



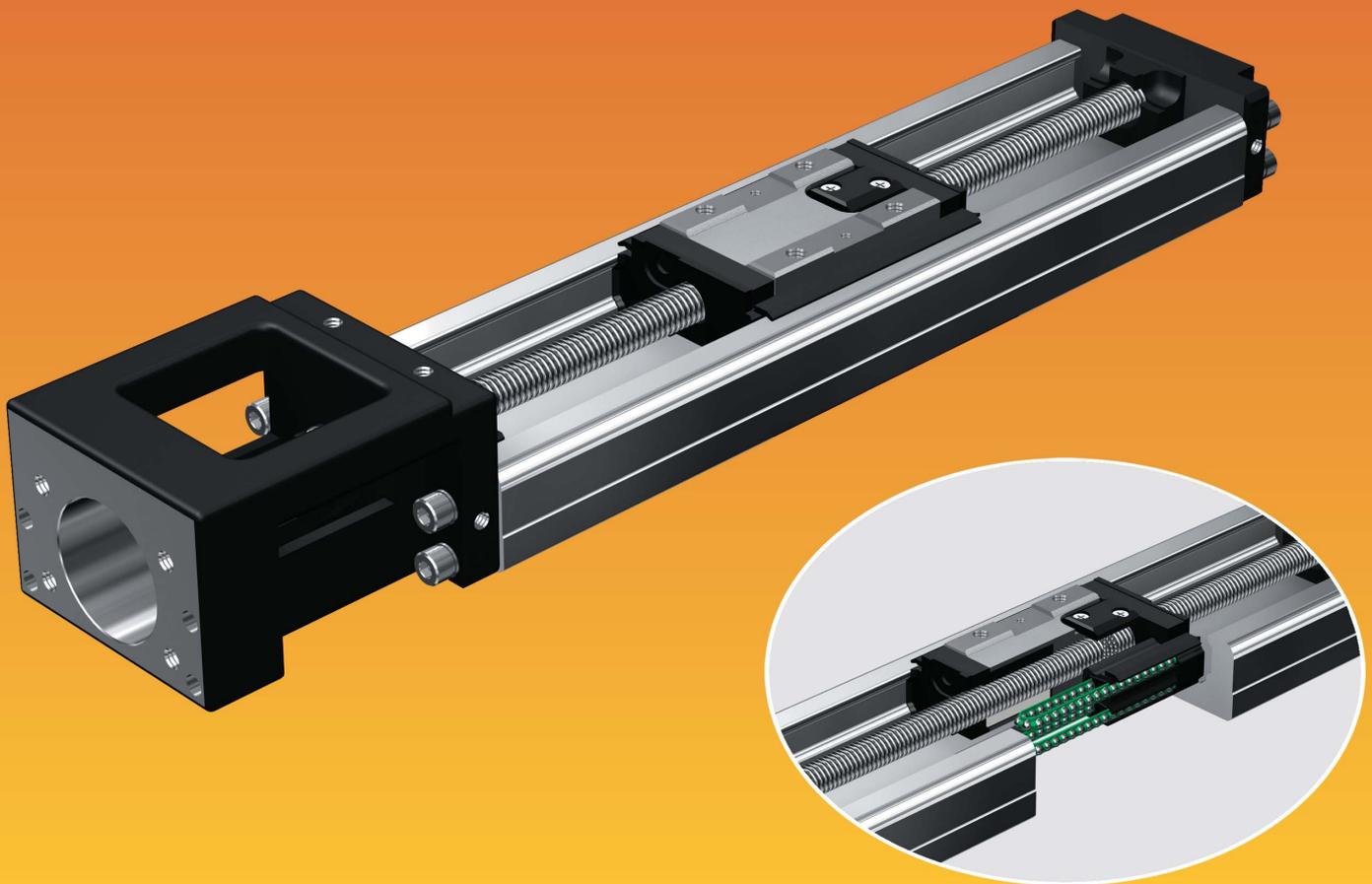
NEW

Miniature LM Guide Actuators Featuring Caged Ball Technology

Caged Ball Technology Offers

- Long life and long-term, maintenance-free operation
- Excellent high speed performance
- Excellent Sliding Smooth Motion Capability

SKR20/26



Type SKR 20/26 Miniature LM Guide Actuator with Caged Ball Technology

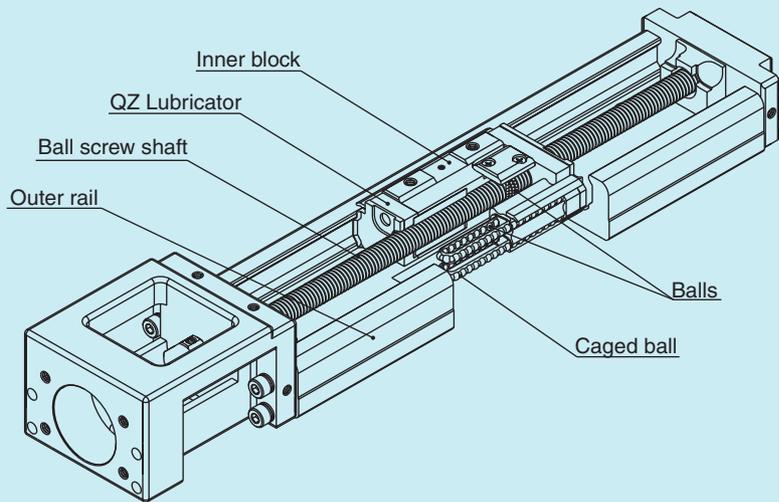


Fig.1 Construction of SKR-type LM Guide Actuator with Caged Ball Technology

Construction and Features

The SKR-type LM guide actuator with Caged Ball Technology is a compact actuator that places an inner block(s) with integrated LM block and ball screw nut onto the inside of the U-shaped outer rail.

Caged ball technology in the LM guide sections and QZ lubricator in the ball screw sections are integrated in the design. The SKR20/26-type LM guide actuator assures excellent sliding, higher speed, longer maintenance-free operation and other features in comparison with the conventional KR-type.

The inner block, outer rail, ball screw shaft (excluding normal and high-accuracy grades 6-mm leads), and balls are made of stainless steels.

1. Four-way Equal Loading Capacity

Each row of balls is arranged at a contact angle of 45° so that loads acting on the inner block in the four directions (radial, reverse-radial, and two lateral directions) show the same rated load. Thus, the SKR-type LM guide actuators can be mounted in any orientation.

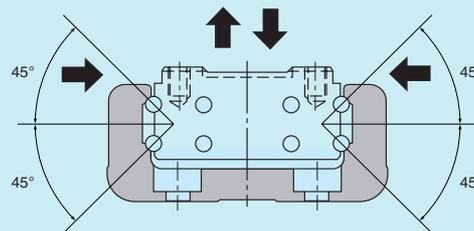


Fig.2 Load-carrying Capacity and Contact Angles of the SKR

2. High Rigidity

The adoption of the U-shaped outer rail allows improved rigidity against moment loads.

