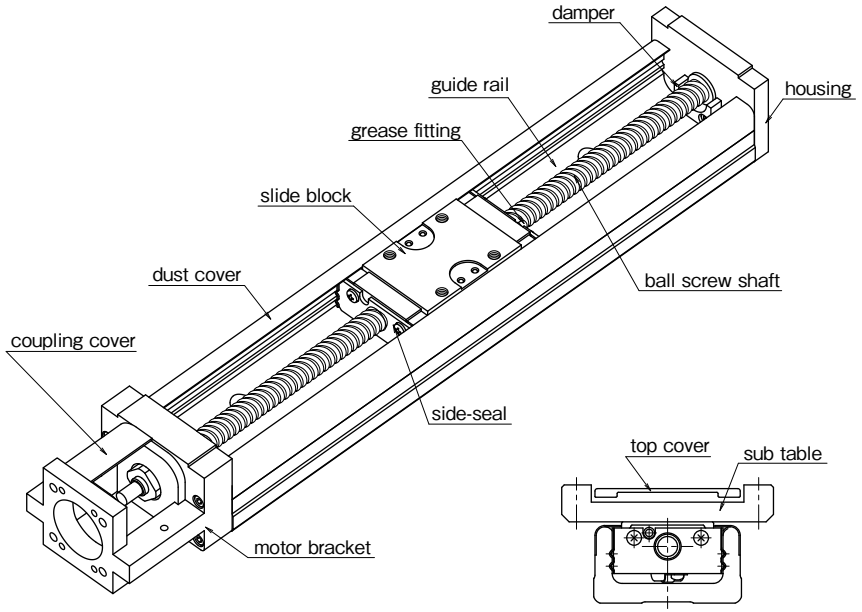
ACTUATOR

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



ADVANTAGES

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

High Rigidity
"U" shaped guide rail provides very high rigidity despite its compact configuration and can be used for cantilevered application. (refer to page H-9)

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.

Figure H-2 Ball Contact Profile

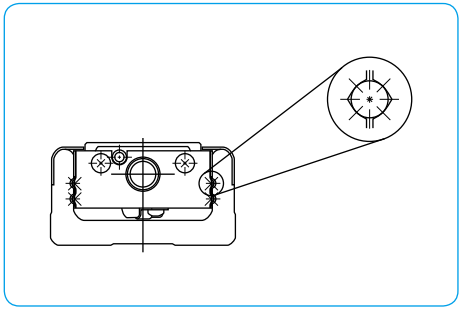
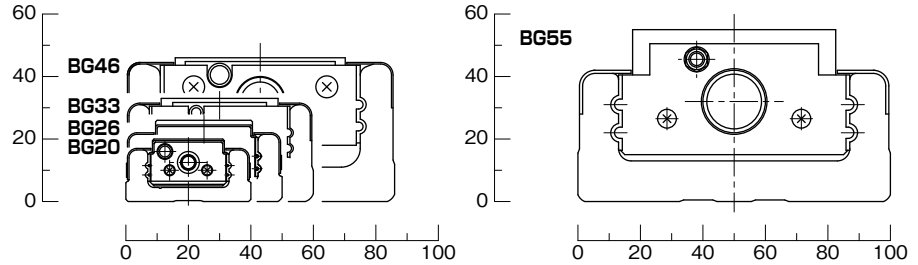


Figure H-3 Cross Section



PART NUMBER STRUCTURE

Part number for BG type is described as follows.

①	②	③	④	⑤	⑥	⑦	⑧	⑨	⑩
BG	20	01	A	100	H	A0			
		05	B	150	P	A1	C	S	P△
				200		A3	J○○	K	G▲
						A5			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	C	S	P△
				250		A3	J○○	K	G▲
				300		A5			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	C	S	P△
		20	C	300		A2	J○○	H	G▲
			D	400		A3		K	LB
				500		A4			PNP
				600		A5			
						A6			
						A7			
						B1			
						B2			
						R0			
						RA□			
						RB□			
						RC□			

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

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

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

⑥ precision grade

H	high grade
P	precision grade

⑦ motor bracket (refer to page H-17~)

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

⑧ cover and bellows

none	without top cover
C	with top cover + sub table
J○○	with bellows

○○ sensor cable outlet position
(refer to page H-45)

⑨ sensor

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 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 or W (refer to page H-53)
※2: ▲ is K, U, L or F (refer to page H-16)
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.

SPECIFICATIONS

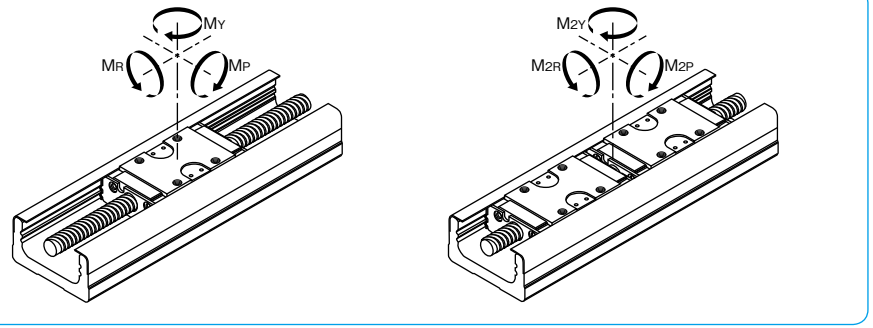
BG Type is categorized as either high grade (H) or precision grade (P).

Table H-1 Specifications

part number				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
guide	radial clearance		μm	−3~0	−6~−3	−3~0	−6~−3	−4~0	−8~−4	−4~0	−8~−4	−3~0	−7~−3	−3~0	−7~−3	−3~0	−7~−3	−5~0	−11~−5	−5~0	−11~−5	−6~0	−18~−6
	long block	basic dynamic load	C	kN	4.27			7.87			12.6					29.8				43.2		
		basic static load	C0	kN	7.89			14.98			22.7					51.2				74.0		
		allowable static moment	MP	N·m	35			99			181					610				1,088		
			M2P	N·m	199			550			1,035					3,285				5,465		
			MY	N·m	42			118			215					727				1,297		
			M2Y	N·m	237			656			1,233					3,914				6,513		
			MR	N·m	101			255			500					1,612				2,701		
			M2R	N·m	201			509			1,000					3,224				5,402		
	short block	basic dynamic load	C	kN	—			—			7.8			—		19.9				—		
		basic static load	C0	kN	—			—			11.4			—		28.8				—		
		allowable static moment	MP	N·m	—			—			49			—		207				—		
			M2P	N·m	—			—			368			—		1,336				—		
			MY	N·m	—			—			59			—		246				—		
			M2Y	N·m	—			—			439			—		1,593				—		
			MR	N·m	—			—			250			—		907				—		
			M2R	N·m	—			—			500			—		1,814				—		
ball screw	shaft diameter		mm	6				8				10				12		15				20	
	lead		mm	1		5		2		5		5		10		20		10		20		20	
	spacer-ball ratio		—	—				—				—	1:1	—	1:1	—	1:1	—	1:1	—	2:1	—	2:1
	basic dynamic load	Ca	kN	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
	basic static load	Coa	kN	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		—	AC5-14DF				AC6-16DF				70M8DF/GMP5						7001T2DF/GMP5				7002T2DF/GMP5	
	basic dynamic load	Cb	kN	1.31				1.79				4.40						6.77				7.74	
	basic static load	Cob	kN	1.25				1.76				4.36						7.45				9.50	

M2P ,M2Y and M2R are the allowable static moments when 2 blocks are used in close contact.
※ Please contact NB when using BG20-P & BG26-P grade series with short and frequent stroke. (short stroke, BG2001: 7 mm or less, BG2005: 25 mm or less, BG2602: 14 mm or less and BG2605: 25 mm or less)
Short blocks are not available for BG3320.

Figure H-4 Direction of Moment



ALLOWABLE SPEED

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-2 Allowable Speed

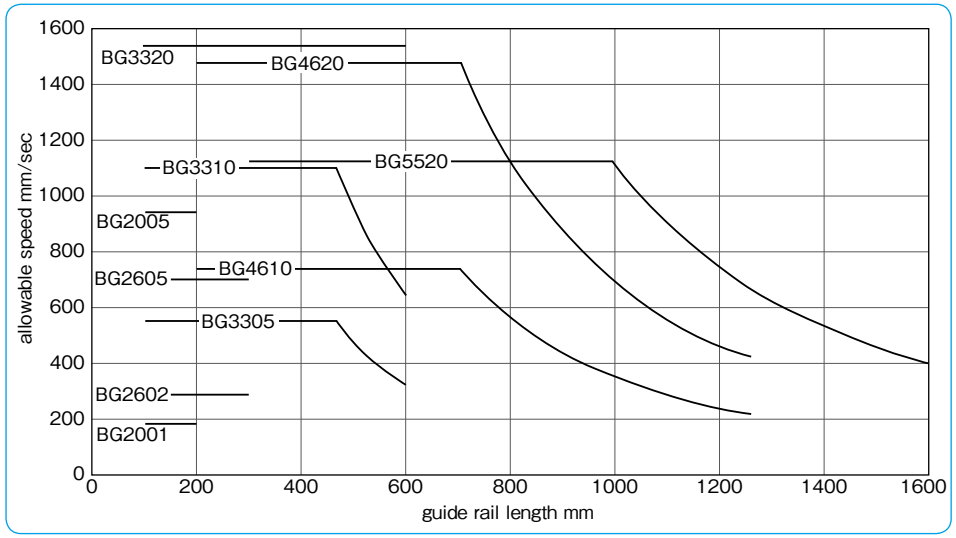
part number	rail length mm	speed mm/sec
BG2001	100	187
	150	
	200	
BG2005	100	925
	150	
	200	
BG2602	150	281
	200	
	250	
	300	
BG2605	150	694
	200	
	250	
	300	

part number	rail length mm	speed mm/sec
BG3305	150	550
	200	
	300	
	400	
	500	460
	600	310
BG3310	150	1,100
	200	
	300	
	400	
	500	930
	600	620
BG3320	150	1,500
	200	
	300	
	400	
	500	
	600	

part number	rail length mm	speed mm/sec
BG4610	340	740
	440	
	540	
	640	
	740	650
	840	500
	940	390
	1,040	315
	1,140	260
	1,240	220
BG4620	340	1,480
	440	
	540	
	640	
	740	1,300
	840	1,000
	940	780
	1,040	630
	1,140	520
	1,240	440

part number	rail length mm	speed mm/sec
BG5520	980	1,120
	1,080	910
	1,180	750
	1,280	630
	1,380	530

Figure H-5 Guide Rail Length and Allowable Speed



MASS

The mass of the BG type is listed in Table H-3 and slide block mass is listed in Table H-4.

Table H-3 Mass of BG type Actuator unit / kg

part number	rail length mm	without top cover				with top cover				rail length mm
		long block		short block		long block		short block		
		1 block A	2 blocks B	1 block C	2 blocks D	1 block A	2 blocks B	1 block C	2 blocks D	
BG20	100	0.45	0.52	—	—	0.50	0.61	—	—	100
	150	0.58	0.65	—	—	0.63	0.74	—	—	150
	200	0.71	0.78	—	—	0.77	0.88	—	—	200
BG26	150	0.93	1.10	—	—	1.07	1.31	—	—	150
	200	1.14	1.31	—	—	1.30	1.54	—	—	200
	250	1.36	1.53	—	—	1.53	1.78	—	—	250
	300	1.57	1.74	—	—	1.76	2.01	—	—	300
BG33	150	1.6	—	1.5	1.7	1.8	—	1.6	1.9	150
	200	2.0	—	1.8	2.0	2.1	—	2.0	2.2	200
	300	2.6	2.9	2.5	2.7	2.8	3.2	2.6	2.9	300
	400	3.2	3.6	3.1	3.3	3.5	3.9	3.3	3.5	400
	500	3.9	4.2	3.8	3.9	4.2	4.6	4.0	4.2	500
	600	4.6	4.9	4.4	4.6	4.9	5.3	4.7	4.9	600
BG46	340	6.5	7.5	6.0	6.5	7.0	8.0	6.5	7.0	340
	440	8.0	8.5	7.5	8.0	8.5	9.5	8.0	8.5	440
	540	9.0	10.0	8.5	9.5	10.0	11.0	9.5	10.0	540
	640	10.5	11.5	10.0	10.5	11.0	12.5	10.5	11.5	640
	740	12.0	13.0	11.5	12.0	12.5	14.0	12.0	13.0	740
	840	13.0	14.0	13.0	13.5	14.0	15.5	13.5	14.0	840
	940	14.5	15.5	14.0	14.5	15.5	16.5	15.0	15.5	940
	1,040	16.0	17.0	15.5	16.0	17.0	18.0	16.5	17.0	1,040
	1,140	17.5	18.0	17.0	17.5	18.5	19.5	18.0	18.5	1,140
	1,240	18.5	19.5	18.5	19.0	19.5	21.0	19.0	20.0	1,240
BG55	980	20	22	—	—	21	24	—	—	980
	1,080	22	24	—	—	23	26	—	—	1,080
	1,180	23	25	—	—	25	27	—	—	1,180
	1,280	25	27	—	—	27	29	—	—	1,280
	1,380	27	29	—	—	29	31	—	—	1,380

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

Table H-4 Mass of Block unit / kg

part number	without top cover		with top cover	
	long block	short block	long block	short block
BG20	0.07	—	0.11	—
BG26	0.17	—	0.24	—
BG33	0.3	0.15	0.4	0.2
BG46	0.9	0.5	1.2	0.7
BG55	1.7	—	2.3	—

Mass stated "with top cover" includes mass of sub table.

INERTIA

Inertia of the slide block and ball screw of BG type are shown in Table H-5.

Table H-5 Inertia (reference) unit／kg・m²

part number	rail length mm	without top cover				with top cover				rail length mm
		long block		short block		long block		short block		
		1 block A	2 blocks B	1 block C	2 blocks D	1 block A	2 blocks B	1 block C	2 blocks D	
BG2001	100	1.34×10^{-7}	1.36×10^{-7}	—	—	1.35×10^{-7}	1.37×10^{-7}	—	—	100
	150	1.83×10^{-7}	1.85×10^{-7}	—	—	1.84×10^{-7}	1.87×10^{-7}	—	—	150
	200	2.33×10^{-7}	2.35×10^{-7}	—	—	2.34×10^{-7}	2.37×10^{-7}	—	—	200
BG2005	100	1.76×10^{-7}	2.21×10^{-7}	—	—	2.00×10^{-7}	2.69×10^{-7}	—	—	100
	150	2.26×10^{-7}	2.70×10^{-7}	—	—	2.50×10^{-7}	3.18×10^{-7}	—	—	150
	200	2.76×10^{-7}	3.20×10^{-7}	—	—	3.00×10^{-7}	3.68×10^{-7}	—	—	200
BG2602	150	6.08×10^{-7}	6.26×10^{-7}	—	—	6.16×10^{-7}	6.40×10^{-7}	—	—	150
	200	7.65×10^{-7}	7.83×10^{-7}	—	—	7.73×10^{-7}	7.97×10^{-7}	—	—	200
	250	9.22×10^{-7}	9.39×10^{-7}	—	—	9.29×10^{-7}	9.54×10^{-7}	—	—	250
	300	1.08×10^{-6}	1.10×10^{-6}	—	—	1.09×10^{-6}	1.11×10^{-6}	—	—	300
BG2605	150	6.99×10^{-7}	8.07×10^{-7}	—	—	7.44×10^{-7}	8.98×10^{-7}	—	—	150
	200	8.56×10^{-7}	9.63×10^{-7}	—	—	9.01×10^{-7}	1.05×10^{-6}	—	—	200
	250	1.01×10^{-6}	1.12×10^{-6}	—	—	1.06×10^{-6}	1.21×10^{-6}	—	—	250
	300	1.17×10^{-6}	1.28×10^{-6}	—	—	1.21×10^{-6}	1.37×10^{-6}	—	—	300
BG3305	150	1.64×10^{-6}	—	1.56×10^{-6}	1.64×10^{-6}	1.71×10^{-6}	—	1.60×10^{-6}	1.71×10^{-6}	150
	200	2.02×10^{-6}	—	1.94×10^{-6}	2.03×10^{-6}	2.09×10^{-6}	—	1.98×10^{-6}	2.10×10^{-6}	200
	300	2.79×10^{-6}	2.99×10^{-6}	2.71×10^{-6}	2.79×10^{-6}	2.86×10^{-6}	3.13×10^{-6}	2.75×10^{-6}	2.86×10^{-6}	300
	400	3.55×10^{-6}	3.75×10^{-6}	3.48×10^{-6}	3.56×10^{-6}	3.62×10^{-6}	3.89×10^{-6}	3.51×10^{-6}	3.63×10^{-6}	400
	500	4.32×10^{-6}	4.52×10^{-6}	4.24×10^{-6}	4.32×10^{-6}	4.39×10^{-6}	4.66×10^{-6}	4.28×10^{-6}	4.39×10^{-6}	500
	600	5.08×10^{-6}	5.28×10^{-6}	5.01×10^{-6}	5.09×10^{-6}	5.15×10^{-6}	5.42×10^{-6}	5.04×10^{-6}	5.16×10^{-6}	600
BG3310	150	2.19×10^{-6}	—	1.88×10^{-6}	2.21×10^{-6}	2.47×10^{-6}	—	2.02×10^{-6}	2.49×10^{-6}	150
	200	2.57×10^{-6}	—	2.27×10^{-6}	2.59×10^{-6}	2.85×10^{-6}	—	2.40×10^{-6}	2.87×10^{-6}	200
	300	3.34×10^{-6}	4.14×10^{-6}	3.03×10^{-6}	3.36×10^{-6}	3.61×10^{-6}	4.69×10^{-6}	3.17×10^{-6}	3.64×10^{-6}	300
	400	4.10×10^{-6}	4.90×10^{-6}	3.80×10^{-6}	4.12×10^{-6}	4.38×10^{-6}	5.46×10^{-6}	3.94×10^{-6}	4.40×10^{-6}	400
	500	4.87×10^{-6}	5.67×10^{-6}	4.56×10^{-6}	4.89×10^{-6}	5.15×10^{-6}	6.22×10^{-6}	4.70×10^{-6}	5.17×10^{-6}	500
	600	5.63×10^{-6}	6.43×10^{-6}	5.33×10^{-6}	5.65×10^{-6}	5.91×10^{-6}	6.99×10^{-6}	5.47×10^{-6}	5.93×10^{-6}	600
BG3320	150	5.94×10^{-6}	—	—	—	7.06×10^{-6}	—	—	—	150
	200	6.74×10^{-6}	—	—	—	7.85×10^{-6}	—	—	—	200
	300	8.33×10^{-6}	1.15×10^{-5}	—	—	9.44×10^{-6}	1.38×10^{-5}	—	—	300
	400	9.91×10^{-6}	1.31×10^{-5}	—	—	1.10×10^{-5}	1.53×10^{-5}	—	—	400
	500	1.15×10^{-5}	1.47×10^{-5}	—	—	1.26×10^{-5}	1.69×10^{-5}	—	—	500
	600	1.31×10^{-5}	1.63×10^{-5}	—	—	1.42×10^{-5}	1.85×10^{-5}	—	—	600
BG4610	340	1.79×10^{-5}	2.02×10^{-5}	1.69×10^{-5}	1.82×10^{-5}	1.87×10^{-5}	2.17×10^{-5}	1.74×10^{-5}	1.92×10^{-5}	340
	440	2.18×10^{-5}	2.41×10^{-5}	2.08×10^{-5}	2.20×10^{-5}	2.25×10^{-5}	2.56×10^{-5}	2.13×10^{-5}	2.31×10^{-5}	440
	540	2.57×10^{-5}	2.79×10^{-5}	2.46×10^{-5}	2.59×10^{-5}	2.64×10^{-5}	2.95×10^{-5}	2.52×10^{-5}	2.69×10^{-5}	540
	640	2.95×10^{-5}	3.18×10^{-5}	2.85×10^{-5}	2.98×10^{-5}	3.03×10^{-5}	3.33×10^{-5}	2.90×10^{-5}	3.08×10^{-5}	640
	740	3.34×10^{-5}	3.57×10^{-5}	3.24×10^{-5}	3.37×10^{-5}	3.42×10^{-5}	3.72×10^{-5}	3.29×10^{-5}	3.47×10^{-5}	740
	840	3.73×10^{-5}	3.96×10^{-5}	3.63×10^{-5}	3.75×10^{-5}	3.80×10^{-5}	4.11×10^{-5}	3.67×10^{-5}	3.83×10^{-5}	840
	940	4.12×10^{-5}	4.35×10^{-5}	4.02×10^{-5}	4.14×10^{-5}	4.19×10^{-5}	4.50×10^{-5}	4.06×10^{-5}	4.22×10^{-5}	940
	1,040	4.50×10^{-5}	4.74×10^{-5}	4.41×10^{-5}	4.53×10^{-5}	4.58×10^{-5}	4.88×10^{-5}	4.44×10^{-5}	4.61×10^{-5}	1,040
	1,140	4.89×10^{-5}	5.12×10^{-5}	4.79×10^{-5}	4.92×10^{-5}	4.97×10^{-5}	5.27×10^{-5}	4.83×10^{-5}	4.99×10^{-5}	1,140
	1,240	5.28×10^{-5}	5.51×10^{-5}	5.18×10^{-5}	5.30×10^{-5}	5.35×10^{-5}	5.66×10^{-5}	5.22×10^{-5}	5.38×10^{-5}	1,240
BG4620	340	2.47×10^{-5}	3.39×10^{-5}	2.07×10^{-5}	2.58×10^{-5}	2.78×10^{-5}	3.99×10^{-5}	2.27×10^{-5}	2.98×10^{-5}	340
	440	2.86×10^{-5}	3.77×10^{-5}	2.46×10^{-5}	2.96×10^{-5}	3.17×10^{-5}	4.38×10^{-5}	2.66×10^{-5}	3.37×10^{-5}	440
	540	3.25×10^{-5}	4.16×10^{-5}	2.84×10^{-5}	3.35×10^{-5}	3.55×10^{-5}	4.77×10^{-5}	3.05×10^{-5}	3.76×10^{-5}	540
	640	3.63×10^{-5}	4.55×10^{-5}	3.23×10^{-5}	3.74×10^{-5}	3.94×10^{-5}	5.16×10^{-5}	3.44×10^{-5}	4.14×10^{-5}	640
	740	4.03×10^{-5}	4.94×10^{-5}	3.62×10^{-5}	4.13×10^{-5}	4.33×10^{-5}	5.55×10^{-5}	3.82×10^{-5}	4.53×10^{-5}	740
	840	4.41×10^{-5}	5.34×10^{-5}	4.02×10^{-5}	4.51×10^{-5}	4.71×10^{-5}	5.93×10^{-5}	4.17×10^{-5}	4.82×10^{-5}	840
	940	4.80×10^{-5}	5.72×10^{-5}	4.41×10^{-5}	4.90×10^{-5}	5.09×10^{-5}	6.32×10^{-5}	4.56×10^{-5}	5.21×10^{-5}	940
	1,040	5.19×10^{-5}	6.11×10^{-5}	4.80×10^{-5}	5.29×10^{-5}	5.48×10^{-5}	6.71×10^{-5}	4.95×10^{-5}	5.59×10^{-5}	1,040
	1,140	5.57×10^{-5}	6.50×10^{-5}	5.18×10^{-5}	5.68×10^{-5}	5.87×10^{-5}	7.09×10^{-5}	5.34×10^{-5}	5.98×10^{-5}	1,140
	1,240	5.96×10^{-5}	6.89×10^{-5}	5.57×10^{-5}	6.06×10^{-5}	6.26×10^{-5}	7.48×10^{-5}	5.72×10^{-5}	6.37×10^{-5}	1,240
BG5520	980	1.46×10^{-4}	1.64×10^{-4}	—	—	1.52×10^{-4}	1.76×10^{-4}	—	—	980
	1,080	1.59×10^{-4}	1.76×10^{-4}	—	—	1.65×10^{-4}	1.88×10^{-4}	—	—	1,080
	1,180	1.71×10^{-4}	1.88×10^{-4}	—	—	1.77×10^{-4}	2.00×10^{-4}	—	—	1,180
	1,280	1.83×10^{-4}	2.00×10^{-4}	—	—	1.89×10^{-4}	2.12×10^{-4}	—	—	1,280
	1,380	1.95×10^{-4}	2.13×10^{-4}	—	—	2.01×10^{-4}	2.25×10^{-4}	—	—	1,380

RIGIDITY

By utilizing four-circuit and four-point contact structure, the BG type provides extremely high rigidity. Figure H-6 shows displacement of each size of long block against radial load. Table H-6 shows the geometrical moment of inertia of guide rails.

