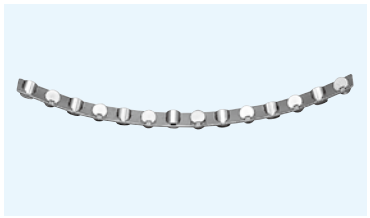
CR TYPE

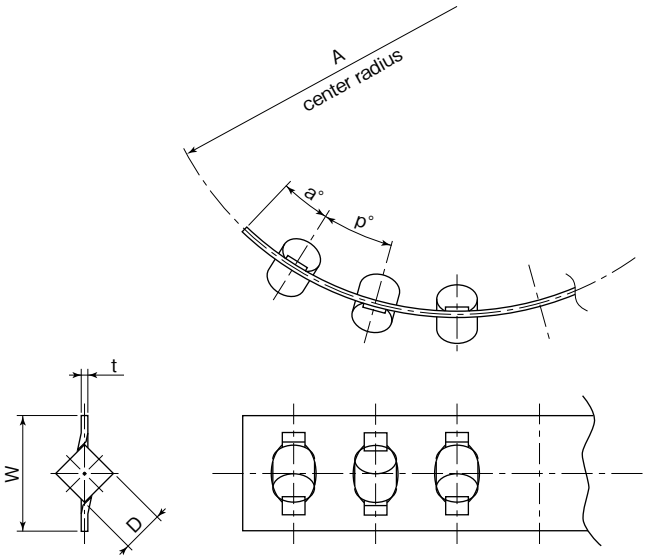
– Standard Curved Roller Cage –



part number structure

example CR 3 - 110 - 10Z

- CR type
- size
- center radius
- number of rollers



part number	roller diameter D mm	center radius A mm	t mm	w mm	p°	a°	applicable type
CR2- 50- 7Z	2	50	0.3	5.6	4.6°	2.9°	RV
CR2- 60-12Z		60			3.8°	2.4°	RV
CR2- 70-10Z		70			3.3°	2.0°	RVF
CR2- 87-10Z		87			2.6°	1.6°	RVF
CR2-103-10Z		103			2.2°	1.4°	RVF
CR2-120- 9Z		120			1.9°	1.2°	RVF
CR3- 85-10Z	3	85	0.4	7.2	3.4°	2.0°	RVF
CR3- 90-11Z		90			3.2°	1.9°	RV
CR3-110-10Z		110			2.6°	1.5°	RVF、RV
CR3-125-16Z		125			2.3°	1.3°	RVF
CR3-160-14Z		160			1.8°	1.0°	RVF、RV

ACTUATOR

ACTUATOR

ACTUATOR

NB's BG type is a compact single axis actuator which integrates a slide guide and precision ball screw. BG type offers compact dimensions and outperforms conventional positioning tables.
This is made possible by a unique "U" shaped guide rail and slide block which provides multiple functions of a guide block and a ball screw nut combined into a single unit. The "U" shaped guide rail offers high rigidity against bending moment. This structural feature allows for integrated framework of machinery or equipment and can be cantilevered. Additionally, the slide block contains 4 ball circuits which delivers high load capacity, high accuracy and high rigidity.

Figure H-1 Structure of BG type

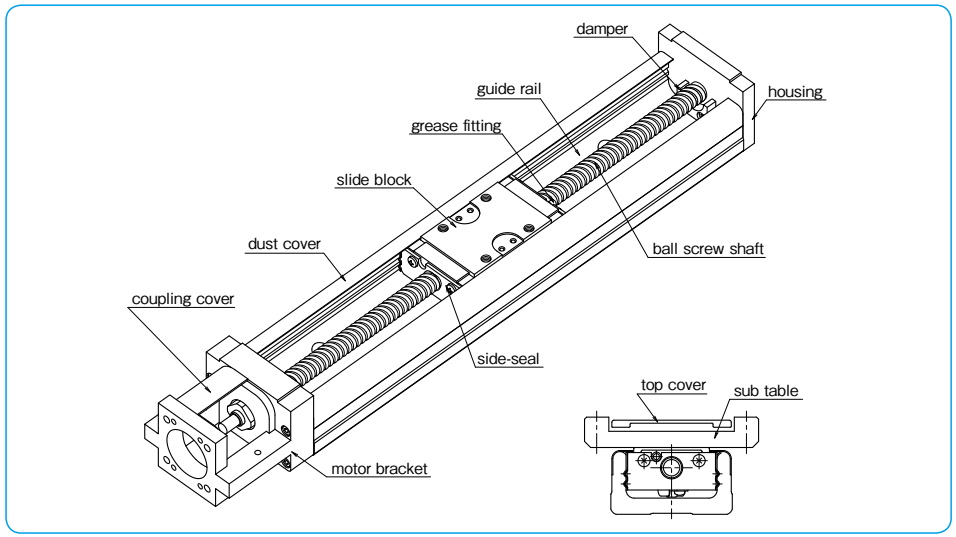
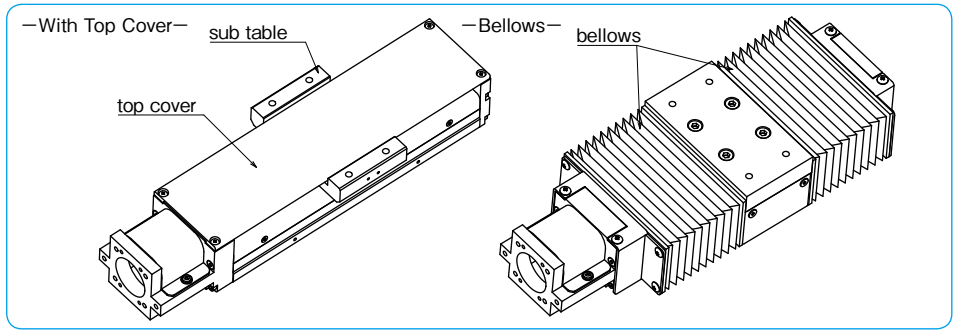


Figure H-2 Structure of With Top Cover and Bellow



ADVANTAGES

Adjustment Free
The integration of the slide guide and precision ball screw eliminates complex precision adjustment and reduces installation time dramatically.

High Rigidity
Four-circuit and four-point contact structure and "U" shaped guide rail provide very high rigidity despite its compact configuration and can be used for cantilevered application.

High Accuracy
BG type contains four ball circuits and four-point contact ball grooves which contribute to its high rigidity. The combination of precision ground guide rail, slide block and precision ball screw provides high positioning accuracy.

Space Saving
In comparison to conventional positioning tables, the BG type allows for compact designs and dramatic space saving. The "U" shaped guide rail and integrated slide block and precision ball screw make this possible.

By utilizing four-circuit and four-point contact structure, the BG type provides extremely high rigidity. Figure H-3 shows displacement of each size of long block against radial load. Table H-3 shows the moment of inertia of area of guide rails.

Figure H-3 Block Displacement against Radial Load

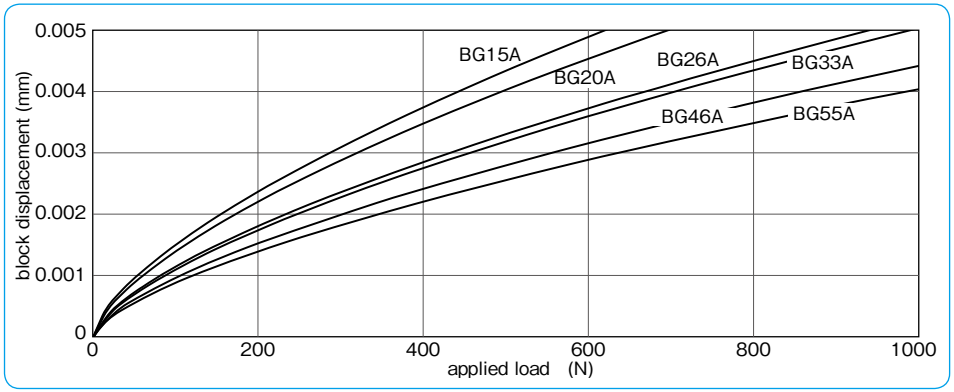


Figure H-4 Ball Contact Profile

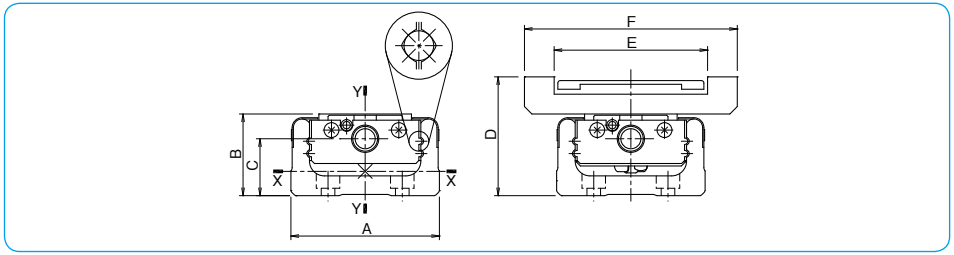


Table H-1 Moment of Inertia of Area of Guide Rail

part number	A	B	C	D	E	F	moment of inertia of area (mm⁴) Ix (X Axis)	Iy (Y Axis)	mass W (kg/100mm)
BG15	30	15	9.5	25	32	44	1.22×10^{3}	1.56×10^{4}	0.12
BG20	40	20	12.5	32	37	52	6.50×10^{3}	6.00×10^{4}	0.25
BG26	50	26	16	40	47	62	1.69×10^{4}	1.47×10^{5}	0.38
BG33	60	33	23	48	62	86	5.11×10^{4}	3.42×10^{5}	0.60
BG46	86	46	32	68	88	112	2.42×10^{5}	1.49×10^{6}	1.24
BG55	100	55	32	80	95	124	2.29×10^{5}	2.28×10^{6}	1.50

PART NUMBER STRUCTURE

Part number for BG type is described as follows.

①	②	③	④		⑤	⑥		⑦	⑧	⑨		⑩
BG	15	01	A	-	75	H	/	A0			-	
		02	B		100	P		A1	L	K		P△□
					125			A2	C			G▲
					150			A3	J○○			LB
					175			A4				PNP
					200			A5				
								A6				
								A7				
								R0				

①	②	③	④		⑤	⑥		⑦	⑧	⑨		⑩
BG	20	01	A	-	100	H	/	A0			-	
		05	B		150	P		A1	L	S		P△□
					200			A3	C	K		G▲
								A5	J○○			LB
								A6				PNP
								A8				
								A9				
								AA				
								R0				

①	②	③	④		⑤	⑥		⑦	⑧	⑨		⑩
BG	26	02	A	-	150	H	/	A0			-	
		05	B		200	P		A1	L	S		P△□
					250			A3	C	K		G▲
					300			A5	J○○			LB
								A6				PNP
								A8				
								A9				
								AA				
								R0				

①	②	③	④		⑤	⑥		⑦	⑧	⑨		⑩
BG	33	05	A	-	150	H	/	A0			-	
		10	B		200	P		A1	L	S		P△□
		20	C		300			A2	C	H		G▲
			D		400			A3	J○○	K		LB
					500			A5				PNP
					600			A6				
								A7				
								A8				
								B1				
								B2				
								R0				
								RA□				
								RB□				
								RC□				

※Short blocks are not available for BG3320.

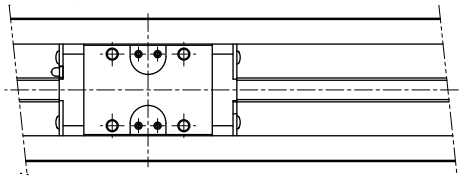
①	②	③	④		⑤	⑥		⑦	⑧	⑨		⑩
BG	46	10	A	-	340	H	/	A0			-	
		20	B		440	P		A1	L	S		P△□
			C		540			A2	C	H		G▲
			D		640			A3	J○○	K		LB
					740			A4				PNP
					840			B0				
					940			C0				
					1040			D0				
					1140			D1				
					1240			R0				
								RA□				
								RB□				
								RC□				

①	②	③	④		⑤	⑥		⑦	⑧	⑨		⑩
BG	55	20	A	-	980	H	/	A0			-	
			B		1080	P		A1	L	S		P△□
					1180			A2	C	H		G▲
					1280			A3	J○○	K		LB
					1380			A4				PNP
								A5				
								R0				

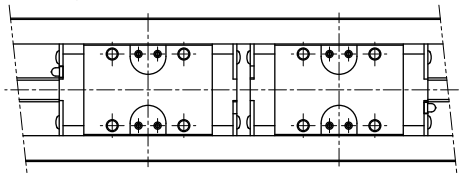
There is limitation on the length of rails depending on block type and accuracy grade. Please refer to page H-7,8.

① BG type
② size
③ ball screw lead
④ type of block

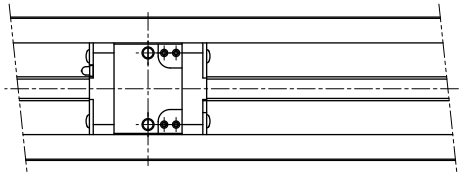
A:1 long block



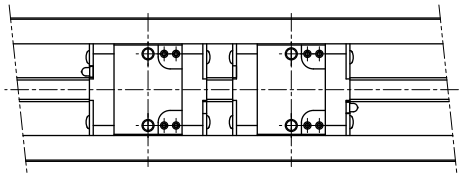
B:2 long blocks



C:1 short block



D:2 short blocks



※ Drive block is located closest to motor bracket side.

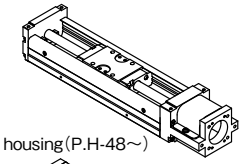
⑤ guide rail length
※Precision grade(P) has limitation on the length of rails. Please refer to page H-8.

⑥ accuracy grade (P.H-8)

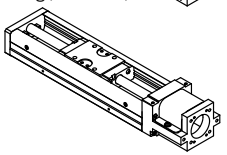
H	high grade
P	precision grade

⑦ motor bracket (refer to page H-30,H-31)
The number in the square , □ ,after suffix RA , RB or RC indicates the mounting direction code.
(refer to page H-46)

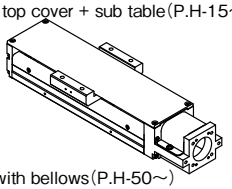
⑧ cover, low housing and bellows
none: without top cover(P.H-14～)



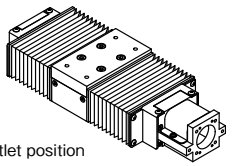
L:low housing(P.H-48～)



C: with top cover + sub table(P.H-15～)



J○○: with bellows(P.H-50～)



○○ sensor cable outlet position
(refer to page H-50)

⑨ sensor (P.H-59～)

none	without sensor
S	with slim-type / compact photomicro sensor
H	with close contact capable photomicro sensor
K	with proximity sensor

⑩ option

none	without option
P△□	with positioning pin hole (※1)
G▲	with special grease option (※2)
LB	with low temperature black chrome treatment (※3)
PNP	with PNP sensor

In case of multiple options, add + between each option.
Example: (PS+LB+PNP)
※1: △ is S, W or R (refer to page H-74)
□ is R (refer to page H-74)
※2: ▲ is U, L or F (refer to page H-79)
Grease is applied to slide guide, ball screw, and angular bearings.
※3: LB is applied to steel parts except for aluminum parts and radial bearings.
For BG15, LB is applied to steel parts except for the drive block, aluminum parts, and radial bearings.
Black chrome treatment is applied to the drive block.

SPECIFICATIONS

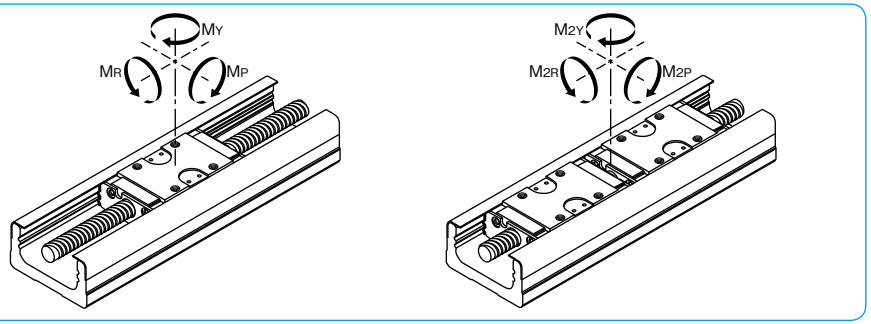
BG Type is categorized as either high grade (H) or precision grade (P).
Precision grade(P) has limitation on the length of rails. Please refer to page H-8.

Table H-2 Specifications

part number				BG1501		BG1502		BG2001		BG2005		BG2602		BG2605		BG3305		BG3310		BG3320		BG4610		BG4620		BG5520	
precision grade				high	※precision	high	※precision	high	※precision	high	※precision	high	※precision	high	※precision	high	※precision	high	※precision	high	※precision	high	※precision	high	※precision	high	※precision
guide	radial clearance		μm	−2~0	−4~−2	−2~0	−4~−2	−3~0	−6~−3	−3~0	−6~−3	−4~0	−8~−4	−4~0	−8~−4	−3~0	−7~−3	−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	C	kN	2.42			4.27		7.87				12.6						29.8				43.2			
guide	long block	basic static load	Co	kN	4.76			7.89		14.98				22.7						51.2				74.0			
guide	long block	allowable static moment	MP	N•m	17			35		99				181						610				1,088			
guide	long block	allowable static moment	M2P	N•m	92			199		550				1,035						3,285				5,465			
guide	long block	allowable static moment	MY	N•m	20			42		118				215						727				1,297			
guide	long block	allowable static moment	M2Y	N•m	110			237		656				1,233						3,914				6,513			
guide	long block	allowable static moment	MR	N•m	51			101		255				500						1,612				2,701			
guide	long block	allowable static moment	M2R	N•m	102			201		509				1,000						3,224				5,402			
guide	short block	basic dynamic load	C	kN	—			—		—				7.8				—		19.9				—			
guide	short block	basic static load	Co	kN	—			—		—				11.4				—		28.8				—			
guide	short block	allowable static moment	MP	N•m	—			—		—				49				—		207				—			
guide	short block	allowable static moment	M2P	N•m	—			—		—				368				—		1,336				—			
guide	short block	allowable static moment	MY	N•m	—			—		—				59				—		246				—			
guide	short block	allowable static moment	M2Y	N•m	—			—		—				439				—		1,593				—			
guide	short block	allowable static moment	MR	N•m	—			—		—				250				—		907				—			
guide	short block	allowable static moment	M2R	N•m	—			—		—				500				—		1,814				—			
ball screw	shaft diameter		mm	6				6		8				10				12		15				20			
ball screw	lead		mm	1	2			1	5	2	5			5	10		20			10	20			20			
ball screw	spacer-ball ratio		—	—				—		—				—	1:1	—	1:1	—	1:1	—	1:1	—	2:1	—	2:1		
ball screw	basic dynamic load	Ca	kN	0.39	0.54	0.63	0.65	2.60	2.35	3.35	2.11	2.20	1.39	2.32	1.46	4.40	2.77	4.40	3.36	5.40	4.12						
ball screw	basic static load	Coa	kN	0.77	0.75	1.34	0.92	3.64	3.30	5.90	2.95	3.50	1.75	4.05	2.02	7.90	3.95	7.90	5.27	10.5	7.00						
bearing support	part number		—	AC4-12DF		AC5-14DF		AC6-16DF		70M8DF/GMP5										7001T2DF/GMP5					7002T2DF/GMP5		
bearing support	basic dynamic load	Cb	kN	1.21		1.31		1.79		4.40										6.77				7.74			
bearing support	basic static load	Cob	kN	1.08		1.25		1.76		4.36										7.45				9.50			

M_{2P} ,M_{2Y} and M_{2R} are the allowable static moments when 2 blocks are used in close contact.
※ Please consult with NB when using BG15, BG20 and BG26 series in the Precision grade with short and frequent stroke. (short stroke: BG1501= 2mm or less, BG1502= 4mm or less, BG2001 = 7mm or less, BG2005 = 25mm or less, BG2602 = 14mm or less and BG2605 = 25mm or less)
Short blocks are not available for BG3320.

Figure H-5 Direction of Moment



ALLOWABLE SPEED AND STROKE LIMIT

Allowable speed of BG type is subject to the type of motor and operating conditions. The speed may also be limited by the critical speed of the ball screw. Use caution when operating at high speeds or using long rails.

Table H-3 ALLOWABLE SPEED AND STROKE LIMIT

part number	rail length	stroke limit (mm) 1 long block	2 long blocks	1 short block	2 short blocks	speed (mm/sec) lead1	lead2
BG15	75	30	—	—	—	185	370
	100	55	—	—	—		
	125	80	46	—	—		
	150	105	71	—	—		
	175	130	96	—	—		
	200	155	121	—	—		

part number	rail length	stroke limit (mm) 1 long block	2 long blocks	1 short block	2 short blocks	speed (mm/sec) lead1	lead5
BG20	100	43	—	—	—	187	925
	150	93	51	—	—		
	200	143	101	—	—		

part number	rail length	stroke limit (mm) 1 long block	2 long blocks	1 short block	2 short blocks	speed (mm/sec) lead2	lead5
BG26	150	73	—	—	—	281	694
	200	123	61	—	—		
	250	173	111	—	—		
	300	223	161	—	—		

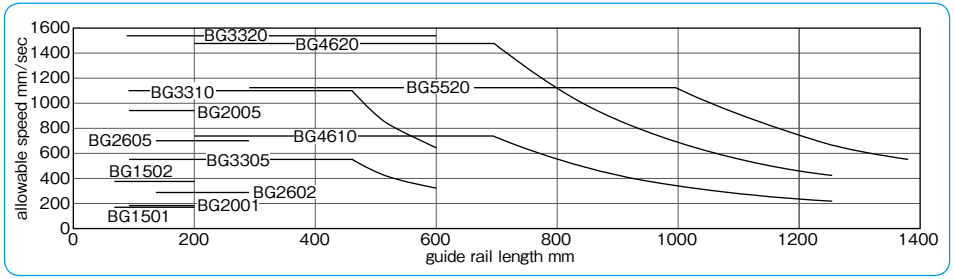
part number	rail length	stroke limit (mm) 1 long block	2 long blocks	1 short block	2 short blocks	speed (mm/sec) lead5	lead10	lead20
BG33	150	60	—	85	34	550	1,100	1,500
	200	110	—	135	84			
	300	210	133	235	184			
	400	310	233	335	284			
	500	410	333	435	384	460	930	
	600	510	433	535	484	310	620	

Short block type is not available for lead 20.

part number	rail length	stroke limit (mm) 1 long block	2 long blocks	1 short block	2 short blocks	speed (mm/sec) lead10	lead20
BG46	340	209	100	245	172	740	1,480
	440	309	200	345	272		
	540	409	300	445	372		
	640	509	400	545	472		
	740	609	500	645	572	650	1,300
	840	709	600	745	672	500	1,000
	940	809	700	845	772	390	780
	1,040	909	800	945	872	315	630
	1,140	1,009	900	1,045	972	260	520
	1,240	1,109	1,000	1,145	1,072	220	440

part number	rail length	stroke limit (mm) 1 long block	2 long blocks	1 short block	2 short blocks	speed (mm/sec) lead20
BG55	980	834	711	—	—	1,120
	1,080	934	811	—	—	910
	1,180	1,034	911	—	—	750
	1,280	1,134	1,011	—	—	630
	1,380	1,234	1,111	—	—	530

Figure H-6 Guide Rail Length and Allowable Speed



ACCURACY

Table H-4 shows accuracy of BG type.

Table H-4 Accuracy

part number	rail length mm	positioning repeatability high μm	positioning repeatability precision μm	positioning accuracy high μm	positioning accuracy precision μm	running parallelism B high μm	running parallelism B precision μm	backlash high μm	backlash precision μm	※starting torque high N・m	※starting torque precision N・m
BG15	75	±3	±1	40	20	20	10	5	2	0.01	0.012
	100										
	125										
	150										
	175										
	200										
BG20	100	±3	±1	50	20	25	10	5	2	0.01	0.012
	150										
	200										
BG26	150	±3	±1	50	20	25	10	5	2	0.015	0.04
	200										
	250										
	300										
BG33	150	±3 (±5)	±1 (±3)	30	15	25	10	5	2	0.07	0.15
	200										
	300			35	20						
	400										
	500			40	25	35	15				
	600		–	70	–		–		–		–
BG46	340	±3 (±5)	±1 (±3)	35	20	35	15	5	2	0.10	0.15
	440										
	540			40	25						
	640										0.17
	740			50	30	40	20				
	840		–	80	–	50	–		–		–
	940										
	1,040										
	1,140			100							
	1,240										
BG55	980	±3	±1	80	35	50	25	5	2	0.12	0.17
	1,080										
	1,180			100	40		30				0.20
	1,280		–		–		–		–		–
	1,380										

Above values are measured by using our selected motors.
※ Above specifications are based on using NB standard grease. Other grease may cause deviations.
The values in the parentheses are positioning repeatability when used with return pully unit.

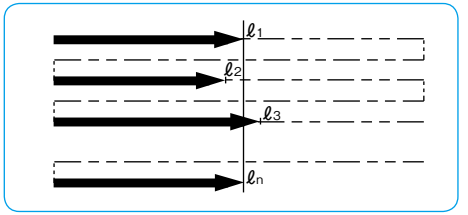
Positioning Repeatability

After setting an arbitrary position, from one end, move the drive block to this position and measure the stop position. Repeat the positioning and measurement process 7 times with respect to the setting position at the midpoint and near both ends of travel. Take the maximum difference and divide it by 2, then indicate it with a positive and negative sign as the test result.

Positioning Repeatability

$$=\pm\frac{1}{2}((\text{maximum value of } \ell n)-(\text{minimum value of } \ell n))$$

Figure H-7 Positioning Repeatability

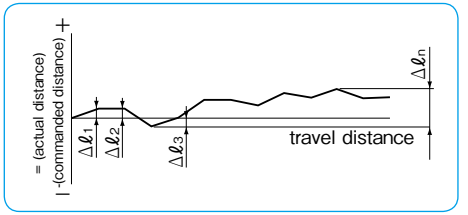


Positioning Accuracy

Positioning is performed in one direction and the resulting position is set as the datum point. Take the difference between the actual travel distance and the commanded travel distance from the datum point. Continuing in the same direction (without returning to the start point) repeat this process randomly several times until nearing to the stroke limit. Express the accuracy by the absolute maximum difference.

Positioning Accuracy $= (\Delta \ell n)_{max}$

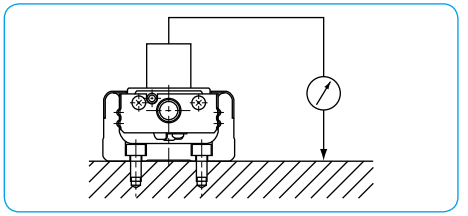
Figure H-8 Positioning Accuracy



Running Parallelism B

After fixing the guide rail onto the surface plate, placing the dial test indicator on the center of the slide block and connecting the indicator probe onto the mounting surface, run the block over the entire travel distance. Take the maximum deviation in readings as the test result.

Figure H-9 Running Parallelism

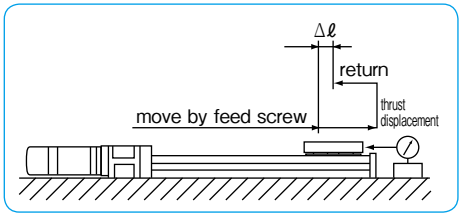


Backlash

Using the feed screw to move the slide block a little, take the dial test indicator reading and make it the datum point. While in this position, thrust the block by a certain force in the same direction without using the feed screw. Release the thrust and read the return, then take the difference from the datum point. Repeat the same process at the midpoint and near both ends of travel. Take the maximum difference as the test result.

Backlash $= \Delta \ell$

Figure H-10 Backlash



RATED LIFE

To obtain the rated life of the BG type, calculate the rated life of the guide portion, ball screw portion and support bearing portion. Use the minimum value as the rated life of the BG type.

A. Life of Guide Portion

Use the following equation for calculating the rated life of guide portion.

$$L_G=\left(\frac{f_C}{f_W}\cdot\frac{C}{P_T}\right)^3\cdot 50 \quad \cdots\cdots (1)$$

L_G: rated life (km)　f_C: contact coefficient (refer to Table H-5)
f_W: applied load coefficient (refer to Table H-6)
C: basic dynamic load rating (N)
P_T: calculated load applied to one block (N)

A.1. Calculation of P_T

Before calculating the rated life using the equation (1), the calculated load applied to one block (P_T) needs to be obtained in consideration of the moment load, etc. that will be actually applied. For rapidly-accelerating or short stroke motion, P_T needs to be calculated with acceleration taken into consideration. The calculation of this acceleration will be carried out for the mass applied to BG. Obtain the calculated load during uniform motion, acceleration, and deceleration, and use the average value of the three as P_T.
For the calculation of P_T, select an appropriate equation depending on the installation conditions of the guide.
It is also possible to calculate P_T without including the effect of acceleration by using the equation "$P_T = P_{TC}$ (see the equations (2), (5), and (8)). In this case, however, the obtained value is a rough approximation, so a selection with sufficient margin is recommended.

Table H-5 Contact Coefficient (f_C)

number of blocks in close contact on one axis	contact coefficient (f_C)
1	1.0
2	0.81

Table H-6 Applied Load Coefficient (f_W)

operating conditions		applied load coefficient (f_W)
vibration, impact	velocity	
none	0.25m/s or less	1.0 ~ 1.5
low	1m/s or less	1.5 ~ 2.0
high	1m/s or more	2.0 ~ 3.5

Table H-7 Moment Equivalent Coefficient

	Ep (E2p)	Ey (E2y)	Er (E2r)
BG15＊＊A	2.82×10^{-1}	2.37×10^{-1}	9.35×10^{-2}
BG15＊＊B	5.16×10^{-2}	4.33×10^{-2}	4.67×10^{-2}
BG20＊＊A	2.25×10^{-1}	1.89×10^{-1}	7.84×10^{-2}
BG20＊＊B	3.98×10^{-2}	3.34×10^{-2}	3.92×10^{-2}
BG26＊＊A	1.51×10^{-1}	1.27×10^{-1}	5.88×10^{-2}
BG26＊＊B	2.72×10^{-2}	2.28×10^{-2}	2.94×10^{-2}
BG33＊＊A	1.26×10^{-1}	1.06×10^{-1}	4.55×10^{-2}
BG33＊＊B	2.20×10^{-2}	1.84×10^{-2}	2.27×10^{-2}
BG33＊＊C	2.31×10^{-1}	1.94×10^{-1}	4.55×10^{-2}
BG33＊＊D	3.09×10^{-2}	2.59×10^{-2}	2.27×10^{-2}
BG46＊＊A	8.39×10^{-2}	7.04×10^{-2}	3.17×10^{-2}
BG46＊＊B	1.56×10^{-2}	1.31×10^{-2}	1.59×10^{-2}
BG46＊＊C	1.39×10^{-1}	1.17×10^{-1}	3.17×10^{-2}
BG46＊＊D	2.15×10^{-2}	1.81×10^{-2}	1.59×10^{-2}
BG55＊＊A	6.80×10^{-2}	5.71×10^{-2}	2.74×10^{-2}
BG55＊＊B	1.35×10^{-2}	1.14×10^{-2}	1.37×10^{-2}

※The E2 coefficient is for two blocks being used in close contact.

A.1.a. P_T for Horizontal Move (Horizontal Mounting)

i) during uniform motion (P_{TC})

$$P_{TC}=\frac{1}{n}\cdot W+Ep\cdot M_{pL}+Ey\cdot M_{yL}+Er\cdot M_{rL} \quad \cdots\cdots (2)$$

ii) during acceleration (P_{Ta})

$$P_{Ta}=\frac{1}{n}\cdot W+Ep(M_{pL}+m\cdot\alpha_a\cdot Z)+Ey(M_{yL}+m\cdot\alpha_a\cdot X)+Er\cdot M_{rL} \quad \cdots\cdots (3)$$

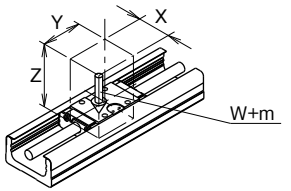
Note that the values of ($M_{pL}+m\cdot\alpha_a\cdot Z$) and ($M_{yL}+m\cdot\alpha_a\cdot X$) will be treated as 0 (zero) when the calculated value is negative.

iii) during deceleration (P_{Td})

$$P_{Td}=\frac{1}{n}\cdot W+Ep(M_{pL}+m\cdot\alpha_d\cdot Z)+Ey(M_{yL}+m\cdot\alpha_d\cdot X)+Er\cdot M_{rL} \quad \cdots\cdots (4)$$

Note that the values of ($M_{pL}+m\cdot\alpha_d\cdot Z$) and ($M_{yL}+m\cdot\alpha_d\cdot X$) will be treated as 0 (zero) when the calculated value is negative.