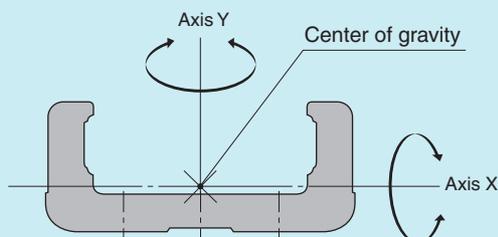


Fig.3 Sectional View of Outer Rail

Unit: mm ⁴			
Model	I_x	I_y	Mass: [kg/100mm]
SKR20	6.0×10^3	6.14×10^4	0.26
SKR26	1.66×10^4	1.48×10^5	0.39

I_x = geometrical moment of inertia around axis X [mm⁴]

I_y = geometrical moment of inertia around axis Y [mm⁴]

3. High Precision

The linear motion guide raceway has four rows of circular arc grooves that provide smooth motion under pre-load, delivering clearance-free guidance with high rigidity against moment and torsion. In addition, changes in frictional resistance resulting from load variations are minimized, allowing the SKR-type to achieve high-precision feed.

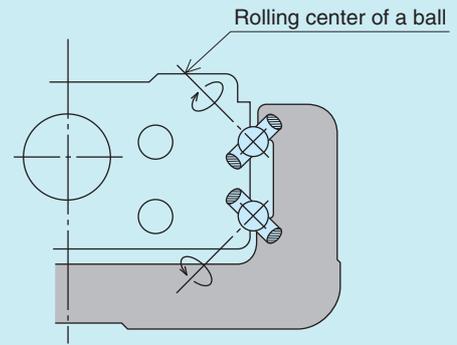


Fig.4 Contact Structure of SKR-Type

4. Space Saving

The integration of a miniature LM guide and a miniature ball screw allow the SKR20/26-type to achieve high rigidity and high precision in a minimal space.

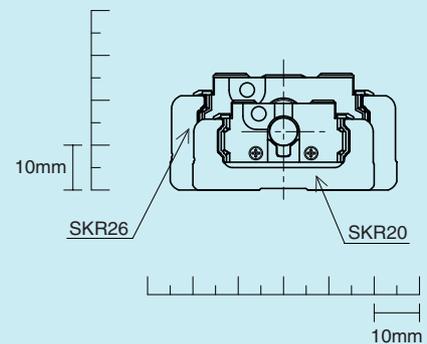


Fig.5 Cross Section of SKR-Type

5. Long Life Span and Long-term Maintenance-free Operation

Utilizing the caged ball technology in the LM guide sections, and by adopting a QZ lubricator in the ball screw sections, the SKR has improved grease retention, and hence which leads to a long life span and long-term maintenance-free operation.

6. Excellent Smooth Motion Capability

Caged Ball Technology also helps the SKR-type eliminate ball-to-ball friction, significantly improving the torque characteristics. It minimizes torque variations, allowing excellent smooth motion capability.

Rated Loads

		Model	SKR 20		SKR 26	
LM Guide	Basic dynamic load rating C [N]		6010		13000	
	Basic static load rating C ₀ [N]		8030		16500	
	Radial clearance [mm]	Normal grade/High-accuracy grade	-0.004 to 0		-0.006 to 0	
Precision grade		-0.006 to -0.004		-0.007 to -0.006		
Ball Screw	Screw shaft outer diameter [mm]		6		8	
	Lead [mm]		1	6	2	6
	Root diameter [mm]		5.3	5.0	6.6	6.7
	Ball center diameter [mm]		6.15	6.3	8.3	8.4
	Basic dynamic load rating C _a [N]	Normal grade/High-accuracy grade	660	860	2350	1950
		Precision grade	660	1060	2350	2390
	Basic static load rating C _{0a} [N]	Normal grade/High-accuracy grade	1170	1450	4020	3510
Precision grade		1170	1600	4020	3900	
Support Bearing	Basic dynamic load rating C _a [N]		1150		2000	
	Permissible static load P _{0a} [N]		735		1230	

Notes: The rating of the LM Guide is the rated load per Inner block.

Accuracy Standard

Model	Accuracy Standard	Normal grade	High-accuracy grade (H)	Precision grade (P)
SKR20	Positioning Repeatability Accuracy [mm]	±0.01	±0.005	±0.003
	Positioning Accuracy [mm]	—	0.060	0.020
	Running Parallelism [mm]	—	0.025	0.010
	Backlash [mm]	0.020	0.010	0.003
	Starting Torque [N-cm]	0.5	0.5	1.2
SKR26	Positioning Repeatability Accuracy [mm]	±0.01	±0.005	±0.003
	Positioning Accuracy [mm]	—	0.060	0.020
	Running Parallelism [mm]	—	0.025	0.010
	Backlash [mm]	0.020	0.010	0.003
	Starting Torque [N-cm]	1.5	1.5	4.0

● Permissible Static Moment / Equivalent Moment Factor

Direction Model	Permissible Static Moment			Equivalent Moment Factor	
	M _A [kN-m]	M _B [kN-m]	M _C [kN-m]	K _A , K _B	K _C
SKR20A	0.038	0.038	0.098	2.34×10^{-1}	8.07×10^{-2}
SKR20B	0.207	0.207	0.197	4.38×10^{-2}	8.07×10^{-2}
SKR26A	0.117	0.117	0.265	1.59×10^{-1}	6.17×10^{-2}
SKR26B	0.589	0.589	0.53	3.18×10^{-2}	6.17×10^{-2}

Note: The values for models SKR-B indicate the values when two blocks are used in close contact with each other.

Note: K_A: moment equivalent coefficient in the M_A direction

K_B: moment equivalent coefficient in the M_B direction

K_C: moment equivalent coefficient in the M_C direction

● Maximum Travel Speed

The SKR-type is compatible with the latest high-speed rotational AC servo-motors (6000 min⁻¹)

Moreover, the lineup of the 6-mm lead type allows a higher feed rate.

The maximum manufacturing length is shown as the outer rail length.

Model	Ball Screw's Lead [mm]	Outer rail Length [mm]	Maximum Travel Speed [mm/s]	Maximum Manufacturing Length [mm]
SKR20	1	100	100	250
		150	100	
		200	100	
	6	100	600	
		150	600	
		200	600	
SKR26	2	150	200	350
		200	200	
		250	200	
		300	200	
	6	150	600	
		200	600	
		250	600	
		300	600	

Note: Maximum Travel Speed is when the rotational speed of the motor is 6000 min⁻¹.

Accuracy Standards

The precision of the SKR is determined by positioning repetitive repeatability, positioning accuracy, backlash, and running parallelism.

Positioning Repetitive 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 value as the measurement value and express the value of half the maximum difference with symbol " \pm " as positioning repeatability.

