

NIPPON BEARING

BH Type

PART NUMBER STRUCTURE

Part number for BH type is described as follows.

①	②	③	④	⑤	⑥	⑦	⑧	⑨	⑩
BH	15	01	A	100	U	A0			
		02	B	150	W	A1	C	K	G▲
				200		A2			LB
						A3			PNP

①	②	③	④	⑤	⑥	⑦	⑧	⑨	⑩
BH	23	02	A	150	U	A0			
		05	B	200	W	A1	C	S	P△□
				250		A3		K	G▲
				300		A5			LB
						A6			PNP

①	②	③	④	⑤	⑥	⑦	⑧	⑨	⑩
BH	30	04	A	150	U	A0			
		05	B	200	W	A1	C	S	P△□
		10		300		A2		K	G▲
				400		A3			LB
				500		A4			PNP
				600		A5			
				700		A7			
				750		B1			
						RO			
						RA□			
						RB□			

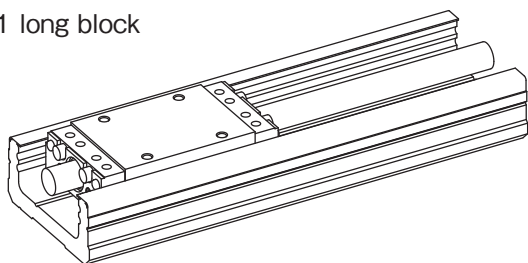
*Guide rail length 750mm is only available for BH3010.

①	②	③	④	⑤	⑥	⑦	⑧	⑨	⑩
BH	45	05	A	340	U	A0			
		10	B	440	W	A1	C	S	P△□
		20	C	540		A2		K	G▲
			D	640		A3			LB
				740		A4			PNP
				840		A5			
				940		A6			
						RO			
						RA□			
						RB□			
						RC□			

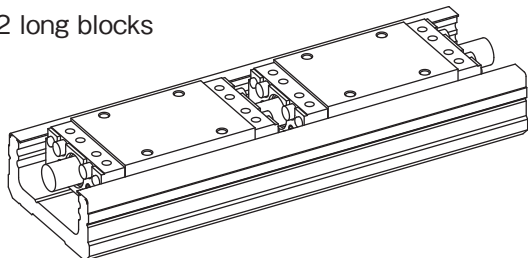
ACTUATOR

- ① BH type
- ② size
- ③ ballscrew lead (refer to page H-84)
- ④ type of block

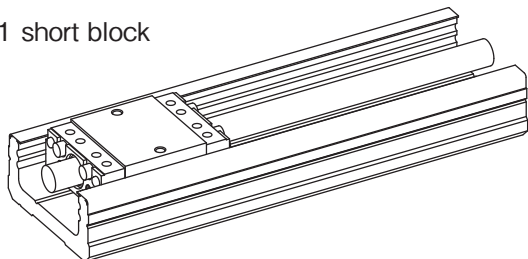
A: 1 long block



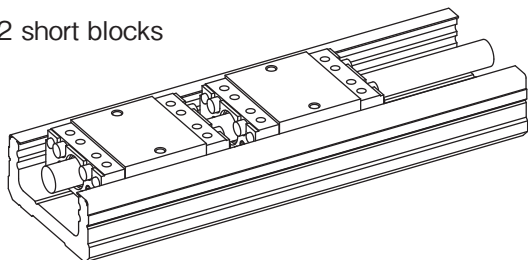
B: 2 long blocks



C: 1 short block



D: 2 short blocks



*Drive block is located closest to motor bracket side.

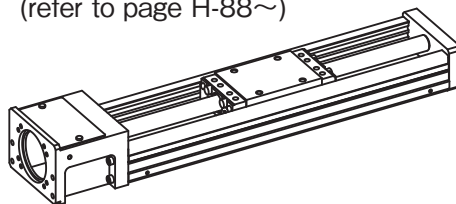
- ⑤ guide rail length
- ⑥ accuracy grade (refer to page H-86)

U	positioning repeatability $\pm 5 \mu\text{m}$
W	positioning repeatability $\pm 10 \mu\text{m}$

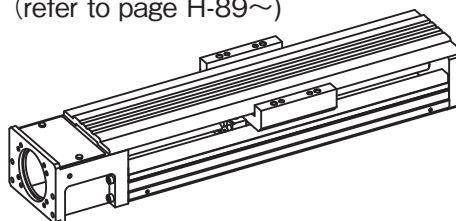
⑦ motor bracket (refer to page H-98, 99)
 The number in the square □ after suffix RA, RB or RC indicates the mounting direction code. (refer to page H-108, 109)

- ⑧ cover

none: without top cover
 (refer to page H-88~)



C: with top cover + sub table
 (refer to page H-89~)



- ⑨ sensor (refer to page H-111~)

none	without sensor
S	with slim-type / compact photomicro sensor
K	with proximity sensor

- ⑩ option

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

In case of multiple options, add + between each option.
 Example: (PS + LB + PNP)

*1: △ is S, W or R (refer to page H-118)

□ is R (refer to page H-118)

*2: ▲ is U, L or F (refer to page H-122)

Grease is applied to slide guide, ballscrew, and angular bearings.

*3: LB is applied to steel parts except for aluminum parts and radial bearings.

NIPPON BEARING

SPECIFICATIONS

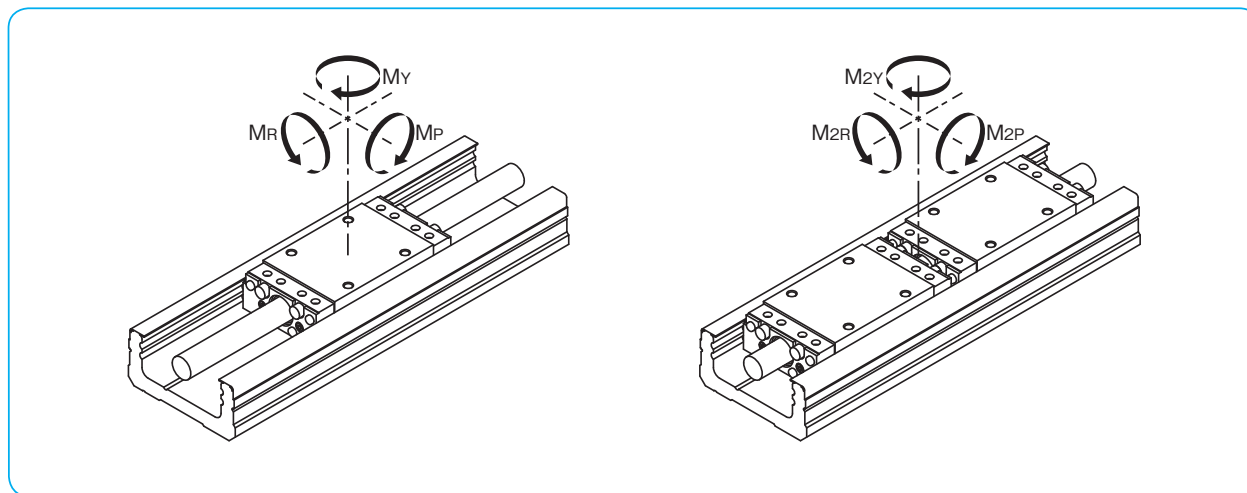
BH Type is categorized as either positioning repeatability $\pm 5\mu\text{m}$ (U) or positioning repeatability $\pm 10\mu\text{m}$ (W).

Table H-22 Specifications

part number			BH1501	BH1502	BH2302	BH2305	BH3004	BH3005	BH3010	BH4505	BH4510	BH4520		
accuracy grade			W	U	W	U	W	U	W	U	W	U		
guide	long block	radial clearance	μm	- 3 ~ 0		- 3 ~ 0		- 3 ~ 0			- 5 ~ 0			
		basic dynamic load	C	kN		1.6		4.3		7.0			27.0	
		basic static load	C ₀	kN		2.7		7.0		11.8			45.0	
		allowable static moment	M _P	N·m	10		46		101			572		
			M _{2P}	N·m	60		276		606			3,432		
			M _Y	N·m	11		51		120			681		
			M _{2Y}	N·m	71		306		720			4,086		
	M _R	N·m	28		134		260			1,410				
	M _{2R}	N·m	56		268		520			2,820				
	short block	basic dynamic load	C	kN							16.9			
		basic static load	C ₀	kN							28.1			
		allowable static moment	M _P	N·m								223		
			M _{2P}	N·m	-		-		-			1,341		
			M _Y	N·m								266		
M _{2Y}			N·m								1,598			
M _R			N·m								887			
M _{2R}	N·m								1,774					
ballscrew	shaft diameter	mm	6		8		10			15				
	lead	mm	1	2	2	5	4	5	10	5	10	20		
	basic dynamic load	C _a	kN		0.39	0.54	1.8	1.9	3.0	3.0	2.0	5.1	5.1	3.1
	basic static load	C _{0a}	kN		0.77	0.76	3.2	3.1	5.3	5.3	3.2	10.5	10.5	6.6
bearing support	part number	-	604 or equivalent		AC6-16DF or equivalent		708DFP5 or equivalent			5201A or equivalent				
	basic dynamic load	C _b	kN		0.5		1.79		4.40			5.90		
	basic static load	C _{0b}	kN		0.19		1.76		4.36			3.20		

M_{2P}, M_{2Y} and M_{2R} are the allowable static moments when 2 blocks are used in close contact.

Figure H-19 Direction of Moment



ACTUATOR

ALLOWABLE SPEED AND STROKE LIMIT

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

Table H-23 Allowable Speed and Stroke Limit

part number	rail length	stroke limit (mm)				allowable speed (mm/sec)		
		1 long block	2 long blocks	1 short block	2 short blocks	lead1	lead2	
BH15	100	60	—	—	—	133	260	
	150	110	70	—	—			
	200	160	120	—	—	90	180	

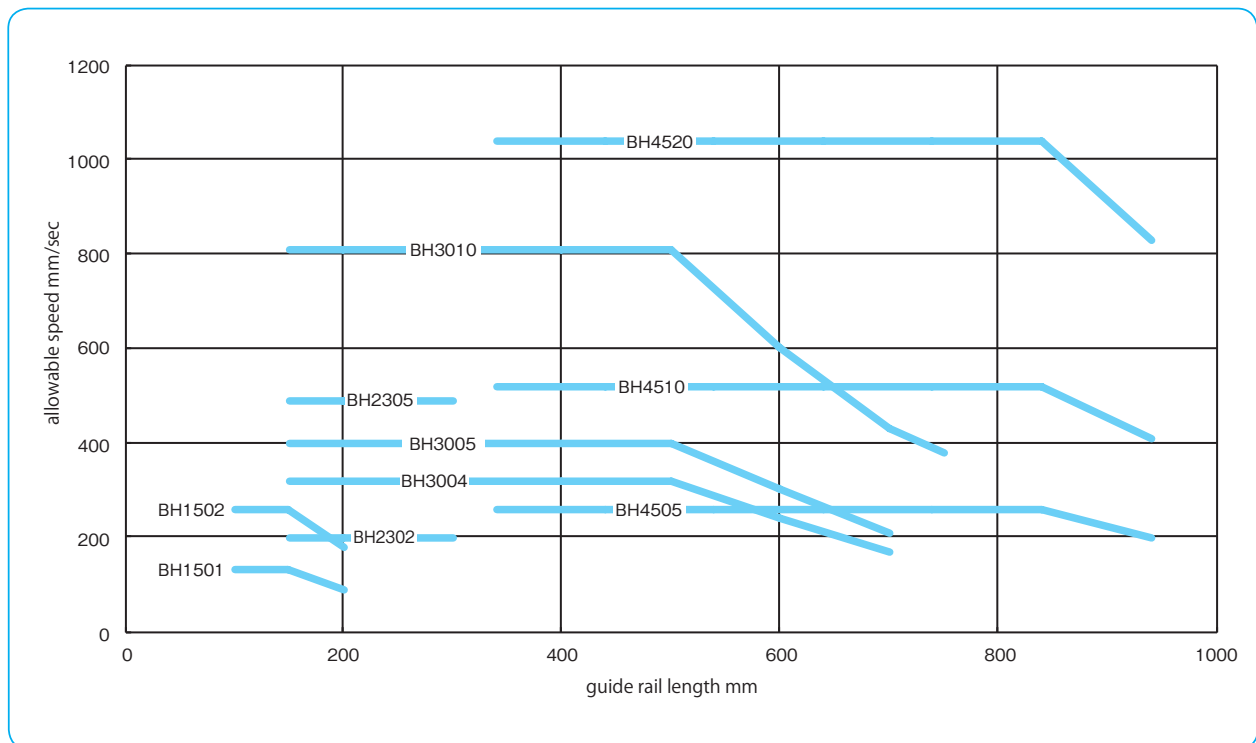
part number	rail length	stroke limit (mm)				allowable speed (mm/sec)	
		1 long block	2 long blocks	1 short block	2 short blocks	lead2	lead5
BH23	150	76	—	—	—	200	490
	200	126	57	—	—		
	250	176	107	—	—		
	300	226	157	—	—		

part number	rail length	stroke limit (mm)				allowable speed (mm/sec)		
		1 long block	2 long blocks	1 short block	2 short blocks	lead4	lead5	lead10
BH30	150	60	—	—	—	320	400	810
	200	110	—	—	—			
	300	210	126	—	—			
	400	310	226	—	—			
	500	410	326	—	—	240	300	600
	600	510	426	—	—			
	700	610	526	—	—			
	750	660	576	—	—			

Guide rail length 750mm is only available for lead10.

part number	rail length	stroke limit (mm)				allowable speed (mm/sec)		
		1 long block	2 long blocks	1 short block	2 short blocks	lead5	lead10	lead20
BH45	340	219	104	249	164	260	520	1,040
	440	319	204	349	264			
	540	419	304	449	364			
	640	519	404	549	464			
	740	619	504	649	564			
	840	719	604	749	664			
	940	819	704	849	764	200	410	830

Figure H-20 Guide Rail Length and Allowable Speed



ACTUATOR

NIPPON BEARING

ACCURACY

Table H-24 shows accuracy of BH type.

Table H-24 Accuracy

part number	rail length mm	positioning repeatability		positioning accuracy		running parallelism B		backlash		*starting torque	
		W μm	U μm	W μm	U μm	W μm	U μm	W μm	U μm	W N · m	U N · m
BH15	100	± 10	± 5	65		15	20	5	0.010	0.012	
	150			70							
	200			75							
BH23	150	± 10	± 5	70		15	20	5	0.03	0.06	
	200			75							
	250			85							
	300			90							
BH30	150	± 10	± 5	70		15	20	5	0.07	0.15	
	200			80							
	300			90							
	400			95							
	500			100		25					
	600			110							
	700			120							
	750			130							
BH45	340	± 10	± 5	95		35	20	5	0.1	0.2	
	440			100							
	540			110		40					
	640			120							
	740			130							
	840			150		50					
	940			170							

Above values are measured by using our selected motors.

*Above specifications are based on using NB standard grease. Other grease may cause deviations.

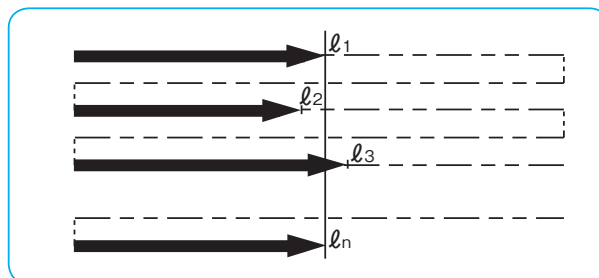
ACTUATOR

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.

$$\text{Positioning Repeatability} = \pm \frac{1}{2} ((\text{maximum value of } \ell_n) - (\text{minimum value of } \ell_n))$$

Figure H-21 Positioning Repeatability

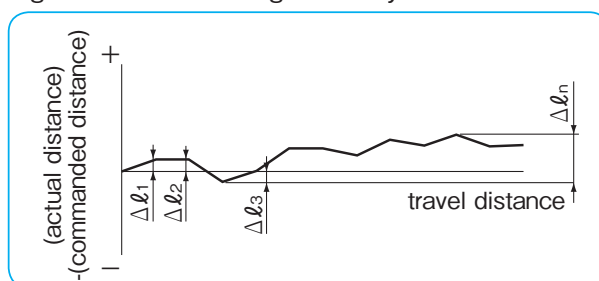


Positioning Accuracy

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.

$$\text{Positioning Accuracy} = (\Delta \ell_n)_{\max}$$

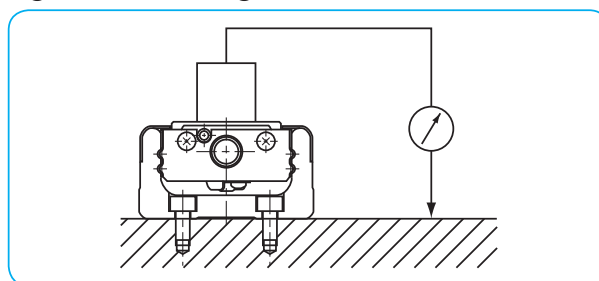
Figure H-22 Positioning Accuracy



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-23 Running Parallelism B

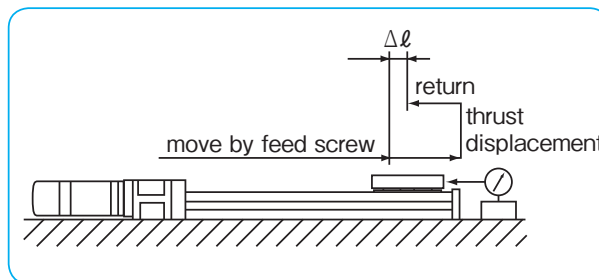


Backlash

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.