Figure H-11



In case of load coming from different direction other than the direction shown in the drawing W+m, please contact NB.

P_{TC}: calculated load applied to a block during uniform motion (N)　P_{Ta}: calculated load applied to a block during accelerating (N)
P_{Td}: calculated load applied to a block during decelerating (N)　n: number of blocks of BG　W: applied load (N)　m: carrying mass (kg)
α_a: acceleration during accelerating (m/sec^2)　α_d: acceleration during decelerating (m/sec^2) (the negative value)
X: distance between the center of BG and the center of the carrying mass (mm)
Y: distance between the center of BG and the center of the carrying mass (mm)
Z: distance between the center of BG ball screw and the center of the carrying mass (mm)
Ep: moment equivalent coefficient in the pitching direction (refer to Table H-7)
Ey: moment equivalent coefficient in the yawing direction (refer to Table H-7)
Er: moment equivalent coefficient in the rolling direction (refer to Table H-7)
M_{pL}: applied moment in the pitching direction (N・mm)　$M_{pL}=W\cdot Y$
M_{yL}: applied moment in the yawing direction (N・mm)　$M_{yL}=0$
M_{rL}: applied moment in the rolling direction (N・mm)　$M_{rL}=W\cdot X$　※Refer to Fig.H-5 for the direction of moment.

A.1.b. P_T for Horizontal Move (Wall Mounting)

i) during uniform motion (P_{TC})

$$P_{TC}=\frac{1}{1.19\cdot n}\cdot W+Ep\cdot M_{pL}+Ey\cdot M_{yL}+Er\cdot M_{rL} \quad \cdots\cdots (5)$$

ii) during acceleration (P_{Ta})

$$P_{Ta}=\frac{1}{1.19\cdot n}\cdot W+Ep(M_{pL}+m\cdot\alpha_a\cdot Z)+Ey(M_{yL}+m\cdot\alpha_a\cdot X)+Er\cdot M_{rL} \quad \cdots\cdots (6)$$

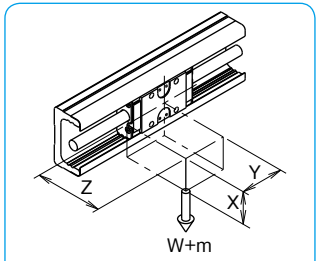
Note that the values of ($M_{pL}+m\cdot\alpha_a\cdot Z$) and ($M_{yL}+m\cdot\alpha_a\cdot X$) will be treated as 0 (zero) when the calculated value is negative.

iii) during deceleration (P_{Td})

$$P_{Td}=\frac{1}{1.19\cdot n}\cdot W+Ep(M_{pL}+m\cdot\alpha_d\cdot Z)+Ey(M_{yL}+m\cdot\alpha_d\cdot X)+Er\cdot M_{rL} \quad \cdots\cdots (7)$$

Note that the values of ($M_{pL}+m\cdot\alpha_d\cdot Z$) and ($M_{yL}+m\cdot\alpha_d\cdot X$) will be treated as 0 (zero) when the calculated value is negative.

Figure H-12



In case of load coming from different direction other than the direction shown in the drawing W+m, please contact NB.

P_{TC}: calculated load applied to a block during uniform motion (N)　P_{Ta}: calculated load applied to a block during accelerating (N)
P_{Td}: calculated load applied to a block during decelerating (N)　n: number of blocks of BG　W: applied load (N)　m: carrying mass (kg)
α_a: acceleration during accelerating (m/sec^2)　α_d: acceleration during decelerating (m/sec^2) (the negative value)
X: distance between the center of BG and the center of the carrying mass (mm)
Y: distance between the center of BG and the center of the carrying mass (mm)
Z: distance between the center of BG ball screw and the center of the carrying mass (mm)
Ep: moment equivalent coefficient in the pitching direction (refer to Table H-7)　Ey: moment equivalent coefficient in the yawing direction (refer to Table H-7)　Er: moment equivalent coefficient in the rolling direction (refer to Table H-7)
M_{pL}: applied moment in the pitching direction (N・mm)　$M_{pL}=0$
M_{yL}: applied moment in the yawing direction (N・mm)　$M_{yL}=W\cdot Y$
M_{rL}: applied moment in the rolling direction (N・mm)　$M_{rL}=W\cdot Z$　※Refer to Fig. H-5 for the direction of moment.

A.1.c. P_T for Vertical Move

i) during uniform motion (P_{TC})

$$P_{TC}=Ep\cdot M_{pL}+Ey\cdot M_{yL}+Er\cdot M_{rL} \quad \cdots\cdots (8)$$

ii) during acceleration (P_{Ta})

$$P_{Ta}=Ep(M_{pL}+m\cdot\alpha_a\cdot Z)+Ey(M_{yL}+m\cdot\alpha_a\cdot X)+Er\cdot M_{rL} \quad \cdots\cdots (9)$$

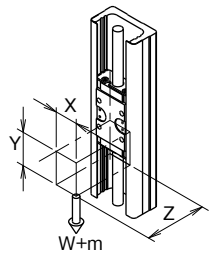
Note that the values of ($M_{pL}+m\cdot\alpha_a\cdot Z$) and ($M_{yL}+m\cdot\alpha_a\cdot X$) will be treated as 0 (zero) when the calculated value is negative.

iii) during deceleration (P_{Td})

$$P_{Td}=Ep(M_{pL}+m\cdot\alpha_d\cdot Z)+Ey(M_{yL}+m\cdot\alpha_d\cdot X)+Er\cdot M_{rL} \quad \cdots\cdots (10)$$

Note that the values of ($M_{pL}+m\cdot\alpha_d\cdot Z$) and ($M_{yL}+m\cdot\alpha_d\cdot X$) will be treated as 0 (zero) when the calculated value is negative.

Figure H-13



In case of load coming from different direction other than the direction shown in the drawing W+m, please contact NB.

P_{TC}: calculated load applied to a block during uniform motion(N) P_{Ta}: calculated load applied to a block during accelerating(N)
P_{Td}: calculated load applied to a block during decelerating(N) n: number of blocks of BG W: applied load(N) m: carrying mass(kg)
α_a: acceleration during accelerating(m/sec^2) α_d: acceleration during decelerating(m/sec^2) (the negative value)
X: distance between the center of BG and the center of the carrying mass(mm)
Y: distance between the center of BG and the center of the carrying mass(mm)
Z: distance between the center of BG ball screw and the center of the carrying mass(mm)
Ep: moment equivalent coefficient in the pitching direction (refer to Table H-7)
Ey: moment equivalent coefficient in the yawing direction (refer to Table H-7)
Er: moment equivalent coefficient in the rolling direction (refer to Table H-7)
M_{pL}: applied moment in the pitching direction (N・mm) $M_{pL}=W\cdot Z$ MyL: loaded moment in the yawing direction (N・mm) $MyL=W\cdot X$
M_{rL}: applied moment in the rolling direction (N・mm) $M_{rL}=0$ ※Refer to Fig. H-5 for the direction of moment.

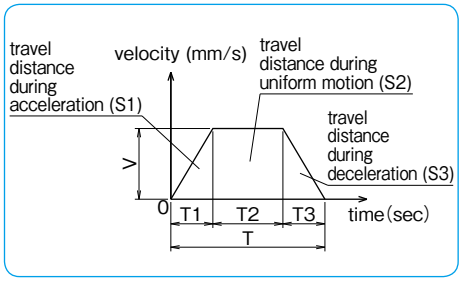
A.1.d.

Obtain the calculated load applied to a block (P_T) by calculating the average load of each motion using an appropriate equation among those shown above according to the application.

$$P_T=\sqrt[3]{\frac{1}{(S1+S2+S3)}(P_{Ta}{}^3\cdot S1+P_{TC}{}^3\cdot S2+P_{Td}{}^3\cdot S3)} \quad \cdots\cdots (11)$$

P_T: calculated load applied to one block (N)
S1: travel distance during acceleration (mm) (refer to Figure H-14)
S2: travel distance during uniform motion (mm) (refer to Figure H-14)
S3: travel distance during deceleration (mm) (refer to Figure H-14)
P_{Ta}: calculated load applied to one block during accelerating (N): equation (3), (6), and (9)
P_{TC}: calculated load applied to one block during uniform motion (N): equation (2), (5), and (8)
P_{Td}: calculated load applied to one block during decelerating (N): equation (4), (7), and (10)

Figure H-14



B. Life of Ball Screw and Support Bearing

The life of ball screw and support bearing can be calculated using a common equation, as shown below. Compare the dynamic load rating of the ball screw and the support bearing and apply smaller value for calculation.

$$L_a=\left(\frac{1}{f_W}\cdot\frac{C_a \text{ or } C_b}{P_a}\right)^3\cdot\ell \quad \cdots\cdots (12)$$

L_a: rated life (km) f_W: applied load coefficient (refer to Table H-6)
C_a: basic dynamic load rating of the ball screw (N)
C_b: basic dynamic load rating of the support bearing (N)
P_a: axial load (N) ℓ: ball screw lead (mm)

B.1. Calculation of Pa

Before calculating the life using the equation (12), calculate Pa with acceleration taken into consideration. Calculate the load in each axial direction during uniform motion, acceleration, and deceleration and the obtained value is used as Pa.

B.1.a. For Horizontal Move

i) during uniform motion (P_{ac})

$$P_{ac}=\mu\cdot W+F+f_b\cdot n \quad \cdots\cdots (13)$$

ii) during acceleration (P_{aa})

$$P_{aa}=\mu\cdot W+F+fb\cdot n+(m+mb\cdot n)\alpha_a \quad \cdots\cdots (14)$$

iii) during deceleration (P_{ad})

$$P_{ad}=\mu\cdot W+F+f_b\cdot n+(m+mb\cdot n)\alpha_d \quad \cdots\cdots (15)$$

B.1.b. For Vertical Move

i) during uniform motion (P_{ac})

$$P_{ac}=(m+m_b\cdot n)g+F+f_b\cdot n \quad \cdots\cdots (16)$$

ii) during acceleration (P_{aa})

$$P_{aa}=(m+m_b\cdot n)\cdot(g+\alpha_a)+F+f_b\cdot n \quad \cdots\cdots (17)$$

iii) during deceleration (P_{ad})

$$P_{ad}=(m+m_b\cdot n)\cdot(g+\alpha_d)+F+f_b\cdot n \quad \cdots\cdots (18)$$

Table H-8 Sliding Resistance (f_b) of a Single Block (Seal Resistance)

unit: N

	high grade (H)	precision grade (P)
BG15	0.8	1.8
BG20	2.3	4.9
BG26	5.4	9.8
BG33	4.4	10.2
BG46	7.4	13.3
BG55	9	16

P_{ac}: axial load rating during uniform motion (N)
P_{aa}: axial load rating during accelerating (N)
P_{ad}: axial load rating during decelerating (N)
μ: friction coefficient W: load applied to a block (N)
F: external force (load) applied to the axial direction (N)
f_b: sliding resistance of a single block (N) (refer to Table H-8)
n: number of blocks of BG m: carrying mass (kg)
m_b: mass of a block of BG (kg) (refer to P.H14～29)
α_a: acceleration during accelerating (m/s^2)
α_d: acceleration during decelerating (m/s^2)
g: acceleration of gravity

B.1.c.

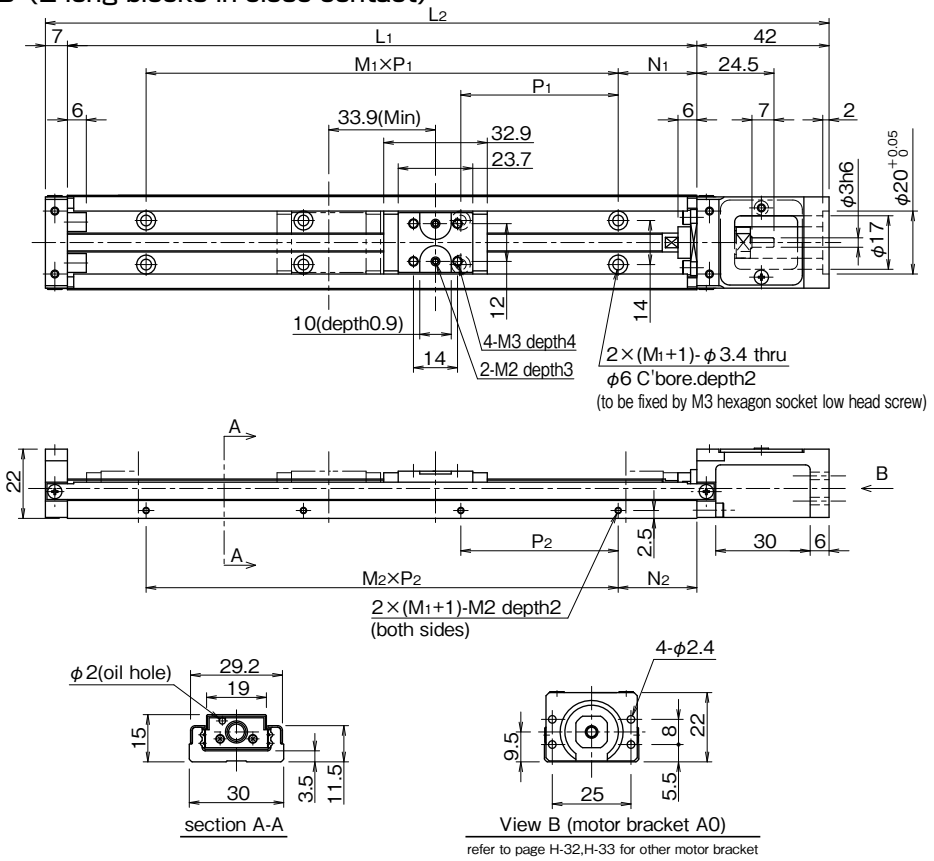
Obtain the average axial load (Pa) using an appropriate formula among those shown above depending on the application.

$$P_a=\sqrt[3]{\frac{1}{(S1+S2+S3)}(|P_{aa}|^3\cdot S1+|P_{ac}|^3\cdot S2+|P_{ad}|^3\cdot S3)} \quad \cdots (19)$$

Pa: average axial load (N)
S1: travel distance during acceleration (mm) (refer to Table H-14)
S2: travel distance during uniform motion (mm) (refer to Table H-14)
S3: travel distance during deceleration (mm) (refer to Table H-14)
P_{aa}: axial load during accelerating (N): formulas (14) and (17)
P_{ac}: axial load during uniform motion (N): formulas (13) and (16)
P_{ad}: axial load during decelerating (N): formulas (15) and (18)

BG15 −Without Top Cover−

A (1 long block)
B (2 long blocks in close contact)



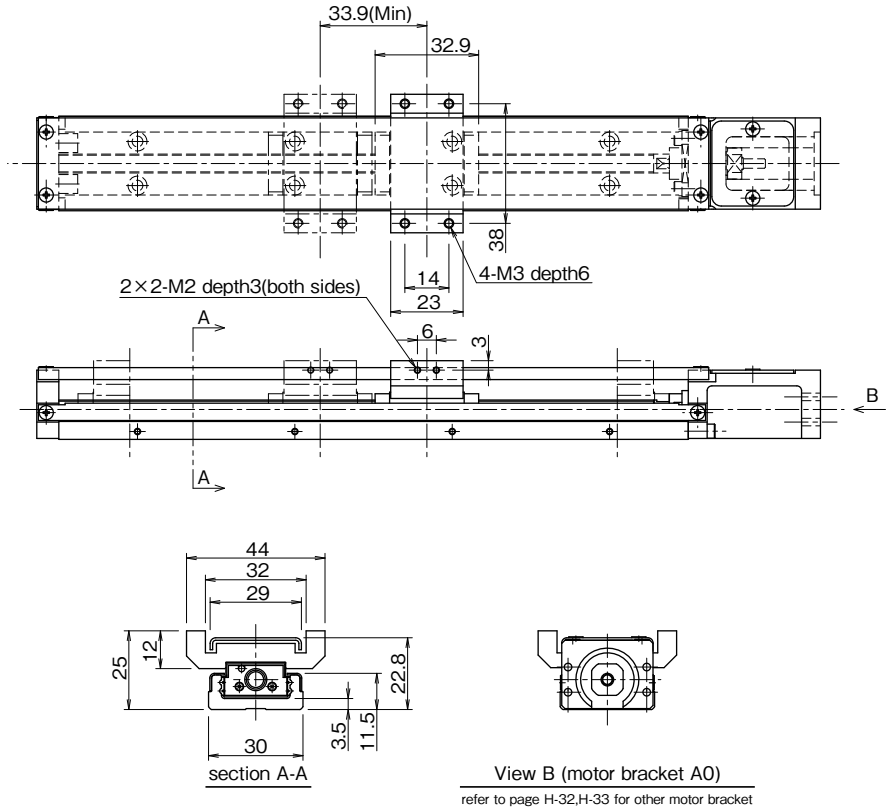
refer to page H-32,H-33 for other motor bracket

part number※3※4	stroke limit mm ※1	dimensions mm L1	L2	N1	M1×P1	N2	M2×P2	block mass kg ※2 without top cover	with top cover	total mass kg without top cover	with top cover
BG15□□A- 75	30	75	124	12.5	1×50	12.5	1×50	0.03	0.05	0.21	0.24
B	–	–	–	–	–	–	–	–	–	–	–
BG15□□A-100	55	100	149	25	1×50	25	1×50	0.03	0.05	0.25	0.28
B	–	–	–	–	–	–	–	–	–	–	–
BG15□□A-125	80	125	174	12.5	2×50	12.5	2×50	0.03	0.05	0.28	0.31
B	46							0.06	0.10	0.32	0.37
BG15□□A-150	105	150	199	25		25		0.03	0.05	0.32	0.35
B	71							0.06	0.10	0.35	0.40
BG15□□A-175	130	175	224	12.5	3×50	12.5	3×50	0.03	0.05	0.35	0.39
B	96							0.06	0.10	0.39	0.44
BG15□□A-200	155	200	249	25		25		0.03	0.05	0.39	0.42
B	121							0.06	0.10	0.42	0.48

※1 : Stroke limit is a drive distance between both ends of the dampers.
※2 : Mass stated "with top cover" includes mass of sub tables.
※3 : For B type (2 long blocks), drive block is located closest to motor bracket side.
※4 : □ is ball screw lead.

BG15 −With Top Cover−

A (1 long block)
B (2 long blocks in close contact)



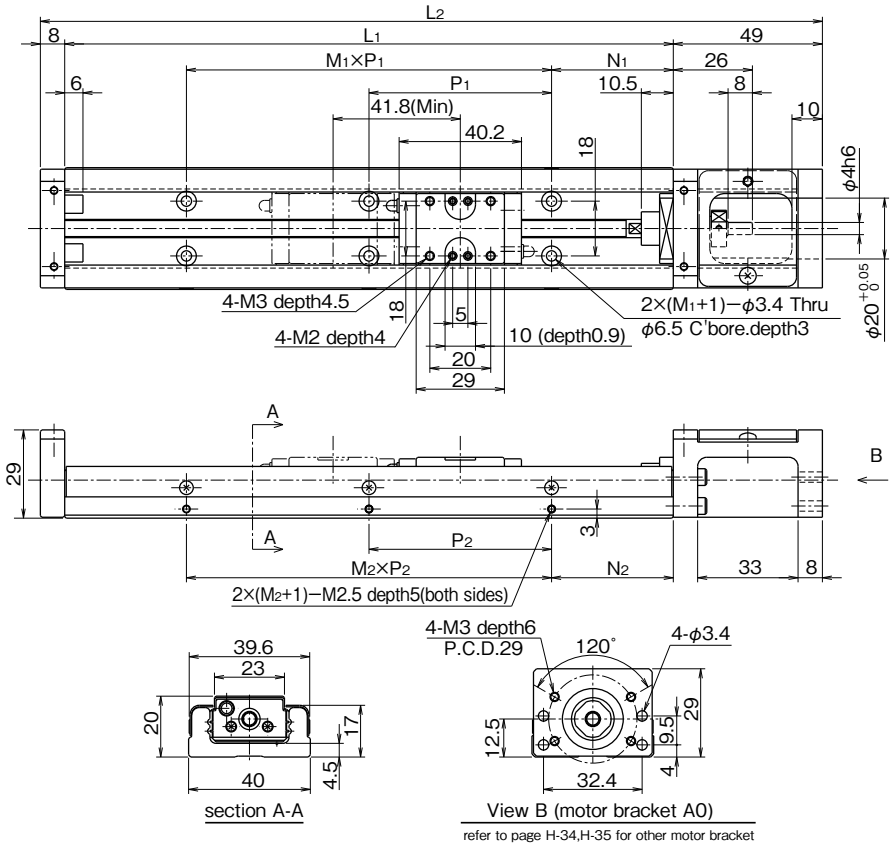
refer to page H-32,H-33 for other motor bracket

inertia (reference values) unit : kg・m²

part number	rail length mm	long block without top cover A 1 block	without top cover B 2 block	with top cover A 1 block	with top cover B 2 block
BG1501	75	1.06×10⁻⁷	–	1.07×10⁻⁷	–
	100	1.31×10⁻⁷	–	1.31×10⁻⁷	–
	125	1.56×10⁻⁷	1.56×10⁻⁷	1.56×10⁻⁷	1.58×10⁻⁷
	150	1.80×10⁻⁷	1.81×10⁻⁷	1.81×10⁻⁷	1.82×10⁻⁷
	175	2.05×10⁻⁷	2.06×10⁻⁷	2.06×10⁻⁷	2.07×10⁻⁷
	200	2.30×10⁻⁷	2.31×10⁻⁷	2.31×10⁻⁷	2.32×10⁻⁷
BG1502	75	1.09×10⁻⁷	–	1.11×10⁻⁷	–
	100	1.33×10⁻⁷	–	1.35×10⁻⁷	–
	125	1.58×10⁻⁷	1.62×10⁻⁷	1.60×10⁻⁷	1.66×10⁻⁷
	150	1.83×10⁻⁷	1.86×10⁻⁷	1.85×10⁻⁷	1.90×10⁻⁷
	175	2.08×10⁻⁷	2.11×10⁻⁷	2.10×10⁻⁷	2.15×10⁻⁷
	200	2.33×10⁻⁷	2.36×10⁻⁷	2.35×10⁻⁷	2.40×10⁻⁷

BG20 −Without Top Cover−

A (1 long block)
B (2 long blocks in close contact)



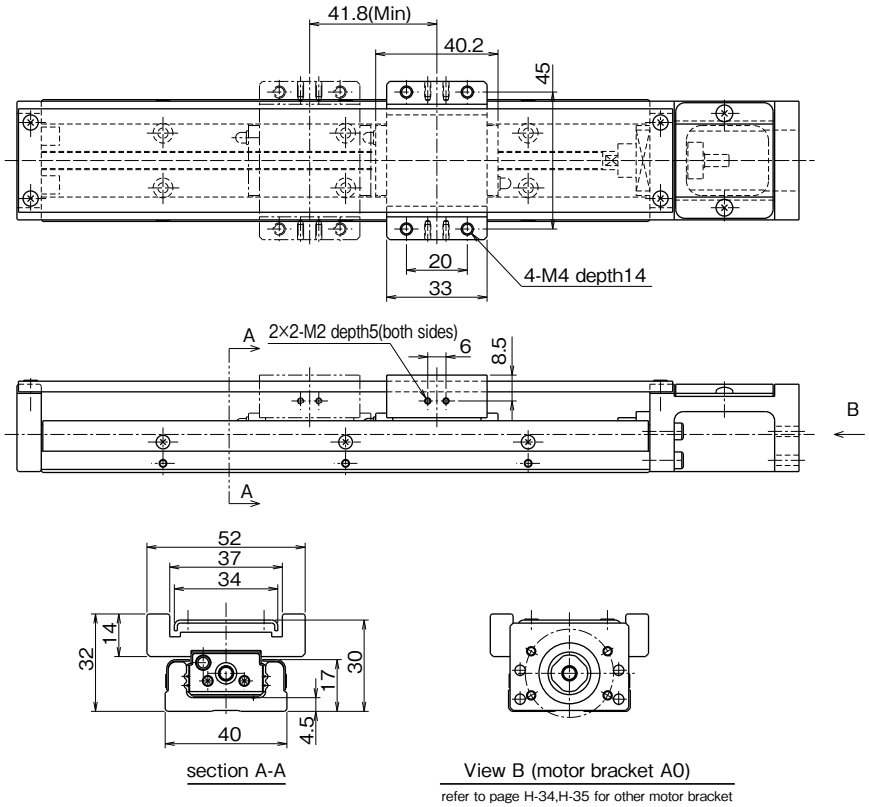
refer to page H-34,H-35 for other motor bracket

part number※3※4	stroke limit mm ※1	dimensions mm L1	L2	N1	M1×P1	N2	M2×P2	block mass kg ※2 without top cover	with top cover	total mass kg without top cover	with top cover
BG20□□A-100	43	100	157	20	1×60	20	1×60	0.07	0.11	0.45	0.50
B	–	–	–	–	–	–	–	–	–	–	–
BG20□□A-150	93	150	207	15	2×60	15	2×60	0.07	0.11	0.58	0.63
B	51							0.14	0.22	0.65	0.74
BG20□□A-200	143	200	257	40		40		0.07	0.11	0.71	0.77
B	101							0.14	0.22	0.78	0.88

※1 : Stroke limit is a drive distance between both ends of the dampers.
※2 : Mass stated "with top cover" includes mass of sub tables.
※3 : For B type (2 long blocks), drive block is located closest to motor bracket side.
※4 : □ is ball screw lead.

BG20 −With Top Cover−

A (1 long block)
B (2 long blocks in close contact)



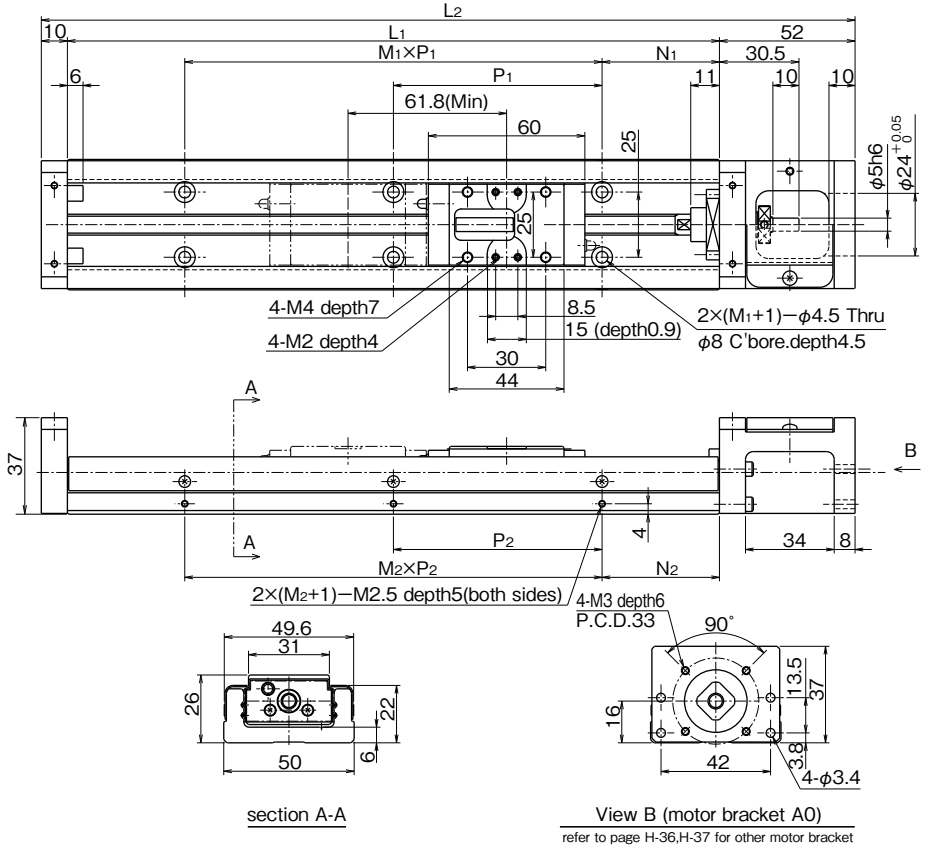
refer to page H-34,H-35 for other motor bracket

inertia (reference values) unit : kg・m²

part number	rail length mm	long block without top cover A 1 block	without top cover B 2 block	with top cover A 1 block	with top cover B 2 block
BG2001	100	1.34×10⁻⁷	–	1.35×10⁻⁷	–
	150	1.83×10⁻⁷	1.85×10⁻⁷	1.84×10⁻⁷	1.87×10⁻⁷
	200	2.33×10⁻⁷	2.35×10⁻⁷	2.34×10⁻⁷	2.37×10⁻⁷
BG2005	100	1.76×10⁻⁷	–	2.00×10⁻⁷	–
	150	2.26×10⁻⁷	2.70×10⁻⁷	2.50×10⁻⁷	3.18×10⁻⁷
	200	2.76×10⁻⁷	3.20×10⁻⁷	3.00×10⁻⁷	3.68×10⁻⁷

BG26 −Without Top Cover−

A (1 long block)
B (2 long blocks in close contact)



section A-A

View B (motor bracket A0)

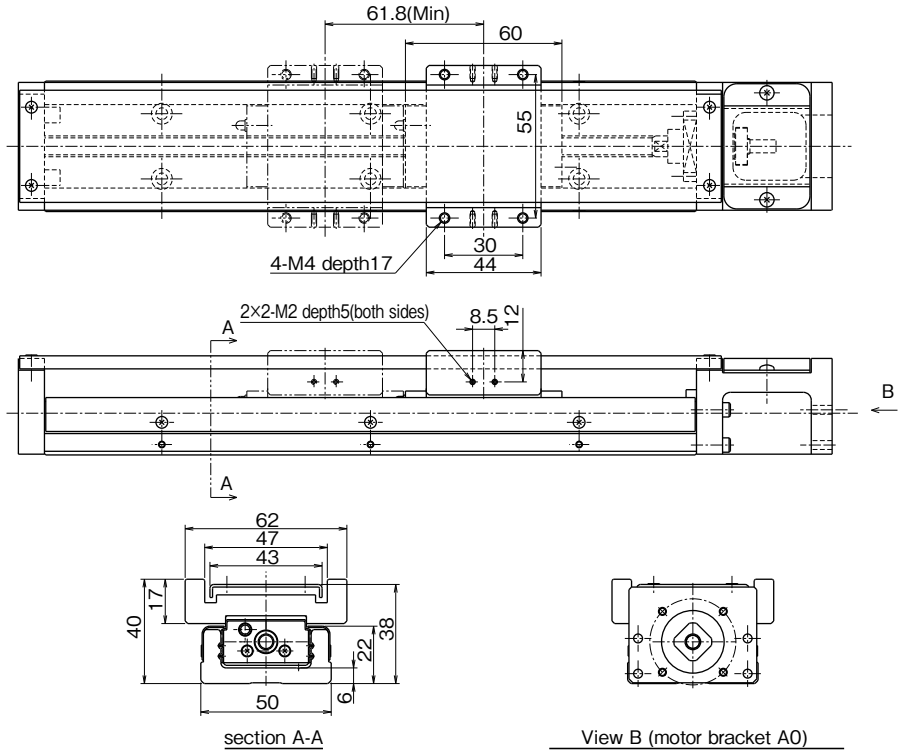
refer to page H-36,H-37 for other motor bracket

part number※3※4	stroke limit mm ※1	dimensions mm L1	L2	N1	M1×P1	N2	M2×P2	block mass kg ※2 without top cover	with top cover	total mass kg without top cover	with top cover
BG26□□A-150	73	150	212	35	1×80	35	1×80	0.17	0.24	0.93	1.07
B	–	–	–	–	–	–	–	–	–	–	–
BG26□□A-200	123	200	262	20	2×80	20	2×80	0.17	0.24	1.14	1.3
B	61							0.34	0.48	1.31	1.54
BG26□□A-250	173	250	312	45		45		0.17	0.24	1.36	1.53
B	111							0.34	0.48	1.53	1.78
BG26□□A-300	223	300	362	30	3×80	30	3×80	0.17	0.24	1.57	1.76
B	161							0.34	0.48	1.74	2.01

※1 : Stroke limit is a drive distance between both ends of the dampers.
※2 : Mass stated "with top cover" includes mass of sub tables.
※3 : For B type (2 long blocks), drive block is located closest to motor bracket side.
※4 : □ is ball screw lead.