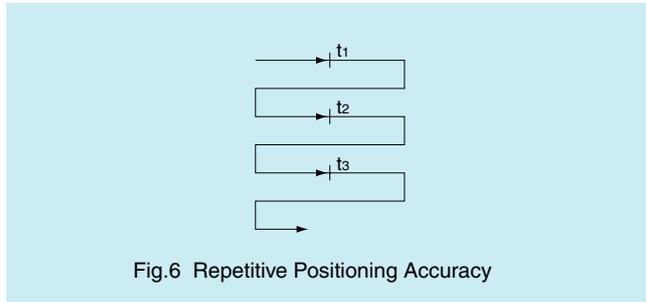


Fig.6 Repetitive Positioning Accuracy

Positioning Accuracy

The positioning accuracy is expressed as the absolute value of maximum difference in error between the actual distance traveled from the reference position and the commanded value when the maximum stroke is defined as the reference length.

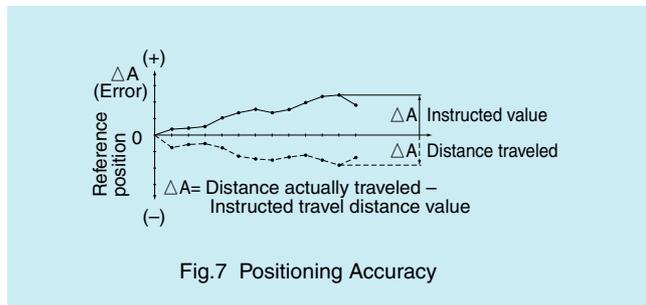


Fig.7 Positioning Accuracy

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.

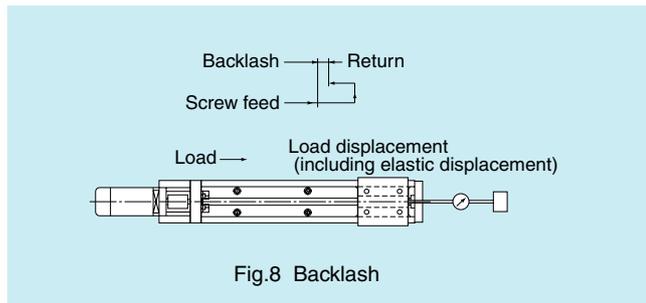


Fig.8 Backlash

Running Parallelism

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.

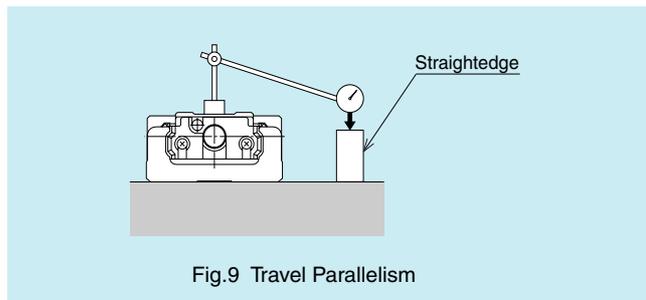


Fig.9 Travel Parallelism

How to Interpret the Model Number

10
SKR20 06 A +200L P 0 - 0 0 0 0
1
2
3
4
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9

- 1 Model number
 2 Ball screw lead [mm]
 3 Type of inner block
 4 Outer rail length [mm]
5 Accuracy grade
 6 Presence/Absence of a motor
 7 Presence/Absence of a cover
 8 Sensor specifications
9 Type of Motor bracket (housing-A, intermediate flange) (See page 13)
 10 Control number

5	Accuracy grade	Description	Normal grade	High-accuracy grade	Precision grade
	Symbol		No Symbol	H	P
6	Provision of Motor	Description	Not provided		Provided (assembled at THK)
	Symbol		0		1
7	Provision of Cover	Description	Not provided		Provided
	Symbol		0		1