Figure H-6 Block Displacement against Radial Load

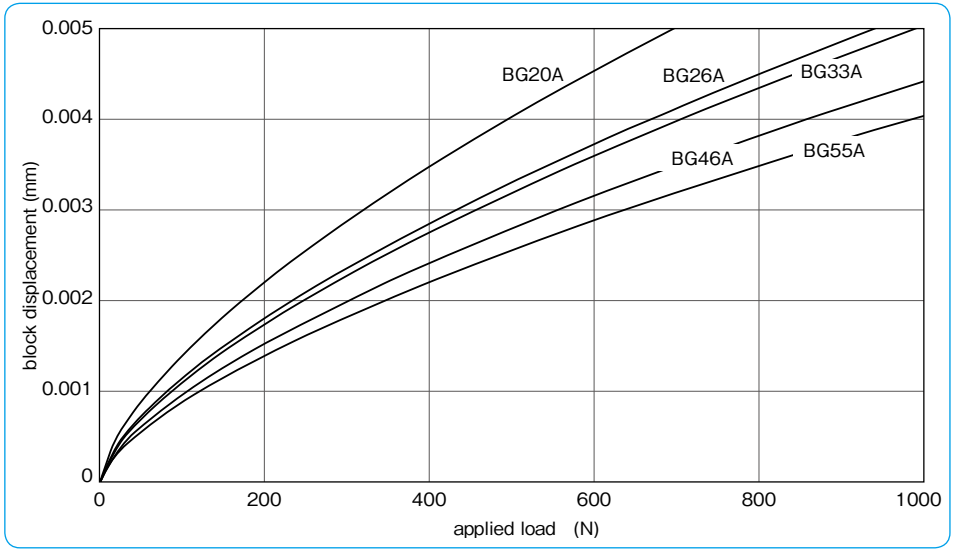
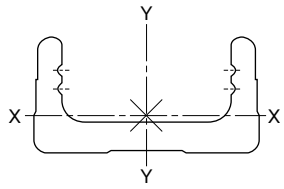


Table H-6 Geometrical Moment of Inertia of Guide Rail



part number	geometrical moment of inertia (mm⁴) Ix (X Axis)	Iy (Y Axis)	mass W (kg/100mm)
BG20	6.50×10^{3}	6.00×10^{4}	0.25
BG26	1.69×10^{4}	1.47×10^{5}	0.38
BG33	5.11×10^{4}	3.42×10^{5}	0.60
BG46	2.42×10^{5}	1.49×10^{6}	1.24
BG55	2.29×10^{5}	2.28×10^{6}	1.50

ACCURACY

Table H-7 shows accuracy of BG type.

Table H-7 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
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.

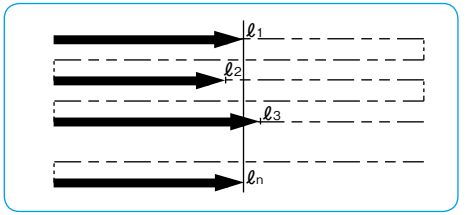
Positioning Repeatability

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

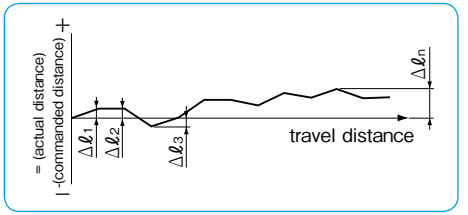


Positioning Accuracy

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

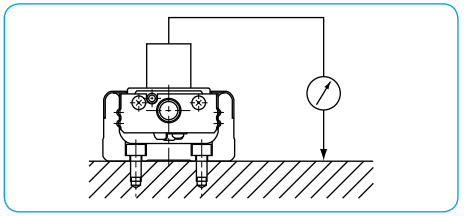
Figure H-8 Positioning Accuracy



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

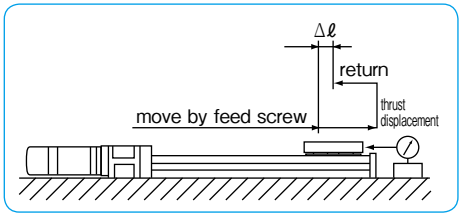


Backlash

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 TableH-8)
f_W: applied load coefficient (refer to TableH-9)
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-8 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-9 Applied Load Coefficient (f_W)

operating conditions		applied load coefficient (f_W)
vibration, impact	velocity	
none	15m/min or less	1.0 ~ 1.5
low	60m/min or less	1.5 ~ 2.0
high	60m/min or more	2.0 ~ 3.5

Table H-10 Moment Equivalent Coefficient

	Ep (E2p)	Ey (E2p)	Er (E2r)
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})

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

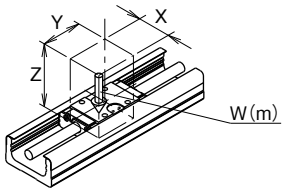
Note that the values of $(M_{pL}+m\cdot\alpha_a\cdot Z)$ and $(M_{yL}+m\cdot\alpha_a\cdot X)$ will be treated as 0 (zero) when the calculated value is negative.

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-10)
Ey: moment equivalent coefficient in the yawing direction (refer to Table H-10)
Er: moment equivalent coefficient in the rolling direction (refer to Table H-10)
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-4 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})

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

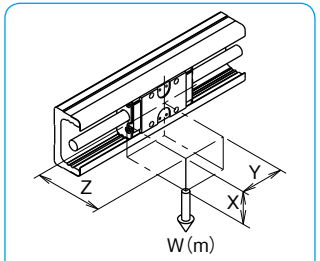
Note that the values of $(M_{pL}+m\cdot\alpha_a\cdot Z)$ and $(M_{yL}+m\cdot\alpha_a\cdot X)$ will be treated as 0 (zero) when the calculated value is negative.

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-10) Ey: moment equivalent coefficient in the yawing direction (refer to Table H-10) Er: moment equivalent coefficient in the rolling direction (refer to Table H-10)
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-4 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})

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

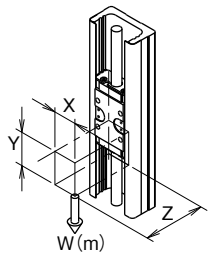
Note that the values of ($M_{pL}+m\cdot\alpha_a\cdot Z$) and ($M_{yL}+m\cdot\alpha_a\cdot X$) will be treated as 0 (zero) when the calculated value is negative.

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-10)
Ey: moment equivalent coefficient in the yawing direction (refer to Table H-10)
Er: moment equivalent coefficient in the rolling direction (refer to Table H-10)
M_{pL}: applied moment in the pitching direction (N・mm) $M_{pL}=W\cdot Z$ MyL: loaded moment in the yawing direction (N・mm) $M_{yL}=W\cdot X$
M_{rL}: applied moment in the rolling direction (N・mm) $M_{rL}=0$ ※Refer to Fig. H-4 for the direction of moment.

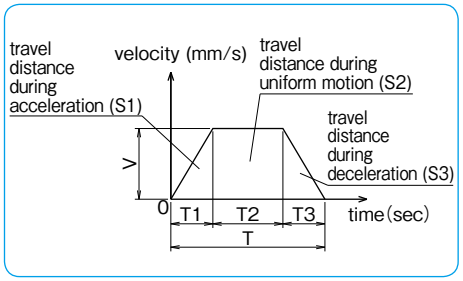
A.1.d.

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-9)
C_a: basic dynamic load rating of the ball screw (N)
C_b: basic dynamic load rating of the support bearing (N)
P_a: Pa: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})

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

iii) during deceleration (P_{ad})

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

Table H-11 Sliding Resistance (fb) of a Single Block (Seal Resistance)

unit: N

	high grade (H)	precision grade (P)
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-11)
n: number of blocks of BG m: carrying mass (kg)
m_b: mass of a block of BG (kg) (refer to Table H-4)
α_a: acceleration during accelerating (m/s^3)
α_d: acceleration during decelerating (m/s^3)
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.

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

P_a: average axis-directional 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)

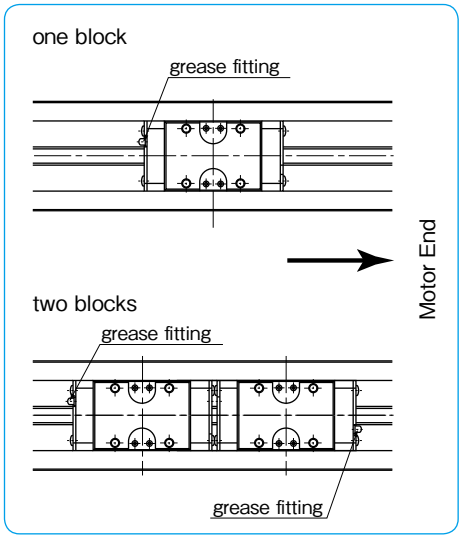
LUBRICATION

- 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.
- Unless otherwise instructed, a grease fitting is located as shown in Figure H-15.
- 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-12 for the grease type. Also refer to page Eng-39 for further details.

Table H-12 Applicable Grease

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

Figure H-15 Location of Grease Fitting



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.
- Depending upon the operating environment, dust and debris may contaminate BG type and disrupt the ball circulation and precision performance.

MOTOR BRACKET CONFIGURATIONS & APPLICABLE MOTORS

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

Table H-13 Applicable Motors

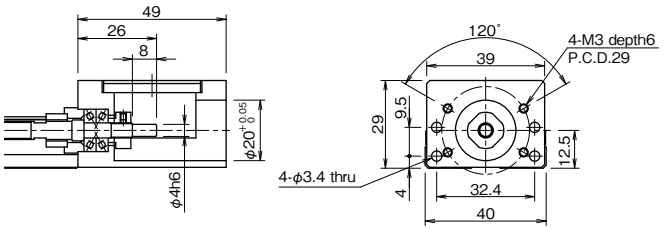
Applicable motors		Part number		BG20	BG26	BG33	BG46	BG55
AC Servo motor	Panasonic	MUMA5A	50W	AA	AA	B2	—	—
		MUMA01	100W					
		MUMA02	200W	—	—	A7	A2	
		MUMA04	400W			—		
		MSMA3A	30W	A3	A3	A2	C0	—
		MSMD(MSMA)5A	50W					
		MSMD(MSMA)01	100W					
		MSMD(MSMA)02	200W	—	—	A7	A2	—
		MSMD(MSMA)04	400W			—		
		MSMD(MSMA)08	750W	—	—	—	A3	A2
	MITSUBISHI ELECTRIC	HC-AQ0135	10W	A8	A8	—	—	—
		HC-AQ0235	20W					
		HC-AQ0335	30W					
		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
		HA-FF053	50W	—	—	A3	A0	—
		HA-FF13	100W					
		HA-FF23	200W	—	—	—	A3	A2
		HA-FF33	300W					
	YASKAWA ELECTRIC	SGMM-A131＊	10W	A9	A9	—	—	—
		SGMM-A231＊	20W					
		SGMM-A331＊	30W					
		SGMAH-A3	30W	A1	A1	A1	B0	—
		SGMJV, SGMAV(SGMAS)-A5	50W					
		SGMJV, SGMAV(SGMAS)-01	100W					
		SGMAV(SGMAS)-C2	150W					
		SGMJV, SGMAV(SGMAS)-02	200W	—	—	A6	A1	A0
		SGMJV, SGMAV(SGMAS)-04	400W			—		
		SGMJV, SGMAV(SGMAS)-08	750W	—	—	—	A4	A1
	SANYO DENKI	Q1AA04003D	30W	A1	A1	A1	B0	—
		Q1AA04005D	50W					
		Q1AA04010D	100W					
		Q1AA06020D	200W	—	—	A6	A1	A0
		Q1AA06040D	400W			—		
		Q1AA07075D	750W	—	—	—	A4	A1
		Q2AA05005D	50W	—	—	A3	A0	—
		Q2AA05010D	100W					
		Q2AA07020D	200W	—	—	—	A3	A2
		Q2AA07030D	300W					
		Q2AA07040D	400W					
		Q2AA08050D	500W	—	—	—	—	A3
		Q2AA08075D	750W					
Stepper motor	ORIENTAL MOTOR	UPD534M-A	—	A5	A5	B1	—	—
		PMU33AH	—	A6	A6	—	—	—
		UPK(RK)54, AS4	—	A5	A5	B1	—	—
		UPK(RK)56, AS6	—	—	—	A4	D0	—
		UPK(RK)59, AS9	—	—	—	—	—	A4
		PK26	—	—	—	A5	—	—
	SANYO DENKI	F SERIES□42mm	—	A5	A5	B1	—	—
		F SERIES□60mm	—	—	—	A4	D0	—
		F SERIES□85mm	—	—	—	—	—	A4
	TECHNO DRIVE	＊K-S54＊	—	A5	A5	B1	—	—
		＊K-S(M)56＊	—	—	—	A4	D0	—
		＊K-M(G)59＊	—	—	—	—	—	A4

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

BG20

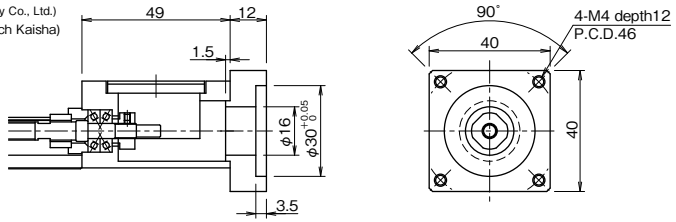
Figures inside( ) indicates mass of the motor mount adapter plate.

Motor Bracket A0



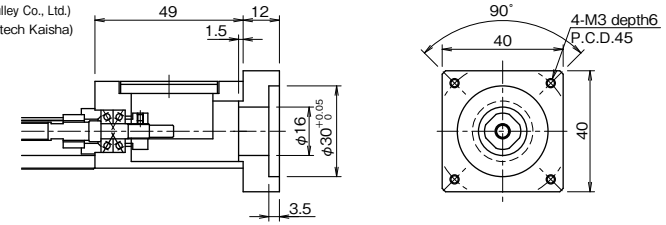
Motor Bracket A1 (Mass: 38g)

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



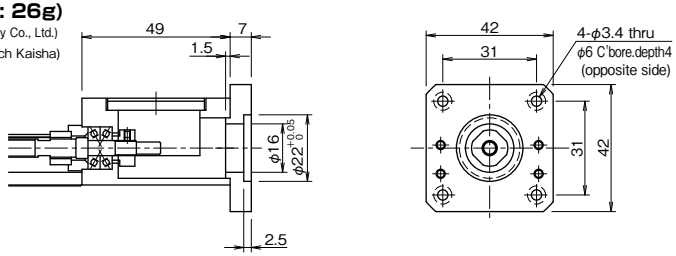
Motor Bracket A3 (Mass: 39g)

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



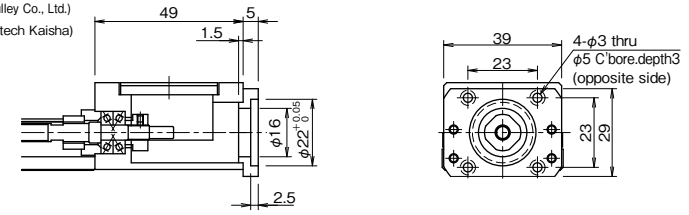
Motor Bracket A5 (Mass: 26g)

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



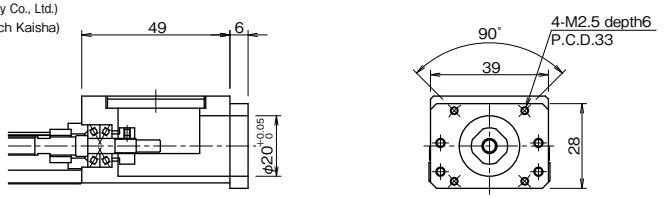
Motor Bracket A6 (Mass: 10g)

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



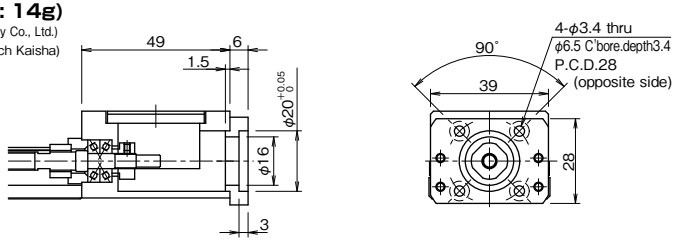
Motor Bracket A8 (Mass: 12g)

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



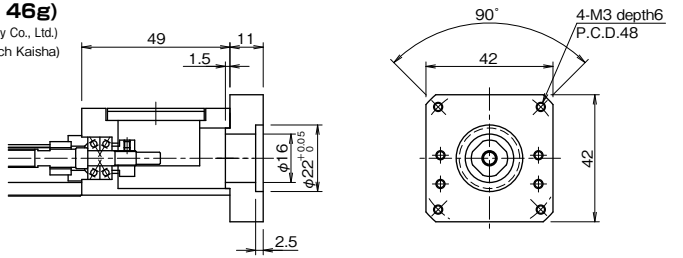
Motor Bracket A9 (Mass: 14g)

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



Motor Bracket AA(Mass: 46g)

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

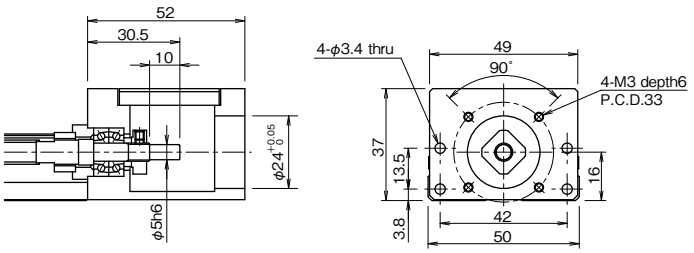


For configurations A5, A6, A9 and AA, attach the motor to the motor mount adapter plate first.

BG26

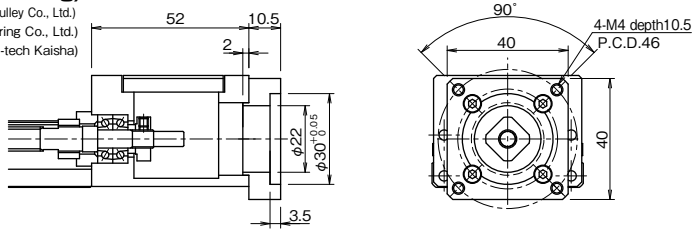
Figures inside( ) indicates mass of the motor mount adapter plate.