BG26 −With Top Cover−

A (1 long block)
B (2 long blocks in close contact)



section A-A

View B (motor bracket A0)

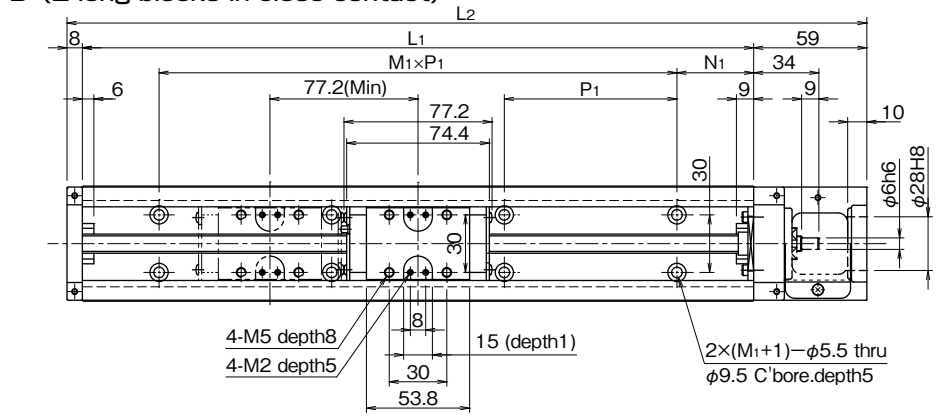
refer to page H-36,H-37 for other motor bracket

inertia (reference values) unit : kg・m²

part number	rail length mm	long block without top cover A 1 block	B 2 block	with top cover A 1 block	B 2 block
BG2602	150	6.08×10⁻⁷	–	6.16×10⁻⁷	–
	200	7.65×10⁻⁷	7.83×10⁻⁷	7.73×10⁻⁷	7.97×10⁻⁷
	250	9.22×10⁻⁷	9.39×10⁻⁷	9.29×10⁻⁷	9.54×10⁻⁷
	300	1.08×10⁻⁶	1.10×10⁻⁶	1.09×10⁻⁶	1.11×10⁻⁶
BG2605	150	6.99×10⁻⁷	–	7.44×10⁻⁷	–
	200	8.56×10⁻⁷	9.63×10⁻⁷	9.01×10⁻⁷	1.05×10⁻⁶
	250	1.01×10⁻⁶	1.12×10⁻⁶	1.06×10⁻⁶	1.21×10⁻⁶
	300	1.17×10⁻⁶	1.28×10⁻⁶	1.21×10⁻⁶	1.37×10⁻⁶

BG33 −Without Top Cover−

A (1 long block)
B (2 long blocks in close contact)



section A-A

View B (motor bracket A0)

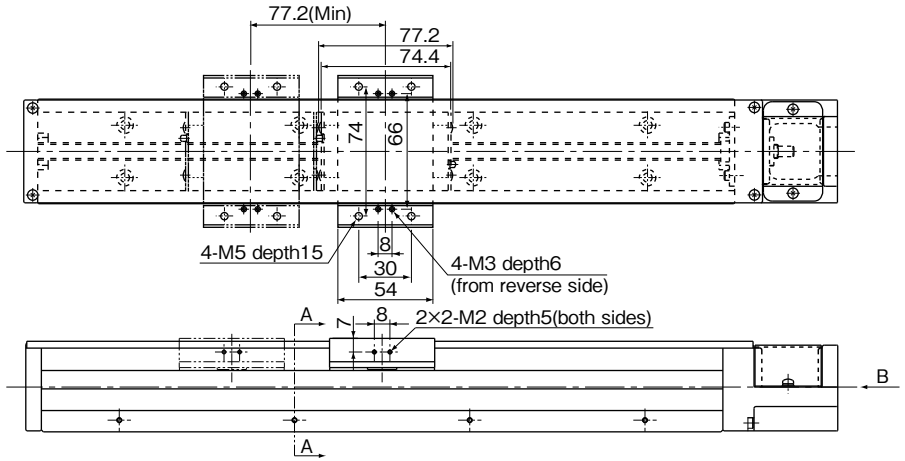
refer to page H-38,H-39 for other motor bracket

part number※3※4	stroke limit mm ※1	dimensions mm						block mass kg ※2		total mass kg	
		L_1	L_2	N_1	$M_1\times P_1$	N_2	$M_2\times P_2$	without top cover	with top cover	without top cover	with top cover
BG33□□A-150	60	150	217	25	1×100	25	1×100	0.3	0.4	1.6	1.8
B	–	–	–	–	–	–	–	–	–	–	–
BG33□□A-200	110	200	267	50	1×100	50	1×100	0.3	0.4	2	2.1
B	–	–	–	–	–	–	–	–	–	–	–
BG33□□A-300	210	300	367	50	2×100	50	2×100	0.3	0.4	2.6	2.8
B	133							0.6	0.8	2.9	3.2
BG33□□A-400	310	400	467		3×100		3×100	0.3	0.4	3.2	3.5
B	233							0.6	0.8	3.6	3.9
BG33□□A-500	410	500	567		4×100		4×100	0.3	0.4	3.9	4.2
B	333							0.6	0.8	4.2	4.6
BG33□□A-600	510	600	667		5×100		5×100	0.3	0.4	4.6	4.9
B	433							0.6	0.8	4.9	5.3

※1 : Stroke limit is a drive distance between both ends of the dampers.
※2 : Mass stated "with top cover" includes mass of sub tables.
※3 : For B type (2 long blocks), drive block is located closest to motor bracket side.
※4 : □ is ball screw lead.

BG33 −With Top Cover−

A (1 long block)
B (2 long blocks in close contact)



section A-A

View B (motor bracket A0)

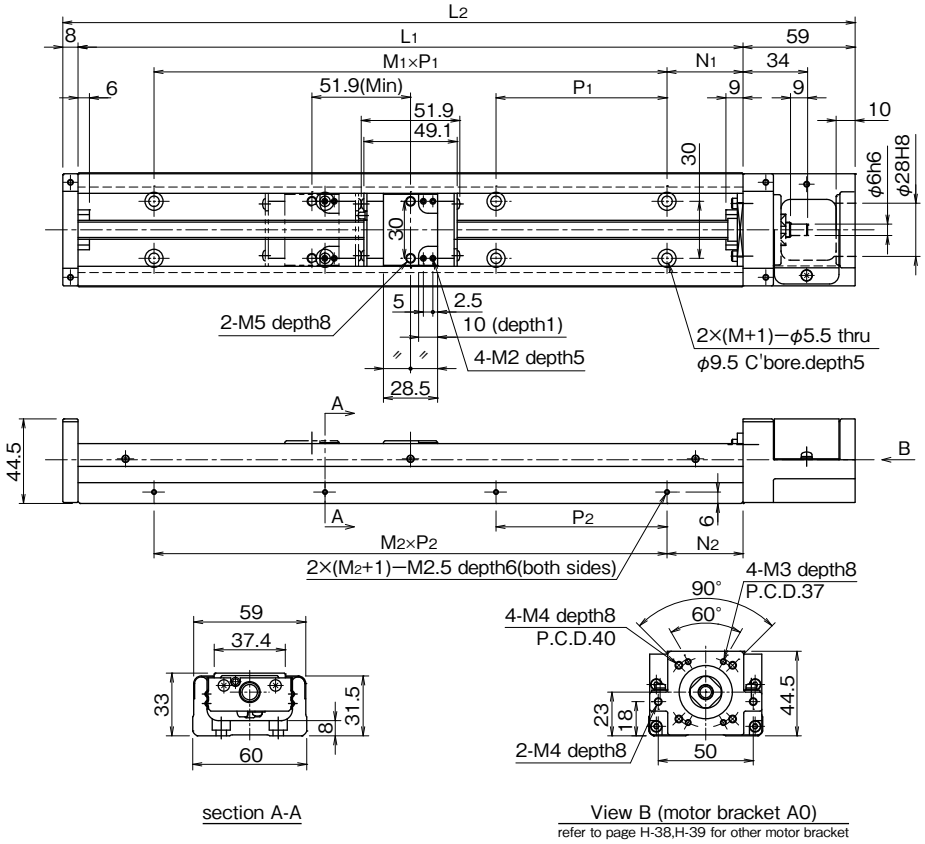
refer to Page H-38,H-39 for other motor bracket

inertia (reference values) unit : kg・m²

part number	rail length mm	long block without top cover A 1 block	long block without top cover B 2 block	long block with top cover A 1 block	long block with top cover B 2 block
BG3305	150	1.64×10^{-6}	–	1.71×10^{-6}	–
	200	2.02×10^{-6}	–	2.09×10^{-6}	–
	300	2.79×10^{-6}	2.99×10^{-6}	2.86×10^{-6}	3.13×10^{-6}
	400	3.55×10^{-6}	3.75×10^{-6}	3.62×10^{-6}	3.89×10^{-6}
	500	4.32×10^{-6}	4.52×10^{-6}	4.39×10^{-6}	4.66×10^{-6}
	600	5.08×10^{-6}	5.28×10^{-6}	5.15×10^{-6}	5.42×10^{-6}
BG3310	150	2.19×10^{-6}	–	2.47×10^{-6}	–
	200	2.57×10^{-6}	–	2.85×10^{-6}	–
	300	3.34×10^{-6}	4.14×10^{-6}	3.61×10^{-6}	4.69×10^{-6}
	400	4.10×10^{-6}	4.90×10^{-6}	4.38×10^{-6}	5.46×10^{-6}
	500	4.87×10^{-6}	5.67×10^{-6}	5.15×10^{-6}	6.22×10^{-6}
	600	5.63×10^{-6}	6.43×10^{-6}	5.91×10^{-6}	6.99×10^{-6}
BG3320	150	5.94×10^{-6}	–	7.06×10^{-6}	–
	200	6.74×10^{-6}	–	7.85×10^{-6}	–
	300	8.33×10^{-6}	1.15×10^{-5}	9.44×10^{-6}	1.38×10^{-5}
	400	9.91×10^{-6}	1.31×10^{-5}	1.10×10^{-5}	1.53×10^{-5}
	500	1.15×10^{-5}	1.47×10^{-5}	1.26×10^{-5}	1.69×10^{-5}
	600	1.31×10^{-5}	1.63×10^{-5}	1.42×10^{-5}	1.85×10^{-5}

BG33 −Without Top Cover−

C (1 short block)
D (2 short blocks in close contact)



section A-A

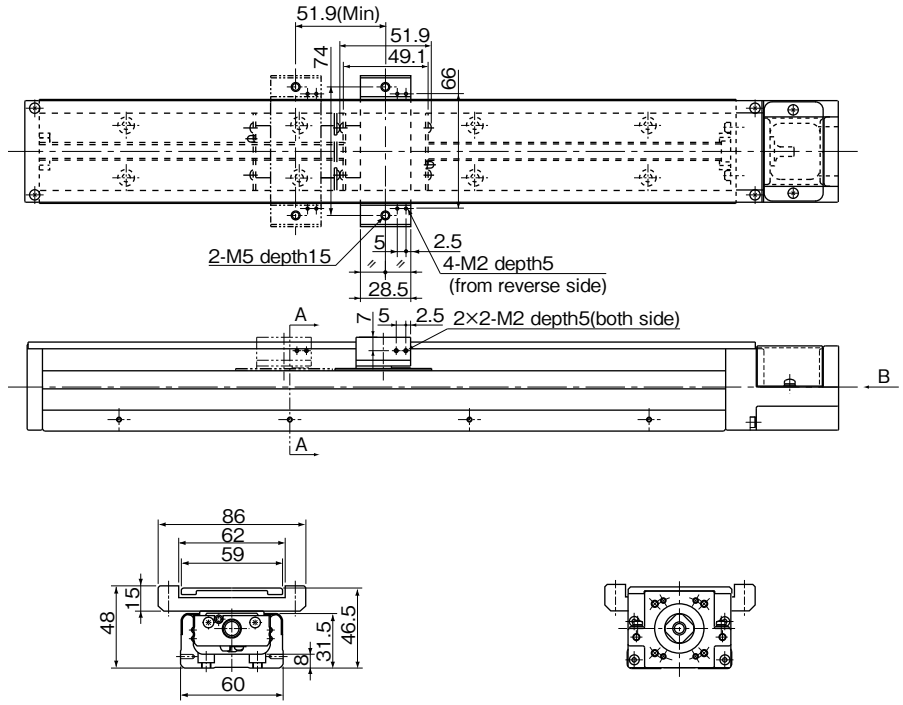
View B (motor bracket A0)
refer to page H-38,H-39 for other motor bracket

part number※3※4	stroke limit mm ※1	dimensions mm L1	L2	N1	M1×P1	N2	M2×P2	block mass kg ※2 without top cover	with top cover	total mass kg without top cover	with top cover
BG33□□C-150	85	150	217	25	1×100	25	1×100	0.15	0.2	1.5	1.6
D	34							0.3	0.4	1.7	1.9
BG33□□C-200	135	200	267	50		50		0.15	0.2	1.8	2
D	84							0.3	0.4	2	2.2
BG33□□C-300	235	300	367		2×100		2×100	0.15	0.2	2.5	2.6
D	184							0.3	0.4	2.7	2.9
BG33□□C-400	335	400	467		3×100		3×100	0.15	0.2	3.1	3.3
D	284							0.3	0.4	3.3	3.5
BG33□□C-500	435	500	567		4×100		4×100	0.15	0.2	3.8	4
D	384							0.3	0.4	3.9	4.2
BG33□□C-600	535	600	667		5×100		5×100	0.15	0.2	4.4	4.7
D	484							0.3	0.4	4.6	4.9

※1 : Stroke limit is a drive distance between both ends of the dampers.
※2 : Mass stated "with top cover" includes mass of sub tables.
※3 : For D type (2 short blocks), drive block is located closest to motor bracket side.
※4 : □ is ball screw lead.
※5 : Ball screw lead of 20mm is not available for BG33 short block type.

BG33 −With Top Cover−

C (1 short block)
D (2 short blocks in close contact)



section A-A

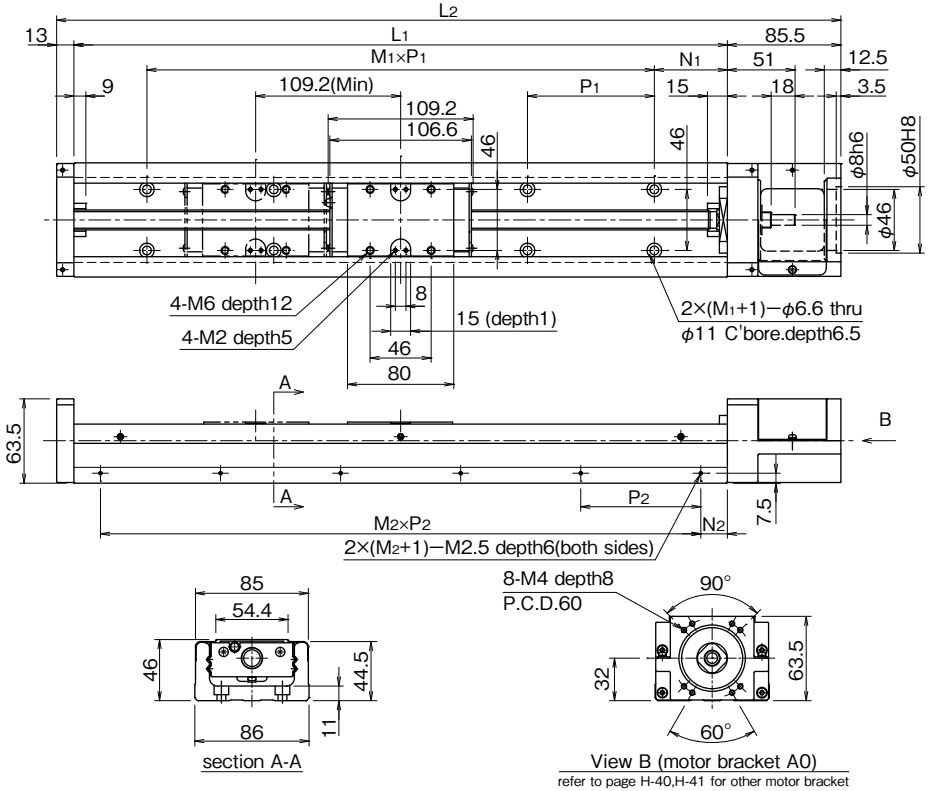
View B (motor bracket A0)
refer to page H-38,H-39 for other motor bracket

inertia (reference values) unit : kg・m²

part number	rail length mm	short block without top cover C 1 block	without top cover D 2 block	with top cover C 1 block	with top cover D 2 block
BG3305	150	1.56×10⁻⁶	1.64×10⁻⁶	1.60×10⁻⁶	1.71×10⁻⁶
	200	1.94×10⁻⁶	2.03×10⁻⁶	1.98×10⁻⁶	2.10×10⁻⁶
	300	2.71×10⁻⁶	2.79×10⁻⁶	2.75×10⁻⁶	2.86×10⁻⁶
	400	3.48×10⁻⁶	3.56×10⁻⁶	3.51×10⁻⁶	3.63×10⁻⁶
	500	4.24×10⁻⁶	4.32×10⁻⁶	4.28×10⁻⁶	4.39×10⁻⁶
	600	5.01×10⁻⁶	5.09×10⁻⁶	5.04×10⁻⁶	5.16×10⁻⁶
BG3310	150	1.88×10⁻⁶	2.21×10⁻⁶	2.02×10⁻⁶	2.49×10⁻⁶
	200	2.27×10⁻⁶	2.59×10⁻⁶	2.40×10⁻⁶	2.87×10⁻⁶
	300	3.03×10⁻⁶	3.36×10⁻⁶	3.17×10⁻⁶	3.64×10⁻⁶
	400	3.80×10⁻⁶	4.12×10⁻⁶	3.94×10⁻⁶	4.40×10⁻⁶
	500	4.56×10⁻⁶	4.89×10⁻⁶	4.70×10⁻⁶	5.17×10⁻⁶
	600	5.33×10⁻⁶	5.65×10⁻⁶	5.47×10⁻⁶	5.93×10⁻⁶

BG46 −Without Top Cover−

A (1 long block)
B (2 long blocks in close contact)

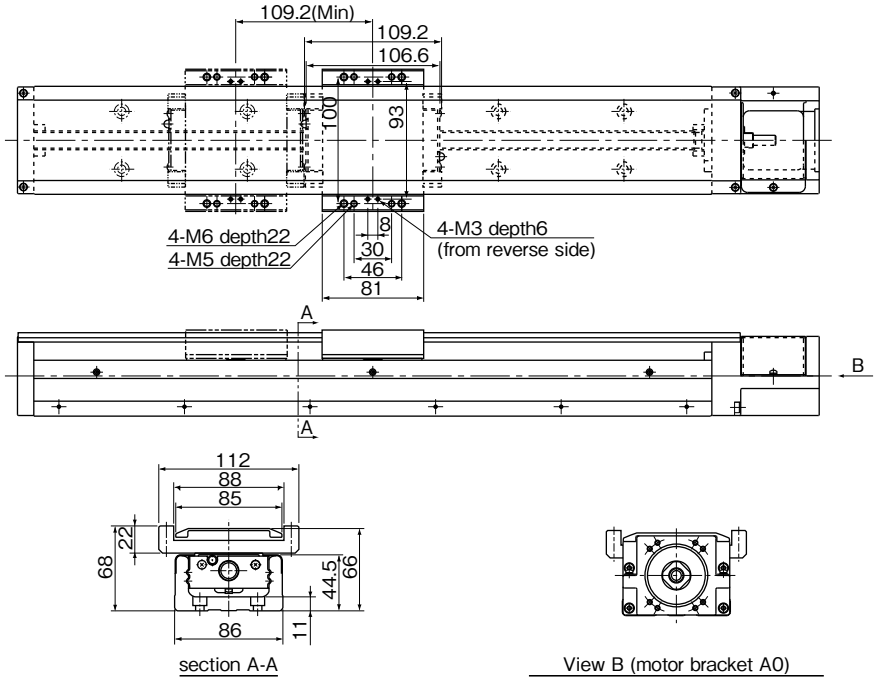


part number※3※4	stroke limit mm ※1	dimensions mm L1	L2	N1	M1×P1	N2	M2×P2	block mass kg ※2 without top cover	with top cover	total mass kg without top cover	with top cover
BG46□□A- 340	209	340	438.5	70	2×100	20	3×100	0.9	1.2	6.5	7
B	100							1.8	2.4	7.5	8
BG46□□A- 440	309	440	538.5		3×100		4×100	0.9	1.2	8	8.5
B	200							1.8	2.4	8.5	9.5
BG46□□A- 540	409	540	638.5		4×100		5×100	0.9	1.2	9	10
B	300							1.8	2.4	10	11
BG46□□A- 640	509	640	738.5		5×100		6×100	0.9	1.2	10.5	11
B	400							1.8	2.4	11.5	12.5
BG46□□A- 740	609	740	838.5		6×100		7×100	0.9	1.2	12	12.5
B	500							1.8	2.4	13	14
BG46□□A- 840	709	840	938.5		7×100		8×100	0.9	1.2	13	14
B	600							1.8	2.4	14	15.5
BG46□□A- 940	809	940	1,038.5		8×100		9×100	0.9	1.2	14.5	15.5
B	700							1.8	2.4	15.5	16.5
BG46□□A-1040	909	1,040	1,138.5		9×100		10×100	0.9	1.2	16	17
B	800							1.8	2.4	17	18
BG46□□A-1140	1,009	1,140	1,238.5		10×100		11×100	0.9	1.2	17.5	18.5
B	900							1.8	2.4	18	19.5
BG46□□A-1240	1,109	1,240	1,338.5		11×100		12×100	0.9	1.2	18.5	19.5
B	1,000							1.8	2.4	19.5	21

※1 : Stroke limit is a drive distance between both ends of the dampers.
※2 : Mass stated "with top cover" includes mass of sub tables.
※3 : For B type (2 long blocks), drive block is located closest to motor bracket side.
※4 : □ is ball screw lead.

BG46 −With Top Cover−

A (1 long block)
B (2 long blocks in close contact)

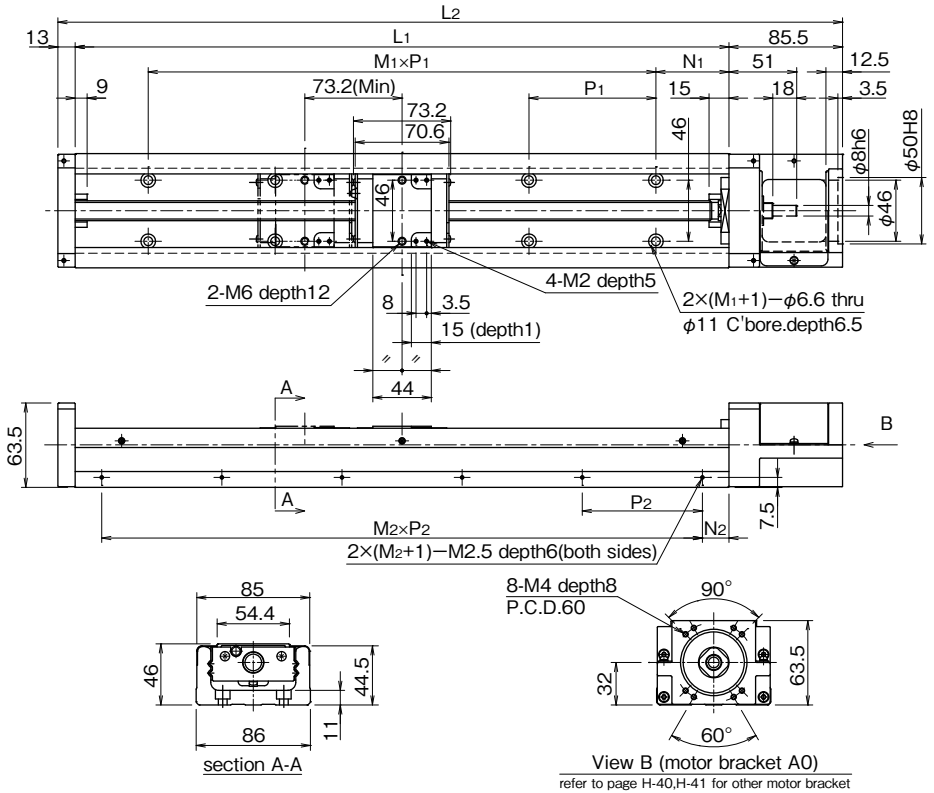


inertia (reference values) unit : kg・m²

part number	rail length mm	long block without top cover A 1 block	without top cover B 2 block	with top cover A 1 block	with top cover B 2 block
BG4610	340	1.79×10⁻⁵	2.02×10⁻⁵	1.87×10⁻⁵	2.17×10⁻⁵
	440	2.18×10⁻⁵	2.41×10⁻⁵	2.25×10⁻⁵	2.56×10⁻⁵
	540	2.57×10⁻⁵	2.79×10⁻⁵	2.64×10⁻⁵	2.95×10⁻⁵
	640	2.95×10⁻⁵	3.18×10⁻⁵	3.03×10⁻⁵	3.33×10⁻⁵
	740	3.34×10⁻⁵	3.57×10⁻⁵	3.42×10⁻⁵	3.72×10⁻⁵
	840	3.73×10⁻⁵	3.96×10⁻⁵	3.80×10⁻⁵	4.11×10⁻⁵
	940	4.12×10⁻⁵	4.35×10⁻⁵	4.19×10⁻⁵	4.50×10⁻⁵
	1,040	4.50×10⁻⁵	4.74×10⁻⁵	4.58×10⁻⁵	4.88×10⁻⁵
	1,140	4.89×10⁻⁵	5.12×10⁻⁵	4.97×10⁻⁵	5.27×10⁻⁵
	1,240	5.28×10⁻⁵	5.51×10⁻⁵	5.35×10⁻⁵	5.66×10⁻⁵
BG4620	340	2.47×10⁻⁵	3.39×10⁻⁵	2.78×10⁻⁵	3.99×10⁻⁵
	440	2.86×10⁻⁵	3.77×10⁻⁵	3.17×10⁻⁵	4.38×10⁻⁵
	540	3.25×10⁻⁵	4.16×10⁻⁵	3.55×10⁻⁵	4.77×10⁻⁵
	640	3.63×10⁻⁵	4.55×10⁻⁵	3.94×10⁻⁵	5.16×10⁻⁵
	740	4.03×10⁻⁵	4.94×10⁻⁵	4.33×10⁻⁵	5.55×10⁻⁵
	840	4.41×10⁻⁵	5.34×10⁻⁵	4.71×10⁻⁵	5.93×10⁻⁵
	940	4.80×10⁻⁵	5.72×10⁻⁵	5.09×10⁻⁵	6.32×10⁻⁵
	1,040	5.19×10⁻⁵	6.11×10⁻⁵	5.48×10⁻⁵	6.71×10⁻⁵
	1,140	5.57×10⁻⁵	6.50×10⁻⁵	5.87×10⁻⁵	7.09×10⁻⁵
	1,240	5.96×10⁻⁵	6.89×10⁻⁵	6.26×10⁻⁵	7.48×10⁻⁵

BG46 −Without Top Cover−

C (1 short block)
D (2 short blocks in close contact)

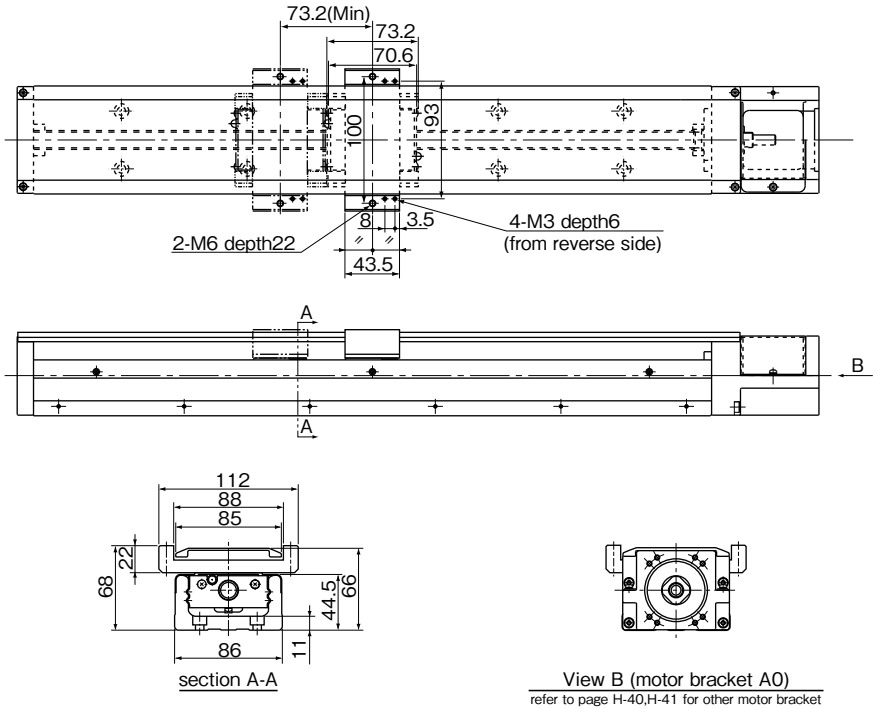


part number※3※4	stroke limit mm ※1	dimensions mm L1	L2	N1	M1×P1	N2	M2×P2	block mass kg ※2 without top cover	with top cover	total mass kg without top cover	with top cover
BG46□□C- 340	245	340	438.5	70	2×100	20	3×100	0.5	0.7	6	6.5
D	172							1	1.4	6.5	7
BG46□□C- 440	345	440	538.5		3×100		4×100	0.5	0.7	7.5	8
D	272							1	1.4	8	8.5
BG46□□C- 540	445	540	638.5		4×100		5×100	0.5	0.7	8.5	9.5
D	372							1	1.4	9.5	10
BG46□□C- 640	545	640	738.5		5×100		6×100	0.5	0.7	10	10.5
D	472							1	1.4	10.5	11.5
BG46□□C- 740	645	740	838.5		6×100		7×100	0.5	0.7	11.5	12
D	572							1	1.4	12	13
BG46□□C- 840	745	840	938.5		7×100		8×100	0.5	0.7	13	13.5
D	672							1	1.4	13.5	14
BG46□□C- 940	845	940	1,038.5		8×100		9×100	0.5	0.7	14	15
D	772							1	1.4	14.5	15.5
BG46□□C-1040	945	1.040	1,138.5		9×100		10×100	0.5	0.7	15.5	16.5
D	872							1	1.4	16	17
BG46□□C-1140	1,045	1.140	1,238.5		10×100		11×100	0.5	0.7	17	18
D	972							1	1.4	17.5	18.5
BG46□□C-1240	1,145	1.240	1,338.5		11×100		12×100	0.5	0.7	18.5	19
D	1,072							1	1.4	19	20

※1 : Stroke limit is a drive distance between both ends of the dampers.
※2 : Mass stated "with top cover" includes mass of sub tables.
※3 : For D type (2 short blocks), drive block is located closest to motor bracket side.
※4 : □ is ball screw lead.