$$\text{Backlash} = \Delta \ell$$

Figure H-24 Backlash



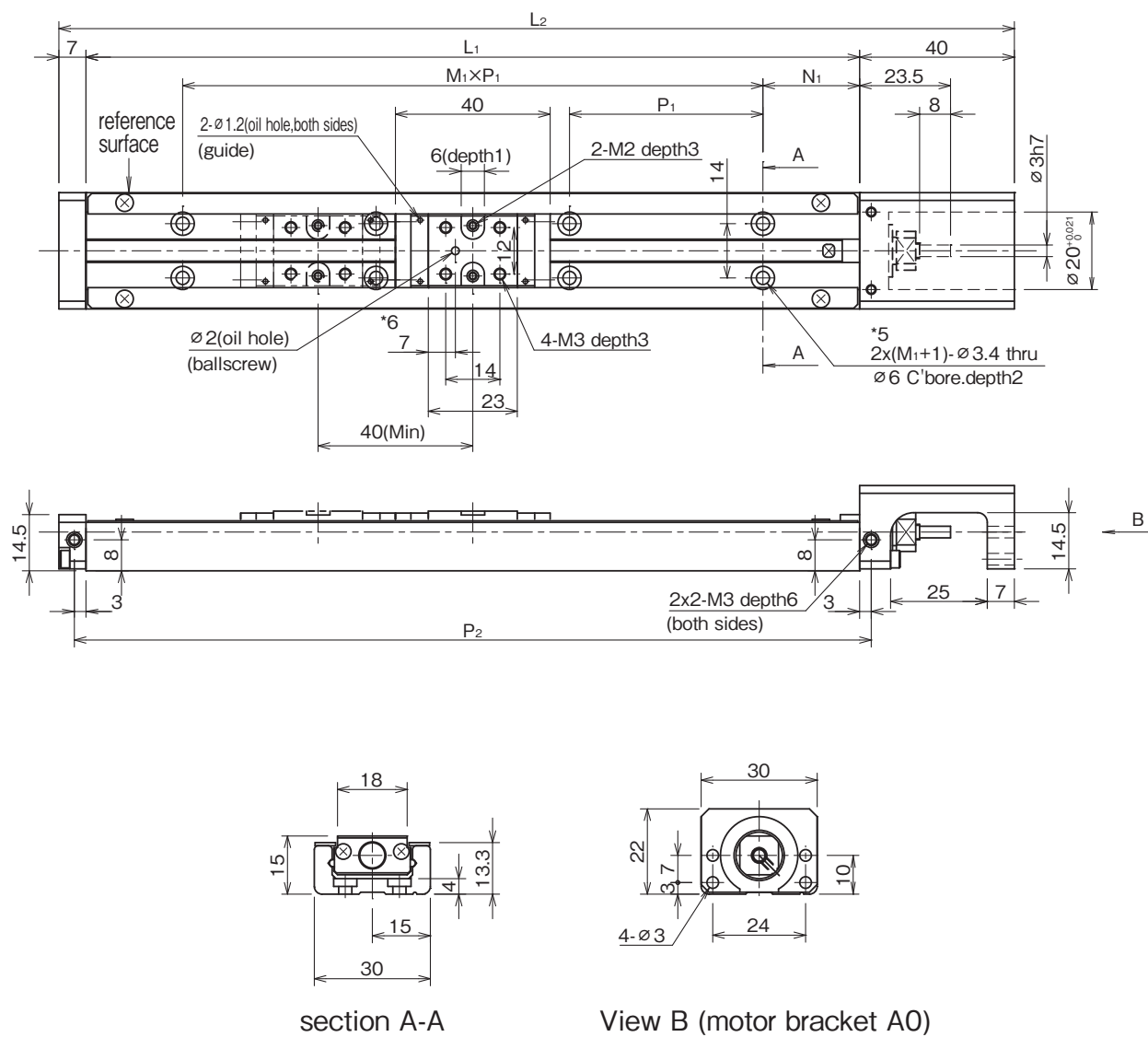
ACTUATOR

NIPPON BEARING

BH15 –Without Top Cover–

A(1 long block)

B(2 long blocks)



View B (motor bracket A0)
refer to page H-102 for other motor bracket

part number ^{3,4}	stroke limit mm ¹	dimensions mm					block mass kg ²		total mass kg	
		L ₁	L ₂	N ₁	M ₁ × P ₁	P ₂	without top cover	with top cover	without top cover	with top cover
BH15 □□ A-100	60	100	147	25	1 × 50	106	0.03	0.05	0.28	0.31
B	—	—	—	—	—	—	—	—	—	—
BH15 □□ A-150	110	150	197	25	2 × 50	156	0.03	0.05	0.36	0.39
B	70						0.06	0.10	0.39	0.44
BH15 □□ A-200	160	200	247	25	3 × 50	206	0.03	0.05	0.45	0.48
B	120						0.06	0.10	0.48	0.53

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

*2: Mass stated "with top cover" includes mass of sub tables.

*3: For B type (2 long blocks), drive block is located closest to motor bracket side.

*4: □ is ballscrew lead.

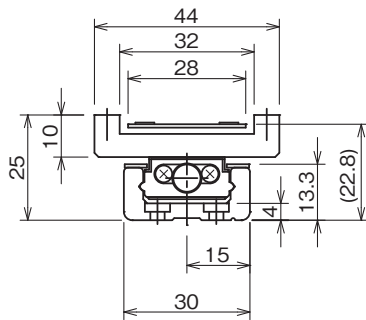
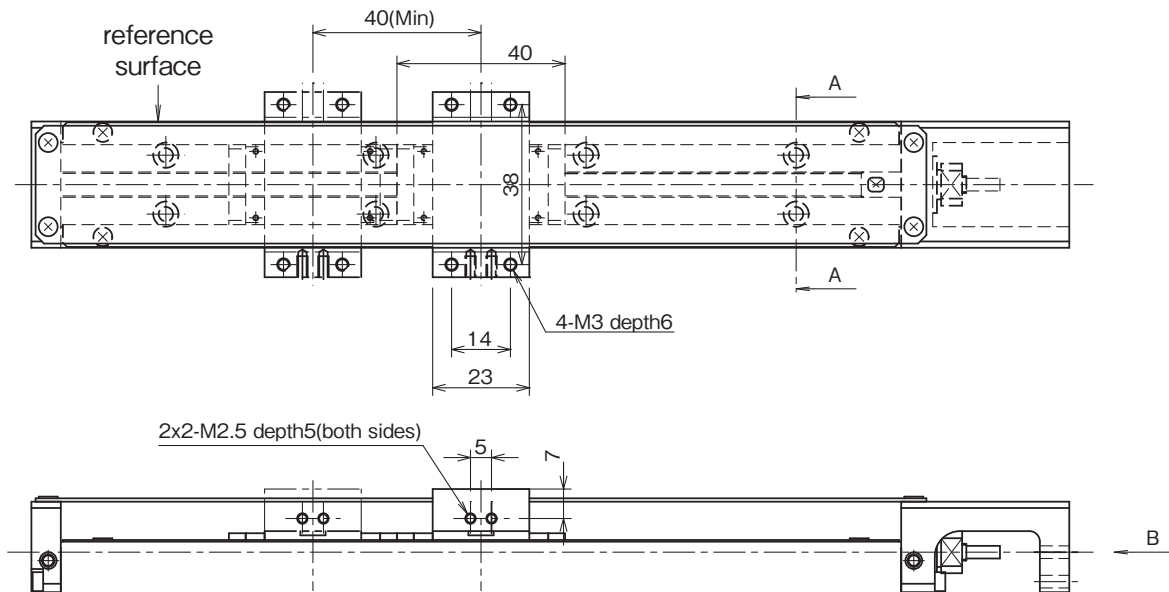
*5: For mounting guide rail, use provided hexagon socket low head cap screws. (M3x5, stainless)

*6: The dimension is different depending on the lead. BH1501: 7mm, BH1502: 8mm

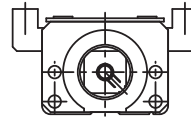
ACTUATOR

BH15 –With Top Cover–

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



section A-A



View B (motor bracket A0)

refer to page H-102 for other motor bracket

inertia (reference values)

unit : kg · m²

part number	rail length mm	long block			
		without top cover		with top cover	
		A 1 block	B 2 blocks	A 1 block	B 2 blocks
BH1501	100	1.11 × 10 ⁻⁷	—	1.20 × 10 ⁻⁷	—
	150	1.60 × 10 ⁻⁷	1.61 × 10 ⁻⁷	1.61 × 10 ⁻⁷	1.62 × 10 ⁻⁷
	200	2.10 × 10 ⁻⁷	2.11 × 10 ⁻⁷	2.11 × 10 ⁻⁷	2.12 × 10 ⁻⁷
BH1502	100	1.15 × 10 ⁻⁷	—	1.16 × 10 ⁻⁷	—
	150	1.64 × 10 ⁻⁷	1.67 × 10 ⁻⁷	1.66 × 10 ⁻⁷	1.71 × 10 ⁻⁷
	200	2.14 × 10 ⁻⁷	2.17 × 10 ⁻⁷	2.16 × 10 ⁻⁷	2.20 × 10 ⁻⁷

part name	material	remarks
guide rail	carbon steel	black oxide except for raceway grooves
ballscrew shaft	carbon steel	
slide block	chromium-molybdenum steel	
motor bracket	aluminum alloy	black anodizing
housing	aluminum alloy	black anodizing
adapter plate	aluminum alloy	black anodizing
dust cover	aluminum alloy	white anodizing
sub table	aluminum alloy	white anodizing
top cover	aluminum alloy	

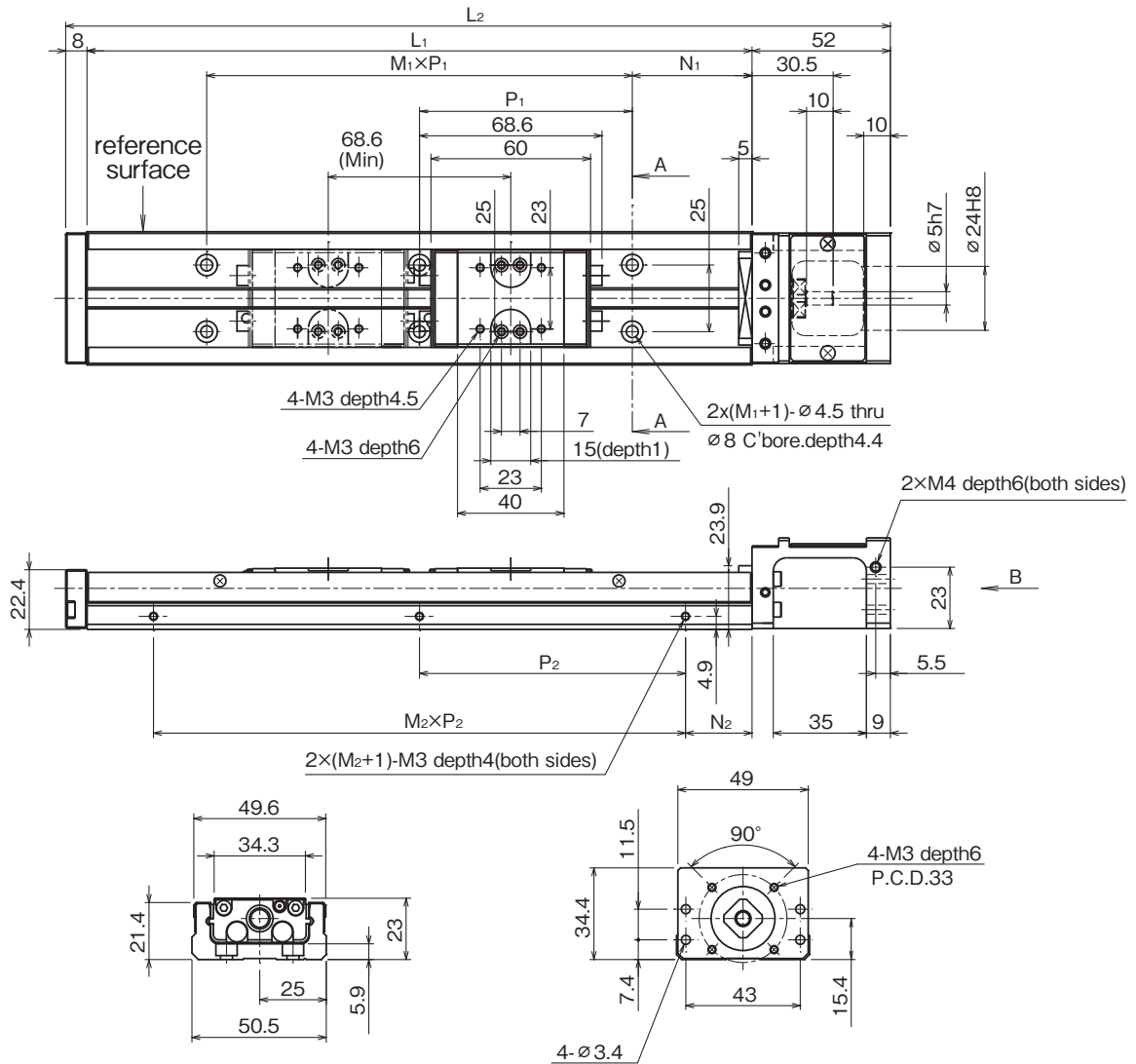
When LB option is selected, steel parts are treated with low temperature black chrome treatment.

ACTUATOR

NIPPON BEARING

BH23 –Without Top Cover–

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



section A-A

View B (motor bracket A0)

refer to page H-103 for other motor bracket

part number ^{*3,4}	stroke limit mm ^{*1}	dimensions mm						block mass kg ^{*2}		total mass kg	
		L ₁	L ₂	N ₁	M ₁ × P ₁	N ₂	M ₂ × P ₂	without top cover	with top cover	without top cover	with top cover
BH23 □□ A-150	76	150	210	35	1 × 80	25	1 × 100	0.14	0.26	1.00	1.11
B	—	—	—	—	—	—	—	—	—	—	—
BH23 □□ A-200	126	200	260	20	2 × 80	50	1 × 100	0.14	0.26	1.21	1.32
B	57							0.28	0.52	1.35	1.46
BH23 □□ A-250	176	250	310	45	2 × 80	25	2 × 100	0.14	0.26	1.41	1.52
B	107							0.28	0.52	1.56	1.67
BH23 □□ A-300	226	300	360	30	3 × 80	50	2 × 100	0.14	0.26	1.61	1.73
B	157							0.28	0.52	1.76	1.88

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

*2: Mass stated "with top cover" includes mass of sub tables.

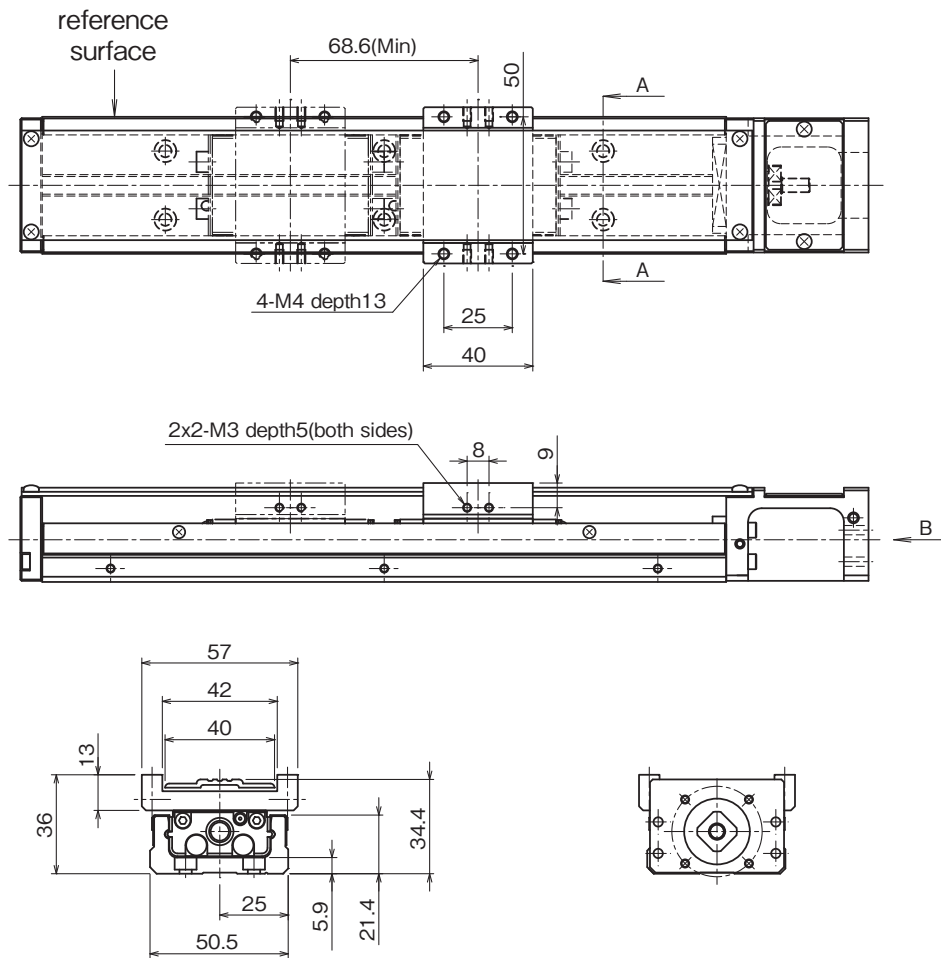
*3: For B type (2 long blocks), drive block is located closest to motor bracket side.

*4: □ is ballscrew lead.

