail onto the rail, or vice versa, but the provisional rail up against the rail and slide the ball slide directly from one onto the other. It is a good idea to secure the ball slide onto the provisional rail with a rubber band after removal from the rail.

If a ball is accidentally dropped from the ball slide, it should be cleaned and replaced to the appropriate groove. The correct groove can be determined by the size of the clearance between the balls (the groove missing the ball will have greater clearance than the other grooves). It is normal to have a gap of 1.5 ball diameters in each groove.

The following section describes how to install the linear guides on the machine.

Ball slides and rails are supplied separatelly. Each is wrapped in vinyl sheet, and packed in a container. Each container has a certificate of inspection included.

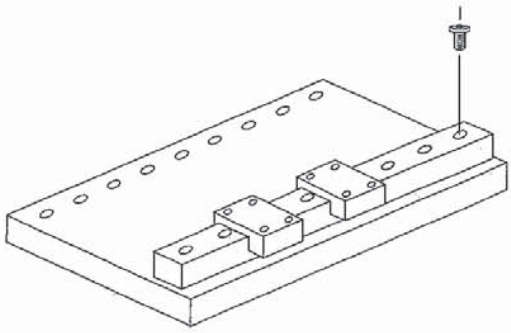
Caps for rail mounting bolt holes are available upon request.

The certificate of inspection included with every rail and ball slide is NSK's guarantee of quality. If you should have any questions about the quality, please feel free to contact your local NSK representative.

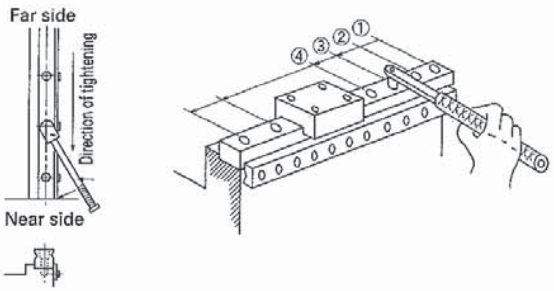
The rail is always shipped with rust preventive oil, which should be wiped off before applying grease to the rail. LH and LS Series ball slides are pre-packed with AV2 grease, so no cleaning is required prior to installation.

Now the linear guide is ready for installation. Put it on a mounting surface.

Snugly tighten its mounting bolts temporarily so that the rail's bottom is firmly against the bed.



Then tighten the bolts firmly with torque wrench to the specified torque starting from the one end.

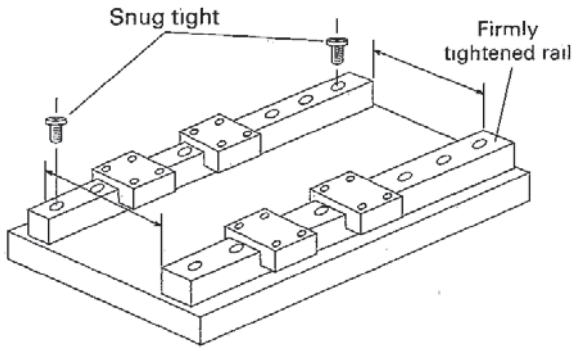


In NSK linear guides, the mounting bolt holes are processed after heat treatment using a precision machining center; therefore, the bolt hole pitch accuracy is as good as the positioning accuracy of the machine, which is considered very good.

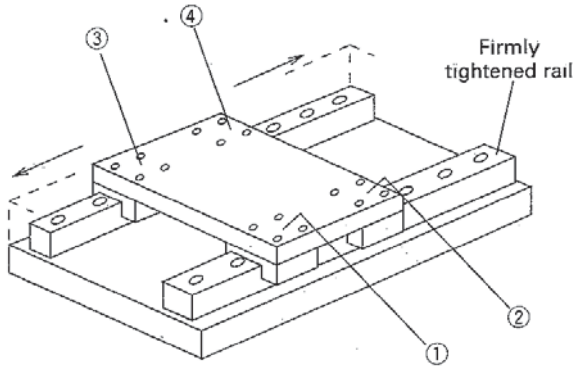
When installing a linear guide rail in a flat surface the same as this case, the rail tends to be slightly bent in the shape of S letter if the bolts are tightened indiscriminately starting near the middle because of friction at the seat of bolt head. NSK recommends that the bolts be tightened starting at one end with the wrench as shown in the above figure.

The rail that has been tightened can now be used as a reference rail. Using a vernier calipers or other accurate tool, measure the distance between the two rails, and adjust each end until they are the same. Tighten a bolt snugly at each end of the rail.

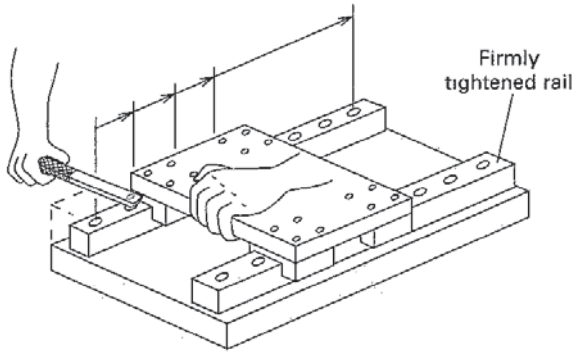
The next step is to install the table, and to use the table to align the rails.



Firmly bolt the table to ball slides 1 and 2 on the firmly secured rail as shown in the diagram. Then position ball slide 3 at the left end of the adjusting rail, and bolt the table to this ball slide. Move the ball slide 3 to right and bolt the table to the ball slide 4.



Move the table to one end of the rails, and start tightening the adjusting rail bolts sequentially to the specified torque while checking excessive friction of table movement. Continue moving the table down the rail tightening each adjacent bolt until they have all been tightened.



As described above, installation of the linear guides is not difficult work if you carefully follow the above procedure.

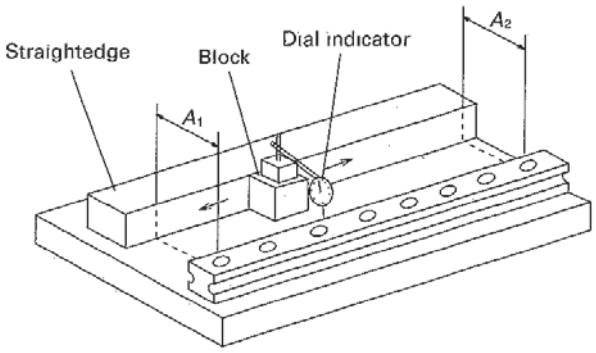
However, objective of the preceding procedure is only for an assembly of the table that moves smoothly. If you need to control motion accuracy of the table (linearity), it requires to add the following procedure.

When bolting the first rail on the machine base, align it straight using a straightedge and a dial indicator.

Bolt on the rail at the both ends lightly, and position a straightedge beside it. Set the straightedge parallel to the rail measuring distance A1 and A2 by a vernier calipers or some other accurate measuring tool.

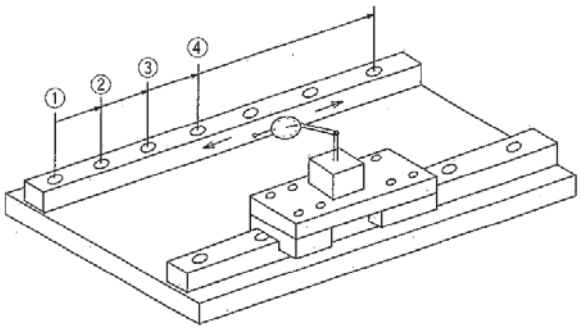
Move the dial indicator along the straightedge, and take readings at every bolt hole along the rail. Make fine adjustment of the rail to the straightedge until the desired reading is made, and tighten the bolt to the specified torque.

When all of the bolts have been tightened, slide the dial indicator from one end of the rail to the other to ensure that the desired straightness has been achieved.



Position the dial indicator on two ball slides on the reference rail as shown in the diagram. Tighten bolts of the adjusting side rail sequentially from the one end while noting the reading of the dial indicator.

Straightness of NSK linear guides is controlled so that it can be easily adjusted manually for easy installation.



In order to maintain stable production of the tables, we recommend to install the linear guides while checking the alignment accuracy quantitatively even smooth operation is the least requirement.

LH Series

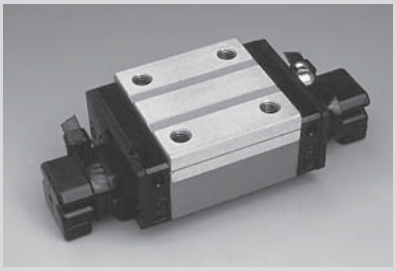
Main features:

Both the sliders and the ball tracks are hardened by surface hardening. Due to the X configuration in the contact points of the balls with the tracks, the LH series feature a high self aligning ability.

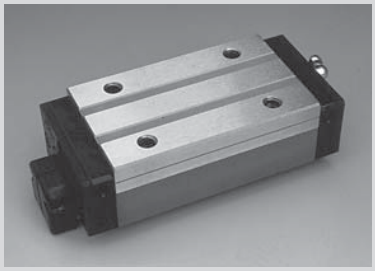
The LH series is available as interchangeable type. Interchangeable types enable random matching of rails and ball slides for prompt delivery.

The LH series are also available in black chrome plating, for enhanced protection in the sort of applications that are potentially corrosive.

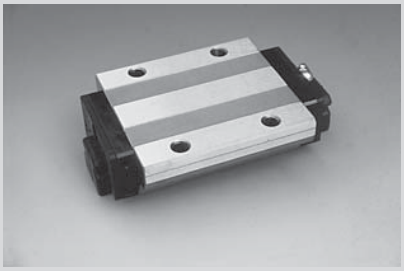
This LH series are ideal for the general applications of the mechanical engineering, particularly for the conveying of heavy loads and the construction of linear positioning systems.



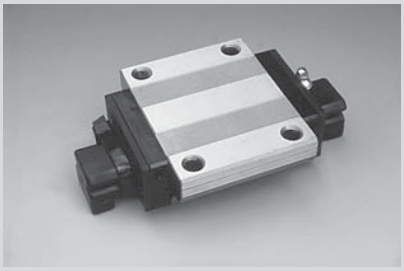
ANZ / ALZ Type
Tap fixing holes.



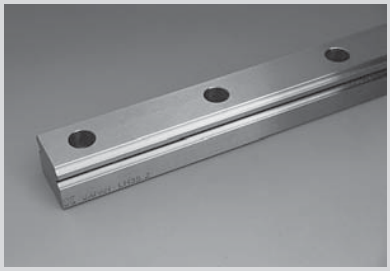
Type BNZ / BLZ
Tap fixing holes.



GMZ type
The fixing holes can be used both as drill or as tap hole.

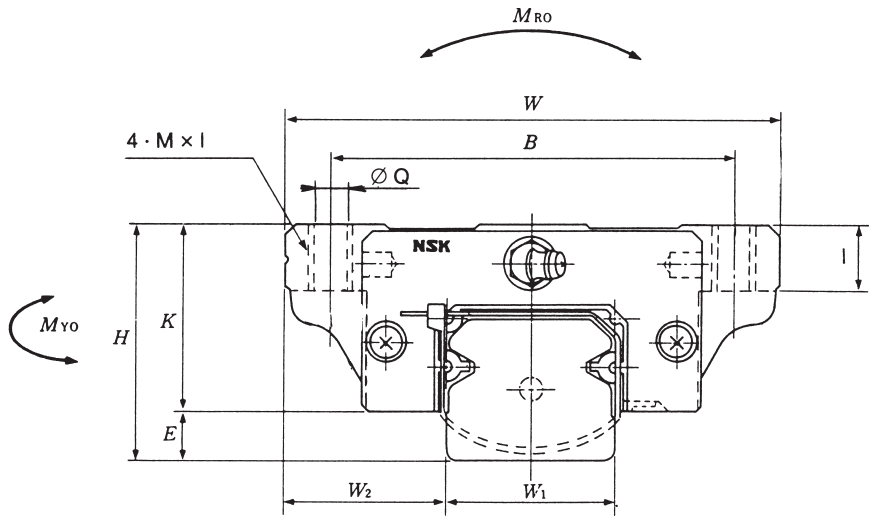


EMZ type
The fixing holes can be used both as drill or as a tap hole.



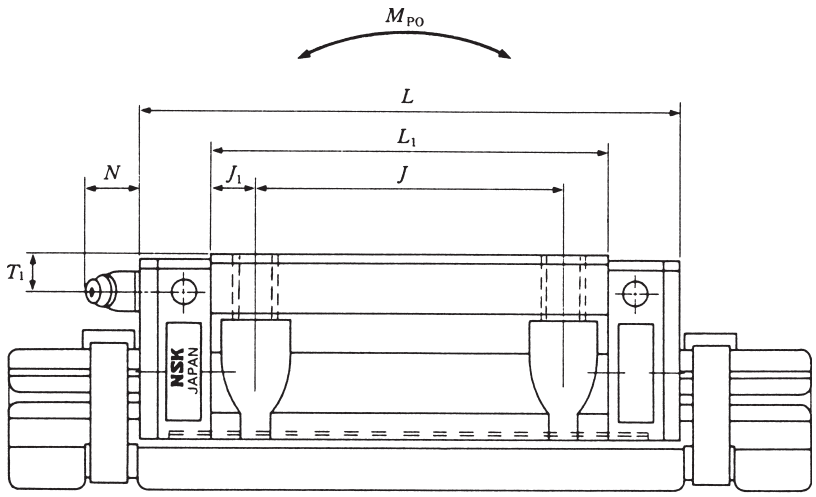
Rail

Sliders EMZ and GMZ type



Slider mounted on a dummy rail. For dimensions of the rail see pages 38 and 39

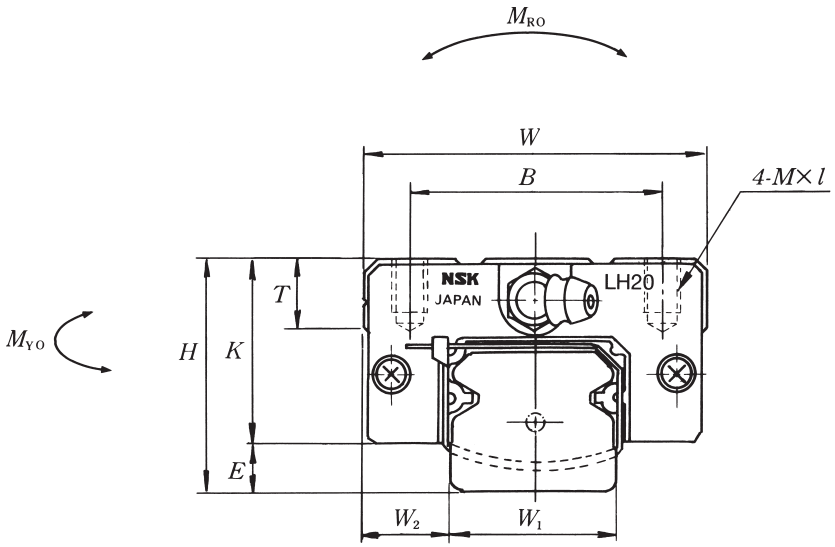
Model-No.		Assembly (mm)			Slider (mm)								
		H	E	W_2	W	B × J	L	L_1	J_1	K	T	Q × l	M × l
LAH15	EMZ	24	4.6	16	47	38 × 30	55	39	4.5	19.4	8	4.5 × 7	M 5 × 8
	GMZ						74	58	14			4.5 × 7	M 5 × 8
LAH20	EMZ	30	5	21.5	63	53 × 40	69.8	50	5	25	10	5.3 × 10	M 6 × 10
	GMZ						91.8	72	16			5.3 × 10	M 6 × 10
LAH25	EMZ	36	7	23.5	70	57 × 45	79	58	6.5	29	11	6.4 × 10	M 8 × 10
	GMZ						107	86	20.5			6.4 × 10	M 8 × 10
LAH30	EMZ	42	9	31	90	72 × 52	98.6	72	10	33	11	8.4 × 12	M 10 × 12
	GMZ						124.6	98	23			8.4 × 12	M 10 × 12
LAH35	EMZ	48	9.5	33	100	82 × 62	109	80	9	38.5	12	8.4 × 13	M 10 × 13
	GMZ						143	114	26			8.4 × 13	M 10 × 13
LAH45	EMZ	60	14	37.5	120	100 × 80	139	105	12.5	46	13	10.5 × 15	M 12 × 15
	GMZ						171	137	28.5			10.5 × 15	M 12 × 15
LAH55	EMZ	70	15	43.5	140	116 × 95	163	126	15.5	55	15	12.5 × 18	M 14 × 18
	GMZ						201	164	34.5			12.5 × 18	M 14 × 18
LAH65	EMZ	90	16	53.5	170	142 × 110	193	147	18.5	74	23	14.6 × 23	M 16 × 23
	GMZ						253	207	48.5			14.6 × 23	M 16 × 23



Slider mounted on a dummy rail. For dimensions of the rail see pages 38 and 39

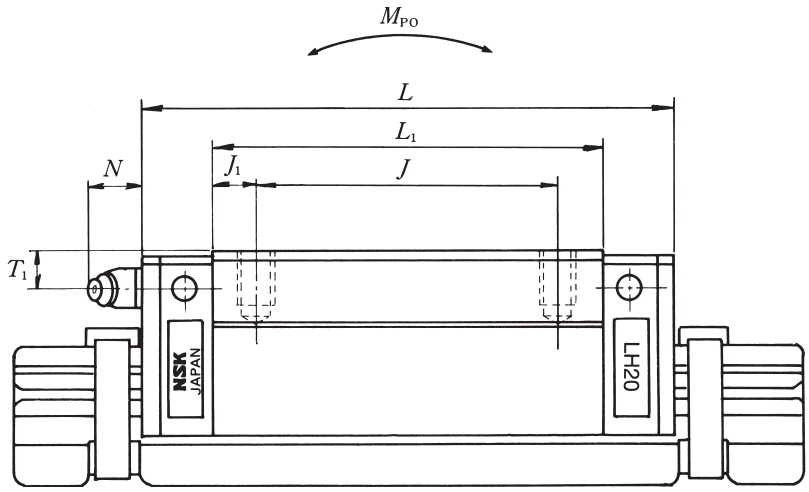
Grease fitting (mm)			Basic load rating (N)		Static moment (Nm)			Weight (kg)	Slider length with 2 K1 (mm)
	T_1	N	Dynamic C	Static C_0	M_{RO}	M_{PO}	M_{YO}		
Ø 3 mm	4.6	3.3	10 800	20 700	108	95	80	0.17	65.6
			14 600	32 000	166	216	181	0.25	84.6
M 6 × 0.75	5	11	17 400	32 500	219	185	155	0.45	80.4
			23 500	50 500	340	420	355	0.65	102.4
M 6 × 0.75	6	11	25 600	46 000	360	320	267	0.63	90.6
			34 500	71 000	555	725	610	0.93	11
M 6 × 0.75	7	11	35 500	63 000	600	505	125	1.2	110.6
			46 000	91 500	870	1 030	865	1.6	136.6
M 6 × 0.75	8	11	47 500	80 500	950	755	630	1.7	122
			61 500	117 000	1 380	1 530	1 280	2.4	156
R 1/8“	10	13	81 000	140 000	2 140	1 740	1 460	3.0	154
			99 000	187 000	2 860	3 000	2 520	3.9	186
R 1/8“	11	13	119 000	198 000	3 600	3 000	2 510	5.0	178
			146 000	264 000	4 850	5 150	4 350	6.5	216
R 1/8“	19	13	181 000	281 000	6 150	4 950	4 150	10.0	211
			235 000	410 000	8 950	10 100	8 450	14.1	271

Slider ANZ and BNZ type



Slider mounted on a dummy rail. For dimensions of the rail see pages 38 and 39

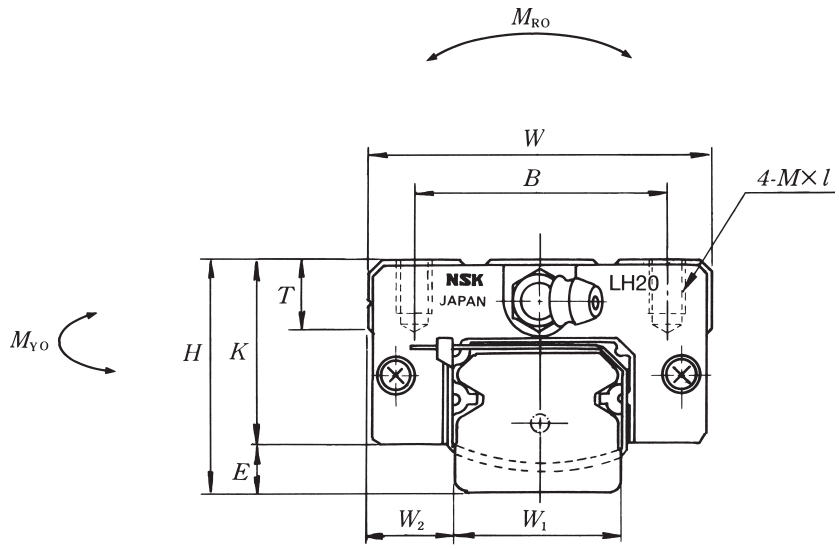
Model-No.		Assembly (mm)			Slider (mm)							
		H	E	W_2	W	B × J	L	L_1	J_1	K	T	M × l
LAH15	ANZ BNZ	28	4.6	9.5	34	26 × 26	55 74	39 58	6.5 16	23.4	8	M 4 × 6
LAH20	ANZ BNZ	30	5	12	44	32 × 36 32 × 50	69.8 91.8	50 72	7 11	25	12	M 5 × 6
LAH25	ANZ BNZ	40	7	12.5	48	35 × 35 35 × 50	79 107	58 86	11.5 18	33	12	M 6 × 9
LAH30	ANZ BNZ	45	9	16	60	40 × 40 40 × 60	85.6 124.6	59 98	9.5 19	36	14	M 8 × 10
LAH35	ANZ BNZ	55	9.5	18	70	50 × 50 50 × 72	109 143	80 114	15 21	45.5	15	M 8 × 12
LAH45	ANZ BNZ	70	14	20.5	86	60 × 60 60 × 80	139 171	105 137	22.5 28.5	56	17	M 10 × 17
LAH55	ANZ BNZ	80	15	23.5	100	75 × 75 75 × 95	163 201	126 164	25.5 34.5	65	18	M 12 × 18
LAH65	ANZ BNZ	90	16	31.5	126	76 × 70 76 × 120	193 253	147 207	38.5 43.5	74	23	M 16 × 20



Slider mounted on a dummy rail. For dimensions of the rail see pages 38 and 39

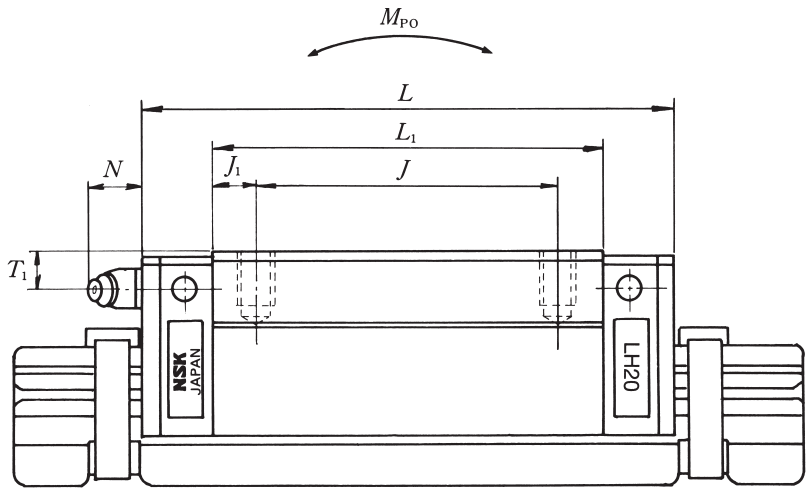
Grease fitting (mm)			Basic load rating (N)		Static moment (Nm)			Weight (kg)	Slider length with 2 K1 (mm)
	T_1	N	Dynamic C	Static C_0	M_{RO}	M_{PO}	M_{YO}		
Ø 3 mm	8.5	3.3	10 800 14 600	20 700 32 000	108 166	95 216	80 181	0.18 0.26	65.6 84.6
M 6 × 0.75	5	11	17 400 23 500	32 500 50 500	219 340	185 420	151 355	0.33 0.48	80.4 102.4
M 6 × 0.75	10	11	25 600 34 500	46 000 71 000	360 555	320 725	267 610	0.55 0.82	90.6 118.6
M 6 × 0.75	10	11	31 000 46 000	51 500 91 500	490 870	350 1 030	292 865	0.77 1.3	97.6 136.6
M 6 × 0.75	15	11	47 500 61 500	80 500 117 000	950 1 380	755 1 530	630 1 280	1.5 2.1	122 156
R 1/8“	20	13	81 000 99 000	140 000 187 000	2 140 2 860	1 740 3 000	1 460 2 520	3.0 3.9	154 186
R 1/8“	21	13	119 000 146 000	198 000 264 000	3 600 4 850	3 000 5 150	2 510 4 350	4.7 6.1	178 216
R 1/8“	19	13	181 000 235 000	281 000 410 000	6 150 8 950	4 950 10 100	4 150 8 450	7.7 10.8	211 271

Sliders ALZ and BLZ type



Slider mounted on a dummy rail. For dimensions of the rail see pages 38 and 39

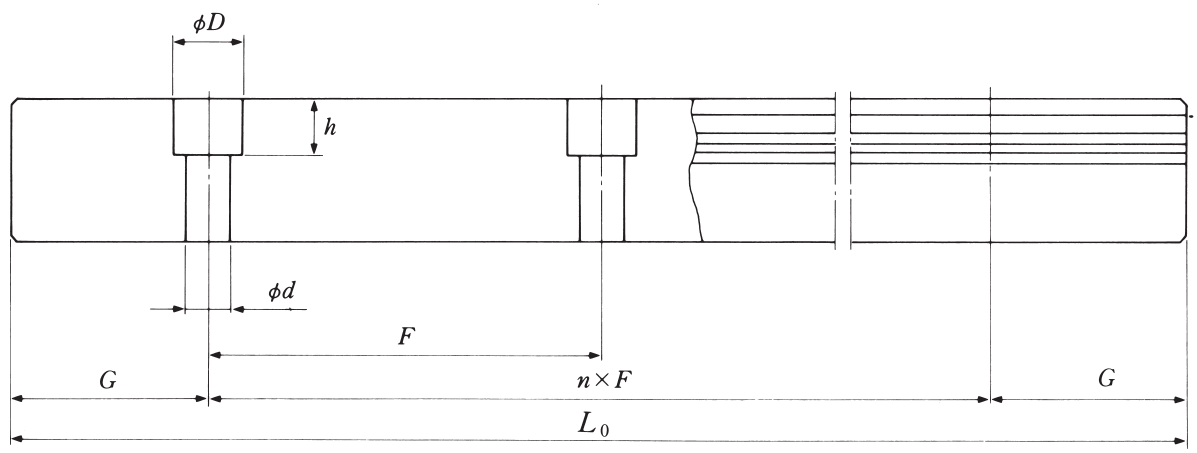
Model-No.		Assembly (mm)			Slider (mm)							
		H	E	W_2	W	B × J	L	L_1	J_1	K	T	M × Lead × l
LAH25	ALZ BLZ	36	7	12.5	48	35 × 35 35 × 50	79 107	58 86	11.5 18	29	12	M6 × 1 × 6
LAH30	ALZ BLZ	42	9	16	60	40 × 40 40 × 60	85.6 124.6	59 98	9.5 19	33	14	M8 × 1.25 × 8
LAH35	ALZ BLZ	48	9.5	18	70	50 × 50 50 × 72	109 143	80 114	15 21	38.5	15	M8 × 1.25 × 8



Slider mounted on a dummy rail. For dimensions of the rail see pages 38 and 39

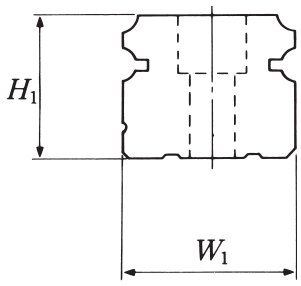
Grease fitting (mm)			Basic load rating (N)		Static moment (Nm)			Weight (kg)	Slider length with 2 K1 (mm)
	T_1	N	Dynamic C	Static C_0	M_{RO}	M_{PO}	M_{YO}		
M 6 × 0.75	6	11	25 600 34 500	46 000 71 000	360 555	320 725	267 610	0.46 0.69	90.6 118.6
M 6 × 0.75	7	11	31 000 46 000	51 500 91 500	490 870	350 1 030	292 865	0.69 1.16	97.6 136.6
M 6 × 0.75	8	11	47 500 61 500	80 500 117 000	950 1 380	755 1 530	630 1 280	1.2 1.7	122 156

Rail LH type



Model-No.	Rail dimensions (mm)				
	W_1	H_1	F	d × D × h	G (recommended)
L1H15 . . . Z	15	15	60	4.5 × 7.5 × 5.3	20 $_{-2}$
L1H20 . . . Z	20	18	60	6 × 9.5 × 8.5	20 $_{-2}$
L1H25 . . . Z	23	22	60	7 × 11 × 9	20 $_{-2}$
L1H30 . . . Z	28	26	80	9 × 14 × 12	20 $_{-2}$
L1H35 . . . Z	34	29	80	9 × 14 × 12	20 $_{-2}$
L1H45 . . . Z	45	38	105	14 × 20 × 17	22.5 $_{-2}$
L1H55 . . . Z	53	44	120	16 × 23 × 20	30 $_{-2}$
L1H65 . . . Z	63	53	150	18 × 26 × 22	35 $_{-2}$

The cutting tolerance of the ends of the rail (G dimension) is - 2 mm for standard, and – 0.5 mm for butting rails.



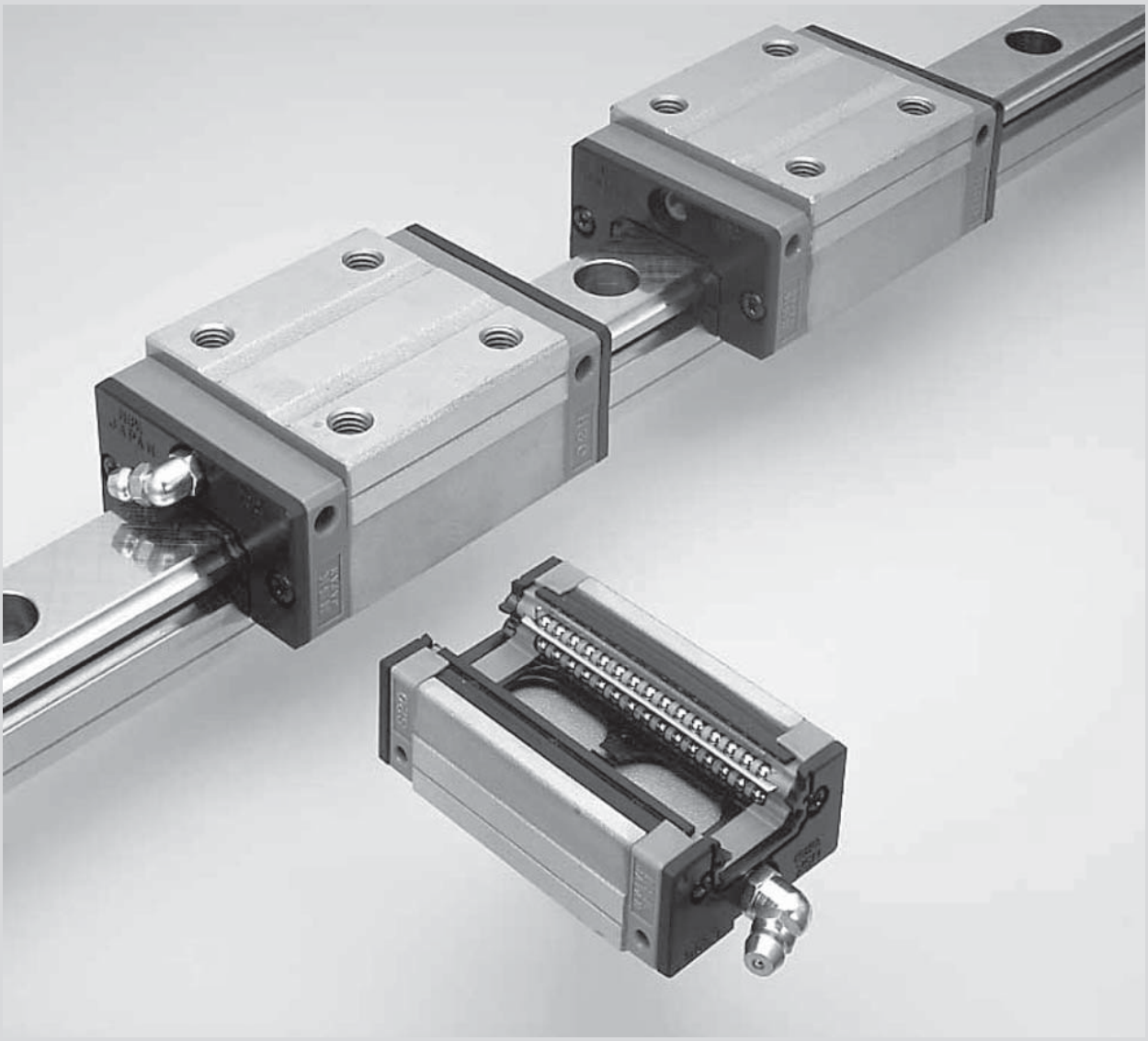
Weight kg/m	Max. Lenght L_0 for standard	Max. Lenght L_0 for black chrome	Model-No.
1.6	2000	2000	L1H15 . . . Z
2.6	3960	3000	L1H20 . . . Z
3.6	3960	3000	L1H25 . . . Z
5.2	4000	3040	L1H30 . . . Z
7.2	4000	3040	L1H35 . . . Z
12.3	3990	3045	L1H45 . . . Z
16.9	3960	3000	L1H55 . . . Z
24.3	3900	3000	L1H65 . . . Z

When cutting the black chrome rails to the desired length, the extreme faces of the rail will lack this black chrome plating.

Main features:

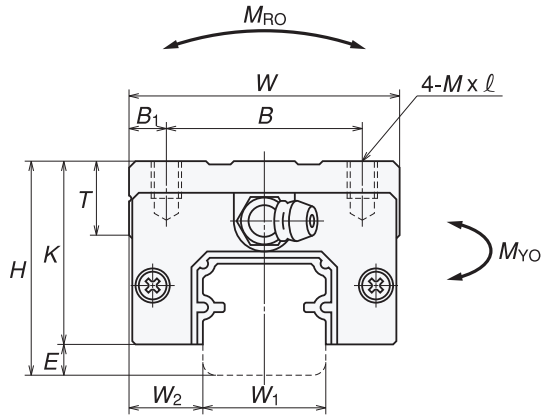
The SH series is available as interchangeable type. Interchangeable types enable random matching of rails and ball slides for prompt delivery.

Silent operation and low friction due to the ball spacers between the balls, that prevent collision and rubbing.



SH interchangeable type
applicable to standard LH rail

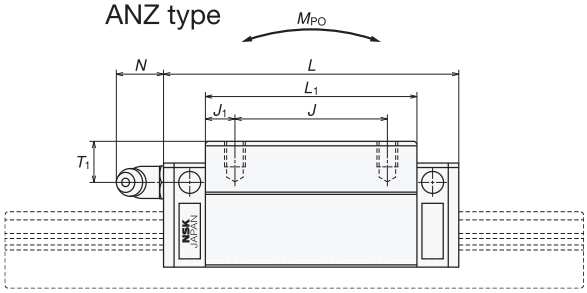
Sliders ANZ and BNZ type



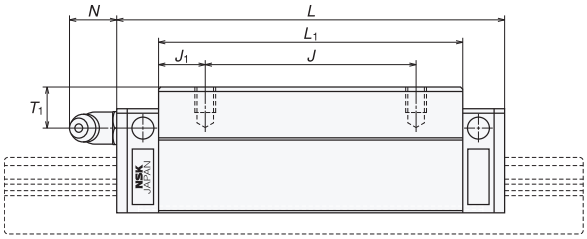
Slider mounted on a dummy rail. For dimensions of the rail see pages 38 and 39

Model-No.	Assembly (mm)			Slider (mm)									
	H	*E*	W_2	*W*	*L*	*B*	*J*	*M*×*Lead*×ℓ	B_1	L_1	J_1	*K*	*T*
SAH15ANZ	28	4.6	9.5	34	55	26	26	M4×0.7×6	4	39	6.5	23.4	8
SAH15BNZ					74					58	16		
SAH20ANZ	30	5	12	44	69.8	32	36	M5×0.8×6	6	50	7	25	12
SAH20BNZ					91.8		50			72	11		
SAH25ANZ	40	7	12.5	48	79	35	35	M6×1×9	6.5	58	11.5	33	12
SAH25BNZ					107		50			86	18		
SAH30ANZ	45	9	16	60	85.6	40	40	M8×1.25×10	10	59	9.5	36	14
SAH30BNZ					124.6		60			98	19		
SAH35ANZ	55	9.5	18	70	109	50	50	M8×1.25×12	10	80	15	45.5	15
SAH35BNZ					143		72			114	21		

ANZ type



BNZ type

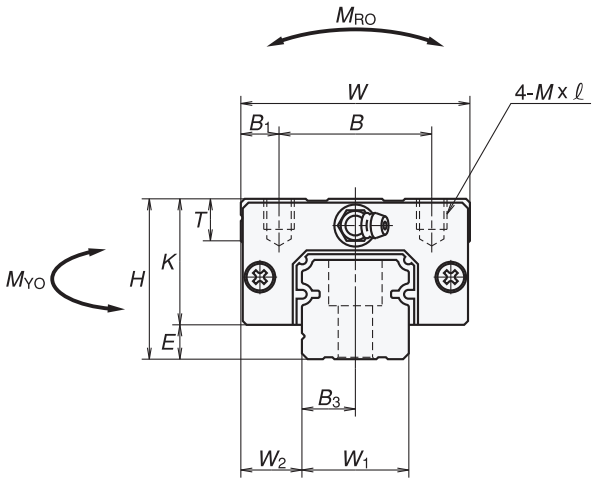


Slider mounted on a dummy rail. For dimensions of the rail see pages 38 and 39

Grease fitting (mm)			Basic load rating (N)		Static moment (N · m)			Ball dia.	Weight		Slider length with 2 K1 (mm)
	T_1	N	*Dynamic C*	*Static* C_0	M_{RO}	M_{PO}	M_{YO}	D_w	Slider (kg)	Rail (kg/m)	
∅3	8.5	3.3	10 100	18 800	98	87	73	3.175	0.18	1.6	65.6
			13 400	28 200	147	193	162		0.26		84.6
M6×0.75	5	11	16 300	29 600	199	167	141	3.698	0.33	2.6	80.4
			21 600	44 500	298	360	305		0.48		102.4
M6×0.75	10	11	22 400	37 500	295	246	207	4.762	0.55	3.6	90.6
			32 000	62 500	490	615	515		0.82		118.6
M6×0.75	10	11	31 000	51 500	490	365	305	5.556	0.77	5.2	97.6
			46 000	91 500	870	1 060	885		1.3		136.6
M6×0.75	15	11	47 500	80 500	950	780	655	6.35	1.5	7.2	122
			61 500	117 000	1 380	1 600	1 340		2.1		156

Sliders ALZ and BLZ type

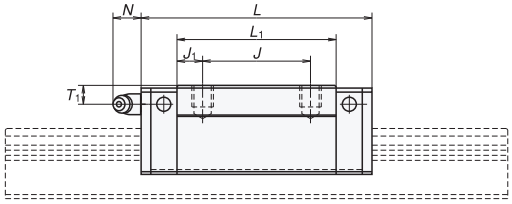
Frontal view of ALZ and BLZ types



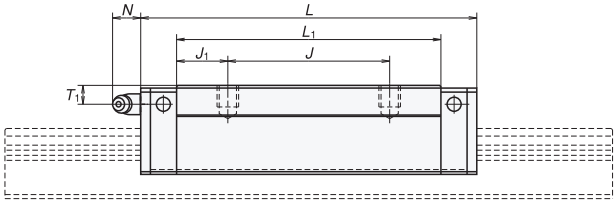
Slider mounted on a dummy rail. For dimensions of the rail see pages 38 and 39

Model-No.	Assembly (mm)			Slider (mm)									
	H	*E*	W_2	*W*	*L*	*B*	*J*	*M*×*Lead*×ℓ	B_1	L_1	J_1	*K*	*T*
SAH25ALZ	36	7	12.5	48	79	35	35	M6×1×6	6.5	58	11.5	29	12
SAH25BLZ					107		50			86	18		
SAH30ALZ	42	9	16	60	85.6	40	40	M8×1.25×8	10	59	9.5	33	14
SAH30BLZ					124.6		60			98	19		
SAH35ALZ	48	9.5	18	70	109	50	50	M8×1.25×8	10	80	15	38.5	15
SAH35BLZ					143		72			114	21		

ALZ type



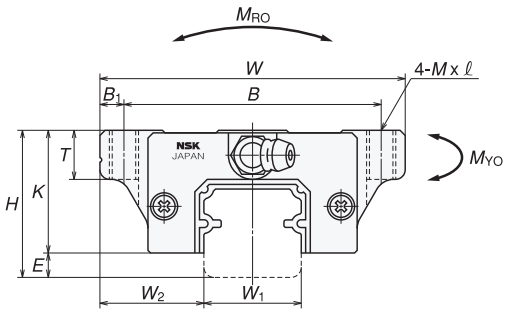
BLZ type



Slider mounted on a dummy rail. For dimensions of the rail see pages 38 and 39

Grease fitting (mm)			Basic load rating (N)		Static moment (N · m)			Ball dia.	Weight		Slider length with 2 K1 (mm)
	T_1	N	*Dynamic C*	*Static* C_0	M_{RO}	M_{PO}	M_{YO}	D_w	Slider (kg)	Rail (kg/m)	
M6×0.75	6	11	22 400	37 500	295	246	207	4.762	0.55	3.6	90.6
			32 000	62 500	490	615	515		0.82		118.6
M6×0.75	7	11	31 000	51 500	490	365	305	5.556	0.77	5.2	97.6
			46 000	91 500	870	1 060	885		1.3	^	136.6
M6×0.75	8	11	47 500	80 500	950	780	655	6.35	1.5	7.2	122
			61 500	117 000	1 380	1 600	1 340		2.1		156

Sliders EMZ and GMZ type

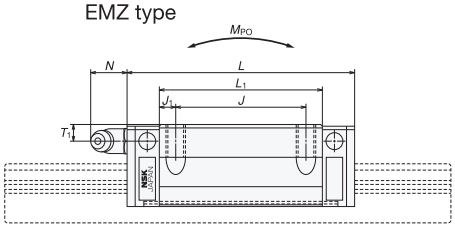


Slider mounted on a dummy rail. For dimensions of the rail see pages 38 and 39

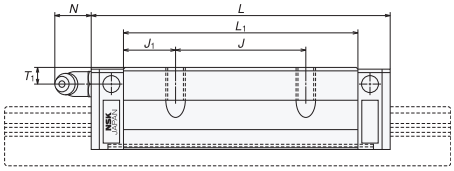
Model-No.	Assembly (mm)			Slider (mm)										
	H	*E*	W_2	*W*	*L*	*B*	*J*	*M*×*Lead*×ℓ	*Q*×ℓ	B_1	L_1	J_1	*K*	*T*
SAH15EMZ	24	4.6	16	47	55	38	30	M5×0.8×7	4.5×7	4.5	39	4.5	19.4	8
SAH15GMZ					74						58	14		
SAH20EMZ	30	5	21.5	63	69.8	53	40	M6×1×9.5	6×10	5	50	5	25	10
SAH20GMZ					91.8						72	16		
SAH25EMZ	36	7	23.5	70	79	57	45	M8×1.25×10	7×10	6.5	58	6.5	29	11
SAH25GMZ					107			(M8×1.25×11.5)	(7×11.5)		86	20.5		(12)
SAH30EMZ	42	9	31	90	98.6	72	52	M10×1.5×12	9×12	9	72	10	33	11
SAH30GMZ					124.6			(M10×1.5×14.5)	(9×14.5)		98	23		(15)
SAH35EMZ	48	9.5	33	100	109	82	62	M10×1.5×13	9×13	9	80	9	38.5	12
SAH35GMZ					143						114	26		

Dimension in ( ) are applicable to stainless steel products.

EMZ type



GMZ type



Slider mounted on a dummy rail. For dimensions of the rail see pages 38 and 39

Grease fitting (mm)			Basic load rating (N)		Static moment (N · m)			Ball dia.	Weight		Slider length with 2 K1 (mm)
	T_1	N	*Dynamic C*	*Static* C_0	M_{RO}	M_{PO}	M_{YO}	D_w	Slider (kg)	Rail (kg/m)	
∅3	4.5	3.3	10 100	18 800	98	87	73	3.175	0.17	1.6	65.6
			13 400	28 200	147	193	162		0.25		84.6
M6×0.75	5	11	16 300	29 600	199	167	141	3.698	0.45	2.6	80.4
			21 600	44 500	298	360	305		0.65		102.4
M6×0.75	6	11	22 400	37 500	295	246	207	4.762	0.63	3.6	90.6
			32 000	62 500	490	615	515		0.93		118.6
M6×0.75	7	11	35 500	63 000	600	540	450	5.556	1.2	5.2	110.6
			46 000	91 500	870	1 060	885		1.6		136.6
M6×0.75	8	11	47 500	80 500	950	780	655	6.35	1.7	7.2	122
			61 500	117 000	1 380	1 600	1 340		2.4		156

LS Series

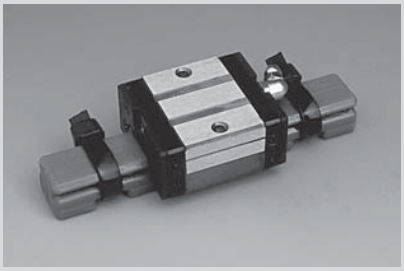
Main features:

Both the sliders and the ball tracks are hardened by surface hardening. Due to the X configuration in the contact points of the balls with the tracks, the LH series feature a high self aligning ability.

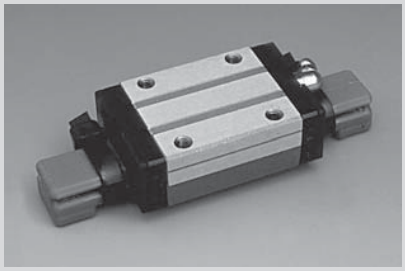
The LS series are available as interchangeable type. Interchangeable types enable random matching of rails and ball slides for prompt delivery.

As the LH series, this LS series are ideal for the general applications of the mechanical engineering, specially when there is a limited mounting space.

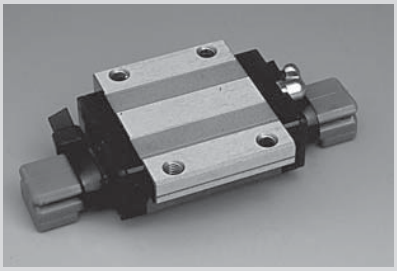
The LS Series are also available in stainless steel.



CL type
Tap fixing holes

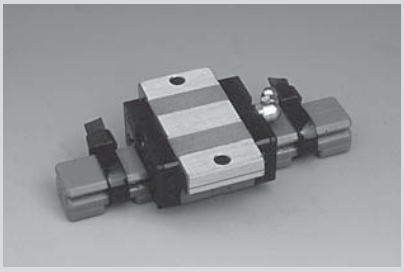


AL type
Tap fixing holes



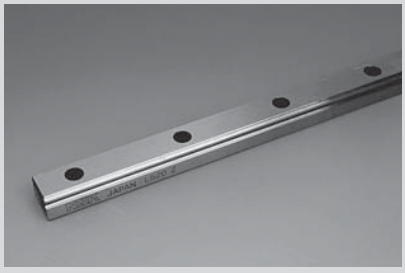
EM type
Drill / tap holes

Size
15 to 35



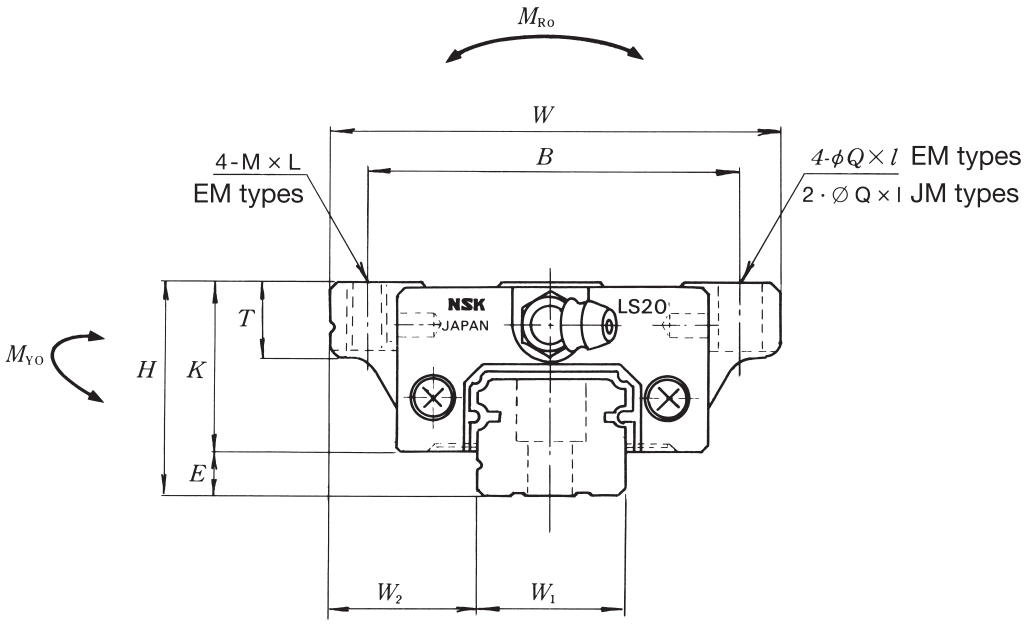
JM type
Drill / tap holes

Size
15 to 35



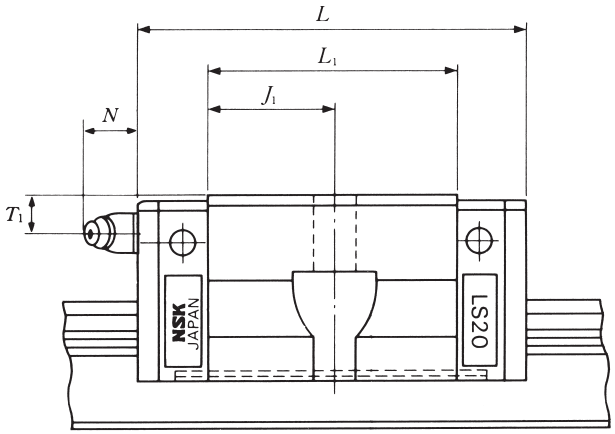
Rail

Sliders JMZ and EMZ type

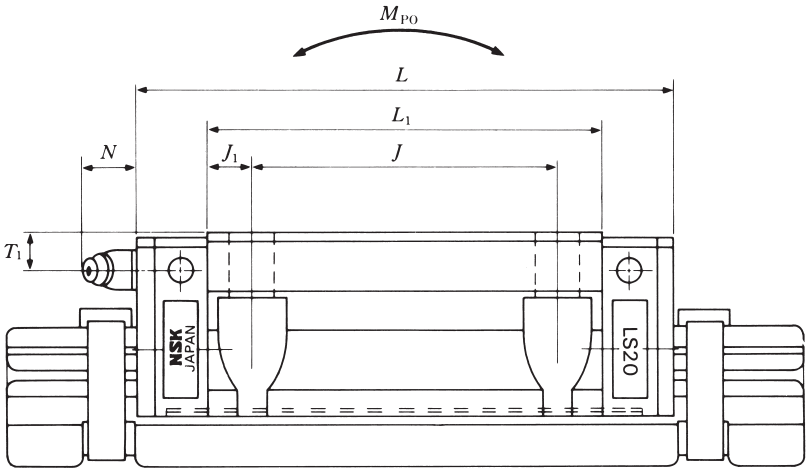


Slider mounted on a dummy rail. For dimensions of the rail see pages 54 and 55

Model-No.	Assembly (mm)			Slider (mm)								
	H	E	W_2	W	B × J	L	L_1	J_1	K	T	Q × I	M × I
LAS 15 JMZ	24	4.6	18.5	52	41	40.4	23.6	11.8	9.4	8	4.5 × 7	M5 × 7
EMZ					41 × 26	56.8	40	7				
LAS 20 JMZ	28	6	19.5	59	49	47.2	30	15	22	10	5.3 × 9	M6 × 9
EMZ					49 × 32	65.2	48	8				
LAS 25 JMZ	33	7	25	73	60	59.4	38	19	26	11	6.8 × 10	M8 × 12
EMZ					60 × 35	81.4	60	12.5				
LAS 30 JMZ	42	9	31	90	72 × 40	96.4	71	15.5	33	11	8.6 × 12	M10 × 12
EMZ					72 × 40	96.4	71	15.5				
LAS 35 JMZ	48	10.5	33	100	82 × 50	108	80	15	37.5	12	8.6 × 13	M10 × 13
EMZ					82 × 50	108	80	15				



JM types

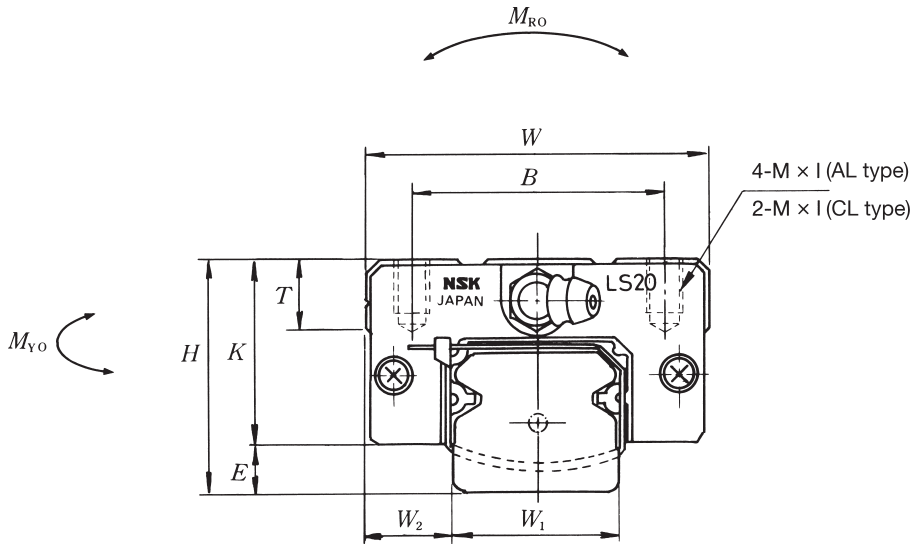


EM types

Slider mounted on a dummy rail. For dimensions of the rail see pages 54 and 55

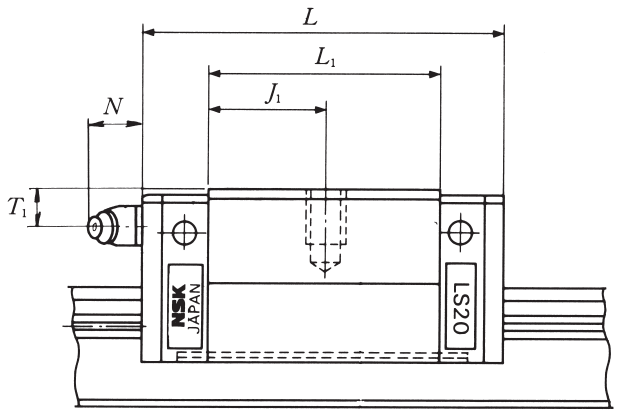
Grease fitting (mm)			Basic load rating (N)		Static moment (Nm)			Weight (kg)	Slider length with 2 K1 (mm)
	T_1	N	Dynamic C	Static C_0	M_{RO}	M_{PO}	M_{YO}		
Ø 3	6	3	5 400 8 350	9 100 16 900	46 85	25 77	21 65	0.17 0.26	50 66.4
M 6 × 0.75	5.5	11	7 900 11 700	13 400 23 500	92 160	47 133	39 111	0.24 0.35	57.8 75.8
M 6 × 0.75	7	11	12 700 18 800	20 800 36 500	164 286	91 258	76 217	0.44 0.66	70.2 92.2
M 6 × 0.75	8	11	28 800 28 800	55 000 55 000	520 520	435 435	365 365	1.20 1.20	79.4 108.4
M 6 × 0.75	8.5	11	40 000 40 000	74 500 74 500	865 865	695 695	580 580	1.70 1.70	90 121

Sliders CLZ and ALZ type

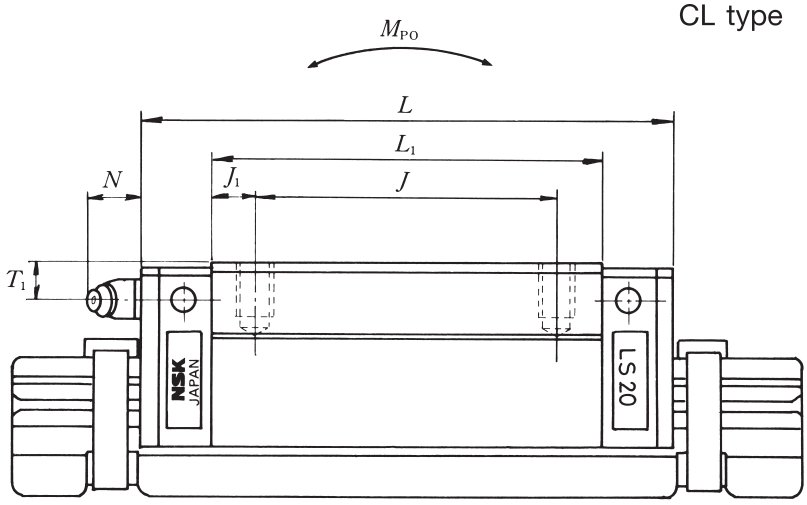


Slider mounted on a dummy rail. For dimensions of the rail see pages 54 and 55

Model-No.		Assembly (mm)			Slider (mm)							
		H	E	W_2	W	B × J	L	L_1	J_1	K	T	M × l
LAS 15	CLZ ALZ	24	4.6	9.5	34	26 26 × 26	40.4 56.8	23.6 40	11.8 7	19.4	10	M4 × 6
LAS 20	CLZ ALZ	28	6	11	42	32 32 × 32	47.2 65.2	30 48	15 8	22	12	M5 × 7
LAS 25	CLZ ALZ	33	7	12.5	48	35 35 × 35	59.4 81.4	38 60	19 12.5	26	12	M6 × 9
LAS 30	CLZ ALZ	42	9	16	60	40 40 × 40	67.4 96.4	42 71	21 15.5	33	13	M8 × 12
LAS 35	CLZ ALZ	48	10.5	18	70	50 50 × 50	77 108	49 80	24.5 15	37.5	14	M8 × 12



CL type

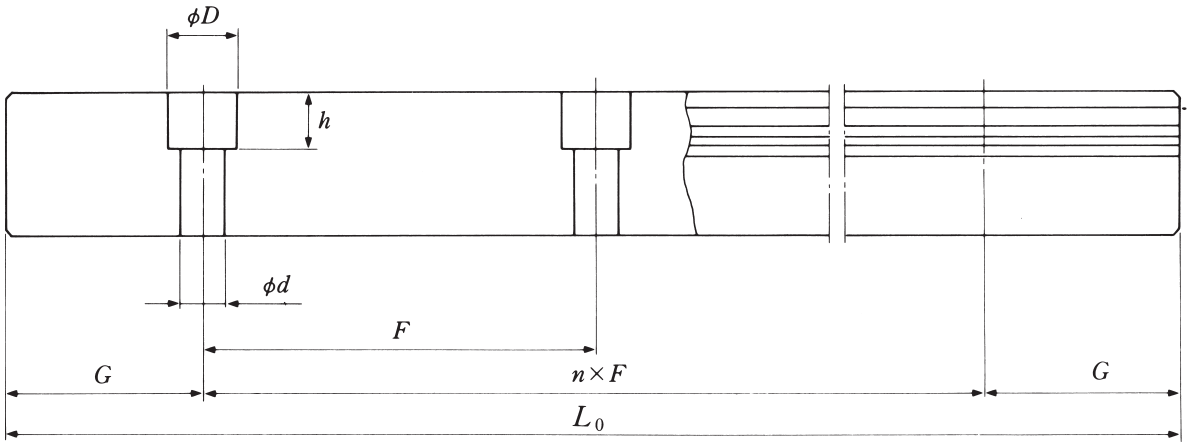


AL type

Slider mounted on a dummy rail. For dimensions of the rail see pages 54 and 55

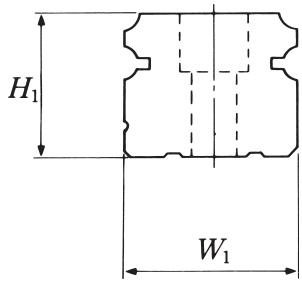
Grease fitting (mm)			Basic load rating (N)		Static moment (Nm)			Weight (kg)	Slider length with 2 K1 (mm)
	T_1	N	Dynamic C	Static C_0	M_{RO}	M_{PO}	M_{YO}		
Ø 3	6	3	5 400 8 350	9 100 16 900	46 85	25 77	21 65	0.14 0.20	50 66.4
M 6 × 0.75	5.5	11	7 900 11 700	13 400 23 500	92 160	47 133	39 111	0.19 0.28	57.8 75.8
M 6 × 0.75	7	11	12 700 18 800	20 800 36 500	164 286	91 258	76 217	0.34 0.51	70.2 92.2
M 6 × 0.75	8	11	18 700 28 800	29 600 55 000	282 520	139 435	116 365	0.58 0.85	67.4 79.4
M 6 × 0.75	8.5	11	26 000 40 000	40 000 74 500	465 865	220 695	185 580	0.86 1.25	90 121

Rail LS type

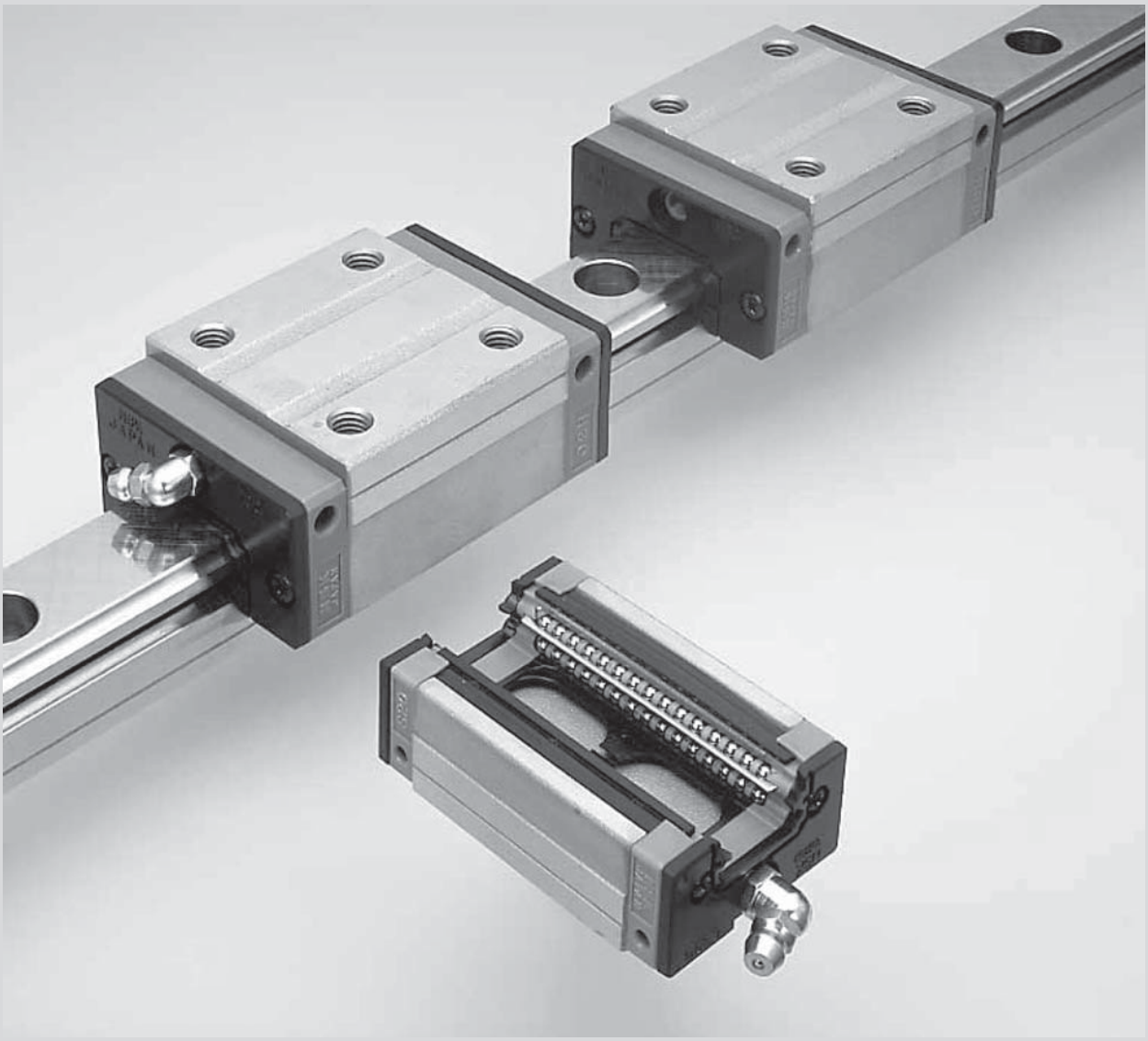


Model-No.	Rail dimensions (mm)				
	W_1	H_1	F	d × D × h	G (recommended)
L1S15 . . . Z	15	12.5	60	3.5 × 6 × 4.5	20_{-2}
L1S15 . . . T . . . Z	15	12.5	60	4.5 × 7.5 × 5.3	20_{-2}
L1S20 . . . Z	20	15.5	60	6 × 9.5 × 8.5	20_{-2}
L1S25 . . . Z	23	18	60	7 × 11 × 9	20_{-2}
L1S30 . . . Z	28	23	80	7 × 11 × 9	20_{-2}
L1S35 . . . Z	34	27.5	80	9 × 14 × 12	20_{-2}

The cutting tolerance of the ends of the rail (G dimension) is - 2 mm for standard, and – 0.5 mm for butting rails.

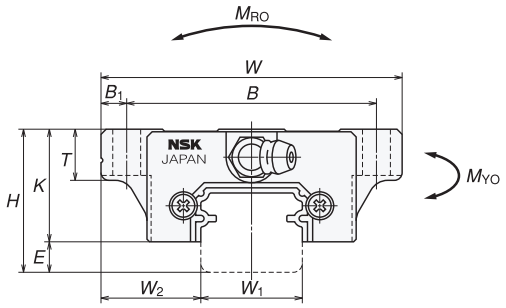


Weight kg	Max. Lenght L_0	Max. Lenght L_0 for stainless steel	Model-No.
1.4	2000	1700	L1S15 . . . Z
1.4	1600	1000	L1S15 . . . T . . . Z
2.3	3960	3500	L1S20 . . . Z
3.1	3960	3500	L1S25 . . . Z
4.8	4000	3500	L1S30 . . . Z
7.0	4000	3500	L1S35 . . . Z



SS interchangeable type
applicable to standard LS rail

Linear guide with slider SS-EMZ (high load type) **and SS-KLZ** (medium load type)

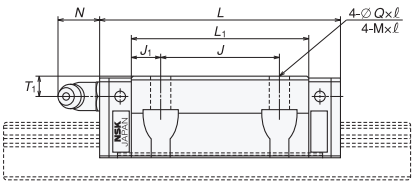


Slider mounted on a dummy rail. For dimensions of the rail see pages 54 and 55

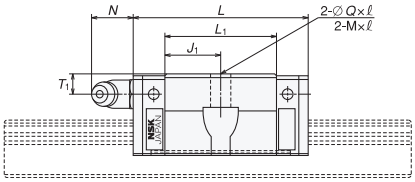
Model-No.	Assembly (mm)			Slider (mm)										
	H	*E*	W_2	*W*	*L*	*B*	*J*	*Q*×ℓ	*M*×Lead×ℓ	B_1	L_1	J_1	*K*	*T*
SAS15JMZ	24	4.6	18.5	52	40.4	41	—	4.4×7	M5×0.8×7	5.5	23.6	11.8	19.4	8
SAS15EMZ					56.8		26				40	7		
SAS20JMZ	28	6	19.5	59	47.2	49	—	5.3×9	M6×1×9	5	30	15	22	10
SAS20EMZ					65.2		32				48	8		
SAS25JMZ	33	7	25	73	59.6	60	—	6.8×10	M8×1.25×10	6.5	38	19	26	11
SAS25EMZ					81.6		35				60	12.5		(12)
SAS30JMZ	42	9	31	90	67.4	72	—	8.6×12	M10×1.5×12	9	42	21	33	11
SAS30EMZ					96.4		40				71	15.5		(15)
SAS35JMZ	48	10.5	33	100	77	82	—	8.6×13	M10×1.5×13	9	49	24.5	37.5	12
SAS35EMZ					108		50				80	15		(15)

Dimensions in ( ) are applicable to stainless steel products.

EMZ type



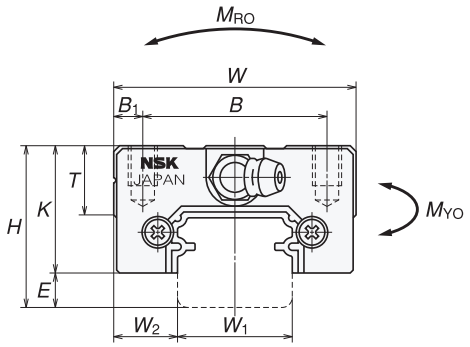
JMZ type



Slider mounted on a dummy rail. For dimensions of the rail see pages 54 and 55

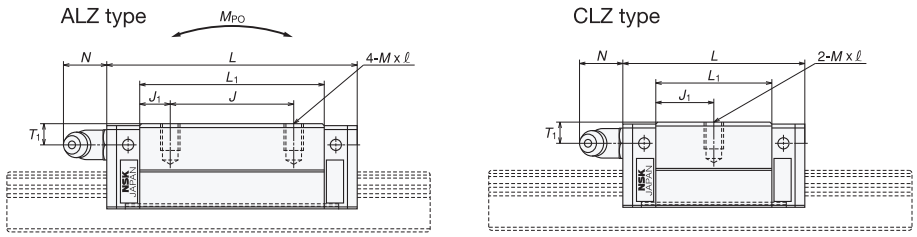
Grease fitting (mm)			Basic load rating (N)		Static moment (N · m)			Ball dia.	Weight		Slider length with 2 K1 (mm)
	T_1	N	*Dynamic C*	*Static* C_0	M_{RO}	M_{PO}	M_{YO}	D_w	Slider (kg)	Rail (kg/m)	
∅3	6	3	4 900	7 800	39	21	18	2.778	0.17	1.4	50
			7 900	15 600	78	74	62		0.26		66.4
M6×0.75	5.5	11	7 250	11 800	80	41	34	3.175	0.24	2.3	57.8
			11 100	21 800	149	124	104		0.35		75.8
M6×0.75	7	11	12 700	20 800	164	96.5	81	3.968	0.44	3.1	70.2
			17 900	33 500	266	242	203		0.66		92.2
M6×0.75	8	11	18 700	29 600	282	153	128	4.762	0.76	4.8	79.4
			27 300	50 500	480	415	350		1.2		108.4
M6×0.75	8.5	11	26 000	40 000	465	234	196	5.556	1.2	7	90
			38 000	68 500	800	620	520		1.7		121

Sliders ALZ and CLZ type



Slider mounted on a dummy rail. For dimensions of the rail see pages 54 and 55

Model-No.	Assembly (mm)			Slider (mm)									
	H	*E*	W_2	*W*	*L*	*B*	*J*	*M*×*Lead*×ℓ	B_1	L_1	J_1	*K*	*T*
SAS15CLZ	24	4.6	9.5	34	40.4	26	—	M4×0.7×6	4	23.6	11.8	19.4	10
SAS15ALZ					56.8		26			40	7		
SAS20CLZ	28	6	11	42	47.2	32	—	M5×0.8×7	5	30	15	22	12
SAS20ALZ					65.2		32			48	8		
SAS25CLZ	33	7	12.5	48	59.6	35	—	M6×1×9	6.5	38	19	26	12
SAS25ALZ					81.6		35			60	12.5		
SAS30CLZ	42	9	16	60	67.4	40	—	M8×1.25×12	10	42	21	33	13
SAS30ALZ					96.4		40			71	15.5		
SAS35CLZ	48	10.5	18	70	77	50	—	M8×1.25×12	10	49	24.5	37.5	14
SAS35ALZ					108		50			80	15		



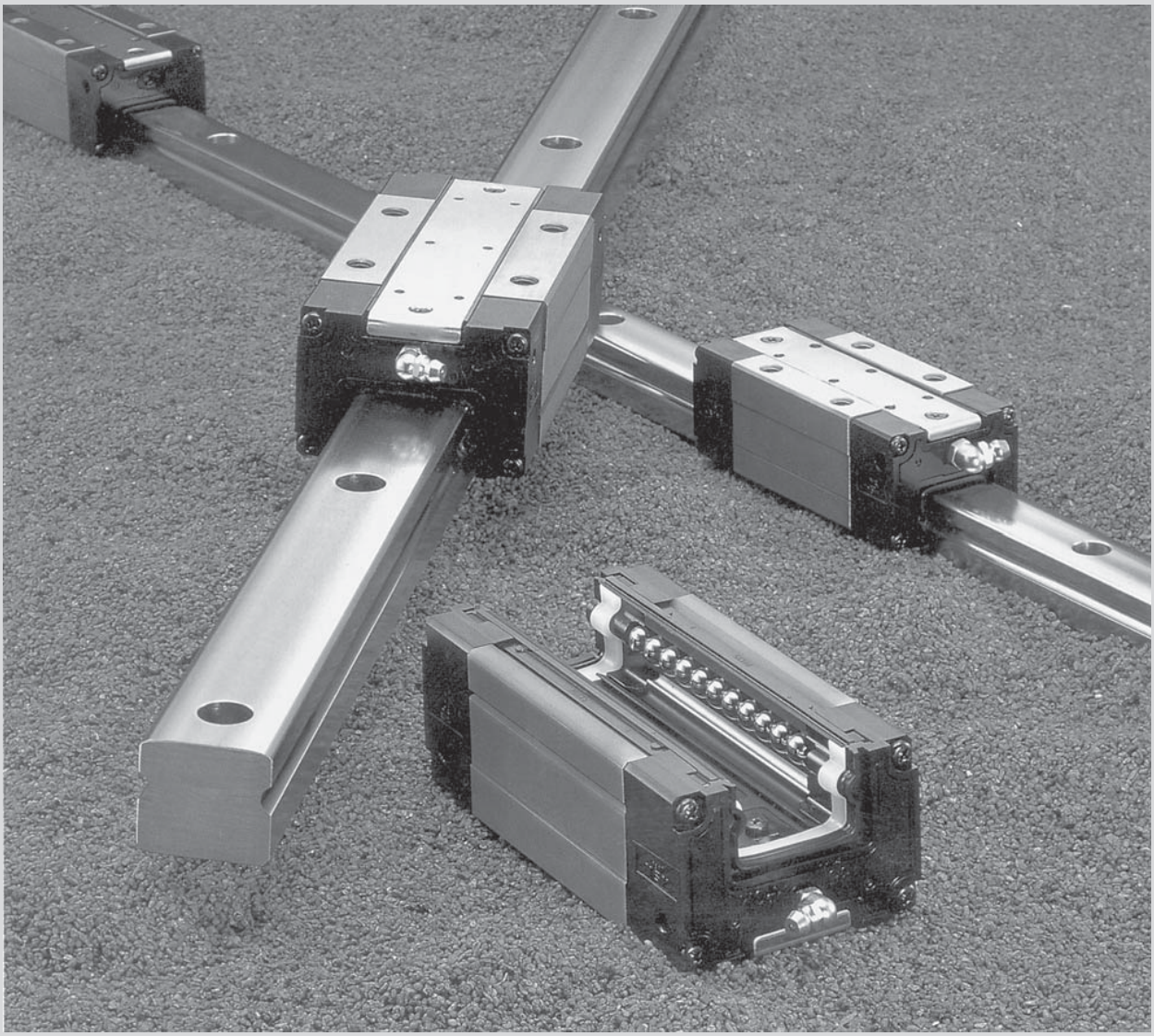
Slider mounted on a dummy rail. For dimensions of the rail see pages 54 and 55

Grease fitting (mm)			Basic load rating (N)		Static moment (N · m)			Ball dia.	Weight		Slider length with 2 K1 (mm)
	T_1	N	*Dynamic C*	*Static* C_0	M_{RO}	M_{PO}	M_{YO}	D_w	Slider (kg)	Rail (kg/m)	
∅3	6	3	4 900	7 800	39	21	18	2.778	0.14	1.4	50
			7 900	15 600	78	74	62		0.2		66.4
M6×0.75	5.5	11	7 250	11 800	80	41	34	3.175	0.19	2.3	57.8
			11 100	21 800	149	124	104		0.28		75.8
M6×0.75	7	11	12 700	20 800	164	97	81	3.968	0.34	3.1	70.2
			17 900	33 500	266	242	203		0.51		92.2
M6×0.75	8	11	18 700	29 600	282	153	128	4.762	0.58	4.8	67.4
			27 300	50 500	480	415	350		0.85		79.4
M6×0.75	8.5	11	26 000	40 000	465	234	196	5.556	0.86	7	90
			38 000	68 500	800	620	520		1.3		121

Translide™

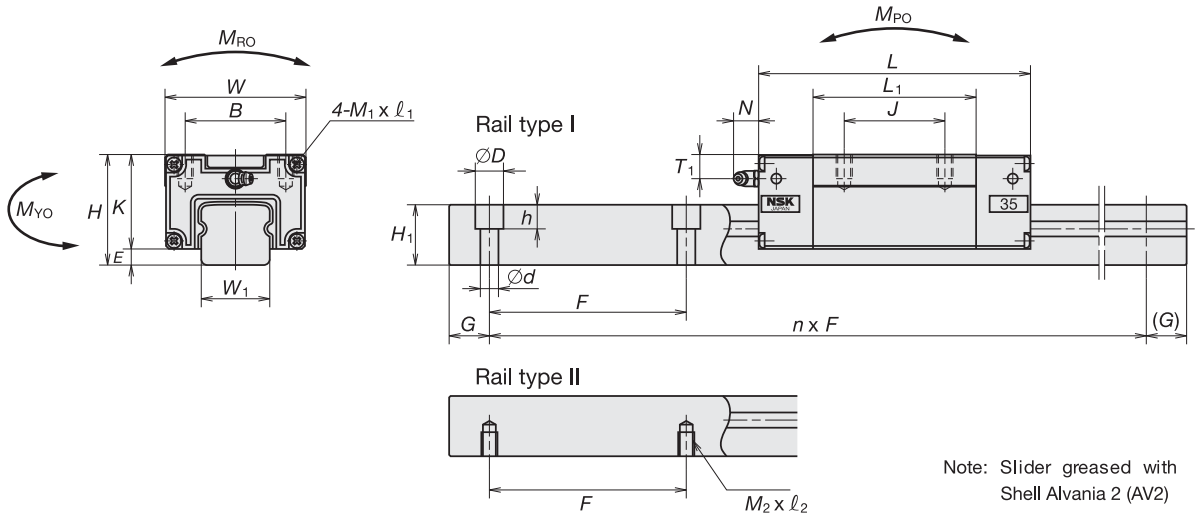
Main features:

This innovative guiding system features an outstanding reliability in contaminated environments, and at the same time is economically convenient. Translide™ is equipped with the K1 lubrication units and with the triple lipped high performance seal as standard. Translide™ is specially suitable for transportation equipment.



AN type
Slider with tap fixing holes.

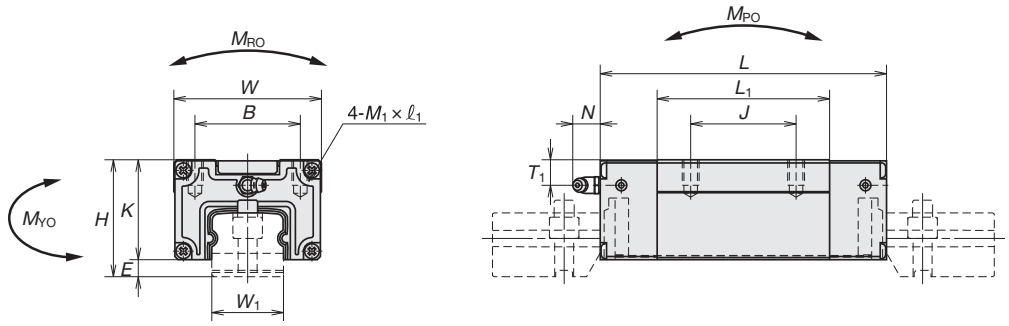
Translide with AN slider



Note: Slider greased with Shell Alvania 2 (AV2)

For the reference number of the rail, see page 9

Model-No.	Assembly (mm)		Slider (mm)							Grease fitting (mm)			Rail dimensions		
	$H^{\pm 0.1}$	E	W	L	B	J	M_1×$Lead$×ℓ_1	L_1	K		T_1	N	W_1	H_1	F
TAS15AN	28	3	34	72.2	26	26	M4×0.7×6	39	25	∅3	6.5	(5)	15	14	120
TAS20AN	30	3	44	87	32	36	M5×0.8×8	50	27	M6×0.75	6.5	(14)	20	15	120
TAS25AN	40	4	48	100	35	35	M6×1×9	58	36	M6×0.75	9.5	(14)	23	20	120
TAS30AN	45	6.5	60	115	40	40	M8×1.25×10	70	38.5	M6×0.75	9.5	(14)	28	25	160
TAS35AN	55	8	70	135.8	50	50	M8×1.25×12	81.8	47	M6×0.75	12	(14)	34	30	160



For the reference number of the rail, see page 9

Rail dimensions (mm)				Basic load rating (N)		Static moment (N · m)			Ball dia.	Weight	
Type I $d \times h$	Type II $M_2 \times Lead \times \ell_2$	G	Max. lenght L_{0max}*	*Dynamic C*	*Static* C_0	M_{RO}	M_{PO}	M_{YO}	D_w	Slider (kg)	(kg/m)
4.5×7.5×5.3	M4×0.7×6	20	1 960	9 800	11 800	92	64	64	3.968	0.21	1.5
6×9.5×8.5	M5×0.8×8	20	2 920	15 700	19 100	196	137	137	4.762	0.37	2.1
7×11×9	M6×1×9	20	4 000	21 800	26 000	320	217	217	5.556	0.47	3.4
9×14×12	M8×1.25×12	20	4 040	31 000	37 500	565	395	395	6.350	0.77	5.3
9×14×12	M8×1.25×12	20	4 040	46 500	53 000	970	635	635	7.937	1.3	7.7

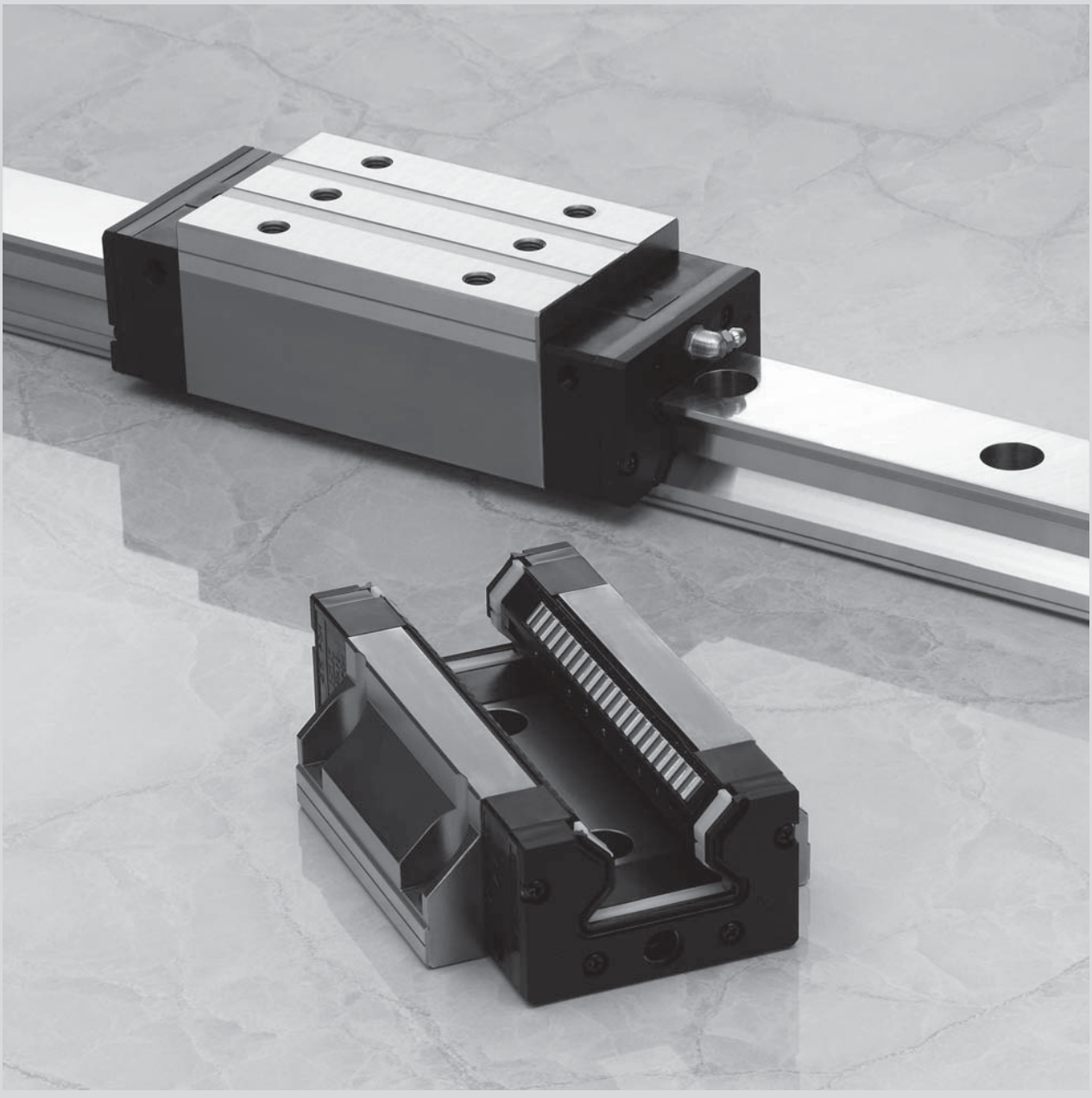
* Maximum length of a rail. Nevertheless, it is possible to assemble various rails up to the desired total length.