BG46 −With Top Cover−

C (1 short block)
D (2 short blocks in close contact)

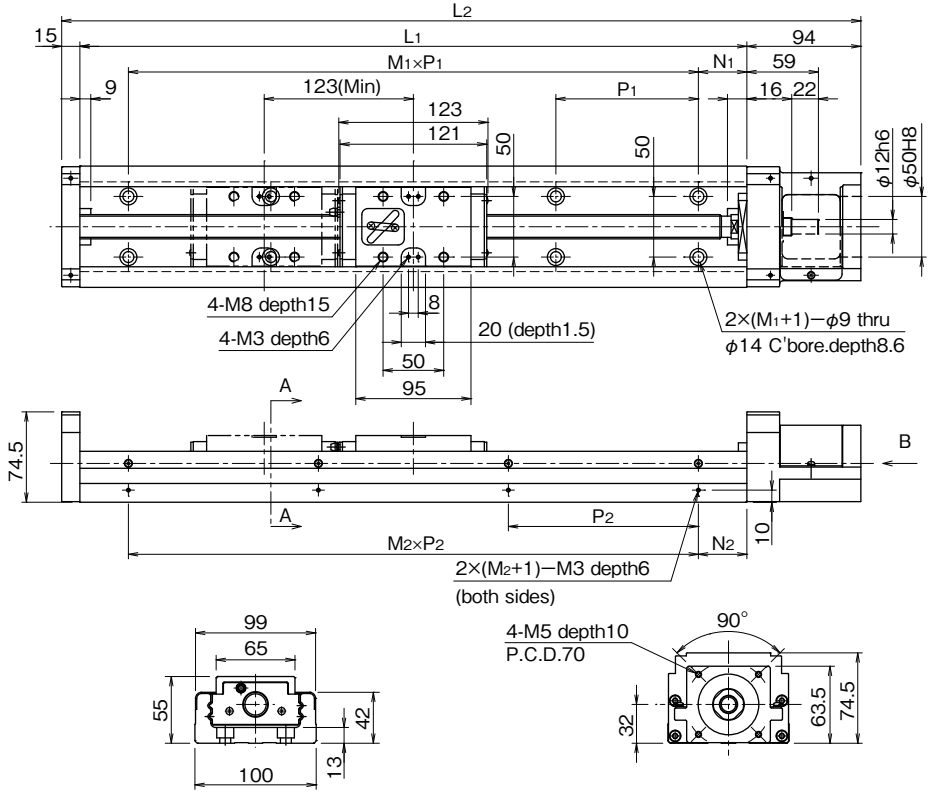


inertia (reference values) unit : kg・m²

part number	rail length mm	short block without top cover C 1 block	without top cover D 2 block	with top cover C 1 block	with top cover D 2 block
BG4610	340	1.69×10⁻⁵	1.82×10⁻⁵	1.74×10⁻⁵	1.92×10⁻⁵
	440	2.08×10⁻⁵	2.20×10⁻⁵	2.13×10⁻⁵	2.31×10⁻⁵
	540	2.46×10⁻⁵	2.59×10⁻⁵	2.52×10⁻⁵	2.69×10⁻⁵
	640	2.85×10⁻⁵	2.98×10⁻⁵	2.90×10⁻⁵	3.08×10⁻⁵
	740	3.24×10⁻⁵	3.37×10⁻⁵	3.29×10⁻⁵	3.47×10⁻⁵
	840	3.63×10⁻⁵	3.75×10⁻⁵	3.67×10⁻⁵	3.83×10⁻⁵
	940	4.02×10⁻⁵	4.14×10⁻⁵	4.06×10⁻⁵	4.22×10⁻⁵
	1,040	4.41×10⁻⁵	4.53×10⁻⁵	4.44×10⁻⁵	4.61×10⁻⁵
	1,140	4.79×10⁻⁵	4.92×10⁻⁵	4.83×10⁻⁵	4.99×10⁻⁵
	1,240	5.18×10⁻⁵	5.30×10⁻⁵	5.22×10⁻⁵	5.38×10⁻⁵
BG4620	340	2.07×10⁻⁵	2.58×10⁻⁵	2.27×10⁻⁵	2.98×10⁻⁵
	440	2.46×10⁻⁵	2.96×10⁻⁵	2.66×10⁻⁵	3.37×10⁻⁵
	540	2.84×10⁻⁵	3.35×10⁻⁵	3.05×10⁻⁵	3.76×10⁻⁵
	640	3.23×10⁻⁵	3.74×10⁻⁵	3.44×10⁻⁵	4.14×10⁻⁵
	740	3.62×10⁻⁵	4.13×10⁻⁵	3.82×10⁻⁵	4.53×10⁻⁵
	840	4.02×10⁻⁵	4.51×10⁻⁵	4.17×10⁻⁵	4.82×10⁻⁵
	940	4.41×10⁻⁵	4.90×10⁻⁵	4.56×10⁻⁵	5.21×10⁻⁵
	1,040	4.80×10⁻⁵	5.29×10⁻⁵	4.95×10⁻⁵	5.59×10⁻⁵
	1,140	5.18×10⁻⁵	5.68×10⁻⁵	5.34×10⁻⁵	5.98×10⁻⁵
	1,240	5.57×10⁻⁵	6.06×10⁻⁵	5.72×10⁻⁵	6.37×10⁻⁵

BG55 −Without Top Cover−

A (1 long block)
B (2 long blocks in close contact)



section A-A

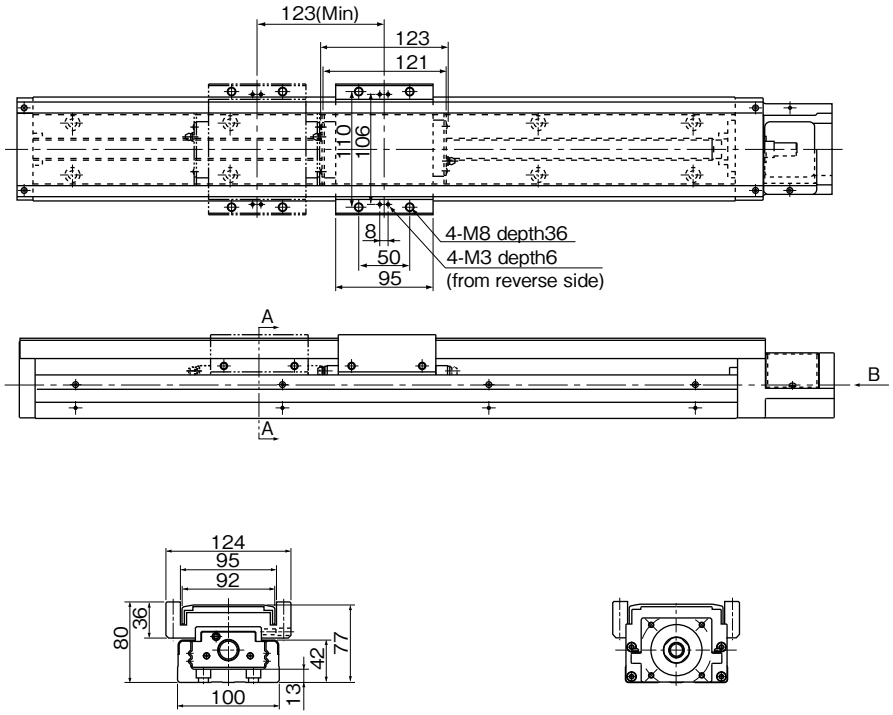
View B (motor bracket A0)
refer to page H-42,H-43 for other motor bracket

part number※3※4	stroke limit mm ※1	dimensions mm L1	L2	N1	M1×P1	N2	M2×P2	block mass kg ※2 without top cover	with top cover	total mass kg without top cover	with top cover
BG55□□A- 980	834	980	1,089	40	6×150	90	4×200	1.7	2.3	20	21
B	711							3.4	4.6	22	24
BG55□□A-1080	934	1,080	1,189	15	7×150	40	5×200	1.7	2.3	22	23
B	811							3.4	4.6	24	26
BG55□□A-1180	1,034	1,180	1,289	65		90		1.7	2.3	23	25
B	911							3.4	4.6	25	27
BG55□□A-1280	1,134	1,280	1,389	40	8×150	40	6×200	1.7	2.3	25	27
B	1,011							3.4	4.6	27	29
BG55□□A-1380	1,234	1,380	1,489	15	9×150	90		1.7	2.3	27	29
B	1,111							3.4	4.6	29	31

※1 : Stroke limit is a drive distance between both ends of the dampers.
※2 : Mass stated "with top cover" includes mass of sub tables.
※3 : For B type (2 long blocks), drive block is located closest to motor bracket side.
※4 : □ is ball screw lead.

BG55 −With Top Cover−

A (1 long block)
B (2 long blocks in close contact)



section A-A

View B (motor bracket A0)
refer to page H-42,H-43 for other motor bracket

inertia (reference values) unit : kg・m²

part number	rail length mm	long block without top cover A 1 block	without top cover B 2 block	with top cover A 1 block	with top cover B 2 block
BG5520	980	1.46×10^{-4}	1.64×10^{-4}	1.52×10^{-4}	1.76×10^{-4}
	1,080	1.59×10^{-4}	1.76×10^{-4}	1.65×10^{-4}	1.88×10^{-4}
	1,180	1.71×10^{-4}	1.88×10^{-4}	1.77×10^{-4}	2.00×10^{-4}
	1,280	1.83×10^{-4}	2.00×10^{-4}	1.89×10^{-4}	2.12×10^{-4}
	1,380	1.95×10^{-4}	2.13×10^{-4}	2.01×10^{-4}	2.25×10^{-4}

MOTOR BRACKET CONFIGURATIONS & APPLICABLE MOTORS

NB provides optional motor brackets to easily install most popular motors.

Table H-9 (1) Applicable Motors

Applicable motors				Output flange	BG15 P.H-32 ~33	BG20 P.H-34 ~35	BG26 P.H-36 ~37	BG33 P.H-38 ~39	BG46 P.H-40 ~41	BG55 P.H-42 ~43
AC Servo motor	Panasonic	E	MUMA5A	50W	—	AA	AA	B2	—	—
			MUMA01	100W						
			MUMA02	200W	—	—	—	A7	A2	
			MUMA04	400W				—		
		A4	MSMD5A	50W	—	A3	A3	A2	C0	—
			MSMD01	100W						
			MSMD02	200W	—	—	—	A7	A2	—
			MSMD04	400W				—		
			MSMD08	750W	—	—	—	—	A3	A2
		A5	MSME5A	50W	—	A3	A3	A2	C0	—
			MSME01	100W						
			MSME02	200W	—	—	—	A7	A2	—
			MSME04	400W				—		
			MSME08	750W	—	—	—	—	A3	A2
	MITSUBISHI ELECTRIC	J2-Jr	HC-AQ0135	10W	A1	A8	A8	—	—	—
			HC-AQ0235	20W						
			HC-AQ0335	30W						
		J4	HG-KR(MR)053	50W	—	A1	A1	A1	B0	—
			HG-KR(MR)13	100W						
			HG-KR(MR)23	200W	—	—	—	A6	A1	A0
			HG-KR(MR)43	400W				—		
			HG-KR(MR)73	750W	—	—	—	—	A4	A1
		J3	HF-KP(MP)053	50W	—	A1	A1	A1	B0	—
			HF-KP(MP)13	100W						
			HF-KP(MP)23	200W	—	—	—	A6	A1	A0
			HF-KP(MP)43	400W				—		
			HF-KP(MP)73	750W	—	—	—	—	A4	A1
	YASKAWA ELECTRIC	Σ-V mini	SGMMV-A1	10W	A2	A9	A9	—	—	—
			SGMMV-A2	20W						
			SGMMV-A3	30W						
		Σ-V	SGMJV(SGMAV)-A5	50W	—	A1	A1	A1	B0	—
			SGMJV(SGMAV)-01	100W						
			SGMAV-C2	150W						
			SGMJV(SGMAV)-02	200W	—	—	—	A6	A1	A0
			SGMJV(SGMAV)-04	400W				—		
			SGMAV-06	550W						
			SGMJV(SGMAV)-08	750W	—	—	—	—	A4	A1
		Σ-Ⅲ	SGMAS-A5	50W	—	A1	A1	A1	B0	—
			SGMAS-01	100W						
			SGMAS-C2	150W						
			SGMAS-02	200W	—	—	—	A6	A1	A0
			SGMAS-04	400W				—		
			SGMAS-08	750W	—	—	—	—	A4	A1

Table H-9 (2) Applicable Motors

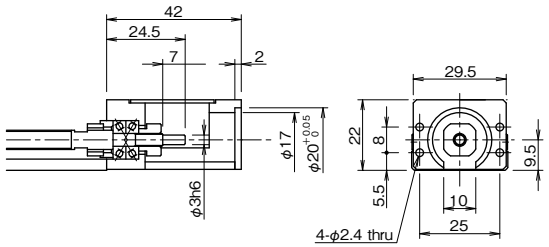
Applicable motors				Output flange	BG15 P.H-32 ~33	BG20 P.H-34 ~35	BG26 P.H-36 ~37	BG33 P.H-38 ~39	BG46 P.H-40 ~41	BG55 P.H-42 ~43
AC Servo motor	SANYO DENKI	Q	Q1AA04003D	30W	—	A1	A1	A1	B0	—
			Q1AA04005D	50W						
			Q1AA04010D	100W						
			Q1AA06020D	200W	—	—	—	A6	A1	A0
			Q1AA06040D	400W				—		
			Q1AA07075D	750W	—	—	—	—	A4	A1
		R	R2AA04005	50W	—	A1	A1	A1	B0	—
			R2AA04010	100W						
			R2AA06020	200W	—	—	—	A6	A1	A0
			R2AA06040	400W				—		
			R2AA08075	750W	—	—	—	—	A4	A1
Stepper motor	ORIENTAL MOTOR	α step	ASC3※	□28	A3	A6	A6	—	—	—
			AS46,ASC46	□42	—	A5	A5	B1	—	—
			AS6※,ASC66	□60	—	—	—	A8	D0	—
			AS9※	□85	—	—	—	—	D1	A4
			AR4,ARL4	□42	—	A5	A5	B1	—	—
			AR6,ARL6	□60	—	—	—	—	D0	—
			AR9,ARL9	□85	—	—	—	—	D1	A4
		5 phase motor	CSK51,CRK51	□20	A5	—	—	—	—	—
			CSK52,CRK52	□28	A3	A6	A6	—	—	—
			CSK54,CRK54	□42	—	A5	A5	B1	—	—
			CSK56,CRK56	□60	—	—	—	A8	D0	—
			CSK59	□85	—	—	—	—	D1	A4
			RK54	□42	—	A5	A5	B1	—	—
			RK56	□60	—	—	—	A8	D0	—
			RK59	□85	—	—	—	—	D1	A4
			RKS54	□42	—	A5	A5	B1	—	—
			RKS56	□60	—	—	—	—	D0	—
			RKS59	□85	—	—	—	—	D1	A4
		2 phase motor	PK22,CSK22	□28	A3	A6	A6	—	—	—
			PK24,CSK24,UMK24	□42	—	A5	A5	B1	—	—
			PK26,CSK26,UMK26	□60	—	—	—	A5	—	—
			SH528	□28	A3	A6	A6	—	—	—
	SANYO DENKI	5 phase motor	103H(F,M)55	□42	—	A5	A5	B1	—	—
			103H(F,M)785	□60	—	—	—	A8	D0	—
			103H(F,M)858	□85	—	—	—	—	D1	A5
	TECHNO DRIVE	5 phase motor	※K-S52※	□28	A4	—	—	—	—	—
			※K-S54※	□42	—	A5	A5	B1	—	—
			※K-S(M)56※	□60	—	—	—	A8	D0	—
			※K-M(G)59※	□85	—	—	—	—	D1	A5

NB can provide other types of motor brackets. Please contact NB for details.

BG15

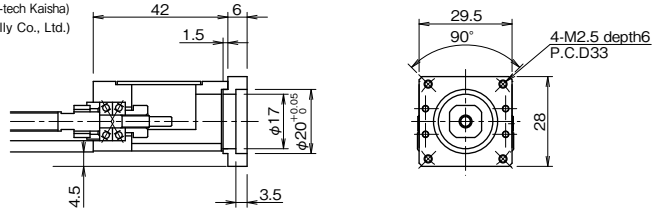
Figures inside( ) indicates mass of the motor mount adapter plate.

A0



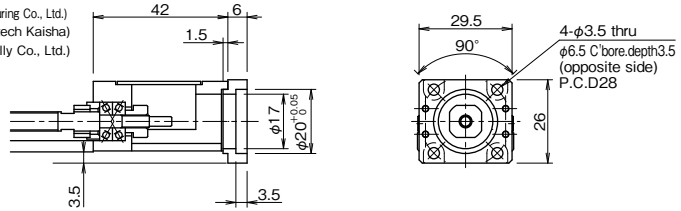
A1 (Mass: 9g)

Recommended Coupling: XBW-15C2(Nabeya Bi-tech Kaisha)
SFC-005DA2(Miki Pully Co., Ltd.)



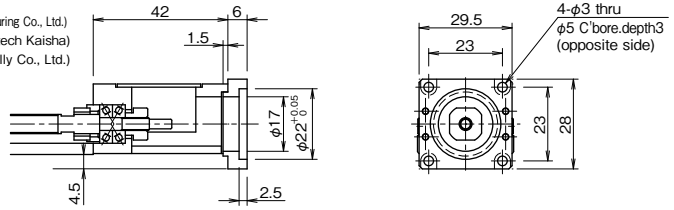
A2 (Mass: 8g)

Recommended Coupling: LAD-15C(Sakai Manufacturing Co., Ltd.)
XBW-15C2(Nabeya Bi-tech Kaisha)
SFC-005DA2(Miki Pully Co., Ltd.)



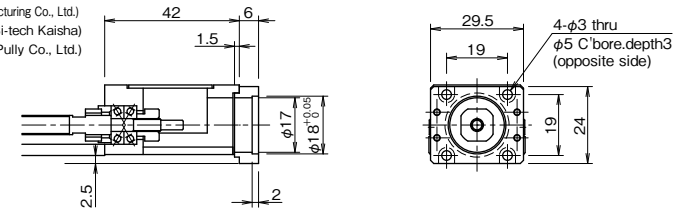
A3 (Mass: 9g)

Recommended Coupling: LAD-15C(Sakai Manufacturing Co., Ltd.)
XBW-15C2(Nabeya Bi-tech Kaisha)
SFC-005DA2(Miki Pully Co., Ltd.)



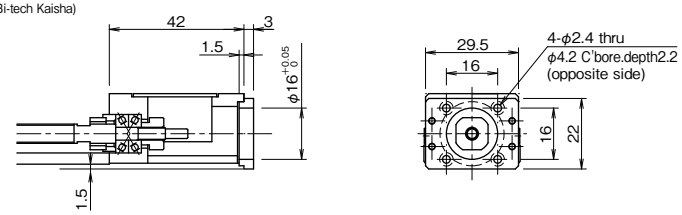
A4 (Mass: 8g)

Recommended Coupling: LAD-15C(Sakai Manufacturing Co., Ltd.)
XBW-15C2(Nabeya Bi-tech Kaisha)
SFC-005DA2(Miki Pully Co., Ltd.)



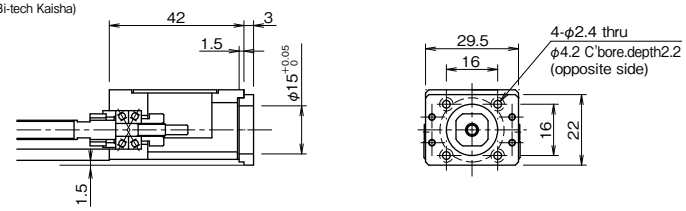
A5 (Mass: 4g)

Recommended Coupling: XBW-15C2(Nabeya Bi-tech Kaisha)



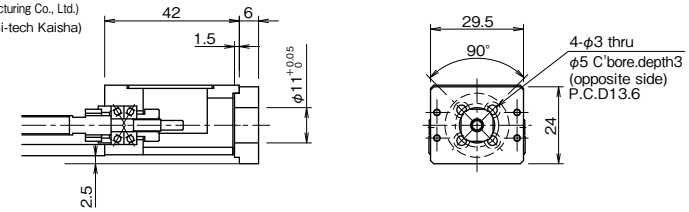
A6 (Mass: 4g)

Recommended Coupling: XBW-15C2(Nabeya Bi-tech Kaisha)



A7 (Mass: 11g)

Recommended Coupling: LAD-15C(Sakai Manufacturing Co., Ltd.)
XBW-15C2(Nabeya Bi-tech Kaisha)

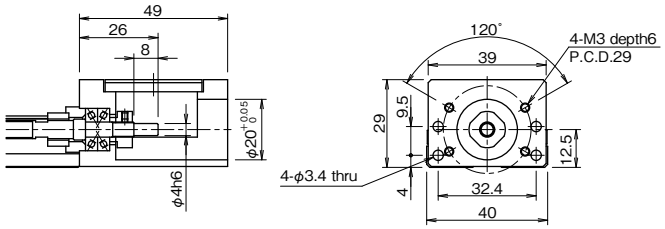


Attach the motor to the motor mount adapter plate first.

BG20

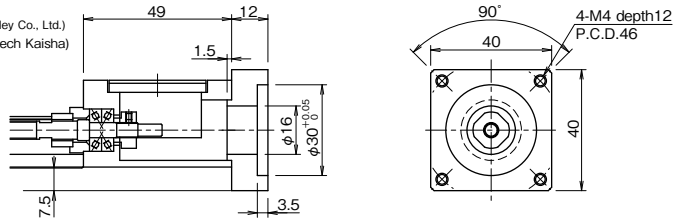
Figures inside( ) indicates mass of the motor mount adapter plate.

A0



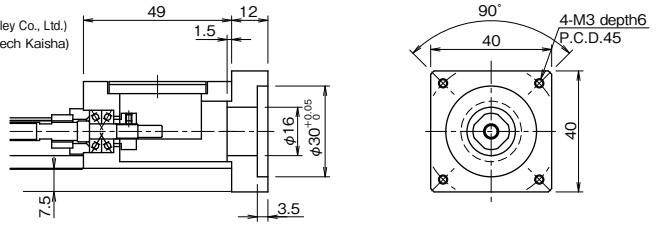
A1 (Mass: 38g)

Recommended Coupling: SFC-010DA2(Miki Pulley Co., Ltd.)
XBW-19C2(Nabeya Bi-tech Kaisha)



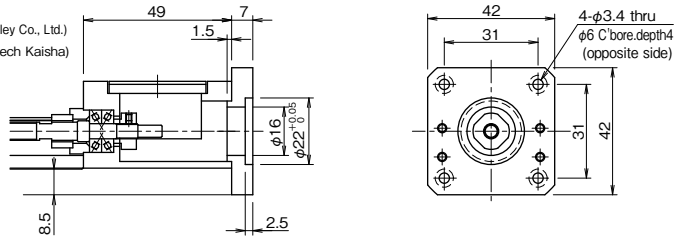
A3 (Mass: 39g)

Recommended Coupling: SFC-010DA2(Miki Pulley Co., Ltd.)
XBW-19C2(Nabeya Bi-tech Kaisha)



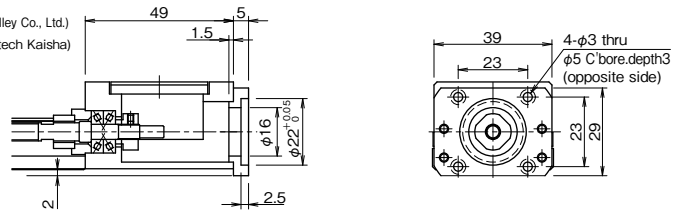
A5 (Mass: 26g)

Recommended Coupling: SFC-010DA2(Miki Pulley Co., Ltd.)
XBW-19C2(Nabeya Bi-tech Kaisha)



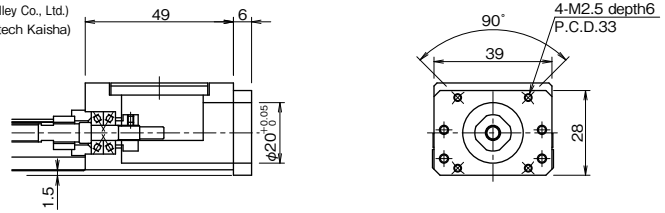
A6 (Mass: 10g)

Recommended Coupling: SFC-010DA2(Miki Pulley Co., Ltd.)
XBW-19C2(Nabeya Bi-tech Kaisha)



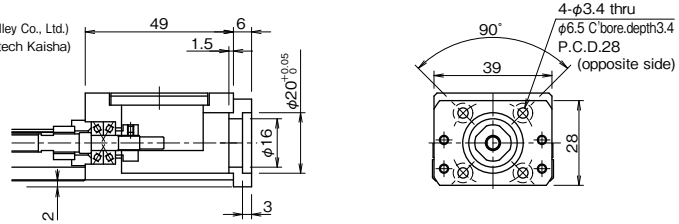
A8 (Mass: 12g)

Recommended Coupling: SFC-010DA2(Miki Pulley Co., Ltd.)
XBW-19C2(Nabeya Bi-tech Kaisha)



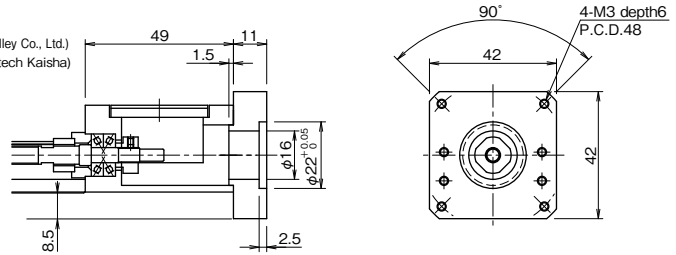
A9 (Mass: 14g)

Recommended Coupling: SFC-010DA2(Miki Pulley Co., Ltd.)
XBW-19C2(Nabeya Bi-tech Kaisha)



AA (Mass: 46g)

Recommended Coupling: SFC-010DA2(Miki Pulley Co., Ltd.)
XBW-19C2(Nabeya Bi-tech Kaisha)

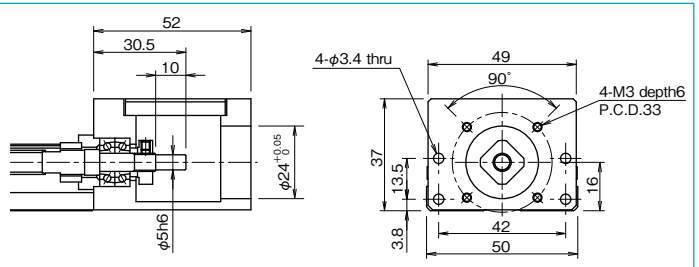


For configurations A5, A6, A9 and AA, attach the motor to the motor mount adapter plate first.

BG26

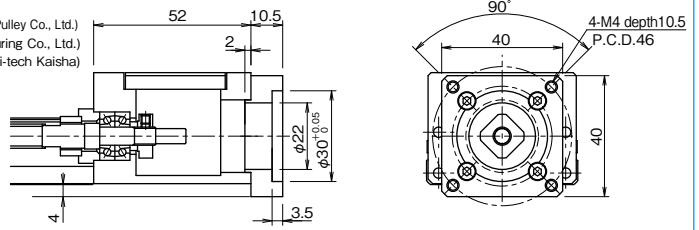
Figures inside( ) indicates mass of the motor mount adapter plate.

A0



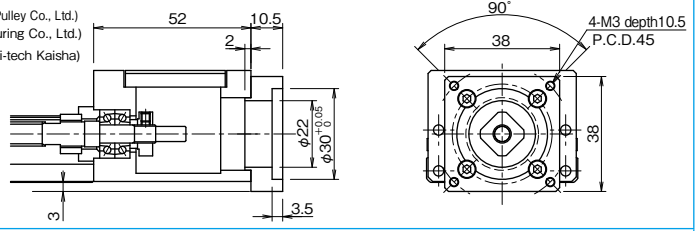
A1 (Mass: 28g)

Recommended Coupling: SFC-010DA2(Miki Pulley Co., Ltd.)
LAD-20C(Sakai Manufacturing Co., Ltd.)
XBW-19C2(Nabeya Bi-tech Kaisha)



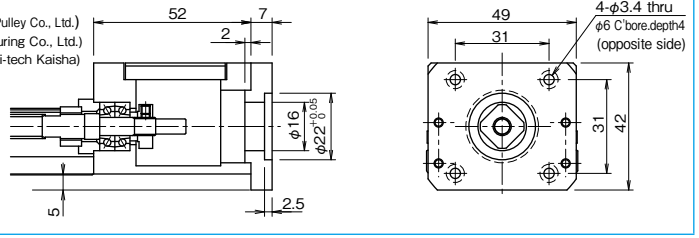
A3 (Mass: 24g)

Recommended Coupling: SFC-010DA2(Miki Pulley Co., Ltd.)
LAD-20C(Sakai Manufacturing Co., Ltd.)
XBW-19C2(Nabeya Bi-tech Kaisha)



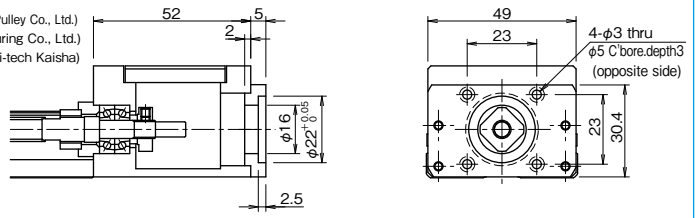
A5 (Mass: 32g)

Recommended Coupling: SFC-010DA2(Miki Pulley Co., Ltd.)
LAD-20C(Sakai Manufacturing Co., Ltd.)
XBW-19C2(Nabeya Bi-tech Kaisha)



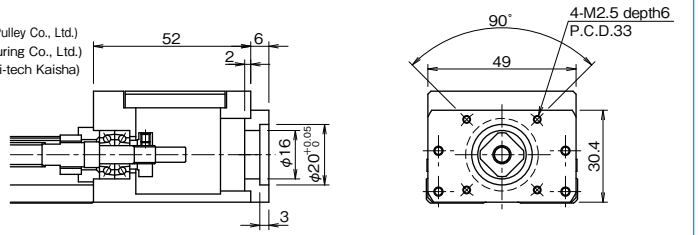
A6 (Mass: 16g)

Recommended Coupling: SFC-010DA2(Miki Pulley Co., Ltd.)
LAD-20C(Sakai Manufacturing Co., Ltd.)
XBW-19C2(Nabeya Bi-tech Kaisha)



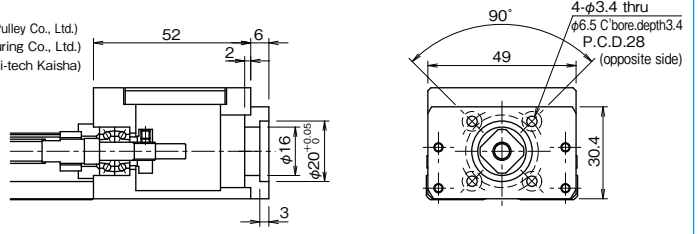
A8 (Mass: 21g)

Recommended Coupling: SFC-010DA2(Miki Pulley Co., Ltd.)
LAD-20C(Sakai Manufacturing Co., Ltd.)
XBW-19C2(Nabeya Bi-tech Kaisha)



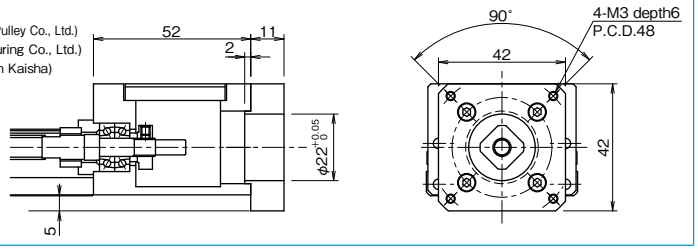
A9 (Mass: 21g)

Recommended Coupling: SFC-010DA2(Miki Pulley Co., Ltd.)
LAD-20C(Sakai Manufacturing Co., Ltd.)
XBW-19C2(Nabeya Bi-tech Kaisha)



AA (Mass: 41g)

Recommended Coupling: SFC-010DA2(Miki Pulley Co., Ltd.)
LAD-20C(Sakai Manufacturing Co., Ltd.)
XBW-19C2(Nabeya Bi-tech Kaisha)

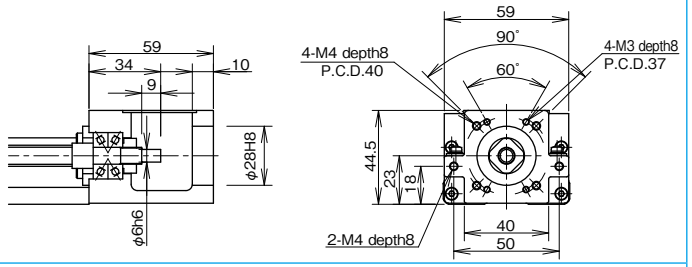


For configurations A5, A6 and A9, attach the motor to the motor mount adapter plate first.