ACTUATOR

BH23 –With Top Cover–

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



section A-A

View B (motor bracket A0)

refer to page H-103 for other motor bracket

inertia (reference values)

unit : kg · m²

part number	rail length mm	long block			
		without top cover		with top cover	
		A 1 block	B 2 blocks	A 1 block	B 2 blocks
BH2302	150	6.07×10^{-7}	—	6.15×10^{-7}	—
	200	7.64×10^{-7}	7.79×10^{-7}	7.72×10^{-7}	7.87×10^{-7}
	250	9.21×10^{-7}	9.36×10^{-7}	9.29×10^{-7}	9.44×10^{-7}
	300	1.08×10^{-6}	1.09×10^{-6}	1.09×10^{-6}	1.10×10^{-6}
BH2305	150	6.96×10^{-7}	—	7.41×10^{-7}	—
	200	8.53×10^{-7}	9.46×10^{-7}	8.98×10^{-7}	9.92×10^{-7}
	250	1.01×10^{-6}	1.10×10^{-6}	1.06×10^{-6}	1.15×10^{-6}
	300	1.17×10^{-6}	1.26×10^{-6}	1.21×10^{-6}	1.31×10^{-6}

part name	material	remarks
guide rail	carbon steel	black oxide except for raceway grooves
ballscrew shaft	carbon steel	
slide block	chromium-molybdenum steel	
motor bracket	aluminum alloy	black anodizing
coupling cover	aluminum alloy	black anodizing
housing	aluminum alloy	black anodizing
adapter plate	aluminum alloy	black anodizing
dust cover	aluminum alloy	white anodizing
sub table	aluminum alloy	white anodizing
top cover	aluminum alloy	

When LB option is selected, steel parts are treated with low temperature black chrome treatment.

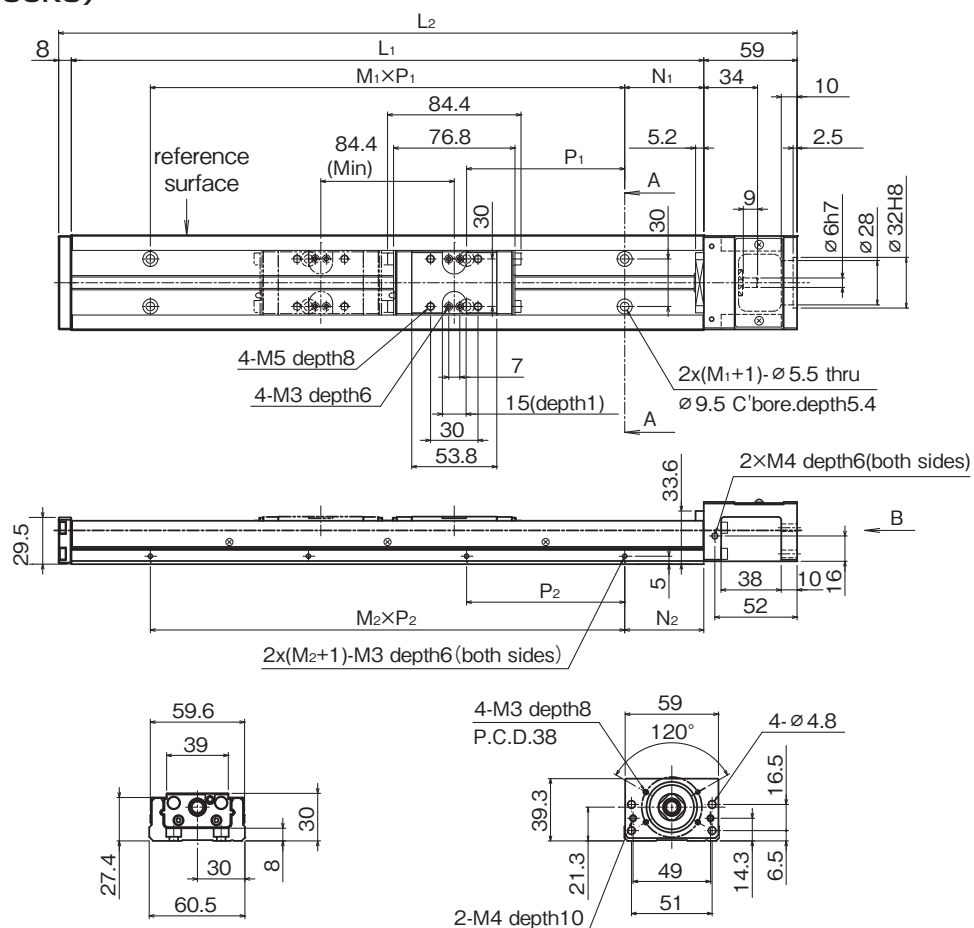
ACTUATOR

NIPPON BEARING

BH30 –Without Top Cover–

A (1 long block)

B (2 long blocks)



section A-A

View B (motor bracket A0)

refer to page H-104, 105 for other motor bracket

part number ^{3*4}	stroke limit mm ¹	dimensions mm						block mass kg ^{*2}		total mass kg	
		L 1	L 2	N 1	M 1 × P 1	N 2	M 2 × P 2	without top cover	with top cover	without top cover	with top cover
BH30 □□ A-150	60	150	217	25	1 × 100	25	1 × 100	0.3	0.4	1.6	1.7
B	—	—	—	—	—	—	—	—	—	—	—
BH30 □□ A-200	110	200	267	50	1 × 100	50	1 × 100	0.3	0.4	1.9	2.1
B	—	—	—	—	—	—	—	—	—	—	—
BH30 □□ A-300	210	300	367	50	2 × 100	50	2 × 100	0.3	0.4	2.6	2.7
B	126							0.6	0.8	2.9	3.2
BH30 □□ A-400	310	400	467		3 × 100		3 × 100	0.3	0.4	3.3	3.4
B	226							0.6	0.8	3.6	3.8
BH30 □□ A-500	410	500	567		4 × 100		4 × 100	0.3	0.4	3.9	4.1
B	326							0.6	0.8	4.2	4.5
BH30 □□ A-600	510	600	667	5 × 100	5 × 100	0.3	0.4	4.6	4.7		
B	426					0.6	0.8	4.9	5.1		
BH30 □□ A-700	610	700	767	6 × 100	6 × 100	0.3	0.4	5.2	5.4		
B	526					0.6	0.8	5.5	5.8		
BH30 □□ A-750 ⁵	660	750	817	25	7 × 100	25	7 × 100	0.3	0.4	5.6	5.7
B	576							0.6	0.8	5.9	6.1

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

*2 : Mass stated "with top cover" includes mass of sub tables.

*3 : For B type (2 long blocks), drive block is located closest to motor bracket side.

*4 : □ is ballscrew lead.

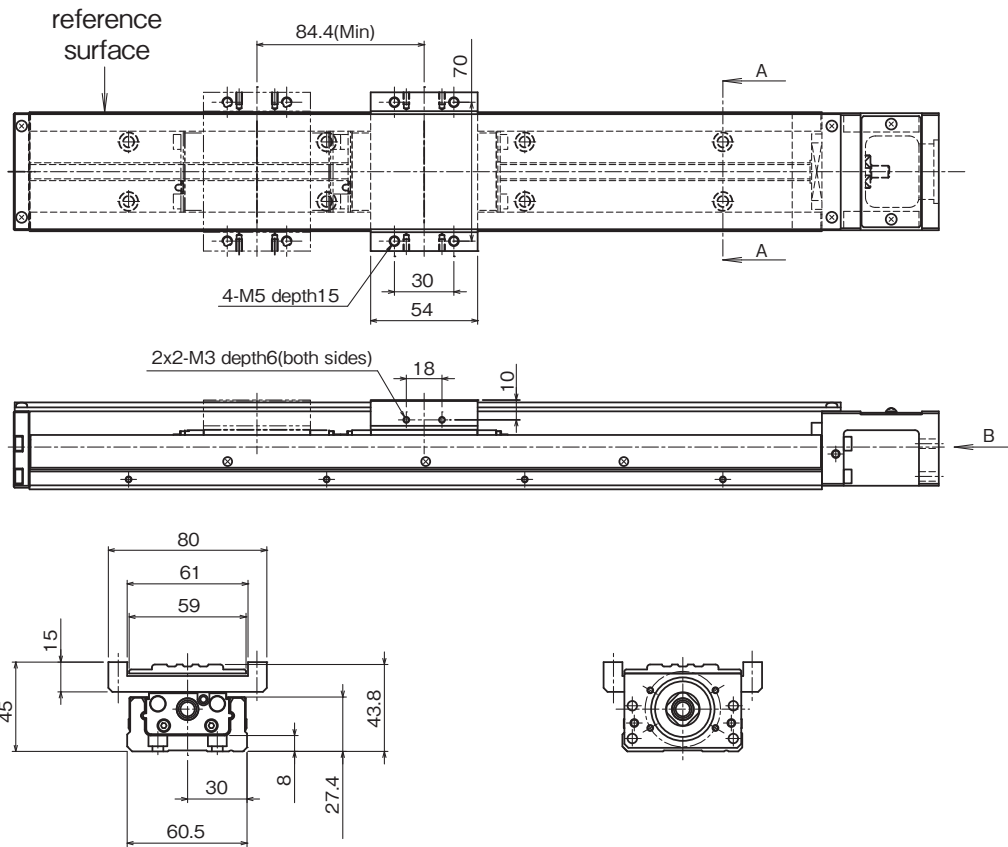
*5 : For rail length 750mm, only lead 10mm is available.

ACTUATOR

BH30 –With Top Cover–

A(1 long block)

B(2 long blocks)



section A-A

View B (motor bracket A0)

refer to page H-104, 105 for other motor bracket

inertia (reference values)

unit : kg · m²

part number	rail length mm	long block			
		without top cover		with top cover	
		A 1 block	B 2 blocks	A 1 block	B 2 blocks
BH3004	150	1.57 × 10 ⁻⁶	—	1.62 × 10 ⁻⁶	—
	200	1.96 × 10 ⁻⁶	—	2.01 × 10 ⁻⁶	—
	300	2.73 × 10 ⁻⁶	2.84 × 10 ⁻⁶	2.77 × 10 ⁻⁶	2.89 × 10 ⁻⁶
	400	3.50 × 10 ⁻⁶	3.61 × 10 ⁻⁶	3.54 × 10 ⁻⁶	3.66 × 10 ⁻⁶
	500	4.26 × 10 ⁻⁶	4.38 × 10 ⁻⁶	4.31 × 10 ⁻⁶	4.42 × 10 ⁻⁶
	600	5.03 × 10 ⁻⁶	5.14 × 10 ⁻⁶	5.07 × 10 ⁻⁶	5.19 × 10 ⁻⁶
	700	5.80 × 10 ⁻⁶	5.91 × 10 ⁻⁶	5.84 × 10 ⁻⁶	5.96 × 10 ⁻⁶
BH3005	150	1.65 × 10 ⁻⁶	—	1.72 × 10 ⁻⁶	—
	200	2.03 × 10 ⁻⁶	—	2.10 × 10 ⁻⁶	—
	300	2.80 × 10 ⁻⁶	2.98 × 10 ⁻⁶	2.87 × 10 ⁻⁶	3.05 × 10 ⁻⁶
	400	3.56 × 10 ⁻⁶	3.74 × 10 ⁻⁶	3.63 × 10 ⁻⁶	3.81 × 10 ⁻⁶
	500	4.33 × 10 ⁻⁶	4.51 × 10 ⁻⁶	4.40 × 10 ⁻⁶	4.58 × 10 ⁻⁶
	600	5.10 × 10 ⁻⁶	5.28 × 10 ⁻⁶	5.17 × 10 ⁻⁶	5.35 × 10 ⁻⁶
	700	5.87 × 10 ⁻⁶	6.05 × 10 ⁻⁶	5.93 × 10 ⁻⁶	6.11 × 10 ⁻⁶
BH3010	150	2.22 × 10 ⁻⁶	—	2.50 × 10 ⁻⁶	—
	200	2.61 × 10 ⁻⁶	—	2.88 × 10 ⁻⁶	—
	300	3.37 × 10 ⁻⁶	4.09 × 10 ⁻⁶	3.65 × 10 ⁻⁶	4.37 × 10 ⁻⁶
	400	4.14 × 10 ⁻⁶	4.86 × 10 ⁻⁶	4.42 × 10 ⁻⁶	5.14 × 10 ⁻⁶
	500	4.91 × 10 ⁻⁶	5.62 × 10 ⁻⁶	5.18 × 10 ⁻⁶	5.90 × 10 ⁻⁶
	600	5.67 × 10 ⁻⁶	6.39 × 10 ⁻⁶	5.95 × 10 ⁻⁶	6.67 × 10 ⁻⁶
	700	6.44 × 10 ⁻⁶	7.16 × 10 ⁻⁶	6.72 × 10 ⁻⁶	7.44 × 10 ⁻⁶
	750	6.82 × 10 ⁻⁶	7.54 × 10 ⁻⁶	7.10 × 10 ⁻⁶	7.82 × 10 ⁻⁶

part name	material	remarks
guide rail	carbon steel	black oxide except for raceway grooves
ballscrew shaft	carbon steel	
slide block	chromium-molybdenum steel	
motor bracket	aluminum alloy	black anodizing
coupling cover	aluminum alloy	black anodizing
housing	aluminum alloy	black anodizing
adapter plate	aluminum alloy	black anodizing
dust cover	aluminum alloy	white anodizing
sub table	aluminum alloy	white anodizing
top cover	aluminum alloy	

When LB option is selected, steel parts are treated with low temperature black chrome treatment.

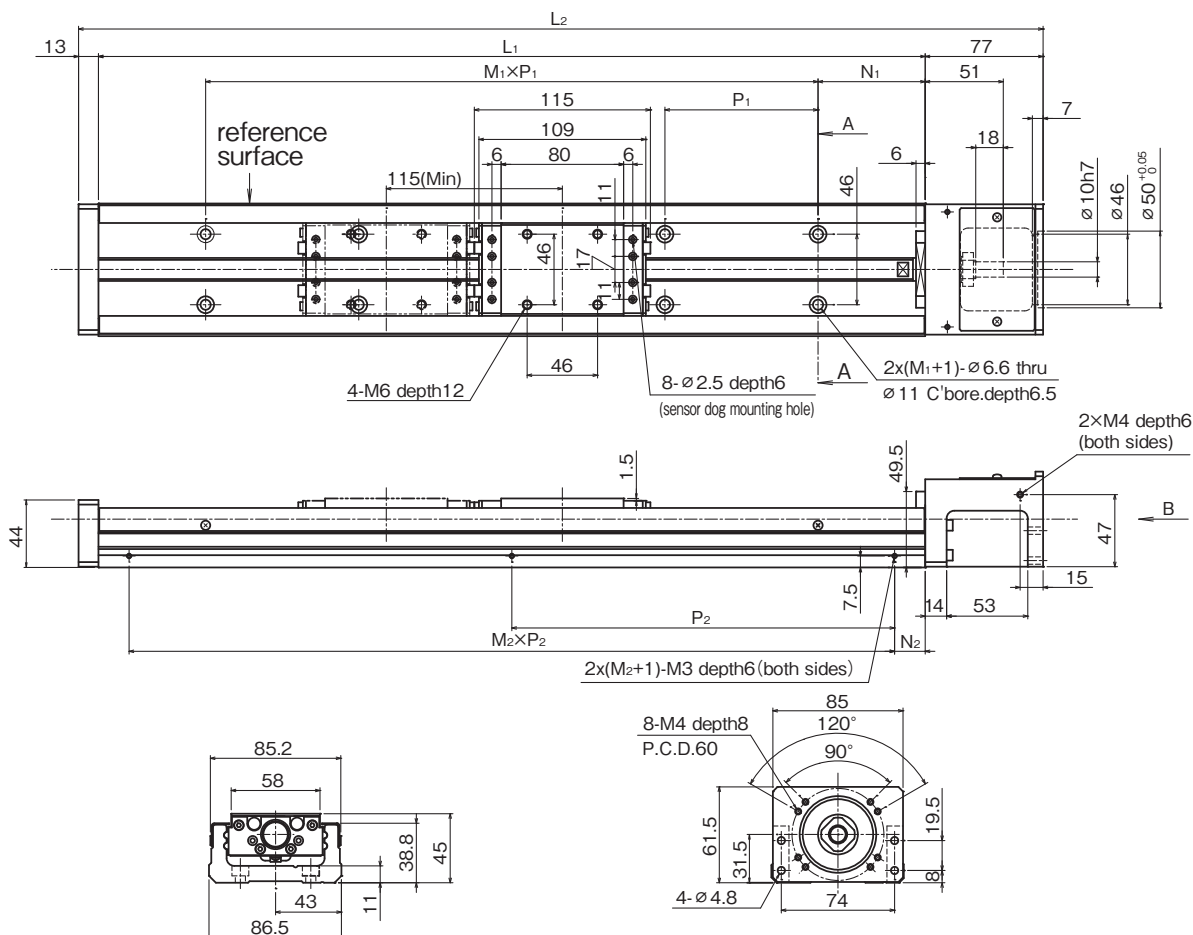
ACTUATOR

NIPPON BEARING

BH45 –Without Top Cover–

A(1 long block)

B(2 long blocks)



section A-A

View B (motor bracket A0)

refer to page H-106, 107 for other motor bracket

part number*3,4	stroke limit mm*1	dimensions mm						block mass kg *2		total mass kg	
		L ₁	L ₂	N ₁	M ₁ × P ₁	N ₂	M ₂ × P ₂	without top cover	with top cover	without top cover	with top cover
BH45 □□ A-340	219	340	430	70	2 × 100	20	1 × 300	0.86	1.19	6	6.9
B	104							1.72	2.38	6.9	8.1
BH45 □□ A-440	319	440	530		3 × 100		1 × 400	0.86	1.19	7.3	8.3
B	204							1.72	2.38	8.2	9.5
BH45 □□ A-540	419	540	630		4 × 100		2 × 250	0.86	1.19	8.5	9.6
B	304							1.72	2.38	9.4	10.9
BH45 □□ A-640	519	640	730		5 × 100		2 × 300	0.86	1.19	9.8	11
B	404							1.72	2.38	10.7	12.2
BH45 □□ A-740	619	740	830	6 × 100	2 × 350	0.86	1.19	11	12.4		
B	504					1.72	2.38	11.9	13.6		
BH45 □□ A-840	719	840	930	7 × 100	2 × 400	0.86	1.19	12.3	13.8		
B	604					1.72	2.38	13.2	15		
BH45 □□ A-940	819	940	1,030	8 × 100	3 × 300	0.86	1.19	13.5	15.1		
B	704					1.72	2.38	14.4	16.4		

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

*2 : Mass stated "with top cover" includes mass of sub tables.

