



# Caged Ball LM Guide Actuator

## SKR



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**THK CO., LTD.**  
TOKYO, JAPAN

CATALOG No. 309-9E

**Integrated LM Guide and Ball Screw  
High-rigidity / High-precision Actuator**

## **Caged Ball LM Guide Actuator Model SKR**

Model No. SKR20 to 46

### **Ball Cage Effect**



The early forms of ball bearings were full-ball types without ball cages. Friction between balls caused loud noise, made high-speed rotation impossible and shortened the service life. Twenty years later, a Caged Ball design was developed for ball bearings. The new design enabled high-speed rotation at a low noise level, and extended the service life despite the reduced number of balls used. It marked a major development in the history of ball bearings.

Similarly, the quality of needle bearings was significantly improved by the caged needle structure. With cage-less, full-ball types of ball bearings, balls make metallic contact with one another and produce loud noise. In addition, they rotate in opposite directions, causing the sliding contact between two adjacent balls to occur at a speed twice the ball-spinning rate. It results in severe wear and shortens the service life.

In addition, without a cage, balls make point contact to increase bearing stress, thus facilitating breakage of the oil film. In contrast, each caged ball contacts the cage over a wide area. Therefore, the oil film does not break, the noise level is low and balls can rotate at a high speed, resulting in a long service life.



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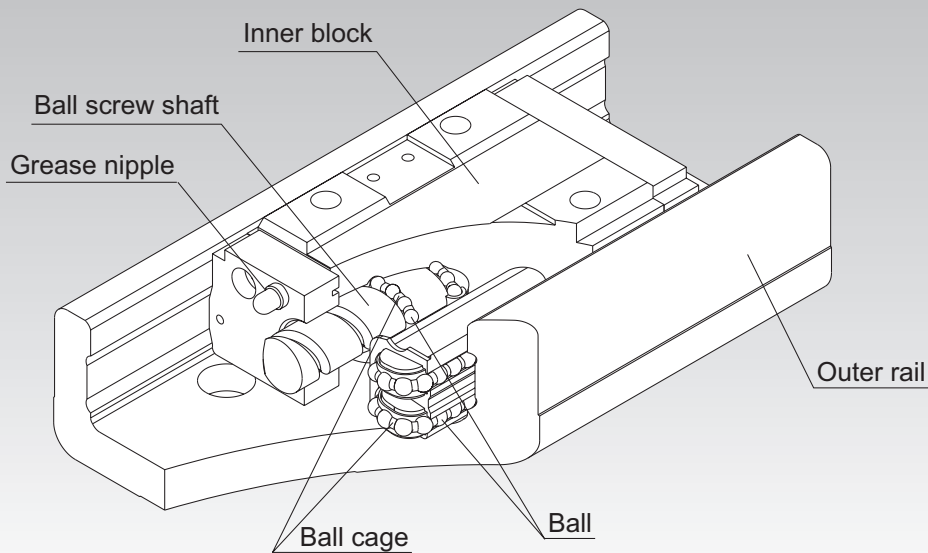


Fig.1 Structure of Caged Ball LM Guide Model SKR

### Structure and Features

Caged Ball LM Guide Actuator model SKR is a compact actuator that has a inner block consisting of LM blocks and a ball screw nut integrated inside a U-shaped outer rail.

In addition, this model achieves high speed operation, lower noise and longer-term maintenance-free operation by using ball cages in the LM Guide units and the Ball Screw unit. (A ball cage is used only for the LM guide section of models SKR20 and SKR26 and the ball screws are fitted with QZ lubricators.)

#### [4-way Equal Load]

Each row of balls is arranged at a contact angle of 45° so that the rated load on the inner block is uniform under loads applied to the inner block in the four directions (radial, reverse radial and lateral directions). As a result, model SKR can be used in any mounting orientation.

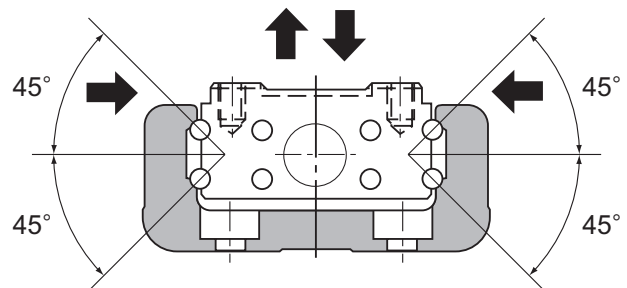


Fig.2 Load Capacity and Contact Angle of Model SKR

**[High Rigidity]**

Use of an outer rail with a U-shaped cross section increases the rigidity with respect to moment and torsion.

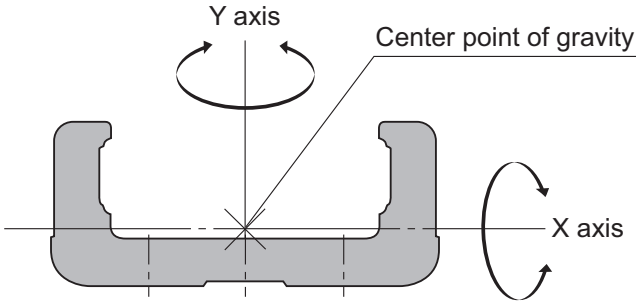


Fig.3 Cross Section of the Outer Rail

Table1 Cross-sectional Characteristics of the Outer rail Rail

Model No.	$I_x$ [mm <sup>4</sup> ]	$I_y$ [mm <sup>4</sup> ]	Mass[kg/m]
SKR20	$6.0 \times 10^3$	$6.14 \times 10^4$	2.6
SKR26	$1.66 \times 10^4$	$1.48 \times 10^5$	3.9
SKR33	$5.35 \times 10^4$	$3.52 \times 10^5$	6.1
SKR46	$2.05 \times 10^5$	$1.45 \times 10^6$	12.6

$I_x$ =geometrical moment of inertia around X axis  
 $I_y$ =geometrical moment of inertia around Y axis

**[High Accuracy]**

Since the linear guide section consists of 4 rows of circular-arc grooves that enable balls to smoothly move even under a preload, a highly rigid guide with no clearance is achieved. Additionally, variation in frictional resistance caused by load fluctuation is minimized, allowing the system to follow highly accurate feed.

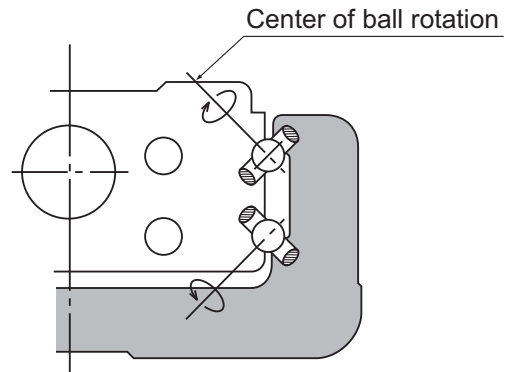


Fig.4 Contact Structure of SKR

**[Space Saving]**

Due to an integral structure where LM Guide units are placed on both side faces of the inner block and a Ball Screw unit is placed in the center of the inner block, a highly rigid and highly accurate actuator with a minimal space is achieved.

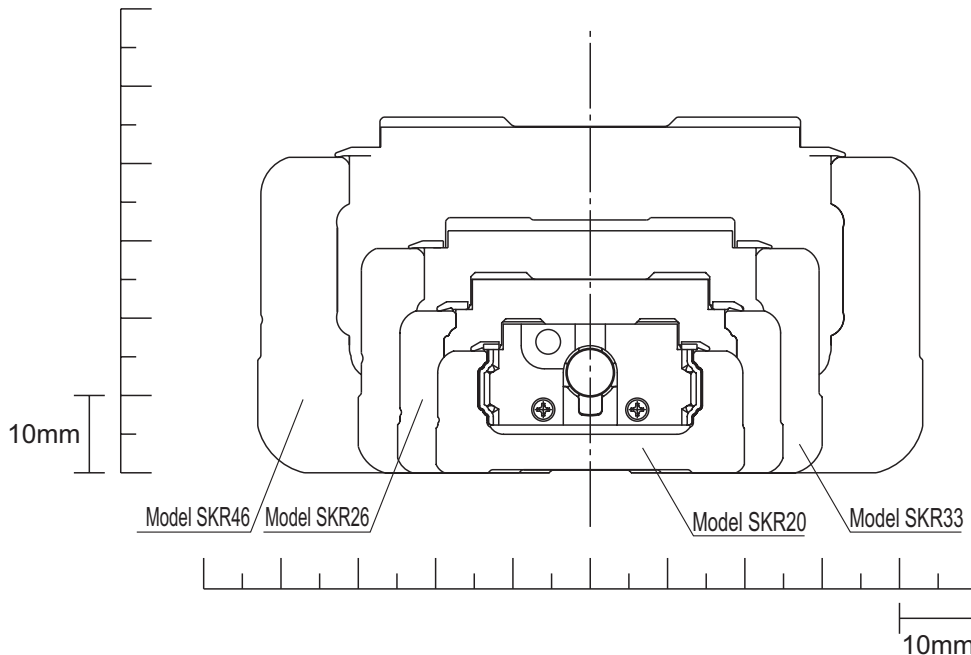


Fig.5 Cross Sectional Drawing

## Caged Ball Technology

### [High Speed]

Model SKR supports a latest high-rotation servomotor (6,000 min<sup>-1</sup>) by using a ball cage and is capable of operating at higher speed than the full-ball type model KR.

To achieve faster motion, leads of 6 mm and 10 mm were provided on the full-ball type model KR33 ball screws, model SKR33 includes types with a 20 mm lead.

### [High Lubricity]

Model SKR uses ball cages to eliminate friction between balls and significantly improve torque characteristics. As a result, the torque fluctuation is reduced and superb lubricity is achieved.

Item	Description
Shaft diameter/lead	φ13/10mm
Shaft rotation speed	60min <sup>-1</sup>

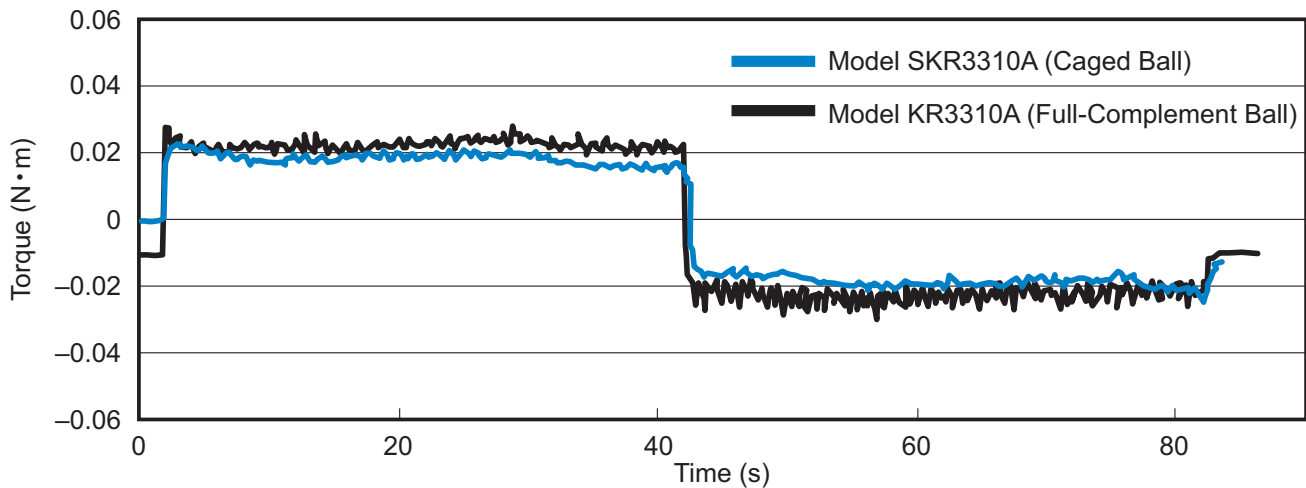


Fig.6 Comparison of Torque Fluctuation between Model SKR and Model KR



**[Low Noise, Acceptable Running Sound]**

In model SKR, the use of a ball cage in the LM guide section and ball screw section (SKR33 and 46 only) has eliminated collision noise between the balls. As a result, low noise and acceptable running sound are achieved.

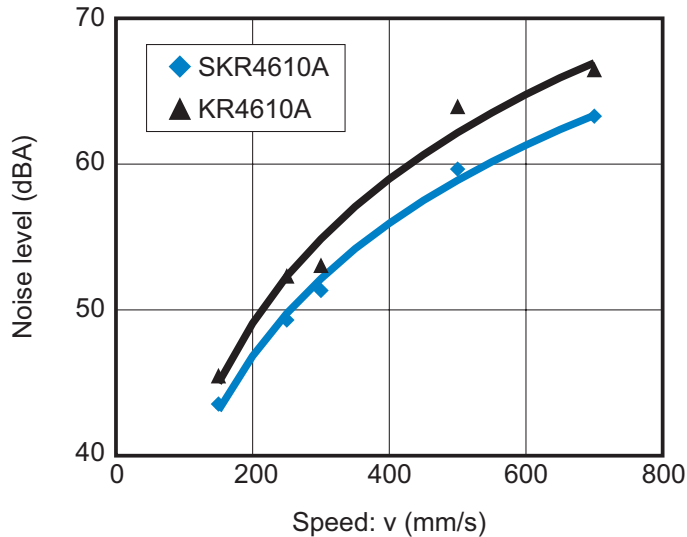


Fig.7 Comparison of Noise between Model SKR4610A and Model KR4610A

**[Long-term Maintenance-free Operation]**

With model SKR, the ball cage effect helps increase grease retention and achieve long-term maintenance-free operation.

**[Long service life—3 times]**

With model SKR, both the LM Guide unit and the Ball Screw unit have larger basic dynamic load ratings than the full-ball type model KR, and therefore a longer service lives are achieved.

The rated service life is calculated from the following equation.

LM guide unit

$$L=(C/P)^3 \times 50$$

- L : Nominal life (km)
- C : Basic dynamic load rating (N)
- P : Applied load (N)

Ball screw unit

$$L=(Ca/Fa)^3 \times 10^6$$

- L : Nominal life (rev)
- Ca : Basic dynamic load rating (N)
- Fa : Applied axial load (N)

As indicated in the equation above, the greater the basic dynamic load rating, the longer the service life of both the LM Guide unit and the Ball Screw unit.

Table2 Comparison of Basic Dynamic Load Rating between Model SKR and Model KR

Unit: N

Basic dynamic load rating		SKR20	KR20	SKR26	KR26	SKR33	KR33	SKR46	KR46
LM guide unit C	Long type block	6010	3590	13000	7240	17000	11600	39500	27400
	Short type block	—	—	—	—	11300	4900	28400	14000
Ball screw unit Ca		660	660	2350	2350	2700	1760	4240	3040

Note) On the SKR20/26, only the LM guide section features a ball cage.

**[Seal]**

Model SKR is equipped with end seals and side seals for dust prevention as standard.

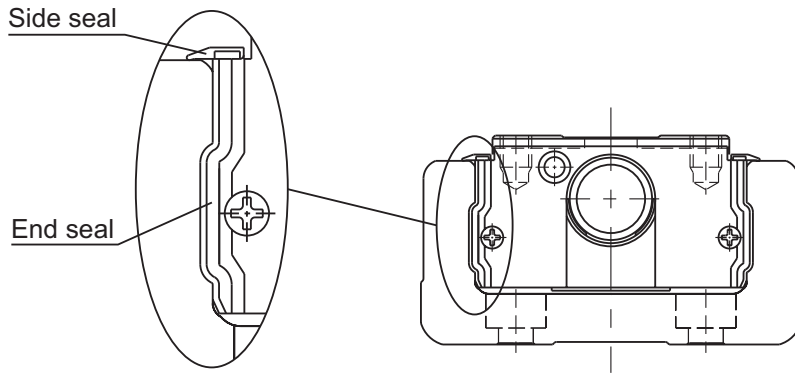


Table3 shows the rolling resistance and seal resistance per inner block (guide section).

Table3 Maximum Resistance Value Unit: N

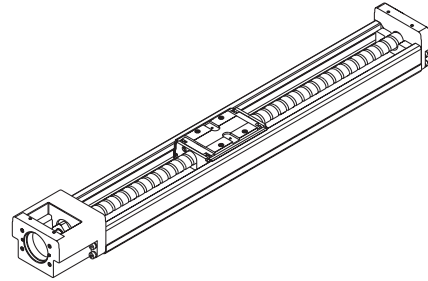
Model No.	Rolling resistance value	Seal resistance value	Total
SKR20	4.0	0.8	4.8
SKR26	4.5	1.2	5.7
SKR33	3.0	1.7	4.7
SKR46	6.0	2.1	8.1



## Types and Features

### Model SKR-A (with a Single Long Type Block)

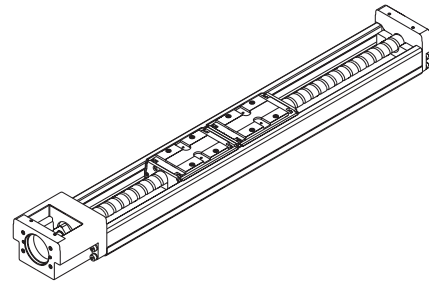
Representative model of SKR.



Model SKR-A

### Model SKR-B (with Two Long Type Blocks)

Equipped with two units of the inner block of model SKR-A, this model achieves higher rigidity and higher load carrying capacity.

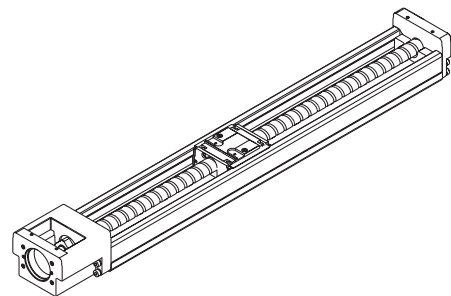


Model SKR-B

### Model SKR-C (with a Single Short Type Block)

This model has a shorter overall length of the inner block and a longer stroke than model SKR-A.

\* With model SKR3320, a short-block type is not available.

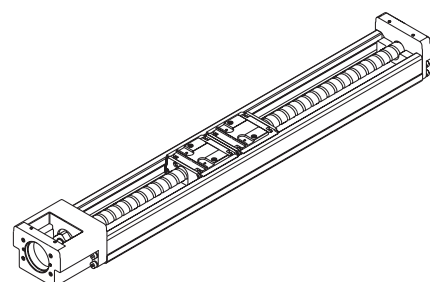


Model SKR-C

### Model SKR-D (with Two Short Type Blocks)

Equipped with two units of the inner block of model SKR-C, this design allows a span between blocks that suits the equipment, thus to achieve high rigidity.

\* With model SKR3320, a short-block type is not available.

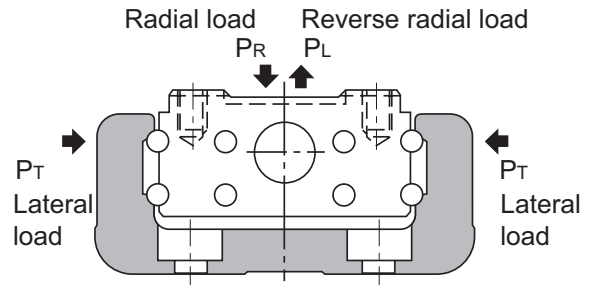


Model SKR-D

## Load Ratings in All Directions and Static Permissible Moment

### [Load Rating]

Caged Ball LM Guide Actuator Model SKR consists of an LM Guide, a Ball Screw and a support bearing.



### ● LM Guide Unit

Model SKR is capable of receiving loads in four directions (radial, reverse radial and lateral directions). Its basic load ratings are equal in all four directions (radial, reverse radial and lateral directions), and their values are indicated in Table4.

### ● Ball Screw Unit

Since the inner block is incorporated with a ball screw nut, model SKR is capable of receiving an axial load. The basic load rating value is indicated in Table4.

### ● Bearing Unit (Fixed Side)

Since housing A contains an angular bearing, model SKR is capable of receiving an axial load. The basic load rating value is indicated in Table4.