Motor Bracket A0



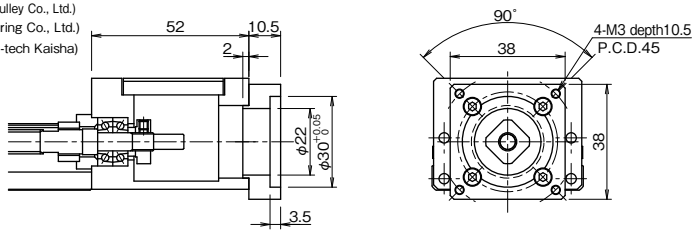
Motor Bracket A1 (Mass: 28g)

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



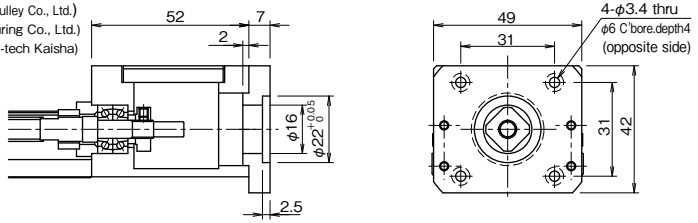
Motor Bracket A3 (Mass: 24g)

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



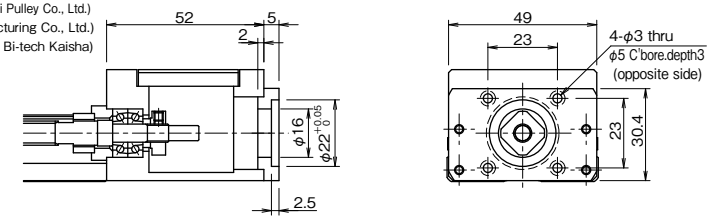
Motor Bracket A5 (Mass: 32g)

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



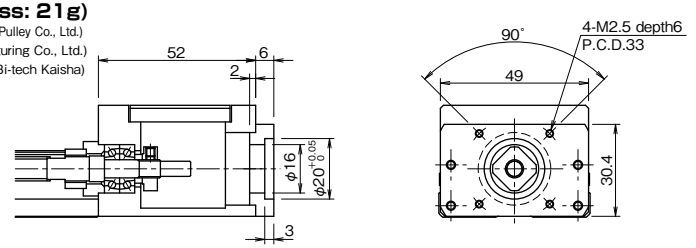
Motor Bracket A6 (Mass: 16g)

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



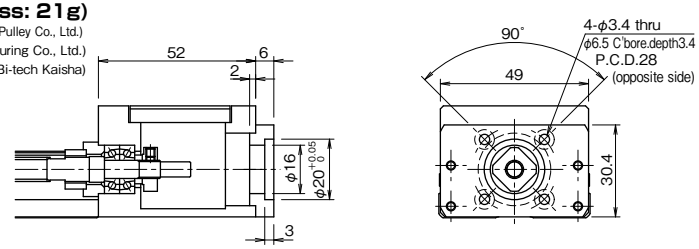
Motor Bracket A8 (Mass: 21g)

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



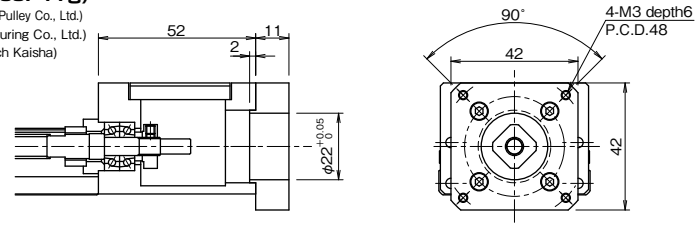
Motor Bracket A9 (Mass: 21g)

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



Motor Bracket AA (Mass: 41g)

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

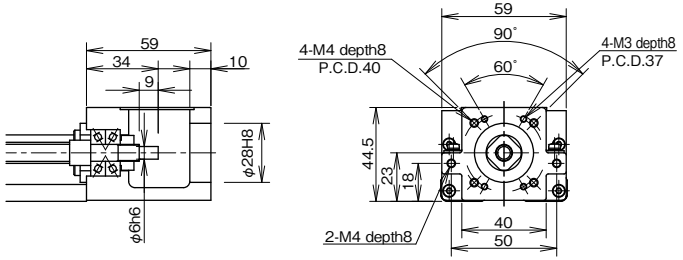


For configurations A5, A6 and A9, attach the motor to the motor mount adapter plate first.

BG33

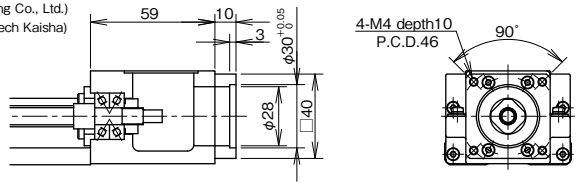
Figures inside( ) indicates mass of the motor mount adapter plate.

Motor Bracket A0



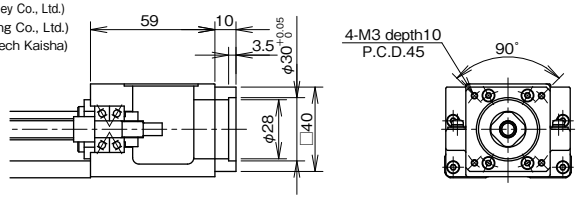
Motor Bracket A1 (Mass: 66g)

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



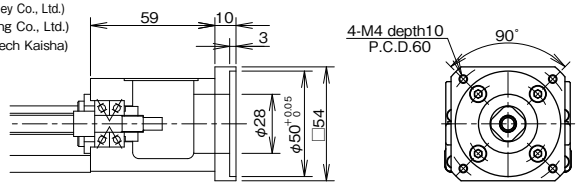
Motor Bracket A2 (Mass: 67g)

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



Motor Bracket A3 (Mass: 133g)

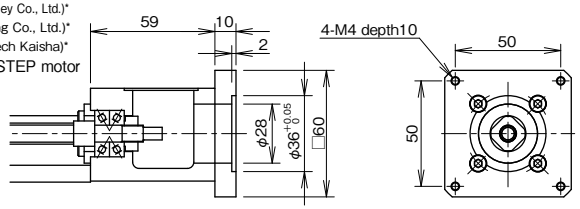
Recommended Coupling: SFC-020DA2(Miki Pulley Co., Ltd.)
LAD-25C(Sakai Manufacturing Co., Ltd.)
XBW-25C2(Nabeya Bi-tech Kaisha)



Motor Bracket A4 (Mass: 212g)

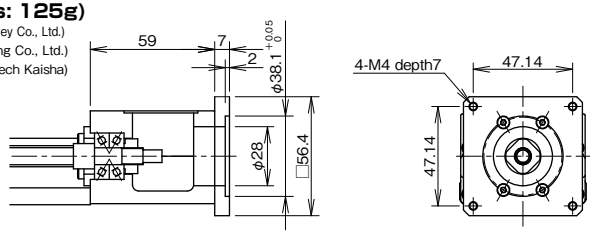
Recommended Coupling: SFC-020DA2(Miki Pulley Co., Ltd.)*
LAD-25C(Sakai Manufacturing Co., Ltd.)*
XBW-25C2(Nabeya Bi-tech Kaisha)*

*Please contact NB when you use αSTEP motor (Oriental Motor Co., Ltd.).



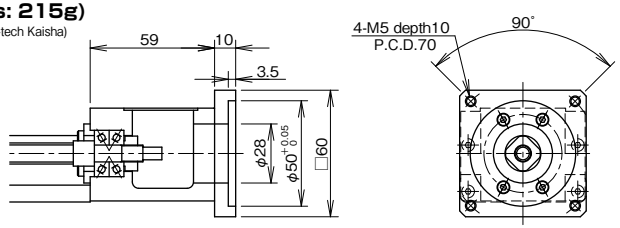
Motor Bracket A5 (Mass: 125g)

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



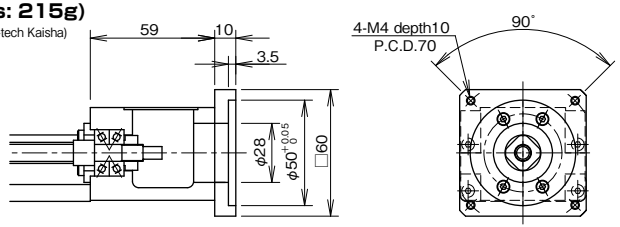
Motor Bracket A6 (Mass: 215g)

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



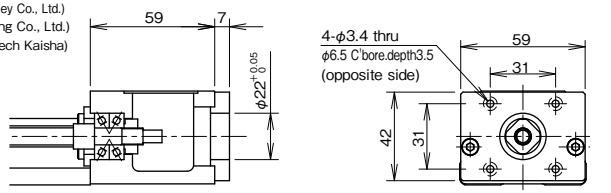
Motor Bracket A7 (Mass: 215g)

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



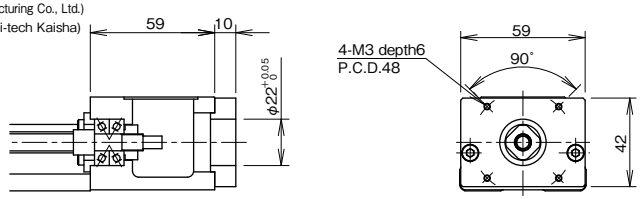
Motor Bracket B1 (Mass: 111g)

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



Motor Bracket B2 (Mass: 167g)

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



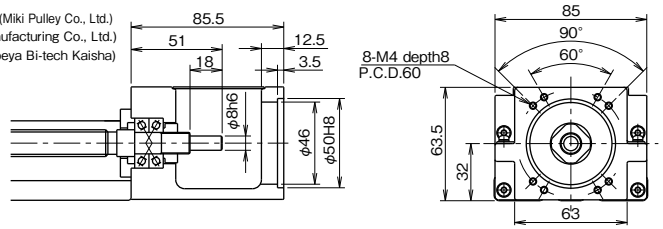
For configurations B1 and B2, attach the motor to the motor mount adapter plate first.

BG46

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

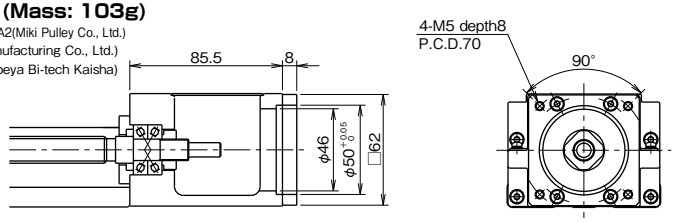
Motor Bracket A0

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



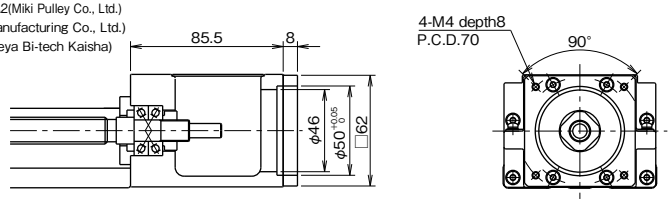
Motor Bracket A1 (Mass: 103g)

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



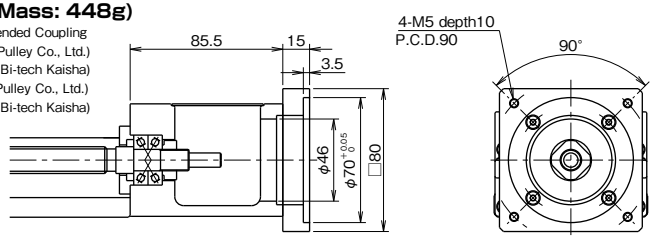
Motor Bracket A2 (Mass: 106g)

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



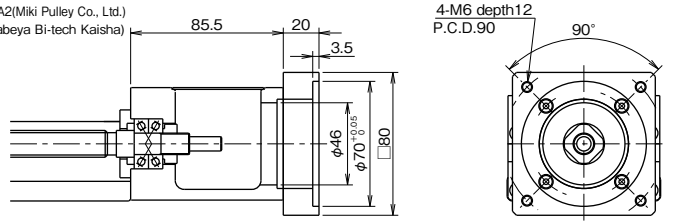
Motor Bracket A3 (Mass: 448g)

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)



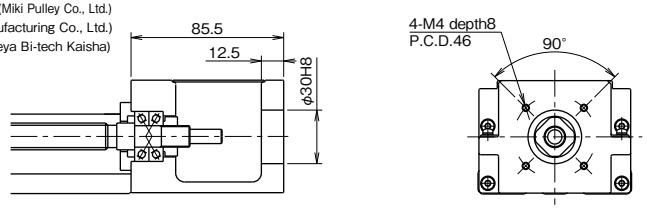
Motor Bracket A4 (Mass: 628g)

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



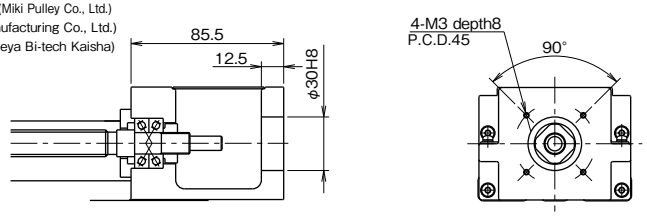
Motor Bracket B0

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



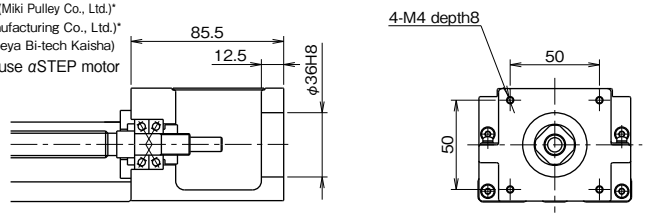
Motor Bracket C0

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



Motor Bracket 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.).

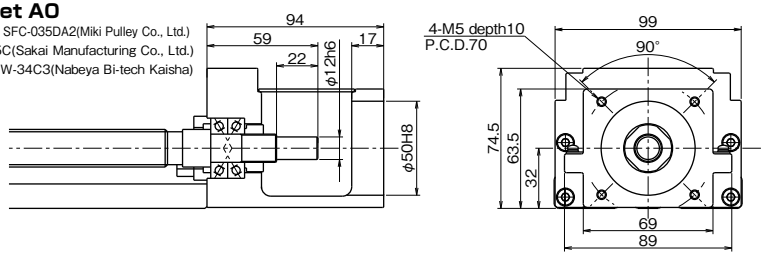


BG55

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

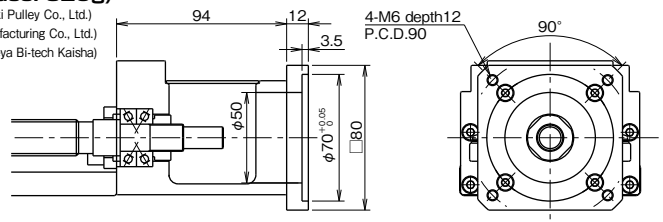
Motor Bracket A0

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



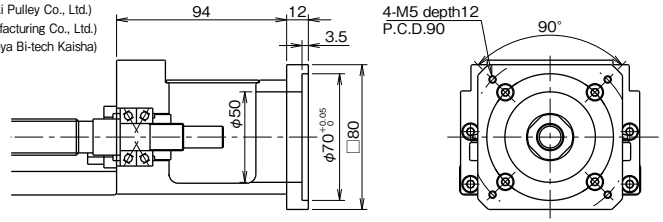
Motor Bracket A1 (Mass: 329g)

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



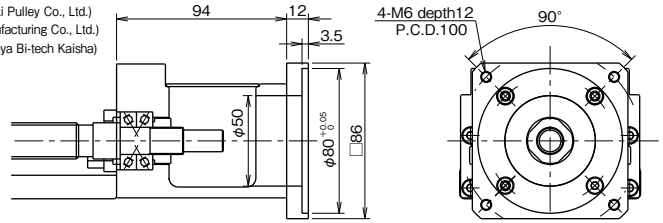
Motor Bracket A2 (Mass: 333g)

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



Motor Bracket A3 (Mass: 399g)

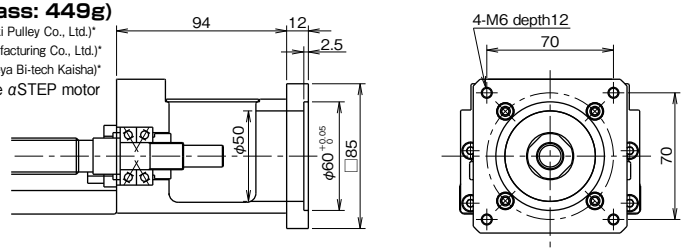
Recommended Coupling: SFC-040DA2(Miki Pulley Co., Ltd.)
LAD-40C(Sakai Manufacturing Co., Ltd.)
XBW-39C2(Nabeya Bi-tech Kaisha)



Motor Bracket A4 (Mass: 449g)

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

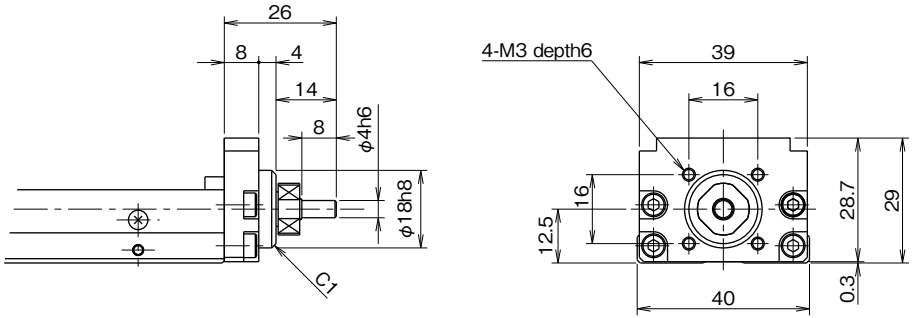
*Please contact NB when you use αSTEP motor (Oriental Motor Co., Ltd.).



EXPOSED BRACKET RO

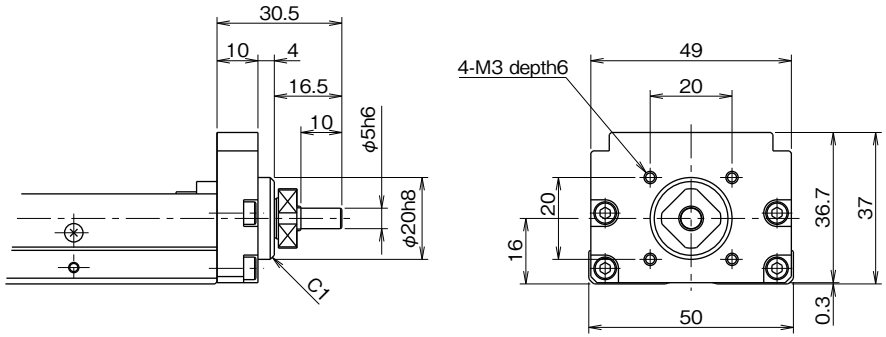
The ball screw shaft end is exposed with the exposed bracket R0 type.
Please fabricate an original bracket in case the standard brackets are not applicable.

BG20 Exposed Bracket RO



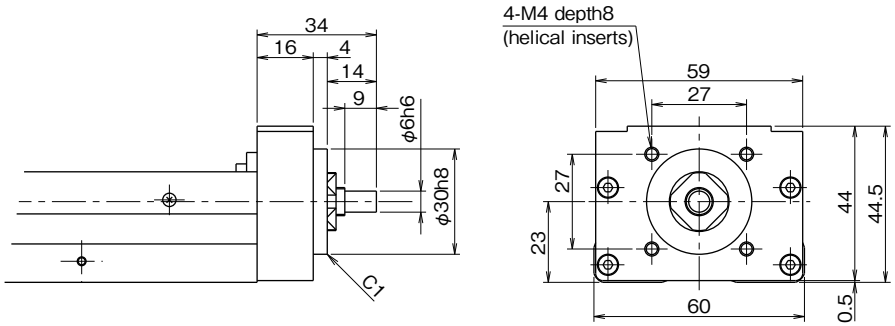
1. Applicable with cover and with sensors.
2. Mass is 0.04kg less than the mass in Table H-3 on page H-7.

BG26 Exposed Bracket RO



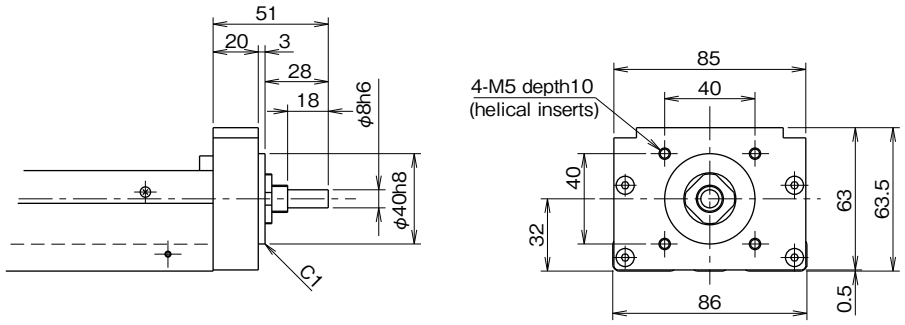
1. Applicable with cover and with sensors.
2. Mass is 0.08kg less than the mass in Table H-3 on page H-7.

BG33 Exposed Bracket R0



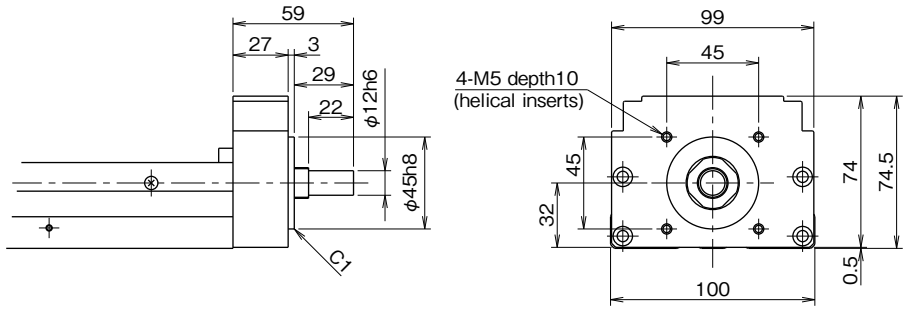
1. Applicable with cover and with sensors.
2. Mass is 0.1kg less than the mass in Table H-3 on page H-7.

