KURODA

HIGH ACCURACY AND HIGH RIGIDITY
SINGLE AXIS MODULE
SG、SE SERIES

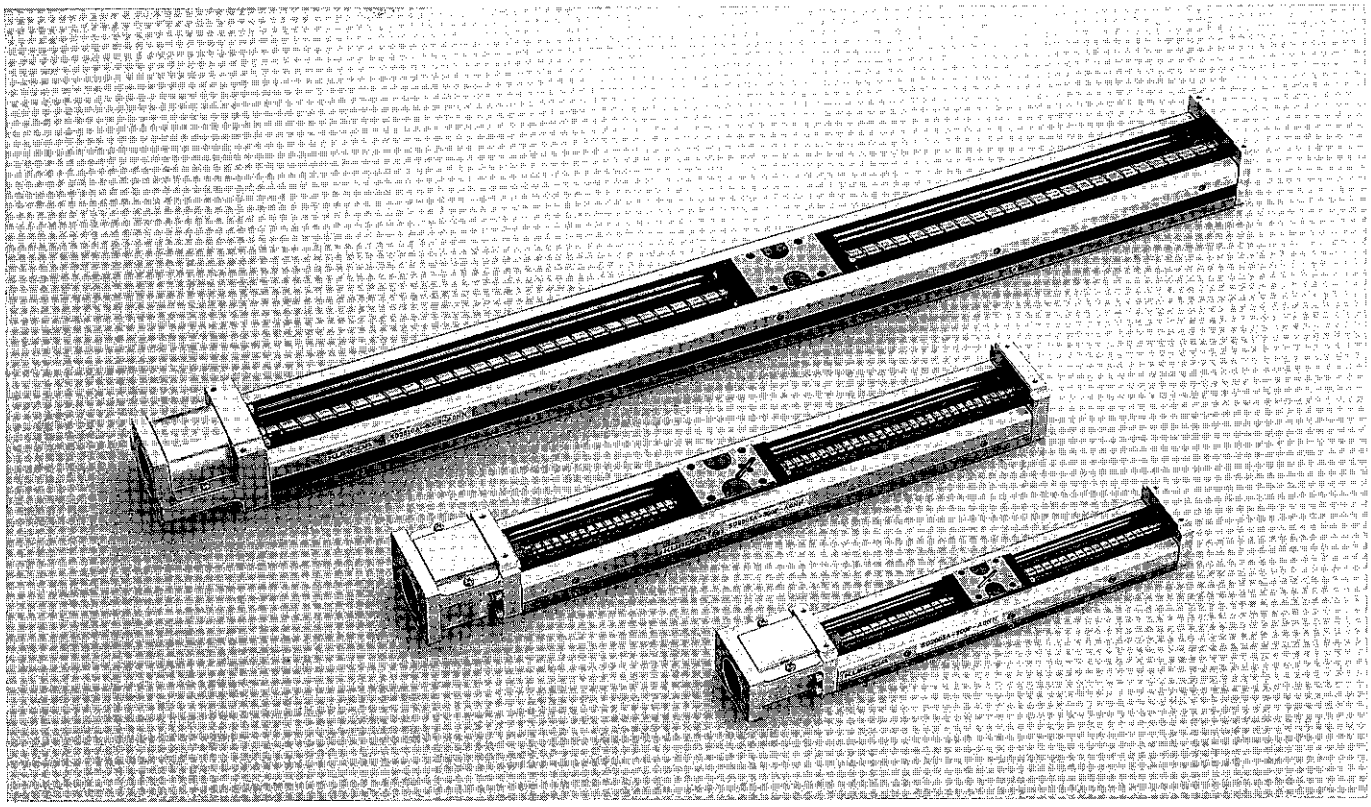
TÜV CERT
ISO 9001
Cert. No. 09 100 5769
ISO 14001
Cert. No. 01 104 010775

LLOYD'S REGISTER QUALITY ASSURANCE ISO 14001

UKAS ENVIRONMENTAL MANAGEMENT
001

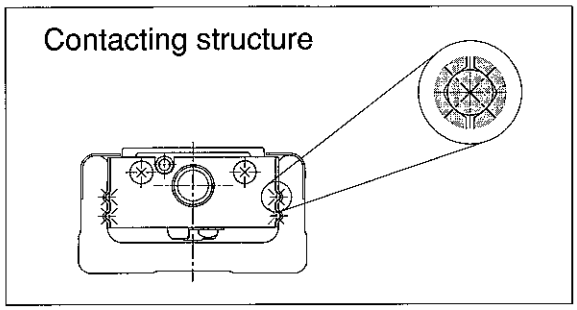
HIGH ACCURACY SINGLE AXIS MODULE SG SERIES

High degree of accuracy, rigidity and compactness attained by integrating precision ball screw with precision slide guide in single axis module.



Accuracy

Linear motion unit uses "4-Ballway/4 points-contact" structure to assure high degree of rigidity. Guide rail, slide block and ball screw shaft are accurately ground, making accurate positioning possible.



Rigidity

Despite of its compact structure, the rigidity of single axis module has remarkable improved by using a U-guide rail, so that it can be applied even to a structure supported at only one end. (Refer to page 8.)
In addition, short block, long block and second block are available to enhance permissible moment.

Space-saving

Slide block is set in U-guide rail, making it possible to reduce the size and space considerably as compared with the usual table type structure.

No necessity for adjustment

Guide rail and ball screw are integrated in single axis module, eliminating the need for complicated fine adjustment and reducing the number of working processes to a great extent.

Wide variations

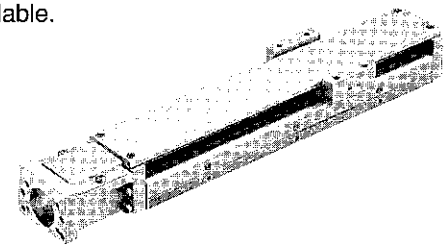
Model No.	Outside diameter of ball screw (mm)	Lead of ball screw (mm)				
		1	2	5	10	20
SG20	ϕ 6	◎	–	◎	–	–
SG26	ϕ 8	–	◎	◎	–	–
SG33	ϕ 10	–	○	◎	◎	–
SG46	ϕ 15	–	–	○	◎	◎
SG55	ϕ 20	–	–	○	○	◎

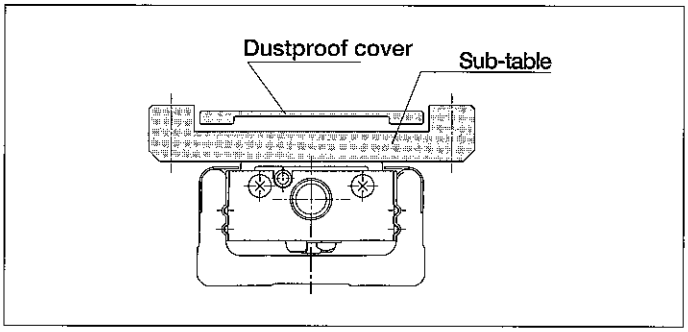
◎ : In-stock items ○ : Standard items For other leads, contact KURODA.

OPTION

Dustproof Cover

Single axis module with dustproof cover is optionally available.





Motor brackets and intermediate flanges

Motor brackets and intermediates flanges are provided for single axis module so that various motors can be optionally mounted on single axis module. (Refer to Pages 15 to 20)
In addition, Parallel motor mounting is also available to make compactness fit for practical use. (Refer to Page 31.)

Dustproof bellows (Customized Option)

Dustproof bellows for protection against environmental factors is available, contact KURODA.

Rust proofing

Processable by highly effective Raydent treatment. For stainless steel type,contact KURODA.

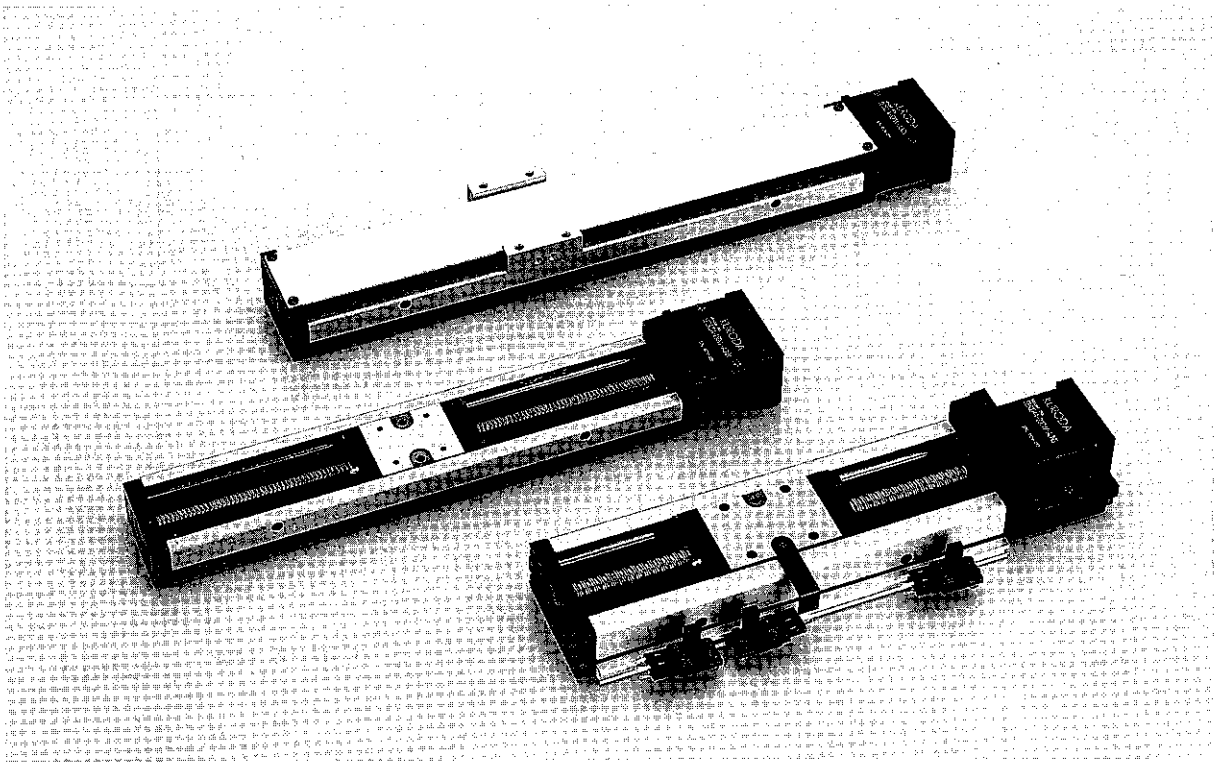
Dust preventive grease (C-grease)

C-grease can be applied to ball screw and guide to prevent particle generation for Semicon related industries.

Sensor

(Refer to Pages 32 to 34 and 52 to 54.)

HIGH RIGIDITY SINGLE AXIS MODULE SE SERIES



●High-precision motion

Gothic arch configuration (4-points contact structure) assures smooth and high-precision motion.

●No necessity for adjustment.

Guide rail and ball screw are integrated in single axis module, eliminating the need for complicated fine adjustment and reducing the number of working processes to a great extent.

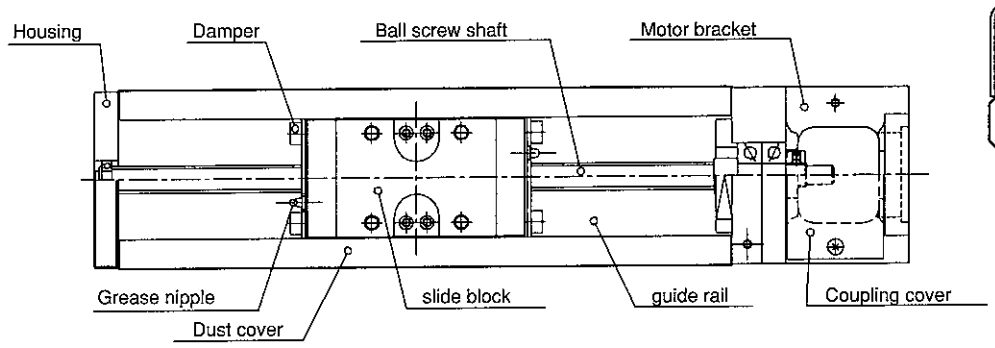
●Satisfactory optional accessories

Abundant variety of optional accessories such as dustproof cover, bellows*,sensors, motor brackets, Parallel motor mounting and XY brackets*are available to meet a broad range of needs. (For asterisked items, contact KURODA.)

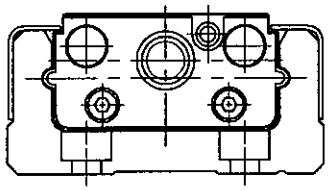
●Compactness

U-shaped guide rail is adopted to provide compactness and high rigidity.

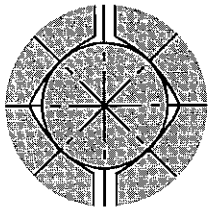
STRUCTURE



Sectional form



4 points-contact



Wide variations

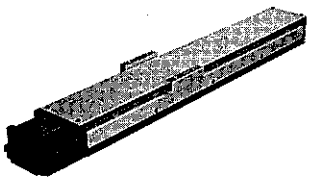
SE30 are added to existing SE23.

Model No.	Outside diameter of ball screw (mm)	Lead of ball screw (mm)			
		2	4	5	10
SE23	ϕ8	◎	–	◎	–
SE30	ϕ10	–	◎	◎	◎

OPTION

Dustproof cover

Single axis module with dustproof cover is optionally available.



Dowel pin hole

It is possible to make a dowel pin hole on slide block so as to perform mounting work more efficient.

Sensor

(Refer to Pages 50 to 54.)

Motor brackets and intermediate flanges

Motor brackets and intermediates flanges are provided for single axis module so that various motors can be optionally mounted on single axis module.
In addition, Parallel motor mounting are also available to make compactness fit for practical use. (Refer to Pages 42 to 44 and 49.)

Rust proofing

Processable by highly effective Raydent treatment.
For stainless steel type, contact KURODA.

Dust preventive grease (C-grease)

C-grease can be applied to ball screw and guide to prevent particle generation for Semicon related industries. For other greases, contact KURODA.

CONTENTS

FOR SAFETY USE

Be sure to read the following instructions before use.
For common instructions, refer to the text of this catalog.

The following safety precautions recommend the correct usage of our products to prevent an injury and a damage.
These precautions are classified into 3 categories : **"DANGER","WARNING"** and **"CAUTION"** according to the degree of possible injury or damage and the degree of impendence of such injury or damage.
Be sure to follow all these precautions, as they include important contents regarding safety.

DANGER	WARNING	CAUTION
Indicates an impending hazardous situation that may arise due to improper handling or operation and could result in a serious injury or death.	Indicates a potentially hazardous situation that may arise due to improper handling or operation and could result in a serious injury or death.	Indicates a potentially hazardous situation that may arise due to improper handling or operation and could result in an injury or property damage only.

Be sure to obey "Labor Safety and Sanitation Law" and other safety rules and regulations in addition to these precautions.
There is some situation that may lead to a serious result according to circumstances, even if it is mentioned in the category of **"CAUTION"**. Be sure to follow these precautions, as they contain important matters.

WARNING

●Select a single axis module properly.

As operating conditions for products mentioned in this catalog are diversified, the applicability of single axis module to the intended system should be determined by the total system designer or the person who determined specifications for such system after conducting an analysis and testing as necessary.
The person who determined the applicability of the system shall be responsible for assuring the intended system performance and safety. When configuring a system, the system designer should thoroughly examine all specifications for such a system by referring to the latest product catalog and data, and also take into consideration the possibility of equipment troubles.

●The single axis module should be handled by persons who have sufficient knowledge and rich experience.

- Thoroughly read this catalog and operation manual before use.
- Never disassemble the single axis module. Dust can enter the inside, degrading the accuracy of the module and causing an accident. When the single axis module has been disassembled from necessity, return it to our company for repair and reassembling. (In this case, repairing charges are required.)
- When mounting a single axis module to a machine and dismounting it from machine, check that a fall prevention means has been taken and the moving part of the machine has been fixed beforehand.

●When using the single axis module in the following conditions or environments, take the proper safety measures and consult KURODA beforehand.

- Conditions and environments other than specified and outdoor use.
- Applications to nuclear power equipment, railroads aircraft, vehicles, medical equipment, equipment connected with food and drink, and the likes.
- Applications which require extreme safety and will also greatly affect men and property.

SINGLE AXIS MODULE/COMMON INSTRUCTIONS

Be sure to read the following instructions before use.
Also refer to "FOR SAFETY USE".

DESIGN

⚠ WARING

- **Especially when there is the possibility that the single axis module is dangerous to the human body, provide it with a protective cover.**
  When there is the possibility that the load and the moving part of the single axis module are dangerous to the human body, design the structure to prevent the human body from touching such load and moving part directly.
- **Firmly tighten the fixed part and connection of the single axis module.**
  Improper mounting of the body may adversely affect safety and accuracy according to circumstances.
- **Take into consideration the behavior of the single axis module in an emergency.**
  When the machine is immediately stopped in an emergency by a person or by a safety device in case of power failure or system trouble, the motion of the module can injure the human body and can damage the machine. So design the machine to prevent an injuy to the human body and a damage to the machine.

SELECTION

⚠ WARNING

- **Check specifications.**
  Be sure to use the single axis module within the given specifications.
- **When selecting a rigid type as coupling for connecting a motor, consult KURODA.**

MOUNTING

⚠ CAUTION

- **Be careful not to dent and flaw the body and the mounting surface of the table.**
  The parallelism of the mounting surface will degrade, loosening the guide and increasing slidiing resistance.
- **When connecting the single axis module to a load with an extemal support or guide, do so in accordance with a proper connecting method and perform centering satisfactorily.**
- **When mounting a load, do not apply an excessive shock or moment.**
  If the single axis module receives external force exceeding the permissible moment, the guide will loosen and sliding resistance will increase.
- **Do not start the system until it is confirmed that the single axis module works properly.**
  After mounting the single axis module, perform an appropriate functional test and make sure that it is correctly mounted and works safety without fail before starting the system.

OPERATING ENVIRONMENT

⚠ DANGER

- **Do not use the single axis module in a place where an explosive atmosphere exists.**

⚠ WARNING

- **Do not use the single axis module in an atmosphere containing corrosive gases, chemicals, seawater, water and vapor and in a place where it can be stained with such matters.**
- **When using the single axis module in a place where it is exposed to dust, cuttings, spatters, etc., fit a protective cover or other protector.**
- **Do not use the single axis module in a vibratory or shockable place ; otherwise causing a bad condition or breakdown.**
  When using the single axis module in such an environment, consult KURODA.

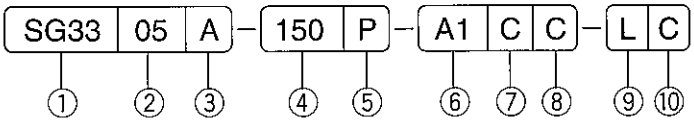
LUBRICANTS

⚠ CAUTION

- **Unless otherwise specified, the nut contains Multemp PS No.2 Grease(KYODO YUSHI CO., LTD.)as a lubricant.**
- **Checking and supplying lubricant**
  Check the lubricant 2 to 3 months after the ball screw is used for the first time. If it is extremely dirty, wipe off old grease and apply new grease. Then, check and supply the lubricant once every year as a general rule. However, as the service life of lubricants varies according to operating conditions and environment, adjust the intervals properly.
- **Do not use at high temperature over 80℃.**
  As resin is used in single axis module, use at lower temperature than 80℃.
  For single axis module with sensor, use at lower temperature than 55℃.

HIGH ACCURACY SINGLE AXIS MODULE
SG SERIES

ORDERING INSTRUCTIONS



①Model No.
SG20
SG26
SG33
SG46
SG55

②Lead of ball screw (mm)

	Lead	SG20	SG26	SG33	SG46	SG55
01	1mm	○	—	—	—	—
02	2mm	—	○	—	—	—
05	5mm	○	○	○	—	—
10	10mm	—	—	○	○	—
20	20mm	—	—	—	○	○

③Slide Block

A	With 1 long block
B	With 2 long blocks
C	With 1 short block
D	With 2 short blocks

(Note) SG20, SG26 and SG55 : A, B only
Linear operation shall be made by only the motor bracket side block.

④Guide rail length (mm)

Model	Standard guide rail length
SG20	100、150、200
SG26	150、200、250、300
SG33	150、200、300、400、500、*600
SG46	340、440、540、640、740、*840、*940
SG55	980、1080、1180、*1280、*1380

(Note) Asterisked (*) : Applicable to Ball Screw Accuracy "High Grade" only.

⑤Ball Screw Accuracy Grade

H	High Grade
P	Precision Grade

⑥Shape of Motor Bracket (see page 15 to 20)

	SG20	SG26	SG33	SG46	SG55
A0	○	○	○	○	○
A1	○	○	○	○	○
A2	○	○	○	○	○
A3	○	○	○	○	○
A4	○	—	○	—	○
A5	○	○	○	—	—
A6	○	○	—	—	—
A7	○	○	—	—	—
B0	—	—	—	○	—
B1	—	—	○	—	—
C0	—	—	—	○	—
D0	—	—	—	○	—
R0	—	—	○	○	—
*E□	—	—	○	○	—
*F□	—	—	○	○	—
*G□	—	—	○	○	—

(Note) Asterisked (*) item is provided with pulley unit.
Fill motor position number in □.
(Refer to Page 31.)

⑦Dustproof cover

N	Without dustproof cover
C	With dustproof cover

⑧Sensor

NPN output type		PNP output type		
N	Without sensor	N	Without sensor	
S	PM-L24	—	—	SG20,26
M	PM-Y54	Y	PM-Y54P	
K	APM-D3B1	E	APM-D3E1	
C	EE-SX674	P	EE-SX674P	SG33,46
H	EE-SX671	J	EE-SX671P	55

(Note) For module with sensor, the following parts are supplied as standard accessories:

⑨Raydent treatment

N	Without Raydent
L	With Raydent

⑩Grease

N	Standard grease
C	C-grease

Sensor Accessories

Symbol S (NPN)	Symbol M (NPN)/Y (PNP)	Symbol K (NPN)/E (PNP)	Symbol C (NPN)/P (PNP)	Symbol H (NPN)/J (PNP)
Photo-microsensor	Photo-microsensor	Proximity sensor	Photo-microsensor	Photo-microsensor
PM-L24 (NPN) :3pcs.	PM-Y54(NPN)	APM-D3B1(NPN)	EE-SX674(NPN)	EE-SX671(NPN)
Sensor dog :1pc.	/PM-Y54(PNP) :3pcs.	/APM-D3E1(PNP):2pcs.	/EE-SX674P(PNP) :3pcs.	/EE-SX671P(PNP) :3pcs.
Sensor mounting plate	Sensor dog :1pc.	APM-D3B1F(NPN)	Connector for sensor	Connector for sensor
:3pcs.	Sensor mounting plate	/APM-D3E1F(PNP):1pc.	EE-1001 :3pcs.	EE-1001 :3pcs.
Sensor rail :1pc.	:3pcs.	Sensor dog :1pc.	Sensor dog :1pc.	Sensor dog :1pc.
	Sensor rail :1pc.	Sensor rail :1pc.	Sensor rail :1pc.	Sensor rail :1pc.

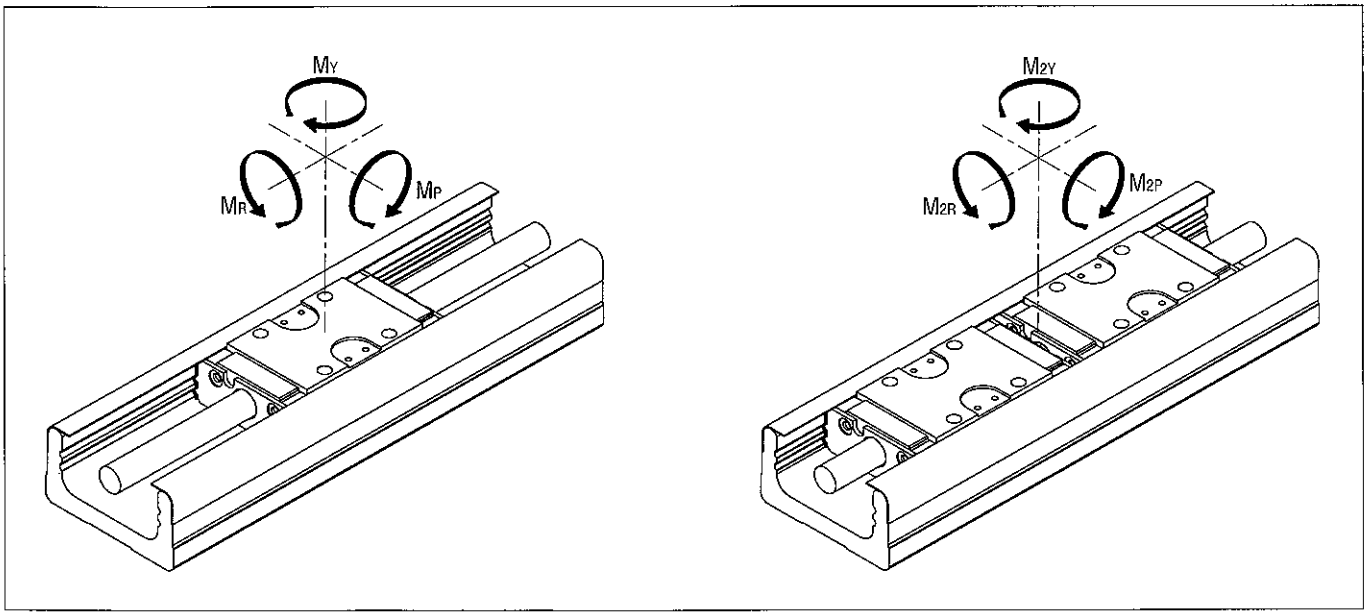
For detailed specifications of sensors, refer to Pages 52 to 54.

