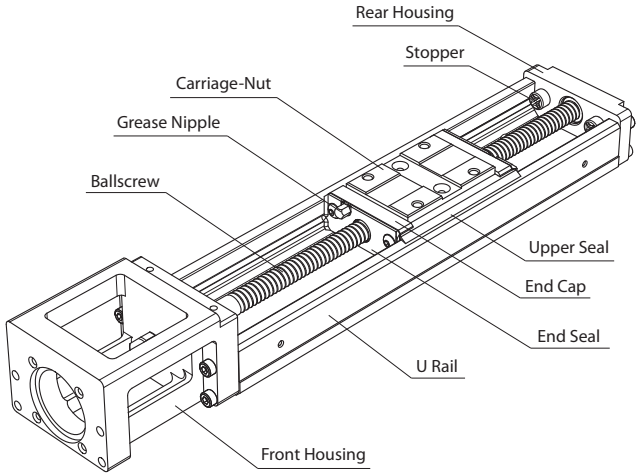
Ball Chain Type, SKM Series

Construction

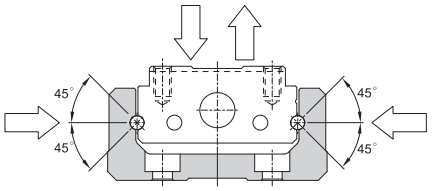


Characteristics

KM series consist of linear guideway unit and ballscrew unit. For saving space, PMI combine the carriage of linear guideway and nut of ballscrew to a integral Carriage-Nut. The carriage-nut cooperate with the U rail designed for high rigidity to achieve the high rigidity and high accuracy in the minimal space, especially to saving time of installation. Moreover, the design of two rows with Gothic-arch groove and contact angle of 45°can bear four directional loading.

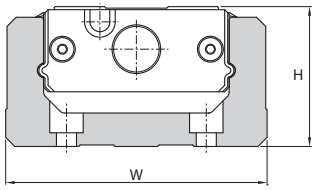
Four Directional Equal Load

KM series are applied two rows with Gothic-arch groove and designed to contact angle of 45° which enables it to carry an equal load in radial, reversed radial and lateral directions to suit to any mounting orientation.



Saving Space

Combine the carriage of linear guideway and nut of ballscrew to a carriage-nut, SKM series can achieve the best use of space.

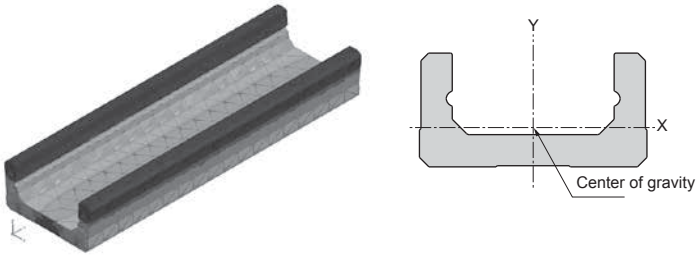


Unit : mm

Model	H	W
SKM26	26	50
SKM33	33	60

High Rigidity

Base on the optimal analysis of FEM for the shape of U rail, it has the balance between light weight and high rigidity.



Unit : mm^4

Model	I_X	I_Y
SKM26	$1.6x10^4$	$1.5x10^5$
SKM33	$6.1×10^4$	$3.8×10^5$

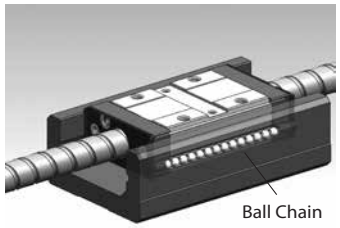
Note* I_X : Geometrical moment of inertia around X axis
I_Y : Geometrical moment of inertia around Y axis

High Accuracy

The design of two rows with Gothic-arch groove and stable manufacturing technology can control the variation by load at the minimum. It can provide the smooth feed with high accuracy.