BG33

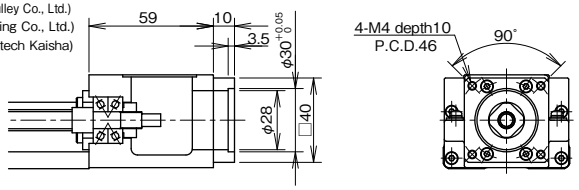
Figures inside( ) indicates mass of the motor mount adapter plate.

A0



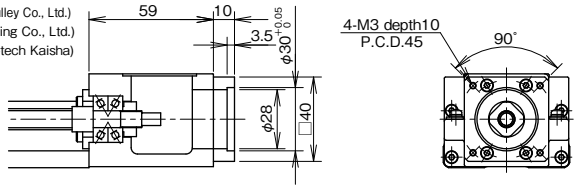
A1 (Mass: 66g)

Recommended Coupling: SFC-020DA2(Miki Pulley Co., Ltd.)
LAD-25C(Sakai Manufacturing Co., Ltd.)
XBW-25C2(Nabeya Bi-tech Kaisha)



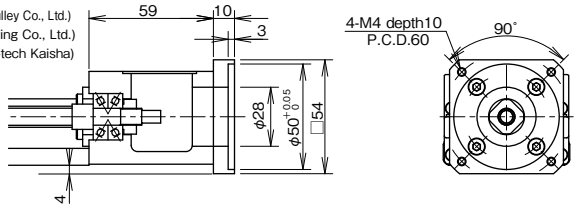
A2 (Mass: 67g)

Recommended Coupling: SFC-020DA2(Miki Pulley Co., Ltd.)
LAD-25C(Sakai Manufacturing Co., Ltd.)
XBW-25C2(Nabeya Bi-tech Kaisha)



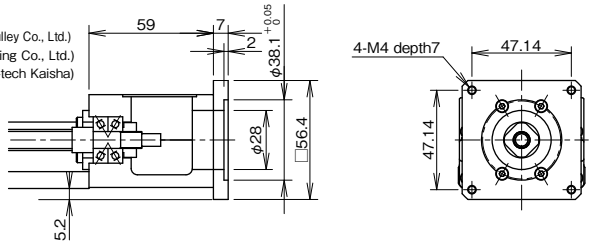
A3 (Mass: 133g)

Recommended Coupling: SFC-020DA2(Miki Pulley Co., Ltd.)
LAD-25C(Sakai Manufacturing Co., Ltd.)
XBW-25C2(Nabeya Bi-tech Kaisha)



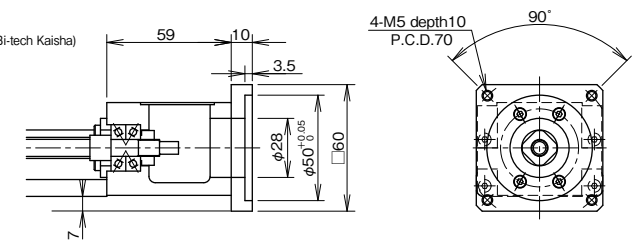
A5 (Mass: 125g)

Recommended Coupling: SFC-020DA2(Miki Pulley Co., Ltd.)
LAD-25C(Sakai Manufacturing Co., Ltd.)
XBW-25C2(Nabeya Bi-tech Kaisha)



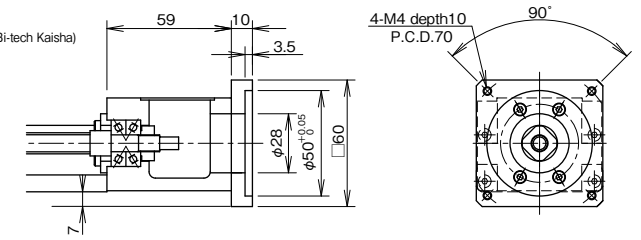
A6 (Mass: 215g)

Recommended Coupling: XBW-27C2(Nabeya Bi-tech Kaisha)



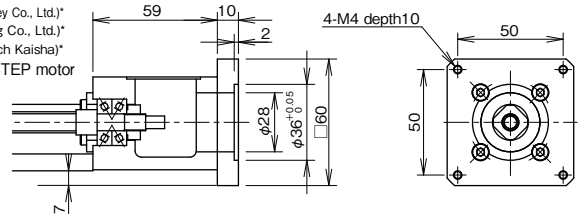
A7 (Mass: 215g)

Recommended Coupling: XBW-27C2(Nabeya Bi-tech Kaisha)



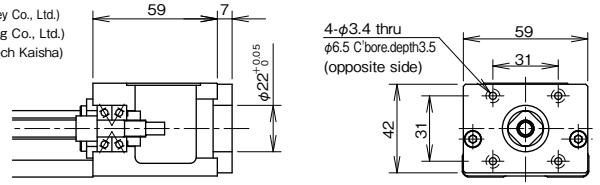
A8 (Mass: 212g)

Recommended Coupling: SFC-020DA2(Miki Pulley Co., Ltd.)*
LAD-25C(Sakai Manufacturing Co., Ltd.)*
XBW-25C2(Nabeya Bi-tech Kaisha)*
*Please contact NB when you use αSTEP motor (Oriental Motor Co., Ltd.).



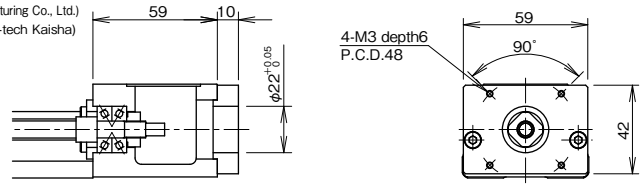
B1 (Mass: 111g)

Recommended Coupling: SFC-010DA2(Miki Pulley Co., Ltd.)
LAD-20C(Sakai Manufacturing Co., Ltd.)
XBW-19C2(Nabeya Bi-tech Kaisha)



B2 (Mass: 167g)

Recommended Coupling: LAD-25C(Sakai Manufacturing Co., Ltd.)
XBW-19C2(Nabeya Bi-tech Kaisha)



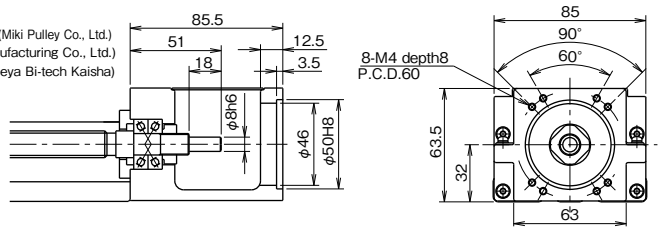
For configurations B1 and B2, attach the motor to the motor mount adapter plate first.

BG46

Figures inside( ) indicates mass of the motor mount adapter plate.

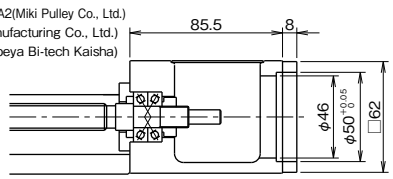
A0

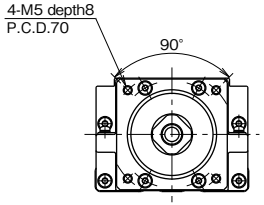
Recommended Coupling: SFC-020DA2(Miki Pulley Co., Ltd.)
LAD-25C(Sakai Manufacturing Co., Ltd.)
XBW-25C2(Nabeya Bi-tech Kaisha)



A1 (Mass: 103g)

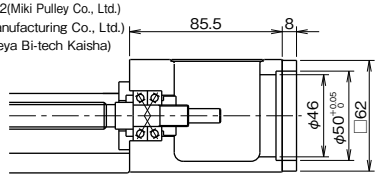
Recommended Coupling: SFC-030DA2(Miki Pulley Co., Ltd.)
LAD-30C(Sakai Manufacturing Co., Ltd.)
XBW-34C3(Nabeya Bi-tech Kaisha)

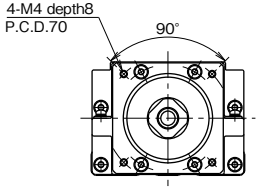




A2 (Mass: 106g)

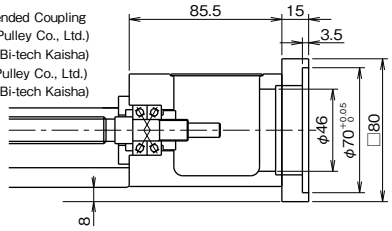
Recommended Coupling: SFC-030DA2(Miki Pulley Co., Ltd.)
LAD-30C(Sakai Manufacturing Co., Ltd.)
XBW-34C3(Nabeya Bi-tech Kaisha)

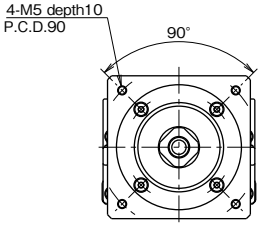




A3 (Mass: 448g)

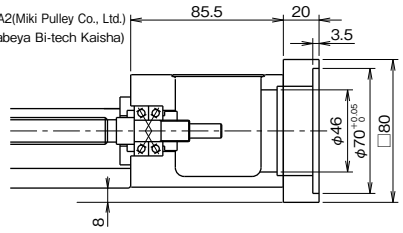
Recommended Coupling
(200W-400W): SFC-030DA2(Miki Pulley Co., Ltd.)
XBW-34C3(Nabeya Bi-tech Kaisha)
(750W): SFC-040DA2(Miki Pulley Co., Ltd.)
XBW-39C2(Nabeya Bi-tech Kaisha)

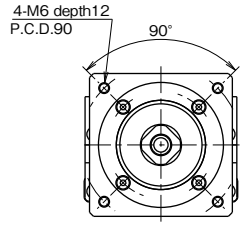




A4 (Mass: 628g)

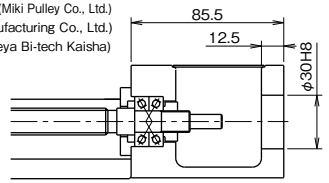
Recommended Coupling: SFC-040DA2(Miki Pulley Co., Ltd.)
XBW-39C2(Nabeya Bi-tech Kaisha)

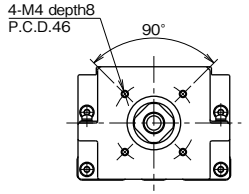




B0

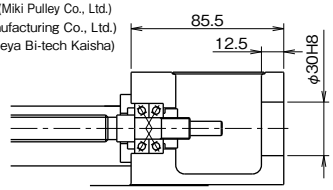
Recommended Coupling: SFC-020DA2(Miki Pulley Co., Ltd.)
LAD-25C(Sakai Manufacturing Co., Ltd.)
XBW-25C2(Nabeya Bi-tech Kaisha)

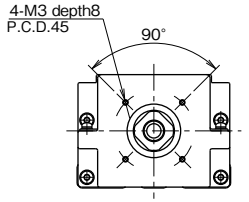




C0

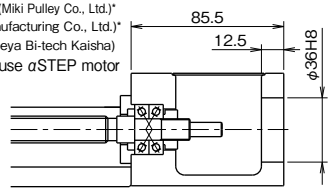
Recommended Coupling: SFC-020DA2(Miki Pulley Co., Ltd.)
LAD-25C(Sakai Manufacturing Co., Ltd.)
XBW-25C2(Nabeya Bi-tech Kaisha)

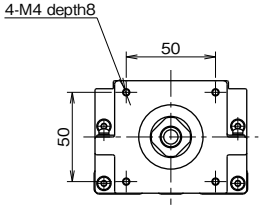




D0

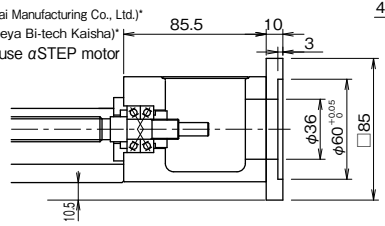
Recommended Coupling: SFC-020DA2(Miki Pulley Co., Ltd.)*
LAD-25C(Sakai Manufacturing Co., Ltd.)*
XBW-27C2(Nabeya Bi-tech Kaisha)
*Please contact NB when you use αSTEP motor (Oriental Motor Co., Ltd.).

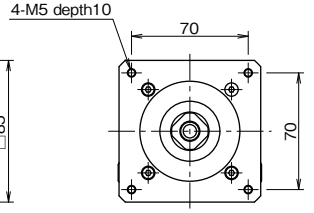




D1 (Mass:435g)

Recommended Coupling: LAD-35C(Sakai Manufacturing Co., Ltd.)*
XBW-34C3(Nabeya Bi-tech Kaisha)*
*Please contact NB when you use αSTEP motor (Oriental Motor Co., Ltd.).



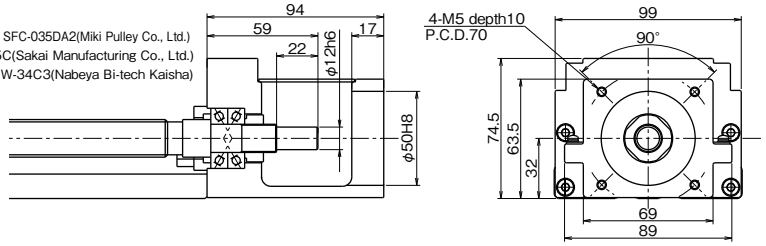


BG55

Figures inside(　) indicates mass of the motor mount adapter plate.

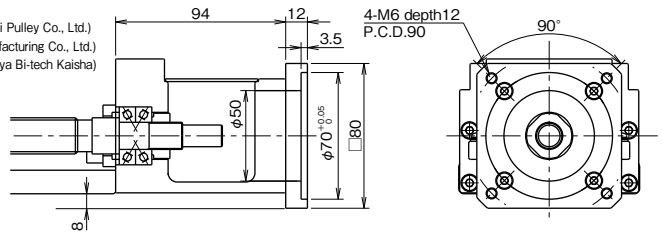
A0

Recommended Coupling: SFC-035DA2(Miki Pulley Co., Ltd.)
LAD-35C(Sakai Manufacturing Co., Ltd.)
XBW-34C3(Nabeya Bi-tech Kaisha)



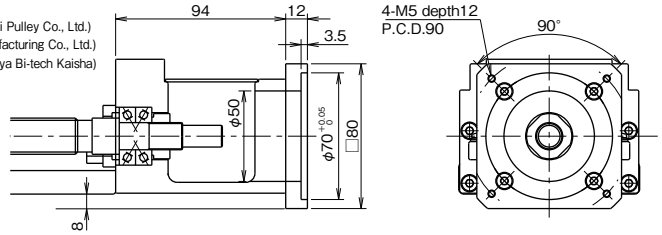
A1 (Mass: 329g)

Recommended Coupling: SFC-040DA2(Miki Pulley Co., Ltd.)
LAD-40C(Sakai Manufacturing Co., Ltd.)
XBW-39C2(Nabeya Bi-tech Kaisha)



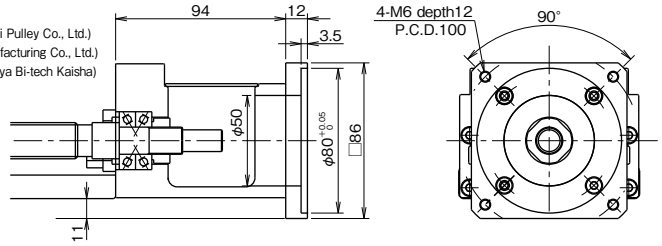
A2 (Mass: 333g)

Recommended Coupling: SFC-040DA2(Miki Pulley Co., Ltd.)
LAD-40C(Sakai Manufacturing Co., Ltd.)
XBW-39C2(Nabeya Bi-tech Kaisha)



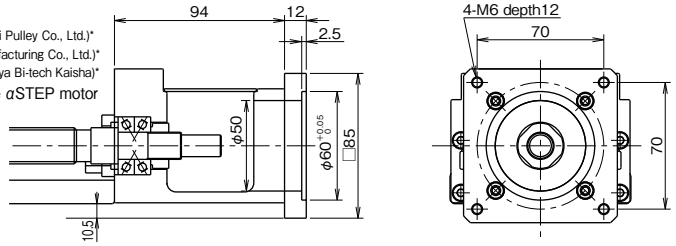
A3 (Mass: 399g)

Recommended Coupling: SFC-040DA2(Miki Pulley Co., Ltd.)
LAD-40C(Sakai Manufacturing Co., Ltd.)
XBW-39C2(Nabeya Bi-tech Kaisha)



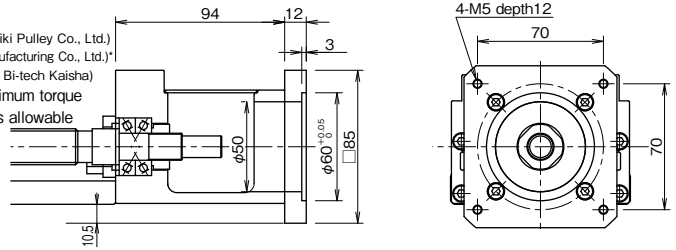
A4 (Mass: 449g)

Recommended Coupling: SFC-035DA2(Miki Pulley Co., Ltd.)*
LAD-40C(Sakai Manufacturing Co., Ltd.)*
XBW-39C2(Nabeya Bi-tech Kaisha)*
*Please contact NB when you use αSTEP motor (Oriental Motor Co., Ltd.).



A5 (Mass:449g)

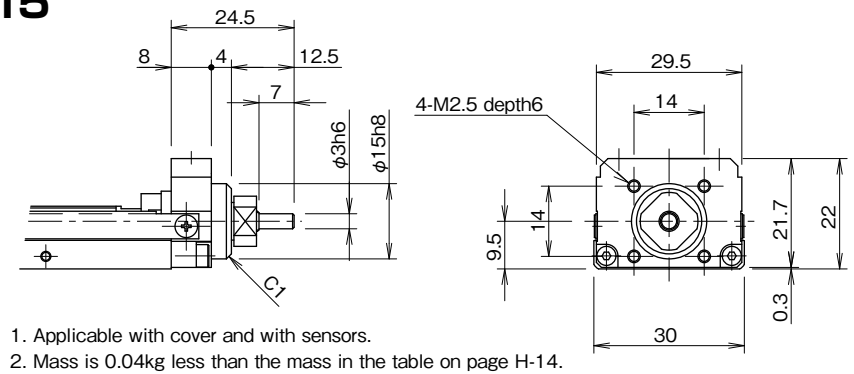
Recommended Coupling: SFC-035DA2(Miki Pulley Co., Ltd.)
LAD-40C(Sakai Manufacturing Co., Ltd.)*
XBW-39C2(Nabeya Bi-tech Kaisha)
*Please note that the motor's maximum torque should be set within the coupling's allowable torque.



EXPOSED BRACKET R0

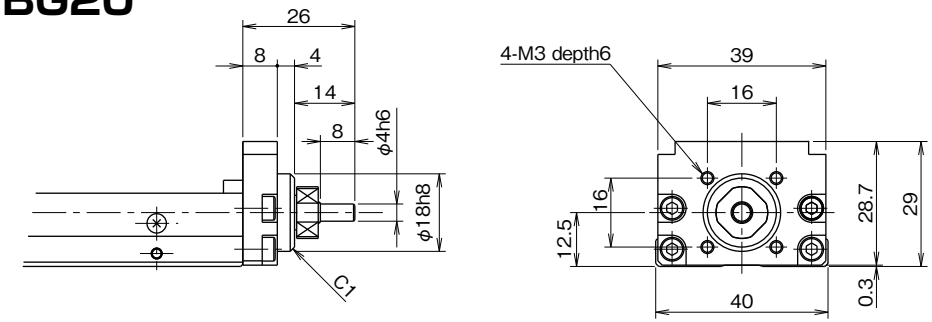
The ball screw shaft end is exposed with the exposed bracket R0 type.
Please fabricate an original bracket in case the standard brackets are not applicable.

BG15



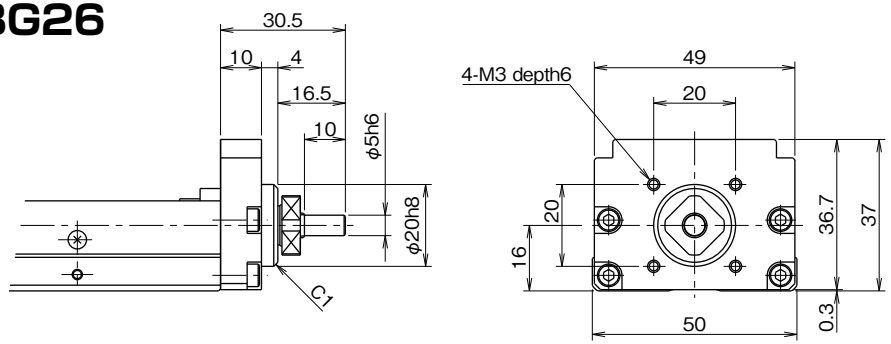
1. Applicable with cover and with sensors.
2. Mass is 0.04kg less than the mass in the table on page H-14.

BG20



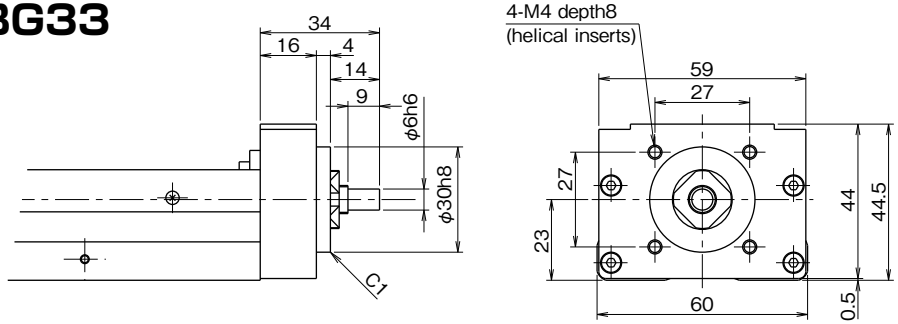
1. Applicable with cover and with sensors.
2. Mass is 0.04kg less than the mass in the table on page H-16.

BG26



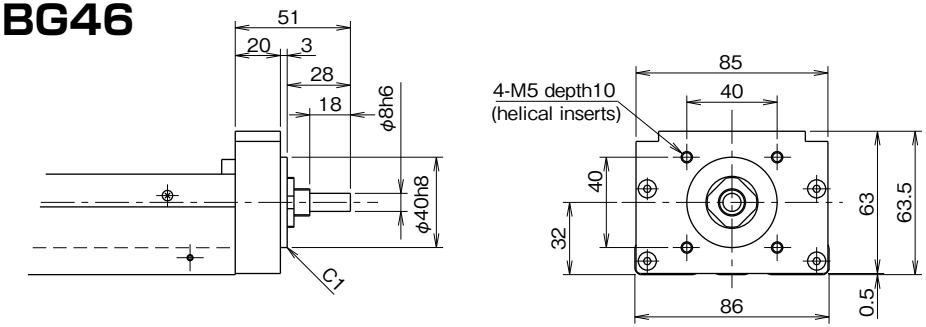
1. Applicable with cover and with sensors.
2. Mass is 0.08kg less than the mass in the table on page H-18.

BG33



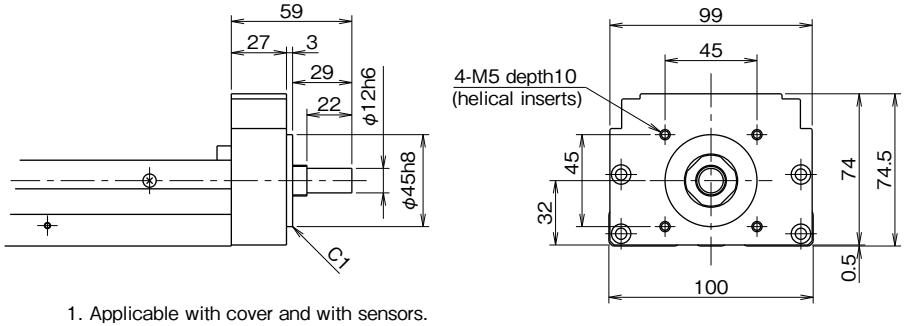
1. Applicable with cover and with sensors.
2. Mass is 0.1kg less than the mass in the table on page H-20,H-22.

BG46



1. Applicable with cover and with sensors.
2. Mass is 0.3kg less than the mass in the table on page H-24,H-26.

BG55

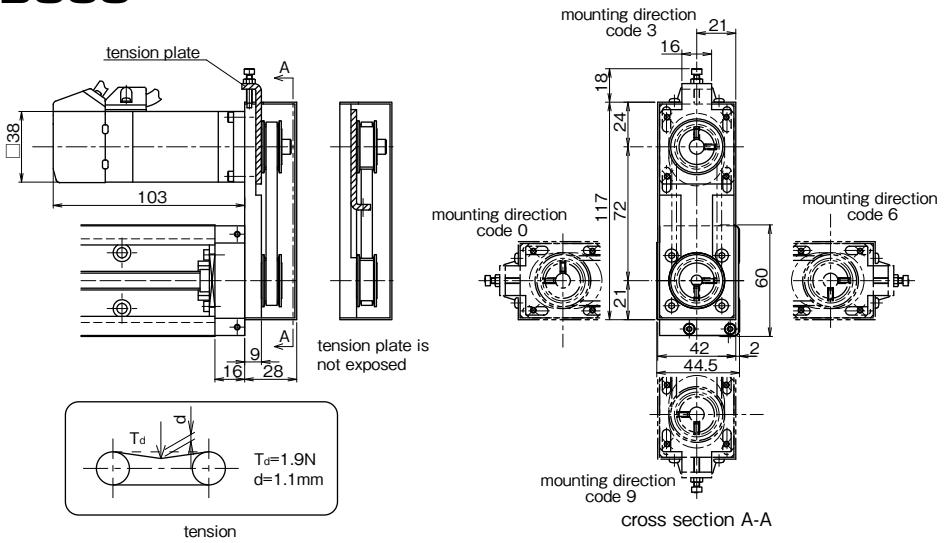


1. Applicable with cover and with sensors.
2. Mass is 0.3kg less than the mass in the table on page H-28.

RETURN PULLEY UNIT

Return pulley units in which a motor is connected with a timing belt are available for BG type. Its return structure allows the reduction of total length (available for BG33 and BG46).

BG33



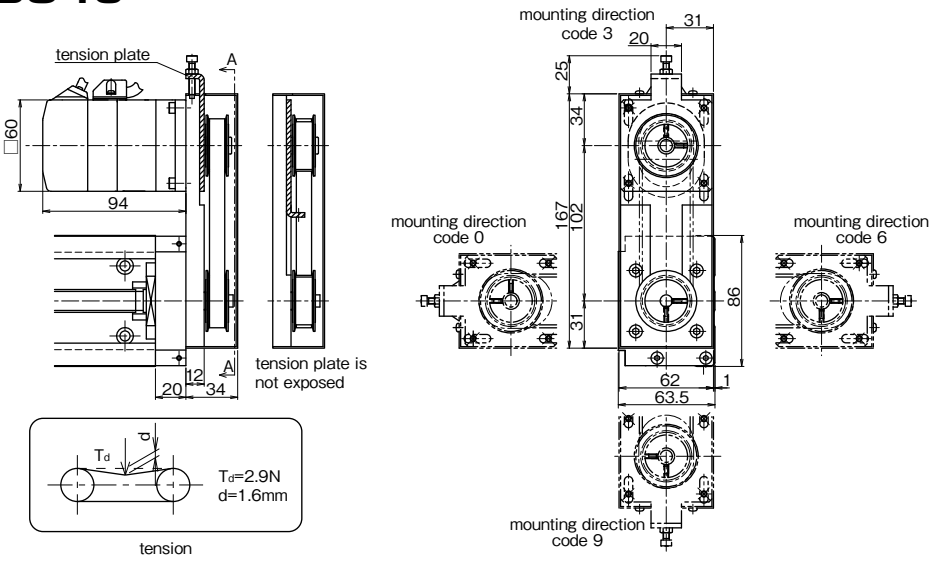
1.This drawing shows RA for MSMA01(Panasonic).
2.Installation position of Pulley Unit can be selected at 90° intervals (mounting direction code).
3.Applicable with cover and with sensors.
Precaution for applying H type sensors
When the motor is positioned at direction 3 or 9, H type sensors interfere if mounted on the side of motor. H type sensors must be mounted opposite to the motor.
4.Tension plate can be built in and is not exposed. (not applicable to RC)
5.Mass is added 0.2kg to the mass on page H-20～23.
6.Inertia is added 2.22×10^{-6}kg・m^2 to the value of Table on page H-20～23. (motor inertia not included)
7.Part number structure BG33＊＊＊—＊＊＊＊/ ☆☆□
☆☆: Symbol of applicable motor bracket (refer to Table H-10)
□: Mounting direction code (refer to cross section A-A)

Table H-10 Applicable Motor

motor bracket	applicable motors		output	flange	motor diameter
RA	Panasonic	MINAS SERIES	50～100W	□38	ϕ8
RB	YASKAWA ELECTRIC	SIGMA SERIES	50～100W	□40	ϕ8
	MITSUBISHI ELECTRIC	MELSERVO SERIES	50～100W	□40	
	SANYO DENKI	SANMOTIONQ1 SERIES	50～100W	□40	
RC	5 PHASE STEPPING MOTOR		—	□42	ϕ5

Please contact NB for other stepper motors.

BG46



1.This drawing shows RA for MSMA01(Panasonic).
2.Installation position of Pulley Unit can be selected at 90° intervals (mounting direction code).
3.Applicable with cover and with sensors.
Precaution for applying H type sensors
When the motor is positioned at direction 3 or 9, H type sensors interfere if mounted on the side of motor. H type sensors must be mounted opposite to the motor.
4.Tension plate can be built in and is not exposed.
5.Mass is added 0.7kg to the mass on page H-24 ～27.
6.Inertia is added 1.24×10^{-5}kg・m^2 to the value of Table on page H-24～27. (motor inertia not included)
7.Parts number structure BG46＊＊＊—＊＊＊＊/☆☆□
☆☆: Symbol of applicable motor bracket (refer to Table H-11)
□: Mounting direction code (refer to cross section A-A)

Table H-11 Applicable Motor

motor bracket	applicable motors		output	flange	motor diameter
RA	Panasonic	MINAS SERIES	200W	□60	ϕ11
RB	YASKAWA ELECTRIC	SIGMA SERIES	200W	□60	ϕ14
	MITSUBISHI ELECTRIC	MELSERVO SERIES	200W	□60	
	SANYO DENKI	SANMOTIONQ1 SERIES	200W	□60	
RC	5 PHASE STEPPING MOTOR		—	□60	ϕ8

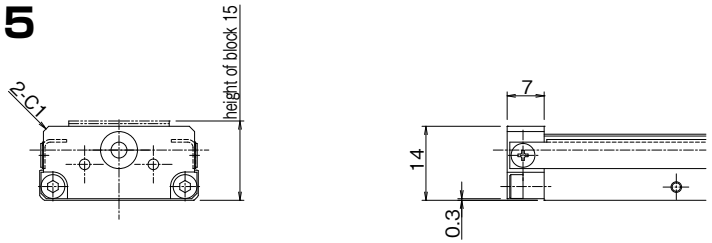
Please contact NB for other stepper motors.