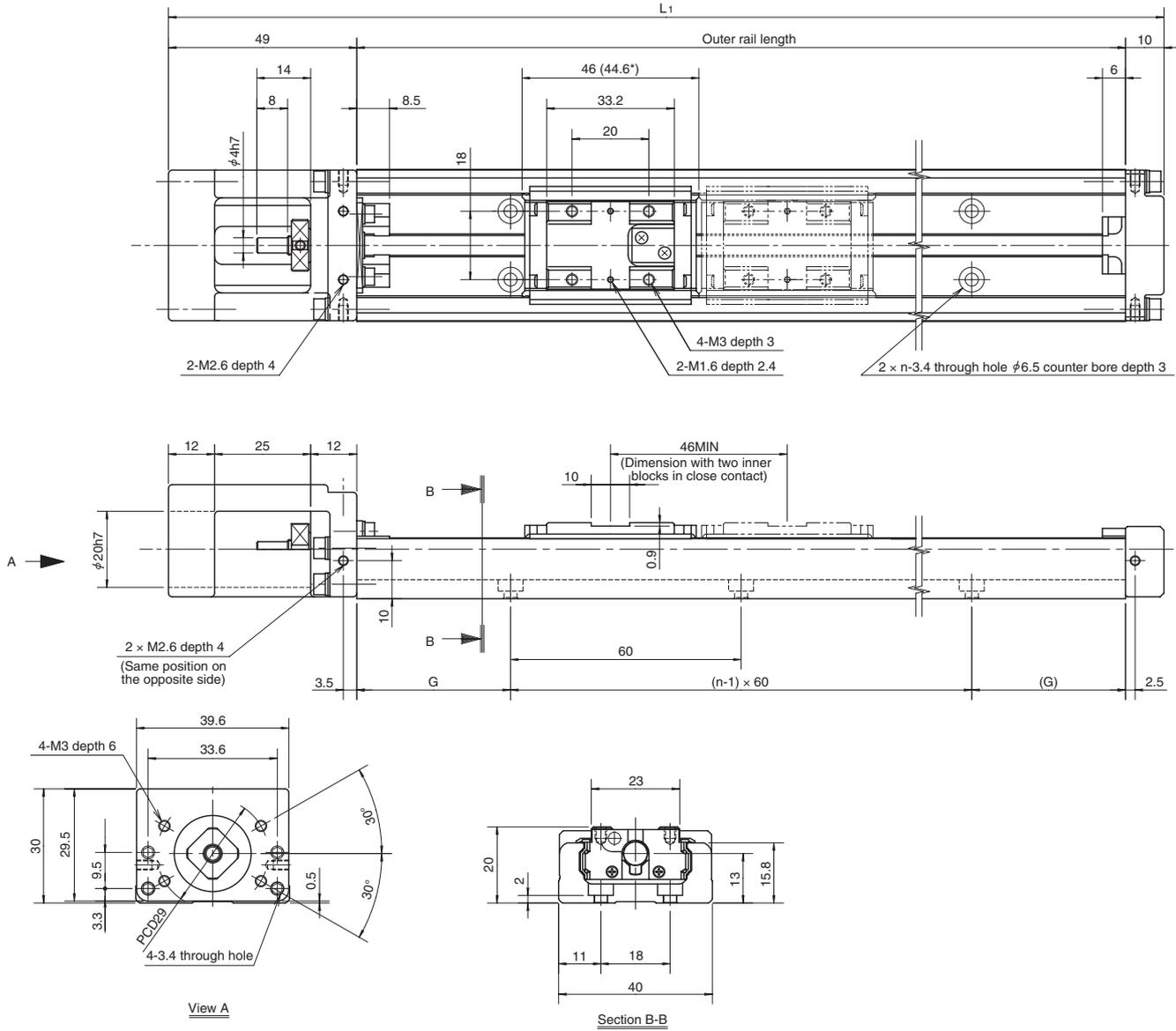
8 Sensor Specifications

Symbol	Description	Type	Accessory
0	None	-	-
1	With sensor rail	-	Mounting screw
2	3 photosensors	EE-SX671 (OMRON)	Mounting screw/nut, detecting plate, sensor rail, mounting plate, connector (EE-1001)
4	3 proximity sensors Normally OPEN	GL-12F (SUNX)	Mounting screw/nut, detecting plate, sensor rail, fixture (MS-GL12)
5	3 proximity sensors Normally OPEN	GXL-N12F (SUNX)	Mounting screw/nut, detecting plate, sensor rail, fixture (MS-GXL12)
6	3 photosensors	EE-SX674 (OMRON)	Mounting screw/nut, detecting plate, sensor rail, mounting plate, connector (EE-1001)
7	3 proximity sensors Normally OPEN	APM-D3A1-001(YAMATAKE)	Mounting screw/nut, detecting plate, sensor rail
8	3 proximity sensors Normally OPEN	GL-N12F (SUNX)	Mounting screw/nut, detecting plate, sensor rail
9	3 proximity sensors Normally CLOSED	GL-N12FB (SUNX)	Mounting screw/nut, detecting plate, sensor rail
A	3 proximity sensors Normally CLOSED	GXL-N12FB (SUNX)	Mounting screw/nut, detecting plate, sensor rail, fixture (MS-GXL12)
B	3 proximity sensors Normally CLOSED	APM-D3B1-003(YAMATAKE)	Mounting screw/nut, detecting plate, sensor rail
C	Proximity sensor Normally OPEN (1), Normally CLOSED (2)	GL-N12F (1 unit), GL-N12FB (2 units)	Mounting screw/nut, detecting plate, sensor rail
D	Proximity sensor Normally OPEN (1), Normally CLOSED (2)	GXL-N12F (1 unit), GXL-N12FB (2 units)	Mounting screw/nut, detecting plate, sensor rail, fixture (MS-GXL12)
E	Proximity sensor Normally OPEN (1), Normally CLOSED (2)	APM-D3A1-001 (1 unit), APM-D3B1-003 (2 units)	Mounting screw/nut, detecting plate, sensor rail
F	Proximity sensor Normally OPEN (1), Normally CLOSED (2) (PNP OUTPUT)	GXL-N12F-P (1 unit), GXL-N12FB-P (2 units)	Mounting screw/nut, detecting plate, sensor rail, fixture (MS-GXL12)

SKR20 Standard Specifications

SKR20 A (with a single long block)

SKR20 B (with two long blocks)



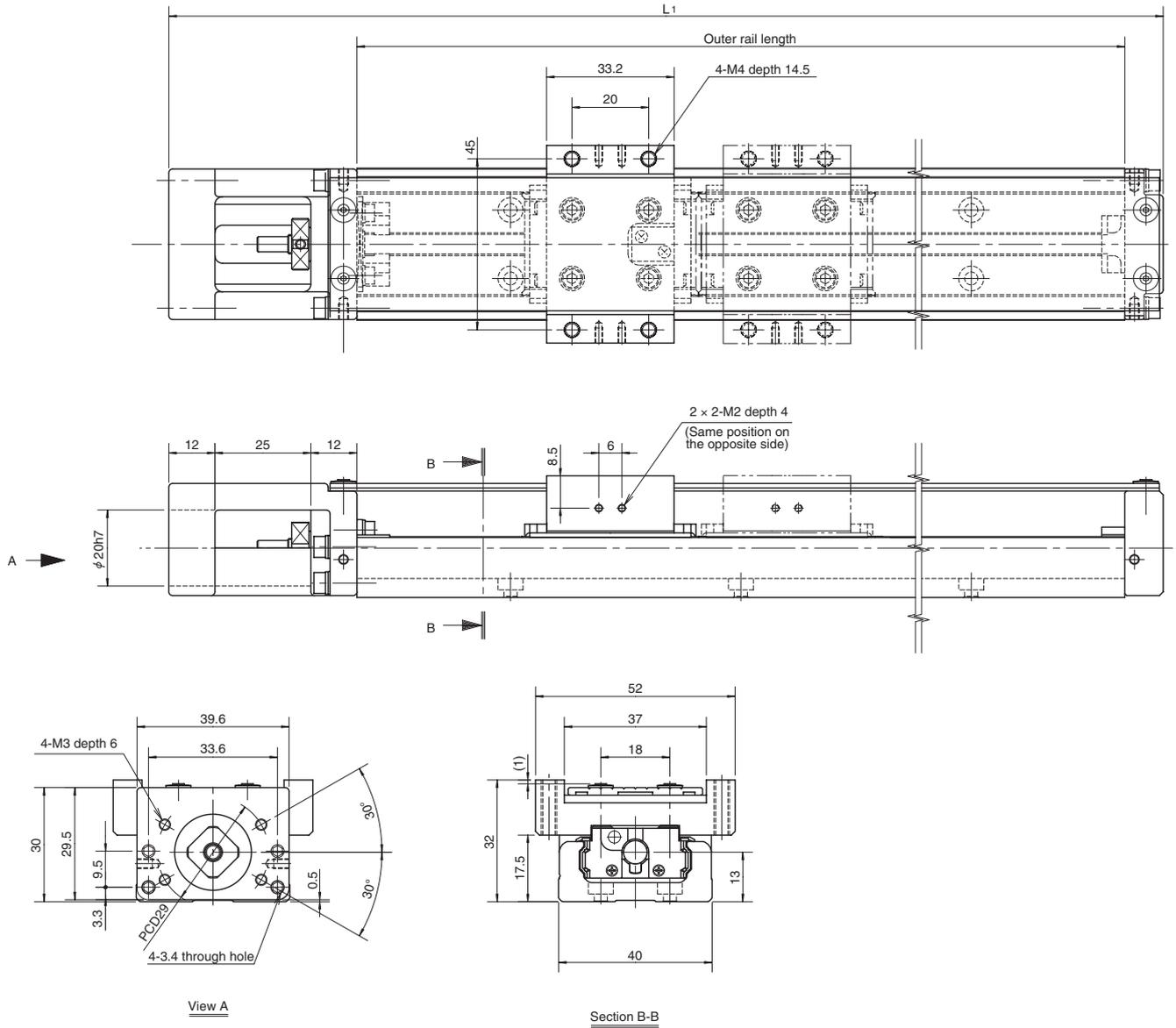
*: Block length for calculating available stroke length. Block length of SKR20 B (with two blocks) is 90.6 mm.