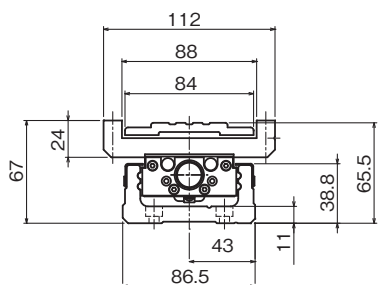
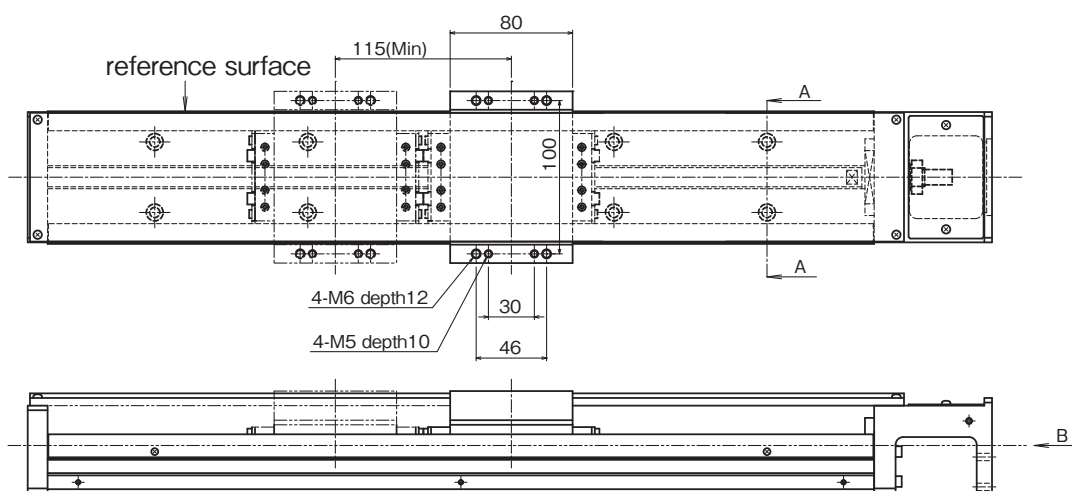
*3 : For B type (2 long blocks), drive block is located closest to motor bracket side.

*4 : □ is ballscrew lead.

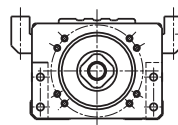
ACTUATOR

BH45 –With Top Cover–

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



section A-A



View B (motor bracket A0)

refer to page H-106, 107 for other motor bracket

inertia (reference values)

unit : kg · m²

part number	rail length mm	long block			
		without top cover		with top cover	
		A 1 block	B 2 blocks	A 1 block	B 2 blocks
BH4505	340	1.63 × 10 ⁻⁵	1.68 × 10 ⁻⁵	1.65 × 10 ⁻⁵	1.72 × 10 ⁻⁵
	440	2.01 × 10 ⁻⁵	2.10 × 10 ⁻⁵	2.03 × 10 ⁻⁵	2.11 × 10 ⁻⁵
	540	2.40 × 10 ⁻⁵	2.46 × 10 ⁻⁵	2.42 × 10 ⁻⁵	2.50 × 10 ⁻⁵
	640	2.79 × 10 ⁻⁵	2.85 × 10 ⁻⁵	2.81 × 10 ⁻⁵	2.89 × 10 ⁻⁵
	740	3.17 × 10 ⁻⁵	3.24 × 10 ⁻⁵	3.20 × 10 ⁻⁵	3.28 × 10 ⁻⁵
	840	3.56 × 10 ⁻⁵	3.62 × 10 ⁻⁵	3.59 × 10 ⁻⁵	3.67 × 10 ⁻⁵
	940	3.95 × 10 ⁻⁵	4.01 × 10 ⁻⁵	3.98 × 10 ⁻⁵	4.05 × 10 ⁻⁵
BH4510	340	1.81 × 10 ⁻⁵	2.04 × 10 ⁻⁵	1.89 × 10 ⁻⁵	2.20 × 10 ⁻⁵
	440	2.20 × 10 ⁻⁵	2.42 × 10 ⁻⁵	2.28 × 10 ⁻⁵	2.59 × 10 ⁻⁵
	540	2.58 × 10 ⁻⁵	2.81 × 10 ⁻⁵	2.67 × 10 ⁻⁵	2.98 × 10 ⁻⁵
	640	2.97 × 10 ⁻⁵	3.20 × 10 ⁻⁵	3.06 × 10 ⁻⁵	3.37 × 10 ⁻⁵
	740	3.36 × 10 ⁻⁵	3.59 × 10 ⁻⁵	3.44 × 10 ⁻⁵	3.76 × 10 ⁻⁵
	840	3.75 × 10 ⁻⁵	3.98 × 10 ⁻⁵	3.83 × 10 ⁻⁵	4.14 × 10 ⁻⁵
BH4520	340	2.54 × 10 ⁻⁵	3.45 × 10 ⁻⁵	2.87 × 10 ⁻⁵	4.12 × 10 ⁻⁵
	440	2.92 × 10 ⁻⁵	3.84 × 10 ⁻⁵	3.26 × 10 ⁻⁵	4.50 × 10 ⁻⁵
	540	3.31 × 10 ⁻⁵	4.22 × 10 ⁻⁵	3.65 × 10 ⁻⁵	4.89 × 10 ⁻⁵
	640	3.70 × 10 ⁻⁵	4.61 × 10 ⁻⁵	4.03 × 10 ⁻⁵	5.28 × 10 ⁻⁵
	740	4.09 × 10 ⁻⁵	5.00 × 10 ⁻⁵	4.42 × 10 ⁻⁵	5.67 × 10 ⁻⁵
	840	4.48 × 10 ⁻⁵	5.39 × 10 ⁻⁵	4.81 × 10 ⁻⁵	6.06 × 10 ⁻⁵
	940	4.86 × 10 ⁻⁵	5.78 × 10 ⁻⁵	5.20 × 10 ⁻⁵	6.45 × 10 ⁻⁵

part name	material	remarks
guide rail	carbon steel	black oxide except for raceway grooves
ballscrew shaft	carbon steel	
slide block	chromium-molybdenum steel	
motor bracket	aluminum alloy	black anodizing
coupling cover	aluminum alloy	black anodizing
housing	aluminum alloy	black anodizing
adapter plate	aluminum alloy	black anodizing
dust cover	aluminum alloy	white anodizing
sub table	aluminum alloy	white anodizing
top cover	aluminum alloy	

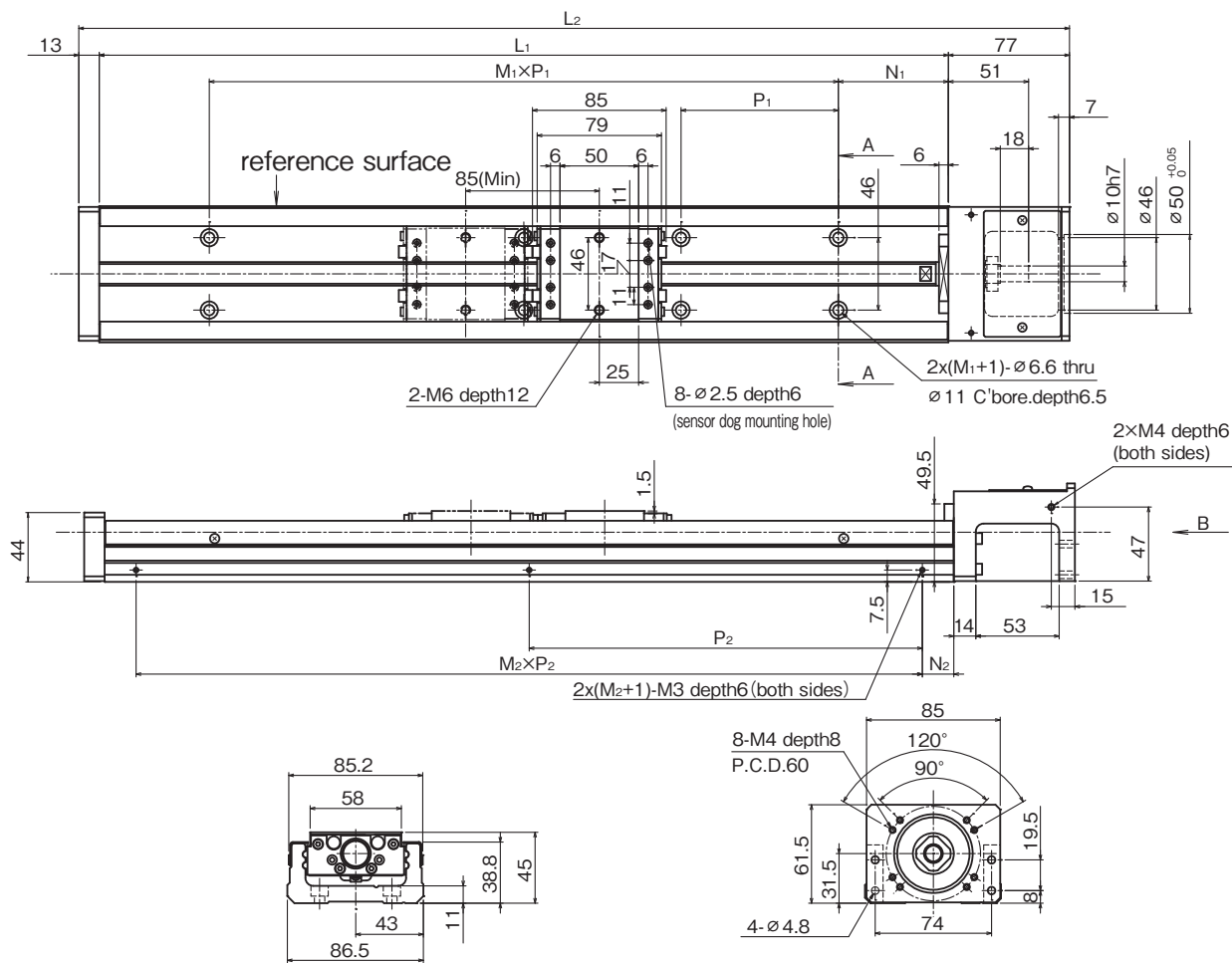
When LB option is selected, steel parts are treated with low temperature black chrome treatment.

ACTUATOR

NIPPON BEARING

BH45 –Without Top Cover–

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



section A–A

View B (motor bracket A0)

refer to page H-106, 107 for other motor bracket

part number*3*4	stroke limit mm* 1	dimensions mm						block mass kg *2		total mass kg	
		L 1	L 2	N 1	M1 × P1	N2	M2 × P2	without top cover	with top cover	without top cover	with top cover
BH45 □□ C-340	249	340	430	70	2 × 100	20	1 × 300	0.58	0.79	5.7	6.5
D	164							1.16	1.58	6.3	7.2
BH45 □□ C-440	349	440	530		3 × 100		1 × 400	0.58	0.79	7	7.8
D	264							1.16	1.58	7.6	8.6
BH45 □□ C-540	449	540	630		4 × 100		2 × 250	0.58	0.79	8.2	9.2
D	364							1.16	1.58	8.8	10
BH45 □□ C-640	549	640	730		5 × 100		2 × 300	0.58	0.79	9.5	10.6
D	464							1.16	1.58	10.1	11.4
BH45 □□ C-740	649	740	830	6 × 100	2 × 350	0.58	0.79	10.7	12		
D	564					1.16	1.58	11.3	12.8		
BH45 □□ C-840	749	840	930	7 × 100	2 × 400	0.58	0.79	12	13.3		
D	664					1.16	1.58	12.6	14.1		
BH45 □□ C-940	849	940	1,030	8 × 100	3 × 300	0.58	0.79	13.2	14.7		
D	764					1.16	1.58	13.8	15.5		

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

*2 : Mass stated "with top cover" includes mass of sub tables.

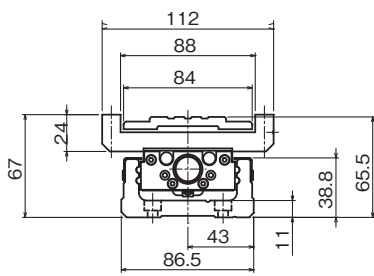
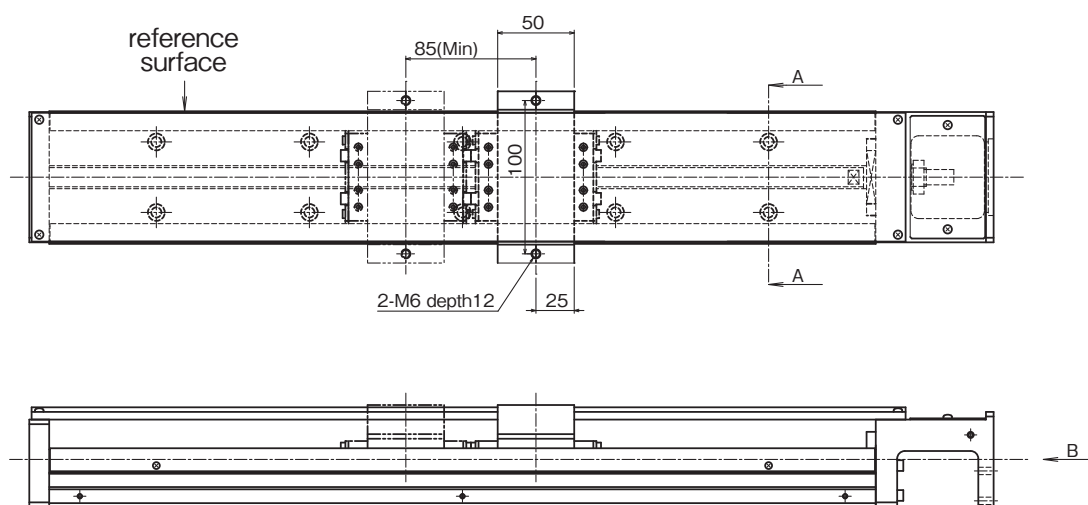
*3 : For D type (2 short blocks), drive block is located closest to motor bracket side.

*4 : □ is ballscrew lead.

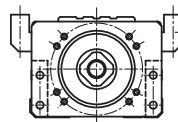
ACTUATOR

BH45 –With Top Cover–

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



section A-A



View B (motor bracket A0)

refer to page H-106, 107 for other motor bracket

inertia (reference values)

unit : kg · m²

part number	rail length mm	short block			
		without top cover		with top cover	
		C 1 block	D 2 blocks	C 1 block	D 2 blocks
BH4505	340	1.61 × 10 ⁻⁵	1.64 × 10 ⁻⁵	1.62 × 10 ⁻⁵	1.67 × 10 ⁻⁵
	440	1.99 × 10 ⁻⁵	2.03 × 10 ⁻⁵	2.01 × 10 ⁻⁵	2.06 × 10 ⁻⁵
	540	2.38 × 10 ⁻⁵	2.42 × 10 ⁻⁵	2.40 × 10 ⁻⁵	2.45 × 10 ⁻⁵
	640	2.77 × 10 ⁻⁵	2.81 × 10 ⁻⁵	2.78 × 10 ⁻⁵	2.83 × 10 ⁻⁵
	740	3.16 × 10 ⁻⁵	3.20 × 10 ⁻⁵	3.17 × 10 ⁻⁵	3.22 × 10 ⁻⁵
	840	3.55 × 10 ⁻⁵	3.59 × 10 ⁻⁵	3.56 × 10 ⁻⁵	3.61 × 10 ⁻⁵
BH4510	940	3.94 × 10 ⁻⁵	3.97 × 10 ⁻⁵	3.95 × 10 ⁻⁵	4.00 × 10 ⁻⁵
	340	1.73 × 10 ⁻⁵	1.88 × 10 ⁻⁵	1.78 × 10 ⁻⁵	1.98 × 10 ⁻⁵
	440	2.12 × 10 ⁻⁵	2.27 × 10 ⁻⁵	2.17 × 10 ⁻⁵	2.37 × 10 ⁻⁵
	540	2.51 × 10 ⁻⁵	2.66 × 10 ⁻⁵	2.56 × 10 ⁻⁵	2.76 × 10 ⁻⁵
	640	2.90 × 10 ⁻⁵	3.05 × 10 ⁻⁵	2.95 × 10 ⁻⁵	3.15 × 10 ⁻⁵
	740	3.28 × 10 ⁻⁵	3.44 × 10 ⁻⁵	3.33 × 10 ⁻⁵	3.54 × 10 ⁻⁵
BH4520	840	3.67 × 10 ⁻⁵	3.82 × 10 ⁻⁵	3.72 × 10 ⁻⁵	3.93 × 10 ⁻⁵
	940	4.06 × 10 ⁻⁵	4.21 × 10 ⁻⁵	4.11 × 10 ⁻⁵	4.31 × 10 ⁻⁵
	340	2.23 × 10 ⁻⁵	2.84 × 10 ⁻⁵	2.43 × 10 ⁻⁵	3.24 × 10 ⁻⁵
	440	2.62 × 10 ⁻⁵	3.23 × 10 ⁻⁵	2.82 × 10 ⁻⁵	3.63 × 10 ⁻⁵
	540	3.01 × 10 ⁻⁵	3.62 × 10 ⁻⁵	3.21 × 10 ⁻⁵	4.02 × 10 ⁻⁵
	640	3.40 × 10 ⁻⁵	4.00 × 10 ⁻⁵	3.60 × 10 ⁻⁵	4.41 × 10 ⁻⁵
BH4520	740	3.78 × 10 ⁻⁵	4.39 × 10 ⁻⁵	3.99 × 10 ⁻⁵	4.80 × 10 ⁻⁵
	840	4.17 × 10 ⁻⁵	4.78 × 10 ⁻⁵	4.38 × 10 ⁻⁵	5.19 × 10 ⁻⁵
	940	4.56 × 10 ⁻⁵	5.17 × 10 ⁻⁵	4.76 × 10 ⁻⁵	5.57 × 10 ⁻⁵

part name	material	remarks
guide rail	carbon steel	black oxide except for raceway grooves
ballscrew shaft	carbon steel	
slide block	chromium-molybdenum steel	
motor bracket	aluminum alloy	black anodizing
coupling cover	aluminum alloy	black anodizing
housing	aluminum alloy	black anodizing
adapter plate	aluminum alloy	black anodizing
dust cover	aluminum alloy	white anodizing
sub table	aluminum alloy	white anodizing
top cover	aluminum alloy	

When LB option is selected, steel parts are treated with low temperature black chrome treatment.