SPECIFICATIONS

Model No.				Unit	SG2001		SG2005		SG2602		SG2605		SG3305		SG3310		SG4610		SG4620		SG5520	
Precision grade					High	Precision	High	Precision	High	Precision	High	Precision	High	Precision	High	Precision	High	Precision	High	Precision	High	Precision
Radial clearance				μm	−3~0	−6~−3	−3~0	−6~−3	−4~0	−8~−4	−4~0	−8~−4	−3~0	−7~−3	−3~0	−7~−3	−5~0	−11~−5	−5~0	−11~−5	−6~0	−18~−6
Guide	Long block	Basic dynamic load rating	C	kN	4.10				7.91				11.8				27.0				36.8	
		Basic static load rating	C_0	kN	6.90				13.1				19.9				45.0				61.4	
		Static permissible moment	M_P	N·m	32				93				169				572				910	
			M_{2P}	N·m	194				560				1014				3432				5460	
			M_Y	N·m	38				111				201				681				1080	
			M_{2Y}	N·m	231				667				1206				4086				6480	
			M_R	N·m	88				224				411				1410				2230	
			M_{2R}	N·m	176				448				822				2820				4460	
	Short block	Basic dynamic load rating	C	kN	—				—				5.90				13.5				—	
		Basic static load rating	C_0	kN	—				—				9.90				22.5				—	
		Static permissible moment	M_P	N·m	—				—				42				143				—	
			M_{2P}	N·m	—				—				252				858				—	
			M_Y	N·m	—				—				49				169				—	
			M_{2Y}	N·m	—				—				294				1014				—	
			M_R	N·m	—				—				205				705				—	
			M_{2R}	N·m	—				—				410				1410				—	
Ball screw	Shaft diameter			mm	6				8				10				15				20	
	Lead			mm	1		5		2		5		5		10		10		20		20	
	Spacer to ball ratio			—	—				—				—	1:1	—	1:1	—	1:1	—	2:1	—	2:1
	Basic dynamic load rating		C_a	kN	0.63		0.65		2.60		2.35		3.35	2.11	2.20	1.39	4.40	2.77	4.40	3.36	5.40	4.12
	Basic static load rating		C_{oa}	kN	1.34		0.92		3.64		3.30		5.90	2.95	3.50	1.75	7.90	3.95	7.90	5.27	10.5	7.00
Fixed side bearing	Model No. of bearing			—	AC5-14DF or equivalent				AC6-16DF or equivalent				70M8DF/GMP5 or equivalent				7001T2DF/GMP5 or equivalent				7002T2DF/GMP5 or equivalent	
	Basic dynamic load rating		C_b	kN	0.696				1.38				4.40				6.77				7.74	
	Basic static load rating		C_{ob}	kN	0.304				1.76				4.36				7.45				9.50	

(Note) Each of static permissible moment M_{2P}, and M_{2Y} means static permissible moment where 2 slide blocks are used.
When using precision grade of SG20 and SG26 at small stroke (SG2001 : Less than 7mm,SG2005 : Less than 25mm, SG2602 : Less than 14mm, SG2605 : Less than 25mm) and at high-frequency reciprocation, consult KURODA.

DIRECTION OF MOMENT



HIGH ACCURACY SINGLE AXIS MODULE SG SERIES

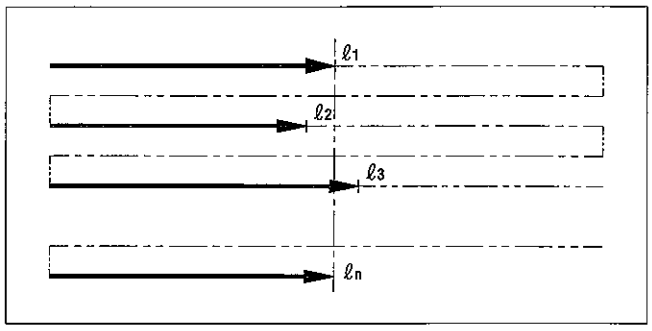
ACCURACY

Model No.	Guide Rail Length (mm)	Repeated positioning accuracy		Positioning accuracy		Traveling parallelism		Backlash		Starting torque	
		High (μm)	Precision (μm)	High (μm)	Precision (μm)	High (μm)	Precision (μm)	High (μm)	Precision (μm)	High (N·m)	Precision (N·m)
SG20	100	±5	±3	50	20	25	10	10	3	0.01	0.012
	150										
	200										
SG26	150	±5	±3	50	20	25	10	10	3	0.015	0.04
	200										
	250										
	300										
SG33	150	±5	±3	30	15	25	10	10	3	0.07	0.15
	200										
	300			35	20						
	400										
	500			40	25	35	15				
	600		—	70	—		—		—		—
SG46	340	±5	±3	35	20	35	15	10	3	0.10	0.15
	440										
	540			40	25						0.17
	640										
	740			50	30	40	20				
	840		—	90	—	50	—		—		—
	940										
SG55	980	±5	±3	80	35	50	25	10	3	0.12	0.17
	1080										
	1180			100	40		30				0.20
	1280		—		—		—		—		—
	1380										

Measurement is to be performed with KURODA's specified motor mounted.

●Repeated Positioning Accuracy

Repeat positioning of slide block in the same direction 7 times, measure stop position of slide block and halve maximum difference between obtained readings. Perform this measurement at the center and both ends of travel distance. Maximum value a-



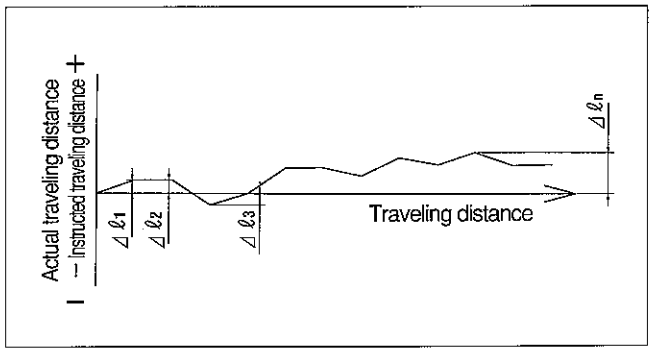
Repeated positioning accuracy =

$\pm\frac{1}{2}$ ((Maximum value of ℓn) − (Minimum value of ℓn))

●Positioning Accuracy

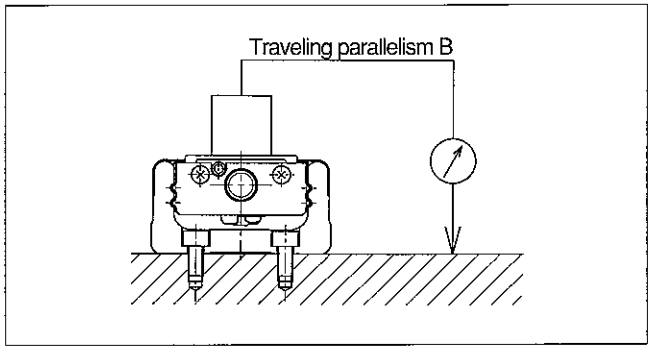
Position slide block properly in a fixed direction and use the position so obtained as datum point. Then, perform positioning of slide block in the same direction and measure difference between actual traveling distance of slide block from datum point and distance to be traveled by slide block from datum point is measured. Perform this measurement throughout stroke range and use maximum value among differences between these distances as measured value.

Positiong accuracy=(⊿ℓn)max



●Traveling Parallelism B

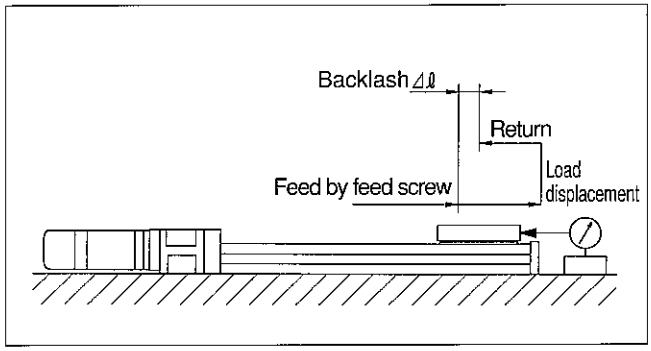
Fix indicator at center of slide block and apply it to surface plate equipped with guide rail. Move slide block throughout traveling distance and use maximum distance among readings of test indicator as measured value.



●Backlash

Feed slide block, read test indicator when it is slightly moved and use the reading as reference value. Move slide block from this state in the same direction at prescribed load and measure difference between reading of test indicator with load removed and reference value. Perform this measurement at the center and both ends of traveling distance and use maximum value among values so obtained as measured value.

Backlash = ⊿ℓ



- Firmly tighten the fixed part and connection of the single axis module.

  Improper mounting of the body may adversely affect safety and accuracy according to circumstances.

HIGH ACCURACY SINGLE AXIS MODULE SG SERIES

PERMISSIBLE SPEED

Permissible speed of single axis module varies according to type of motor and operating conditions. Furthermore it is restricted due to some cases such as critical speed, DmN value of ball screws and so on. Take into consideration in such cases, when using single axis module at high speed or using long guide rail.

Model No.	Guide rail length (mm)	Permissible speed (mm/s)
SG2001	100	187
	150	
	200	
SG2005	100	925
	150	
	200	
SG2602	150	281
	200	
	250	
	300	
SG2605	150	694
	200	
	250	
	300	
SG3305	150	550
	200	
	300	
	400	
	500	460
	600	310
SG3310	150	1100
	200	
	300	
	400	
	500	930
	600	620

Model No.	Guide rail length (mm)	Permissible speed (mm/s)
SG4610	340	740
	440	
	540	
	640	
	740	650
	840	500
	940	390
SG4620	340	1480
	440	
	540	
	640	
	740	1300
	840	1000
	940	780
SG5520	980	1120
	1080	910
	1180	750
	1280	630
	1380	530

MASS

Net Mass

(Unit : kg)

Model No.	Guide rail length (mm)	Without dustproof cover				With dustproof cover				Guide rail length (mm)
		Long block		Short block		Long block		Short block		
		1 block A	2 blocks B	1 block C	2 blocks D	1 block A	2 blocks B	1 block C	2 blocks D	
SG20	100	0.45	0.52	–	–	0.50	0.61	–	–	100
	150	0.58	0.65	–	–	0.63	0.74	–	–	150
	200	0.71	0.78	–	–	0.77	0.88	–	–	200
SG26	150	0.93	1.10	–	–	1.07	1.31	–	–	150
	200	1.14	1.31	–	–	1.30	1.54	–	–	200
	250	1.36	1.53	–	–	1.53	1.78	–	–	250
	300	1.57	1.74	–	–	1.76	2.01	–	–	300
SG33	150	1.6	–	1.5	1.7	1.8	–	1.6	1.9	150
	200	2.0	–	1.8	2.0	2.1	–	2.0	2.2	200
	300	2.6	2.9	2.5	2.7	2.8	3.2	2.6	2.9	300
	400	3.2	3.6	3.1	3.3	3.5	3.9	3.3	3.5	400
	500	3.9	4.2	3.8	3.9	4.2	4.6	4.0	4.2	500
	600	4.6	4.9	4.4	4.6	4.9	5.3	4.7	4.9	600
SG46	340	6.5	7.5	6.0	6.5	7.0	8.0	6.5	7.0	340
	440	8.0	8.5	7.5	8.0	8.5	9.5	8.0	8.5	440
	540	9.0	10.0	8.5	9.5	10.0	11.0	9.5	10.0	540
	640	10.5	11.5	10.0	10.5	11.0	12.5	10.5	11.5	640
	740	12.0	13.0	11.5	12.0	12.5	14.0	12.0	13.0	740
	840	13.0	14.0	13.0	13.5	14.0	15.5	13.5	14.0	840
	940	14.5	15.5	14.0	14.5	15.5	16.5	15.0	15.5	940
SG55	980	20	22	–	–	21	24	–	–	980
	1080	22	24	–	–	23	26	–	–	1080
	1180	23	25	–	–	25	27	–	–	1180
	1280	25	27	–	–	27	29	–	–	1280
	1380	27	29	–	–	29	31	–	–	1380

A : With 1 long block B : With 2 long blocks C : With 1 short block D : With 2 short blocks

Mass of Slide Block

(Unit : kg)

Model No.	Without dustproof cover		With dustproof cover	
	Long block	Short block	Long block	Short block
SG20	0.07	–	0.11	–
SG26	0.17	–	0.24	–
SG33	0.3	0.15	0.4	0.2
SG46	0.9	0.5	1.2	0.7
SG55	1.7	–	2.3	–

In case of the mass for slide block with dustproof cover, the mass of sub-table is included.

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INERTIA

Inertia for slide block and ball screw of single axis module is shown in the following table:

(Unit : kg·m²)

Model No.	Guide rail length (mm)	Without dustproof cover				With dustproof cover				Guide rail length (mm)
		Long block		Short block		Long block		Short block		
		1 block A	2 blocks B	1 block C	2 blocks D	1 block A	2 blocks B	1 block C	2 blocks D	
SG2001	100	1.34×10^{-7}	1.36×10^{-7}	–	–	1.35×10^{-7}	1.37×10^{-7}	–	–	100
	150	1.83×10^{-7}	1.85×10^{-7}	–	–	1.84×10^{-7}	1.87×10^{-7}	–	–	150
	200	2.33×10^{-7}	2.35×10^{-7}	–	–	2.34×10^{-7}	2.37×10^{-7}	–	–	200
SG2005	100	1.76×10^{-7}	2.21×10^{-7}	–	–	2.00×10^{-7}	2.69×10^{-7}	–	–	100
	150	2.26×10^{-7}	2.70×10^{-7}	–	–	2.50×10^{-7}	3.18×10^{-7}	–	–	150
	200	2.76×10^{-7}	3.20×10^{-7}	–	–	3.00×10^{-7}	3.68×10^{-7}	–	–	200
SG2602	150	6.08×10^{-7}	6.26×10^{-7}	–	–	6.16×10^{-7}	6.40×10^{-7}	–	–	150
	200	7.65×10^{-7}	7.83×10^{-7}	–	–	7.73×10^{-7}	7.97×10^{-7}	–	–	200
	250	9.22×10^{-7}	9.39×10^{-7}	–	–	9.29×10^{-7}	9.54×10^{-7}	–	–	250
	300	1.08×10^{-6}	1.10×10^{-6}	–	–	1.09×10^{-6}	1.11×10^{-6}	–	–	300
SG2605	150	6.99×10^{-7}	8.07×10^{-7}	–	–	7.44×10^{-7}	8.98×10^{-7}	–	–	150
	200	8.56×10^{-7}	9.63×10^{-7}	–	–	9.01×10^{-7}	1.05×10^{-6}	–	–	200
	250	1.01×10^{-6}	1.12×10^{-6}	–	–	1.06×10^{-6}	1.21×10^{-6}	–	–	250
	300	1.17×10^{-6}	1.28×10^{-6}	–	–	1.21×10^{-6}	1.37×10^{-6}	–	–	300
SG3305	150	1.64×10^{-6}	–	1.56×10^{-6}	1.64×10^{-6}	1.71×10^{-6}	–	1.60×10^{-6}	1.71×10^{-6}	150
	200	2.02×10^{-6}	–	1.94×10^{-6}	2.03×10^{-6}	2.09×10^{-6}	–	1.98×10^{-6}	2.10×10^{-6}	200
	300	2.79×10^{-6}	2.99×10^{-6}	2.71×10^{-6}	2.79×10^{-6}	2.86×10^{-6}	3.13×10^{-6}	2.75×10^{-6}	2.86×10^{-6}	300
	400	3.55×10^{-6}	3.75×10^{-6}	3.48×10^{-6}	3.56×10^{-6}	3.62×10^{-6}	3.89×10^{-6}	3.51×10^{-6}	3.63×10^{-6}	400
	500	4.32×10^{-6}	4.52×10^{-6}	4.24×10^{-6}	4.32×10^{-6}	4.39×10^{-6}	4.66×10^{-6}	4.28×10^{-6}	4.39×10^{-6}	500
	600	5.08×10^{-6}	5.28×10^{-6}	5.01×10^{-6}	5.09×10^{-6}	5.15×10^{-6}	5.42×10^{-6}	5.04×10^{-6}	5.16×10^{-6}	600
SG3310	150	2.19×10^{-6}	–	1.88×10^{-6}	2.21×10^{-6}	2.47×10^{-6}	–	2.02×10^{-6}	2.49×10^{-6}	150
	200	2.57×10^{-6}	–	2.27×10^{-6}	2.59×10^{-6}	2.85×10^{-6}	–	2.40×10^{-6}	2.87×10^{-6}	200
	300	3.34×10^{-6}	4.14×10^{-6}	3.03×10^{-6}	3.36×10^{-6}	3.61×10^{-6}	4.69×10^{-6}	3.17×10^{-6}	3.64×10^{-6}	300
	400	4.10×10^{-6}	4.90×10^{-6}	3.80×10^{-6}	4.12×10^{-6}	4.38×10^{-6}	5.46×10^{-6}	3.94×10^{-6}	4.40×10^{-6}	400
	500	4.87×10^{-6}	5.67×10^{-6}	4.56×10^{-6}	4.89×10^{-6}	5.15×10^{-6}	6.22×10^{-6}	4.70×10^{-6}	5.17×10^{-6}	500
	600	5.63×10^{-6}	6.43×10^{-6}	5.33×10^{-6}	5.65×10^{-6}	5.91×10^{-6}	6.99×10^{-6}	5.47×10^{-6}	5.93×10^{-6}	600
SG4610	340	1.79×10^{-5}	2.02×10^{-5}	1.69×10^{-5}	1.82×10^{-5}	1.87×10^{-5}	2.17×10^{-5}	1.74×10^{-5}	1.92×10^{-5}	340
	440	2.18×10^{-5}	2.41×10^{-5}	2.08×10^{-5}	2.20×10^{-5}	2.25×10^{-5}	2.56×10^{-5}	2.13×10^{-5}	2.31×10^{-5}	440
	540	2.57×10^{-5}	2.79×10^{-5}	2.46×10^{-5}	2.59×10^{-5}	2.64×10^{-5}	2.95×10^{-5}	2.52×10^{-5}	2.69×10^{-5}	540
	640	2.95×10^{-5}	3.18×10^{-5}	2.85×10^{-5}	2.98×10^{-5}	3.03×10^{-5}	3.33×10^{-5}	2.90×10^{-5}	3.08×10^{-5}	640
	740	3.34×10^{-5}	3.57×10^{-5}	3.24×10^{-5}	3.37×10^{-5}	3.42×10^{-5}	3.72×10^{-5}	3.29×10^{-5}	3.47×10^{-5}	740
	840	3.73×10^{-5}	3.96×10^{-5}	3.63×10^{-5}	3.75×10^{-5}	3.80×10^{-5}	4.11×10^{-5}	3.67×10^{-5}	3.83×10^{-5}	840
	940	4.12×10^{-5}	4.35×10^{-5}	4.02×10^{-5}	4.14×10^{-5}	4.19×10^{-5}	4.50×10^{-5}	4.06×10^{-5}	4.22×10^{-5}	940
SG4620	340	2.47×10^{-5}	3.39×10^{-5}	2.07×10^{-5}	2.58×10^{-5}	2.78×10^{-5}	3.99×10^{-5}	2.27×10^{-5}	2.98×10^{-5}	340
	440	2.86×10^{-5}	3.77×10^{-5}	2.46×10^{-5}	2.96×10^{-5}	3.17×10^{-5}	4.38×10^{-5}	2.66×10^{-5}	3.37×10^{-5}	440
	540	3.25×10^{-5}	4.16×10^{-5}	2.84×10^{-5}	3.35×10^{-5}	3.55×10^{-5}	4.77×10^{-5}	3.05×10^{-5}	3.76×10^{-5}	540
	640	3.64×10^{-5}	4.55×10^{-5}	3.23×10^{-5}	3.74×10^{-5}	3.94×10^{-5}	5.16×10^{-5}	3.44×10^{-5}	4.14×10^{-5}	640
	740	4.03×10^{-5}	4.94×10^{-5}	3.62×10^{-5}	4.13×10^{-5}	4.33×10^{-5}	5.55×10^{-5}	3.82×10^{-5}	4.53×10^{-5}	740
	840	4.41×10^{-5}	5.34×10^{-5}	4.02×10^{-5}	4.51×10^{-5}	4.71×10^{-5}	5.93×10^{-5}	4.17×10^{-5}	4.82×10^{-5}	840
	940	4.80×10^{-5}	5.72×10^{-5}	4.41×10^{-5}	4.90×10^{-5}	5.09×10^{-5}	6.32×10^{-5}	4.56×10^{-5}	5.21×10^{-5}	940
SG5520	980	1.46×10^{-4}	1.64×10^{-4}	–	–	1.52×10^{-4}	1.76×10^{-4}	–	–	980
	1080	1.59×10^{-4}	1.76×10^{-4}	–	–	1.65×10^{-4}	1.88×10^{-4}	–	–	1080
	1180	1.71×10^{-4}	1.88×10^{-4}	–	–	1.77×10^{-4}	2.00×10^{-4}	–	–	1180
	1280	1.83×10^{-4}	2.00×10^{-4}	–	–	1.89×10^{-4}	2.12×10^{-4}	–	–	1280
	1380	1.95×10^{-4}	2.13×10^{-4}	–	–	2.01×10^{-4}	2.25×10^{-4}	–	–	1380

A : With 1 long block B : With 2 long blocks C : With 1 short block D : With 2 short blocks

LIFE EXPECTANCY

●For single axis module, each life expectancy of guide, ball screw and support bearing is obtained, and the shortest life expectance is used as life expectancy. The following formula is used for calculating life expectancy:

●Formula for calculating life expectancy of guide

$$L_G=\left(\frac{fc}{fw}\cdot\frac{C}{P}\right)^3\times 50\ (km)$$

L_G : Rating life expectancy (km)
fc : Contact factor
fw : Load factor
C : Basic dynamic load rating (N)
P : Load (N)
Consult KURODA for a moment of load.

●Formula for calculating life expectancy of ball screw and support bearing

$$La=\left(\frac{1}{fw}\cdot\frac{Ca\ or\ Cb}{Pa}\right)^3\times 10^6\ (rev)$$

or

$$La=\left(\frac{1}{fw}\cdot\frac{Ca\ or\ Cb}{Pa}\right)^3\times L\ (km)$$

La : Life expectancy (rev, km)
fw : Load factor
Pa : Axial load (N)
Ca or Cb : Basic dynamic load rating (N)
L : Ball screw lead (mm)

●Contact factor (fc)

Number of blocks to be used in contact, when single axis module is used.	Contact factor (fc)
1	1.0
2	0.81

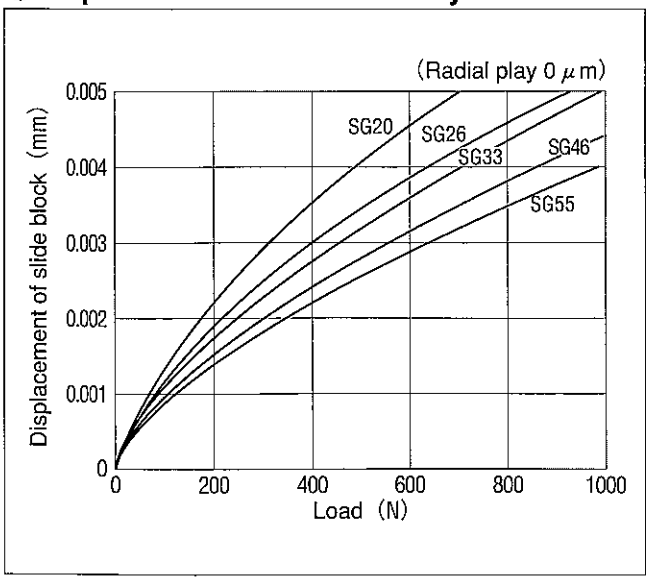
●Load factor (fw)

Operating condition		Load factor (fw)
Vibration and shock	Speed	
Zero	15 m/min or less	1.0~1.5
Small	60 m/min or less	1.5~2.0
Large	60 m/min or more	2.0~3.5

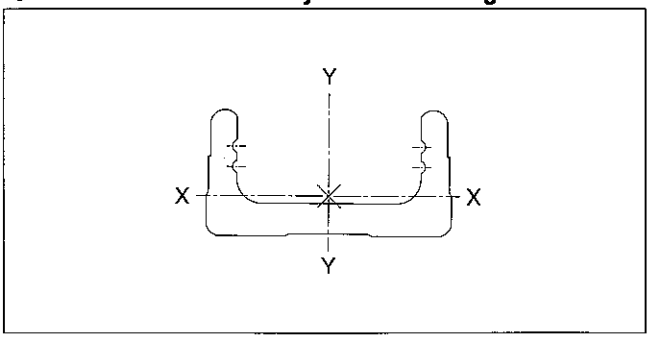
RIGIDITY

Single axis module has "4-thread/4-contact" structure with high rigidity. Displacement of slide block to radial load in each size is shown in table.

●Displacement of slide block by radial load



●Sectional secondary moment of guide rail



Model No.	Sectional secondary moment of guide rail (mm⁴)		Mass W (kg/100mm)
	I_X (X axis)	I_Y (Y axis)	
SG20	6.50×10^3	6.00×10^4	0.25
SG26	1.69×10^4	1.47×10^5	0.38
SG33	5.11×10^4	3.42×10^5	0.60
SG46	2.42×10^5	1.49×10^6	1.24
SG55	2.29×10^5	2.28×10^6	1.50

MOTOR BRACKET CONFIGURATIONS AND MOTOR OPTION

Various motor brackets and intermediate flanges are available, making it possible to mount optional motor on single axis module.