### [Equivalent Load (LM Guide Unit)]

The equivalent load when the LM Guide unit of model SKR simultaneously receives loads in all directions is obtained from the following equation.

$$P_E = P_R (P_L) + P_T$$

$P_E$	: Equivalent load	(N)
	: Radial direction	
	: Reverse radial direction	
	: Lateral directions	
$P_R$	: Radial load	(N)
$P_L$	: Reverse radial load	(N)
$P_T$	: Lateral load	(N)

Table4 Load Rating of Model SKR

Model No.			SKR20		SKR26		SKR33*			SKR46*	
			SKR2001	SKR2006	SKR2602	SKR2606	SKR3306	SKR3310	SKR3320	SKR4610	SKR4620
LM guide unit	Basic dynamic load rating C (N)	Long type block	6010		13000		17000			39500	
		Short type block	—		—		11300		—	28400	
	Basic static load rating C <sub>0</sub> (N)	Long type block	8030		16500		20400			45900	
		Short type block	—		—		11500		—	28700	
	Radial clearance (mm)	Normal grade, high accuracy grade	-0.004 to 0		-0.006 to 0		-0.004 to 0			-0.006 to 0	
		Precision grade	-0.006 to -0.004		-0.007 to -0.006		-0.012 to -0.004			-0.016 to -0.006	
Ball screw unit	Basic dynamic load rating C <sub>a</sub> (N)	Normal grade, high accuracy grade	660	860	2350	1950	4400	2700	2620	4350	4240
		Precision grade	660	1060	2350	2390					
	Basic static load rating C <sub>0a</sub> (N)	Normal grade, high accuracy grade	1170	1450	4020	3510	6290	3780	3770	6990	7040
		Precision grade	1170	1600	4020	3900					
	Screw shaft diameter (mm)		6		8		13			15	
	Ball Screw lead (mm)		1	6	2	6	6	10	20	10	20
	Thread minor diameter (mm)		5.3	5.0	6.6	6.7	10.8			12.5	
	Ball center-to-center diameter (mm)		6.15	6.3	8.3	8.4	13.5			15.75	
Bearing unit (Fixed side)	Axial direction	Basic dynamic load rating C <sub>a</sub> (N)	1150		2000		6250			6700	
		Static permissible load P <sub>0a</sub> (N)	735		1230		2700			3330	

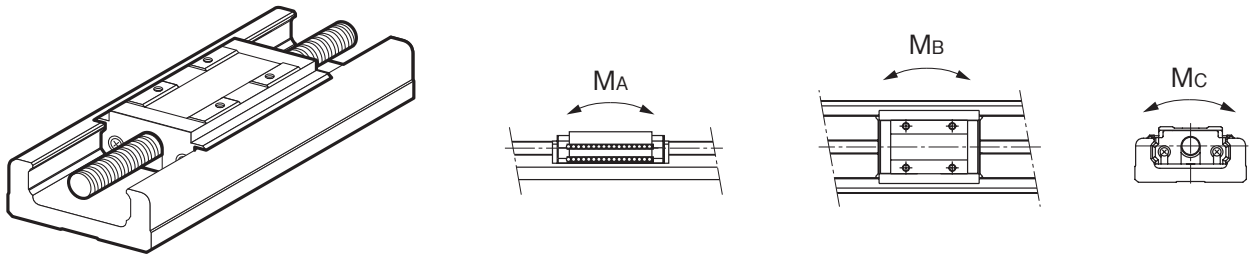
\*For use in a special environment or where an axial load (25% or more of the basic dynamic load rating C<sub>a</sub>) is applied, a special type is also available. Contact THK for details.

Note1) The load ratings in the LM Guide unit each indicate the load rating per inner block.

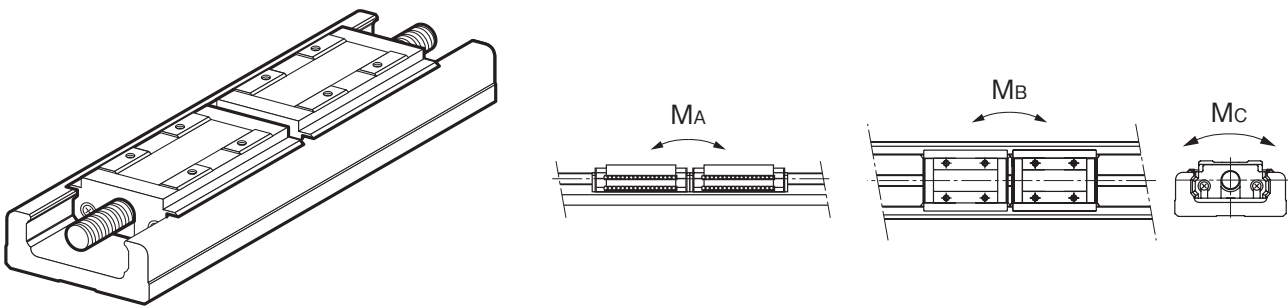
Note2) With model SKR3320, a short-block type is not available.

**[Permissible Moment (LM Guide Unit)]**

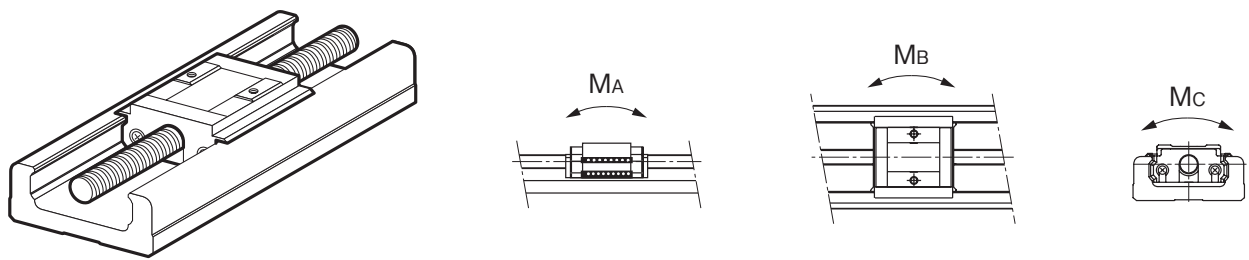
The Inner block is capable of receiving moment loads in all three (3) directions.  
 Table5 on page12 shows the permissible static moment in the  $M_A$ ,  $M_B$  and  $M_C$  directions.



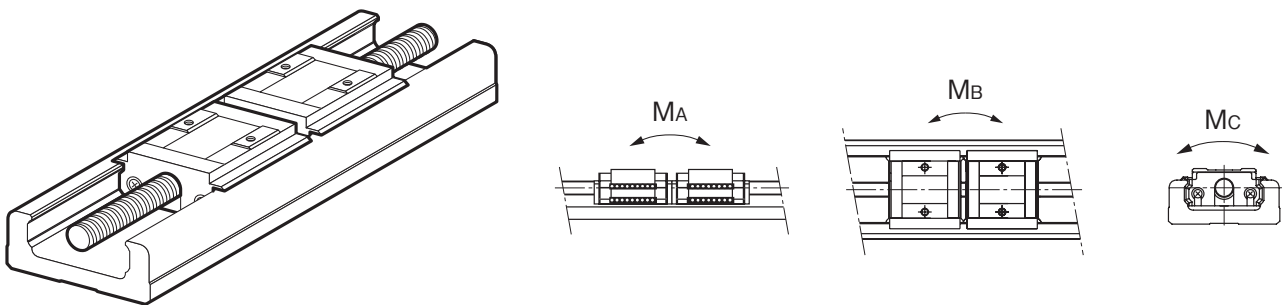
With a single long type block (Model SKR-A)



With double long type blocks (Model SKR-B)



With a single short type block (Model SKR-C)



With double short type blocks (Model SKR-D)

Table5 Static Permissible Moments of Model SKR

Unit: N-m

Model No.	Static permissible moment		
	$M_A$	$M_B$	$M_C$
SKR20-A	38	38	98
SKR20-B	207	207	197
SKR26-A	117	117	265
SKR26-B	589	589	530
SKR33-A	173	173	424
SKR33-B	990	990	848
SKR33-C	58	58	240
SKR33-D	390	390	480
SKR46-A	579	579	1390
SKR46-B	3240	3240	2780
SKR46-C	236	236	870
SKR46-D	1460	1460	1740

Note1) Symbols A, B, C or D in the end of each model number indicates the inner block size and the number of inner blocks used.

A: With a single long type block

B: With double long type blocks

C: With a single short type block

D: With double short type blocks

Note2) The values for models SKR-B/D indicate the values when double inner blocks are used in close contact with each other.

Note3) Static permissible moment is the maximum moment that can be permitted while the product is stationary.

## Maximum Speeds with Different Strokes

Table6 Maximum speed

Model No.	Ball Screw lead (mm)	Stroke* (mm)		Outer rail length (mm)	Maximum speed (mm/s)	
		Long type block	Short type block		Long type block	Short type block
SKR20	1	30	—	100	100	—
		80	—	150	100	—
		130	—	200	100	—
	6	30	—	100	600	—
		80	—	150	600	—
		130	—	200	600	—
SKR26	2	60	—	150	200	—
		110	—	200	200	—
		160	—	250	200	—
		210	—	300	200	—
	6	60	—	150	600	—
		110	—	200	600	—
		160	—	250	600	—
		210	—	300	600	—
SKR33	6	45	70	150	600	
		95	120	200	600	
		195	220	300	600	
		295	320	400	600	
		395	420	500	600	
		495	520	600	550	500
		595	620	700	390	360
		—	—	—	1000	
	10	45	70	150	1000	
		95	120	200	1000	
		195	220	300	1000	
		295	320	400	1000	
		395	420	500	1000	
		495	520	600	920	830
		595	620	700	650	600
		—	—	—	1000	
	20	45	—	150	2000	—
		95	—	200	2000	—
		195	—	300	2000	—
		295	—	400	2000	—
		395	—	500	2000	—
		495	—	600	1780	—
		595	—	700	1270	—
		—	—	—	1000	
SKR46	10	190	220	340	1000	
		290	320	440	1000	
		390	420	540	1000	
		490	520	640	1000	910
		590	620	740	730	660
		690	720	840	550	500
		790	820	940	430	400
		—	—	—	2000	
	20	190	220	340	2000	
		290	320	440	2000	
		390	420	540	2000	
		490	520	640	1980	1770
		590	620	740	1430	1300
		690	720	840	1080	990
		790	820	940	840	780
		—	—	—	2000	

\*Indicates a stroke when one inner block is incorporated.

Note1) The maximum speed is the value restricted by the motor rotation speed (at 6,000 min<sup>-1</sup>), or by the permissible rotation speed of the Ball Screw.

Note2) When considering the use of this model at speed higher than the maximum speed indicated above, contact THK.

## Lubrication

Table7 shows standard greases used in model SKR and grease nipple types.

Table7 Types of standard grease and grease nipples used

Model No.	Standard grease	Grease nipple used
SKR20	THK AFA Grease	PB107
SKR26	THK AFA Grease	PB107
SKR33	THK AFB-LF Grease	PB107
SKR46	THK AFB-LF Grease	A-M6F



## Static Safety Factor

Caged Ball LM Guide Actuator Model SKR consists of an LM Guide, a Ball Screw and a support bearing. The static safety factor and the service life of each component can be obtained from the basic load rating indicated in “Rated load of model SKR” (see Table4 on page10).

### [Calculating the Static Safety Factor]

#### ● LM Guide Unit

To calculate a load applied to the LM Guide of model SKR, the average load required for calculating the service life and the maximum load needed for calculating the static safety factor must be obtained first. In particular, if the system starts and stops frequently, or if a large moment caused by an overhung load is applied to the system, it may receive an unexpectedly large load.

When selecting a model number, make sure that the desired model is capable of receiving the required maximum load (whether stationary or in motion).

$$f_s = \frac{C_0}{P_{max}}$$

$f_s$  : Static safety factor

$C_0$  : Basic static load rating (N)

$P_{max}$  : Maximum applied load (N)

\*The basic static load rating is a static load with a constant direction and magnitude whereby the sum of the permanent deformation of the rolling element and that of the raceway on the contact area under the maximum stress is 0.0001 times the rolling element diameter.

#### ● Ball Screw Unit/Bearing Unit(Fixed Side)

If an unexpected external force is applied in the axial direction as a result of an inertia caused by an impact or start and stop while model SKR is stationary or operating, it is necessary to take into account the static safety factor.

$$f_s = \frac{C_{0a}}{F_{max}}$$

$f_s$  : Static safety factor

$C_{0a}$  : Basic static load rating (N)

$F_{max}$  : Maximum applied load (N)

### [Standard Values for the Static Safety Factor ( $f_s$ )]

Machine type	Load conditions	Minimum Static Safety Factor ( $f_s$ )
General industrial machinery	Without vibration or impact	1.0 to 3.5
	With vibration or impact	2.0 to 5.0

\*The standard value of the static safety factor may vary depending on the load conditions as well as environment, lubrication status, mounting accuracy, and/or rigidity.

## Service Life

### [LM Guide Unit]

#### ● Nominal Life

The nominal life (L) means the total travel distance that 90% of a group of units of the same LM Guide model can achieve without flaking (scale-like pieces on the metal surface) after individually running under the same conditions.

The nominal life of the LM Guide is obtained using the following equation.

$$L = \left( \frac{f_c \cdot C}{f_w \cdot P_c} \right)^3 \times 50$$

L	: Nominal life	(km)	$f_w$	: Load factor	(see Table8 on page17)
C	: Basic dynamic load rating	(N)	$f_c$	: Contact factor	(see Table9 on page18)
$P_c$	: Calculated applied load	(N)			

- If a moment is applied, calculate the equivalent load by multiplying the applied moment by the equivalent factor indicated in Table10 on page 18.

$$P_m = K \cdot M$$

$P_m$  : Equivalent load (per inner block) (N)

K : Equivalent moment factor

M : Applied moment (N-mm)

(If planning to use the product with a wide inner block span, contact THK.)

If moment  $M_c$  is applied to model SKR-B/D

$$P_m = \frac{K_c \cdot M_c}{2}$$

- If a radial load (P) and a moment are simultaneously applied to model SKR

$$P_E = P_m + P$$

$P_E$  : Overall equivalent radial load (N)

Perform a nominal life calculation using the above data.

#### ● Service Life Time

When the nominal life (L) has been obtained, the service life time is obtained using the following equation (if the stroke length and the number of reciprocations per minute are constant).

$$L_h = \frac{L \times 10^6}{2 \cdot l_s \cdot n_1 \times 60}$$

$L_h$	: Service life time	(h)	$n_1$	: Number of reciprocations per minute	( $\text{min}^{-1}$ )
$l_s$	: Stroke length	(mm)			

**[Ball Screw Unit/Bearing Unit(Fixed Side)]**

● **Nominal Life**

The nominal life (L) means the total travel distance that 90% of a group of units of the same Ball Screw (bearing) can achieve without flaking after individually running under the same conditions.

The nominal life of the Ball Screw unit/bearing unit (fixed side) is obtained using the following equation.

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

- L : Nominal life (rev)
- C<sub>a</sub> : Basic dynamic load rating (N)
- F<sub>a</sub> : Axial load (N)
- f<sub>w</sub> : Load factor (see Table8)

Table8 Load Factor (f<sub>w</sub>)

Vibrations/impact	Speed(V)	f <sub>w</sub>
Faint	Very low V ≤ 0.25m/s	1 to 1.2
Weak	Slow 0.25m/s < V ≤ 1m/s	1.2 to 1.5
Medium	Medium 1m/s < V ≤ 2m/s	1.5 to 2
Strong	High V > 2m/s	2 to 3.5

### ● Service Life Time

When the nominal life (L) has been obtained, the service life time is obtained using the following equation (if the stroke length and the number of reciprocations per minute are constant).

$$L_h = \frac{L \cdot \ell}{2 \cdot \ell_s \cdot n_1 \times 60}$$

$L_h$  : Service life time (h)       $n_1$  : Number of reciprocations per minute ( $\text{min}^{-1}$ )  
 $\ell_s$  : Stroke length (mm)       $\ell$  : Ball Screw lead (mm)

### ■ $f_c$ : Contact Factor

If two inner blocks are used in close contact with each other with model SKR-B/D, multiply the basic load rating by the corresponding contact factor indicated in Table9.

Table9 Contact Factor ( $f_c$ )

Block type	Contact factor $f_c$
Model SKR-B Model SKR-D	0.81

### ■ $f_w$ : Load Factor

In general, machines in reciprocal motion are likely to cause vibration and impact during operation, and it is particularly difficult to accurately determine each of vibration generated during high-speed operation, impact applied during repeated starting and stopping in normal use, etc. Therefore, where the effect of speed vibration is estimated to be significant, divide the basic load rating (C) by an empirically obtained load factor.

### ■ $K$ : Moment Equivalent Factor (LM Guide Unit)

When model SKR travels under a moment, the distribution of load applied to the LM Guide is locally large. In such cases, calculate the load by multiplying the moment value by the corresponding moment equivalent factor indicated in Table10.

Symbols  $K_A$ ,  $K_B$  and  $K_C$  indicate the moment equivalent loads in the  $M_A$ ,  $M_B$  and  $M_C$  directions, respectively.

Table10 Equivalent moment factor(K)

Model No.	$K_A$	$K_B$	$K_C$
SKR20-A	$2.34 \times 10^{-1}$	$2.34 \times 10^{-1}$	$8.07 \times 10^{-2}$
SKR20-B	$4.38 \times 10^{-2}$	$4.38 \times 10^{-2}$	$8.07 \times 10^{-2}$
SKR26-A	$1.59 \times 10^{-1}$	$1.59 \times 10^{-1}$	$6.17 \times 10^{-2}$
SKR26-B	$3.18 \times 10^{-2}$	$3.18 \times 10^{-2}$	$6.17 \times 10^{-2}$
SKR33-A	$1.42 \times 10^{-1}$	$1.42 \times 10^{-1}$	$5.05 \times 10^{-2}$
SKR33-B	$2.47 \times 10^{-2}$	$2.47 \times 10^{-2}$	$5.05 \times 10^{-2}$
SKR33-C	$2.39 \times 10^{-1}$	$2.39 \times 10^{-1}$	$5.05 \times 10^{-2}$
SKR33-D	$3.54 \times 10^{-2}$	$3.54 \times 10^{-2}$	$5.05 \times 10^{-2}$
SKR46-A	$9.51 \times 10^{-2}$	$9.51 \times 10^{-2}$	$3.46 \times 10^{-2}$
SKR46-B	$1.70 \times 10^{-2}$	$1.70 \times 10^{-2}$	$3.46 \times 10^{-2}$
SKR46-C	$1.46 \times 10^{-1}$	$1.46 \times 10^{-1}$	$3.46 \times 10^{-2}$
SKR46-D	$2.36 \times 10^{-2}$	$2.36 \times 10^{-2}$	$3.46 \times 10^{-2}$

$K_A$ : Moment equivalent factor in the  $M_A$  direction.

$K_B$ : Moment equivalent factor in the  $M_B$  direction.

$K_C$ : Moment equivalent factor in the  $M_C$  direction.

Note) The values for models SKR-B/D indicate the values when double inner blocks are used in close contact with each other.

## Accuracy Standards

The accuracy standard of model SKR is defined in positioning repeatability, positioning accuracy, running parallelism (vertical direction) and backlash.

### [Positioning Repeatability]

After repeating positioning to a given point in the same direction seven times, measure the halting point and obtain the value of half the maximum difference. Perform this measurement in the center and both ends of the travel distance; use the maximum difference as the measurement value and express the value of half the maximum difference with a “±” sign prefixed to the value.

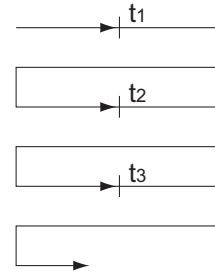


Fig.8 Positioning Repeatability

### [Positioning Accuracy]

Using the maximum stroke as the reference length, express the maximum error between the actual distance traveled from the reference point and the command value in an absolute value as positioning accuracy.

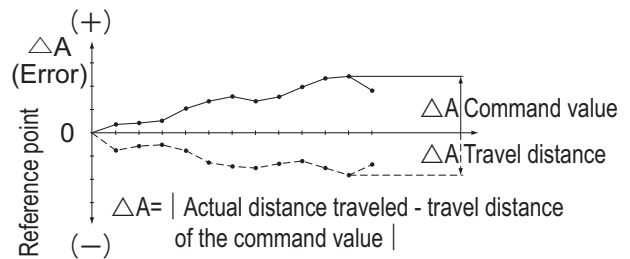


Fig.9 Positioning Accuracy

### [Running of Parallelism (Vertical direction)]

Place a straightedge on the surface table where model SKR is mounted, measure almost throughout the travel distance of the inner block using a test indicator. Use the maximum difference among the readings within the travel distance as the running parallelism measurement.

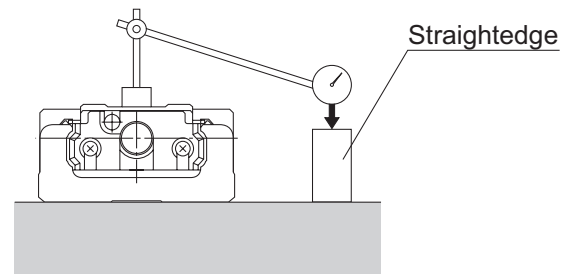


Fig.10 Running of Parallelism

### [Backlash]

Feed and slightly move the inner block and read the measurement on the test indicator as the reference value. Subsequently, apply a load to the inner block from the same direction (table feed direction), and then release the inner block from the load. Use the difference between the reference value and the return as the backlash measurement.

Perform this measurement in the center and near both ends, and use the maximum value as the measurement value.

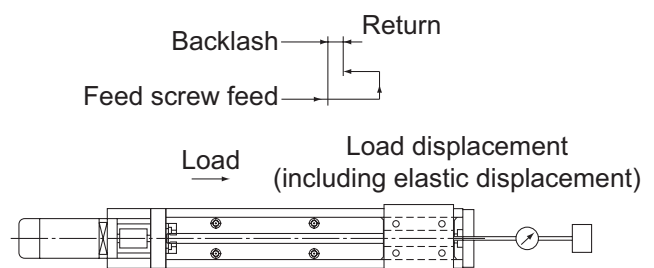


Fig.11 Backlash

The accuracies of model SKR are classified into normal grade (no symbol), high accuracy grade (H) and precision grade (P). Tables below show standards for all the accuracies.