ACTUATOR

NIPPON BEARING

MOTOR BRACKET CONFIGURATIONS & APPLICABLE MOTORS

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

Table H-25 (1) Applicable Motors

Applicable motors				Output	BH15	BH23	BH30	BH45	
					P.H-102	P.H-103	P.H-104 ~ 105	P.H-106 ~ 107	
AC Servo motor	Panasonic	A5	MSME5A	50W	—	A3	A2	A5	
			MSME01	100W					
			MSME02	200W					
			MSME04	400W					
			MSME08	750W					
		A6	MSMF5A	50W	—	A3	A2	A5	
			MSMF01	100W					
			MSMF02	200W					
			MSMF04	400W					
			MSMF08	750W					
	MITSUBISHI ELECTRIC	J3	HF-KP(MP)053	50W	—	A1	A1	A4	
			HF-KP(MP)13	100W					
			HF-KP(MP)23	200W					
			HF-KP(MP)43	400W					
			HF-KP(MP)73	750W					
		J4	HG-AK0136	10W	A1	—	—	—	
			HG-AK0236	20W					
			HG-AK0336	30W					
			HG-KR(MR)053	50W					
			HG-KR(MR)13	100W					
			HG-KR(MR)23	200W					
			HG-KR(MR)43	400W					
			HG-KR(MR)73	750W					
		YASKAWA ELECTRIC	Σ - V mini	SGMMV-A1	10W	A1	—	—	—
				SGMMV-A2	20W				
				SGMMV-A3	30W				
			Σ - V	SGMJV(SGMAV)-A5	50W	—	A1	A1	A4
				SGMJV(SGMAV)-01	100W				
SGMAV-C2	150W								
SGMJV(SGMAV)-02	200W								
SGMJV(SGMAV)-04	400W								
SGMAV-06	550W								
SGMJV(SGMAV)-08	750W								
Σ - 7	SGM7J(SGM7A)-A5		50W	—	A1	A1	A4		
	SGM7J(SGM7A)-01		100W						
	SGM7J(SGM7A)-C2		150W						
	SGM7J(SGM7A)-02		200W						
	SGM7J(SGM7A)-04		400W						
	SGM7J(SGM7A)-06	600W							
	SGM7J(SGM7A)-08	750W							

ACTUATOR

Table H-25 (2) Applicable Motors

Applicable motors				Output	BH15	BH23	BH30	BH45	
					P.H-102	P.H-103	P.H-104 ~ 105	P.H-106 ~ 107	
AC Servo motor	SANYO DENKI	Q	Q1AA04003D	30W	-	A1	A1	A4	
			Q1AA04005D	50W					
			Q1AA04010D	100W					
			Q1AA06020D	200W					
			Q1AA06040D	400W					
			Q1AA07075D	750W					
		R	R2AA04005	50W	-	A1	A1	A4	
			R2AA04010	100W					
			R2AA06020	200W					
			R2AA06040	400W					
	R2AA08075		750W						
	OMRON	G	R88M-G05030	50W	-	A1	A1	A4	
			R88M-G10030	100W					
			R88M-G20030	200W					
			R88M-G40030	400W					
			R88M-G75030	750W					
		G5	R88M-K05030	50W	-	A1	A1	A4	
			R88M-K10030	100W					
			R88M-K20030	200W					
			R88M-K40030	400W					
			R88M-K75030	750W					
		1S	R88M-1M10030	100W	-	A1	A1	A4	
			R88M-1M20030	200W					
			R88M-1M40030	400W					
			R88M-1M75030	750W					
		KEYENCE	MV	MV-M005	50W	-	A1	A1	A4
				MV-M010	100W				
				MV-M020	200W				
				MV-M040	400W				
				MV-M075	750W				
SV	SV(SV2)-M005		50W	-	A1	A1	A4		
	SV(SV2)-M010		100W						
	SV(SV2)-M020		200W						
	SV(SV2)-M040		400W						
	SV(SV2)-M075		750W						
FANUC	β is	β is0.2/5000	50W	-	A1	A1	A4		
		β is0.3/5000	100W						
		β is0.4/5000 ※	130W						
		β is0.5/6000 ※	350W						
		β is1/6000	500W						

※Please contact NB for the coupling because the motor shaft length will be shortened.
NB can provide other types of motor brackets. Please contact NB for details.

NIPPON BEARING

MOTOR BRACKET CONFIGURATIONS & APPLICABLE MOTORS

Table H-26 (1) Applicable Motors

Applicable motors				Flange	BH15	BH23	BH30	BH45	
					P.H-102	P.H-103	P.H-104 ~ 105	P.H-106 ~ 107	
Stepper motor	ORIENTAL MOTOR	α step	AR	AR2	□ 28	A3	A6	—	—
				AR46	□ 42	—	A5	B1	—
				AR6	□ 60	—	—	A4	A6
			AZ	AZM2	□ 28	A3	A6	—	—
				AZM4	□ 42	—	A5	B1	—
				AZM6	□ 60	—	—	A4	A6
		5 phase motor	RK II	RKS54	□ 42	—	A5	B1	—
				RKS56	□ 60	—	—	A4	A6
			CRK	CRK52	□ 28	A3	A6	—	—
				CRK54	□ 42	—	A5	B1	—
				CRK56	□ 60	—	—	A4	A6
			CVK (PKP)	PKP52	□ 28	A3	A6	—	—
				PKP54	□ 42	—	A5	B1	—
				PKP56	□ 56.4	—	—	A5	—
				PKP56 □ F	□ 60	—	—	A4	A6
			2 phase motor	CVK (PKP)	PKP22	□ 28	A3	A6	—
	PKP24	□ 42			—	A5	B1	—	
	PKP26	□ 56.4			—	—	A5	—	
	SANYO DENKI	5 phase motor	F5	SH528	□ 28	A3	A6	—	—
				SM542	□ 42	—	A5	B1	—
SM560				□ 60	—	—	A4	A6	
2 phase motor		F2	SH228	□ 28	A3	A6	—	—	
			SH142,103H52	□ 42	—	A5	B1	—	
			103H712	□ 56.4	—	—	A5	—	
			103H782 (connector type)	□ 60	—	—	A4	A6	
			□ K-S54 □	□ 42	—	A5	B1	—	
TECHNO DRIVE	5 phase motor	□ K-S(M)56 □	□ 60	—	—	A4	A6		

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

ACTUATOR

Table H-26 (2) Applicable Motors

Applicable motors				Flange	BH15	BH23	BH30	BH45
					P.H-102	P.H-103	P.H-104 ~105	P.H-106 ~107
Stepper motor	TAMAGAWA SEIKI	2 phase motor	TS3641	□28	A3	A6	—	—
			TS3617	□42	—	A5	B1	—
			TS3690	□56.4	—	—	A5	—
		5 phase motor	TS3667	□42	—	A5	B1	—
			TS3624 *	□60	—	—	A4	A6
Stepper servo		i-STEP	TS3699N112	□28	A3	A6	—	—
	TS3699N172		□42	—	A5	B1	—	
	TS3699N231(N232)		□56.4	—	—	A5	—	
	Si servo	TS3641	□28	A3	A6	—	—	
		TS3617	□42	—	A5	B1	—	
		TS3653	□56.4	—	—	A5	—	
	Si super	SM-L5MH	□28	A3	A6	—	—	
		SM-02MH/SM-04MH	□42	—	A5	B1	—	
		SM-09MH/SM-12MH	□56.4	—	—	A5	—	

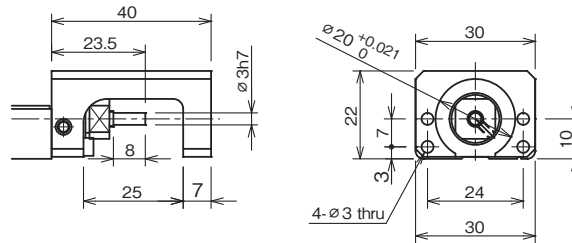
※Please contact NB for the coupling because the motor shaft length will be shortened.

NIPPON BEARING

BH15

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

A0



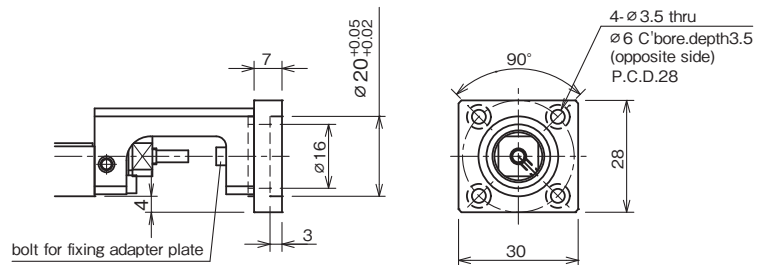
A1 (Mass: 10g)

Recommended Coupling:

XBW-15C2(Nabeya Bi-tech Kaisha)

LAD-15C(Sakai Manufacturing Co., Ltd.)

SFC-005DA2(Miki Pulley Co., Ltd.)

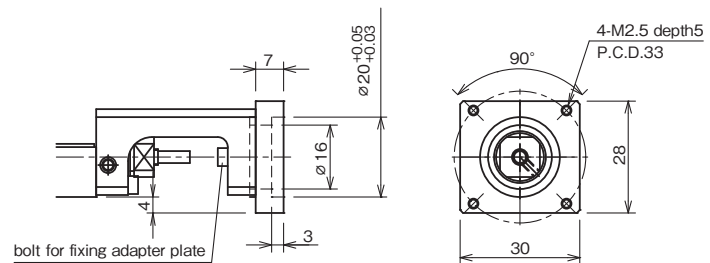


A2 (Mass: 10g)

Recommended Coupling:

XBW-15C2(Nabeya Bi-tech Kaisha)

SFC-005DA2(Miki Pulley Co., Ltd.)



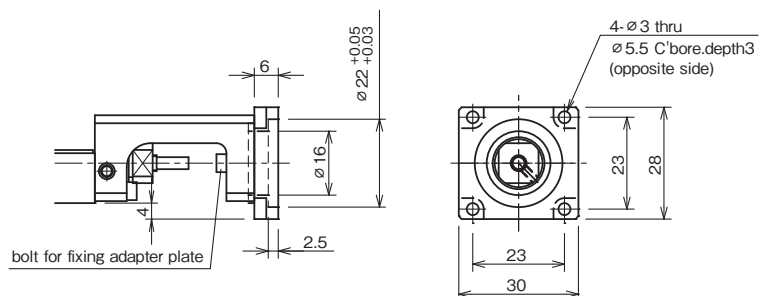
A3 (Mass: 10g)

Recommended Coupling:

XBW-15C2(Nabeya Bi-tech Kaisha)

LAD-15C(Sakai Manufacturing Co., Ltd.)

SFC-005DA2(Miki Pulley Co., Ltd.)



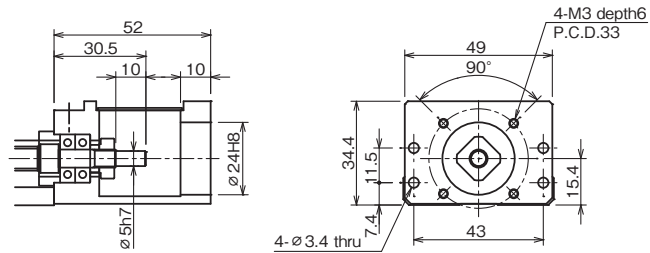
For configurations A1 and A3, attach the motor to the motor mount adapter plate first before mounting it to actuator.

ACTUATOR

BH23

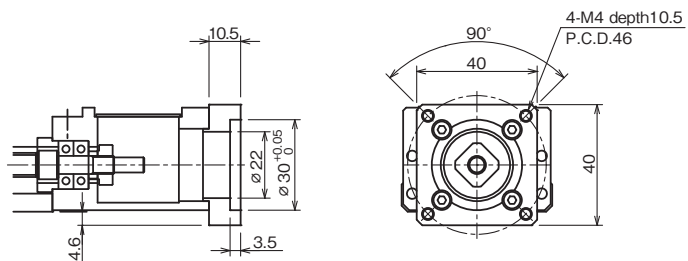
Figures inside() indicates mass of the motor mount adapter plate.

A0



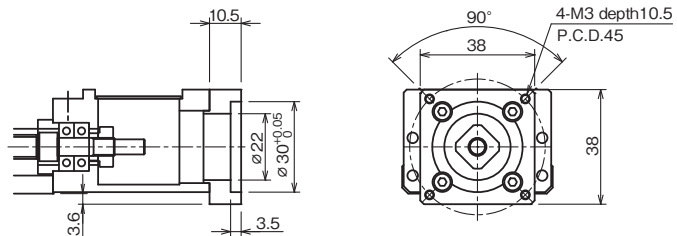
A1 (Mass:28g)

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



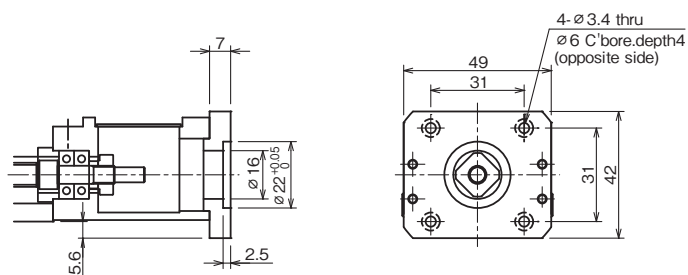
A3(Mass:24g)

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



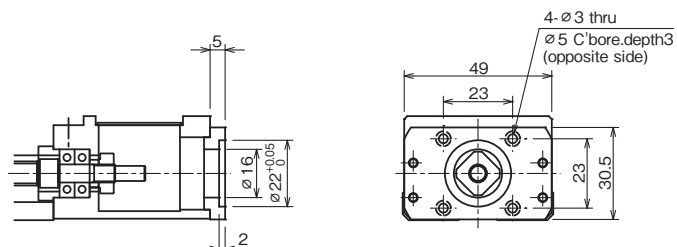
A5(Mass:32g)

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



A6(Mass:16g)

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



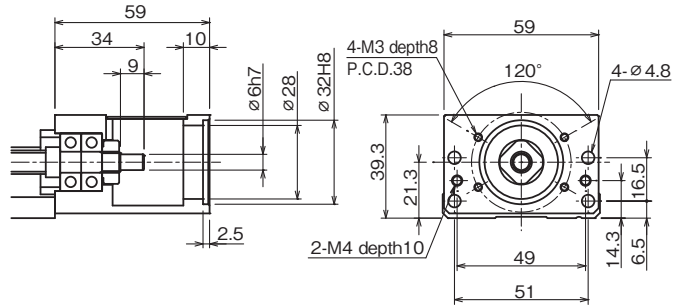
For configurations A5 and A6, attach the motor to the motor mount adapter plate first before mounting it to actuator.

NIPPON BEARING

BH30

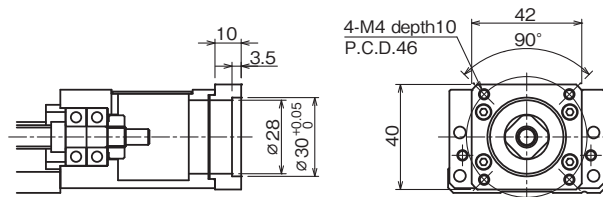
Figures inside() indicates mass of the motor mount adapter plate.

A0



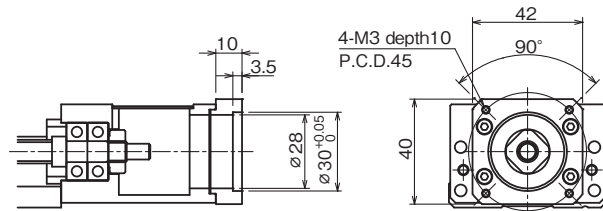
A1 (Mass:25g)

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



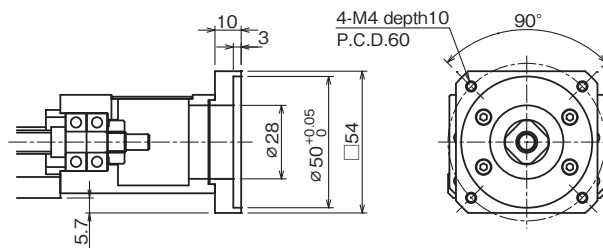
A2 (Mass:25g)

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



A3 (Mass:55g)

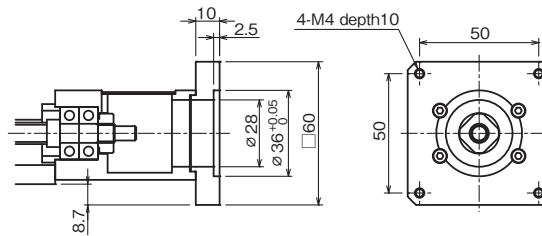
Recommended Coupling:
 XBW-25C2(Nabeya Bi-tech Kaisha)
 LAD-25C(Sakai Manufacturing Co., Ltd.)
 SFC-020DA2(Miki Pulley Co., Ltd.)