Return pulley units is available for sizes other than BG33 and BG46. Please contact NB.

LOW HOUSING

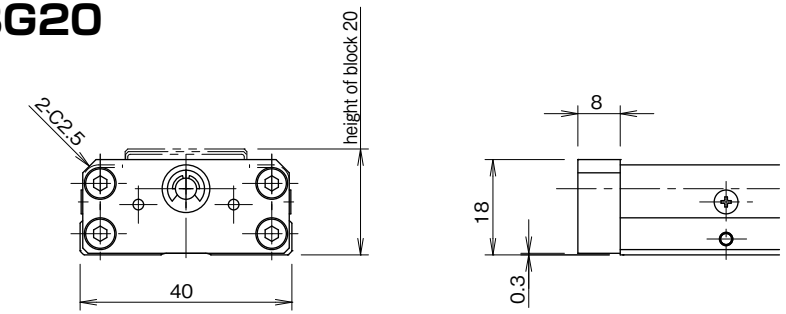
NB provides low housing with actuators. The height of housing is lower than the block. When the length of work is longer than the block, mounted with standatad housing, the housing contact works. It is recommended to take low housing when long work is mounted.
Please note that the height of motor bracket cannot be lower any more.

BG15



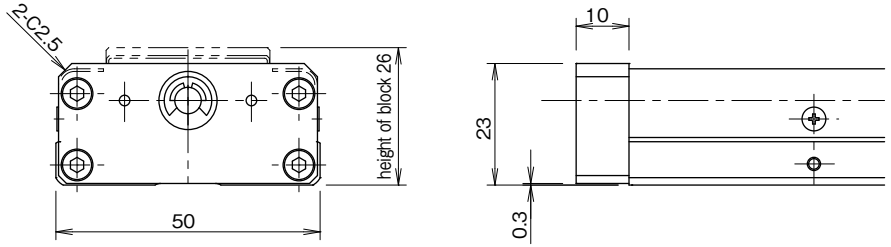
・Mass is 0.005Kg less than the mass on page H-14.

BG20



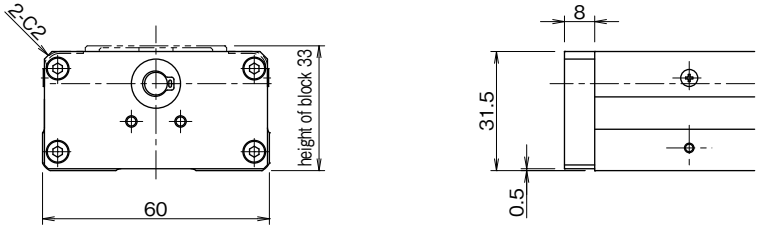
・Mass is 0.01Kg less than the mass on page H-16.

BG26



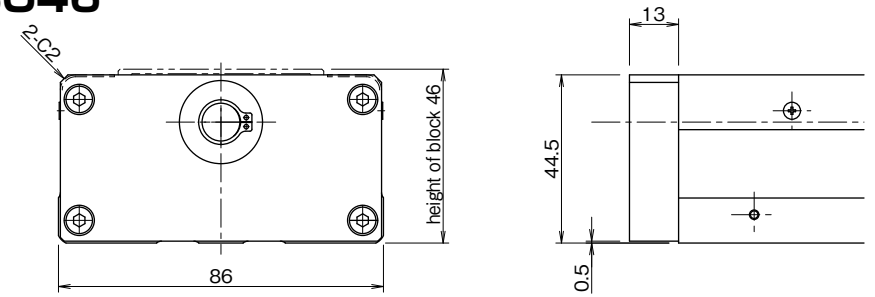
・Mass is 0.02Kg less than the mass on page H-18.

BG33



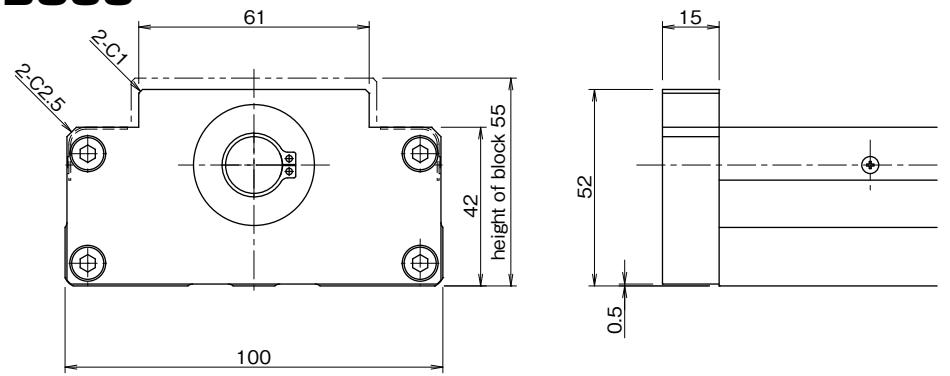
・Mass is 0.02Kg less than the mass on page P.H-20,22.

BG46



・Mass is 0.05Kg less than the mass on page P.H-24,26.

BG55



・Mass is 0.1Kg less than the mass on page P.H-28.

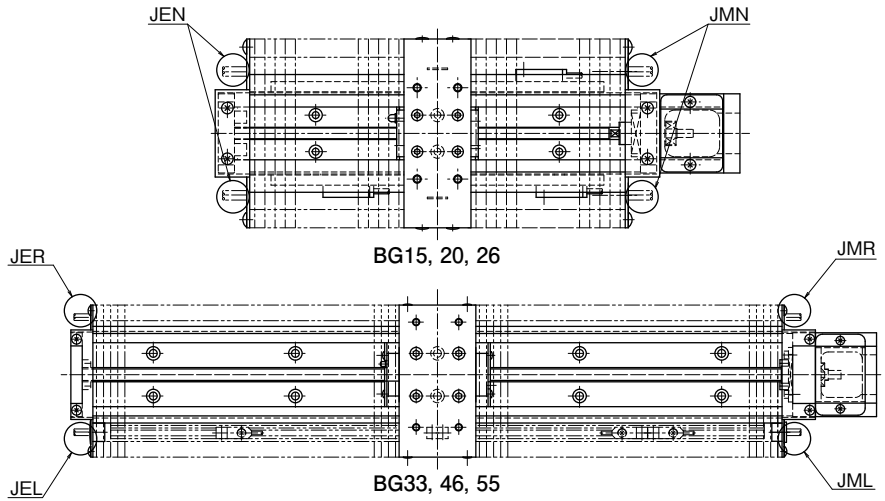
BELLOWS

BG type can be specified with a cover or bellows for dust prevention. Bellows are securely fixed for various installation methods in positioning and directions. Sensor for bellows is limited to K (proximity sensor) type only, which is pre-installed at proper positions. Please pay attention to the stroke limit of BG with bellows that is shorter than the standard stroke limit.

－Position of Sensor Cable Outlet－

The positions of the outlet for sensor cables can be selected as Figure H-15 shows.

Figure H-15 Position of Sensor Cable Outlet



※ The above drawing shows the J*L position. The sensor rail is reversed for the J*R position.

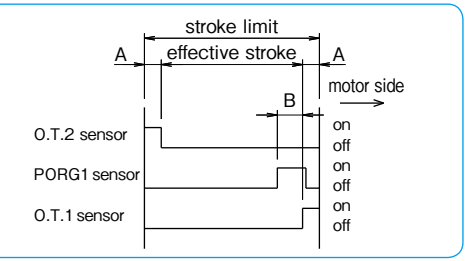
part number structure for bellows

1. J (for the first symbol)
2. Specification of the position of the sensor cable outlet
   Please select the motor side or the housing side.
   M: motor side E: housing side (end plate side)
3. Specification of the position of the sensor rail
   Please select the right hand or the left hand.
   R: on the right from the motor side
   L: on the left from the motor side
   ※N for BG15, 20, and 26 since the sensors are mounted on both the right and left hand.
4. JNN for without sensors
5. Sensor type is K (proximity sensor) type only (APM-D3 series: YAMATAKE CORPORATION).

－Sensor Timing Chart－

The following chart shows the standard sensor arrangement.

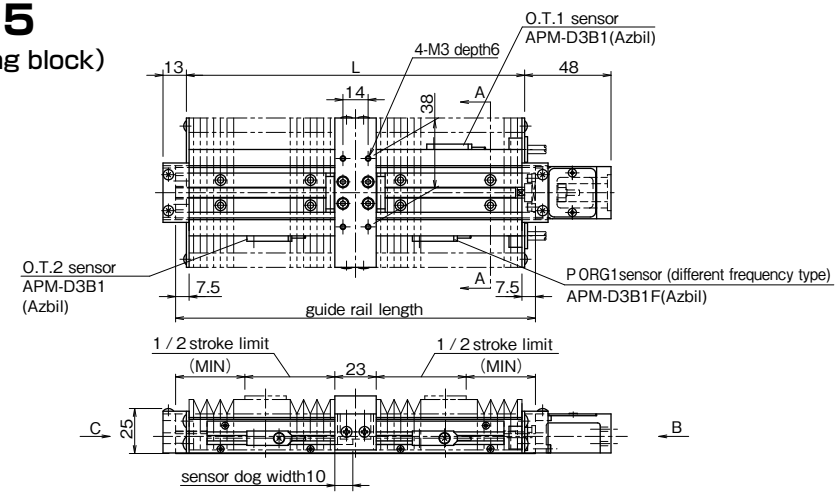
Figure H-16 Sensor Timing Chart



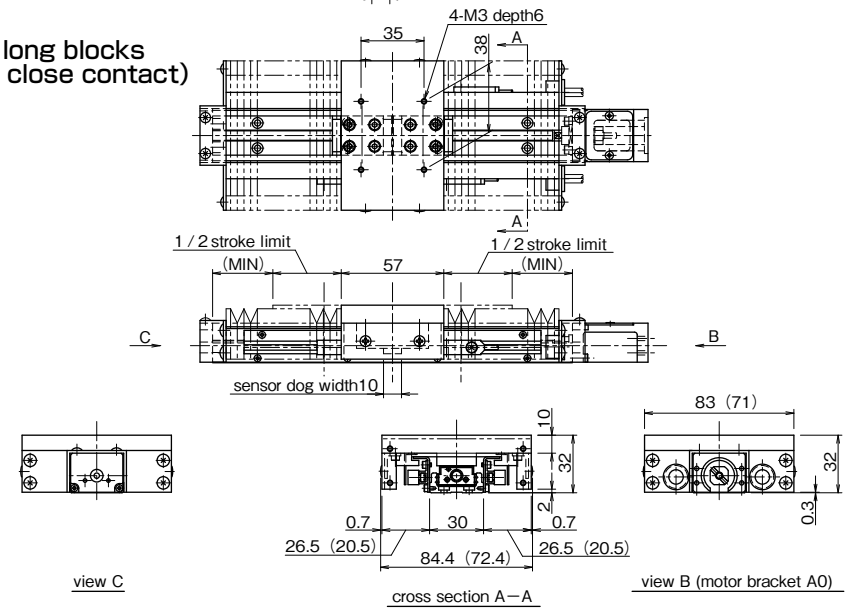
part number	A	B
BG15	5	8
BG20	5	8
BG26	5	13
BG33	10	13
BG46	10	13
BG55	10	13

BG15

A(1 long block)



B(2 long blocks in close contact)



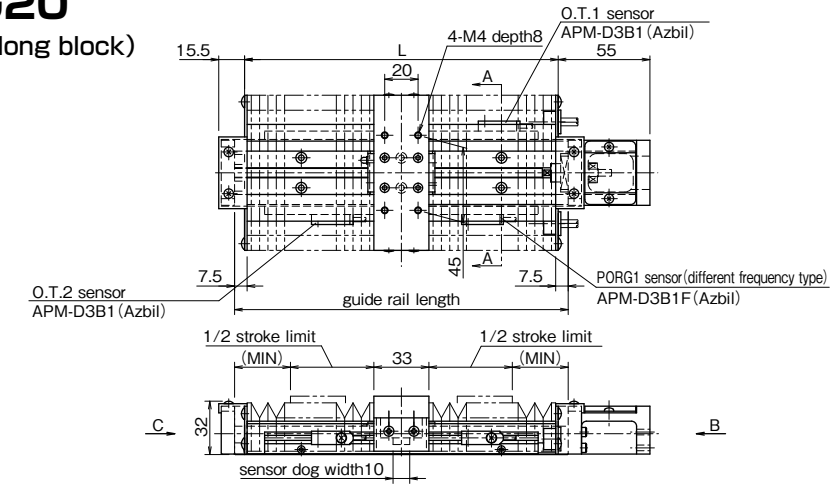
1.The drawings show the "JMN" configuration.
2.The numbers in the parentheses are the dimensions when sensors are not selected.
3.Please refer to page H-14 for dimensions that are not shown on the drawings.
4.material of bellows: composite resin sheet (black)

rail length	L	1 long block			2 long blocks		
		stroke limit	effective stroke	MIN	stroke limit	effective stroke	MIN
75	–	–	–	–	–	–	–
100	–	–	–	–	–	–	–
125	113	43	33	29.5	–	–	–
150※	138	60	50	33.5	40	30	26.5
175	163	85	75	33.5	59	49	29.5
200	188	100	90	38.5	76	60	33.5

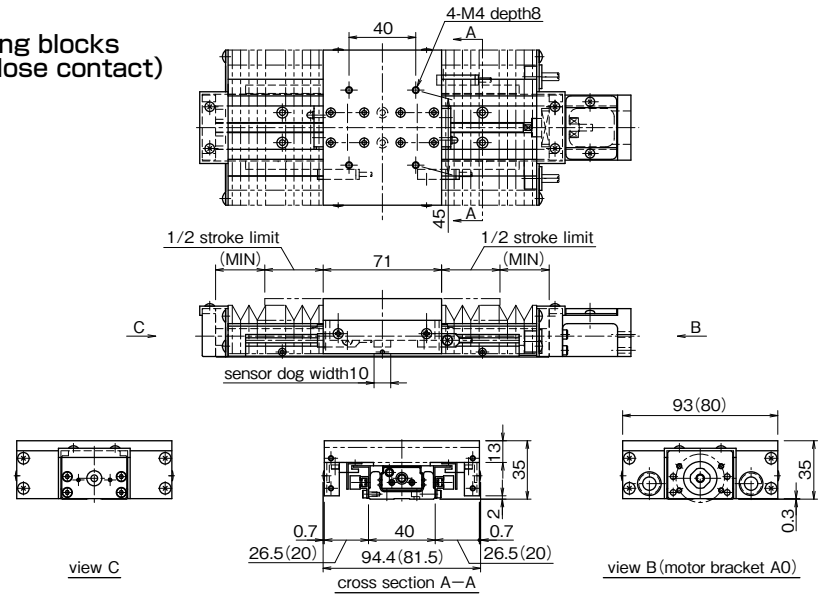
※ The rail mounting holes at the center cannot be used for the rail length 150 with two long blocks.

BG20

A(1 long block)



B(2 long blocks in close contact)



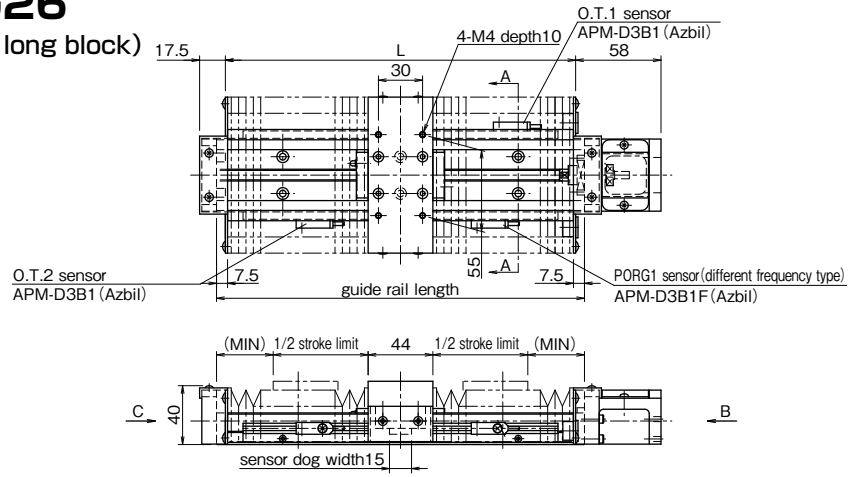
1. The drawings show the "JMN" configuration.
2. The numbers in the parentheses are the dimensions when sensors are not selected.
3. Please refer to page H-16 for dimensions that are not shown on the drawings.
4. material of bellows: composite resin sheet (black)

rail length	L	1 long block			2 long blocks		
		stroke limit	effective stroke	MIN	stroke limit	effective stroke	MIN
100	—	—	—	—	—	—	—
150※	138	58	48	29.5	32	22	23.5
200	188	100	90	33.5	70	60	29.5

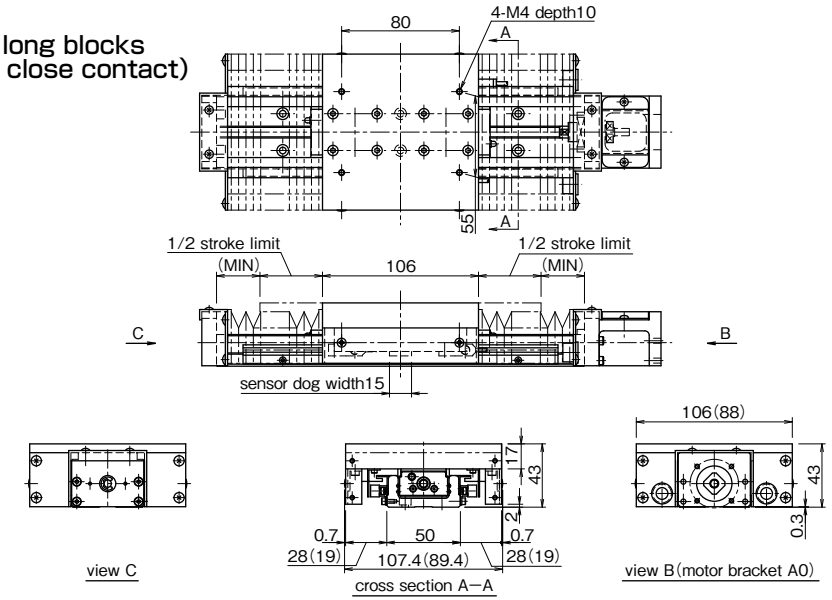
※The rail mounting holes at the center cannot be used for the rail length 150 with two long blocks.

BG26

A(1 long block)



B(2 long blocks in close contact)



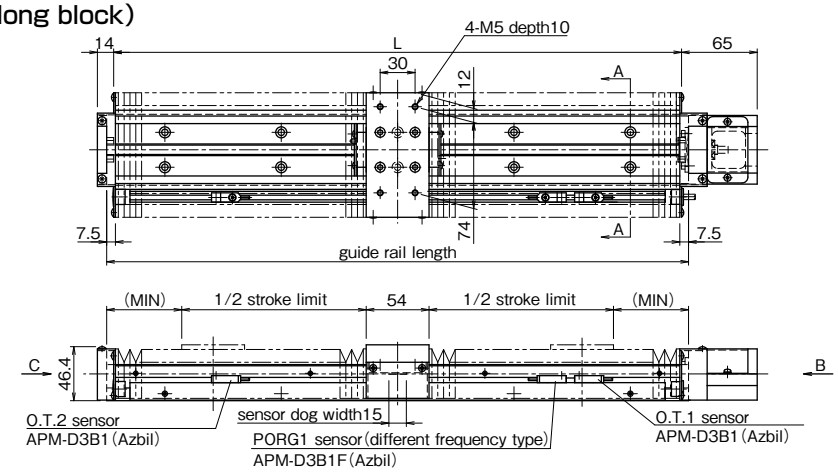
1. The drawings show the "JMN" configuration.
2. The numbers in the parentheses are the dimensions when sensors are not selected.
3. Please refer to page H-18 for dimensions that are not shown on the drawings.
4. material of bellows: composite resin sheet (black)

rail length	L	1 long block			2 long blocks		
		stroke limit	effective stroke	MIN	stroke limit	effective stroke	MIN
150	138	53	43	26.5	—	—	—
200※	188	97	87	29.5	41	31	26.5
250	238	129	119	38.5	85	75	29.5
300	288	169	159	43.5	127	117	33.5

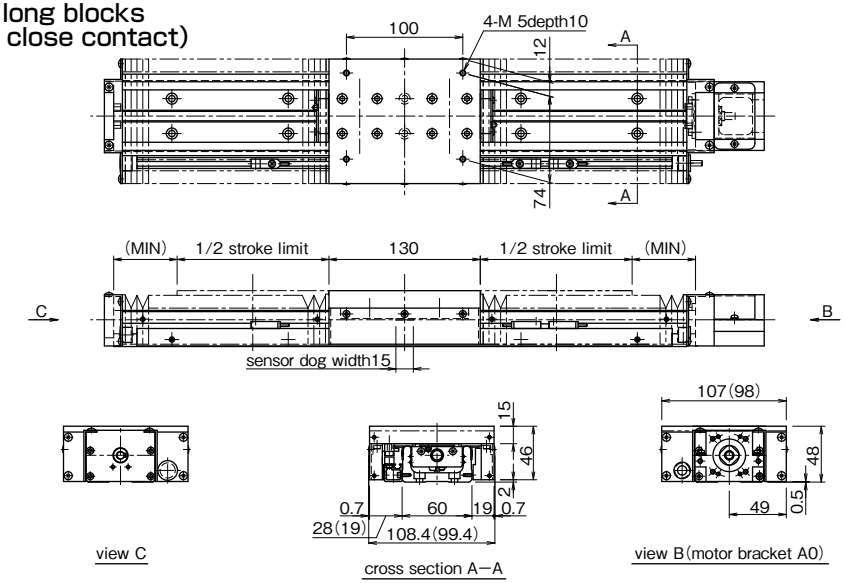
※The rail mounting holes at the center cannot be used for the rail length 200 with two long blocks.

BG33

A(1 long block)



B(2 long blocks in close contact)



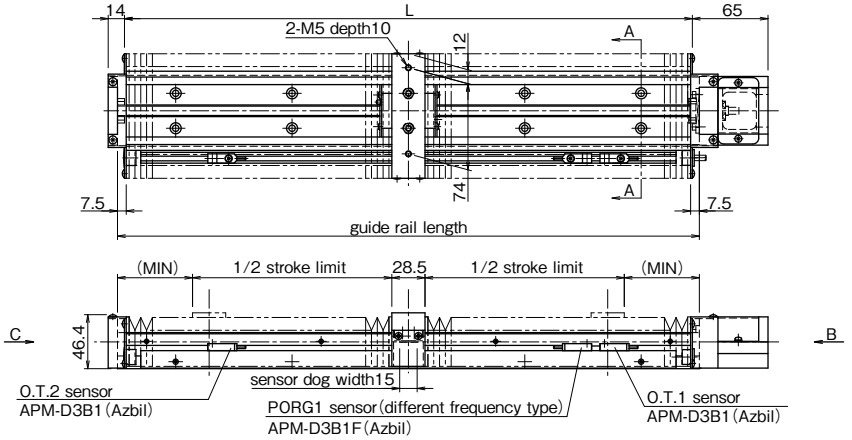
1. The drawings show the "JML" configuration. The cross sections become reversed when "J*R" is selected.
2. The numbers in the parentheses are the dimensions when sensors are not selected.
3. Please refer to page H-20 for dimensions that are not shown on the drawings.
4. material of bellows: composite resin sheet (black)

rail length	L	1 long block			2 long blocks		
		stroke limit	effective stroke	MIN	stroke limit	effective stroke	MIN
150	—	—	—	—	—	—	—
200	188	79	59	33.5	—	—	—
300※	288	159	139	43.5	103	83	33.5
400	388	237	217	54.5	183	163	43.5
500	488	317	297	64.5	261	241	54.5
600	588	395	375	75.5	341	321	64.5

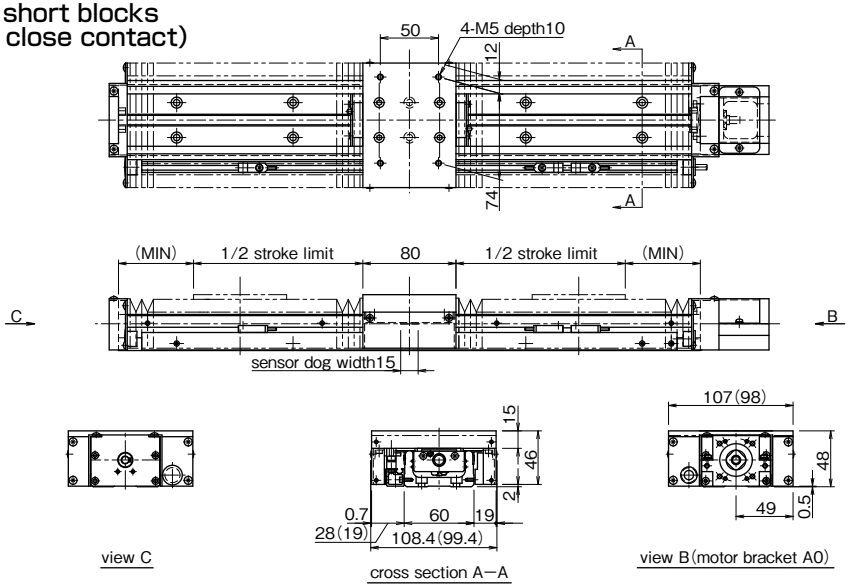
※The rail mounting holes at the center cannot be used for the rail length 300 with two long blocks.

BG33

C(1 short block)



D(2 short blocks in close contact)

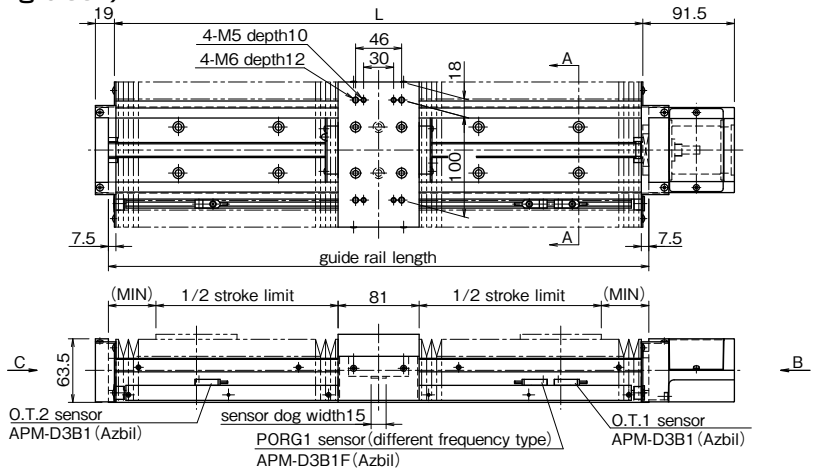


1. The drawings show the "JML" configuration. The cross sections become reversed when "J*R" is selected.
2. The numbers in the parentheses are the dimensions when sensors are not selected.
3. Please refer to page H-22 for dimensions that are not shown on the drawings.
4. material of bellows: composite resin sheet (black)

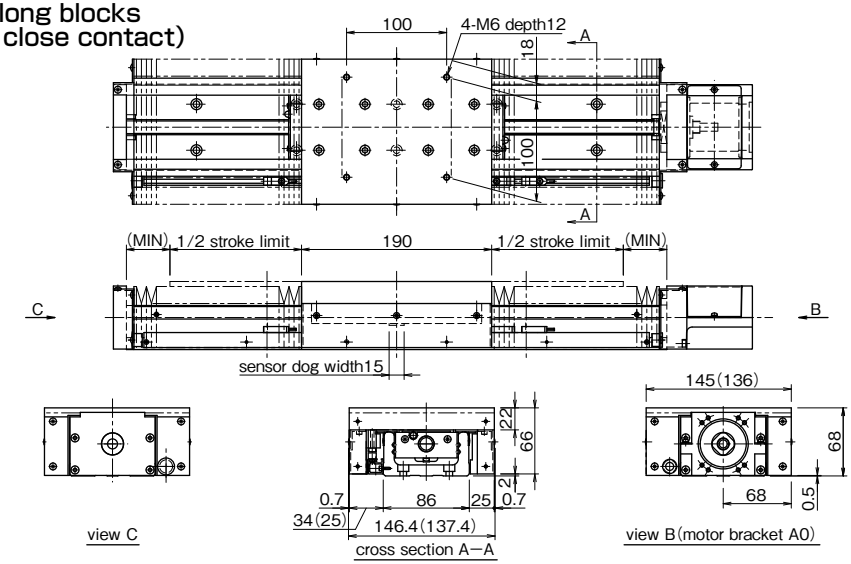
rail length	L	1 short block			2 short blocks		
		stroke limit	effective stroke	MIN	stroke limit	effective stroke	MIN
150	138	68.5	48.5	26.5	—	—	—
200	188	104.5	84.5	33.5	67	47	26.5
300	288	184.5	164.5	43.5	143	123	38.5
400	388	262.5	242.5	54.5	211	191	54.5
500	488	342.5	322.5	64.5	291	271	64.5
600	588	404.5	384.5	83.5	369	349	75.5

BG46

A(1 long block)



B(2 long blocks in close contact)



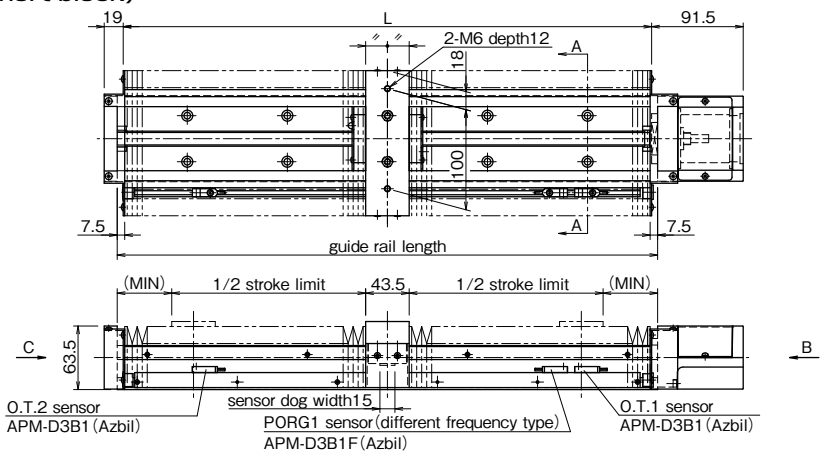
1. The drawings show the "JML" configuration. The cross sections become reversed when "J*R" is selected.
2. The numbers in the parentheses are the dimensions when sensors are not selected.
3. Please refer to page H-24 for dimensions that are not shown on the drawings.
4. material of bellows: composite resin sheet (black)

rail length	L	1 long block			2 long blocks		
		stroke limit	effective stroke	MIN	stroke limit	effective stroke	MIN
340※	328	192	172	33.5	97	77	26.5
440	428	272	252	43.5	183	163	33.5
540	528	364	344	47.5	263	243	43.5
640	628	450	430	54.5	355	335	47.5
740	728	530	510	64.5	441	421	54.5
840	828	608	588	75.5	521	501	64.5
940	928	686	666	86.5	599	579	75.5
1,040	1,028	774	754	92.5	677	657	86.5
1,140	1,128	866	846	96.5	765	745	92.5
1,240	1,228	944	924	107.5	857	837	96.5

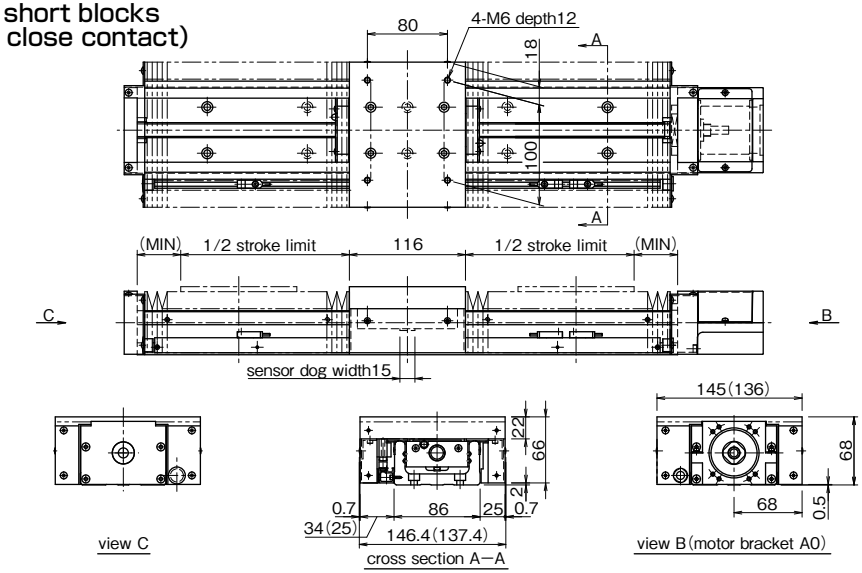
※The rail mounting holes at the center cannot be used for the rail length 340 with two short or long blocks.