Motor option				Motor bracket configurations				
Motor type	Maker	Model No.	Output (W)	SG20	SG26	SG33	SG46	SG55
AC Servo motor	MATSUSHITA ELECTRIC INDUSTRIAL	MSM5BZ21A	5	A2	A2	—	—	—
		MSM1AZ21A	10					
		MSM2AZ21A	20					
		MSMA3AZ	30	A3	A3	A2	C0	—
		MSMA5AZ	50					
		MSMA01	100					
		MSMA02	200	—	—	—	A2	—
		MSMA04	400					
		MSMA08	750	—	—	—	—	A2
	MITSUBISHI ELECTRIC	HC-KFS (MFS,PQ) 053	50	A1	A1	A1	B0	—
		HC-KFS (MFS,PQ) 13	100					
		HC-KFS (MFS,PQ) 23	200	—	—	—	A1	A0
		HC-KFS (MFS,PQ) 43	400					
		HC-KFS (MFS) 73	750	—	—	—	—	A1
		HA-FF053	50	—	—	A3	A0	—
		HA-FF13	100					
		HA-FF23	200	—	—	—	A3	A2
		HA-FF33	300					
	YASKAWA ELECTRIC	SGMAH (SGML) -A3	30	A1	A1	A1	B0	—
		SGMAH (SGML) -A5	50					
		SGMAH (SGML) -01	100					
		SGMAH (SGML) -02	200	—	—	—	A1	A0
		SGML-03	300					
		SGMAH (SGML) -04	400					
		SGMAH-08	750	—	—	—	—	A1
	SANYO ELECTRIC	P30B04003	30	A1	A1	A1	B0	—
		P30B04005	50					
		P30B04010	100					
		P30B06020	200	—	—	—	A1	A0
		P30B06040	400					
		P30B08075	750	—	—	—	—	A1
		P50B05005	50	—	—	A3	A0	—
		P50B05010	100					
		P50B07020	200	—	—	—	A3	A2
		P50B07030	300					
		P50B07040	400					
		P50B08050	500	—	—	—	—	A3
		P50B08075	750					
	CHIBA PRECISION	EA-2151	6	A4	—	—	—	—
		EA-2169	10					
		EA-2565	12	A7	A7	—	—	—
		EA-2580	20					
	HITACHI INDUSTRIAL EQUIPMENT SYSTEM	ADMA-R5	50	—	—	A1	B0	—
		ADMA-01	100					
		ADMA-02	200	—	—	—	A1	A0
		ADMA-04	400					
		ADMA-08	750	—	—	—	—	A1
	TAMAGAWA SEIKI	TS4601	30	—	A1	—	B0	—
		TS4602	50					
		TS4603	100					
		TS4606	100	—	—	—	A1	A0
		TS4607	200					
		TS4609	400					
		TS4611	200	—	—	—	—	A1
		TS4612	400					
		TS4613	600					
		TS4614	750					
Stepping motor	ORIENTAL MOTOR	UPD534M-A	—	A5	A5	—	—	—
		PMU33AH	—	A6	A6	—	—	—
		UPK (RK) 54,AS4	—	A5	A5	B1	—	—
		UPK (RK) 56,AS6	—	—	—	A4	D0	—
		UPK (RK) 59,AS9	—	—	—	—	—	A4
		UK26	—	—	—	A5	—	—

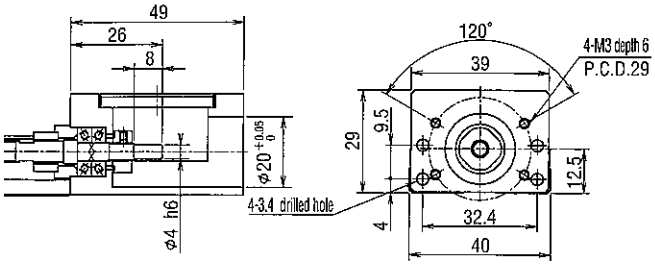
- For motors other than above-mentioned, consult KURODA.
- When selecting a rigid type as coupling for connecting a motor, consult KURODA.

MOTOR BRACKET CONFIGURATIONS

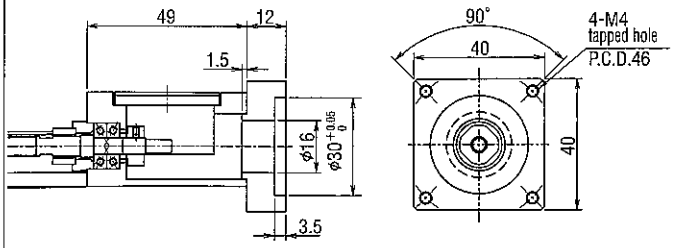
●SG20

(Unit : mm)

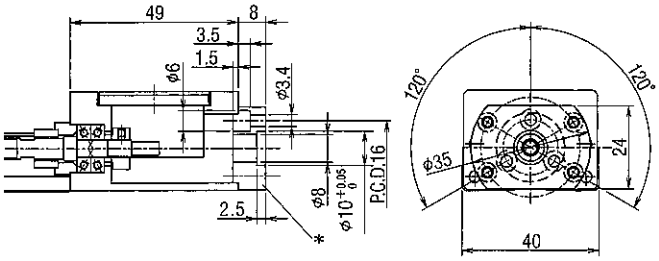
Motor bracket configuration : A0



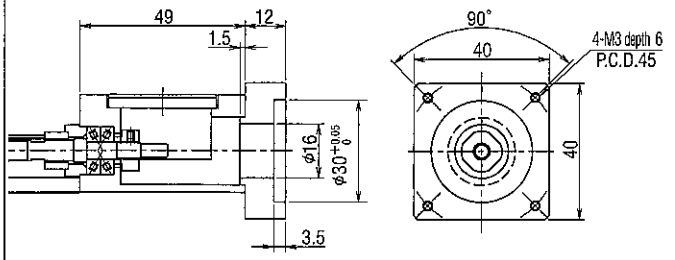
Motor bracket configuration : A 1 (Mass : 38g)



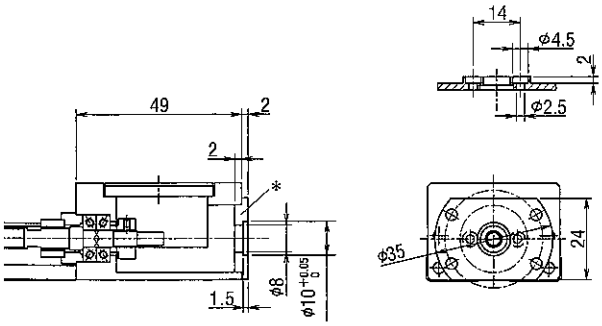
Motor bracket configuration : A2 (Mass : 14g)



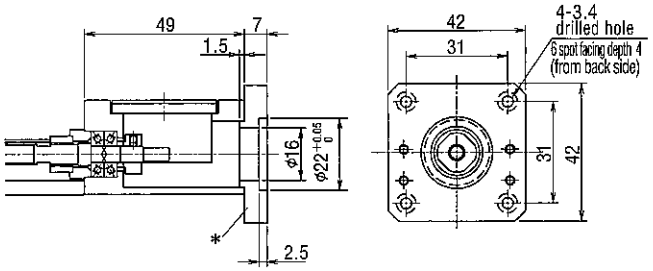
Motor bracket configuration : A3 (Mass : 39g)



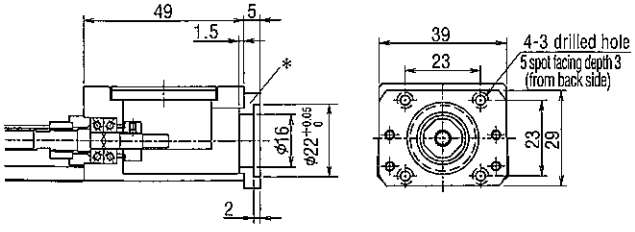
Motor bracket configuration : A4 (Mass : 5g)



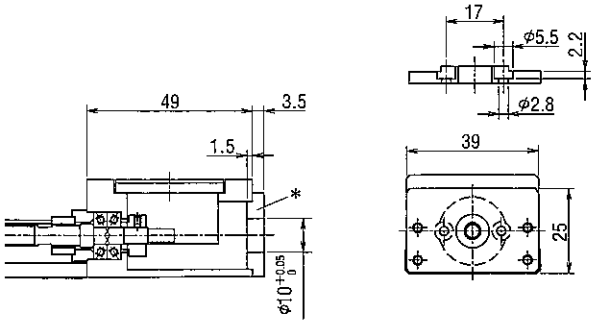
Motor bracket configuration : A5 (Mass : 26g)



Motor bracket configuration : A6 (Mass : 10g)



Motor bracket configuration : A7 (Mass : 8g)



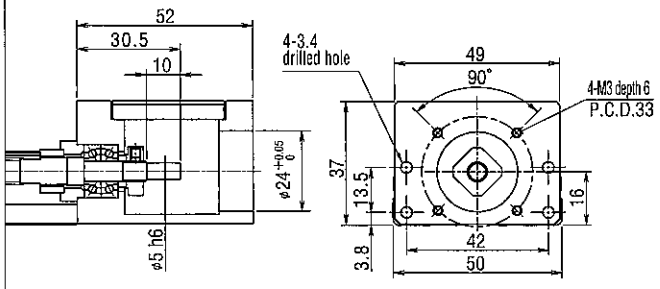
For A2, A4, A5, A6 and A7 configuration, fix the ＊marked intermediate flange after mounting motor.

HIGH ACCURACY SINGLE AXIS MODULE SG SERIES

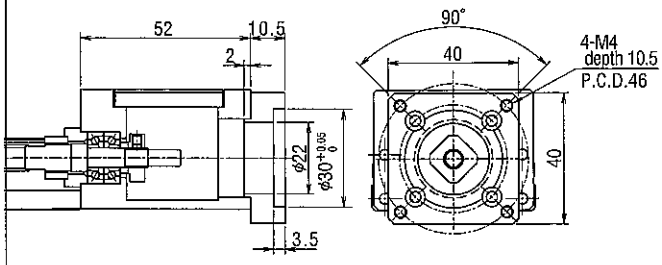
MOTOR BRACKET CONFIGURATIONS

●SG26 (Unit : mm)

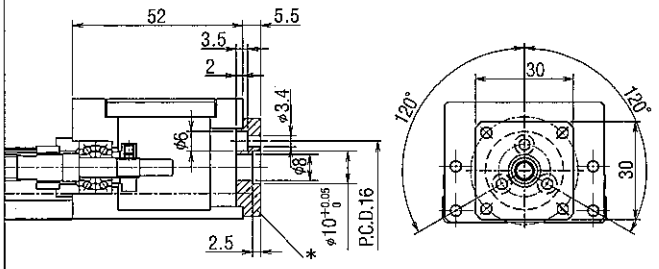
Motor bracket configuration : A0



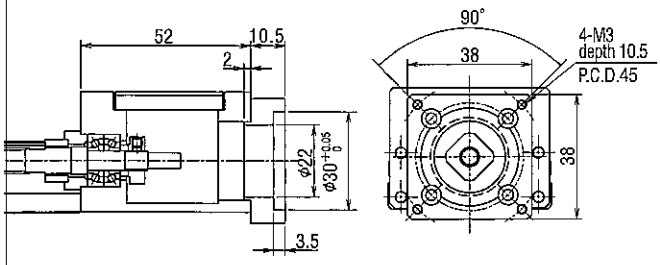
Motor bracket configuration : A 1 (Mass : 28g)



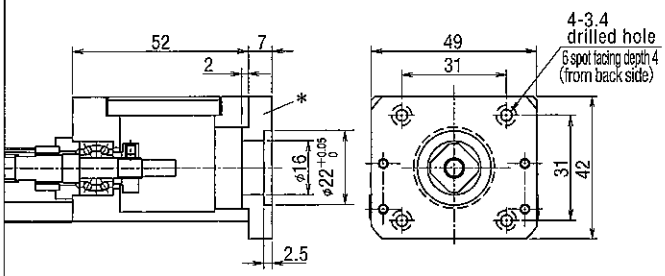
Motor bracket configuration : A2 (Mass : 12g)



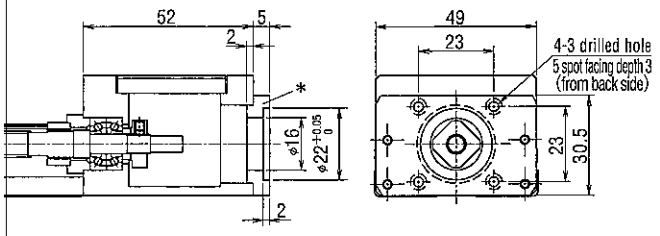
Motor bracket configuration : A3 (Mass : 24g)



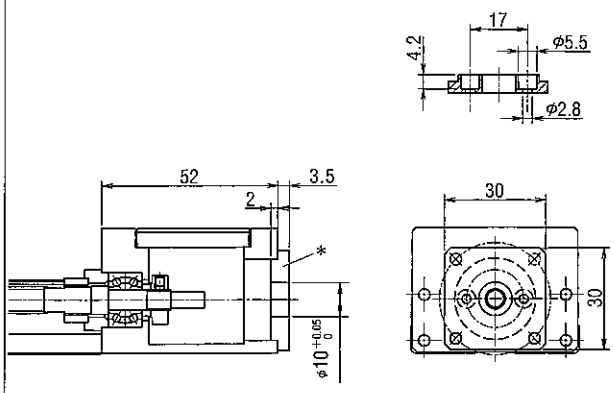
Motor bracket configuration : A5 (Mass : 32g)



Motor bracket configuration : A6 (Mass : 16g)



Motor bracket configuration : A7 (Mass : 8g)



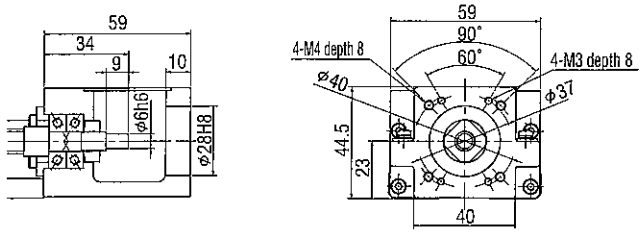
For A2, A5, A6 and A7 configuration, fix the ＊marked intermediate flange after mounting motor.

MOTOR BRACKET CONFIGURATIONS

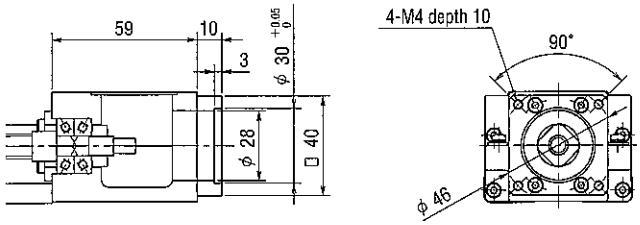
●SG33

(Unit : mm)

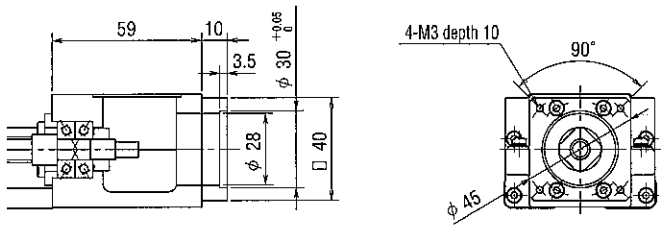
Motor bracket configuration : A0



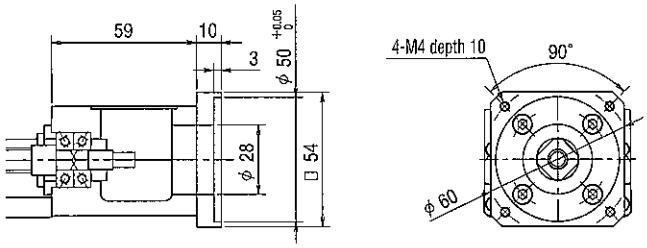
Motor bracket configuration : A 1 (Mass : 66g)



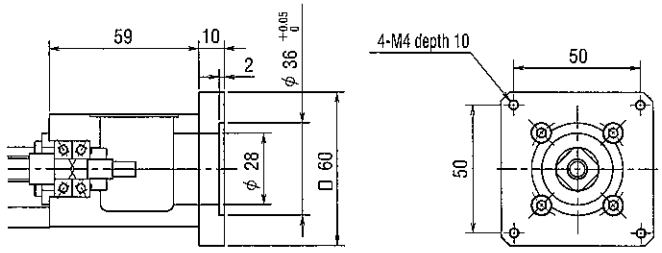
Motor bracket configuration : A2 (Mass : 67g)



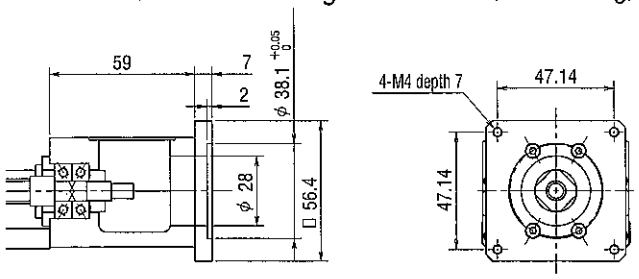
Motor bracket configuration : A3 (Mass : 133g)



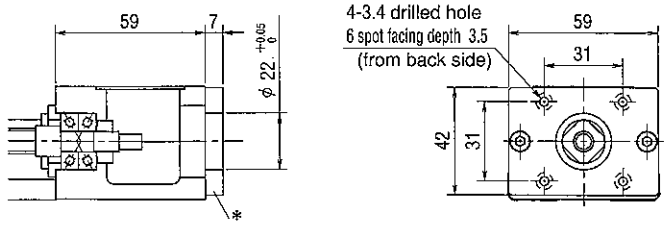
Motor bracket configuration : A4 (Mass : 212g)



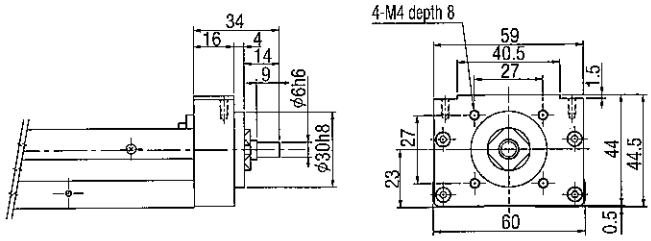
Motor bracket configuration : A5 (Mass : 125g)



Motor bracket configuration : B1 (Mass : 111g)



Motor bracket configuration : R0



Mass is 0.1g less than value shown in Page 12.

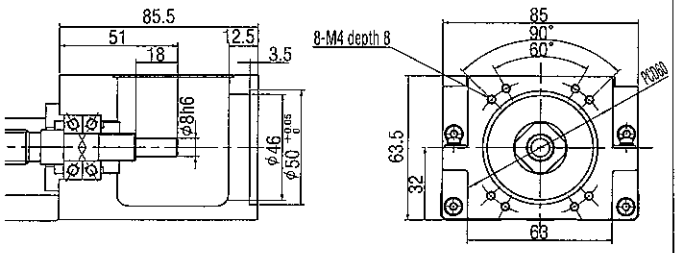
For B1 configuration, fix the * marked intermediate flange after mounting motor.

HIGH ACCURACY SINGLE AXIS MODULE SG SERIES

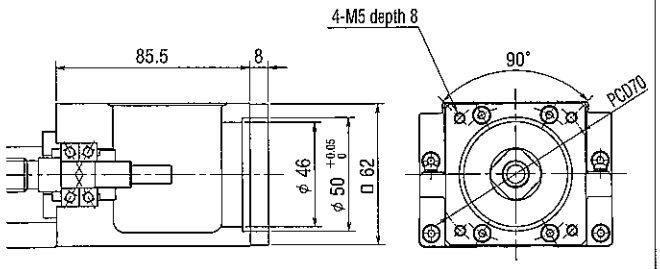
MOTOR BRACKET CONFIGURATIONS

●SG46 (Unit : mm)

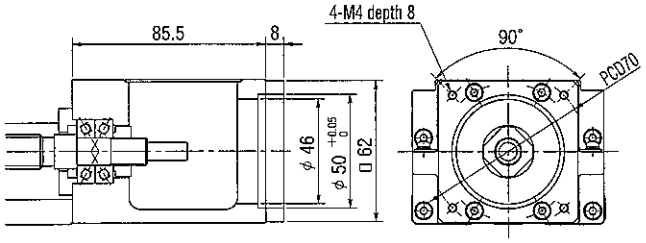
Motor bracket configuration : A0



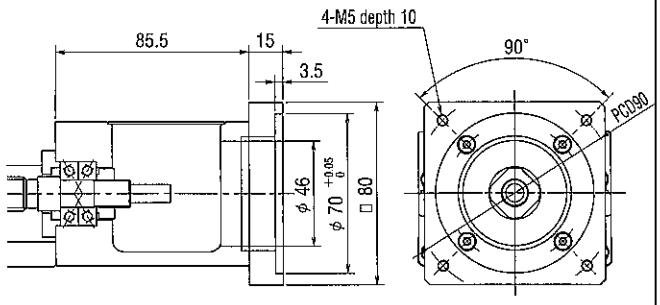
Motor bracket configuration : A 1 (Mass : 103g)



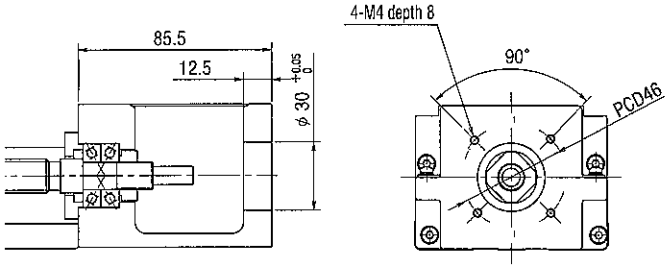
Motor bracket configuration : A2 (Mass : 106g)



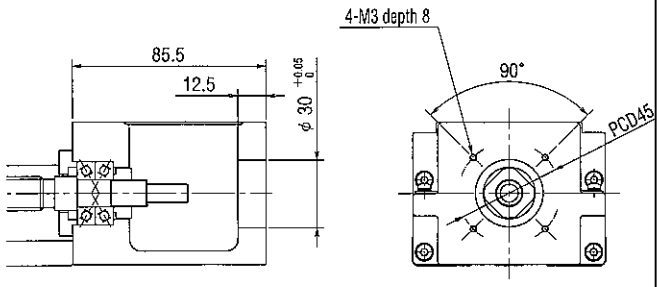
Motor bracket configuration : A3 (Mass : 448g)



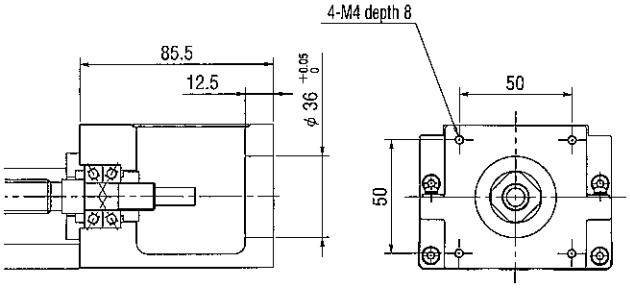
Motor bracket configuration : B0



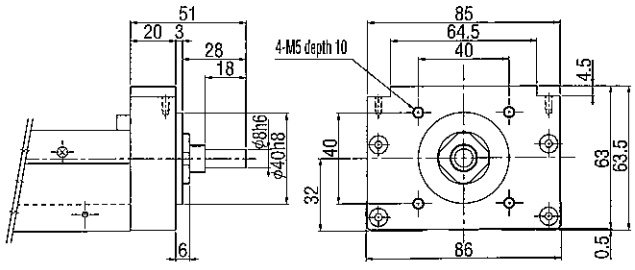
Motor bracket configuration : C0



Motor bracket configuration : D0



Motor bracket configuration : R0

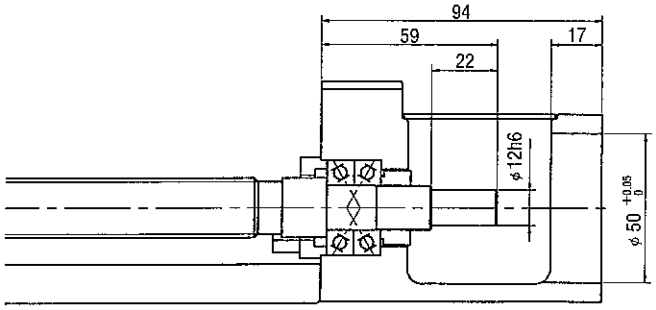


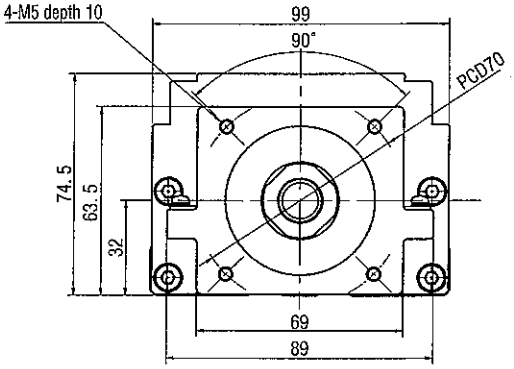
Mass is 0.3g less than value shown in Page 12.