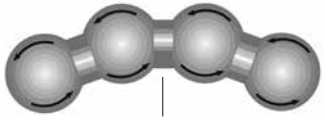
Ball Chain Design, Smooth Movement

The U rail and carriage-nut circulating system with the ball chain design which use the strengthened synthetic resin of accessorie and avoid interference between balls to make it more stable during passing the load district. Besides, the ball chain can keep the ball move in line and improve the movement.



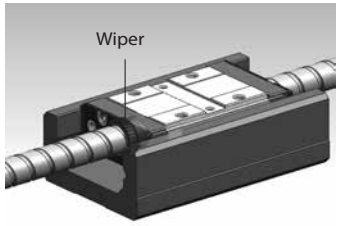
Low Noise

The retaining pieces of the carrige-nut can avoids collision between balls then decrease the noise. Non-mutual friction can decrease heat generation and keep the accuracy in the range.



High Dustproof, Extend The Maintenance Intervals

The carriage-nut with the wiper at both ends can reduce grease leakage. Besides, Besides, the wiper with a special lips structure can matches the threads that ensures the removal of scraps as well as insulation dust.



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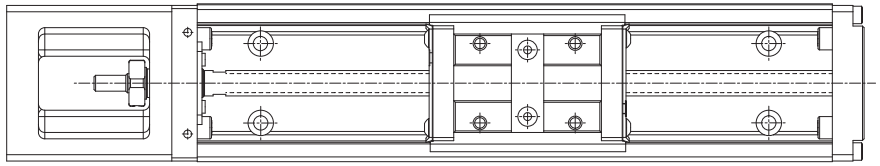
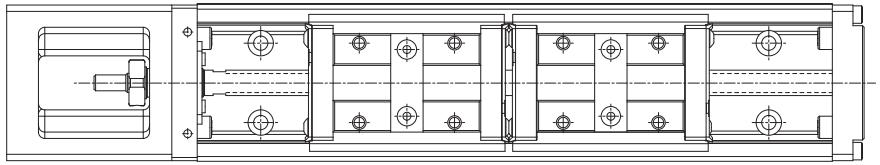
Carriage-Nut Type

A Type : A single carriage-nut with standard length



B Type : Two carriage-nuts with standard length



Description of Specification

SKM33 05 A +400 P 0 -0 0 30 CA AA

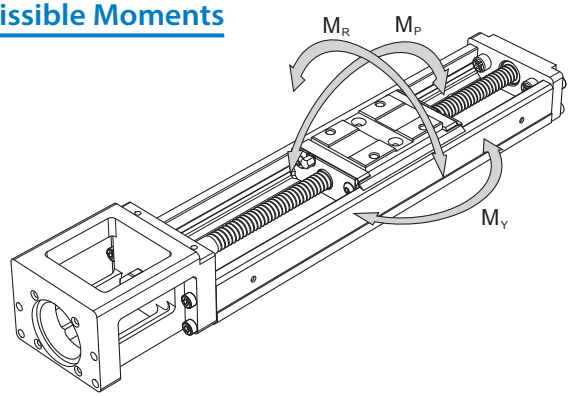
- Model
- Ballscrew Lead
- Carriage-Nut type
  - **A** : A single carriage-nut with standard length
  - **B** : Two carriage-nuts with standard length
- Rail length (mm)
- Accuracy grade
  - **N** : Normal grade
  - **P** : Precision grade
- With / Without a Motor
  - **0** : None
  - **1** : With a Motor (mounted at *PMI*)
- With / Without a Cover
  - **0** : None
  - **1** : With a Cover
  - **2** : With a Bellows
- Sensor Specification (see **page C1-13**)
- Type of Motor Bracket type (see **page C1-15**)
- Surface treatment mode :
  - **No symbol** : Black Chrome Plating + Special Fluororesin(PS-CF)
  - **CB :** Black oxide treatment
  - **CE:**Black Chrome Plating(PS-C)
  - **CA** : Electroless Nickel
- Code of special type
  - **AA** : Special process
  - **A1** : Heighten housing
  - **No symbol** : Standard housing

Load Ratings

The load ratings of SKM series are divided to linear guideway and ballscrew, the load ratings of each part are shown below.