Table11 Normal Grade (No Symbol)

Unit: mm

Model No.	Stroke*	Outer rail length	Positioning Repeatability	Positioning Accuracy	Running Parallelism (Vertical Direction)	Backlash	Starting torque (N-cm)
SKR20	30	100	±0.01	No standard defined	No standard defined	0.02	0.5
	80	150					
	130	200					
SKR26	60	150	±0.01	No standard defined	No standard defined	0.02	1.5
	110	200					
	160	250					
	210	300					
SKR33	45	150	±0.01	No standard defined	No standard defined	0.02	7
	95	200					
	195	300					
	295	400					
	395	500					
	495	600					
	595	700					
SKR46	190	340	±0.01	No standard defined	No standard defined	0.02	10
	290	440					
	390	540					
	490	640					
	590	740					
	690	840					
	790	940					

Table12 High Accuracy Grade (H)

Unit: mm

Model No.	Stroke*	Outer rail length	Positioning Repeatability	Positioning Accuracy	Running of Parallelism (Vertical direction)	Backlash	Starting torque (N-cm)
SKR20	30	100	±0.005	0.06	0.025	0.01	0.5
	80	150					
	130	200					
SKR26	60	150	±0.005	0.06	0.025	0.01	1.5
	110	200					
	160	250					
	210	300					
SKR33	45	150	±0.005	0.06	0.025	0.02	7
	95	200					
	195	300					
	295	400		0.10	0.035		
	395	500					
	495	600					
	595	700					
SKR46	190	340	±0.005	0.10	0.035	0.02	10
	290	440					
	390	540					
	490	640		0.12	0.04		
	590	740					
	690	840					
	790	940					

Table13 Precision Grade (P)

Unit: mm

Model No.	Stroke*	Outer rail length	Positioning Repeatability	Positioning Accuracy	Running of Parallelism (Vertical direction)	Backlash	Starting torque (N-cm)
SKR20	30	100	±0.003	0.02	0.01	0.003	1.2
	80	150					
	130	200					
SKR26	60	150	±0.003	0.02	0.01	0.003	4
	110	200					
	160	250					
	210	300					
SKR33	45	150	±0.003	0.02	0.01	0.003	15
	95	200					
	195	300					
	295	400		0.025	0.015		
	395	500		0.03	0.02		
	495	600					
	595	700					
SKR46	190	340	±0.003	0.025	0.015	0.003	15
	290	440					
	390	540					
	490	640		0.03	0.02		17
	590	740					

\*Indicates stroke length when one long-type inner block is incorporated.

Note1) The evaluation method complies with THK standards.

Note2) The starting torque represents the value when the following grease is used.

Models SKR20 and SKR26 : THK AFA Grease

Models SKR33 and SKR46 : THK AFB-LF Grease

Note3) If harder grease is used, such as vacuum/clean-room grease, the actual starting torque may exceed the values listed.

Note4) Contact THK for information on the accuracy for standard or longer stroke.





# Model Number Coding

Model No.	Ball Screw Lead	Inner block type	Stroke	Accuracy
<b>SKR33</b>	<b>10</b>	<b>A</b>	<b>0195</b>	<b>P</b>

①

②

③

④

⑤

SKR20	01 : 1mm	A	0025 : 25mm	No symbol: normal grade H : High accuracy grade P : Precision Grade
SKR26	02 : 2mm	B	0050 : 50mm	
SKR33	06 : 6mm	C	}	
SKR46	10 : 10mm	D	1490 : 1490mm	
	20 : 20mm			

If "2" (with Bellows) was selected for the cover ⑦, specify a stroke incorporating the bellows(→page38).

The available ball screw leads differ depending on the model.

SKR20 : "01", "06"

SKR26 : "02", "06"

SKR33 : "06", "10", "20" (20 mm is available for inner block type A and B only)

SKR46 : "10", "20"

With/without a motor	Cover	Sensor	Housing A/ Intermediate Flange
<b>0</b>	<b>1</b>	<b>B</b>	<b>AQ</b>
⑥	⑦	⑧	⑨

0: direct-coupled (without a motor)
1: direct-coupled (with a motor, specified by the customer)

0: without a cover
1: with a cover
2: with a bellows

0: none	20
1	40
2	60
6	A0
7	AM
B	AN
E	AP
H	AQ
L	AR
J	AS
M	AT
	AU
	AV
	AY

If "0" is selected, a coupling is not attached. If a coupling is required, please indicate so.

"1" means that a motor specified by the customer is mounted.

For item ⑨, select a housing A/intermediate flange that matches the specified motor.

Several motors by different manufacturers can be mounted. Contact THK for details.

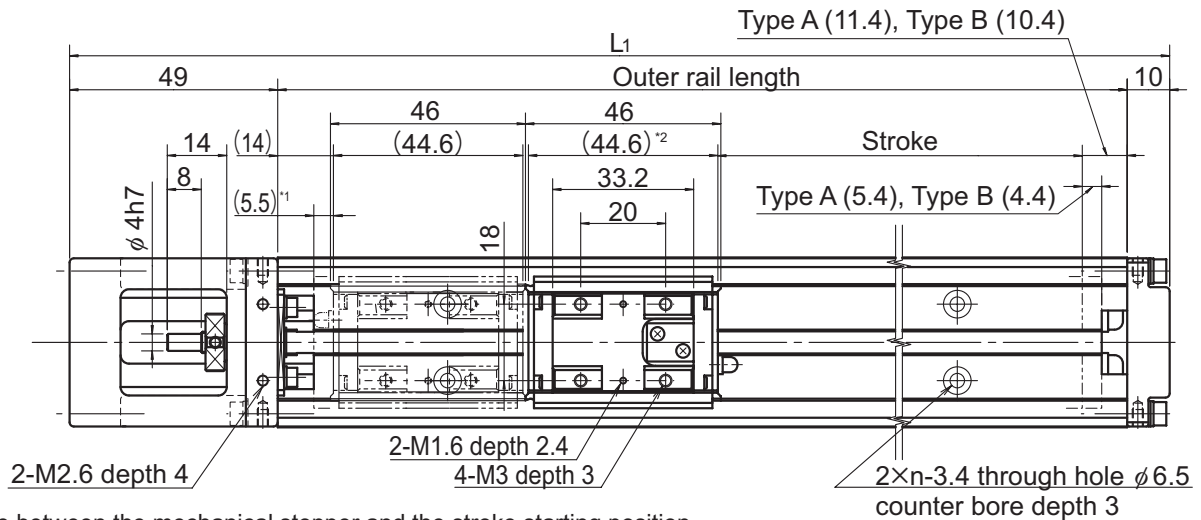
A type with a wrap-around housing A and a motor wrap-around type, which are not contained in the catalog, are also available. Contact THK for details.

# Model SKR20 Standard Type

Model SKR20□□A (with a Single Long Nut Block)

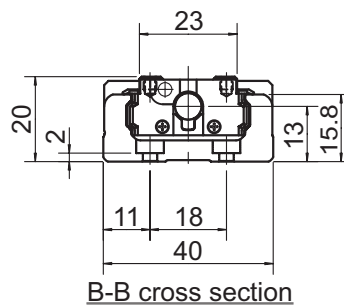
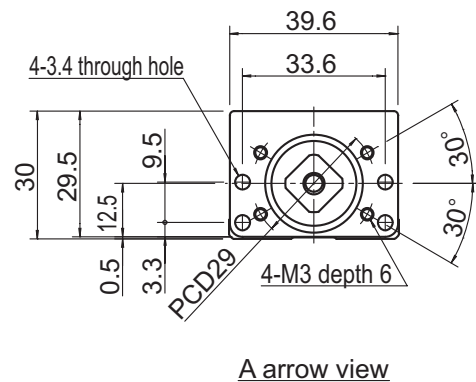
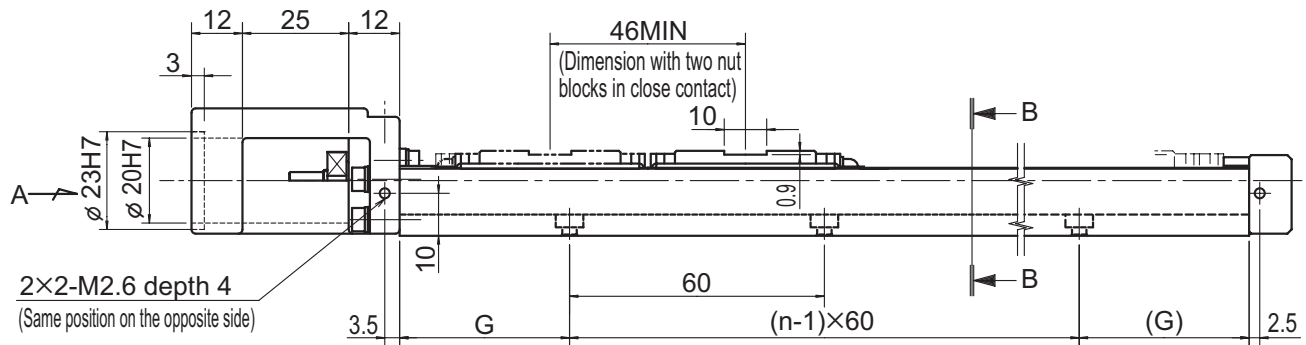
Model SKR20□□B (with Two Long Nut Blocks)

For model number coding, see page23.



\*1 Distance between the mechanical stopper and the stroke starting position.

\*2 Indicates the inner block length when calculating the available stroke range. The length in model SKR-B (with two long-type inner blocks) is 90.6 mm.



Stroke (mm) (stroke between mechanical stoppers)		Outer rail length (mm)	Overall length $L_1$ (mm)	G (mm)	n	Overall main unit mass (kg)	
Type A	Type B					Type A	Type B
30(40.9)	—	100	159	20	2	0.45	—
80(90.9)	35(44.9)	150	209	15	3	0.58	0.66
130(140.9)	85(94.9)	200	259	40	3	0.72	0.8

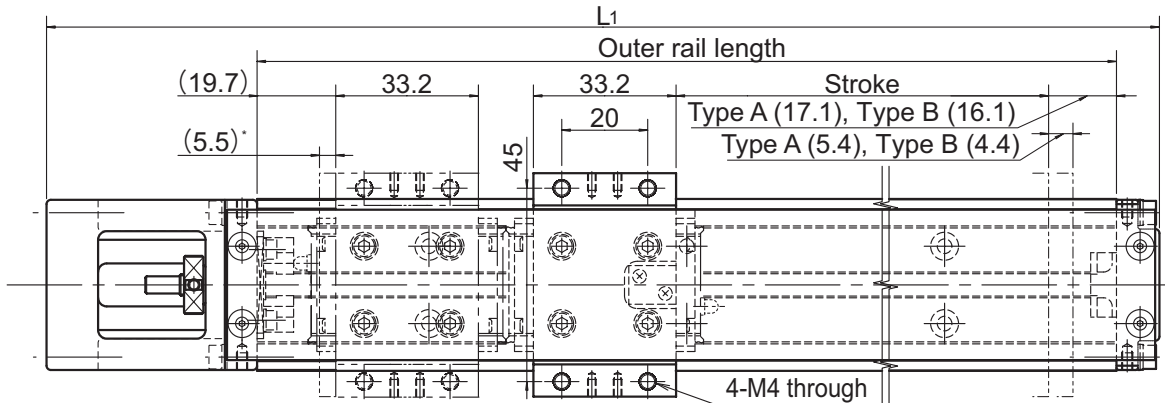
\*Indicates a value when two inner blocks are in close contact with each other.

# Model SKR20 (with a Cover)

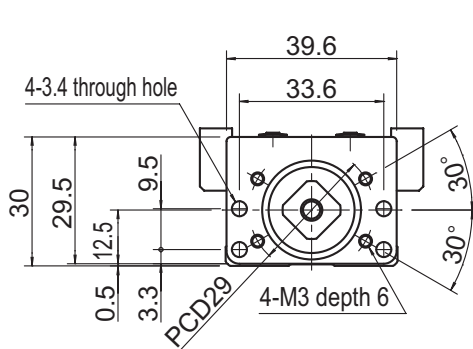
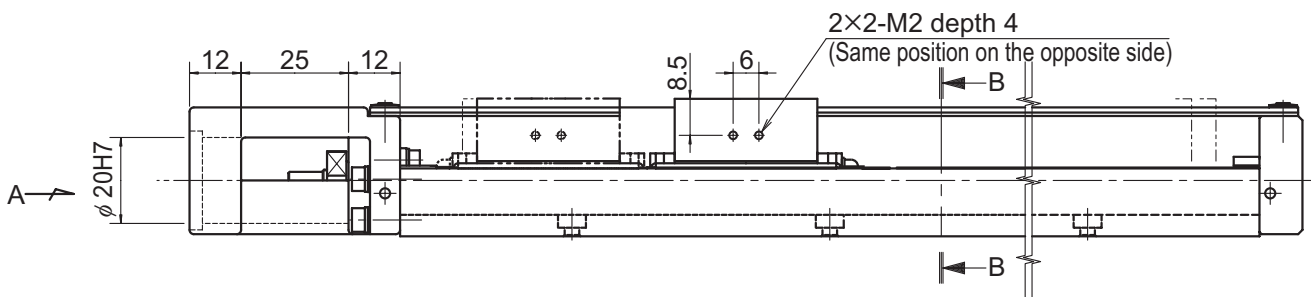
Model SKR20□□A (with a Single Long Nut Block)

Model SKR20□□B (with Two Long Nut Blocks)

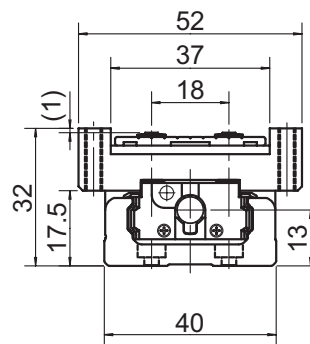
For model number coding, see page23.



\* Distance between the mechanical stopper and the stroke starting position.



A arrow view



B-B cross section

Stroke (mm) (stroke between mechanical stoppers)		Outer rail length (mm)	Overall length $L_1$ (mm)	G (mm)	n	Overall main unit mass (kg)	
Type A	Type B					Type A	Type B
30(40.9)	—	100	159	20	2	0.5	—
80(90.9)	35(44.9)	150	209	15	3	0.64	0.76
130(140.9)	85(94.9)	200	259	40	3	0.79	0.91

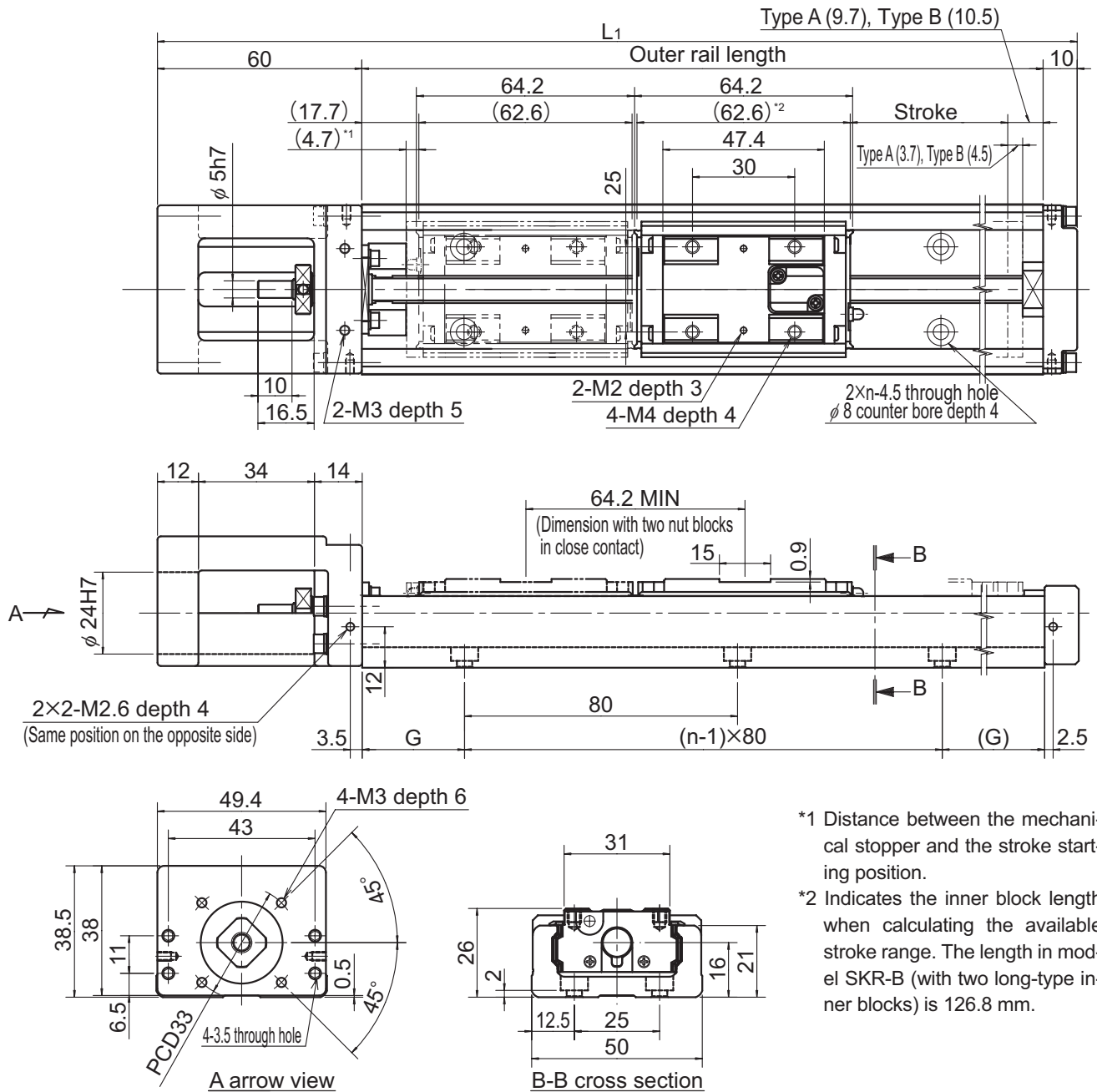
\*Indicates a value when two inner blocks are in close contact with each other.

# Model SKR26 Standard Type

Model SKR26□□A (with a Single Long Nut Block)

Model SKR26□□B (with Two Long Nut Blocks)

For model number coding, see page23.



\*1 Distance between the mechanical stopper and the stroke starting position.

\*2 Indicates the inner block length when calculating the available stroke range. The length in model SKR-B (with two long-type inner blocks) is 126.8 mm.

Stroke (mm) (stroke between mechanical stoppers)		Outer rail length (mm)	Overall length L <sub>1</sub> (mm)	G (mm)	n	Overall main unit mass (kg)	
Type A	Type B <sup>*</sup>					Type A	Type B
60(68.4)	—	150	220	35	2	0.99	—
110(118.4)	45(54.2)	200	270	20	3	1.2	1.38
160(168.4)	95(104.2)	250	320	45	3	1.41	1.59
210(218.4)	145(154.2)	300	370	30	4	1.62	1.8

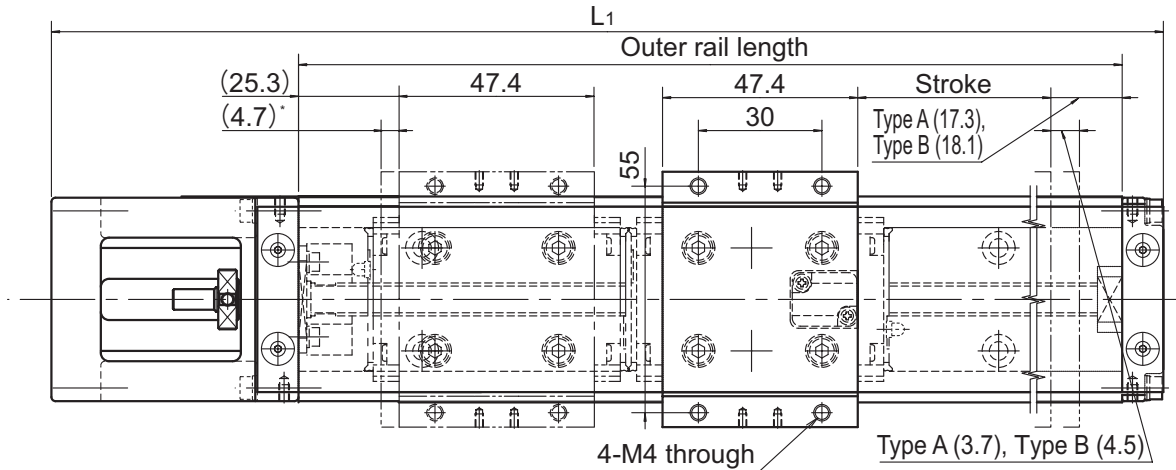
\*Indicates a value when two inner blocks are in close contact with each other.