BG46

C(1 short block)



D(2 short blocks in close contact)



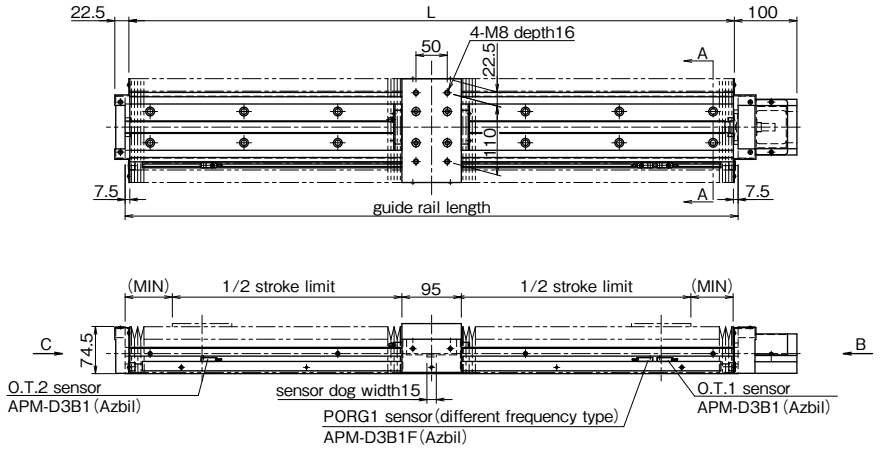
1. The drawings show the "JML" configuration. The cross sections become reversed when "J*R" is selected.
2. The numbers in the parentheses are the dimensions when sensors are not selected.
3. Please refer to page H-26 for dimensions that are not shown on the drawings.
4. material of bellows: composite resin sheet (black)

rail length	L	1 short block			2 short blocks		
		stroke limit	effective stroke	MIN	stroke limit	effective stroke	MIN
340※	328	219.5	199.5	38.5	165	145	29.5
440	428	309.5	289.5	43.5	247	227	38.5
540	528	387.5	367.5	54.5	337	317	43.5
640	628	467.5	447.5	64.5	415	395	54.5
740	728	545.5	525.5	75.5	495	475	64.5
840	828	645.5	625.5	75.5	573	553	75.5
940	928	723.5	703.5	86.5	651	631	86.5
1,040	1,028	803.5	783.5	96.5	751	731	86.5
1,140	1,128	881.5	861.5	107.5	831	811	96.5
1,240	1,228	981.5	961.5	107.5	909	889	107.5

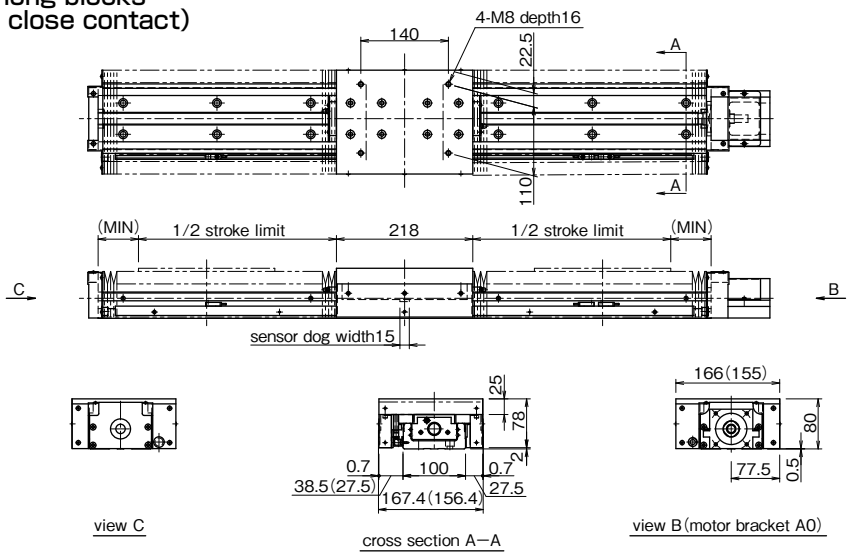
※The rail mounting holes at the center cannot be used for the rail length 340 with two short or long blocks.

BG55

A(1 long block)



B(2 long blocks in close contact)



1. The drawings show the "JML" configuration. The cross sections become reversed when "J*R" is selected.
2. The numbers in the parentheses are the dimensions when sensors are not selected.
3. Please refer to page H-28 for dimensions that are not shown on the drawings.
4. material of bellows: composite resin sheet (black)

rail length	L	1 long block			2 long blocks		
		stroke limit	effective stroke	MIN	stroke limit	effective stroke	MIN
980	968	734	714	75.5	633	613	64.5
1,080	1,068	812	792	86.5	711	691	75.5
1,180	1,168	912	892	86.5	789	769	86.5
1,280	1,268	992	972	96.5	889	869	86.5
1,380	1,368	1,070	1,050	107.5	969	949	96.5

SENSOR

Photomicro sensor or proximity sensor can be attached to the BG actuator with our optional sensor-mounting rail (the same length as the guide rail length). Tapped holes are machined on both sides of the guide rail, allowing attachment of sensor to either side. Standard positioning (without special instruction from customer) would be to the left of the motor mount end. Sensor option includes the items that are listed below.
Three types of sensor rail are available. (see Figure H-17) For details, please refer to page H-59 ~ H-69.
Depending on sizes, some sensor rail are not available.

Table H-12 NPN Sensor

sensor code	sensor type	BG15	BG20	BG26	BG33	BG46	BG55
S	slim/compact type photomicro sensor	———	PM-L24 [3pcs]※1 (SUNX)		EE-SX674 [3pcs]※2 (OMRON)		
H	close contact capable photomicro sensor	———			EE-SX671 [3pcs]※2 (OMRON)		
K	proximity sensor (N.C.contact)※3	APM-D3B1 [2pcs]※1 APM-D3B1F [1pcs]※1※4 (Azbil)					

※1 : length of cable: 1m
※2 : 3 pcs of sensor connector will be attached
※3 : normal close contact
※4 : different frequency type

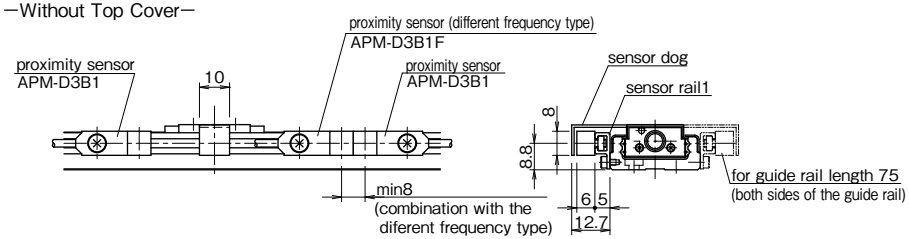
Figure H-17 Sensor rail

sensor rail No. / part number	sensor rail1	sensor rail2	sensor rail3
BG15	○	×	×
BG20	○	×	×
BG26	○	×	×
BG33	○	○	○
BG46	○	○	○
BG55	○	○	○

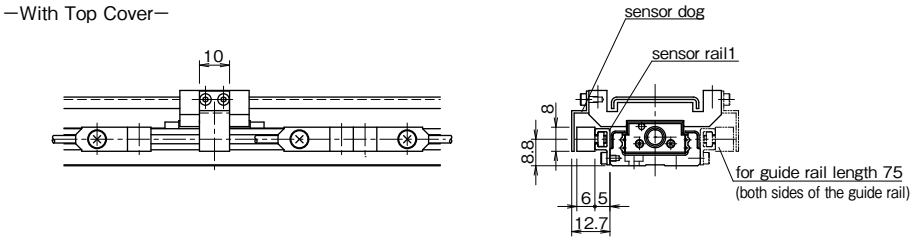
BG15

K Specification (Proximity Sensor)

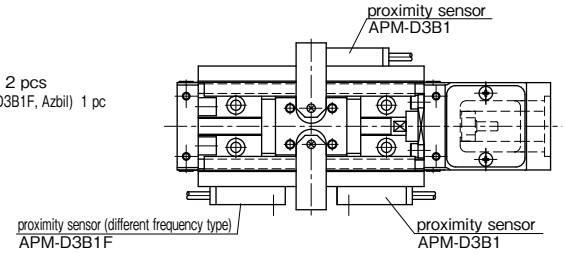
—Without Top Cover—



—With Top Cover—



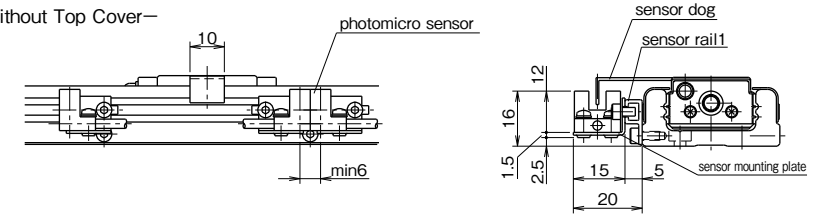
accessories
proximity sensor (APM-D3B1, Azbil) 2 pcs
proximity sensor (different frequency type)(APM-D3B1F, Azbil) 1 pc
sensor rail 1 pc
sensor dog 1 pc
*2 pcs of sensor dogs for BG15A-75
(refer to the figure on the right.)



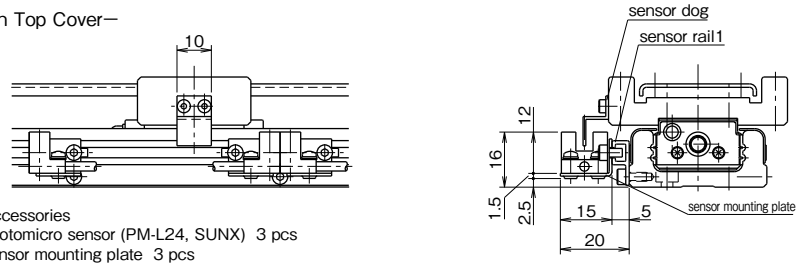
BG20

S Specification (Compact Photomicro Sensor)

—Without Top Cover—



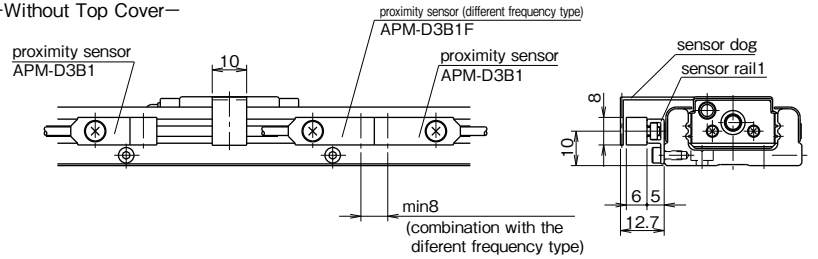
—With Top Cover—



Accessories
photomicro sensor (PM-L24, SUNX) 3 pcs
sensor mounting plate 3 pcs
sensor rail 1 pc
sensor dog 1 pc

K Specification (Proximity Sensor)

—Without Top Cover—



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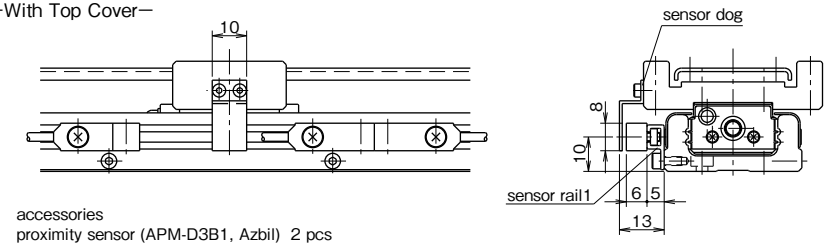
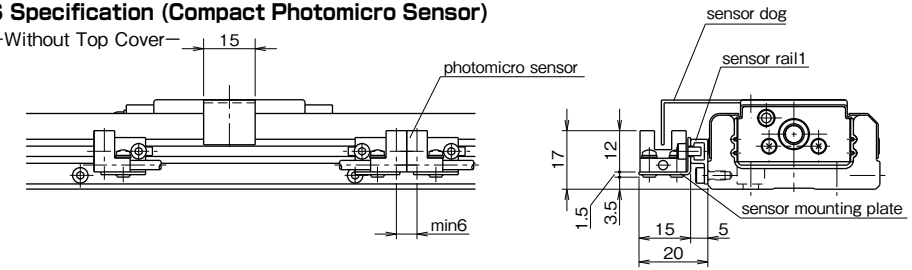


accessories
proximity sensor (APM-D3B1, Azbil) 2 pcs
proximity sensor (different frequency type)(APM-D3B1F, Azbil) 1 pc
sensor rail 1 pc
sensor dog 1 pc

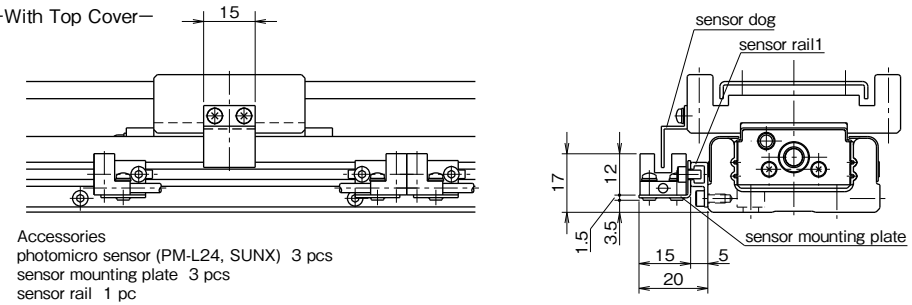
BG26

S Specification (Compact Photomicro Sensor)

—Without Top Cover—



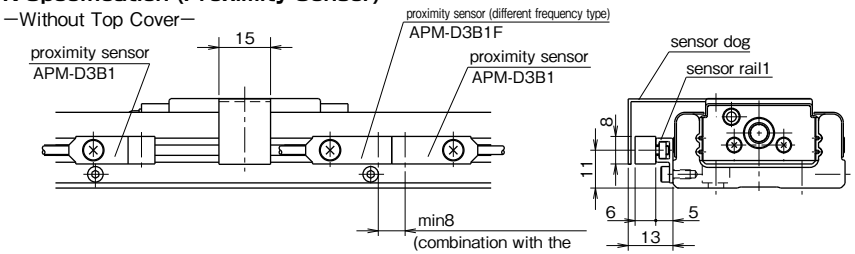
—With Top Cover—



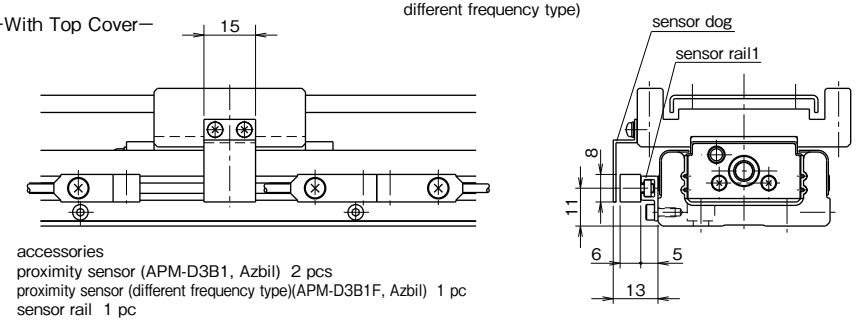
Accessories
photomicro sensor (PM-L24, SUNX) 3 pcs
sensor mounting plate 3 pcs
sensor rail 1 pc
sensor dog 1 pc

K Specification (Proximity Sensor)

—Without Top Cover—



—With Top Cover—

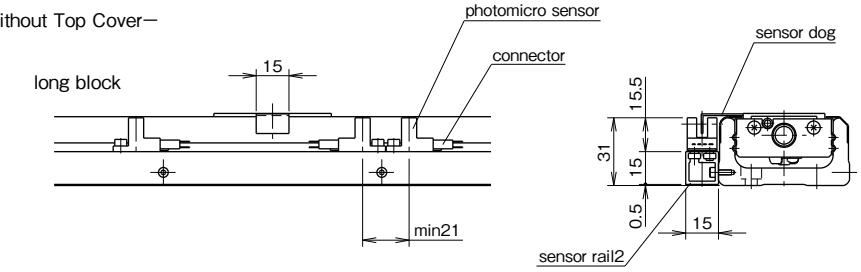


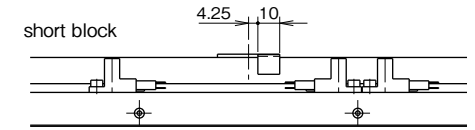
accessories
proximity sensor (APM-D3B1, Azbil) 2 pcs
proximity sensor (different frequency type)(APM-D3B1F, Azbil) 1 pc
sensor rail 1 pc
sensor dog 1 pc

BG33

S Specification (Slim-Type Photomicro Sensor)

—Without Top Cover—





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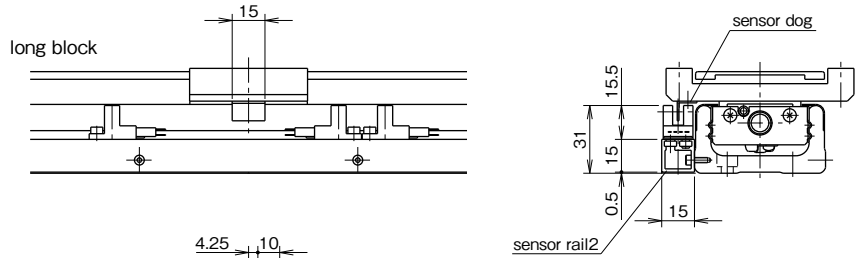
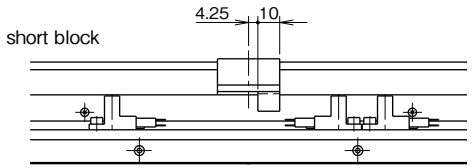


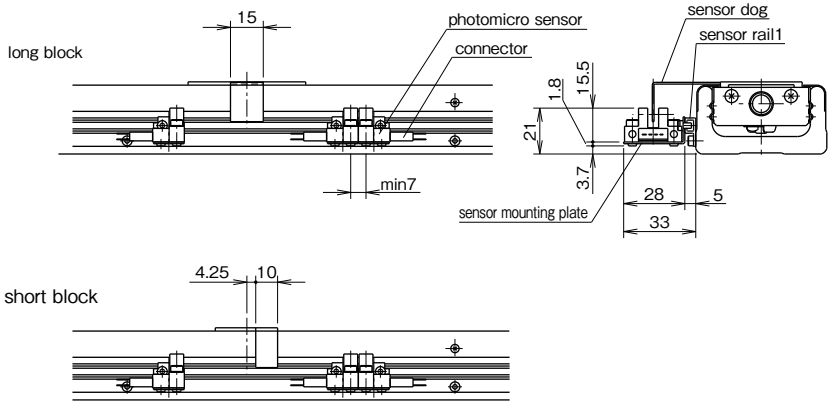


accessories
photomicro sensor (EE-SX674, OMRON) 3 pcs
connector (EE-1001, OMRON) 3 pcs
sensor rail 1 pc
sensor dog *1 pc
* 2 pcs for BG33D-150.

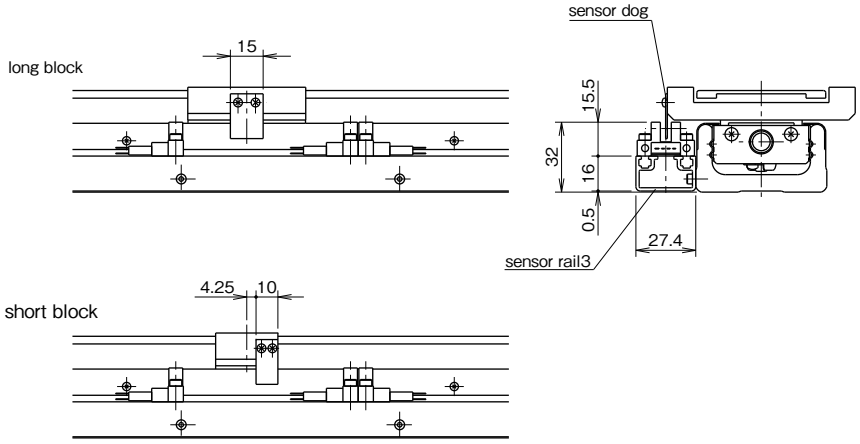
BG33

H Specification (Close Contact Capable Photomicro Sensor)

—Without Top Cover—



—With Top Cover—

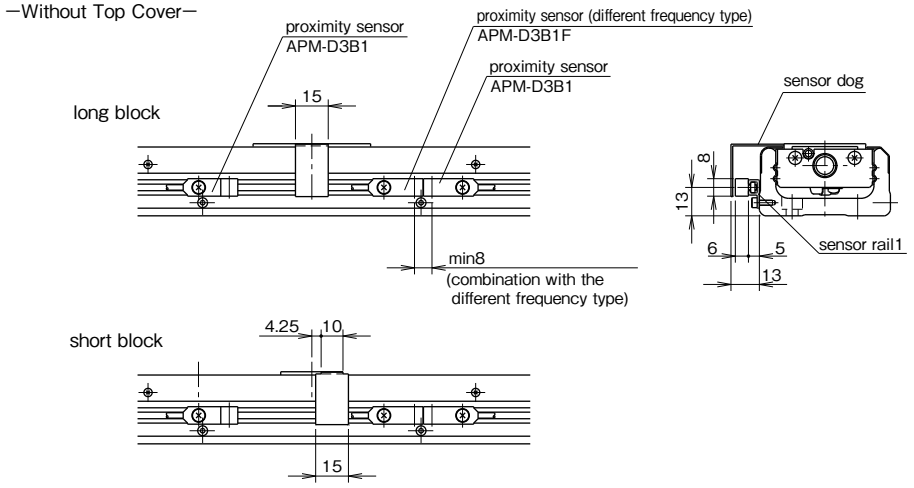


accessories
photomicro sensor (EE-SX671, OMRON) 3 pcs
connector (EE-1001, OMRON) 3 pcs
sensor mounting plate (only for the without cover type) 3 pcs
sensor rail 1 pc
sensor dog *1 pcs
* 2 pcs for BG33D-150.

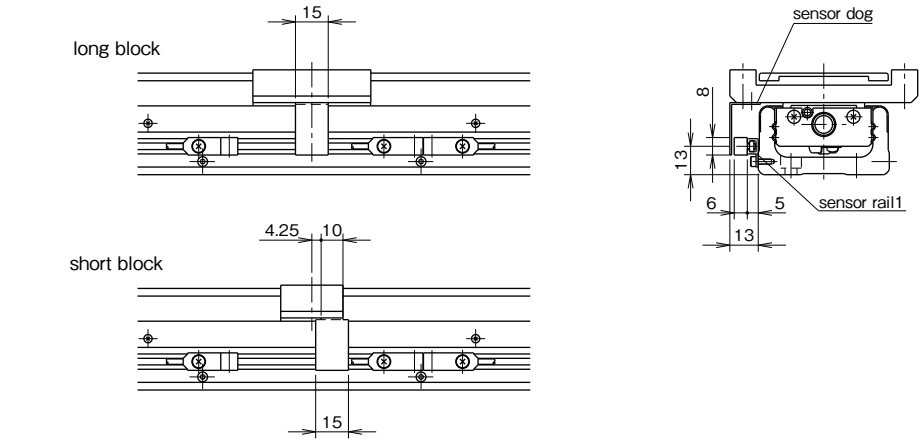
BG33

K Specification (Proximity Sensor)

—Without Top Cover—



—With Top Cover—

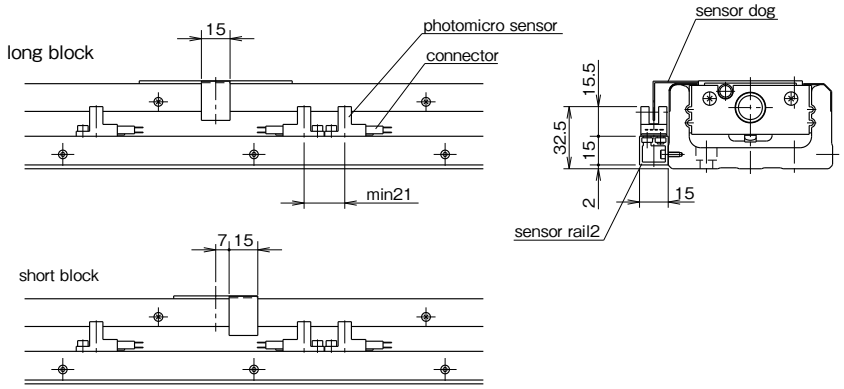


accessories
proximity sensor (APM-D3B1, Azbil) 2 pcs
proximity sensor (different frequency type)(APM-D3B1F, Azbil) 1 pc
sensor rail 1 pc
sensor dog *1 pcs
* 2 pcs for BG33D-150.

BG46

S Specification (Slim-Type Photomicro Sensor)

—Without Top Cover—



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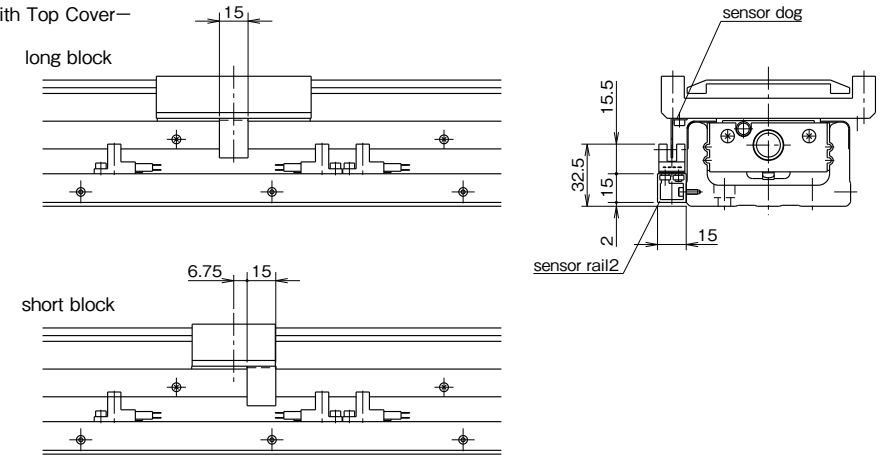
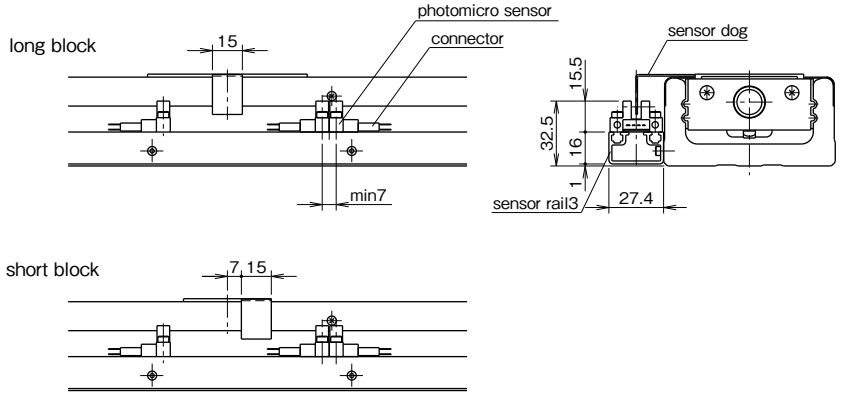


accessories
photomicro sensor (EE-SX674, OMRON) 3 pcs
connector (EE-1001, OMRON) 3 pcs
sensor rail 1 pc
sensor dog 1 pc

BG46

H Specification (Close Contact Capable Photomicro Sensor)

—Without Top Cover—



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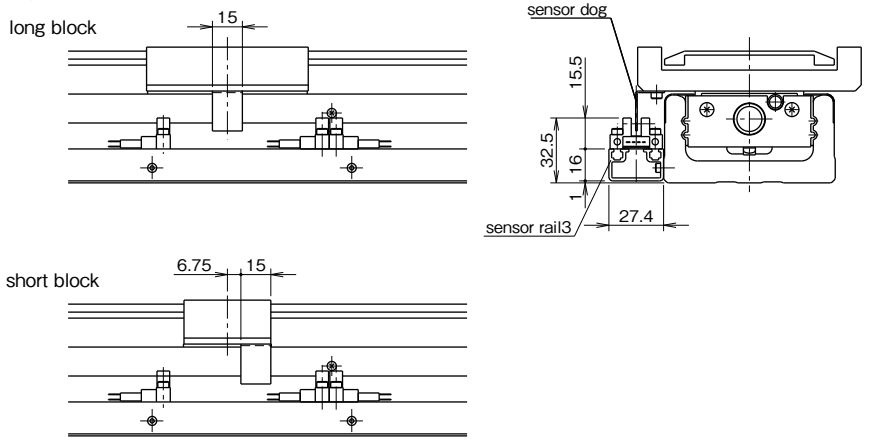
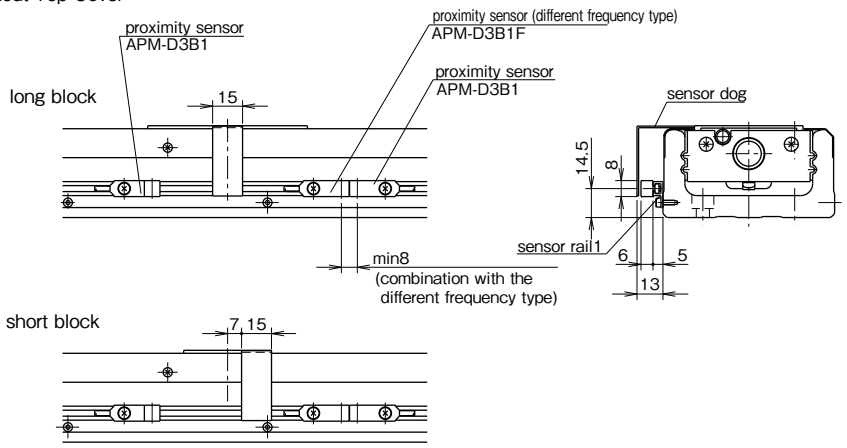


accessories
photomicro sensor (EE-SX671, OMRON) 3 pcs
connector (EE-1001, OMRON) 3 pcs
sensor rail 1 pc
sensor dog 1 pc

BG46

K Specification (Proximity Sensor)

—Without Top Cover—



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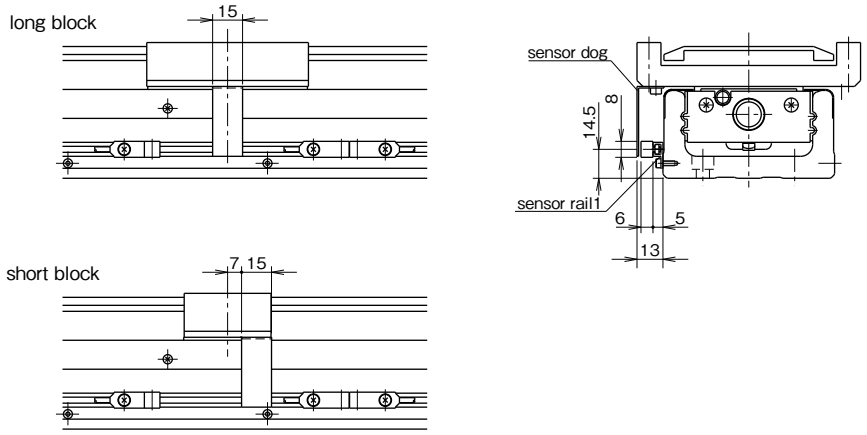
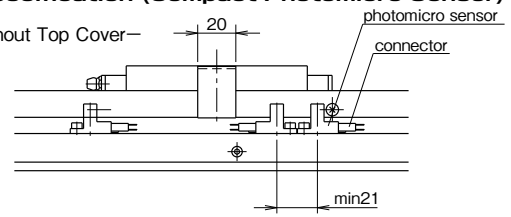