Model	Linear Guideway		Ballscrew					
	Basic dynamic load rating C (kN)	Basic static load rating C_0 (kN)	Basic dynamic load rating Ca (kN)	Basic static load rating C_{0a} (kN)	Ballscrew diameter (mm)	Lead (mm)	Thread minor diameter (mm)	Ball center to center diameter (mm)
	A、B	A、B	Normal、Precision N、P	Normal、Precision N、P				
SKM26 SKM2602 SKM2606	7.61	14.15	2.50	4.02	8	2	6.6	8.3
			1.18	1.67		6		
SKM33 SKM3305 SKM3310	11.57	20.41	2.94	5.10	12	5	10.3	12.4
			2.84	4.51		10	9.9	

Static Permissible Moments



Unit : N-m

Model	Static Permissible Moments					
	M_P		M_Y		M_R	
	A	B	A	B	A	B
SKM26 SKM2602 SKM2606	107.3	501.8	107.3	501.8	278.6	557.3
SKM33 SKM3305 SKM3310	156.6	858.5	156.6	858.5	462.0	924.0

註*: BType之容許靜力矩為兩滑塊螺帽緊密相連之數值。

Accuracy Grade

SKM series is classified into normal grade (N) and precision grade (P) , the standards are shown below.

Model	Rail Length (mm)	Positioning Repeatability(mm)		Positioning Accuracy(mm)		Running of Parallelism(mm)		Backlash (mm)		Starting Torque (N-cm)	
		Nomal N	Precision P	Nomal N	Precision P	Nomal N	Precision P	Nomal N	Precision P	Nomal N	Precision P
SKM 26	150	±0.01	±0.003	-	0.02	-	0.01	0.02	0.003	2	4
	200										
	250										
	300										
SKM 33	150	±0.01	±0.003	-	0.02	-	0.01	0.02	0.003	7	15
	200										
	300										
	400										
	500				0.025		0.015				
	600										

Maximum Travel Speed and the Maximum Length

SKM series is limited by the dangerous speed of the ballscrew and the DN value regardless, the maximum travel speed and the maximum length are shown below.

Unit : mm

Model	Ballscrew Lead	Rail Length	Maximum Travel Speed (mm/s)		Maximum Length	
			Normal N	Precision P	Normal N	Precision P
SKM 26	2	150	200	200	300	300
		200				
		250				
		300				
	6	150	600	600	300	300
		200				
		250				
		300				
SKM 33	5	150	500	500	600	600
		200				
		300				
		400				
		500				
		600	340	340		
	10	150	1000	1000	600	600
		200				
		300				
		400				
		500	980	980		
		600	650	650		

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Life Calculation

SKM series consists of a linear guideway, a ballscrew and a support bearing. The calculation of nominal life of each component is shown below. The nominal life is defined as the total running distance that 90% of identical linear guideways or ballscrew in a group, when they are applied under the same conditions, can work without developing flaking.

Linear Guideway

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

L : Nominal life (km)
fc : Contact factor (see Table 1)
fw : Load factor (see Table 2)
C : Basic dynamic load rating (N)
P : Calculated applied load (N)

Table 1

Carriage-Nut Type	Contact factor fc
A	1.00
B	0.81

Ballscrew and Bearing

$$L = \left(\frac{1}{f_w} \cdot \frac{C_a}{P_a}\right)^3 \times 10^6 \text{ rev}$$

L : Nominal life (rev)
fw : Load factor (see Table 2)
Ca : Basic dynamic load rating (N)
Pa : Applied axial load (N)