# Model SKR26 (with a Cover)

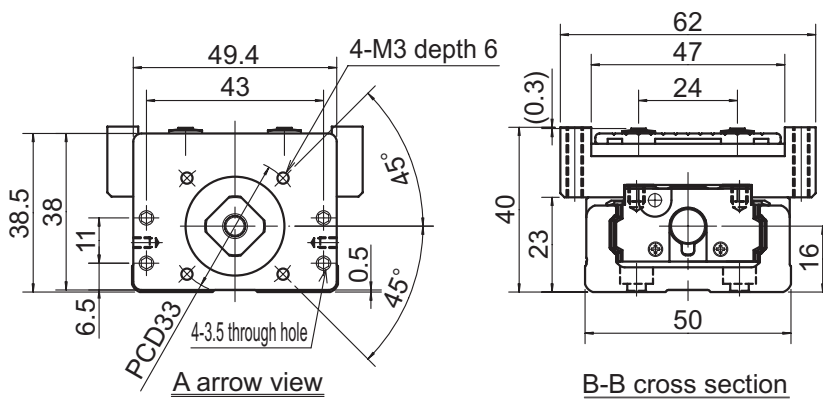
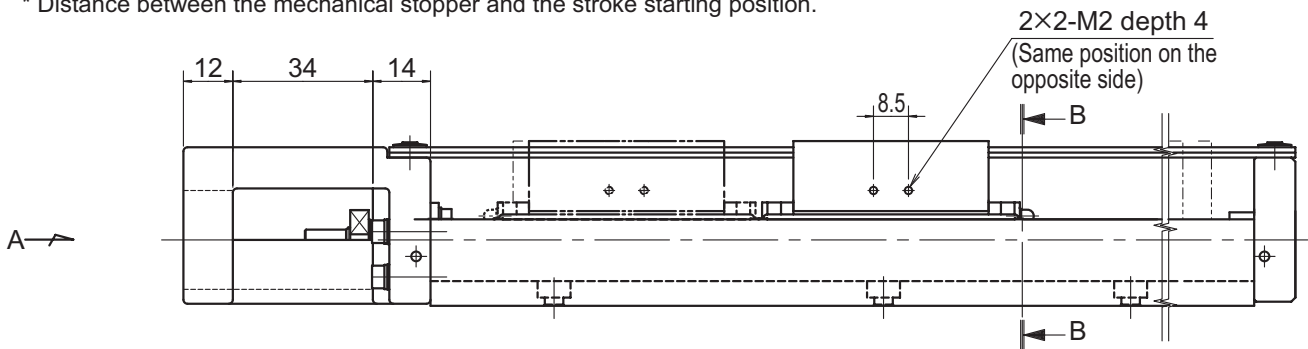
Model SKR26□□A (with a Single Long Nut Block)

Model SKR26□□B (with Two Long Nut Blocks)

For model number coding, see page23.



\* Distance between the mechanical stopper and the stroke starting position.



Stroke (mm) (stroke between mechanical stoppers)		Outer rail length (mm)	Overall length L <sub>1</sub> (mm)	G (mm)	n	Overall main unit mass (kg)	
Type A	Type B					Type A	Type B
60(68.4)	—	150	220	35	2	1.1	—
110(118.4)	45(54.2)	200	270	20	3	1.32	1.57
160(168.4)	95(104.2)	250	320	45	3	1.54	1.79
210(218.4)	145(154.2)	300	370	30	4	1.76	2.01

\*Indicates a value when two inner blocks are in close contact with each other.

Options⇒page38

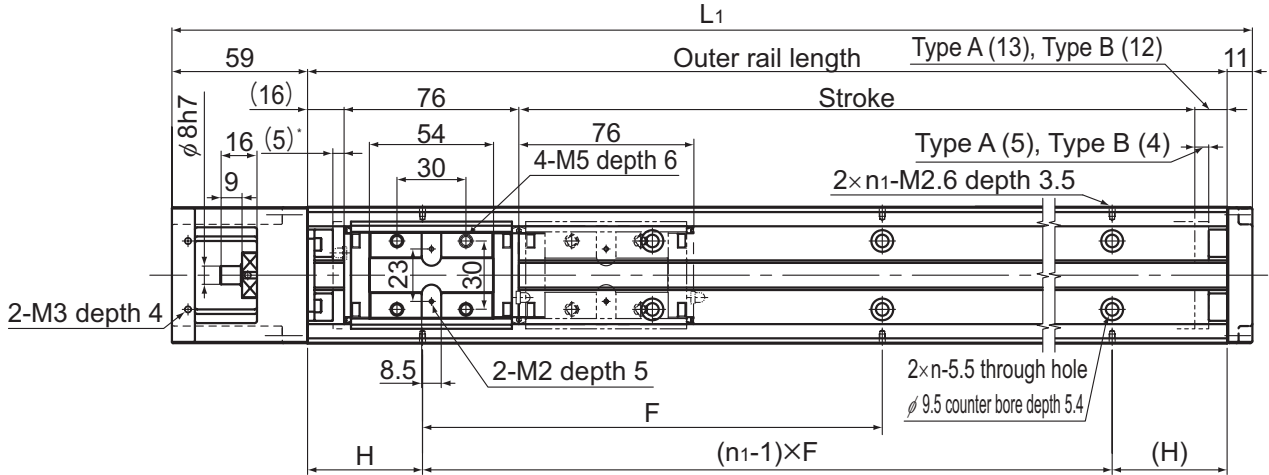


# Model SKR33 Standard Type

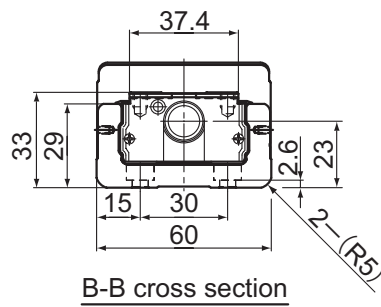
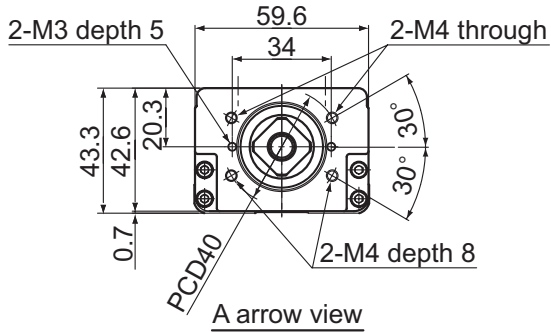
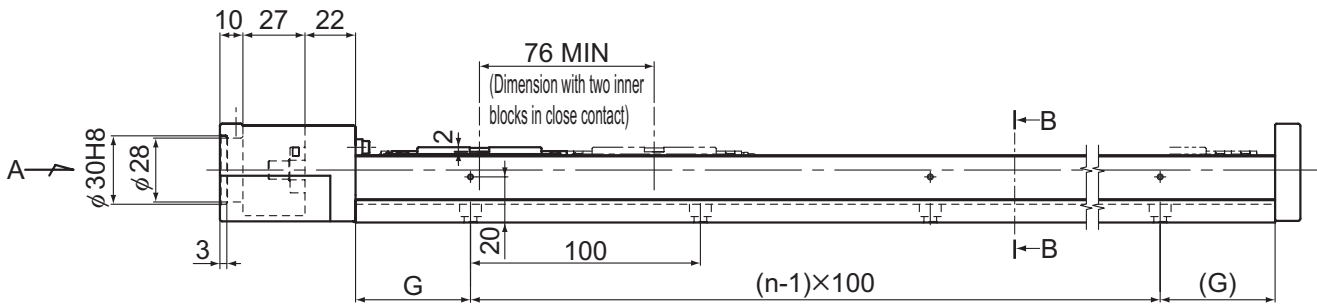
Model SKR33□□A (with a Single Long Nut Block)

Model SKR33□□B (with Two Long Nut Blocks)

For model number coding, see page23.



\* Distance between the mechanical stopper and the stroke starting position.



Stroke (mm) (stroke between mechanical stoppers)		Outer rail length (mm)	Overall length $L_1$ (mm)	H (mm)	G (mm)	F (mm)	n	n <sub>1</sub>	Overall main unit mass (kg)	
Type A	Type B								Type A	Type B
45(55)	—	150	220	25	25	100	2	2	1.7	—
95(105)	—	200	270	50	50	100	2	2	2.1	—
195(205)	120(129)	300	370	50	50	200	3	2	2.8	3.1
295(305)	220(229)	400	470	100	50	200	4	2	3.5	3.8
395(405)	320(329)	500	570	50	50	200	5	3	4.2	4.5
495(505)	420(429)	600	670	100	50	200	6	3	5.0	5.3
595(605)	520(529)	700	770	50	50	200	7	4	5.7	6.0

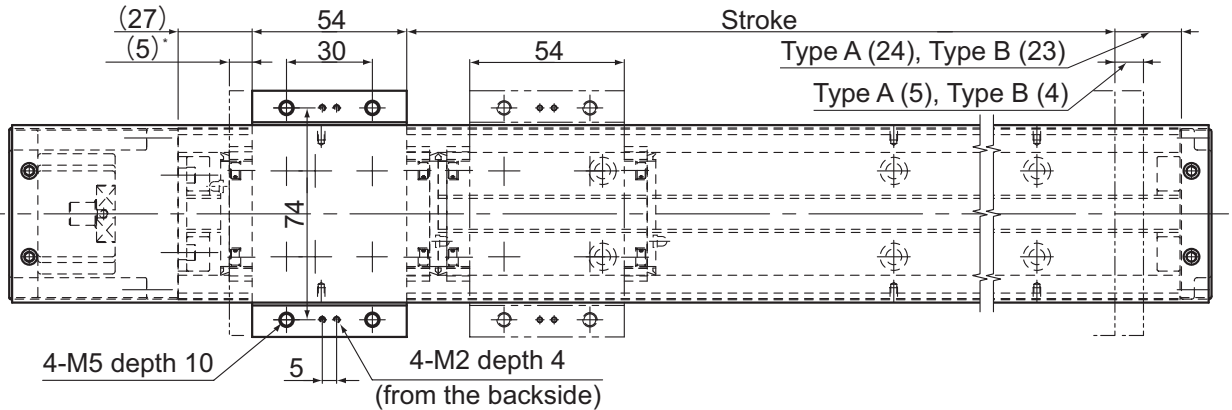
\*Indicates a value when two inner blocks are in close contact with each other.

# Model SKR33 (with a Cover)

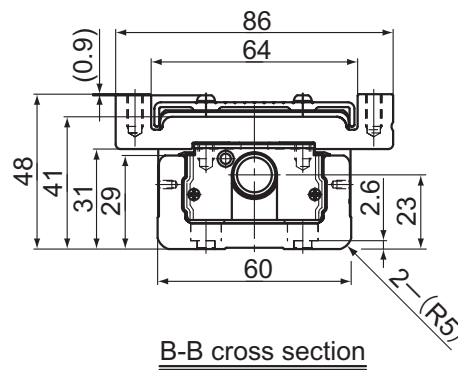
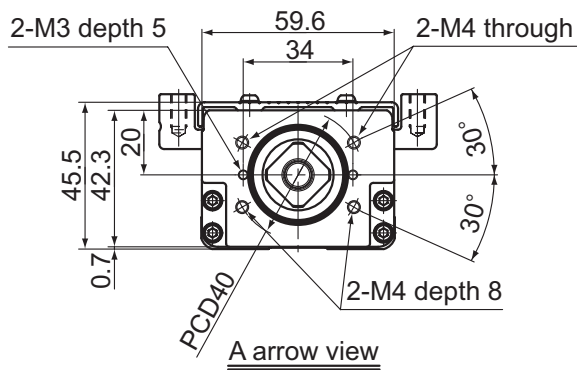
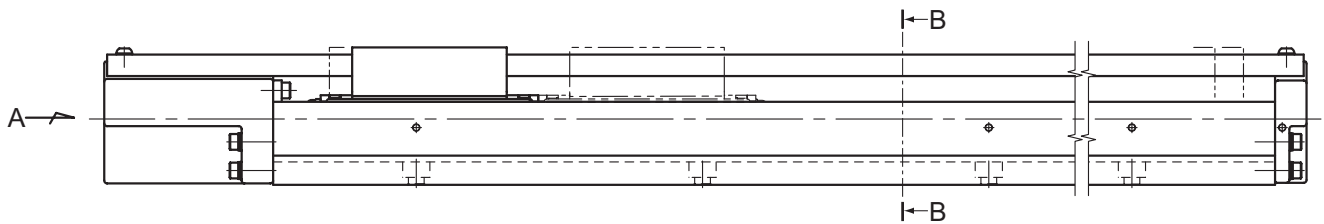
Model SKR33□□A (with a Single Long Nut Block)

Model SKR33□□B (with Two Long Nut Blocks)

For model number coding, see page23.



\* Distance between the mechanical stopper and the stroke starting position.



Stroke (mm) (stroke between mechanical stoppers)		Outer rail length (mm)	Overall length L (mm)	H (mm)	G (mm)	F (mm)	n	n <sub>1</sub>	Overall main unit mass (kg)	
Type A	Type B								Type A	Type B
45(55)	—	150	220	25	25	100	2	2	1.9	—
95(105)	—	200	270	50	50	100	2	2	2.3	—
195(205)	120(129)	300	370	50	50	200	3	2	3.1	3.5
295(305)	220(229)	400	470	100	50	200	4	2	3.8	4.2
395(405)	320(329)	500	570	50	50	200	5	3	4.6	5.0
495(505)	420(429)	600	670	100	50	200	6	3	5.3	5.7
595(605)	520(529)	700	770	50	50	200	7	4	6.1	6.5

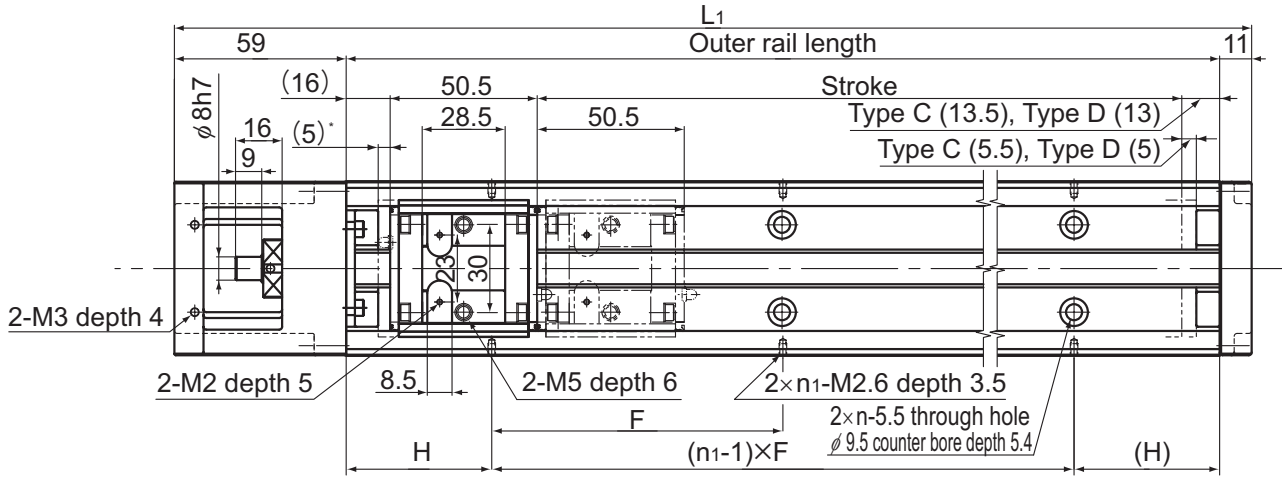
\*Indicates a value when two inner blocks are in close contact with each other.

# Model SKR33 Standard Type

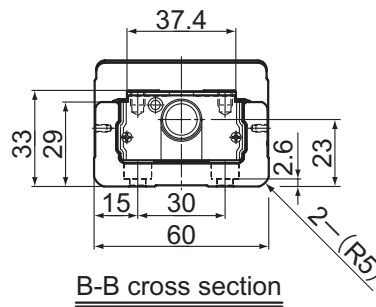
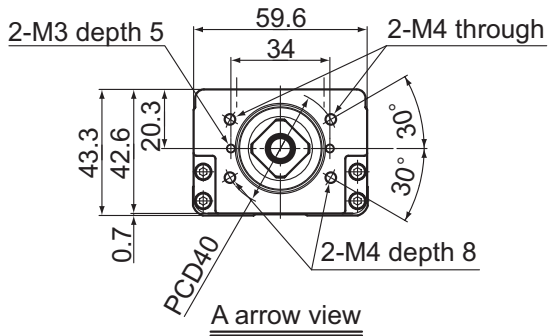
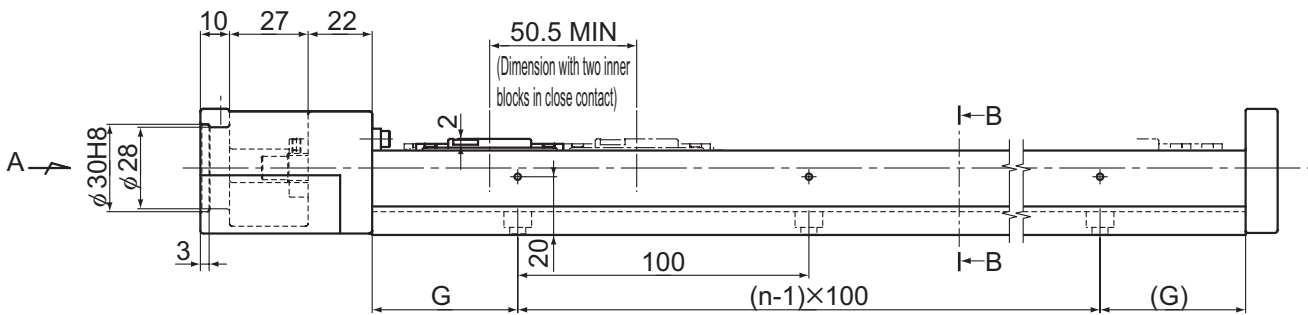
Model SKR33□□C (with a Single Short Nut Block)

Model SKR33□□D (with Two Short Nut Blocks)

For model number coding, see page23.



\* Distance between the mechanical stopper and the stroke starting position.



Stroke (mm) (stroke between mechanical stoppers)		Outer rail length (mm)	Overall length $L_1$ (mm)	H (mm)	G (mm)	F (mm)	n	$n_1$	Overall main unit mass (kg)	
Type C	Type D								Type C	Type D
70(80.5)	20(30)	150	220	25	25	100	2	2	1.6	1.8
120(130.5)	70(80)	200	270	50	50	100	2	2	2.0	2.1
220(230.5)	170(180)	300	370	50	50	200	3	2	2.7	2.8
320(330.5)	270(280)	400	470	100	50	200	4	2	3.4	3.6
420(430.5)	370(380)	500	570	50	50	200	5	3	4.1	4.3
520(530.5)	470(480)	600	670	100	50	200	6	3	4.8	5.0
620(630.5)	570(580)	700	770	50	50	200	7	4	5.5	5.7

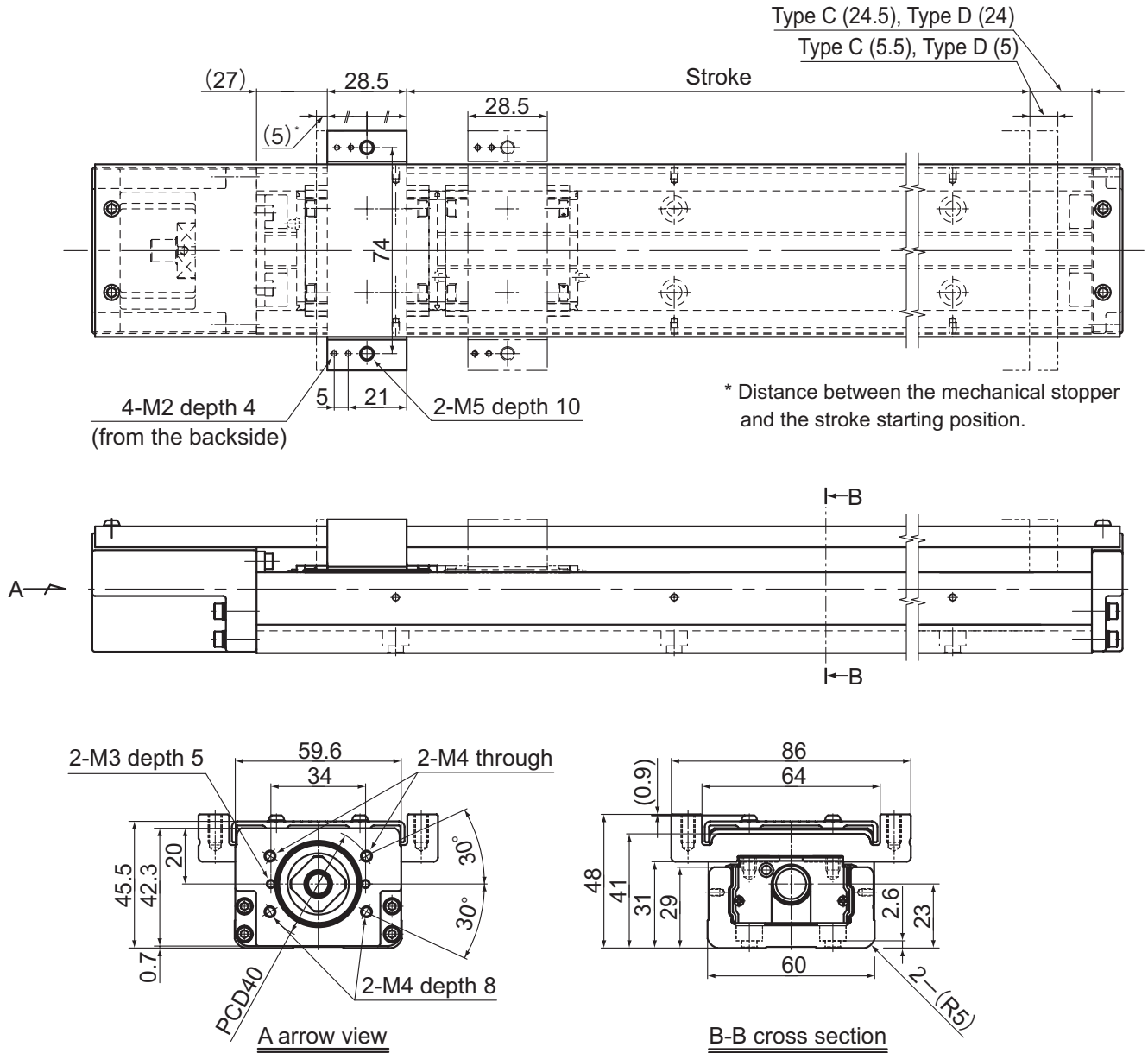
\*Indicates a value when two inner blocks are in close contact with each other.