Outer rail Length [mm]	Overall Length L_1 [mm]	Available Stroke Range [mm]		G [mm]	n	Overall main unit mass [kg]	
		Type A	Type B			Type A	Type B
100	159	40.9	—	20	2	0.45	—
150	209	90.9	44.9	15	3	0.58	0.66
200	259	140.9	94.9	40	3	0.72	0.8

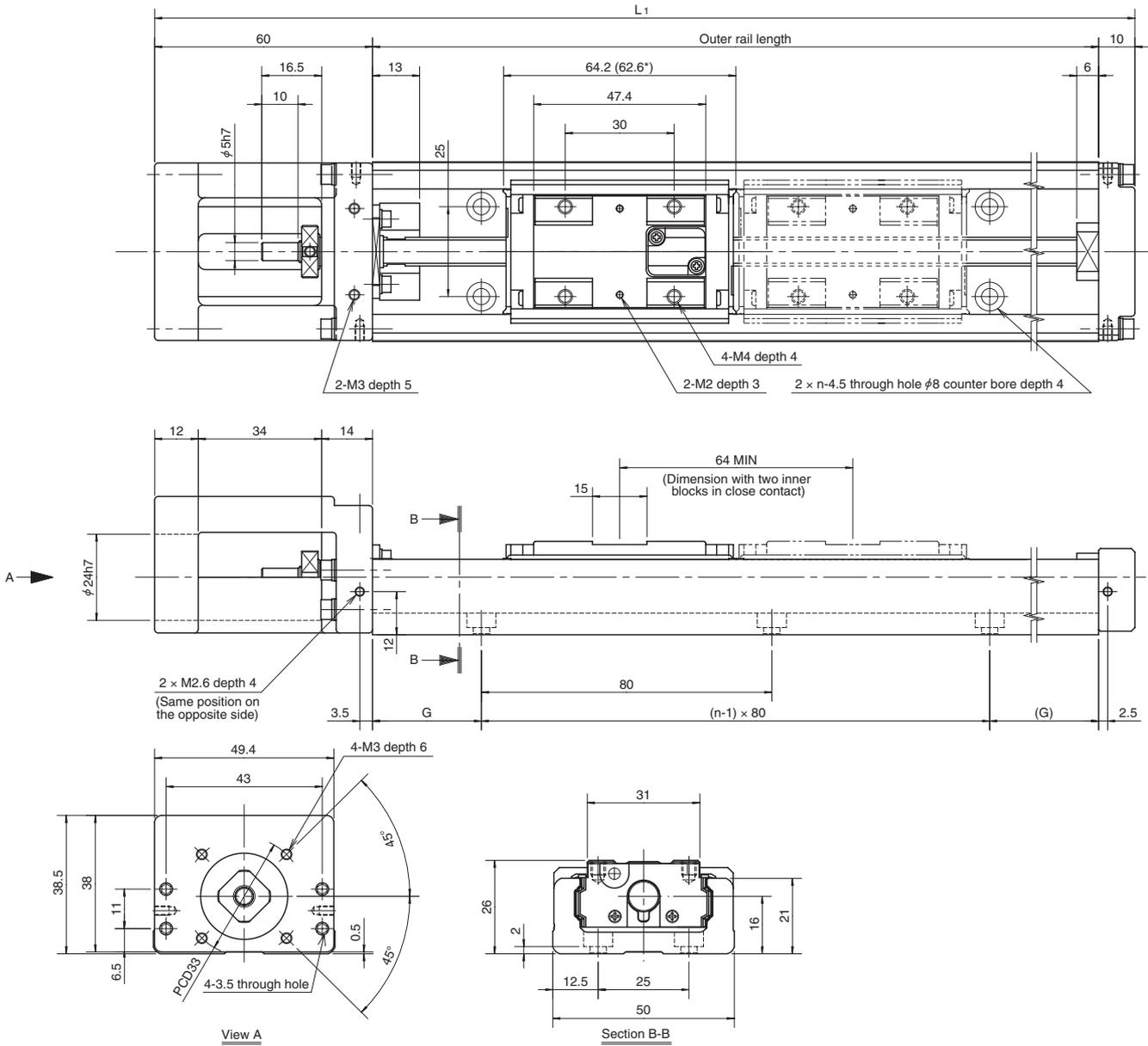
SKR20 □□□ (with the Cover)

SKR20 □□ A (with a single long block)

SKR20 □□ B (with two long blocks)



Outer rail Length [mm]	Overall Length L ₁ [mm]	Available Stroke Range [mm]		G [mm]	n	Overall main unit mass [kg]	
		Type A	Type B			Type A	Type B
100	159	40.9	—	20	2	0.5	—
150	209	90.9	44.9	15	3	0.64	0.76
200	259	140.9	94.9	40	3	0.79	0.91