MOTOR BRACKET CONFIGURATIONS

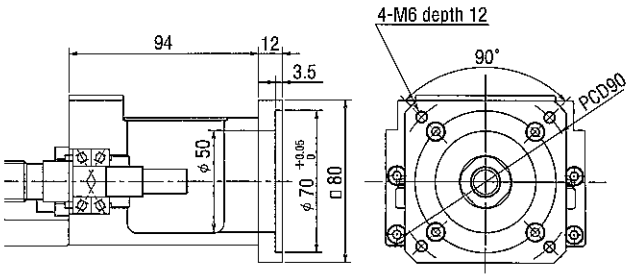
●SG55 (Unit : mm)

Motor bracket configuration : A0

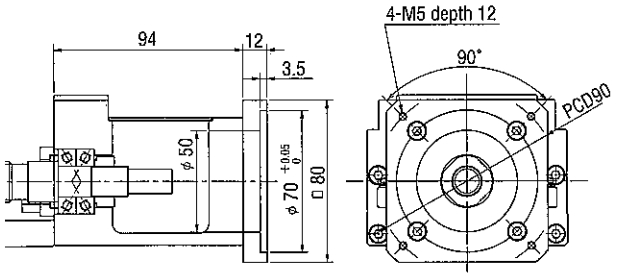




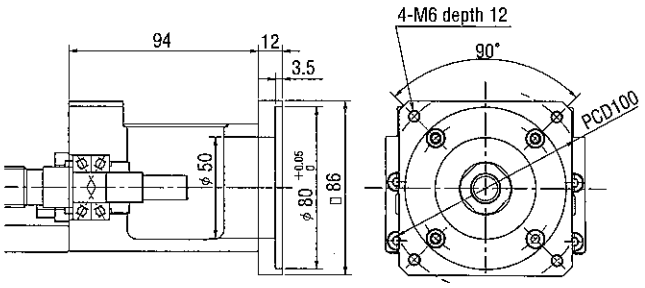
Motor bracket configuration : A 1 (Mass : 329g)



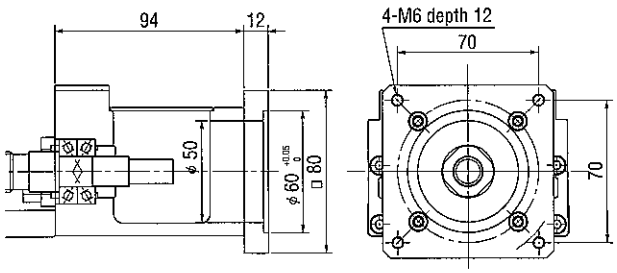
Motor bracket configuration : A2 (Mass : 333g)



Motor bracket configuration : A3 (Mass : 399g)



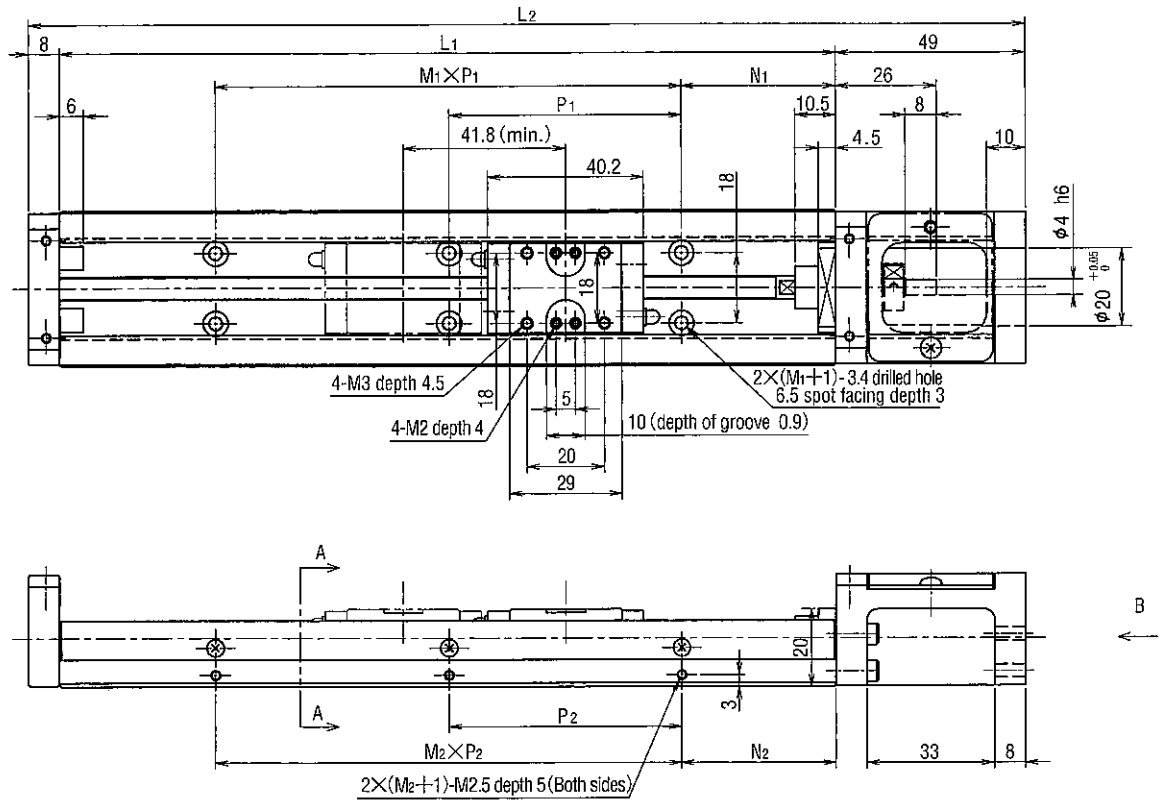
Motor bracket configuration : A4 (Mass : 449g)



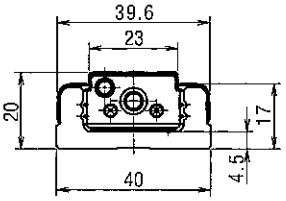
DIMENSIONS

●SG20 (Unit : mm)

With 1 long block : A (With 2 long blocks : B)

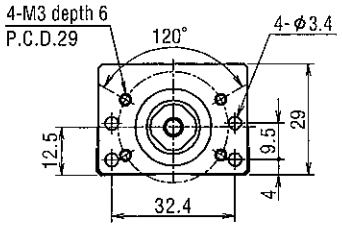


Without dustproof cover



A-A sectional view

Motor bracket configuration : A0

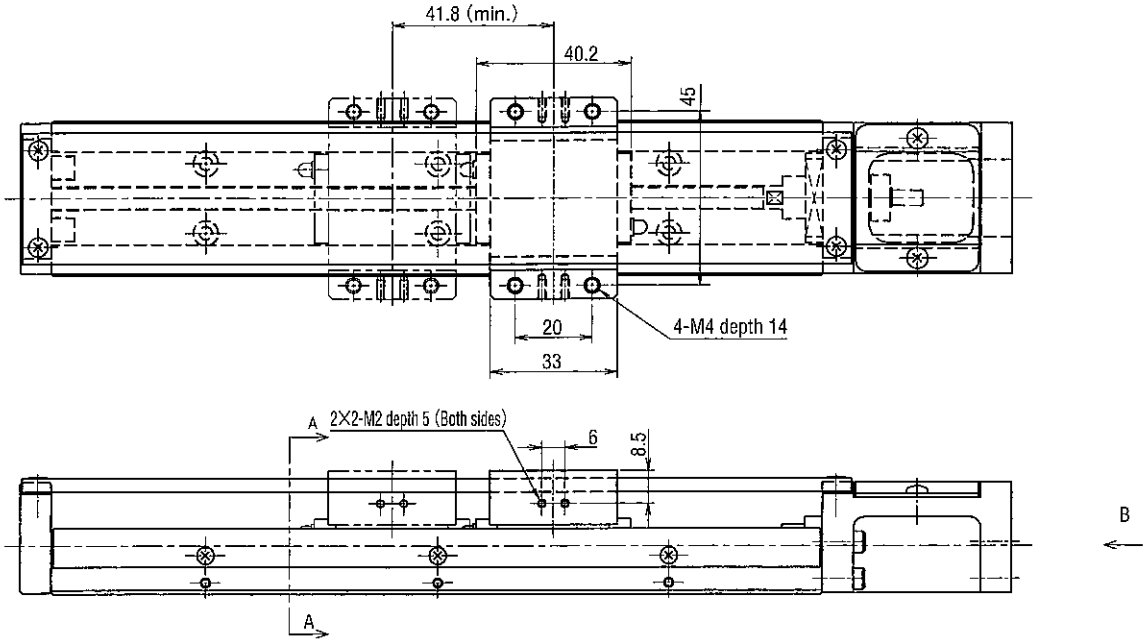


B view

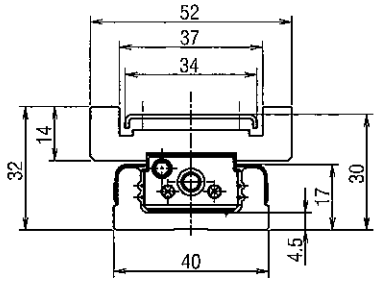
DIMENSIONS

●SG20 (Unit : mm)

With dustproof cover and long block

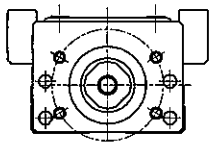


With dustproof cover



A-A sectional view

Motor bracket configuration : A0



B view

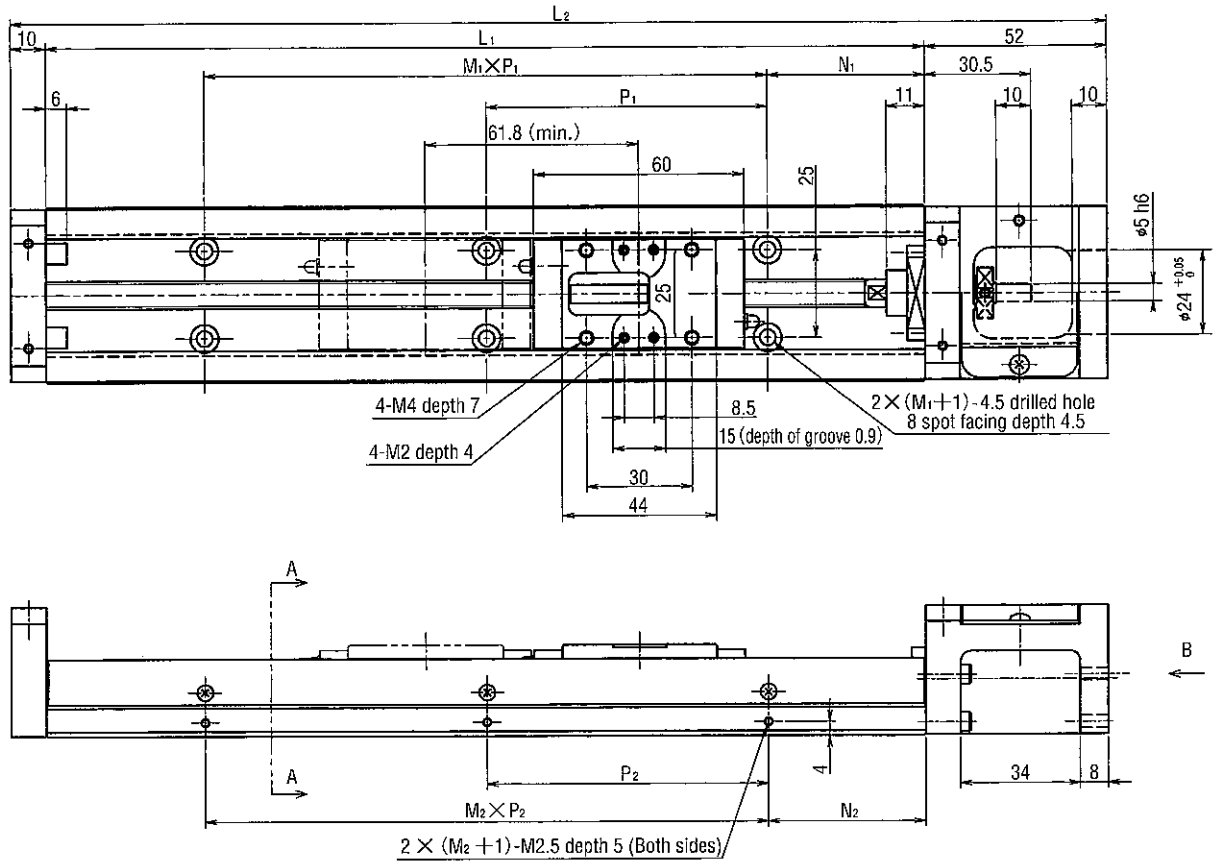
Dimensions						Maximum stroke	
L_1	L_2	N_1	$M_1 \times P_1$	N_2	$M_2 \times P_2$	SG20□A	SG20□B
100	157	20	1×60	20	1×60	43	—
150	207	15	2×60	15	2×60	93	51
200	257	40		40		143	101

Maximum stroke : Traveling distance of slide block between urethane rubber

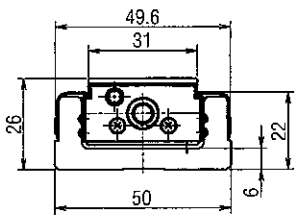
DIMENSIONS

●SG26 (Unit : mm)

With 1 long block : A (With 2 long blocks : B)

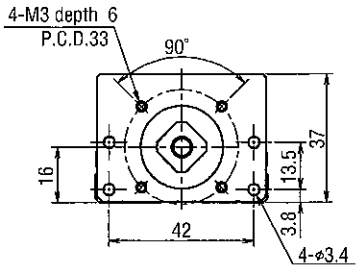


Without dustproof cover



A-A sectional view

Motor bracket configuration : A0

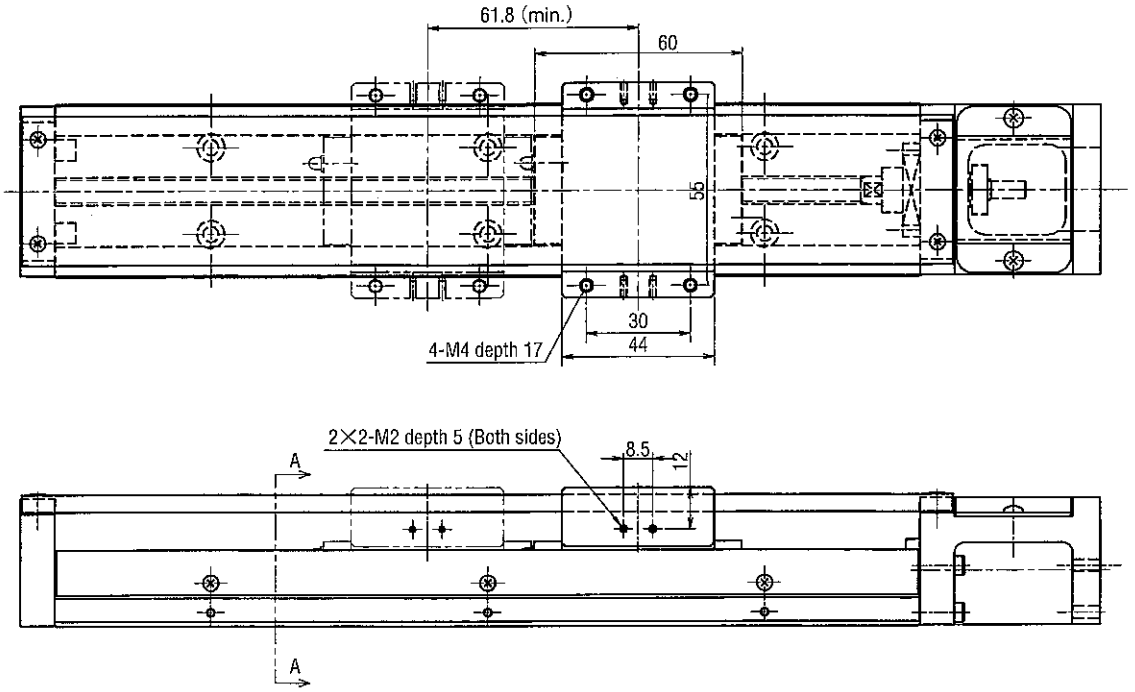


B view

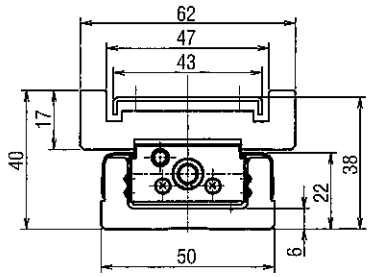
DIMENSIONS

●SG26 (Unit : mm)

With dustproof cover and long block

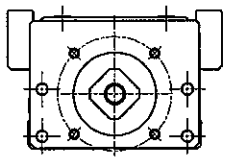


With dustproof cover



A-A sectional view

Motor bracket configuration : A0



B view

Dimensions						Maximum stroke	
L_1	L_2	N_1	$M_1 \times P_1$	N_2	$M_2 \times P_2$	SG26□A	SG26□B
150	212	35	1×80	35	1×80	73	—
200	262	20	2×80	20	2×80	123	61
250	312	45		45		173	111
300	362	30	3×80	30	3×80	223	161

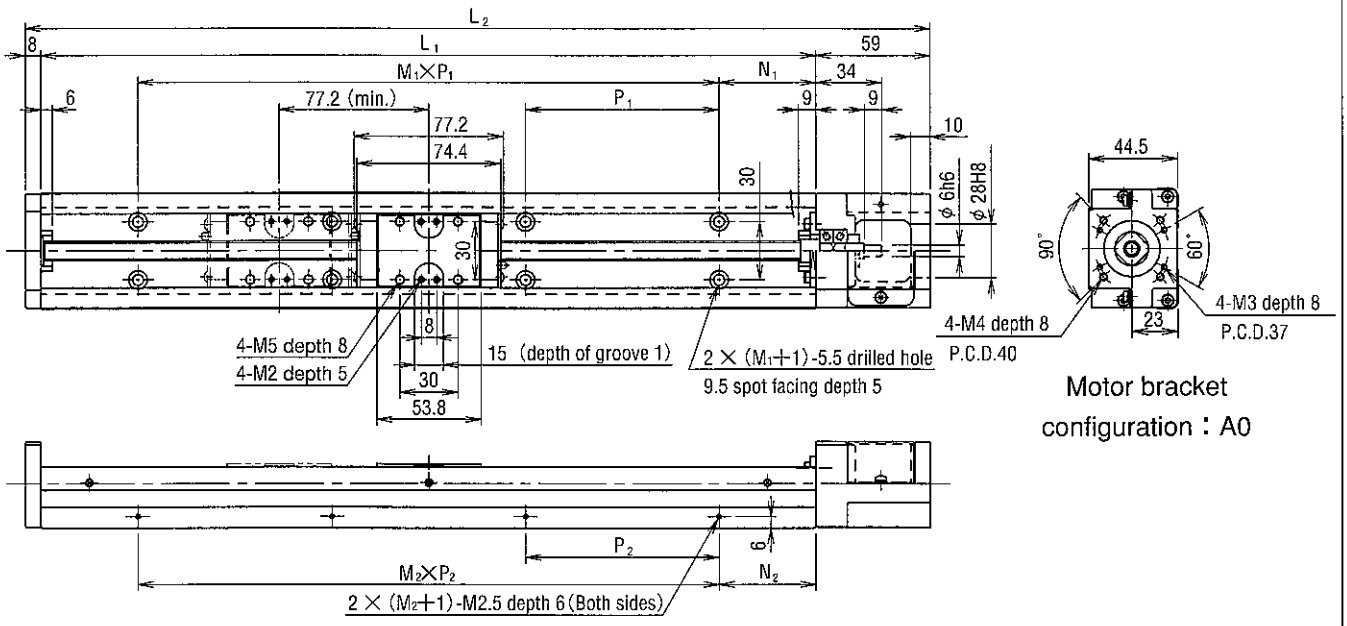
Maximum stroke : Traveling distance of slide block between urethane rubber

HIGH ACCURACY SINGLE AXIS MODULE SG SERIES

DIMENSIONS

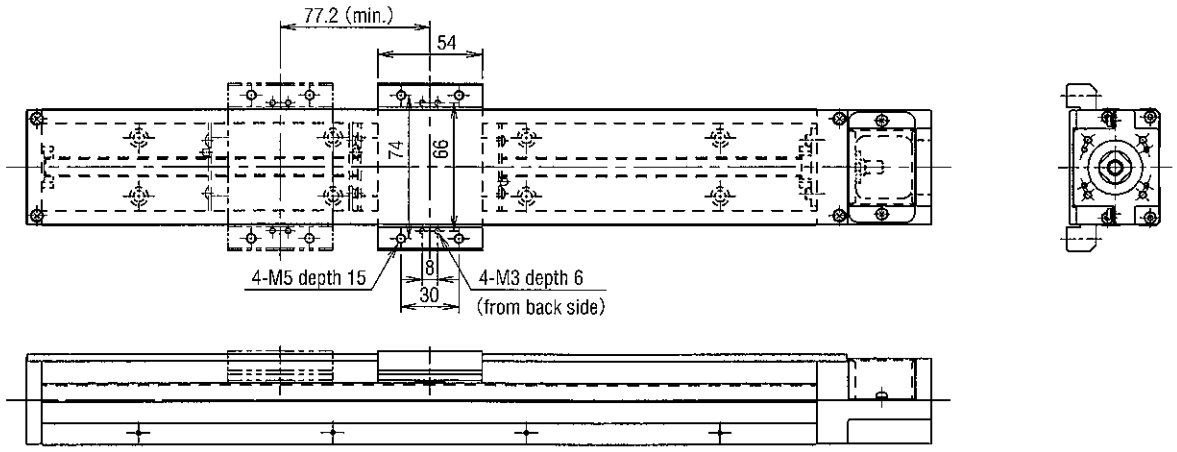
●SG33 (Unit : mm)

With 1 long block : A (With 2 long blocks : B)

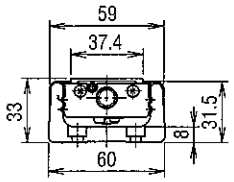


Motor bracket configuration : A0

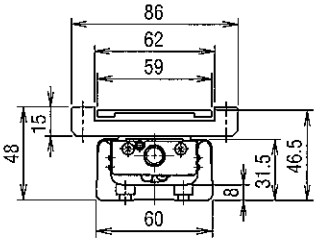
With dustproof cover and long block



Without dustproof cover



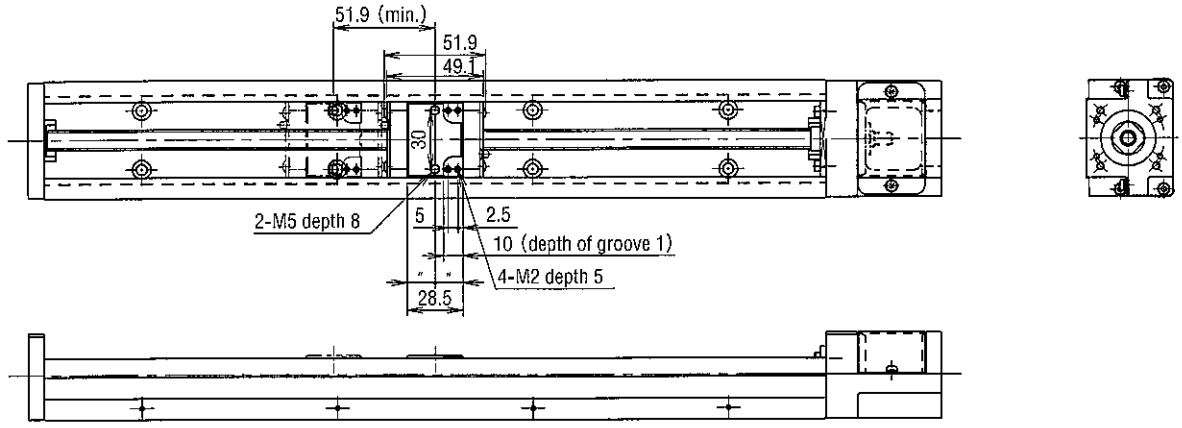
With dustproof cover



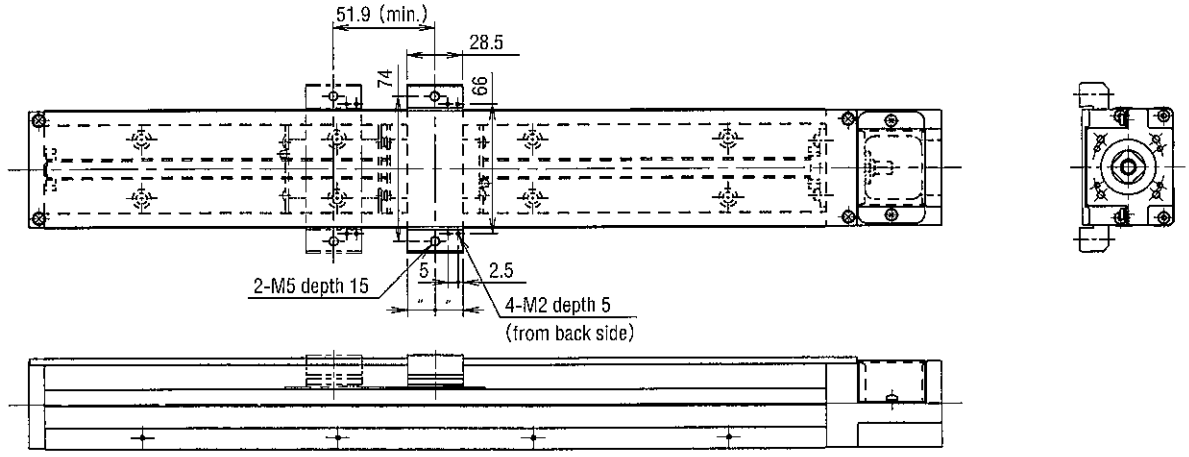
DIMENSIONS

●SG33 (Unit : mm)

With 1 short block : C (With 2 short blocks : D)



With dustproof cover and short block



Dimensions						Maximum stroke			
L_1	L_2	N_1	$M_1 \times P_1$	N_2	$M_2 \times P_2$	SG33□A	SG33□B	SG33□C	SG33□D
150	217	25	1×100	25	1×100	60	—	85	34
200	267	50	1×100	50	1×100	110	—	135	84
300	367		2×100		2×100	210	133	235	184
400	467		3×100		3×100	310	233	335	284
500	567		4×100		4×100	410	333	435	384
600	667		5×100		4×100	510	433	535	484

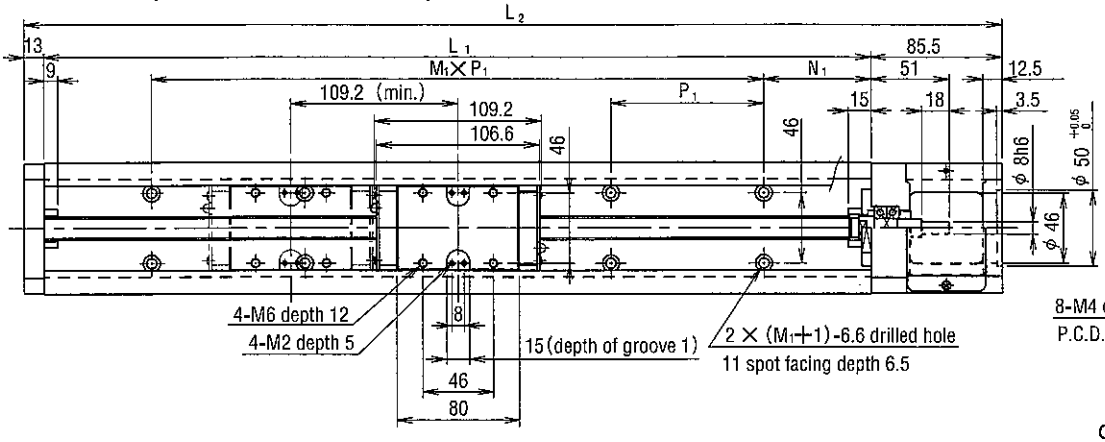
Maximum stroke : Traveling distance of slide block between urethane rubber