BG46 Exposed Bracket R0



1. Applicable with cover and with sensors.
2. Mass is 0.3kg less than the mass in Table H-3 on page H-7.

BG55 Exposed Bracket R0

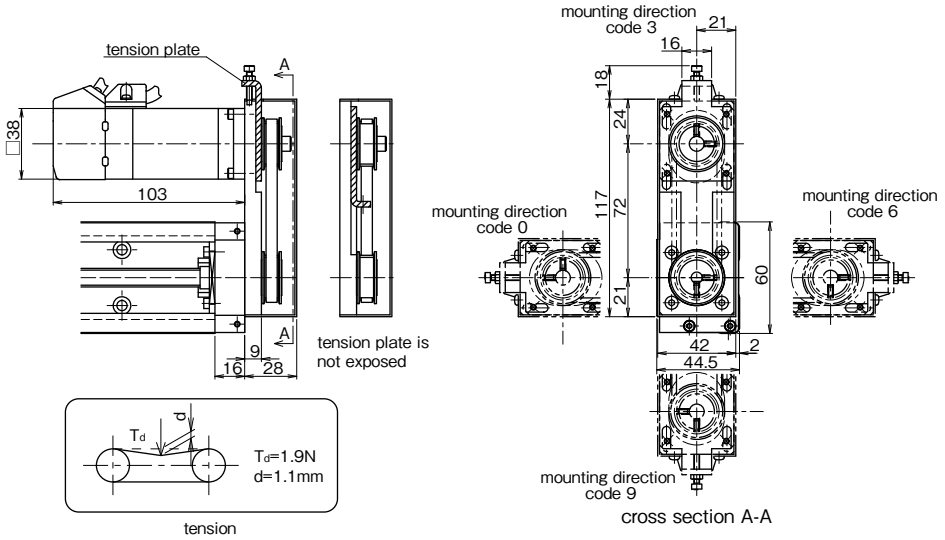


1. Applicable with cover and with sensors.
2. Mass is 0.3kg less than the mass in Table H-3 on page H-7.

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 Return Pulley Unit



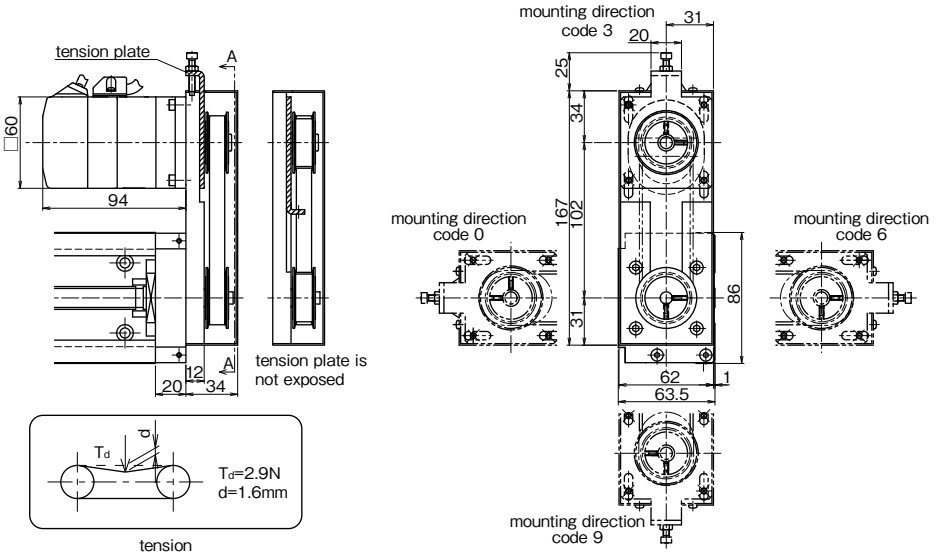
1.This drawing shows RA for MSMA01(Panasonic).
2.Installation position of Pulley Unit can be selected at 90° intervals (mounting direction code).
3.Applicable with cover and with sensors.
4.Tension plate can be built in and is not exposed. (not applicable to RC)
5.Mass is added 0.2kg to the mass in Table H-3, page H-7.
6.Inertia is added 2.22×10^{-6}kg・m^2 to the value of Table H-5, page H-8. (motor inertia not included)
7.Part number structure BG33＊＊＊—＊＊＊＊/ ☆☆□
☆☆: Symbol of applicable motor bracket (refer to Table H-14)
□: Mounting direction code (refer to cross section A-A)

Table H-14 Applicable Motor

motor bracket	applicable motors	
RA	Panasonic	MINAS SERIES : 50~100W
RB	YASKAWA ELECTRIC	SIGMA SERIES : 50~100W
	MITSUBISHI ELECTRIC	HC-MF SERIES : 50~100W
	SANYO DENKI	Q1 SERIES : 50~100W
RC	5 PHASE STEPPING MOTOR	□42 SERIES

Please contact NB for other stepper motors.

BG46 Return Pulley Unit



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.
4.Tension plate can be built in and is not exposed. (not applicable to RC)
5.Mass is added 0.7kg to the value in Table H-3, page H-7.
6.Inertia is added 1.24×10^{-5}kg・m^2 to the value of Table H-5, page H-8. (motor inertia not included)
7.Parts number structure BG46＊＊＊—＊＊＊＊/☆☆□
☆☆: Symbol of applicable motor bracket (refer to Table H-15)
□: Mounting direction code (refer to cross section A-A)

Table H-15 Applicable Motor

motor bracket	applicable motors	
RA	Panasonic	MINAS SERIES : 200W
RB	YASKAWA ELECTRIC	SIGMA SERIES : 200W
	MITSUBISHI ELECTRIC	HC-MF SERIES : 200W
	SANYO DENKI	Q1 SERIES : 200W
RC	5 PHASE STEPPING MOTOR	□60 SERIES

Please contact NB for other stepper motors.

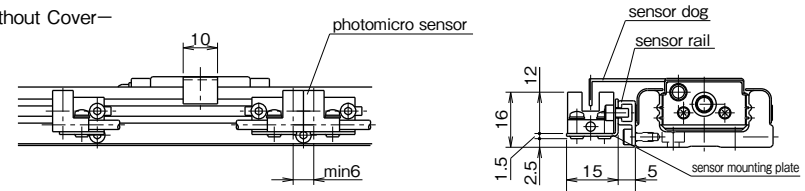
SENSOR

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.

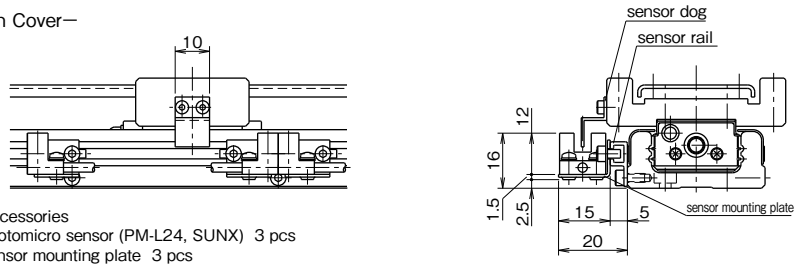
BG20

S Specification (Compact Photomicro Sensor)

—Without Cover—



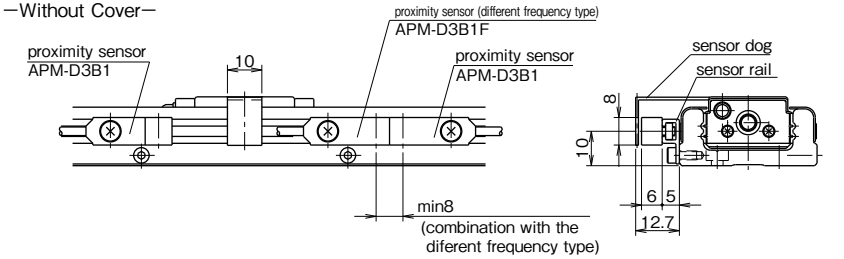
—With Cover—



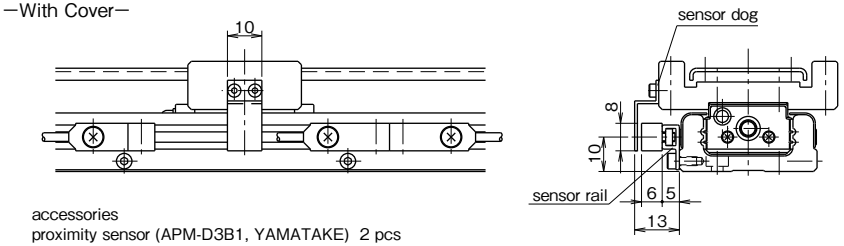
Accessories
photomicro sensor (PM-L24, SUNX) 3 pcs
sensor mounting plate 3 pcs
sensor rail 1 pc
sensor dog 1 pc

K Specification (Proximity Sensor)

—Without Cover—



—With Cover—

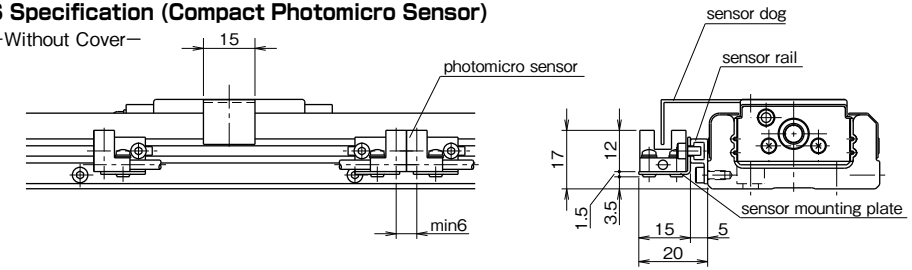


accessories
proximity sensor (APM-D3B1, YAMATAKE) 2 pcs
proximity sensor (different frequency type)(APM-D3B1F, YAMATAKE) 1 pc
sensor rail 1 pc
sensor dog 1 pc

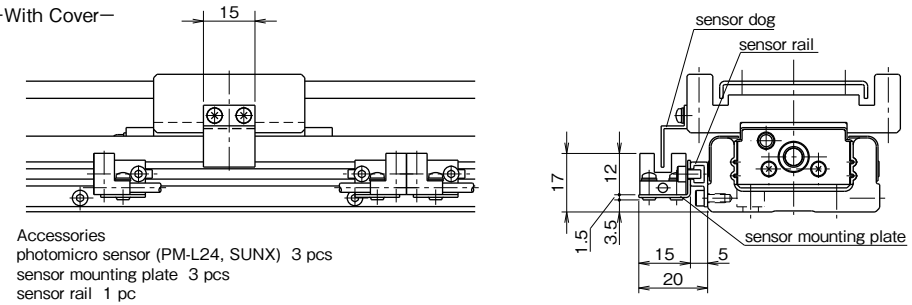
BG26

S Specification (Compact Photomicro Sensor)

—Without Cover—



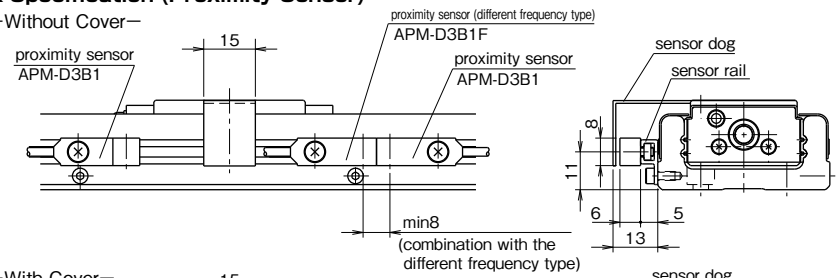
—With Cover—



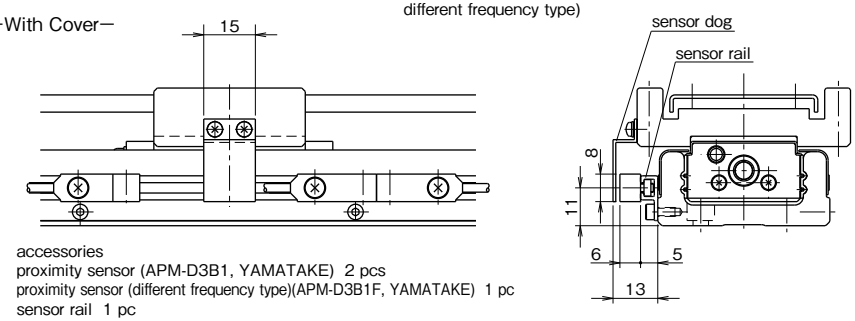
Accessories
photomicro sensor (PM-L24, SUNX) 3 pcs
sensor mounting plate 3 pcs
sensor rail 1 pc
sensor dog 1 pc

K Specification (Proximity Sensor)

—Without Cover—



—With Cover—

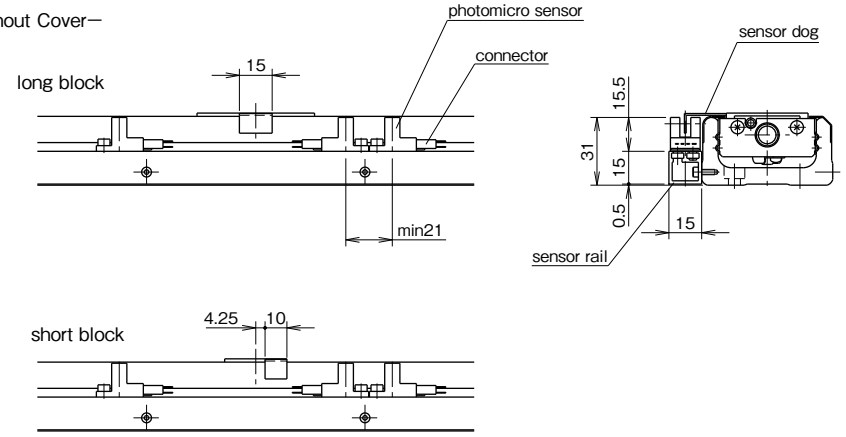


accessories
proximity sensor (APM-D3B1, YAMATAKE) 2 pcs
proximity sensor (different frequency type)(APM-D3B1F, YAMATAKE) 1 pc
sensor rail 1 pc
sensor dog 1 pc

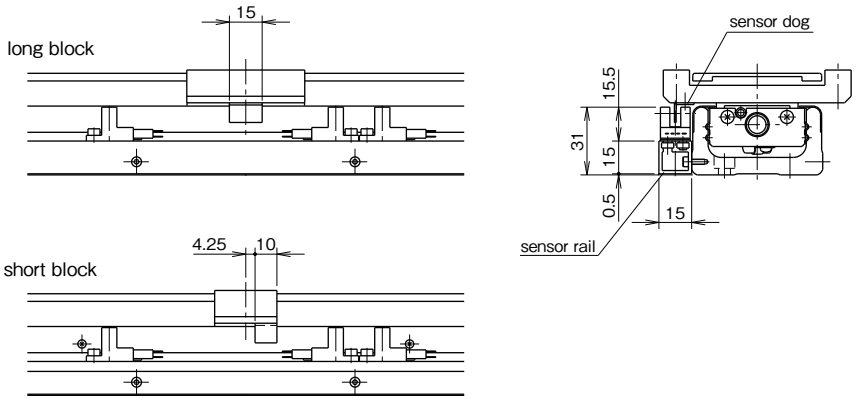
BG33

S Specification (Slim-Type Photomicro Sensor)

—Without Cover—



—With Cover—

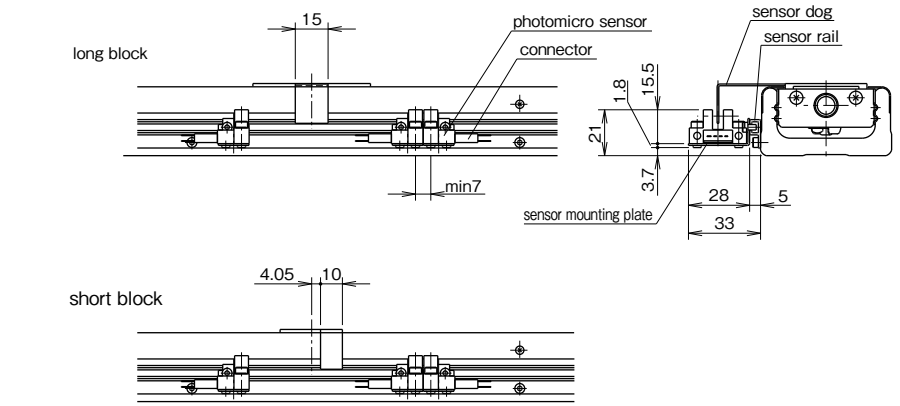


accessories
photomicro sensor (EE-SX674, OMRON) 3 pcs
connector (EE-1001, OMRON) 3 pcs
sensor rail 1 pc
sensor dog *1 pc
* 2 pcs for BG33D-150.

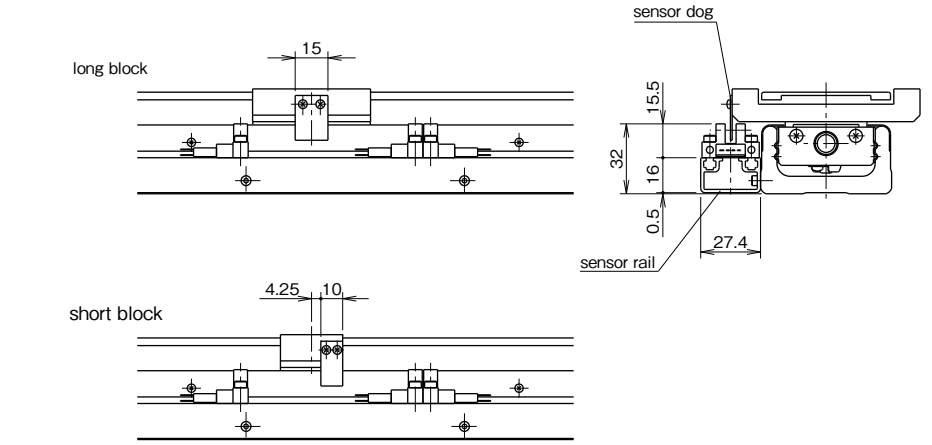
BG33

H Specification (Close Contact Capable Photomicro Sensor)

—Without Cover—



—With Cover—

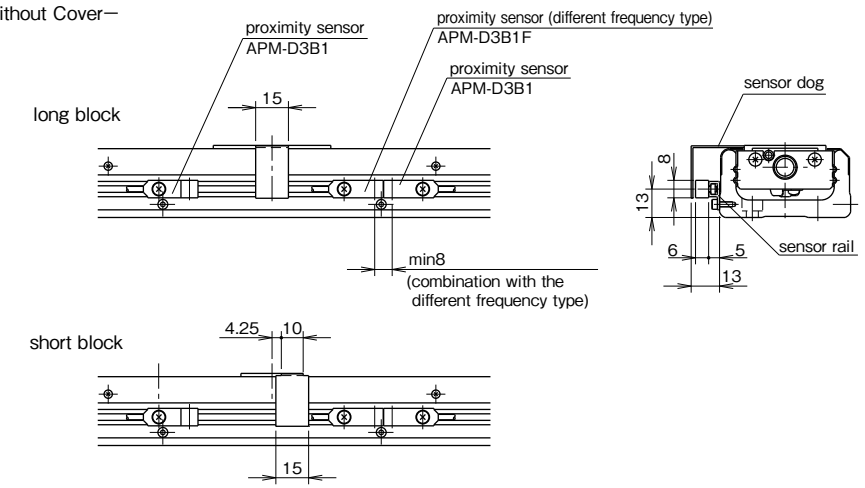


accessories
photomicro sensor (EE-SX671, OMRON) 3 pcs
connector (EE-1001, OMRON) 3 pcs
sensor mounting plate (only for the without cover type) 3 pcs
sensor rail 1 pc
sensor dog *1 pcs
* 2 pcs for BG33D-150.

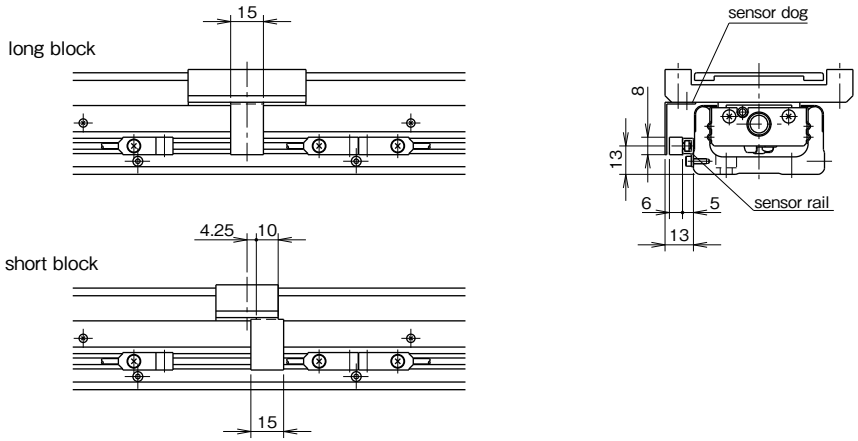
BG33

K Specification (Proximity Sensor)

—Without Cover—



—With Cover—

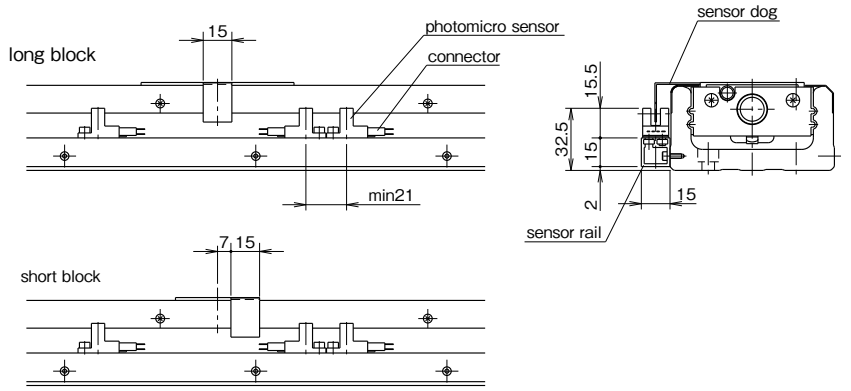


accessories
proximity sensor (APM-D3B1, YAMATAKE) 2 pcs
proximity sensor (different frequency type)(APM-D3B1F, YAMATAKE) 1 pc
sensor rail 1 pc
sensor dog *1 pc
* 2 pcs for BG33D-150.