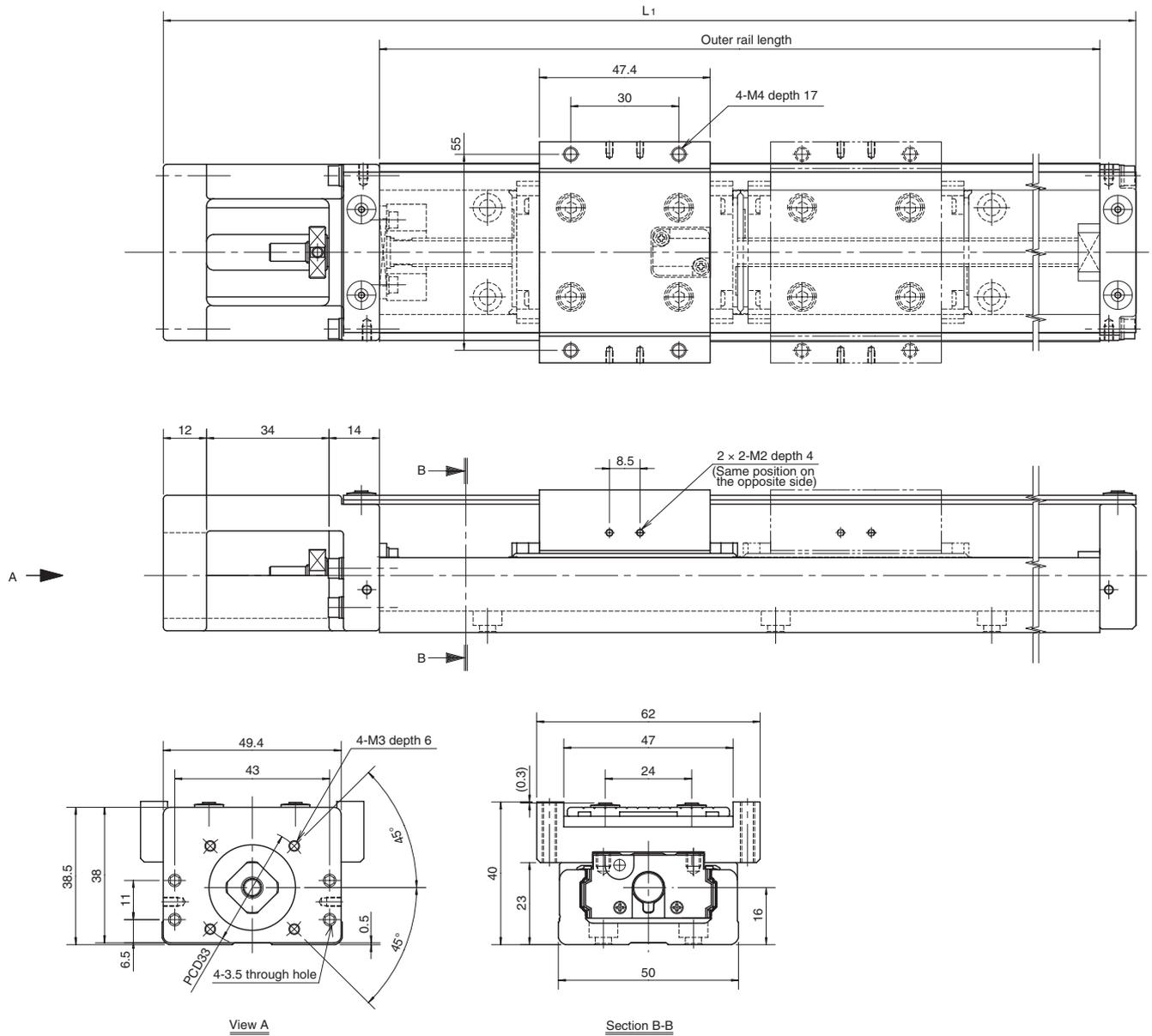
*: Block length for calculating available stroke length. Block length of SKR26 B (with two blocks) is 126.8 mm.

Outer rail Length [mm]	Overall Length L_1 [mm]	Available Stroke Range [mm]		G [mm]	n	Overall main unit mass [kg]	
		Type A	Type B			Type A	Type B
150	220	68.4	—	35	2	0.99	—
200	270	118.4	54.2	20	3	1.2	1.38
250	320	168.4	104.2	45	3	1.41	1.59
300	370	218.4	154.2	30	4	1.62	1.8

SKR26 □□□ (with the Cover)

SKR26 □□ A (with a single long block)

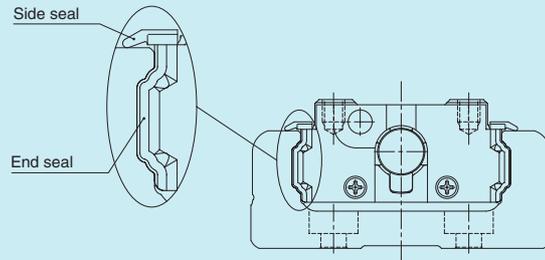
SKR26 □□ B (with two long blocks)



Outer rail Length [mm]	Overall Length L_1 [mm]	Available Stroke Range [mm]		G [mm]	n	Overall main unit mass [kg]	
		Type A	Type B			Type A	Type B
150	220	68.4	—	35	2	1.1	—
200	270	118.4	54.2	20	3	1.32	1.57
250	320	168.4	104.2	45	3	1.54	1.79
300	370	218.4	154.2	30	4	1.76	2.01

Seals

The SKR is equipped with an end seal and side seal as standard for dust-proofing.



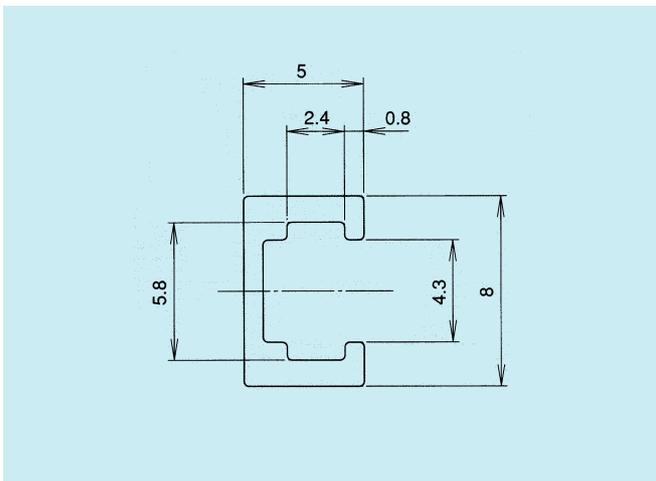
Sensors

Proximity sensors and photosensors are available as options for the SKR20 and SKR26. When a customer specifies a model with a sensor, specially designed sensor rails and sensor dogs are supplied with the product. (See page 6 for details.)

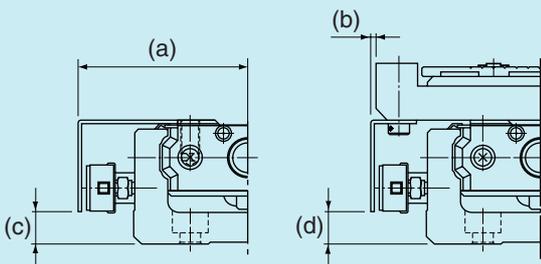
Sensor rails

It is also possible to install a sensor rail only.

Unit: mm



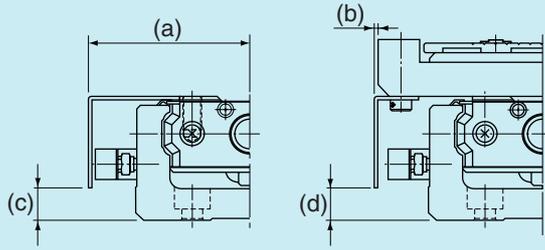
Proximity sensors GL-12F GL-N12F(B) GXL-N12F(B) GXL-N12F(B)-P (SUNX)



Unit: mm

Model	a	b	c	d
SKR20	34	8	3.6	4
SKR26	39.5	8	6	6

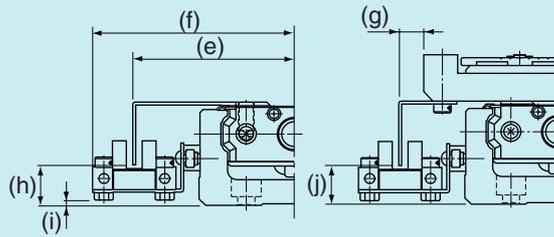
Proximity sensors APM-D3A1-001 APM-D3B1-003 (YAMATAKE)