ACTUATOR

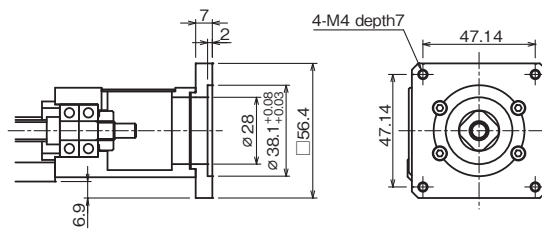
A4 (Mass:71g)

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



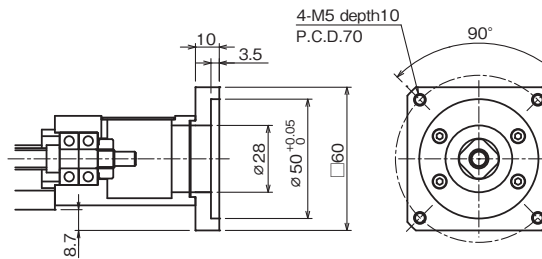
A5 (Mass:46g)

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



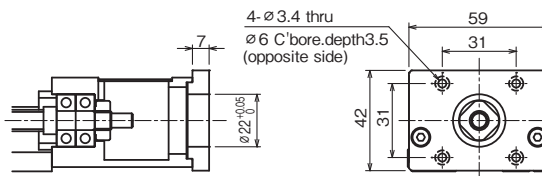
A7 (Mass:64g)

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



B1 (Mass:37g)

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



For configuration B1, attach the motor to the motor mount adapter plate first before mounting it to actuator.

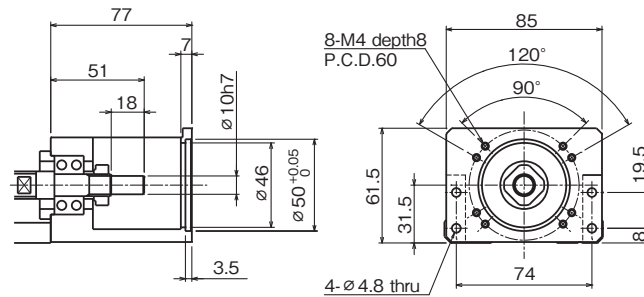
ACTUATOR

NIPPON BEARING

BH45

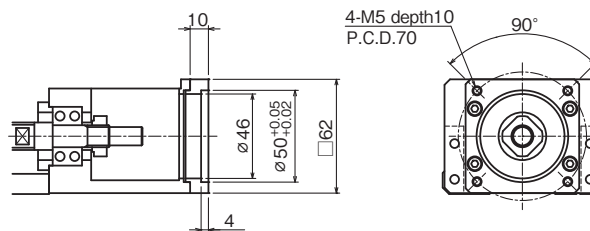
Figures inside() indicates mass of the motor mount adapter plate.

A0



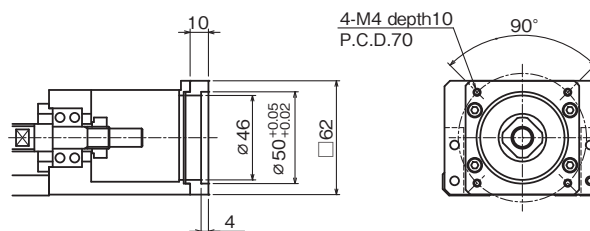
A1 (Mass:53g)

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



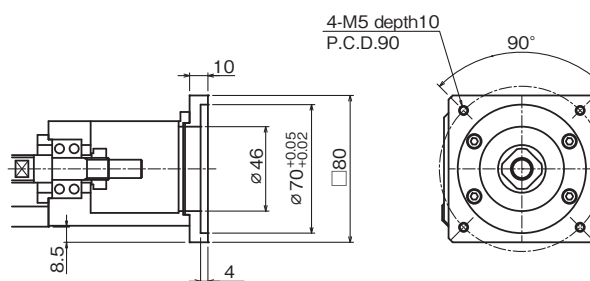
A2 (Mass:53g)

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



A3 (Mass:103g)

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



ACTUATOR

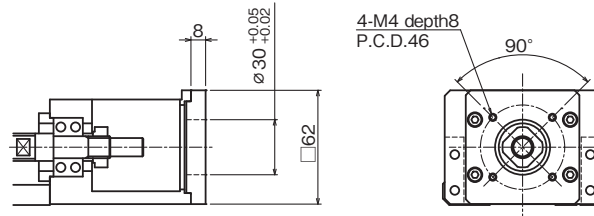
A4 (Mass:73g)

Recommended Coupling:

XBW-25C2(Nabeya Bi-tech Kaisha)

LAD-25C(Sakai Manufacturing Co., Ltd.)

SFC-020DA2(Miki Pulley Co., Ltd.)



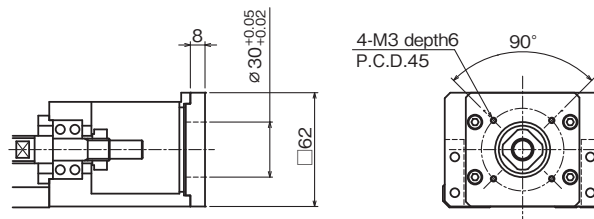
A5 (Mass:73g)

Recommended Coupling:

XBW-25C2(Nabeya Bi-tech Kaisha)

LAD-25C(Sakai Manufacturing Co., Ltd.)

SFC-020DA2(Miki Pulley Co., Ltd.)



A6 (Mass:64g)

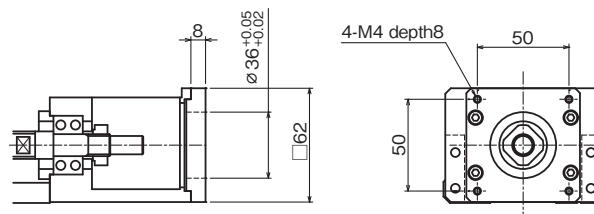
Recommended Coupling:

XBW-27C2(Nabeya Bi-tech Kaisha)

LAD-25C(Sakai Manufacturing Co., Ltd.)*

SFC-020DA2(Miki Pulley Co., Ltd.)*

*Please contact NB if you are using aSTEP motor (Oriental Motor Co., Ltd.).

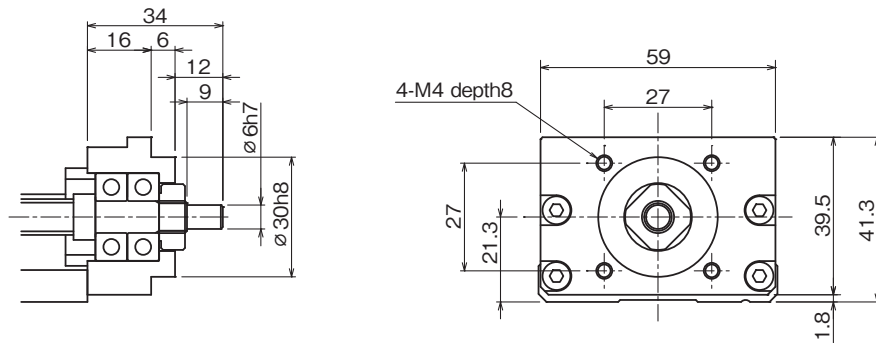


NIPPON BEARING

EXPOSED BRACKET R0

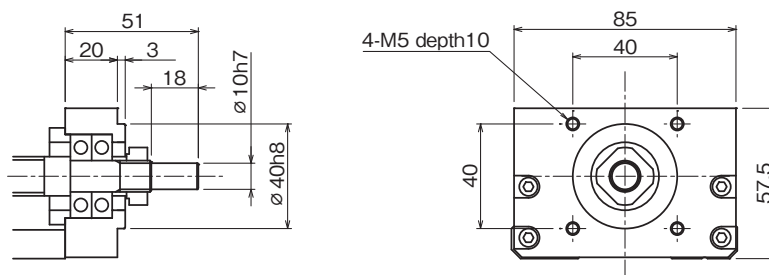
The BH type ballscrew shaft end is exposed with the exposed bracket R0 type. Please fabricate an original bracket in case the standard brackets are not applicable. R0 type is applicable with cover and with sensors.

BH30



Mass is 0.085kg less than the mass in the table on page H-92.

BH45



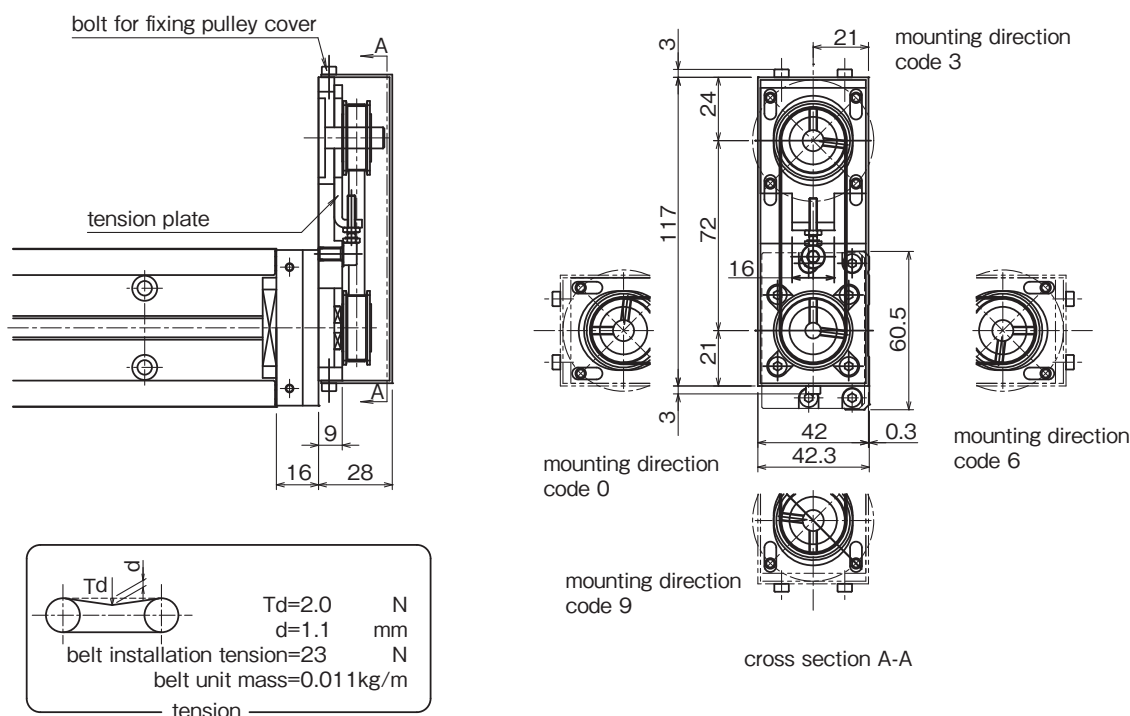
Mass is 0.26kg less than the mass in the table on page H-94 and H-96.

ACTUATOR

RETURN PULLEY UNIT

Return pulley units in which a motor is connected with a timing belt are available for BH type. Its return structure allows the reduction of total length (available for BH30 and BH45).

BH30



- 1.Installation position of Pulley Unit can be selected at 90° intervals (mounting direction code).
- 2.Applicable with cover and with sensors.
- 3.0.2kg is added to the mass on page H-92.
- 4.Inertia is added 2.22x10⁻⁶kg · m² to the value on page H-93.
- 5.Part number structure BH30***-****/☆☆□
 ☆☆: Symbol of applicable motor bracket (refer to Table H-27)
 □: Mounting direction code (refer to cross section A-A)

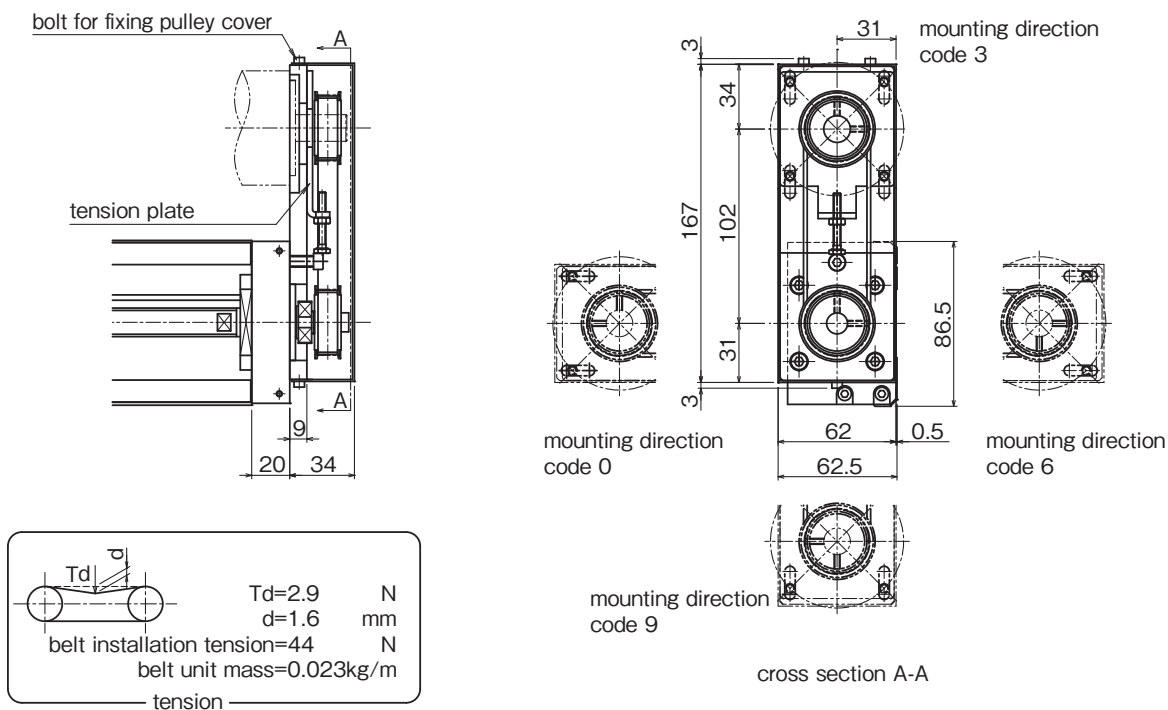
Table H-27 Applicable Motor Bracket

motor bracket	applicable motors		rated output	flange	motor shaft dia.
RA	Panasonic	MINAS SERIES	50 ~ 100 W	□ 38	φ 8
RB	YASKAWA ELECTRIC	SIGMA SERIES	50 ~ 100 W	□ 40	φ 8
	MITSUBISHI ELECTRIC	MELSERVO SERIES	50 ~ 100 W	□ 40	
	SANYO DENKI	SANMOTION Q1 SERIES	50 ~ 100 W	□ 40	

ACTUATOR

NIPPON BEARING

BH45



1. Installation position of Pulley Unit can be selected at 90° intervals (mounting direction code).
2. Applicable with cover and with sensors.
3. 0.7kg is added to the mass on page H-94 and H-96.
4. Inertia is added $1.24 \times 10^{-5} \text{kg} \cdot \text{m}^2$ to the value on page H-95 and H-97.
5. Part number structure BH45***-****/☆☆□
 ☆☆: Symbol of applicable motor bracket (refer to Table H-28)
 □: Mounting direction code (refer to cross section A-A)

Table H-28 Applicable Motor Bracket

motor bracket	applicable motors		rated output	flange	motor shaft dia.
RA	Panasonic	MINAS SERIES	200 W	□ 60	φ 11
RB	YASKAWA ELECTRIC	SIGMA SERIES	200 W	□ 60	φ 14
	MITSUBISHI ELECTRIC	MELSERVO SERIES	200 W	□ 60	
	SANYO DENKI	SANMOTION Q1 SERIES	200 W	□ 60	
RC	5 PHASE STEPPING MOTOR		---	□ 60	φ 8

ACTUATOR

SENSOR

Photomicro sensor or proximity sensor can be attached to the BH actuator with our optional sensor-mounting rail (refer to Table H-29). Tapped holes are machined on both sides of the guide rail, allowing attachment of sensor rail to either side. The case without special instruction from customer, standard positioning would be to the left of the motor mount end. When with two blocks, sensor dog is attached on the driving block as standard. Please change to attach sensor dog on the driven block if necessary.