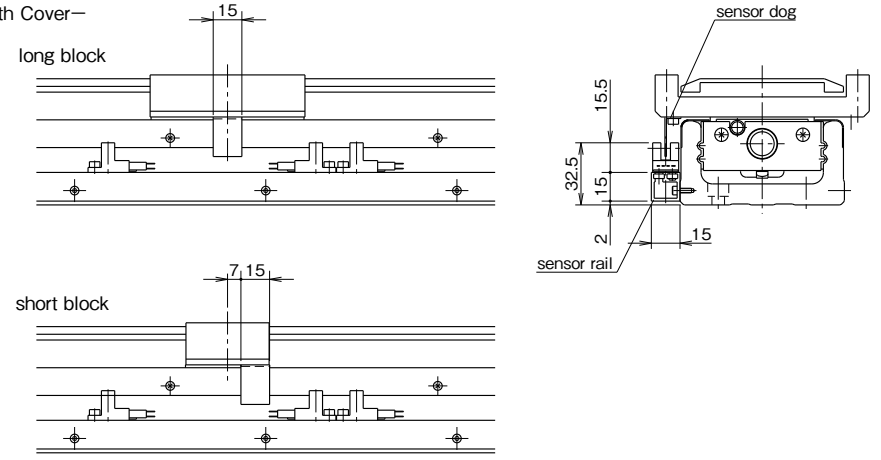
BG46

S Specification (Slim-Type Photomicro Sensor)

—Without Cover—



—With Cover—

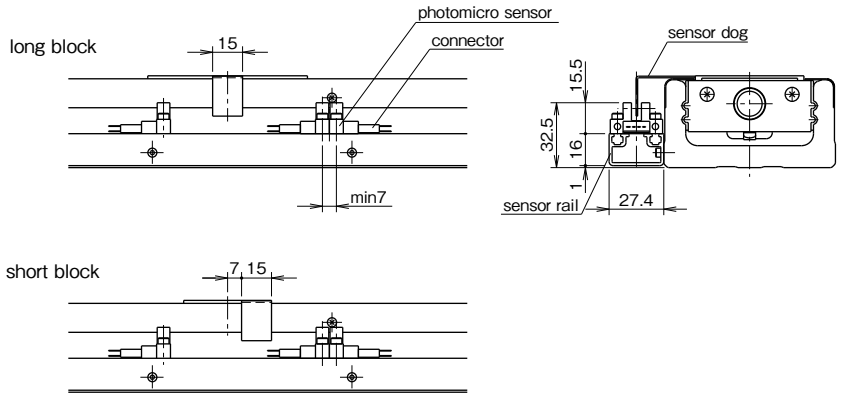


accessories
photomicro sensor (EE-SX674, OMRON) 3 pcs
connector (EE-1001, OMRON) 3 pcs
sensor rail 1 pc
sensor dog 1 pc

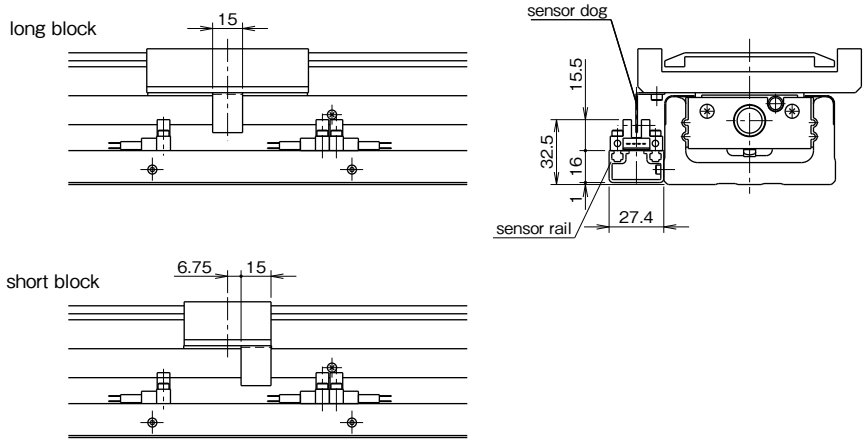
BG46

H Specification (Close Contact Capable Photomicro Sensor)

—Without Cover—



—With Cover—

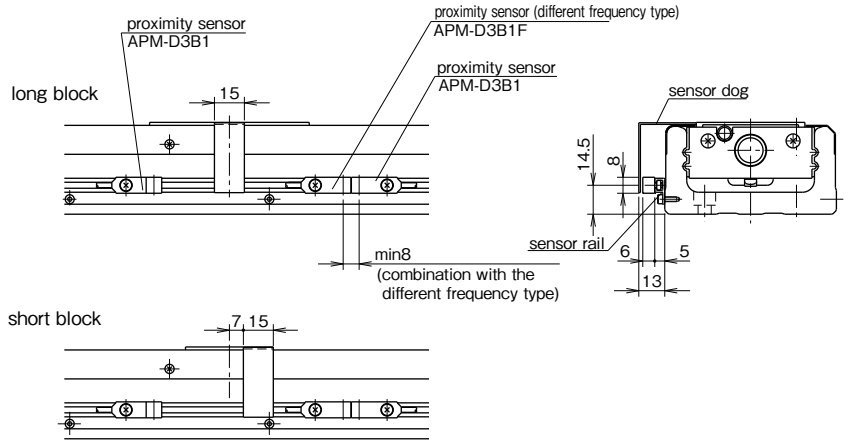


accessories
photomicro sensor (EE-SX671, OMRON) 3 pcs
connector (EE-1001, OMRON) 3 pcs
sensor rail 1 pc
sensor dog 1 pc

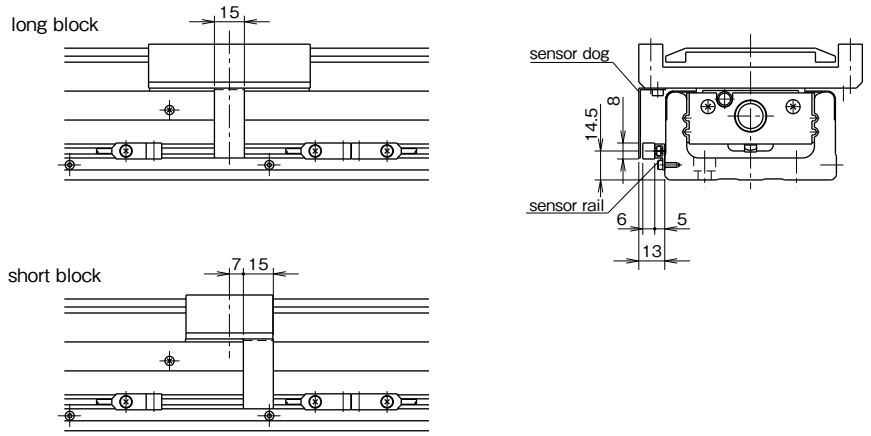
BG46

K Specification (Proximity Sensor)

—Without Cover—



—With Cover—

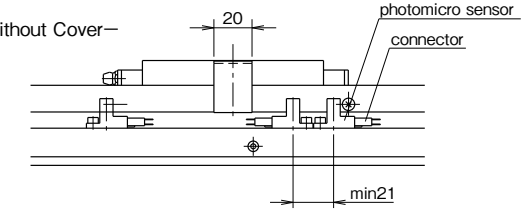


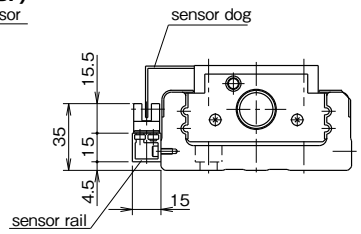
accessories
proximity sensor (APM-D3B1, YAMATAKE) 2 pcs
proximity sensor (different frequency type)(APM-D3B1F, YAMATAKE) 1 pc
sensor rail 1 pc
sensor dog 1 pc

BG55

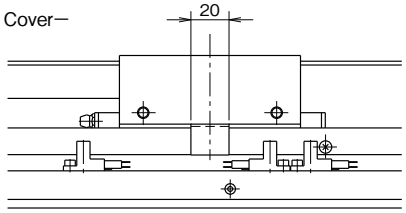
S Specification (Compact Photomicro Sensor)

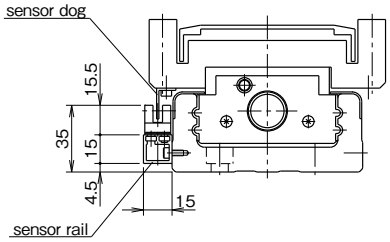
—Without Cover—





—With Cover—

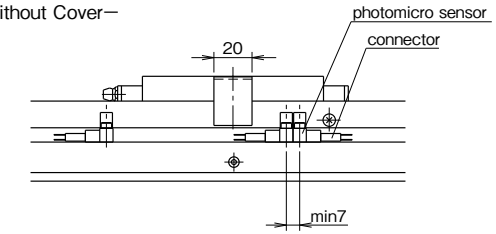


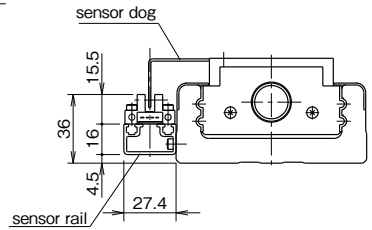


accessories
photomicro sensor (EE-SX674, OMRON) 3 pcs
connector (EE-1001, OMRON) 3 pcs
sensor rail 1 pc
sensor dog 1 pc

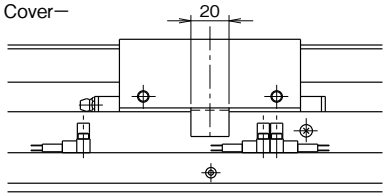
H Specification (Close Contact Capable Photomicro Sensor)

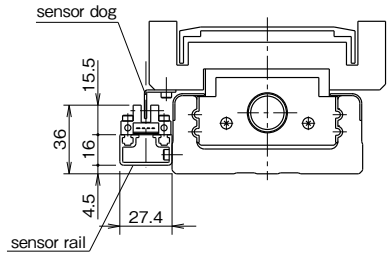
—Without Cover—





—With Cover—



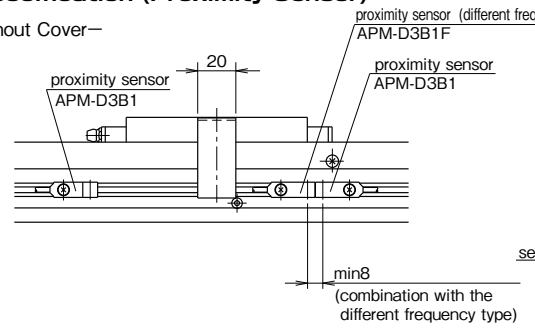


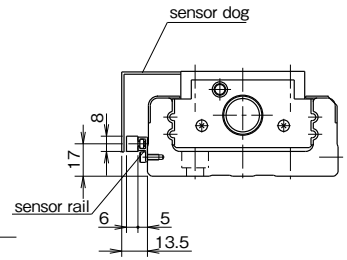
accessories
photomicro sensor (EE-SX671, OMRON) 3 pcs
connector (EE-1001, OMRON) 3 pcs
sensor rail 1 pc
sensor dog 1 pc

BG55

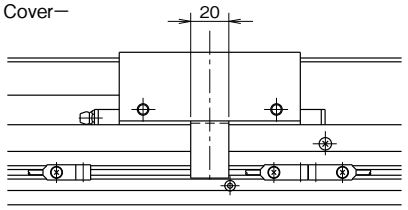
K Specification (Proximity Sensor)

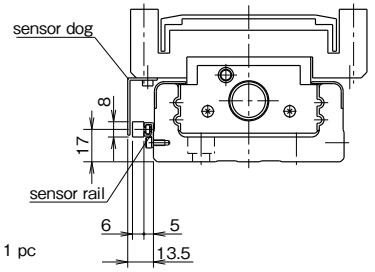
—Without Cover—





—With Cover—





accessories
proximity sensor (APM-D3B1, YAMATAKE) 2 pcs
proximity sensor (different frequency type)(APM-D3B1F, YAMATAKE) 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-16 for the model number of PNP type sensors.

Table H-16 Sensor Type

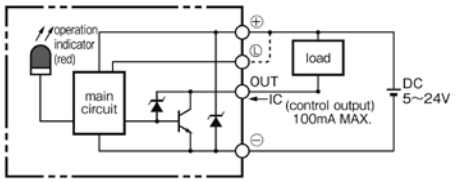
sensor code	sensor type	applicable model type	standard specification	PNP specification model type
S	slim-type photomicro sensor	BG33, BG46, BG55	EE-SX674	EE-SX674P
	compact photomicro sensor	BG20, BG26	PM-L24	PM-L24P
H	close contact capable photomicro sensor	BG33, BG46, BG55	EE-SX671	EE-SX671P
K	proximity sensor	all model types	APM-D3B1	APM-D3E1
	proximity sensor (different frequency type)	all model types	APM-D3B1F	APM-D3E1F

SENSOR SPECIFICATIONS

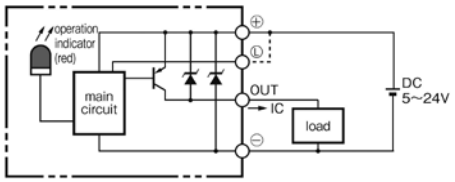
slim-type, close contact capable photomicro sensor (symbol: S,H)/ OMRON CORPORATION

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		35mA max. (NPN), 30 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 Y,Y, and Z directions	
degree of protection		IEC60529 IP50	
connection method		connector type (direct soldering possible)	
weight		approx. 3g	
material	case	Polybutylene phthalate (PBT)	
	cover	Polycarbonate (PC)	
	emitter/receiver		

NPN TYPE
CIRCUIT DIAGRAM



PNPTYPE
CIRCUIT DIAGRAM

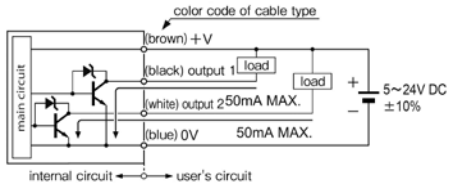


Please read the specifications and precautions of the manufacture's catalog.

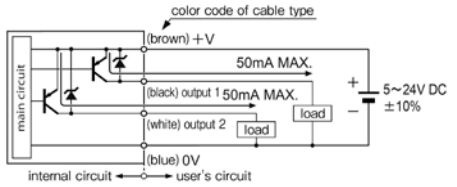
compact photomicro sensor (symbol: S)/ SUNX LIMITED

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/s^2 acceleration (1,500 G approx.) in X, Y, and Z directions for three times each
cable		0.09mm^2 4-core cabtyre cable 1m long
weight		approx. 10g
material	case	Polybutylene phthalate (PBT)
	cover	Polycarbonate

NPN TYPE
CIRCUIT DIAGRAM



PNP TYPE
CIRCUIT DIAGRAM

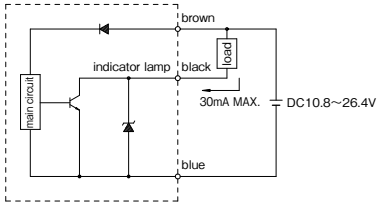


Please read the specifications and precautions of the manufacture's catalog.

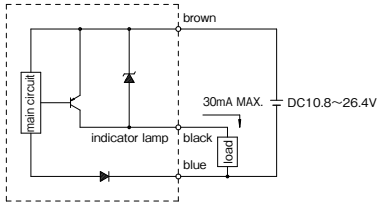
proximity sensor (symbol: K)/ YAMATAKE CORPORATION

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

NPN TYPE
CIRCUIT DIAGRAM



PNP TYPE
CIRCUIT DIAGRAM



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

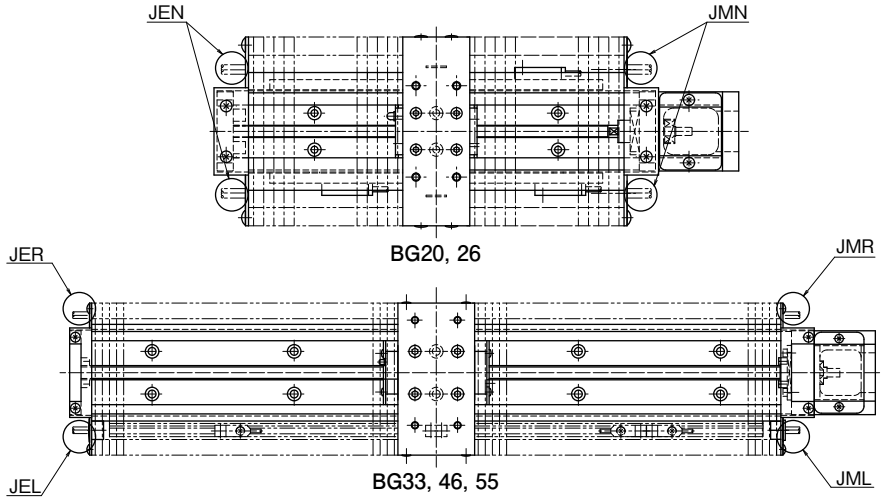
BELLOWS

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-16 shows.

Figure H-16 Position of Sensor Cable Outlet



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

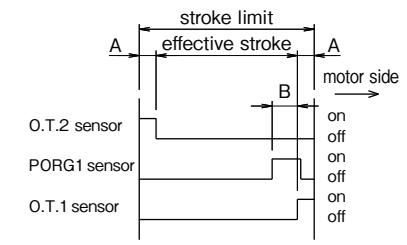
part number structure for bellows

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 BG20 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.

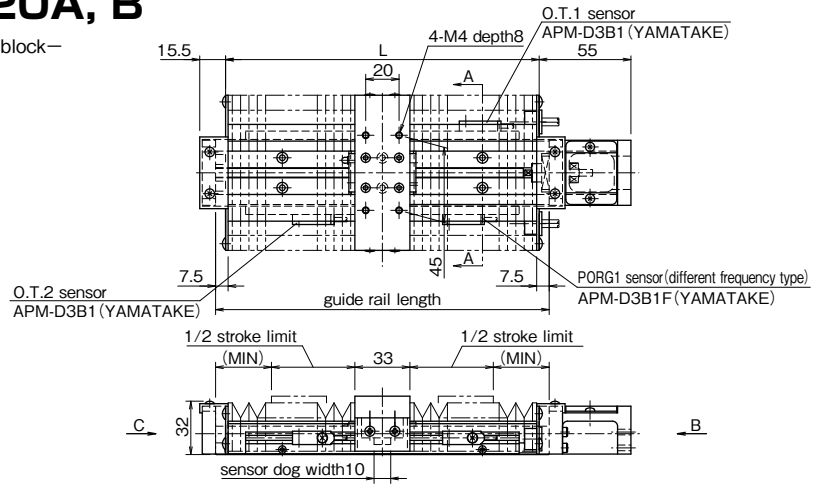
Figure H-17 Sensor Timing Chart



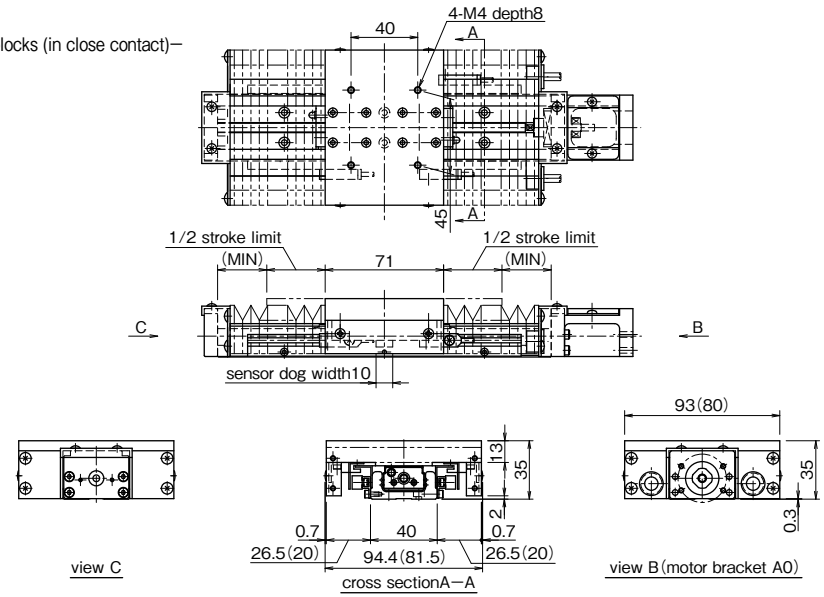
part number	A	B
BG20	5	8
BG26	5	13
BG33	10	13
BG46	10	13
BG55	10	13

BG20A, B

—1 long block—



—2 long blocks (in close contact)—



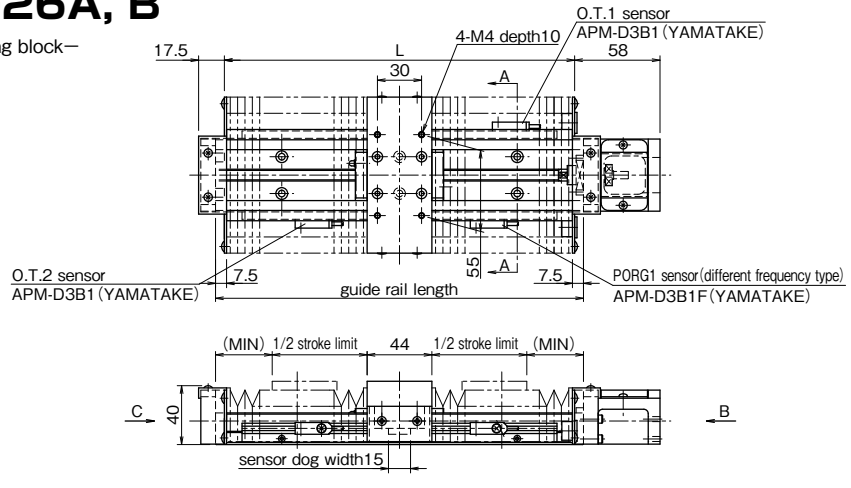
1. The drawings show the "JMN" configuration.
2. The numbers in the parentheses are the dimensions when sensors are not selected.
3. Please refer to page H-56 for dimensions that are not shown on the drawings.
4. material of bellows: composite resin sheet (shining black)

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

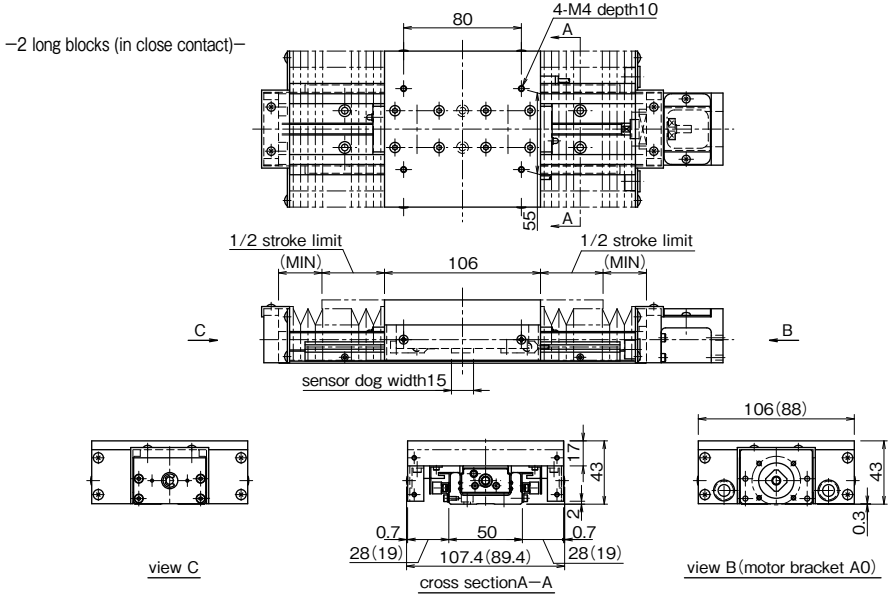
※The rail mounting holes at the center cannot be used for the rail length 150 with two long blocks.