Unit: mm

Model	a	b	c	d
SKR20	32.5	6.5	6	6
SKR26	38	6.5	8	8

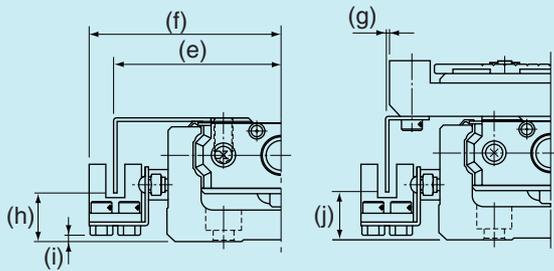
Photosensors EE-SX671 (OMRON)



Unit: mm

Model	e	f	g	h	i	j
SKR20	41	54	15	9.4	1	9.5
SKR26	46.5	58.5	15	11.5	3	11.5

Photosensors EE-SX674 (OMRON)



Unit: mm

Model	e	f	g	h	i	j
SKR20	38.5	45	12.5	11	0.8	11
SKR26	44	50	12.5	13	2.8	13

Intermediate Flanges

Applicable Motors and Applicable Intermediate Flanges

The SKR-type is provided with intermediate flanges so that a variety of motors can be installed. The table below shows the control number of the intermediate flanges meeting the applicable motors on a model number basis. At the time of order, specify the intermediate flange control number.

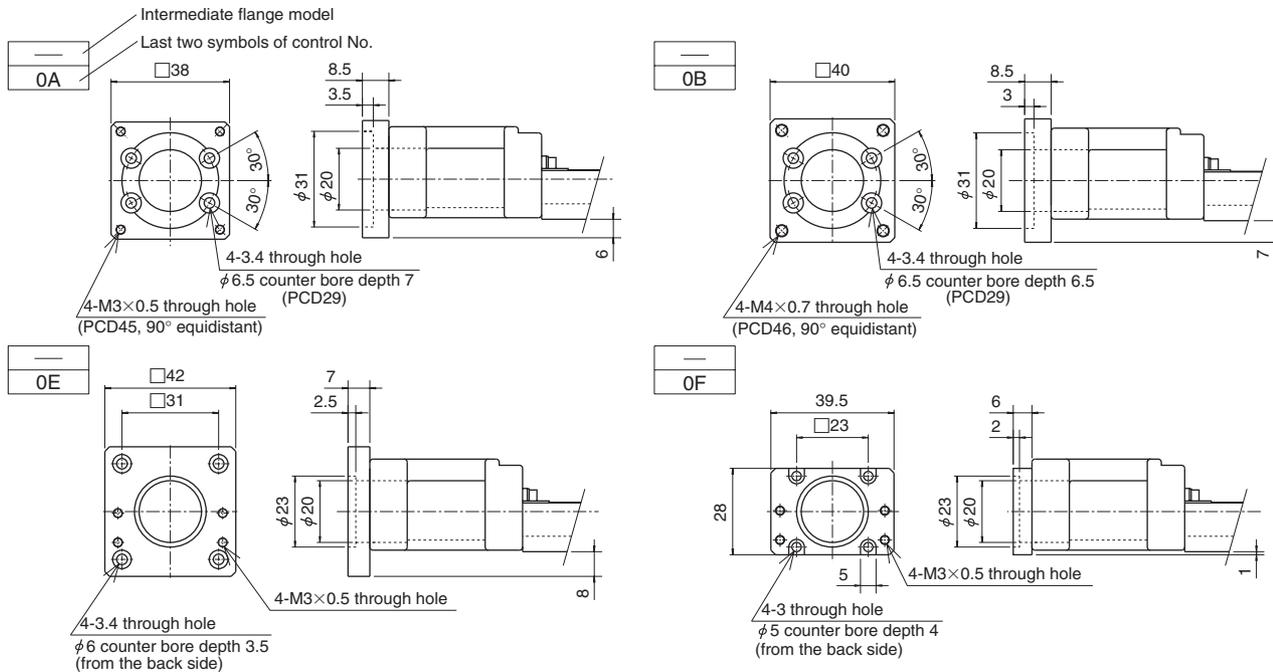
			Motor Model	Flange angle	SKR20	SKR26	
AC Servo Motors	Yaskawa Electric	Σ -V	SGMJV-A5 (50W) SGMAV-A5 (50W)	□40	0B	0B	
		Σ -III	SGMAS-A5 (50W)				
		Σ -II	SGMAH-A3 (30W) SGMAH-A5 (50W)				
		Σ -mini	SGMM-A1 (10W) SGMM-A2 (20W) SGMM-A3 (30W)				
	Mitsubishi Electric	MELSERVO	J3	HF-MP053 (50W) HF-KP053 (50W)	□40	0B	0B
			J2 Super	HC-MFS053 (50W) HC-KFS053 (50W)			
			J2-Jr	HC-AQ013 (10W) HC-AQ023 (20W) HC-AQ033 (30W)			
	Matsushita Electric	MINAS A4		MSMD 5A (50W)	□38	0A	0A
		MINAS A III		MSMA 3A (30W) MSMA 5A (50W)			
	SANVO Electric	SANMOTION Q1		Q1AA04003D (30W) Q1AA04005D (50W)	□40	0B	0B
OMRON		OMNUC W		R88M-W03030 (30W) R88M-W05030 (50W)			
	SMARTSTEP A		R7M-A03030 (30W) R7M-A05030 (50W)	□40	0B	0B	
FANUC	βis series		β0.2/5000is (50W)				□40
KEYENCE	MV		MV-M05 (50W)	□40	0B	0B	
Stepping Motors	Oriental Motor	α Step		ASC3* AS 46, ASC46, AR46	□28	0F	0F
		Five phase	CSK II	CSK52*	□28	0F	0F
				CSK54*	□42	0E	0E
				RK54*	□42	0E	0E
		Two phase	UMK	UMK24*	□42	0E	0E
				CSK	CSK24*	□42	0E

Note 1: Symbols in the SKR type columns show the lower two digits of the intermediate flange control numbers.

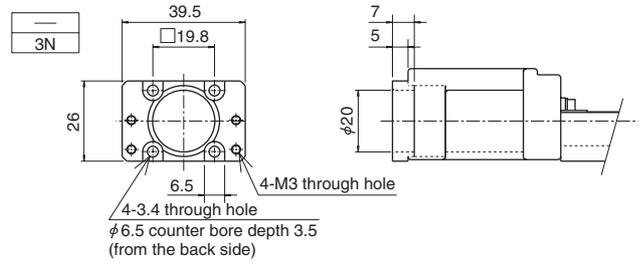
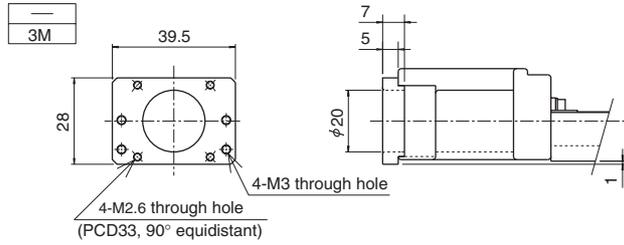
Note 2: Please contact THK regarding the coupling when installing motors in the above table.