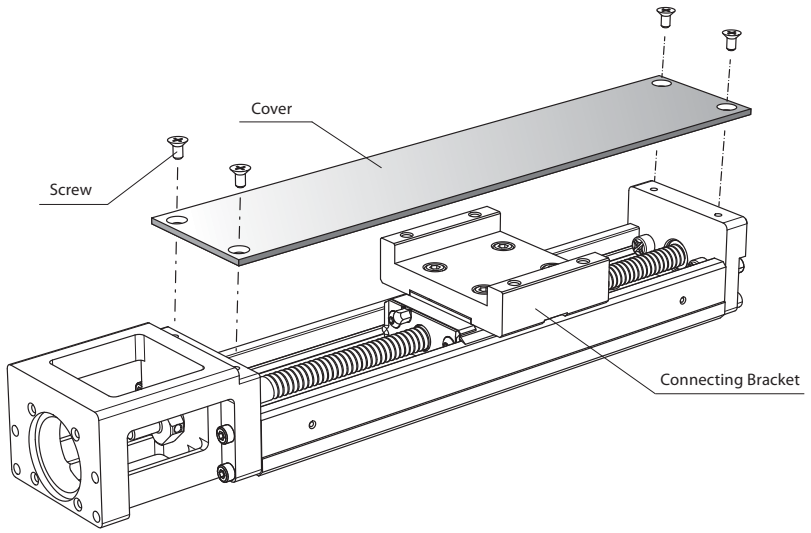
Table 2

Motion Condition	Operating Speed	Load factor fw
No Impact & Vibration	V≦15m/min	1.0~1.2
Slight Impact & Vibration	15＜V≦60m/min	1.2~1.5
Moderate Impact & Vibration	60＜V≦120m/min	1.5~2.0
Strong Impact & Vibration	V≧120m/min	2.0~3.5

Options

Cover

SKM series provides cover and transfer seat option. The detail size could be refered by specification tables of product, please.



Bellows

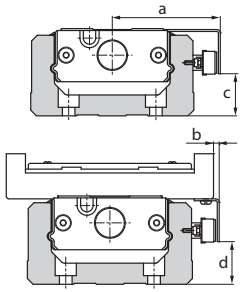
For SKM series, a bellows is available for option. Please contact ***PMI***.

Sensor

For SKM series, a optional proximity sensors and photo sensors are available as an option. Models equipped with a sensor are provided with a dedicated sensor rail / detecting plate. Please see the table below.

Symbol	Description	Type	Accessory
0	None	-	-
1	with Sensor rail	-	Mounting Screw
2	Photo sensor (3 units)	EE-SX671 (Omron)	Mounting Screw / Nut, Detecting Plate, Sensor Rail, Mounting Plate, Connector (EE-1001)
3	Photo sensor (3 units)	EE-SX674 (Omron)	Mounting Screw / Nut, Detecting Plate, Sensor Rail, Mounting Plate, Connector (EE-1001)
4	Proximity sensor a-contact (On when close, 3 units)	GX-F12A(Panasonic)	Mounting Screw/Nut、Detecting Plate、Sensor Rail
5	Proximity sensor b-contact (On when away, 3 units)	GX-F12B(Panasonic)	Mounting Screw/Nut、Detecting Plate、Sensor Rail
A	Proximity sensor a-contact (Single) b-contact (Double)	GX-F12A(Single) GX-F12B(Double)	Mounting Screw/Nut、Detecting Plate、Sensor Rail

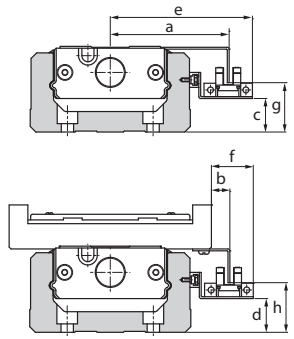
The dimension of installation for sensor:



Panasonic GX-F12A、GX-F12B

Model	a	b	c	d
SKM 26	38.9	7.9	6.2	6.2
SKM 33	44	1	9.2	10

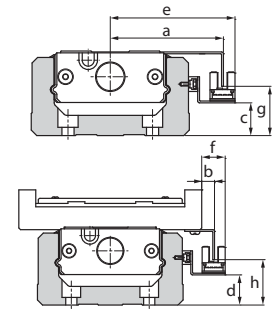
Unit : mm



Omron EE-SX671

Model	a	b	c	d	e	f	g	h
SKM 26	46.0	15.0	2.0	2.0	58.5	27.5	10.5	10.5
SKM 33	50.9	7.9	5.0	5.0	63.4	20.4	13.8	15