BG26A, B

—1 long block—



—2 long blocks (in close contact)—



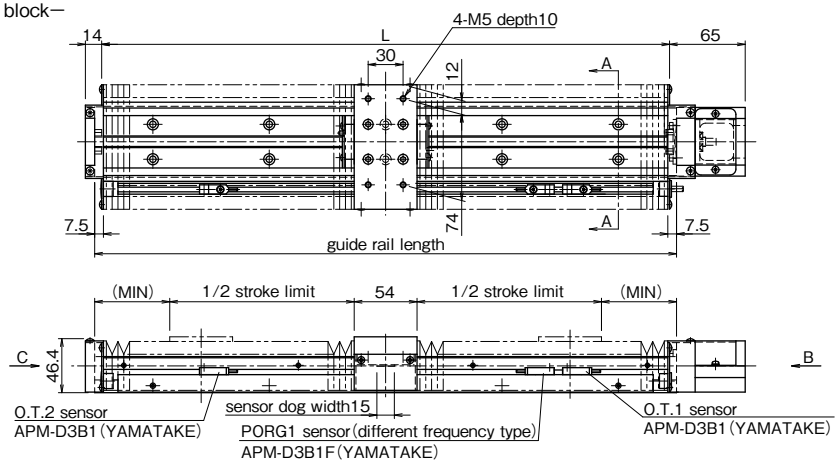
1. The drawings show the "JMN" configuration.
2. The numbers in the parentheses are the dimensions when sensors are not selected.
3. Please refer to page H-58 for dimensions that are not shown on the drawings.
4. material of bellows: composite resin sheet (shining black)

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

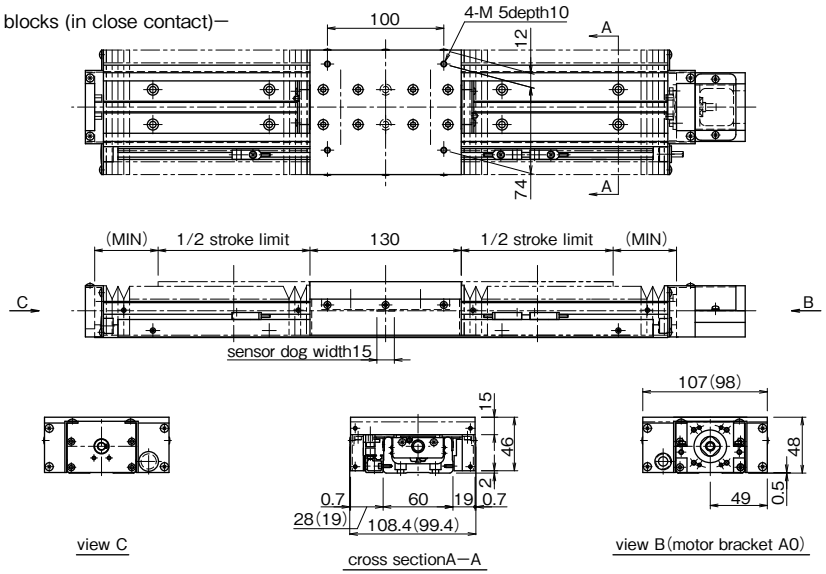
※The rail mounting holes at the center cannot be used for the rail length 200 with two long blocks.

BG33A, B

−1 long block−



−2 long blocks (in close contact)−



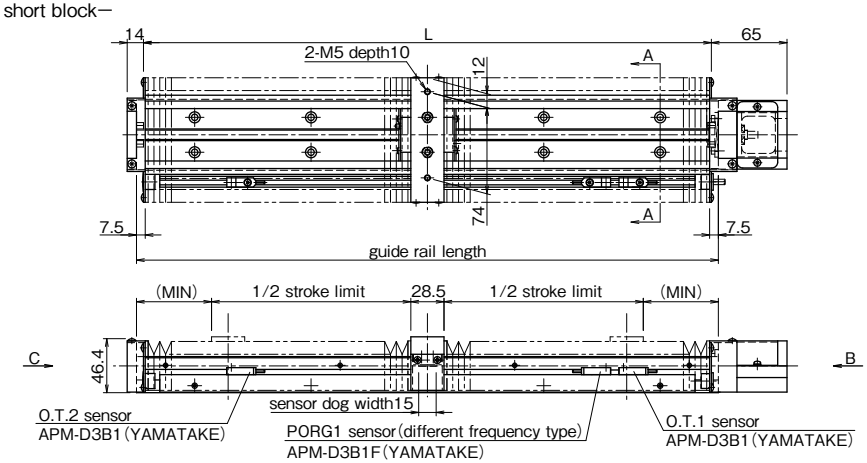
1. The drawings show the "JML" configuration. The cross sections become reversed when "J*R" is selected.
2. The numbers in the parentheses are the dimensions when sensors are not selected.
3. Please refer to page H-60 for dimensions that are not shown on the drawings.
4. material of bellows: composite resin sheet (shining 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

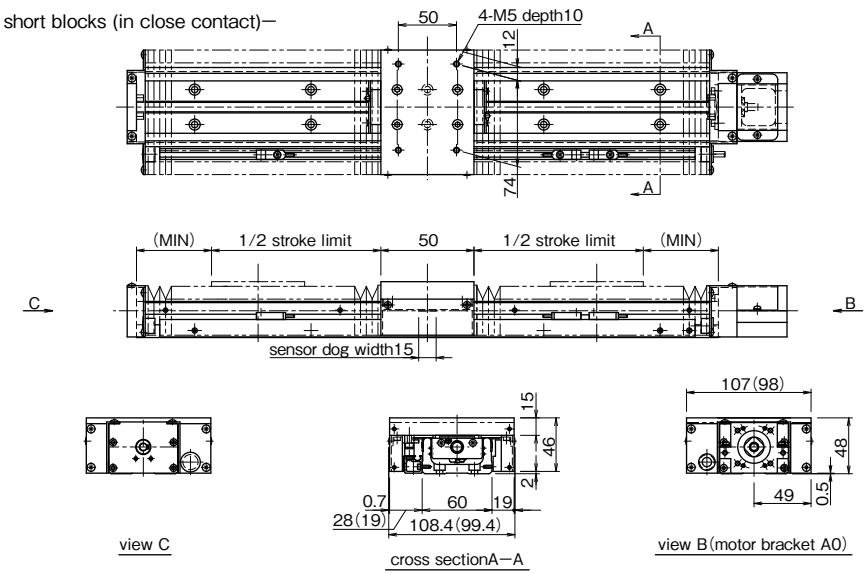
※The rail mounting holes at the center cannot be used for the rail length 300 with two long blocks.

BG33C, D

−1 short block−



−2 short blocks (in close contact)−

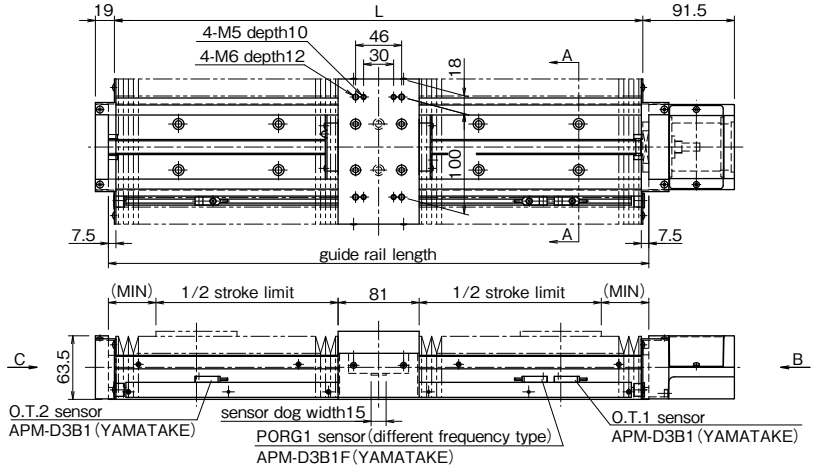


1. The drawings show the "JML" configuration. The cross sections become reversed when "J*R" is selected.
2. The numbers in the parentheses are the dimensions when sensors are not selected.
3. Please refer to page H-62 for dimensions that are not shown on the drawings.
4. material of bellows: composite resin sheet (shining black)

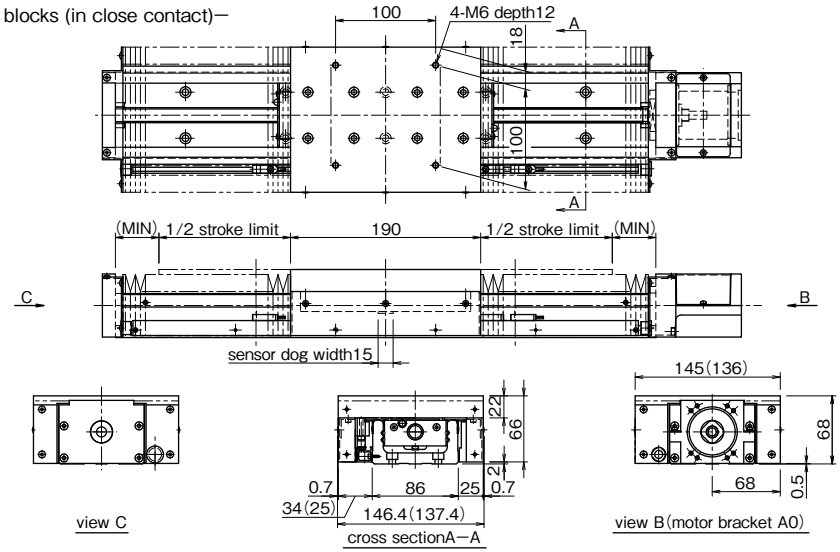
rail length	L	1 short block			2 short blocks		
		stroke limit	effective stroke	MIN	stroke limit	effective stroke	MIN
150	138	68.5	48.5	26.5	—	—	—
200	188	104.5	84.5	33.5	67	47	26.5
300	288	184.5	164.5	43.5	143	123	38.5
400	388	262.5	242.5	54.5	211	191	54.5
500	488	342.5	322.5	64.5	291	271	64.5
600	588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

BG46A, B

−1 long block−



−2 long blocks (in close contact)−



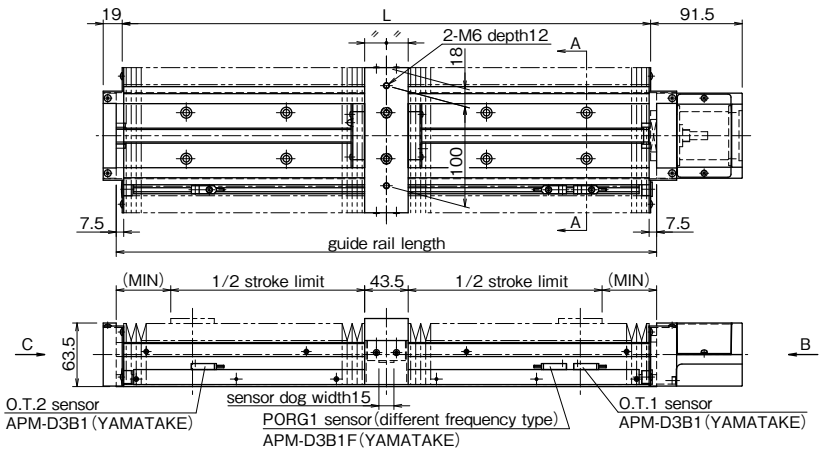
1. The drawings show the "JML" configuration. The cross sections become reversed when "J*R" is selected.
2. The numbers in the parentheses are the dimensions when sensors are not selected.
3. Please refer to page H-64 for dimensions that are not shown on the drawings.
4. material of bellows: composite resin sheet (shining 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

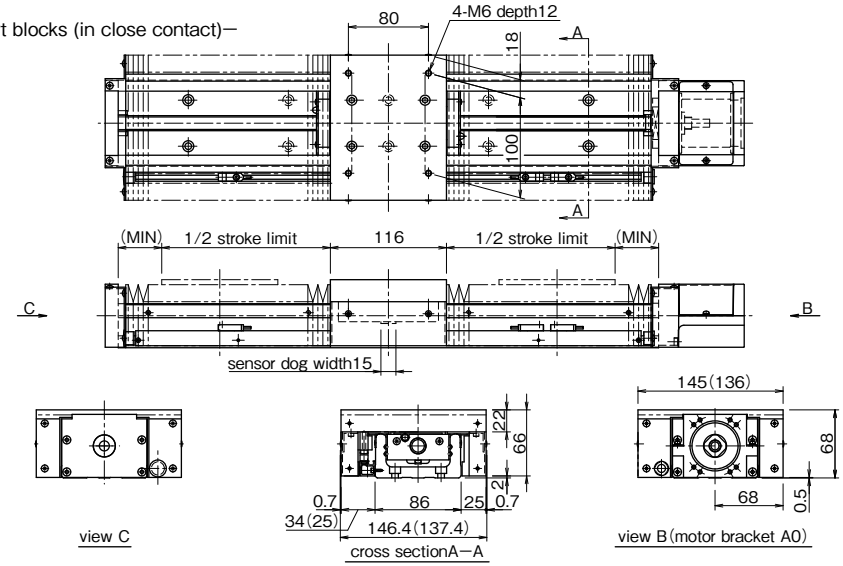
※The rail mounting holes at the center cannot be used for the rail length 340 with two short or long blocks.

BG46C, D

−1 short block−



−2 short blocks (in close contact)−



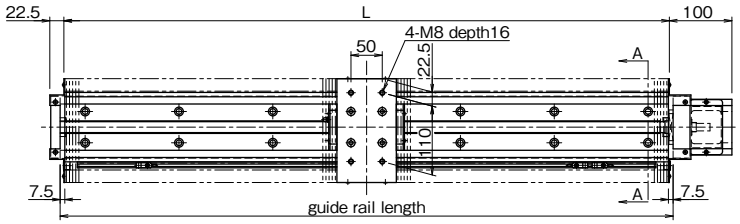
1. The drawings show the "JML" configuration. The cross sections become reversed when "J*R" is selected.
2. The numbers in the parentheses are the dimensions when sensors are not selected.
3. Please refer to page H-66 for dimensions that are not shown on the drawings.
4. material of bellows: composite resin sheet (shining black)

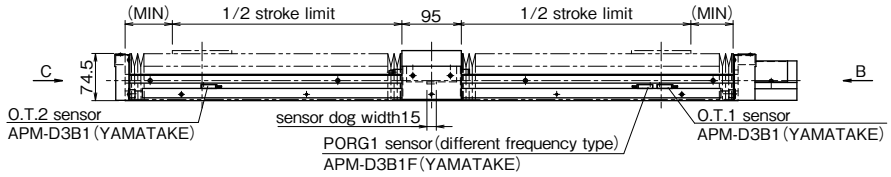
rail length	L	1 short block			2 short blocks		
		stroke limit	effective stroke	MIN	stroke limit	effective stroke	MIN
340※	328	219.5	199.5	38.5	165	145	29.5
440	428	309.5	289.5	43.5	247	227	38.5
540	528	387.5	367.5	54.5	337	317	43.5
640	628	467.5	447.5	64.5	415	395	54.5
740	728	545.5	525.5	75.5	495	475	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.

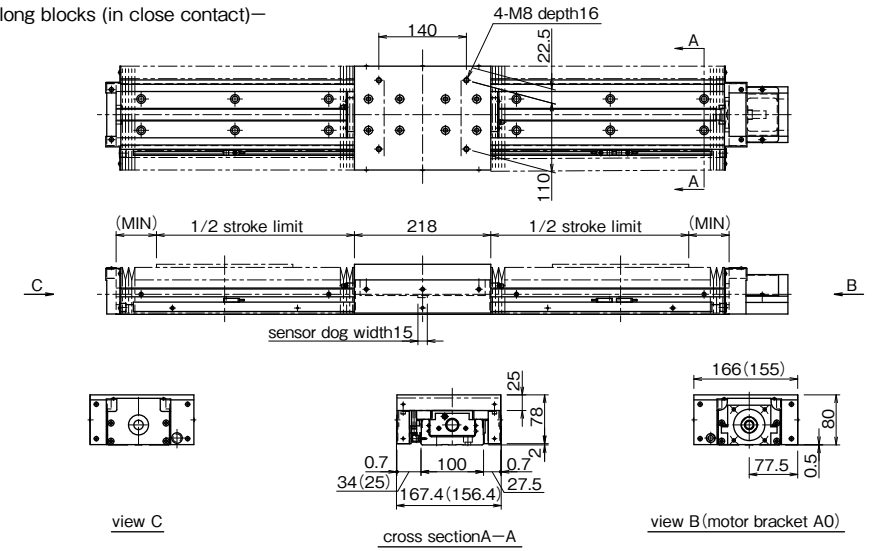
BG55A, B

—1 long block—





—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-68 for dimensions that are not shown on the drawings.
4. material of bellows: composite resin sheet (shining black)

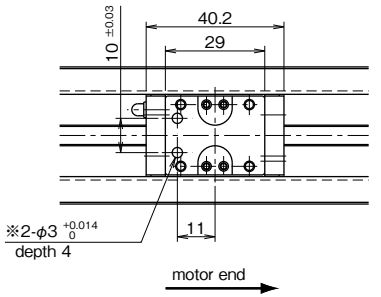
rail length	L	1 long block			2 long blocks		
		stroke limit	effective stroke	MIN	stroke limit	effective stroke	MIN
980	968	734	714	75.5	633	613	64.5
1,080	1,068	812	792	86.5	711	691	75.5
1,180	1,168	912	892	86.5	789	769	86.5
1,280	1,268	992	972	96.5	889	869	86.5
1,380	1,368	1,070	1,050	107.5	969	949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

POSITIONING PIN HOLE

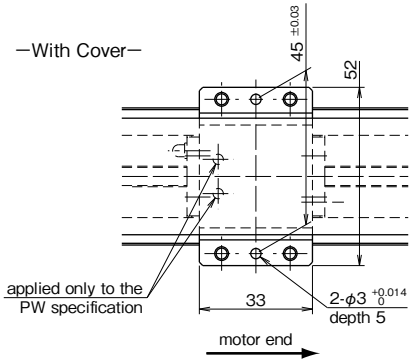
For the BG type, positioning pin holes can be provided on the slide block or the sub-table by adding the option code "PS" or "PW" at the end of the part number. When two blocks are used in the BG, the both blocks will be processed.
It is useful when exacting reassembly positioning is required.
When the code "PS" is added, the drilling is processed only on the mounting surface. On the other hand, when the code "PW" is specified for a BG with a cover, straight pins will be used at the connecting area of the slide block and the sub table (although the position is the same as the for "PS").
Note that only hole drilling is processed to the mounting surface and that no straight pin is provided.
NB provides bellows with the positioning pin hole option. Please contact NB for dimensions of the bellows.