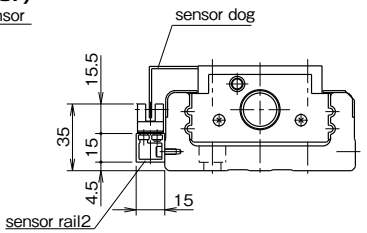
accessories
proximity sensor (APM-D3B1, Azbil) 2 pcs
proximity sensor (different frequency type)(APM-D3B1F, Azbil) 1 pc
sensor rail 1 pc
sensor dog 1 pc

BG55

S Specification (Compact Photomicro Sensor)

—Without Top Cover—





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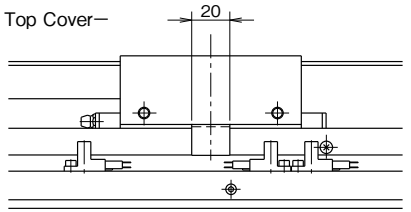
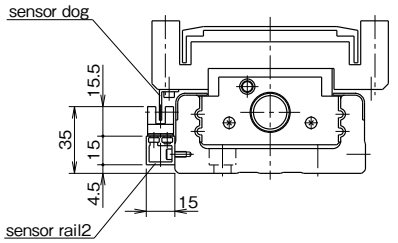
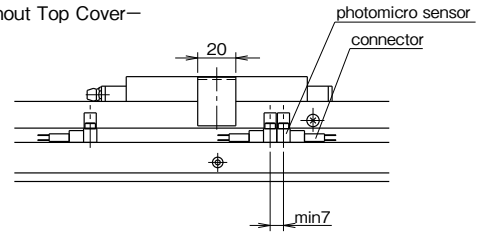


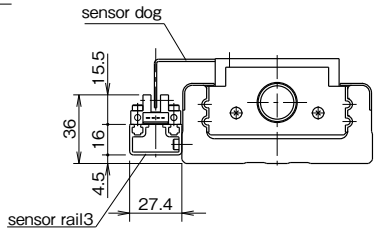


accessories
photomicro sensor (EE-SX674, OMRON) 3 pcs
connector (EE-1001, OMRON) 3 pcs
sensor rail 1 pc
sensor dog 1 pc

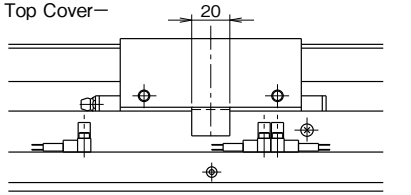
H Specification (Close Contact Capable Photomicro Sensor)

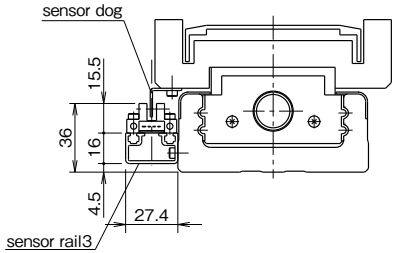
—Without Top Cover—





—With Top Cover—

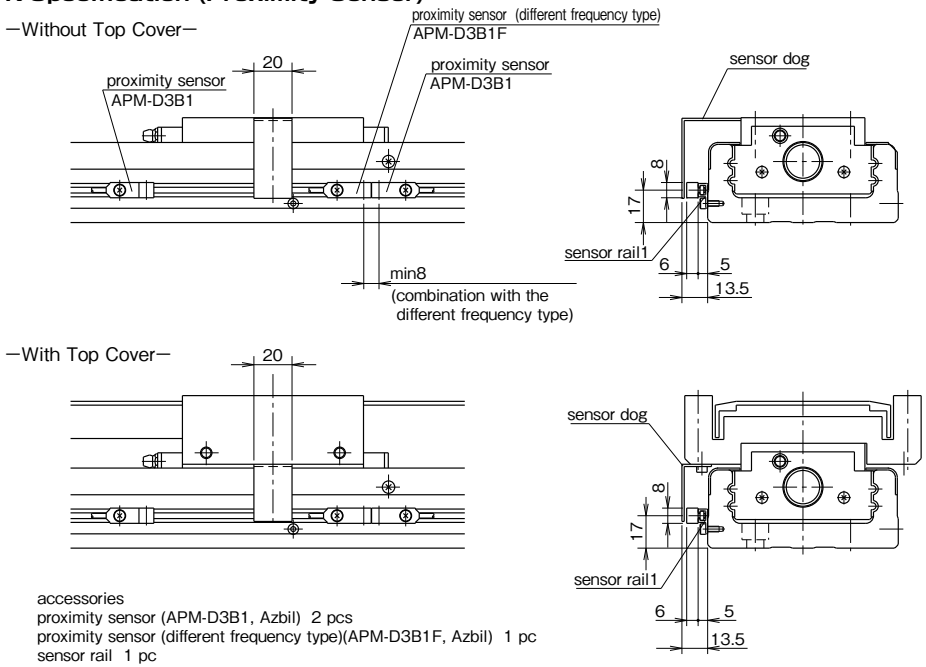




accessories
photomicro sensor (EE-SX671, OMRON) 3 pcs
connector (EE-1001, OMRON) 3 pcs
sensor rail 1 pc
sensor dog 1 pc

BG55

K Specification (Proximity Sensor)



accessories
proximity sensor (APM-D3B1, Azbil) 2 pcs
proximity sensor (different frequency type)(APM-D3B1F, Azbil) 1 pc
sensor rail 1 pc
sensor dog 1 pc

PNP SENSOR

For the BG type sensors can be changed to the PNP type by adding a sensor option code “PNP” at the end of the part number.
Refer to Table H-12 for the model number of PNP type sensors.

Table H-13 PNP Sensor Type

sensor code	sensor type	BG15	BG20	BG26	BG33	BG46	BG55
S	slim/compact type photomicro sensor	———	PM-L24 P [3pcs] ※1 (SUNX)		EE-SX674P [3pcs] ※2		
H	close contact capable photomicro sensor	———			EE-SX671P [3pcs] ※2 (OMRON)		
K	proximity sensor (N.C. contact) ※3	APM-D3E1 [2pcs] ※1 APM-D3E1F [1pcs] ※1※4 (Azbil)					

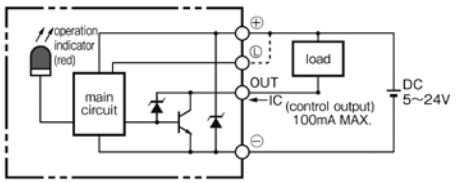
※ 1 : length of cable: 1m
※ 2 : 3 pcs of sensor connector will be attached
※ 3 : normal close contact
※ 4 : different frequency type

SENSOR SPECIFICATIONS

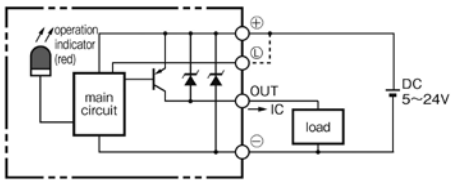
slim-type, close contact capable photomicro sensor (symbol: S,H)/ OMRON CORPORATION

type	NPN TYPE	EE-SX674	EE-SX671
	PNP TYPE	EE-SX674P	EE-SX671P
sensing distance		5mm (slot width)	
standard sensing object		opaque: 2×0.8mm min.	
differential travel		0.025mm	
power supply voltage		5 to 24 VDC ±10%, ripple(P-P): 10% max.	
current consumption		12mA max. (NPN), 12 mA max.(PNP)	
control output	NPN TYPE	NPN open collector output models: At 5 to 24 VDC: 100-mA load current (Ic) with a residual voltage of 0.8V max.40-mA load current (Ic) with a residual voltage of 0.4V max.	
	PNP TYPE	PNP open collector output models: At 5 to 24 VDC: 50-mA load current (Ic) with a residual voltage of 1.3V max.	
output operation		Dark-On (+, L terminal open-circuit), Light-On (+, L terminal short-cuircuit)	
response frequency		1kHz max. (3kHz average)	
operation indicater		operation indicator (red) lit with incident	
ambient illumination (on receiver lens)		fluorescent light: 1000 ℓx max.	
ambient temperature		operating: -25 to 55℃ storage: -30 to 80℃	
ambient humidity		operating: 5 to 85%RH storage: 5 to 95%RH	
vibration resistance		destruction: 20 to 2000Hz, (with a peak acceleration of 100m/s^2) 1.5mm double amplitude for 2hrs (with 4-minute cycles) each in X,Y, and Z directions	
shock resistance		destruction: 500m/s^2 for 3 times each in X,Y, and Z directions	
degree of protection		IEC60529 IP50	
connection method		connector type (direct soldering possible)	
weight		approx. 3g	
material	case	Polybutylene telephthalate (PBT)	
	cover	Polycarbonate (PC)	
	emitter/receiver		

NPN TYPE
CIRCUIT DIAGRAM



PNPTYPE
CIRCUIT DIAGRAM

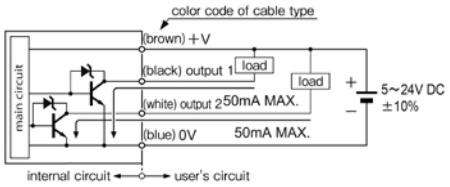


Please read the specifications and precautions of the manufacture's catalog.

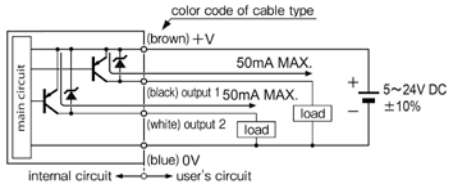
compact photomicro sensor (symbol: S)/ Panasonic Electric Works SUNX Co.,Ltd.

type	NPN TYPE	PM-L24
	PNP TYPE	PM-L24P
sensing range		5mm (fixed)
minimum sensing object		0.8×1.8mm min. opaque
hysteresis		0.05mm or less
repeatability		0.03mm or less
supply voltage		5 to 24 VDC ±10%, ripple(P-P) 10% or less
current consumption		15mA or less
output	NPN TYPE	NPN open-collector transistor maximum sink current: 50mA, applied voltage: 30VDC 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 TYPE	PNP open-collector transistor maximum source current: 50mA, applied voltage: 30VDC or less (between output and +V) 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: 20μs or less under light interrupted condition: 100μs or less (response frequency: 1kHz or more)
operation indicater		vermilion LED (lights up under light received condition)
ambient illuminance		fluorescent light: 1000ℓx at the light-receiving face
ambient temperature		operating: -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 togeter and enclosure
vibration resistance		10 to 2,000Hz frequency, 1.5mm amplitude in X, Y, and Z directions for two hours each
shock resistance		15,000m/s² acceleration (1,500 G approx.) in X, Y, and Z directions for three times each
cable		0.09mm² 4-core cabtyre cable 1m long
weight		approx. 10g
material	case	Polybutylene telephthalate (PBT)
	cover	Polycarbonate

NPN TYPE
CIRCUIT DIAGRAM



PNP TYPE
CIRCUIT DIAGRAM

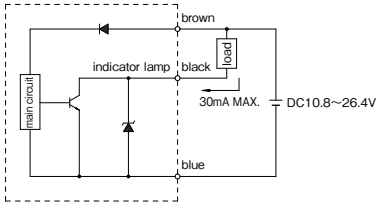


Please read the specifications and precautions of the manufacture's catalog.

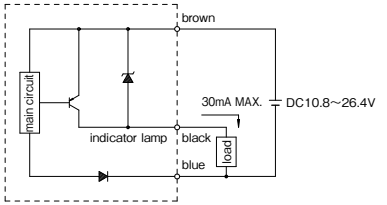
proximity sensor (symbol: K)/ Azbil CORPORATION

type	NPN TYPE	APM-D3B1,APM-D3B1F(different-frequency type)
	PNP TYPE	APM-D3E1,APM-D3E1F(different-frequency type)
rated sensing distance		2.5mm±15%
standard target object		15×15mm, 1mm thick iron
differential travel		15% max. of sensing distance
rated supply voltage		12/24VDC
operating voltage range		10.8 to 26.4 VDC (ripple voltage 10% max.)
current consumption		10mA max.
control output	NPN TYPE	NPN transistor open collector switching current: 30mA max. (resistive load) voltage drop: 1V max. (switching current 30mA) output dielectric strength: 26.4V
	PNP TYPE	PNP transistor open collector switching current: 30mA max. (resistive load) voltage drop: 1V max. (switching current 30mA) output dielectric strength: 26.4V
operation mode		normally closed (N.C.)
operating frequency		120Hz
indicator lamps		lights (red) when object approaches
operating temperature range		-10 to 55℃ storage: -25 to 70℃
operating humidity range		35 to 85% RH
ambient illumination(on receiver lens)		fluorescent light: 1000lxmax.
dielectric strength		1000V AC (50/60Hz) for one min. between case and electrically live metals
insulation resistance		50MΩ min. (by 500V DC megger)
vibration resistance		10 to 55Hz, 1.5mm peak-to-peak amplitude, 2hrs in X, Y, and Z directions
voltage withstandability		1000V AC(50/60Hz) for one min. between all supply terminals connected together and enclosure
insulation resistance		50MΩ, or more(with 500V DC megger)
shock resistance		500m/s² 3 times in Y,Y, and Z directions
protection		IP67 (IEC 529)
weight		approx. 10g (only mass: 1m cable is attached)

NPN TYPE
CIRCUIT DIAGRAM



PNP TYPE
CIRCUIT DIAGRAM

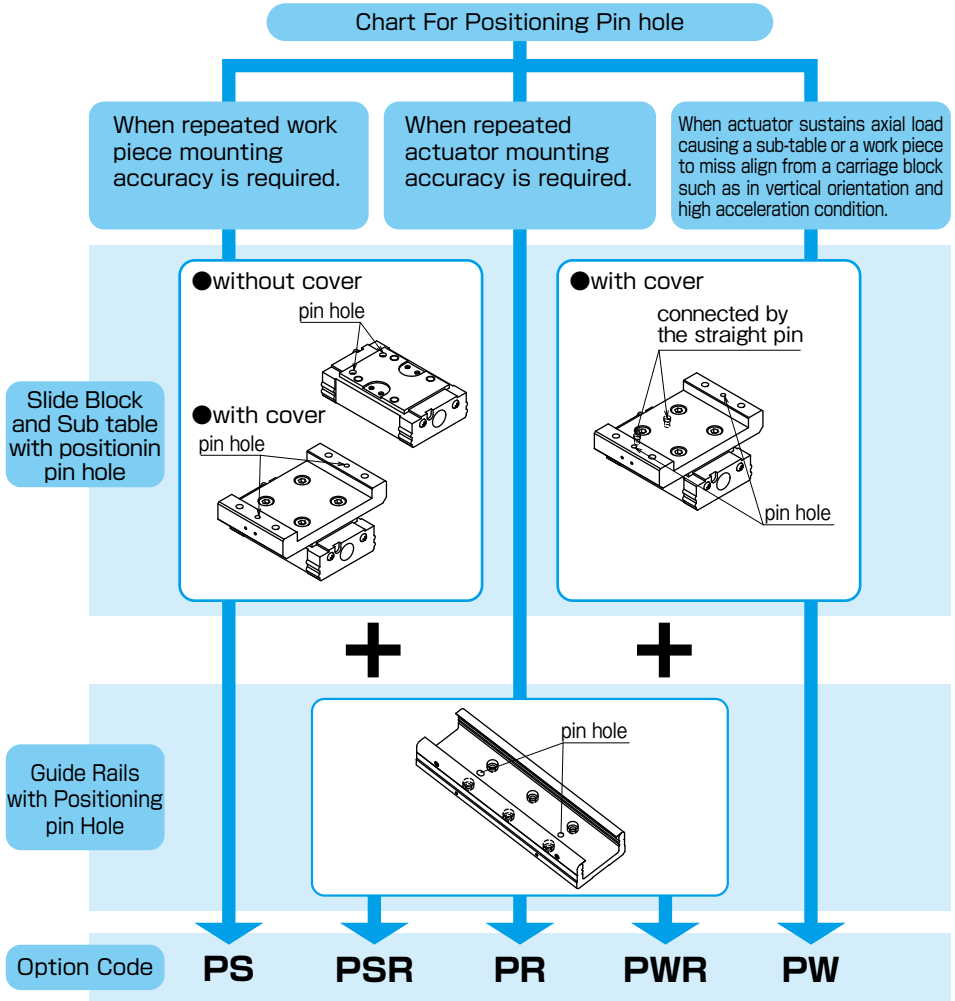


Please read the specifications and precautions of the manufacture's catalog.

POSITIONING PIN HOLE

For the BG type, positioning pin holes can be provided on the slide block and sub table by adding the option code “PS” or “PW” in the end of the part number.
The option code “PR” is used to provide the guide rail with positioning pin holes.
When positioning pin holes are necessary on both the slide block/sub table and guide rail, please add the option code “PSR” or “PWR”

Table H-14　Chart For Positioning

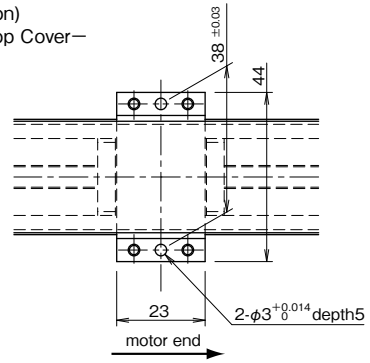


Positioning Pin Hole for Slide Block and Sub Table

It is useful when exacting reassembly positioning is required. In case of two blocks used, both blocks are processed.
When the code “PS” is added, the drilling is processed only on the mounting surface(slide block or sub table). When the code “PW” is specified for a BG with a top cover (except for BG15), the slide block and sub table are connected by the straight pins at the location where the “PS” option specifies on the slide block.
Note that NB does not supply straight pins for the “PS” option.

BG15A,B (long block)

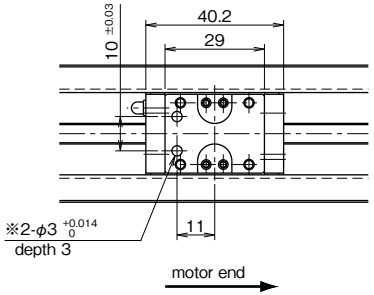
(PS Option)
—With Top Cover—



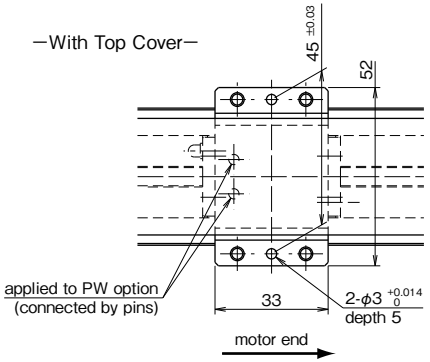
※Please contact NB for the without-top-cover option or the “PW” option.

BG20A,B (long block)

(PS Option)
—Without Top Cover—



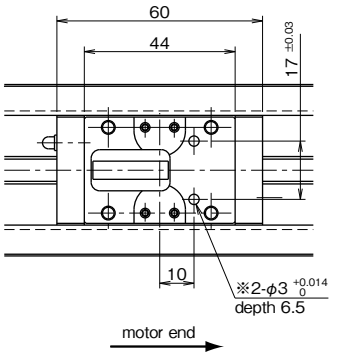
—With Top Cover—



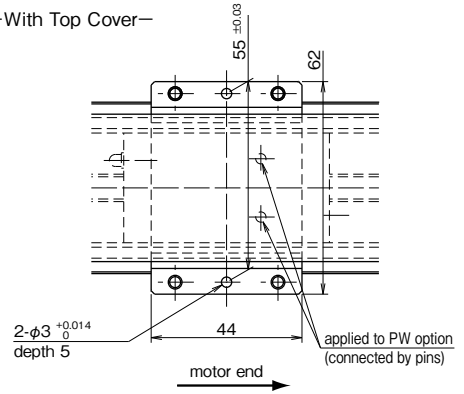
※For some cases, a shallow counterbore of φ4 will be machined at the hole area with "※" to remove a hardened layer.

BG26A,B (long block)

(PS Option)
—Without Top Cover—



—With Top Cover—

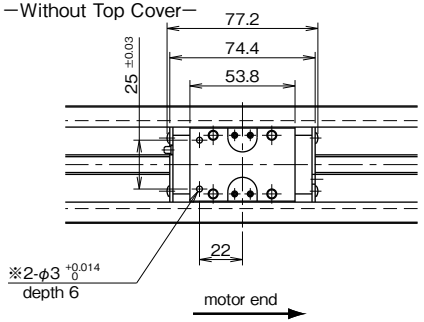


※For some cases, a shallow counterbore of φ4 will be machined at the hole area with "※" to remove a hardened layer.

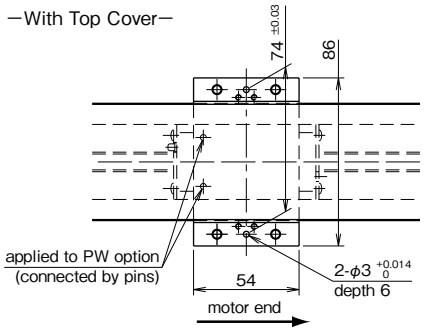
BG33A,B (long block)

(PS Option)

−Without Top Cover−



−With Top Cover−

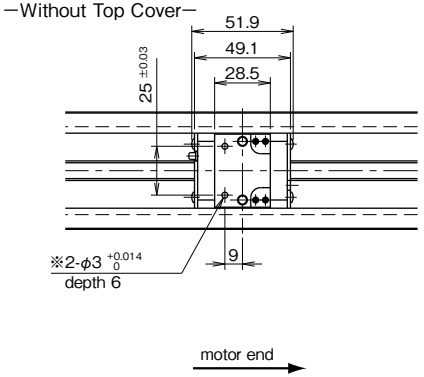


※For some cases, a shallow counterbore of φ4 will be machined at the hole area with "※" to remove a hardened layer.

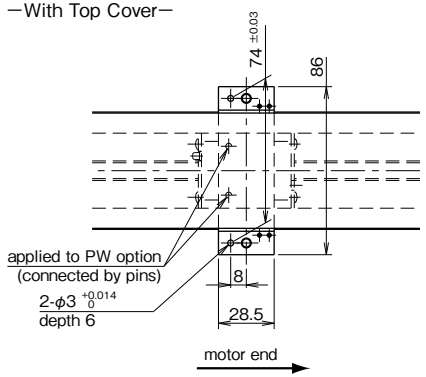
BG33C,D (short block)

(PS Option)

−Without Top Cover−



−With Top Cover−

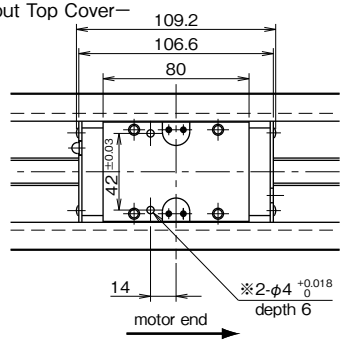


※For some cases, a shallow counterbore of φ4 will be machined at the hole area with "※" to remove a hardened layer.

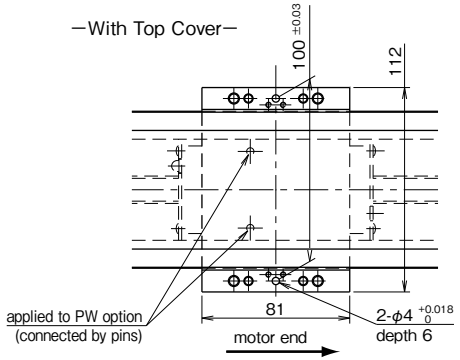
BG46A,B (long block)

(PS Option)

−Without Top Cover−



−With Top Cover−

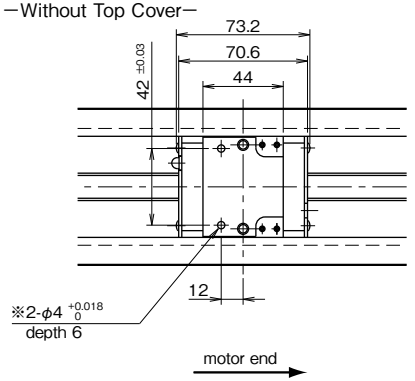


※For some cases, a shallow counterbore of φ5 will be machined at the hole area with "※" to remove a hardened layer.

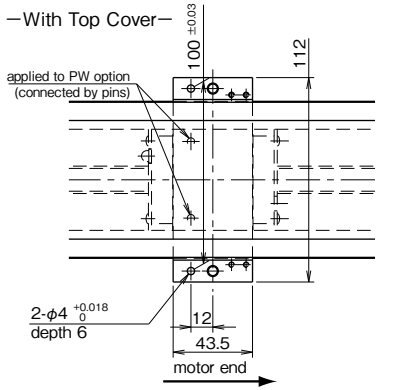
BG46C,D (short block)

(PS Option)

−Without Top Cover−



−With Top Cover−

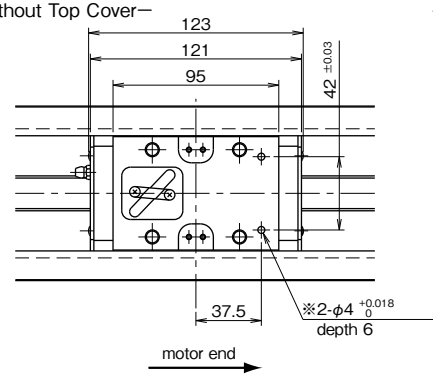


※For some cases, a shallow counterbore of φ5 will be machined at the hole area with "※" to remove a hardened layer.

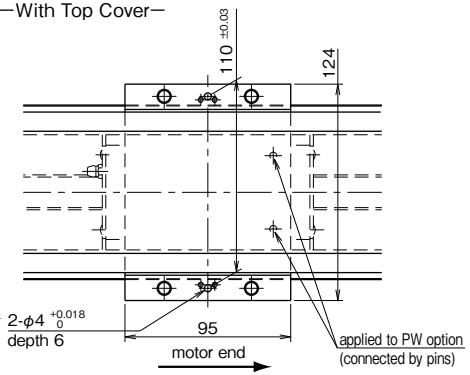
BG55A,B (long block)

(PS Option)

−Without Top Cover−



−With Top Cover−



※For some cases, a shallow counterbore of φ5 will be machined at the hole area with "※" to remove a hardened layer.

POSITIONING PIN HOLE FOR GUIDE RAIL

It is useful to use positioning pin holes on the guide rail when exacting reassembly positioning is required. After the insertion of the straight pins in the BG guide rail base, the pins might interfere with the slide block. In the positioning process, please consider the BG base thickness. The length of the pin in the BG base shall be shorter than the BG base thickness. Please make sure that the pins shall not interfere with the slide block. Table H-15 shows the pin length in the BG base.Note that NB does not supply straight pins for the guide rail. (Parallel pin type A is recommended.)

Figure H-18 Positioning Pin Hole Location

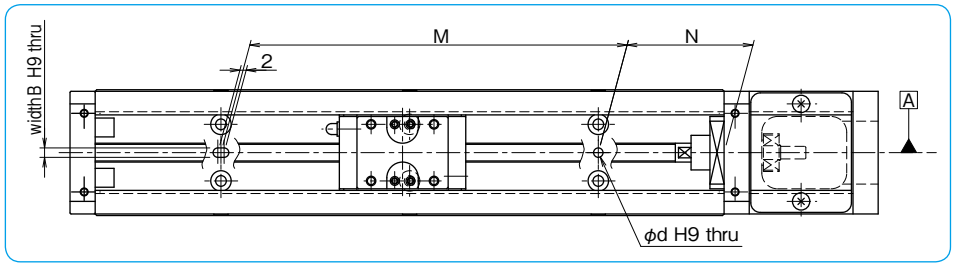


Table H-15 Positioning Pin Hole for Guide Rail unit:mm

part number	pin length (BG base thickness)	major dimensions				
		rail length	N	M	ϕd	B
BG15	3.5 or less	75	12.5	50	$\phi 3^{+0.025}_{0}$	$3^{+0.025}_{0}$
		100	25			
		125	12.5	100		
		150	25			
		175	12.5	150		
		200	25			
BG20	4.5 or less	100	20	60		
		150	15	120		
		200	40			
BG26	6 or less	150	35	80		
		200	20	160		
		250	45			
		300	30	240		
BG33	8 or less	150	25	100	$\phi 5^{+0.030}_{0}$	$5^{+0.030}_{0}$
		200	50	200		
		300		300		
		400		400		
		500		500		
		600		500		
BG46	11 or less	340	70	200		
		440		300		
		540		400		
		640		500		
		740		600		
		840		700		
		940		800		
		1,040		900		
		1,140		1,000		
		1,240		1,100		
BG55	13 or less	980	40	900	$\phi 6^{+0.030}_{0}$	$6^{+0.030}_{0}$
		1,080	15	1,050		
		1,180	65			
		1,280	40	1,200		
		1,380	15	1,350		

LUBRICATION

- BG type contains a lithium soap based grease. (Multemp PS No.2, KYODO YUSHI) Apply similar type of grease for the lubrication as required depending on the operating conditions.
- Use the grease fitting to lubricate the slide block. For ball screw portion apply grease directly to the surface of screw shaft.
  ※BG15 slide block has ϕ2mm oil holes instead of grease fitting.
- Unless otherwise instructed, a grease fitting is located as shown in Figure H-19.
- The grease can be changed to a high function type by adding a special grease option at the end of the part number. Please refer to Table H-16 for the grease type. Also refer to page Eng-40 for further details.

Figure H-19 Location of Grease Fitting

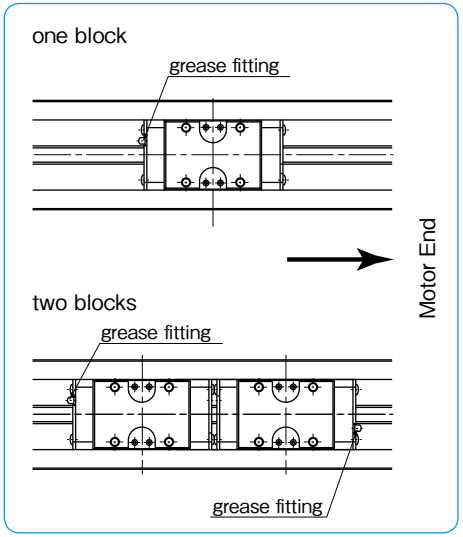


Table H-16 Applicable Grease

grease option	features	product name
none (standard)	–	Multemp PS No.2 (KYODO YUSHI)
GU	urea-type low dust generation grease; low sliding resistance	KGU Grease
GLA	lithium-type low dust generation grease	KGLA Grease
GF	urea-type anti-fretting grease	KGF Grease

OPERATING TEMPERATURE

- Resin parts are incorporated in the BG type. Please avoid using BG type above 80℃. Please use the product at 55℃ or lower when sensor/bellows are optioned.

USE AND HANDLING PRECAUTIONS

- Please handle as a precision component and avoid excessive vibration or shock.
- Rough handling will affect the smooth motion and reduce the precision performance and life time.
- DO NOT DISASSEMBLE. The accuracy of BG type is preadjusted when assembled.
- Please allow for extra stroke length. If the guide block repeatedly collides with damper, it may cause damage.
- Please never touch the area at both stroke ends during operation. There is a danger for the fingers to be caught at the stroke end. Please pay enough attention to the guide rail area even when not in operation, there is a danger for the fingers to be injured by the dust cover.
- Depending upon the operating environment, dust and foreign particles may contaminate BG type and disrupt the ball circulation and precision performance.