# Model SKR33 (with a Cover)

Model SKR33□□C (with a Single Short Nut Block)

Model SKR33□□D (with Two Short Nut Blocks)

For model number coding, see page23.



Stroke (mm) (stroke between mechanical stoppers)		Outer rail length (mm)	Overall length L <sub>1</sub> (mm)	H (mm)	G (mm)	F (mm)	n	n <sub>1</sub>	Overall main unit mass (kg)	
Type C	Type D								Type C	Type D
70(80.5)	20(30)	150	220	25	25	100	2	2	1.8	2.0
120(130.5)	70(80)	200	270	50	50	100	2	2	2.2	2.3
220(230.5)	170(180)	300	370	50	50	200	3	2	2.9	3.1
320(330.5)	270(280)	400	470	100	50	200	4	2	3.7	3.8
420(430.5)	370(380)	500	570	50	50	200	5	3	4.4	4.6
520(530.5)	470(480)	600	670	100	50	200	6	3	5.2	5.3
620(630.5)	570(580)	700	770	50	50	200	7	4	5.9	6.1

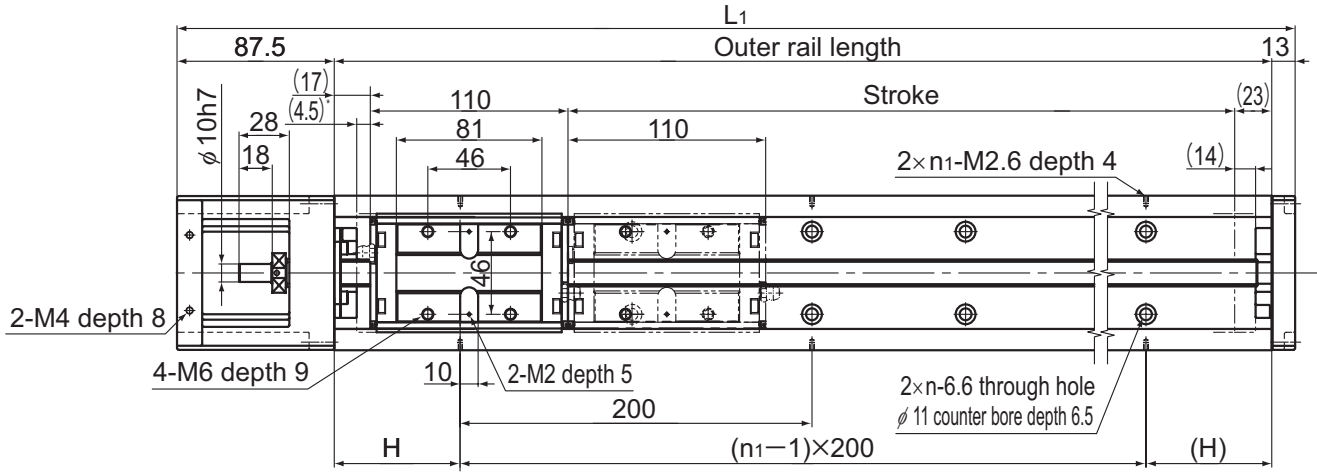
\*Indicates a value when two inner blocks are in close contact with each other.

# Model SKR46 Standard Type

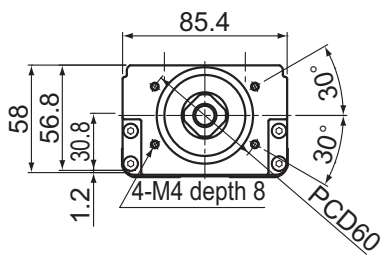
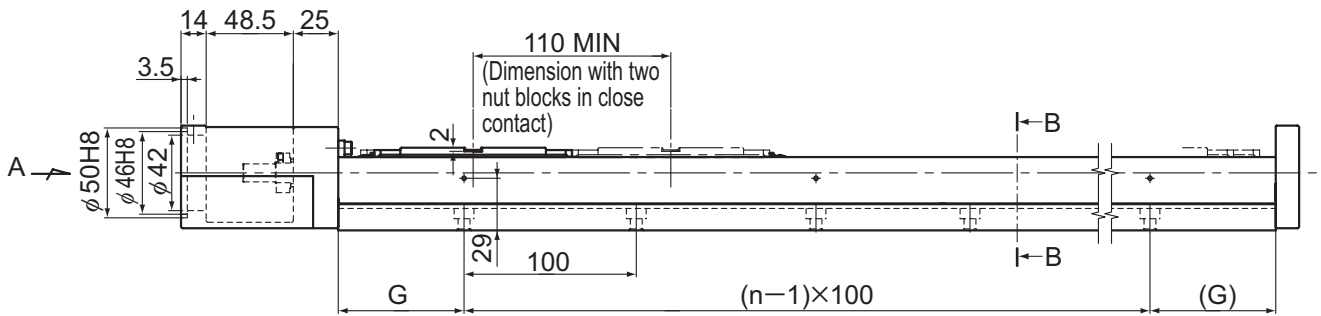
Model SKR46□□A (with a Single Long Nut Block)

Model SKR46□□B (with Two Long Nut Blocks)

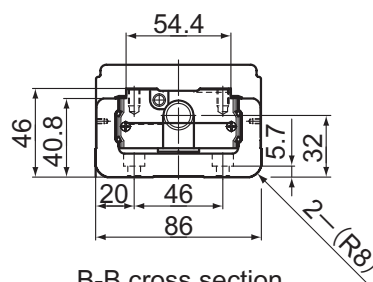
For model number coding, see page23.



\* Distance between the mechanical stopper and the stroke starting position.



A arrow view



B-B cross section

Stroke (mm) (stroke between mechanical stoppers)		Outer rail length (mm)	Overall length $L_1$ (mm)	H (mm)	G (mm)	n	$n_1$	Overall main unit mass (kg)	
Type A	Type B*							Type A	Type B
190(208.5)	80(98.5)	340	440.5	70	70	3	2	6.4	7.4
290(308.5)	180(198.5)	440	540.5	20	70	4	3	7.8	8.7
390(408.5)	280(298.5)	540	640.5	70	70	5	3	9.2	10.1
490(508.5)	380(398.5)	640	740.5	20	70	6	4	10.6	11.5
590(608.5)	480(498.5)	740	840.5	70	70	7	4	12.0	12.9
690(708.5)	580(598.5)	840	940.5	20	70	8	5	13.4	14.4
790(808.5)	680(698.5)	940	1040.5	70	70	9	5	14.8	15.7

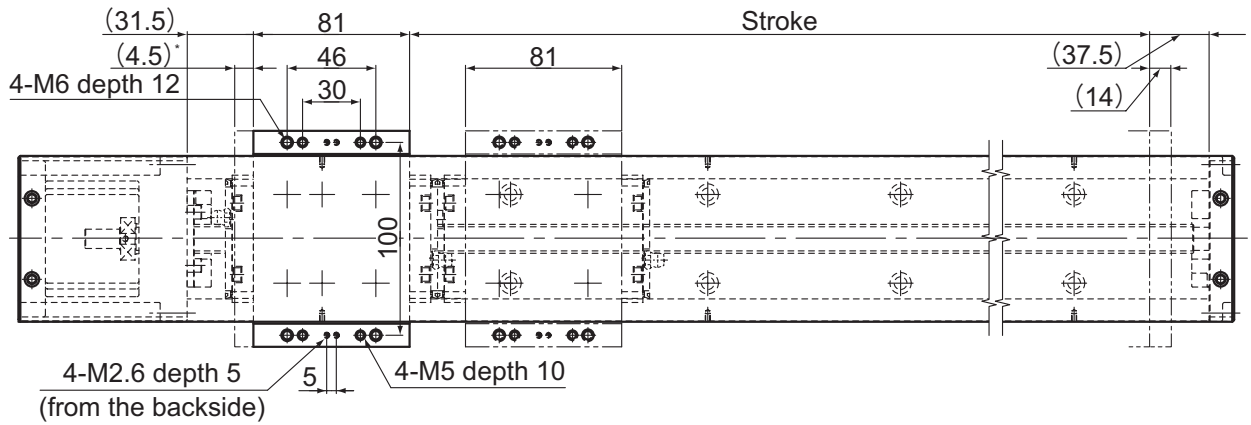
\*Indicates a value when two inner blocks are in close contact with each other.

# Model SKR46 (with a Cover)

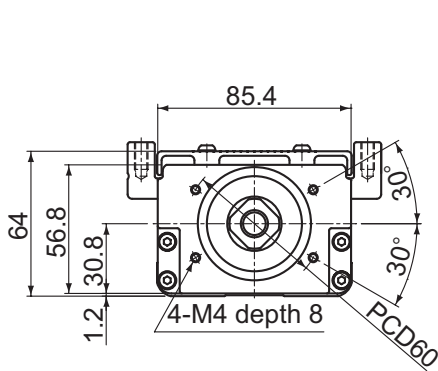
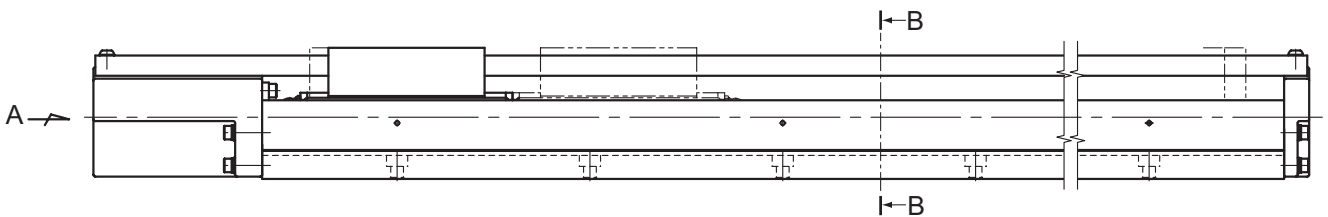
Model SKR46□□A (with a Single Long Nut Block)

Model SKR46□□B (with Two Long Nut Blocks)

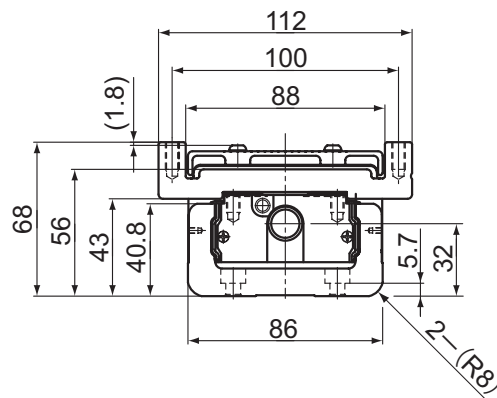
For model number coding, see page23.



\* Distance between the mechanical stopper and the stroke starting position.



A arrow view



B-B cross section

Stroke (mm) (stroke between mechanical stoppers)		Outer rail length (mm)	Overall length L <sub>1</sub> (mm)	H (mm)	G (mm)	n	n <sub>1</sub>	Overall main unit mass (kg)	
Type A	Type B							Type A	Type B
190(208.5)	80(98.5)	340	440.5	70	70	3	2	7.1	8.3
290(308.5)	180(198.5)	440	540.5	20	70	4	3	8.6	9.8
390(408.5)	280(298.5)	540	640.5	70	70	5	3	10.0	11.3
490(508.5)	380(398.5)	640	740.5	20	70	6	4	11.5	12.7
590(608.5)	480(498.5)	740	840.5	70	70	7	4	13.0	14.2
690(708.5)	580(598.5)	840	940.5	20	70	8	5	14.5	15.7
790(808.5)	680(698.5)	940	1040.5	70	70	9	5	16.0	17.2

\*Indicates a value when two inner blocks are in close contact with each other.

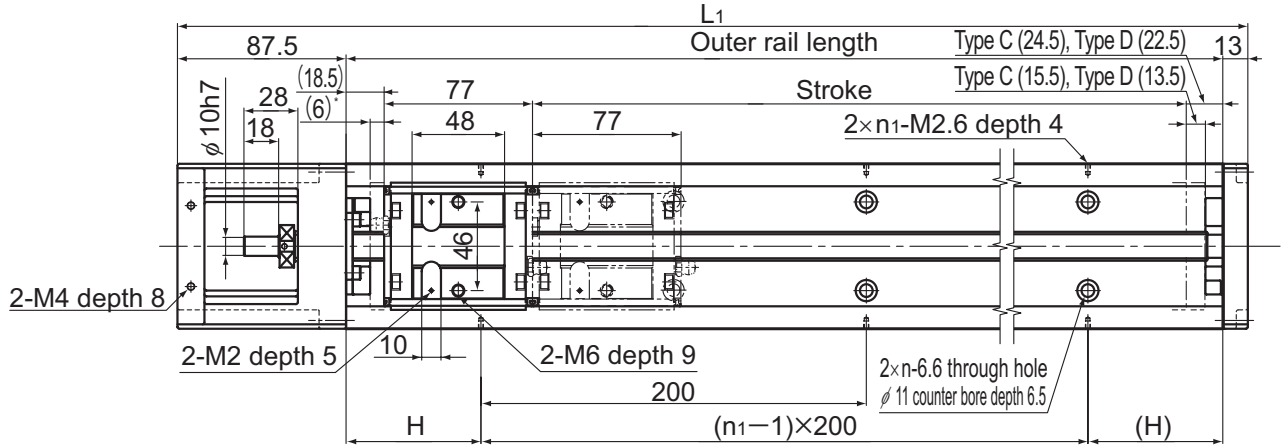
Options⇒page38

# Model SKR46 Standard Type

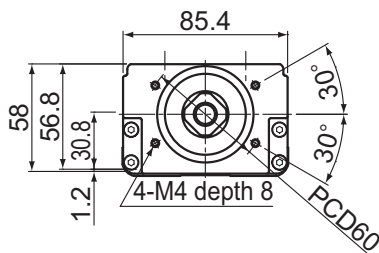
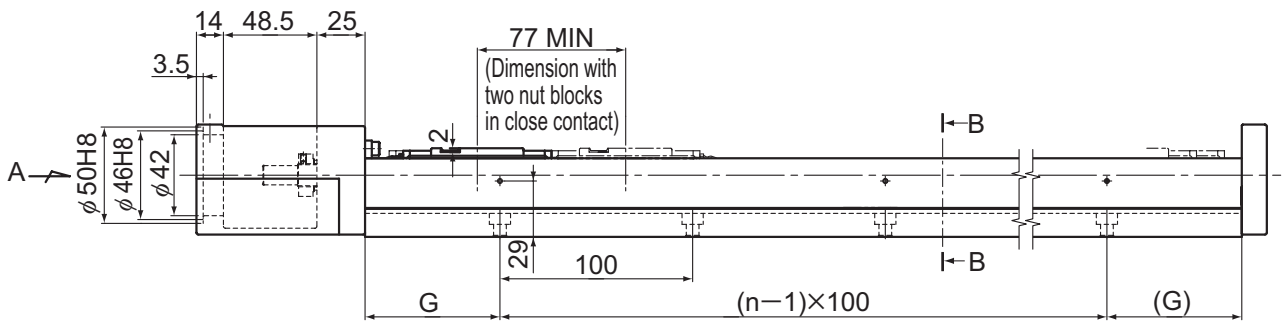
Model SKR46□□C (with a Single Short Nut Block)

Model SKR46□□D (with Two Short Nut Blocks)

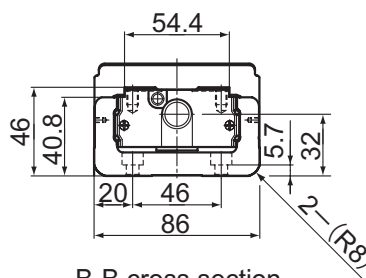
For model number coding, see page23.



\* Distance between the mechanical stopper and the stroke starting position.



A arrow view



B-B cross section

Stroke (mm) (stroke between mechanical stoppers)		Outer rail length (mm)	Overall length L <sub>1</sub> (mm)	H (mm)	G (mm)	n	n <sub>1</sub>	Overall main unit mass (kg)	
Type C	Type D							Type C	Type D
220(241.5)	145(164.5)	340	440.5	70	70	3	2	6.1	6.7
320(341.5)	245(264.5)	440	540.5	20	70	4	3	7.5	8.1
420(441.5)	345(364.5)	540	640.5	70	70	5	3	8.9	9.5
520(541.5)	445(464.5)	640	740.5	20	70	6	4	10.3	10.8
620(641.5)	545(564.5)	740	840.5	70	70	7	4	11.7	12.2
720(741.5)	645(664.5)	840	940.5	20	70	8	5	13.1	13.7
820(841.5)	745(764.5)	940	1040.5	70	70	9	5	14.5	15.0

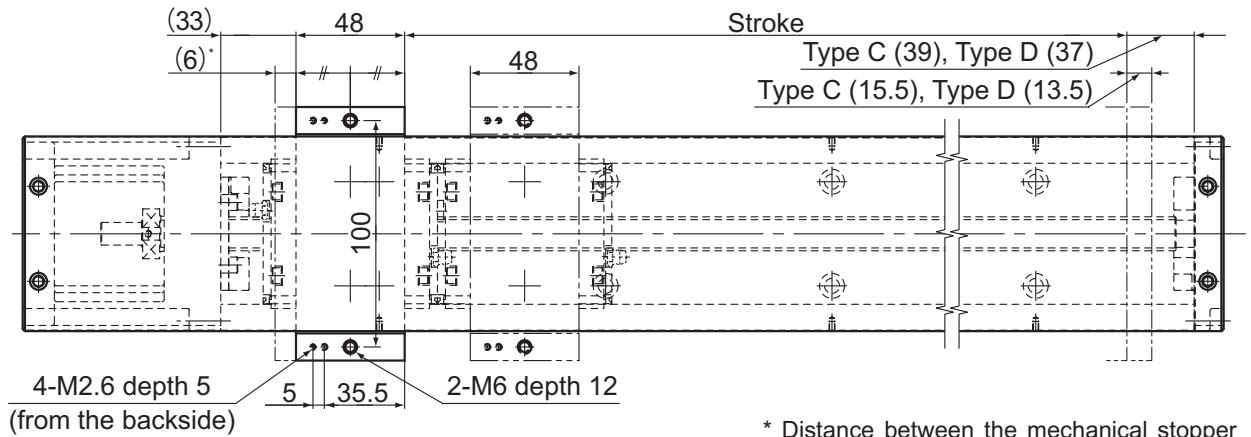
\*Indicates a value when two inner blocks are in close contact with each other.