BG20A, B

—Without Cover—



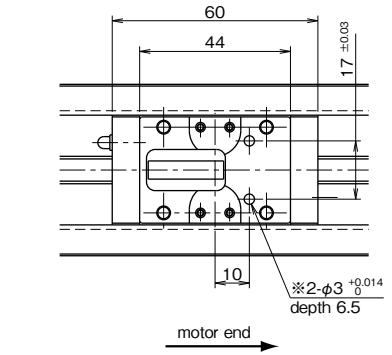
—With Cover—



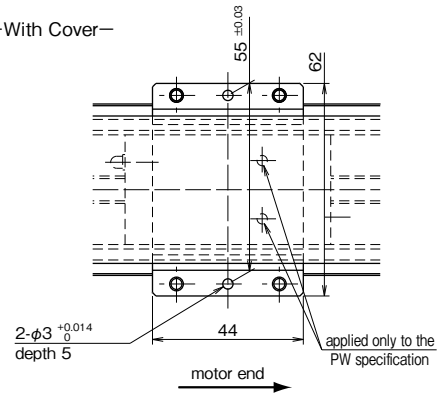
※For some cases, a shallow counterbore of φ4 will be machined at the hole area with "※" to remove a hardened layer.

BG26A, B

—Without Cover—



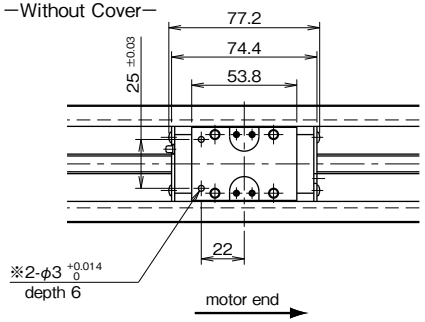
—With Cover—



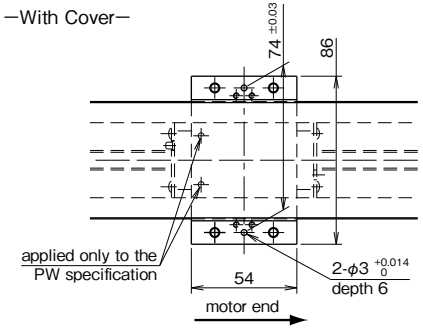
※For some cases, a shallow counterbore of φ4 will be machined at the hole area with "※" to remove a hardened layer.

BG33A, B

—Without Cover—



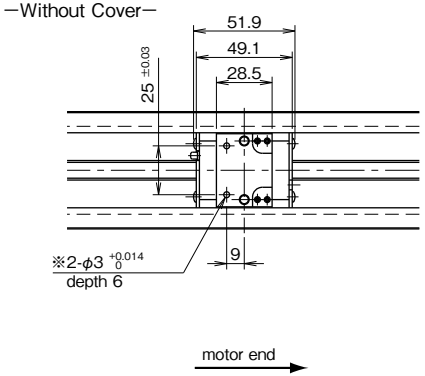
—With Cover—



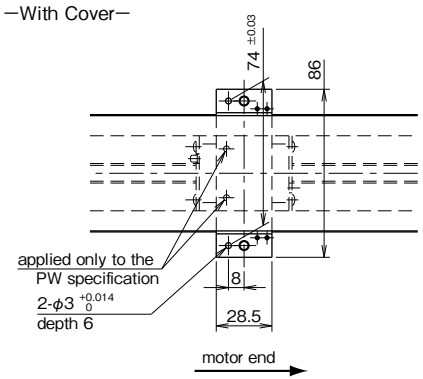
※For some cases, a shallow counterbore of φ4 will be machined at the hole area with "※" to remove a hardened layer.

BG33C, D

—Without Cover—



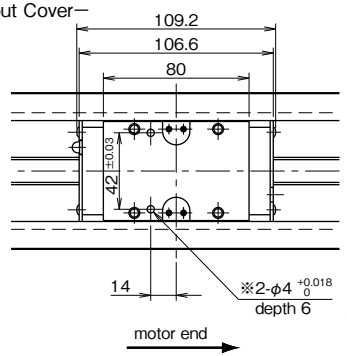
—With Cover—



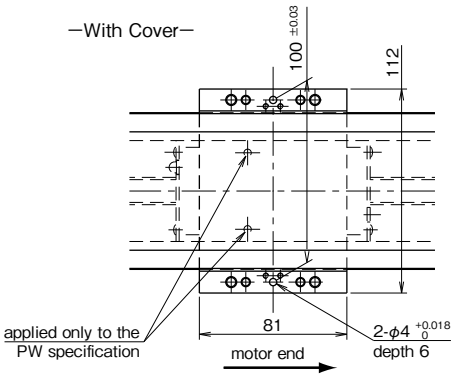
※For some cases, a shallow counterbore of φ4 will be machined at the hole area with "※" to remove a hardened layer.

BG46A, B

—Without Cover—



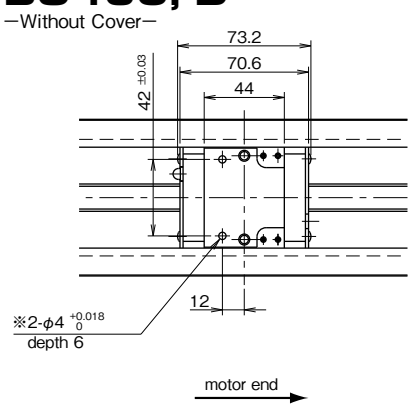
—With Cover—



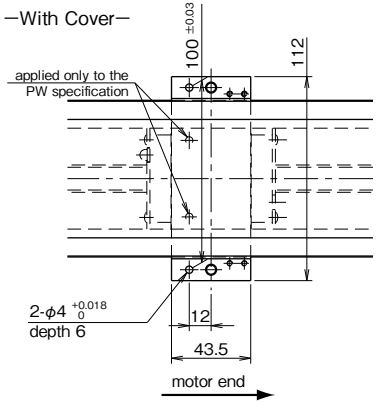
※For some cases, a shallow counterbore of φ5 will be machined at the hole area with "※" to remove a hardened layer.

BG46C, D

—Without Cover—



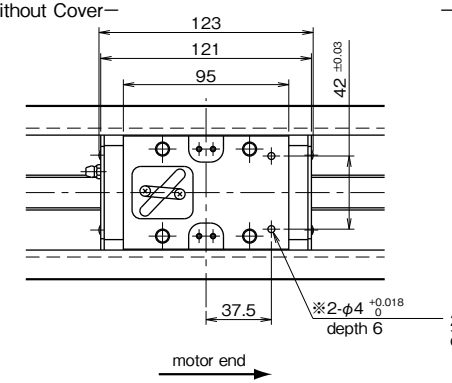
—With Cover—



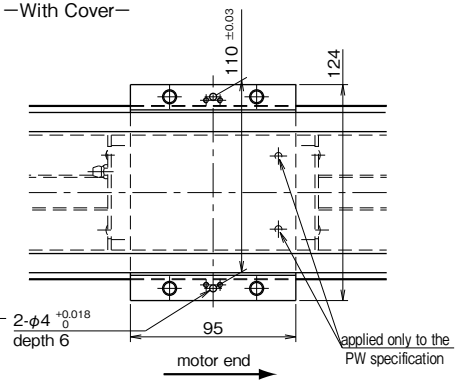
※For some cases, a shallow counterbore of φ5 will be machined at the hole area with "※" to remove a hardened layer.

BG55A, B

—Without Cover—



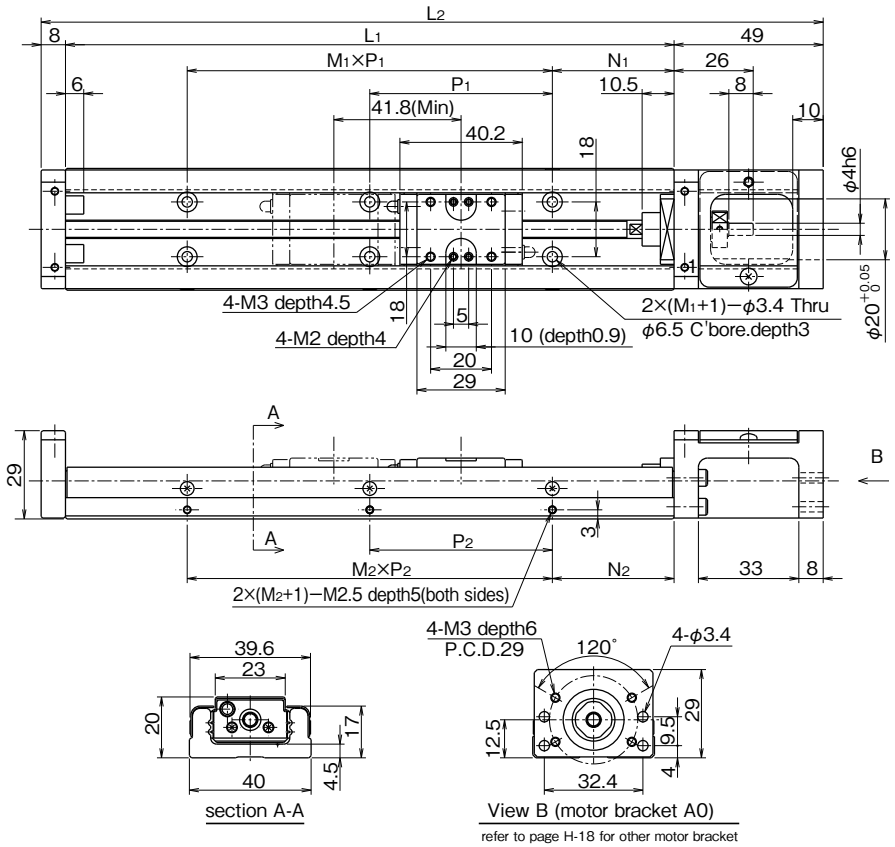
—With Cover—



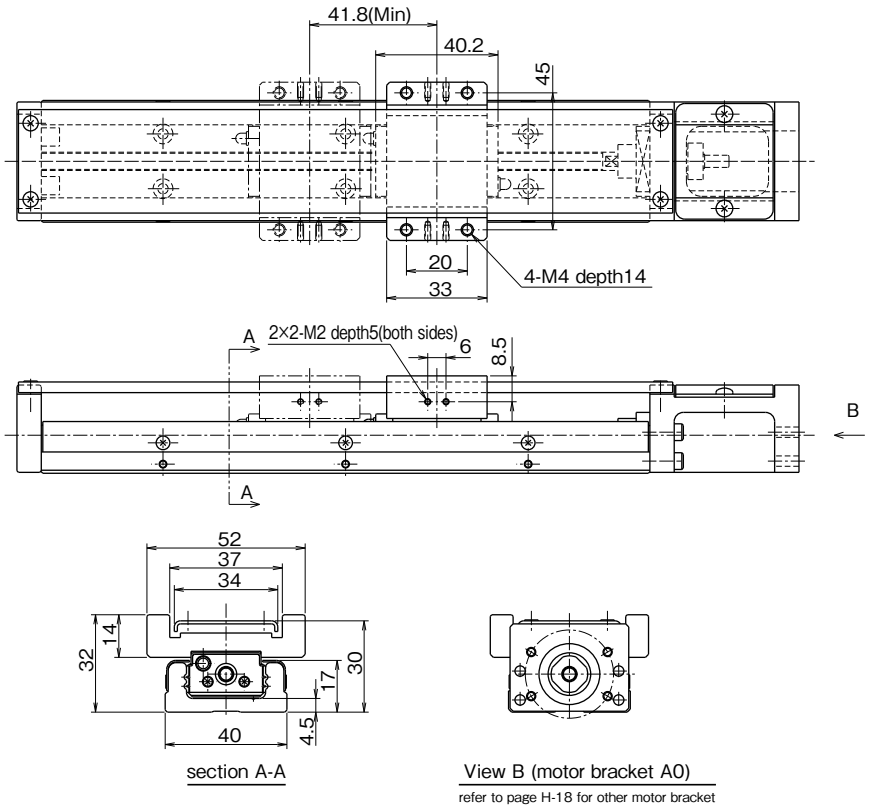
※For some cases, a shallow counterbore of φ5 will be machined at the hole area with "※" to remove a hardened layer.

BG20A, B

—Without Top Cover—



—With Top Cover—

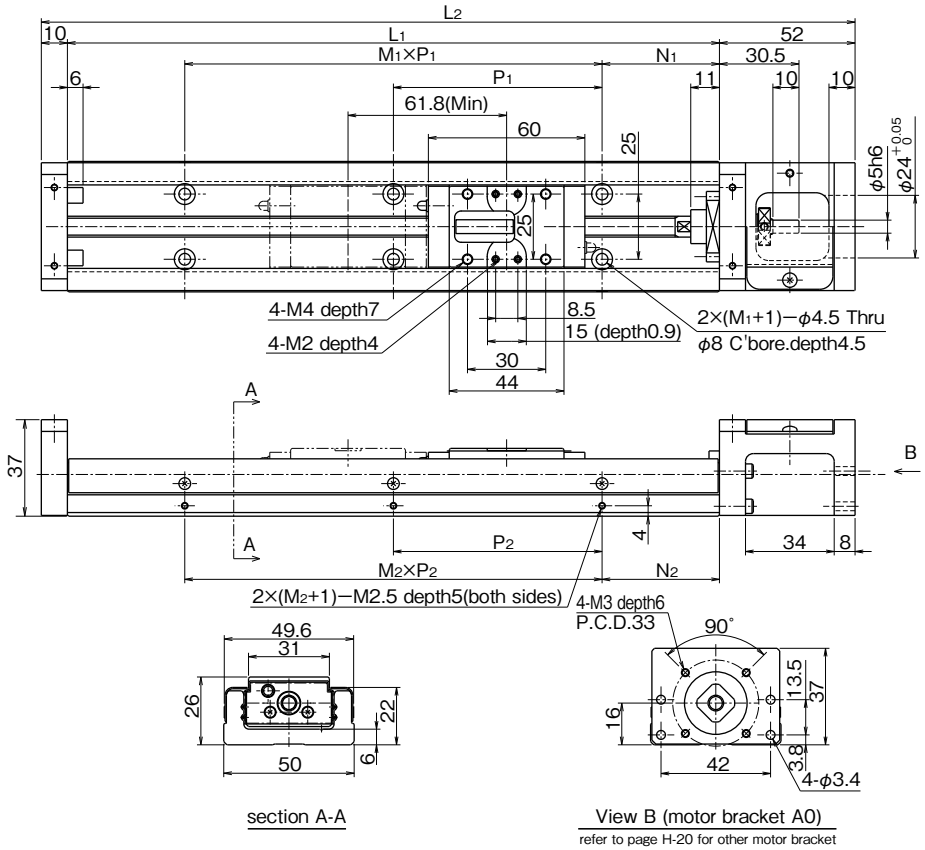


dimensions						stroke limit	
L1	L2	N1	M1×P1	N2	M2×P2	BG20A	BG20B
100	157	20	1×60	20	1×60	43	—
150	207	15	2×60	15	2×60	93	51
200	257	40		40		143	101

Stroke limit is a drive distance between both ends of the dampers.

BG26A, B

—Without Top Cover—

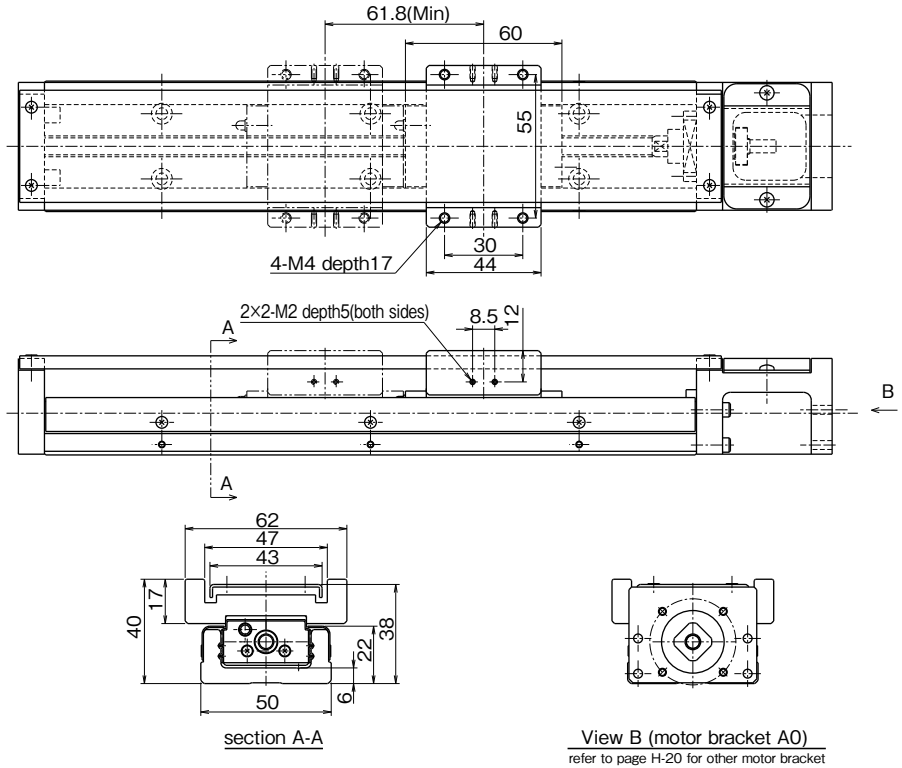


section A-A

View B (motor bracket A0)

refer to page H-20 for other motor bracket

—With Top Cover—



section A-A

View B (motor bracket A0)

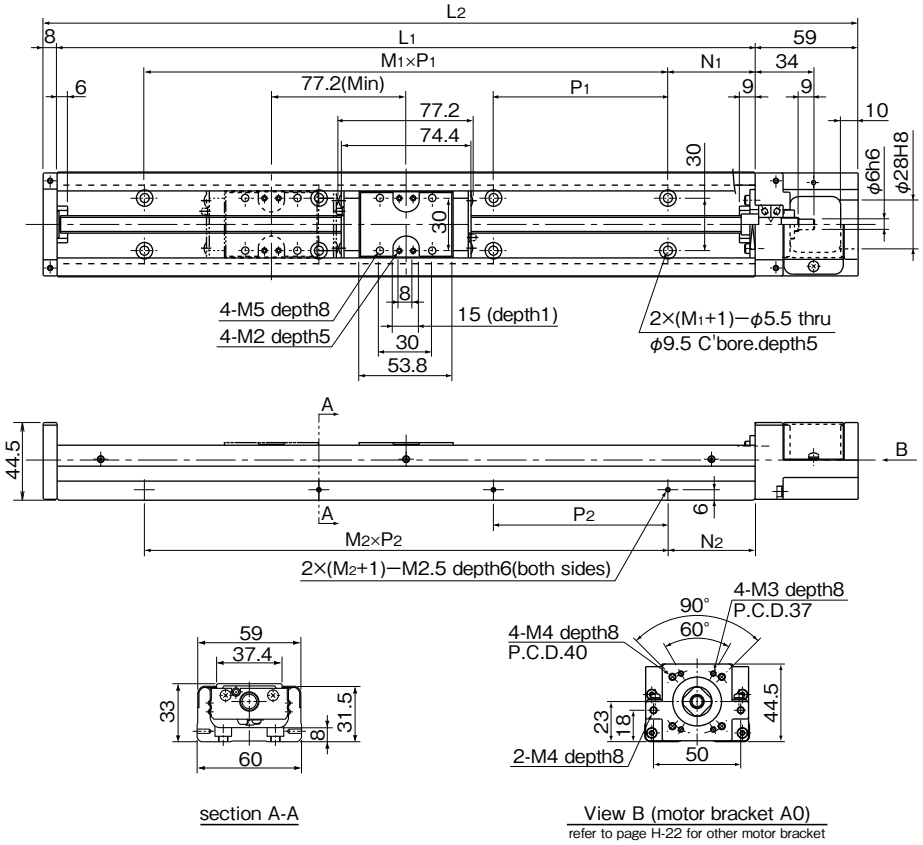
refer to page H-20 for other motor bracket

dimensions						stroke limit	
L_1	L_2	N_1	$M_1 \times P_1$	N_2	$M_2 \times P_2$	BG26A	BG26B
150	212	35	1×80	35	1×80	73	—
200	262	20	2×80	20	2×80	123	61
250	312	45		45		173	111
300	362	30	3×80	30	3×80	223	161

Stroke limit is a drive distance between both ends of the dampers.