RA Series

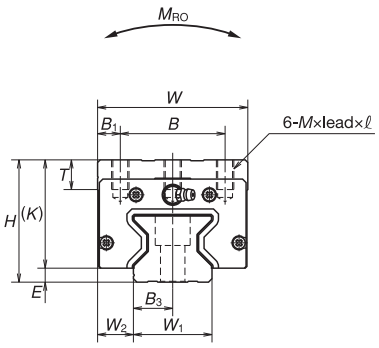
Main features:

A roller guide series employing advanced analysis technology offers super-high load capacity and rigidity. The RA series includes a complete line-up to handle a wide range of applications.

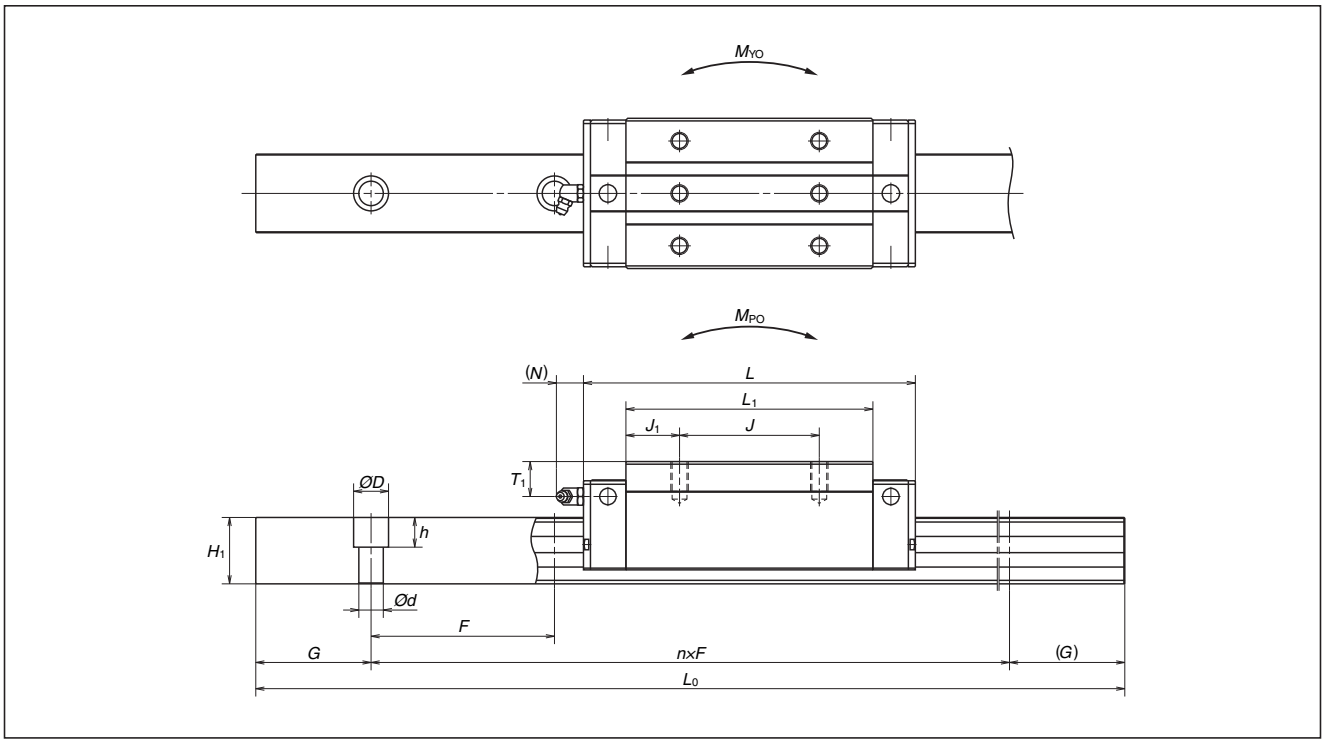
The RA series of roller guides is the product of a combination of NSK's extensive experience in roller bearings and linear guide technologies. The result is an optimal design that takes full advantage of NSK's unique expertise to realize super-high load capacity, rigidity and motion accuracy, plus smooth motion. Capable of handling a variety of applications, the RA series supports high machine performance.



Roller guide with sliders RA-AL, RA-AN (high load type) RA-BL, RA-BN (super-high load type)

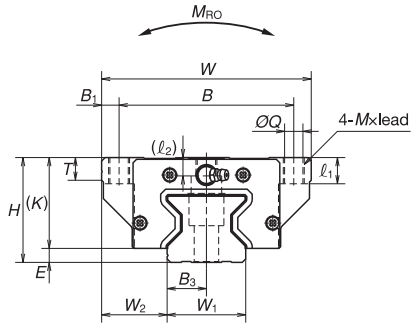


Model No.	Assembly [mm]			Slider [mm]										Grease fitting [mm]		
						Fixing holes										
	H	E	W_2	W	L	B	J	M×lead×ℓ	B_1	L_1	J_1	K	T		T_1	
RA15AL	24	4	9.5	34	70	26	26	M4×0.7×5.5	4	44.8	9.4	20	8	M3×0.5	4	3
RA15AN	28							M4×0.7×6				24			8	
RA15BL	24				85.4			M4×0.7×5.5		60.2	17.1	20			4	
RA15BN	28							M4×0.7×6				24			8	
RA20AN	30	5	12	44	86.5	32	36	M5×0.8×6	6	57.5	10.75	25	12	M3×0.5	4	3
RA20BN					106.3		50			77.3	13.65					
RA25AL	36	5	12.5	48	97.5	35	35	M6×1×9	6.5	65.5	15.25	31	12	M6×0.75	6	11
RA25AN	40											35			10	
RA25BL	36				115.5		50			83.5	16.75	31			6	
RA25BN	40											35			10	
RA30AL	42	6.5	16	60	110.8	40	40	M8×1.25×11	10	74	17	35.5	14	M6×0.75	7	11
RA30AN	45							M8×1.25×11				38.5			10	
RA30BL	42				135.4		60	M8×1.25×11		98.6	19.3	35.5			7	
RA30BN	45							M8×1.25×11				38.5			10	
RA35AL	48	6.5	18	70	123.8	50	50	M8×1.25×12	10	83.2	16.6	41.5	15	M6×0.75	8	11
RA35AN	55											48.5			15	
RA35BL	48				152		72			111.4	19.7	41.5			8	
RA35BN	55											48.5			15	
RA45AL	60	8	20.5	86	154	60	60	M10×1.5×16	13	105.4	22.7	52	17	Rc1/8	10	14
RA45AN	70							M10×1.5×17				62			20	
RA45BL	60				190		80	M10×1.5×16		141.4	30.7	52			10	
RA45BN	70							M10×1.5×17				62			20	
RA55AL	70	9	23.5	100	184	75	75	M12×1.75×18	13	128	26.5	61	18	Rc1/8	11	14
RA55AN	80											71			21	
RA55BL	70				234		95			178	41.5	61			11	
RA55BN	80											71			21	
RA65AN	90	13	31.5	126	228.4	76	70	M16×2×20	25	155.4	42.7	77	22	Rc1/8	19	14
RA65BN					302.5		120			229.5	54.75					

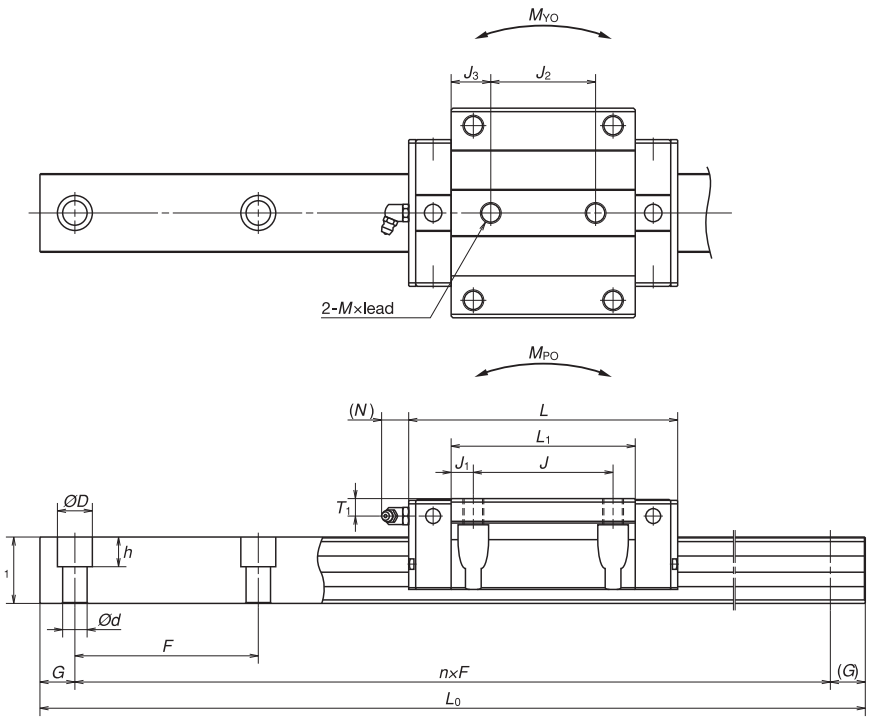


Rail dimensions [mm]							Basic load rating (N)					Weight		Slider Length (mm)
					G		Dynamic	Static	Static moment [Nm]			Slider	Rail	
W_1	H_1	F	d×D×h	B_3	(recommended)	L_{0max}	C (N)	C_0 (N)	M_{R0} (N·m)	M_{P0} (N·m)	M_{Y0} (N·m)	(kg)	(kg/m)	
15	16.3	60 (30)	4.5×7.5×5.3	7.5	20	2000	10300 13000	27500 37000	210 350	210 375	210 375	0.17 0.21 0.25 0.30	1.6	79 94.4
20	20.8	60 (30)	6×9.5×8.5	10	20	3000	19200 24000	52500 70000	665 890	505 900	505 900	0.38 0.50	2.6	95.5 115.3
23	24	30	7×11×9	11.5	20	3000	29200 35400	72700 92900	970 1240	760 1240	760 1240	0.45 0.60 0.80 0.91	3.4	107.5 125.5
28	28	40	9×14×12	14	20	3000	38900 47600	93500 121000	1670 2170	1140 1950	1140 1950	0.85 1.0 1.1 1.3	4.9	122.8 147.4
34	31	40	9×14×12	17	20	3000	53300 67400	129000 175000	2810 3810	1800 3250	1800 3250	1.2 1.6 1.7 2.1	6.8	136.8 165
45	38	52.5	14×20×17	22.5	22.5	3000	92800 116000	229000 305000	6180 8240	4080 7150	4080 7150	2.5 3.0 3.4 4.1	10.9	168 204
53	43.5	60	16×23×20	26.5	30	3000	129000 168000	330000 462000	10200 14300	7060 13600	7060 13600	4.1 4.9 5.7 6.7	14.6	198 248
63	55	75	18×26×22	31.5	35	3000	210000 288000	504000 756000	19200 28700	12700 28600	12700 28600	9.3 12.2	22.0	243.3 317.5

Roller guide with sliders RA-EM (high load type) RA-GM (super-high load type)



Model No.	Assembly [mm]			Slider [mm]															
						Fixing holes											Grease fitting [mm]		
	H	E	W_2	W	L	B	J	J_2	M×lead×ℓ	Q×ℓ	B_1	L_1	J_1	J_3	K	T		T_1	N
RA15EM	24	4	16	47	70	38	30	26	M5×0.8×8.5(6.5)	4.4×8.5(6.5)	4.5	44.8	7.4	9.4	20	8	M3×0.5	4	3
RA15GM					85.4							60.2	15.1	17.1					
RA20EM	30	5	21.5	63	86.5	53	40	35	M6×1×9.5(8)	5.3×9.5(8)	5	57.5	8.75	11.25	25	10	M3×0.5	4	3
RA20GM					106.3							77.3	18.65	21.15					
RA25EM	36	5	23.5	70	97.5	57	45	40	M8×1.25×10(11)	6.8×10(11)	6.5	65.5	10.25	12.75	31	11	M6×0.75	6	11
RA25GM					115.5							83.5	19.25	21.75					
RA30EM	42	6.5	31	90	110.8	72	52	44	M10×1.5×12(12.5)	8.6×12(12.5)	9	74	11	15	35.5	11	M6×0.75	7	11
RA30GM					135.4							98.6	23.3	27.3					
RA35EM	48	6.5	33	100	123.8	82	62	52	M10×1.5×13(7)	8.6×13(7)	9	83.2	10.6	15.6	41.5	12	M6×0.75	8	11
RA35GM					152							111.4	24.7	29.7					
RA45EM	60	8	37.5	120	154	100	80	60	M12×1.75×15(10.5)	10.5×15(10.5)	10	105.4	12.7	22.7	52	13	Rc1/8	10	14
RA45GM					190							141.4	30.7	40.7					
RA55EM	70	9	43.5	140	184	116	95	70	M14×2×18(13)	12.5×18(13)	12	128	16.5	29	61	15	Rc1/8	11	14
RA55GM					234							178	41.5	54					
RA65EM	90	13	53.5	170	228.4	142	110	82	M16×2×24(18.5)	14.6×24(18.5)	14	155.4	22.7	36.7	77	22	Rc1/8	19	14
RA65GM					302.5							229.5	59.75	73.75					



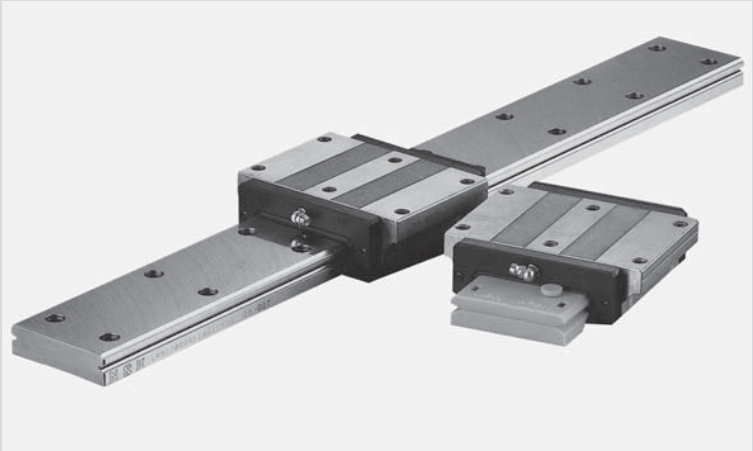
Rail dimensions [mm]							Basic load rating (N)					Weight		Slider Length (mm)
							Dynamic	Static	Static moment [Nm]			Slider	Rail	
W_1	H_1	F	d×D×h	B_3	G (recommended)	L_{0max}	C (N)	C_0 (N)	M_{R0} (N·m)	M_{P0} (N·m)	M_{Y0} (N·m)	(kg)	(kg/m)	
15	16.3	60 (30)	4.5×7.5×5.3	7.5	20	2000	10300 13000	27500 37000	210 350	210 375	210 375	0.21 0.28	1.6	79 94.4
20	20.8	60 (30)	6×9.5×8.5	10	20	3000	19200 24000	52500 70000	665 890	505 900	505 900	0.45 0.65	2.6	95.5 115.3
23	24	30	7×11×9	11.5	20	3000	29200 35400	72700 92900	970 1240	760 1240	760 1240	0.8 1.1	3.4	107.5 125.5
28	28	40	9×14×12	14	20	3000	38900 47600	93500 121000	1670 2170	1140 1950	1400 1950	1.3 1.7	4.9	122.8 147.4
34	31	40	9×14×12	17	20	3000	53300 67400	129000 175000	2810 3810	1800 3250	1800 3250	1.7 2.3	6.8	136.8 165
45	38	52.5	14×20×17	22.5	22.5	3000	92800 116000	229000 305000	6180 8240	4080 7150	4080 7150	3.2 4.3	10.9	168 204
53	43.5	60	16×23×20	26.5	30	3000	129000 168000	330000 462000	10200 14300	7060 13600	7060 13600	5.4 7.5	14.6	198 248
63	55	75	18×26×22	31.5	35	3000	210000 288000	504000 756000	19200 28700	12700 28600	12700 28600	12.2 16.5	22.0	243.4 317.5

Main features:

The sliders and the ball tracks are hardened by surface hardening.

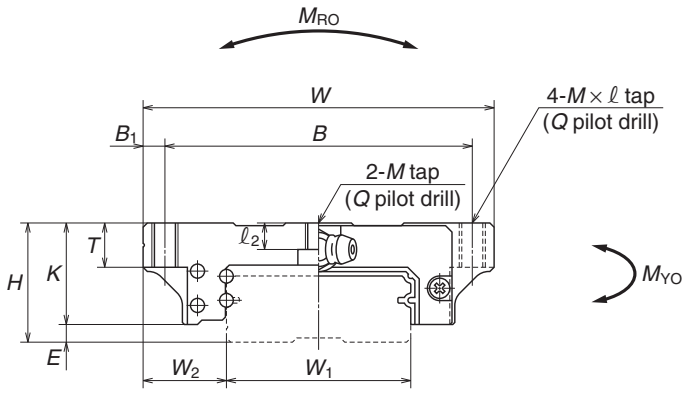
The design of the guide is similar to the LH type, but the width of the rail is over-sized, in order to bear high moment loads in rolling direction.

It is specially suitable for use as single rail, and it is available as interchangeable type for prompt delivery.



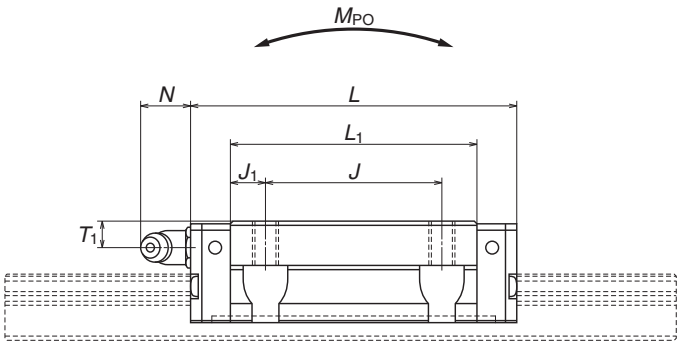
LW interchangeable type

Slider ELZ type



Slider mounted on a dummy rail. For dimensions of the rail see pages 76 and 77

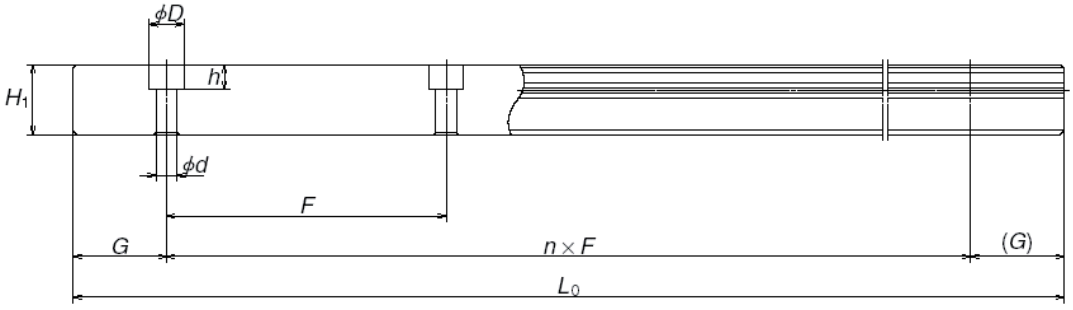
Model-No.	Assembly mm			Slider mm										
	H	E	W_2	W	B	B_1	L	ℓ_2	J	J_1	K	T	M × l	Q
LAW17ELZ	17	2.5	13.5	60	53	3.5	51.4	3.2	26	4.5	14.5	6	M 4 × 6	3.3
LAW21ELZ	21	3	15.5	68	60	4	58.8	3.7	29	6	18	8	M 5 × 8	4.4
LAW27ELZ	27	4	19	80	70	5	74	6	40	8	23	10	M 6 × 10	5.3
LAW35ELZ	35	4	25.5	120	107	6.5	108	9	60	12	31	14	M 8 × 14	6.8
LAW50ELZ	50	4.5	36	162	144	9	140.6	14	80	14	45.5	18	M 10 × 18	8.6



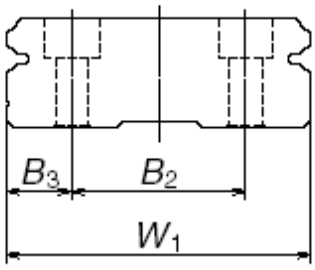
Slider mounted on a dummy rail. For dimensions of the rail see pages 76 and 77

Grease fitting			Basic load rating N		Static moment Nm			Slider Lenghth with 2 K1
	T_1	N	Dynamic C	Static C_0	M_{RO}	M_{PO}	M_{YO}	
Ø 3	4	3	5600	11300	135	44	37	61.6
M6 × 0.75	4.5	11	6450	13900	185	66	55	71.4
M6 × 0.75	6	11	12800	26900	400	171	143	86.6
M6 × 0.75	8	11	33000	66500	1690	645	545	123
R_c 1/8	14	14	61500	117000	3900	1530	1280	155.6

Rail LW Series



Model-No.	Rail dimensions (mm)						
	W_1	H_1	B_2	F	d × D × h	B_3	G (recommended)
L1W17	33	8.7	18	40	4.5 x 7.5 x 5.3	7.5	15
L1W21	37	10.5	22	50	4.5 x 7.5 x 5.3	7.5	15
L1W27	42	15	24	60	4.5 x 7.5 x 5.3	9	20
L1W35	69	19	40	80	7 x 11 x 9	14.5	20
L1W50	90	24	60	80	9 x 14 x 12	15	20



Rail		Model-No.
Max. Lenght $L_{0\ max}$	Weight (kg / m)	
1000	2,1	L1W17
1600	2,9	L1W21
2000	4,7	L1W27
2400	9,6	L1W35
3000	15,8	L1W50

Miniature Series PU and PE

Main features:

PU Series and PE Series
The PU series is a miniature linear guide with the re-circulation way made in resin. This innovative solution allows a weight reduction of the slider a smooth operation, because it is eliminated the metal-to-metal contact in the re-circulation way. For the same reason, the operation of the guide is more silent, and the dust emission is lower. The sealing system was improved, therefore the slider is better protected against the contamination by particles. The PU series can incorporate the lubrication system K1, for long free maintenance periods.

The PE series is similar to the PU series but with oversized wide rail. It allows the guide to bear higher moments in the rolling direction, which makes it suitable for single-rail applications.

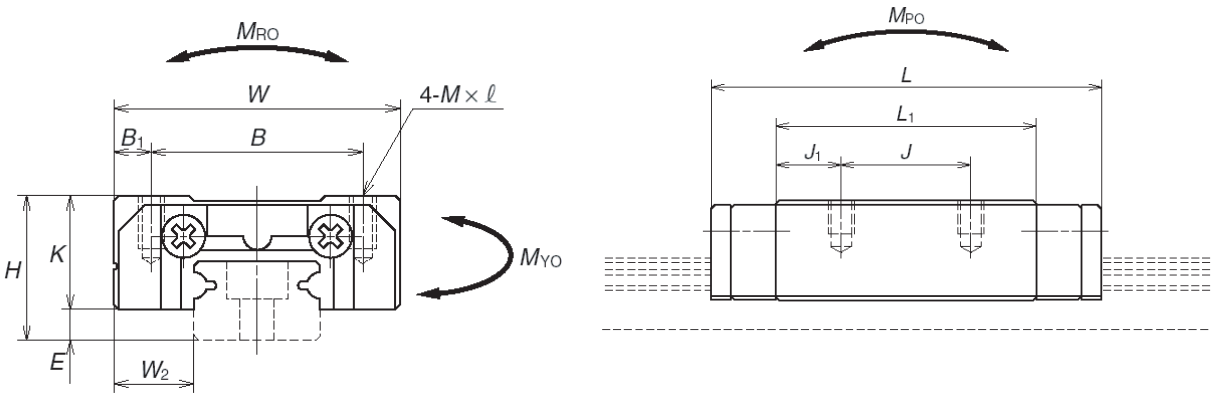
PU- and PE Series

Sizes PU Series
05 TR
07 TR
09 TR
12 TR
15 AL

Sizes PE Series
05 AR
07 TR
09 TR
12 TR
15 AR

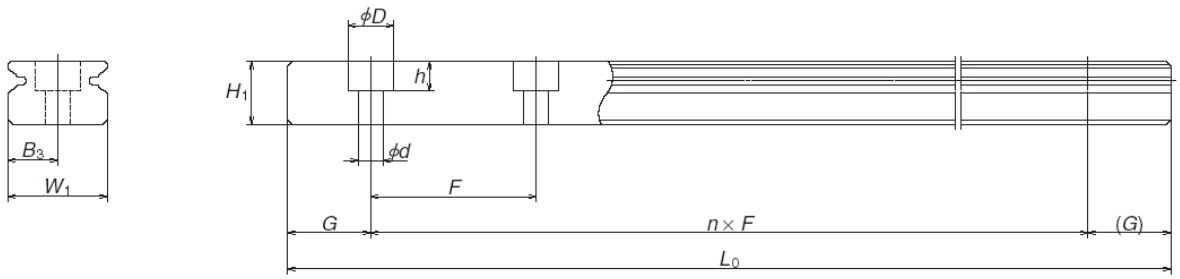
LU Series
The LU series is similar to the PU series, but without the resin re-circulation way. Available in size 15, in special high carbon steel.

Miniature Slider LU Series, size 15



Model No.	Assembly			Slider									Basic load rating (N)		Static moment (N·m)			Ball dia.	Weight
	Height H	E	W_2	Width W	Length L	B	J	M x pitch x l	B_1	L_1	J_1	K	Dynamic C	Static C_0	M_{RO}	M_{PO}	M_{YO}	D_W	Slider (g)
LAU15AL	16	4	8.5	32	43.6	25	20	M3x0.5x4	3.5	27	3.5	12	5550	6600	50	26	26	3.175	70

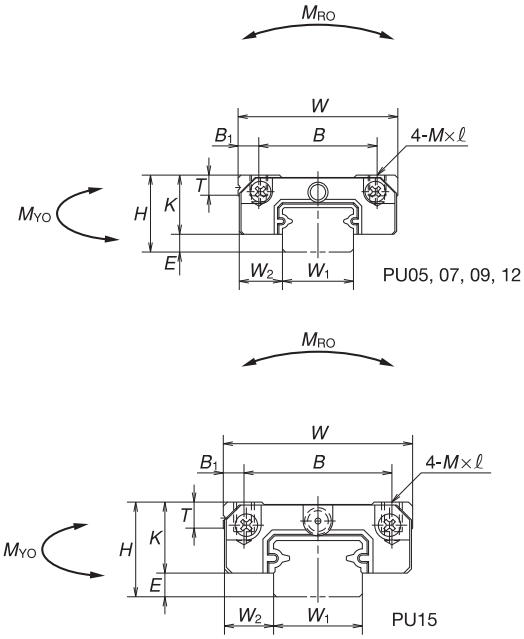
Miniature Rail LU Series, size 15



Model No	Rail								Model No
	Width W_1	Height H_1	Pitch F	Mounting bolt Hole d x D x h	B_3	G (recommended)	Max. length L_{0max}	Weight (g / 100 mm)	
L1U15	**15**	**9.5**	**40**	**3.5x6x4.5**	**7.5**	**15**	**2000**	**105**	**L1U15**

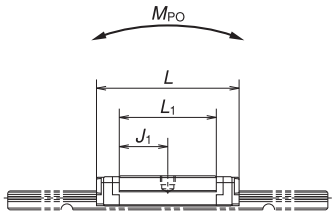
The size LU15AL is available in special high carbon steel (NSK standard)

Miniature linear guide with sliders TR and AL type

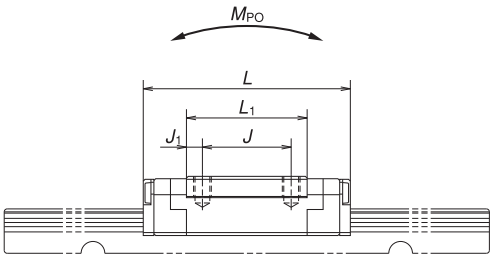


Slider mounted on a dummy rail. For dimensions, see pages 84 and 85

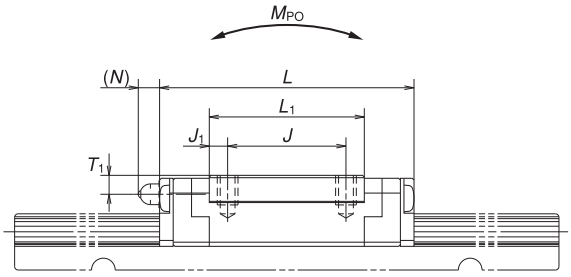
Model-No.	Assembly (mm)			Slider (mm)									
	H	*E*	W_2	*W*	*L*	*B*	*J*	*M*×*Lead*×ℓ	B_1	L_1	J_1	*K*	*T*
PAU05TR	6	1	3.5	12	19.4	8	–	M2×0.4×1.5	2	11.4	5.7	5	2.3
PAU07AR	8	1.5	5	17	23.4	12	8	M2×0.4×2.4	2.5	13.3	2.65	6.5	2.45
PAU09TR	10	2.2	5.5	20	30	15	10	M3×0.5×3	2.5	19.6	4.8	7.8	2.6
PAU12TR	13	3	7.5	27	35	20	15	M3×0.5×3.5	3.5	20.4	2.7	10	3.4
PAU15AL	16	4	8.5	32	43	25	20	M3×0.5×5	3.5	26.2	3.1	12	4.4



PU05



PU07, 09, 12

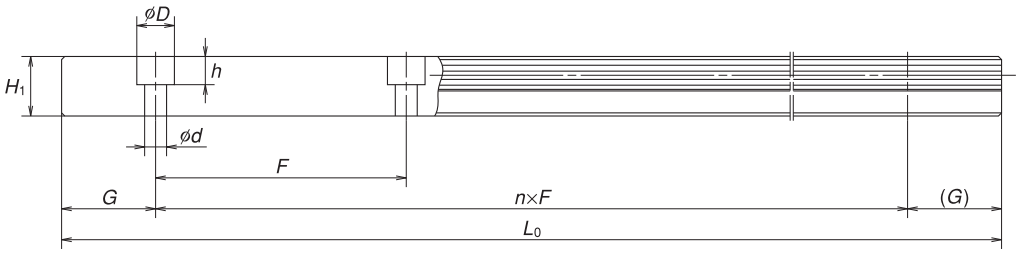


PU15

Slider mounted on a dummy rail. For dimensions, see pages 84 and 85

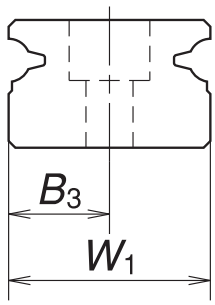
Grease fitting (mm)			Basic load rating (N)		Static moment (N · m)			Ball dia.	Weight		Slider length with 2 K1 (mm)
	T_1	N	Dynamic C	StaticC_0	M_{RO}	M_{PO}	M_{YO}	D_w	Slider (kg)	Rail (kg/m)	
–	–	–	520	775	2	1	1	1	3	11	24.4
–	–	–	1 090	1370	5	3	3	1.5875	8	23	29.4
–	–	–	1 490	2150	10	6	6	1.5875	16	35	36.4
–	–	–	2 830	3500	21	11	11	2.3812	32	65	42
∅3	3.2	(3.3)	5 550	6600	50	26	26	3.175	59	105	51.2

Rail PU Series



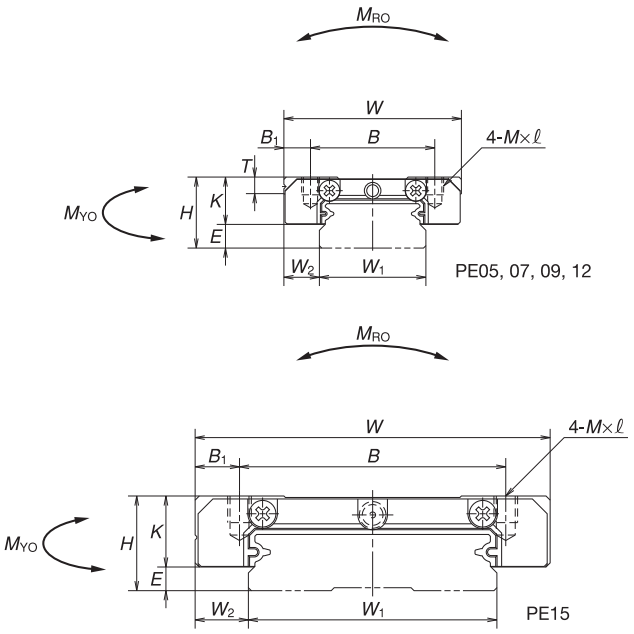
Model-No.	Rail dimensions (mm)					
	W_1	H_1	F	d × D × h	B_3	G (recommended)
P1U05	5	3.2	15	2.3 x 3.3 x 0.8	2.5	5
P1U07	7	4.7	15	2.4 x 4.2 x 2.3	3.5	5
P1U09	9	5.5	20	3.5 x 6 x 4.5	4.5	7.5
P1U12	12	7.5	25	3.5 x 6 x 4.5	6	10
P1U15	15	9.5	40	3.5 x 6 x 4.5	7.5	15

Rail PU Series



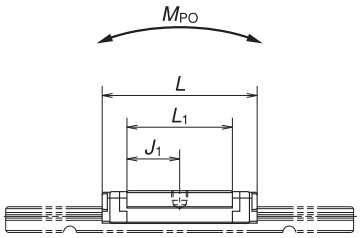
Rail		Model-No.
Max. Lenght $L_{0\ max}$	Weight (g / 100 mm)	
210	11	P1U05
375	23	P1U07
600	35	P1U09
800	65	P1U12
1000	105	P1U15

Miniature wide rail type with sliders AR and TR

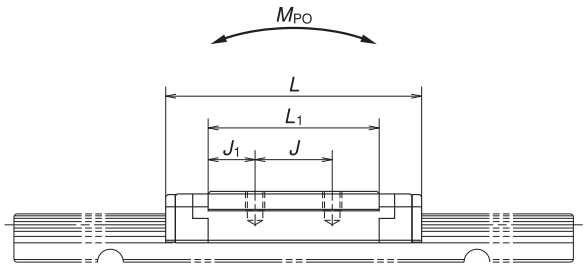


Slider mounted on a dummy rail for dimensions see pages 88 and 89

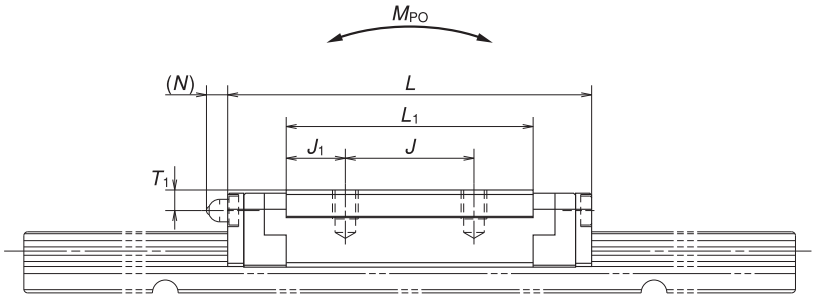
Model-No.	Assembly (mm)			Slider (mm)									
	H	*E*	W_2	*W*	*L*	*B*	*J*	*M*×*Lead*×ℓ	B_1	L_1	J_1	*K*	*T*
PAE05AR	6.5	1.4	3.5	17	24.1	13	–	M2.5×0.45×1.5	2	16.4	8.2	5.1	2.5
PAE07TR	9	2	5.5	25	31.1	19	10	M3×0.5×2.8	3	20.9	5.45	7	3
PAE09TR	12	4	6	30	39.8	21	12	M3×0.5×3	4.5	26.6	7.3	8	2.8
PAE12AR	14	4	8	40	45	28	15	M3×0.5×4	6	31	8	10	3.2
PAE15AR	16	4	9	60	56.6	45	20	M4×0.7×4.5	7.5	38.4	9.2	12	4.1



PE05



PE07, 09, 12

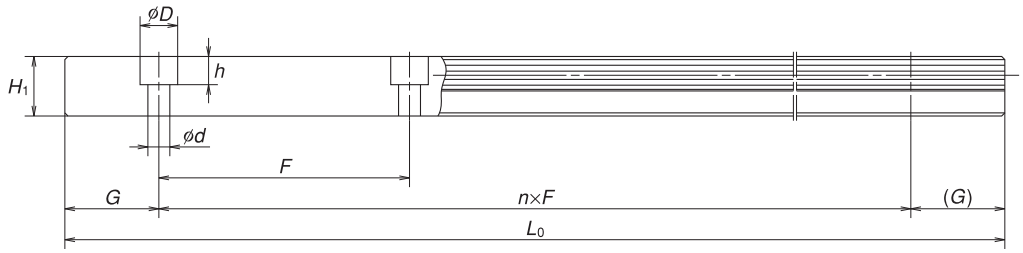


PE15

Slider mounted on a dummy rail for dimensions see pages 88 and 89

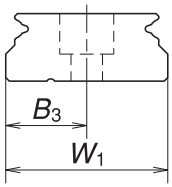
Grease fitting (mm)			Basic load rating (N)		Static moment (N · m)			Ball dia.	Weight		Slider length with 2 K1 (mm)
	T_1	N	Dynamic C	StaticC_0	M_{RO}	M_{PO}	M_{YO}	D_w	Slider (kg)	Rail (kg/m)	
–	–	–	690	1160	6	3	3	1	10	34	28.9
–	–	–	1 580	2 350	17	7	7	1.5875	22	55	37.1
–	–	–	3 000	4 500	37	17	17	2	34	95	46.8
–	–	–	4 350	6 350	71	29	29	2.3812	63	140	53
∅3	3.2	(3.3)	7 600	10 400	207	59	59	3.175	130	275	66.2

Rail PE Series

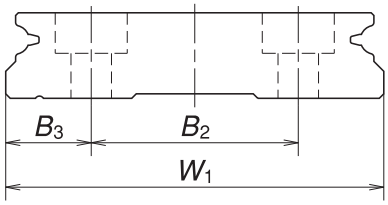


Model-No.	Rail dimensions (mm)						
	W_1	H_1	B_2	F	d × D × h	B_3	G (recommended)
P1E05	10	4	-	20	3 x 5 x 1.6	5	7.5
P1E07	14	5.2	-	30	3.5 x 6 x 3.2	7	10
P1E09	18	7.5	-	30	3.5 x 6 x 4.5	9	10
P1E12	24	8.5	-	40	4.5 x 8 x 4.5	12	15
P1E15	42	9.5	23	40	4.5 x 8 x 4.5	9.5	15

Rail PE Series



PE05, 07, 09, 12



PE15

Rail		Model-No.
Max. Lenght $L_{0\ max}$	Weight (g / 100 mm)	
150	34	P1E05
600	55	P1E07
800	95	P1E09
1000	140	P1E12
1200	275	P1E15

Technical description of Monocarrier

- **Selection**
- **Rigidity**
- **Allowable speed**
- **Life expentancy estimation**
- **Lubrication and maintenance**

10

Monocarrier

1.1 Features:

Unsurpassed Monocarrier, fruit of technology that has long been accumulated by NSK, is now available from standard stock.
Light weight, compact single axis linear actuator, integrating the exeptionally reliable NSK's ball screw, linear guide, and support bearing.

1. Light weight, compact design

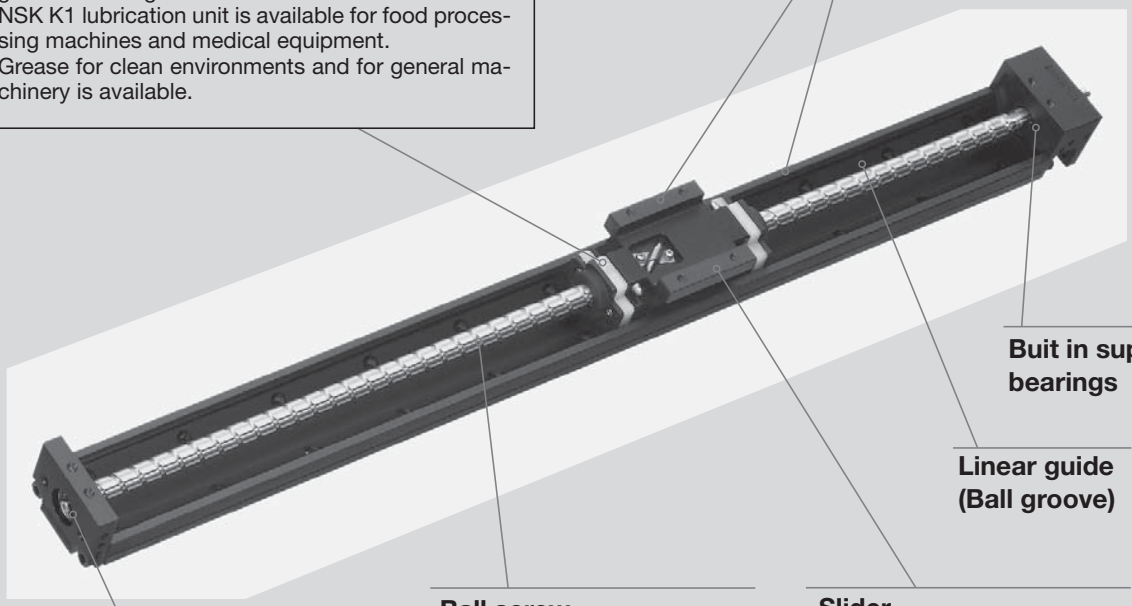
Available in two different shapes of cross-section, depending on application.
Light weight type : MCM Series
Rigid type : MCH Series
The design fully utilizing given space facilitates compact structure.

4. Long term maintenance free

Simultaneous use of NSK K1 lubrication unit and grease maintains smooth lubrication performan ce for long periods in mechanical environments where lubrication is difficult to apply.
The simultaneous use of a small amount of grease and an NSK K1 lubrication unit provides sufficient lubrication effect in the environment where use of oil is not permitted because of hygienic issues or where the mechanical equippment requires high degree of washing out.
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 mjuch higher rust prevention.



Buit in support bearings

Linear guide (Ball groove)

Ball screw
A wide veriety of leads, from fine leads to high helix leads, is available.

Slider
A ball nut and a slider are integrated into one component.

Built in support bearings

2. All-in-one structure

The all-in-one structure, integration a ball screw, a linear guide and support bearings into a unit, significantly reduces workload for design and installation.
Multiple datum planes, the bottom and a lateral side of the rail, facilitate highly accurate installation.

Immediate operation riht after running-in is possible because grease has been prviously packed at the plant.
Ball screw lead is available in fine to high helix leads from a wide array of the product lineup.

1.4 Selection of Monocarrier

1.4.1 Procedures for selecting Monocarrier

Select a reference type of Monocarrier based on stroke and rigidity (Refer to Fig. 1-6, 1-7).

Select a ball screw lead referring to "1.4.3 Maximum Rotational 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 substituting them for equation 1 or 2 on Page C13. Obtain the mean effective load Fm substituting them for equation 3 on Page C14, then calculate the life.

Study the loads to be applied to the ball screw and support unit. Obtain the mean effective load Fm substituting them for equation 3 on Page C14, then calculate the life.

1. 4. 2. Rigidity

Rigidity of rail

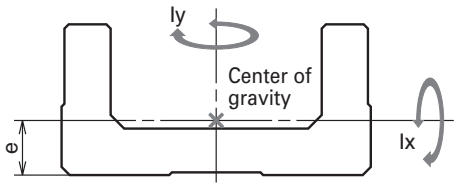


Fig. 1-5

Table 1-2 Rigidity of rail

Nominal size	Geometrical moment of inertia ×10⁴ (mm⁴)		Center of gravity (mm)	Mass (kg/ 100mm)
	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

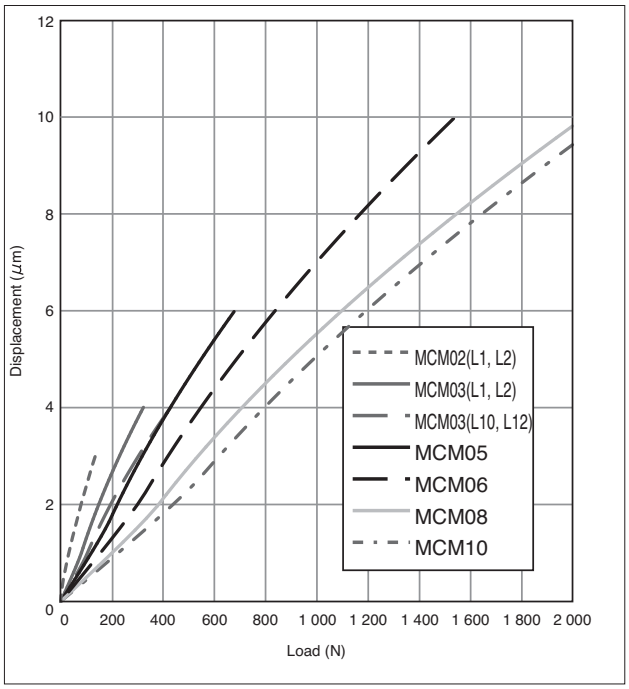


Fig. 1-6 MCM Series Rigidity in radial direction

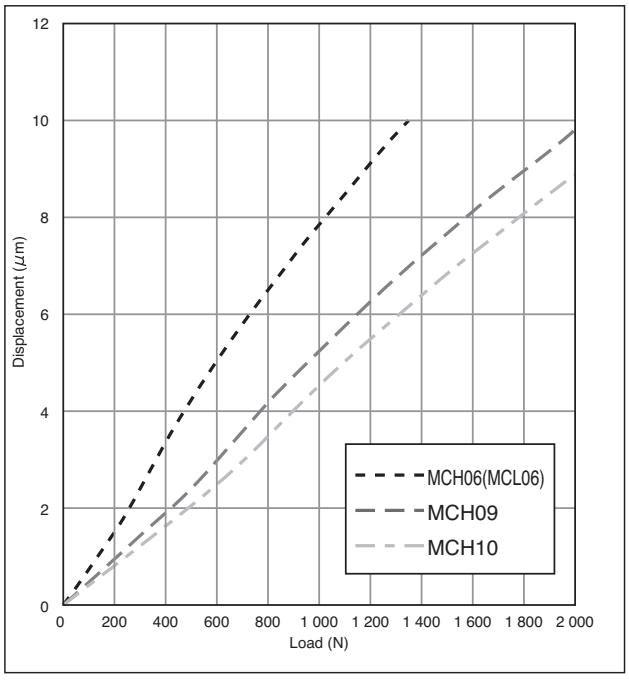


Fig. 1-7 MCH Series Rigidity in radial direction

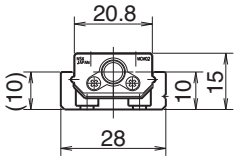
1. 2. Classification and Series

Table 1-1

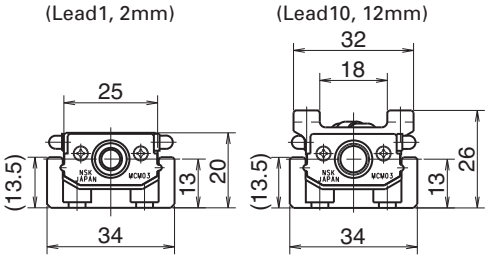
	Light Weight	Beam Rigidity	Moment Rigidity
MCM Series	◎	○	○
MCH Series	○	◎	○

[MCM Series Cross-sections]

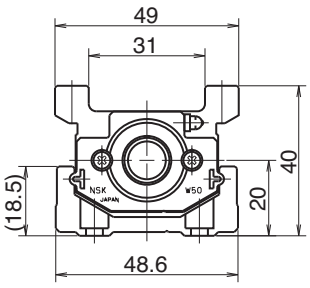
MCM02



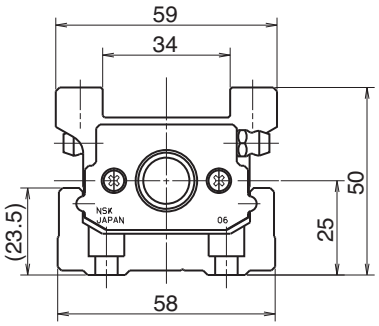
MCM03



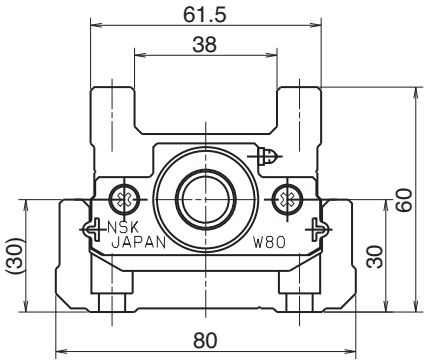
MCM05



MCM06



MCM08



MCM10

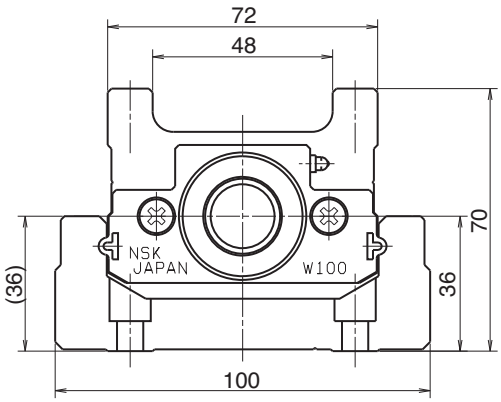
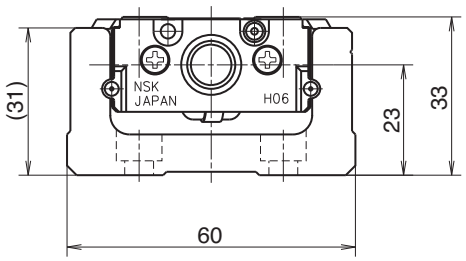


Fig. 1-1

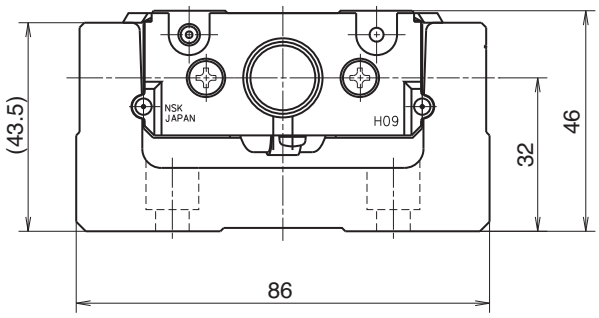
	Accuracy	Long Stroke	Size Variation
MCM Series	◎	○	◎
MCH Series	◎	◎	○

[MCH Series Cross-sections]

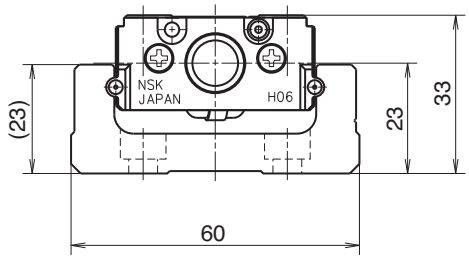
MCH06



MCH09



MCL06



MCH10

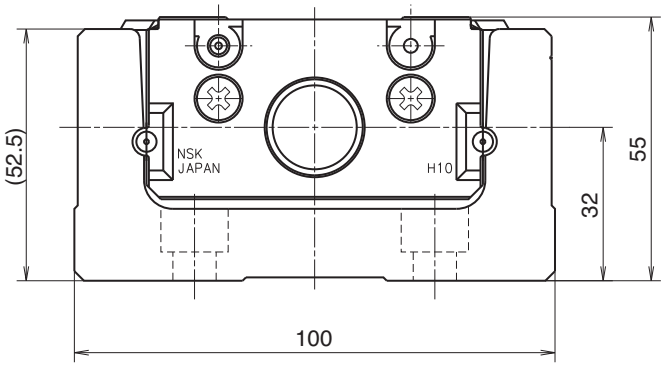


Fig. 1-2

1.4.3 Maximum Rotational Speed

Maximum Rotational Speed of MCM Series

Maximum rotational speed of Monocarrier is determined by the critical speed of ball screw shaft and the d • n value.
Do not exceed the maximum rotational speeds on the table below.

Table 1-3

	Ball screw lead	stroke (mm)	Rail length L_2 (mm)	Maximum rotational 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	
	10	100 ≀ 250	190 ≀ 340	500
	12	100 ≀ 250	190 ≀ 340	600
MCM05 Single slider	5	50 ≀ 200	180 ≀ 330	250
	10	50 ≀ 600	180 ≀ 730	500
	20	300 ≀ 600	430 ≀ 730	1000
MCM05 Double slider	10	60 ≀ 510	280 ≀ 730	500
	20	210 ≀ 510	430 ≀ 730	1000
MCM06 Single slider	5	50 ≀ 500	190 ≀ 640	250
	10	50 ≀ 600	190 ≀ 740	500
		700	840	490
		800	940	390
	20	300 ≀ 600	440 ≀ 740	1000
		700	840	980
		800	940	770
MCM06 Double slider	5	110 ≀ 410	340 ≀ 640	250
	10	110 ≀ 610	340 ≀ 840	500
		710	940	490
	20	210 ≀ 610	440 ≀ 840	1000
		710	940	980

	Ball screw lead	stroke (mm)	Rail length L_2 (mm)	Maximum rotational speed (mm/s)
MCM08 Single slider	5	50 ≀ 200	220 ≀ 370	250
	10	100 ≀ 700	270 ≀ 870	500
		800	970	390
	20	300 ≀ 700	470 ≀ 870	1000
		800	970	780
MCM08 Double slider	10	80 ≀ 680	370 ≀ 970	500
	20	180 ≀ 680	470 ≀ 970	1000
MCM10 Single slider	10	200 ≀ 800	380 ≀ 980	500
		900	1080	440
		1000	1180	360
	20	300 ≀ 800	480 ≀ 980	1000
		900	1080	880
		1000	1180	720
MCM10 Double slider	10	70 ≀ 670	380 ≀ 980	500
		870	1180	440
	20	170 ≀ 670	480 ≀ 980	1000
		870	1180	880

Maximum Rotational Speed of MCH Series

Maximum rotational speed of Monocarrier is determined by the critical speed of ball screw shaft and the d • n value.
Do not exceed the maximum rotational speeds on the table below.

Table 1-4

	Ball screw lead	stroke (mm)	Rail length L_2 (mm)	Maximum rotational speed (mm/s)
MCH06 MCL06 Single slider	5	50 ≀ 500	150 ≀ 600	250
	10	50 ≀ 500	150 ≀ 600	500
	20	50 ≀ 500	150 ≀ 600	1000
MCH06 Double slider	5	100 ≀ 400	300 ≀ 600	250
	10	100 ≀ 400	300 ≀ 600	500
	20	100 ≀ 400	300 ≀ 600	1000
MCH09 Single slider	5	200 ≀ 600	340 ≀ 740	250
		800	940	210
	10	200 ≀ 600	340 ≀ 740	500
		800	940	410
	20	200 ≀ 600	340 ≀ 740	1000
		800	940	830
MCH09 Double slider	5	150 ≀ 650	440 ≀ 940	250
	10	150 ≀ 650	440 ≀ 940	500
	20	150 ≀ 650	440 ≀ 940	1000

	Ball screw lead	stroke (mm)	Rail length L_2 (mm)	Maximum rotational speed (mm/s)
MCH10 Single slider	10	400 ≀ 800	580 ≀ 980	500
		900	1080	440
		1000	1180	360
		1100	1280	300
		1200	1380	250
	20	400 ≀ 800	580 ≀ 980	1000
		900	1080	870
		1000	1180	720
		1100	1280	600
		1200	1380	510
MCH10 Double slider	10	250 ≀ 750	580 ≀ 1080	500
		850	1180	480
		950	1280	390
		1050	1380	320
	20	250 ≀ 750	580 ≀ 1080	1000
		850	1180	950
		950	1280	780
		1050	1380	650

1.4.4 Accuracy Grade

The accuracy grade of Monocarrier standard inventories is high grade (H), except for lead 1 and 2 of MCM02, and 03.
When you require strokes longer than 1200 mm, please consult NSK about the accuracy grade.

Table 1-5

(Unit : μm)

Grade	High grade			Precision			
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		16			25	10	
~600		20			30	12	
~700		23			30	15	
~1000		23			35	15	
~1200		30			40	20	

1. 4. 5 Stroke and Ball Screw Lead

1. 4. 5. 1 MCM Series standard combinations of Stroke and Ball Screw Lead

Table 1-6 Single slider

(●mark : Standard inventory ○mark: Short-term delivery) (Unit : mm)

Nominal size	MCM02		MCM03				MCM05			MCM06			MCM08			MCM10	
lead / stroke	1	2	1	2	10	12	5	10	20	5	10	20	5	10	20	10	20
50	●	●	●	●	○	○	●	●	○	●	○	○	○	○			
100	●	●	●	●	●	●	●	●	○	●	●	○	○	●	○	○	○
150	●	●	○	○	○	○	○	●	○	○	○	○	○	○	○	○	○
200					●	○	●	●	○	●	●	○	○	●	○	●	○
250					○	○	○	●	○	○	○	○	○	○	○	○	○
300							○	●	●	●	●	●	○	●	●	●	●
400							○	●	●	●	●	●	○	●	●	●	●
500							○	●	●	○	●	●	○	●	●	○	○
600							○	●	●	○	○	○	○	●	○	●	○
700										○	●	●	○	○	○	○	○
800										○	○	○	○	○	○	●	○
900																○	○
1000																○	○

Table 1-7 Double slider

(○mark: Short-term delivery) (Unit : mm)

Nominal size	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								○	○

Please consult NSK about double slider of MCM 02 and 03.

1. 4. 5. 2 MCH Series Standard Combinations of Stroke and Ball Screw **Lead**

Table 1-8 Single slider

(● mark : Standard inventory ○ mark: Short-term delivery) (Unit : mm)

Nominal size	MCH06			MCH09			MCH10	
lead / stroke	5	10	20	5	10	20	10	20
50	●	●	○					
100	●	●	○	○	○	○	○	○
200	●	●	●	●	●	○	○	○
300	○	●	●	●	●	○	○	○
400	○	●	●	●	●	○	●	●
500	○	●	●	○	●	●	●	●
600				○	●	●	●	●
700				○	○	○	●	●
800				○	●	●	●	●
900							○	●
1000							○	●
1100							○	○
1200							○	○

Table 1-9 Double slider

(○ mark: Short-term delivery) (Unit : mm)

Nominal size	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								○
1050								○

Table 1-10 Limitations

	Nominal size	lead (mm)	slider	stroke (mm)
MCM series	MCM02	1,2	Single	150
	MCM03	1,2	Single	150
		10,12	Single	350
	MCM05	5,10,20	Single	900
			Double	810
	MCM06	5,10,20	Single	1000
			Double	910
	MCM08	5,10,20	Single	1000
			Double	880
	MCM10	10,20	Single	1800
			Double	1670
MCH series	MCH06	5,10,20	Single	600
			Double	500
	MCH09	5,10,20	Single	1000
			Double	850
	MCH10	10,20	Single	1800
			Double	1650
	MCL06	5,10,20	Single	500

1. 4. 6 Basic Load Rating
1. 4. 6. 1 MCM Series Basic Load Rating

Table 1-11 Basic Load Rating

Nominal size	Lead ℓ (mm)	Shaft dia d (mm)	Basic dynamic load rating (N) Ball screw C_a	Linearguide Support unit C	C_a	Rated running distance L_a (km)	Basic static load rating (N) Ball screw C_{0a}	Linearguide C_0	Support unit Limit load (N)
MCM02	1	ø 6	340 (High grade) 405 (Precision)	4910	615	1	555 (High grade) 615 (Precision)	2120	490
	2		340 (High grade) 405 (Precision)	3900		2	555 (High grade) 615 (Precision)		
MCM03	1	ø 6	735	10900	2670	1	1230	4900	1040
	2		735	8650		2			
	10	ø 8	1230	6250		10	1690	6620	
	12		1230	5880		12			
MCM05	5	ø 12	3760	15600	4400	5	6310	10900	1450
	10		2260	12400		10	3780		
	20		2260	9850		20	3780		
MCM06	5	ø 16	7310	25200	6550	5	13500	17000	2730
	10	ø15	7060	20000		10	12700		
	20		4560	15900		20	7750		
MCM08	5	ø 16	7310	30800	7100	5	13500	22800	3040
	10	ø15	7060	24400		10	12700		
	20		4560	19400		20	7750		
MCM10	10	ø 20	10900	33500	7600	10	21700	29400	3380
	20		7060	26600		20	12700		

Notes ●Basic dynamic and static load ratings indicate the values for one slider. ●Basic dynamic load rating of the linear guide is the load of perpendicular direction to the axis that allows 90% of a group of the same Monocarriers to operate " Rated running distance" in the table, that is equivalent to 1 million revolutions of the ball screw and the support unit, under the same condition without causing flaking by rolling contact fatigue. ●Basic dynamic load rating of the ball screw is a load to axial direction that allows 90% of ball screws of a group of the same Monocarriers to rotate 1 million revolutions under the same condition without causing flaking by rolling contact fatigue. ●Basic dynamic load rating of the support unit is a constant load to axial direction that allows 90% of support units of the same group of Monocarriers to rotate 1 million revolutions under the same condition without causing flaking by rolling contact fatigue. ●Basic static load rating is a load that results in combined permanent deformations at the contact points of balls and ball grooves of respective parts is 0.01% of the diameter.

Table 1-12 Basic static moment load of linearguide

Nominal size	Lead (mm)	Slider	Basic static moment (N m) Rolling M_{RO}	Pitching M_{PO}	Yawing M_{YO}
MCM02	1,2	Single	24	8	8
MCM03	1,2		68	28	28
	10,12		92	51	51
MCM05	5,10,20	Single	229	89	89
		Double	455	765	765
MCM06	5,10,20	Single	415	174	174
		Double	825	1220	1220
MCM08	5,10,20	Single	770	300	300
		Double	1540	2050	2050
MCM10	10,20	Single	1170	425	425
		Double	2340	2940	2940

●Basic static moment of double slider is a value when two sliders equipped with NSK K1 are butted against each other.
●The basic static moment is the value when a rolling contact pressure of balls exceeds 4000 N/mm^2.
●If you require to apply extremely heavy load, please consult NSK for estimation of fatigue life.

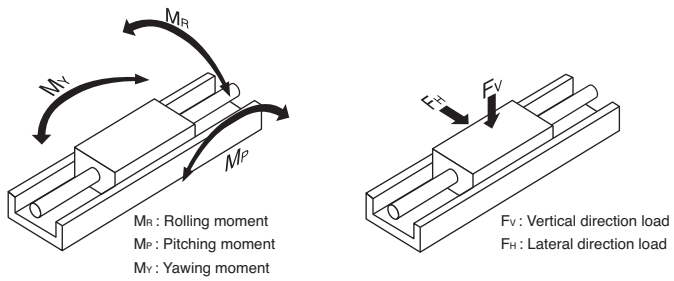


Fig. 1-8

1. 4. 6. 2 MCH Series Basic Load Rating

Table 1-13 Basic Load Rating

Nominal size	Lead ℓ (mm)	Shaft dia d (mm)	Basic dynamic load rating (N) Ball screw C_a	Linearguide C	Support unit C_a	Rated running distance L_a (km)	Basic static load rating (N) Ball screw C_{0a}	Linearguide C_0	Support unit Limit load (N)
MCH06 (MCL06)	5	ø12	3000 (High grade) 3760 (Precision)	22800	4400	5	5410 (High grade) 6310 (Precision)	16300	1450
	10		1930 (High grade) 2260 (Precision)	18100		10	3160 (High grade) 3780 (Precision)		
	20		1930 (High grade) 2260 (Precision)	14400		20	3160 (High grade) 3780 (Precision)		
MCH09	5	ø15	6820 (High grade) 7100 (Precision)	40600	7100	5	13200 (High grade) 13000 (Precision)	30500	3040
	10		5110 (High grade) 7060 (Precision)	32200		10	9290 (High grade) 12700 (Precision)		
	20		3290 (High grade) 4560 (Precision)	25500		20	5620 (High grade) 7750 (Precision)		
MCH10	10	ø20	8230 (High grade) 10900 (Precision)	44600	7600	10	17100 (High grade) 21700 (Precision)	42000	3380
	20		5300 (High grade) 7060 (Precision)	35400		20	10300 (High grade) 12700 (Precision)		

Notes ●Basic dynamic and static load ratings indicate the values for one slider. ●Basic dynamic load rating of the linear guide is the load of perpendicular direction to the axis that allows 90% of a group of the same Monocarriers to operate " Rated running distance" in the table, that is equivalent to 1 million revolutions of the ball screw and the support unit, under the same condition without causing flaking by rolling contact fatigue. ●Basic dynamic load rating of the ball screw is a load to axial direction that allows 90% of ball screws of a group of the same Monocarriers to rotate 1 million revolutions under the same condition without causing flaking by rolling contact fatigue. ●Basic dynamic load rating of the support unit is a constant load to axial direction that allows 90% of support units of the same group of Monocarriers to rotate 1 million revolutions under the same condition without causing flaking by rolling contact fatigue. ●Basic static load rating is a load that results in combined permanent deformations at the contact points of balls and ball grooves of respective parts is 0.01% of the diameter.

Table 1-14 Basic static moment load of linearguide

Nominal size	Slider	Basic static moment (N • m) Rolling M_{RO}	Pitching M_{PO}	Yawing M_{YO}
MCH06 (MCL06)	Single	335	133	133
	Double	770	730	730
MCH09	Single	890	385	385
	Double	1780	2070	2070
MCH10	Single	1460	610	610
	Double	2920	3430	3430

● Basic static moment of double slider is a value when two sliders equipped with NSK K1 are butted against each other.
● The basic static moment is the value when a rolling contact pressure of balls exceeds 4000 N/mm².
● If you require to apply extremely heavy load, please consult NSK for estimation of fatigue life.

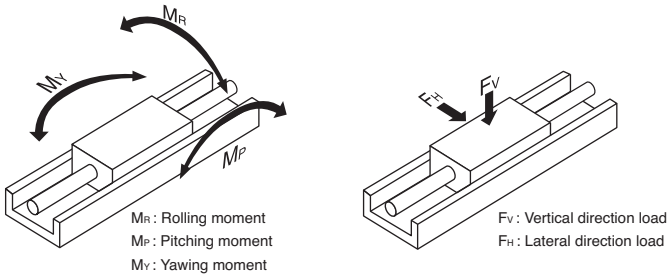


Fig. 1-8

1.4.7 Estimation of Life Expectancy

1.4.7.1 Life of Linear Guide

Study the load to be applied to the linear guide of Monocarrier (Fig. 1-10). The equivalent load (Fe) is determined by substituting the load for equation ① (Eq.② : in case of the tightly coupled double slider type).

● In case of the single slider

$$Fe = Y_H F_H + Y_V F_V + Y_R \varepsilon_R M_R + Y_P \varepsilon_P M_P + Y_Y \varepsilon_Y M_Y \cdots ①$$

● In case of the double slider

$$Fe = \frac{Y_H F_H}{2} + \frac{Y_V F_V}{2} + Y_R \varepsilon_{Rd} M_R + Y_P \varepsilon_{Pd} M_P + Y_Y \varepsilon_{Yd} M_Y \cdots ②$$

F_H : Lateral direction load acting on the slider (N)
F_V : Vertical direction load acting on the slider (N)
M_R : Rolling moment acting on the slider (N m)
M_P : Pitching moment acting on the slider (N m)
M_Y : Yawing moment acting on the slider (N m)
ε_R, ε_{Rd}
: Dynamic equivalent coefficient to rolling moment
ε_P, ε_{Pd}
: Dynamic equivalent coefficient to pitching moment
ε_Y, ε_{Yd}
: Dynamic equivalent coefficient to yawing moment
Refer to Table 1-15 about Dynamic equivalent coefficient.
Y_H, Y_V, Y_R, Y_P, Y_Y
: 1.0 or 0.5

At equations ① and ② for obtaining equivalent load Fe, among F_H, F_V, $\varepsilon_P M_P$, $\varepsilon_R M_R$, $\varepsilon_Y M_Y$, the maximum load is assumed to be 1.0, and others are to be 0.5.

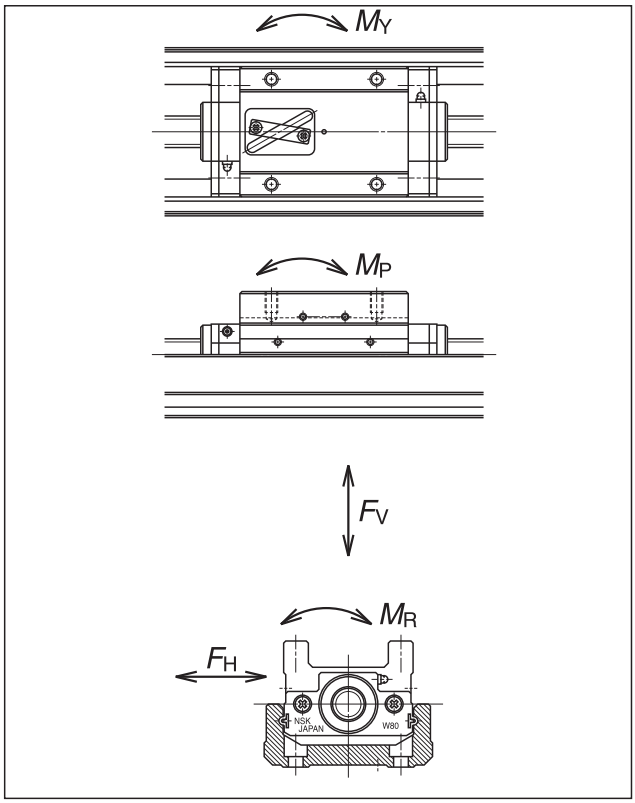


Fig. 1-10 Direction of load

Figures in parentheses( ) are Dynamic equivalent coefficient in case of the Monocarrier without NSK K1.

Table 1-15 Dynamic equivalent coefficient

Nominal size	MCM02	MCM03		MCM05	MCM06	MCM08	MCM10	MCH06 MCL06	MCH09	MCH10
		lead 1, 2	lead 10, 12							
ε_R	95.2	79.4	79.4	52.6	45.5	32.5	27.8	48.3	34.5	28.6
ε_P	174	113.9	84.2	81.3	65.1	48.8	45.2	75.1	47.9	41.0
ε_Y	174	113.9	84.2	81.3	65.1	48.8	45.2	75.1	47.9	41.0
ε_{Rd}	—	—	—	26.3	22.7	16.3	13.9	24.2	17.2	14.3
ε_{Pd}	—	—	—	10.4(12.2)	9.7(11.5)	7.6(8.6)	7.1(8.0)	11.4(13.2)	8.11(9.10)	6.98(7.82)
ε_{Yd}	—	—	—	10.4(12.2)	9.7(11.5)	7.6(8.6)	7.1(8.0)	11.4(13.2)	8.11(9.10)	6.98(7.82)

In case when the load acting on the slider may fluctuate (In general, M_P, M_Y may fluctuate with the acceleration/deceleration of slider), the mean effective load is determined by Eq. ③.

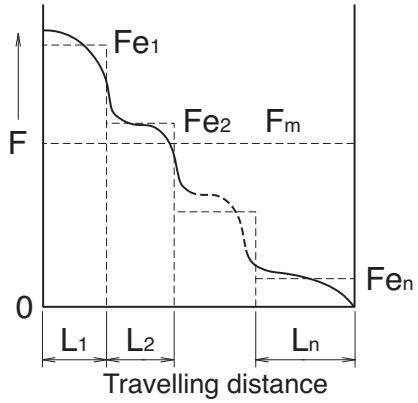


Fig. 1-11 Stepwise Fluctuating Load

Travelling distance under the equiralent load Fe_1 : L_1
Travelling distance under the equiralent load Fe_2 : L_2
. . . . . .
Travelling distance under the equiralent load Fe_n : L_n

$$Fm = \sqrt[3]{\frac{1}{L}\left(Fe_1^3L_1 + Fe_2^3L_2 + \cdots Fe_n^3L_n\right)} \cdots ③$$

Fm : Mean effective load of fluctuating loads
L : Total travelling distance

The life of linear guide is calculated by Eq. ④

$$L = L_a \times \left(\frac{C}{f_W \ Fm}\right)^3 \cdots ④$$

L : Life of linear guide (km)
Fm : Mean effective load acting on the linear guide (N)
C : Basic dynamic load rating of the linear guide (N)
L_a : Travelling distance (km)
f_w : Load factor (Refer to Table 1-16)

When the estimated life does not clear the required life, the life of linear guide is to be calculated again after the following measures are taken:

1. Change from the single slider type to double slider type.
2. Use a larger size Monocarrier.

1. 4. 7. 2 Life of Ball Screw (Support unit)

The mean effective load is determined from the axial loads.

For calculation of the mean effective load, use Eq.③.

The life of ball screw is calculated by Eq. ⑤.

$$L = R \times \left(\frac{C_a}{f_w \ Fm}\right)^3 \times 10^6 \cdots ⑤$$

ℓ : Lead of ball screw (mm)
L : Life of ball screw (mm)
C_a : Basic dynamic load rating of the ball screw (N)
Fm : Mean effective load acting on the ball screw (N)
f_w : Load factor (Refer to Table 1-16)

The life of support unit is calculated by Eq. ⑤.

If the life of ball screw / support unit does not clear the required life, use a larger size Monocarrier.

Upon calculations as mentioned above, selection of Monocarrier completed.

Table 1-16 Values of load factor f_w

Operating conditions	Load factor f_w
At smooth operation with no mechanical shock	1.0 ~ 1.2
At normal operation	1.2 ~ 1.5
At operation with mechanical shock and vibrations	1.5 ~ 3.0

1. 4. 8 Example of Life Estimation

This section offers an example how to estimate the life of Monocarrier based on the life of each component.

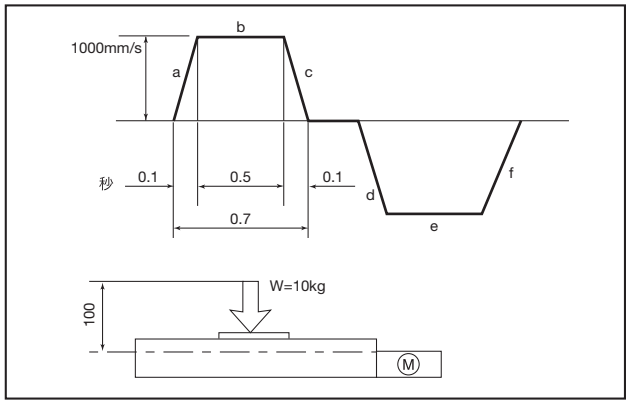


Fig. 1-12

1. Use condition

Stroke	: 600mm
Maximum Speed	: 1000mm/s
Load Mass	: W=10kg
Acceleration	: g=9.8m/s^2
Setting Position	: Horizontal
Operating Profile	: See above figure

2. Selection of Nominal size

2-1. Interim Selection

Firstly, select a greater ball screw lead as the maximum speed is 1000 mm/s. The interim selection is MCM06060H20K00, a single slider specification MCM06 that has 600 mm stroke, as the stroke is 600 mm.

3. Calculation

3-1. Linear guide

3-1-1. Fatigue life

Multiply the result of the Eq. ① by the dynamic equivalent coefficient (Table 1-15. single slider) to convert the load volume. From above operation profile,

i) Constant speed $Fe_1=Y_vF_v=Y_vW_g=1 \cdot 10 \cdot 9.8=98N$

ii) Accelerating $Fe_2=Y_vF_v+Y_p\varepsilon_pM_p=0.5 \cdot 10\ 9.8+1 \cdot 65.1 \cdot 0.1 \cdot 100=700N$

iii) Decelerating $Fe_2=Y_vF_v+Y_p\varepsilon_pM_p=0.5 \cdot 10\ 9.8+1 \cdot 65.1 \cdot 0.1 \cdot 100=700N$

Mean effective load *Fm*

$$Fm=\sqrt[3]{\frac{1}{L}\left(Fe_1^3\cdot L_1+Fe_2^3\cdot L_2+Fe_3^3\cdot L_3\right)}$$

$$=\sqrt[3]{\frac{1}{600}\left(98^3\cdot 500+700^3\cdot 50+700^3\cdot 50\right)}$$

$$=387\ N$$

$$L=\left(\frac{C}{f_w\cdot F_m}\right)^3\times L_a$$

$$=\left(\frac{15900}{1.2\cdot 387}\right)^3\times 20$$

$$=8.02\times 10^5 km$$

3-1-2. Static safety factor ; Divide the basic static load rating by the maximum load.

$$F_s=\frac{C_0}{Fe}=\frac{C_0}{Fe_2}=\frac{17000}{700}=24.2$$

3-2. Ball screw

3-2-1. Fatigue life ; Obtain the axial load of each stage of operation referring to the operation profile, then calculate the mean load.

By the process above,

i) Constant speed

$Fe_1=\mu \cdot W \cdot g=0.01 \cdot 10 \cdot 9.8=0.98$

ii) Accelerating

$Fe_2=Fe_1+W\alpha=101N$

iii) Decelerating

$Fe_3=Fe_1 \cdot W\alpha=99N$

Axial mean effective load Fm

$$Fm=\sqrt[3]{\frac{1}{L}\left(Fe_1^3\cdot L_1+Fe_2^3\cdot L_2+Fe_3^3\cdot L_3\right)}$$

$$=\sqrt[3]{\frac{1}{600}\left(0.98^3\cdot 500+101^3\cdot 50+99^3\cdot 50\right)}$$

$$=55N$$

$$L=\left(\frac{C_a}{f_w\cdot F_m}\right)^3\times R\times 10^6$$

$$=\left(\frac{4560}{1.2\cdot 55}\right)^3\times 20\times 10^6(mm)$$

$$=6.5\times 10^6 km$$

3-2-2. Static safety factor ; Divide the basic static load rating by the maximum axial load.

$$F_s=\frac{C_{0a}}{Fe}=\frac{C_{0a}}{Fe_2}=\frac{7750}{101}=76.7$$

3-2-3. Maximum rotational speed ; According to the table of maximum rotational speed on page C7, MCM06 with 20 mm lead and 600 mm stroke, is possible to operate under the maximum speed of 1000 mm/s.

3-3. Support unit

3-3-1. Fatigue life ; Use the axial load Fm = 55 N, that is the result of above calculation 3-2-1.

$$L=\left(\frac{C_a}{fw\cdot Fm}\right)^3\times R\times 10^6=\left(\frac{6550}{1.2\times 55}\right)^3\times 20\times 10^6(mm)$$

$$=1.95\times 10^7 km$$

3-3-2. Static safety factor ; Divide the limit load by the maximum axial load.

$$F_s = \frac{C_{0a}}{Fe} = \frac{C_{0a}}{Fe_2} = \frac{2730}{101} = 27.0$$

3.4. Result

MCM06060H20K00	Linear guide	Ball screw	Support unit
Fatigue life	8.02 ×	6.5 ×	1.95 ×
	10^5km	10^6km	10^7km
Static safety factor	24.2	76.7	27.0

The shortest fatigue life of linear guide among the components must be taken as the life of the Mononcarrier. The interim selection of MCM06060H20K00, that is chosen based on the use conditions, satisfies the required life.

1.5 Maintenance

1.5.1 Maintenance Method

1. For standard Monocarrier, we pack grease in slider, linear guides and ball screw.

2. The Monocarriers equip with NSK K1 lubrication unit as a standard feature, and therefore, you can operate it for 5 years or 10 000 km, whichever comes first, without the maintenance. However replenishment of preceded grease may extend its life substantially.

3. NSK K1 lubrication unit demonstrates its effects in environment where oily dust exists. However, the life may be shorter than the case described in the Clause 2 above. In such a case, it requires the measures such as increasing the frequency of replenishment.

4. Nozzle for NSK grease gun exclusive for MCH Monocarries is available as an option.

NSK reperence number : NSK HGP NZ8

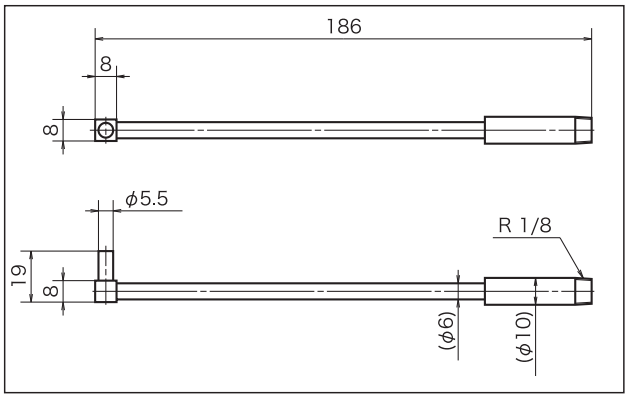


Fig. 1-13 NSK HGP NZ8

Precautions for handling

1. Please consult with NSK when the motor is coupled to the ball screw using a pulley because there is a restriction on allowable torque to the end of ball screw shaft.
2. To extend high performance of NSK K1 lubrication unit, please observe the following.

1. Temperature range	Ambient temperature :	50°C
	Max. instantaneous temperature :	80°C
2. Use of chemicals	Never leave a Monocarrier in close proximity of grease removing organic solvents such as hexane or thinner. Never immerse it in an antirust solvent that contains kerosene.	

Note: Other oils, such as water-based and oil based cutting oil, and grease do not cause any problems.

1. 5. 2 NSK K1™ Lubricant Unit

NSK K1 lubrication unit exhibits outstanding features, confirmed by abundant experimental data, along with proven performance of linear guides and ball screws that are equipped with NSK K1.