# Model SKR46 (with a Cover)

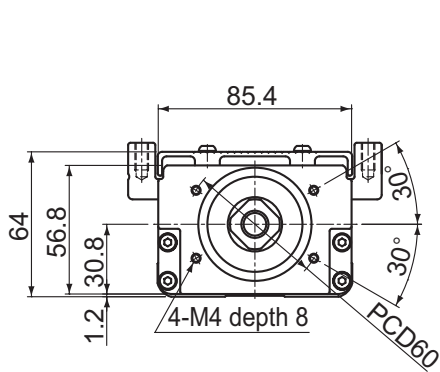
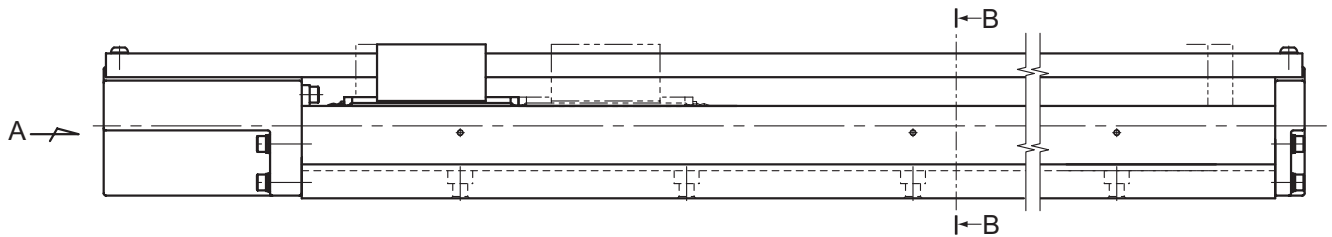
Model SKR46□□C (with a Single Short Nut Block)

Model SKR46□□D (with Two Short Nut Blocks)

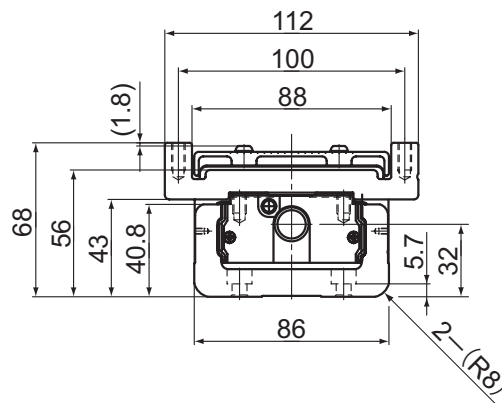
For model number coding, see page23.



\* Distance between the mechanical stopper and the stroke starting position.



A arrow view



B-B cross section

Stroke (mm) (stroke between mechanical stoppers)		Outer rail length (mm)	Overall length L <sub>1</sub> (mm)	H (mm)	G (mm)	n	n <sub>1</sub>	Overall main unit mass (kg)	
Type C	Type D							Type C	Type D
220(241.5)	145(164.5)	340	440.5	70	70	3	2	6.6	7.4
320(341.5)	245(264.5)	440	540.5	20	70	4	3	8.1	8.9
420(441.5)	345(364.5)	540	640.5	70	70	5	3	9.6	10.3
520(541.5)	445(464.5)	640	740.5	20	70	6	4	11.0	11.8
620(641.5)	545(564.5)	740	840.5	70	70	7	4	12.5	13.3
720(741.5)	645(664.5)	840	940.5	20	70	8	5	14	14.8
820(841.5)	745(764.5)	940	1040.5	70	70	9	5	15.5	16.3

\*Indicates a value when two inner blocks are in close contact with each other.

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## Mass of Moving Element

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Table14 shows the mass of the inner block and top table of model SKR.

Table14 Mass of the Inner Block and Top table of SKR

Unit: kg

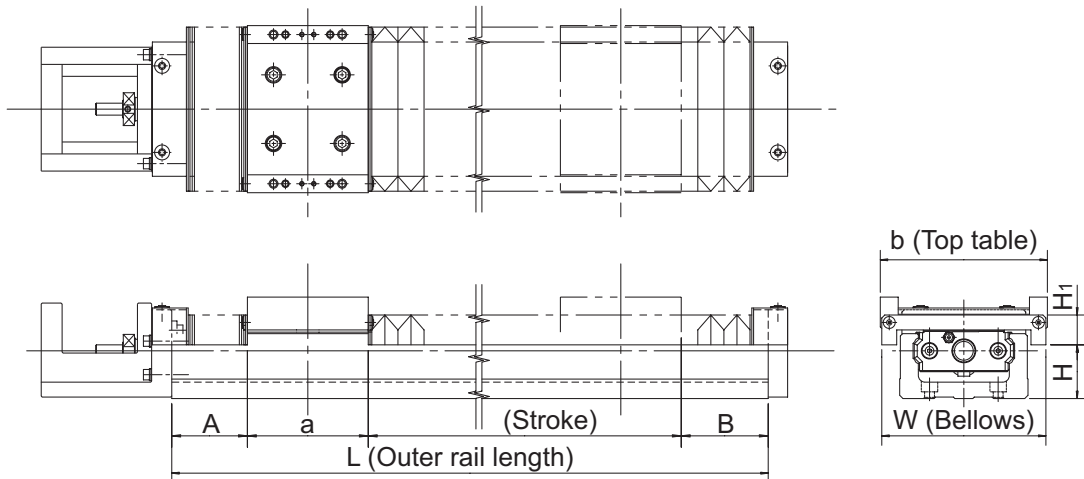
Model No.	Long nut block types (A)		Short nut block types (C)	
	Inner block	Top table	Inner block	Top table
SKR20	0.064	0.038	—	—
SKR26	0.153	0.074	—	—
SKR33	0.31	0.13	0.17	0.07
SKR46	0.91	0.34	0.57	0.20

# Options

## Bellows

For model SKR, bellows are available for contamination protection in addition to a cover.

### [Model SKR-A (with a Single Long Nut Block)]

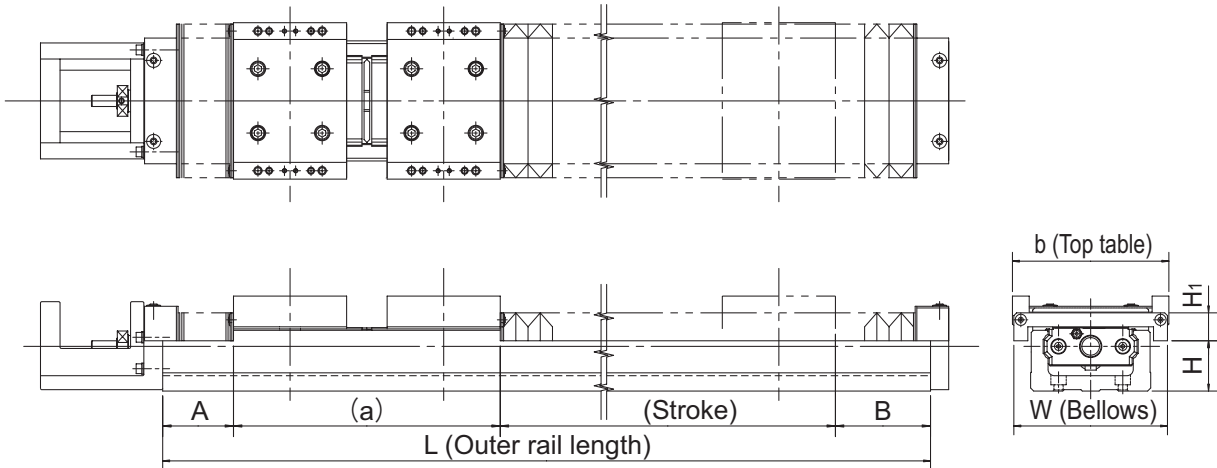


Unit: mm

Model No.	Stroke <sup>*1</sup>	Outer rail length L	A	B	a	b	W	H	H <sub>1</sub>
SKR20	20(30.8)	100	18.8	17.2	33.2	52	60	10	20
	55(67.8)	150	25.3	23.7					
	80(93.6)	200	37	36.2					
SKR26	50(60.7)	150	23.7	17.6	47.4	62	74	18	20
	80(91.6)	200	32.8	28.2					
	110(125.6)	250	40.8	36.2					
	160(175.6)	300	40.8	36.2					
SKR33	30(42.8)	150	25.6	27.6	54	86	84	24.5	20
	60(72.8)	200	35.6	37.6					
	140(152.8)	300	45.6	47.6					
	210(222.8)	400	60.6	62.6					
	290(302.8)	500	70.6	72.6					
	360(372.8)	600	85.6	87.6					
SKR46	140(155.8)	340	52.1	51.1	81	112	110	36	20
	210(225.8)	440	67.1	66.1					
	290(305.8)	540	77.1	76.1					
	360(375.8)	640	92.1	91.1					
	440(455.8)	740	102.1	101.1					
	510(525.8)	840	117.1	116.1					
	590(605.8)	940	127.1	126.1					

\*1 The value in the parentheses represents the maximum stroke.

[Model SKR-B (with Two Long Nut Blocks)]



Unit: mm

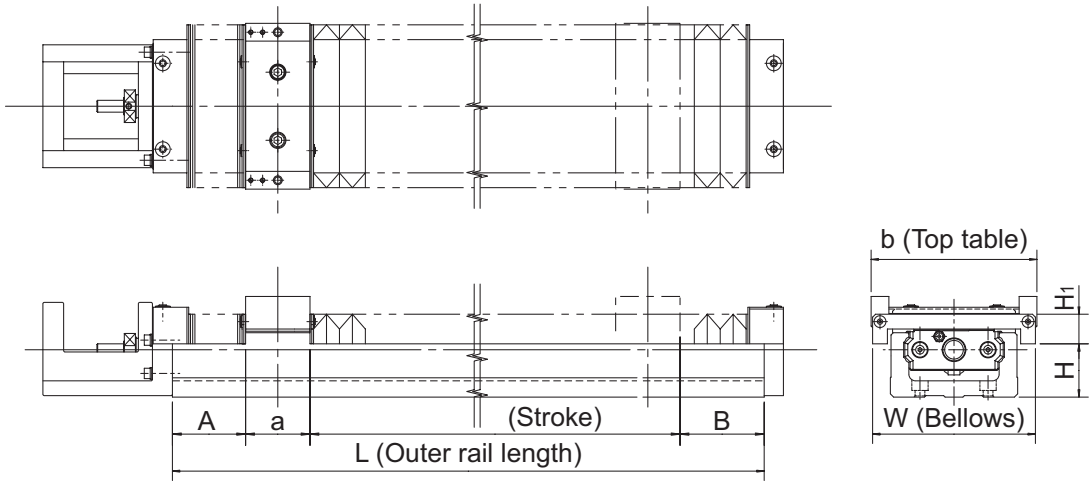
Model No.	Stroke <sup>*1,2</sup>	Outer rail length L	A	B	a	b	W	H	H <sub>1</sub>																																																																				
SKR20	25(34.8)	150	18.8	17.2	79.2	52	60	10	20																																																																				
	60(71.8)	200	25.3	23.7						SKR26	35(46.5)	200	23.7	17.6	111.6	62	74	18	20	65(77.4)	250	32.8	28.2	115(127.4)	300	32.8	28.2	SKR33	80(96.8)	300	35.6	37.6	130	86	84	24.5	20	150(166.8)	400	50.6	52.6	230(246.8)	500	60.6	62.6	300(316.8)	600	75.6	77.6	SKR46	60(75.8)	340	37.1	36.1	191	112	110	36	20	130(145.8)	440	52.1	51.1	210(225.8)	540	62.1	61.1	280(295.8)	640	77.1	76.1	360(375.8)	740	87.1	86.1	430(445.8)	840
SKR26	35(46.5)	200	23.7	17.6	111.6	62	74	18	20																																																																				
	65(77.4)	250	32.8	28.2																																																																									
	115(127.4)	300	32.8	28.2																																																																									
SKR33	80(96.8)	300	35.6	37.6	130	86	84	24.5	20																																																																				
	150(166.8)	400	50.6	52.6																																																																									
	230(246.8)	500	60.6	62.6																																																																									
	300(316.8)	600	75.6	77.6																																																																									
SKR46	60(75.8)	340	37.1	36.1	191	112	110	36	20																																																																				
	130(145.8)	440	52.1	51.1																																																																									
	210(225.8)	540	62.1	61.1																																																																									
	280(295.8)	640	77.1	76.1																																																																									
	360(375.8)	740	87.1	86.1																																																																									
	430(445.8)	840	102.1	101.1																																																																									
	510(525.8)	940	112.1	111.1																																																																									

\*1 The strokes in the table are values when the blocks are in close contact with each other.

\*2 The value in the parentheses represents the maximum stroke.

Note) The bellows cannot be attached between the top tables.

[Model SKR-C (with a Single Short Nut Block)]

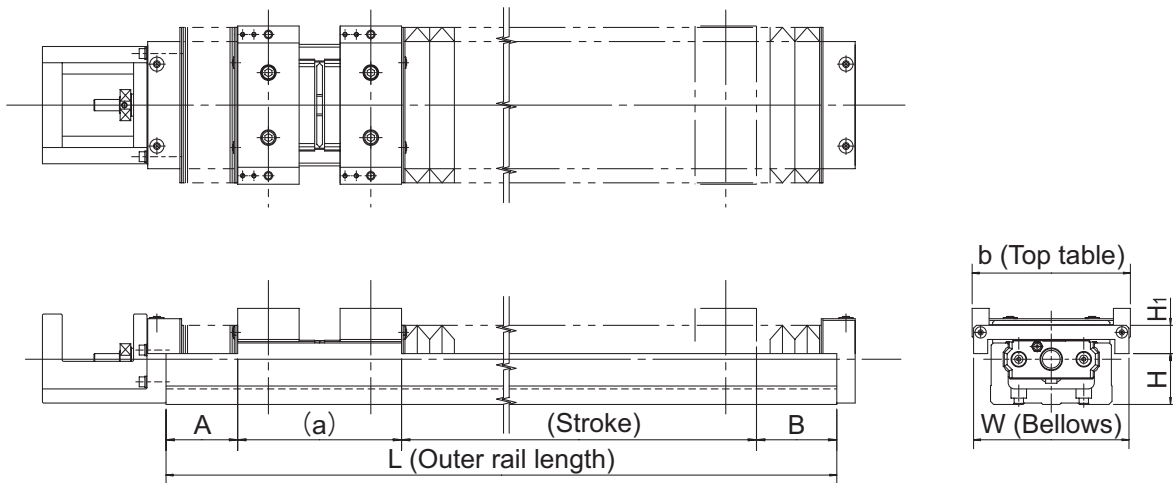


Unit: mm

Model No.	Stroke*	Outer rail length L	A	B	a	b	W	H	H <sub>1</sub>
SKR33	45(58.3)	150	30.6	32.6	28.5	80	80	21.5	17.5
	85(98.3)	200	35.6	37.6					
	155(168.3)	300	50.6	52.6					
	235(248.3)	400	60.6	62.6					
	305(318.3)	500	75.6	77.6					
	385(398.3)	600	85.6	87.6					
SKR46	160(178.8)	340	57.1	56.1	48	112	110	36	20
	230(248.8)	440	72.1	71.1					
	310(328.8)	540	82.1	81.1					
	380(398.8)	640	97.1	96.1					
	460(478.8)	740	107.1	106.1					
	530(548.8)	840	122.1	121.1					
	610(628.8)	940	132.1	131.1					

\*The value in the parentheses represents the maximum stroke.

[Model SKR-D (with Two Short Nut Blocks)]



Unit: mm

Model No.	Stroke <sup>*1,*2</sup>	Outer rail length L	A	B	a	b	W	H	H <sub>1</sub>
SKR33	45(57.8)	200	30.6	32.6	79	86	84	24.5	20
	125(137.8)	300	40.6	42.6					
	195(207.8)	400	55.6	57.6					
	275(287.8)	500	65.6	67.6					
	345(357.8)	600	80.6	82.6					
SKR46	110(121.8)	340	47.1	46.1	125	112	110	36	20
	180(191.8)	440	62.1	61.1					
	260(271.8)	540	72.1	71.1					
	330(341.8)	640	87.1	86.1					
	410(421.8)	740	97.1	96.1					
	480(491.8)	840	112.1	111.1					
	560(571.8)	940	122.1	121.1					

\*1 The strokes in the table are values when the blocks are in close contact with each other.

\*2 The value in the parentheses represents the maximum stroke.

Note) The bellows cannot be attached between the top tables.

## Sensor

Optional proximity sensors and photo sensors are available for model SKR. Models equipped with a sensor are also provided with a dedicated sensor rail/sensor dog.

If the stroke is less than 70 mm, 2 sensor flag and 2 sensor rail will be attached.

### [Example of Installation]

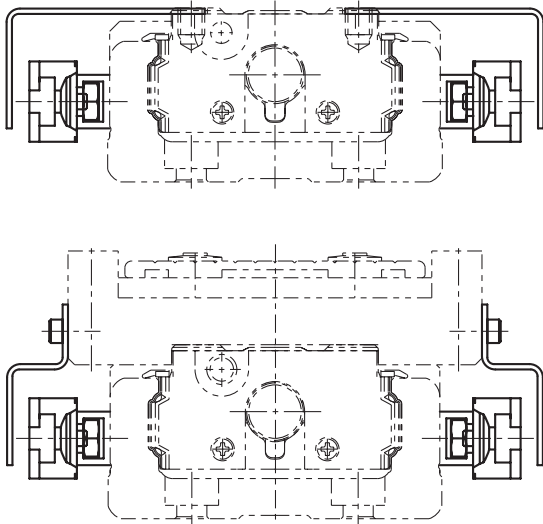


Table15 With/without a sensor

Symbol	Description	Type	Accessory
0	None	—	—
1	With sensor rail	—	Mounting screws, sensor rail
2	Photo Sensor* [3 units]	EE-SX671 (Omron Corp.)	Mounting screw/nut, detecting plate, sensor rail, mounting plate, connector (EE-1001)
6	Photo Sensor* [3 units]	EE-SX674 (Omron Corp.)	Mounting screw/nut, detecting plate, sensor rail, mounting plate, connector (EE-1001)
7	Proximity Sensor N.O. contact [3 units]	APM-D3A1-001 (Azbil Corp.)	Mounting screw/nut, detecting plate, sensor rail
B	Proximity Sensor N.C. contact [3 units]	APM-D3B1-003 (Azbil Corp.)	Mounting screw/nut, detecting plate, sensor rail
E	Proximity Sensor N.O. contact [1 unit] N.C. contact [2 units]	APM-D3A1-001 APM-D3B1-003 (Azbil Corp.)	Mounting screw/nut, detecting plate, sensor rail
H	Proximity Sensor N.O. contact [3 units]	GX-F12A (Panasonic Industrial Devices SUNX Co., Ltd.)	Mounting screw/nut, detecting plate, sensor rail
L	Proximity Sensor N.C. contact [3 units]	GX-F12B (Panasonic Industrial Devices SUNX Co., Ltd.)	Mounting screw/nut, detecting plate, sensor rail
J	Proximity Sensor N.O. contact [1 unit] N.C. contact [2 units]	GX-F12A GX-F12B (Panasonic Industrial Devices SUNX Co., Ltd.)	Mounting screw/nut, detecting plate, sensor rail
M	Proximity Sensor N.O. contact [1 unit] N.C. contact [2 units]	GX-F12A-P GX-F12B-P (Panasonic Industrial Devices SUNX Co., Ltd.)	Mounting screw/nut, detecting plate, sensor rail

N.O. contact: normally open contact

N.C. contact: normally closed contact

\*The photo-sensors can be switched between ON when lit and ON when unlit.

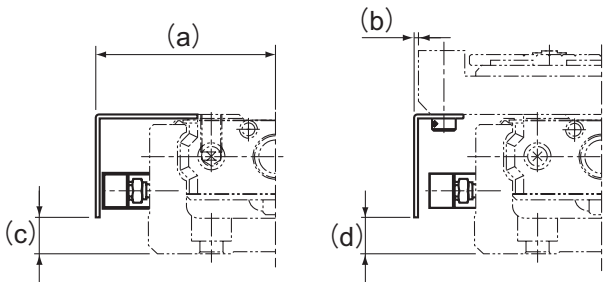
**[Proximity Sensor]**

APM-D3A1-001 (Azbil Corp.) 3 units  
 APM-D3B1-003 (Azbil Corp.) 3 units  
 GX-F12A (Panasonic Industrial Devices SUNX Co., Ltd.) 3 units

GX-F12B (Panasonic Industrial Devices SUNX Co., Ltd.) 3 units  
 GX-F12A-P (Panasonic Industrial Devices SUNX Co., Ltd.) 3 units  
 GX-F12B-P (Panasonic Industrial Devices SUNX Co., Ltd.) 3 units

● Proximity Sensor: APM-D3A1-001 APM-D3B1-003 (Azbil Corp.)

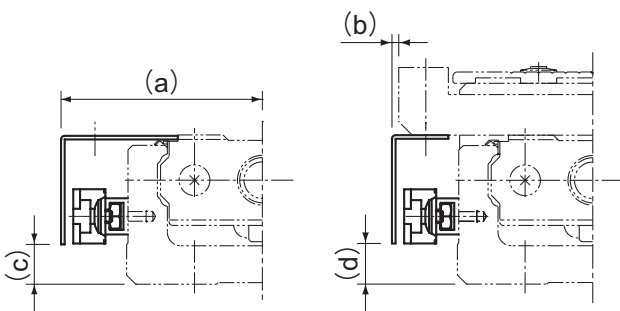
Unit: mm



Model No.	a	b	c	d
SKR20	32.5	6.6	6	6
SKR26	37.5	6.4	8	8
SKR33	43	0.3	14.8	15
SKR46	56.2	0.2	26.8	22

● Proximity sensor GX-F12A GX-F12B GX-F12A-P GX-F12B-P (Panasonic Industrial Devices SUNX Co., Ltd.)