Table H-29 Standard (NPN) Sensor

sensor symbol	sensor type	BH15	BH23	BH30	BH45
S	slim/compact type photomicro sensor	—	PM-L25 [3 pcs] *1 (SUNX)	EE-SX674 [3 pcs] *2 (OMRON)	
K	proximity sensor (N.C. contact) *3	APM-D3B1 [2 pcs]*1 APM-D3B1F [1 pc]*1*4 (Azbil)			

*1: length of cable: 1m

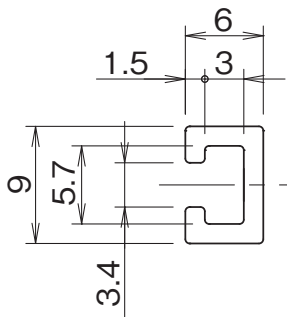
*2: 3 pcs of connector EE-1001 (OMRON) will be attached

*3: normal close contact

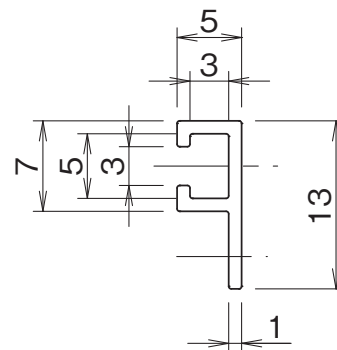
*4: different frequency type

Figure H-25 Sensor Rail

BH15



BH23, 30, 45

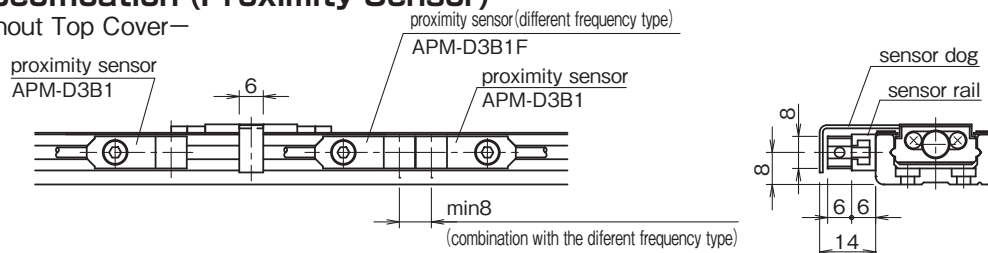


NIPPON BEARING

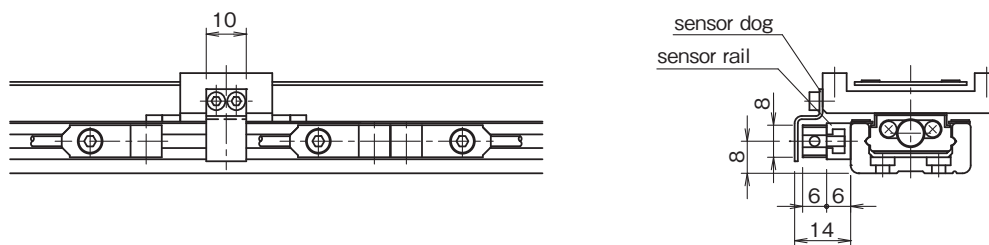
BH15

K Specification (Proximity Sensor)

—Without Top Cover—



—With Top Cover—



accessories

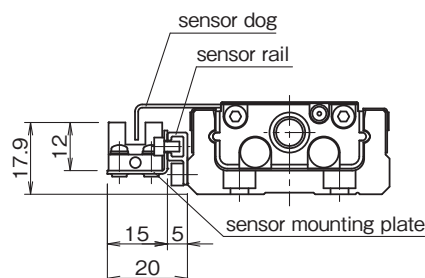
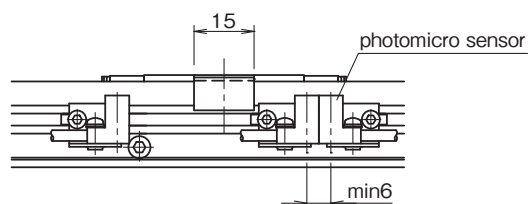
part name	qty
proximity sensor: APM-D3B1 (Azbil)	2 pcs
proximity sensor (different frequency type): APM-D3B1F (Azbil)	1 pc
sensor rail	1 pc
sensor dog	1 pc

ACTUATOR

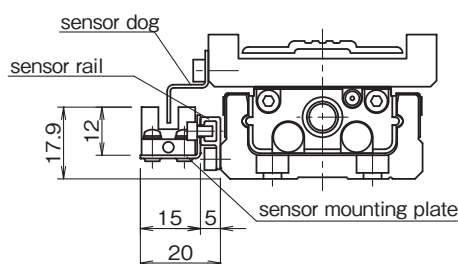
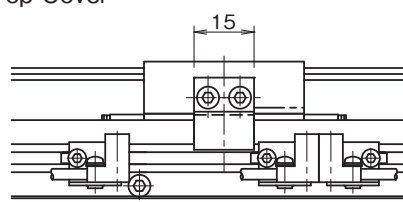
BH23

S Specification (Compact Photomicro Sensor)

—Without Top Cover—



—With Top Cover—

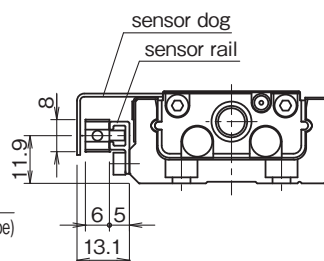
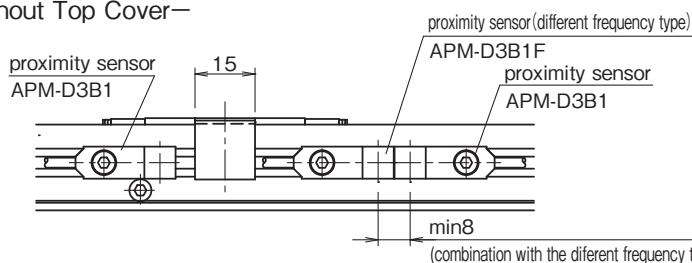


accessories

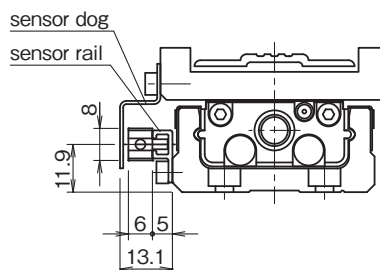
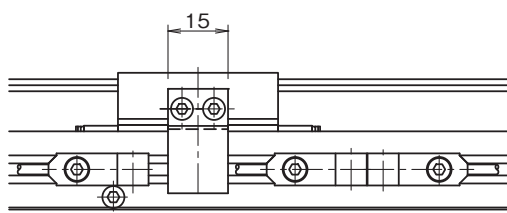
part name	qty
photomicro sensor:PM-L25(SUNX)	3 pcs
sensor mounting plate	3 pcs
sensor rail	1 pc
sensor dog	1 pc

K Specification (Proximity Sensor)

—Without Top Cover—



—With Top Cover—



accessories

part name	qty
proximity sensor: APM-D3B1 (Azbil)	2 pcs
proximity sensor (different frequency type):APM-D3B1F(Azbil)	1 pc
sensor rail	1 pc
sensor dog	1 pc

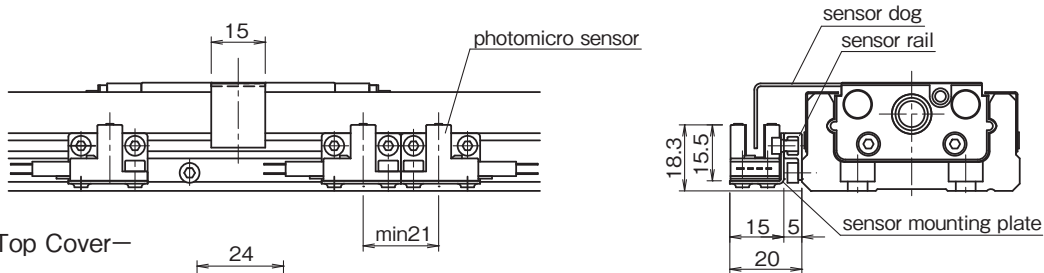
ACTUATOR

NIPPON BEARING

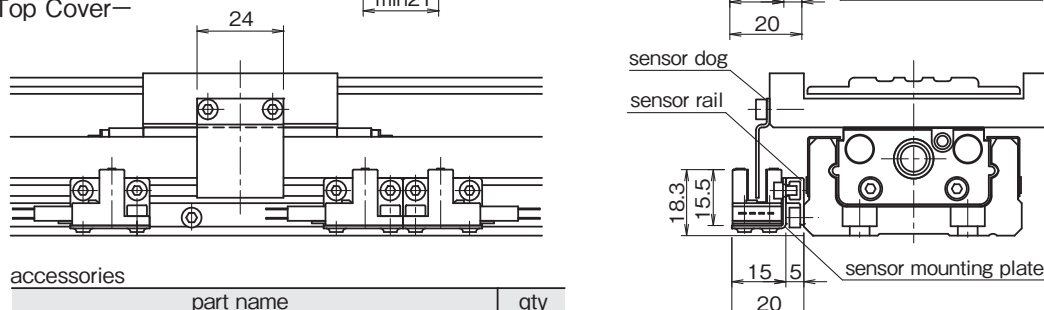
BH30

S Specification (Slim-Type Photomicro Sensor)

—Without Top Cover—



—With Top Cover—

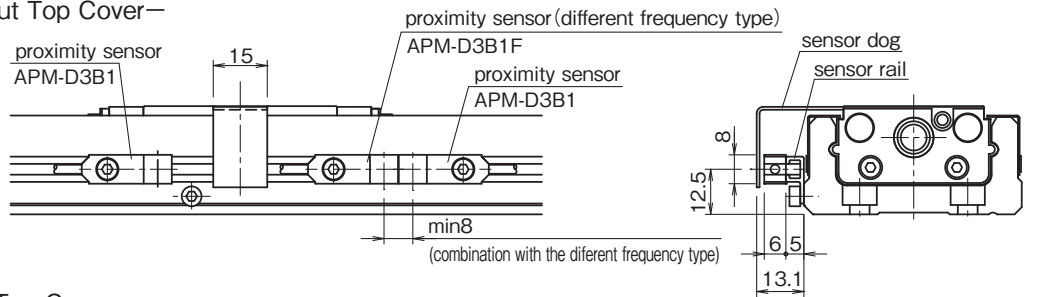


accessories

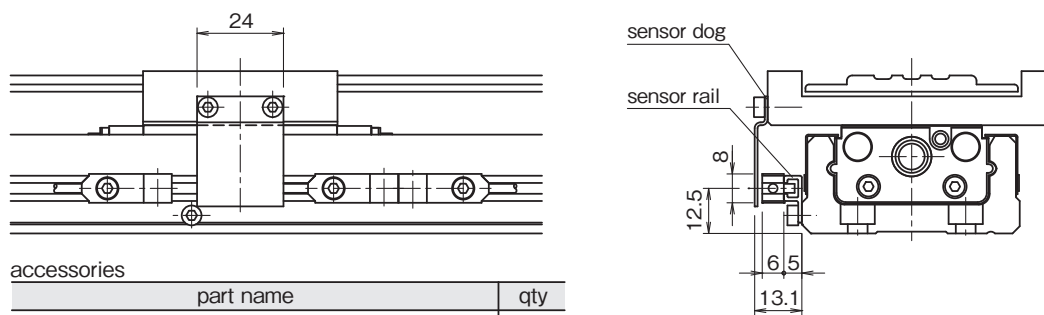
part name	qty
photomicro sensor: EE-SX674 (OMRON)	3 pcs
connector: EE-1001 (OMRON)	3 pcs
sensor mounting plate	3 pcs
sensor rail	1 pc
sensor dog	1 pc

K Specification (Proximity Sensor)

—Without Top Cover—



—With Top Cover—



accessories

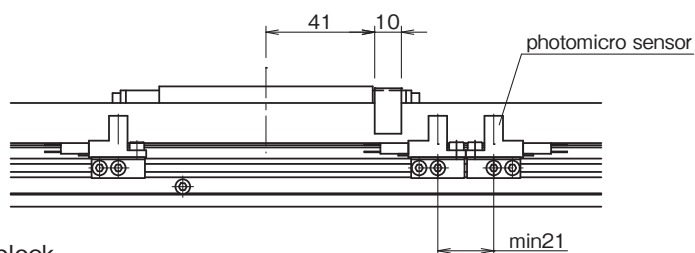
part name	qty
proximity sensor: APM-D3B1 (Azbil)	2 pcs
proximity sensor (different frequency type): APM-D3B1F (Azbil)	1 pc
sensor rail	1 pc
sensor dog	1 pc

ACTUATOR

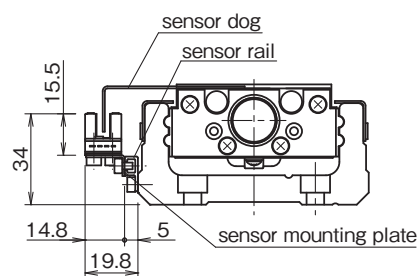
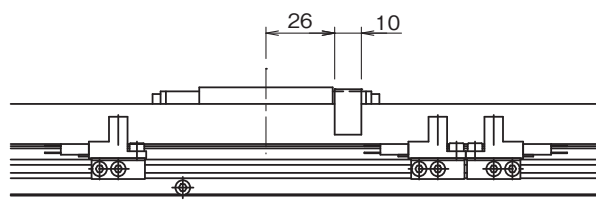
BH45

S Specification (Slim-Type Photomicro Sensor)

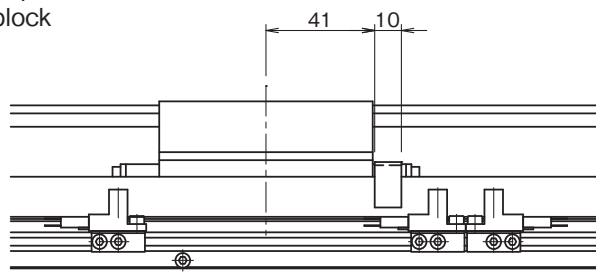
—Without Top Cover—
long block



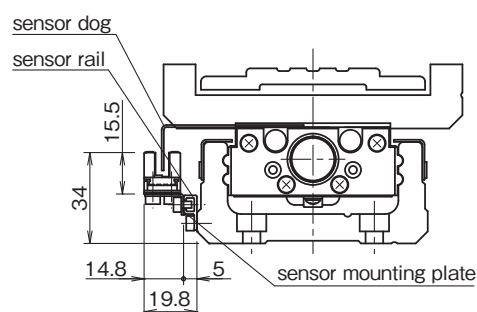
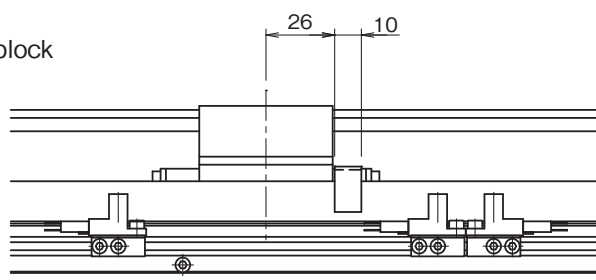
short block



—With Top Cover—
long block



short block



accessories

part name	qty
photomicro sensor: EE-SX674 (OMRON)	3 pcs
connector: EE-1001 (OMRON)	3 pcs
sensor mounting plate	3 pcs
sensor rail	1 pc
sensor dog	1 pc

ACTUATOR

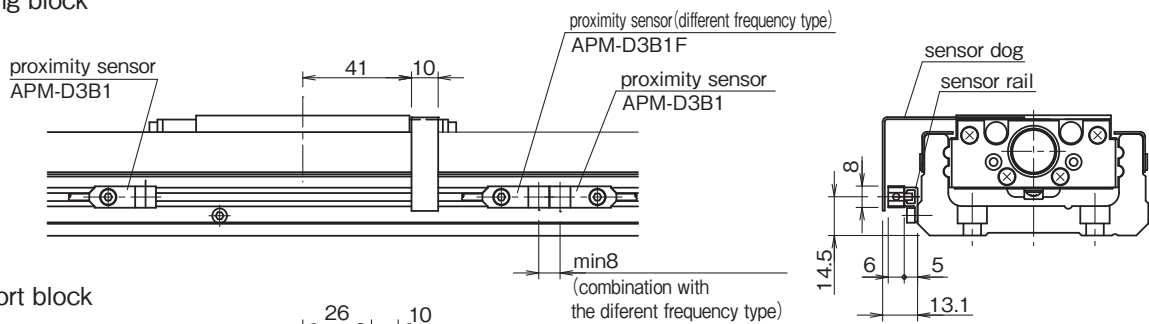
NIPPON BEARING

BH45

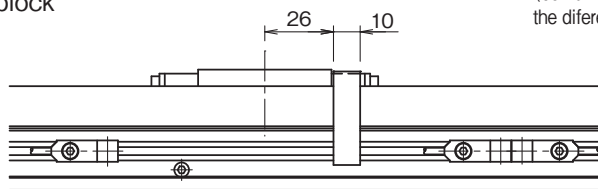
K Specification (Proximity Sensor)

—Without Top Cover—

long block

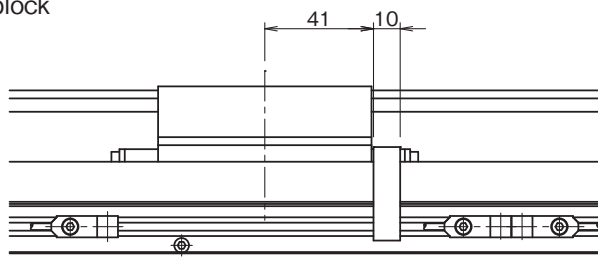


short block

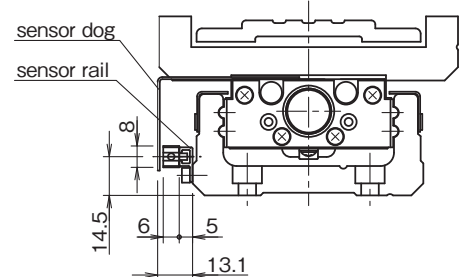
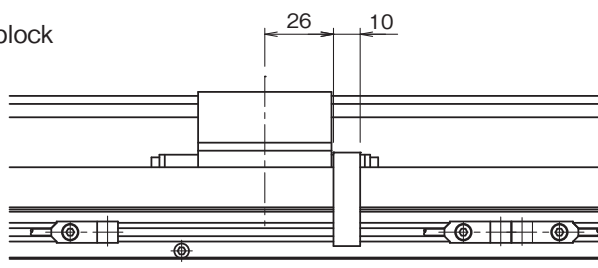


—With Top Cover—

long block



short block



accessories

part name	qty
proximity sensor: APM-D3B1 (Azbil)	2 pcs
proximity sensor (different frequency type): APM-D3B1F (Azbil)	1 pc
sensor rail	1 pc
sensor dog	1 pc

ACTUATOR

PNP SENSOR

For the BH 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-30 for the model number of PNP type sensors.