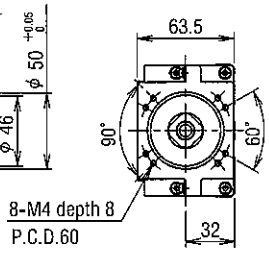
HIGH ACCURACY SINGLE AXIS MODULE SG SERIES

DIMENSIONS

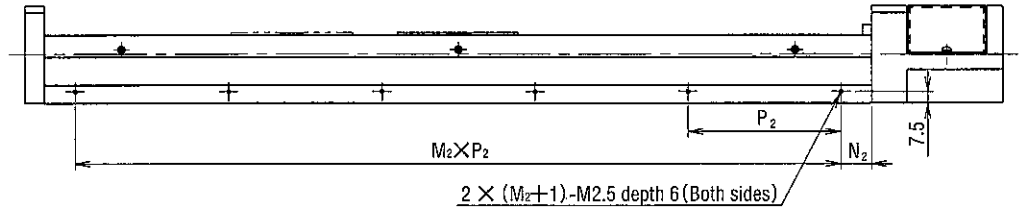
●SG46 (Unit : mm)

With 1 long block : A (With 2 long blocks : B)

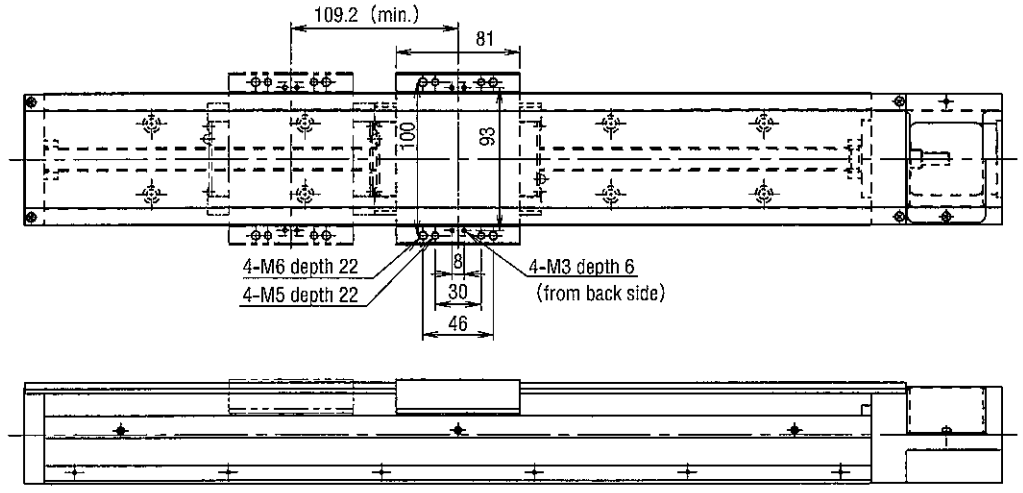


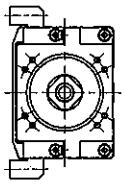


Motor bracket configuration : A0

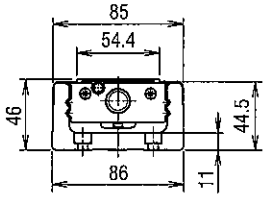


With dustproof cover and long block

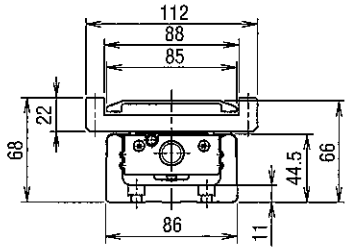




Without dustproof cover



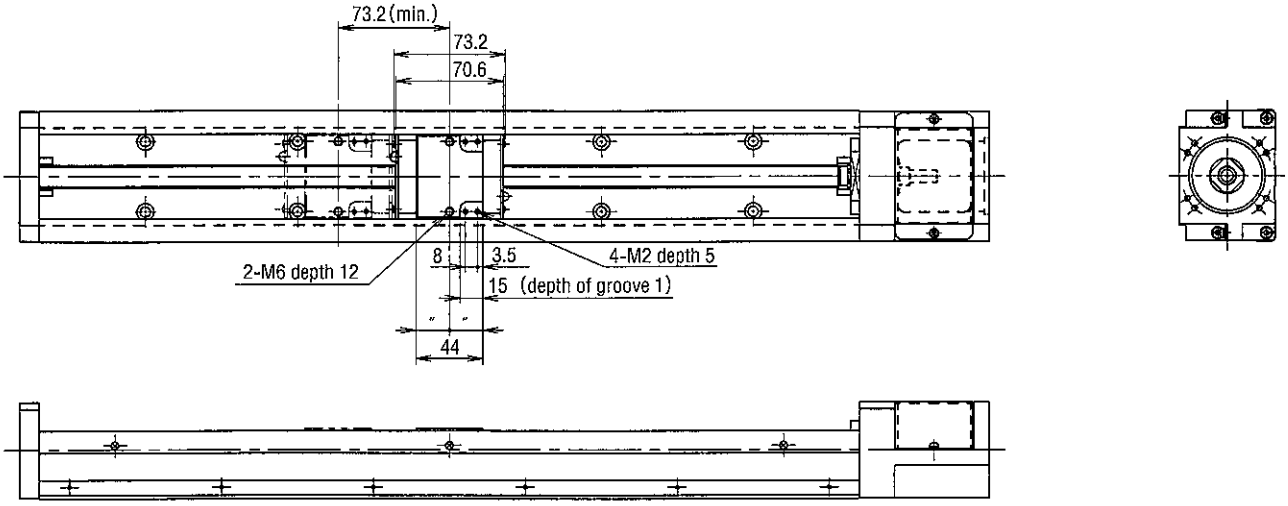
With dustproof cover



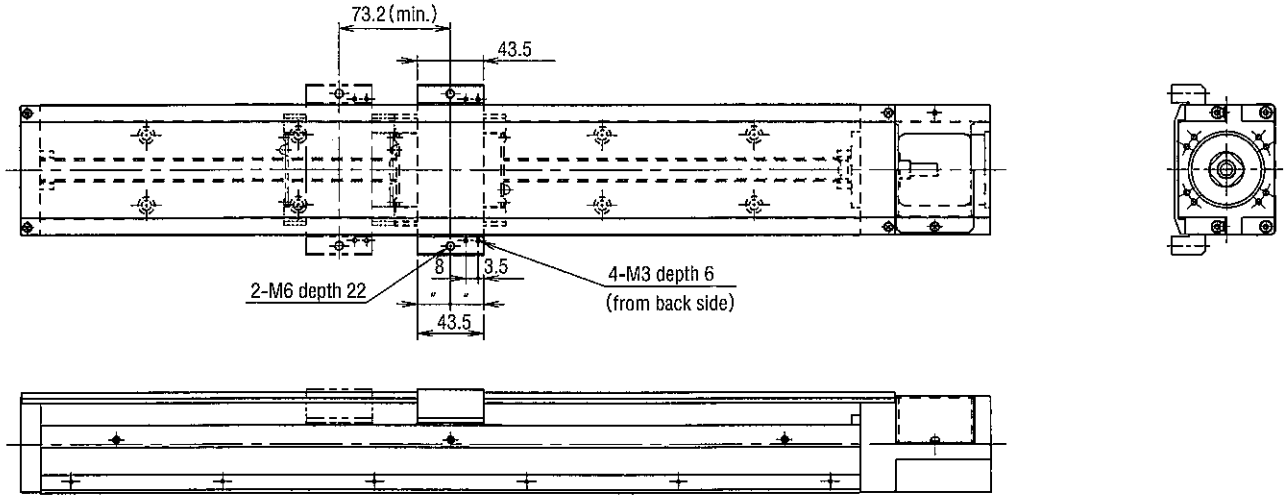
DIMENSIONS

●SG46 (Unit : mm)

With 1 short block : C (With 2 short blocks : D)



With dustproof cover and short block



Dimensions						Maximum stroke			
L_1	L_2	N_1	$M_1 \times P_1$	N_2	$M_2 \times P_2$	SG46□A	SG46□B	SG46□C	SG46□D
340	438.5	70	2×100	20	3×100	209	100	245	172
440	538.5		3×100		4×100	309	200	345	272
540	638.5		4×100		5×100	409	300	445	372
640	738.5		5×100		6×100	509	400	545	472
740	838.5		6×100		7×100	609	500	645	572
840	938.5		7×100		8×100	709	600	745	672
940	1038.5		8×100		9×100	809	700	845	772

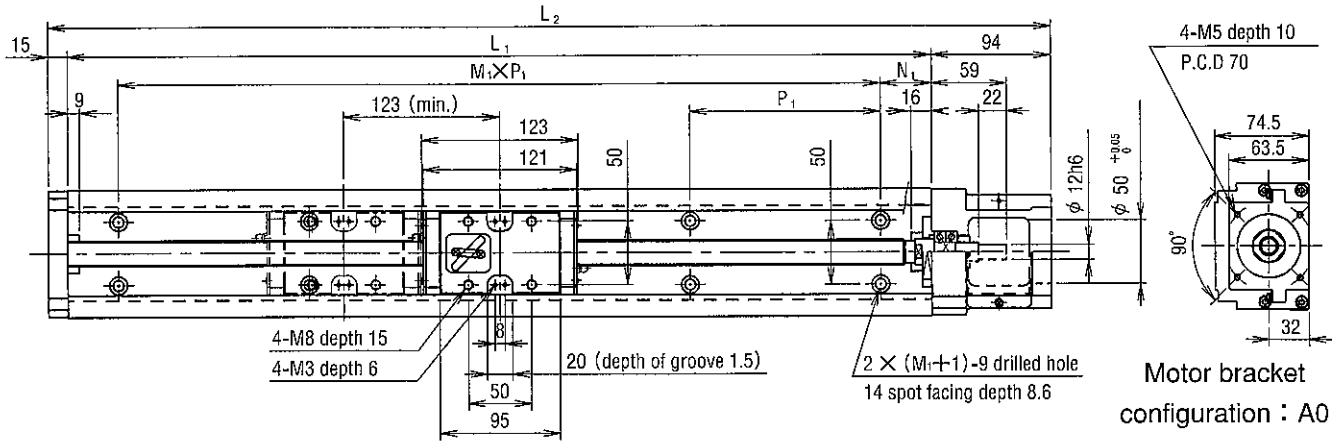
Maximum stroke : Traveling distance of slide block between urethane rubber

HIGH ACCURACY SINGLE AXIS MODULE SG SERIES

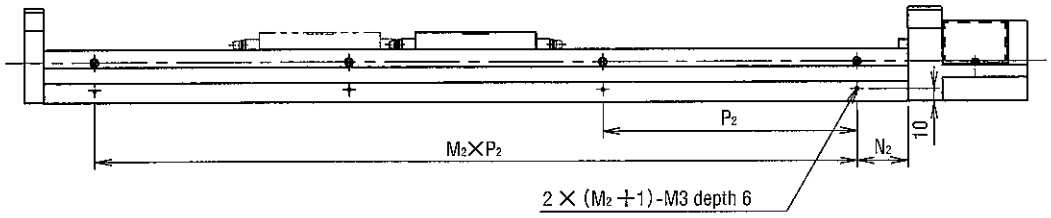
DIMENSIONS

●SG55 (Unit : mm)

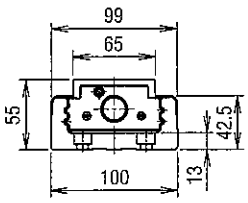
With 1 long block : A (With 2 long blocks : B)



Motor bracket configuration : A0



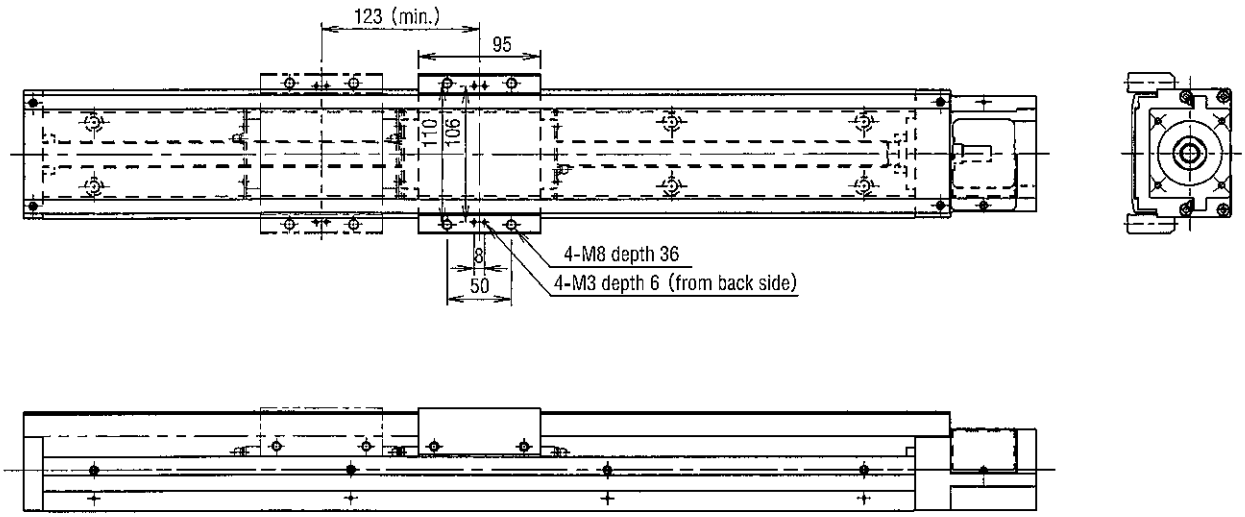
Without dustproof cover



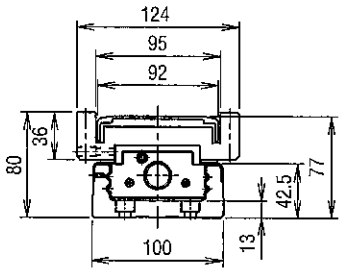
DIMENSIONS

●SG55 (Unit : mm)

With dustproof cover and long block



With dustproof cover



Dimensions						Maximum stroke	
L_1	L_2	N_1	$M_1 \times P_1$	N_2	$M_2 \times P_2$	SG55□A	SG55□B
980	1089	40	6×150	90	4×200	834	711
1080	1189	15	7×150	40	5×200	934	811
1180	1289	65		90		1034	911
1280	1389	40	8×150	40	6×200	1134	1011
1380	1489	15	9×150	90		1234	1111

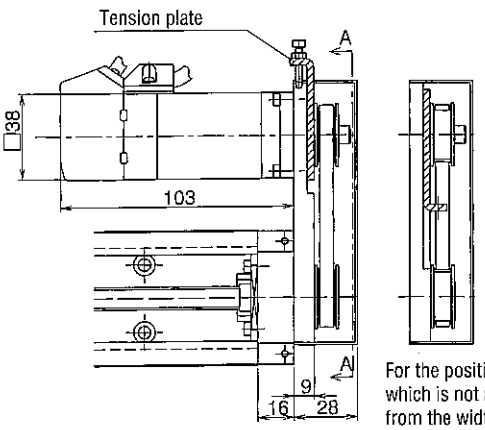
Maximum stroke : Traveling distance of slide block between urethane rubber

HIGH ACCURACY SINGLE AXIS MODULE SG SERIES

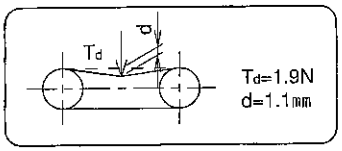
PARALLEL MOTOR MOUNTING (Option)

(Unit : mm)

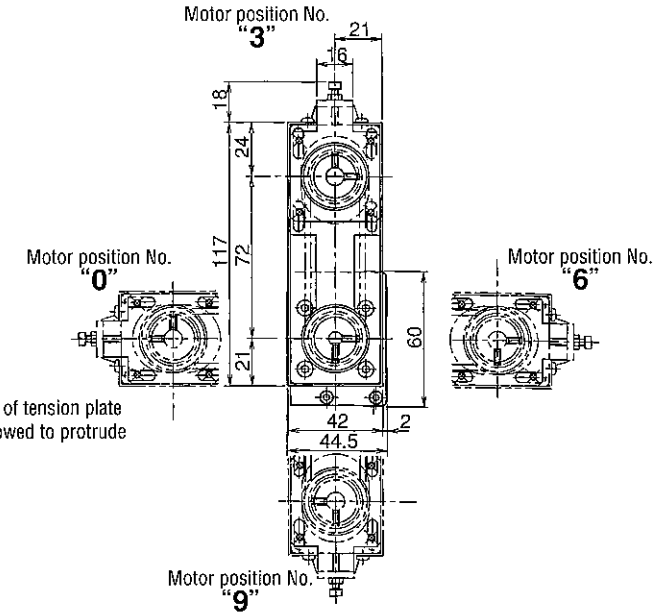
●SG33



For the position of tension plate which is not allowed to protrude from the width.



Belt tension

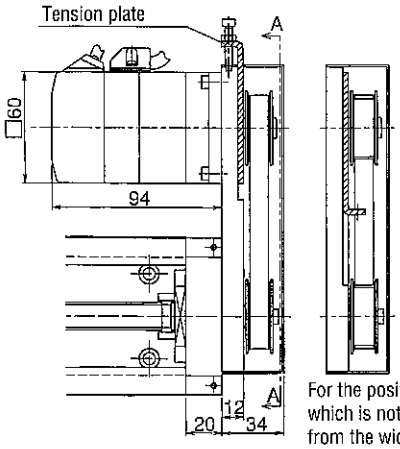


A-A sectional view

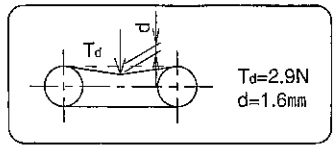
- The above figure shows MSMA01 (MATSUSHITA) : E□
- Pulley unit position can be adjusted at 90 degree each. Fill mounting direction number in □.
- Can be used with unit equipped with dustproof cover and sensor.
- Tension plate position can be mounted not to protrude from the width.
- The mass is increased 0.2kg from standard.
- Inertia moment is increased 2.22×10⁻⁶kg·m² from standard.

Mark	Motor option
E□	MATSUSHITA ELECTRIC INDUSTRIAL MICRO MINUS SERIES : 50~100W
F□	YASKAWA ELECTRIC SIGMA SERIES : 50~100W
	MITSUBISHI ELECTRIC HC-MF SERIES : 50~100W
	SANYO ELECTRIC P3 SERIES : 50~100W

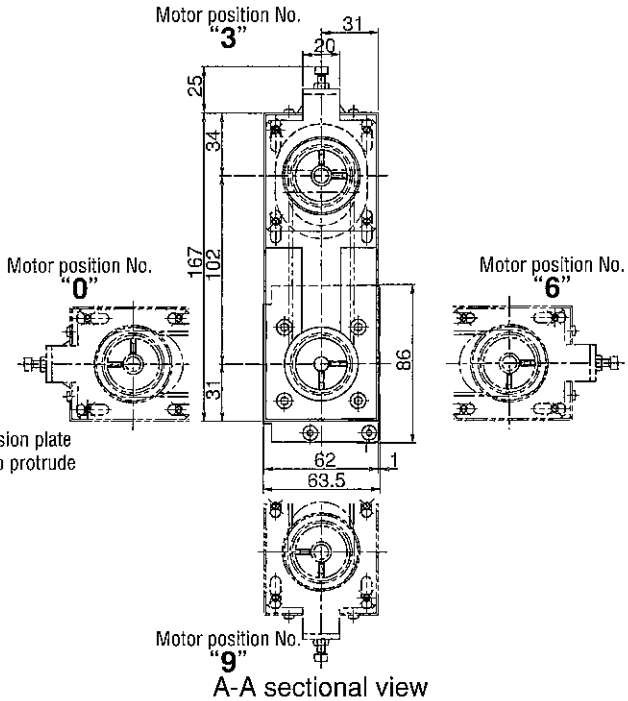
●SG46



For the position of tension plate which is not allowed to protrude from the width.



Belt tension



A-A sectional view

- The above figure shows MSMA01 (MATSUSHITA) : E□
- Pulley unit position can be adjusted at 90 degree each. Fill mounting direction number in □.
- Can be used with unit equipped with dustproof cover and sensor.
- Tension plate position can be mounted not to protrude from the width.
- The mass is increased 0.7kg from standard.
- Inertia moment is increased 1.24×10⁻⁵kg·m² from standard.

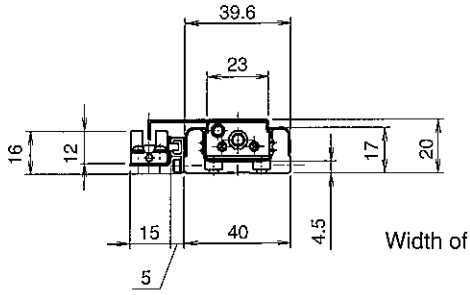
Mark	Motor option
E□	MATSUSHITA ELECTRIC INDUSTRIAL MICRO MINUS SERIES : 200W
F□	YASKAWA ELECTRIC SIGMA SERIES : 200W
	MITSUBISHI ELECTRIC HC-MF SERIES : 200W
	SANYO ELECTRIC P3 SERIES : 200W
G□	ORIENTAL MOTOR STEPPING MOTOR □60 SERIES

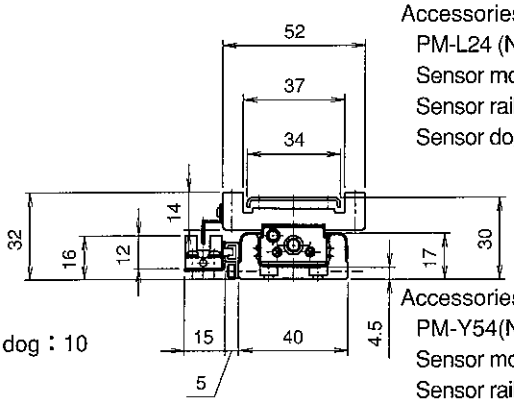
SENSOR

Photo-microsensor or proximity sensor can be mounted on single axis module using special rail.
Single axis module has sensor rail mounting holes on both of guide rail so that sensor can be mounted on any side.
For module with sensor, the following parts are supplied as standard accessories:

Symbol S (NPN)/M (NPN)/Y (PNP) (Unit : mm)

●SG20



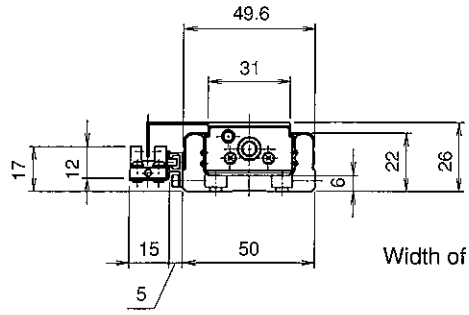


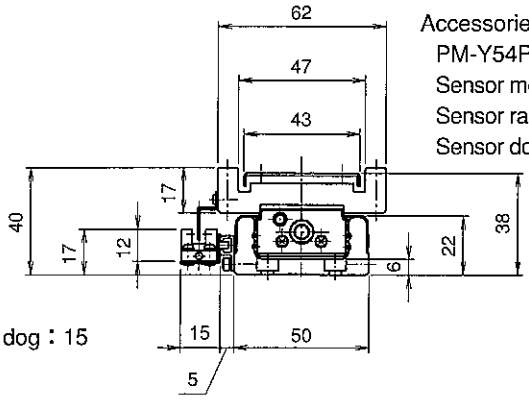
Width of sensor dog : 10

Accessories for Symbol S
PM-L24 (NPN) : 3 pcs.
Sensor mounting plate : 3 pcs.
Sensor rail : 1 pc.
Sensor dog : 1 pc.

Accessories for Symbol M
PM-Y54(NPN) : 3 pcs.
Sensor mounting plate : 3 pcs.
Sensor rail : 1 pc.
Sensor dog : 1 pc.

●SG26



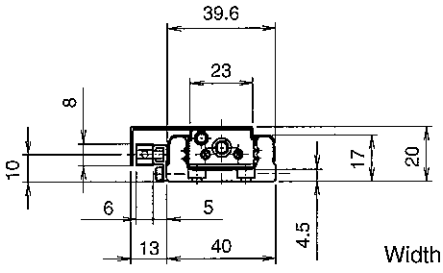


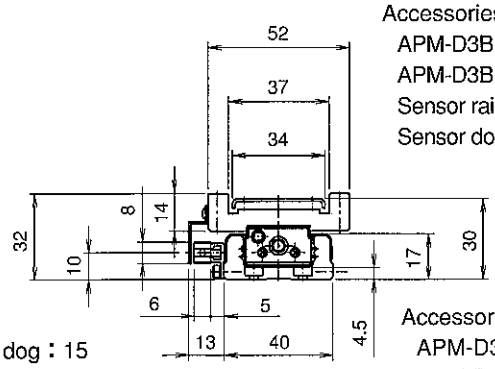
Width of sensor dog : 15

Accessories for Symbol Y
PM-Y54P(PNP) : 3 pcs.
Sensor mounting plate : 3 pcs.
Sensor rail : 1 pc.
Sensor dog : 1 pc.