(1) High-speed Durability Test of Linear Guides without Lubricant

Results of high-speed durability testing of linear guide without lubricant are shown in Fig. 1-14. While the linear guide cannot be operated without lubricant for even short periods without damage, the installation of the NSK K1 permits the linear guide to run over 25,000 km without any problem.

Conditions	Test piece: LH30AN (Preload Z1)
	Speed: 3.3 m/s
	Stroke: 1800 mm
No lubricant	All grease removed
NSK K1	All grease removed + NSK K1

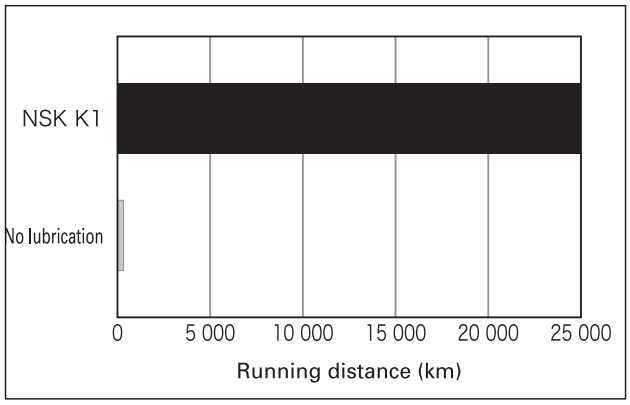


Fig. 1-14 Results of high-speed durability test of linear guides without lubricant

(2) High-speed durability test of ball screws without Lubricant

Results of high-speed durability testing of ball screw without lubrication are shown in Fig.1-15. While the ball screw cannot be operated without a lubricant at 8.5 km without damage, the installation of the NSK K1 permits the ball screw to run over 21,000 km without any problem.

Conditions	Test piece: BS2020 (ball screw)
	Shaft diameter: 20 mm
	Lead: 20 mm
	Load: none
	Speed: 1.3m/s (4 000 min^{-1})
	Stroke: 600 mm
No lubricant	All grease removed
NSK K1	All grease removed + NSK K1

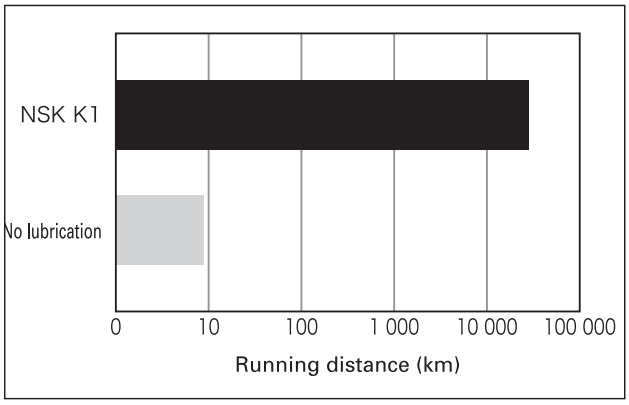


Fig. 1-15 Results of high-speed durability test of ball screws without lubricant

● NSK K1 lubrication unit for food processing is available.

For safety equipment of food processing and medical care, NSK provides the Monocarrier equipped with special NSK K1 lubrication unit that is made of compatible material with FDA regulations.

Dimensions are the same as the standard NSK K1 lubrication unit, and special handling care is not required.

1. 6 Characteristics and Evaluation Method

1. 6. 1 Positioning Accuracy

Perform positioning successively from the reference position in a specific direction. Measure the difference between the actual and desired travel distances for each point from the reference position. Repeat this measurement seven times to determine the average value. Measure such average value almost over the entire travel distance at the intervals specified for each model and take the maximum difference of the average values determined at respective positions as the measured value.

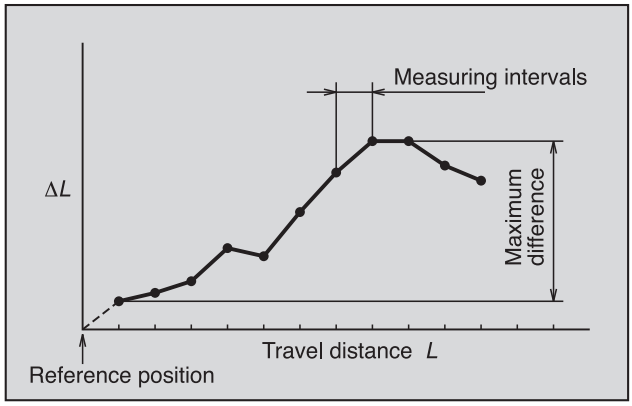


Fig. 1-16

1. 6. 2 Repeatability

Repeat positioning at any point seven times from the same direction to measure the stopping position and determine one half of the maximum difference of readings. Repeat this measurement almost over the entire travel distance at the intervals specified for each model. Take the maximum difference of the determined values as the measured value. Express one half of the maximum difference with a plus-or-minus (±) sign.

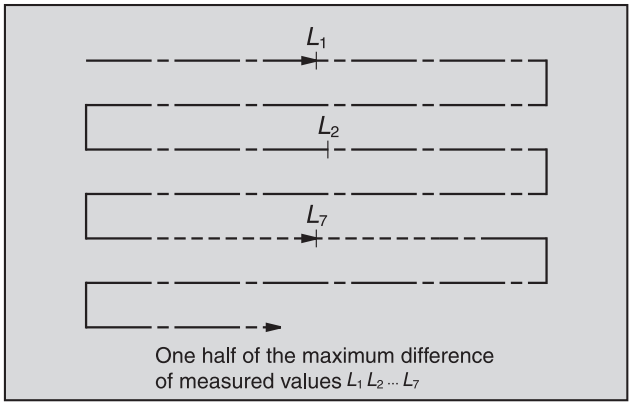


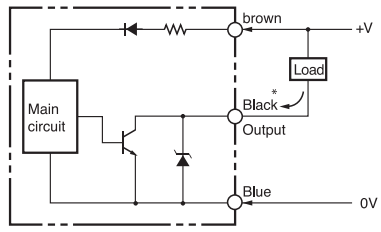
Fig. 1-17

1. 7 Sensor specification

1. 7. 1 Proximity switch

Use of OMRON E2S-W13,E2S-W14

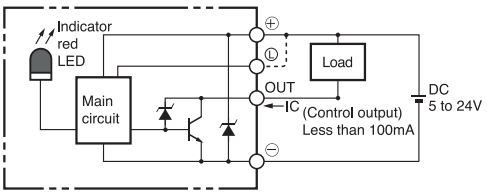
Item	E2S – W13 type	E2S – W14 type
Setting surface	Front face	
Sensing distance	1.6mm ± 15 %	
Setting distance	0 to 1.2mm	
Differential travel	10% max. of sensing distance	
Detectable object type	Ferrous metal	
Standard sensing object	Iron,12 x 12 x 1mm	
Response frequency	1 kHz min.	
Power supply voltage (operating voltage range)	12 to 24 V DC, ripple (p–p): 10% max., (10 to 30 V DC)	
Current consumption	13 mA max. at 24 V DC with no load	
Control output (Switching Capacity)	NPN open collector output 50 mA max.(30 V DC max.)	
Control output(Residual voltage)	1.0 V max. with a load current of 50 mA and a cable length of 1 m	
Indicator	Operation indicator (orange)	
Operating status (with sensing object approaching)	NO	NC

Movement mode	Output type	Type	Time chart	Output circuit
NO	NPN	E2S-W13 type	Target object: Yes / No Output transistor (load): ON / OFF Outoput transistor (orange): ON / OFF	
NC		E2S-W14 type	Target object: Yes / No Output transistor (load): ON / OFF Outoput transistor (orange): ON / OFF	

*(Maximum load current : 50mA)

1. 7. 2 Photo sensor
Use of OMRON EE-SX674

Item	EE-SX674 type
Slot width	5mm
Standard reference object	Opaque: 2 x 0.8 mm
Differential distance	0.025mm
Light source	GaAs infrared LED with a peak wavelength of 940 nm
Indicator(Without detecting object)	ON GaP red LED (peak emission wavelength: 690 nm).
Supply voltage	5 to 24VDC 10 %,ripple: (p-p) 10 % max.
Current consumption	35mA max.
Control output	NPN open collector output models:At 5 to 24 VDC: 100 mA load current
Response frequency	1kHz max. (3kHz typ.)
Ambient illumination	Fluorescent light: 1,000 l x max.
Ambient temperature	Operating : -25 C to 55 C (-13 F to 131 F) Storage : -30 C to 80 C (-22 F to 176 F)
Ambient humidity	Operating : 5 to 85 %RH Storage : 5 to 95 %RH
Connecting method	EE-1001/1006 Connectors; soldering terminals

Type	Movement mode	Time chart	Connection terminal	Output circuit
EE-SX674 type	Light-ON	Incident / Interrupted Indicator (red) ON / OFF Output transistor ON / OFF Load 1 (relay) Operates / Releases Load 2 H / L	When terminals L and ⊕ are short circuited	
	Dark-ON	Incident / Interrupted Indicator (red) ON / OFF Output transistor ON / OFF Load 1 (relay) Operates / Releases Load 2 H / L	When terminals L and ⊕ are open circuited	

MCM Series – Light weight type

2 MCM Series
2. 1 MCM Series Reference Number Coding

[Body]

Reference number : MCM 08040 H 10K 0 0

- MCM: Monocarrier
- M: M type: MCM Series
- 08: 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 (See page C9) D: Double slider
- 0: Grease specification: O (standard AS2) Clean grease specification: B (LG2)
- 0: NSK management number

[With Option part]

Reference number : MCE 08040 H 10K 0 0 K 0 0 0

- E: With MCM option part
- K: NSK management number
- 0: Sensor unit
- 0: Cover unit
- 0: Motor bracket

Note : Optional components are available separately.

Table 2-1 Sensor unit (See page 125~128)

Reference number code	Specification	Reference number
0	N/A	—
1	Proximity switch (b-contact 3pieces)	MC – SRxx – 10
2	Proximity switch (a-contact 3pieces)	MC – SRxx – 11
3	Proximity switch (a-contact 1pieces, b-contact 2pieces)	MC – SRxx – 12
4	Photo sensor 3pieces	MC – SRxx – 13

Note xx: Reference number

Table 2-2 Cover unit (See page 129~130)

Reference number code	Specification	Reference number
0	N/A	—
1	With top cover	MC – CVxxxxx – 01 (02) ❖
2	Full cover	MC – CVxxxxx – 00

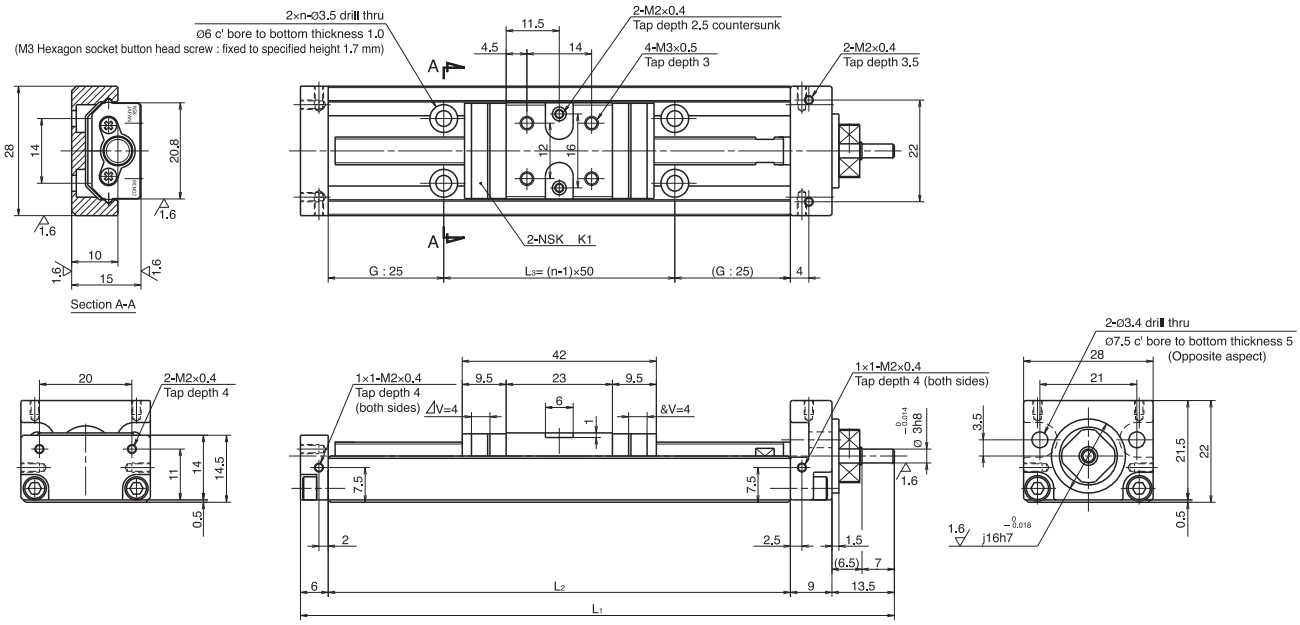
Note ❖: Monocarrier "-02" is only used for MCM03

Note xxxxx: Reference number and stroke number

Table 2-3 The reference number of motor bracket

Reference number code	Reference number				
	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**	

2. 2 MCM Series dimension table of standard prodacts
MCM02



⊿V is thickness of NSK K1

Reference number	Nominal stroke (mm)	Stroke limit (mm)	Ball screw lead (mm)	Body length (mm)			No. of mounting hole	Inertia	Mass
				L_1	L_2	L_3	n	$\times 10^{-7}$ (kg • m^2)	(kg)
MCM02005H01K	50	58	1	128.5	100	50	2	0.93	0.26
MCM02005P01K									
MCM02005H02K			2						
MCM02005P02K									
MCM02010H01K	100	108	1	178.5	150	100	3	1.36	0.32
MCM02010P01K									
MCM02010H02K			2						
MCM02010P02K									
MCM02015H01K	150	158	1	228.5	200	150	4	1.81	0.39
MCM02015P01K									
MCM02015H02K			2						
MCM02015P02K									

Items not marked are available from standard stock.

Monocarrier dynamic torque specification (N • cm)			
		High grade	Precision
Ball screw lead (mm)	1	0.1～1.3	0.2～1.6
	2		

1. Frictional resistance of NSK K1 is included in the dynamic torque in the 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. Stroke limit = stroke + (4[margin]×2)

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	Ø 6	340 (High grade) 405 (Precision)	4910	615	1	555 (High grade) 615 (Precision)	2120	490
2		340 (High grade) 405 (Precision)	3900		2	555 (High grade) 615 (Precision)		

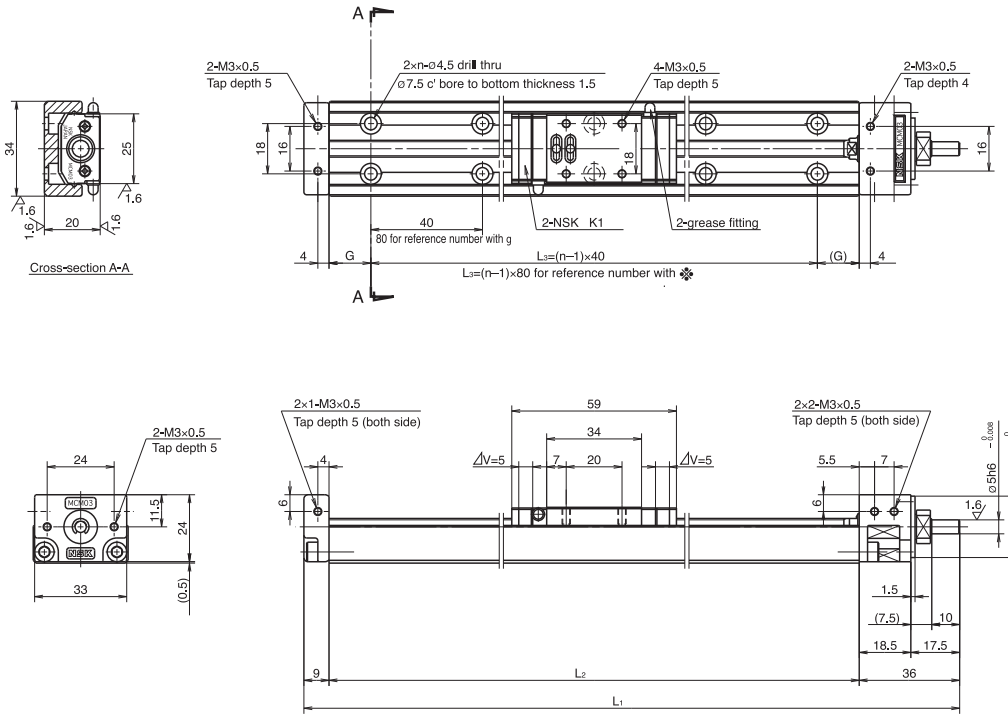
Basic static moment load of linear guide

Slider	Basic static moment load (N • m)		
	Rolling M_{RO}	Pitching M_{PO}	Yawing M_{YO}
Single	24	8	8

MCM03

Accuracy grade: Precision (P)

Ball screw lead 1 and 2



Dimension of MCM03 (Single slider)

⊿V is thickness of NSK K1

Reference number	Nominal stroke (mm)	Stroke limit(mm) (K1 is not equipped)	Ball screw lead (mm)	Body length (mm)				No. of mounting hole	Inertia	Mass
				L_1	L_2	G	L_3	n	$\times10^{-5}$ (kg • m^2)	(kg)
❖**MCM03005P01K00**	50	56 (66)	1	160	115	17.5	80	2	0.015	0.6
❖**MCM03005P02K00**			2						0.016	
MCM03010P01K00	100	131 (141)	1	235	190	15	160	5	0.021	0.7
MCM03010P02K00			2						0.022	
★ **MCM03015P01K00**	150	181 (191)	1	285	240	20	200	6	0.025	0.8
★ **MCM03015P02K00**			2						0.026	

Items not marked are available from standard stock.
Items marked with ★ are designated as "quick delivery item" upon request.
Bolt hole pitch L_3 on the items marked with ❖ is 80 mm.

Monocarrier dynamic torque specification (N • cm)		
Ball screw lead (mm)	1	0.2∼1.7
	2	

1. Frictional resistance of NSK K1 is included in the dynamic torque in the 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. Optional spacer is required, when I put cover unit, sensor unit or the both together in ball screw lead of 1 and 2mm (See page C39).
5. Stroke limit = stroke + (3[margin] ×2)

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	ø6	735	10900	2670	1	1230	4900	1040
2		735	8650		2			

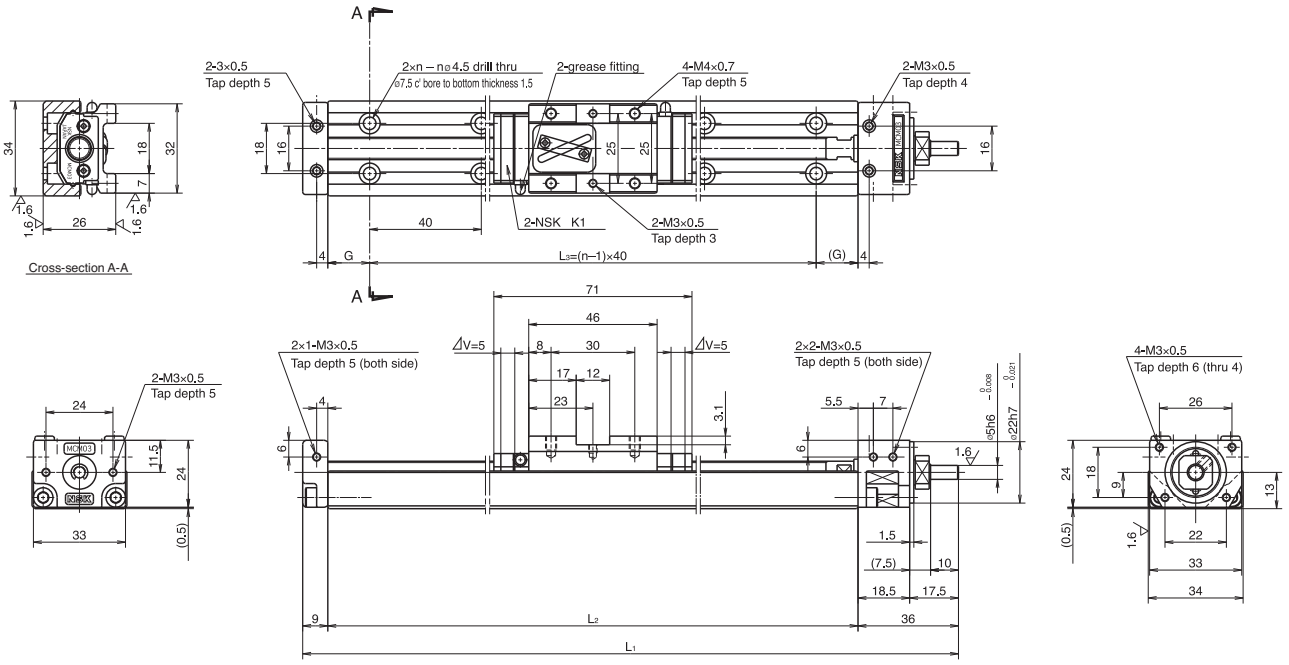
Basic static moment load of linear guide

Slider	Basic static moment load (N • m)		
	RollingM_{RO}	PitchingM_{PO}	YawingM_{YO}
Single	68	28	28

MCM03

Accuracy grade: High grade (H)

Ball screw lead 10 and 12



Dimension of MCM03 (Single slider)

⊿V is thickness of NSK K1

Reference number	Nominal stroke (mm)	Stroke limit(mm) (K1 is not equipped)	Ball screw lead (mm)	Body length (mm) L_1	L_2	G	L_3	No. of mounting hole n	Inertia $\times 10^{-5}$ (kg m^2)	Mass (kg)
MCM03010H10K00	100	119 (129)	10	235	190	15	160	5	0.092	0.7
MCM03010H12K00			12						0.109	
★ **MCM03015H10K00**	150	169 (179)	10	285	240	20	200	6	0.105	0.8
★ **MCM03015H12K00**			12						0.122	
MCM03020H10K00	200	219 (229)	10	335	290	25	240	7	0.118	0.9
★ **MCM03020H12K00**			12						0.135	
★ **MCM03025H10K00**	250	269 (279)	10	385	340	30	280	8	0.131	1.0
★ **MCM03025H12K00**			12						0.147	

Items not marked are available from standard stock.

Items marked with ★ are designated as "quick delivery item" upon request.

Monocarrier dynamic torque specification (N • cm)		
Ball screw lead (mm)	10	0.3~3.0
	12	

1. Frictional resistance of NSK K1 is included in the dynamic torque in the 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. Stroke limit = stroke + (9.5[margin] ×2)

Basic load rating

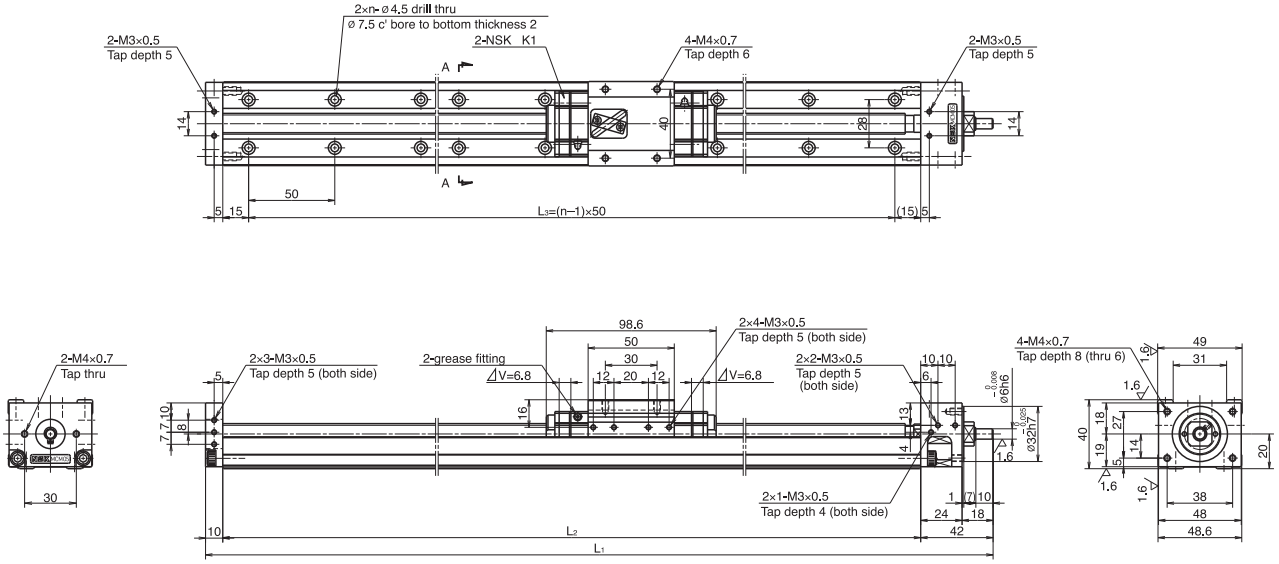
Lead ℓ (mm)	Shaft dia d (mm)	Basic dynamic load rating (N) Ball screw C_a	linear guides C	Support unit C_a	Rated running distance L_a (km)	Basic static load rating (N) Ball screw C_{0a}	Linear guides C_0	Support unit Load limit (N)
10	ø8	1230	6250	2670	10	1690	6620	1040
12		1230	5880		12			

Basic static moment load of linear guide

Slider	Basic static moment load (N • m)		
	Rolling M_{RO}	Pitching M_{PO}	Yawing M_{YO}
Single	92	51	51

MCM05

Accuracy grade: High grade (H)



Dimension of MCM05 (Single slider)

△V is thickness of NSK K1

Reference number	Nominal stroke (mm)	Stroke limit(mm) (K1 is not equipped)	Ball screw lead (mm)	Body length (mm)			No. of mounting hole	Inertia	Mass (kg)
				L_1	L_2	L_3	n	$\times10^{-4}$ (kg m^2)	
MCM05005H05K00	50	80	5	232	180	150	4	0.025	1.4
MCM05005H10K00		(95)	10					0.035	
MCM05010H05K00	100	130	5	282	230	200	5	0.031	1.6
MCM05010H10K00		(145)	10					0.040	
★ **MCM05015H05K00**	150	180	5	332	280	250	6	0.036	1.8
MCM05015H10K00		(195)	10					0.046	
MCM05020H05K00	200	230	5	382	330	300	7	0.042	2.0
MCM05020H10K00		(245)	10					0.051	
MCM05025H10K00	250	280 (295)	10	432	380	350	8	0.057	2.2
MCM05030H10K00	300	330	10	482	430	400	9	0.063	2.3
MCM05030H20K00		(345)	20					0.101	
MCM05040H10K00	400	430	10	582	530	500	11	0.074	2.7
MCM05040H20K00		(445)	20					0.112	
MCM05050H10K00	500	530	10	682	630	600	13	0.085	3.1
MCM05050H20K00		(545)	20					0.123	
MCM05060H10K00	600	630	10	782	730	700	15	0.096	3.5
MCM05060H20K00		(645)	20					0.134	

Items not marked are available from standard stock.

Items marked with ★ are designated as "quick delivery item" upon request.

Monocarrier dynamic torque specification (N • cm)		
Ball screw lead (mm)	5	1.0~4.8
	10	1.1~5.8
	20	1.6~7.9

1. Frictional resistance of NSK K1 is included in the dynamic torque in the 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. Stroke limit = stroke + (15[margin] ×2)

Basic load rating

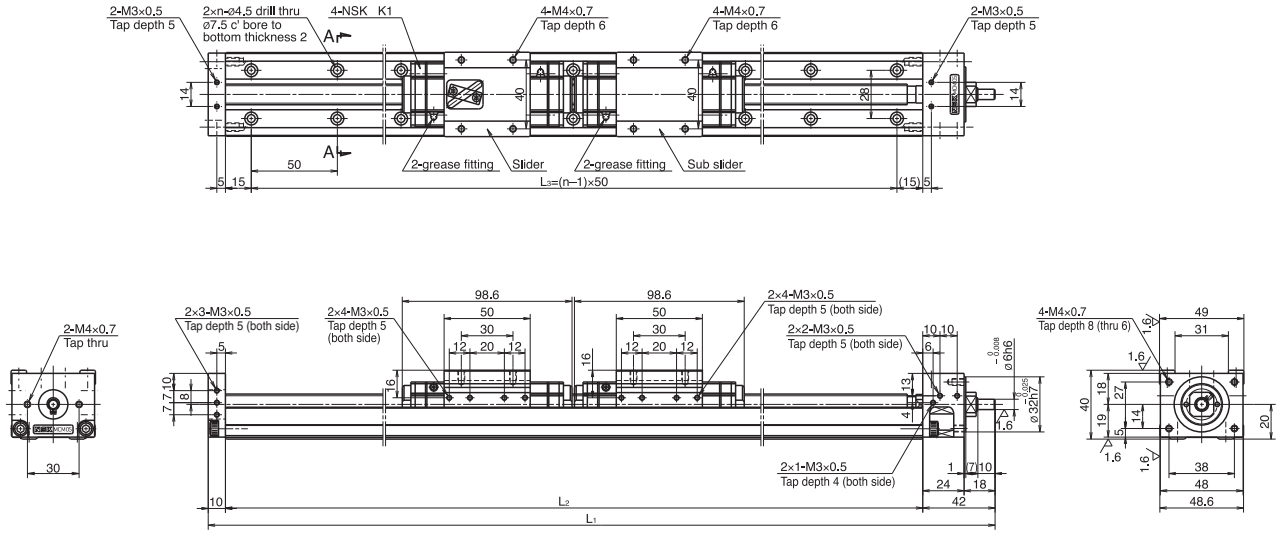
Lead	Shaft dia	Basic dynamic load rating (N)				Basic static load rating (N)		Support unit Load limit (N)
ℓ (mm)	d (mm)	Ball screw C_a	linear guides C	Support unit C_a	Rated running distance L_a (km)	Ball screw C_{0a}	Linear guides C_0	
5	ø12	3760	15600	4400	5	6310	10900	1450
10		2260	12400		10	3780		
20		2260	9850		20	3780		

Basic static moment load of linear guide

Slider	Basic static moment load (N • m)		
	Rolling M_{RO}	Pitching M_{PO}	Yawing M_{YO}
Single	229	89	89

MCM05 (Double slider)

Accuracy grade: High grade (H)



Dimension of MCM05 (Double slider)

⊿V is thickness of NSK K1

Reference number	Nominal stroke (mm)	Stroke limit(mm) (K1 is not equipped)	Ball screw lead (mm)	Body length (mm)			No. of mounting hole	Inertia	Mass (kg)
				L_1	L_2	L_3	n	$\times10^{-4}$ (kg m^2)	
★ **MCM05006H10D00**	60	83 (110)	10	332	280	250	6	0.058	2.3
★ **MCM05011H10D00**	110	133 (160)	10	382	330	300	7	0.064	2.5
★ **MCM05016H10D00**	160	183 (210)	10	432	380	350	8	0.070	2.7
★ **MCM05021H10D00**	210	233 (260)	10 20	482	430	400	9	0.075 0.151	2.8
★ **MCM05021H20D00**									
★ **MCM05031H10D00**	310	333 (360)	10 20	582	530	500	11	0.086 0.162	3.2
★ **MCM05031H20D00**									
★ **MCM05041H10D00**	410	433 (460)	10 20	682	630	600	13	0.098 0.174	3.6
★ **MCM05041H20D00**									
★ **MCM05051H10D00**	510	533 (560)	10 20	782	730	700	15	0.109 0.185	4.2
★ **MCM05051H20D00**									

Items not marked are available from standard stock.

Items marked with ★ are designated as "quick delivery item" upon request.

Monocarrier dynamic torque specification (N • cm)		
Ball screw lead (mm)	10	1.5~7.6
	20	2.3~11.8

1. Frictional resistance of NSK K1 is included in the dynamic torque in the 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. Stroke limit = stroke + (11.4[margin] ×2)

Basic load rating

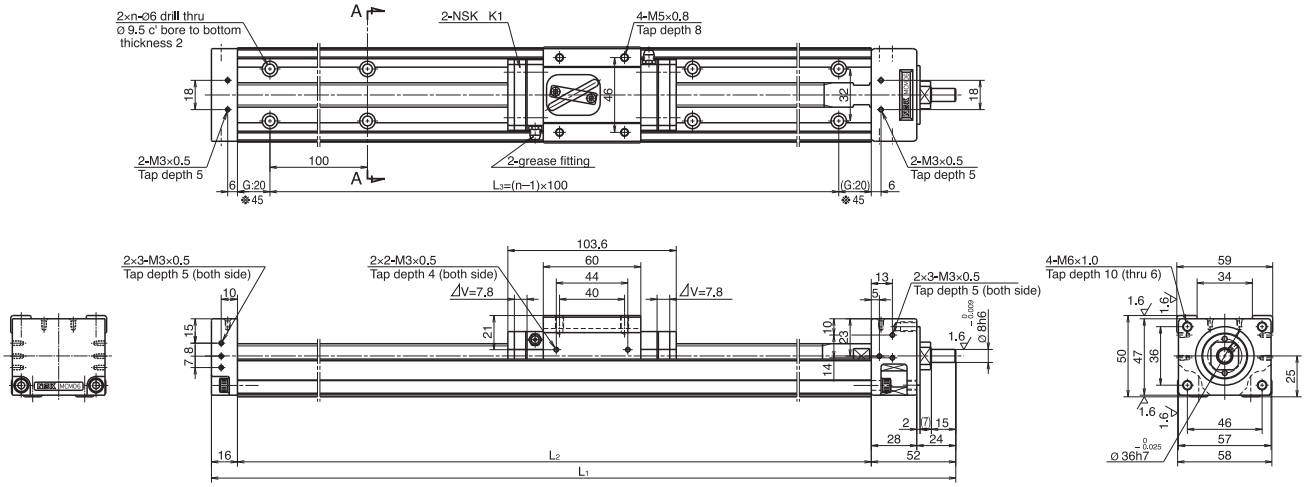
Lead ℓ (mm)	Shaft dia d (mm)	Basic dynamic load rating (N)				Basic static load rating (N)		Support unit Load limit (N)
		Ball screw C_a	linear guides C	Support unit C_a	Rated running distance L_a (km)	Ball screw C_{0a}	Linear guides C_0	
5	ø12	3760	15600	4400	5	6310	10900	1450
10		2260	12400		10	3780		
20		2260	9850		20	3780		

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

MCM06

Accuracy grade: High grade (H)



Dimension of MCM06 (Single slider)

ΔV is thickness of NSK K1

Reference number	Nominal stroke (mm)	Stroke limit(mm) (K1 is not equipped)	Ball screw lead (mm)	Body length (mm)			No. of mounting hole	Inertia ×10⁻⁴ (kg • m²)	Mass (kg)
				L_1	L_2	L_3	n		
❖MCM06005H05K00	50	85 (102)	5	258	190	100	2	0.083	2.7
★❖MCM06005H10K00			10					0.077	
MCM06010H05K00	100	135 (152)	5	308	240	200	3	0.103	3.0
MCM06010H10K00			10					0.092	
MCM06020H05K00	200	235 (252)	5	408	340	300	4	0.142	3.8
MCM06020H10K00			10					0.121	
MCM06030H05K00	300	335 (352)	5	508	440	400	5	0.180	4.5
MCM06030H10K00			10					0.150	
MCM06030H20K00			20					0.196	
MCM06040H05K00	400	435 (452)	5	608	540	500	6	0.219	5.2
MCM06040H10K00			10					0.180	
MCM06040H20K00			20					0.225	
★ MCM06050H05K00	500	535 (552)	5	708	640	600	7	0.258	6.0
MCM06050H10K00			10					0.209	
MCM06050H20K00			20					0.255	
★ MCM06060H10K00	600	635 (652)	10	808	740	700	8	0.239	6.7
★ MCM06060H20K00			20					0.284	
MCM06070H10K00	700	735 (752)	10	908	840	800	9	0.268	7.4
MCM06070H20K00			20					0.314	
★ MCM06080H10K00	800	835 (852)	10	1008	940	900	10	0.298	8.1
★ MCM06080H20K00			20					0.343	

Dimension G is 45 for those marked with ❖.

Items not marked are available from standard stock.
Items marked with ★ are designated as "quick delivery item" upon request.

Monocarrier dynamic torque specification (N • cm)		
Ball screw lead (mm)	5	1.9~7.4
	10	2.2~8.6
	20	2.8~11.0

1. Frictional resistance of NSK K1 is included in the dynamic torque in the 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. Stroke limit = stroke + (17.5[margin] ×2)

Basic load rating

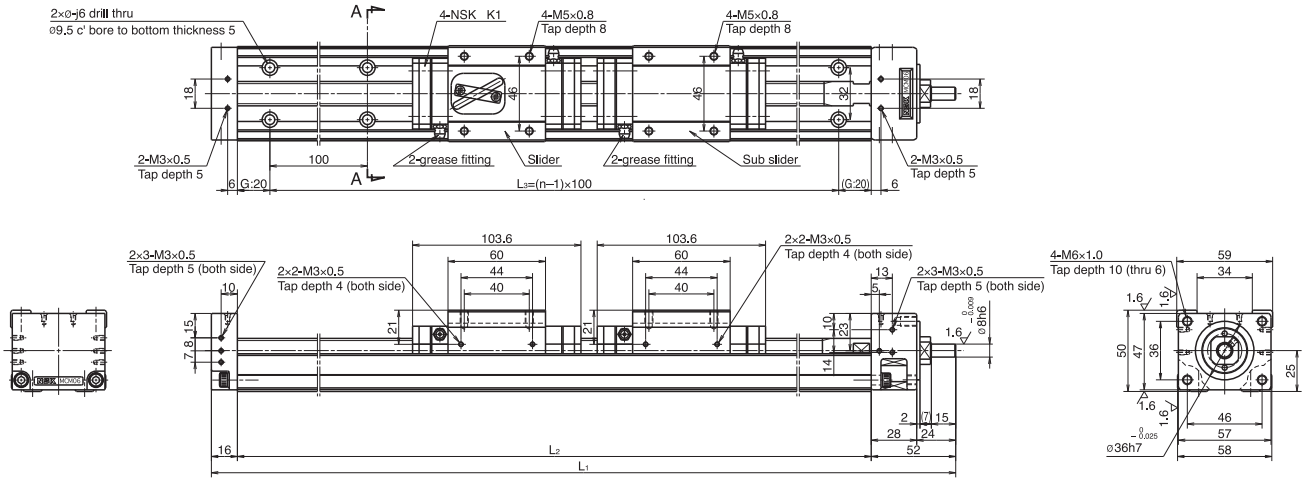
Lead	Shaft dia	Basic dynamic load rating (N)				Basic static load rating (N)		Support unit Load limit (N)
ℓ (mm)	d (mm)	Ball screw C_a	linear guides C	Support unit C_a	Rated running distance L_a (km)	Ball screw C_{0a}	Linear guides C_0	
5	ø16	7310	25200	6550	5	13500	17000	2730
10	ø15	7060	20000		10	12700		
20		4560	15900		20	7750		

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)

⊿V is thickness of NSK K1

Reference number	Nominal stroke (mm)	Stroke limit(mm) (K1 is not equipped)	Ball screw lead (mm)	Body length (mm) L1	Body length (mm) L2	Body length (mm) L3	No. of mounting hole n	Inertia ×10^{-4} (kg • m^2)	Mass (kg)
★ **MCM06011H05D00**	110	133 (164)	5	408	340	300	4	0.145	4.4
★ **MCM06011H10D00**			10					0.136	
★ **MCM06021H05D00**	210	233 (264)	5	508	440	400	5	0.184	5.1
★ **MCM06021H10D00**			10					0.166	
★ **MCM06021H20D00**			20					0.257	
★ **MCM06031H05D00**	310	333 (364)	5	608	540	500	6	0.223	5.8
★ **MCM06031H10D00**			10					0.195	
★ **MCM06031H20D00**			20					0.286	
★ **MCM06041H05D00**	410	433 (464)	5	708	640	600	7	0.262	6.6
★ **MCM06041H10D00**			10					0.224	
★ **MCM06041H20D00**			20					0.316	
★ **MCM06051H10D00**	510	533 (564)	10	808	740	700	8	0.254	7.3
★ **MCM06051H20D00**			20					0.345	
★ **MCM06061H10D00**	610	633 (664)	10	908	840	800	9	0.283	8.0
★ **MCM06061H20D00**			20					0.375	
★ **MCM06071H10D00**	710	733 (764)	10	1008	940	900	10	0.313	8.7
★ **MCM06071H20D00**			20					0.404	

Items not marked are available from standard stock.

Items marked with ★ are designated as "quick delivery item" upon request.

Monocarrier dynamic torque specification (N • cm)		
Ball screw lead (mm)	5	2.3~8.5
	10	2.7~10.9
	20	4.0~15.9

1. Frictional resistance of NSK K1 is included in the dynamic torque in the 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. Stroke limit = stroke + (11.4[margin] ×2)

Basic load rating

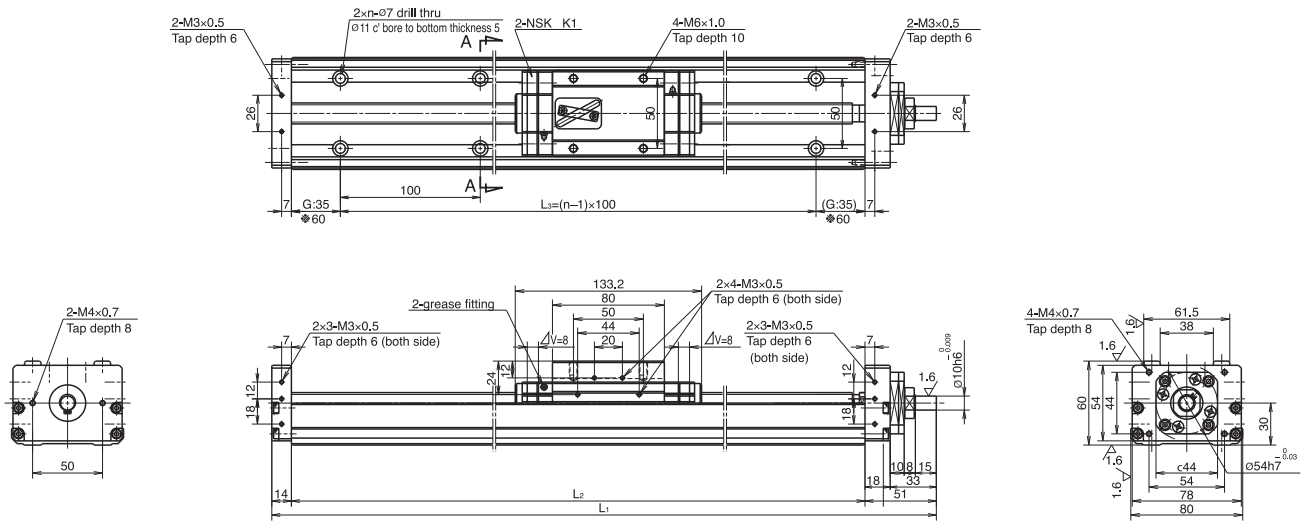
Lead ℓ (mm)	Shaft dia d (mm)	Basic dynamic load rating (N) Ball screw C_a	linear guides C	Support unit C_a	Rated running distance L_a (km)	Basic static load rating (N) Ball screw C_{0a}	Linear guides C_0	Support unit Load limit (N)
5	ø16	7310	25200	6550	5	13500	17000	2730
10	ø15	7060	20000		10	12700		
20		4560	15900		20	7750		

Basic static moment load of linear guide

Slider	Basic static moment load (N • m)		
	RollingM_{RO}	PitchingM_{PO}	YawingM_{YO}
Double	825	1220	1220

MCM08

Accuracy grade: High grade (H)



Dimension of MCM08 (Single slider)

⊿V is thickness of NSK K1

Reference number	Nominal stroke (mm)	Stroke limit(mm) (K1 is not equipped)	Ball screw lead (mm)	Body length (mm)			No. of mounting hole	Inertia $\times10^{-4}$ (kg • m^2)	Mass (kg)
				L_1	L_2	L_3	n		
★ ❖**MCM08005H05K00**	50	85 (101)	5	285	220	100	2	0.101	4.1
★ **MCM08010H05K00**	100	135 (151)	5	335	270	200	3	0.120	4.6
MCM08010H10K00			10					0.114	
★ ❖**MCM08015H05K00**	150	185 (201)	5	385	320	200	3	0.139	5.1
★ **MCM08020H05K00**	200	235 (251)	5	435	370	300	4	0.159	5.5
MCM08020H10K00			10					0.144	
MCM08030H10K00	300	335 (351)	10	535	470	400	5	0.173	6.5
MCM08030H20K00			20					0.249	
MCM08040H10K00	400	435 (451)	10	635	570	500	6	0.203	7.4
MCM08040H20K00			20					0.279	
MCM08050H10K00	500	535 (551)	10	735	670	600	7	0.232	8.4
MCM08050H20K00			20					0.308	
MCM08060H10K00	600	635 (651)	10	835	770	700	8	0.262	9.3
★ **MCM08060H20K00**			20					0.338	
★ **MCM08070H10K00**	700	735 (751)	10	935	870	800	9	0.291	10.5
★ **MCM08070H20K00**			20					0.367	
★ **MCM08080H10K00**	800	835 (851)	10	1035	970	900	10	0.320	11.2
★ **MCM08080H20K00**			20					0.396	

Dimension G is 60 for those marked with ❖.

Items not marked are available from standard stock.

Items marked with ★ are designated as "quick delivery item" upon request.

Monocarrier dynamic torque specification (N • cm)		
Ball screw lead (mm)	5	1.0~5.9
	10	2.0~7.8
	20	2.5~10.8

1. Frictional resistance of NSK K1 is included in the dynamic torque in the 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. Stroke limit = stroke + (17.5[margin] ×2)

Basic load rating

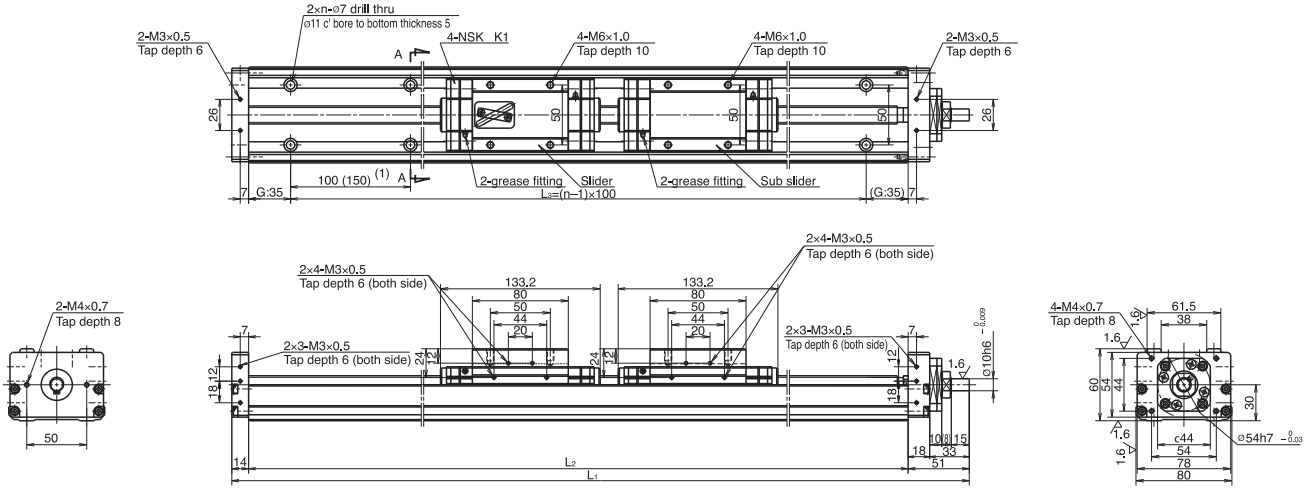
Lead	Shaft dia	Basic dynamic load rating (N)				Basic static load rating (N)		Support unit Load limit (N)
ℓ (mm)	d (mm)	Ball screw C_a	linear guides C	Support unit C_a	Rated running distance L_a (km)	Ball screw C_{0a}	Linear guides C_0	
5	ø16	7310	30800	7100	5	13500	22800	3040
10	ø15	7060	24400		10	12700		
20		4560	19400		20	7750		

Basic static moment load of linear guide

Slider	Basic static moment load (N • m)		
	RollingM_{RO}	PitchingM_{PO}	YawingM_{YO}
Single	770	300	300

MCM08 (Double slider)

Accuracy grade: High grade (H)



Dimension of MCM08 (Double slider)

⊿V is thickness of NSK K1

Reference number	Nominal stroke (mm)	Stroke limit(mm) (K1 is not equipped)	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	104 (136)	10	435	370	300	3	0.169	6.5
★ **MCM08018H10D00**	180	204 (236)	10	535	470	400	5	0.199	7.5
★ **MCM08018H20D00**			20					0.351	
★ **MCM08028H10D00**	280	304 (336)	10	635	570	500	6	0.228	8.4
★ **MCM08028H20D00**			20					0.380	
★ **MCM08038H10D00**	380	404 (436)	10	735	670	600	7	0.257	9.4
★ **MCM08038H20D00**			20					0.409	
★ **MCM08048H10D00**	480	504 (536)	10	835	770	700	8	0.287	10.3
★ **MCM08048H20D00**			20					0.439	
★ **MCM08058H10D00**	580	604 (636)	10	935	870	800	9	0.316	11.5
★ **MCM08058H20D00**			20					0.468	
★ **MCM08068H10D00**	680	704 (736)	10	1035	970	900	10	0.346	12.2
★ **MCM08068H20D00**			20					0.498	

Dimension (1) is 150mm for those marked with ●.

Items not marked are available from standard stock.
Items marked with ★ are designated as "quick delivery item" upon request.

Monocarrier dynamic torque specification (N • cm)		
Ball screw lead (mm)	10	2.5~10.8
	20	4.0~17.2

1. Frictional resistance of NSK K1 is included in the dynamic torque in the 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. Stroke limit = stroke + (11.8[margin] ×2)

Basic load rating

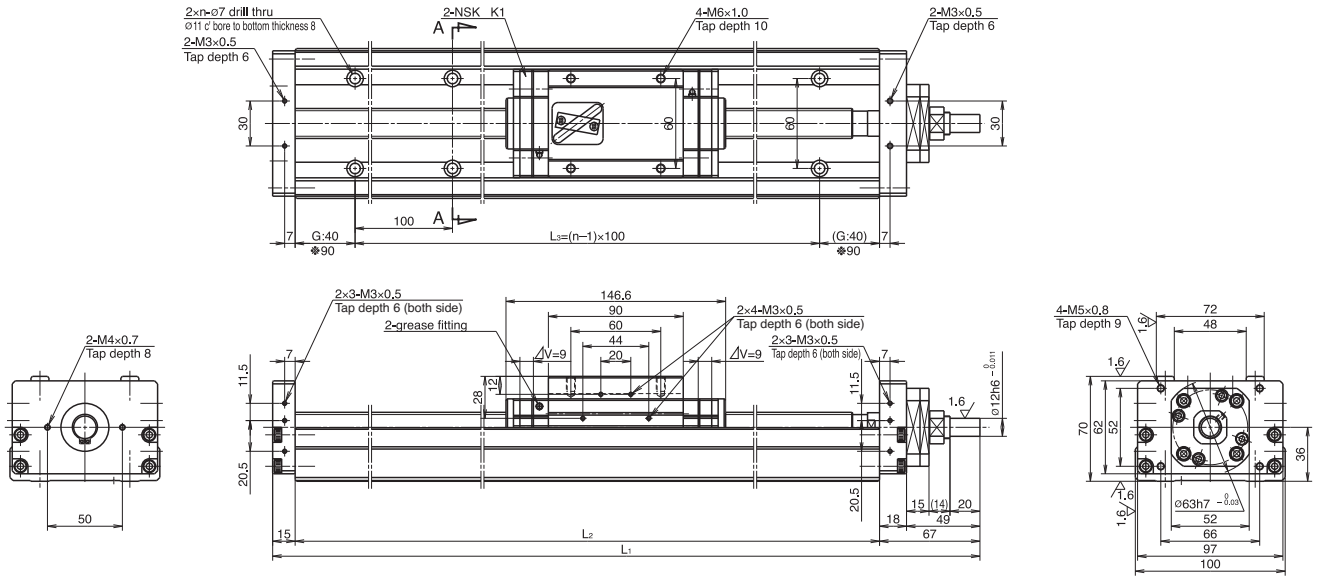
Lead	Shaft dia	Basic dynamic load rating (N)				Basic static load rating (N)		Support unit Load limit (N)
ℓ (mm)	d (mm)	Ball screw C_a	linear guides C	Support unit C_a	Rated running distance L_a (km)	Ball screw C_{0a}	Linear guides C_0	
5	ø16	7310	30800	7100	5	13500	22800	3040
10	ø15	7060	24400		10	12700		
20		4560	19400		20	7750		

Basic static moment load of linear guide

Slider	Basic static moment load (N m)		
	RollingM_{RO}	PitchingM_{PO}	YawingM_{YO}
Double	1540	2050	2050

MCM10

Accuracy grade: High grade (H)



Dimension of MCM10 (Single slider)

ΔV is thickness of NSK K1

Reference number	Nominal stroke (mm)	Stroke limit(mm) (K1 is not equipped)	Ball screw lead (mm)	Body length (mm)			No. of mounting hole	Inertia $\times10^{-4}$ (kg • m^2)	Mass (kg)
				L_1	L_2	L_3	n		
MCM10020H10K00	200	230 (251)	10	462	380	300	4	0.425	9.5
MCM10030H10K00	300	330 (351)	10	562	480	400	5	0.519	11.2
MCM10030H20K00			20					0.633	
MCM10040H10K00	400	430 (451)	10	662	580	500	6	0.612	13.0
MCM10040H20K00			20					0.726	
★ **MCM10050H10K00**	500	530 (551)	10	762	680	600	7	0.706	14.6
★ **MCM10050H20K00**			20					0.820	
MCM10060H10K00	600	630 (651)	10	862	780	700	8	0.800	16.3
★ **MCM10060H20K00**			20					0.914	
★ **MCM10070H10K00**	700	730 (751)	10	962	880	800	9	0.893	18.0
★ **MCM10070H20K00**			20					1.007	
MCM10080H10K00	800	830 (851)	10	1062	980	900	10	0.987	19.7
★ **MCM10080H20K00**			20					1.101	
★ **MCM10090H10K00**	900	930 (951)	10	1162	1080	1000	11	1.081	21.4
★ **MCM10090H20K00**			20					1.195	
★❖ **MCM10100H10K00**	1000	1030 (1051)	10	1262	1180	1000	11	1.174	23.1
★❖ **MCM10100H20K00**			20					1.288	

Dimension G is 90 for those marked with ❖.

Items not marked are available from standard stock.
Items marked with ★ are designated as "quick delivery item" upon request.

Monocarrier dynamic torque specification (N • cm)		
Ball screw lead (mm)	10	2.7~10.8
	20	3.1~12.7

1. Frictional resistance of NSK K1 is included in the dynamic torque in the 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. Stroke limit = stroke + (15[margin] ×2)

Basic load rating

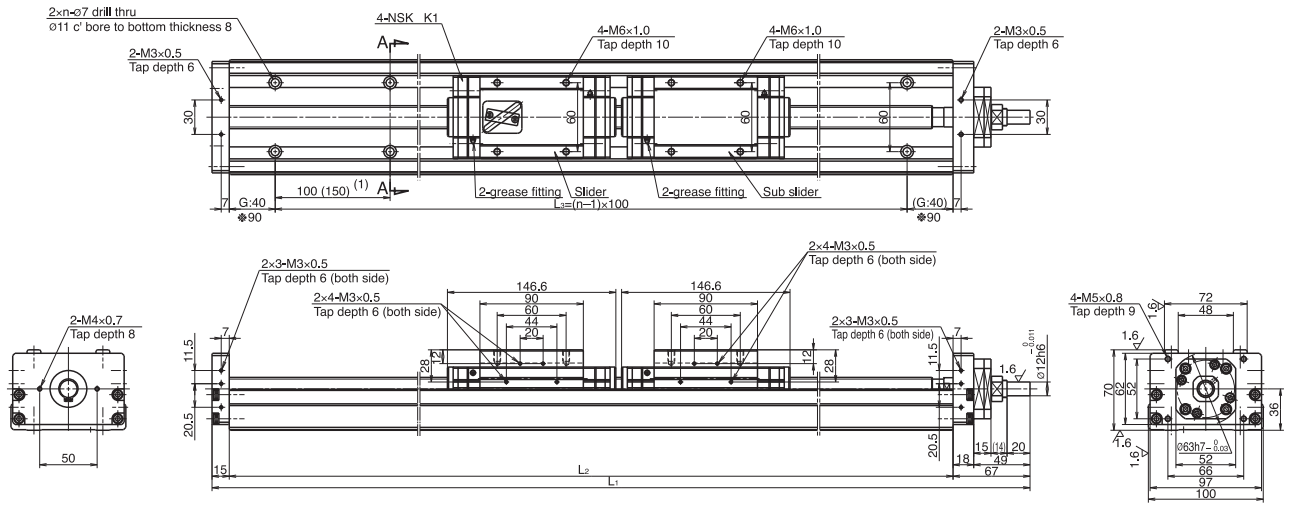
Lead	Shaft dia	Basic dynamic load rating (N)				Basic static load rating (N)		Support unit Load limit (N)
ℓ (mm)	d (mm)	Ball screw C_a	linear guides C	Support unit C_a	Rated running distance L_a (km)	Ball screw C_{0a}	Linear guides C_0	
10	ø20	10900	33500	7600	10	21700	29400	3380
20		7060	26600		20	12700		

Basic static moment load of linear guide

Slider	Basic static moment load (N • m)		
	Rolling M_{RO}	Pitching M_{PO}	Yawing M_{YO}
Single	1170	425	425

MCM10 (Double slider)

Accuracy grade: High grade (H)



Dimension of MCM10 (Double slider)

⊿V is thickness of NSK K1

Reference number	Nominal stroke (mm)	Stroke limit(mm) (K1 is not equipped)	Ball screw lead (mm)	Body length (mm)			No. of mounting hole	Inertia $\times10^{-4}$ (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**			20					0.785	
★ **MCM10027H10D00**	270	286 (322)	10	662	580	500	6	0.650	13.4
★ **MCM10027H20D00**			20					0.878	
★ **MCM10037H10D00**	370	386 (422)	10	762	680	600	7	0.744	15.1
★ **MCM10037H20D00**			20					0.972	
★ **MCM10047H10D00**	470	486 (522)	10	862	780	700	8	0.838	17.8
★ **MCM10047H20D00**			20					1.066	
★ **MCM10057H10D00**	570	586 (622)	10	962	880	800	9	0.931	19.5
★ **MCM10057H20D00**			20					1.159	
★ **MCM10067H10D00**	670	686 (722)	10	1062	980	900	10	1.025	21.2
★ **MCM10067H20D00**			20					1.253	
★❖**MCM10087H10D00**	870	886 (922)	10	1262	1180	1000	11	1.212	23.6
★❖**MCM10087H20D00**			20					1.440	

Dimension G is 90 for those marked with ❖.
Dimension (1) is 150mm for those marked with ●.

Items not marked are available from standard stock.
Items marked with ★ are designated as "quick delivery item" upon request.

Monocarrier dynamic torque specification (N • cm)		
Ball screw lead (mm)	10	4.2~15.6
	20	5.0~19.6

1. Frictional resistance of NSK K1 is included in the dynamic torque in the 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. Stroke limit = stroke + (8.4[margin] ×2)

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	ø 20	10900	33500	7600	10	21700	29400	3380
20		7060	26600		20	12700		

Basic static moment load of linear guide

Slider	Basic static moment load (N • m)		
	Rolling M_{RO}	Pitching M_{PO}	Yawing M_{YO}
Double	2340	2940	2940

1.3 Optional components

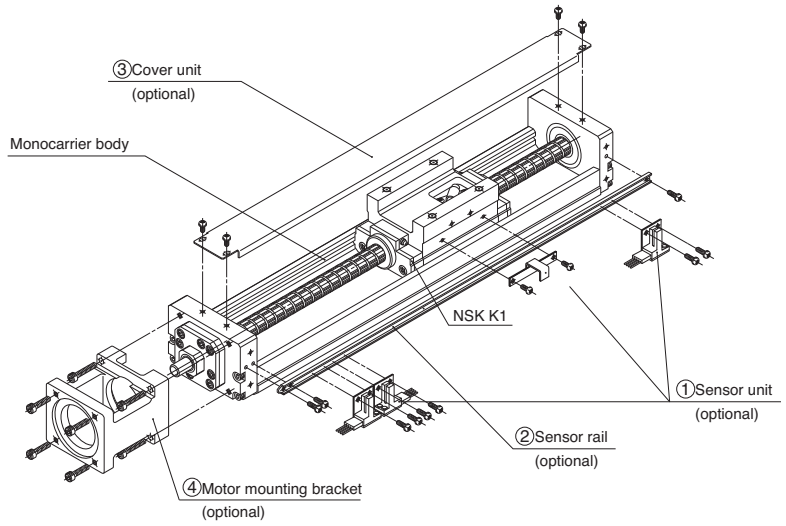


Fig.1-3 Assembly Optional components for MCM10 (example)

1 Sensor unit : Sensors, sensor mounting parts and a sensor dog are available in a set.
❖ When you used a sensor unit, 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.

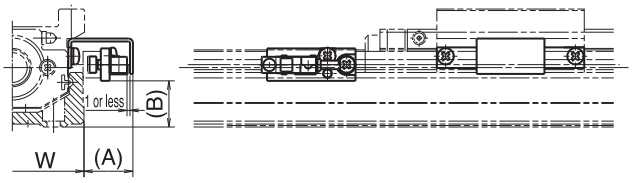
4 Motor bracket for motor mounting : Prepared for each motor maker.

☆ We assemble optional components upon request.

2. 3 MCM Series Option Part

2. 3. 1 Sensor Unit

● Proximity switch

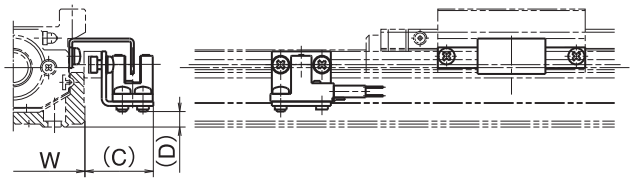


(Example of assembly)

Type		Reference number			Dimension (A) (mm)	Dimension (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 (a-contact)	—	3	1	E2S-W13(OMRON Corp.)		
	Proximity switch (b-contact)	3	—	2	E2S-W14(OMRON Corp.)		
*See page C19 for specification of proximity switch			A sensor unit consists of sensors, a sensor dog and sensor mounring parts.				

You require an optional spacer plate when you use a cover unit or a sensor unit for an MCM03 with the lead of 1 or 2 mm. (Refer to page C39.)

● Photo sensor



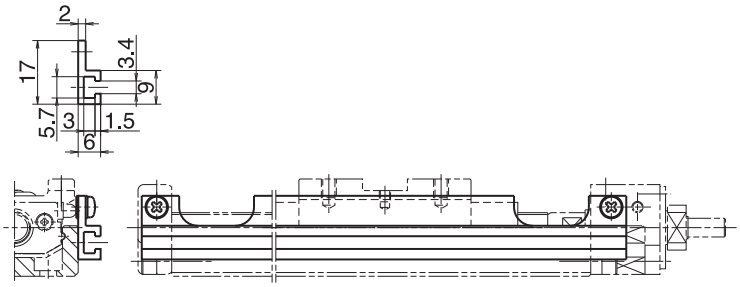
(Example of assembly)

Type	Reference number	Dimension (C) (mm)	Dimension (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	
* See page C20 for specification of photo sensor		A sensor unit consists of sensors, a sensor dog and sensor mounring parts.			

You require an optional spacer plate when you use a cover unit or a sensor unit for an MCM03 with the lead of 1 or 2 mm. (Refer to page C39.)

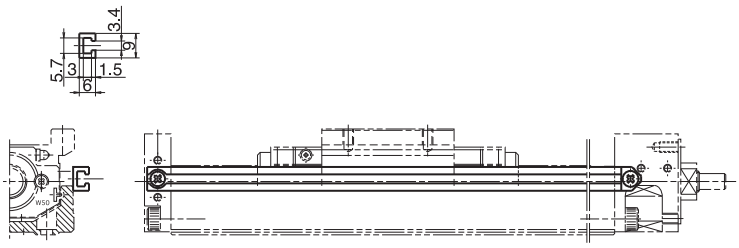
Sensor rail

Sensor rail for MCM03: MC-SRL3-✻✻✻✻



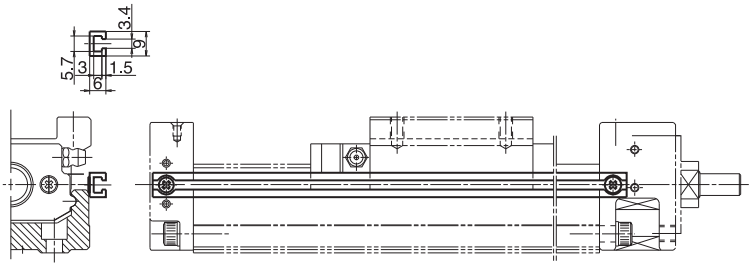
(Example of assembly)

Sensor rail for MCM05: MC-SRL5-✻✻✻✻



(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)

✻✻✻✻ is the same as rail dimension L_2
Please place and assemble the seat during the attachment between the sensor rail and the support unit attaching part for MCM03 and MCM06.

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Body of MCM Series and Sensor rail combination Table

Table 2-4

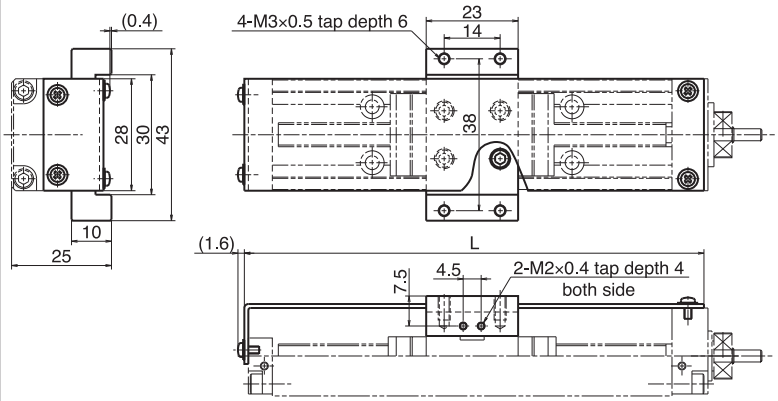
Nominal size	Body length L_2 (mm)	Reference number	Sensor rail reference number
MCM02	100	MCM02005H01K MCM02005P01K MCM02005H02K MCM02005P02K	MC-SRL2-0100
	150	MCM02010H01K MCM02010P01K MCM02010H02K MCM02010P02K	MC-SRL2-0150
	200	MCM02015H01K MCM02015P01K MCM02015H02K MCM02015P02K	MC-SRL2-0200
MCM03	115	MCM03005P01K00 MCM03005P02K00	MC-SRL3-0115
	190	MCM03010P01K00 MCM03010P02K00 MCM03010H10K00 MCM03010H12K00	MC-SRL3-0190
	240	MCM03015P01K00 MCM03015P02K00 MCM03015H10K00 MCM03015H12K00	MC-SRL3-0240
	290	MCM03020H10K00 MCM03020H12K00	MC-SRL3-0290
	340	MCM03025H10K00 MCM03025H12K00	MC-SRL3-0340
MCM05	180	MCM05005H05K00 MCM05005H10K00	MC-SRL5-0180
	230	MCM05010H05K00 MCM05010H10K00	MC-SRL5-0230
	280	MCM05015H05K00 MCM05015H10K00 MCM05006H10D00	MC-SRL5-0280
	330	MCM05020H05K00 MCM05020H10K00 MCM05011H10D00	MC-SRL5-0330
	380	MCM05025H10K00 MCM05016H10D00	MC-SRL5-0380
	430	MCM05030H10K00 MCM05030H20K00 MCM05021H10D00 MCM05021H20D00	MC-SRL5-0430
	530	MCM05040H10K00 MCM05040H20K00 MCM05031H10D00 MCM05031H20D00	MC-SRL5-0530
	630	MCM05050H10K00 MCM05050H20K00 MCM05041H10D00 MCM05041H20D00	MC-SRL5-0630
	730	MCM05060H10K00 MCM05060H20K00 MCM05051H10D00 MCM05051H20D00	MC-SRL5-0730

Nominal size	Body length L_2 (mm)	Reference number	Sensor rail reference number
MCM06	190	MCM06005H05K00 MCM06005H10K00	MC-SRL6-0190
	240	MCM06010H05K00 MCM06010H10K00	MC-SRL6-0240
	340	MCM06020H05K00 MCM06020H10K00 MCM06011H05D00 MCM06011H10D00	MC-SRL6-0340
	440	MCM06030H05K00 MCM06030H10K00 MCM06030H20K00 MCM06021H05D00 MCM06021H10D00 MCM06021H20D00	MC-SRL6-0440
	540	MCM06040H05K00 MCM06040H10K00 MCM06040H20K00 MCM06031H05D00 MCM06031H10D00 MCM06031H20D00	MC-SRL6-0540
	640	MCM06050H05K00 MCM06050H10K00 MCM06050H20K00 MCM06041H05D00 MCM06041H10D00 MCM06041H20D00	MC-SRL6-0640
	740	MCM06060H10K00 MCM06060H20K00 MCM06051H10D00 MCM06051H20D00	MC-SRL6-0740
	840	MCM06070H10K00 MCM06070H20K00 MCM06061H10D00 MCM06061H20D00	MC-SRL6-0840
	940	MCM06080H10K00 MCM06080H20K00 MCM06071H10D00 MCM06071H20D00	MC-SRL6-0940

Nominal size	Body length L_2 (mm)	Reference number	Sensor rail reference number
MCM08	220	MCM08005H05K00	MC-SRL8-0220
	270	MCM08010H05K00 MCM08010H10K00	MC-SRL8-0270
	320	MCM08015H05K00	MC-SRL8-0320
	370	MCM08020H05K00 MCM08020H10K00 MCM08008H10D00	MC-SRL8-0370
	470	MCM08030H10K00 MCM08030H20K00 MCM08018H10D00 MCM08018H20D00	MC-SRL8-0470
	570	MCM08040H10K00 MCM08040H20K00 MCM08028H10D00 MCM08028H20D00	MC-SRL8-0570
	670	MCM08050H10K00 MCM08050H20K00 MCM08038H10D00 MCM08038H20D00	MC-SRL8-0670
	770	MCM08060H10K00 MCM08060H20K00 MCM08048H10D00 MCM08048H20D00	MC-SRL8-0770
	870	MCM08070H10K00 MCM08070H20K00 MCM08058H10D00 MCM08058H20D00	MC-SRL8-0870
	970	MCM08080H10K00 MCM08080H20K00 MCM08068H10D00 MCM08068H20D00	MC-SRL8-0970
MCM10	380	MCM10020H10K00 MCM10007H10D00	MC-SRL1-0380
	480	MCM10030H10K00 MCM10030H20K00 MCM10017H10D00 MCM10017H20D00	MC-SRL1-0480
	580	MCM10040H10K00 MCM10040H20K00 MCM10027H10D00 MCM10027H20D00	MC-SRL1-0580
	680	MCM10050H10K00 MCM10050H20K00 MCM10037H10D00 MCM10037H20D00	MC-SRL1-0680
	780	MCM10060H10K00 MCM10060H20K00 MCM10047H10D00 MCM10047H20D00	MC-SRL1-0780
	880	MCM10070H10K00 MCM10070H20K00 MCM10057H10D00 MCM10057H20D00	MC-SRL1-0880
	980	MCM10080H10K00 MCM10080H20K00 MCM10067H10D00 MCM10067H20D00	MC-SRL1-0980
	1080	MCM10090H10K00 MCM10090H20K00	MC-SRL1-1080
	1180	MCM10100H10K00 MCM10100H20K00 MCM10087H10D00 MCM10087H20D00	MC-SRL1-1180

2. 3. 2 Cover Unit

Cover Unit for MCM02

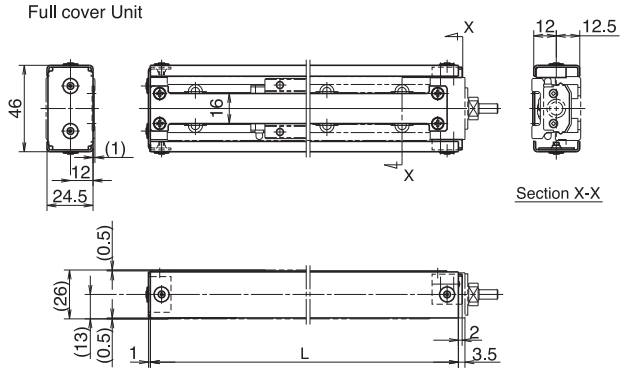


(Unit: mm)

Stroke	Reference number	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



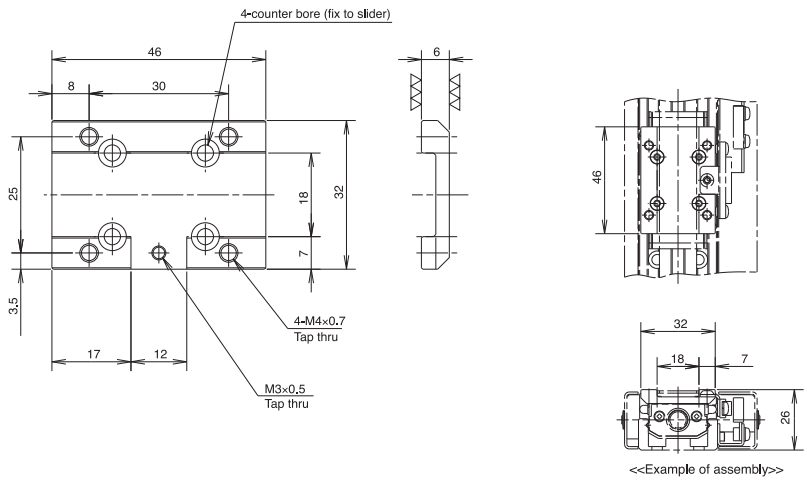
Optional spacer (MC-SP03-00) is required for a main unit with ball screw lead of 1 and 2 mm.

(Unit: mm)

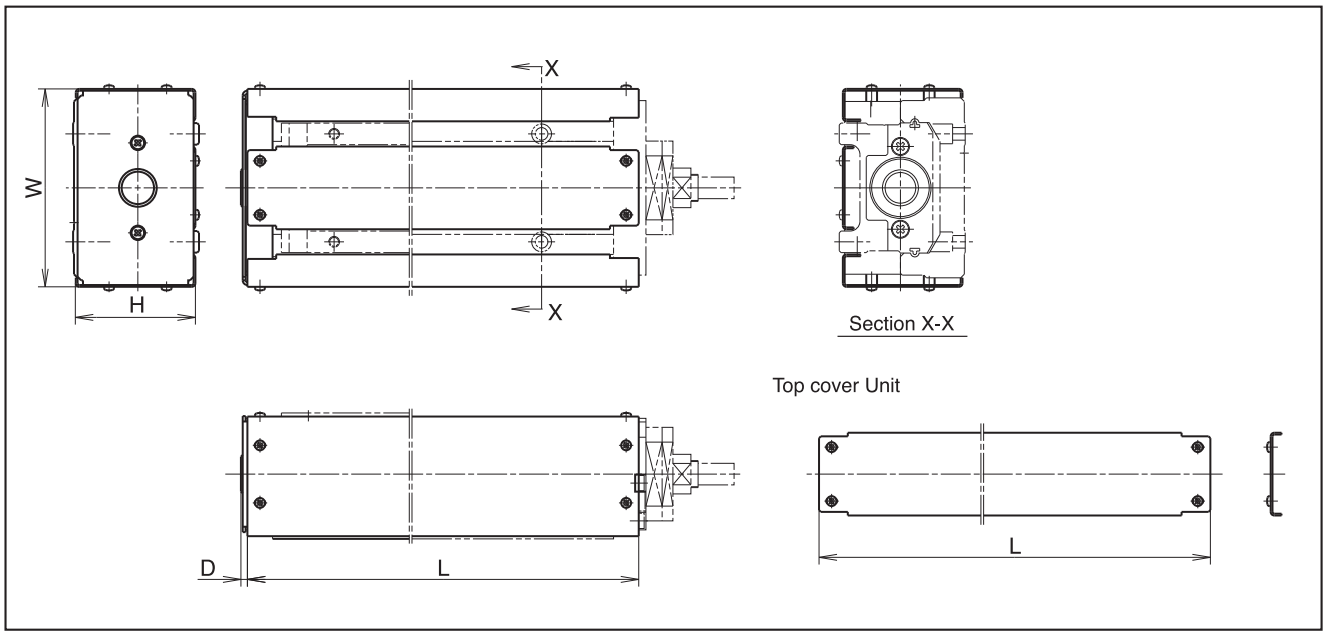
Stroke	Reference number		Cover Length	
	Top cover Unit	Full cover Unit	Length (L)	Length (M)
50	**MC-CV03005-02**	**✻ MC-CV03005-01**	139	133
100	**MC-CV03010-02**	**✻ MC-CV03010-01**	214	208
150	**MC-CV03015-02**	**✻ MC-CV03015-01**	264	258
200	**MC-CV03020-02**	**✻ MC-CV03020-01**	314	308
250	**MC-CV03025-02**	**✻ 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)



Cover Unit for MCM05, 06, 08, and 10



(Unit: mm)

Reference number	Stroke		Cover unit Reference number		Cover length			
	Single slider	Double slider	Top cover Unit	Full cover Unit	Length (L)	Height (H)	Width (W)	End part (D)
MCM05	50	—	MC-CV05005-01	MC-CV05005-00	200	38.5	65	2.6
	100	—	MC-CV05010-01	MC-CV05010-00	250			
	150	60	MC-CV05015-01	MC-CV05015-00	300			
	200	110	MC-CV05020-01	MC-CV05020-00	350			
	250	160	MC-CV05025-01	MC-CV05025-00	400			
	300	210	MC-CV05030-01	MC-CV05030-00	450			
	400	310	MC-CV05040-01	MC-CV05040-00	550			
	500	410	MC-CV05050-01	MC-CV05050-00	650			
	600	510	MC-CV05060-01	MC-CV05060-00	750			
MCM06	50	—	MC-CV06005-01	MC-CV06005-00	225	48.5	75	
	100	—	MC-CV06010-01	MC-CV06010-00	275			
	200	110	MC-CV06020-01	MC-CV06020-00	375			
	300	210	MC-CV06030-01	MC-CV06030-00	475			
	400	310	MC-CV06040-01	MC-CV06040-00	575			
	500	410	MC-CV06050-01	MC-CV06050-00	675			
	600	510	MC-CV06060-01	MC-CV06060-00	775			
	700	610	MC-CV06070-01	MC-CV06070-00	875			
	800	710	MC-CV06080-01	MC-CV06080-00	975			
MCM08	50	—	MC-CV08005-01	MC-CV08005-00	248	56.5	90	2.6
	100	—	MC-CV08010-01	MC-CV08010-00	298			
	200	80	MC-CV08020-01	MC-CV08020-00	398			
	300	180	MC-CV08030-01	MC-CV08030-00	498			
	400	280	MC-CV08040-01	MC-CV08040-00	598			
	500	380	MC-CV08050-01	MC-CV08050-00	698			
	600	480	MC-CV08060-01	MC-CV08060-00	798			
	700	580	MC-CV08070-01	MC-CV08070-00	898			
	800	680	MC-CV08080-01	MC-CV08080-00	998			
MCM10	200	70	MC-CV10020-01	MC-CV10020-00	408	66.5	110	2.6
	300	170	MC-CV10030-01	MC-CV10030-00	508			
	400	270	MC-CV10040-01	MC-CV10040-00	608			
	500	370	MC-CV10050-01	MC-CV10050-00	708			
	600	470	MC-CV10060-01	MC-CV10060-00	808			
	700	570	MC-CV10070-01	MC-CV10070-00	908			
	800	670	MC-CV10080-01	MC-CV10080-00	1008			
	900	—	MC-CV10090-01	MC-CV10090-00	1108			
	1000	870	MC-CV10100-01	MC-CV10100-00	1208			

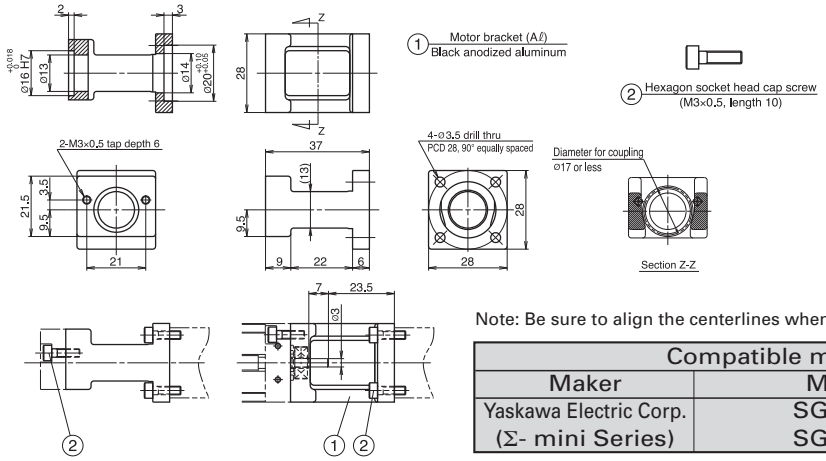
Not include height such as screw

The dimensions of cover shown abore 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.
*When you use a sensor unit, the full-cover unit cannot be used.

2. 3. 3 Motor Bracket

Motor Bracket for MCM02

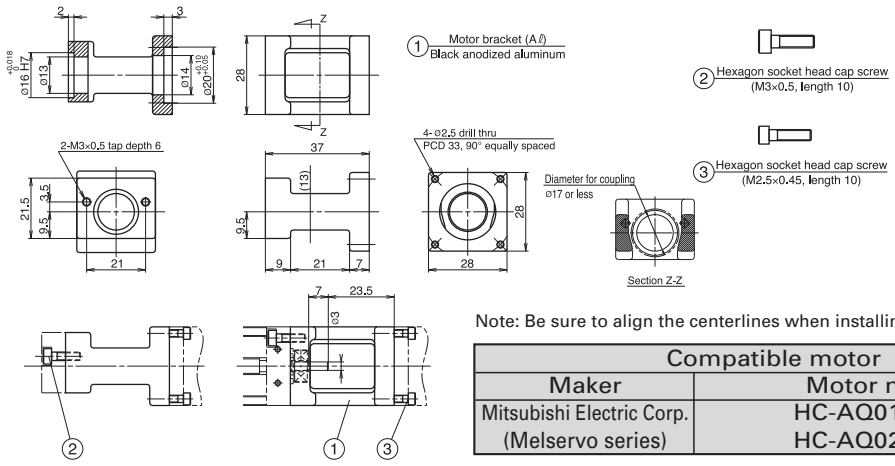
■ Reference number
MC-BK02-128-00



Note: Be sure to align the centerlines when installing the motor.

Compatible motor	
Maker	Motor models
Yaskawa Electric Corp. (Σ- mini Series)	SGMM-A1(10W) SGMM-A2(20W)

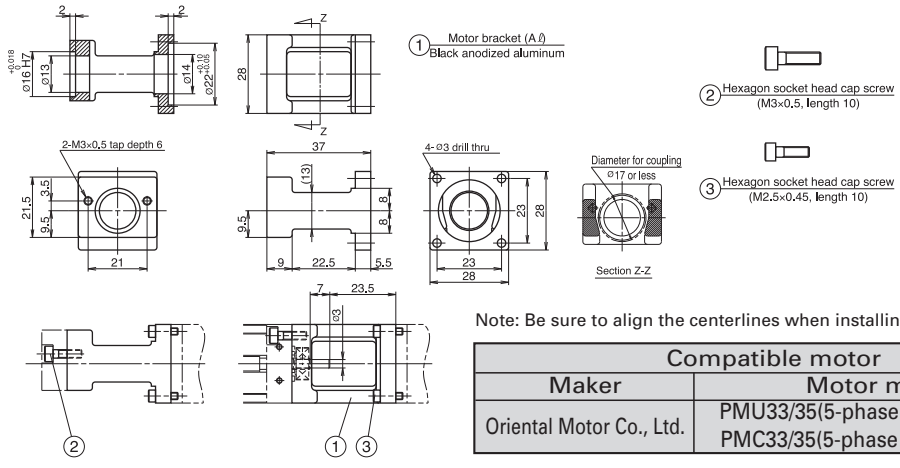
■ Reference number
MC-BK02-133-00



Note: Be sure to align the centerlines when installing the motor.