Unit : mm



Omron EE-SX674

Model	a	b	c	d	e	f	g	h
SKM 26	43.7	12.7	1.8	1.8	50.0	19.0	10.8	10.8
SKM 33	48.6	5.6	4.8	4.8	54.9	11.9	13.8	14

Unit : mm

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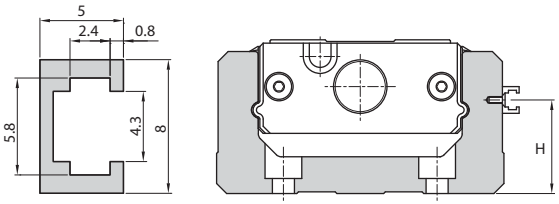
The dimension of sensor rail



Unit : mm

Model	H
SKM 26	12
SKM 33	15

Intermediate Flange

SKM series allow different motors to be attached by intermediate flange. Please see the table below when ordering.

Unit : mm

Brand of Motor	Model	SKM 26	SKM 33
Yaskawa Electric AC servomotor	SGMAH-A3(30W)	2A	3A
	SGMAH-A5(50W)	2A	3A
	SGMAH-01(100W)		3A
	SGMPH-01(100W)		
	SGMAH-02(200W)		
	SGMAH-04(400W)		
	SGMPH-02(200W)		
	SGMPH-04(400W)		
	SGMAH-08(750W)		
Mitsubishi Electric AC servomotor	HC-MFS053(50W)	2A	3A
	HC-MFS13(100W)		3A
	HC-MFS23(200W)		
	HC-KFS23(200W)		
	HC-MFS43(400W)		
	HC-KFS43(400W)		
	HC-MFS73(750W)		
	HC-KFS73(750W)		
Matsushita Electric AC servomotor	MSMD5A(50W)	2D	3D
	MSMD01(100W)		3D
	MSMD02(200W)		
	MSMD04(400W)		
	MSMD08(750W)		
Fastech Stepping motor	EzM-28	2G	
	EzM-42	2H	3H
	EzM-56		3I
	EzM-60		3J
Oriental Motor Stepping motor	PK22	2G	
	PK24	2H	3H
	PK26(標準)		3I
	RK54	2H	3H
	RK56		3J
	RK59		

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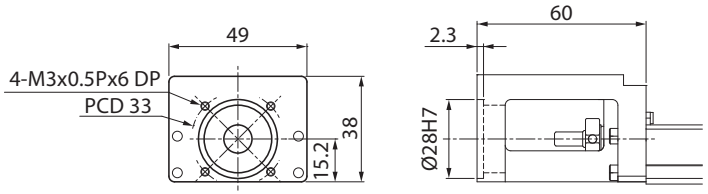
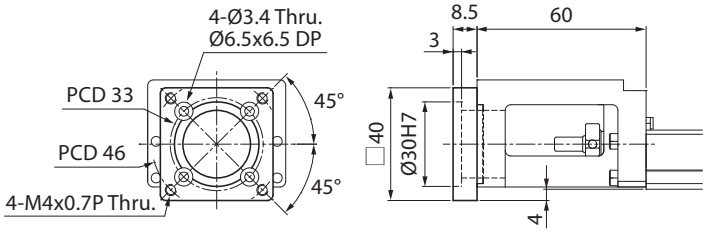
The dimension of intermediate flange