Symbol K (NPN)/E (PNP) (Unit : mm)

●SG20



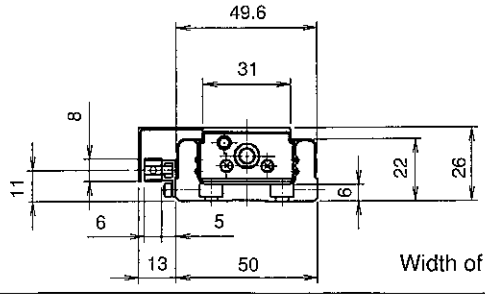


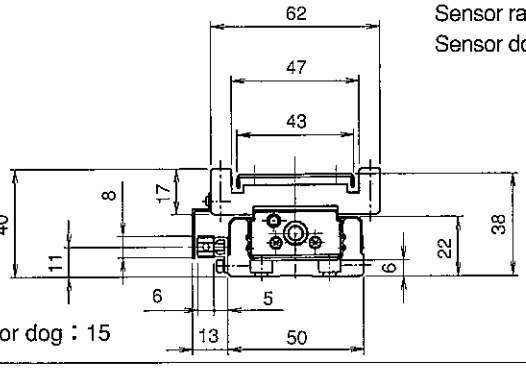
Width of sensor dog : 15

Accessories for Symbol K
APM-D3B1(NPN) : 2 pcs.
APM-D3B1F(NPN) : 1 pc.
Sensor rail : 1 pc.
Sensor dog : 1 pc.

Accessories for Symbol E
APM-D3E1(PNP) : 2 pcs.
APM-D3E1F(PNP) : 1 pc.
Sensor rail : 1 pc.
Sensor dog : 1 pc.

●SG26





Width of sensor dog : 15

SENSOR

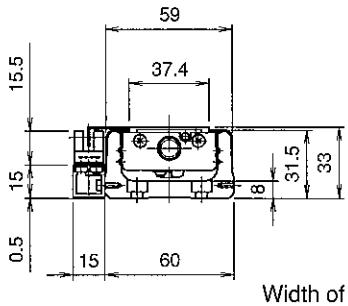
Symbol C (NPN)/P (PNP)

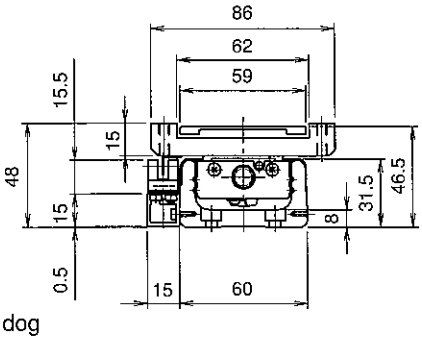
(Unit : mm)

Accessories for Symbol C
EE-SX674 (NPN) : 3 pcs.
EE-1001 : 3 pcs.
Sensor rail : 1 pc.
Sensor dog : *1 pc.

Accessories for Symbol P
EE-SX674P (PNP) : 3 pcs.
EE-1001 : 3 pcs.
Sensor rail : 1 pc.
Sensor dog : *1 pc.
*SG33□D-150 : 2 pcs.

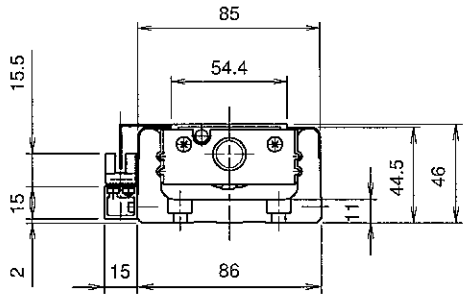
●SG33

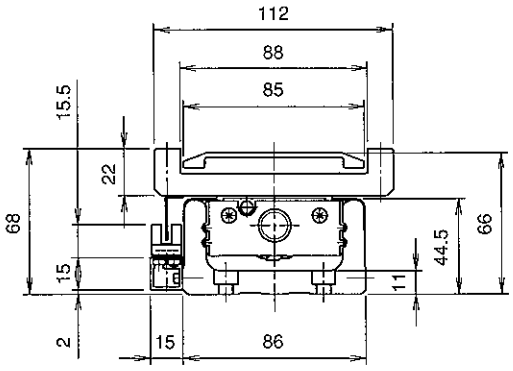




Width of sensor dog
A(long block) : 15
C(short block) : 10

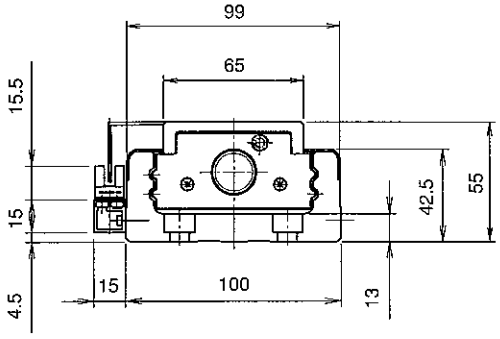
●SG46

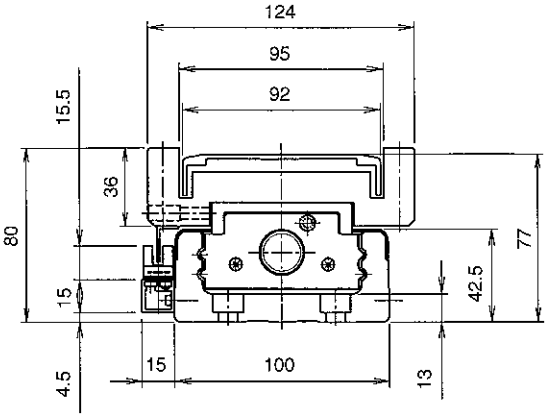




Width of sensor dog : 15

●SG55





Width of sensor dog : 20

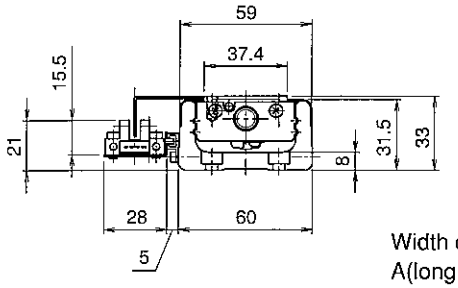
SENSOR

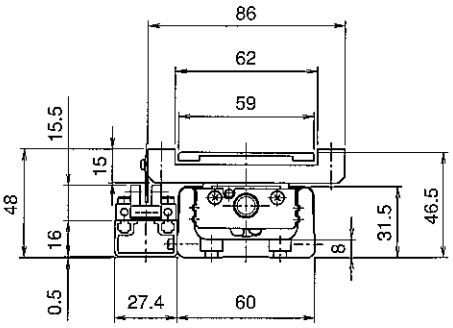
Symbol H (NPN)/J (PNP)

(Unit : mm)

Accessories for Symbol H		Accessories for Symbol J	
EE-SX671(NPN)	: 3 pcs.	EE-SX671P (PNP)	: 3 pcs.
EE-1001	: 3 pcs.	EE-1001	: 3 pcs.
Sensor rail	: 1 pc.	Sensor rail	: 1 pc.
Sensor dog	: 1 pc.	Sensor dog	: 1 pc.

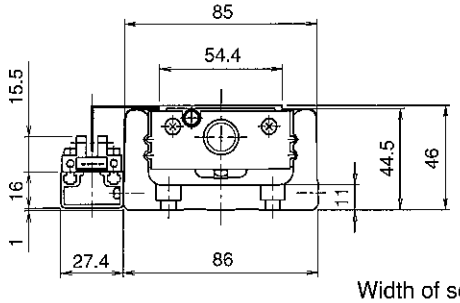
●SG33

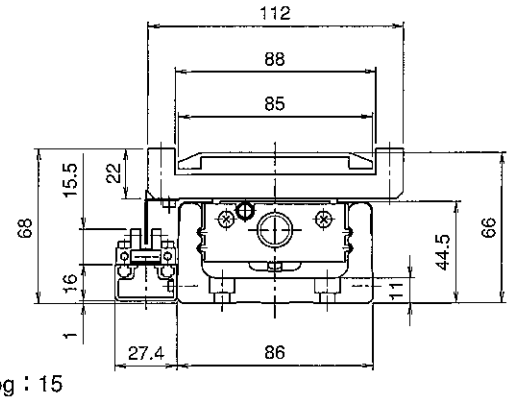




Width of sensor dog
A(long block) : 15
C(short block) : 10

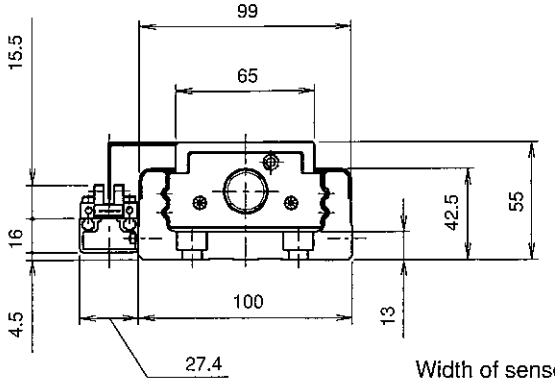
●SG46

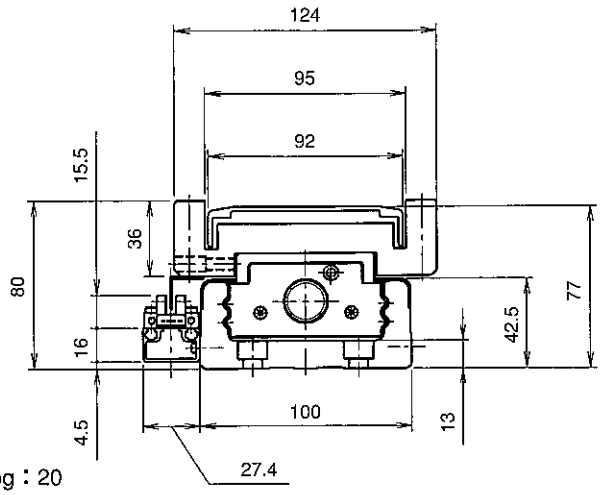




Width of sensor dog : 15

●SG55





Width of sensor dog : 20

HIGH RIGIDITY SINGLE AXIS MODULE
SE SERIES

ORDERING INSTRUCTIONS

SE23	10	A	–	300	W	–	A2	N	S	–	L	C
①	②	③		④	⑤		⑥	⑦	⑧		⑨	⑩

①Model No.
SE23
SE30

②Lead of ball screw (mm)

	Lead	SE23	SE30
02	2mm	○	–
04	4mm	–	○
05	5mm	○	○
10	10mm	–	○

③Slide Block

A	With 1 slide block
B	With 2 slide blocks

④Guide rail length (mm)

Model	Standard guide rail length
SE23	150、200、250、300
SE30	150、200、300、400、500、600、700、*750

(Note) Asterisked (*) : SE3010 only.

⑤Ball Screw

W	Rolled ball screw C7 class axial play 0.020 mm or less
U	Rolled ball screw C7 class preloaded

⑥Shape of Motor Bracket (See pages 43 to 44)

	SE23	SE30
A0	○	○
A1	○	○
A2	○	○
A3	○	○
A4	–	○
A5	○	○
A6	○	–
A7	○	–
B1	–	○
RN	–	○
*E□	–	○
*F□	–	○

(Note) Asterisked (*) item is provided with pulley unit.
Fill motor position number in □.
(Refer to Page 49.)

⑦Dustproof cover

N	Without dustproof cover
C	With dustproof cover

⑧Sensor

NPN output type		PNP output type		
N	Without sensor	N	Without sensor	
S	PM-L24	–	–	SE23
M	PM-Y54	Y	PM-Y54P	
K	APM-D3B1	E	APM-D3E1	
C	EE-SX674	P	EE-SX674P	SE30

(Note) For module with sensor, the following parts are supplied as standard accessories:

⑨Raydent treatment

N	Without Raydent
L	With Raydent

⑩Grease

N	Standard grease
C	C-grease

Sensor Accessories

Symbol S (NPN)	Symbol M (NPN)/Y (PNP)	Symbol K (NPN)/E (PNP)	Symbol C (NPN)/P (PNP)
Photo-microsensor	Photo-microsensor	Proximity sensor	Photo-microsensor
PM-L24 (NPN) :3pcs.	PM-Y54(NPN)	APM-D3B1(NPN)	EE-SX674(NPN)
Sensor dog :1pc.	/PM-Y54P(PNP) :3pcs.	/APM-D3E1(PNP) :2pcs.	/EE-SX674P(PNP) :3pcs.
Sensor mounting plate	Sensor dog :1pc.	APM-D3B1F(NPN)	Connector for sensor
:3pcs.	Sensor mounting plate	/APM-D3E1F(PNP) :1pc.	EE-1001 :3pcs.
Sensor rail :1pc.	:3pcs.	Sensor dog :1pc.	Sensor dog :1pc.
	Sensor rail :1pc.	Sensor rail :1pc.	Sensor rail :1pc.

For detailed specifications of sensors, refer to Pages 52 to 54.

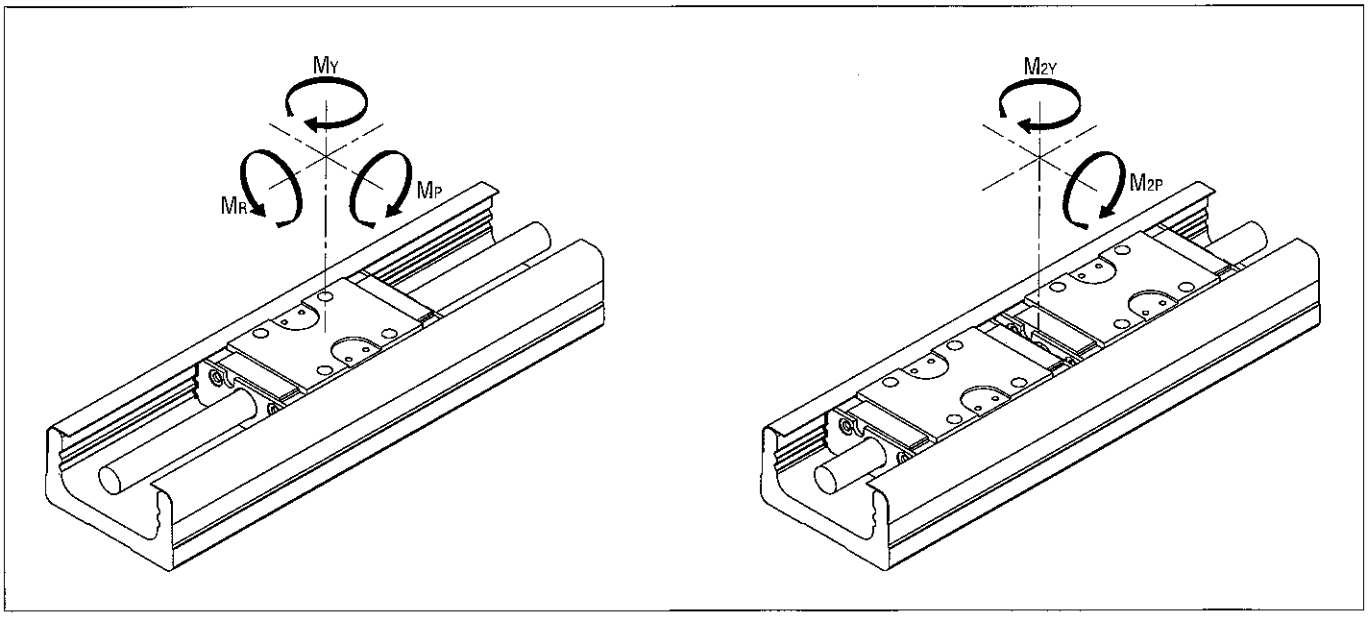
SPECIFICATIONS

	Model No.		Unit	SE2302	SE2305	SE3004	SE3005	SE3010
Guide	Radial clearance		μm	−3~0		−3~0		
	Basic dynamic load rating	C	kN	4.3		7.0		
	Basic static load rating	C_0	kN	7.0		11.8		
	*Static permissible moment	M_P	N·m	46		101		
		M_{2P}	N·m	276		606		
		M_Y	N·m	51		120		
		M_{2Y}	N·m	306		720		
		M_R	N·m	134		260		
		M_{2R}	N·m	268		520		
Ball screw	Shaft diameter		mm	8		10		
	Lead		mm	2	5	4	5	10
	Basic dynamic load rating	C_a	kN	1.8	1.9	3.0	3.0	2.0
	Basic static load rating	C_{oa}	kN	3.2	3.1	5.3	5.3	3.2
Fixed side bearing	Model No. of bearing			AC6-16DF or equivalent		708W1YNKDF/GMP5 or equivalent		
	Basic dynamic load rating	C_b	kN	1.38		4.4		
	Basic static load rating	C_{ob}	kN	1.76		4.36		

(Note) Each of static permissible moment M_{2P} and M_{2Y} means static permissible moment where 2 slide blocks are used.

*: Static permissible moment is the value when the contact stress between steel ball and ball groove surface is 4200N/mm² as stress limitation.

DIRECTION OF MOMENT



HIGH RIGIDITY SINGLE AXIS MODULE SE SERIES

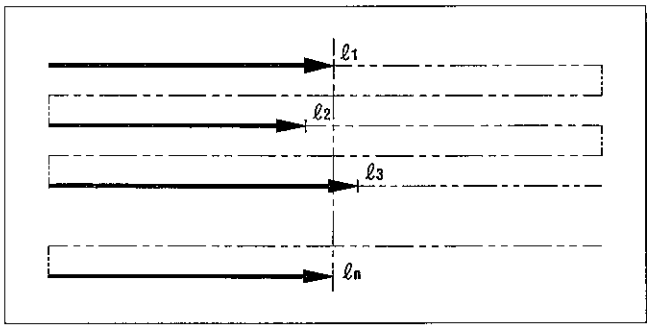
ACCURACY

Model No.	Guide Rail Length (mm)	Repeated positioning accuracy		Positioning accuracy		Traveling parallelism		Backlash		Starting torque	
		W (mm)	U (mm)	W (mm)	U (mm)	W (mm)	U (mm)	W (mm)	U (mm)	W (N·m)	U (N·m)
SE23	150	±0.010	±0.005	0.070		0.015		0.020	0.005	0.03	0.06
	200			0.075							
	250			0.085							
	300			0.090							
SE30	150	±0.010	±0.005	0.070		0.015		0.020	0.005	0.07	0.15
	200			0.080							
	300			0.090							
	400			0.095							
	500			0.100		0.025					
	600			0.110							
	700			0.120							
	750			0.130							

Measurement is to be performed with KURODA's specified motor mounted.

●Repeated Positioning Accuracy

Repeat positioning of slide block in the same direction 7 times, measure stop position of slide block and halve maximum difference between obtained readings. Perform this measurement at the center and both ends of travel distance. Maximum value among values so obtained is used as measured value.



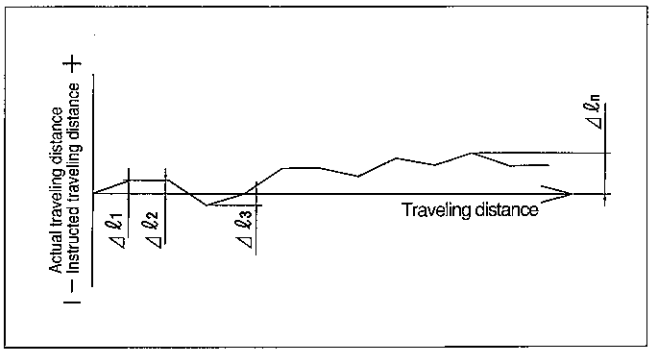
Repeated positioning accuracy

$=\pm\frac{1}{2}$((Maximum value of ℓn)−(Minimum value of ℓn))

●Positioning Accuracy

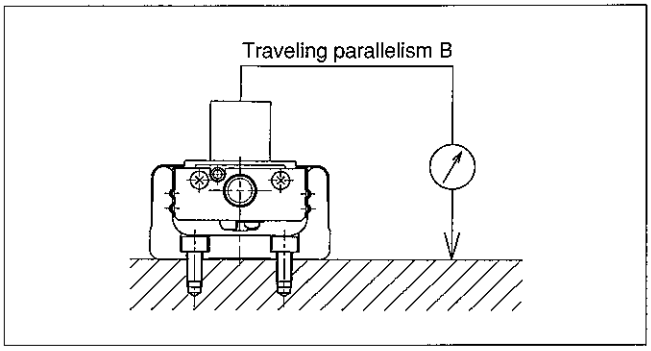
Position slide block properly in a fixed direction and use the position so obtained as datum point. Then, perform positioning of slide block in the same direction and measure difference between actual traveling distance of slide block from datum point and distance to be traveled by slide block from datum point is measured. Perform this measurement throughout stroke range and use maximum value among differences between these distances as measured value.

Positiong accuracy $=(\Delta \ell n)_{max}$



●Traveling Parallelism B

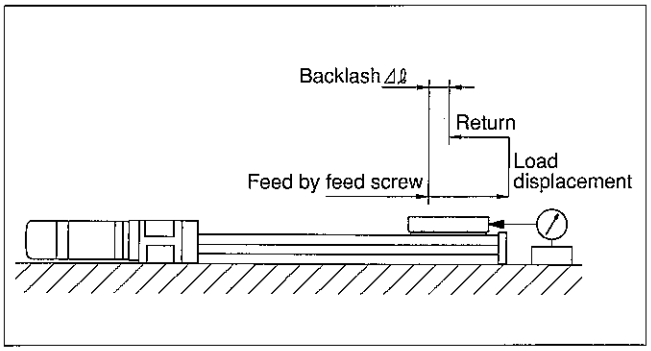
Fix indicator at center of slide block and apply it to surface plate equipped with guide rail. Move slide block throughout traveling distance and use maximum distance among readings of test indicator as measured value.



●Backlash

Feed slide block, read test indicator when it is slightly moved and use the reading as reference value. Move slide block from this state in the same direction at prescribed load and measure difference between reading of test indicator with load removed and reference value. Perform this measurement at the center and both ends of traveling distance and use maximum value among values so obtained as measured value.

Backlash $= \Delta \ell$



- Firmly tighten the fixed part and connection of the single axis module.

  Improper mounting of the body may adversely affect safety and accuracy according to circumstances.

HIGH RIGIDITY SINGLE AXIS MODULE SE SERIES

PERMISSIBLE SPEED

Permissible speed of single axis module varies according to type of motor and operating conditions. Furthermore it is restricted due to some cases such as critical speed, DmN value of ball screws and so on. Take into consideration in such cases, when using single axis module at high speed or using long guide rail.

Model No.	Guide rail length (mm)	Permissible speed (mm/s)
SE2302	150	200
	200	
	250	
	300	
SE2305	150	490
	200	
	250	
	300	

Model No.	Guide rail length (mm)	Permissible speed (mm/s)
SE3004	150	320
	200	
	300	
	400	
	500	
	600	240
	700	170
SE3005	150	400
	200	
	300	
	400	
	500	
	600	300
	700	210
SE3010	150	810
	200	
	300	
	400	
	500	
	600	600
	700	430
	750	380

MASS

Net Mass

(Unit : kg)

Model No.	Guide rail length (mm)	Without dustproof cover		With dustproof cover		Guide rail length (mm)
		Slide block		Slide block		
		1 block	2 blocks	1 block	2 block	
		A	B	A	B	
SE23	150	1.00	—	1.11	—	150
	200	1.21	1.35	1.32	1.46	200
	250	1.41	1.56	1.52	1.67	250
	300	1.61	1.76	1.73	1.88	300
SE30	150	1.6	—	1.7	—	150
	200	1.9	—	2.1	—	200
	300	2.6	2.9	2.7	3.2	300
	400	3.3	3.6	3.4	3.8	400
	500	3.9	4.2	4.1	4.5	500
	600	4.6	4.9	4.7	5.1	600
	700	5.2	5.5	5.4	5.8	700
	750	5.6	5.9	5.7	6.1	750

Mass of Slide Block

(Unit : kg)

Model No.	Without dustproof cover	With dustproof cover
SE23	0.14	0.26
SE30	0.3	0.4

In case of the mass for slide block with dustproof cover, the mass of sub-table is included.

INERTIA

Inertia for slide block and ball screw of single axis module is shown in the following table :

(Unit:kg·m²)

Model No.	Guide rail length (mm)	Without dustproof cover		With dustproof cover		Guide rail length (mm)
		Slide block		Slide block		
		1 block	2 blocks	1 block	2 blocks	
		A	B	A	B	
SE2302	150	6.07×10^{-7}	—	6.15×10^{-7}	—	150
	200	7.64×10^{-7}	7.79×10^{-7}	7.72×10^{-7}	7.87×10^{-7}	200
	250	9.21×10^{-7}	9.36×10^{-7}	9.29×10^{-7}	9.44×10^{-7}	250
	300	1.08×10^{-6}	1.09×10^{-6}	1.09×10^{-6}	1.10×10^{-6}	300
SE2305	150	6.96×10^{-7}	7.89×10^{-7}	7.41×10^{-7}	8.35×10^{-7}	150
	200	8.53×10^{-7}	9.46×10^{-7}	8.98×10^{-7}	9.92×10^{-7}	200
	250	1.01×10^{-6}	1.10×10^{-6}	1.06×10^{-6}	1.15×10^{-6}	250
	300	1.17×10^{-6}	1.26×10^{-6}	1.21×10^{-6}	1.31×10^{-6}	300
SE3004	150	1.57×10^{-6}	—	1.62×10^{-6}	—	150
	200	1.96×10^{-6}	—	2.01×10^{-6}	—	200
	300	2.73×10^{-6}	2.84×10^{-6}	2.77×10^{-6}	2.89×10^{-6}	300
	400	3.50×10^{-6}	3.61×10^{-6}	3.54×10^{-6}	3.66×10^{-6}	400
	500	4.26×10^{-6}	4.38×10^{-6}	4.31×10^{-6}	4.42×10^{-6}	500
	600	5.03×10^{-6}	5.14×10^{-6}	5.07×10^{-6}	5.19×10^{-6}	600
	700	5.80×10^{-6}	5.91×10^{-6}	5.84×10^{-6}	5.96×10^{-6}	700
SE3005	150	1.65×10^{-6}	—	1.72×10^{-6}	—	150
	200	2.03×10^{-6}	—	2.10×10^{-6}	—	200
	300	2.80×10^{-6}	2.98×10^{-6}	2.87×10^{-6}	3.05×10^{-6}	300
	400	3.56×10^{-6}	3.74×10^{-6}	3.63×10^{-6}	3.81×10^{-6}	400
	500	4.33×10^{-6}	4.51×10^{-6}	4.40×10^{-6}	4.58×10^{-6}	500
	600	5.10×10^{-6}	5.28×10^{-6}	5.17×10^{-6}	5.35×10^{-6}	600
	700	5.87×10^{-6}	6.05×10^{-6}	5.93×10^{-6}	6.11×10^{-6}	700
SE3010	150	2.22×10^{-6}	—	2.50×10^{-6}	—	150
	200	2.61×10^{-6}	—	2.88×10^{-6}	—	200
	300	3.37×10^{-6}	4.09×10^{-6}	3.65×10^{-6}	4.37×10^{-6}	300
	400	4.14×10^{-6}	4.86×10^{-6}	4.42×10^{-6}	5.14×10^{-6}	400
	500	4.91×10^{-6}	5.62×10^{-6}	5.18×10^{-6}	5.90×10^{-6}	500
	600	5.67×10^{-6}	6.39×10^{-6}	5.95×10^{-6}	6.67×10^{-6}	600
	700	6.44×10^{-6}	7.16×10^{-6}	6.72×10^{-6}	7.44×10^{-6}	700
	750	6.82×10^{-6}	7.54×10^{-6}	7.10×10^{-6}	7.82×10^{-6}	750

LIFE EXPECTANCY

For single axis module, each life expectancy of guide, ball screw and support bearing is obtained, and the shortest life expectance is used as life expectancy. The following formula is used for calculating life expectancy :

●Formula for calculating life expectancy of guide

$$L_G=\left(\frac{fc}{fw}\cdot\frac{C}{P}\right)^3\times 50 \quad (km)$$

L_G : Rating life expectancy (km)
fc : Contact factor
fw : Load factor
C : Basic dynamic load rating (N)
P : Load (N)
Consult KURODA for a moment of load.