Compatible motor	
Maker	Motor models
Mitsubishi Electric Corp. (Melservo series)	HC-AQ013(10W) HC-AQ023(20W)

■ Reference number
MC-BK02-223-00

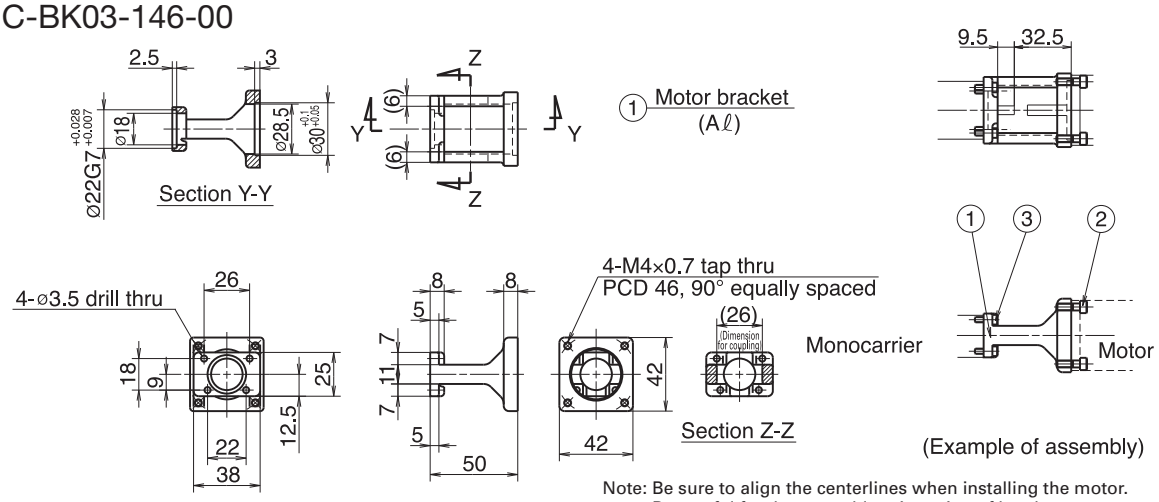


Note: Be sure to align the centerlines when installing the motor.

Compatible motor	
Maker	Motor models
Oriental Motor Co., Ltd.	PMU33/35(5-phase stepping motor) PMC33/35(5-phase stepping motor)

Motor Bracket for MCM03

■ Reference number
MC-BK03-146-00



Note: Be sure to align the centerlines when installing the motor.
Be careful for the assembly orientation of bracket.

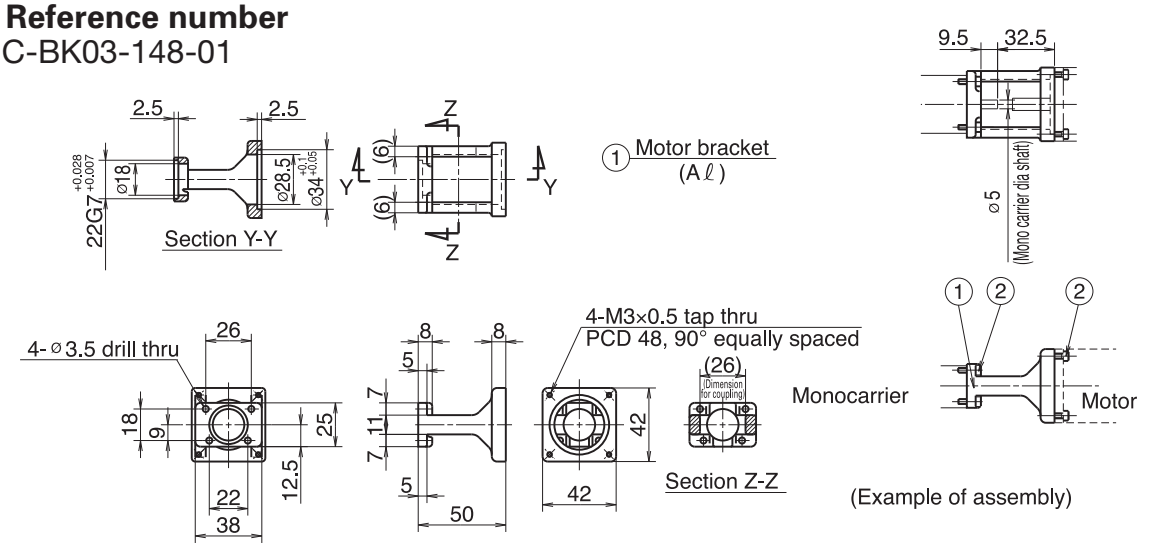
② Hexagon socket head cap screw (M4, length 12)

③ Hexagon socket head cap screw (M3, length 10)

Compatible motor	
Maker	Motor models
Yaskawa Electric Corp.	SGMAH-A3(30W), SGMAH-A5(50W), SGMAS-A5A(50W) SGMAH-01(100W), SGMAS-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.	P30B04003(30W), P30B04005(50W), P30B04006(60W), P30B04010(100W)

Motor Bracket for MCM03

■ Reference number
MC-BK03-148-01



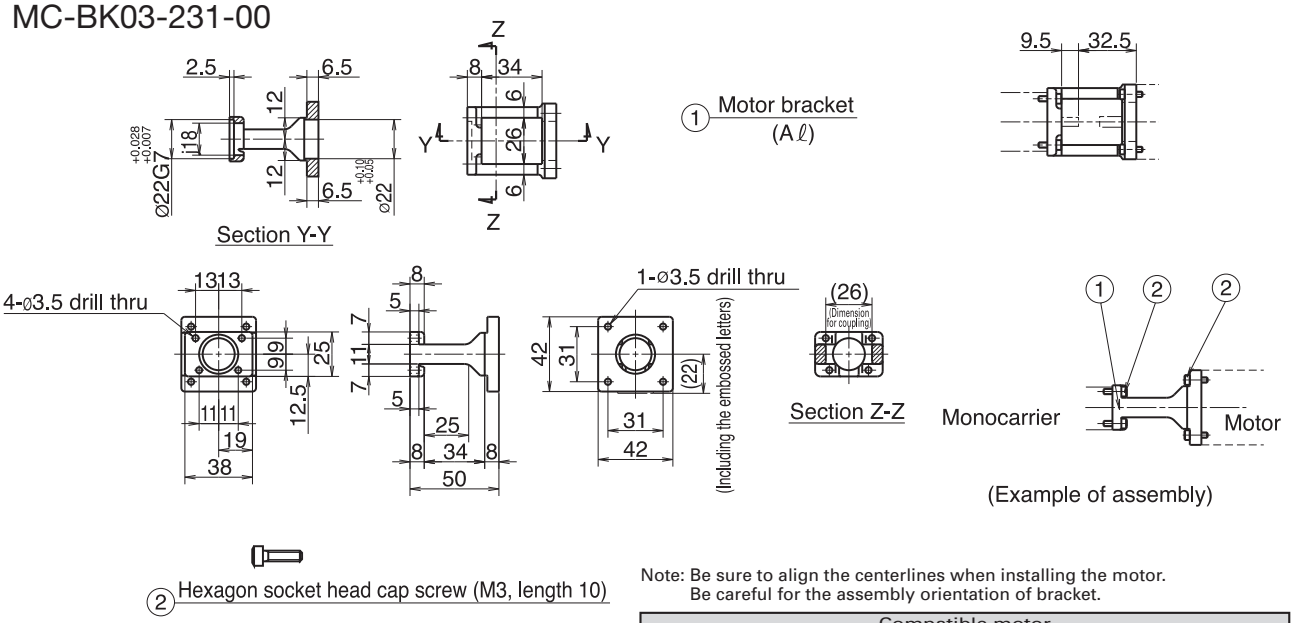
② Hexagon socket head cap screw (M3, length 10)

Note: Be sure to align the centerlines when installing the motor.
Be careful for the assembly orientation of bracket.

Compatible motor	
Maker	Motor models
Sanyo Denki Co., Ltd.	P50B04040(60W), P50B04010(100W)

Motor Bracket for MCM03

■ Reference number
MC-BK03-231-00

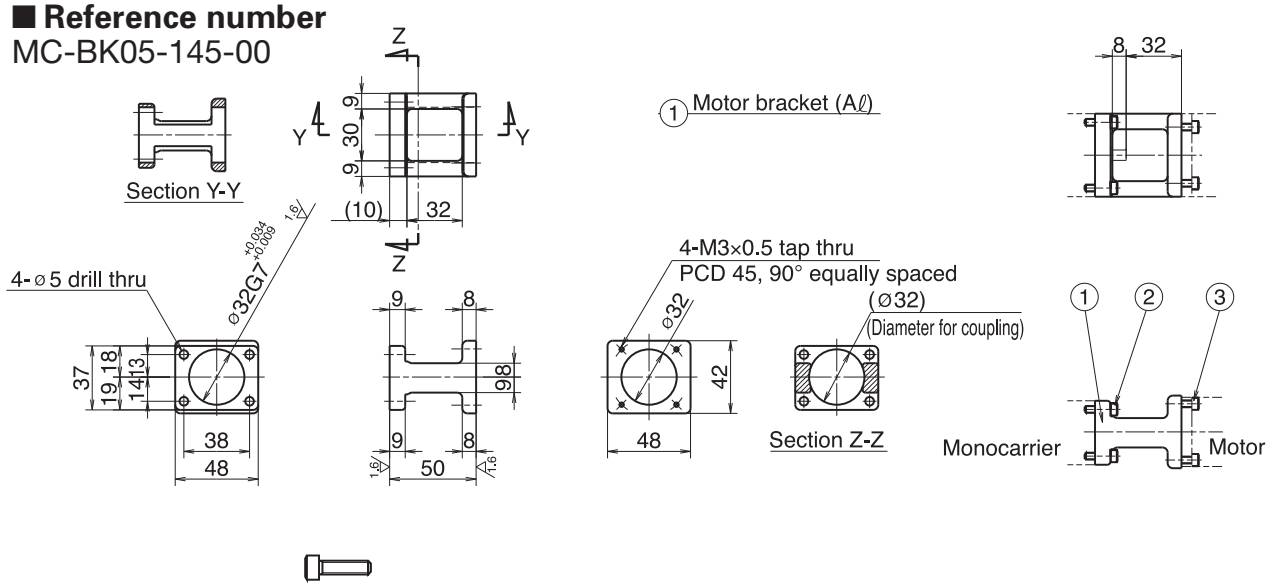


Note: Be sure to align the centerlines when installing the motor.
Be careful for the assembly orientation of bracket.

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

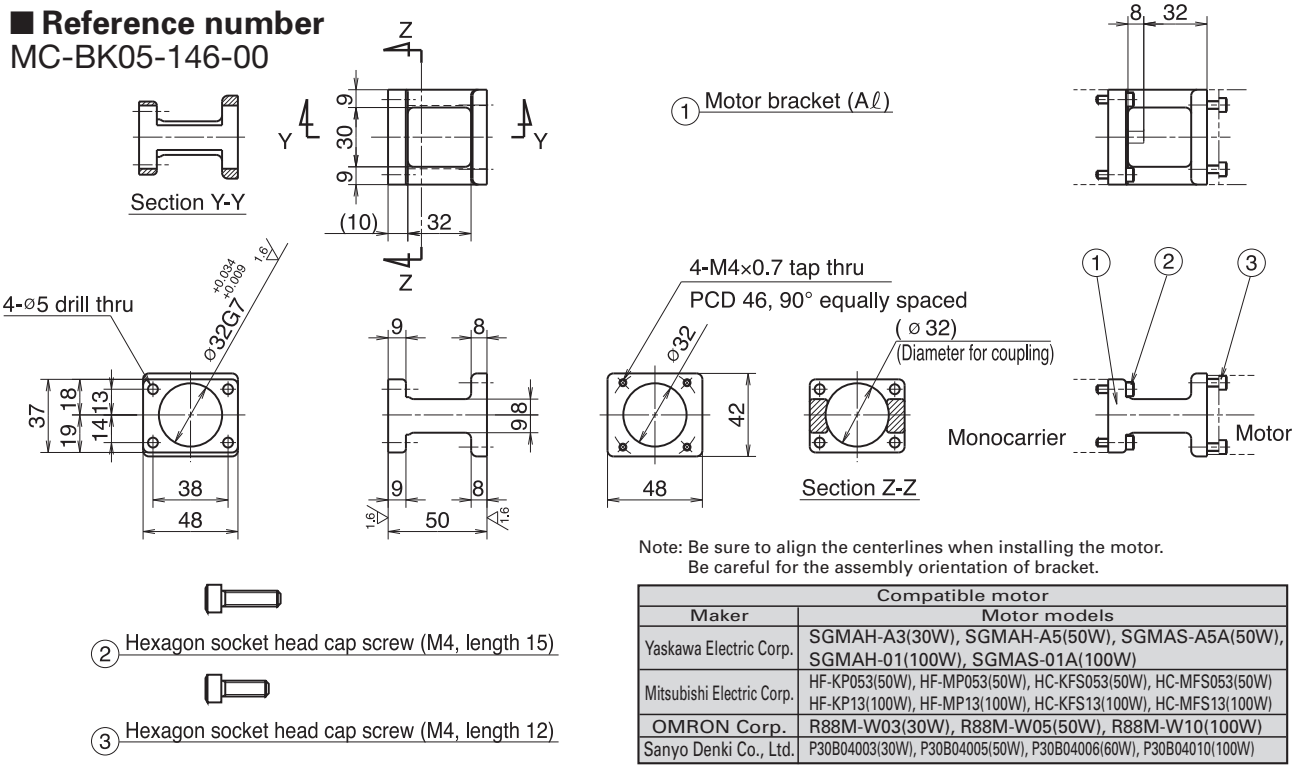


Note: Be sure to align the centerlines when installing the motor.
Be careful for the assembly orientation of bracket.

Compatible motor	
Maker	Motor models
Matsushita Electric Co., Ltd.	MSMD5A(50W), MSMD01(100W)

Motor Bracket for MCM05

■ Reference number
MC-BK05-146-00

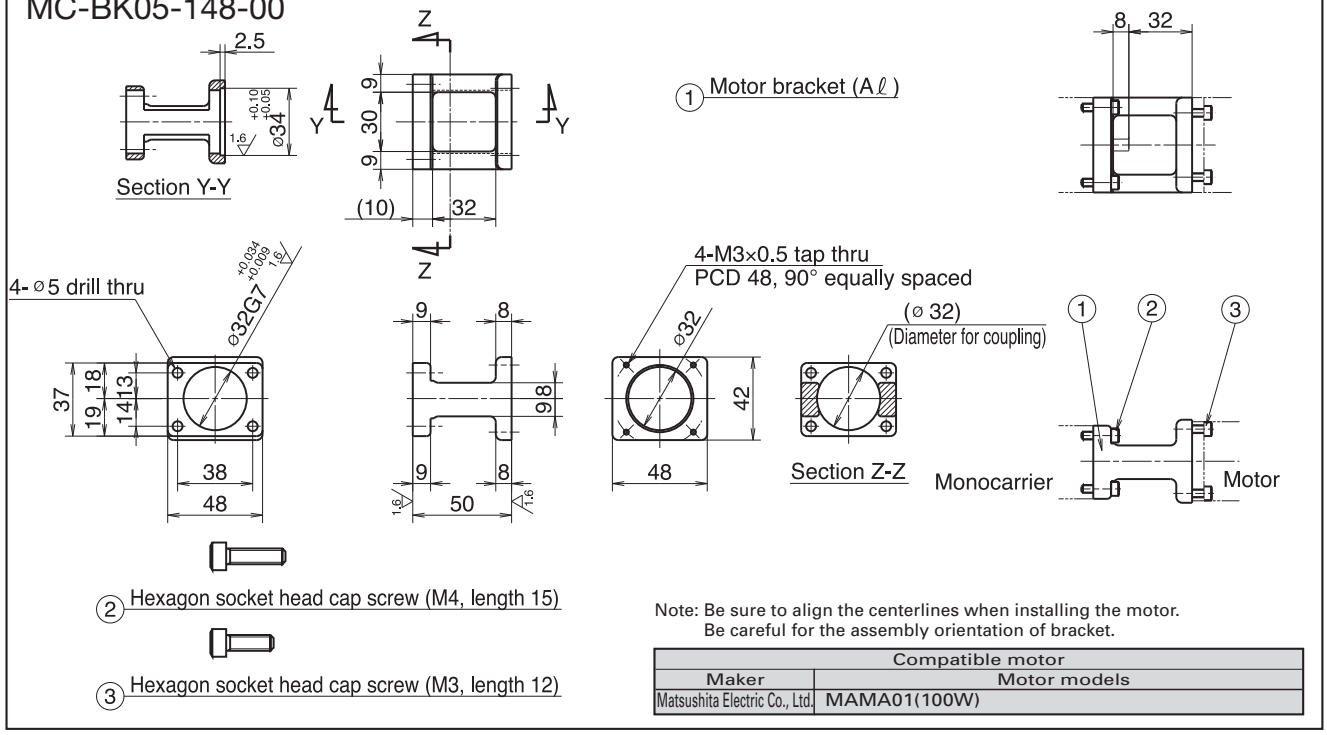


Note: Be sure to align the centerlines when installing the motor.
Be careful for the assembly orientation of bracket.

Compatible motor	
Maker	Motor models
Yaskawa Electric Corp.	SGMAH-A3(30W), SGMAH-A5(50W), SGMAS-A5A(50W), SGMAH-01(100W), SGMAS-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.	P30B04003(30W), P30B04005(50W), P30B04006(60W), P30B04010(100W)

Motor Bracket for MCM05

■ Reference number
MC-BK05-148-00

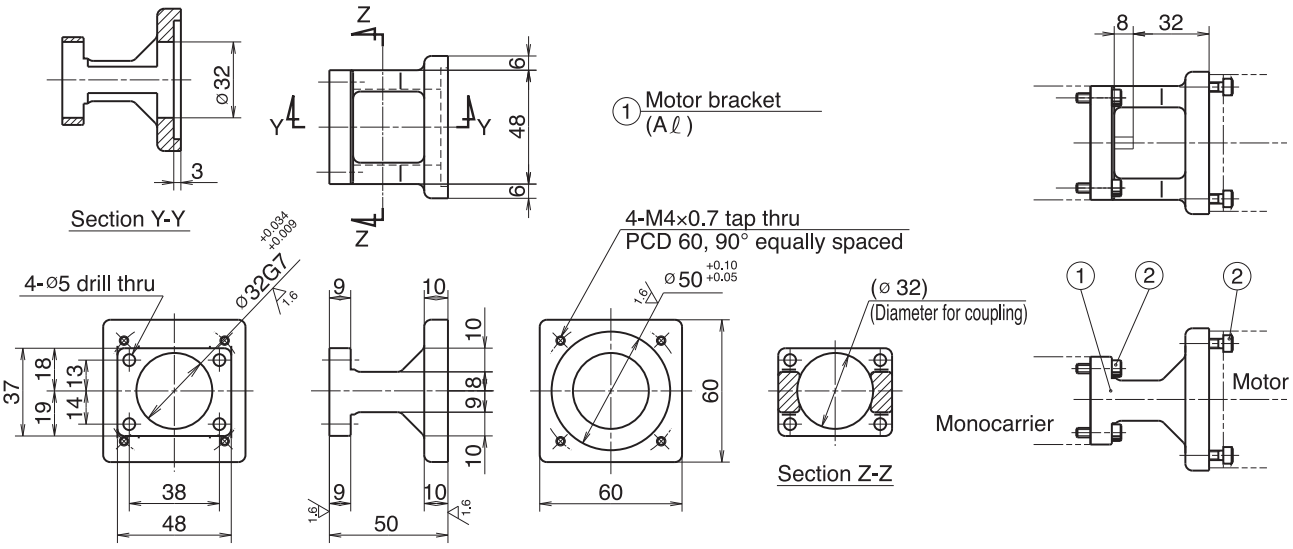


Note: Be sure to align the centerlines when installing the motor.
Be careful for the assembly orientation of bracket.

Compatible motor	
Maker	Motor models
Matsushita Electric Co., Ltd.	MAMA01(100W)

Motor Bracket for MCM05

■ Reference number
MC-BK05-160-00



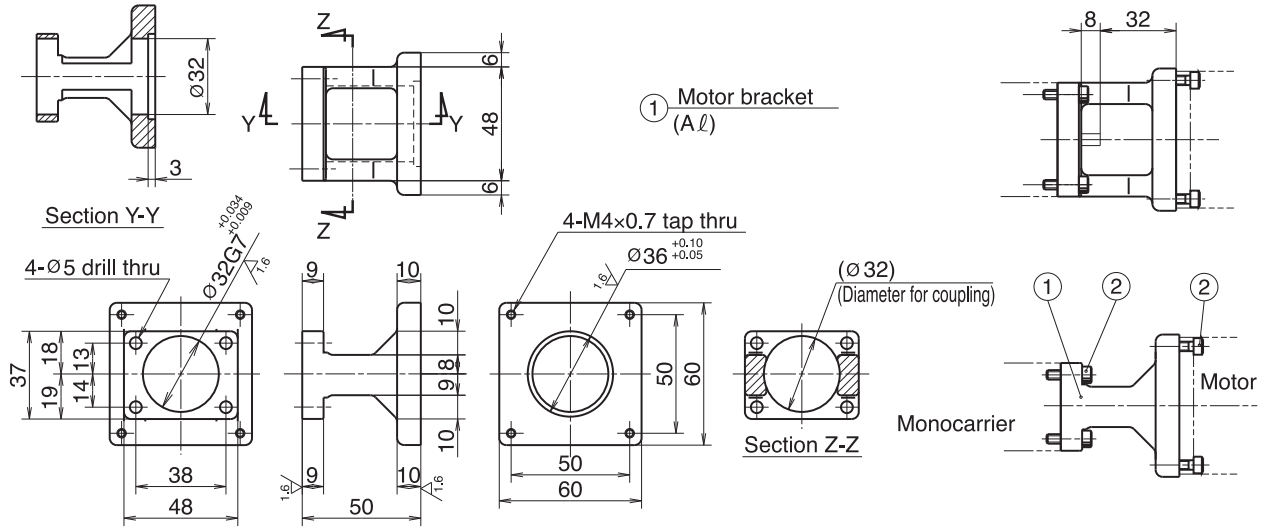
② Hexagon socket head cap screw
(M4, length 15)

Note: Be sure to align the centerlines when installing the motor.
Be careful for the assembly orientation of bracket.

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



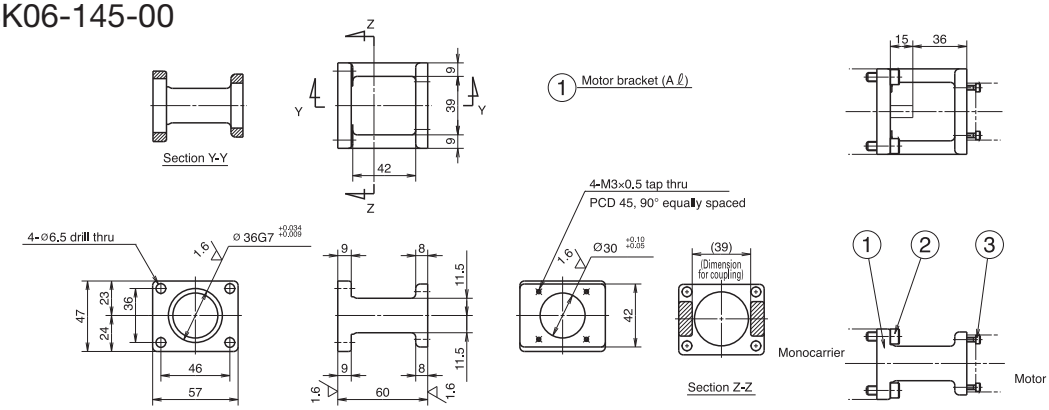
② Hexagon socket head cap screw
(M4, length 15)

Note: Be sure to align the centerlines when installing the motor.
Be careful for the assembly orientation of bracket.

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)

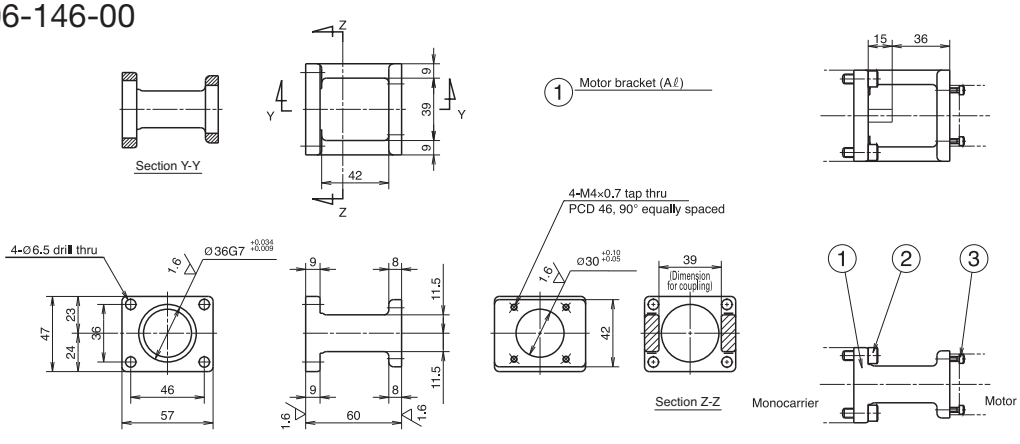
3 Hexagon socket head cap screw (M3, length 12)

Note: Be sure to align the centerlines when installing the motor.
Be careful for the assembly orientation of bracket.

Compatible motor	
Maker	Motor models
Matsushita Electric Industrial Co., Ltd.	MSMD5A(50W), MSMD01(100W)

Motor Bracket for MCM06

■ Reference number
MC-BK06-146-00



2 Hexagon socket head cap screw (M6, length 16)

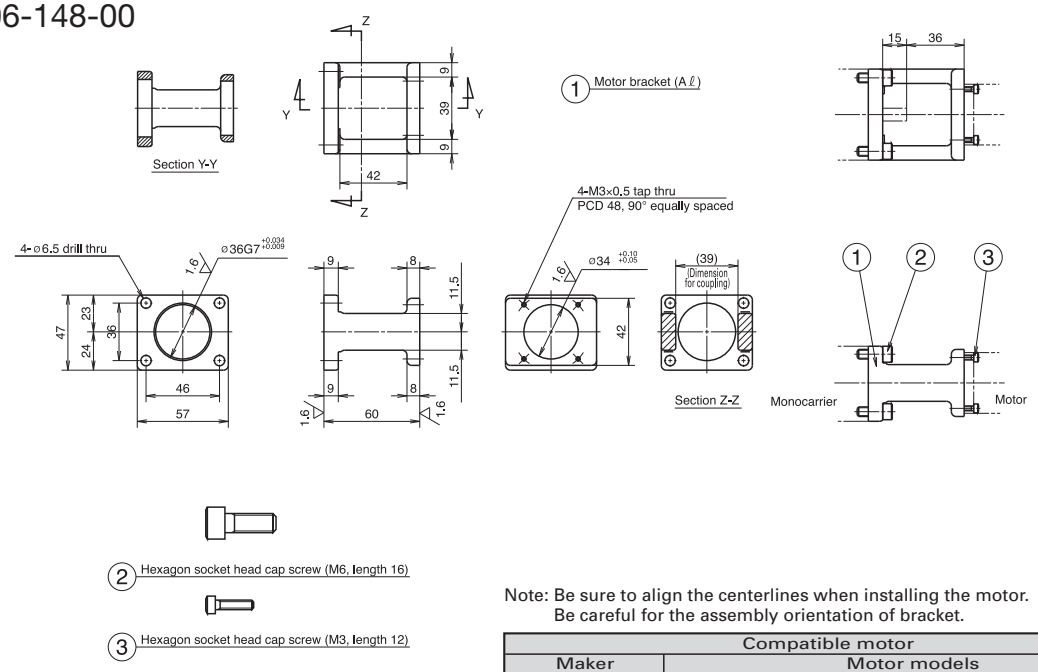
3 Hexagon socket head cap screw (M4, length 12)

Note: Be sure to align the centerlines when installing the motor.
Be careful for the assembly orientation of bracket.

Compatible motor	
Maker	Motor models
Yaskawa Electric Corp.	SGMAH-A5(50W), SGMAH-01(100W) SGMAS-A5A(50W), SGMAS-01A(100W), SGMAS-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), P30B04006(60W), P30B04010(100W)

Motor Bracket for MCM06

■ Reference number
MC-BK06-148-00



2 Hexagon socket head cap screw (M6, length 16)

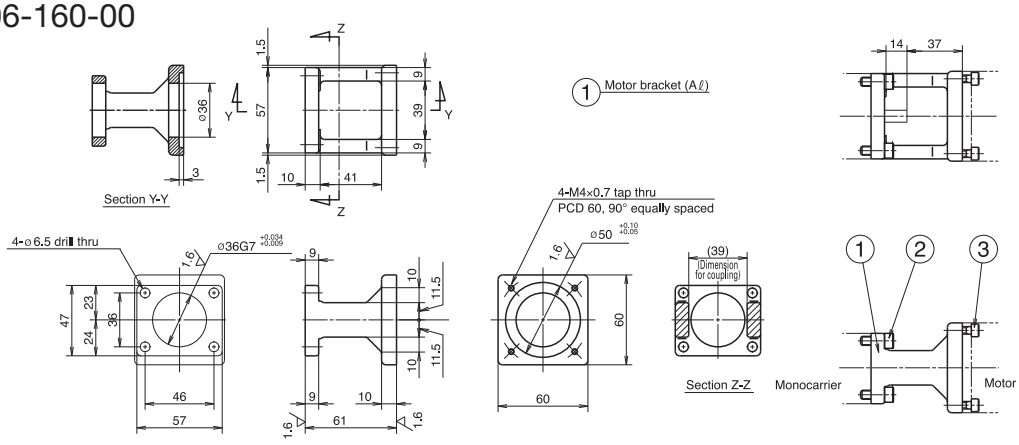
3 Hexagon socket head cap screw (M3, length 12)

Note: Be sure to align the centerlines when installing the motor.
Be careful for the assembly orientation of bracket.

Compatible motor	
Maker	Motor models
Matsushita Electric Co., Ltd.	MAMA01(100W)
Sanyo Denki Co., Ltd.	P50B04040(60W), P50B04010(100W)

Motor Bracket for MCM06

■ Reference number
MC-BK06-160-00



2 Hexagon socket head cap screw (M6, length 16)

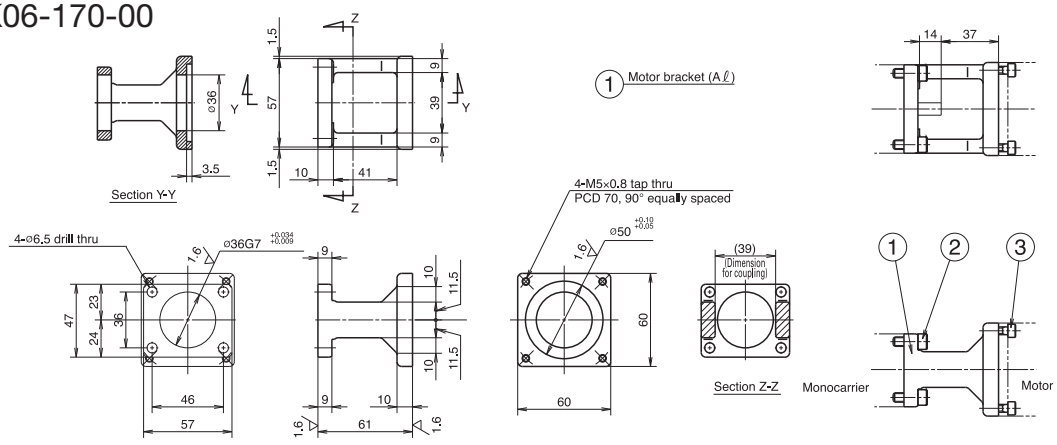
3 Hexagon socket head cap screw (M4, length 14)

Note: Be sure to align the centerlines when installing the motor.
Be careful for the assembly orientation of bracket.

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

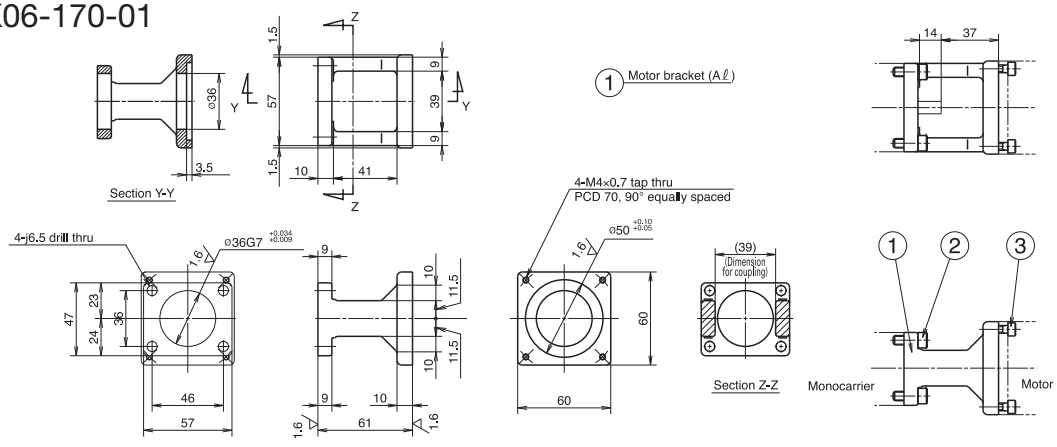


Note: Be sure to align the centerlines when installing the motor.
Be careful for the assembly orientation of bracket.

Compatible motor	
Maker	Motor models
Yaskawa Electric Corp.	SGMAH-02(200W), SGMAS-02A(200W), SGMAH-04(400W), SGMAS-04A(400W)
Mitsubishi Electric Corp.	HF-KP23(200W), HF-MP23(200W), HC-KP43(400W), HC-MP43(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

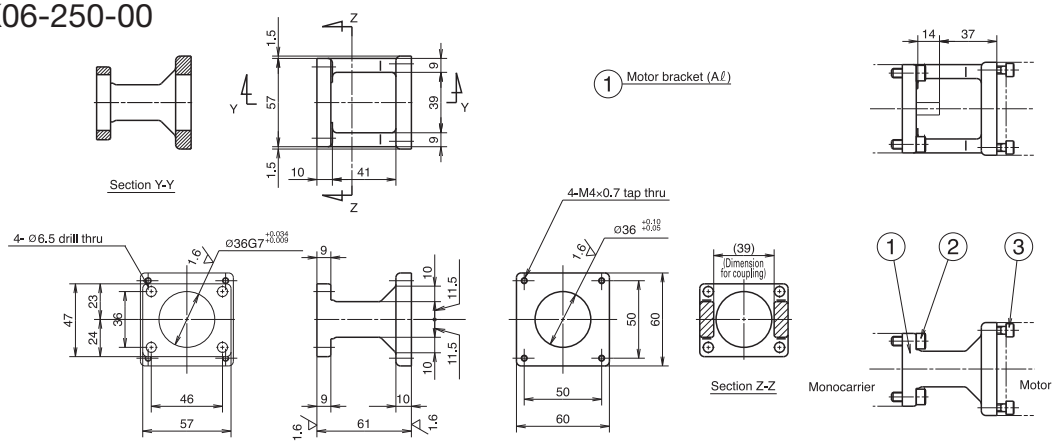


Note: Be sure to align the centerlines when installing the motor.
Be careful for the assembly orientation of bracket.

Compatible motor	
Maker	Motor models
Matsushita Electric Industrial 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)

② Hexagon socket head cap screw (M6, length 16)

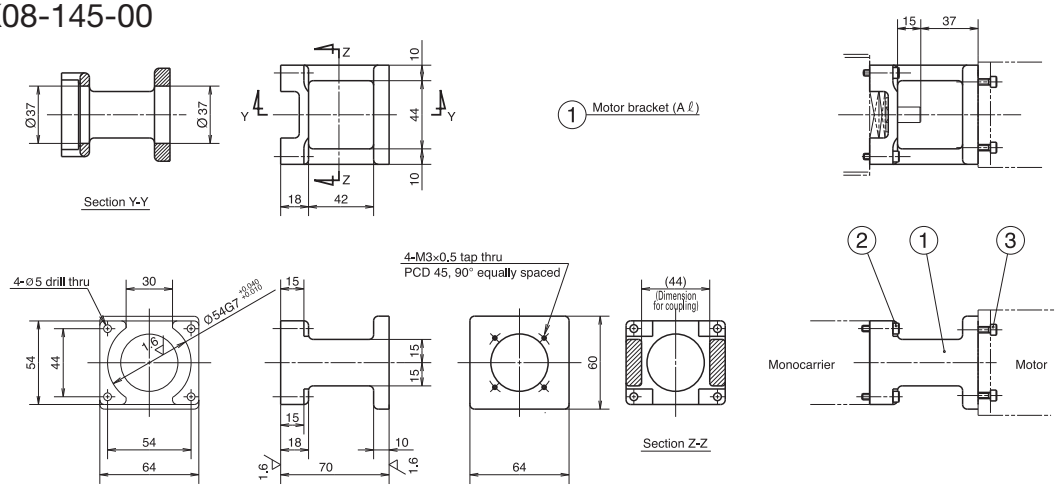
③ Hexagon socket head cap screw (M4, length 14)

Note: Be sure to align the centerlines when installing the motor.
Be careful for the assembly orientation of bracket.

Compatible motor	
Maker	Motor models
Sanyo Denki Co., Ltd.	PBM603xxx, PBM604xxx, 103F78xx
Oriental Motor Co., Ltd.	AS66, ASC66, UPK56x, PK56x, CSK56x CFK56x, UMK56x, UFK56x

Motor Bracket for MCM08

■ Reference number
MC-BK08-145-00



① Motor bracket (A ℓ)

② Hexagon socket head cap screw (M4, length 20)

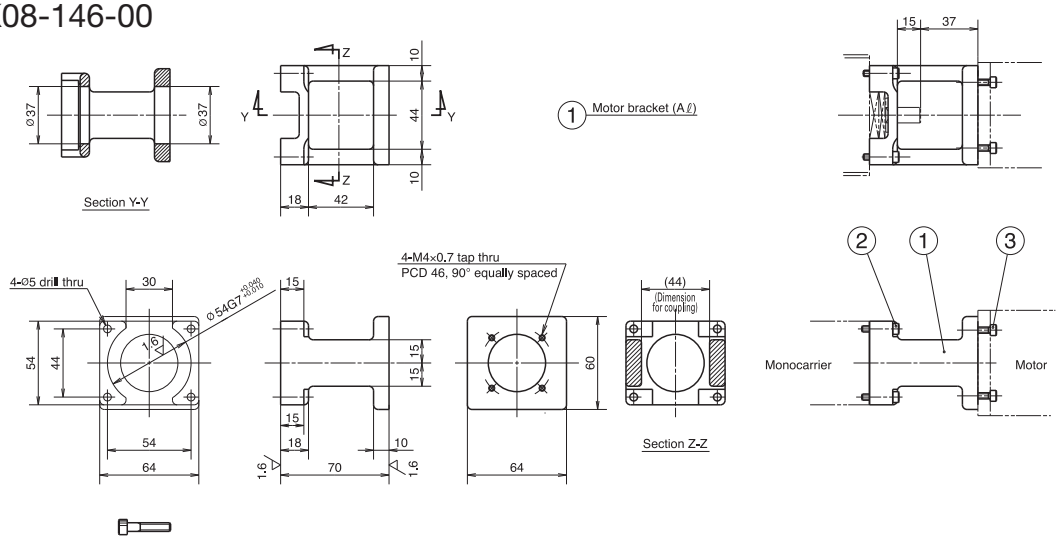
③ Hexagon socket head cap screw (M3, length 12)

Note: Be sure to align the centerlines when installing the motor.
Be careful for the assembly orientation of bracket.

Compatible motor	
Maker	Motor models
Matsushita Electric Industrial Co., Ltd.	MSMD01(100W)

Motor Bracket for MCM08

■ Reference number
MC-BK08-146-00



② Hexagon socket head cap screw (M4, length 20)

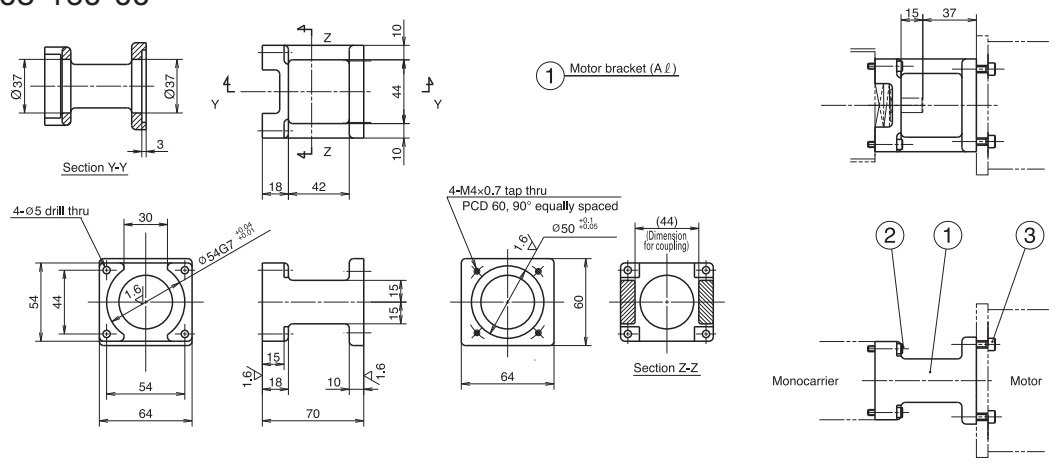
③ Hexagon socket head cap screw (M4, length 14)

Note: Be sure to align the centerlines when installing the motor.
Be careful for the assembly orientation of bracket.

Compatible motor	
Maker	Motor models
Yaskawa Electric Corp.	SGMAH-01(100W), SGMAS-01A(100W), SGMAS-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), P30B04006(60W), P30B04010(100W)

Motor Bracket for MCM08

■ Reference number
MC-BK08-160-00



② Hexagon socket head cap screw (M4, length 20)

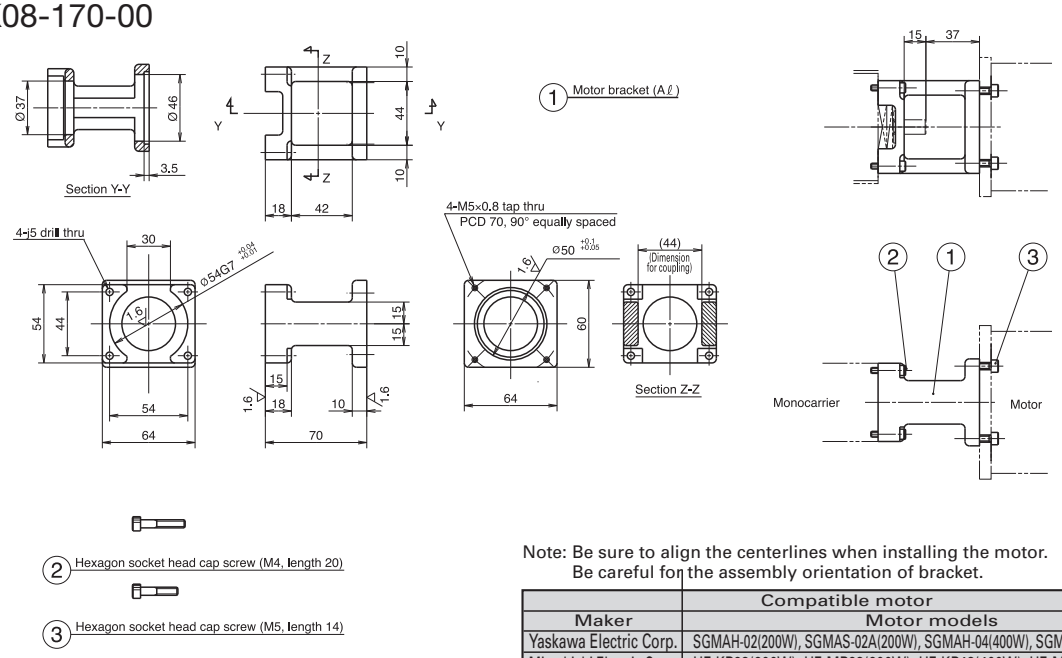
③ Hexagon socket head cap screw (M4, length 14)

Note: Be sure to align the centerlines when installing the motor.
Be careful for the assembly orientation of bracket.

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)

② Hexagon socket head cap screw (M4, length 20)

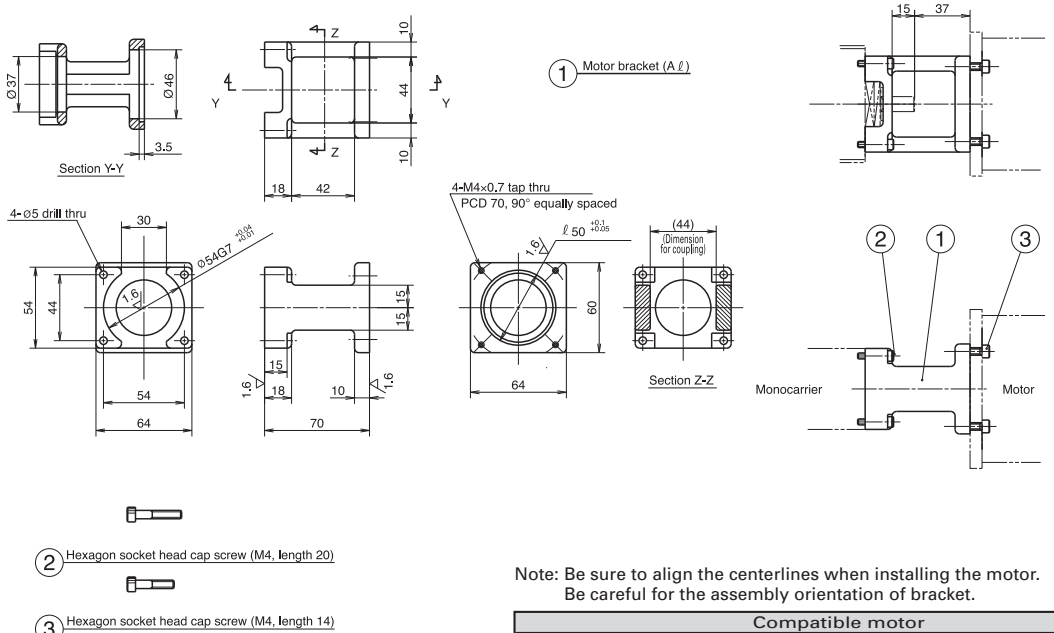
③ Hexagon socket head cap screw (M5, length 14)

Note: Be sure to align the centerlines when installing the motor.
Be careful for the assembly orientation of bracket.

	Compatible motor
Maker	Motor models
Yaskawa Electric Corp.	SGMAH-02(200W), SGMAS-02A(200W), SGMAH-04(400W), SGMAS-04A(400W)
Mitsubishi Electric Corp.	HF-KP23(200W), HF-MP23(200W), HF-KP43(400W), HF-MP43(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)

② Hexagon socket head cap screw (M4, length 20)

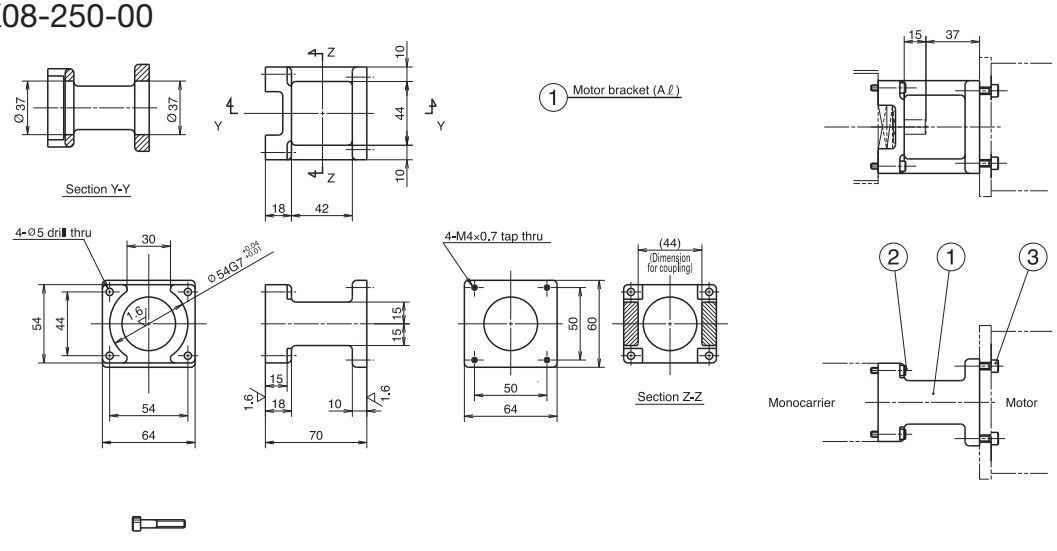
③ Hexagon socket head cap screw (M4, length 14)

Note: Be sure to align the centerlines when installing the motor.
Be careful for the assembly orientation of bracket.

	Compatible motor
Maker	Motor models
Matsushita Electric Industrial Co., Ltd.	MSMD02(200W), MAMA02(200W), MSMD04(400W), MAMA04(400WW)

Motor Bracket for MCM08

■ Reference number
MC-BK08-250-00



② Hexagon socket head cap screw (M4, length 20)

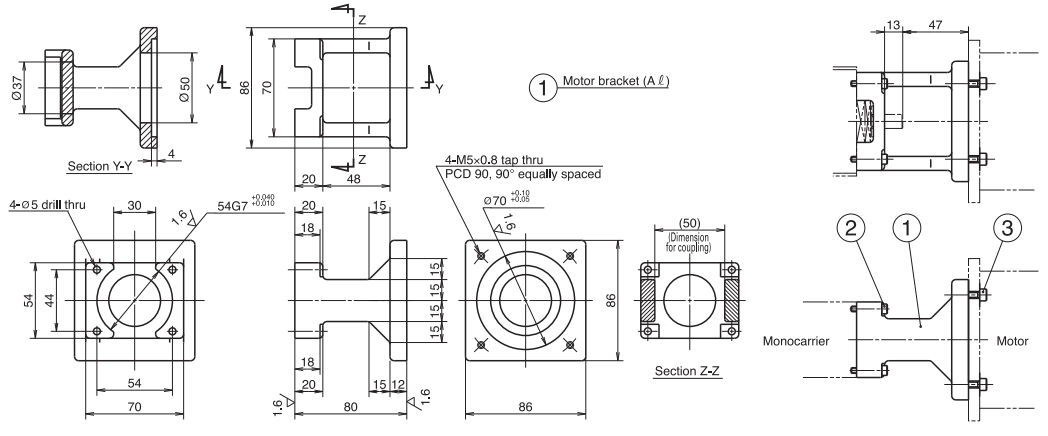
③ Hexagon socket head cap screw (M4, length 14)

Note: Be sure to align the centerlines when installing the motor.
Be careful for the assembly orientation of bracket.

Compatible motor	
Maker	Motor models
Sanyo Denki Co., Ltd.	PBM603xxx, PBM604xxx, 103F78xx
Oriental Motor Co., Ltd.	AS66, ASC66, UPK56xx, PK56xx, CSK56x CFK56x, UMK56x, UFK56x

Motor Bracket for MCM08

■ Reference number
MC-BK08-190-00



② Hexagon socket head cap screw (M4, length 22)

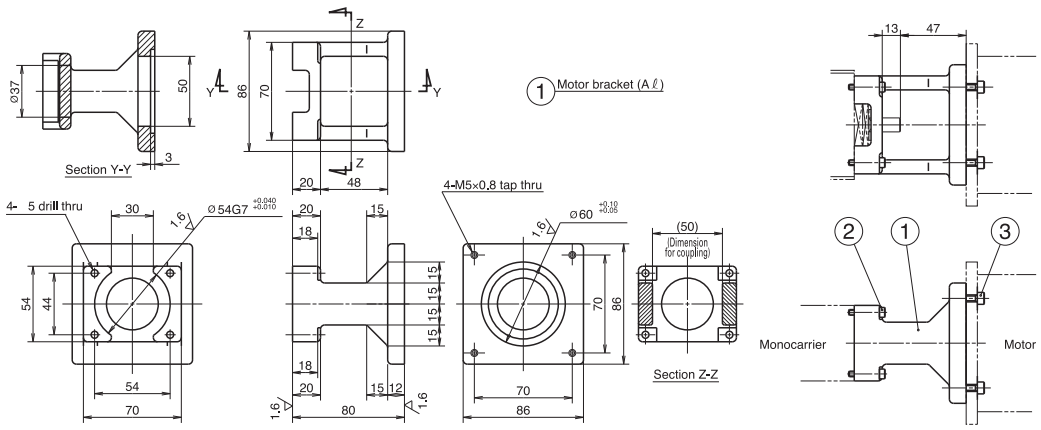
③ Hexagon socket head cap screw (M5, length 16)

Note: Be sure to align the centerlines when installing the motor.
Be careful for the assembly orientation of bracket.

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




② Hexagon socket head cap screw (M4, length 22)

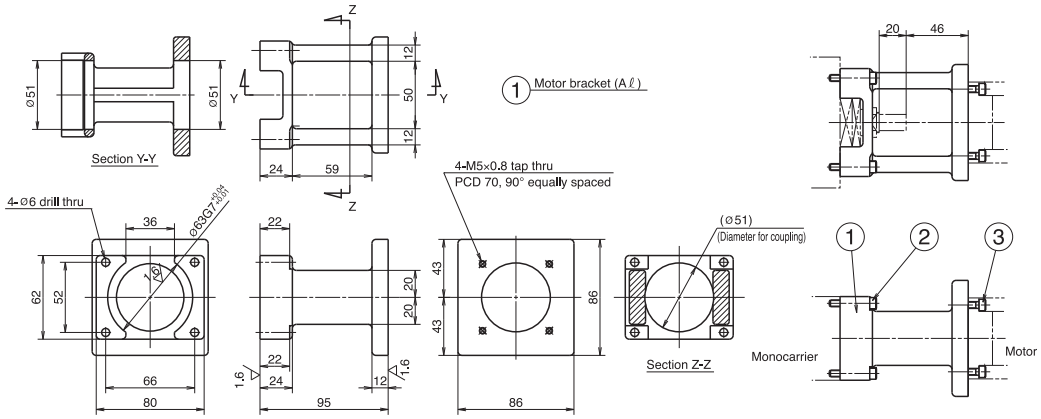

③ Hexagon socket head cap screw (M5, length 16)

Note: Be sure to align the centerlines when installing the motor.
Be careful for the assembly orientation of bracket.

Compatible motor	
Maker	Motor models
Oriental Motor Co., Ltd.	AS98, ASC98, UPK59x, PK59x CSK59x, CFK59x, UMK59x, UFK59x
Sanyo Denki Co., Ltd.	103F85xx

Motor Bracket for MCM10

■ Reference number
MC-BK10-170-00




② Hexagon socket head cap screw (M5, length 30)

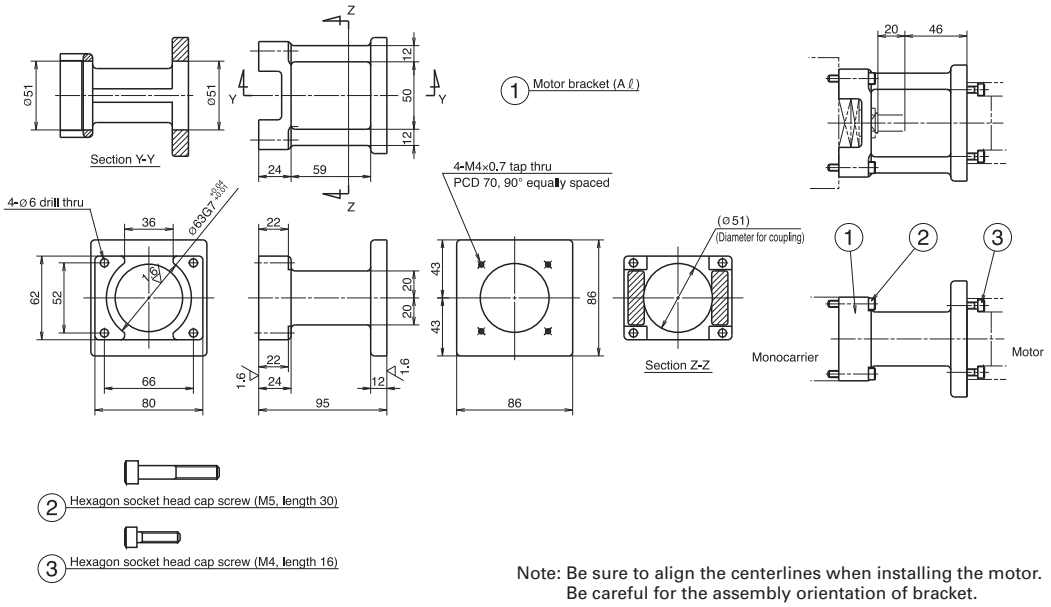

③ Hexagon socket head cap screw (M5, length 16)

Note: Be sure to align the centerlines when installing the motor.
Be careful for the assembly orientation of bracket.

Compatible motor	
Maker	Motor models
Yaskawa Electric Corp.	SGMAH-02(200W), SGMAS-02A(200W), SGMAH-04(400W), SGMAS-04A(400W)
Mitsubishi Electric Corp.	HF-KP23(200W), HF-MP23(200W), HF-KP43(400W), HF-MP43(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

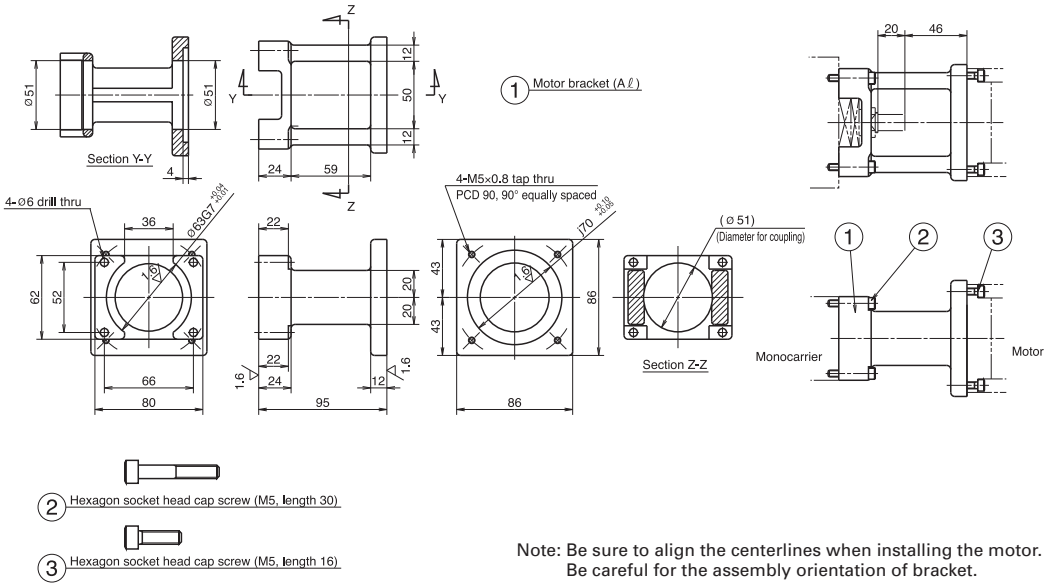


Note: Be sure to align the centerlines when installing the motor.
Be careful for the assembly orientation of bracket.

Compatible motor	
Maker	Motor models
Matsushita Electric Industrial Co., Ltd.	MSMD02(200W), MAMA02(200W), MSMD04(400W), MAMA04(400W)

Motor Bracket for MCM10

■ Reference number
MC-BK10-190-00

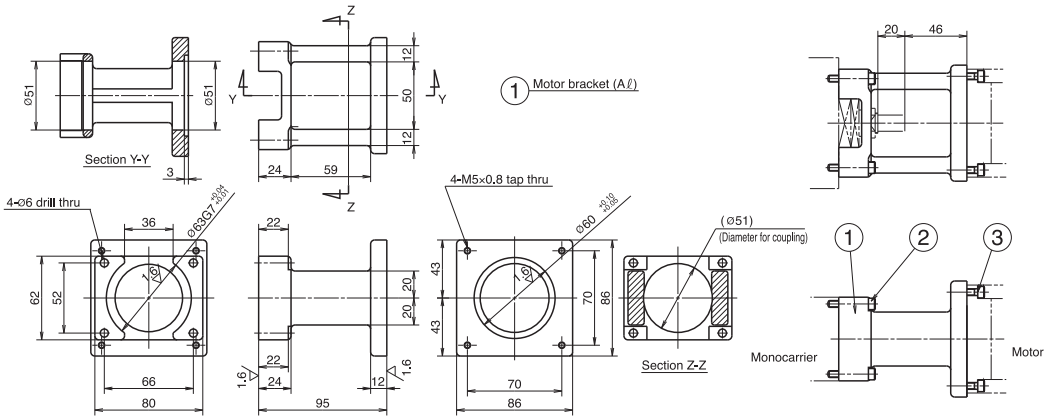


Note: Be sure to align the centerlines when installing the motor.
Be careful for the assembly orientation of bracket.

Compatible motor	
Maker	Motor models
Matsushita Electric Industrial 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)

Note: Be sure to align the centerlines when installing the motor.
Be careful for the assembly orientation of bracket.

Compatible motor	
Maker	Motor models
Sanyo Denki Co., Ltd.	103F85xx
Oriental Motor Co., Ltd.	AS98, ASC98, UPK59x, PK59x, CSK59x CFK59x, UMK59x, UFK59x

Availability Motor Table of Motor Bracket for MCM Series

Table 2-5

Nominal size	Reference number code	Motor bracket reference number	Motor manufacturer	Stepping motor model number	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									
	2	MC-BK02-133-00	Mitsubishi Electric Corp.		HC-AQ013	HC-AQ023									
	3	MC-BK02-223-00	Oriental Motor Co., Ltd.	PMU33/35 (5-phase) PMC33/35 (5-phase)											
MCM03	1	MC-BK03-146-00	Yaskawa Electric Corp.				SGMAH-A3	SGMAH-A5 SGMAS-A5A		SGMAH-01 SGMAS-01A					
			Mitsubishi Electric Corp.					HF-KP053 HF-MP053 HC-KFS053 HC-MFS053		HF-KP13 HF-MP13 HC-KFS13 HC-MFS13					
			OMRON Corp.				R88M-W03	R88M-W05		R88M-W10					
			Sanyo Denki Co., Ltd.				P30B04003	P30B04005	P30B04006	P30B04010					
	2	MC-BK03-148-01	Sanyo Denki Co., Ltd.						P50B04040	P50B04010					
	3	MC-BK03-231-00	Sanyo Denki Co., Ltd.	PBM423xxx											
			Sanyo Denki Co., Ltd.	103F55xx											
			Oriental Motor Co., Ltd.	AS46, ASC46 UPK54x, PK54x CSK54x, CFK54x UMK24x, CSK24x PK24x											
MCM05	1	MC-BK05-145-00	Matsushita Electric Industrial Co., Ltd.					MSMD5A		MSMD01					
	2	MC-BK05-146-00	Yaskawa Electric Corp.				SGMAH-A3	SGMAH-A5 SGMAS-A5A		SGMAH-01 SGMAS-01A					
			Mitsubishi Electric Corp.					HF-KP053 HF-MP053 HC-KFS053 HC-MFS053		HF-KP13 HF-MP13 HC-KFS13 HC-MFS13					
			OMRON Corp.				R88M-W03	R88M-W05		R88M-W10					
			Sanyo Denki Co., Ltd.				P30B04003	P30B04005	P30B04006	P30B04010					
	3	MC-BK05-148-00	Matsushita Electric Industrial Co., Ltd.							MAMA01					
	4	MC-BK05-160-00	Sanyo Denki Co., Ltd.					P50B05005		P50B05010		P50B05020			
	5	MC-BK05-250-00	Sanyo Denki Co., Ltd.	PBM603xx, PBM604xx											
			Sanyo Denki Co., Ltd.	103F78xx											
			Oriental Motor Co., Ltd.	AS66, ASC66 UPK56x, UFK56x PK56x, CSK56x, CFK56x											
MCM06	1	MC-BK06-145-00	Matsushita Electric Industrial Co., Ltd.					MSMD5A		MSMD01					
	2	MC-BK06-146-00	Yaskawa Electric Corp.					SGMAH-A5 SGMAS-A5A		SGMAH-01 SGMAS-01A	SGMAS-C2A				
			Mitsubishi Electric Corp.					HF-KP053 HF-MP053 HC-KFS053 HC-MFS053		HF-KP13 HF-MP13 HC-KFS13 HC-MFS13					
			OMRON Corp.				R88M-W03	R88M-W05		R88M-W10					
			Sanyo Denki Co., Ltd.				P30B04003	P30B04005	P30B04006	P30B04010					
	3	MC-BK06-148-00	Sanyo Denki Co., Ltd.						P50B04040	P50B04010					
			Matsushita Electric Industrial Co., Ltd.							MAMA01					
	4	MC-BK06-160-00	Sanyo Denki Co., Ltd.					P50B05005		P50B05010		P50B05020			
	5	MC-BK06-170-00	Yaskawa Electric Corp.									SGMAH-02 SGMAS-02A		SGMAH-04 SGMAS-04A	
			Mitsubishi Electric Corp.									HF-KP23 HF-MP23		HF-KP43 HF-MP43	
			OMRON Corp.									R88M-W20		R88M-W40	
			Sanyo Denki Co., Ltd.									P30B06020		P30B06040	
	6	MC-BK06-170-01	Matsushita Electric Industrial Co., Ltd.									MSMD02 MAMA02		MSMD04 MAMA04	
	7	MC-BK06-250-00	Sanyo Denki Co., Ltd.	PBM603xxx, PBM604xxx											
			Sanyo Denki Co., Ltd.	103F78xx											
			Oriental Motor Co., Ltd.	AS66, ASC66 UPK56x, PK56x CSK56x, CFK56x UMK56x, UFK56x											
MCM08	1	MC-BK08-145-00	Matsushita Electric Industrial Co., Ltd.							MSMD01					
	2	MC-BK08-146-00	Yaskawa Electric Corp.							SGMAH-01 SGMAS-01A	SGMAS-C2A				
			Mitsubishi Electric Corp.							HF-KP13 HF-MP13 HC-KFS13 HC-MFS13					
			Sanyo Denki Co., Ltd.				P30B04003	P30B04005	P30B04006	P30B04010					
	3	MC-BK08-160-00	Sanyo Denki Co., Ltd.					P50B05005		P50B05010		P50B05020			
	4	MC-BK08-170-00	Yaskawa Electric Corp.									SGMAH-02 SGMAS-02A		SGMAH-04 SGMAS-04A	
			Mitsubishi Electric Corp.									HF-KP23 HF-MP23		HF-KP43 HF-MP43	
			OMRON Corp.									R88M-W20		R88M-W40	
			Sanyo Denki Co., Ltd.									P30B06020		P30B06040	
	5	MC-BK08-170-01	Matsushita Electric Industrial Co., Ltd.									MSMD02 MAMA02		MSMD04 MAMA04	
	6	MC-BK08-190-00	Sanyo Denki Co., Ltd.									P50B07020	P50B07030	P50B07040	
	7	MC-BK08-250-00	Sanyo Denki Co., Ltd.	PBM603xxx, PBM604xxx											
			Sanyo Denki Co., Ltd.	103F78xx											
			Oriental Motor Co., Ltd.	AS66, ASC66 UPK56x, PK56x CSK56x, CFK56x UMK56x, UFK56x											
	8	MC-BK08-270-00	Sanyo Denki Co., Ltd.	103F85xx											
			Oriental Motor Co., Ltd.	AS98, ASC98 UPK59x, PK59x CSK59x, CFK59x UMK59x, UFK59x											
MCM10	1	MC-BK10-170-00	Yaskawa Electric Corp.									SGMAH-02 SGMAS-02A		SGMAH-04 SGMAS-04A	
			Mitsubishi Electric Corp.									HF-KP23 HF-MP23		HF-KP43 HF-MP43	
			OMRON Corp.									R88M-W20		R88M-W40	
			Sanyo Denki Co., Ltd.									P30B06020		P30B06040	
	2	MC-BK10-170-01	Matsushita Electric Industrial Co., Ltd.									MSMD02 MAMA02		MSMD04 MAMA04	
	3	MC-BK10-190-00	Matsushita Electric Industrial Co., Ltd.												MSMD08 MAMA08
			Sanyo Denki Co., Ltd.									P50B07020	P50B07030	P50B07040	
	4	MC-BK10-270-00	Sanyo Denki Co., Ltd.	103F85xx											
			Oriental Motor Co., Ltd.	AS98, ASC98 UPK59x, PK59x CSK59x, CFK59x UMK59x, UFK59x											

MCH Series – Rigid type

3 MCH Series

3. 1 MCH Series Reference Number Coding

[Body]

Reference number : MC H 06 040 H 10 K (B 0) ※1

- MC — Mono carrier
- 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
- (See page C10) D: Double slider
- (B — Grease specification: B (LG2)(See page C18)
- 0) — Special specification

※1 : These two code fields shall be added when non-standard grease is used. The coding of an MCH Monocarrier with standard grease shall have 12 characters as shown above.

[With Option part]

Reference number : MC S 06 040 H 10 K 0 0 K 0 0 0

- S : With MCH optional components
- R : With MCL optional components
- K — NSK management number
- 0 — Sensor unit
- 0 — Cover unit
- 0 — Intermediate plate for motor bracket

Note : Optional components are available separately.

Table 3-1 Sensor unit (See page 156~157)

Reference number code	Specification	Reference number
0	N/A	—
1	Proximity swith (b-contact 3peices)	MC — SRHxx — 10
2	Proximity swith (a-contact 3pieses)	MC — SRHxx — 11
3	Proximity swith (a-contact 1pieses, b-contaact 2pieces)	MC — SRHxx — 12
4	Photo sensor 3pieces	MC — SRHxx — 13

Note xx: Reference number

Table 3-2 Cover unit (See page 158~159)

Reference number code	Specification	Reference number
0	N/A	—
1	For single slider	MC — HVxxxxx — 00
	For double slider	MC — HVxxxxxD00

Note xxxxx: Reference number and stroke number

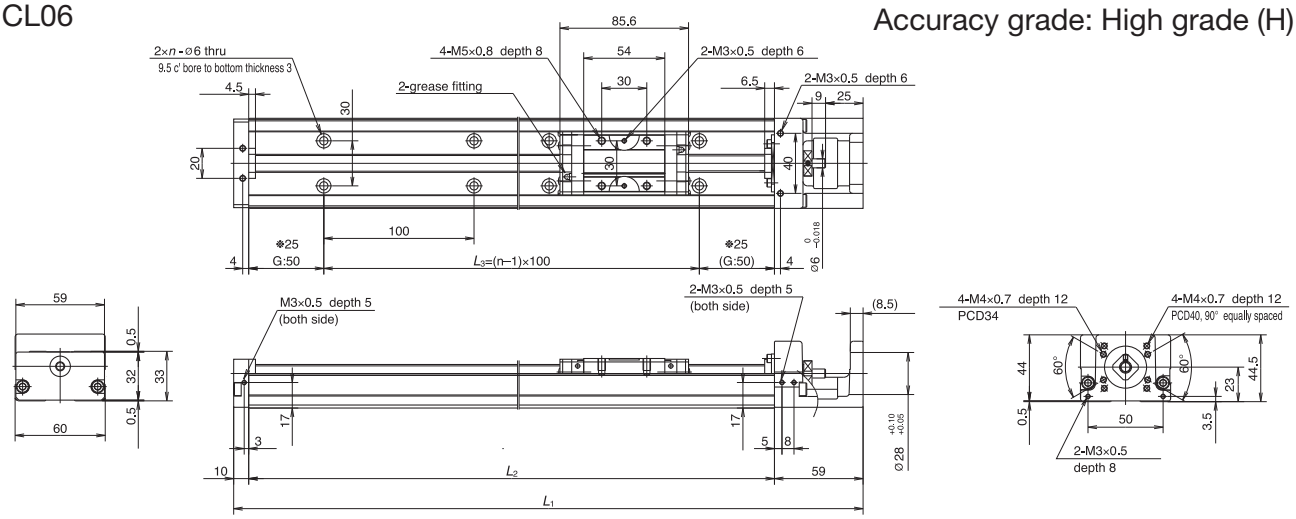
Table 3-3 Intermediate plate for motor bracket (See page 160~163)

Reference number code	Type		
	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**

3. 2 MCH Series dimension table of standard prodacts

MCL06

Accuracy grade: High grade (H)



- The rail of MCL 06 is made lighter than that of MCH 06 by lowering the rail height. The weight ratio between the MCH 06 and MCL 06 is 5 to 4.
- Double slider specification is also available for the MCL 06.
- Combinations of stroke and ball screw lead of the MCL 06 are the same as those of the MCH 06.

Dimension of MCL06 (Single slider)

Reference number	Nominal stroke (mm)	Stroke limit(mm) (K1 is not equipped)	Ball screw lead (mm)	Body length (mm)				Inertia ×10^{-6}(kg • m^2)	Mass (kg)
				L_1	L_2	L_3	n		
★❖MCL06005H05K	50	53 (65)	5	219	150	100	2	2.38	1.0
★❖MCL06005H10K			10					3.45	
★ MCL06010H05K	100	103 (115)	5	269	200	100	2	3.17	1.3
★ MCL06010H10K			10					4.12	
★ MCL06020H05K	200	203 (215)	5	369	300	200	3	4.51	1.9
★ MCL06020H10K			10					5.46	
★ MCL06030H10K	300	303 (315)	10	469	400	300	4	6.80	2.6
★ MCL06030H20K			20					10.6	
★ MCL06040H10K	400	403 (415)	10	569	500	400	5	8.13	3.2
★ MCL06040H20K			20					11.9	
★ MCL06050H10K	500	503 (515)	10	669	600	500	6	9.47	3.9
★ MCL06050H20K			20					13.3	

Dimension of G is 25 instead of 50 for those marked with ❖.

Items not marked are available from standard stock.
Items marked with ★are designated as "quick delivery item" upon request.

Monocarrier dynamic torque specification (N • cm)		
Ball screw lead (mm)	5	1.0~4.8
	10	1.1~5.8
	20	1.6~7.9

1. Frictional resistance of NSK K1 is included in the dynamic torque in the table.
2. Grease is packed into ball screw, linear guide parts and support unit.
3. Consult NSK for life estimates under large moment loads.

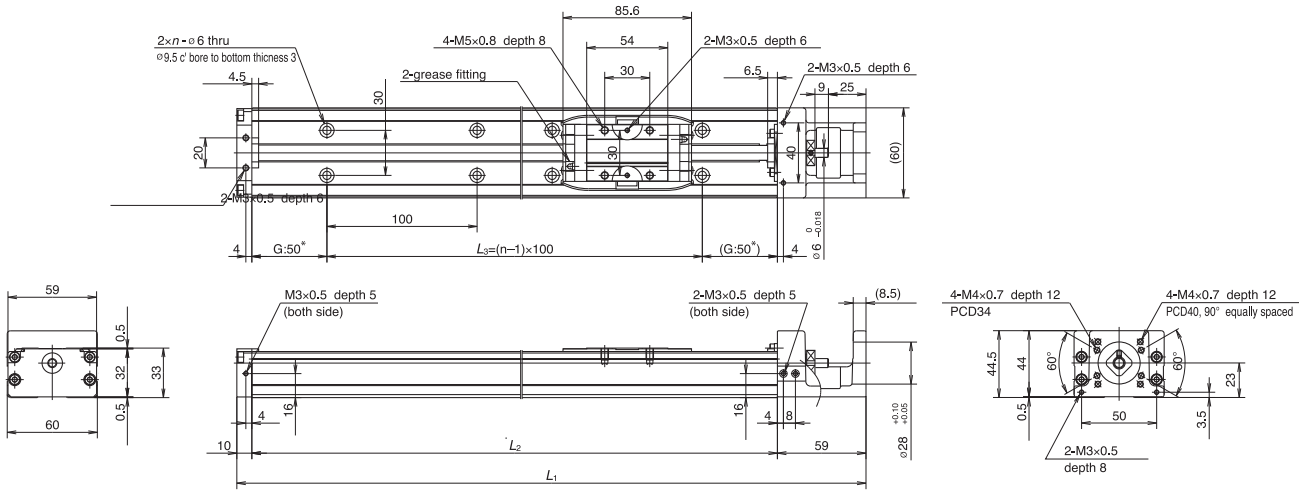
Basic load rating

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	Ø12	3000 (High grade) 3760 (Precision)	22800	4400	5	5410 (High grade) 6310 (Precision)	10900	1450
10		1930 (High grade) 2260 (Precision)	18100		10	3160 (High grade) 3780 (Precision)		
20		1930 (High grade) 2260 (Precision)	14400		20	3160 (High grade) 3780 (Precision)		

Basic static moment load of linear guide

Slider	Basic static moment load (N • m)		
	RollingM_{RO}	PitchingM_{PO}	YawingM_{YO}
Single	335	133	133

MCH06 Accuracy grade: High grade (H)



Dimension of MCH06 (Single slider)

Reference number	Nominal stroke (mm)	Stroke limit(mm) (K1 is not equipped)	Ball screw lead (mm)	Body length (mm)				Inertia ×10^{-6}(kg • m^2)	Mass (kg)
				L_1	L_2	L_3	n		
❖ **MCH06005H05K**	50	53 (65)	5	219	150	100	2	2.38	1.8
❖ **MCH06005H10K**			10					3.45	
MCH06010H05K	100	103 (115)	5	269	200	100	2	3.17	2.2
MCH06010H10K			10					4.12	
MCH06020H05K	200	203 (215)	5	369	300	200	3	4.51	3.0
MCH06020H10K			10					5.46	
MCH06030H10K	300	303 (315)	10	469	400	300	4	6.80	3.7
MCH06030H20K			20					10.6	
MCH06040H10K	400	403 (415)	10	569	500	400	5	8.13	4.5
MCH06040H20K			20					11.9	
MCH06050H10K	500	503 (515)	10	669	600	500	6	9.47	5.2
MCH06050H20K			20					13.3	

Dimension of G is 25 instead of 50 for those marked with ❖

Items not marked are available from standard stock.
Items marked with I are designated as "quick delivery item" upon request.

Monocarrier dynamic torque specification (N • cm)		
Ball screw lead (mm)	5	1.0~4.8
	10	1.1~5.8
	20	1.6~7.9

1. Frictional resistance of NSK K1 is included in the dynamic torque in the 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

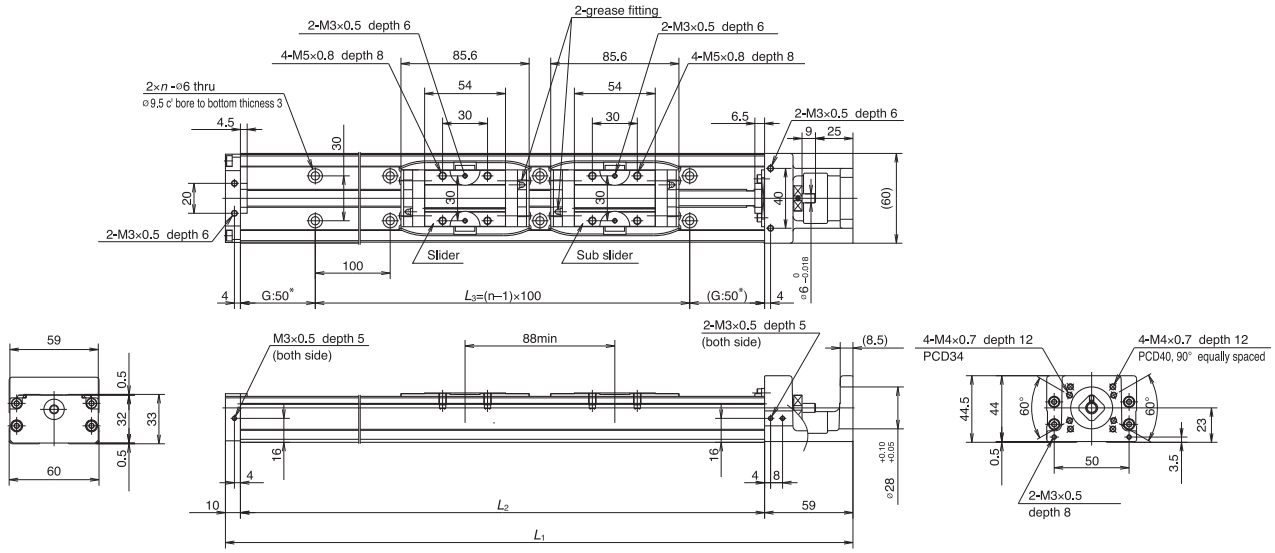
Lead ℓ (mm)	Shaft dia d (mm)	Basic dynamic load rating (N)				Basic static load rating (N)		Support unit Load limit (N)
		Ball screw C_a	linear guides C	Support unit C_a	Rated running distance L_a (km)	Ball screw C_{0a}	Linear guides C_0	
5	Ø12	3000 (High grade) 3760 (Precision)	22800	4400	5	5410 (High grade) 6310 (Precision)	16300	1450
10		1930 (High grade) 2260 (Precision)	18100		10	3160 (High grade) 3780 (Precision)		
20		1930 (High grade) 2260 (Precision)	14400		20	3160 (High grade) 3780 (Precision)		

Basic static moment load of linear guide

Slider	Basic static moment load (N • m)		
	RollingM_{RO}	PitchingM_{PO}	YawingM_{YO}
Single	335	133	133

MCH06 (Double slider)

Accuracy grade: High grade (H)



Dimension of MCH06 (Double slider)

Reference number	Nominal stroke (mm)	Stroke limit(mm) (K1 is not equipped)	Ball screw lead (mm)	Body length (mm)				Inertia $\times 10^{-6}$(kg • m^2)	Mass (kg)
				L_1	L_2	L_3	n		
★ **MCH06010H05D**	100	115 (139)	5	369	300	200	3	4.82	3.5
★ **MCH06010H10D**			10					6.72	
★ **MCH06020H05D**	200	215 (239)	5	469	400	300	4	8.06	4.2
★ **MCH06020H10D**			10					15.7	
★ **MCH06030H05D**	300	315 (339)	5	569	500	400	5	9.40	5.0
★ **MCH06030H10D**			10					17.0	
★ **MCH06040H10D**	400	415 (439)	10	669	600	500	6	10.7	5.7
★ **MCH06040H20D**			20					18.3	

Items not marked are available from standard stock.
Items marked with ★ are designated as "quick delivery item" upon request.

Monocarrier dynamic torque specification (N • cm)		
Ball screw lead (mm)	5	1.2~5.2
	10	1.5~9.6
	20	2.3~11.8

1. Frictional resistance of NSK K1 is included in the dynamic torque in the table.
2. Grease is packed into ball screw, linear guide parts and support unit.
3. Consult NSK for life estimates under large moment loads.