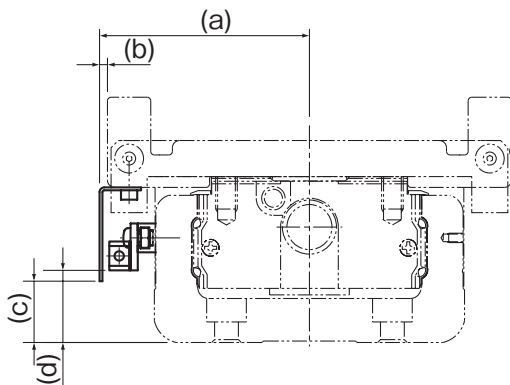
Unit: mm



Model No.	a	b	c	d
SKR20	34	8.1	3.6	4
SKR26	39	7.9	6	6
SKR33	44.7	2	13.8	15
SKR46	57.7	1.8	24.8	22

● Proximity Sensor (with Bellows)

Unit: mm



Model No.	a	b	c	d	Sensor type
SKR33	47	4	8	6	GX-F12 (Panasonic Industrial Devices SUNX Co., Ltd.)
SKR46	59.8	3.8	15	15	
SKR33	45.3	2.3	10	11	APM-D3 (Azbil Corp.)
SKR46	56.2	0.2	22	25	

[Photo Sensor]

EE-SX671 (Omron Corp.) 3 units

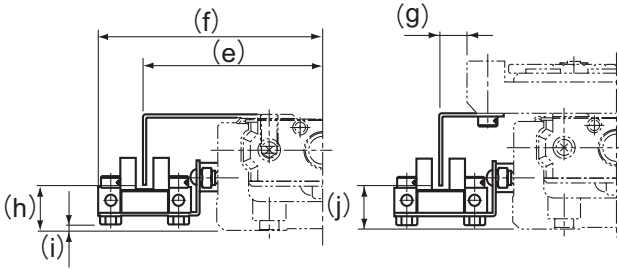
EE-SX674 (Omron Corp.) 3 units

Connector EE-1001 (Omron Corp.) 3 units

Note) The connector is an appended article.

● Photo Sensor: EE-SX671 (Omron Corp.)

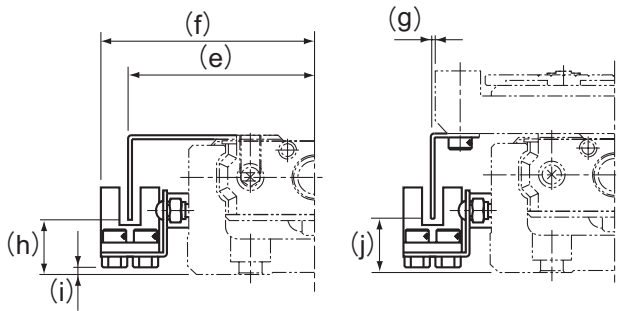
Unit: mm



Model No.	e	f	g	h	i	j
SKR20	41	53.8	15	9.4	0.9	9.5
SKR26	45.9	58.7	14.9	11.4	2.9	11.5
SKR33	51.1	63.6	8.3	18.8	7.4	19.5
SKR46	64.1	76.6	8.3	29.8	16.4	26.5

● Photo Sensor: EE-SX674 (Omron Corp.)

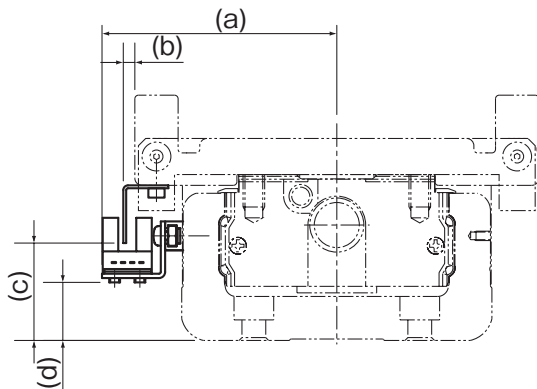
Unit: mm



Model No.	e	f	g	h	i	j
SKR20	38.3	44.8	12.5	10.9	0.6	11
SKR26	43.3	49.7	12.5	12.9	2.6	13
SKR33	45.9	52.1	3.3	17.8	7.1	20
SKR46	58.9	65.1	3.2	28.8	16.1	27

● Photo Sensor (with Bellows)

Unit: mm

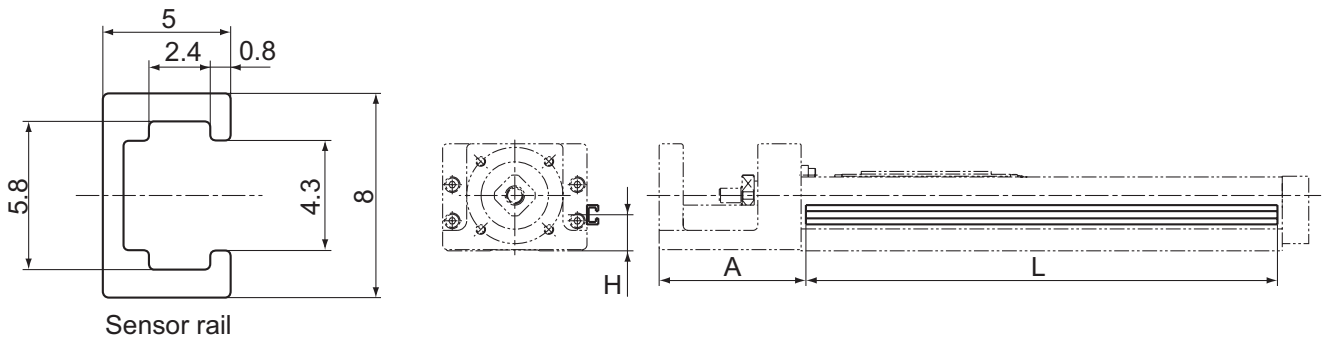


Model No.	a	b	c	d	Sensor type
SKR33	63.6	8.3	14.5	2.4	EE-SX671 (Omron Corp.)
SKR46	76.6	8.3	26.5	16.4	
SKR33	52.1	3.3	18	5.1	EE-SX674 (Omron Corp.)
SKR46	65.1	3.2	27	16.1	



**[Sensor Rail]**

The sensor rail can be attached alone.



Unit: mm

Model No.	Stroke*	Outer rail length	H	A	L
SKR20	30	100	10	43	111
	80	150			161
	130	200			211
SKR26	60	150	12	54	161
	110	200			211
	160	250			261
	210	300			311
SKR33	45	150	20	61	146
	95	200			196
	195	300			296
	295	400			396
	395	500			496
	495	600			596
	595	700			696
SKR46	190	340	29	89.5	336
	290	440			436
	390	540			536
	490	640			636
	590	740			736
	690	840			836
	790	940			936

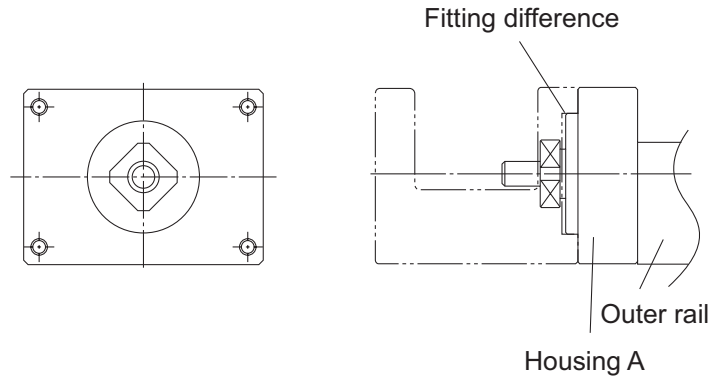
\*Indicates stroke length when one long-type inner block is incorporated.

## Housing

THK also offers Housing A provided with a separate motor, and a turnaround type of Housing A, as options in order to support a motor bracket or a turnaround section that the customer may separately produce.

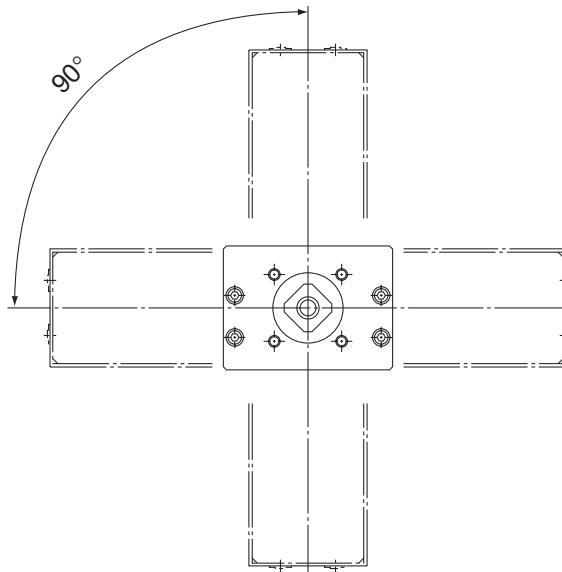
### [Housing A for a Separate Motor]

By using the fitting difference, the user can easily mount a separately manufactured motor bracket.



### [Turnaround Housing A]

Since the mounting holes are drilled in constant pitches, the user can easily select a direction to mount the turnaround section.



## Intermediate Flange

### [Motor Used and Applicable Intermediate Flanges for Model SKR]

Several types of intermediate flanges for mounting motors are available for model SKR. Specify an intermediate flange that matches the motor used.

Table16 Table of Motors Used and Corresponding Intermediate Flanges

		Motor type	Rated output	Flange size	SKR20	SKR26	SKR33	SKR46					
AC servomotor	Yaskawa Electric	Σ-mini	SGMM-A1	10W	□25	AN	AN	—	—				
			SGMM-A2	20W		AN	AN	—	—				
			SGMM-A3	30W		AN	AN	—	—				
		Σ-V	50W	SGMJV-A5	50W	□40	AQ	AQ	AQ	AQ			
				SGMAV-A5			AQ	AQ	AQ	AQ			
			100W	SGMJV-01	100W		—	—	AQ	AQ			
				SGMAV-01			—	—	AQ	AQ			
				SGMAV-C2			150W	—	—	—	AQ		
			200W	200W	SGMJV-02		200W	□60	—	—	—	AV	
					SGMAV-02				—	—	—	AV	
				400W	SGMJV-04				400W	—	—	—	AV
					SGMAV-04					—	—	—	AV
		Σ-III	50W	SGMAS-A5	50W	□40	AQ	AQ	AQ	AQ			
				SGMAS-01			100W	—	—	AQ	AQ		
			200W	SGMPS-01	200W		□60	—	—	—	AV		
				SGMAS-02				200W	—	—	—	AV	
				SGMAS-04				400W	—	—	—	AV	
		Σ-II	30W	SGMAH-A3	30W	□40	AQ	AQ	AQ	AQ			
	SGMAH-A5			50W			AQ	AQ	AQ	AQ			
	100W		SGMAH-01	100W	□60		—	—	AQ	AQ			
			SGMPH-01				—	—	—	AV			
	200W		SGMAH-02	200W	□60		—	—	—	AV			
			SGMAH-04				400W	—	—	—	AV		
	Mitsubishi Electric	MELSERVO	J2-Jr	HC-AQ013	10W	□28	AM	AM	—	—			
				HC-AQ023	20W		AM	AM	—	—			
				HC-AQ033	30W		AM	AM	—	—			
			J3	50W	HF-MP053	50W	□40	AQ	AQ	AQ	AQ		
					HF-KP053			AQ	AQ	AQ	AQ		
				100W	HF-MP13	100W		—	—	AQ	AQ		
					HF-KP13			—	—	AQ	AQ		
HF-MP23					200W			—	—	—	AV		
200W				HF-KP23	200W	□60		—	—	—	AV		
		HF-MP43		400W				—	—	—	AV		
J2 Super		50W	HC-MFS053	50W	□40	AQ	AQ	AQ	AQ				
			HC-KFS053			AQ	AQ	AQ	AQ				
		100W	HC-MFS13	100W		—	—	AQ	AQ				
			HC-KFS13			—	—	AQ	AQ				
		200W	HC-MFS23	200W		□60	—	—	—	AV			
			HC-KFS23				—	—	—	AV			
		400W	HC-MFS43	400W		□60	—	—	—	AV			
			HC-KFS43				—	—	—	AV			

				Motor type	Rated output	Flange size	SKR20	SKR26	SKR33	SKR46
AC servomotor	Panasonic Corp.	MINAS	A4	MSMD5A	50W	□38	AP	AP	AP	AP
				MSMD01	100W		—	—	AP	AP
				MQMA01		200W	—	—	—	AY
			MSMD02	□60	—		—	—	AY	
			MAMA02		—		—	—	AY	
			MSMD04	400W	—		—	—	AY	
			MAMA04		—	—	—	AY		
		AIII	MSMA3A	30W	□38	AP	AP	AP	AP	
			MSMA5A	50W		AP	AP	AP	AP	
			MSMA01	100W	—	—	AP	AP		
			MSMA02	200W	□60	—	—	—	AY	
			MAMA02			—	—	—	—	
			MSMA04	400W	—	—	—	AY		
			MAMA04		—	—	—	AY		
	SANYO Electric	SAMMOTION Q1	Q1AA04003D	30W	□40	AQ	AQ	AQ	AQ	
			Q1AA04005D	50W		AQ	AQ	AQ	AQ	
			Q1AA04010D	100W	—	—	AQ	AQ		
			Q1AA06020D	200W	□60	—	—	—	AV	
			Q1AA06040D	400W		—	—	—	AV	
	Omron	OMNUC G5	R88M-K05030	50W	□40	AQ	AQ	AQ	AQ	
			R88M-K10030	100W		—	—	AQ	AQ	
			R88M-K20030	200W	□60	—	—	—	AY	
			R88M-K40030	400W		—	—	—	AY	
		OMNUC G	R88M-G05030	50W	□40	AQ	AQ	AQ	AQ	
			R88M-G10030	100W		—	—	AQ	AQ	
			R88M-GP10030		□60	—	—	—	AY	
			R88M-G20030	200W		—	—	—	AY	
			R88M-G40030	400W	—	—	—	AY		
Fanuc			βis series	βis0.2/5000	50W	□40	AQ	AQ	AQ	AQ
	βis0.3/5000	100W		—	—		AQ	AQ		
	βis0.4/5000	130W		□60	—	—	—	AV		
	βis0.5/6000	350W			—	—	—	AV		
	βis1/6000	500W			—	—	—	AV		
Keyence Corporation	MV	MV-M05	50W	□40	AQ	AQ	AQ	AQ		
		MV-M10	100W		—	—	AQ	AQ		
		MV-M20	200W	□60	—	—	—	AV		
		MV-M40	400W		—	—	—	AV		
Stepping motor	Oriental Motor	αStep	ASC3 *	□28	AS	AS	—	—		
			AS46, ASC46, AR46	□42	AR	AR	AR	—		
			AS6 *, ASC66, AR6 *	□60	—	—	AU	AU		
		5 phase	CSK II	CSK52 *	□28	AS	AS	—	—	
				CSK54 *	□42	AR	AR	AR	—	
				CSK56 *	□60	—	—	AU	AU	
	RK	RK54 *	□42	AR	AR	AR	—			
		RK56 *	□60	—	—	AU	AU			
		2 phase	UMK	UMK24 *	□42	AR	AR	AR	—	
	UMK26 *			□56.4	—	—	AT	—		
	CSK		CSK24 *	□42	AR	AR	AR	—		
			CSK26 *	□56.4	—	—	AT	—		

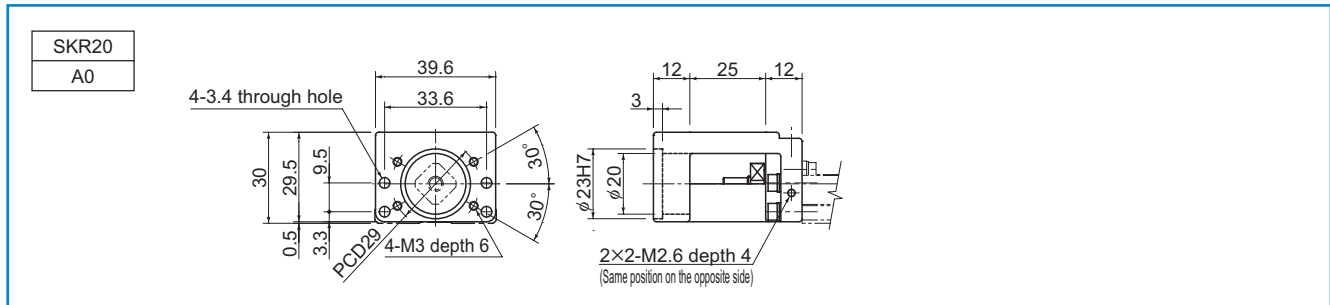
Note1) The symbols in the table indicate the housing A and intermediate flange.  
 Note2) For motor coupling, contact THK.