BG33A, B

—Without Top Cover—

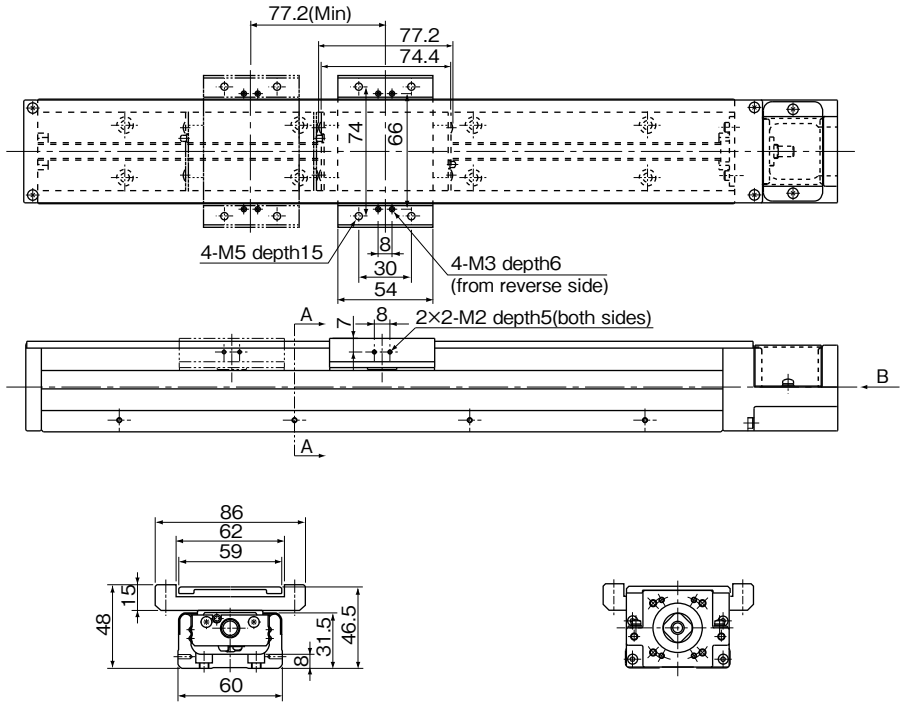


section A-A

View B (motor bracket A0)

refer to page H-22 for other motor bracket

—With Top Cover—



section A-A

View B (motor bracket A0)

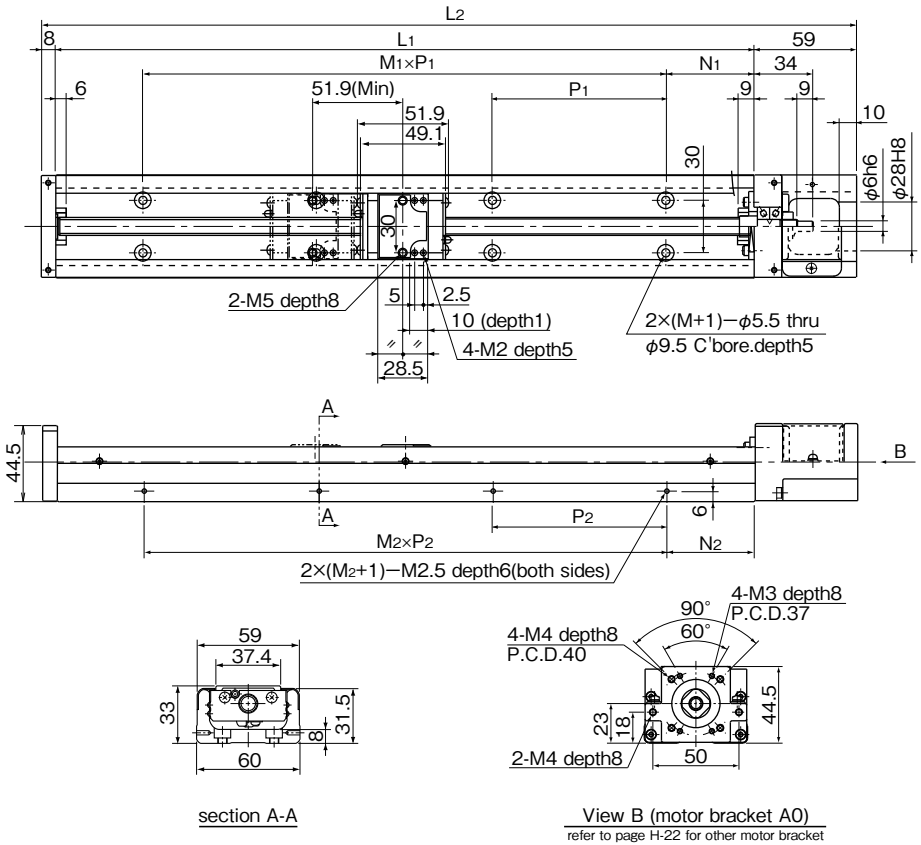
refer to Page H-22 for other motor bracket

dimensions						stroke limit	
L1	L2	N1	M1×P1	N2	M2×P2	BG33A	BG33B
150	217	25	1×100	25	1×100	60	—
200	267	50		50		110	—
300	367		2×100		2×100	210	133
400	467		3×100		3×100	310	233
500	567		4×100		4×100	410	333
600	667		5×100		5×100	510	433

Stroke limit is a drive distance between both ends of the dampers.

BG33C, D

—Without Top Cover—

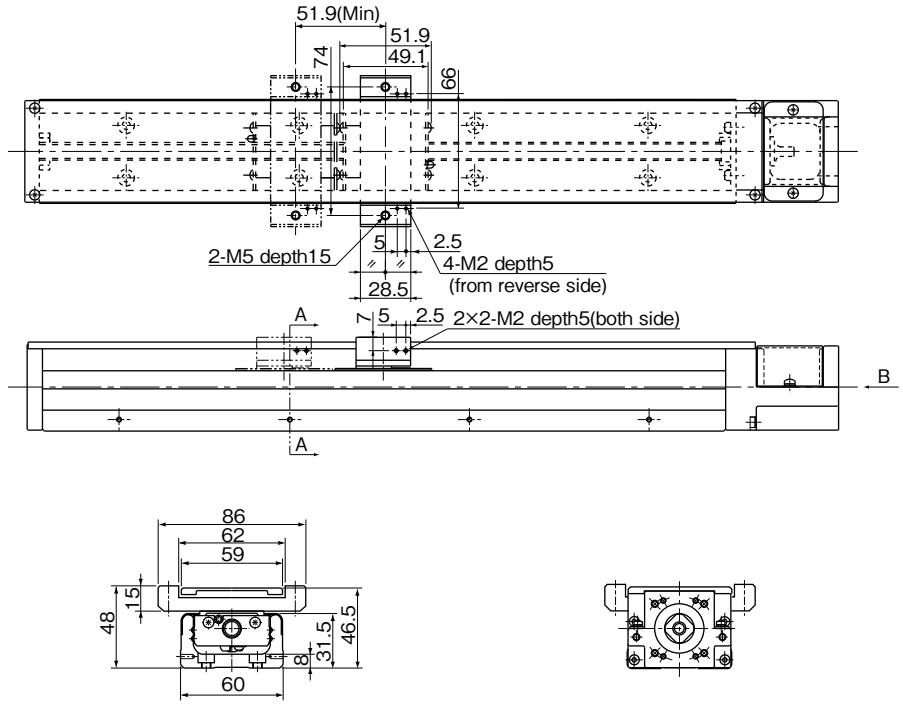


section A-A

View B (motor bracket A0)

refer to page H-22 for other motor bracket

—With Top Cover—



section A-A

View B (motor bracket A0)

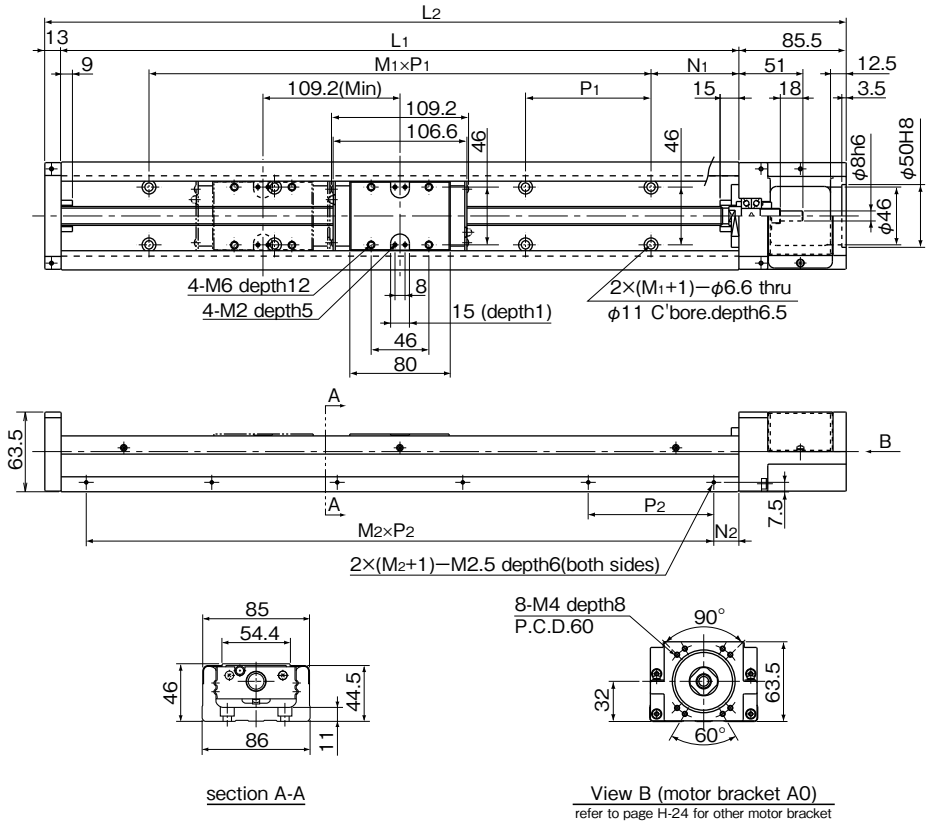
refer to page H-22 for other motor bracket

dimensions						stroke limit	
L_1	L_2	N_1	$M_1 \times P_1$	N_2	$M_2 \times P_2$	BG33C	BG33D
150	217	25	1×100	25	1×100	85	34
200	267	50		50		135	84
300	367		2×100		2×100	235	184
400	467		3×100		3×100	335	284
500	567		4×100		4×100	435	384
600	667		5×100		5×100	535	484

Stroke limit is a drive distance between both ends of the dampers.

BG46A, B

—Without Top Cover—

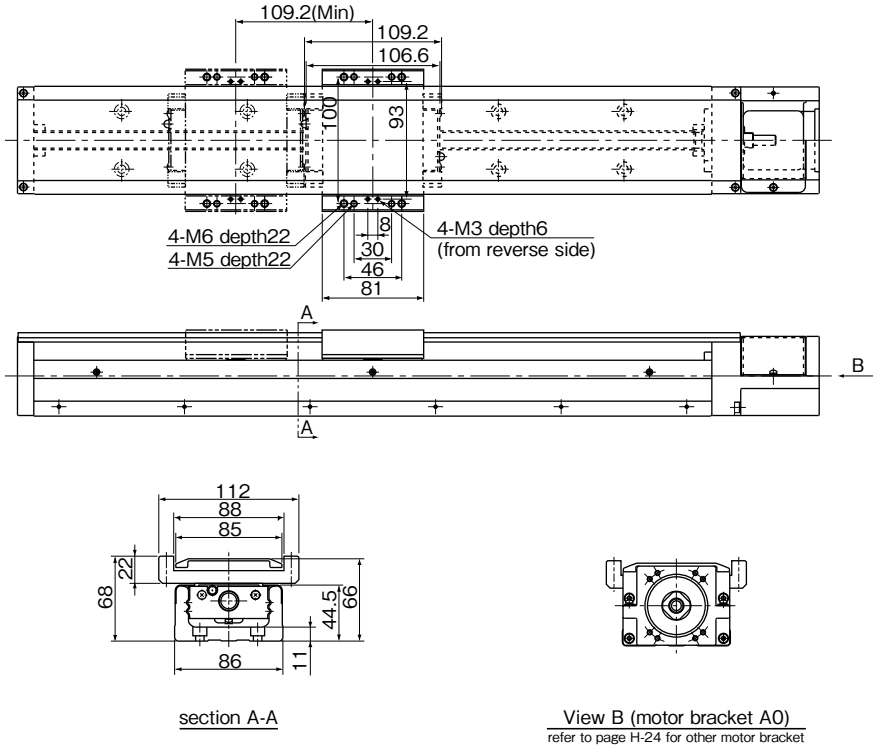


section A-A

View B (motor bracket A0)

refer to page H-24 for other motor bracket

—With Top Cover—



section A-A

View B (motor bracket A0)

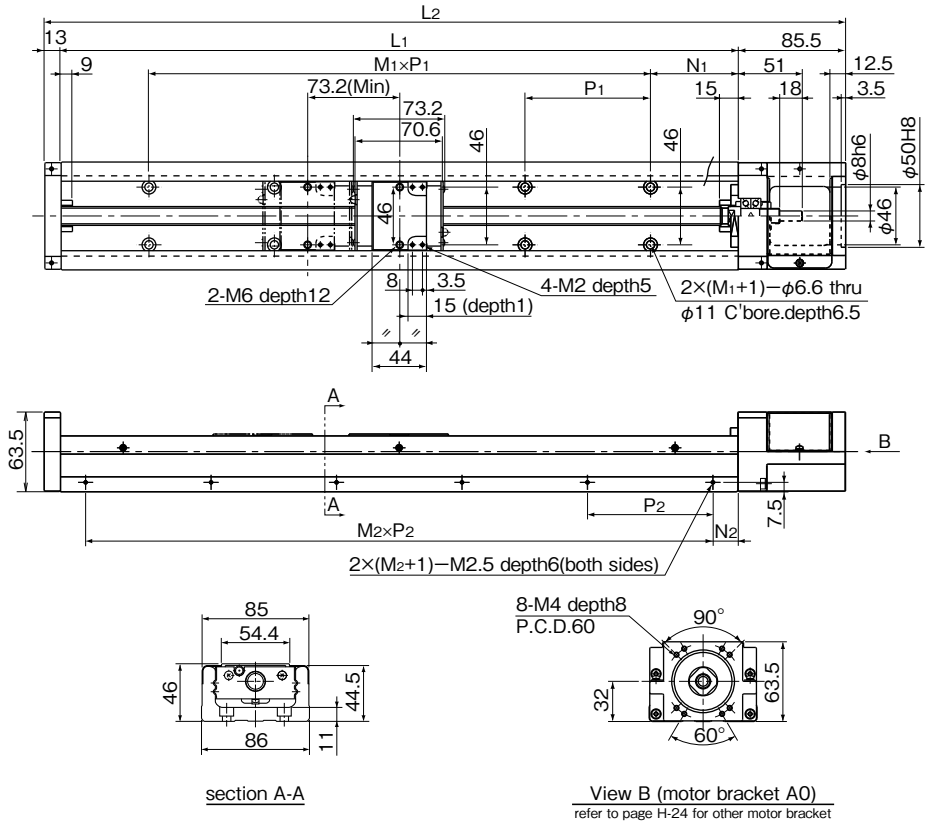
refer to page H-24 for other motor bracket

dimensions						stroke limit	
L1	L2	N1	M1×P1	N2	M2×P2	BG46A	BG46B
340	438.5	70	2×100	20	3×100	209	100
440	538.5		3×100		4×100	309	200
540	638.5		4×100		5×100	409	300
640	738.5		5×100		6×100	509	400
740	838.5		6×100		7×100	609	500
840	938.5		7×100		8×100	709	600
940	1,038.5		8×100		9×100	809	700
1,040	1,138.5		9×100		10×100	909	800
1,140	1,238.5		10×100		11×100	1,009	900
1,240	1,338.5		11×100		12×100	1,109	1,000

Stroke limit is a drive distance between both ends of the dampers.

BG46C, D

—Without Top Cover—

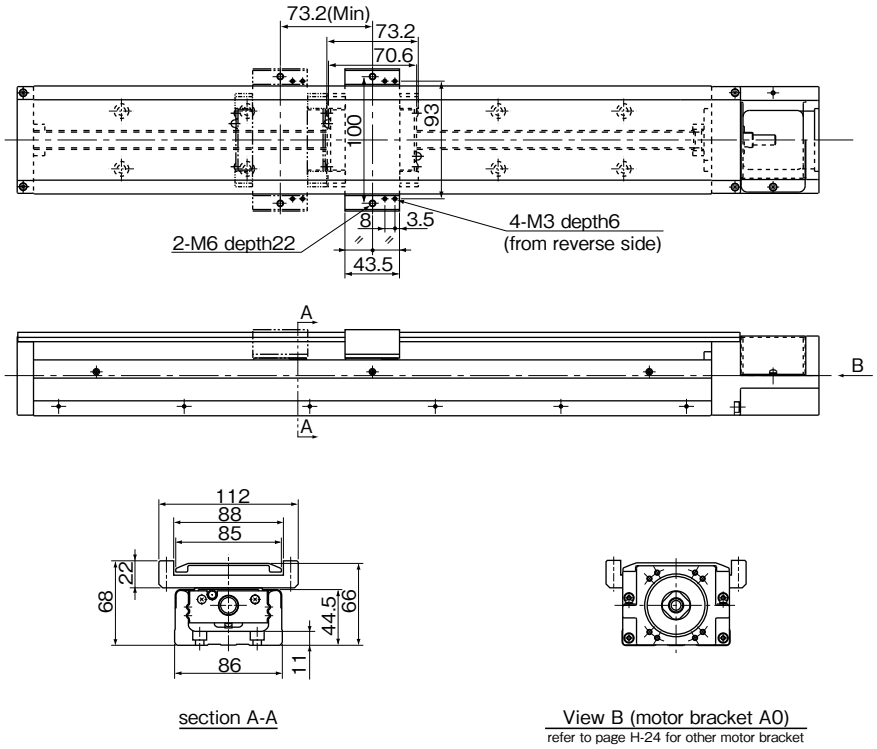


section A-A

View B (motor bracket A0)

refer to page H-24 for other motor bracket

—With Top Cover—



section A-A

View B (motor bracket A0)

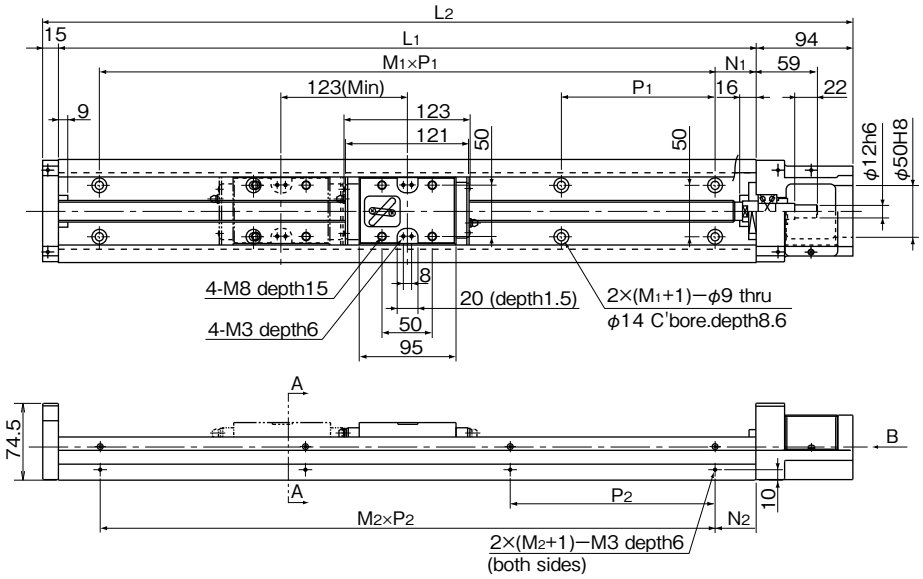
refer to page H-24 for other motor bracket

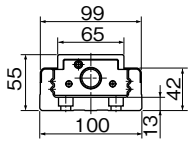
dimensions						stroke limit	
L_1	L_2	N_1	$M_1 \times P_1$	N_2	$M_2 \times P_2$	BG46C	BG46D
340	438.5	70	2×100	20	3×100	245	172
440	538.5		3×100		4×100	345	272
540	638.5		4×100		5×100	445	372
640	738.5		5×100		6×100	545	472
740	838.5		6×100		7×100	645	572
840	938.5		7×100		8×100	745	672
940	1,038.5		8×100		9×100	845	772
1,040	1,138.5		9×100		10×100	945	872
1,140	1,238.5		10×100		11×100	1,045	972
1,240	1,338.5		11×100		12×100	1,145	1,072

Stroke limit is a drive distance between both ends of the dampers.

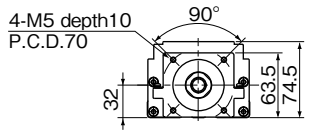
BG55A, B

—Without Top Cover—





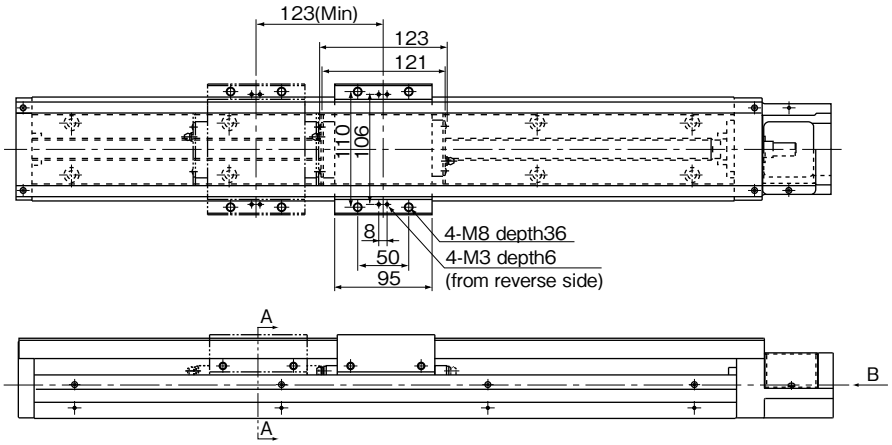
section A-A

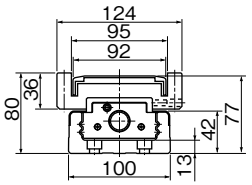


View B (motor bracket A0)

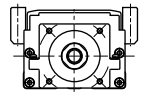
refer to page H-26 for other motor bracket

—With Top Cover—





section A-A



View B (motor bracket A0)

refer to page H-26 for other motor bracket

dimensions						stroke limit	
L_1	L_2	N_1	$M_1 \times P_1$	N_2	$M_2 \times P_2$	BG55A	BG55B
980	1,089	40	6×150	90	4×200	834	711
1,080	1,189	15	7×150	40	5×200	934	811
1,180	1,289	65		90		1,034	911
1,280	1,389	40	8×150	40	6×200	1,134	1,011
1,380	1,489	15	9×150	90		1,234	1,111

Stroke limit is a drive distance between both ends of the dampers.