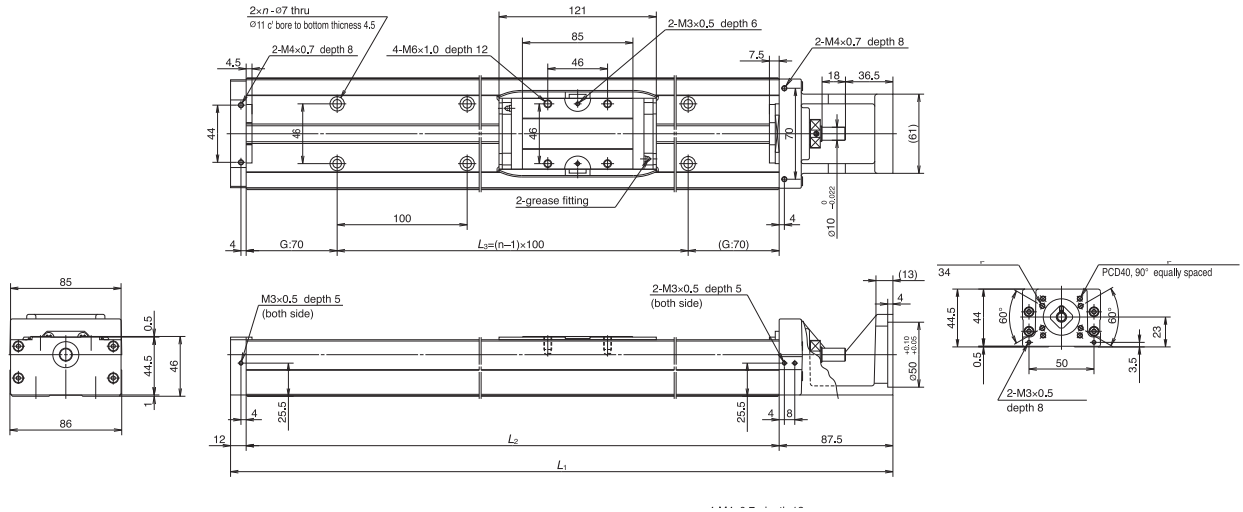
Basic load rating

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	Ø12	3000 (High grade) 3760 (Precision)	22800	4400	5	5410 (High grade) 6310 (Precision)	16300	1450
10		1930 (High grade) 2260 (Precision)	18100		10	3160 (High grade) 3780 (Precision)		
20		1930 (High grade) 2260 (Precision)	14400		20	3160 (High grade) 3780 (Precision)		

Basic static moment load of linear guide

Slider	Basic static moment load (N • m)		
	RollingM_{RO}	PitchingM_{PO}	YawingM_{YO}
Double	770	730	730

MCH09 Accuracy grade: High grade (H)



Dimension of MCH09 (Single slider)

Reference number	Nominal stroke (mm)	Stroke limit(mm) (K1 is not equipped)	Ball screw lead (mm)	Body length (mm)				Inertia ×10⁻⁶(kg • m²)	Mass (kg)
				L_1	L_2	L_3	n		
MCH09020H05K	200	207 (221)	5	439.5	340	200	3	12.4	6.5
MCH09020H10K			10					13.9	
MCH09030H05K	300	307 (321)	5	539.5	440	300	4	15.6	8.1
MCH09030H10K			10					17.1	
MCH09040H05K	400	407 (421)	5	639.5	540	400	5	18.8	9.7
MCH09040H10K			10					20.3	
MCH09050H10K	500	507 (521)	10	739.5	640	500	6	23.5	11
MCH09050H20K			20					29.6	
MCH09060H10K	600	607 (621)	10	839.5	740	600	7	26.7	13
MCH09060H20K			20					32.8	
MCH09080H10K	800	807 (821)	10	1 039.5	940	800	9	33.2	16
MCH09080H20K			20					39.2	

Items not marked are available from standard stock.
Items marked with I are designated as "quick delivery item" upon request.

Monocarrier dynamic torque specification (N • cm)		
Ball screw lead (mm)	5	1.0~5.9
	10	2.0~7.8
	20	2.0~10.8

1. Frictional resistance of NSK K1 is included in the dynamic torque in the 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

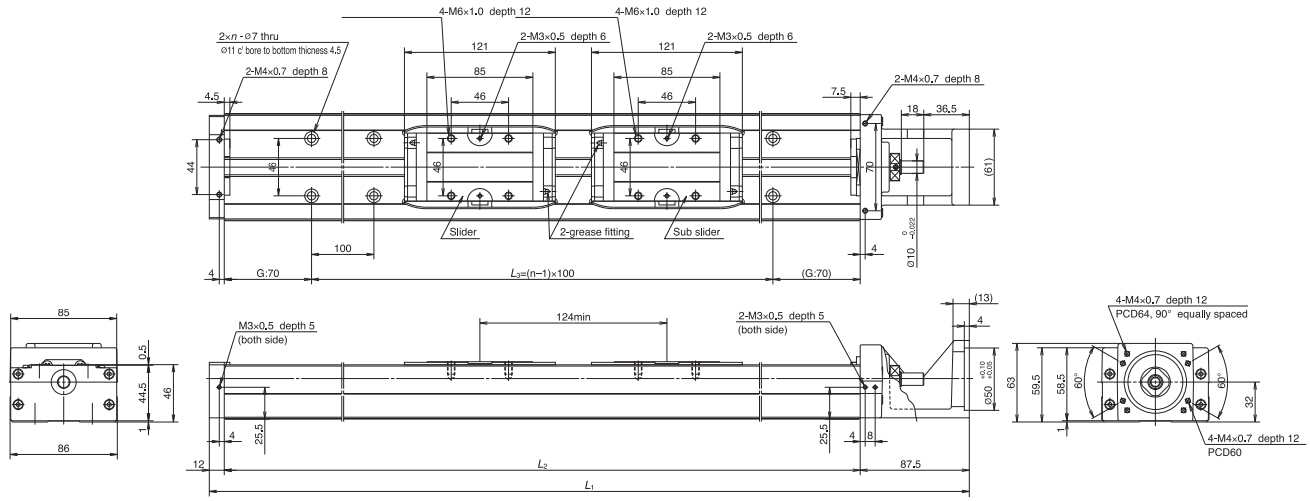
Lead	Shaft dia	Basic dynamic load rating (N)				Basic static load rating (N)		Support unit Load limit (N)
ℓ (mm)	d (mm)	Ball screw C_a	linear guides C	Support unit C_a	Rated running distance L_a (km)	Ball screw C_{0a}	Linear guides C_0	
5	Ø15	6820 (High grade) 7100 (Precision)	40600	7100	5	13200 (High grade) 13000 (Precision)	30500	3040
10		5110 (High grade) 7060 (Precision)	32200		10	9290 (High grade) 12700 (Precision)		
20		3290 (High grade) 4560 (Precision)	25500		20	5620 (High grade) 7750 (Precision)		

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 number	Nominal stroke (mm)	Stroke limit(mm) (K1 is not equipped)	Ball screw lead (mm)	Body length (mm)				Inertia $\times10^{-6}$(kg • m^2)	Mass (kg)
				L_1	L_2	L_3	n		
★ **MCH09015H05D**	150	183 (211)	5	539.5	440	300	4	16.1	8.9
★ **MCH09015H10D**			10					19.2	
★ **MCH09025H05D**	250	283 (311)	5	639.5	540	400	5	19.3	11
★ **MCH09025H10D**			10					22.4	
★ **MCH09035H05D**	350	383 (411)	5	739.5	640	500	6	22.5	12
★ **MCH09035H10D**			10					25.6	
★ **MCH09045H10D**	450	483 (511)	10	839.5	740	600	7	28.8	14
★ **MCH09045H20D**			20					40.9	
★ **MCH09065H10D**	650	683 (711)	10	1 039.5	940	800	9	35.2	17
★ **MCH09065H20D**			20					47.3	

Items not marked are available from standard stock.
Items marked with ★ are designated as "quick delivery item" upon request.

Monocarrier dynamic torque specification (N • cm)		
Ball screw lead (mm)	5	1.5~7.0
	10	2.5~10.8
	20	4.0~17.2

1. Frictional resistance of NSK K1 is included in the dynamic torque in the table.
2. Grease is packed into ball screw, linear guide parts and support unit.
3. Consult NSK for life estimates under large moment loads.

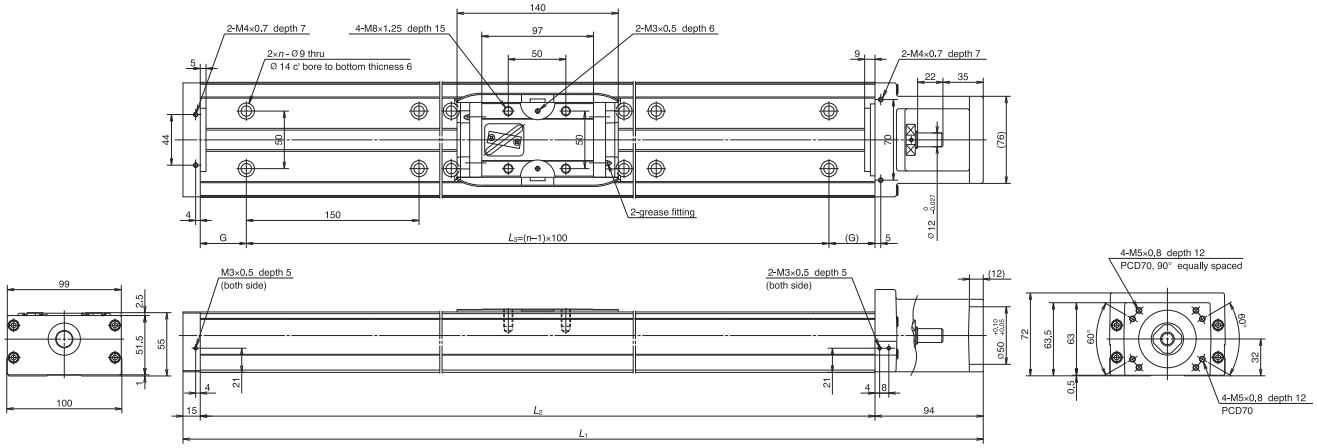
Basic load rating

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	Ø15	6820 (High grade) 7100 (Precision)	40600	7100	5	13200 (High grade) 13000 (Precision)	30500	3040
10		5110 (High grade) 7060 (Precision)	32200		10	9290 (High grade) 12700 (Precision)		
20		3290 (High grade) 4560 (Precision)	25500		20	5620 (High grade) 7750 (Precision)		

Basic static moment load of linear guide

Slider	Basic static moment load (N • m)		
	RollingM_{RO}	PitchingM_{PO}	YawingM_{YO}
Double	1780	2070	2070

MCH10 Accuracy grade: High grade (H)



Dimension of MCH10 (Single slider)

Reference number	Nominal stroke (mm)	Stroke limit(mm) (K1 is not equipped)	Ball screw lead (mm)	Body length (mm)					Inertia ×10^{-6}(kg • m^2)	Mass (kg)
				L_1	L_2	G	L_3	n		
MCH10040H10K	400	426	10	689	580	65	450	4	62.4	14
MCH10040H20K		(442)	20						71.8	
MCH10050H10K	500	526	10	789	680	40	600	5	74.7	16
MCH10050H20K		(542)	20						82.3	
MCH10060H10K	600	626	10	889	780	15	750	6	84.9	19
MCH10060H20K		(642)	20						92.5	
MCH10070H10K	700	726	10	989	880	65	750	6	95.1	21
MCH10070H20K		(742)	20						103	
MCH10080H10K	800	826	10	1 089	980	40	900	7	105	23
MCH10080H20K		(842)	20						113	
MCH10090H20K	900	926(942)	20	1 189	1 080	15	1 050	8	123	25
MCH10100H20K	1 000	1 026(1 042)	20	1 289	1 180	65	1 050	8	133	27
★MCH10110H20K	1 100	1 126(1 142)	20	1 389	1 280	40	1 200	9	143	29
★MCH10120H20K	1 200	1 226(1 242)	20	1 489	1 380	15	1 350	10	154	32

Items not marked are available from standard stock.

Items marked with ★ are designated as "quick delivery item" upon request.

Monocarrier dynamic torque specification (N • cm)		
Ball screw lead (mm)	10	2.7~10.8
	20	3.1~12.7

1. Frictional resistance of NSK K1 is included in the dynamic torque in the 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

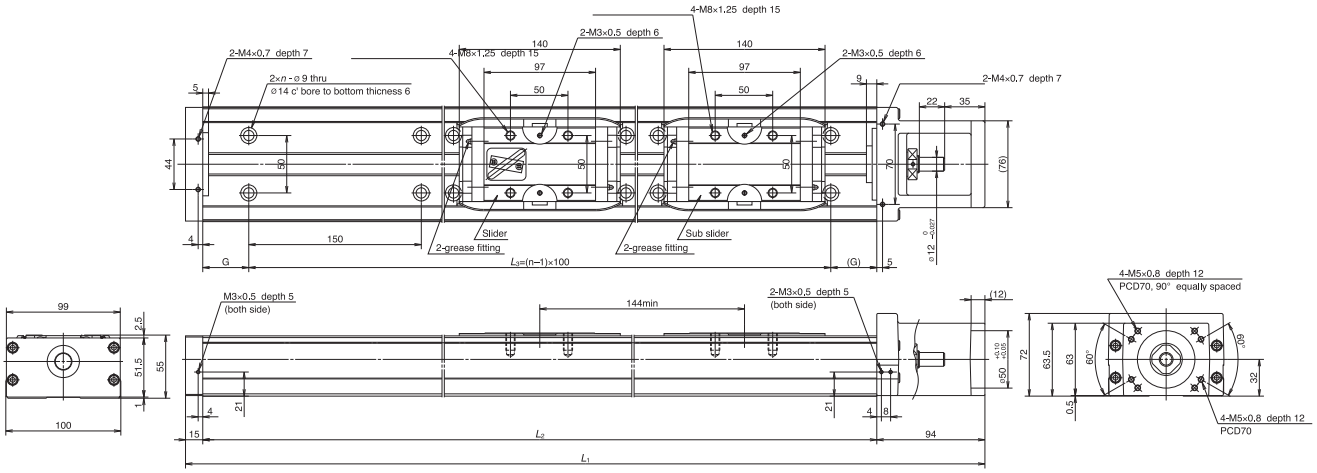
Lead ℓ (mm)	Shaft dia d (mm)	Basic dynamic load rating (N)				Basic static load rating (N)		Support unit Load limit (N)
		Ball screw C_a	linear guides C	Support unit C_a	Rated running distance L_a (km)	Ball screw C_{0a}	Linear guides C_0	
10	Ø20	8230 (High grade) 10900 (Precision)	44600	7600	10	17100 (High grade) 21700 (Precision)	42000	3380
20		5300 (High grade) 7060 (Precision)	35400		20	10300 (High grade) 12700 (Precision)		

Basic static moment load of linear guide

Slider	Basic static moment load (N • m)		
	Rolling M_{RO}	Pitching M_{PO}	Yawing M_{YO}
Single	1460	610	610

MCH10 (Double slider)

Accuracy grade: High grade (H)



Dimension of MCH10 (Double slider)

Reference number	Nominal stroke (mm)	Stroke limit(mm) (K1 is not equipped)	Ball screw lead (mm)	Body length (mm)					Inertia ×10^{-6}(kg • m^2)	Mass (kg)
				L_1	L_2	G	L_3	n		
★MCH10025H10D	250	282	10	689	580	65	450	4	67.1	15
★MCH10025H20D		(314)	20						82.4	
★MCH10035H10D	350	382	10	789	680	40	600	5	77.3	17
★MCH10035H20D		(414)	20						92.5	
★MCH10045H10D	450	482	10	889	780	15	750	6	87.5	20
★MCH10045H20D		(514)	20						103	
★MCH10055H10D	550	582	10	989	880	65	750	6	97.7	22
★MCH10055H20D		(614)	20						113	
★MCH10065H10D	650	682	10	1 089	980	40	900	7	108	24
★MCH10065H20D		(714)	20						123	
★MCH10075H20D	750	782(814)	20	1 189	1 080	15	1 050	8	133	26
★MCH10085H20D	850	882(914)	20	1 289	1 180	65	1 050	8	143	28
★MCH10095H20D	950	982(1 014)	20	1 389	1 280	40	1 200	9	154	30
★MCH10105H20D	1 050	1 082(1 114)	20	1 489	1 380	15	1 350	10	164	33

Items not marked are available from standard stock.

Items marked with ★ are designated as "quick delivery item" upon request.

Monocarrier dynamic torque specification (N • cm)		
Ball screw lead (mm)	10	4.2~15.6
	20	5.0~19.6

1. Frictional resistance of NSK K1 is included in the dynamic torque in the 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	
10	Ø20	8230 (High grade) 10900 (Precision)	44600	7600	10	17100 (High grade) 21700 (Precision)	42000	3380
20		5300 (High grade) 7060 (Precision)	35400		20	10300 (High grade) 12700 (Precision)		

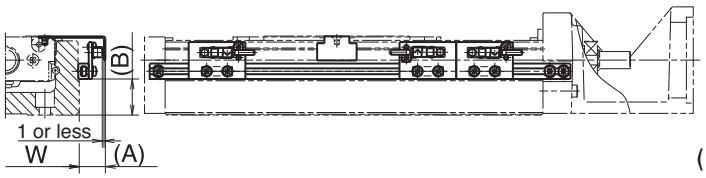
Basic static moment load of linear guide

Slider	Basic static moment load (N • m)		
	RollingM_{RO}	PitchingM_{PO}	YawingM_{YO}
Double	2920	3430	3430

3. 3 MCH Series Option Part

3. 3. 1 Sensor Unit

●Proximity switch

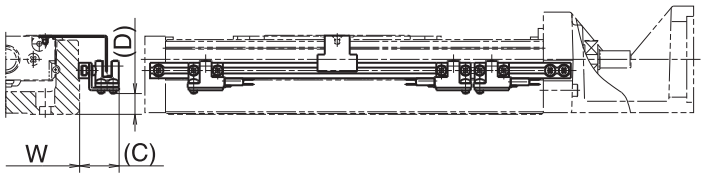


(Example of assembly)

Type		Reference number			Dimension(A) (mm)	Dimension(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 (a-contact)	—	3	1	E2S-W13 (OMRON Corp.)		
	Proximity switch (b-contact)	3	—	2	E2S-W14 (OMRON Corp.)		

*See page C19 for specification of proximity switch. A sensor unit consists of sensors, a sensor dog and sensor mounting parts.

●Photo sensor

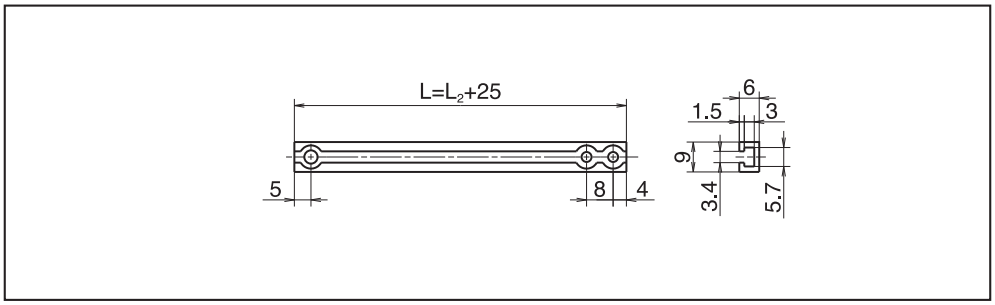


(Example of assembly)

Type	Reference number	Dimension(C) (mm)	Dimension(D) (mm)	Body width W (mm)	Remarks
MCH06	MC-SRH06-13	24	2	60	EE-SX674 (OMRON Corp.)
MCH09	MC-SRH09-13	23	12	86	3 sets
MCH10	MC-SRH10-13	22	16	100	(EE-1001 connector atachment)

*See page C20 for specification of photo sensor. A sensor unit consists of sensors, a sensor dog and sensor mounting parts.

●Sensor rail
Reference number : MC-SRL-✻✻✻✻
●✻✻✻✻ is the same as rail dimension L2.



Body of MCH Series and Sensor rail combination Table

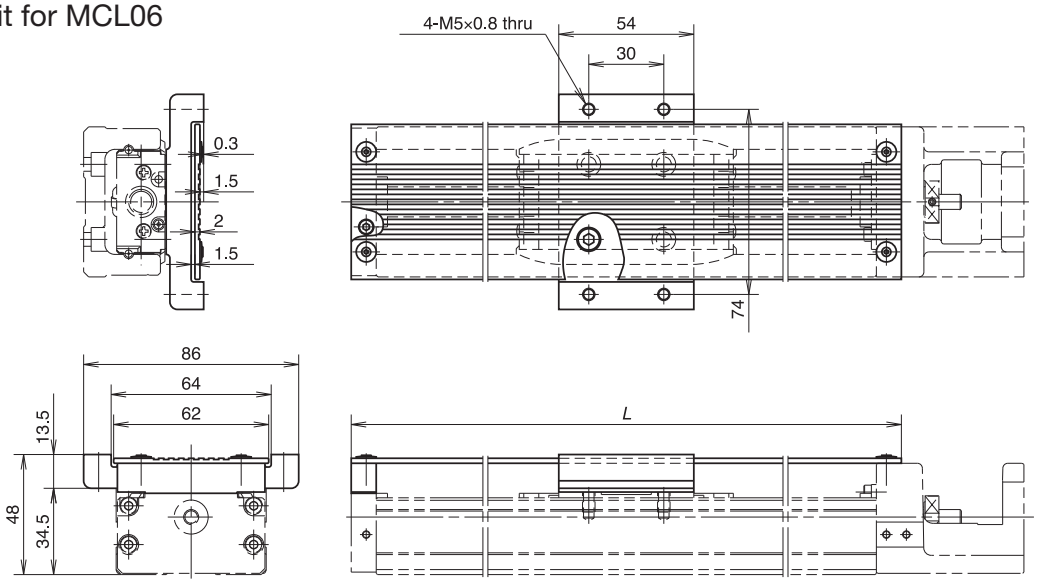
Table 3-4

Nominal size	Body length L_2 (mm)	Reference number	Sensor rail reference number
MCH06	150	MCH06005H05K MCH06005H10K	MC-SRL-0150
	200	MCH06010H05K MCH06010H10K	MC-SRL-0200
	300	MCH06020H05K MCH06020H10K MCH06010H05D MCH06010H10D	MC-SRL-0300
	400	MCH06030H10K MCH06030H20K MCH06020H05D MCH06020H10D	MC-SRL-0400
	500	MCH06040H10K MCH06040H20K MCH06030H05D MCH06030H10D	MC-SRL-0500
	600	MCH06050H10K MCH06050H20K MCH06040H10D MCH06040H20D	MC-SRL-0600
MCL06	150	MCL06005H05K MCL06005H10K	MC-SRL-0150
	200	MCL06010H05K MCL06010H10K	MC-SRL-0200
	300	MCL06020H05K MCL06020H10K	MC-SRL-0300
	400	MCL06030H10K MCL06030H20K	MC-SRL-0400
	500	MCL06040H10K MCL06040H20K	MC-SRL-0500
	600	MCL06050H10K MCL06050H20K	MC-SRL-0600
MCH09	340	MCH09020H05K MCH09020H10K	MC-SRL-0340
	440	MCH09030H05K MCH09030H10K MCH09015H05D MCH09015H10D	MC-SRL-0440
	540	MCH09040H05K MCH09040H10K MCH09025H05D MCH09025H10D	MC-SRL-0540
	640	MCH09050H10K MCH09050H20K MCH09035H05D MCH09035H10D	MC-SRL-0640
	740	MCH09060H10K MCH09060H20K MCH09045H10D MCH09045H20D	MC-SRL-0740
	940	MCH09080H10K MCH09080H20K MCH09065H10D MCH09065H20D	MC-SRL-0940

Nominal size	Body length L_2 (mm)	Reference number	Sensor rail reference number
MCH10	580	MCH10040H10K MCH10025H10D	MC-SRL-0580
	680	MCH10050H10K MCH10050H20K MCH10035H10D MCH10035H20D	MC-SRL-0680
	780	MCH10060H10K MCH10060H20K MCH10045H10D MCH10045H20D	MC-SRL-0780
	880	MCH10070H10K MCH10070H20K MCH10055H10D MCH10055H20D	MC-SRL-0880
	980	MCH10080H10K MCH10080H20K MCH10065H10D MCH10065H20D	MC-SRL-0980
	1080	MCH10090H20K MCH10075H20D	MC-SRL-1080
	1180	MCH10100H20K MCH10085H20D	MC-SRL-1180
	1280	MCH10110H20K MCH10095H20D	MC-SRL-1280
	1380	MCH10120H20K MCH10105H20D	MC-SRL-1380

3. 3. 2 Cover Unit

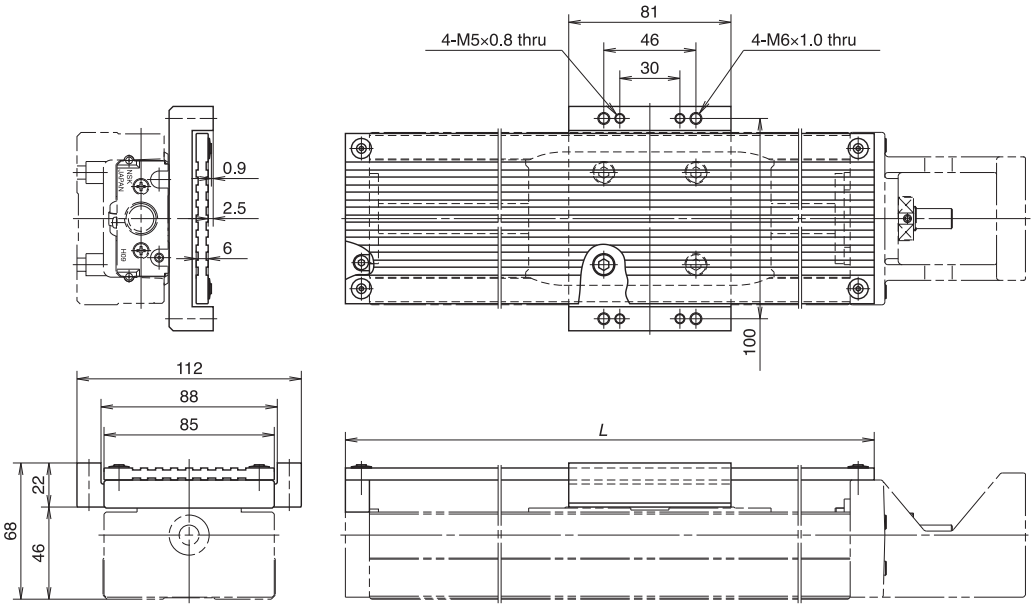
Cover unit for MCH06
Cover unit for MCL06



(Unit: mm)

Single slider		Double slider		Top cover length
Stroke	Reference number	Stroke	Reference number	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

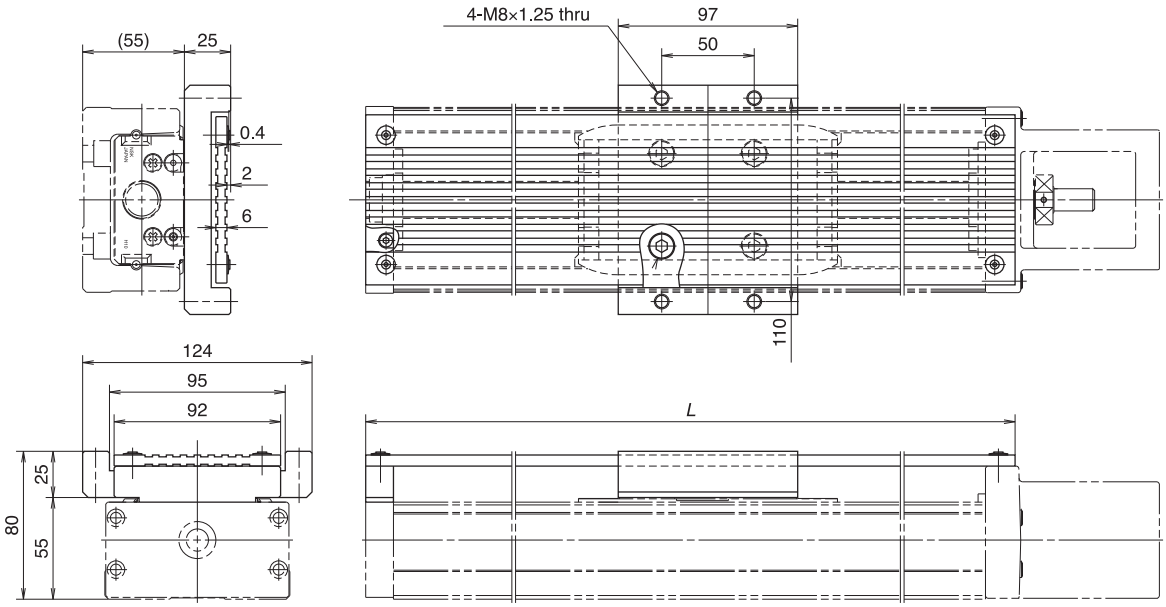
Cover unit for MCH09



(Unit: mm)

Single slider		Double slider		Top cover length
Stroke	Reference number	Stroke	Reference number	L
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
800	MC-HV09080-00	650	MC-HV09065D00	964

Cover unit for MCH10

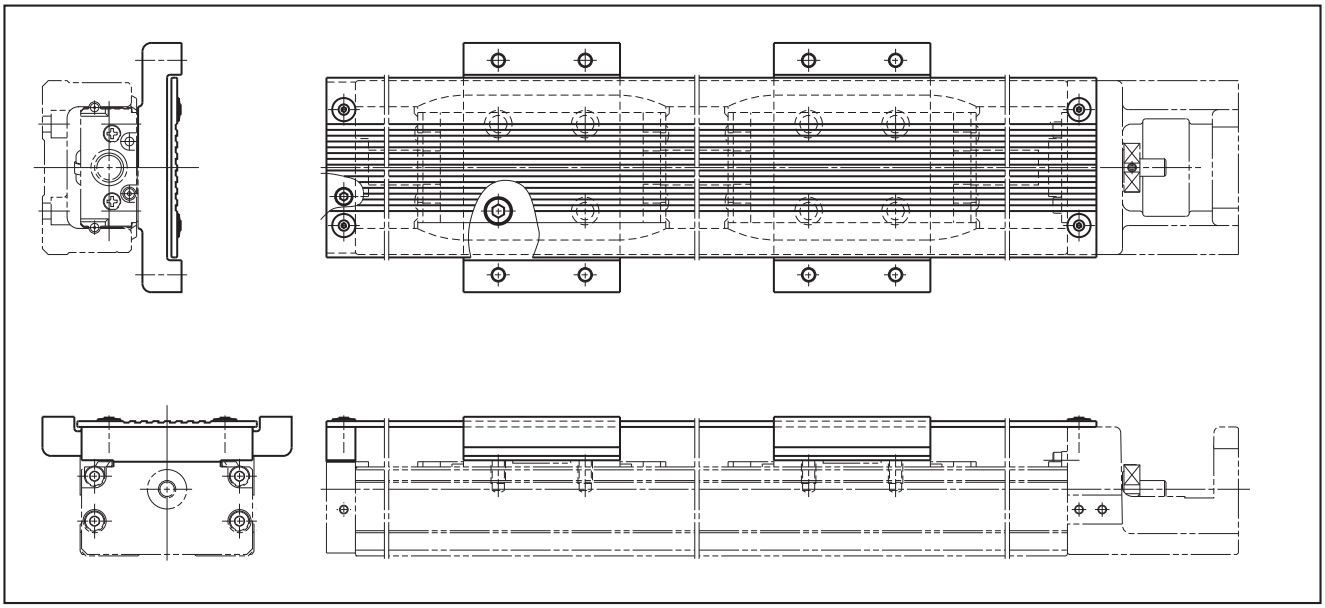


(Unit: mm)

Single slider		Double slider		Top cover length
Stroke	Reference number	Stroke	Reference number	L
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	1010
900	MC-HV10090-00	750	MC-HV10075D00	1110
1000	MC-HV10100-00	850	MC-HV10085D00	1210
1100	MC-HV10110-00	950	MC-HV10095D00	1310
1200	MC-HV10120-00	1050	MC-HV10105D00	1410

● Cover unit for double sliders (reference drawing)

Two spacers are attached for the double slider.

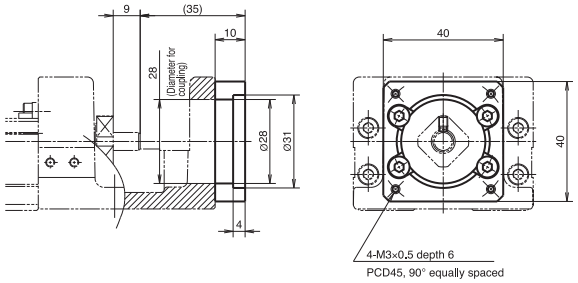


3. 3. 3 Intermediate Plate For Motor

- Please ask NSK for a motor that is not listed in the compatible motor list.
- In case of motor indirect mount, please consult with NSK.
- Be sure to align the center lines when installing the motor.

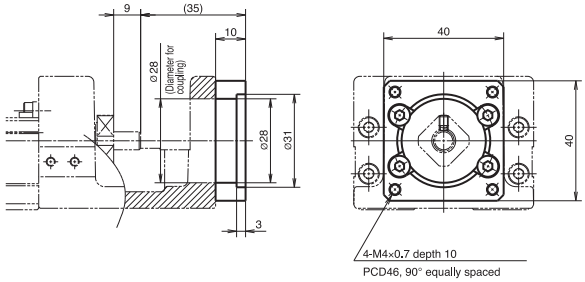
Motor Bracket for MCH06 and MCL06

Reference number : MC-BKH06-145-00



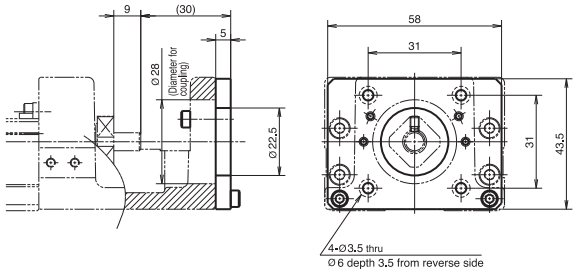
Compatible motor	
Maker	Motor models
Matsushita Electric Industrial Co., Ltd.	MSMD5A(50W), MSMD01(100W)

Reference number : MC-BKH06-146-00



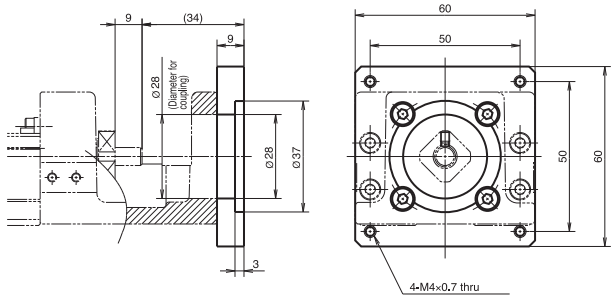
Compatible motor	
Maker	Motor models
Yaskawa Electric Corp.	SGMAH-A3(30W), SGMAH-A5(50W), SGMAS-A5A(50W) SGMAH-01(100W), SGMAS-01A(100W)
Mitsubishi Electric Corp.	HF-KP053(50W), HF-MP053(50W), HC-KFS053(50W) HC-MFS053(50W), HF-KP13(100W), HF-MP13(100W) HC-KFS13(100W), HC-MFS13(100W)
OMRON Corp.	R88M-W03(30W), R88M-W05(50W), R88M-W10(100W)
Sanyo Denki Co., Ltd.	P30B04xxx P Series

Reference number : MC-BKH06-231-00



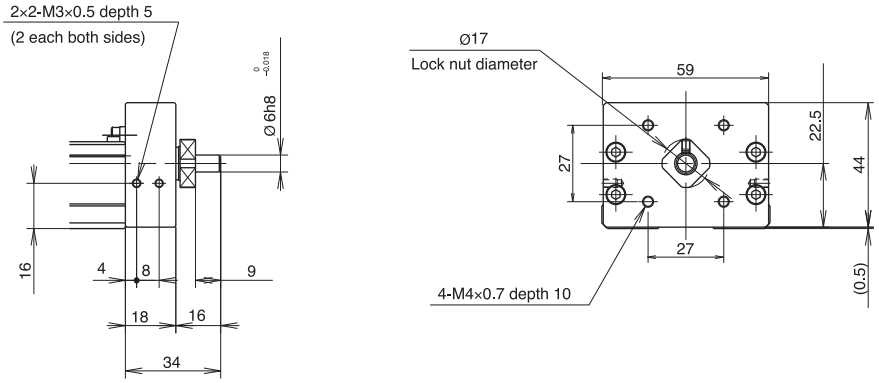
Compatible motor	
Maker	Motor models
Oriental Motor Co., Ltd.	AS46, ASC46, UPK54x, PK54x, CSK54x, CFK54x, UMK24x, CSK24x, PK24x
Sanyo Denki Co., Ltd.	PBM423xxx, 103F55xx

Reference number : MC-BKH06-250-00



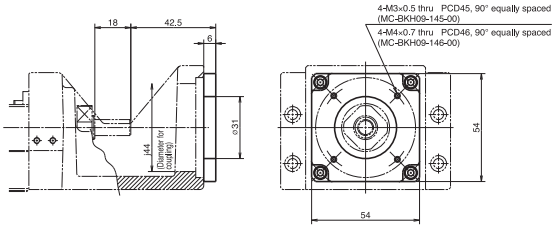
Compatible motor	
Maker	Motor models
Oriental Motor Co., Ltd.	AS66, ASC66, UPK56x, UFK56x, PK56x, CSK56x, CFK56x MUMS02(200W), MUMS04(400W)
Sanyo Denki Co., Ltd.	PBM603xx, PBM604xx, 103F78xx

Diameter of ball screw shaft end to install a pulley for indirect motor mount of MCH06



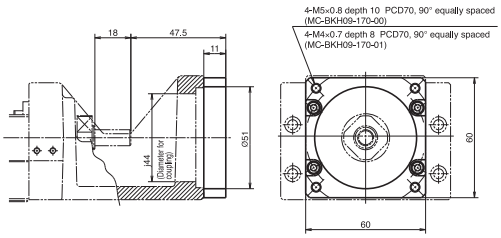
Motor Bracket for MCH09

Reference number : MC-BKH09-145-00
MC-BKH09-146-00



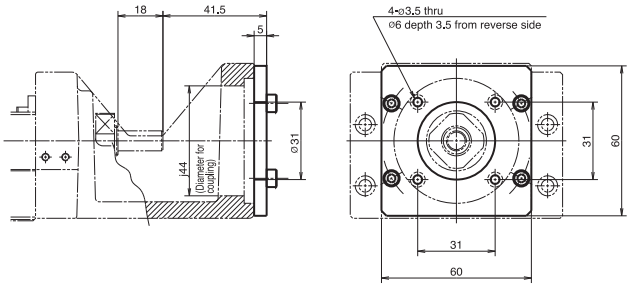
Reference number	Compatible motor	
	Maker	Motor models
MC-BKH09-145-00	Matsushita Electric Industrial Co., Ltd.	MSMD5A(50W), MSMD01(100W)
MC-BKH09-146-00	Yaskawa Electric Corp.	SGMAH-A5(50W), SGMAS-A5A(50W) SGMAH-01(100W), SGMAS-01A(100W)
	Mitsubishi Electric Corp.	HF-KP053(50W), HF-MP05(50W), HC-KFS053(50W) HC-MFS053(50W), HF-KP13(100W), HF-MP13(100W) HC-KFS13(100W), HC-MFS13(100W)
	OMRON Corp.	R88M-W05(50W), R88M-W10(100W)
	Sanyo Denki Co., Ltd.	P30B04xxx P Series

Reference number : MC-BKH09-170-00
MC-BKH09-170-01



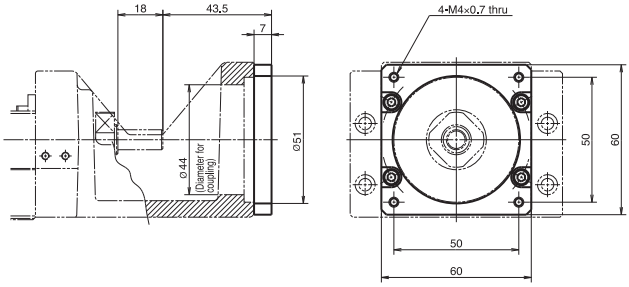
Reference number	Compatible motor	
	Maker	Motor models
MC-BKH09-170-00	Yaskawa Electric Corp.	SGMAH-02(200W), SGMAS-02A(200W) SGMAH-04(400W), SGMAS-04A(400W)
	Mitsubishi Electric Corp.	HF-KP23(200W), HF-MP23(200W) HF-KP43(400W), HF-MP43(400W)
	OMRON Corp.	R88M-W20(200W), R88M-W40(400W)
	Sanyo Denki Co., Ltd.	P30B06xxx P Series
MC-BKH09-170-01	Matsushita Electric Industrial Co., Ltd.	MSMD02(200W), MSMA02(200W) MSMA04(400W), MSMD04(400W)

Reference number : MC-BKH09-231-00



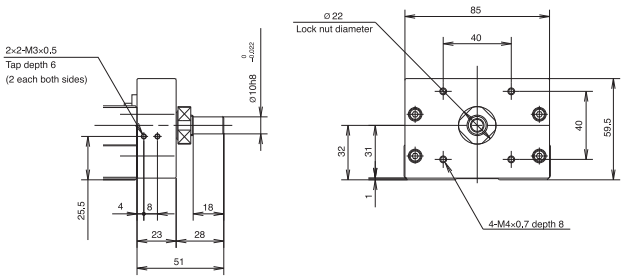
Compatible motor	
Maker	Motor models
Sanyo Denki Co., Ltd.	PBM423xxx, 103F55xx
Oriental Motor Co., Ltd.	AS46, ASC46, UPK54x, PK54x, CSK54x, CFK54x UMK24x, CSK24x, PK24x

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 indirect motor mount of MCH09



MCH Series

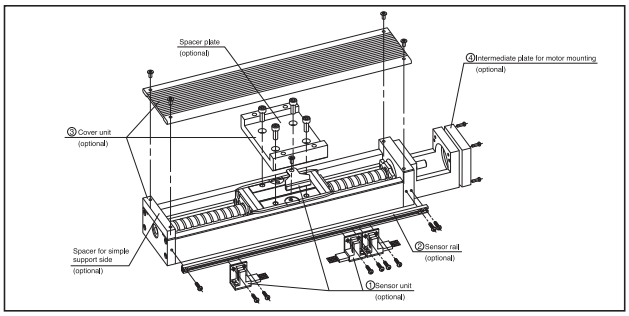
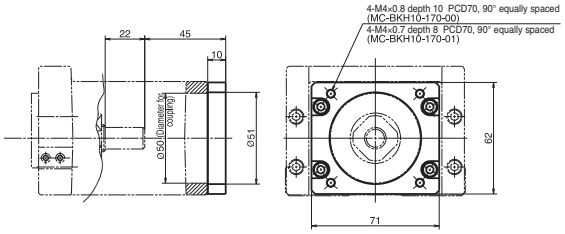


Fig. 1-4 Assembly Optional components for MCH10 (example)

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 : Prepared for each motor maker.
☆ We assemble optional components upon request.

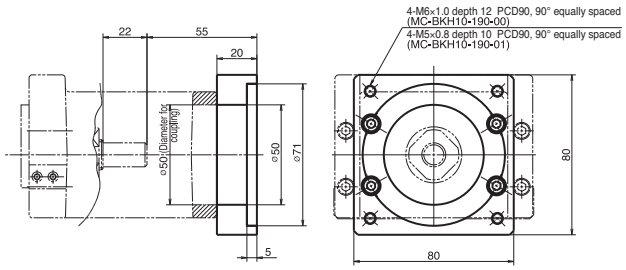
Motor Bracket for MCH10

Reference number : MC-BKH10-170-00
MC-BKH10-170-01



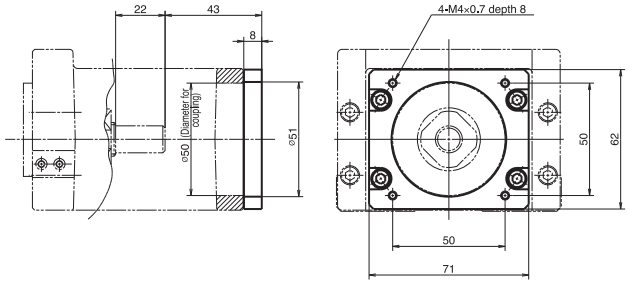
Reference number	Compatible motor	
	Maker	Motor models
MC-BKH10-170-00	Yaskawa Electric Corp.	SGMAH-02(200W), SGMAS-02A(200W) SGMAH-04(400W), SGMAS-04A(400W)
	Mitsubishi Electric Corp.	HF-KP23(200W), HF-MP23(200W) HF-KP43(400W), HF-MP43(400W)
	OMRON Corp.	R88M-W20(200W), R88M-W40(400W)
	Sanyo Denki Co., Ltd.	P30B06xxx P Series
MC-BKH10-170-01	Matsushita Electric Industrial Co., Ltd.	MSMD02(200W), MSMA02(200W) MSMD04(400W), MSMA04(400W)

Reference number : MC-BKH10-190-00
MC-BKH10-190-01



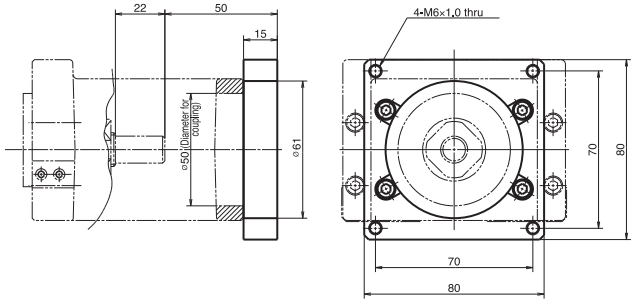
Reference number	Compatible motor	
	Maker	Motor models
MC-BKH10-190-00	Mitsubishi Electric Corp.	HC-KFS73(750W), HC-MFS73(750W) HF-KP73(750W), HF-MP73(750W)
MC-BKH10-190-01	Sanyo Denki Co., Ltd.	P50B07xxx P Series

Reference number : MC-BKH10-250-00



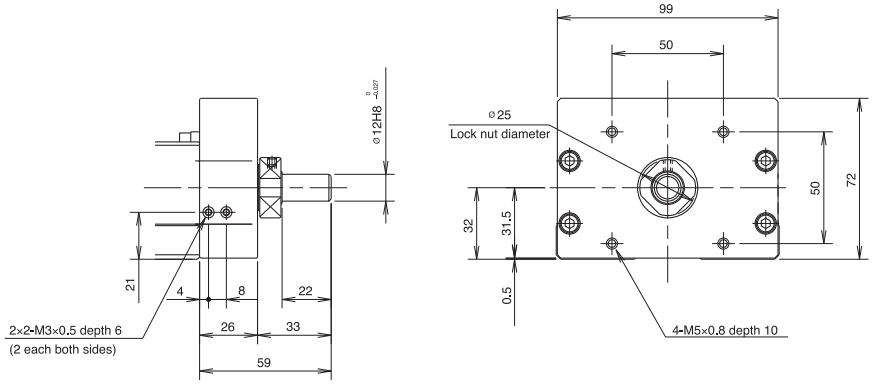
Compatible motor	
Maker	Motor models
Sanyo Denki Co., Ltd.	PBM603xx, PBM604xx, 103F78xx
Oriental Motor Co., Ltd.	AS66, ASC66, UPK56x, PK56x, CSK56x, CFK56x UMK56x, UFK56X

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 indirect motor mount of MCH10



Availability Motor Table of Intermediate Plate for MCH Series

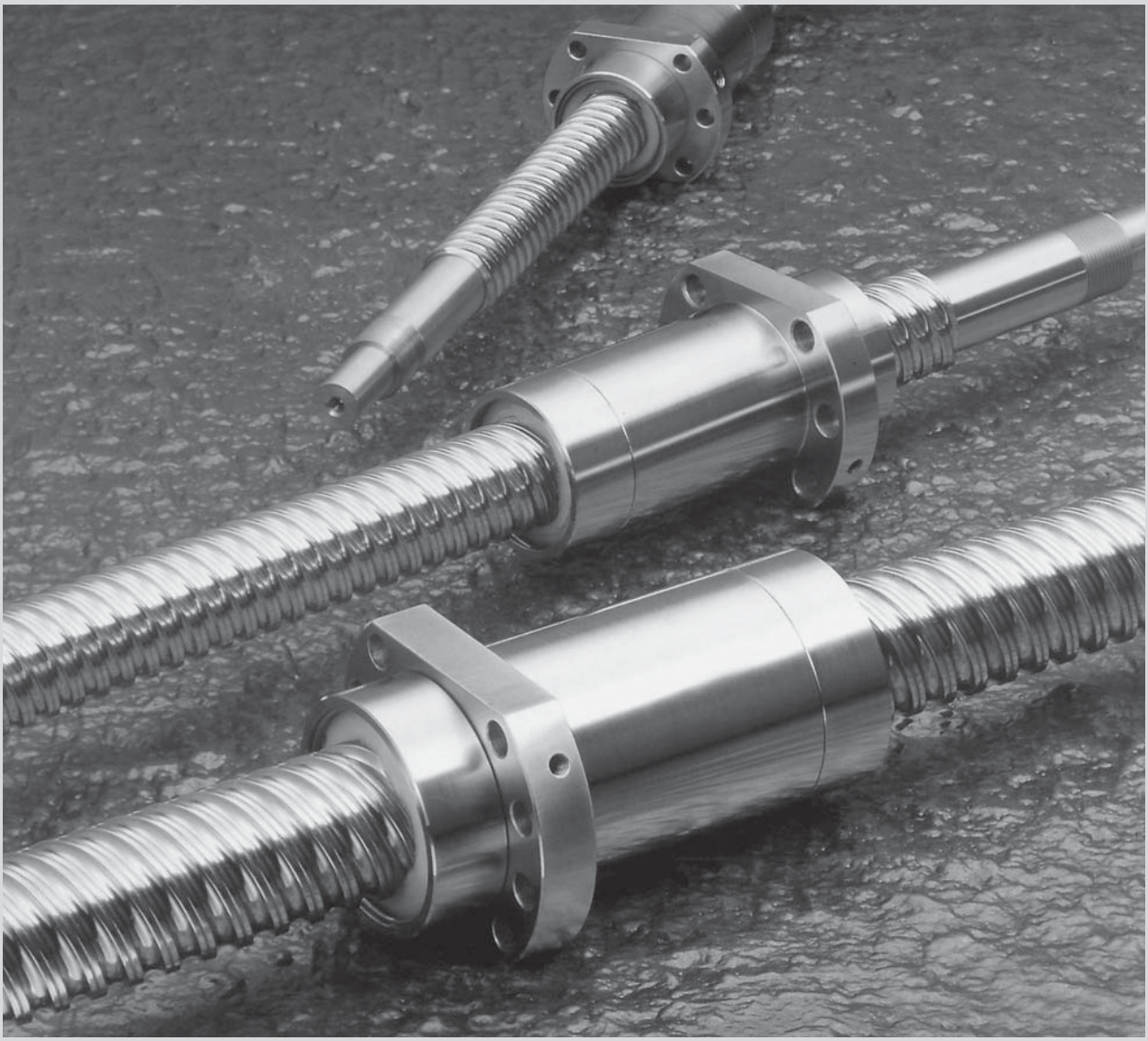
Table 3-5

Nominal size	Reference number code	Motor bracket reference number	Motor manufacturer	Stepping motor model number	Wattage of AC servo motor					
					30	50	100	200	400	750
MCH06 MCL06	1	MC-BKH06-145-00	Matsushita Electric Industrial Co., Ltd.			MSMD5A	MSMD01			
	2	MC-BKH06-146-00	Yaskawa Electric Corp.		SGMAH-A3	SGMAH-A5 SGMAS-A5A	SGMAH-01 SGMAS-01A			
			Mitsubishi Electric Corp.			HF-KP053 HF-MP053 HC-KFS053 HC-MFS053	HF-KP13 HF-MP13 HC-KFS13 HC-MFS13			
			OMRON Corp.		R88M-W03	R88M-W05	R88M-W10			
			Sanyo Denki Co., Ltd.	P30B04xxx (P Series)						
	3	MC-BKH06-231-00	Sanyo Denki Co., Ltd.	PBM423xxx 103F55xx						
			Oriental Motor Co., Ltd.	AS46 , ASC46 UPK54x , PK54x CSK54x , CFK54x UMK24x , CSK24x PK24x						
	4	MC-BKH06-250-00	Sanyo Denki Co., Ltd.	PBM603xx PBM604xx 103F78xx						
			Oriental Motor Co., Ltd.	AS66 , ASC66 UPK56x , UFK56x PK56x , CSK56x CFK56x				MUMS02	MUMS04	
MCH09	1	MC-BKH09-145-00	Matsushita Electric Industrial Co., Ltd.			MSMD5A	MSMD01			
	2	MC-BKH09-146-00	Yaskawa Electric Corp.			SGMAH-A5 SGMAS-A5A	SGMAH-01 SGMAS-01A			
			Mitsubishi Electric Corp.			HF-KP053 HF-MP05 HC-KFS053 HC-MFS053	HF-KP13 HF-MP13 HC-KFS13 HC-MFS13			
			OMRON Corp.			R88M-W05	R88M-W10			
			Sanyo Denki Co., Ltd.	P30B04xxx (P Series)						
	3	MC-BKH09-170-00	Yaskawa Electric Corp.					SGMAH-02 SGMAS-02A	SGMAH-04 SGMAS-04A	
			Mitsubishi Electric Corp.					HF-KP23 HF-MP23	HF-KP43 HF-MP43	
			OMRON Corp.					R88M-W20	R88M-W40	
			Sanyo Denki Co., Ltd.	P30B06xxx (P Series)						
	4	MC-BKH09-170-01	Matsushita Electric Industrial Co., Ltd.					MSMD02 MSMA02	MSMD04 MSMA04	
	5	MC-BKH09-231-00	Sanyo Denki Co., Ltd.	PBM423xxx 103F55xx						
			Oriental Motor Co., Ltd.	AS46 , ASC46 UPK54x , PK54x CSK54x , CFK54x UMK24x , CSK24x PK24x						
	6	MC-BKH09-250-00	Sanyo Denki Co., Ltd.	PBM603xx PBM604xx 103F78xx						
			Oriental Motor Co., Ltd.	AS66 , ASC66 UPK56x , UFK56x PK56x , CSK56x CFK56x						
MCH10	1	MC-BKH10-170-00	Yaskawa Electric Corp.					SGMAH-02 SGMAS-02A	SGMAH-04 SGMAS-04A	
			Mitsubishi Electric Corp.					HF-KP23 HF-MP23	HF-KP43 HF-MP43	
			OMRON Corp.					R88M-W20	R88M-W40	
			Sanyo Denki Co., Ltd.	P30B06xxx (P Series)						
	2	MC-BKH10-170-01	Matsushita Electric Industrial Co., Ltd.					MSMD02 MSMA02	MSMD04 MSMA04	
	3	MC-BKH10-190-00	Mitsubishi Electric Corp.							HC-KFS73 HC-MFS73 HF-KP73 HF-MP73
	4	MC-BKH10-190-01	Sanyo Denki Co., Ltd.	P50B07xxx (P Series)						
	5	MC-BKH10-250-00	Sanyo Denki Co., Ltd.	PBM603xx PBM604xx 103F78xx						
			Oriental Motor Co., Ltd.	AS66 , ASC66 UPK56x , PK56x CSK56x , CFK56x UMK56x , UFK56x						
	6	MC-BKH10-270-00	Oriental Motor Co., Ltd.	AS98 , ASC98 UPK59x , PK59x CSK59x , CFK59x UMK59x , UFK59x						

Precision Rolled Ball Screws

Main features:

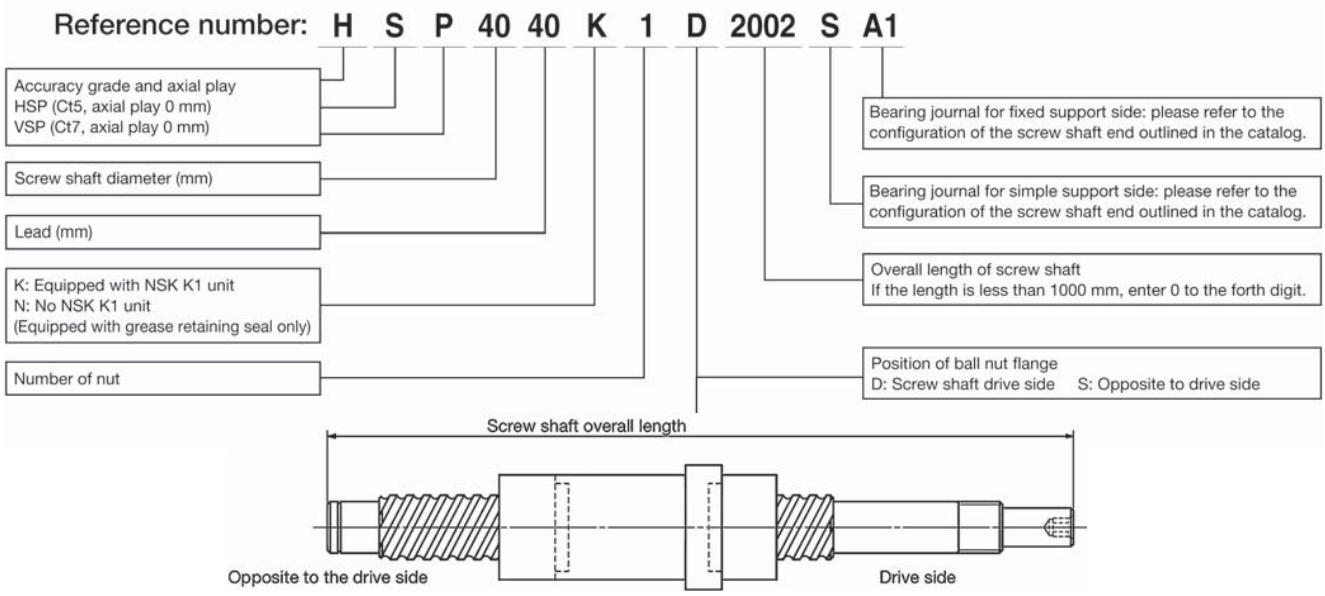
Compact ball nut heralding in the next generation standard.
Extended maintenance free operation with NSK K1®
lubrication unit and new grease retaining seal.
Suitable for high speed and long stroke operation.



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.

- 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})
- Critical speed of the screw shaft (caused by the resonance of the screw shaft)
- Permissible d·N

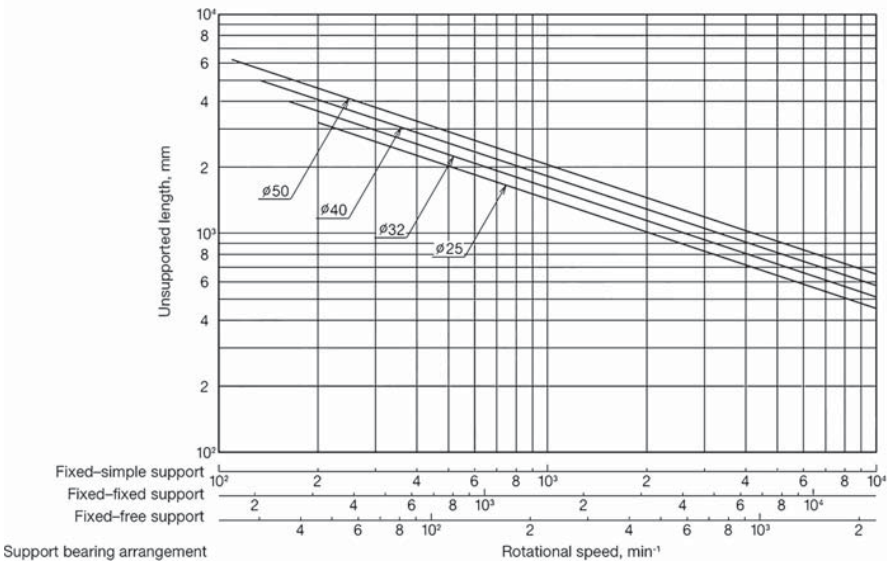
Preferably d·N≦150 000. Please consult with NSK if your ball screw exceeds the limitation.

- Critical speed

See the chart below. For detailed calculations, please refer to the catalog: Precision Machine Component (CAT No. E3161).

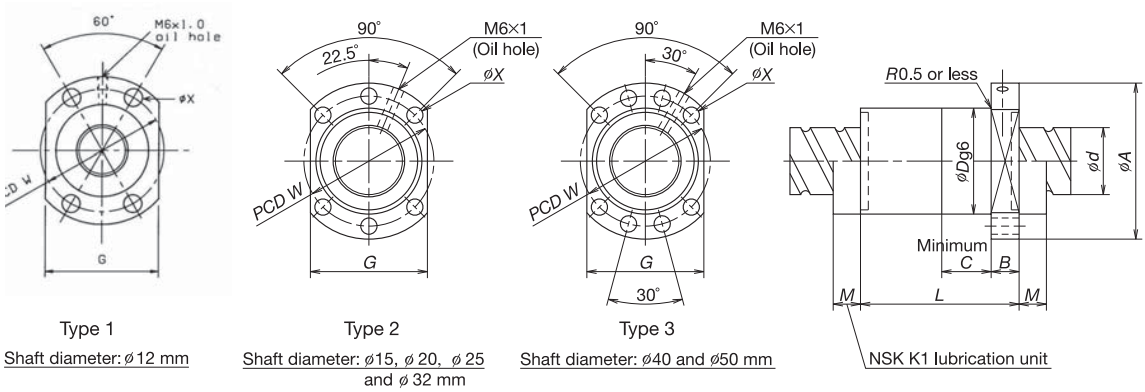
Please consult NSK if the maximum rotational speed exceeds 5 000 min^{-1}, even both the critical speed of the screw shaft rotation and the d·N value are in ranges of the allowable limit.

Permissible rotational speed vs. critical speed.



Precision Rolled Ball Screws PR and LPR Series

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

PR Series

Unit: mm

Model No.	Shaft diameter	Lead	Effective turns of balls	Basic load rating (N)		Dimensions									Maximum screw shaft length	
	d	*ℓ*		Dynamic load rating C_a	Static load rating C_{oa}	*D*	*A*	*G*	*B*	*L*	*C*	*W*	*X*	*M***	Ct5	Ct7
PR1205	12	5	2.7x1	3 200	5 860	24	40	26	11	30	10	32	4.5	(18)	500	900
PR1505	15	5	2.7x1	5 460	10 200	28	48	40	11	30	10	38	5.5	(18)	600	1 200
PR1510	15	10	2.7x1	5 460	10 200	28	48	40	11	43	15	38	5.5	(18)	600	1 200
PR2005	20	5	2.7x1	8 790	18 500	36	58	44	13	31	10	47	6.6	(18)	800	1 600
PR2010	20	10	2.7x1	8 790	18 500	36	58	44	13	45	15	47	6.6	(18)	800	1 600
PR2505	25	5	3.7×1	15 700	40 900	40	62	48	12	42	10	51	6.6	(21)	2500	3 200
PR2510	25	10	3.7×1	12 800	32 300	40	62	48	12	56	15	51	6.6	(21)	2 500	3 200
PR3210	32	10	3.7×1	19 000	51 500	50	80	62	12	59	10	65	9	(21)	3 200	4 000
PR3220	32	20	3.7×1	19 000	51 500	50	80	62	12	98	15	65	9	(21)	3 200	4 000
PR4010	10	10	3.7x1	33 800	89 900	63	93	70	14	60	10	78	9	(21)	1 600	3 200

LPR Series

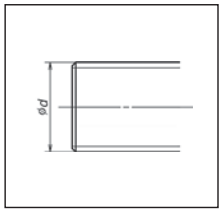
Unit: mm

Model No.	Shaft diameter	Lead	Effective turns of balls	Basic load rating (N)		Dimensions									Maximum screw shaft length	
	d	*ℓ*		Dynamic load rating C_a	Static load rating C_{oa}	*D*	*A*	*G*	*B*	*L*	*C*	*W*	*X*	*M*	Ct5	Ct7
LPR2020	20	20	1.7×2	9 890	21 600	36	58	44	13	54	25	47	6.6	(18)	800	1 600
LPR2525	25	25	1.7×2	11 000	27 500	40	62	48	12	63	30	51	6.6	(21)	2 500	3 200
LPR3232	32	32	1.7×2	16 300	43 900	50	80	62	14	79	40	65	9	(21)	3 200	4 000
LPR4040	40	40	1.7×2	29 000	76 200	63	93	70	16	94	45	78	9	(21)	4 000	6 500
LPR5050	50	50	1.7×2	32 200	96 200	75	110	85	18	115	45	93	11	(21)	4 000	6 500

* Please, consult NSK. ** only for reference.

2. Recommendation of Screw Shaft End Configuration

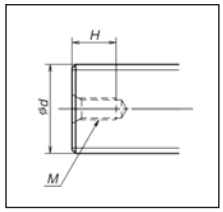
2.1 Drive side shaft end and opposite end: P



Unit: mm

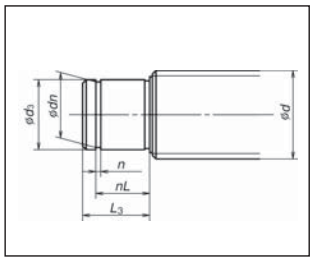
Screw shaft
Diameter *d*
12
15
20
25
32
40
50

2.2 Drive side shaft end and opposite end: R



Screw shaft	Tap hole	
Diameter *d*	Size *M*	Depth *H*
12	M3×0.5	9
15	M4×0.7	10
20	M6×1	12
25	M6×1	12
32	M6×1	12
40	M8×1.25	16
50	M8×1.25	16

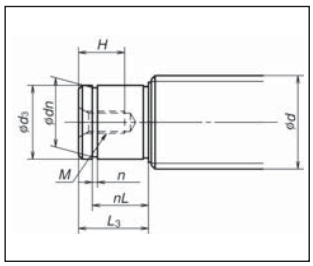
2.3 Opposite to drive side shaft end: S



Support unit	Screw shaft	Bearing journal		Snap ring groove		
Reference number	Diameter *d*	Diameter d_3 g6	Length L_3	Width *n* Tolerance	Diameter *dn* Tolerance	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

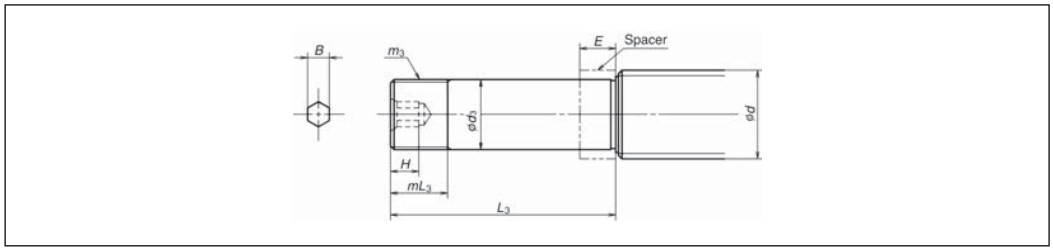
2.4 Opposite to drive side shaft end: T



Support unit	Screw shaft	Bearing journal		Snap ring groove			Tap hole	
Reference number	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	M3×0.5	9
WBK15S-01	20	15	13	$1.15^{+0.14}_{0}$	$14.3^{0}_{-0.11}$	10.15	M3×0.8	10
WBK20S-01	25	20	19	$1.35^{+0.14}_{0}$	$19^{0}_{-0.21}$	15.35	M6×1.0	12
WBK25S-01	32	25	20	$1.35^{+0.14}_{0}$	$23.9^{0}_{-0.21}$	16.35	M6×1.0	12
(6206)	40	30	22	$1.75^{+0.14}_{0}$	$28.6^{0}_{-0.21}$	17.75	M8×1.25	16
(6207)	50	35	25	$1.75^{+0.14}_{0}$	$33^{0}_{-0.21}$	18.75	M8×1.25	16

( ): Reference number of bearing

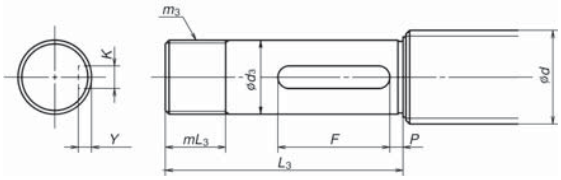
2.5 Drive side shaft end: C Opposite to drive side shaft end: U



Unit: mm

Support unit		Spacer	Screw shaft	Bearing journal		Lock nut thread		Hexagon hole	
Reference number		Reference number	Diameter *d*	Diameter d_3 g6	Length L_3	Nominal m_3	Length mL_3	Width across the flats $B^{+0.2}_{0}$	Depth *H*
WBK08-01A	WBK08-11	WBK08K	12	8	32	M8×1	9	–	–
WBK12-01A	WBK12-11	WBK12K	15	12	35	M12×1	10	4	6
WBK15-01A	WBK15-11	WBK15K	20	15	50	M15×1	15	5	7
WBK20-01	WBK20-11	WBK20K	25	20	64	M20×1	16	6	8
WBK25-01	WBK25-11	WBK25K	32	25	76	M25×1.5	20	8	10
WBK30DF-31		–	40	30	89	M30×1.5	26	10	12
WBK35DF-31		–	50	35	92	M35×1.5	30	12	14

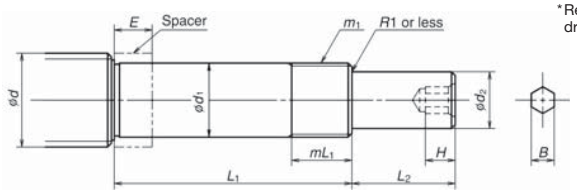
2.6 Opposite to drive side shaft end: V



Unit: mm

Support unit		Screw shaft	Bearing journal		Lock nut thread		Key seat			
Reference number		Diameter d	Diameter d_3 g6	Length L_3	Nominal m_3	Length mL_3	Width K N9	Position P	Depth $Y^{+0.1}_{0}$	Length F
WBK08-01A	WBK08-11	12	8	32	M8×1	9	2	3	1.2	14
WBK12-01A	WBK12-11	15	12	35	M12×1	10	4	3	2.5	20
WBK15-01A	WBK15-11	20	15	50	M15×1	15	5	3	3	25
WBK20-01	WBK20-11	25	20	64	M20×1	16	6	4	3.5	30
WBK25-01	WBK25-11	32	25	76	M25×1.5	20	8	4	4	40
WBK30DF-31		40	30	89	M30×1.5	26	8	5	4	40
WBK35DF-31		50	35	92	M35×1.5	30	10	5	5	50

2.7 Drive side shaft end: A1

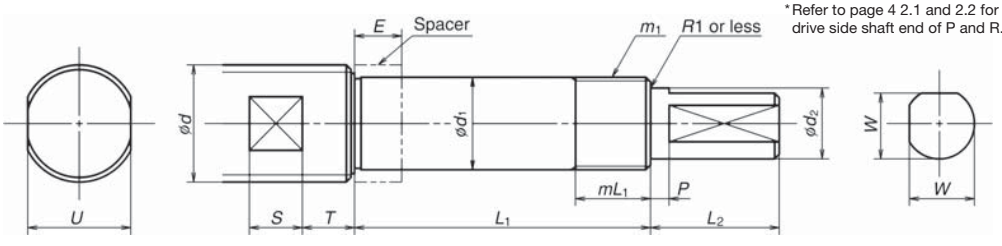


*Refer to page 4 2.1 and 2.2 for the dimensions of drive side shaft end of P and R.

Unit: mm

Support unit		Spacer	Screw shaft	Bearing journal		Lock nut thread		Drive section		Hexagon hole	
Reference number		Reference number	Diameter d	Diameter d_1 g6	Length L_1	Nominal m_3	Length mL_1	Diameter d_2 h_7	Length L_2	Width across the flats $B^{+0.2}_{0}$	Depth H
WBK08-01A	WBK08-11	WBK08K	12	8	32	M8×1	9	6	10	–	–
WBK12-01A	WBK12-11	WBK12K	15	12	35	M12×1	10	10	15	4	6
WBK15-01A	WBK15-11	WBK15K	20	15	50	M15×1	15	12	20	5	7
WBK20-01	WBK20-11	WBK20K	25	20	64	M20×1	16	15	27	6	8
WBK25-01	WBK25-11	WBK25K	32	25	76	M25×1.5	20	20	33	8	10
WBK30DF-31		–	40	30	89	M30×1.5	26	25	61	10	12
WBK35DF-31		–	50	35	92	M35×1.5	30	30	63	12	14

2.8 Drive side shaft end: A3

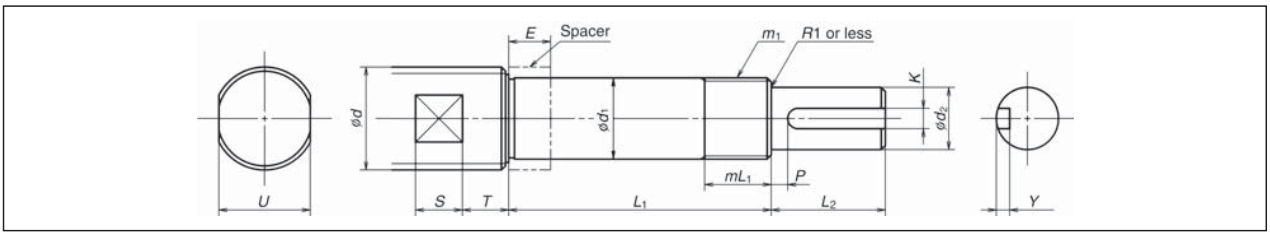


*Refer to page 4 2.1 and 2.2 for the dimensions of drive side shaft end of P and R.

Unit: mm

Support unit		Spacer	Screw shaft	Bearing journal		Lock nut thread		Drive section		D		Wrench flats		
Reference number		Reference number	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	Width across the flats U Tolerance	Position T	Length S
WBK08-01A	WBK08-11	WBK08K	12	8	32	M8×1	9	6	10	2	5.5	$10^{0}_{-0.2}$	4	5.5
WBK12-01A	WBK12-11	WBK12K	15	12	35	M12×1	10	10	15	3	9	$12^{0}_{-0.25}$	6	6.5
WBK15-01A	WBK15-11	WBK15K	20	15	50	M15×1	15	12	20	3	11	$17^{0}_{-0.25}$	6	8.5
WBK20-01	WBK20-11	WBK20K	25	20	64	M20×1	16	15	27	4	14	$22^{0}_{-0.3}$	10	11
WBK25-01	WBK25-11	WBK25K	32	25	76	M25×1.5	20	20	33	4	19	$32^{0}_{-0.3}$	10	15
WBK30DF-31		–	40	30	89	M30×1.5	26	25	61	5	24	$36^{0}_{-0.3}$	16	16
WBK35DF-31		–	50	35	92	M35×1.5	30	30	63	5	29	$41^{0}_{-0.3}$	16	18

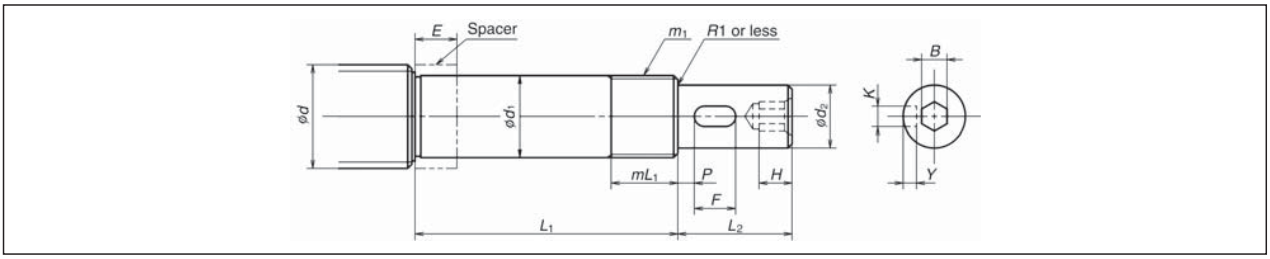
2.9 Drive side shaft end: A4



Unit: mm

Support unit		Spacer	Screw shaft	Bearing journal		Lock nut thread		Drive section		Key seat			Wrench flats		
Reference number		Reference number	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 $Y^{+0.1}_{0}$	Width across the flats U Tolerance	Position T	Length S
WBK08-01A	WBK08-11	WBK08K	12	8	32	M8×1	9	6	10	–	–	–	$10^{0}_{-0.2}$	4	5.5
WBK12-01A	WBK12-11	WBK12K	15	12	35	M12×1	10	10	15	2	3	1.2	$12^{0}_{-0.25}$	6	6.5
WBK15-01A	WBK15-11	WBK15K	20	15	50	M15×1	15	12	20	4	3	2.5	$17^{0}_{-0.25}$	6	8.5
WBK20-01	WBK20-11	WBK20K	25	20	64	M20×1	16	15	27	5	4	3	$22^{0}_{-0.3}$	10	11
WBK25-01	WBK25-11	WBK25K	32	25	76	M25×1.5	20	20	33	6	4	3.5	$32^{0}_{-0.3}$	10	15
WBK30DF-31		–	40	30	89	M30×1.5	26	25	61	8	5	4	$36^{0}_{-0.3}$	16	16
WBK35DF-31		–	50	35	92	M35×1.5	30	30	63	8	5	4	$41^{0}_{-0.3}$	16	18

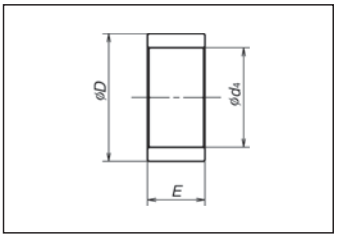
2.10 Drive side shaft end: A5



Unit: mm

Support unit		Spacer	Screw shaft	Bearing journal		Lock nut thread		Drive section		Key seat				Wrench flats	
Reference number		Reference number	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 $Y^{+0.1}_{0}$	Length F	Width across the flats $B^{+0.2}_{0}$	Depth H
WBK08-01A	WBK08-11	WBK08K	12	8	32	M8×1	9	6	10	–	–	–	–	–	–
WBK12-01A	WBK12-11	WBK12K	15	12	35	M12×1	10	10	15	–	–	–	–	4	6
WBK15-01A	WBK15-11	WBK15K	20	15	50	M15×1	15	12	20	4	3	2.5	7	5	7
WBK20-01	WBK20-11	WBK20K	25	20	64	M20×1	16	15	27	5	4	3	10	6	8
WBK25-01	WBK25-11	WBK25K	32	25	76	M25×1.5	20	20	33	6	4	3.5	15	8	10
WBK30DF-31		–	40	30	89	M30×1.5	26	25	61	8	5	4	40	10	12
WBK35DF-31		–	50	35	92	M35×1.5	30	30	63	8	5	4	40	12	14

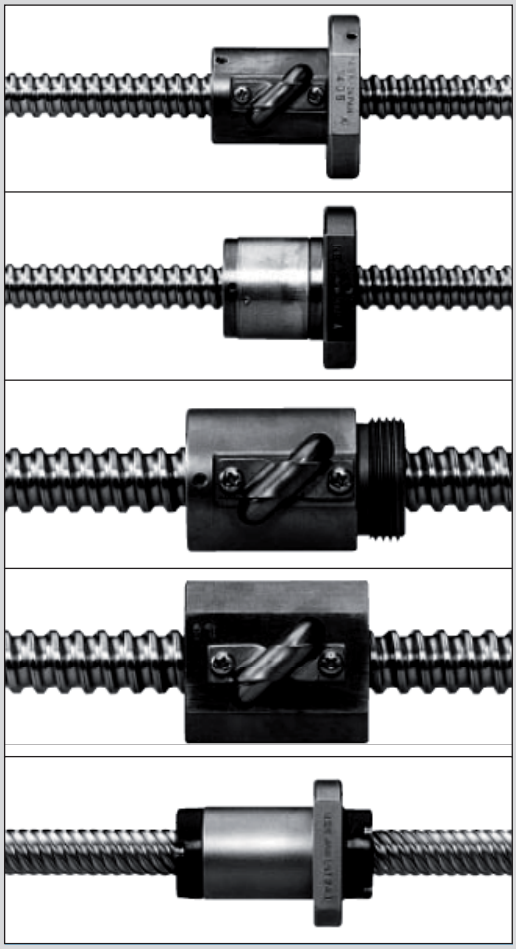
2.11 Spacer



Unit: mm

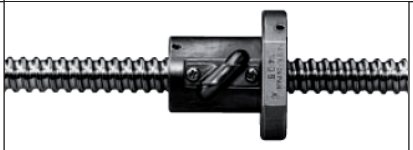
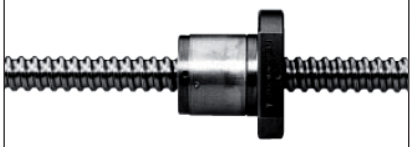
Reference number	Bearing journal	Spacer dimensions		
	Diameter d	Bore d_4	Diameter D	Width E
WBK08K	8	8	11.5	5.5
WBK12K	12	12	14.5	5.5
WBK15K	15	15	19.5	10
WBK20K	20	20	25.5	11
WBK25K	25	25	32	14

Rolled Ball Screws R-Series



- Short delivery time: R Series is standardized, and available in stock.
- Interchangeable screw shaft and ball nut: Screw shaft and nut assembly components are sold separately, and randomly-matched. The maximum axial play after assembly is shown in the dimension tables.
- Low prices: Screw shaft is processed by rolling. This is why prices are lower than those of precision types.
- Abundant series: There are 128 types of nut assembly combinations in the series. Each combination has two to three different lengths in screw shaft.

Rolled Ball Screws

Nut model	Picture group		Recirculation system	Lead classification
RNFTL		Flanged, Tube projecting type	Return tube type	Fine, medium lead High helix lead
RNFBL		Flanged Circular	Return tube type	Fine, medium lead
RNCT		V-thread (no flange) Projecting tube type	Return tube type	Fine lead
RNSTL		Square type	Return tube type	Small, medium leads
RNFCL		Flanged Circular	End cap type	High helix lead Ultra high helix lead

- Short delivery time: R Series is standardized, and available in stock.
- Interchangeable screw shaft and ball nut: Screw shaft and nut assembly components are sold separately, and randomly-matched. The maximum axial play after assembly is shown in the dimension tables.
- Low prices: Screw shaft is processed by rolling. This is why prices are lower than those of precision types.
- Abundant series: There are 128 types of nut assembly combinations in the series. Each combination has two to three different lengths in screw shaft.