**[Dimensional Drawing of Housing A/Intermediate Flange for Model SKR]**

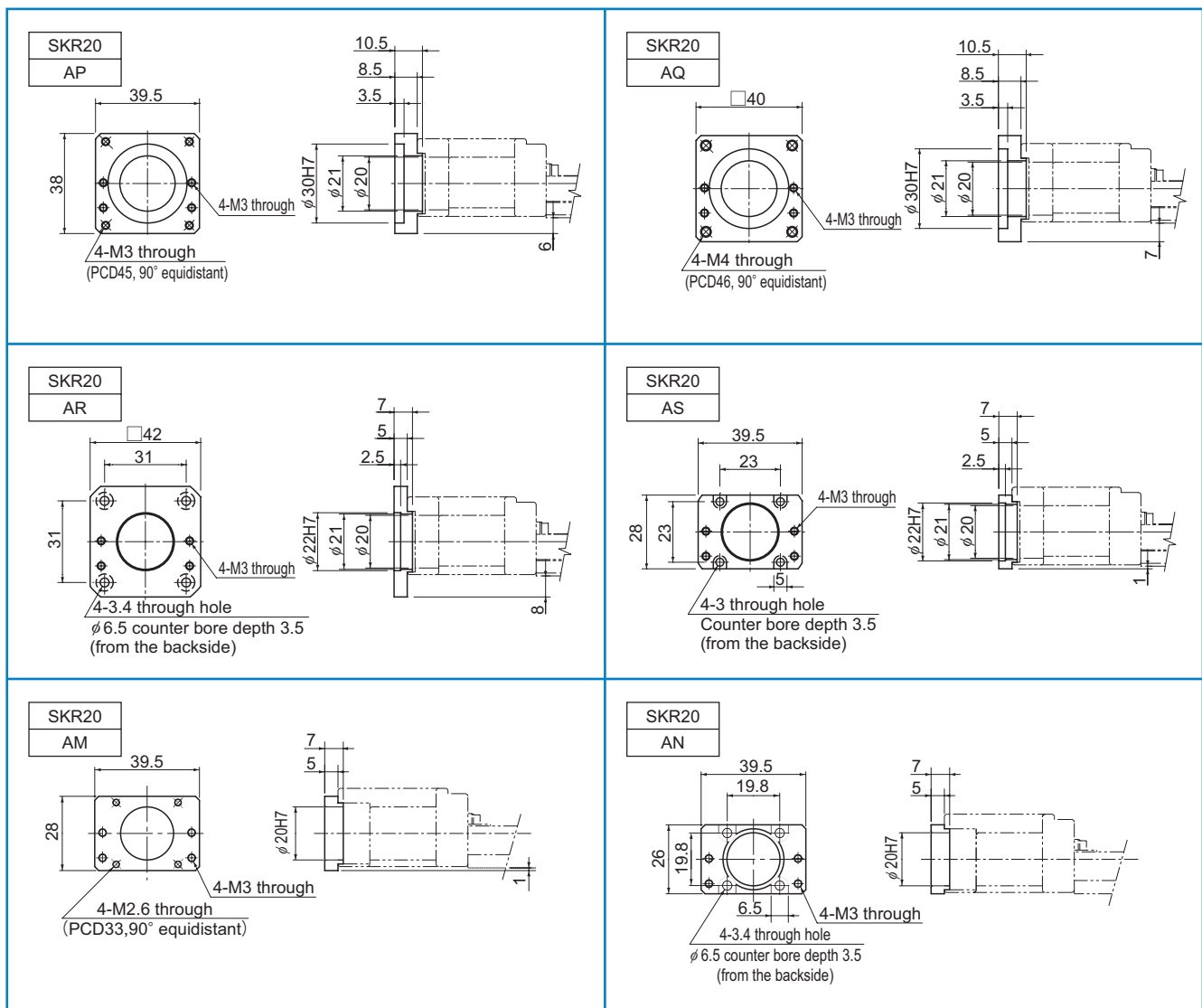
● For Model SKR20

SKR**	··· Actuator model number
● ◇	··· ●: Housing A ◇: Intermediate Flange

■ Housing A



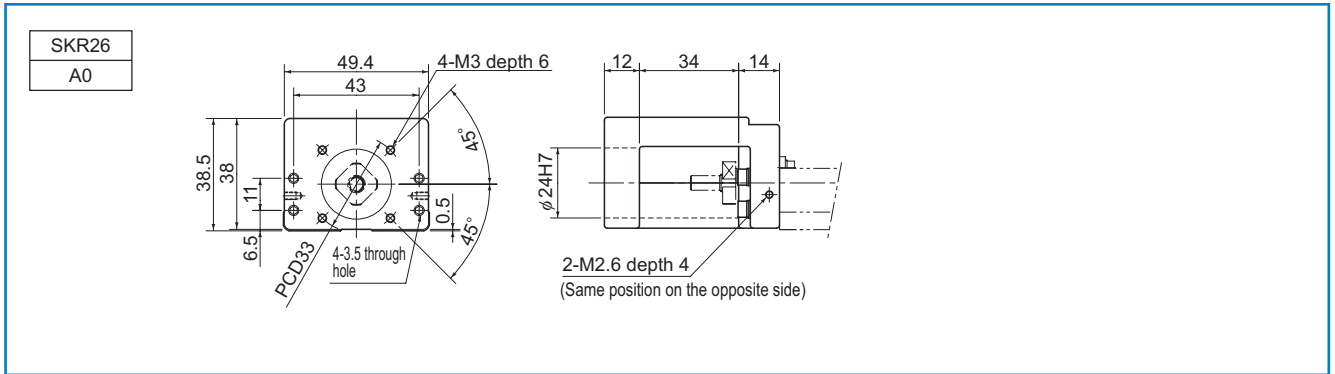
■ Intermediate Flange



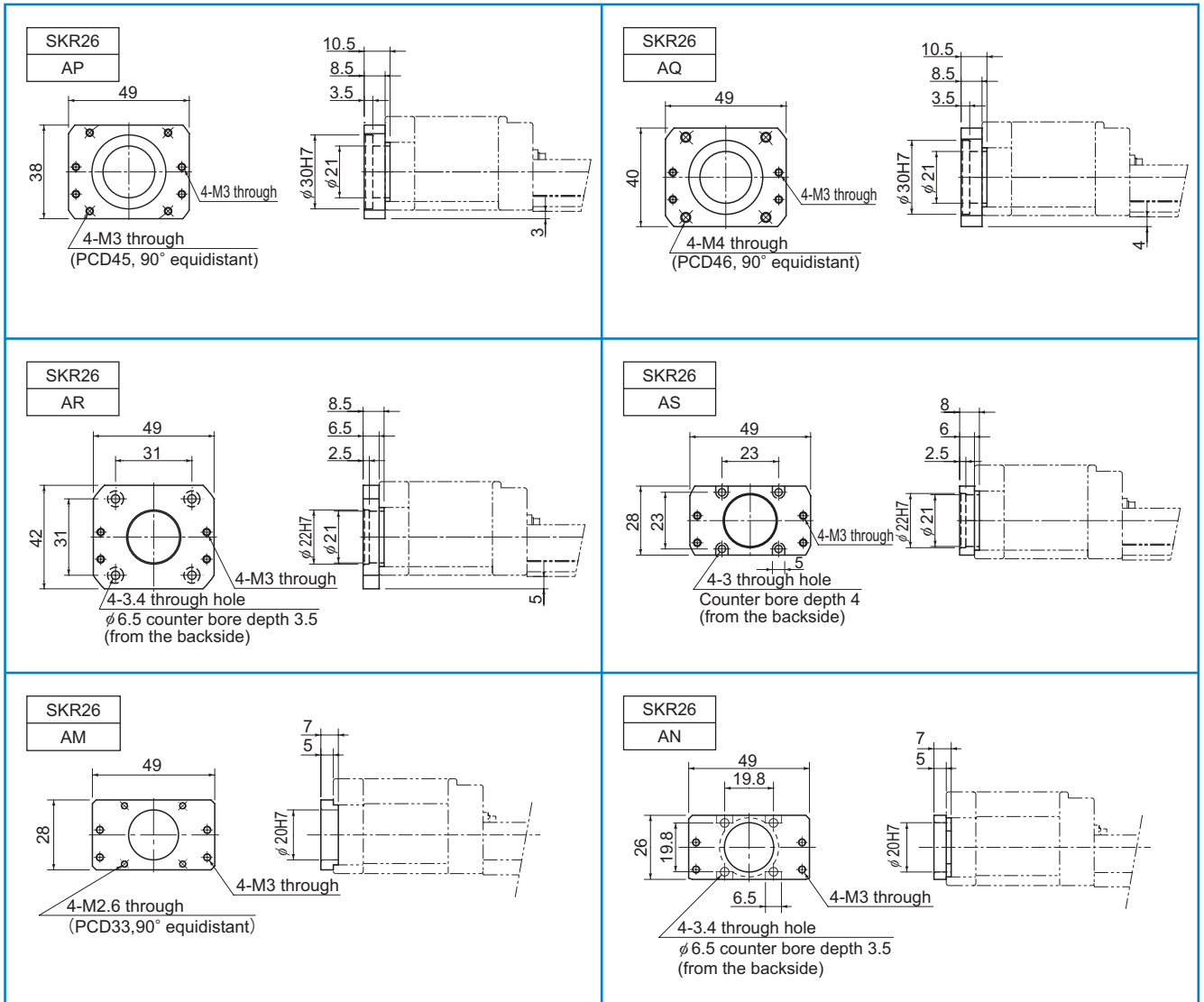
● For Model SKR26

SKR**	··· Actuator model number
●	··· ●: Housing A
◇	··· ◇: Intermediate Flange

■ Housing A



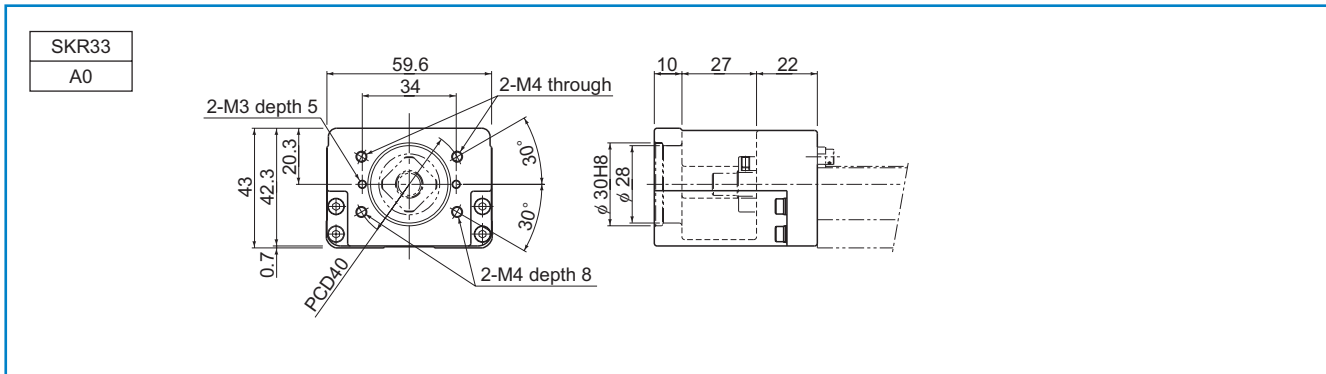
■ Intermediate Flange



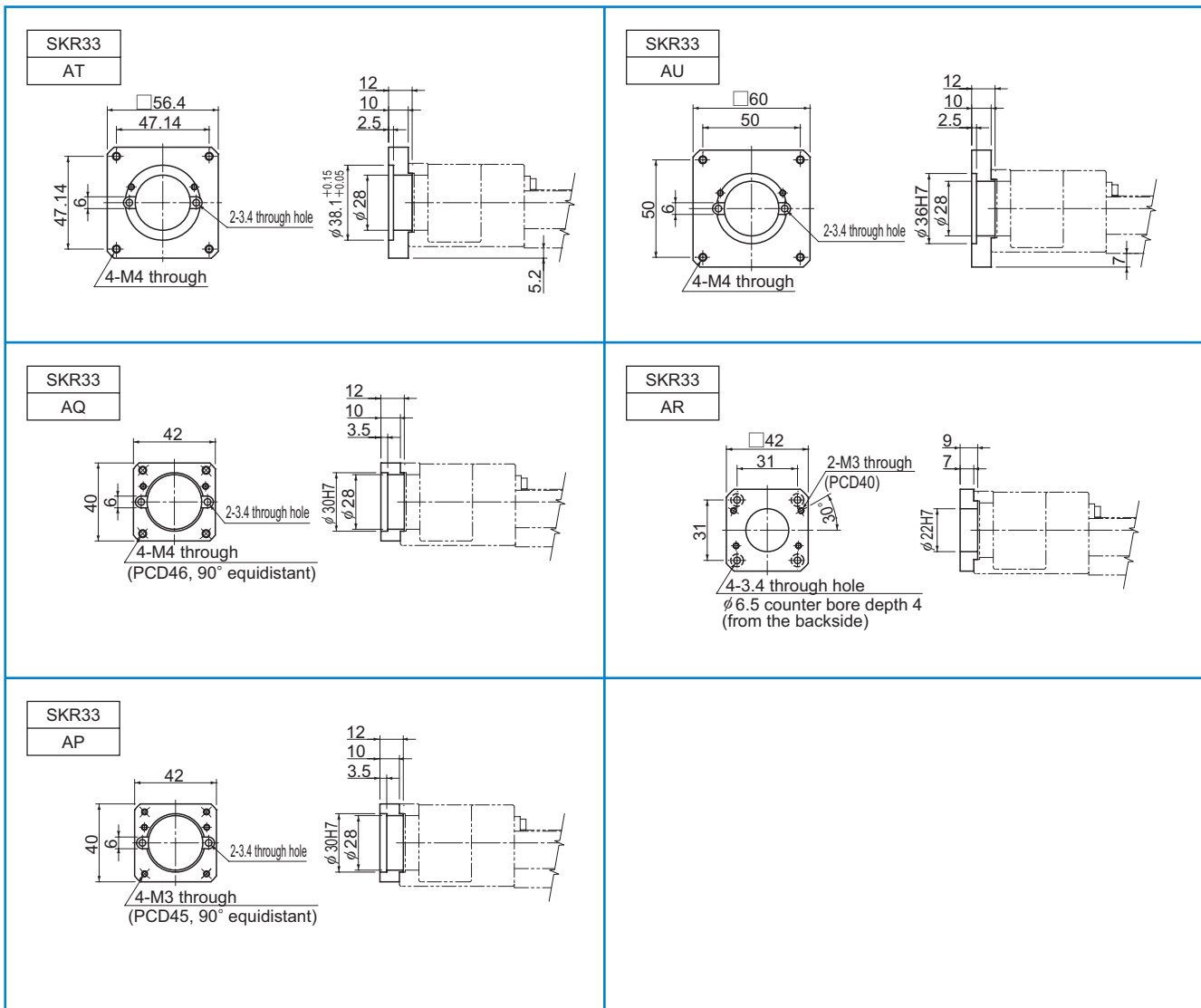
● For Model SKR33

SKR**	···Actuator model number
●◇	··●: Housing A ◇: Intermediate Flange

■Housing A



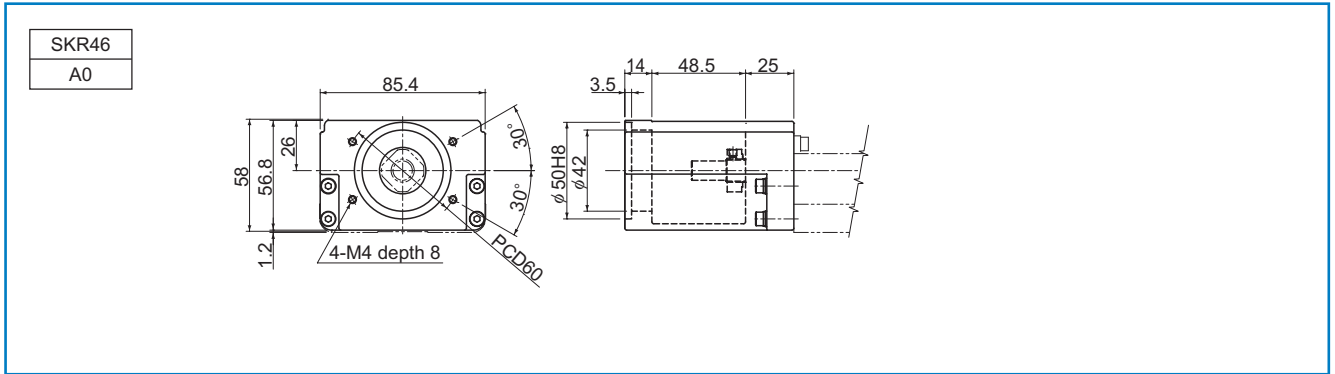
■Intermediate Flange



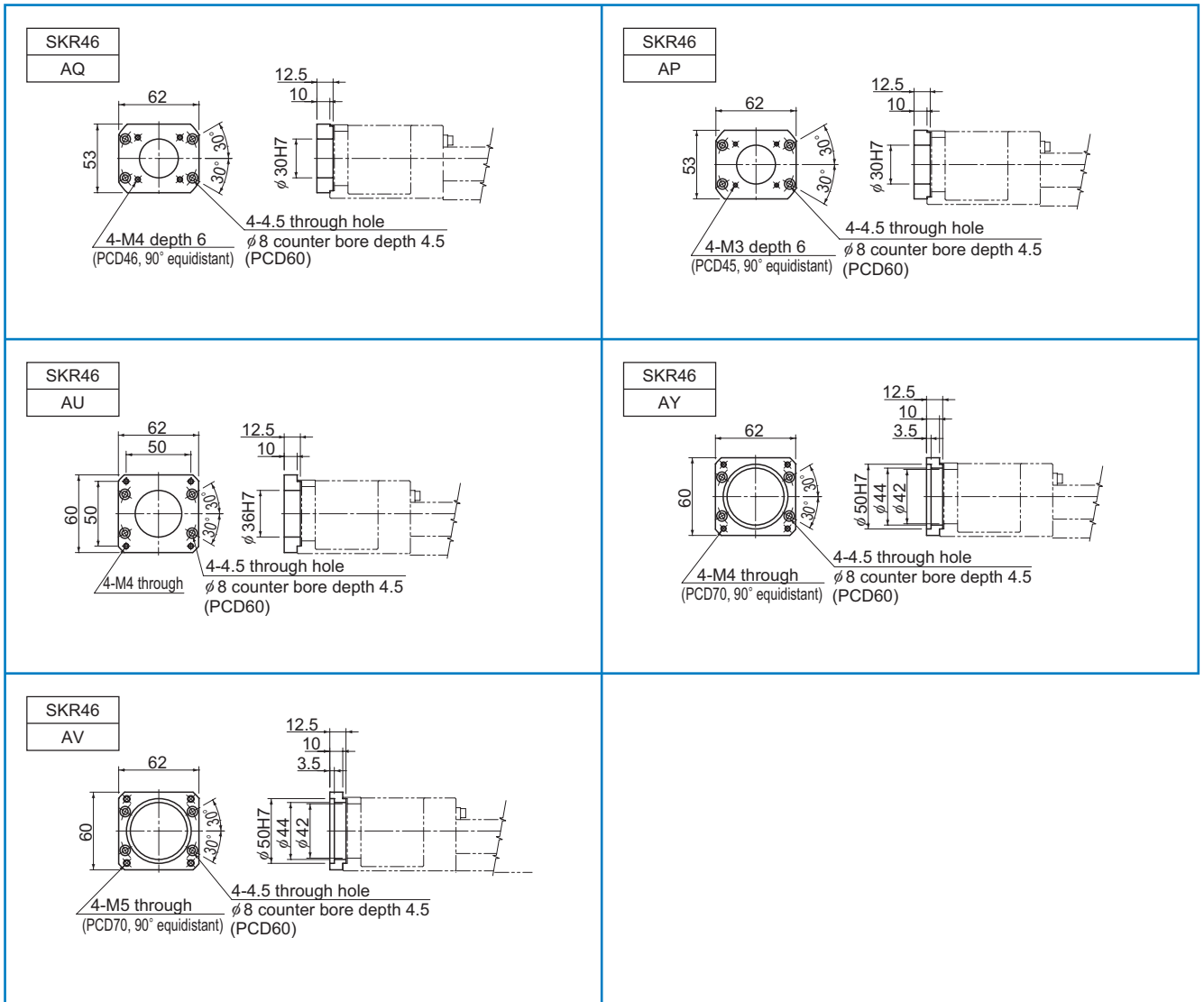
● For Model SKR46

SKR**	··· Actuator model number
●◇	···●: Housing A ◇: Intermediate Flange

■ Housing A



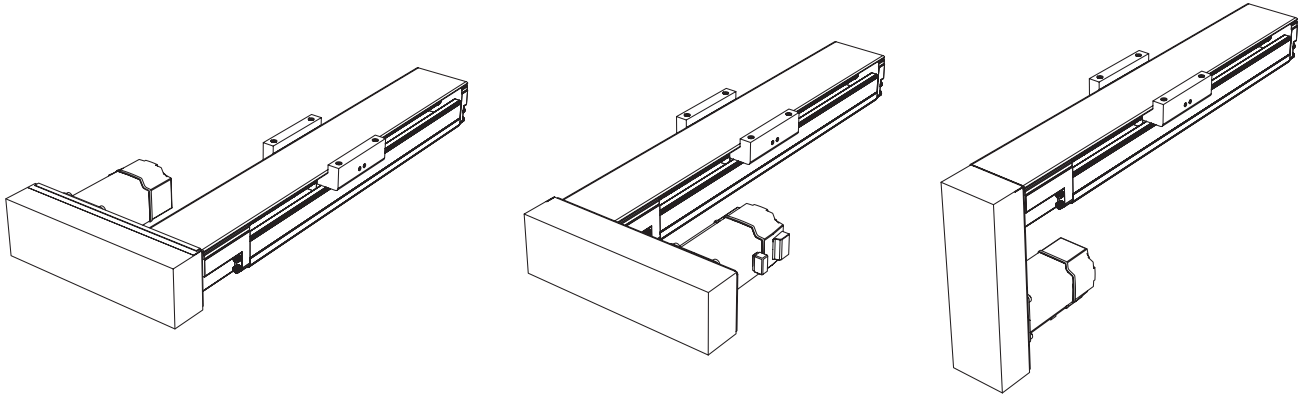
■ Intermediate Flange





## Motor Wrap Type

Model SKR is available in “Motor Wrap” types that allow the motor to be turned around in order to minimize the dimension in the longitudinal direction. (Pulley ratio: 1:1). Contact THK for details.



**[Handling]**

- (1) Do not disassemble this product unless absolutely necessary. This will cause dust to enter the product resulting in loss of functionality.
- (2) Take care not to drop or strike this product. This could cause injury or product damage. Giving an impact to it could also cause damage to its function even if the product looks intact.
- (3) Exceeding the dangerous speed may lead the components to be damaged or cause an accident. Be sure to use the product within the specification range designated by THK.
- (4) Foreign material entering the product will cause damage to the ball circulation components and loss of functionality. Prevent foreign material, such as dust or cutting chips, from entering the system.
- (5) When planning to use the product in an environment where the coolant penetrates the inner block, it may cause trouble to product functions depending on the type of the coolant. Contact THK for details.
- (6) The service temperature range of this product is 0 to 40°C (no freezing or condensation). If you consider using this product outside the service temperature range, contact THK.
- (7) If the product will be used in location exposed to vibrations or in special environment such as vacuum/clean-room, and/or high/low temperatures, contact THK.
- (8) If the product is operating or in the ready state, never touch a moving part. In addition, do not enter the operating area of the actuator.
- (9) If two or more people are involved in the operation, confirm the procedures such as a sequence, signs and anomalies in advance, and appoint another person for monitoring the operation.

**[Lubrication]**

- (1) Thoroughly remove the anti-rust oil before using the product.
- (2) To maximize the performance of model SKR, lubrication is required. Using the product without adequate lubrication may induce premature wear in rolling components and/or shorten the service life. Note the standard grease used in the product as follows.  
Models SKR20 and SKR26 : THK AFA Grease  
Models SKR33 and SKR46 : THK AFB-LF Grease
- (3) Do not mix lubricants of different physical properties.
- (4) Before selecting special lubricant, contact THK.
- (5) When adopting oil lubrication method, contact THK.
- (6) Because the intervals between greasing vary depending on the conditions of product use, it is recommended that the greasing interval be determined through an initial inspection.
- (7) If the product will be used in location exposed to vibrations or in special environment such as vacuum/clean-room, and/or high/low temperatures, contact THK.

**[Storage]**

Model SKR should be stored in a horizontal orientation in the THK wrapping and package, avoiding high or low temperatures and high levels of humidity.

**[Instruction Manual]**

You can download the “LM Guide Actuator Model SKR -- Instruction Manual” from the THK technical support website.

Technical support website: <https://tech.thk.com/>

# THK Caged Ball LM Guide Actuator Model SKR

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