SKM26

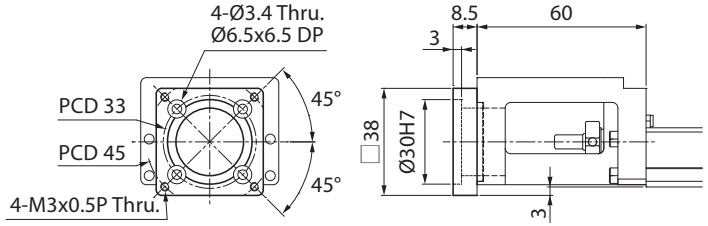
20



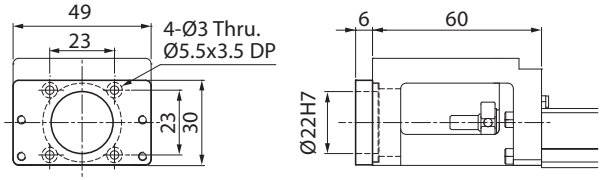
2A



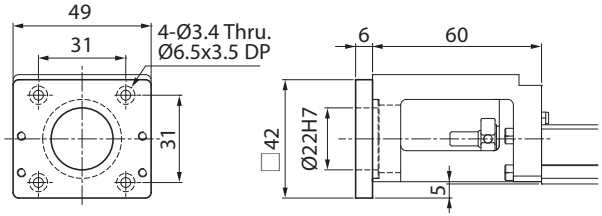
2D



2G



2H



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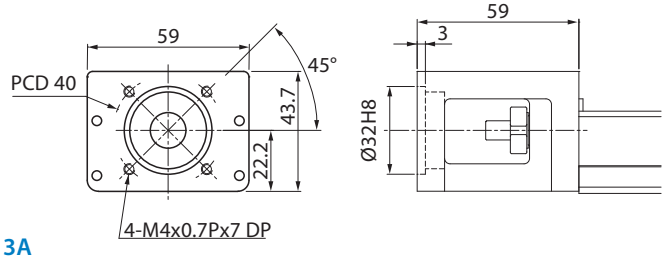
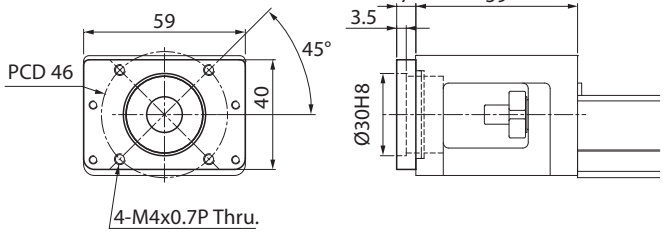
SKM33

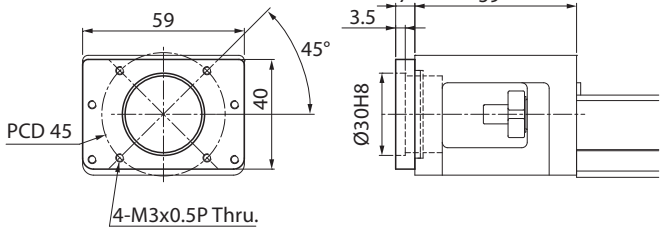
30



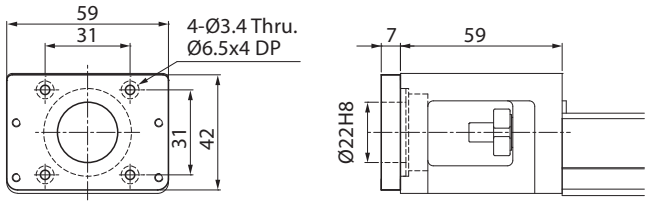
3A



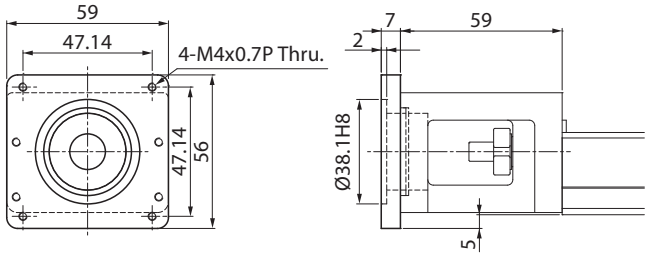
3D



3H



3I



3J