Reference number

Nut assembly (example)

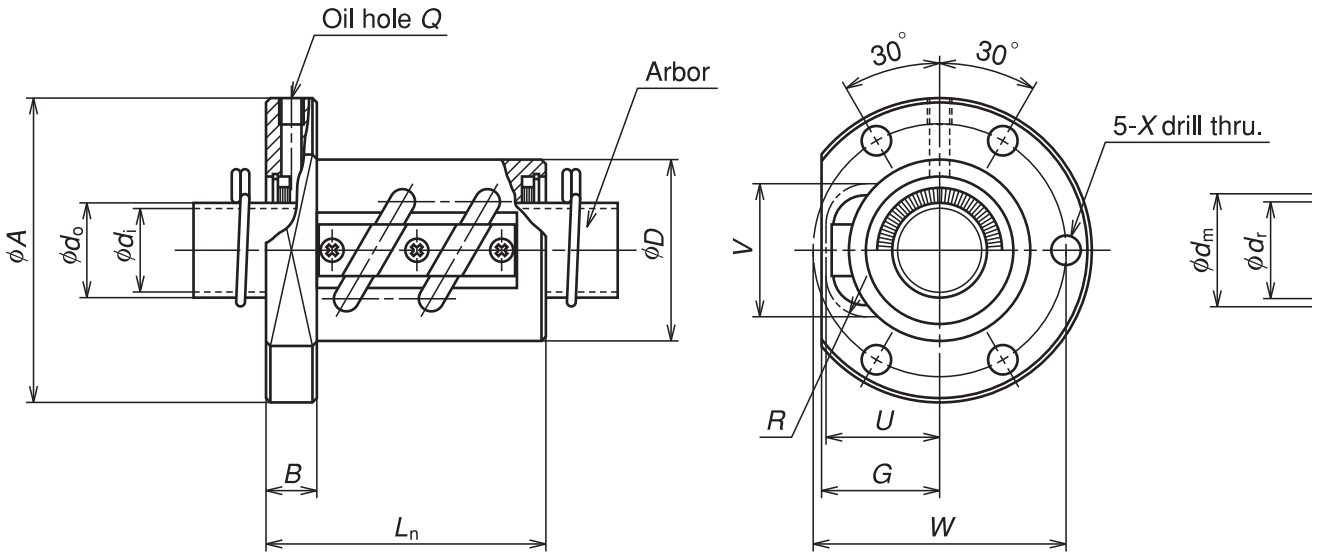
RNFTL 25 10 A5 S

- RNFTL — Product code (rolled nut); Nut model: FTL, FBL, STL, CT, FCL
- 25 — Screw shaft diameter (mm)
- 10 — Lead (mm)
- A5 — Internal design code
- A5 — Effective turns of balls (turns of balls x circuit number)
- S — Seal code S: With seal; No code: Without seal

Screw shaft (example)

RS2510A20

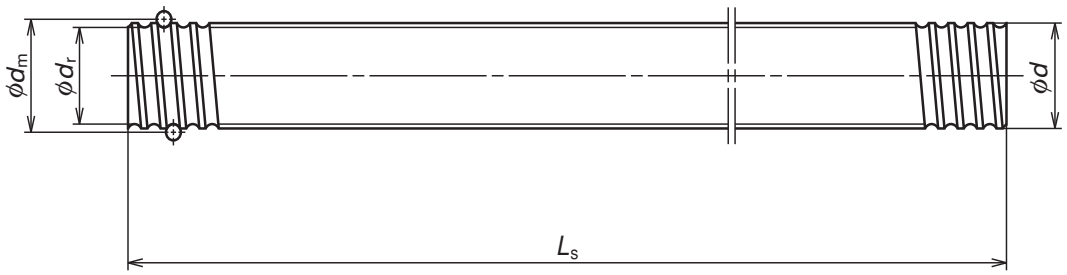
- RS — Product code (Rolled screw shaft)
- 25 — Screw shaft diameter (mm)
- 10 — Lead (mm)
- A — Internal design code
- 20 — Screw shaft length (x 100 mm)



Ball nut No.	Shaft dia. d	Lead l	Ball dia. D_w	Ball circle dia. d_m	Root dia. d_r	Effective turns of balls Turns × Circuits	Basic load rating N Dynamic C_a	Basic load rating N Static C_{0a}	Axial plax Max.
RNFTL 1003A3.5	10	3	2.381	10.65	8.0	3.5×1	3780	6730	0.10
RNFTL 1006A2.5S	10	6	2.381	10.65	8.1	2.5×1	2830	4810	0.10
RNFTL 1208A2.5S	12	8	2.778	12.65	9.6	2.5×1	3730	6560	0.10
RNFTL 1404A3.5S	14	4	2.778	14.5	11.5	3.5×1	5370	10800	0.10
RNFTL 1405A2.5S	14	5	3.175	14.5	11.0	2.5×1	5260	9720	0.10
RNFTL 1610A2.5 **RNFTL 1610A2.5S**	16	10	3.175	16.75	13.3	2.5×1	5660	11500	0.10
RNFTL 1808A3.5 **RNFTL 1808A3.5S**	18	8	4.762	18.5	13.6	3.5×1	13200	25800	0.15
RNFTL 2005A2.5 **RNFTL 2005A2.5S**	20	5	3.175	20.5	17.0	2.5×1	6360	14200	0.10
RNFTL 2010A2.5 **RNFTL 2010A2.5S**	20	10	4.762	21.25	16.2	2.5×1	10900	21800	0.15
RNFTL 2505A5 **RNFTL 2505A5S**	25	5	3.175	25.5	22.0	2.5×2	12800	36300	0.10
RNFTL 2510A2.5 **RNFTL 2510A2.5S**	25	10	6.35	26	19.	2.5×1	17500	35200	0.20
RNFTL 2510A5 **RNFTL 2510A5S**						2.5×2	31800	70300	

Remarks 1. Protruding portion of the tube does not have any interference with the ball nut housing if its dimensions corresponding to U and V are large enough.
2. The actual entire screw shaft length may become slightly longer than nominal length Ls due to manufacturing tolerance.
3. Seal is contained in the nut. Therefore, the external dimensions of those with a seal are the same as those without. In the side view drawing of ball nut, the above of the center line is with seal, and beneath is without seal.
Seal for those with the shaft diameter of 14 mm or less is made of synthetic resin. Seal for those of 16 mm or over is a "Brush-seal."

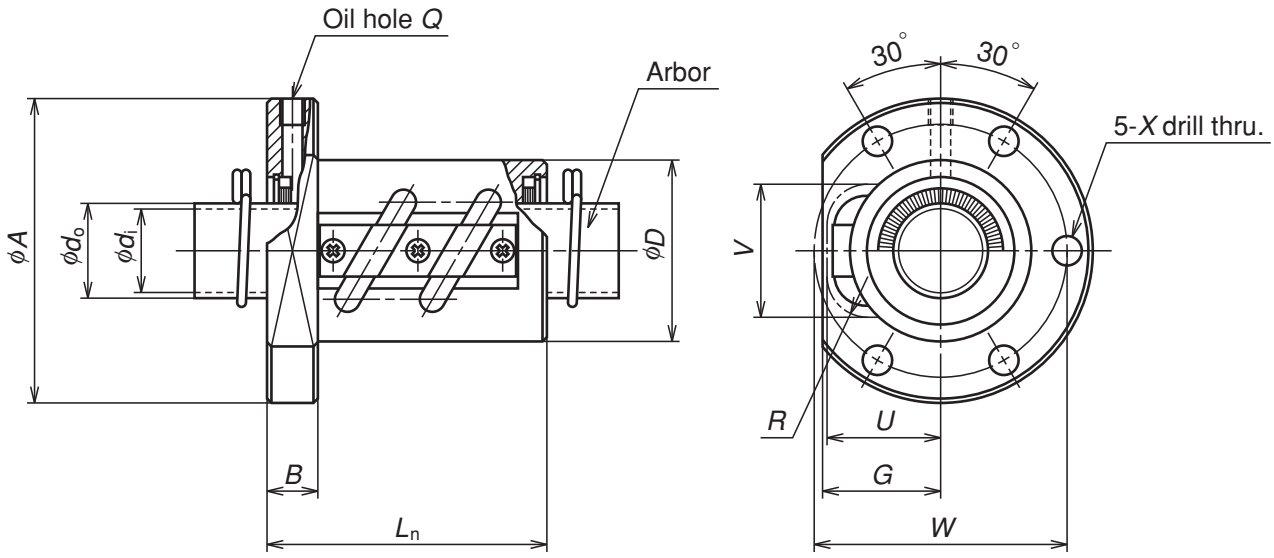
Standard stock



Unit: mm

Ball nut dimensions											Arbor		Screw shaft			
Outside dia.	Flange			Length	Bolt hole		Oil hole	Projecting tube			Outside dia.	Bore	Standard length			Screw shaft No.
D	*A*	*G*	*B*	L_n	*W*	*X*	*Q*	*U*	*V*	*R*	d_0	d_i	L_s			
20	40	15	6	34	30	4.5	M3×0.5	15	15	7	8.1	6.1	400	800		RS1003A**
20	40	15	6	36	30	4.5	M3×0.5	15	15	5	8.1	6.1	400	800		RS1006A**
25	45	19	8	46	35	4.5	M3×0.5	19	18	7	9.6	7.6	400	800		RS1208A**
25	50	19	10	43	40	4.5	M6×1	19	20	7	11.5	9.5	500	1000		RS1404A**
30	50	22	10	45	40	4.5	M6×1	22	21	8	11.0	9.0	500	1000		RS1405A**
30	53	23	10	54	41	5.5	M6×1	23	22.5	8	13.3	11.3	500	1000	1500	RS1610A**
34	63	27	12	58	49	6.6	M6×1	27	27	14	13.6	11.6	500	1000	1500	RS1808A**
40	60	28	10	46	50	4.5	M6×1	28	27	10	17.0	14.6	500	1000	2000	RS2005A**
40	67	30	12	59	53	6.6	M6×1	30	29	12	16.2	13.8	500	1000	2000	RS2010A**
42	71	28	12	66	57	6.6	M6×1	28	31	10	22.0	19.6	1000	2000	2500	RS2505A**
44	80	34	15	62	62	9	M6×1	34	37	17	19.0	16.6	1000	2000	2500	RS2510A**
44	80	34	15	92	62	9	M6×1	34	37	17						

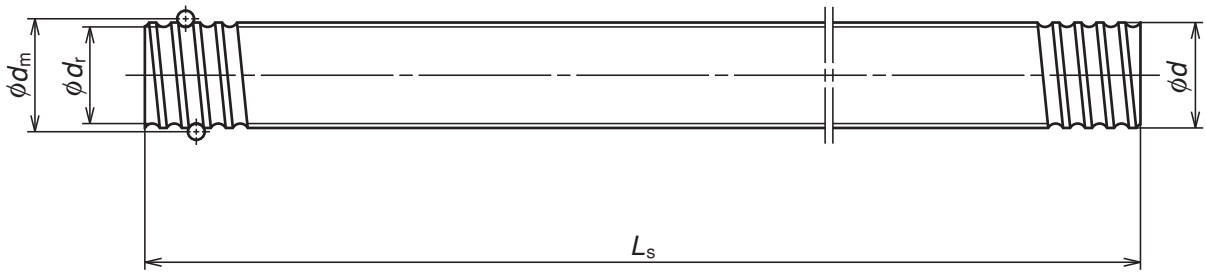
Remarks 4. Nut assembly with arbor and the screw shaft are separated at time of delivery.
5. At the end of the screw shaft reference number where marked with "**", fill with the value obtained by dividing the standard screw shaft length by 100 mm.
6. Items in stock are not applied surface treatment. NSK provides treatment such as phosphate coating on request.



Ball nut No.	Shaft dia. d	Lead l	Ball dia. D_w	Ball circle dia. d_m	Root dia. d_r	Effective turns of balls Turns × Circuits	Basic load rating N Dynamic C_a	Basic load rating N Static C_{0a}	Axial play Max.
RNFTL 2806A2.5	28	6	3.175	28.5	25.0	2.5×1	7430	20300	0.10
RNFTL 2806A2.5S									
RNFTL 2806A5						2.5×2	13500	40600	
RNFTL 2806A5S									
RNFTL 3210A5	32	10	6.35	33.75	27.0	2.5×2	35700	92200	0.20
RNFTL 3210A5S									
RNFTL 3610A2.5	36	10	6.35	37	30.	2.5×1	21000	51000	0.20
RNFTL 3610A2.5S									
RNFTL 3610A5						2.5×2	38100	102000	
RNFTL 3610A5S									
RNFTL 4010A7	40	10	6.35	41.75	35.0	3.5×2	53500	164000	0.20
RNFTL 4010A7S									
RNFTL 4512A5	45	12	7.144	46.5	39.0	2.5×2	49600	147000	0.23
RNFTL 4512A5S									
RNFTL 5010A7	50	10	6.35	51.75	45.0	3.5×2	59500	205000	0.20
RNFTL 5010A7S									
RNFTL 5016A5	50	16	9.525	52	42.0	2.5×2	99900	293000	0.23
RNFTL 5016A5S									

Remarks 1. The protruding portion of the tube does not interfere with nut housing if its corresponding dimensions to U and V are large enough.
2. The actual screw shaft length may become slightly longer than nominal length of Ls due to manufacturing tolerance.
3. The seal is contained in the nut. Therefore, the external dimensions of those with a seal are the same as those without.
In the side view drawing of the nut, the above of the center line is with seal, and beneath is without seal.
Seal is "Brush-seal".

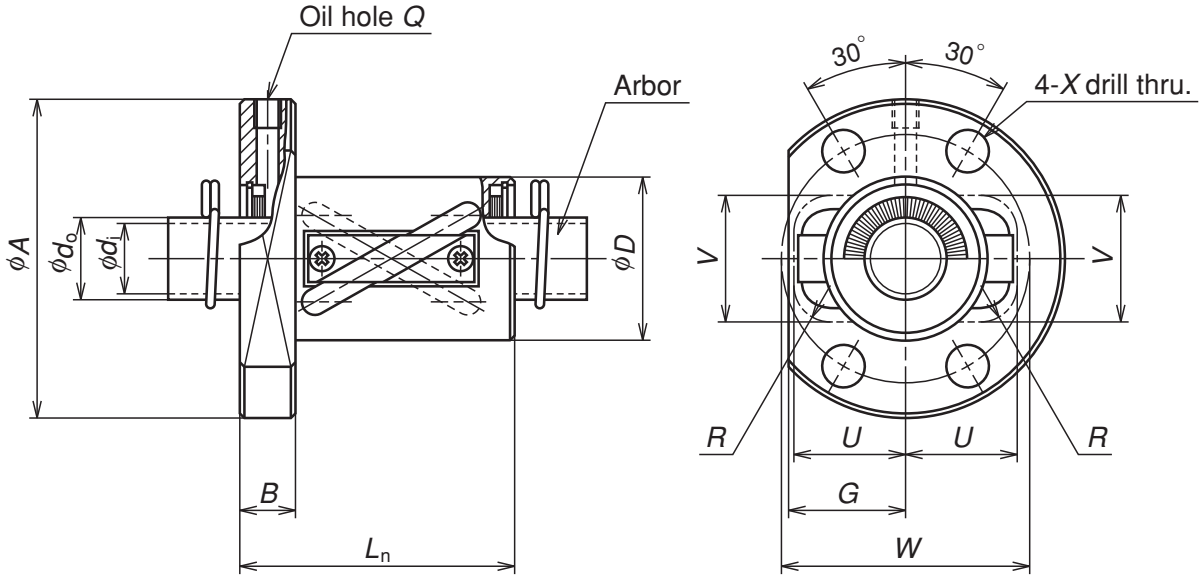
Standard stock



Unit: mm

Ball nut dimensions											Arbor		Screw shaft			
Outside dia.	Flange			Length	Bolt hole		Oil hole	Projecting tube			Outside dia.	Bore	Standard length			Screw shaft No.
D	*A*	*G*	*B*	L_n	*W*	*X*	*Q*	*U*	*V*	*R*	d_0	d_i	L_s			
50	79	33	15	55	65	6.6	M6×1	33	34	10	25.0	22.6	1000	2000	2500	RS2806A**
50	79	33	15	79	65	6.6	M6×1	33	34	10						
55	97	39	18	97	75	11	M6×1	39	42	17	27.0	24.6	1000	2000	3000	RS3210A**
60	102	42	18	68	80	11	M6×1	42	46	17	30.0	27.6	1000	2000	3000	RS3610A**
60	102	42	18	98	80	11	M6×1	42	46	17						
65	114	44	20	120	90	14	M6×1	44	50	20	35.0	31.8	2000	3000	4000	RS4010A**
70	130	47	22	116	100	18	M6×1	47	55	20	39.0	35.8	2000	3000	4000	RS4512A**
80	140	52	22	122	110	18	M6×1	52	59	20	45.0	41.8	2000	3000	4000	RS5010A**
85	163	57	28	146	125	22	M6×1	57	63	25	42.0	38.8	2000	3000	4000	RS5016A**

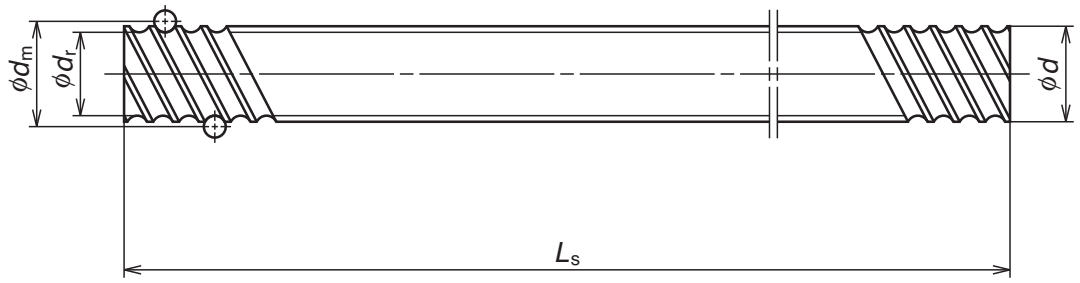
Remarks 4. Nut assembly with arbor and the screw shaft are separated at time of delivery.
5. At the end of the screw shaft reference number where marked with "**", fill with the value obtained by dividing the standard screw shaft length by 100 mm.
6. Items in stock are not applied surface treatment. NSK provides treatment such as phosphate coating on request.



Ball nut No.	Shaft dia. d	Lead l	Ball dia. D_w	Ball circle dia. d_m	Root dia. d_r	Effective turns of balls: Turns × Circuits	Basic load rating (N): Dynamic C_a	Basic load rating (N): Static C_{0a}	Axial play Max.
RNFTL 1212A3	12	12	2.381	12.65	10.1	1.5 × 2	3360	6270	0.10
RNFTL 1616A3 **RNFTL 1616A3S**	16	16	2.778	16.65	13.6	1.5 × 2	4880	9650	0.10
RNFTL 2020A3 **RNFTL 2020A3S**	20	20	3.175	20.75	17.3	1.5 × 2	7010	15400	0.10
RNFTL 2525A3 **RNFTL 2525A3S**	25	25	3.969	26	22.0	1.5 × 2	10500	24100	0.12
RNFTL 3232A3 **RNFTL 3232A3S**	32	32	4.762	33.25	28.0	1.5 × 2	15300	37100	0.15
RNFTL 4040A3 **RNFTL 4040A3S**	40	40	6.35	41.75	35.0	1.5 × 2	24400	61600	0.20

Remarks 1. Protruding portion of the tube does not have any interference with the ball nut housing if its dimensions corresponding to U and V are large enough.
2. The actual entire screw shaft length may become slightly longer than nominal length Ls due to manufacturing tolerance.
3. Seal is contained in the nut. Therefore, the external dimensions of those with a seal are the same as those without.
In the side view drawing of ball nut, the above of the center line is with seal, and beneath is without seal.
Seal for those with the shaft diameter of 14 mm or less is made of synthetic resin. Seal for those of 16 mm or over is a "Brush-seal."

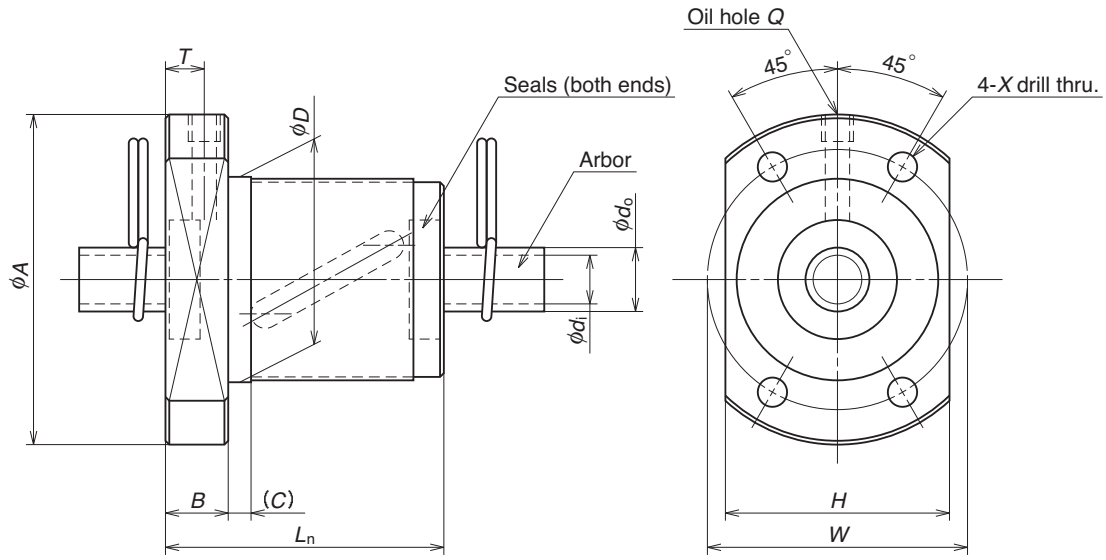
Standard stock



Unit: mm

Ball nut dimensions											Arbor		Screw shaft	
Outside dia.	Flange			Length	Bolt hole		Oil hole	Projecting tube			Outside dia.	Bore	Standard length	Screw shaft No.
D	*A*	*G*	*B*	L_n	*W*	*X*	*Q*	*U*	*V*	*R*	d_0	d_i	L_s	
24	44	17	8	44	34	4.5	M3 × 0.5	17	16	5	10.1	8.1	400 800	RS1212A**
30	55	22	10	50	43	6.6	M6 × 1	22	22	7	13.6	11.6	500 1000 1500	RS1616A**
35	68	25	12	59	52	9	M6 × 1	25	27	8	17.3	14.9	500 1000 2000	RS2020A**
45	80	31	12	69	63	9	M6 × 1	31	32	10	22.0	19.6	1000 2000 2500	RS2525A**
55	100	37	15	84	80	11	M6 × 1	37	40	12	28.0	25.6	1000 2000 3000	RS3232A**
70	120	46	18	103	95	14	M6 × 1	46	49	15	35.0	31.8	2000 3000 4000	RS4040A**

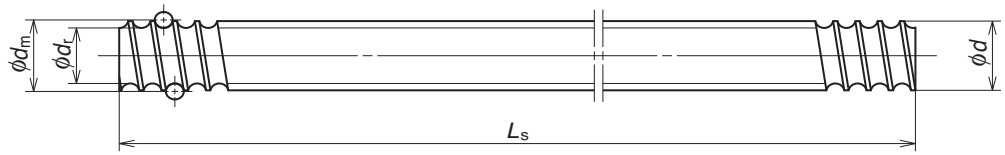
Remarks 4. Nut assembly with arbor and the screw shaft are separated at time of delivery.
5. At the end of the screw shaft reference number where marked with "**", fill with the value obtained by dividing the standard screw shaft length by 100 mm.
6. Items in stock are not applied surface treatment. NSK provides treatment such as phosphate coating on request.



Ball nut No.	Shaft dia. d	Lead l	Ball dia. D_w	Ball circle dia. d_m	Root dia. d_r	Effective turns of balls: Turns × Circuits	Basic load rating (N): Dynamic C_a	Basic load rating (N): Static C_{0a}	Axial play Max.
RNFBL 1006A2.5S	10	6	2.381	10.65	8.1	2.5×1	2830	4810	0.10
RNFBL 1208A2.5S	12	8	2.778	12.65	9.6	2.5×1	3730	6560	0.10
RNFBL 1404A3.5S	14	4	2.778	14.5	11.5	3.5×1	5370	10800	0.10
RNFBL 1405A2.5S	14	5	3.175	14.5	11.0	2.5×1	5260	9720	0.10
RNFBL 1808A3.5S	18	8	4.762	18.5	13.6	3.5×1	13200	25800	0.15
RNFBL 2005A2.5S	20	5	3.175	20.5	17.0	2.5×1	6360	14200	0.10
RNFBL 2010A2.5S	20	10	4.762	21.25	16.2	2.5×1	10900	21800	0.15
RNFBL 2505A2.5S	25	5	3.175	25.5	22.0	2.5×1	7070	18200	0.10
RNFBL 2505A5S						2.5×2	12800	36300	
RNFBL 2510A2.5S	25	10	6.35	26	19.0	2.5×1	17500	35200	0.20
RNFBL 2510A5S						2.5×2	31800	70300	
RNFBL 2806A2.5S	28	6	3.175	28.5	25.0	2.5×1	7430	20300	0.10
RNFBL 2806A5S						2.5×2	13500	40600	
RNFBL 3210A2.5S	32	10	6.35	33.75	27.0	2.5×1	19700	46100	0.20
RNFBL 3210A5S						2.5×2	35700	92200	
RNFBL 3610A2.5S	36	10	6.35	37	30.0	2.5×1	21000	51000	0.20
RNFBL 3610A5S						2.5×2	38100	102000	
RNFBL 4010A5S	40	10	6.35	41.75	35.0	2.5×2	40100	116000	0.20

Remarks 1. The actual screw shaft length may be slightly longer than nominal length Ls due to manufacturing tolerance.
2. Nut assembly with arbor and screw shaft are separated at time of delivery.
3. The value obtained by dividing the standard screw length by 100 mm will be entered at the end of the reference number where marked with "* *."

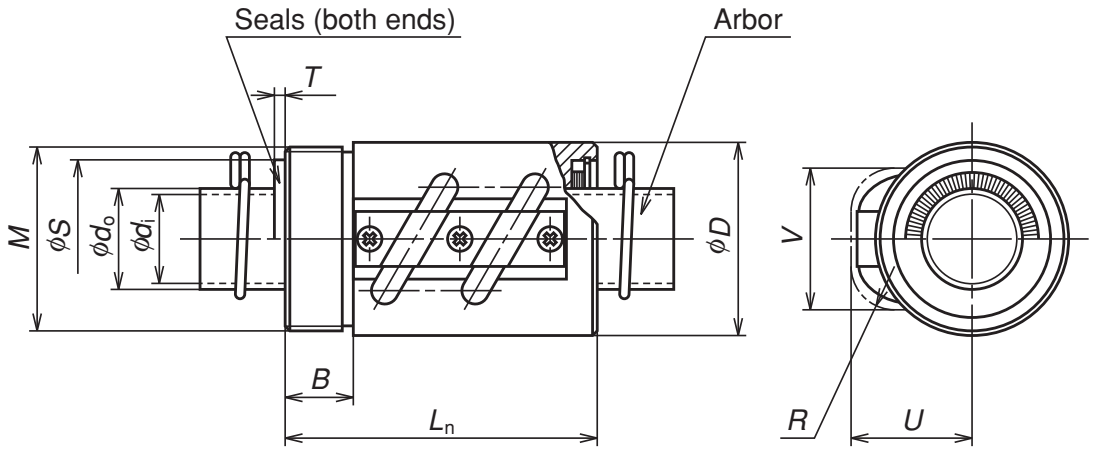
Standard stock



Unit: mm

Ball nut dimensions										Arbor		Screw shaft			
Outside dia.	Flange			Length		Bolt hole		Oil hole		Outside dia.	Bore	Standard length			Screw shaft No.
D	A	H	B	Overall length L	(C)	W	X	Q	T	d_0	d_i	L_s			
26	42	29	8	36	3	34	4.5	M3×0.5	5.0	8.1	6.1	400	800		RS1006A**
29	45	32	8	44	3	37	4.5	M3×0.5	5.5	9.6	7.6	400	800		RS1208A**
31	50	37	10	40	4	40	4.5	M6×1	5.0	11.5	9.5	500	1000		RS1404A**
32	50	38	10	40	4	40	4.5	M6×1	5.0	11.0	9.0	500	1000		RS1405A**
50	80	60	12	61	4	65	6.6	M6×1	6.0	13.6	11.6	500	1000	1500	RS1808A**
40	60	46	10	40	4	50	4.5	M6×1	5.0	17.0	14.6	500	1000	2000	RS2005A**
52	82	64	12	61	5	67	6.6	M6×1	6.0	16.2	13.8	500	1000	2000	RS2010A**
43	67	50	10	40 55	4	55	5.5	M6×1	5.0	22.0	19.6	1000	2000	2500	RS2505A**
60	96	72	15	66 96	5	78	9.0	M6×1	7.5	19.0	16.6	1000	2000	2500	RS2510A**
50	80	60	12	47 65	5	65	6.6	M6×1	6.0	25.0	22.6	1000	2000	2500	RS2806A**
67	103	78	15	67 97	5	85	9.0	M6×1	7.5	27.0	24.6	1000	2000	3000	RS3210A**
70	110	82	17	69 99	5	90	11.0	M6×1	8.5	30.0	27.6	1000	2000	3000	RS3610A**
76	116	88	17	99	5	96	11.0	M6×1	8.5	35.0	31.8	2000	3000	4000	RS4010A**

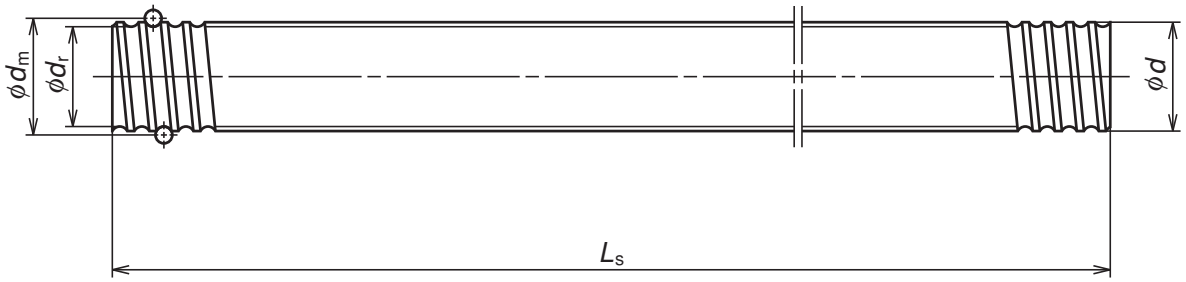
Remarks 4. Items in stock are not applied surface treatment. NSK provides treatment such as phosphate coating on request.
5. Seal for those with the shaft diameter of 14 mm or less is made of synthetic resin. Seal for those with 16 mm or larger is "Brush-seal."



Ball nut No	Shaft dia. d	Lead l	Ball dia. D_w	Ball circle dia. d_m	Root dia. d_r	Effective turns of balls: Turns × Circuits	Basic load rating (N): Dynamic C_a	Basic load rating (N): Static C_{0a}	Axial play Max.
RNCT 1003A3.5	10	3	2.381	10.65	8.0	3.5 × 1	3780	6730	0.10
RNCT 1404A3.5S	14	4	2.778	14.5	11.5	3.5 × 1	5370	10800	0.10
RNCT 1405A2.5S	14	5	3.175	14.5	11.0	2.5 × 1	5260	9720	0.10
RNCT 1808A3.5 **RNCT 1808A3.5S**	18	8	4.762	18.5	13.6	3.5 × 1	13200	25800	0.15
RNCT 2005A2.5 **RNCT 2005A2.5S**	20	5	3.175	20.5	17.0	2.5 × 1	6360	14200	0.10
RNCT 2505A5 **RNCT 2505A5S**	25	5	3.175	25.5	22.0	2.5 × 2	12800	36300	0.10
RNCT 2510A5 **RNCT 2510A5S**	25	10	6.35	26	19.0	2.5 × 2	31800	70300	0.20
RNCT 2806A5 **RNCT 2806A5S**	28	6	3.175	28.5	25.0	2.5 × 2	13500	40600	0.10
RNCT 3210A5 **RNCT 3210A5S**	32	10	6.35	33.75	27.0	2.5 × 2	35700	92200	0.20
RNCT 3610A5 **RNCT 3610A5S**	36	10	6.35	37	30.0	2.5 × 2	38100	102000	0.20
RNCT 4010A7 **RNCT 4010A7S**	40	10	6.35	41.75	35.0	3.5 × 2	53500	164000	0.20
RNCT 4512A5 **RNCT 4512A5S**	45	12	7.144	46.5	39.0	2.5 × 2	49600	147000	0.23
RNCT 5010A7 **RNCT 5010A7S**	50	10	6.35	51.75	45.0	3.5 × 2	59500	205000	0.20
RNCT 5016A5 **RNCT 5016A5S**	50	16	9.525	52	42.0	2.5 × 2	99900	293000	0.23

Remarks 1. Protruding portion of the tube does not have any interference with the ball nut housing if its dimensions corresponding to U and V are large enough.
2. The actual entire screw shaft length may become slightly longer than nominal length Ls due to manufacturing tolerance.
3. A seal cannot be installed in the V thread side. It may be installed in the opposite side.
Seal is contained in the nut. Therefore, the external dimensions of those with a seal are the same as those without.
In the side view drawing of ball nut, the above of the center line is with seal, and beneath is without seal.

Standard stock

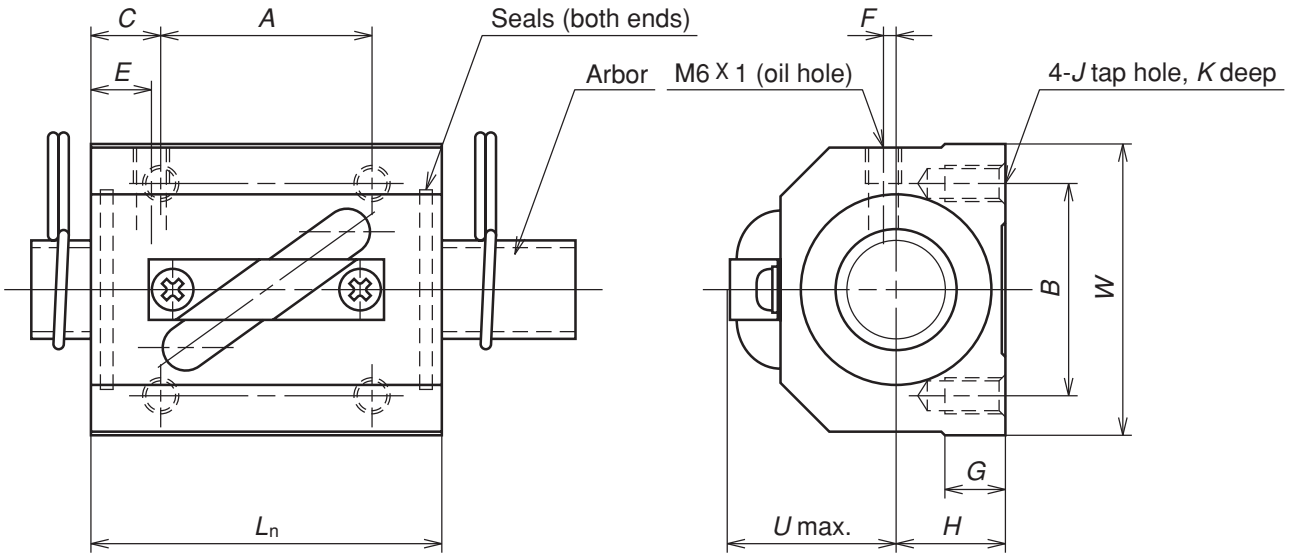


Unit: mm

Ball nut dimensions							Seal dimensions		Arbor		Screw shaft			
Outside dia.	Flange		Length	Projecting tube			Diameter	Thickness	Outside dia.	Bore	Standard length			Screw shaft No.
D	*M*	*B*	L_n	*U*	*V*	*R*	*S*	*T*	d_o	d_i	L_s			
20	M18×1	10	38	15	15	7			8.1	6.1	*400*	800		RS1003A**
25	M24×1	10	43	19	20	7			11.5	9.5	500	1000		RS1404A**
30	M26×1.5	10	45	22	21	8			11.0	9.0	500	1000		RS1405A**
34	M32×1.5	12	58	27	27	14	28.5	2.5	13.6	11.6	500	1000	1500	RS1808A**
40	M36×1.5	12	48	28	27	10	29.5	2.5	17.0	14.6	500	1000	2000	RS2005A**
42	M40×1.5	15	69	28	31	10	34.5	2.5	22.0	19.6	1000	2000	2500	RS2505A**
44	M42×1.5	15	92	34	37	17	38.5	2.5	19.0	16.6	1000	2000	2500	RS2510A**
50	M45×1.5	15	79	33	34	10	37.5	2.5	25.0	22.6	1000	2000	2500	RS2806A**
55	M50×1.5	18	97	39	42	17	45.5	2.5	27.0	24.6	1000	2000	3000	RS3210A**
60	M55×2	18	98	42	46	17	50.5	3.0	30.0	27.6	1000	2000	3000	RS3610A**
65	M60×2	25	125	44	50	20	54.5	3.0	35.0	31.8	2000	3000	4000	RS4010A**
70	M65×2	30	124	47	55	20	60.5	3.0	39.0	35.8	2000	3000	4000	RS4512A**
80	M75×2	40	140	52	59	20	64.5	3.0	45.0	41.8	2000	3000	4000	RS5010A**
85	M80×2	40	158	57	63	25	68.5	3.0	42.0	38.8	2000	3000	4000	RS5016A**

Seal for those with the shaft diameter of 14 mm or less is made of synthetic resin. Seal for those of 16 mm or over is a "Brush-seal."
There is no seal on the V-thread side for RNCT1404A3.5S and RNCT1405A2.5S

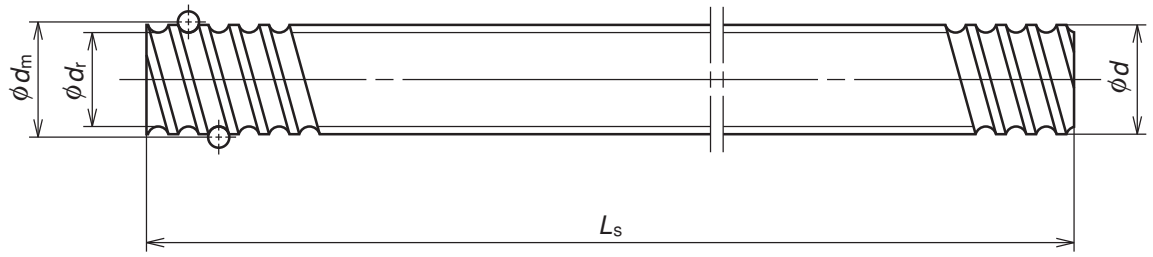
4. Nut assembly with arbor and the screw shaft are separated at time of delivery.
5. At the end of the screw shaft reference number where marked with "**", fill with the value obtained by dividing the standard screw shaft length by 100 mm.
6. Items in stock are not applied surface treatment. NSK provides treatment such as phosphate coating on request.



Ball nut No.	Shaft dia. d	Lead l	Ball dia. D_w	Ball circle dia. d_m	Root dia. d_r	Effective turns of balls Turns × Circuits	Basic load rating (N) Dynamic C_a	Basic load rating (N) Static C_{0a}	Axial play Max.
RNSTL 1404A3.5S	14	4	2.778	14.5	11.5	3.5 × 1	5370	10800	0.10
RNSTL 1405A2.5S	14	5	3.175	14.5	11.0	2.5 × 1	5260	9720	0.10
RNSTL 1808A3.5S	18	8	4.762	18.5	13.6	3.5 × 1	13200	25800	0.15
RNSTL 2005A2.5S	20	5	3.175	20.5	17.0	2.5 × 1	6360	14200	0.10
RNSTL 2010A2.5S	20	10	4.762	21.25	16.2	2.5 × 1	10900	21800	0.15
RNSTL 2505A2.5S	25	5	3.175	25.5	22.0	2.5 × 1	7070	18200	0.10
RNSTL 2510A5S	25	10	6.35	26	19.0	2.5 × 1	31800	70300	0.20
RNSTL 2806A2.5S	28	6	3.175	28.5	25.0	2.5 × 1	7430	20300	0.10
RNSTL 2806A5S						2.5 × 2	13500	40600	
RNSTL 3210A2.5S	32	10	6.35	33.75	27.0	2.5 × 1	19700	46100	0.20
RNSTL 3210A5S						2.5 × 2	35700	92200	
RNSTL 3610A2.5S	36	10	6.35	37	30.0	2.5 × 1	21000	51000	0.20
RNSTL 3610A5S						2.5 × 2	38100	102000	
RNSTL 4512A2.5S	45	12	7.144	46.5	39.0	2.5 × 2	49600	147000	0.23

Remarks 1. The actual screw shaft length may be slightly longer than nominal length Ls due to manufacturing tolerance.
2. Nut assembly with arbor and screw shaft are separated at time of delivery.
3. The value obtained by dividing the standard screw length by 100 mm will be entered at the end of the reference number where marked with "* *."

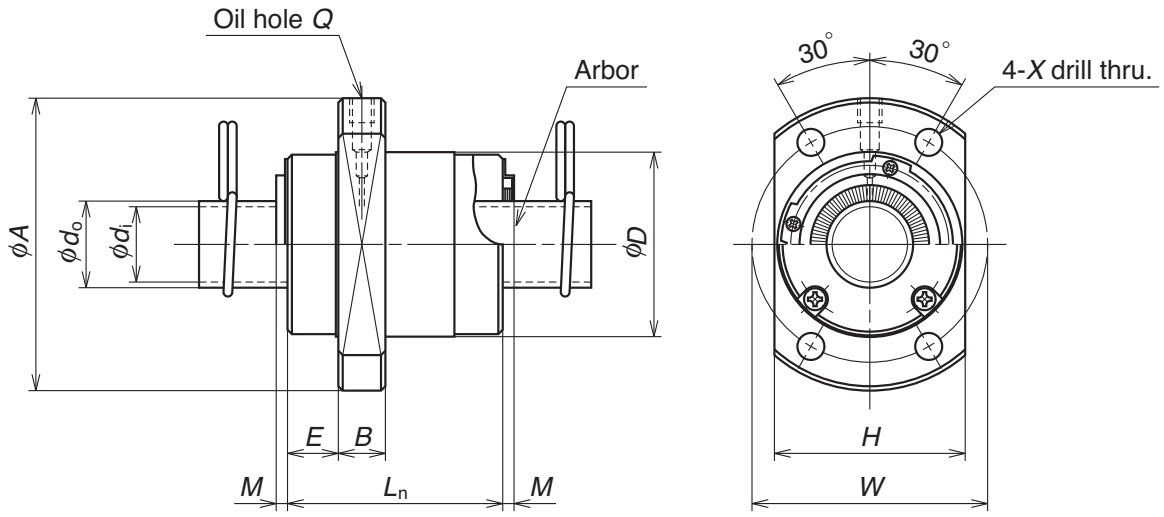
Standard stock



Unit: mm

Ball nut dimensions											Arbor		Screw shaft			
Length	Width	Center height	Bolt hole					Oil hole			Outside dia.	Bore	Standard length			Screw shaft No.
L_n	W	H	A	B	C	J	K	E	F	U	d_0	d_i	L_s			
38	34	13	22	26	8	M4	7	7	3	20	11.5	9.5	500	1000		RS1404A**
38	34	13	22	26	10.5	M4	7	7	3	21	11.0	9.0	500	1000		RS1405A**
56	48	17	35	35	11	M6	10	8	3	26	13.6	11.6	500	1000	1500	RS1808A**
38	48	17	22	35	8	M6	9	6	2	27	17.0	14.6	500	1000	2000	RS2005A**
58	48	18	35	35	11.5	M6	10	10	2	28	16.2	13.8	500	1000	2000	RS2010A**
35	60	20	22	40	6.5	M8	10	6	0	27	22.0	19.6	1000	2000	2500	RS2505A**
94	60	23	60	40	17	M8	12	10	0	32	19.0	16.6	1000	2000	2500	RS2510A**
42 67	60 60	22 22	18 40	40 40	12 13.5	M8	12	8	0	32	25.0	22.6	1000	2000	2500	RS2806A**
64 94	70 70	26 26	45 60	50 50	9.5 17	M8	12	10	0	38	27.0	24.6	1000	2000	3000	RS3210A**
64 96	86 86	29 29	45 60	60 60	9.5 18	M10	16	11	0	41	30.0	27.6	1000	2000	3000	RS3610A**
115	100	36	75	75	20	M12	20	13	0	46	39.0	35.8	2000	3000	4000	RS4510A**

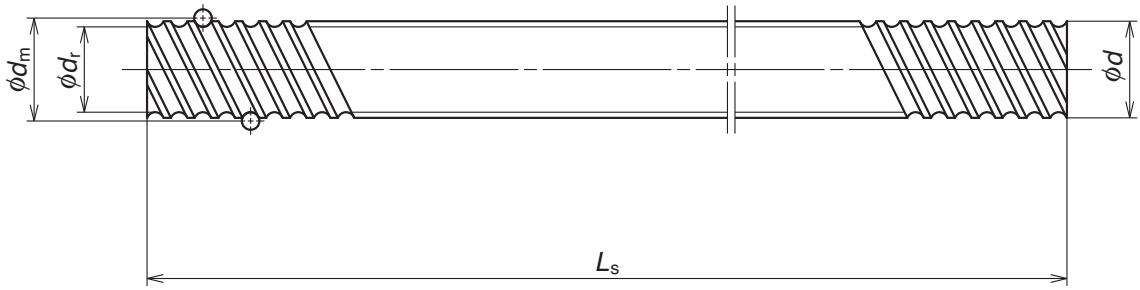
Remarks 4. Items in stock are not applied surface treatment. NSK provides treatment such as phosphate coating on request.
5. Seal for those with the shaft diameter of 14 mm or less is made of synthetic resin. Seal for those with 18 mm or larger is "Brush-seal."



Ball nut No.	Shaft dia. d	Lead l	Ball dia. D_w	Ball circle dia. d_m	Root dia. d_r	Effective turns of balls: Turns × Circuits	Basic load rating (N): Dynamic C_a	Basic load rating (N): Static C_{0a}	Axial play Max.
RNFCL 1212A3	12	12	2.381	12.65	10.1	1.7 × 2	3740	6640	0.10
RNFCL 1212A6						1.7 × 4	6780	13300	
RNFCL 1520A3 **RNFCL 1520A3S**	15	20	3.175	15.5	12.2	1.7 × 2	6730	12300	0.10
RNFCL 1616A3 **RNFCL 1616A3S**	16	16	2.778	16.65	13.5	1.7 × 2	5430	10400	0.10
RNFCL 1616A6 **RNFCL 1616A6S**						1.7 × 4	9860	20800	
RNFCL 2020A3 **RNFCL 2020A3S**	20	20	3.175	20.75	17.3	1.7 × 2	7810	16500	0.10
RNFCL 2020A6 **RNFCL 2020A6S**						1.7 × 4	14200	33000	
RNFCL 2525A3 **RNFCL 2525A3S**	25	25	3.969	26	22.0	1.7 × 2	11700	25800	0.12
RNFCL 2525A6 **RNFCL 2525A6S**						1.7 × 4	21200	51500	
RNFCL 3232A3 **RNFCL 3232A3S**	32	32	4.762	33.25	28.0	1.7 × 2	17100	40500	0.15
RNFCL 3232A6 **RNFCL 3232A6S**						1.7 × 4	31000	81000	
RNFCL 4040A3 **RNFCL 4040A3S**	40	40	6.35	41.75	35.0	1.7 × 2	27200	67900	0.20
RNFCL 4040A6 **RNFCL 4040A6S**						1.7 × 4	49300	136000	
RNFCL 5050A3 **RNFCL 5050A3S**	50	50	7.938	52.25	44.0	1.7 × 2	40600	106000	0.25
RNFCL 5050A6 **RNFCL 5050A6S**						1.7 × 4	73700	212000	

Remarks 1. The actual screw shaft length may be slightly longer than nominal length Ls due to manufacturing tolerance.
2. Nut assembly with arbor and screw shaft are separated at time of delivery.
3. The value obtained by dividing the standard screw length by 100 mm will be entered at the end of the reference number where marked with "* *."

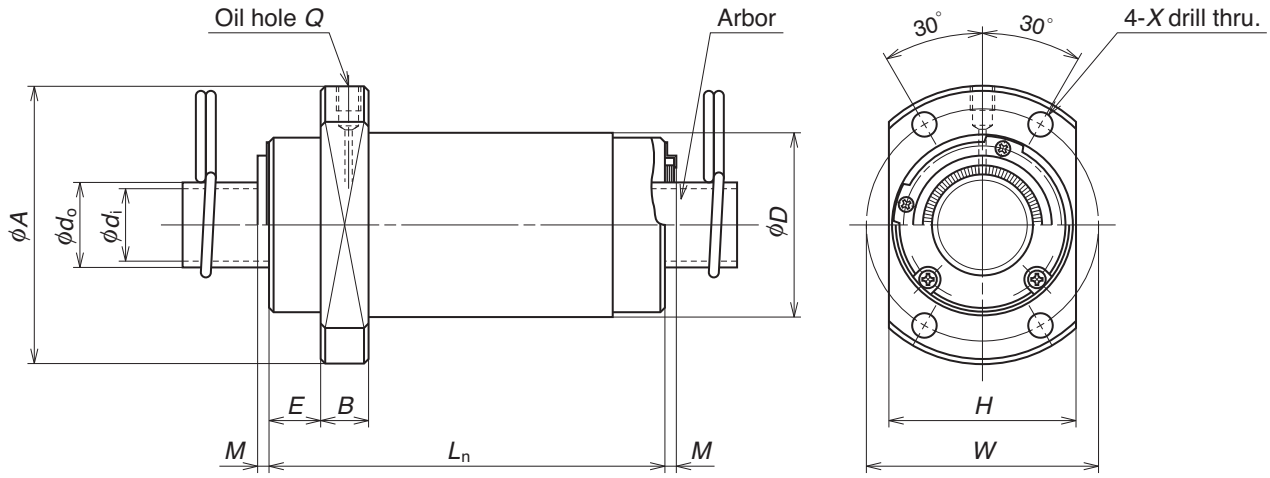
Standard stock



Unit: mm

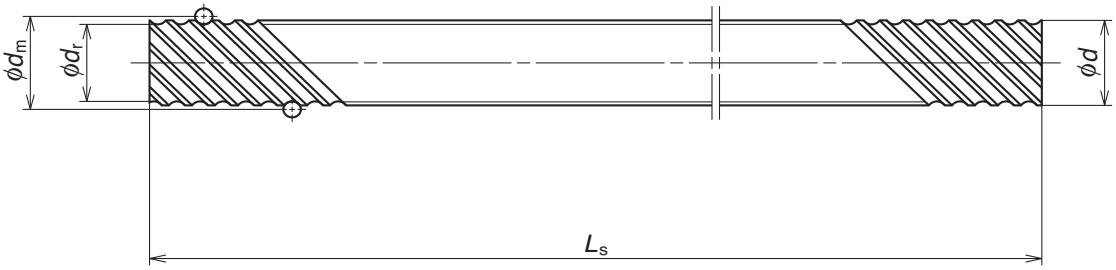
Ball nut dimensions										Arbor		Screw shaft			
Outside dia.	Flange			Length			Bolt hole		Oil hole	Outside dia.	Bore	Standard length			Screw shaft No.
D	*A*	*H*	*B*	*E*	L_n	*M*	*W*	*X*	*Q*	d_0	d_i	L_s			
26	44	28	6	9	30	—	35	4.5	M3 × 0.5	10.1	8.1	400	800		RS1212A**
33	51	35	10	11	45	— 3	42	4.5	M6 × 1	12.2	10.2	500	1000	1500	RS1520A**
32	53	34	10	10	38	— 3 — 3	42	4.5	M6 × 1	13.6	11.6	500	1000	1500	RS1616A**
39	62	41	10	11.5	46	— 3 — 3	50	5.5	M6 × 1	17.3	14.9	500	1000	2000	RS2020A**
47	74	49	12	13	55	— 3 — 3	60	6.6	M6 × 1	22.0	19.6	1000	2000	2500	RS2525A**
58	92	60	12	16	70	— 3 — 3	74	9	M6 × 1	28.0	25.6	1000	2000	3000	RS3232A**
73	114	75	15	19.5	85	— 3.5 — 3.5	93	11	M6 × 1	35.0	31.8	2000	3000	4000	RS4040A**
90	135	92	20	21.5	107	— 3.5 — 3.5	112	14	M6 × 1	44.0	40.8	2000	3000	4000	RS5050A**

Remarks 4. Items in stock are not applied surface treatment. NSK provides treatment such as phosphate coating on request.
5. The entire length of the nut becomes longer by "2 x M " for those with a seal. The seal is "Brush-seal."



Ball nut No.	Shaft dia. d	Lead l	Ball dia. D_w	Ball circle dia. d_m	Root dia. d_r	Effective turns of balls: Turns × Circuits	Basic load rating (N): Dynamic C_a	Basic load rating (N): Static C_{0a}	Axial play Max.
RNFCL 1632A2	16	32	2.778	16.65	13.5	0.7 × 4	4600	8460	0.10
RNFCL 1632A2S									
RNFCL 1632A3						1.7 × 2	5430	10400	
RNFCL 1632A3S									
RNFCL 1632A6						1.7 × 4	9860	20800	
RNFCL 1632A6S									
RNFCL 2040A2	20	40	3.175	20.75	17.3	0.7 × 4	6610	13600	0.10
RNFCL 2040A2S									
RNFCL 2040A3						1.7 × 2	7810	16500	
RNFCL 2040A3S									
RNFCL 2040A6						1.7 × 4	14200	33000	
RNFCL 2040A6S									
RNFCL 2550A2	25	50	3.969	26	22.0	0.7 × 4	9870	21200	0.12
RNFCL 2550A2S									
RNFCL 2550A3						1.7 × 2	11700	25800	
RNFCL 2550A3S									
RNFCL 2550A6						1.7 × 4	21200	51500	
RNFCL 2550A6S									
RNFCL 3264A3	32	64	4.762	33.25	28.0	1.7 × 2	17100	40500	0.15
RNFCL 3264A3S									
RNFCL 3264A6						1.7 × 4	31000	81000	
RNFCL 3264A6S									
RNFCL 4080A3	40	80	6.350	41.75	35.0	1.7 × 2	27200	67900	0.20
RNFCL 4080A3S									
RNFCL 4080A6						1.7 × 4	49300	136000	
RNFCL 4080A6S									

Remarks 1. The actual screw shaft length may be slightly longer than nominal length Ls due to manufacturing tolerance.
2. Nut assembly with arbor and screw shaft are separated at time of delivery.
3. The value obtained by dividing the standard screw length by 100 mm will be entered at the end of the reference number where marked with "* *."



Unit: mm

Ball nut dimensions										Arbor		Screw shaft	
Outside dia.	Flange			Length			Bolt hole		Oil hole	Outside dia.	Bore	Standard length	Screw shaft No.
D	*A*	*H*	*B*	*E*	L_n	*M*	*W*	*X*	*Q*	d_0	d_i	L_s	
32	50	34	10	10	34	—	41	4.5	M6 × 1	13.5	11.5	500 1000 1500	RS1632A**
						3							
					66	—							
						3							
					66	—							
						3							
38	58	40	10	11	41	—	48	5.5	M6 × 1	17.3	14.9	500 1000 1500 2000	RS2040A**
						3							
					81	—							
						3							
					81	—							
						3							
46	70	48	12	13	50	—	58	6.6	M6 × 1	22.0	19.6	1000 2000 2500	RS2550A**
						3							
					100	—							
						3							
					100	—							
						3							
58	92	60	12	15.5	126	—	74	9	M6 × 1	28.0	25.6	1000 2000 3000 4000	RS3264A**
						3							
						—							
						3							
73	114	75	15	19	158	—	93	11	M6 × 1	35.0	31.8	2000 3000 4000 5000	RS4080A**
						3.5							
						—							
						3.5							

Remarks 4. Items in stock are not applied surface treatment. NSK provides treatment such as phosphate coating on request.
5. The entire length of the nut becomes longer by "2 x M " for those with a seal. The seal is "Brush-seal."

Compact FA Series – E3230

Main features:

Next-generation compact ball screws offer quiet, high speed operation performance.
A standard stock series assures immediate delivery.

Features:

6 dB less noise
The noise level of ball screws has been reduced by 6 dB, about half of what is sensed by the ear. Ball screws subsequently produce a quieter and gentler sound.

10%–30% more compact ball nut
The outside diameter of the ball nut is as much as 30% smaller than those of NSK conventional products. This contributes to more compact design of all sorts of equipment and devices such as thinner XY tables.

High-speed operation of up to 5 000 min-1
The new ball screws offer 1.6 times faster rotational speed than conventional ball screws. They handle speeds up to 5000 min-1. This capability dramatically expands the range of service conditions.
Note: Please refer to the dimension table for details of permissible rotational speed.

Grease fitting provided as standard equipment
The new ball screws are standardly equipped with a grease fitting (M5 × 0.8). Lubrication ports are provided in 2 places to facilitate maintenance. The ball screws can be easily connected to an integrated lubrication system.

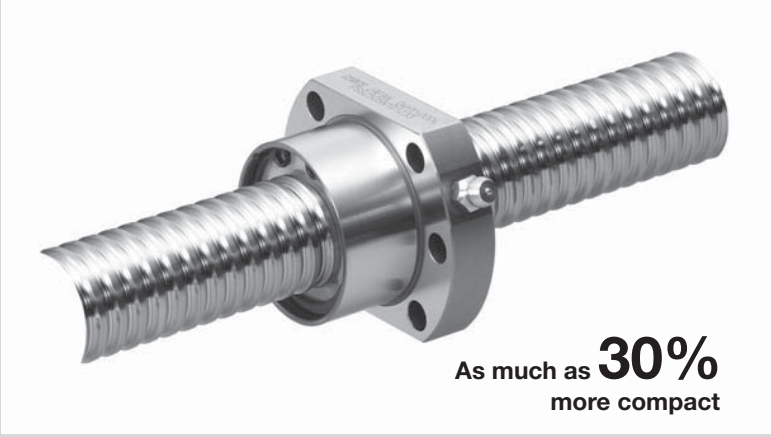
New type of contact seal
A new model high-performance contact seal minimizes grease dispersion and helps to maintain a clean work environment.

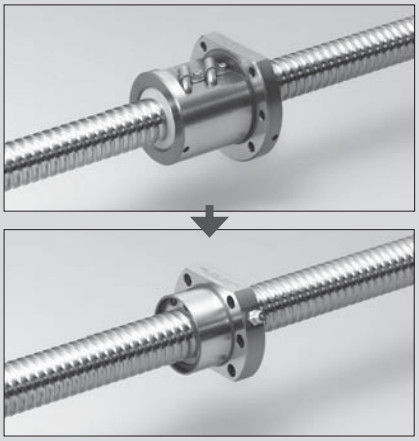
Low-profile design
The low-profile support units especially compatible with the compact FA series are available for uniquely space-saving design.

Existing support unit – New low profile support

Example of reference number: **PSS 15 20 N1D 0561**

- PSS: Compact FA Series, Accuracy grade: C5
- 15: Screw shaft diameter (mm)
- 20: Lead (mm)
- N1D: NSK control No.
- 0561: Ball screw shaft length L_1 (mm)

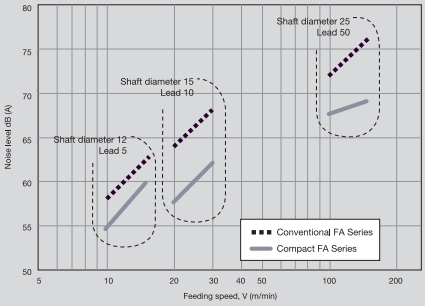




Shaft diameter	Lead	Stroke														Recommended support unit	
		50	100	150	200	300	400	500	600	700	800	1 000	1 200	1 600	2 000	Fixed side support unit	Simple side support unit
10	5	●	●		●	●	●									WBK08-01B	WBK08S-01B
	10		●		●	●	●										
12	5	●	●		●	●	●	●								WBK08-01B	WBK08S-01B
	10		●		●	●	●	●									
	20		●		●	●	●	●									
	30		●		●	●	●	●									
15	5	●	●		●	●	●	●	●							WBK12-01B WBK10-01B	WBK12S-01B
	10		●		●	●	●	●	●	●	●	●					
	20		●		●	●	●	●	●	●	●	●					
	30		●		●	●	●	●	●	●	●	●					
20	5			●	●	●	●	●	●	●	●					WBK15-01B	WBK15S-01B
	10				●	●	●	●	●	●	●	●	●				
	20					●	●	●	●	●	●	●	●	●			
	30				●	●	●	●	●	●	●	●	●				
	40						●	●	●	●	●	●	●	●	●		
	60						●	●	●	●	●	●	●	●	●		
25	5			●	●	●	●	●		●	●	●				WBK20-01	WBK20S-01
	10					●	●	●	●	●	●	●		●			
	20							●	●	●	●	●	●	●	●		
	25							●	●	●	●	●	●	●	●		
	30							●	●	●	●	●	●	●	●		
	50							●	●	●	●	●	●	●	●		

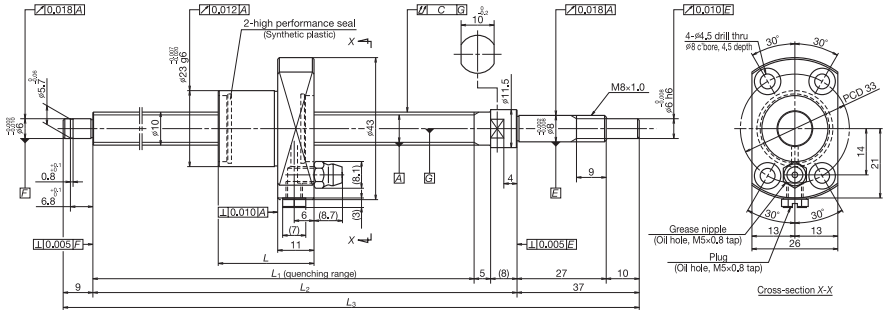
Other support units are also available. See last page of catalog for details.

Noise data



(Microphone was positioned at a distance of 400 mm for all noise measurements.)

Screw shaft ø10
Lead 5, 10



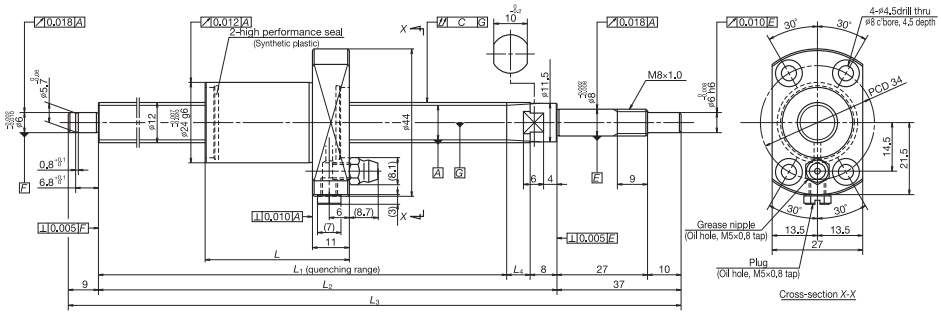
Ball screw specification	
Preload type	Oversize ball preload (P-preload)
Ball diameter/screw shaft root diameter	2.000/8.2
Accuracy grade/axial play	C5/0
Factory pre-packed grease	NSK grease PS2

Recommended support unit	
WBK08-01B	(square, fixed side)
WBK08S-01B	(square, simple side)
WBK08-11B	(round, fixed side)

Reference number	Screw shaft diameter d	Lead ℓ	Basic load ratings (N) Dynamic C_a	Static C_{0a}	Stroke Nominal	Max. L_1-L	Nut length L	Screw shaft dimensions L_1	L_2	L_3	Lead accuracy Target value T	Error e_p	Variation v_u	Shaft runout, C	Dynamic preload torque (N·cm) *1	Permissible rotational speed (min⁻¹) *2 Fixed-Simple
PSS1005N1D0171	10	5	2 930	4 790	50	83	29	112	125	171	0	0.020	0.018	0.030	0.7 – 3.3	5 000
PSS1005N1D0221					100	133		162	175	221		0.020	0.018	0.045	0.7 – 3.3	
PSS1005N1D0321					200	233		262	275	321		0.023	0.018	0.060	0.6 – 4.3	
PSS1005N1D0421					300	333		362	375	421		0.025	0.020	0.070	0.6 – 4.3	
PSS1005N1D0521					400	433		462	475	521		0.027	0.020	0.085	0.4 – 4.9	
PSS1010N1D0221		10	1 970	3 010	100	130	32	162	175	221		0.020	0.018	0.045	0.7 – 3.3	5 000
PSS1010N1D0321					200	230		262	275	321		0.023	0.018	0.060	0.6 – 4.3	
PSS1010N1D0421					300	330		362	375	421		0.025	0.020	0.070	0.6 – 4.3	
												0.027	0.020	0.085	0.4 – 4.9	

*1. Indicates ball screw preload control value. About 2.0 N·cm of torque is added due to high performance seal. *2. Contact NSK if permissible rotational speed is to be exceeded. *3. Service temperature range is -20°C to 80°C

Screw shaft ø12
Lead 5, 10, 20, 30



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

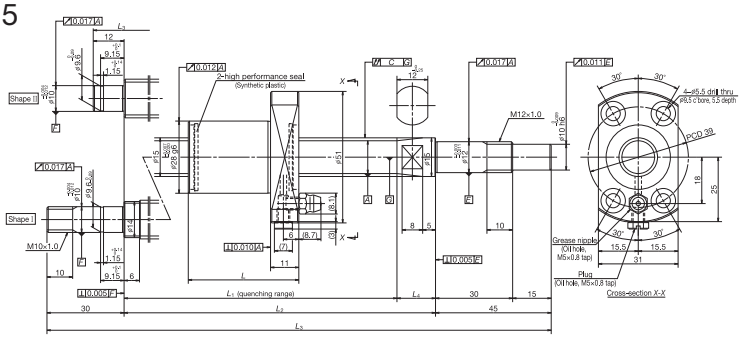
Recommended support unit	
WBK08-01B	(square, fixed side)
WBK08S-01B	(square, simple side)
WBK08-11B	(round, fixed side)

Unit: mm

Reference number	Screw shaft diameter d	Lead ℓ	Basic load ratings (N) Dynamic C_a	Static C_{0a}	Stroke Nominal	Max. L_1-L	Nut length L	Screw shaft dimensions L_1	L_2	L_3	L_4	Lead accuracy Target value T	Error e_p	Variation v_u	Shaft runout, C	Dynamic preload torque (N·cm) *1	Permissible rotational speed (min⁻¹) *2 Fixed-Simple
PSS1205N1D0171	12	5	3 200	5 860	50	80	30	110	125	171	7	0	0.020	0.018	0.030	0.7 – 3.3	5 000
PSS1205N1D0221					100	130		160	175	221			0.020	0.018	0.045	0.7 – 3.3	
PSS1205N1D0321					200	230		260	275	321			0.023	0.018	0.060	0.6 – 4.3	
PSS1205N1D0421					300	330		360	375	421			0.025	0.020	0.070	0.6 – 4.3	
PSS1205N1D0521					400	430		460	475	521			0.027	0.020	0.085	0.6 – 4.3	
PSS1205N1D0621					500	530		560	575	621			0.030	0.023	0.085	0.4 – 4.9	
PSS1210N1D0221		10	3 200	5 860	100	117	43	160	175	221	7		0.020	0.018	0.045	0.7 – 3.3	5 000
PSS1210N1D0321					200	217		260	275	321			0.023	0.018	0.060	0.6 – 4.3	
PSS1210N1D0421					300	317		360	375	421			0.025	0.020	0.070	0.6 – 4.3	
													0.027	0.020	0.085	0.6 – 4.3	
PSS1210N1D0521					400	417		460	475	521			0.030	0.023	0.085	0.4 – 4.9	
PSS1210N1D0621					500	517		560	575	621			0.023	0.018	0.045	1.4 – 4.5	
PSS1220N1D0271		20	2 150	3 610	100	158	50	208	225	271	9		0.023	0.018	0.060	0.9 – 4.9	5 000
PSS1220N1D0371					200	258		308	325	371			0.027	0.020	0.070	0.9 – 4.9	
PSS1220N1D0471					300	358		408	425	471			0.030	0.023	0.085	0.6 – 5.9	
													0.030	0.023	0.110	0.6 – 5.9	4 200
PSS1220N1D0571		30	2 150	3 610	400	458	70	508	525	571	14		0.023	0.018	0.045	1.4 – 4.5	5 000
PSS1220N1D0671					500	558		608	625	671			0.023	0.018	0.060	0.9 – 4.9	
PSS1230N1D0271					100	133		203	225	271			0.027	0.020	0.070	0.9 – 4.9	
PSS1230N1D0371					200	233		303	325	371			0.030	0.023	0.085	0.6 – 5.9	
PSS1230N1D0471					300	333		403	425	471			0.030	0.023	0.110	0.6 – 5.9	4 300

*1. Indicates ball screw preload control value. About 2.0 N·cm of torque is added due to high performance seal. *2. Contact NSK if permissible rotational speed is to be exceeded. *3. Service temperature range is -20°C to 80°C

Screw shaft ø15
Lead 5, 10



Ball screw specification

Preload type	Oversize ball preload (P-preload)
Ball diameter/screw shaft root diameter	2.7781/12.6
Accuracy grade/axial play	C5/0
Factory pre-packed grease	NSK grease LR3

Recommended support unit

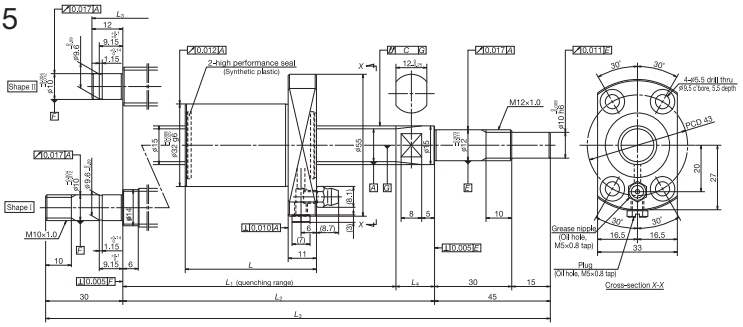
WBK12-01B	(square, fixed side)
WBK12S-01B	(square, simple side)
WBK12-11	(round, fixed side)
*4 WBK10-01B	(square, fixed side)
WBK10-11	(round, fixed side)

Unit: mm

Reference number	Screw shaft diameter d	Lead ℓ	Basic load ratings (N) Dynamic C_a	Basic load ratings (N) Static C_{0a}	Stroke Nominal	Stroke Max. L_1-L	Nut length L	Screw shaft dimensions L_1	L_2	L_3	L_4	Lead accuracy Target value T	Lead accuracy Error e_p	Lead accuracy Variation v_u	Shaft runout C	Dynamic preload torque (N-cm) *1	Permissible rotational speed (min⁻¹) *2 Fixed-Simple	Permissible rotational speed (min⁻¹) *2 Fixed-Fixed	Left shaft end (opposite driven side)
PSS1505N1D0211	15	5	5 460	10 200	50	109	30	139	154	211	15	0	0.020	0.018	0.035	0.2 – 6.9	5 000	–	Shape II
PSS1505N1D0261					100	159		189	204	261			0.020	0.018	0.035	0.2 – 6.9			
PSS1505N1D0361					200	259		289	304	361			0.023	0.018	0.045	0.2 – 6.9			
PSS1505N1D0461					300	359		389	404	461			0.025	0.020	0.050	0.4 – 9.8			
PSS1505N1D0561					400	459		489	504	561			0.027	0.020	0.060	0.4 – 9.8			
PSS1505N1D0661					500	559		589	604	661			0.030	0.023	0.075	0.4 – 9.8			
PSS1505N1D0761					600	659		689	704	761			0.035	0.025	0.075	0.4 – 11.8	3 600		
PSS1510N1D0261		10	5 460	10 200	100	146	43	189	204	261	15		0.020	0.018	0.035	0.6 – 7.4	5 000	–	Shape II
PSS1510N1D0361					200	246		289	304	361			0.023	0.018	0.045	0.6 – 7.4			
PSS1510N1D0461					300	346		389	404	461			0.025	0.020	0.050	0.4 – 9.8			
PSS1510N1D0561					400	446		489	504	561			0.027	0.020	0.060	0.4 – 9.8			
PSS1510N1D0661					500	546		589	604	661			0.030	0.023	0.075	0.4 – 9.8			
PSS1510N1D0761					600	646		689	704	761			0.035	0.025	0.075	0.4 – 11.8	3 600		
PSS1510N1D0879					700	746		789	804	879			0.035	0.025	0.095	0.4 – 11.8	2 700	3 400	Shape I
PSS1510N1D0979					800	846		889	904	979			0.040	0.027	0.095	0.4 – 11.8	2 200	3 400	
PSS1510N1D1179					1 000	1 046		1 089	1 104	1 179			0.046	0.030	0.120	0.4 – 11.8	1 400	2 300	

*1. Indicates ball screw preload control value. About 2.0 N-cm of torque is added due to high performance seal. *2. Contact NSK if permissible rotational speed is to be exceeded. *3. Service temperature range is -20℃ to 80℃. *4. WBK 10-01B and WBK 10-11 are for shape I.

Screw shaft ø15
Lead 20, 30



Ball screw specification

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

Recommended support unit

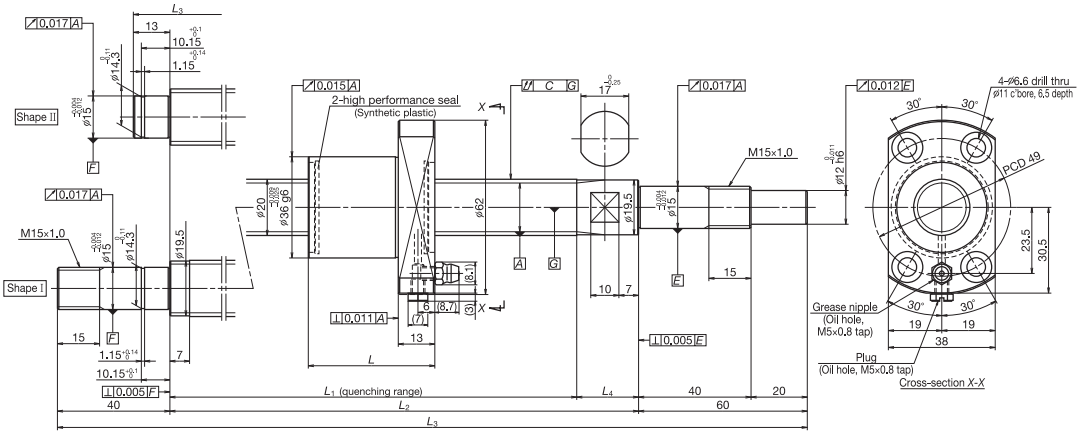
WBK12-01B	(square, fixed side)
WBK12S-01B	(square, simple side)
WBK12-11	(round, fixed side)
*4 WBK10-01B	(square, fixed side)
WBK10-11	(round, fixed side)

Unit: mm

Reference number	Screw shaft diameter d	Lead ℓ	Basic load ratings (N) Dynamic C_a	Basic load ratings (N) Static C_{0a}	Stroke Nominal	Stroke Max. L_1-L	Nut length L	Screw shaft dimensions L_1	L_2	L_3	L_4	Lead accuracy Target value T	Lead accuracy Error e_p	Lead accuracy Variation v_u	Shaft runout C	Dynamic preload torque (N-cm) *1	Permissible rotational speed (min⁻¹) *2 Fixed-Simple	Permissible rotational speed (min⁻¹) *2 Fixed-Fixed	Left shaft end (opposite driven side)
PSS1520N1D0261	15	20	5 070	8 730	100	135	51	186	204	261	18	0	0.020	0.018	0.035	0.8 – 8.8	5 000	–	Shape II
PSS1520N1D0361					200	235		286	304	361			0.023	0.018	0.045	0.8 – 8.8			
PSS1520N1D0461					300	335		386	404	461			0.025	0.020	0.050	0.8 – 10.8			
PSS1520N1D0561					400	435		486	504	561			0.027	0.020	0.060	0.8 – 10.8			
PSS1520N1D0661					500	535		586	604	661			0.030	0.023	0.075	0.8 – 10.8			
PSS1520N1D0761					600	635		686	704	761			0.035	0.025	0.075	0.8 – 13.8	3 700		
PSS1520N1D0879					700	735		786	804	879			0.035	0.025	0.095	0.8 – 13.8	2 900	4 200	Shape I
PSS1520N1D0979					800	835		886	904	979			0.040	0.027	0.095	0.8 – 13.8	2 200	3 300	
PSS1520N1D1179					1 000	1 035		1 086	1 104	1 179			0.046	0.030	0.120	0.8 – 13.8	1 500	2 200	
PSS1530N1D0311		30	5 070	8 730	100	159	71	230	254	311	24		0.023	0.018	0.035	1.2 – 9.3	5 000	–	Shape II
PSS1530N1D0411					200	259		330	354	411			0.025	0.020	0.050	0.8 – 10.8			
													0.027	0.020	0.060	0.8 – 10.8			
PSS1530N1D0511					300	359		430	454	511			0.030	0.023	0.060	0.8 – 10.8			
PSS1530N1D0611					400	459		530	554	611			0.030	0.023	0.075	0.8 – 13.8	4 500		
PSS1530N1D0711					500	559		630	654	711			0.035	0.025	0.095	0.8 – 13.8	3 300		
PSS1530N1D0811					600	659		730	754	811			0.040	0.027	0.095	0.8 – 13.8	2 600	3 800	Shape I
PSS1530N1D0929					700	759		830	854	929			0.040	0.027	0.120	0.8 – 13.8	2 000	3 000	
PSS1530N1D1029					800	859		930	954	1 029			0.046	0.030	0.120	0.8 – 13.8	1 400	2 000	

*1. Indicates ball screw preload control value. About 2.0 N-cm of torque is added due to high performance seal. *2. Contact NSK if permissible rotational speed is to be exceeded. *3. Service temperature range is -20℃ to 80℃. *4. WBK 10-01B and WBK 10-11 are for shape I.

Screw shaft ⌀20
Lead 5, 10, 20, 30, 40, 60



Ball screw specification

Preload type	Oversize ball preload (P-preload)
Ball diameter/screw shaft root diameter	3.175/17.2
Accuracy grade/axial play	C5/0
Factory pre-packed grease	NSK grease LR3

Recommended support unit

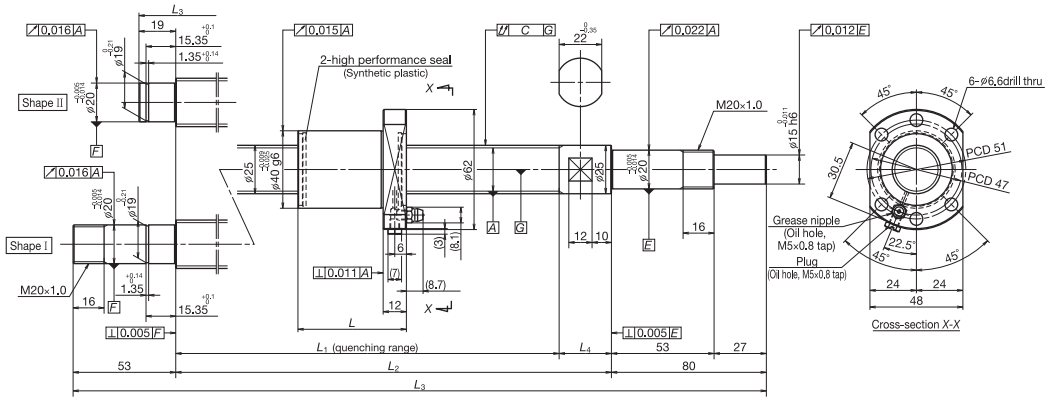
WBK15-01B	(square, fixed side)
WBK15S-01B	(square, simple side)
WBK15-11	(round, fixed side)

Unit: mm

Reference number	Screw shaft diameter d	Lead ℓ	Basic load ratings (N) Dynamic C_a	Basic load ratings (N) Static C_{0a}	Stroke Nominal	Stroke Max. L_1-L	Nut length L	Screw shaft dimensions L_1	L_2	L_3	L_4	Lead accuracy Target value T	Lead accuracy Error e_p	Lead accuracy Variation v_u	Shaft runout C	Dynamic preload torque (N-cm) *1	Permissible rotational speed (min⁻¹) *2 Fixed-Simple	Permissible rotational speed (min⁻¹) *2 Fixed-Fixed	Left shaft end (opposite driven side)
PSS2005N1D0323	20	5	8 790	18 500	150	197	31	228	250	323	22	0	0.023	0.018	0.045	0.6 – 7.4	5 000	–	Shape II
PSS2005N1D0373					200	247		278	300	373			0.023	0.018	0.045	0.6 – 7.4			
PSS2005N1D0473					300	347		378	400	473			0.025	0.020	0.050	0.6 – 7.4			
PSS2005N1D0573					400	447		478	500	573			0.027	0.020	0.060	0.4 – 9.8			
PSS2005N1D0673					500	547		578	600	673			0.030	0.023	0.075	0.4 – 9.8			
PSS2005N1D0773					600	647		678	700	773			0.035	0.025	0.075	0.4 – 9.8			
PSS2005N1D0873					700	747		778	800	873			0.035	0.025	0.095	0.4 – 9.8	4 000		
PSS2005N1D1000					800	847		878	900	1000			0.040	0.027	0.095	0.4 – 11.8	3 200	4 700	Shape I
PSS2010N1D0387		10	8 790	18 500	200	247	45	292	314	387	22		0.023	0.018	0.045	1.2 – 9.3	5 000	–	Shape II
PSS2010N1D0487					300	347		392	414	487			0.025	0.020	0.050	1.2 – 9.3			
PSS2010N1D0587					400	447		492	514	587			0.027	0.020	0.060	0.8 – 10.8			
PSS2010N1D0687					500	547		592	614	687			0.030	0.023	0.075	0.8 – 10.8			
PSS2010N1D0787					600	647		692	714	787			0.035	0.025	0.075	0.8 – 10.8			
PSS2010N1D0887					700	747		792	814	887			0.035	0.025	0.095	0.8 – 10.8	4 000		
PSS2010N1D1014					800	847		892	914	1 014			0.040	0.027	0.120	0.8 – 13.8	3 100	4 600	
PSS2010N1D1214					1 000	1047		1 092	1 114	1 214			0.046	0.030	0.120	0.8 – 13.8	2 100	3 100	Shape I
PSS2010N1D1414					1 200	1247		1 292	1 314	1 414			0.054	0.035	0.160	0.8 – 13.8	1 500	2 200	
PSS2020N1D0508		20	5 900	11 700	300	359	54	413	435	508	22		0.027	0.020	0.060	1.4 – 11.8	5 000	–	Shape II
PSS2020N1D0608					400	459		513	535	608			0.030	0.023	0.060	1.4 – 11.8			
PSS2020N1D0708					500	559		613	635	708			0.030	0.023	0.075	1.4 – 11.8			
PSS2020N1D0808					600	659		713	735	808			0.035	0.025	0.095	1.4 – 11.8			
PSS2020N1D0908					700	759		813	835	908			0.040	0.027	0.095	0.8 – 13.8	3 700		
PSS2020N1D1035					800	859		913	935	1 035			0.040	0.027	0.120	0.8 – 13.8	3 000	4 500	
PSS2020N1D1235					1 000	1 059		1 113	1 135	1 235			0.046	0.030	0.120	0.8 – 13.8	2 000	3 000	Shape I
PSS2020N1D1435					1 200	1 259		1 313	1 335	1 435			0.054	0.035	0.160	0.8 – 13.8	1 400	2 100	
PSS2020N1D1835					1 600	1 659		1 713	1 735	1 835			0.065	0.040	0.200	0.8 – 13.8	800	1 200	
PSS2030N1D0408		30	5 900	11 700	200	234	74	308	335	408	27		0.023	0.018	0.050	1.6 – 9.8	5 000	–	Shape II
PSS2030N1D0508					300	334		408	435	508			0.027	0.020	0.060	1.4 – 11.8			
PSS2030N1D0608					400	434		508	535	608			0.030	0.023	0.060	1.4 – 11.8			
PSS2030N1D0708					500	534		608	635	708			0.030	0.023	0.075	1.4 – 11.8			
PSS2030N1D0808					600	634		708	735	808			0.035	0.025	0.095	1.4 – 11.8			
PSS2030N1D0908					700	734		808	835	908			0.040	0.027	0.095	0.8 – 13.8	3 900		
PSS2030N1D1035					800	834		908	935	1 035			0.040	0.027	0.120	0.8 – 13.8	3 100	4 600	
PSS2030N1D1235					1 000	1 034		1 108	1 135	1 235			0.046	0.030	0.120	0.8 – 13.8	2 100	3 000	Shape I
PSS2030N1D1435					1 200	1 234		1 308	1 335	1 435			0.054	0.035	0.160	0.8 – 13.8	1 500	2 200	
PSS2040N1D0658		40	5 900	11 700	400	461	92	553	585	658	32		0.030	0.023	0.075	2.2 – 12.8	5 000	–	Shape II
PSS2040N1D0758					500	561		653	685	758			0.035	0.025	0.075	2.2 – 12.8			
PSS2040N1D0858					600	661		753	785	858			0.035	0.025	0.095	2.2 – 12.8			
PSS2040N1D0958					700	761		853	885	958			0.040	0.027	0.095	1.8 – 14.8	3 500		
PSS2040N1D1085					800	861		953	985	1 085			0.040	0.027	0.120	1.8 – 14.8	2 800	4 200	
PSS2040N1D1285					1 000	1 061		1 153	1 185	1 285			0.046	0.030	0.160	1.8 – 14.8	1 900	2 800	
PSS2040N1D1485					1 200	1 261		1 353	1 385	1 485			0.054	0.035	0.160	1.8 – 14.8	1 400	2 000	Shape I
PSS2040N1D1885					1 600	1 661		1 753	1 785	1 885			0.065	0.040	0.200	1.8 – 14.8	800	1 200	
PSS2040N1D2285					2 000	2 061		2 153	2 185	2 285			0.077	0.046	0.240	1.8 – 14.8	500	800	
PSS2060N1D0708		60	5 900	11 700	400	464	129	593	635	708	42		0.030	0.023	0.075	2.7 – 13.8	5 000	–	Shape II
PSS2060N1D0808					500	564		693	735	808			0.035	0.025	0.095	2.7 – 13.8			
PSS2060N1D0908					600	664		793	835	908			0.035	0.025	0.095	2.7 – 13.8	4 200		
PSS2060N1D1008					700	764		893	935	1 008			0.040	0.027	0.120	1.8 – 14.8	3 300		
PSS2060N1D1135					800	864		993	1 035	1 135			0.040	0.027	0.120	1.8 – 14.8	2 600	3 900	
PSS2060N1D1335					1 000	1 064		1 193	1 235	1 335			0.046	0.030	0.160	1.8 – 14.8	1 800	2 700	
PSS2060N1D1535					1 200	1 264		1 393	1 435	1 535			0.054	0.035	0.160	1.8 – 14.8	1 300	1 900	Shape I
PSS2060N1D1935					1 600	1 664		1 793	1 835	1 935			0.065	0.040	0.200	1.8 – 14.8	800	1 100	
PSS2060N1D2335					2 000	2 064		2 193	2 235	2 335			0.077	0.046	0.240	1.8 – 14.8	500	700	

*1. Indicates ball screw preload control value. About 3.0 N-cm of torque is added due to high performance seal. *2. Contact NSK if permissible rotational speed is to be exceeded. *3. Service temperature range is -20°C to 80°C.