Dimensions of the Intermediate Flanges

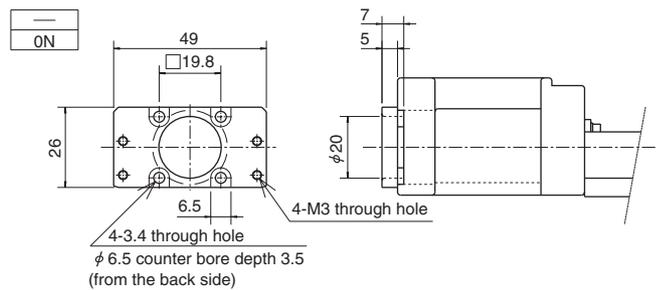
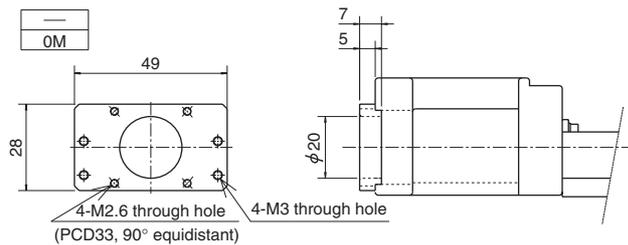
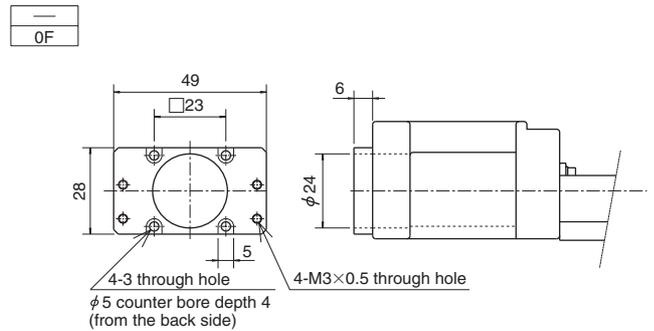
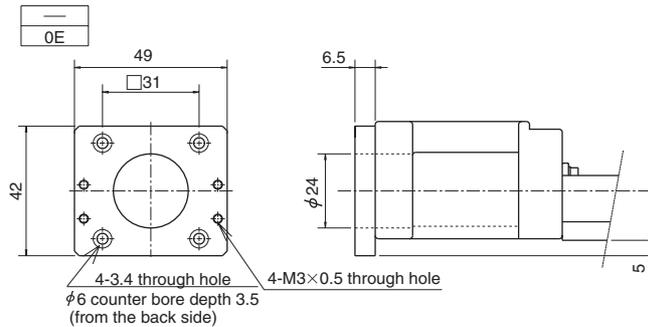
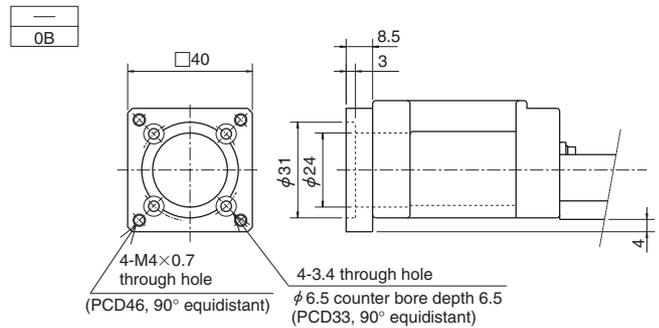
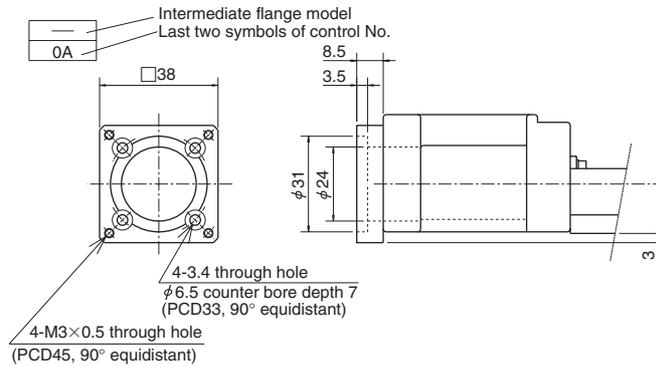
SKR20



Dimensions of the Intermediate Flanges



SKR26



Precautions on Use

Handling

- Do not disassemble the product; doing so may result in the entry of foreign material or the decreased accuracy of the assembly.
- Handle the product carefully. Dropping or striking it may result in breakage. Applying shock to the product may result in functional damage even if the product appears to have no visible damage.

Lubrication

- Thoroughly wipe off the rust-preventive oil from the product and then fill it with lubricant before use.
- Do not mix and use lubricants with different properties.
- If the product is to be used in locations constantly exposed to vibration or in special environments such as clean rooms, vacuum, low temperature, or high temperature, there are cases where ordinary grease cannot be used. In such cases, contact THK.
- When special lubricants are used, contact THK.
- When oil lubrication is to be used, contact THK.
- To obtain maximum performance from the SKR, lubrication is essential. Use of the product without lubrication may result in increased abrasion at rolling sections or a shorter life.
- Standard grease: THK AFA grease. The standard SKR model has no grease nipples. Apply grease directly to the rolling surfaces. Please contact THK if you wish to have a grease nipple provided on the product. A low dust-generating grease, THK AFF, is available for use in clean rooms. Contact THK.

Precautions on Use

- Entry of foreign material may cause damage to the ball circulating path or loss of function. Prevent foreign material, such as dust or chips, from entering the system.
- When using the system in an environment where coolant penetrates the inner block, contact THK.
- This product must be used within a temperature range of 0 to +40°C (no freezing or condensation must occur). When using the system at temperatures of +40°C or higher, contact THK.
- If foreign material, such as dirt or chips, penetrates the system, replenish the lubricant after cleaning the product. For available types of cleaning fluid, contact THK.
- Operating the product exceeding the permissible revolution speed may lead to part breakage or accidents. The operating rotational speed should be limited to the range specified by THK.
- When using the product in locations constantly exposed to vibrations or in special environments such as clean rooms, vacuum, low temperature or high temperature, contact THK.

Precautions on Safety

- When the product is in operation or is ready for operation, DO NOT touch any moving parts of the product. Do not come within the operating range of the actuator.
- When two or more persons engage in work concerning the product, previously confirm the procedure, signaling, and measures against abnormal conditions and arrange for an observer.

Storage

- When storing the SKR, pack it in the package specified by THK and store it in the horizontal state while avoiding low and high temperatures, and high humidity.

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