●Formula for calculating life expectancy of ball screw and support bearing

$$La=\left(\frac{1}{fw}\cdot\frac{Ca \text{ or } Cb}{Pa}\right)^3\times 10^6 \quad (rev)$$

または

$$La=\left(\frac{1}{fw}\cdot\frac{Ca \text{ or } Cb}{Pa}\right)^3\times L \quad (km)$$

La : Life expectancy (rev, km)
fw : Load factor
Pa : Axial load (N)
Ca or Cb : Basic dynamic load rating (N)
L : Ball screw lead (mm)

●Contact factor (fc)

Number of blocks to be used in contact, when single axis module is used.	Contact factor (fc)
1	1.0
2	0.81

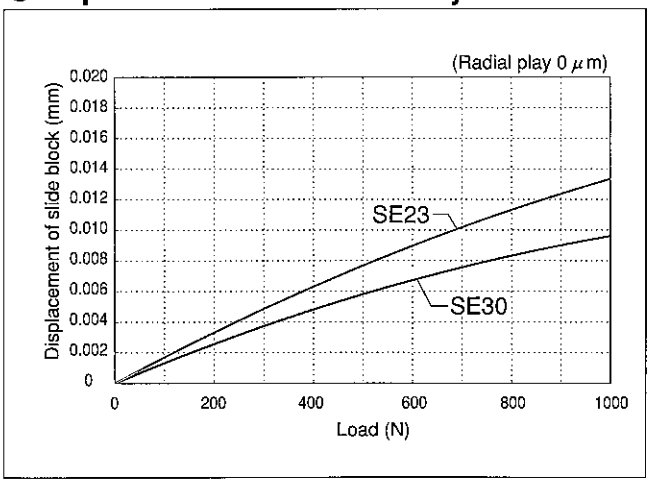
●Load factor (fw)

Operating condition		Load factor (fw)
Vibration and shock	Speed	
Zero	15 m/min or less	1.0~1.5
Small	60 m/min or less	1.5~2.0
Large	60 m/min or more	2.0~3.5

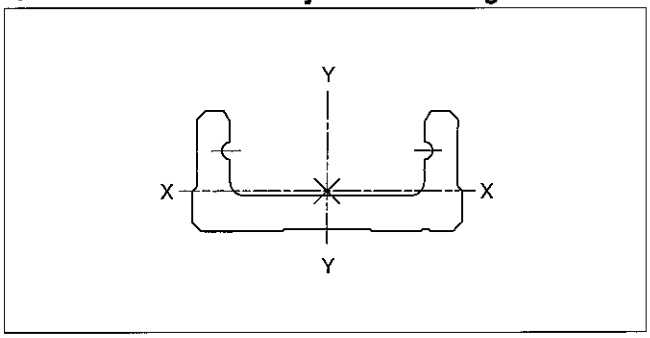
RIGIDITY

Single axis module has "2-thread/4-contact" structure with high rigidity. Displacement of slide block to radial load in each size is shown in table.

●Displacement of slide block by radial load



●Sectional secondary moment of guide rail



Model No.	Sectional secondary moment of guide rail (mm⁴)		Mass W (kg/100mm)
	I_X (X axis)	I_Y (Y axis)	
SE23	1.44×10^4	1.37×10^5	0.41
SE30	3.88×10^4	3.14×10^5	0.56

MOTOR BRACKET CONFIGURATIONS AND MOTOR OPTION

Various motor brackets and intermediate flanges are available, making it possible to mount optional motor on single axis module.

Motor option				Motor bracket configurations	
Motor type	Maker	Model No.	Output (W)	SE23	SE30
AC Servo motor	MATSUSHITA ELECTRIC INDUSTRIAL	MSM5BZ21A	5	A2	—
		MSM1AZ21A	10		
		MSM2AZ21A	20		
		MSMA3AZ	30	A3	A2
		MSMA5AZ	50		
		MSMA01	100		
	MITSUBISHI ELECTRIC	HC-KFS (MFS,PQ) 053	20	A1	A1
		HC-KFS (MFS,PQ) 13	100		
		HA-FF053	50	—	A3
		HA-FF13	100		
	YASKAWA ELECTRIC	SGMAH (SGML) -A3	30	A1	A1
		SGMAH (SGML) -A5	50		
		SGMAH (SGML) -01	100		
	SANYO ELECTRIC	P30B04003	30	A1	A1
		P30B04005	50		
		P30B04010	100		
		P30B05005	50	—	—
		P30B05010	100		
	CHIBA PRECISION	EA-2565	12	A7	A3
		EA-2580	20		
	HITACHI INDUSTRIAL EQUIPMENT SYSTEM	ADMA-R5	50	A1	A1
		ADMA-01	100		
	TAMAGAWA SEIKI	TS4601	30	A1	A1
		TS4602	50		
		TS4603	100		
	FANUC	βM0.2	50	A1	A1
		βM0.3	100		
Stepping motor	ORIENTAL MOTOR	UPD53M-A	—	A5	—
		PMU33AH	—	A6	—
		UPK (RK) 54,AS4	—	A5	B1
		UPK (RK) 56,AS6	—	—	A4
		UK26,UMK26,CSK26	—	—	A5

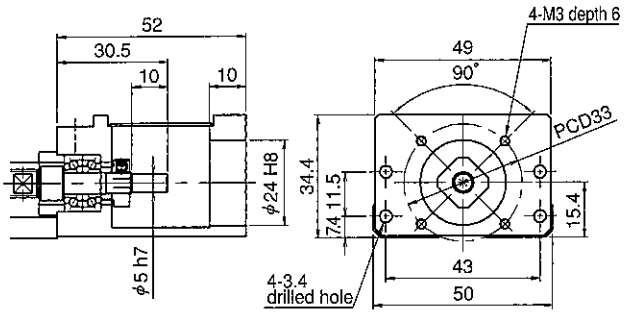
- For motors other than above-mentioned, consult KURODA.
- When selecting a rigid type as coupling for connecting a motor, consult KURODA.

HIGH RIGIDITY SINGLE AXIS MODULE SE SERIES

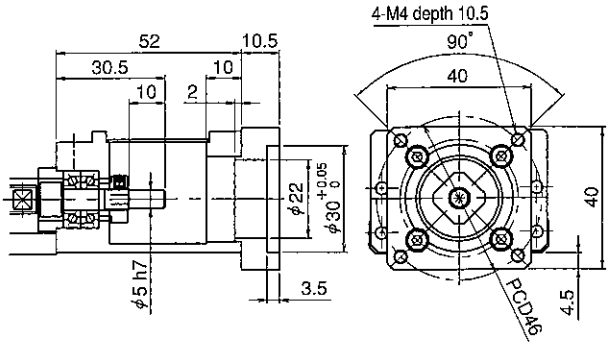
MOTOR BRACKET CONFIGURATIONS

●SE23 (Unit : mm)

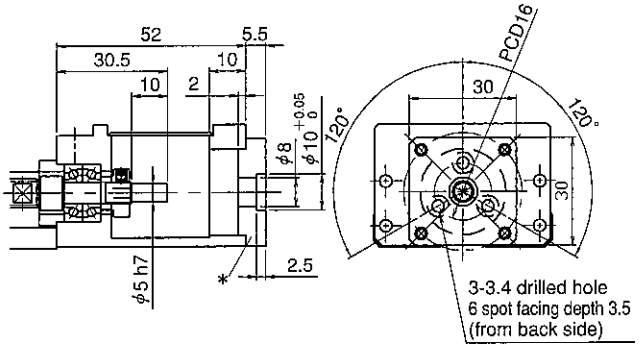
Motor bracket configuration : A0



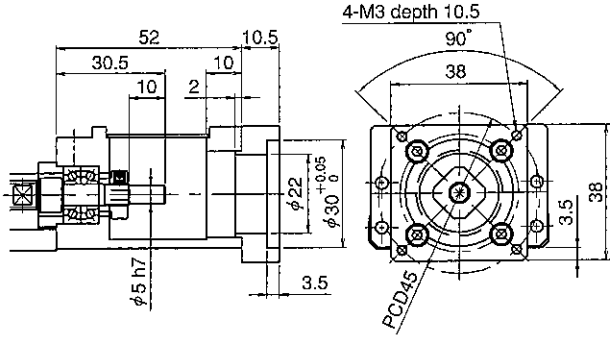
Motor bracket configuration : A 1 (Mass : 28g)



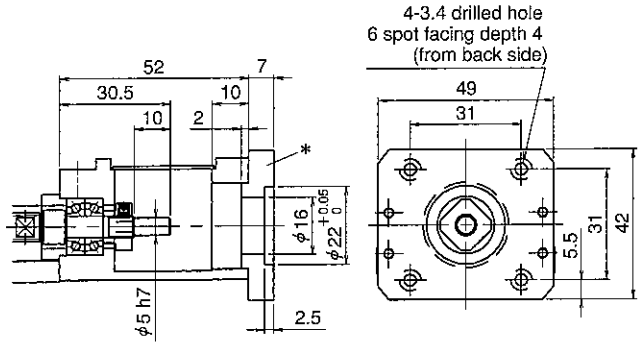
Motor bracket configuration : A2 (Mass : 12g)



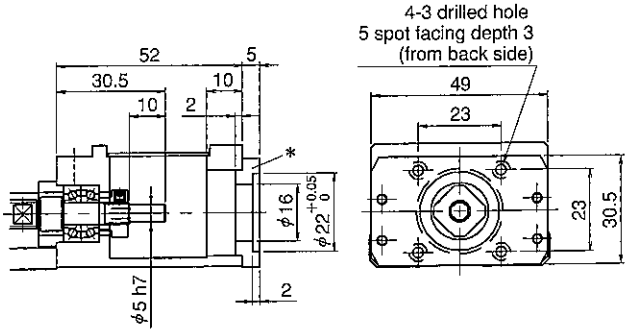
Motor bracket configuration : A3 (Mass : 24g)



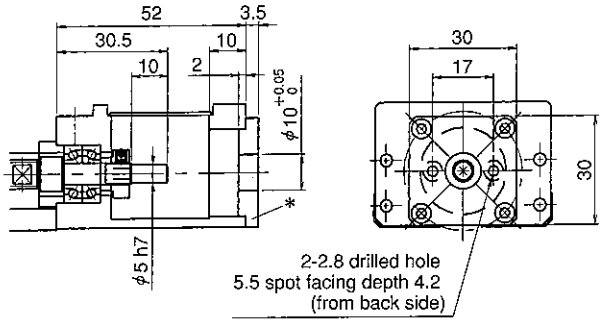
Motor bracket configuration : A5 (Mass : 32g)



Motor bracket configuration : A6 (Mass : 16g)



Motor bracket configuration : A7 (Mass : 8g)

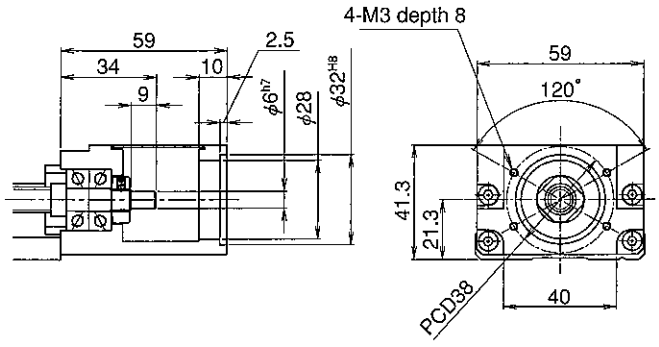


For A2, A5, A6 and A7 configuration, fix the * marked intermediate flange after mounting motor.

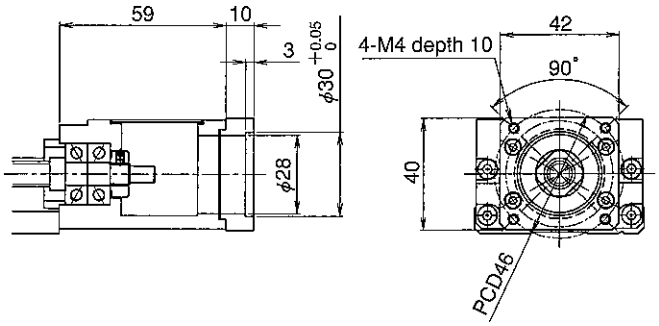
MOTOR BRACKET CONFIGURATIONS

●SE30 (Unit : mm)

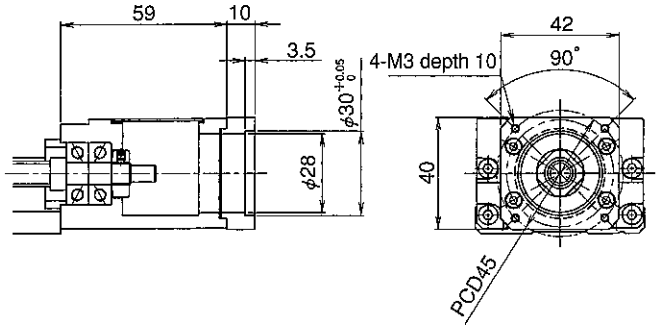
Motor bracket configuration : A0



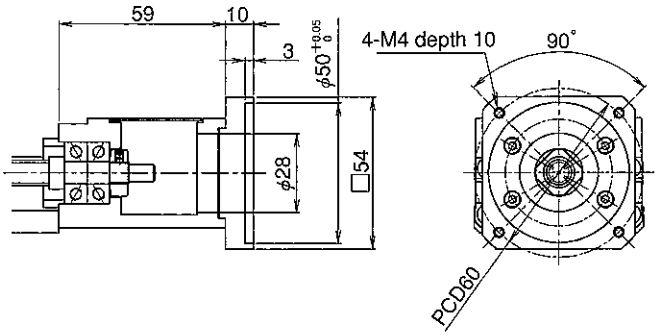
Motor bracket configuration : A1 (Mass : 25g)



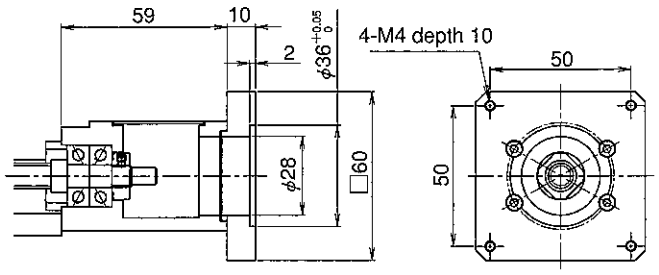
Motor bracket configuration : A2 (Mass : 25g)



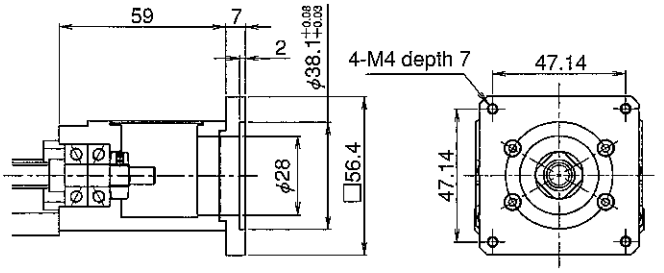
Motor bracket configuration : A3 (Mass : 55g)



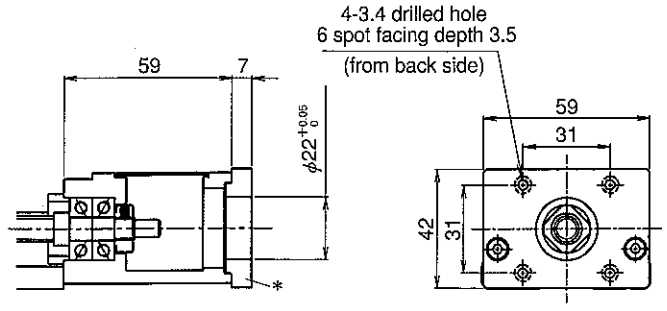
Motor bracket configuration : A4 (Mass : 71g)



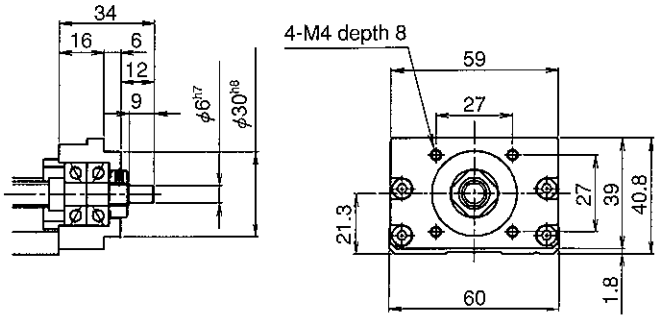
Motor bracket configuration : A5 (Mass : 46g)



Motor bracket configuration : B1 (Mass : 37g)



Motor bracket configuration : RN



For B1 configuration, fix the * marked intermediate flange after mounting motor.

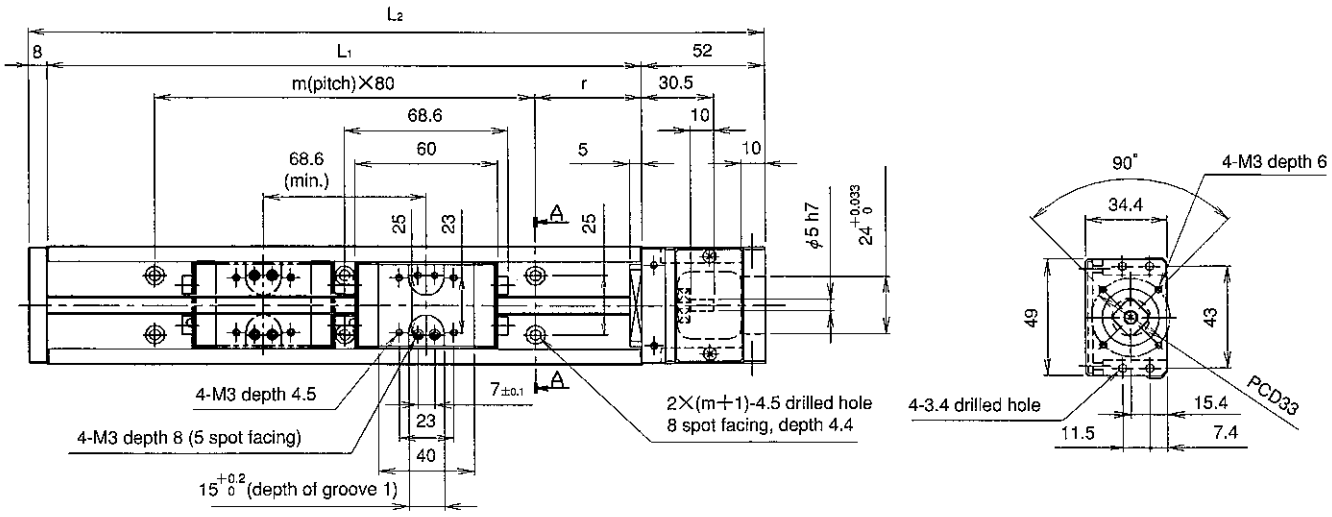
Mass is 80g less than value shown in Page 33.

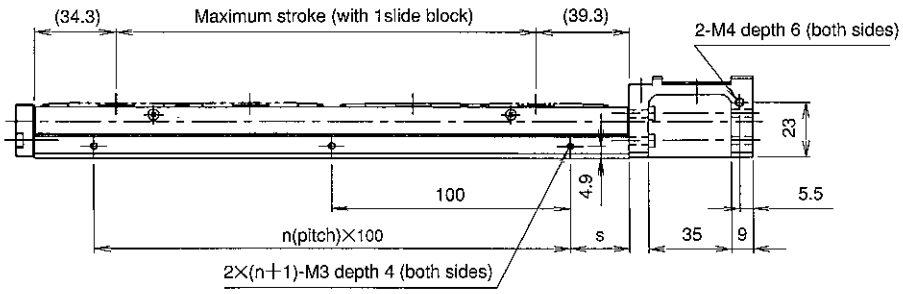
DIMENSIONS

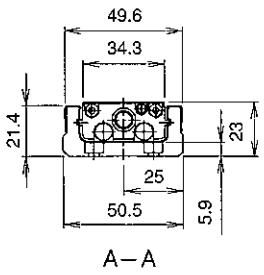
●SE23

(Unit : mm)

Without dustproof cover







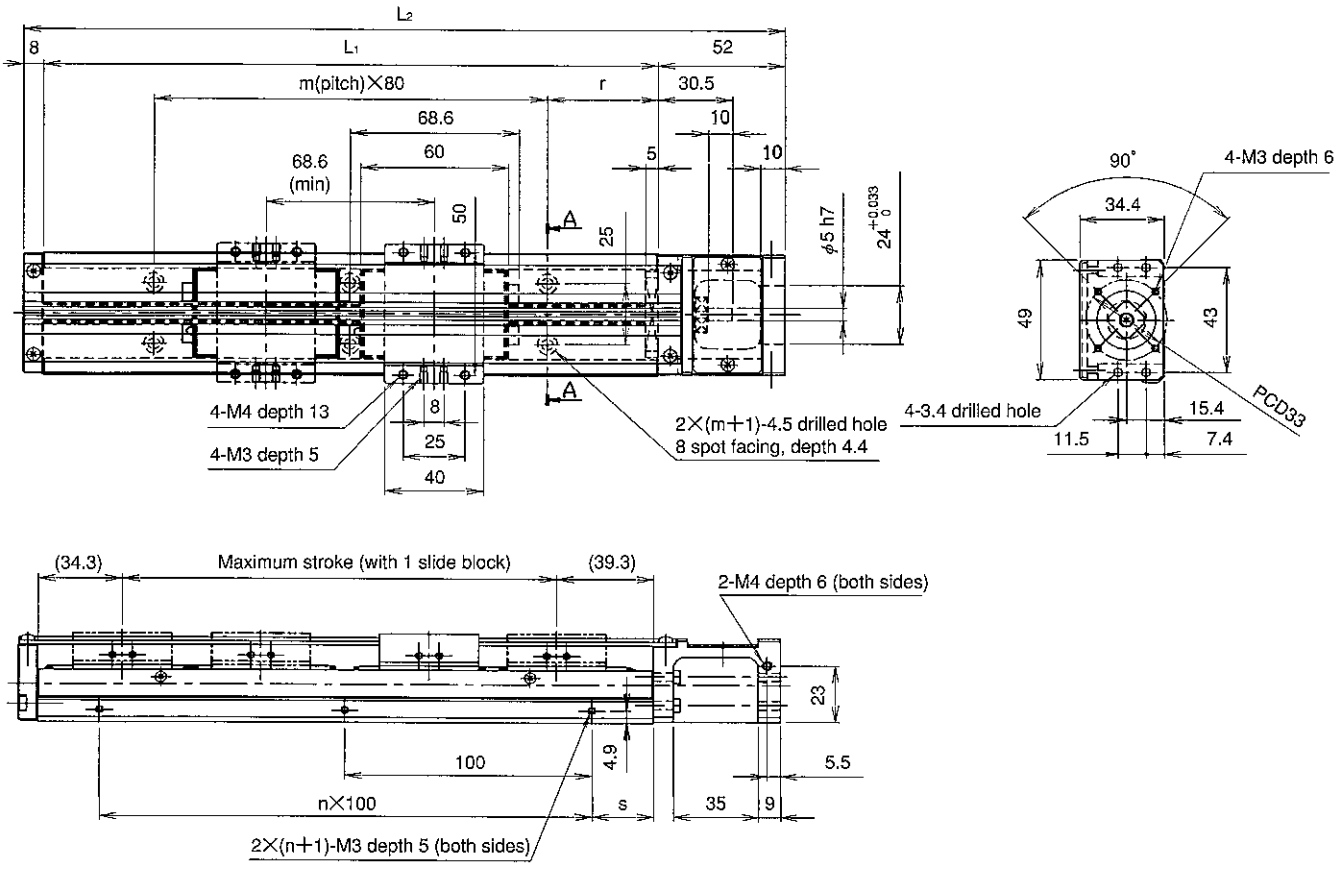
A—A

Max.stroke	L1	L2	m	n	r	s
76	150	210	1	1	35	25
126	200	260	2	1	20	50
176	250	310	2	2	45	25
226	300	360	3	2	30	50

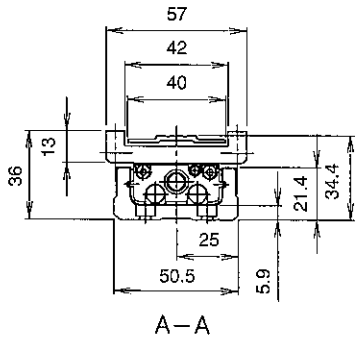
DIMENSIONS

●SE23 (Unit : mm)