Screw shaft ø25
Lead 5, 10, 20, 25, 30, 50



Ball screw specification

Preload type	Oversize ball preload (P-preload)
Ball diameter/screw shaft root diameter	3.175/22.2
Accuracy grade/axial play	C5/0
Factory pre-packed grease	NSK grease LR3

Recommended support unit

WBK20-01	(square, fixed side)
WBK20S-01	(square, simple side)
WBK20-11	(round, fixed side)

Unit: mm

Reference number	Screw shaft diameter	Lead	Basic load ratings (N)		Stroke		Nut length	Screw shaft dimensions				Lead accuracy			Shaft runout	Dynamic preload torque (N-cm) *1	Permissible rotational speed (min⁻¹) *2		Left shaft end (opposite driven side)
			Dynamic	Static								Target value	Error	Variation					
			C_a	C_{0a}	Nominal	Max.		L_1	L_2	L_3	L_4						Fixed-Simple	Fixed-Fixed	
	d	ℓ				L_1-L	L					T	e_p	v_u	C				
PSS2505N1D0349	25	5	9 760	23 600	150	191	32	223	250	349	27	0	0.023	0.018	0.035	1.2 – 9.3	5 000	–	Shape II
PSS2505N1D0399					200	241		273	300	399			0.023	0.018	0.035	1.2 – 9.3			
PSS2505N1D0499					300	341		373	400	499			0.025	0.020	0.040	1.2 – 9.3			
PSS2505N1D0599					400	441		473	500	599			0.027	0.020	0.045	1.2 – 9.3			
PSS2505N1D0699					500	541		573	600	699			0.030	0.023	0.055	0.8 – 10.8			
PSS2505N1D0899					700	741		773	800	899			0.035	0.025	0.065	0.8 – 10.8			
PSS2505N1D0999					800	841		873	900	999			0.040	0.027	0.065	0.8 – 10.8	4 100		
PSS2505N1D1233					1 000	1 041		1 073	1 100	1 233			0.046	0.030	0.080	0.8 – 13.8	2 700	4 000	Shape I
PSS2510N1D0549		10	12 800	32 300	300	367	56	423	450	549	27		0.027	0.020	0.045	3.1 – 11.8	5 000	–	Shape II
PSS2510N1D0649					400	467		523	550	649			0.030	0.023	0.055	2.2 – 12.8			
PSS2510N1D0749					500	567		623	650	749			0.030	0.023	0.055	2.2 – 12.8			
PSS2510N1D0849					600	667		723	750	849			0.035	0.025	0.065	2.2 – 12.8			
PSS2510N1D0949					700	767		823	850	949			0.040	0.027	0.065	2.2 – 12.8			
PSS2510N1D1049					800	867		923	950	1 049			0.040	0.027	0.080	2.2 – 12.8	3 600		
PSS2510N1D1283					1 000	1 067		1 123	1 150	1 283			0.046	0.030	0.100	1.8 – 14.8	2 500	3 700	Shape I
PSS2510N1D1883					1 600	1 667		1 723	1 750	1 883			0.065	0.040	0.130	1.8 – 14.8	1 000	1 600	
PSS2520N1D0729		20	6 560	14 600	500	550	54	604	630	729	26		0.030	0.023	0.055	2.2 – 12.8	5 000	–	Shape II
PSS2520N1D0829					600	650		704	730	829			0.035	0.025	0.065	2.2 – 12.8			
PSS2520N1D0929					700	750		804	830	929			0.040	0.027	0.065	2.2 – 12.8	4 800		
PSS2520N1D1029					800	850		904	930	1 029			0.040	0.027	0.080	2.2 – 12.8	3 800		
PSS2520N1D1263					1 000	1 050		1 104	1 130	1 263			0.046	0.030	0.100	1.8 – 14.8	2 600	3 800	Shape I
PSS2520N1D1463					1 200	1 250		1 304	1 330	1 463			0.054	0.035	0.100	1.8 – 14.8	1 800	2 700	
PSS2520N1D1863					1 600	1 650		1 704	1 730	1 863			0.065	0.040	0.130	1.8 – 14.8	1 100	1 600	
PSS2520N1D2263					2 000	2 050		2 104	2 130	2 263			0.077	0.046	0.170	1.8 – 14.8	700	1 000	
PSS2525N1D0779		25	6 560	14 600	500	587	63	650	680	779	30		0.035	0.025	0.055	2.7 – 13.8	5 000	–	Shape II
PSS2525N1D0879					600	687		750	780	879			0.035	0.025	0.065	2.7 – 13.8			
PSS2525N1D0979					700	787		850	880	979			0.040	0.027	0.065	2.7 – 13.8	4 300		
PSS2525N1D1079					800	887		950	980	1 079			0.040	0.027	0.080	2.7 – 13.8	3 400		
PSS2525N1D1313					1 000	1 087		1 150	1 180	1 313			0.046	0.030	0.100	1.8 – 14.8	2 300	3 500	Shape I
PSS2525N1D1513					1 200	1 287		1 350	1 380	1 513			0.054	0.035	0.100	1.8 – 14.8	1 700	2 600	
PSS2525N1D1913					1 600	1 687		1 750	1 780	1 913			0.065	0.040	0.130	1.8 – 14.8	1 000	1 500	
PSS2525N1D2313					2 000	2 087		2 150	2 180	2 313			0.077	0.046	0.170	1.8 – 14.8	700	1 000	
PSS2530N1D0779		30	6 560	14 600	500	576	74	650	680	779	30		0.035	0.025	0.055	2.7 – 13.8	5 000	–	Shape II
PSS2530N1D0879					600	676		750	780	879			0.035	0.025	0.065	2.7 – 13.8			
PSS2530N1D0979					700	776		850	880	979			0.040	0.027	0.065	2.7 – 13.8	4 300		
PSS2530N1D1079					800	876		950	980	1 079			0.040	0.027	0.080	2.7 – 13.8	3 400		
PSS2530N1D1313					1 000	1 076		1 150	1 180	1 313			0.046	0.030	0.100	1.8 – 14.8	2 300	3 600	Shape I
PSS2530N1D1513					1 200	1 276		1 350	1 380	1 513			0.054	0.035	0.100	1.8 – 14.8	1 700	2 600	
PSS2530N1D1913					1 600	1 676		1 750	1 780	1 913			0.065	0.040	0.130	1.8 – 14.8	1 000	1 500	
PSS2530N1D2313					2 000	2 076		2 150	2 180	2 313			0.077	0.046	0.170	1.8 – 14.8	700	1 000	
PSS2550N1D0829		50	6 560	14 600	500	576	114	690	730	829	40		0.035	0.025	0.065	5.4 – 17.6	5 000	–	Shape II
PSS2550N1D0929					600	676		790	830	929			0.035	0.025	0.065	5.4 – 17.6	4 800		
PSS2550N1D1029					700	776		890	930	1 029			0.040	0.027	0.080	5.4 – 17.6	3 800		
PSS2550N1D1129					800	876		990	1 030	1 129			0.040	0.027	0.080	5.4 – 17.6	3 100		
PSS2550N1D1363					1 000	1 076		1 190	1 230	1 363			0.046	0.030	0.100	4.1 – 19.6	2 200	3 400	Shape I
PSS2550N1D1563					1 200	1 276		1 390	1 430	1 563			0.054	0.035	0.100	4.1 – 19.6	1 600	2 500	
PSS2550N1D1963					1 600	1 676		1 790	1 830	1 963			0.065	0.040	0.130	4.1 – 19.6	900	1 500	
PSS2550N1D2363					2 000	2 076		2 190	2 230	2 363			0.077	0.046	0.170	4.1 – 19.6	600	1 000	

*1. Indicates ball screw preload control value. About 3.0 N-cm of torque is added due to high performance seal. *2. Contact NSK if permissible rotational speed is to be exceeded. *3. Service temperature range is -20°C to 80°C.

◇Design

(1) If a ball screw of which left shaft end (opposite driven side) is the shape I, and is supported with the “fixed-fixed” supporting method, you should be aware that the operating life of support bearings may drop due to thermal expansion of the screw shaft, depending on usage conditions. In this case, you should consider a structure that can absorb thermal expansion of the screw shaft if necessary. Please consult with NSK for a detailed examination.

(2) If using an NSK linear guide, the maximum speed of a linear guide of standard specifications under ordinary conditions is limited to 100 m/min. A linear guide with high-speed specifications is available if higher operating speed is required. Contact NSK for further information.

(3) For general precautions concerning ball screws, please see NSK Catalog No. E3161 “Precision Machine Components.”

◇Usage and handling

Ball screws are precision products and should be treated as follows:

[Lubrication]

(1) Compact FA Series ball screws are packed and coated with lubrication grease at the factory, and require no further lubrication under ordinary circumstances. If the surface of the grease becomes contaminated with dirt and metal powder under operation, clean it with white kerosene and replenish with new grease of the same kind through the oil hole (grease nipple) on the ball nut. Avoid mixing different types of grease.

(2) Lubricant should be checked after the first 2 to 3 months of operation. If excessively dirty, we recommend you wipe away the old grease and replenish with a generous quantity of grease. After that, grease should be checked and replenished once a year under ordinary circumstances, but the period may vary depending upon the service environment.

[Handling]

(1)Never disassemble the ball screw, otherwise dirt may contaminate the inside of the unit and affect precision or result in equipment failure.

(2) Compact FA Series ball screws incorporate a new ball re-circulation system. Consequently, only NSK authorized plants should conduct disassembly and reassembly. If the nut accidentally comes off the screw shaft or is dropped, NSK will check precision, problems or perform repairs at your expense.

(3) When the ball screw is erected upright, the screw shaft or nut could fall by force of its own weight and result in injury. If dropped, the ball grooves could be dented or re-circulation parts damaged, resulting in loss of function. This would require the ball screw to be inspected by NSK. If so, be sure to send the ball screw to NSK and we will check it for a fee.

[Usage]

(1) Ball screws should be used in a clean environment. The ball screws should be provided with a dust cover to prevent the entry of debris such as dust and metal powder. If foreign matter is allowed to contaminate the ball screw, this could not only cause the ball screw to lose some of its function, but also result in clogging and damaging the re-circulation system parts, or cause the table to fall or a similar serious accident.

(2) Compact FA Series ball screws are designed to be used in a service temperature environment of 80˚C or lower. Do not allow the service temperature limit to be exceeded. In some cases, using ball screws in temperatures above 80˚C might lead to damage of re-circulation system parts or seal parts. Contact NSK if 80˚C must be exceeded.

◇Compact FA Series options

Consult with NSK for information about optional specification not given in the catalog such as shaft end machining, reverse direction ball nut, alternative grease, surface treatment,
and alternative preload.

NSK has developed a series of low-profile support unit to be used with the ball screws of compact FA series. A combination of the ball screw and the support unit offers a compact design for downsizing of many kinds of machinery.

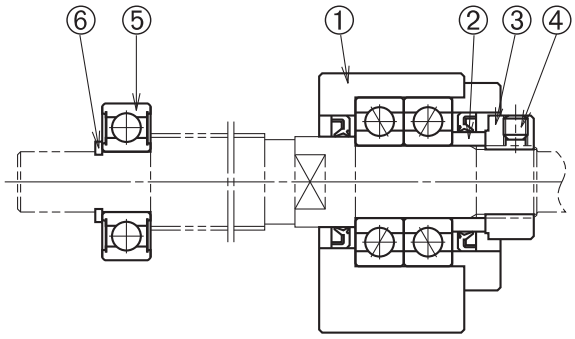
Features

The low-profile support units offer the low center height construction suited for the compact FA series ball screws.

Product configuration

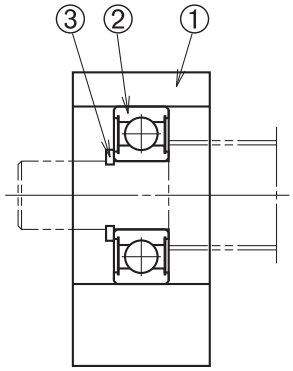
All parts required for ball screw mounting are provided as a set (see the table below). The bearing housing of support unit for fixed side contains a built-in angular contact ball bearings and oil seal and should not be disassembled.

Fixed side support unit



Part No.	Part	Remarks (surface treatment, grease)
①	Bearing housing	Triiron tetroxide film
	Angular contact ball bearing	PS2
	Oil seal	
	Cover	Triiron tetroxide film
②	Spacer	
③	Lock nut	Triiron tetroxide film
④	Setscrew	Triiron tetroxide film
⑤	Deep groove ball bearing	Comes with support side, PS2
⑥	Snap ring	Triiron tetroxide film
Other machine screws are either made of stainless steel or coarted with triiron tetroxide film.		

Simple side support unit



Part No.	Part	Remarks (surface treatment, grease)
①	Bearing housing	Triiron tetroxide film
②	Deep groove ball bearing	PS2
③	Snap ring	Triiron tetroxide film

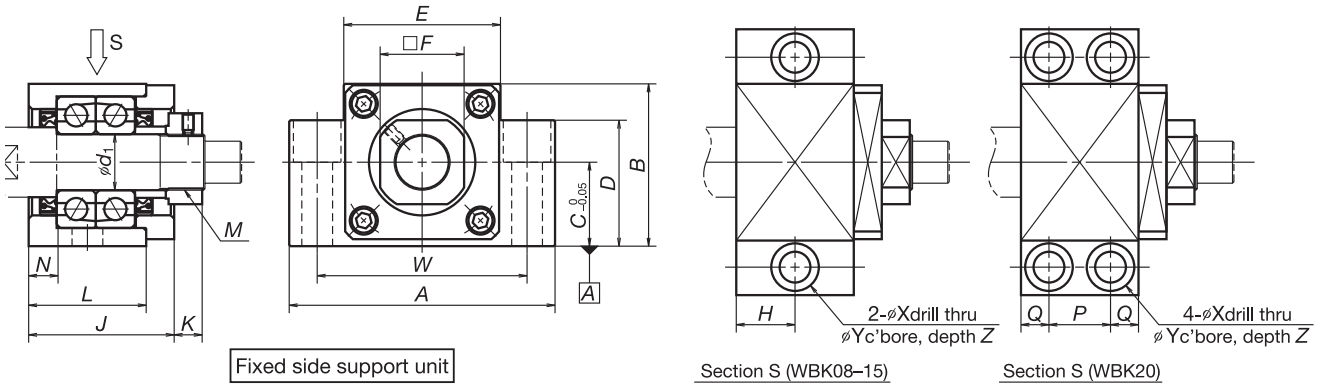
Reference number

Example: **WBK 08 S - 01 B**

- WBK: Support unit product code
- 08: Nominal size code (internal bore of bearing)*
- S: Mounting code — No code: Fixed side support unit; S: Simple side support unit
- 01: 01: Square type, 11: Round type
- B: No code or A: conventional standard support unit; B: Low-profile support unit

*For simple side support units, please note that size codes of 12 or less do not represent internal bores of bearing.

Fixed side support unit (square type)



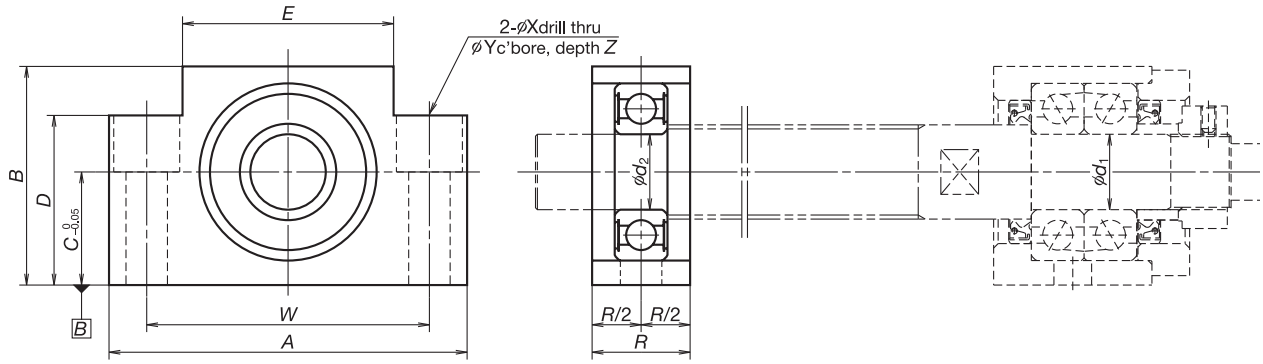
Unit: mm

Screw shaft diameter	Fixed side support unit (square type)																			
	Reference number	d_1	A	B	C	D	E	F	H	J	K	L	N	P	Q	W	X	Y	Z	M
ø10	WBK08-01A	8	52	32	17	26	25	14	11.5	23	7	—	4	—	—	38	6.6	11	12	M8×1
ø12	WBK08-01B	8	62	31	15.5	—	—	14	11	25.5	4.5	21.5	3.5	—	—	46	9	14	18	M8×1
ø15	WBK10-01B*	10	70	38	20	—	—	17	12	30	5.5	24	6	—	—	52	9	14	19	M10×1
	WBK12-01A	12	70	43	25	35	36	19	12	30	5.5	24	6	—	—	52	9	14	11	M12×1
	WBK12-01B	12	70	38	20	—	—	19	12	30	5.5	24	6	—	—	52	9	14	19	M12×1
ø20	WBK15-01A	15	80	50	30	40	41	22	12.5	31	12	25	5	—	—	60	11	17	15	M15×1
	WBK15-01B	15	80	42	22	—	—	22	12.5	31	12	25	5	—	—	60	11	17	23	M15×1
ø25	WBK20-01	20	95	58	30	45	56	30	—	52	10	42	10	22	10	75	11	17	15	M20×1

*Use support unit for fixing side for opposite drive side of shaft diameter ø15.

Remarks 1. Mount to the base using side A as the reference.
2. Tighten the setscrew after tightening the lock nut and adjusting.
3. Insert the set piece and then tighten the setscrew.

Simple side support unit

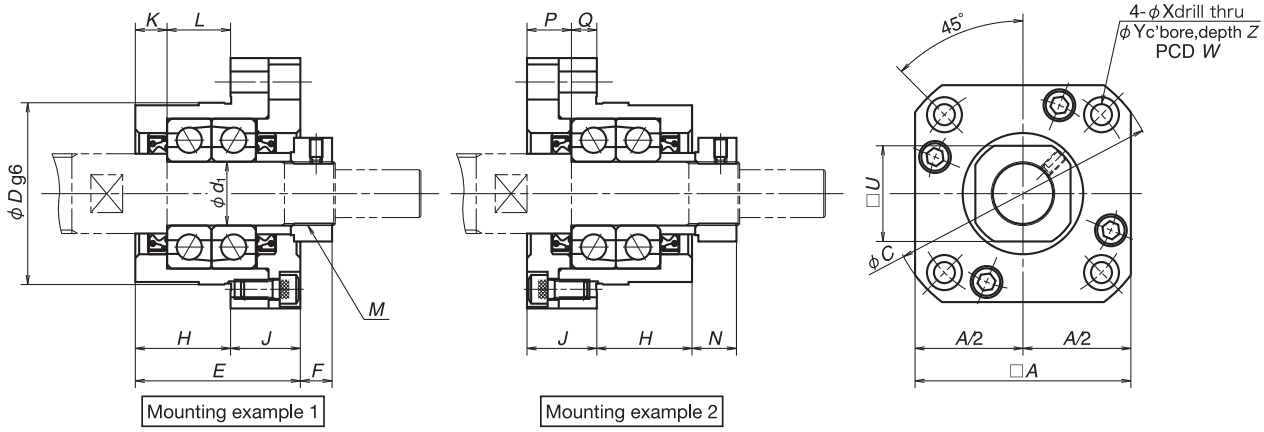


Unit: mm

Screw shaft diameter	Simple side support unit											
	Reference number	d_2	A	B	C	D	E	R	W	X	Y	Z
ø10	WBK08S-01	6	52	32	17	26	25	15	38	6.6	11	12
ø12	WBK08S-01B	6	62	31	15.5	—	—	16	46	9	14	18
ø15	WBK12S-01	10	70	43	25	35	36	20	52	9	14	11
	WBK12S-01B	10	70	38	20	—	—	20	52	9	14	19
ø20	WBK15S-01	15	80	50	30	40	41	20	60	9	14	11
	WBK15S-01B	15	80	42	22	—	—	20	60	9	14	23
ø25	WBK20S-01	20	95	58	30	45	56	26	75	11	17	15

Remarks 1. Mount to the base using side B as the reference.

Fixed side support unit (round type)



Unit: mm

Screw shaft diameter	Fixed side support unit (round type)																			
	Reference number	d_1	A	C	D	E	F	H	J	K	L	N	P	Q	U	W	X	Y	Z	M
ø10	WBK08-11	8	35	43	28	23	7	14	9	4	10	8	5	4	14	35	3.4	6.5	4	M8×1
ø12	WBK08-11B	8	42	52	34	25.5	4.5	15.5	10	3.5	12	7	6	4	14	42	4.5	8	4	M8×1
ø15	WBK10-11*	10	42	52	34	27	7.5	17	10	5	12	8.5	6	4	17	42	4.5	8	4	M10×1
	WBK12-11	12	44	54	36	27	7.5	17	10	5	12	8.5	6	4	19	44	4.5	8	4	M12×1
ø20	WBK15-11	15	52	63	40	32	12	17	15	6	11	14	8	7	22	50	5.5	9.5	6	M15×1
ø25	WBK20-11	20	68	85	57	52	10	30	22	10	20	14	14	8	30	70	6.6	11	10	M15×1

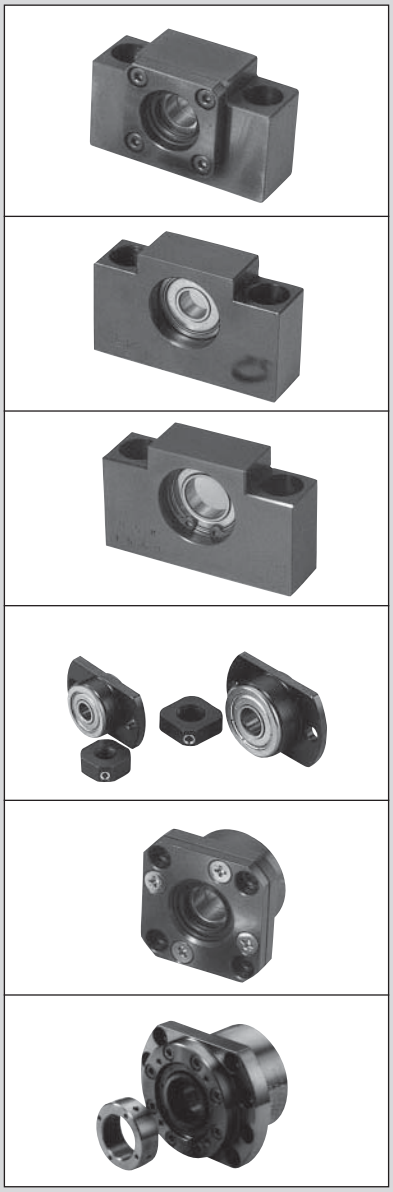
*Use support unit for fixing side for opposite drive side of shaft diameter 15.

Remarks 1. Tighten the setscrew after tightening the lock nut and adjusting.
2. Insert the set piece and then tighten the setscrew.

Specifications of support unit

Screw shaft diameter	Fixed side support unit						Simple side support unit		
	Support unit reference number	Axial load		Maximum starting torque	Tightening torque [N·cm]		Support unit reference number	Bearing number	Radial load
		Basic load ratings C_a [N]	Load limit [N]		Lock nut	Setscrew			Basic load ratings C [N]
ø10 ø12	WBK08-01A (square type)	4 400	1 450	0.88	490	69 (M3)	WBK08S-01	606ZZ	2 260
	WBK08-11 (round type)						—		
	WBK08-01B (square low-profile type)	6 600	2 730	1.9			WBK08S-01B		
	WBK08-11B (round type)						—		
ø15	WBK10-01B (square low-profile type)*	6 600	2 730	1.9	930	147 (M4)	—	6000ZZ	4 550
	WBK10-11 (round type)						—		
	WBK12-01A (square type)	7 100	3 040	2.1	1 370	147 (M4)	WBK12S-01		
	WBK12-01B (square low-profile type)						WBK12S-01B		
	WBK12-11 (round type)						—		
ø20	WBK15-01A (square type)	7 600	3 380	2.3	2 350	147 (M4)	WBK15S-01	6002ZZ	5 600
	WBK15-01B (square low-profile type)						WBK15S-01B		
	WBK15-11 (round type)						—		
ø25	WBK20-01 (square type)	17 900	8 240	5.4	4 700	147 (M4)	WBK20S-01	6204ZZ	12 800
	WBK20-11 (round type)						—		

*Use support unit for fixing side for opposite drive side of shaft diameter 15.



Support units

① **Classification**

Ball screw support units are classified into categories by their shape. Select the type that is appropriate for you to use.

② **Features**

- Short delivery time: Standardized items in stock
- Use most suitable bearings
  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.
- High dust prevention, and low friction torque
  Oil seal is installed in small clearance on the fixed support side. A deep-groove ball bearing with a shield on both sides is used on the simple support side. This minimizes friction torque.
- Lock nut is provided.
  A lock nut of fine grade finish is provided to fix the bearing with high precision.

Support units

Accessories to use with ball screw are available in stock.

Support unit categories

Application		Shape	Support side	Bearing in use	Bearing bore Bearing seat diameter
Small equipment, light load	Square	WBK**-01 	Fixed support side	Angular contact ball bearing	ϕ 6 ~ ϕ 25
		WBK**S-01 	Simple support side	Deep groove ball bearing	ϕ 6 ~ ϕ 25
		WBK**SF-01 		Deep groove ball bearing	ϕ 12, ϕ 15 (Exclusive for VFA Series)
	Round	WBK**R-01 (Support kit) 	Fixed support side	Deep groove ball bearing (arranged to have angular contact)	ϕ 4, ϕ 6 (Exclusive for RMA and RMS Series)
		WBK**-11 		Angular contact ball bearing	ϕ 6 ~ ϕ 25
Machine tools, heavy load	Round	WBK**DF*-31 	Fixed support side	Thrust angular contact ball bearing	ϕ 17 ~ ϕ 40

Support units

① Classification

Ball screw support units are classified into categories by their shape (Table I-6.6). Select the type that is appropriate for you to use.

② Features

- Short delivery time: Standardized items in stock
- Use most suitable bearings

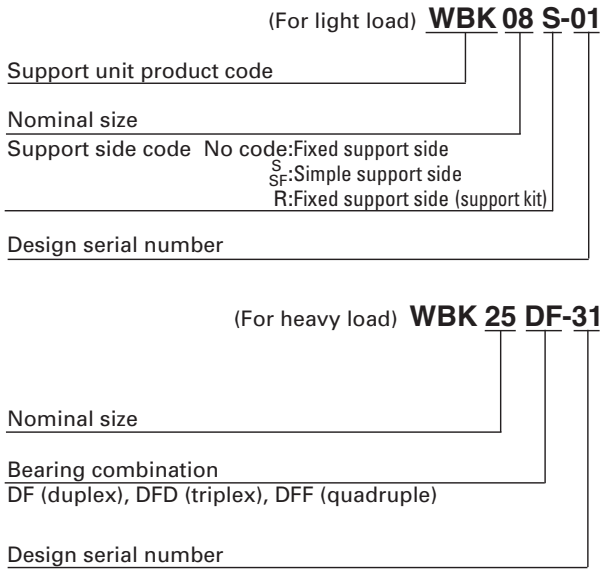
  On the fixed support side, the angular contact ball bearing is used. It has great rigidity and low friction torque which match the rigidity of the ball screw. The thrust angular contact ball bearing with high precision and great rigidity is another choice for the fixed support side.
- High dust prevention, and low friction torque

  Oil seal is installed in small clearance on the fixed support side. A deep-groove ball bearing with a shield on both sides is used on the simple support side. This minimizes friction torque.
- Lock nut is provided.

  A lock nut of fine grade finish is provided to fix the bearing with high precision.

Details for the new NSK Low Profile Support Units you will find on page 154 and following.

③ Reference number and applicable ball screw



The table below show "shaft diameter/lead combinations" of standard ball screws that are applicable to support units.

Support units for light load and applicable "shaft diameter/lead combinations"

Light load / small equipment

Support unit / reference number			"Shaft diameter/lead combinations" of standard ball screws that are applicable to support unit
Square		Round	
Fixed support side (driving motor side)	Simple support side (opposite to driving motor)	Fixed support side	
WBK06-01A	—	WBK06-11	$\phi4\times1$, $\phi6\times1$
WBK08-01A	WBK08S-01	WBK08-11	$\phi8\times1$, $\phi8\times1.5$, $\phi8\times2$, $\phi10\times2$, $\phi10\times2.5$
WBK10-01A	WBK10S-01	WBK10-11	$\phi10\times4$, $\phi12\times2$, $\phi12\times2.5$, $\phi12\times5$, $\phi12\times10$
WBK12-01A	WBK12S-01	WBK12-11	$\phi14\times5$, $\phi14\times8$, $\phi15\times10$, $\phi15\times20$, $\phi16\times2$ $\phi16\times2.5$, $\phi16\times5$, $\phi16\times16$, $\phi16\times32$
WBK15-01A	WBK15S-01	WBK15-11	$\phi20\times4$, $\phi20\times5$, $\phi20\times10$, $\phi20\times20$, $\phi20\times40$
WBK20-01	WBK20S-01	WBK20-11	$\phi20\times4$, $\phi20\times5$, $\phi20\times6$, $\phi20\times10$, $\phi20\times20$ $\phi25\times25$, $\phi25\times50$, $\phi28\times5$, $\phi28\times6$
WBK25-01	WBK25S-01	WBK25-11	$\phi32\times5$, $\phi32\times6$, $\phi32\times8$, $\phi32\times10$ $\phi32\times25$, $\phi32\times32$,

Remarks 1. Reference number is based on the bearing bore on the fixed support side.
2. Please note that the reference numbers 12 or below on the simple-support side do not match the bore of the deep-groove ball bearing in use.

Support units for heavy load and applicable "shaft diameter/lead combinations"

Heavy load / machine tools

Support unit / reference number		"Shaft diameter/lead combinations" of standard ball screws that are applicable to the support unit
Fixed support side (drive motor side)	Fixed support side (opposite to drive motor)	
WBK30DF-31	WBK25DF-31	$\phi36\times10$
WBK30DFD-31	WBK25DFD-31	$\phi36\times10$, $\phi40\times10$
WBK30DF-31	WBK30DF-31	$\phi40\times5$, $\phi40\times8$, $\phi40\times10$, $\phi40\times12$
WBK30DFD-31	WBK30DFD-31	$\phi40\times12$
WBK35DF-31	WBK35DF-31	$\phi45\times10$
WBK40DF-31	WBK40DF-31	$\phi50\times10$
WBK40DFD-31	WBK40DFD-31	$\phi50\times10$

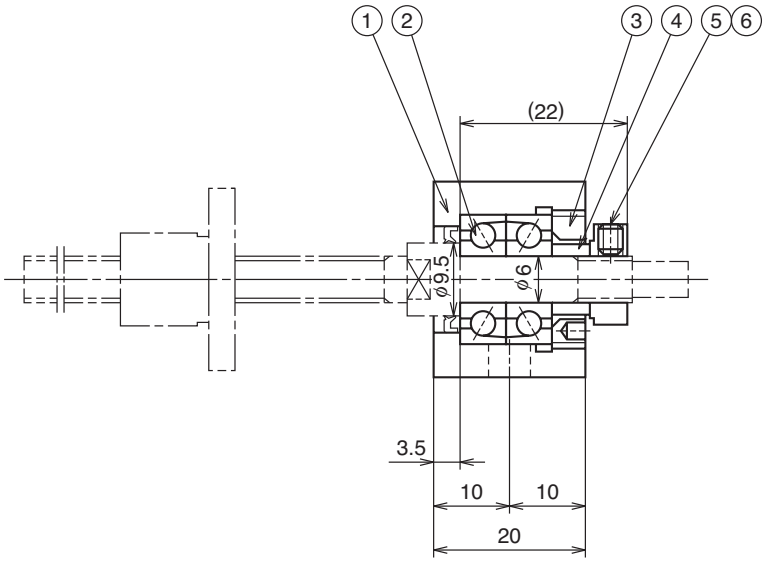
Dimensions of support unit for light load / small equipment

The table shows characteristic value of the support units for light load / small equipment.

Characteristic values of support units for light load

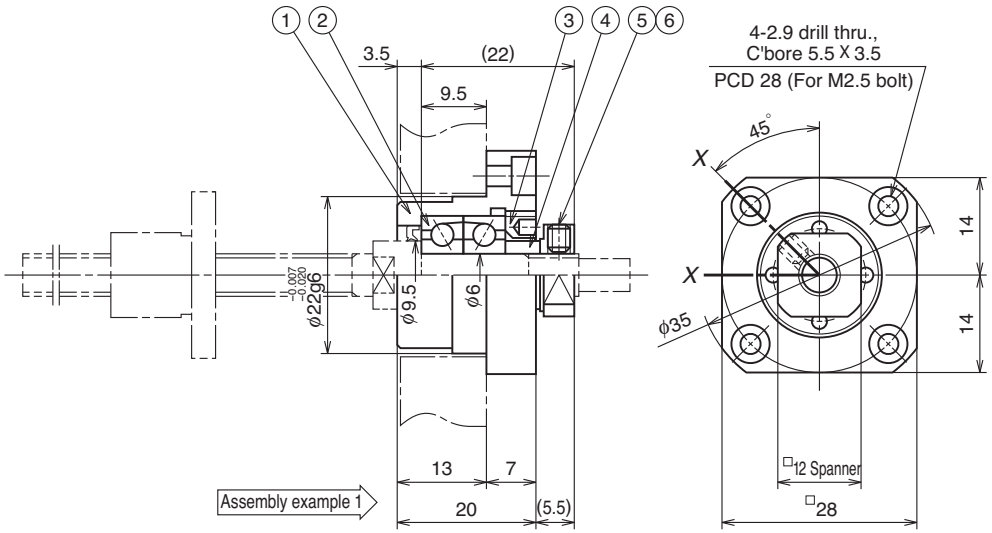
Support unit reference number	Fixed side support unit						Support unit on simple support side		
	Bearing in use (angular contact ball bearing)						Bearing in use (deep-groove ball bearing)		
	Bearing reference number	Axial direction				Maximum starting torque N•cm	Bearing reference number	Radial direction	Support unit reference number
		Basic dynamic load rating C_a N	Load limit N	Preload N	Rigidity N/μm			Basic dynamic load rating C N	
WBK06-01A (Square) WBK06-11 (Round)	706ATYDFC7P5	2670	1040	17	28	0.49	—	—	—
WBK08-01A (Square) WBK08-11 (Round)	708ATYDFC8P5	4400	1450	59	53	0.88	606ZZ	2260	WBK08S-01 (Square)
WBK10-01A (Square) WBK10-11 (Round)	7000ATYDFC8P5	6600	2730	200	94	1.9	608ZZ	3300	WBK10S-01 (Square)
WBK12-01A (Square) WBK12-11 (Round)	7001ATYDFC8P5	7150	3040	215	104	2.1	6000ZZ	4550	WBK12S-01 (Square)
WBK15-01A (Square) WBK15-11 (Round)	7002ATYDFC8P5	7600	3370	235	113	2.3	6002ZZ	5600	WBK15S-01 (Square)
WBK20-01 (Square) WBK20-11 (Round)	7204ATYDFC8P5	17900	8260	440	155	5.4	6204ZZ	12800	WBK20S-01 (Square)
WBK25-01 (Square) WBK25-11 (Round)	7205ATYDFC8P5	20200	10000	580	192	7.2	6205ZZ	14000	WBK25S-01 (Square)

Square type Reference number: WBK06-01A



Section *X-X*

Round type Reference number: WBK06-11

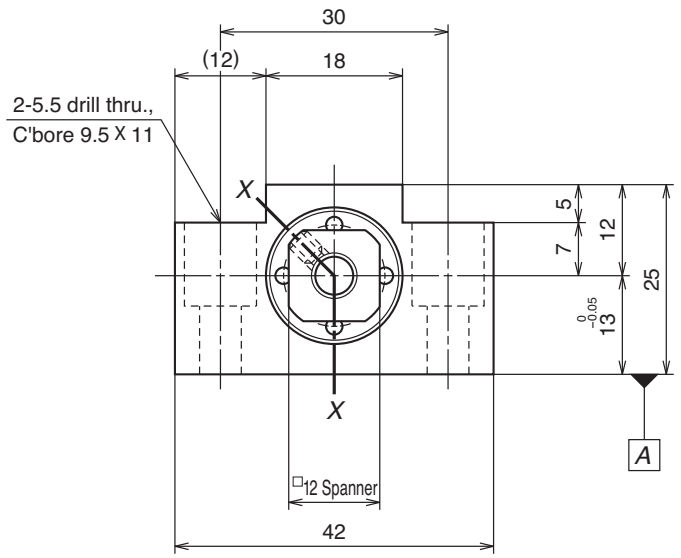


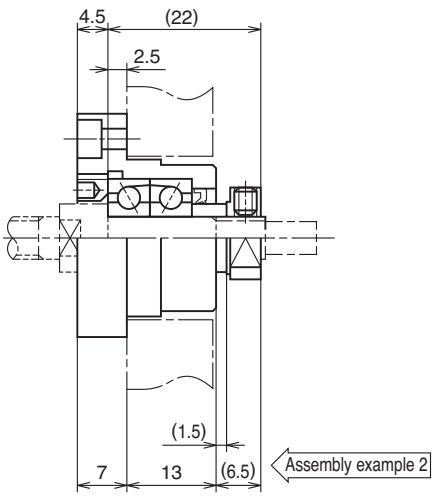
Section *X-X*

WBK06

Standard stock

Unit: mm



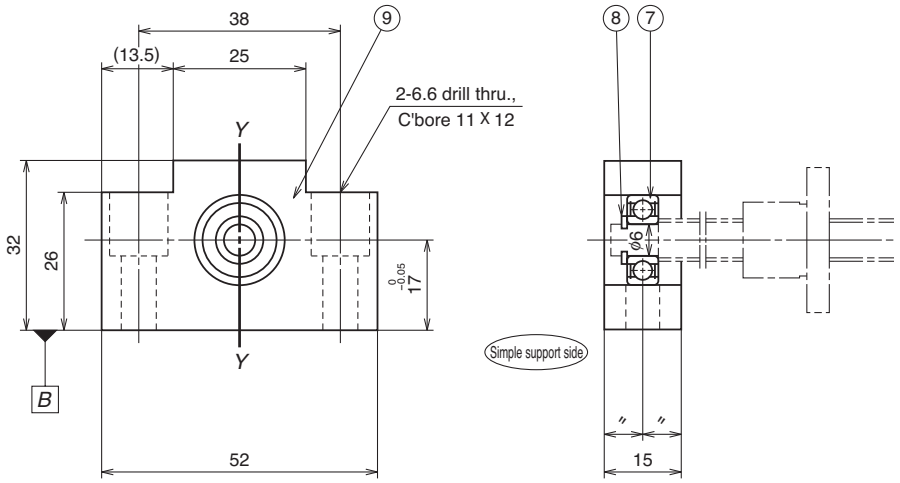


Parts list

Number	Name of part	Quantity	Remarks
①	Bearing housing	1	With oil seal
②	Bearing	One set	706ATYDFC7P5
③	Retaining cover	1	
④	Spacer	1	
⑤	Lock nut	1	For M6, tightening torque 245N•cm {25kgf•cm}
⑥	Set screw	1	M3, with a set piece (pad)

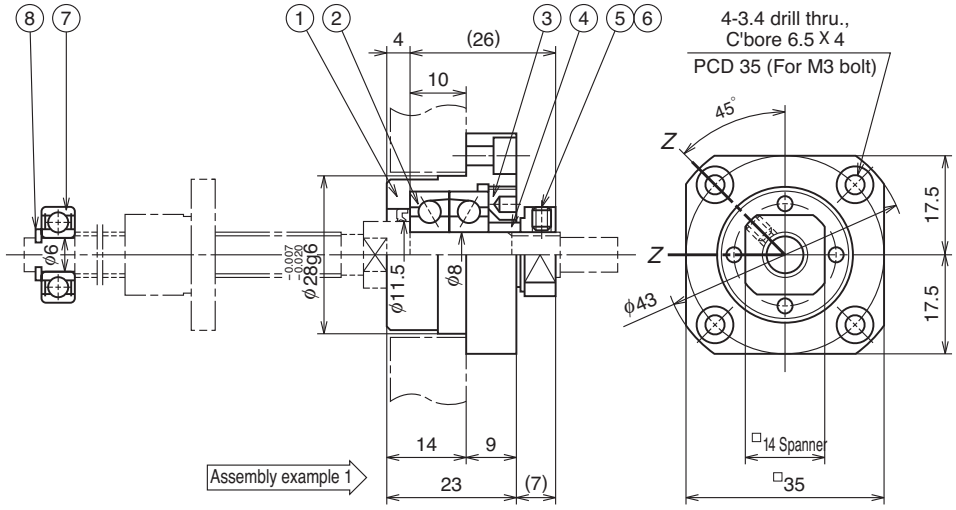
Remarks
1. When installing a square support unit, place A side to the base. Use a spacer if necessary to adjust height.
2. Components ①, ②, ③ are assembled into a unit. Do not disassemble.
3. An appropriate volume of grease is packed in the support unit.
4. Tighten the set screw ⑥ after adjustment.

Square type Reference number: WBK08-01A (fixed support side); WBK08S-01 (simple support side)



WBK08S-01

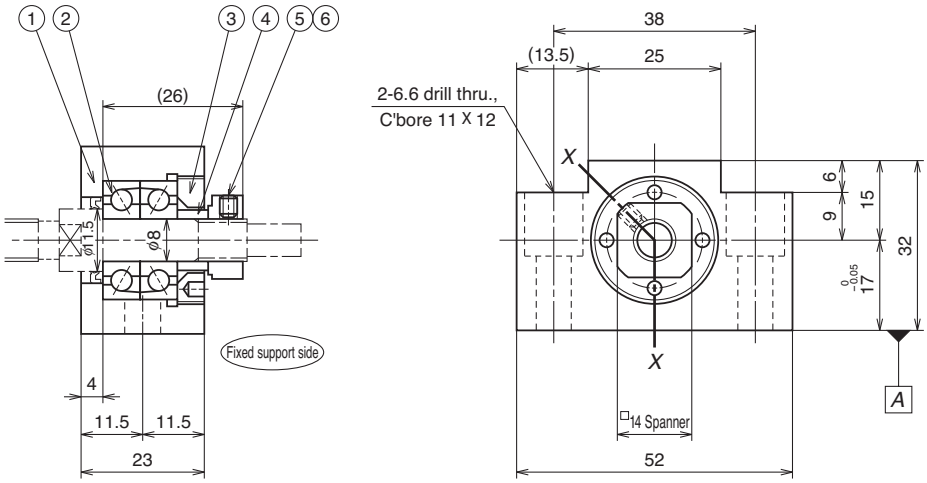
Round type Reference number: WBK08-11

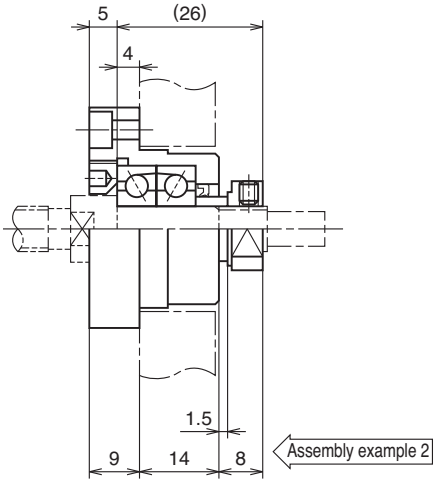


WBK08

Unit: mm

Standard stock



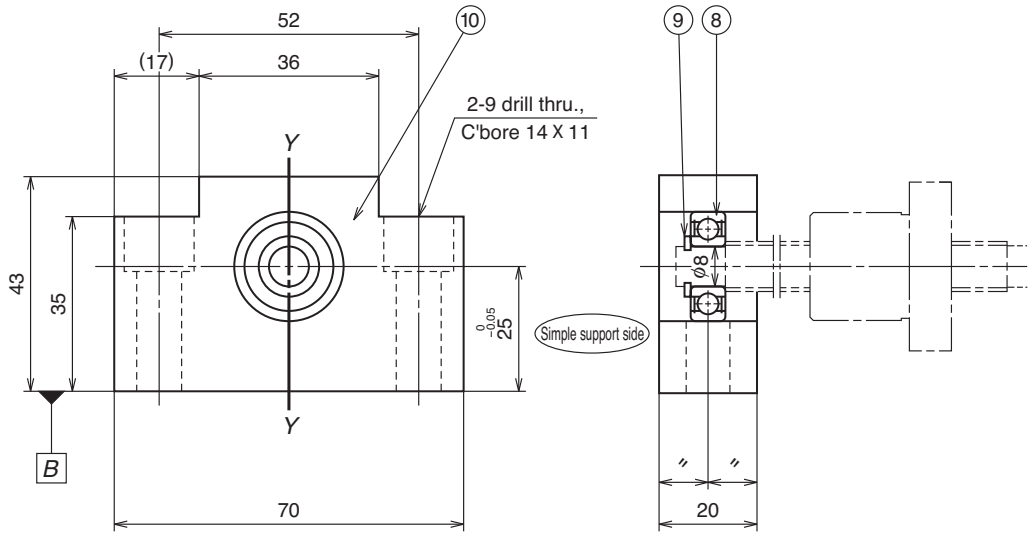


Parts list

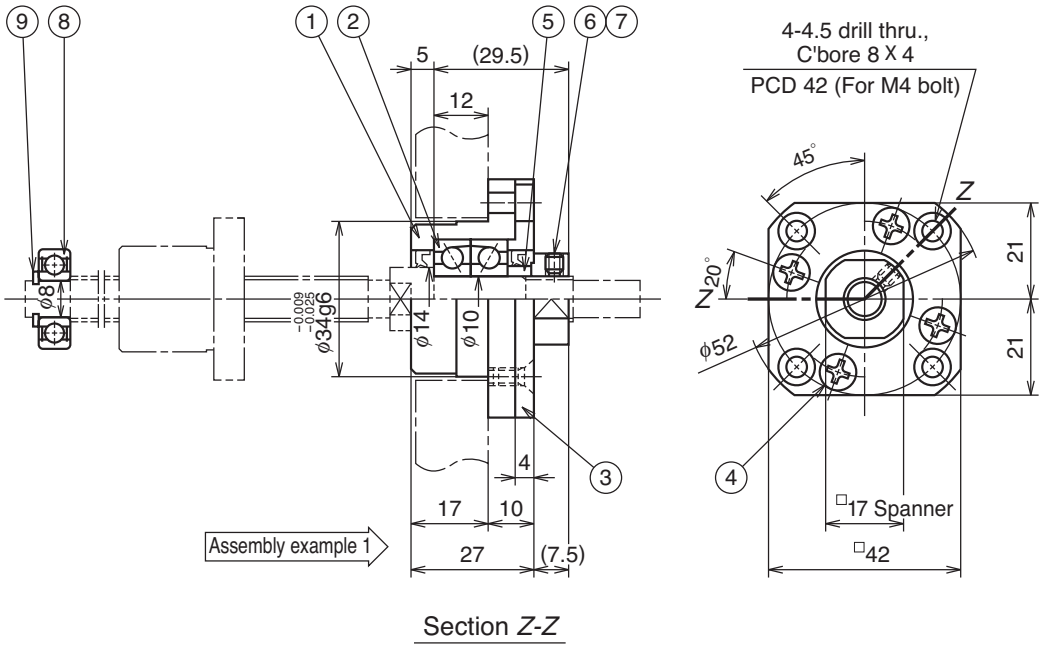
Number	Name of part	Quantity	Remarks
①	Bearing housing	1	With oil seal on fixed support side
②	Bearing	One set	706ATYDFC7P5
③	Retaining cover	1	
④	Spacer	1	
⑤	Lock nut	1	For M8, tightening torque 490N•cm {50 kgf•cm}
⑥	Set screw	1	M3, with a set piece (pad)
⑦	Bearing	1	606ZZ
⑧	Retaining ring	1	
⑨	Bearing housing	1	Simple support side (only square type)

Remarks
1. When installing a square support unit, place A and B sides to the base. Use a spacer if necessary to adjust height.
2. Components ①, ②, ③ are assembled into a unit. Do not disassemble.
3. An appropriate volume of grease is packed in the support unit.
4. Tighten the set screw ⑥ after adjustment.

Square type Reference number: WBK10-01A (fixed support side); WBK10S-01 (simple support side)



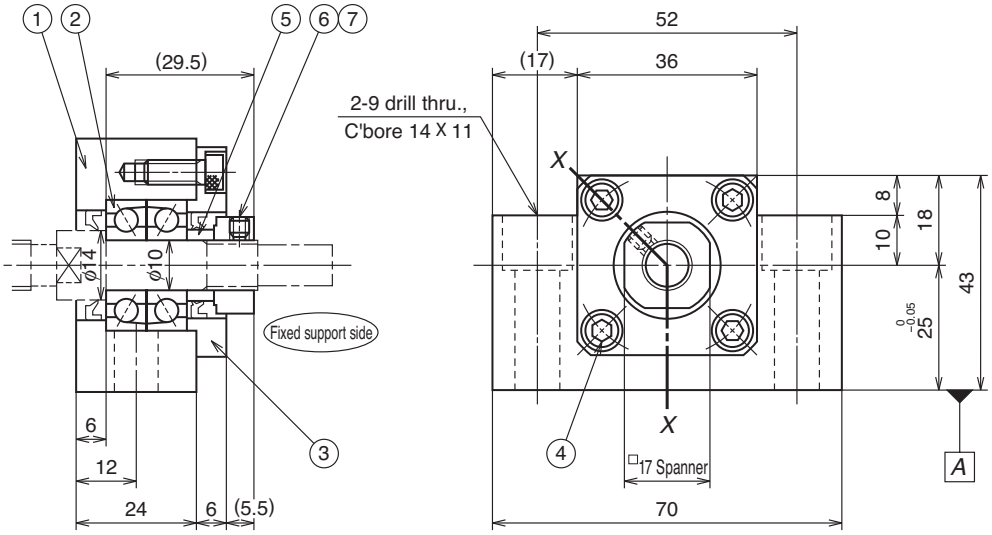
Round type Reference number: WBK10-11

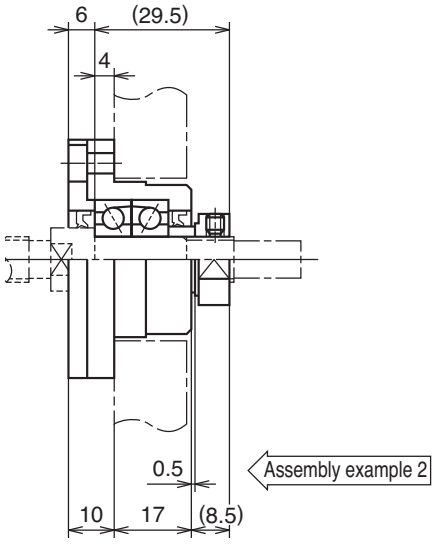


WBK10

Standard stock

Unit: mm



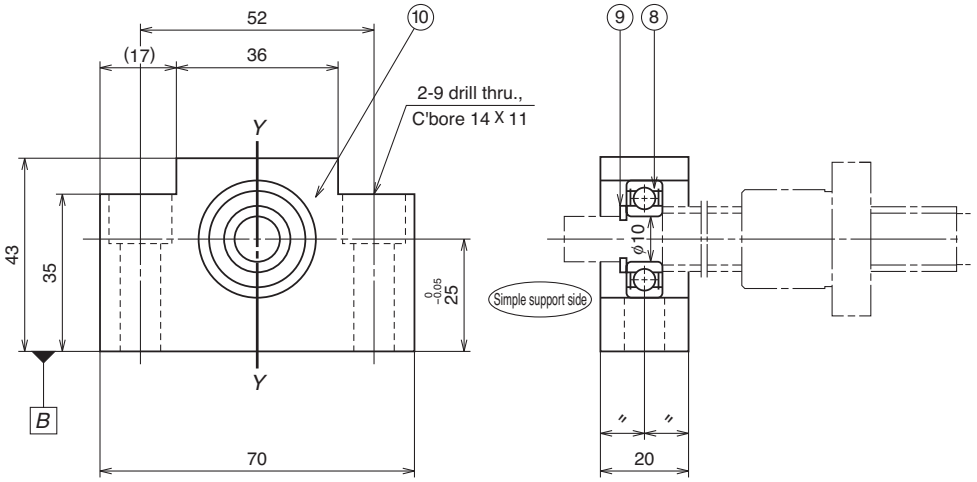


Parts list

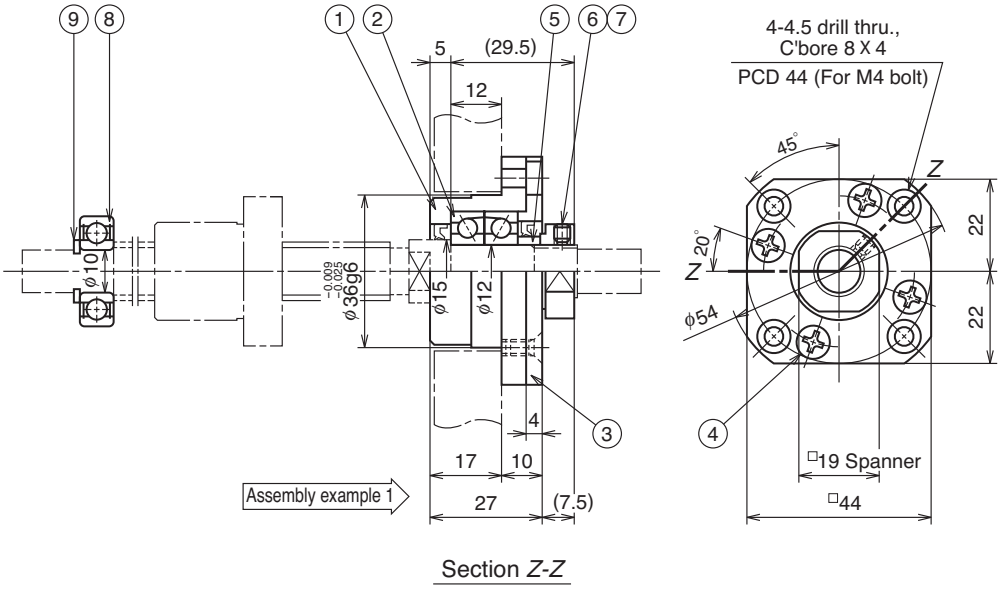
Number	Name of part	Quantity	Remarks
①	Bearing housing	1	With oil seal on fixed support side
②	Bearing	One set	7000ATYDFC8P5
③	Retaining cover	1	
④	Hexagon socket head cap screw or cross recessed pan head screw	4	M4
⑤	Spacer	1	
⑥	Lock nut	1	For M10, tightening torque 930N•cm {95 kgf•cm}
⑦	Set screw	1	M4 with a set piece (pad)
⑧	Bearing	1	608ZZ
⑨	Retaining ring	1	
⑩	Bearing housing	1	Simple support side (only square type)

Remarks
1. When installing a square support unit, place A and B sides to the base. Use a spacer if necessary to adjust height.
2. Components ①, ②, ③ are assembled into a unit. Do not disassemble.
3. An appropriate volume of grease is packed in the support unit.
4. Tighten the set screw ⑦ after adjustment.

Square type Reference umber: WBK12-01 (fixed support side); WBK12S-01 (simple support side)



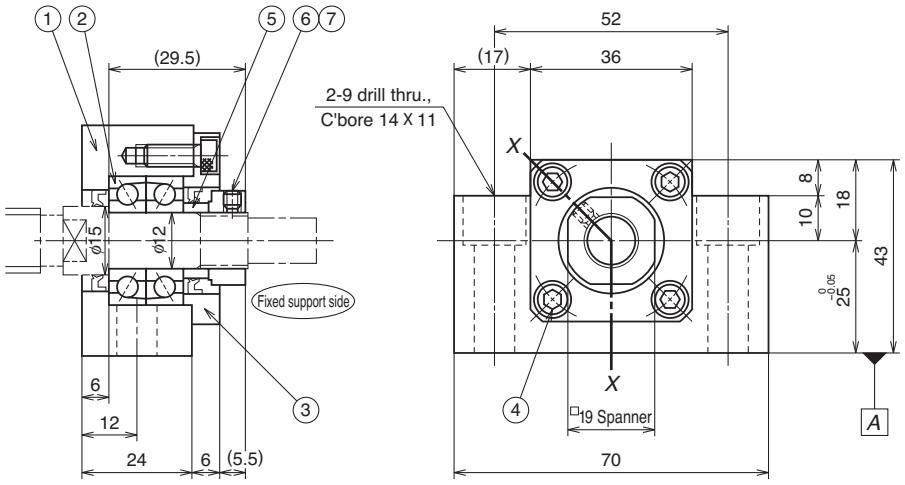
Round type Reference number: WBK12-11

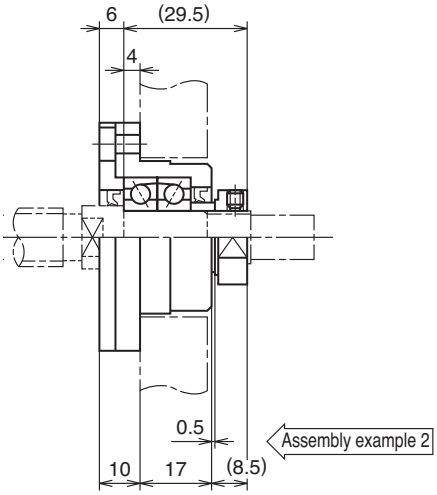


WBK12

Standard stock

Unit: mm



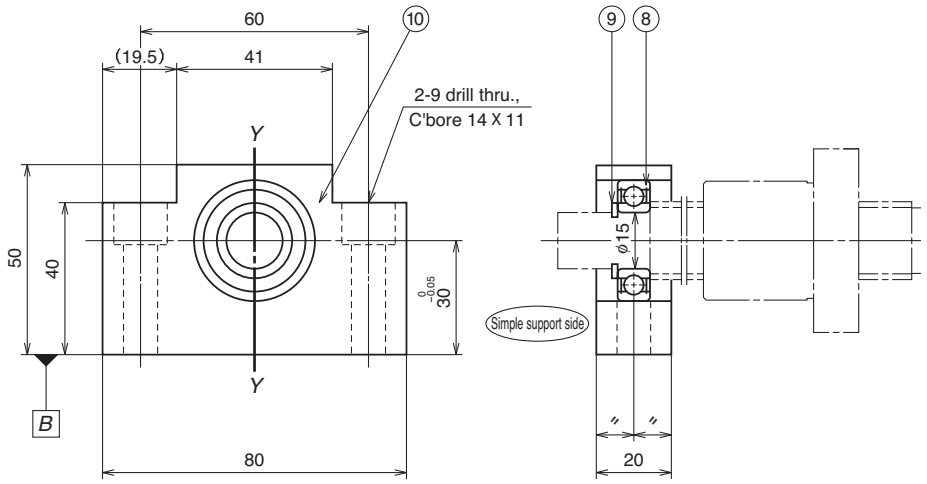


Parts list

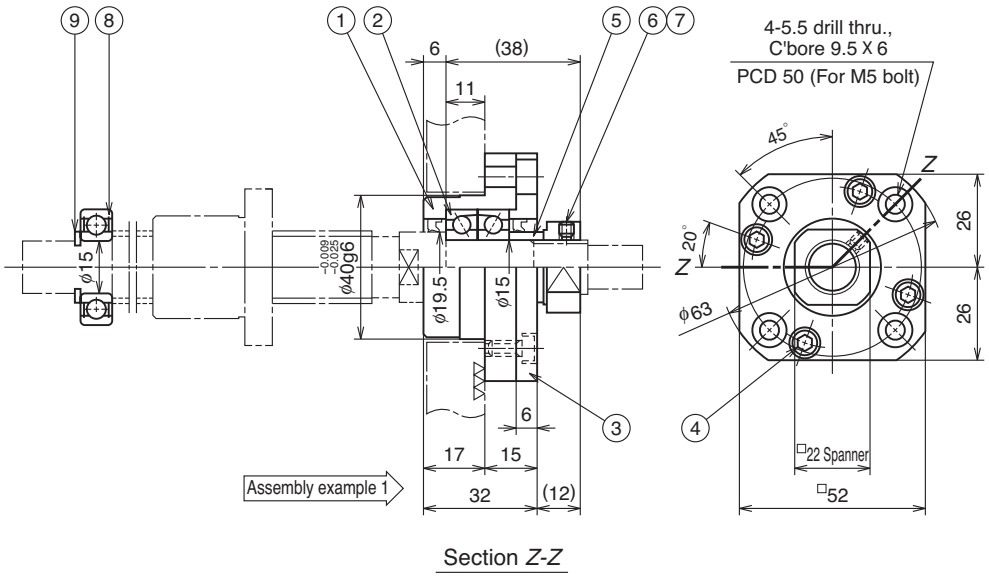
Number	Name of part	Quantity	Remarks
①	Bearing housing	1	With oil seal on fixed support side
②	Bearing	One set	7001ATYDFC8P5
③	Retaining cover	1	
④	Hexagon socket head cap screw or cross recessed pan head screw	4	M4
⑤	Spacer	1	
⑥	Lock nut	1	For M12, tightening torque 1370N•cm {140 kgf•cm}
⑦	Set screw	1	M4 with a set piece (pad)
⑧	Bearing	1	6000ZZ
⑨	Retaining ring	1	
⑩	Bearing housing	1	Simple support side (only square type)

Remarks
1. When installing a square support unit, place A and B sides to the base. Use a spacer if necessary to adjust height.
2. Components ①, ②, ③ are assembled into a unit. Do not disassemble.
3. An appropriate volume of grease is packed in the support unit.
4. Tighten the set screw ⑦ after adjustment.

Square type Reference number: WBK15-01A (fixed support side); WBK15S-01 (simple support side)



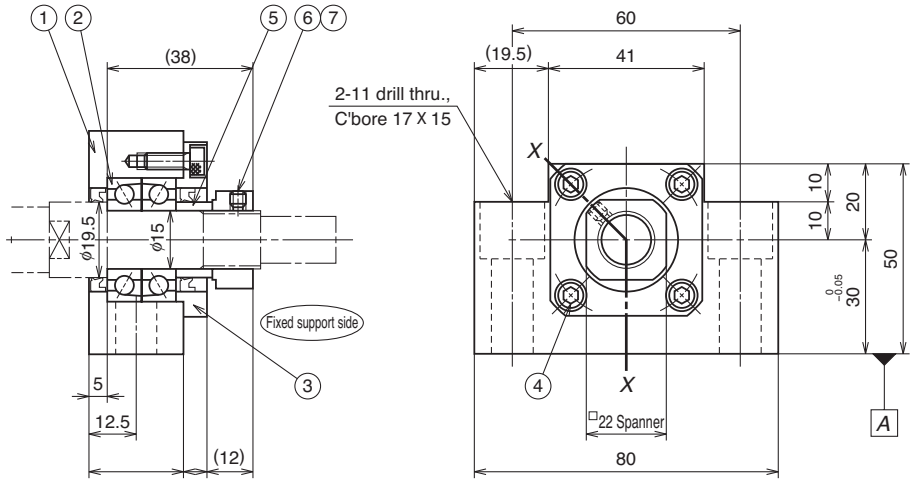
Round type Reference number: WBK15-11

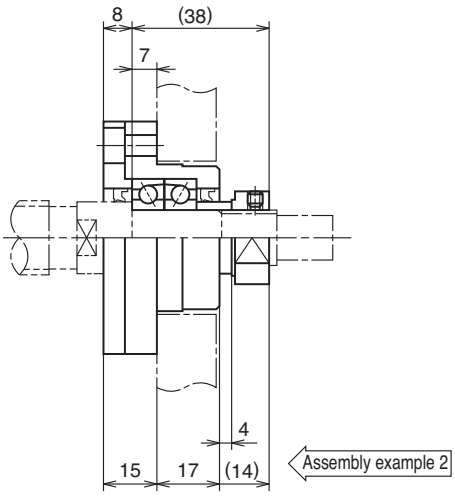


WBK15

Standard stock

Unit: mm



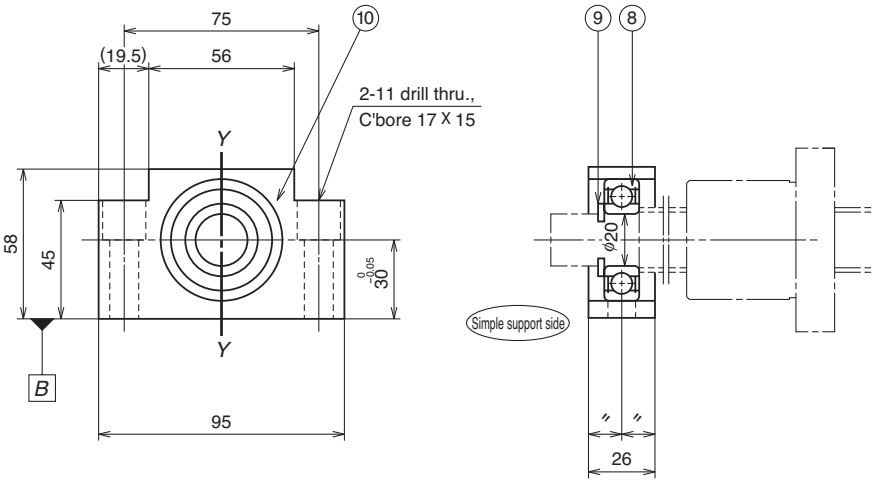


Parts list

Number	Name of part	Quantity	Remarks
①	Bearing housing	1	With oil seal on fixed support side
②	Bearing	One set	7002ATYDFC8P5
③	Retaining cover	1	
④	Hexagon socked head cap screw	4	M4
⑤	Spacer	1	
⑥	Lock nut	1	For M15, tightening torque 2350N•cm {240 kgf•cm}
⑦	Set screw	1	M4 with a set piece (pad)
⑧	Bearing	1	6002ZZ
⑨	Retaining ring	1	
⑩	Bearing housing	1	Simple support side (only square type)

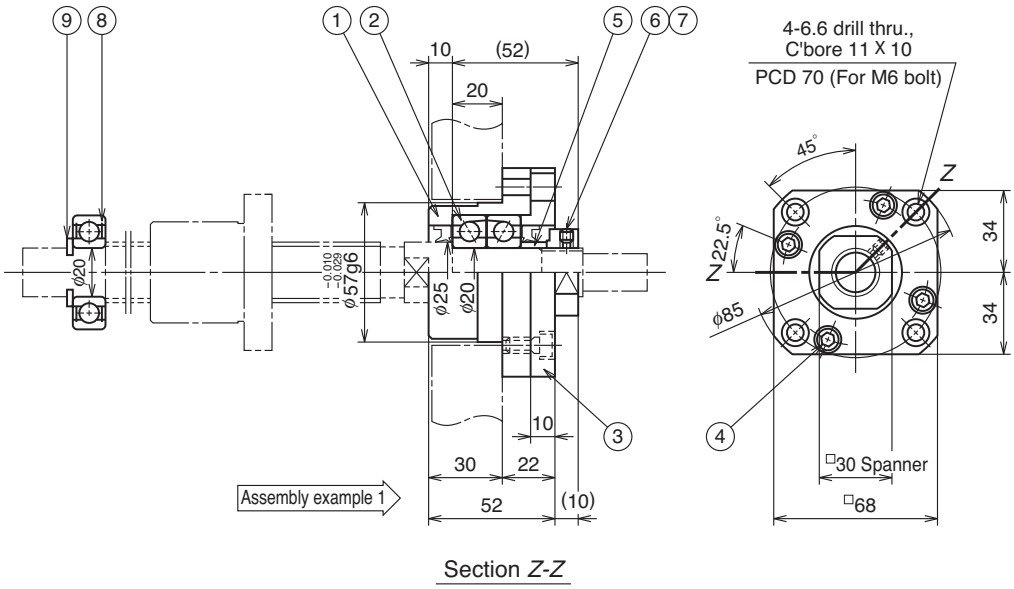
Remarks
1. When installing a square support unit, place A and B sides to the base. Use a spacer if necessary to adjust height.
2. Components ①, ②, ③ are assembled into a unit. Do not disassemble.
3. An appropriate volume of grease is packed in the support unit.
4. Tighten the set screw ⑦ after adjustment.

Square type Reference number: WBK20-01 (fixed support side); WBK20S-01 (simple support side)



WBK20S-01

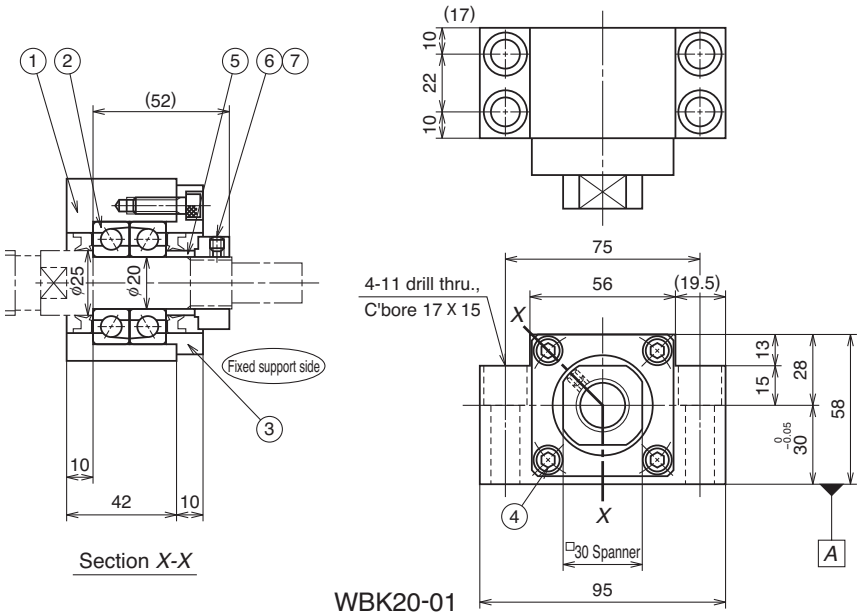
Round type Reference number: WBK20-11

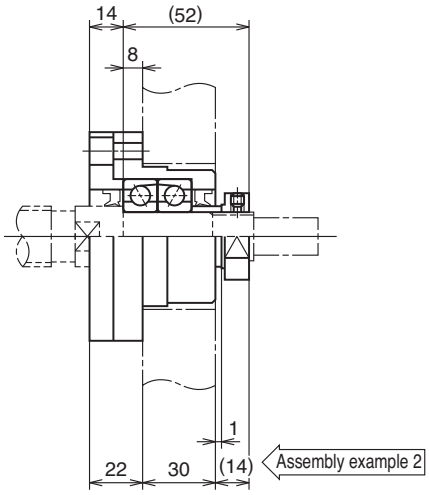


WBK20

Standard stock

Unit: mm



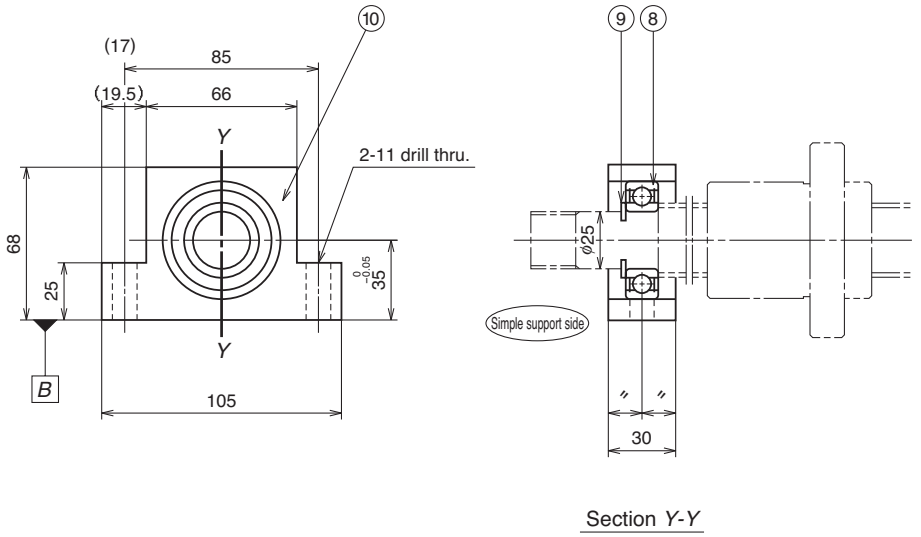


Parts list

Number	Name of part	Quantity	Remarks
①	Bearing housing	1	With oil seal on fixed support side
②	Bearing	One set	7204ATYDFC8P5
③	Retaining cover	1	
④	Hexagon socked head cap screw	4	M6
⑤	Spacer	1	
⑥	Lock nut	1	For M20, tightening torque 4700N•cm {480 kgf•cm}
⑦	Set screw	1	M4 with a set piece (pad)
⑧	Bearing	1	6204ZZ
⑨	Retaining ring	1	
⑩	Bearing housing	1	Simple support side (only square type)

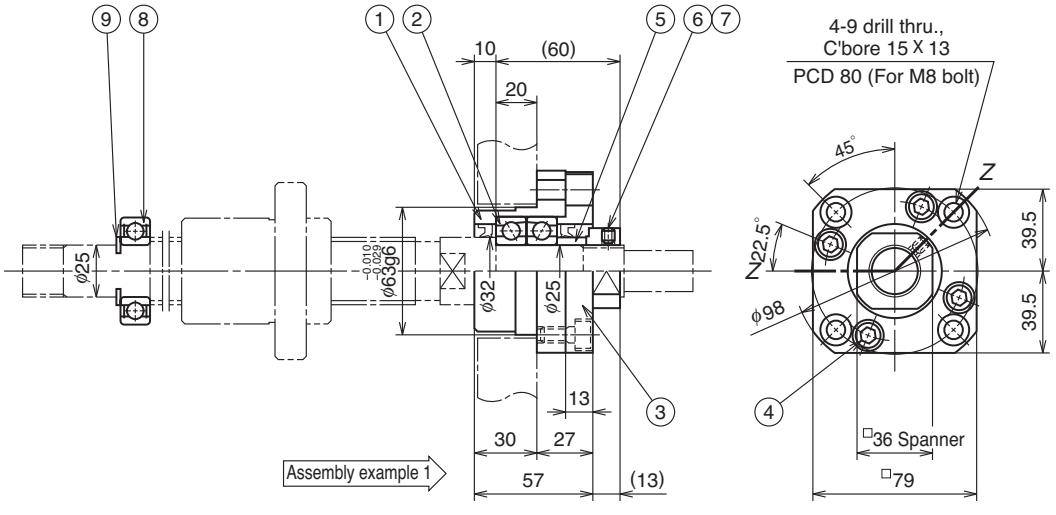
Remarks
1. When installing a square support unit, place A and B sides to the base. Use a spacer if necessary to adjust height.
2. Components ①, ②, ③ are assembled into a unit. Do not disassemble.
3. An appropriate volume of grease is packed in the support unit.
4. Tighten the set screw ⑦ after adjustment.

Square type Reference number: WBK25-01 (fixed support side); WBK25S-01 (simple support side)



WBK25S-01

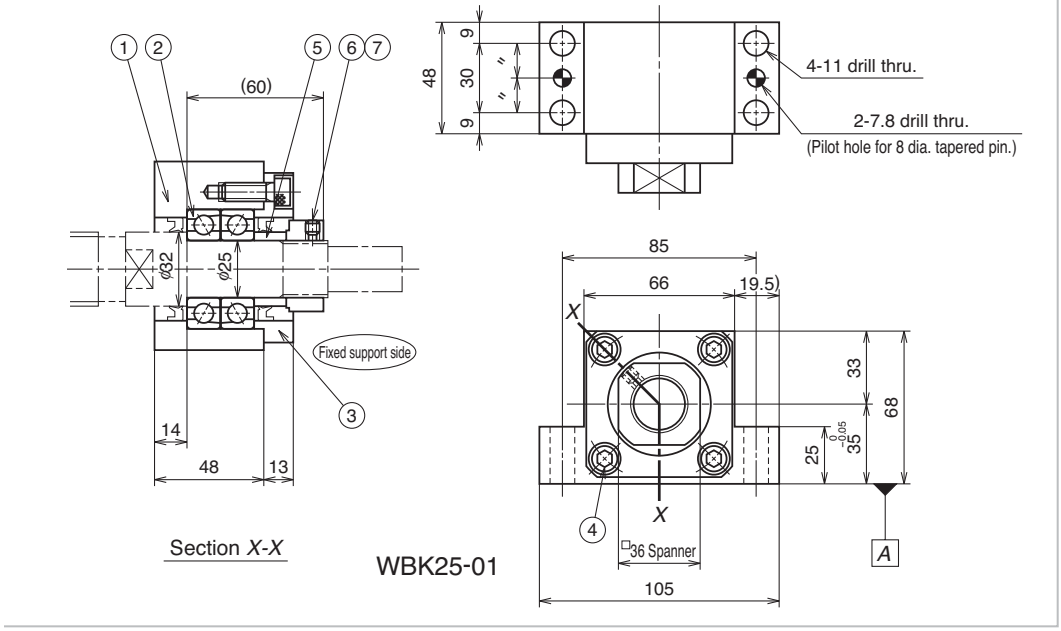
Round type Reference number: WBK25-11

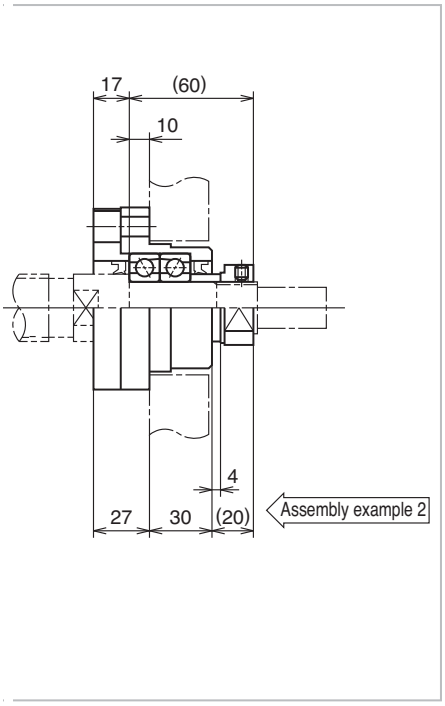


WBK25

Standard stock

Unit: mm



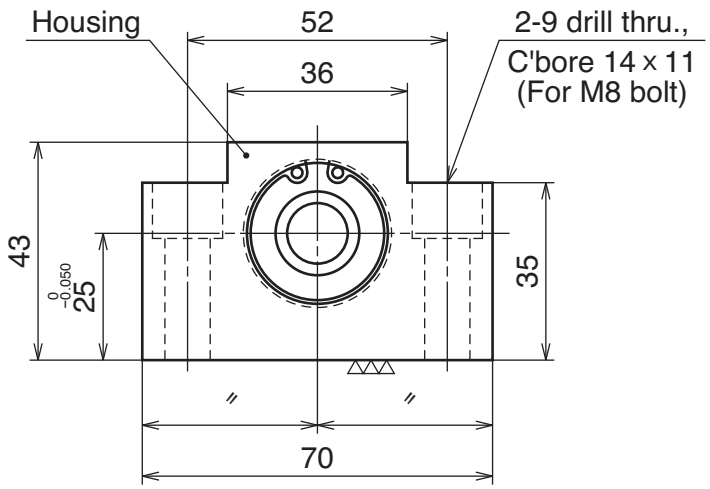


Parts list

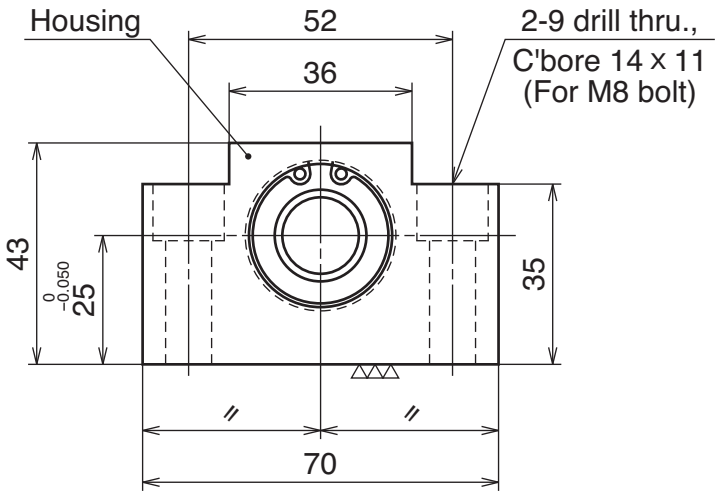
Number	Name of part	Quantity	Remarks
①	Bearing housing	1	With oil seal on fixed support side
②	Bearing	One set	7204ATYDFC8P5
③	Retaining cover	1	
④	Hexagon socked head cap screw	4	M6
⑤	Spacer	1	
⑥	Lock nut	1	For M25, tightening torque 8400N•cm {860 kgf•cm}
⑦	Set screw	1	M6 with a set piece (pad)
⑧	Bearing	1	6205ZZ
⑨	Retaining ring	1	
⑩	Bearing housing	1	Simple support side (only square type)

Remarks
1. When installing a square support unit, place A and B sides to the base. Use a spacer if necessary to adjust height.
2. Components ①, ②, ③ are assembled into a unit. Do not disassemble.
3. An appropriate volume of grease is packed in the support unit.
4. Tighten the set screw ⑦ after adjustment.