With dustproof cover



L1	L2	m	n	r	s
150	210	1	1	35	25
200	260	2	1	20	50
250	310	2	2	45	25
300	360	3	2	30	50



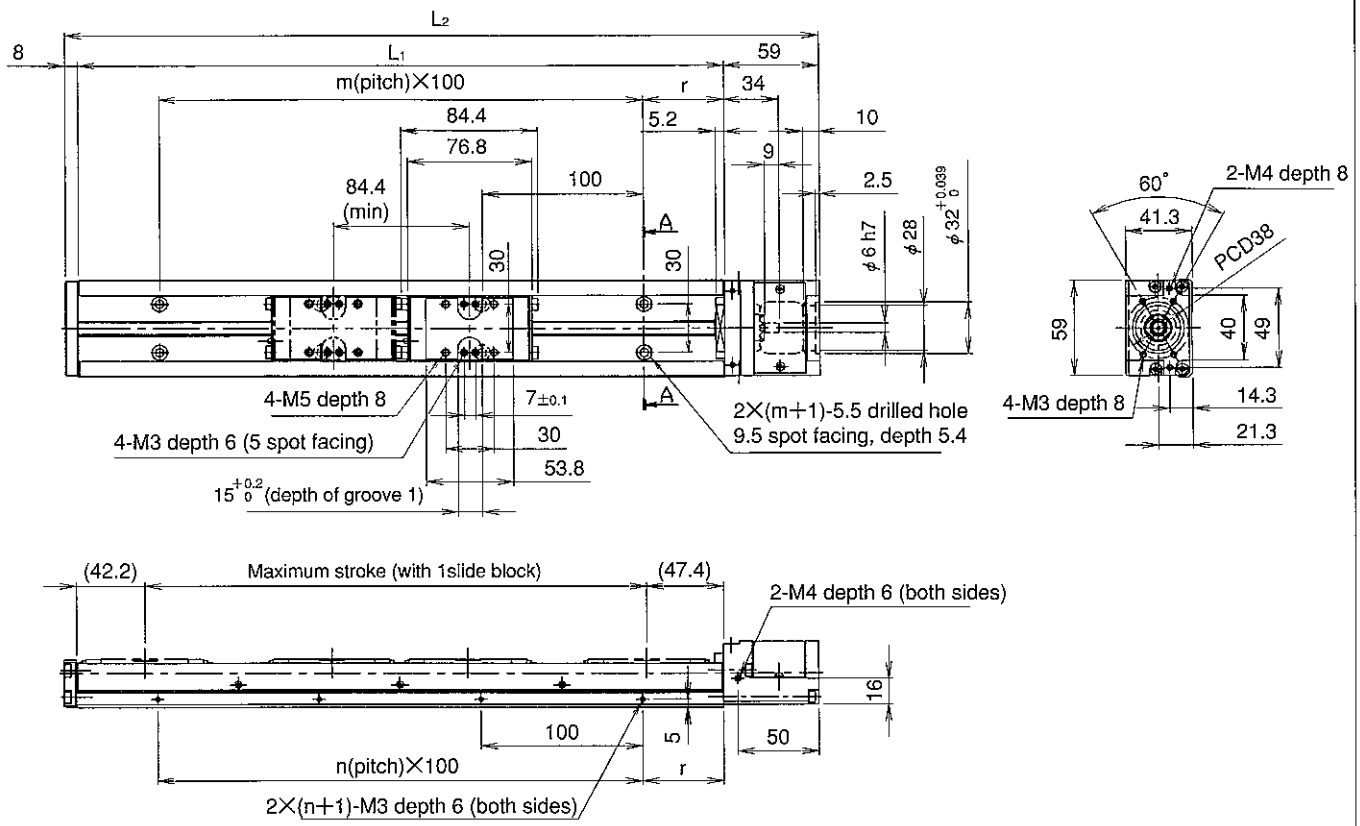
A−A

HIGH RIGIDITY SINGLE AXIS MODULE SE SERIES

DIMENSIONS

●SE30 (Unit : mm)

Without dustproof cover



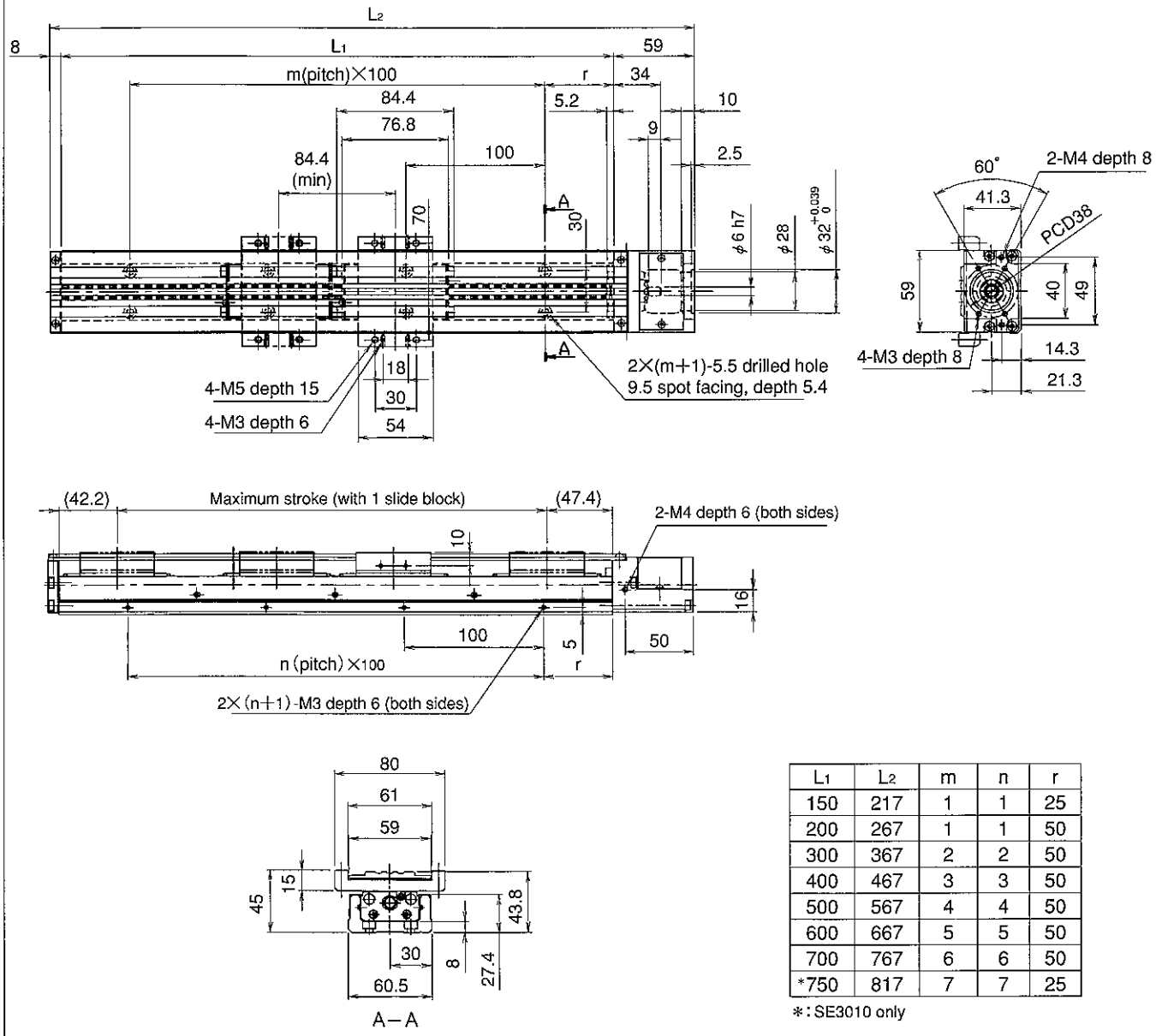
Max.stroke	L1	L2	m	n	r
60	150	217	1	1	25
110	200	267	1	1	50
210	300	367	2	2	50
310	400	467	3	3	50
410	500	567	4	4	50
510	600	667	5	5	50
610	700	767	6	6	50
660	*750	817	7	7	25

*: SE3010 only

DIMENSIONS

●SE30 (Unit : mm)

With dustproof cover



L1	L2	m	n	r
150	217	1	1	25
200	267	1	1	50
300	367	2	2	50
400	467	3	3	50
500	567	4	4	50
600	667	5	5	50
700	767	6	6	50
*750	817	7	7	25

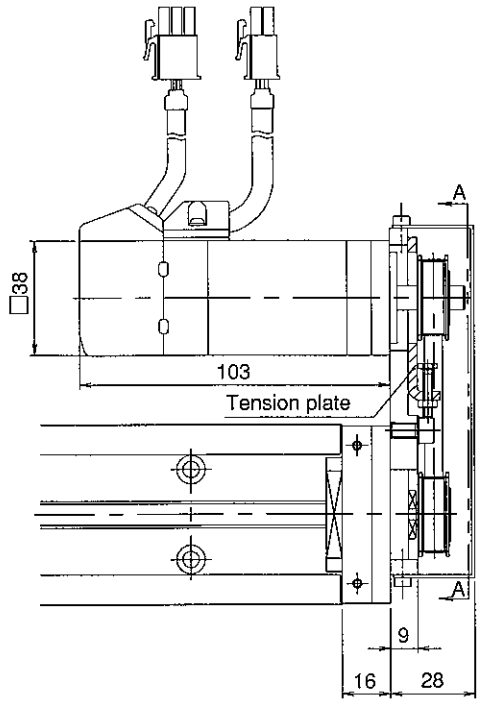
*: SE3010 only

HIGH RIGIDITY SINGLE AXIS MODULE SE SERIES

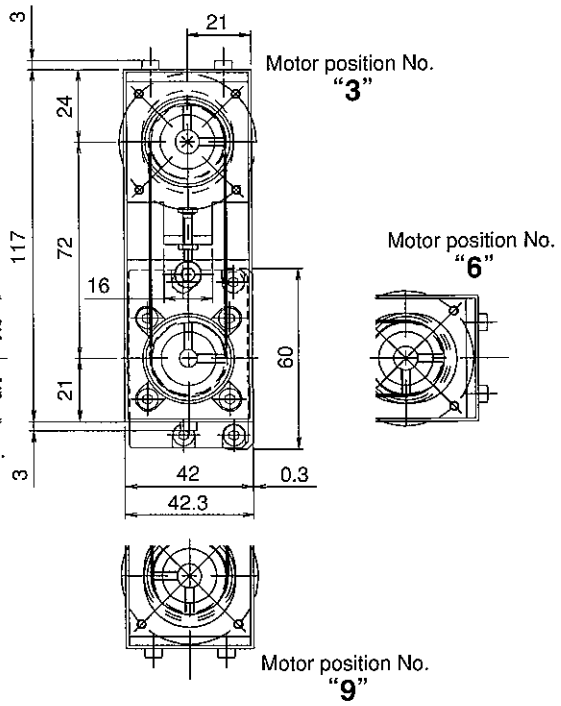
PARALLEL MOTOR MOUNTING (Option)

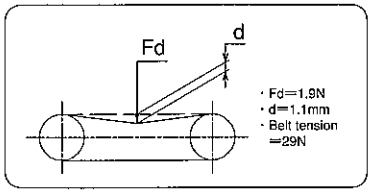
(Unit : mm)

●SE30



A-A sectional view





Belt tension

- The above figure shows MSMA01 (MATUSHITA) : E□
- Pulley unit position can be ajdusted at 90 degree each.
  Fill mounting direction number in □.
  When pulley cover cannot be removed due to angle of unit, ask KURODA to change pulley cover set bolt position. (Hexagon socket head bolt M3,3 pcs.)
- Can be used with unit equipped with dustproof cover and sensor.
- Tension cover plate is to be mounted inside the cover (standard specification). However it can be mounted outside the cover. In this case, consult KURODA.

Mark	Motor option
E□	MATSUSHITA ELECTRIC INDUSTRIAL MICRO MINUS SERIES : 50~100W
F□	YASKAWA ELECTRIC SIGMA SERIES : 50~100W
	MITSUBISHI ELECTRIC HC-MF SERIES : 50~100W
	SANYO ELECTRIC P3 SERIES : 50~100W

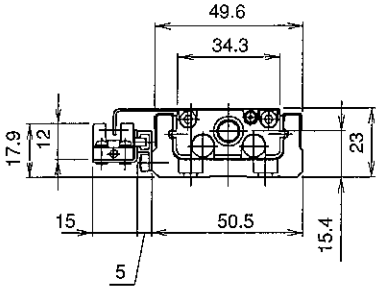
SENSOR

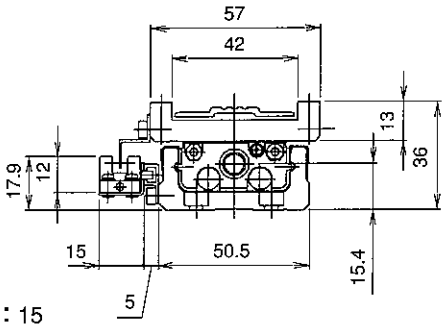
Photo-microsensor or proximity sensor can be mounted on single axis module using special rail.
Single axis module has sensor rail mounting holes on both sides of guide rail so that sensor can be mounted on any side.
For module with sensor, the following parts are supplied as standard accessories:

Symbol S (NPN)/M (NPN)/Y (PNP) (Unit : mm)

●SE23

Accessories for Symbol S		Accessories for Symbol M		Accessories for Symbol Y	
PM-L24 (NPN)	: 3 pcs.	PM-Y54(NPN)	: 3 pcs.	PM-Y54P(PNP)	: 3 pcs.
Sensor mounting plate	: 3 pcs.	Sensor mounting plate	: 3 pcs.	Sensor mounting plate	: 3 pcs.
Sensor rail	: 1 pc.	Sensor rail	: 1 pc.	Sensor rail	: 1 pc.
Sensor dog	: 1 pc.	Sensor dog	: 1 pc.	Sensor dog	: 1 pc.



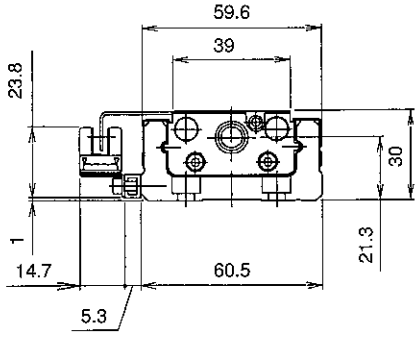


Width of sensor dog : 15

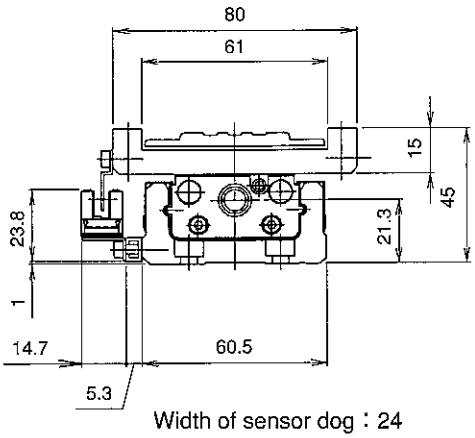
Symbol C (NPN)/P (PNP) (Unit : mm)

●SE30

Accessories for Symbol C		Accessories for Symbol P	
EE-SX674 (NPN)	: 3 pcs.	EE-SX674P(PNP)	: 3 pcs.
EE-1001	: 3 pcs.	EE-1001	: 3 pcs.
Sensor rail	: 1 pc.	Sensor rail	: 1 pc.
Sensor dog	: 1 pc.	Sensor dog	: 1 pc.



Width of sensor dog : 15



Width of sensor dog : 24

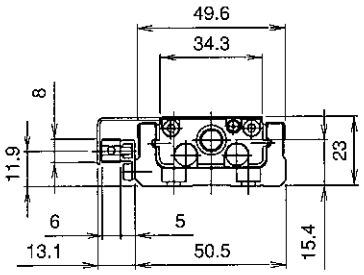
SENSOR

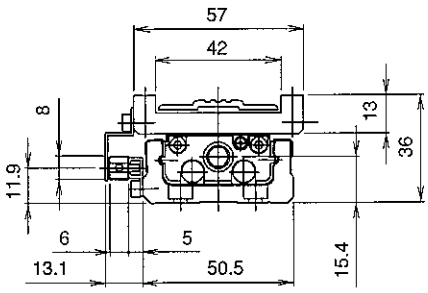
Symbol K (NPN)/E (PNP)

(Unit : mm)

●SE23

Accessories for Symbol K		Accessories for Symbol E	
APM-D3B1 (NPN)	: 2 pcs.	APM-D3E1 (PNP)	: 2 pcs.
APM-D3B1F (NPN)	: 1 pc.	APM-D3E1F (PNP)	: 1 pc.
Sensor rail	: 1 pc.	Sensor rail	: 1 pc.
Sensor dog	: 1 pc.	Sensor dog	: 1 pc.





Width of sensor dog : 15

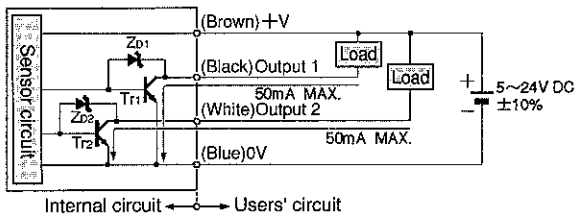
PHOTO-MICROSENSOR/SUNX

Specifications

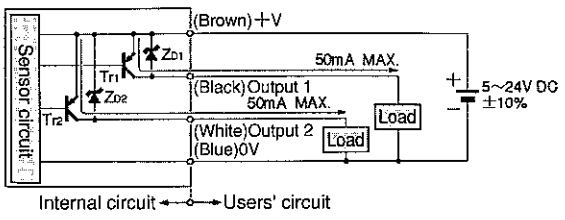
Model No.	NPN output type	PM-24L	PM-Y54
	PNP output type	—	PM-Y54P
Sensing range		5mm(fixed)	
Sensing object		0.8×1.8mm opaque object	
Hysteresis		0.05mm or less	
Repeatability		0.03mm or less	
Supply voltage		5 to 24V DC±10% Ripple P-P 10% or less	
Current consumption		15mA or less	
Output		NPN output type : NPN transistor open collector Maximum sink current ; 50mA Applied voltage ; 30V DC or less (between output and 0V) Residual voltage ; 0.7V or less (at 50mA sink current) 0.4V or less (at 16mA sink current) PNP output type : PNP transistor open collector Maximum sink current ; 50mA Applied voltage ; 30V DC or less (between output and 0V) Residual voltage ; 0.7V or less (at 50mA sink current) 0.4V or less (at 16mA sink current)	
Output operation		Incorporated with 2 outputs : Light-ON/Dark-ON	
Response time		Under light received condition : 20 μs or less	
Operation indicator		Vermillion LED (lights up under light received condition)	
Ambient illuminance		Fluorescent light : 1000 ℓ x at the light- receiving face	
Ambient temprature		−25 to +55℃ (No dew condensation or icing allowed), Storage : −30 to +80℃	
Ambient humidity		35 to 85% RH, Storage : 35 to 85% RH	
Voltage withstandability		1000V AC for one min. between all supply terminals connected together and enclosure	
Insulation resistance		50MΩ, or more, with 250V DC megger between all supply terminals connected together and enclosure	
Vibration resistance		10 to 2000Hz frequency, 1.5mm amplitude in X, Y and Z directions for two hours each	
Shock resistance		15000m/s² acceleration (1500G approx.) in X, Y and Z directions for three times each	
Cable		0.09mm² 4-core cabtyre cable, 1m long	—
Mass		10g approx.	3g approx.
Material	Case	PBT	
	Cover	Polycarbonate	
	Terminal	Solder plated (PM-Y54P only)	

I/O circuit diagram

●NPN output type

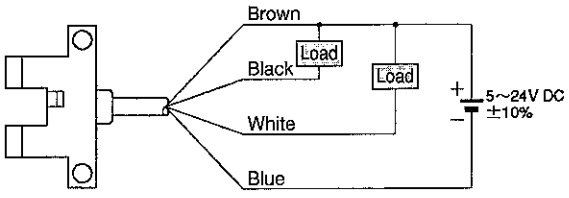


●PNP output type

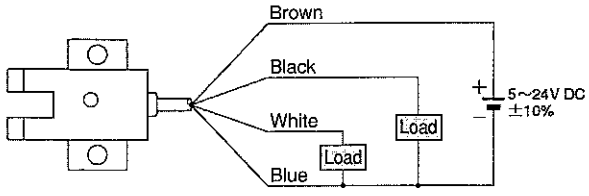


Wiring diagram

●NPN output type



●PNP output type



(Note) For detailed information and operating precautions, refer to catalogs and operating instructions supplied by the sensor maker.

HIGH ACCURACY AND HIGH RIGIDITY SINGLE AXIS MODULE

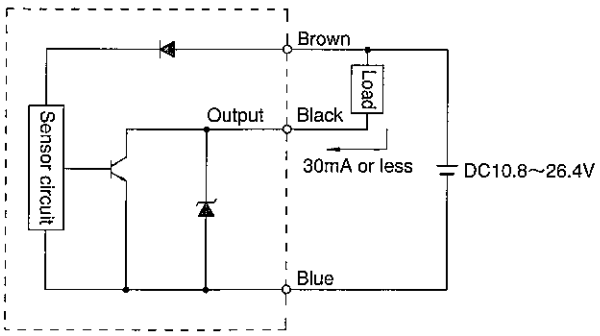
PROXIMITY SENSOR/YAMATAKE

Specifications

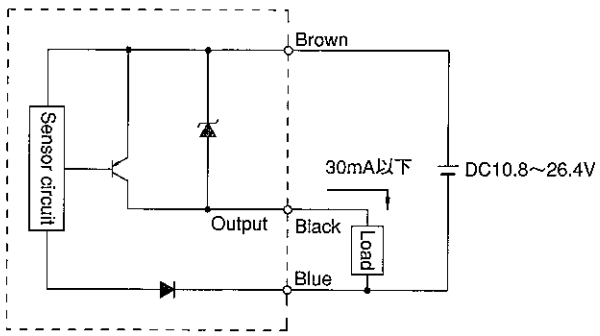
Model No.	NPN output type	APM-D3B1	—
	PNP output type	—	APM-D3E1
Rated sensing distance		2.5mm±15%	
Standard target object		15×15×1mm (Iron)	
Hysteresis		15% or less in sensing length	
Supply voltage		12/24V DC	
Operating voltage range		DC10.8~26.4V	
Current consumption		10mA or less	
Output		NPN output type : NPN transistor open collector Switching current ; 30mA or less (resistive load) Residual voltage ; 1V or less (switching current 30mA) Output dielectric strength ; 26.4V PNP output type : PNP transistor open collector Switching current ; 30mA or less (resistive load) Residual voltage ; 1V or less (switching current 30mA) Output dielectric strength ; 26.4V	
Response frequency		120Hz	
Operation indicator		Red LED (lights up at object approaches)	
Ambient temprature		−10 to +55℃, Strage : −25 to +70℃	
Ambient humidity		35~85%RH	
Voltage withstandability		1000V AC , 50/60Hz for one min. between all supply terminals connected together and enclosure	
Insulation resistance		50MΩ or more (at 500V DC megger)	
Vibration resistance		10 to 55Hz, 1.5mm amplitude in X, Y and Z directions for two hours each	
Shock resistance		500m/s^2 in X, Y and Z directions for three times each	
Protection		IP67 (IEC 529)	
Mass		10g approx.	

Wiring diagram

●NPN output type



●PNP output type



(Note) For detailed information and operating precautions, refer to catalogs and operating instructions supplied by the sensor maker.

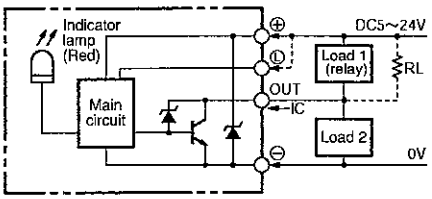
PHOTO-MICROSENSOR/OMRON

Specifications

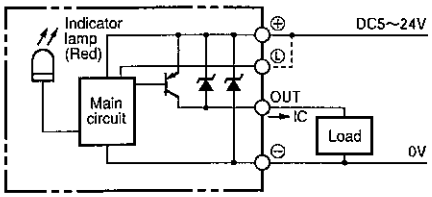
Model No.	NPN output type	EE-SX674	EE-SX671
	PNP output type	EE-SX674P	EE-SX671P
Sensing range		5mm (slot width)	
Sensing object		Opaque object 2×0.8mm or more	
Hysteresis		0.025mm	
Operation indicator		Red LED (lights up at light-received)	
Supply voltage		5 to 24V DC±10% Ripple P-P 10% or less	
Current consumption		NPN type : 35mA or less PNP type : 30mA or less	
Output		NPN output type : NPN transistor open collector Output ; 5 to 24V DC 100mA or less Residual voltage ; 0.8V or less (at 100mA load current) 0.4V or less (at 40mA load current) PNP output type : PNP transistor open collector Output ; 5 to 24V DC 50mA or less Residual voltage ; 1.3V or less (at 50mA load current)	
Response frequency		1kHz (3kHz average)	
Ambient illuminance		Fluorescent light : 1000 ℓx at the light- receiving face	
Ambient temprature		−25 to +55℃, Storage : −30 to +80℃	
Ambient humidity		5 to 85% RH, Storage : 5 to 95% RH	
Vibration resistance		29 to 2000Hz (100m/s^2 peaked acceleration) 1.5mm amplitude in X, Y and Z directions for two hours each (4min. cycle)	
Shock resistance		500m/s^2 in X, Y and Z directions for three times each	
Protection		IP50 (IEC529)	
Connection		Connector	
Mass		3g approx.	
Material	Case	PBT	
	Cover	Polycarbonate	
	Light projecting/ receiving unit		

I/O circuit diagram

●NPN output type



●PNP output type



(Note) For detailed information and operating precautions, refer to catalogs and operating instructions supplied by the sensor maker.

⚠ WARNING

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