Square type Reference number: WBK12SF-01 (Simple support side: For VFA1210)



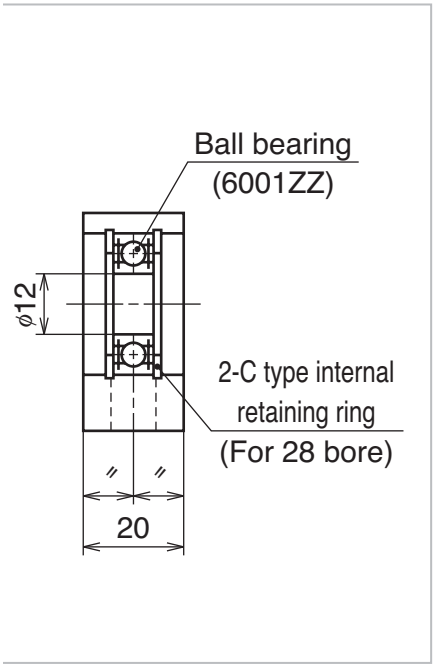
Square type Reference number: WBK15SF-01 (Simple support side: For VFA1510)



WBK12SF

Standard stock

Unit: mm

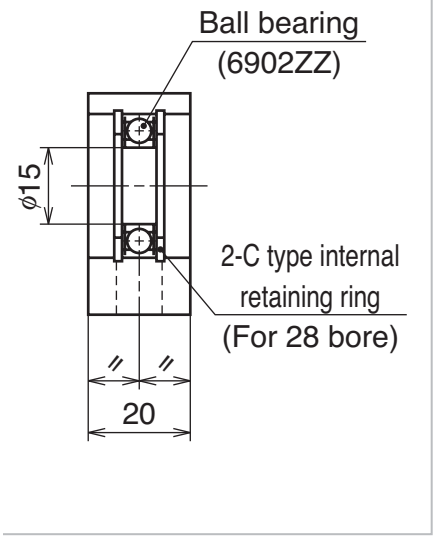


Parts list (WBK12SF-01)

Number	Name of part	Quantity	Remarks
①	Bearing housing	1	Simple support side
②	Bearing	1	6001ZZ
③	Retaining ring	2	

Remarks 1. When installing the square support unit, place side A to the base and install the unit in the vertical direction. Use a spacer if necessary to adjust height.
2. Do not disassemble the support unit.
3. An appropriate volume of grease is packed in the bearing.

Applicable ball screw : **VFA1210**



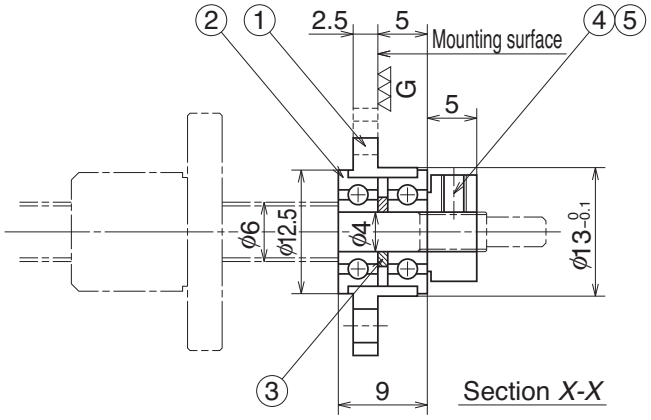
Parts list (WBK15SF-01)

Number	Name of part	Quantity	Remarks
①	Bearing housing	1	Simple support side
②	Bearing	1	6902ZZ
③	Retaining ring	2	

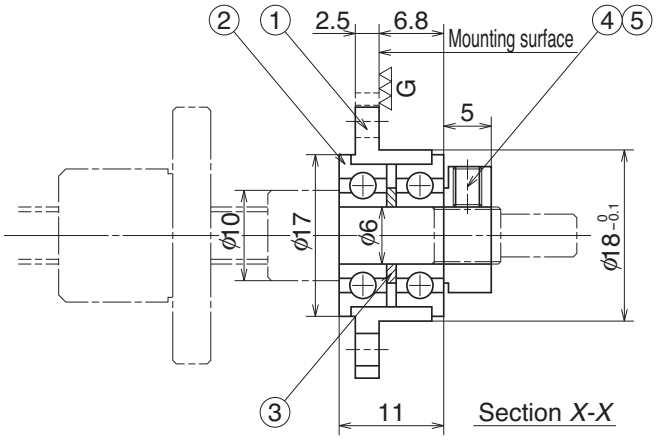
Remarks 1. When installing the square support unit, place side A to the base and install the unit in the vertical direction. Use a spacer if necessary to adjust height.
2. Do not disassemble the support unit.
3. An appropriate volume of grease is packed in the bearing.

Applicable ball screw : **VFA1510, VFA1520**

Round type Reference number: WBK04R-11



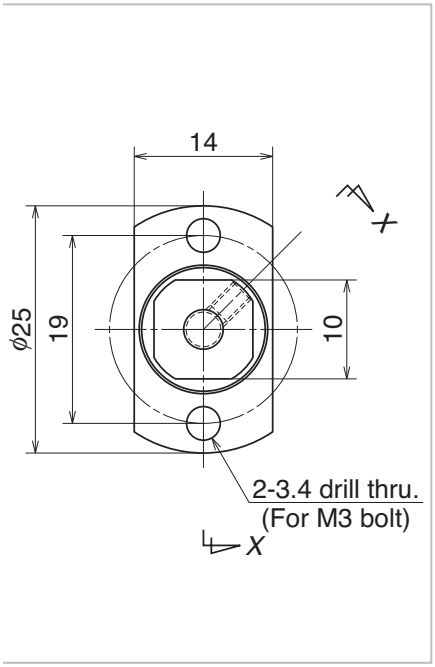
Round type Reference number: WBK06R-11



WBK**R

Standard stock

Unit: mm

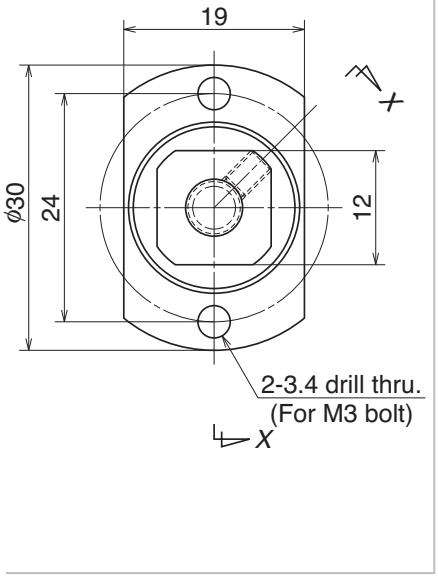


Parts list (WBK04R-11)

Number	Name of part	Quantity	Remarks
①	Bearing housing	1	
②	Bearing	One set	F694ZZ
③	Spacer	1	
④	Lock nut	1	For M4, tightening torque 98N•cm {10 kgf•cm}
⑤	Set screw to secure the lock nut	1	M2.5 with a set piece (pad)

Remarks
1. Adjust phases of the bearing and the lock nut at time of assembly, and secure them in the state when the run out of the flange mounting surface is minimal.
2. Assembled to an arbor (M4 bolt, nut) at time of delivery. Remove it from the arbor and move to the ball screw shaft end before use.
3. An appropriate volume of grease is packed into the bearing.
4. Slightly tighten the set screw ⑤ after adjustment.

Applicable ball screw : **RMA0601**



Parts list (WBK06R-11)

Number	Name of part	Quantity	Remarks
①	Bearing housing	1	
②	Bearing	One set	F696ZZ
③	Spacer	1	
④	Lock nut	1	For M6, tightening torque 118N•cm {12 kgf•cm}
⑤	Set screw to secure the lock nut	1	M2.5 with a set piece (pad)

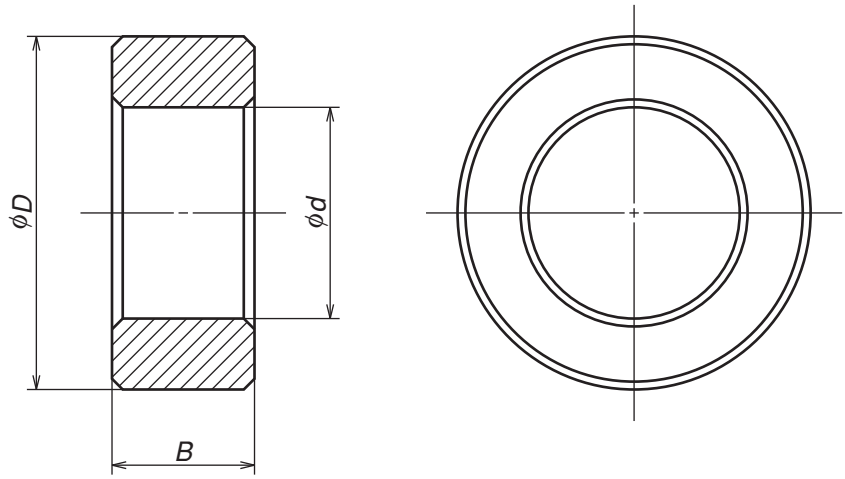
Remarks
1. Adjust phases of the bearing and the lock nut at time of assembly, and secure them in the state when the run out of the flange mounting surface is minimal.
2. Assembled to an arbor (M6 bolt, nut) at time of delivery. Remove it from the arbor and move to the ball screw shaft end before use.
3. An appropriate volume of grease is packed into the bearing.
4. Slightly tighten the set screw ⑤ after adjustment.

Applicable ball screw : **RMA0801, RMA0801.5, RMA0802**

When using with a rolled ball screw

When using a support unit (for small equipment) for a rolled ball screw, install a spacer for holding a seal in the ball screw side of the shaft end.

The table shows the dimensions of spacer. NSK will provide the spacers on request. Use the reference number in the table, and place an order separately.



Drawing of support unit spacer

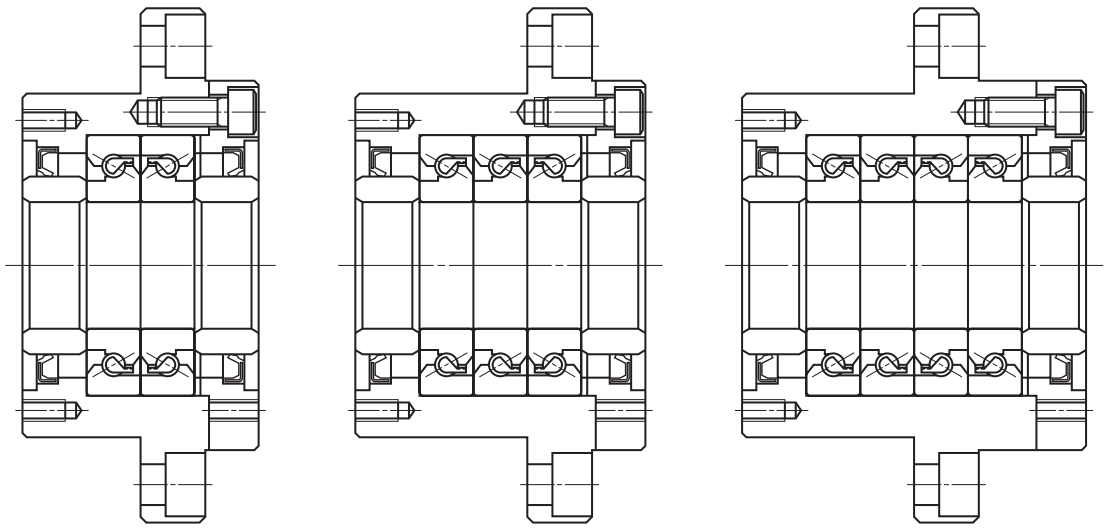
Dimensions of support unit spacer

Unit: mm

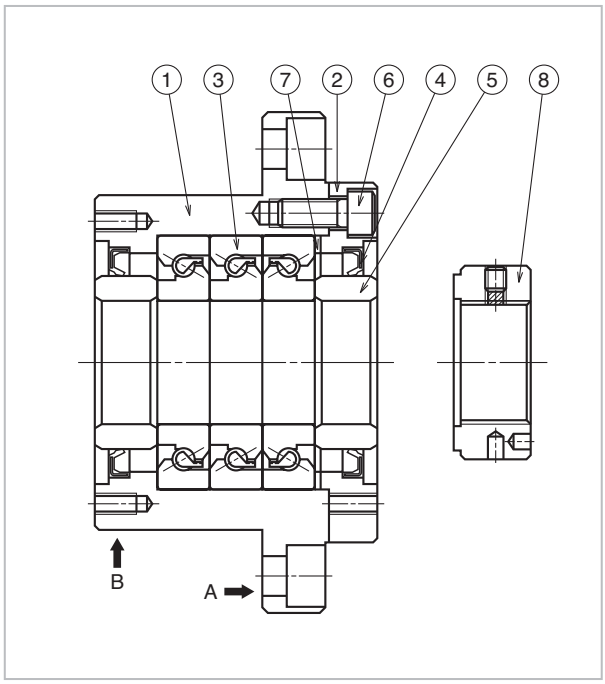
Spacer reference number	Dimensions			Applicable support unit reference number
	Internal diameter *d*	Outside diameter *D*	Width *B*	
WBK06K	6	9.5	5.0	WBK06-**
WBK08K	8	11.5	5.5	WBK08-**
WBK10K	10	14.5	5.5	WBK10-**
WBK12K	12	15.0	5.6	WBK12-**
WBK15K	15	19.5	10.0	WBK15-**
WBK20K	20	25.5	11.0	WBK20-**
WBK25K	25	32.0	14.0	WBK25-**

(2) Dimensions of support unit: heavy-load / for machine tools

Support units for heavy-load / machine tools use a thrust angular contact ball bearing (TAC Series) with high rigidity and accuracy. The thrust angular contact ball bearing has very suitable functions and structure as a ball screw support bearing. There are three combinations as shown below.



DF combination **DFD combination** **DFF combination**

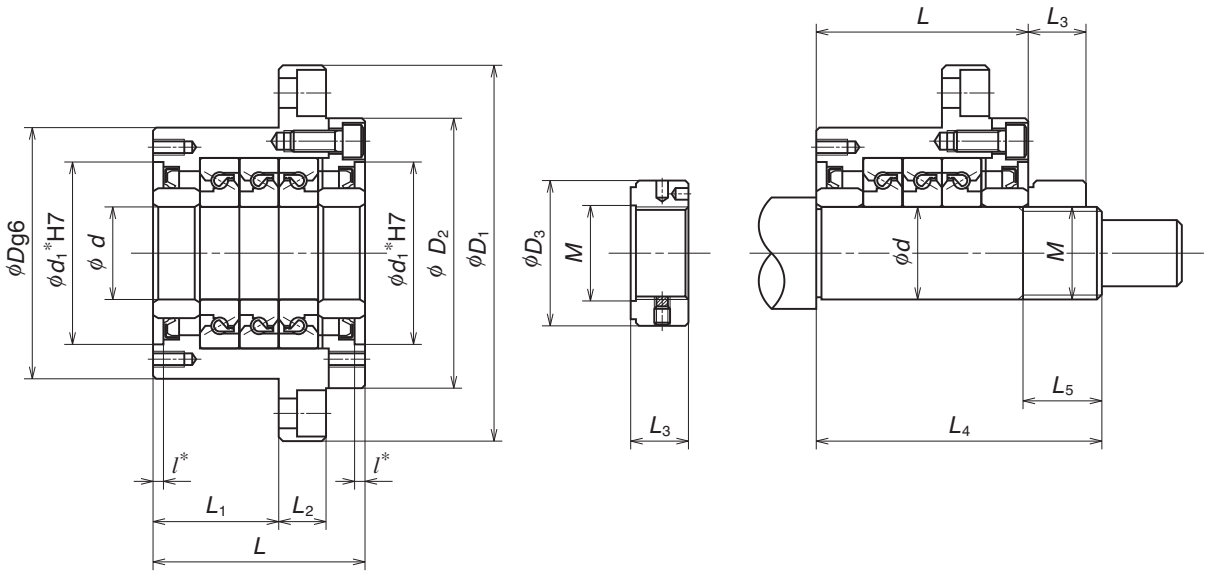


Parts list

Part number	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

Remarks

1. Mount sections A and B to the machine base.
2. NSK support units are precisely preloaded and adjusted. Components ①, ②, ③, ④, ⑥, ⑦ are assembled into a unit. Do not disassemble.
3. Grease is packed into support units.
4. Lock nut ⑧ is exclusively prepared for ball screw. The end face of the nut is in strict control being precisely perpendicular to the V thread. Secure the lock nut using the set screw.
   Lock nut is also available as an accessory (See page 180. Refer to general catalogue E3161 "Precision Machine Components" for high precision trust angular contact ball bearing (TAC Series).

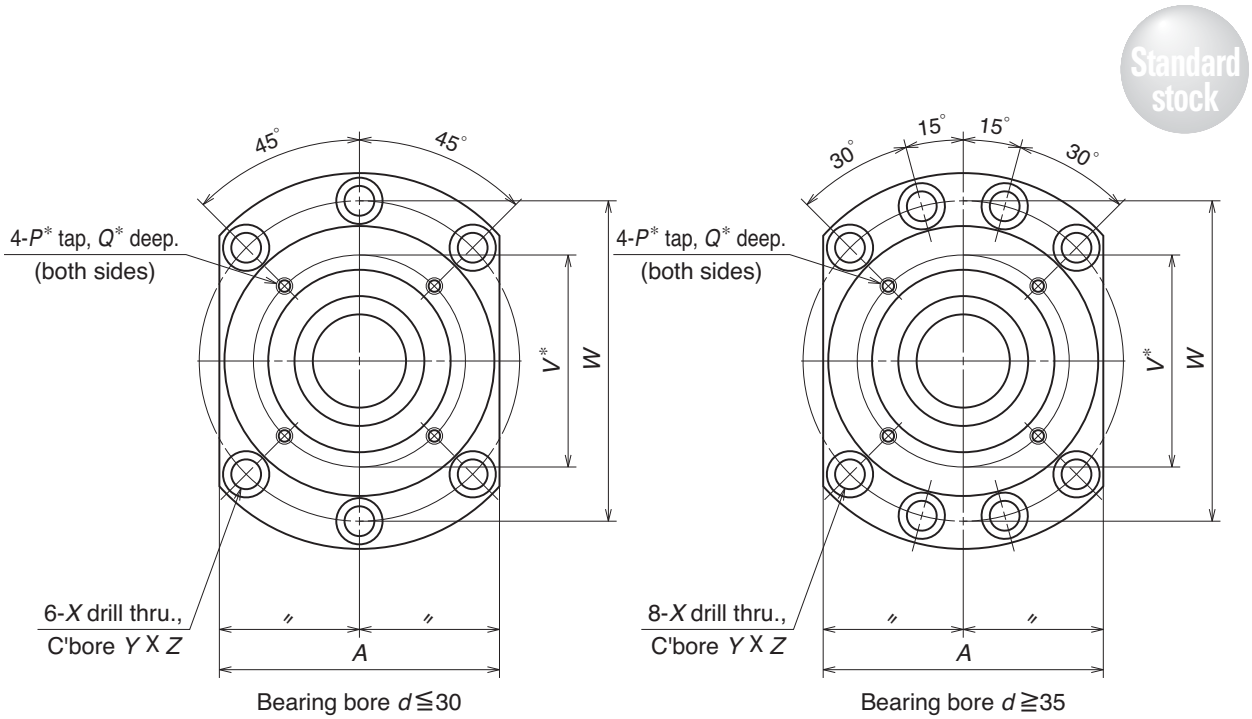


Lock nut

Dimensions of bearing seat

Support unit No.	Support unit																	Basic dynamic load rating C_a	
	d	*D*	D_1	D_2	*L*	L_1	L_2	*A*	*W*	*X*	*Y*	*Z*	d_1*	*l**	*V**	*P**	*Q**	N	{kgf}
WBK 17DF-31	17	70	106	72	60	32	15	80	88	9	14	8.5	45	3	58	M5	10	21900	2240
WBK 20DF-31	20	70	106	72	60	32	15	80	88	9	14	8.5	45	3	58	M5	10	21900	2240
WBK 25DF-31	25	85	130	90	66	33	18	100	110	11	17.5	11	57	4	70	M6	12	28500	2910
WBK 25DFD-31					81	48												46500	4700
WBK 30DF-31	30	85	130	90	66	33	18	100	110	11	17.5	11	57	4	70	M6	12	29200	2980
WBK 30DFD-31					81	48												47500	4850
WBK 35DF-31	35	95	142	102	66	33	18	106	121	11	17.5	11	69	4	80	M6	12	31000	3150
WBK 35DFD-31					81	48												50500	5150
WBK 35DFF-31					96	48												50500	5150
WBK 40DF-31	40	95	142	102	66	33	18	106	121	11	17.5	11	69	4	80	M6	12	31500	3250
WBK 40DFD-31					81	48												51500	5250
WBK 40DFF-31					96	48												51500	5250

Remarks 1. Rigidity
Values in the Table are theoretical values obtained from the elastic deformation between the groove and the 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 grade of the fits tolerance.



Unit: mm

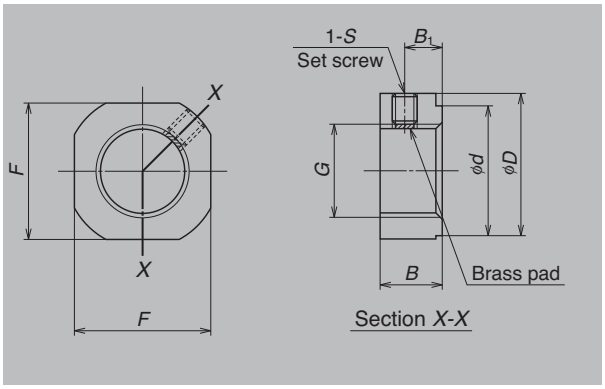
Permissible axial load		Preload		Axial rigidity		Starting torque		Lock nut			Bearing seat for unit		
N	{kgf}	N	{kgf}	N/μm	{kgf/μm}	N•m	{kgf•m}	*M*	D_3	L_3	*d*	L_4	L_5
26600	2710	2150	220	750	75	14.0	1.5	M17×1.0	37	18	17	81	23
26600	2710	2150	220	750	75	14.0	1.5	M20×1.0	40	18	20	81	23
40500	4150	3150	320	1000	100	23.0	2	M25×1.5	45	20	25	89	26
81500	8300	4300	440	1470	150	31.0	3					104	
43000	4400	3350	340	1030	105	24.0	2.5	M30×1.5	50	20	30	89	26
86000	8800	4500	460	1520	155	33.0	3					104	
50000	5100	3800	390	1180	120	28.0	3	M35×1.5	55	22	35	92	30
100000	10200	5200	530	1710	175	37.0	4					107	
100000	10200	7650	780	2350	240	55.0	5.5					122	
52000	5300	3900	400	1230	125	28.0	3	M40×1.5	60	22	40	92	30
104000	10600	5300	540	1810	185	38.0	4					107	
104000	10600	7850	800	2400	245	57.0	5.5					122	

Remarks 4. 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.
5. Grease is packed into the bearing. It is not necessary to apply grease before use. We recommend "h5 grade of the fits tolerance.

In addition to the support units, NSK has other components for the ball screw as shown below.

Lock nuts

Ball screw support bearing must be installed with minimum inclination. NSK lock nuts exclusive for ball screw help to reduce this inclination.



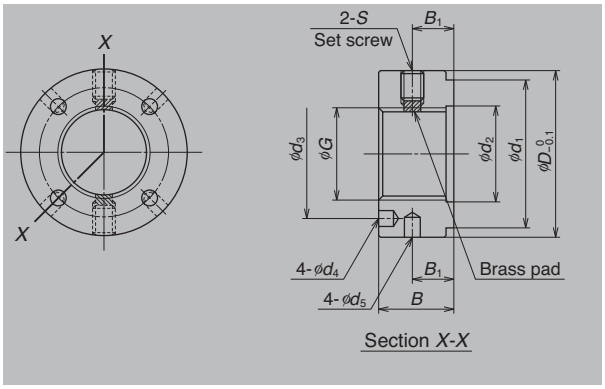
A Type Shapes and dimensions

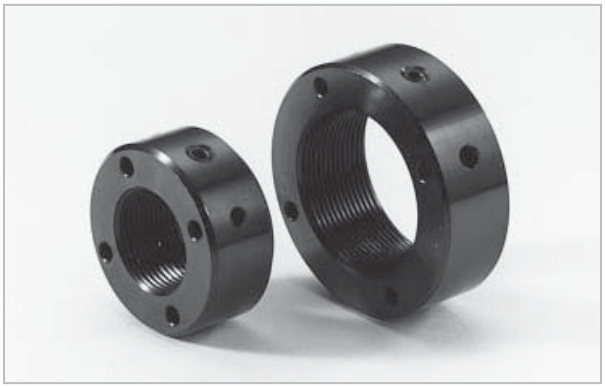
A Type lock nuts

Unit: mm

Lock nut reference number	M	D	F	B	d	B_1	S	Tightening torque N•m (for reference)
WBK06L-01	M6 × 0.75	14.5	12	5	10	2.7	M3, with brass made set piece	245
WBK08L-01	M8 × 1.0	17	14	6.5	13	4	M3, with brass made set piece	490
WBK10L-01	M10 × 1.0	20	17	8	16	5	M4, with brass made set piece	930
WBK12L-01	M12 × 1.0	22	19	8	17	5	M4, with brass made set piece	1350
WBK15L-01	M15 × 1.0	25	22	10	21	6	M4, with brass made set piece	2350
WBK20L-01	M20 × 1.0	35	30	13	26	8	M4, with brass made set piece	4700
WBK25L-01	M25 × 1,5	42	36	16	34	10	M6, with brass made set piece	8400

Remarks: Insert a set piece (brass pad) and tighten the securing set screw.



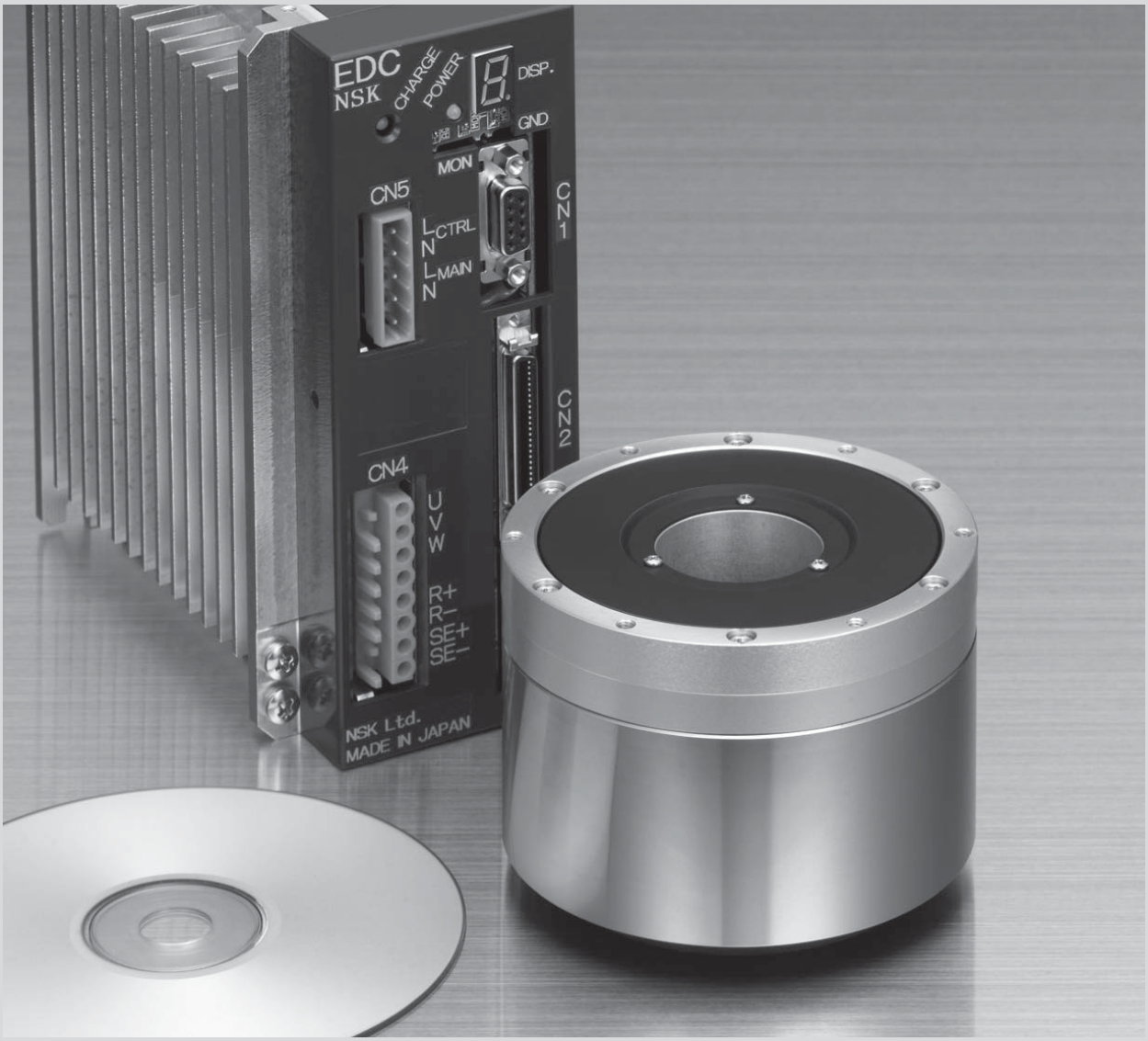


S Type Shapes and dimensions

S Type lock nuts

Unit: mm

Lock nut reference number	G	$D_{-0.1}^{0}$	B	d_1	d_2	d_3	d_4	d_5	B_1	S	Tightening torque N•m (for reference)
WBK17L-31	M17 × 1.0	37	18	30	18	27	4.3	4	10	M6	5400
WBK20L-31	M20 × 1.0	40	18	30	21	30	4.3	4	10	M6	7350
WBK25L-31	M25 × 1.5	45	20	40	26	35	4.3	4	11	M6	13200
WBK30L-31	M30 × 1.5	50	20	40	31	40	4.3	5	11	M6	19600
WBK35L-31	M35 × 1.5	55	22	50	36	45	4.3	5	12	M6	29400
WBK40L-31	M40 × 1.5	60	22	50	41	50	4.3	5	12	M6	39200


EDC
NSK
CHARGE
POWER
DISP.
GND
MON
CN5
LCTRL
N
LMAIN
N
CN1
CN2
CN4
U
V
W
R+
R−
SE+
SE−
NSK Ltd.
MADE IN JAPAN

Advanced Megatorque Motors PS Series, with high-speed and high-resolution capabilities.

Capable of a maximum rotational speed of 10 s^{-1} and position sensor resolution of 2 621 440 counts/rev simultaneously, the PS Series offers high accuracy, high torque, light weight, and compactness. These innovative DD motors are highly accurate, light and compact, and increase the productivity of various devices such as high-speed robot arms.

1 Shortened Positioning Time

A new servo algorithm shortens the settling time to less than one-fifth of that of conventional motors.

Maximum rotational speed: **10** [s^{-1}] *1)

Settling time: less than **1/5**
(compared to other NSK motors)

2 Compact Motor

NSK's advanced design technology creates a compact motor with an outer diameter of 100 [mm] (PS1 type) and upgraded functionality. The optional magnetic field design gives it twice as much thrust density as conventional motors.

Motor outer diameter: **100** [mm]
(PS1 type motor)

Force density: more than **Twice** as much
(compared to other NSK motors)

3 Highly Accurate Absolute Position Sensor

The PS Series incorporates an absolute position sensor with positioning accuracy of 30 arc seconds, requiring no homing operations. The interchangeable motors and driver units can be combined freely.

Sensor accuracy **30** arc seconds
Environmental temperature: 25 ± 5 [°C]

4 Compact Driver Unit

Combined with a special module, the driver unit body is 65% smaller than conventional units.

65% smaller in volume
(compared to other NSK driver unit)

Position sensor resolution of

[counts/rev]

*1) Rotational speed varies with motor model.

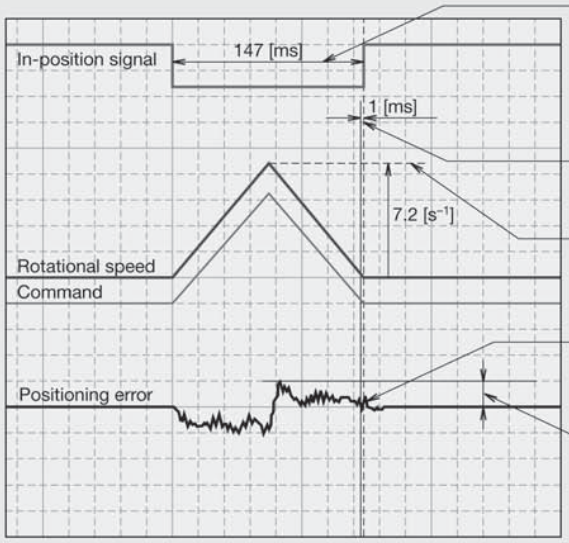
High-performance

Control Technology of PS Series Megatorque Motors

- Adopts a high-performance follow-up controller to minimize positioning errors
- Adopts a friction compensation control to reduce the settling time

High-speed positioning with a settling time of 1 [ms]

Results of 180° Positioning of the PS Series



Positioning time: 147 [ms]

Settling time: 1 [ms]

Maximum rotational speed: 7.2 [s^{-1}]

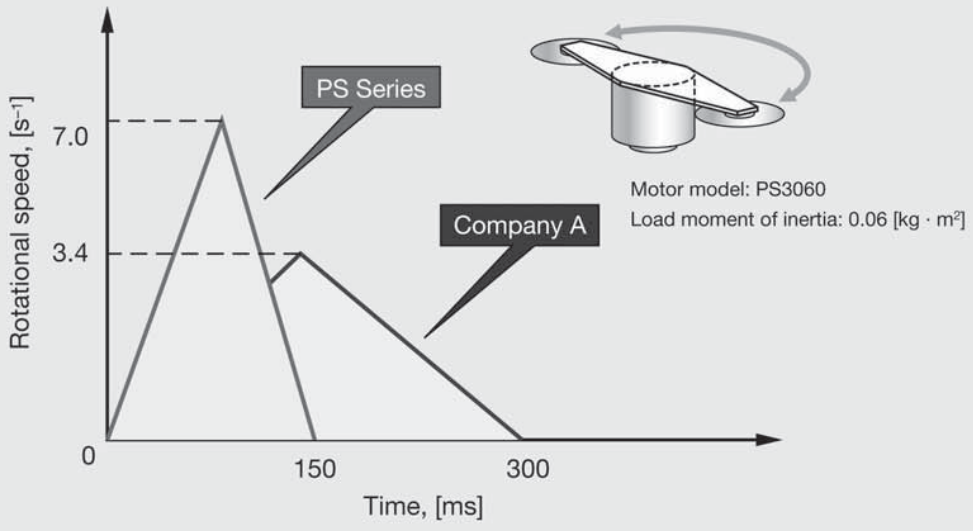
In-position width: 0.06°

Positioning error: 0.09°

Motor model: PS1006
Load inertia: 0.003 [kg · m^2]

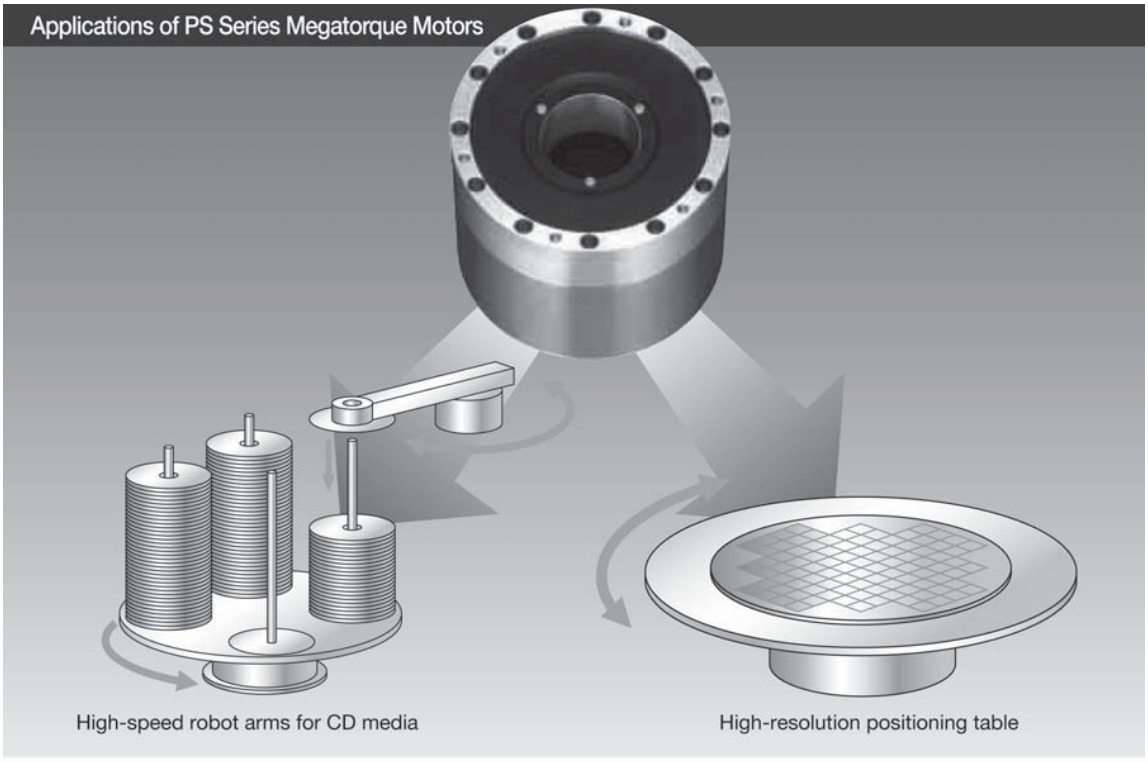
When a high rigid load is mounted

180° positioning in PS Series compared against competitor



Motor model: PS3060
Load moment of inertia: 0.06 [kg · m^2]

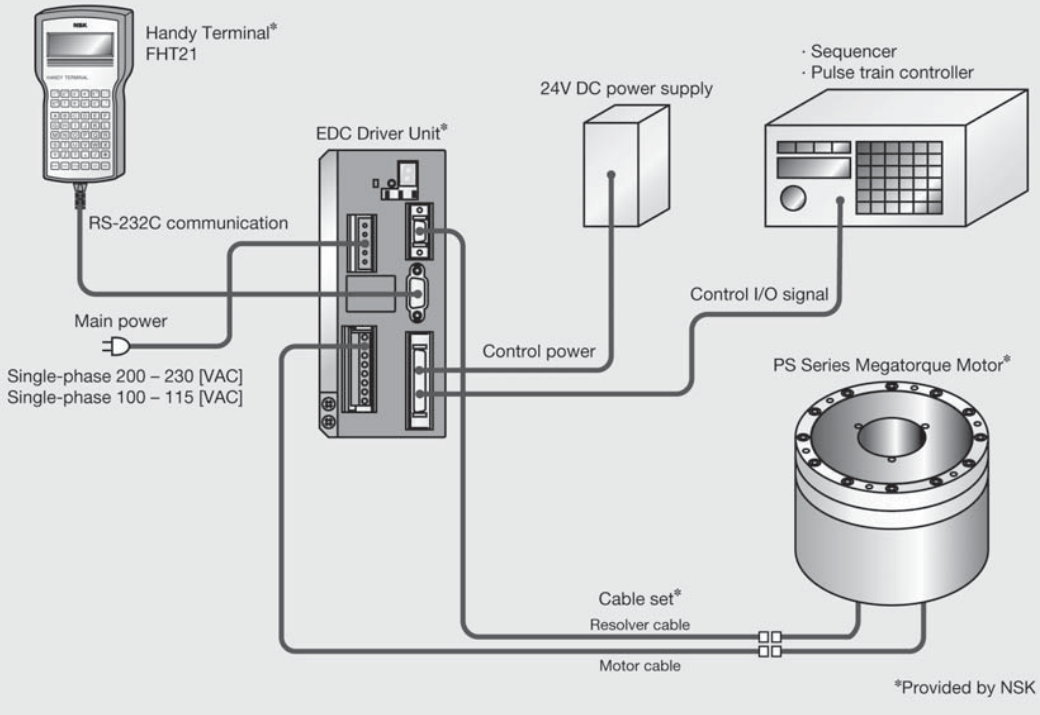
Applications of PS Series Megatorque Motors



High-speed robot arms for CD media

High-resolution positioning table

System Configuration



1. Motor Specifications for PS Series

PS 1 Type Motor

1.1 Coding for Motor Reference Number

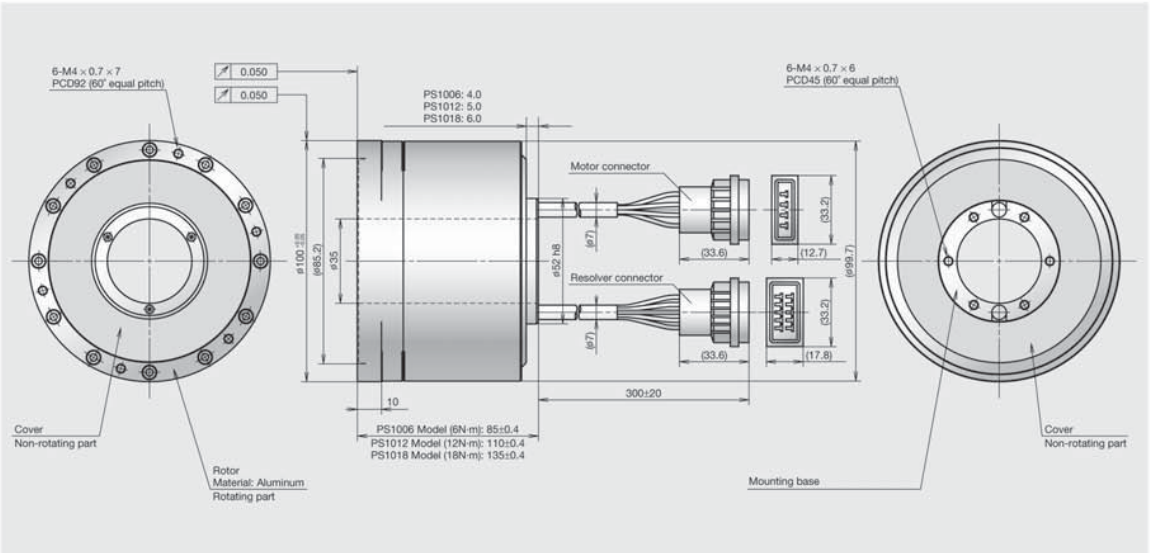
Example of Reference Number: **M-PS 1 006 K N 001**

- M-PS: PS Series Megatorque Motor
- 1: Motor size code
- 006: Maximum output torque [N·m]
- K: K: Standard (incorporates absolute position sensor)
- N: N: Standard
- 001: Design serial number 01: Standard

1.2 PS 1 Type Motor Specifications

Functional item \ Motor model	PS1006	PS1012	PS1018
Motor outer diameter [mm]		ϕ100	
Maximum output torque [N · m]	6	12	18
Rated output torque [N · m]	2	4	6
Motor height [mm]	85	110	135
Motor hollow diameter [mm]		ϕ35	
Maximum rotational speed [s^{-1}]		10	
Resolution of position sensor [count/rev]		2 621 440	
Absolute accuracy [arc sec]		30 (interchangeable type, ambient temperature: 25 ± 5 [°C])	
Repeatability [arc sec]		±2	
Allowable axial load [N]		1 000 (under no radial load)	
Allowable radial load [N]		820 (under no axial load)	
Allowable moment load [N · m]		28	
Rotor inertia moment [kg · m^2]	0.0024	0.0031	0.0038
Mass [kg]	2.4	3.8	4.6
Environmental conditions	Ambient temperature 0–40 [°C]; humidity: 20–80%; use indoors, free from dust, condensation and corrosive gas. IP30 equivalent.		

Note: Please consult with NSK in case the axial load, radial load, and moment load are all applied on the motor simultaneously.



Note: Please pay special attention to interference with the connectors when using the resolver hollow to insert a component.

PS 3 Type Motor

1.3 Coding for Motor Reference Number

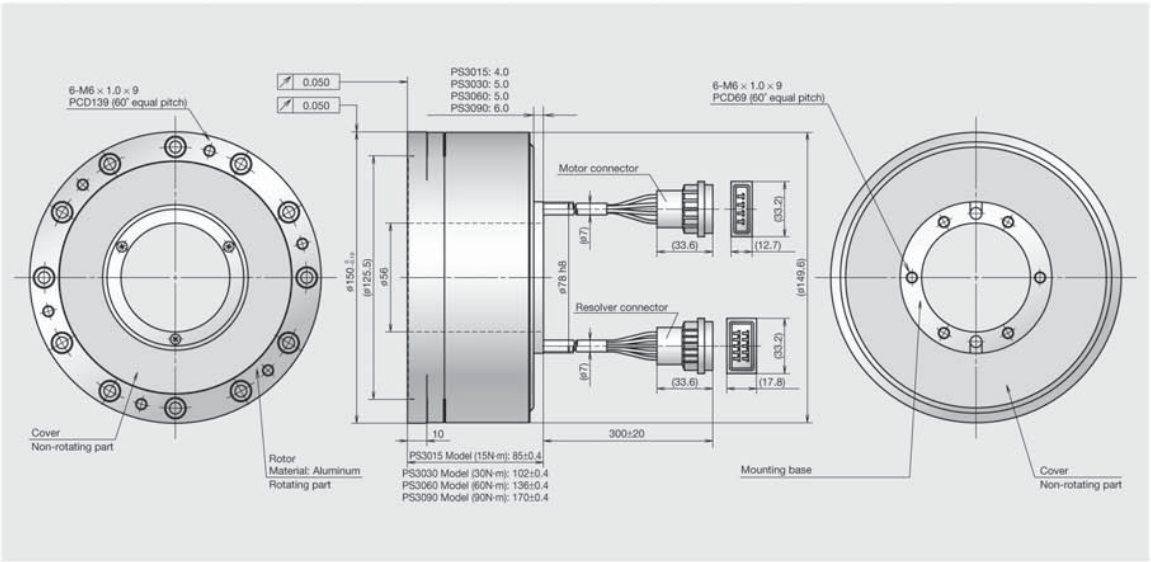
Example of Reference Number: **M-PS 3 015 K N 001**

- M-PS: PS Series Megatorque Motor
- 3: Motor size code
- 015: Maximum output torque [N·m]
- K: K: Standard (incorporates absolute position sensor)
- N: N: Standard
- 001: Design serial number 01: Standard

1.4 PS 3 Type Motor Specifications

Functional item \ Motor model	PS3015	PS3030	PS3060	PS3090
Motor outer diameter [mm]	ϕ150			
Maximum output torque [N · m]	15	30	60	90
Rated output torque [N · m]	5	10	20	30
Motor height [mm]	85	102	136	170
Motor hollow diameter [mm]	ϕ56			
Maximum rotational speed [s^{-1}]	10		8	5
Resolution of position sensor [count/rev]	2 621 440			
Absolute accuracy [arc sec]	30 (interchangeable type, ambient temperature: 25 ± 5 [°C])			
Repeatability [arc sec]	±2			
Allowable axial load [N]	2 000 (under no radial load)			
Allowable radial load [N]	1 700 (under no axial load)			
Allowable moment load [N · m]	42			
Rotor inertia moment [kg · m^2]	0.011	0.014	0.019	0.024
Mass [kg]	5.5	6.9	11.0	13.8
Environmental conditions	Ambient temperature 0–40 [°C]; humidity: 20–80%; use indoors, free from dust, condensation and corrosive gas. IP30 equivalent.			

Note: Please consult with NSK in case the axial load, radial load, and moment load are all applied on the motor simultaneously.



2. EDC Driver Units

2.1 Coding for Driver Unit Reference Number

Example of Reference Number: **M-EDC - PS1006 A B 5 01 - 02**

- M-EDC: EDC Driver Unit
- PS1006: Motor model
- A: Main power voltage
  A: 200 – 230 VAC (single-phase)
  C: 100 – 110 VAC (single-phase)
- B: Specification of position sensor
  B: Incorporates absolute position sensor
- 5: Function 5: Standard
  C: CC-Link (option)
- 01: Design serial number 01: Standard
- 02: Connector, mounting bracket, manual (English version)

2.2 Dimensions of Driver Unit

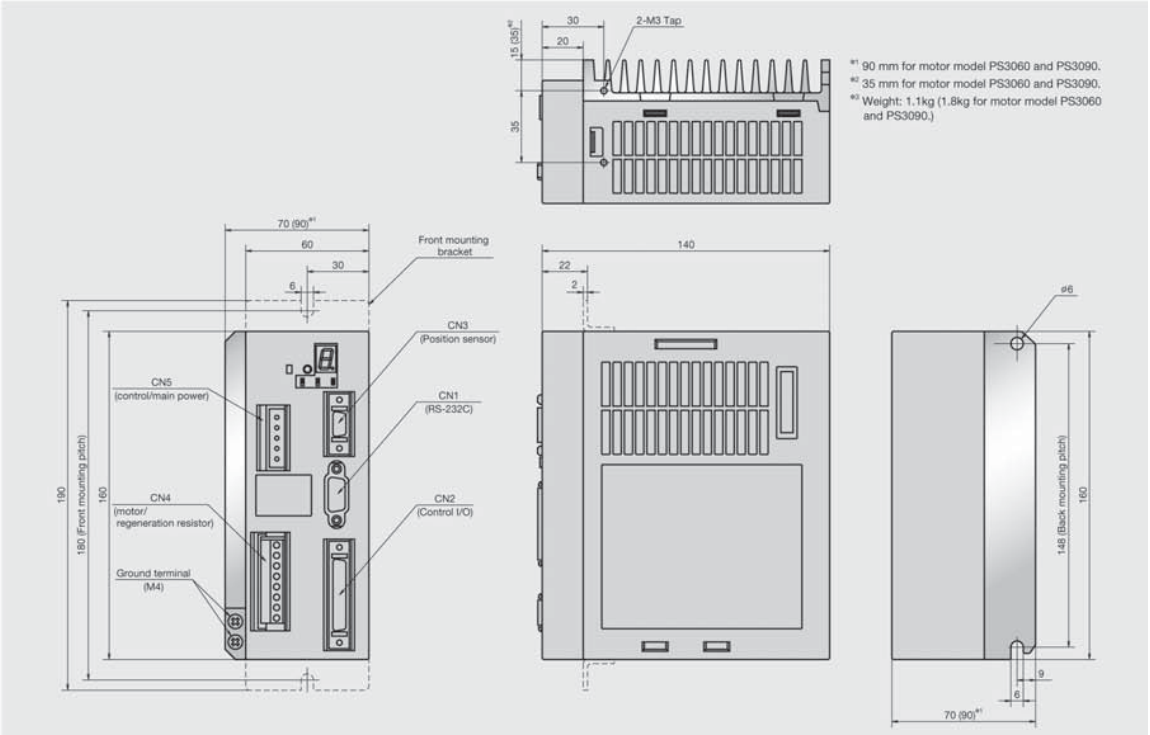
<Accessory for standard type>

① CN2 connector (user side)
Connector: 54306-5011 (Molex)
Connector shell: 54331-0501 (Molex)

② CN5 connector (user side)
Connector: 231-305/026-000 (WAGO)
Wiring lever: 231-131(WAGO)

③ Driver Unit mounting bracket

④ Manual (English version)



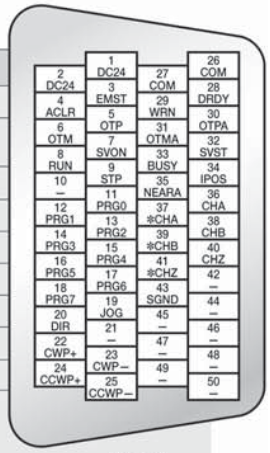
*1 90 mm for motor model PS3060 and PS3090.
*2 35 mm for motor model PS3060 and PS3090.
*3 Weight: 1.1kg (1.8kg for motor model PS3060 and PS3090.)

2.3 General Specification of Driver Unit

Applicable motor model			PS1006	PS1012	PS1018	PS3015	PS3030	PS3060	PS3090
Motor outer diameter [mm]			ϕ100			ϕ150			
Input power	Rated power capacity [VA]		230	380	500	470	770	1 300	1 700
	Maximum power capacity [VA]		670	1 200	1 500	1 400	2 400	3 900	5 900
	Control power specification		Single-phase 100–115 [VAC], single-phase 200–230 [VAC]						
	Main power specification								
Resolution of position sensor [count/rev]			2 621 440						
Position command mode			Programmable indexer positioning command (up to 265 channels, positioning commands and parameter settings are programmable), pulse train command and RS-232C communication command.						
Input signal	Pulse train input		Photo-coupler input Maximum pulse train frequency: 1 [MHz] Input pulse format: CW/CCW; pulse and directional; ϕA/ϕB Resolution changer for free multiplication is available (1000–5242880 [count/rev])						
	Control input		Photo-coupler input (usable as either ± common) × 17 inputs; Power voltage: 24 [V]						
Output signal	Position feedback signal		Signal format: ϕA/ϕB/ϕZ line driver Resolution of phase A and B: Shipping set: 20480 [count/rev] (81920 [count/rev] after quadrupled) Maximum: 1310720 [count/rev] (5242880 [count/rev] after quadrupled) *The resolution limits the Motor maximum speed because the processing frequency is limited to 781K [HZ]. Maximum speed [s-1] = 781K [HZ]/Resolution of Phase A (B) Resolution of phase Z: 80 [count/rev]						
	Control output		Photo coupler output (usable as either ± common) × 8 outputs; Maximum switching capacity: 24 [VDC] /50 [mA]						
Alarms			Excess position error, software thermal, CPU error, travel limit over, resolver circuit error, over current, abnormal main AC line voltage, control AC line under voltage, IPM alarm, motor circuit error, communication error, velocity error, power amp overheat						
Monitoring function			Analog monitor × 2, RS-232C communication monitor						
Communication			RS-232C						
Other			Automatic tuning Allocation of functions to control input/output signal ports Acceleration profiling (modified sine, modified trapezoid, cycloid and half sine)						
Option			Field bus (CC-Link)						
Operating conditions	Operating/storage temperatures		0 to 50 [°C] /–20 to +70 [°C]						
	Operating/storage humidity		90% or less [no condensation]						
	Vibration resistance		4.9 [m/s^2]						
Incorporated functions	Regeneration		External dump resistor (M-E014DCKR1-100, sold separately). Connect to R+ and R-. Do not short circuit.						
	Dynamic brake		Functions at power-off, servo-off and an occurrence of alarm						
Safety standards	UL		UL508C (pending approval)						
	CE	LVD	EN50178 (pending approval)						
		EMC	EMI: EN55011, EMS: EN61000-6-2 (pending approval)						
Connector	RS-232C	CN1	D-sub 9 pins						
	Control I/O	CN2	Standard type: 50 pins half-pitch connector (user side connector) CC-Link type : 10 pins half-pitch connector (user side connector)						
	Position sensor	CN3	14 pins half-pitch connector						
	Motor	CN4	Plastic connector (UL and CE approved)						
	External regeneration resistor								
	Control/main power	CN5	Plastic connector (UL and CE approved) (user side connector)						
	CC-Link (option)	CN6	Connector MSTB2, 5/5-STF-5, 08AU (Phoenix Contact)						

2.4 Signal Specifications of CN2 (Control I/O)

Input/ Output	Signal Code	Pin No.	Signal Name	Function
Input signal	DC24	1, 2	External power supply 24 V	Power supply for input signals
	EMST	3	Emergency stop	Interrupts operation and stops with the dynamic brake.
	ACLR	4	Alarm clear	Releases warning.*1
	OTP	5	Travel limit switch (+)	Limits clockwise rotation.*1
	OTM	6	Travel limit switch (–)	Limits counterclockwise rotation.*1
	SVON	7	Servo on	Enables the servo.*1
	RUN	8	Positioning start	Activates the program selected by PRG input.*1
	STP	9	Stop	Stops operation and program.*1
	—	10	—	Do not connect.
	PRG0	11	Internal program·channel selection 0	A combination of ON and OFF of these 0–7 signals selects a channel (0–225) to execute its internal programs.*1
	PRG1	12	Internal program·channel selection 1	
	PRG2	13	Internal program·channel selection 2	
	PRG3	14	Internal program·channel selection 3	
	PRG4	15	Internal program·channel selection 4	
	PRG5	16	Internal program·channel selection 5	
	PRG6	17	Internal program·channel selection 6	
	PRG7	18	Internal program·channel selection 7	
	JOG	19	Jog operation	Activates/stops jog operations.*1
	DIR	20	Jog direction	Sets the direction of jog operation.
	—	21	—	Do not connect.
	CWP+	22	CW pulse train (+)	The motor rotates clockwise by the pulse train input. (This part can be a direction or ϕB by switching.)
	CWP–	23	CW pulse train (–)	
	CCWP+	24	CCW pulse train (+)	The motor rotates counterclockwise by the pulse train input. (This part can be a pulse train or ϕA by switching.)
	CCWP–	25	CCW pulse train (–)	
Output signal	COM	26, 27	Output signal, common	Output signal, common
	DRDY	28	Driver Unit ready	This signal notifies that the Driver Unit is ready for operation. (This signal opens when the Driver Unit is not ready or an alarm is given.)
	WRN	29	Warning	Reports a warning.*2
	OTPA	30	Over travel limit (+)	Detection and output of the clockwise rotation limit (software/hardware)*2
	OTMA	31	Over travel limit (–)	Detection and output of the counterclockwise rotation limit (software/hardware)*2
	SVST	32	Servo state	Reports the servo state.*2
	BUSY	33	State of Programmable Indexer	Reports the Programmable Indexer state.*2
	IPOS	34	Positioning completed	Reports the position error/positioning states.*2
	NEARA	35	Target proximity A	Reports the motor is approaching the target position.*2
	CHA	36	Positioning completed ϕA	Pulse signals indicate a rotational speed of the motor. Output format is line driver.
	*CHA	37	Positioning completed *ϕA	
	CHB	38	Positioning completed ϕB	
	*CHB	39	Positioning completed *ϕB	
	CHZ	40	Positioning completed ϕZ	
	*CHZ	41	Positioning completed *ϕZ	
	—	42	—	Do not connect.
	SGND	43	Signal ground	Ground connection for position feedback signal
	—	44–50	—	Do not connect.



Pin-out

Selection and optional allocation of control input/output functions
You may set functions to control input/output ports by the parameters.

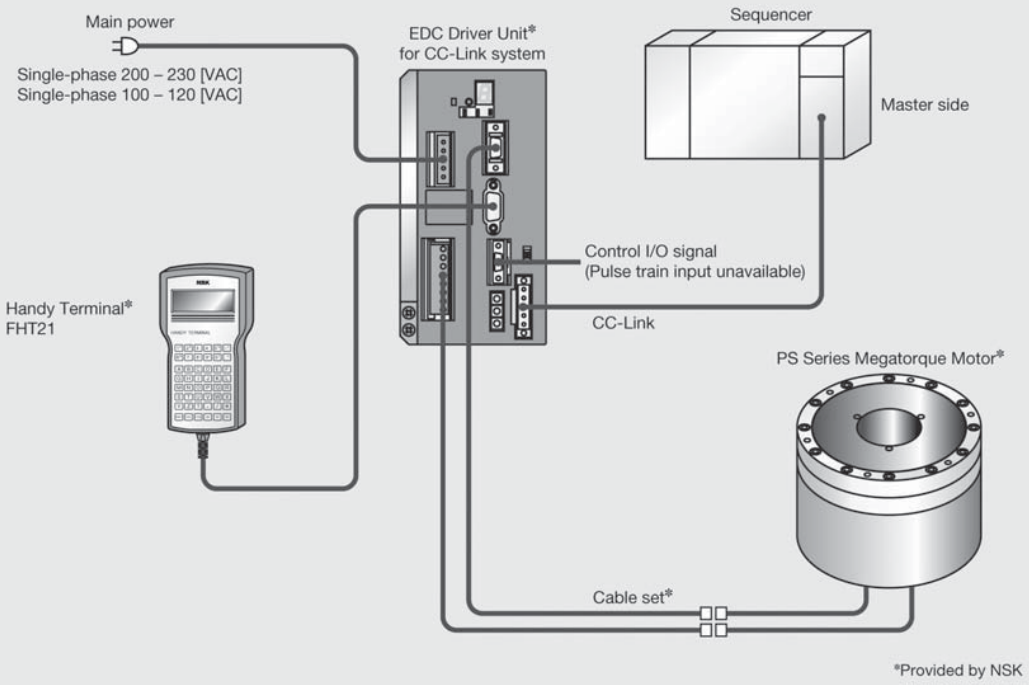
* 1. Input signal
- Select 16 functions out of the 20 functions listed in the above table and then allocate them to the pin numbers 4 to 9 and 11 to 20 (in addition to the input signals listed above, you may allocate 'hold,' 'velocity override,' and 'integration control OFF' to the input signal ports).
- Pin No. 3 is fixed to 'emergency stop' signal (the signal polarity is variable).

* 2. Output signal
- Select 7 functions out of the 22 functions listed in the above table, and then allocate them to pin numbers 29 to 35. In addition to the output signals listed above, the following can be allocated to the output signal ports: target proximity B, target area A/B, detection of travel limit (±), excess position error (under/over), velocity error (under/over), torque command (under/over) and thermal loading (under/over).
- Pin number 28 is fixed to 'Driver Unit ready' output signal.

3. Option

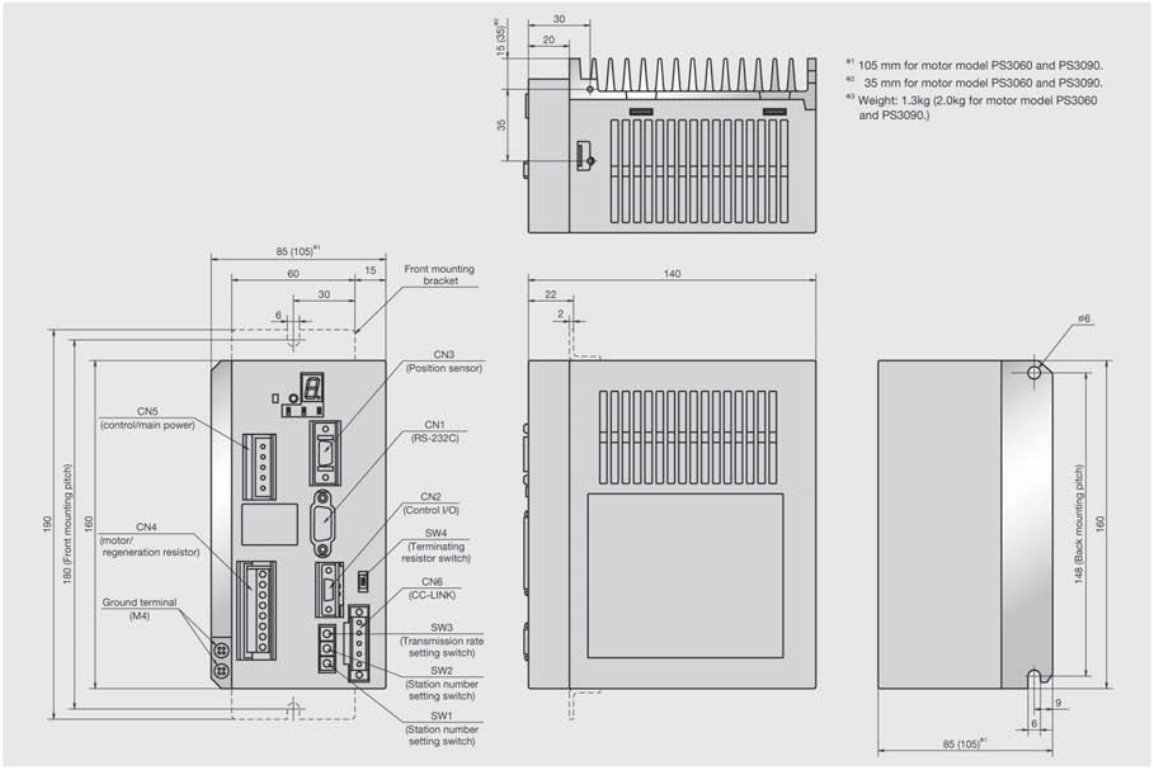
3.1 CC-Link (Field Bus)

CC-Link System Configuration



- EDC Driver Unit of PS Series Megatorque Motor provides the field bus (CC-Link) compatibility.
- You can set station numbers and the baud rate with the switches provided on the Driver Unit's front panel.
- Monitoring communication status by LED and terminating resister can be switched on/off.
- The EDC Driver Units are compatible with CC-Link Ver. 1.10.

3.2 Dimensions of Driver Unit (CC-Link)



<Accessory for CC-Link type>

① CN2 connector (user side)
Connector: DHA-PDA10-3-A01 (DDK)

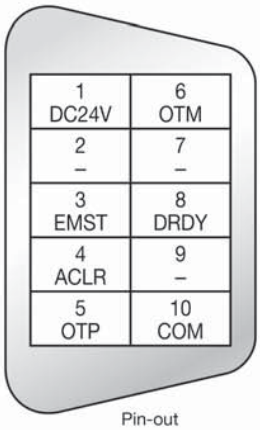
② CN5 connector (user side)
Connector: 231-305/026-000 (WAGO)

③ CN6 connector (user side)
Connector: MSTB, 5/5-STF-5.08AU (Phoenix contact)

④ Driver Unit mounting bracket

⑤ Manual (English version)

⑥ Manual for CC-Link (English version)



Pin-out

3.3 I/O Signal Specification of CC-Link CN2

Input/ Output	Signal Code	Pin No.	Signal Name	Function
Input signal	DC24	1	External power supply 24V	Power supply for input signals
	–	2	–	Do not connect.
	EMST	3	Emergency stop	Interrupts operation and stops with the dynamic brake.
	ACLR	4	Alarm clear	Releases warning.
	OTP	5	Travel limit switch (+)	Limits clockwise rotation.
	OTM	6	Travel limit switch (–)	Limits counterclockwise rotation.
	–	7	–	Do not connect.
Output signal	DRDY	8	Driver Unit ready	This signal notifies that the Driver Unit is ready for operation. (This signal opens when the Driver Unit is not ready or an alarm is given.)
	–	9	–	Do not connect.
	COM	10	Output signal, common	Output signal, common

3.4 Handy Terminal

Example of Reference Number **M-FHT** **21**

- **M-FHT**: Handy Terminal
- **21**: Serial number

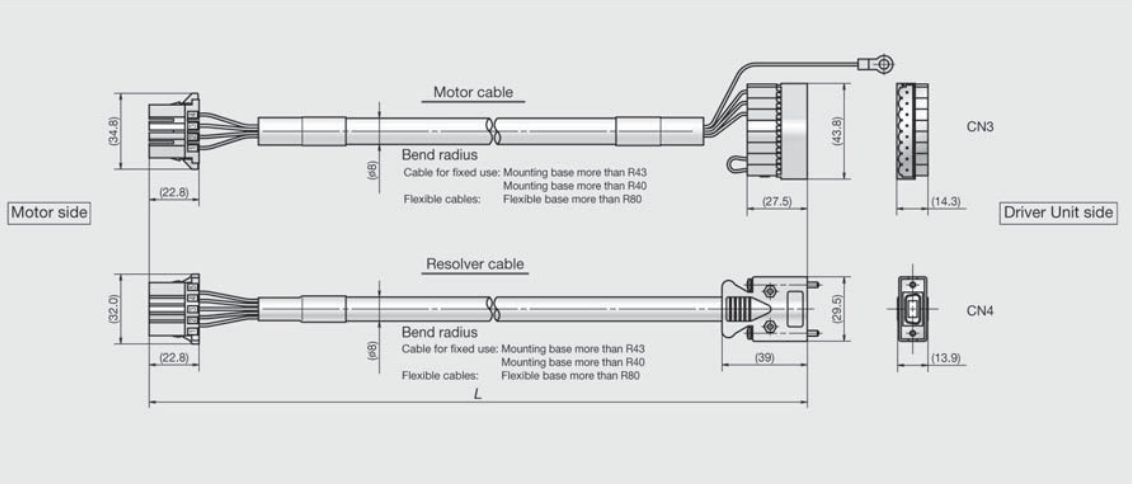
Handy Terminal FHT21 is an easy-to-handle RS-232C communication terminal for inputting parameters and programs to the EDC driver unit. You just need to connect it to the CN1 connector of the driver unit.

- LCD screen: 20 letters × 4 lines, no external power source required, cable length: 3m

3.5 Cable Set

Example of Reference Number **M-C** **004** **SCP** **03**

- **M-C**: Cable set
- **004**: Cable length
  002: 2 m 004: 4 m 008: 8 m
  015: 15 m 030: 30 m
- **SCP**: SCP: EDC Driver Unit
- **03**: 03: Cable (for fixed use)
  13: Flexible cables



4. Selection of PS Series Megatorque Motors

To select appropriate Megatorque Motors, examine the following data.

4.1 **Loads on the Motor** (① Load moment of inertia; ② Axial load/radial load/moment load; ③ Holding torque required during halts)
4.2 **Positioning Accuracy**
4.3 **Positioning Time** (Index Time)
4.4 **Selection of Regenerative Resistance**
4.5 **Effective Torque Calculations**

4.1 Loads on the Motor

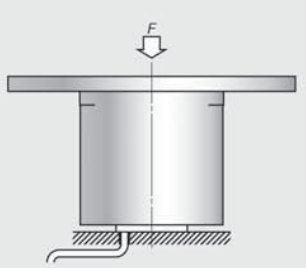
(① Load moment of inertia; ② Axial load/radial load/moment load; ③ Holding torque required during halts)

① **Load moment of inertia *J***

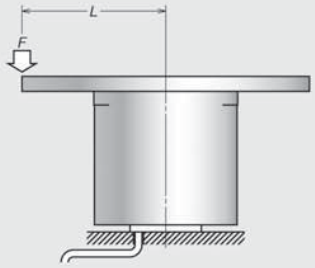
When the Megatorque Motors System is used, the size of the load moment of inertia mounted to the motor body will significantly affect the acceleration-deceleration characteristics. Thus, calculation of the load moment of inertia *J* is required.

② **Axial load/radial load/moment load**

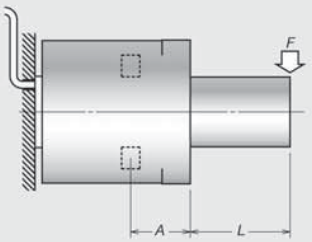
Calculate the load on the motor. The relationship between external force and load is represented in the following patterns. Ensure the axial load/radial load and the moment load are set within the limiting axial,radial and limiting moment loads. (Refer to the limiting values listed in the 1. Motor Specifications for PS Series on pages 5–6 of this catalog.)



① When F is an external force:
- Axial load: $F_a = F$ + total weight of jigs/works
- Moment load: $M = 0$



② When F is an external force:
- Axial load: $F_a = F$ + total weight of jigs/works
- Moment load: $M = F \times L$



③ When F is an external force:
- Radial load: $F_r = F$ + total weight of jigs/works
- Moment load: $M = (F$ + total weight of jigs/works$) \times (L+A)$

Motor model	PS1006 PS1012 PS1018	PS3015 PS3030 PS3060 PS3090
A dimension [mm]	30.2	32.9

③ **Holding torque size required during halts**

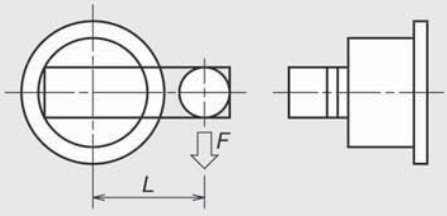
When the arm is halted at the following position, the torque, equal to $F \times L$, will be applied on the motor as a load torque. Therefore, the rated torque of the motor, equal to or greater than the load torque, is required.

4.2 Positioning Accuracy

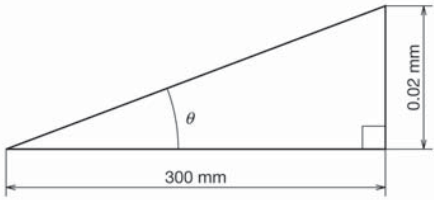
The positioning accuracy of the Megatorque Motors System is classified into the following types:

① Absolute accuracy: 30 [arc sec] (interchangeable combination)

② Repeatability: ± 2 [arc sec]



[Example 1]
We examine the compatibility of PS1 type and PS3 type, assuming a required repeatability of ± 0.02 mm at 300 mm distance from the center.
From $\tan\theta = 0.02 \div 300$
$\theta = \tan^{-1}(0.02 \div 300)$
$= 3.8 \times 10^{-3}$ [°]
=14 [arc sec]
Therefore, ± 14 > ± 2.
Both PS1 and PS3 can be used in terms of the positioning accuracy.



4.3 Positioning Time (Index Time)

When a Megatorque Motors is used to index an angle, index times can be roughly calculated as follows.

J_m	: Load moment of inertia	[kg·m^2]
J_r	: Rotor moment of inertia	[kg·m^2]
N	: Rotational speed of the motor	[s^{-1}]
T	: Output torque at the rotational speed N	[N·m]
T_m	: Load torque	[N·m]
t_1	: Command time	[s]
t_2	: Settling time	[s]
t_3	: Positioning time	[s]
Δt	: Accelerating/decelerating time	[s]
θ	: Rotational angle	[°]
η	: Safety coefficient (normally 1.5)	

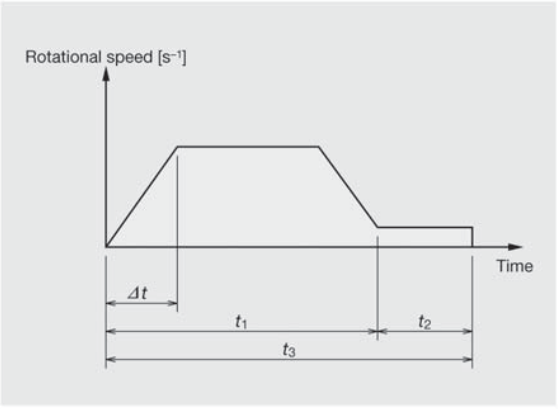
In accordance with the list above,

$$\Delta t = \frac{(J_m+J_r) \times 2\pi N}{(T-T_m)} \times \eta$$

$$t_1 = \frac{\theta}{360 \times N} + \Delta t$$

$$t_3 = t_1 + t_2$$

Where $T - T_m > 0$, and $2 \times \Delta t \leq t_1$



Please refer to the following table for the settling time. Since the settling time will also be affected by factors such as the magnitude of the load moment of inertia and rigidity of the whole structure, the settling time is not absolute.

Required repeatability [arc sec]	Settling time t_2 [s]
±2 to ±10	0.1
±10 to ±100	0.04
±100 and above	0.001

4.4 Selection of Regenerative Resistance

① The rotational energy of a Megatorque Motors during deceleration is obtained.
Calculate the rotational energy using the following equation.

Rotational energy = $1/2 \times J \times \omega^2$
$= 1/2 \times J \times (2\pi N)^2$
$J = J_r + J_m$

J_r : Rotor moment of inertia [kg · m^2]
J_m : Load moment of inertia [kg · m^2]
N : Rotational speed [s^{-1}]

② Regenerative energy capacity by the internal capacitors
The regeneration energy that can be disposed of by the internal capacitors is 28 [J] (200 [VAC]).

③ When the rotational energy is less than the energy capacity of the internal capacitors, external regeneration resistor is unnecessary. However, the external regeneration resistor (M-E014DCKR1-100, sold separately) is necessary when the rotational energy is greater than the capacity of the internal capacitors.

4.5 Effective Torque Calculations

When selecting a PS Series Megatorque Motor, it is necessary to consider the maximum required torque and the effective torque required for the actual operation.

Here, we examine a motor that can rotate 90° in 0.2 [s], assuming that the load moment of inertia is 0.05 [kg·m^2]. We will also calculate the effective torque when a standard operation cycle is 0.6 [s].

Conditions: Maximum rotational speed = 2.5 [s^{-1}]
Rotational acceleration = 25 [s^{-2}]
Repeatability = ± 2 arc sec
Stopping time = 0.09 [s]
J_m (load moment of inertia) = 0.05 [kg·m^2]
J_r (moment of inertia of the rotor) = 0.019 [kg·m^2] (for PS3060)

● Since the rotational acceleration is 25 [s^{-2}], we calculate the approximate required torque using the following equation.

Required torque* = (load moment of inertia + moment of inertia of the rotor) × angular acceleration

$= (0.05 + 0.019)\ 2\pi \times 25$

$= 10.8$ [Nm]

Therefore, the candidate selection is a motor with a maximum output torque of 10.8 [Nm] or larger.

The PS1 type (excluding PS1006) or PS3 type can be selected.

*Since the moment of inertia of the rotor of the motor varies depending on the motor, the required torque needs to be recalculated for each motor.

● The effective torque required for the actual operational pattern in use (see the following diagram) needs to be examined.

Here, we will determine whether the PS3060 meets the operational conditions.

Equations

$T1$: Torque at accelerating [N·m]
$T2$: Dynamic friction torque [N·m]
$T3$: Torque at decelerating [N·m]
J_m (load moment of inertia) = 0.05 [kg·m^2]
J_r (moment of inertia of the rotor) = 0.019 [kg·m^2]
α: Rotational acceleration [s^{-2}] = 25 [s^{-2}]
η: Safety coefficient = 1.3

Dynamic friction torque [N·m]

PS1 type	PS3 type
0.7	2.0

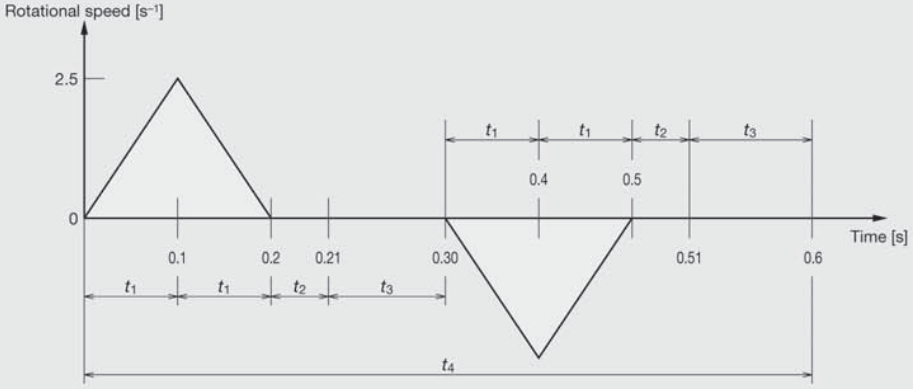
Torque at accelerating $T1 = \eta\,(J_m + J_r) \times \alpha + T2 = 1.3 \times (0.05 + 0.019) \times 2\pi \times 25 + 2.0 = 16.1$ [N·m]

Torque at decelerating $T3 = \eta\,(J_m + J_r) \times \alpha - T2 = 1.3 \times (0.05 + 0.019) \times 2\pi \times 25 - 2.0 = 12.1$ [N·m]

t_1 = accelerating/decelerating time = 0.1 [s], t_2 = settling time = 0.01 [s],
t_3 = stopping time = 0.09 [s], t_4 = cycle time $t_1 \times 4 + t_2 \times 2 + t_3 \times 2 = 0.6$ [s]

$$\text{Effective torque} = \sqrt{\frac{\{(T1)^2 \times t_1 + (T3)^2 \times t_1\} \times 2}{t_4}} = 11.6 \text{ [N·m]}$$

The effective torque is 11.6 [N·m], which is less than the PS3060's rated output torque of 20 [N·m].
Therefore, the PS3060 sufficiently meets the operational conditions.



5. Combination

5.1 Combination of Motor and Driver Unit

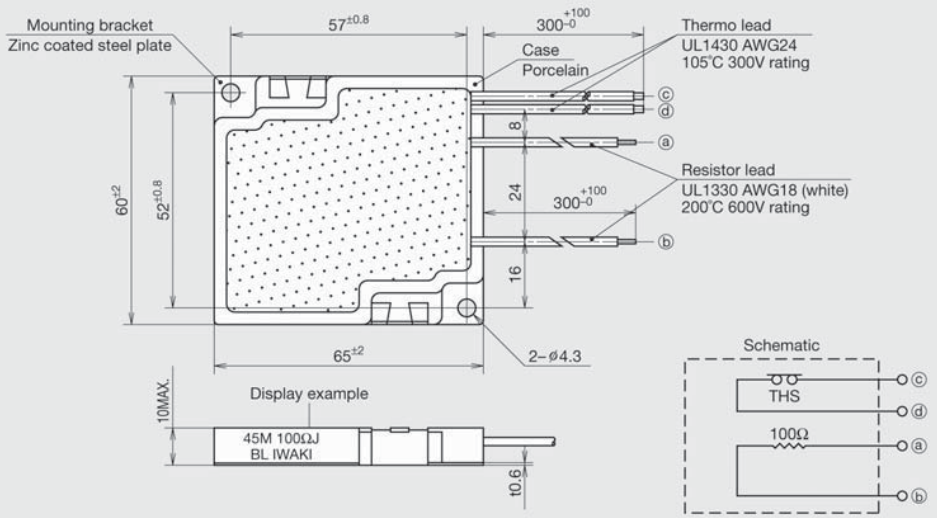
Motor Outer Diameter	Motor Reference Number	Driver Unit Reference Number	Power Voltage	Cable Reference Number	Main Specifications
φ100	M-PS1006KN001	M-EDC-PS1006AB501-02	200–230 VAC	M-C0**SCP03 (Fixed cable) M-C0**SCP13 (Flexible cable) **indicates cable length 01: 1m 02: 2m 03: 3m 04: 4m 05: 5m 06: 6m 07: 7m 08: 8m 09: 9m 10: 10m 15: 15m 20: 20m 30: 30m	Internal program 256 channels Pulse train input (Photo coupler)
		M-EDC-PS1006CB501-02	100–150 VAC		
	M-PS1012KN001	M-EDC-PS1012AB501-02	200–230 VAC		
		M-EDC-PS1012CB501-02	100–150 VAC		
	M-PS1018KN001	M-EDC-PS1018AB501-02	200–230 VAC		
		M-EDC-PS1018CB501-02	100–150 VAC		
φ150	M-PS3015KN001	M-EDC-PS3015AB501-02	200–230 VAC		
		M-EDC-PS3015CB501-02	100–150 VAC		
	M-PS3030KN001	M-EDC-PS3030AB501-02	200–230 VAC		
		M-EDC-PS3030CB501-02	100–150 VAC		
	M-PS3060KN001	M-EDC-PS3060AB501-02	200–230 VAC		
		M-EDC-PS3060CB501-02	100–150 VAC		
	M-PS3090KN001	M-EDC-PS3090AB501-02	200–230 VAC		
		M-EDC-PS3090CB501-02	100–150 VAC		
φ100	M-PS1006KN001	M-EDC-PS1006ABC01-02	200–230 VAC		CC-Link compatible Internal program 256 channels
		M-EDC-PS1006CBC01-02	100–150 VAC		
	M-PS1012KN001	M-EDC-PS1012ABC01-02	200–230 VAC		
		M-EDC-PS1012CBC01-02	100–150 VAC		
	M-PS1018KN001	M-EDC-PS1018ABC01-02	200–230 VAC		
		M-EDC-PS1018CBC01-02	100–150 VAC		
φ150	M-PS3015KN001	M-EDC-PS3015ABC01-02	200–230 VAC		
		M-EDC-PS3015CBC01-02	100–150 VAC		
	M-PS3030KN001	M-EDC-PS3030ABC01-02	200–230 VAC		
		M-EDC-PS3030CBC01-02	100–150 VAC		
	M-PS3060KN001	M-EDC-PS3060ABC01-02	200–230 VAC		
		M-EDC-PS3060CBC01-02	100–150 VAC		
	M-PS3090KN001	M-EDC-PS3090ABC01-02	200–230 VAC		
		M-EDC-PS3090CBC01-02	100–150 VAC		

5.2 Accessories (sold separately)

Item	Reference number	Contents	
Connector	M-E014DCFS1-001	CN2 connector (user side) for standard type	Connector : 54306-5011 (Molex) Connector shell : 54331-0501 (Molex)
	M-E014DCFS1-006	CN2 connector (user side) for CC-Link type	Connector : DHA-PDA10-3-A01 (DDK)
	M-E014DCFS1-002	CN5 connector (user side)	Connector : 231-305/026-000 (WAGO) Wiring lever : 231-131 (WAGO)
	M-E014DCFS1-003	CN6 connector (user side)	Connector : MSTB2, 5/5-STF-5, 08AU (Phoenix Contact)
Mounting bracket	M-E050DCKA1-001	Driver unit mounting bracket	
Manual	M-E099DC0C2-145	English version	
	M-E099DC0C2-154	CC-Link (option) English version	
External dump resistor	M-E014DCKR1-100	External dump resistor	

6. Regenerative Resistance (M-E014DCKR1-100)

6.1 Dimensions and Schematics



6.2 Connection to EDC Driver Unit