Table H-30 Standard (PNP) Sensor

sensor symbol	sensor type	BH15	BH23	BH30	BH45
S	slim/compact type photomicro sensor	—	PM-L25-P [3 pcs] ^{*1} (SUNX)	EE-SX674P [3 pcs] ^{*2} (OMRON)	
K	proximity sensor (N.C. contact) ^{*3}	APM-D3E1 [2 pcs] ^{*1} APM-D3E1F [1 pc] ^{*1*4} (Azbil)			

*1: length of cable: 1m

*2: 3 pcs of connector EE-1001 (OMRON) will be attached

*3: normal close contact

*4: different frequency type

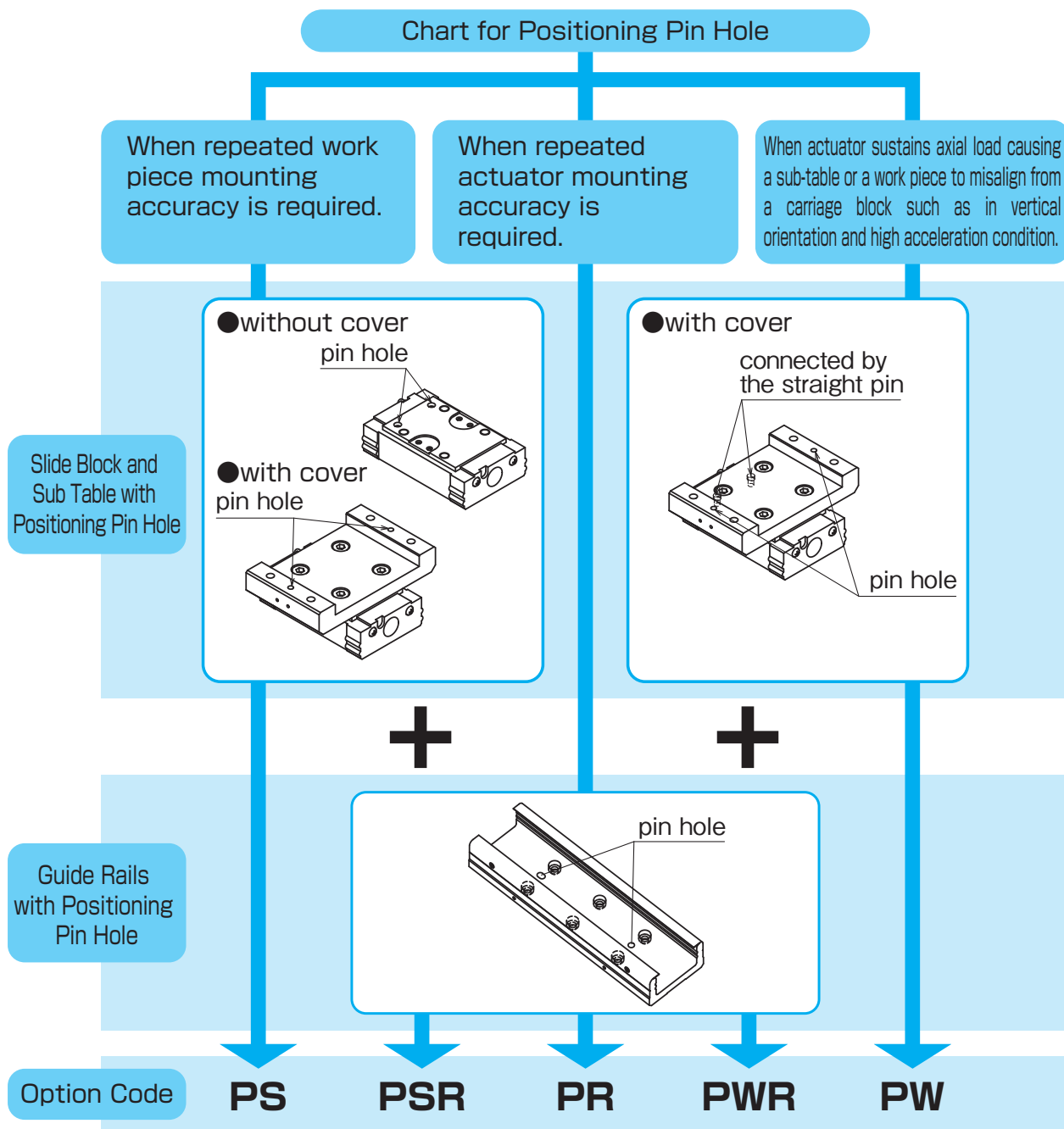
NIPPON BEARING

POSITIONING PIN HOLE

For the BH type, positioning pin holes can be provided on the slide block and sub table by adding the option code "PS" or "PW" in the end of the part number.

The option code "PR" is used to provide the guide rail with positioning pin holes. When positioning pin holes are necessary on both the slide block/sub table and guide rail, please add the option code "PSR" or "PWR"

Table H-31 Chart for Positioning Pin Hole



Positioning Pin Hole for Slide Block and Sub Table

It is useful when exacting reassembly positioning is required. In case of two blocks used, both blocks are processed.

When the code "PS" is specified, the drilling hole is processed only on the mounting surface (slide block or sub table). When the code "PW" is specified for a BH with a top cover, the slide block and sub table are connected by the straight pins at the location where the "PS" option specifies on the slide block.

Note that NB does not supply straight pins for the "PS" option.

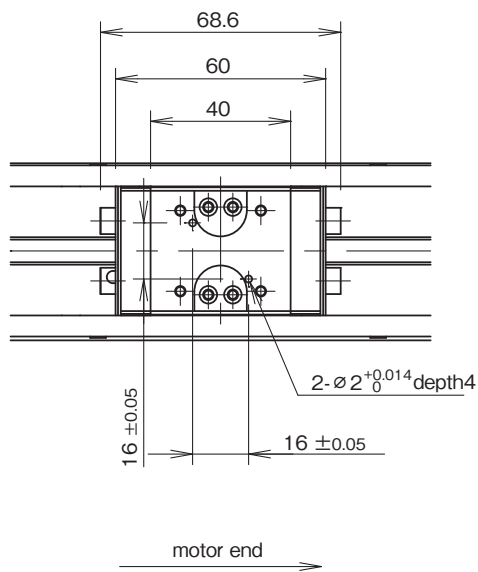
ACTUATOR

BH15A,B (long block)

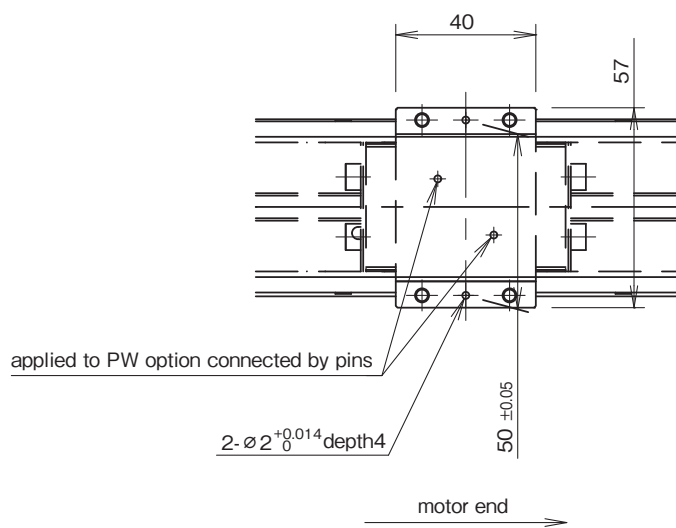
Positioning pin hole option is not available for BH15.

BH23A,B (long block)

- PS Option Without Top Cover -

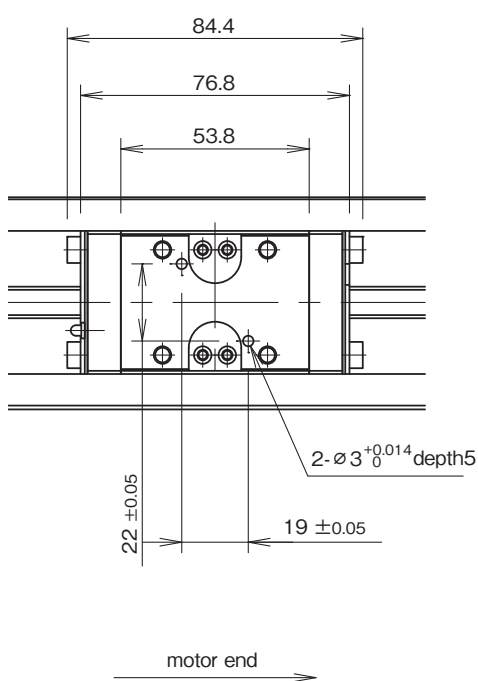


- PS Option With Top Cover -

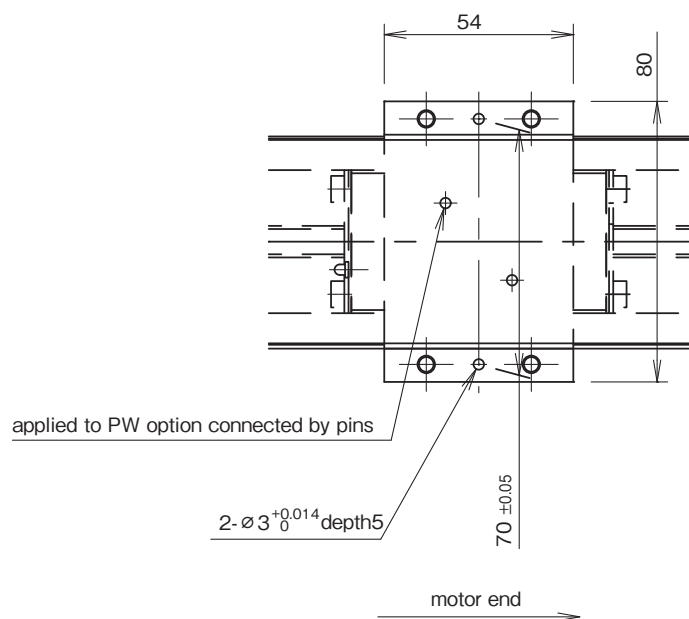


BH30A,B (long block)

- PS Option Without Top Cover -



- PS Option With Top Cover -

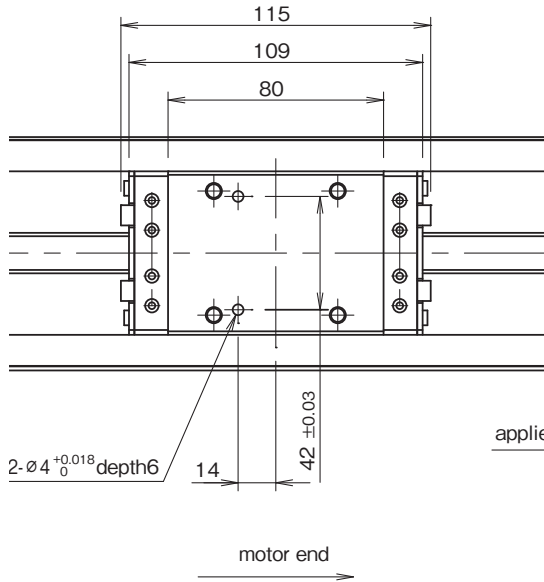


ACTUATOR

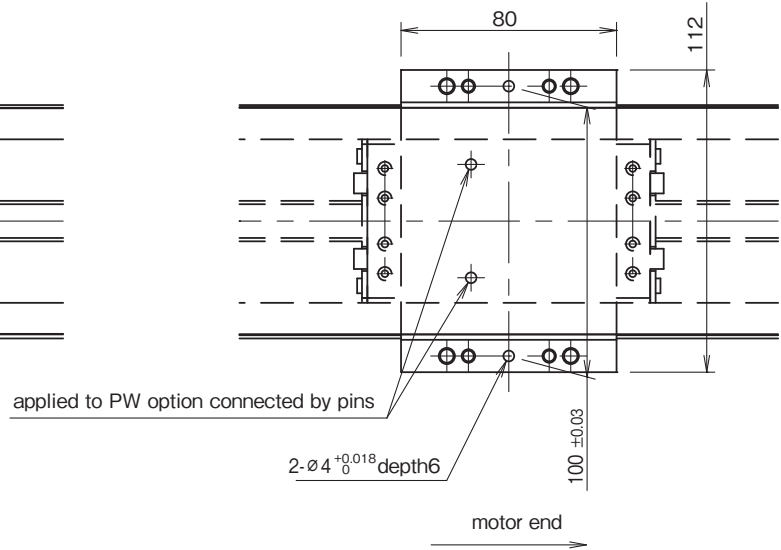
NIPPON BEARING

BH45A,B (long block)

- PS Option Without Top Cover -

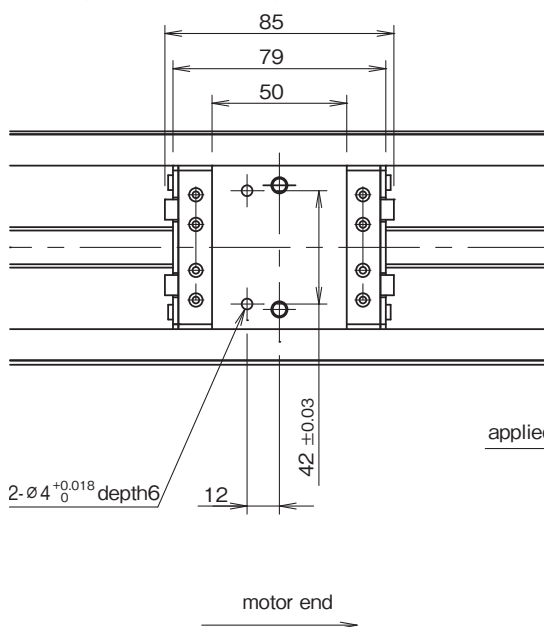


- PS Option With Top Cover -

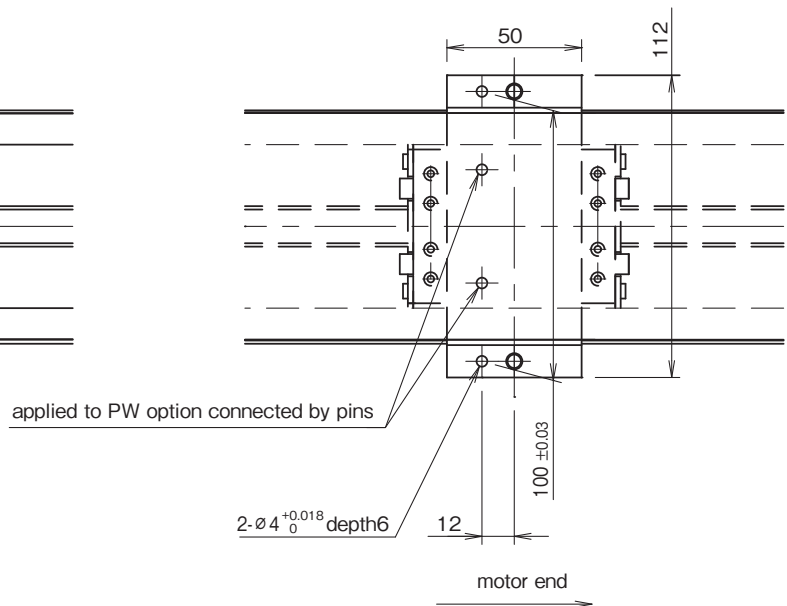


BH45C,D (short block)

- PS Option Without Top Cover -



- PS Option With Top Cover -



ACTUATOR

POSITIONING PIN HOLE FOR GUIDE RAIL

It is useful to use positioning pin holes on the guide rail when exacting reassembly positioning is required. NB does not supply straight pins.

After the insertion of the straight pins in the BH guide rail base, the pins might interfere with the slide block. In the positioning process, please consider the BH base thickness. The length of the pin in the BH base shall be shorter than the BH base thickness. Please make sure that the pins shall not interfere with the slide block.

Figure H-26 Positioning Pin Hole Location

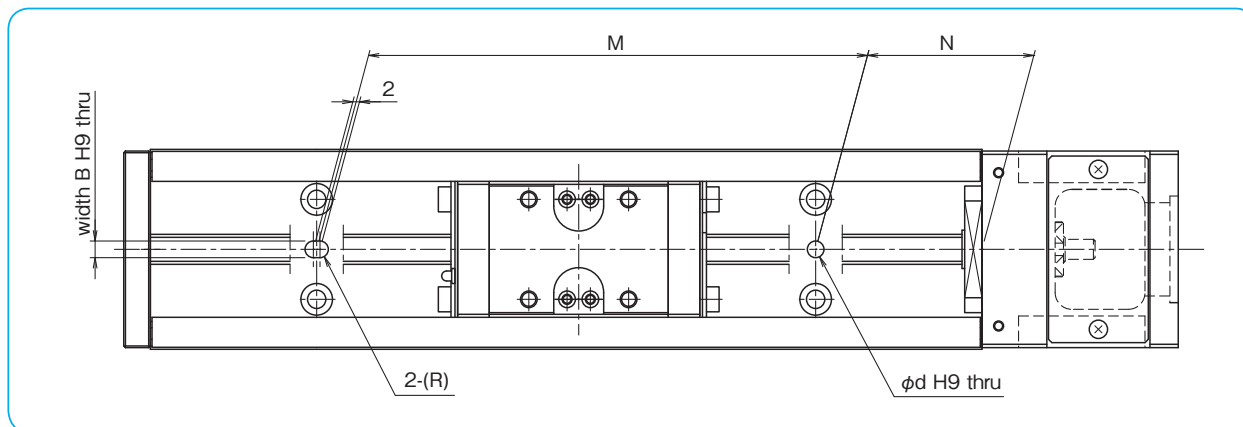


Table H-32 Positioning Pin Hole for Guide Rail

unit: mm

part number	pin length (BH base thickness)	rail length	N	M	ϕd	B
BH23	5.9 or less	150	35	80	$\phi 3^{+0.025}_0$	$\phi 3^{+0.025}_0$
		200	20	160		
		250	45	240		
		300	30	240		
BH30	8 or less	150	25	100	$\phi 5^{+0.030}_0$	$\phi 5^{+0.030}_0$
		200	50	200		
		300		300		
		400		400		
		500		500		
		600		600		
		750	25	700		
BH45	11 or less	340	70	200	$\phi 5^{+0.030}_0$	$\phi 5^{+0.030}_0$
		440		300		
		540		400		
		640		500		
		740		600		
		840		700		
		940		800		

Positioning pin hole option is not available for BH15.

ACTUATOR

NIPPON BEARING

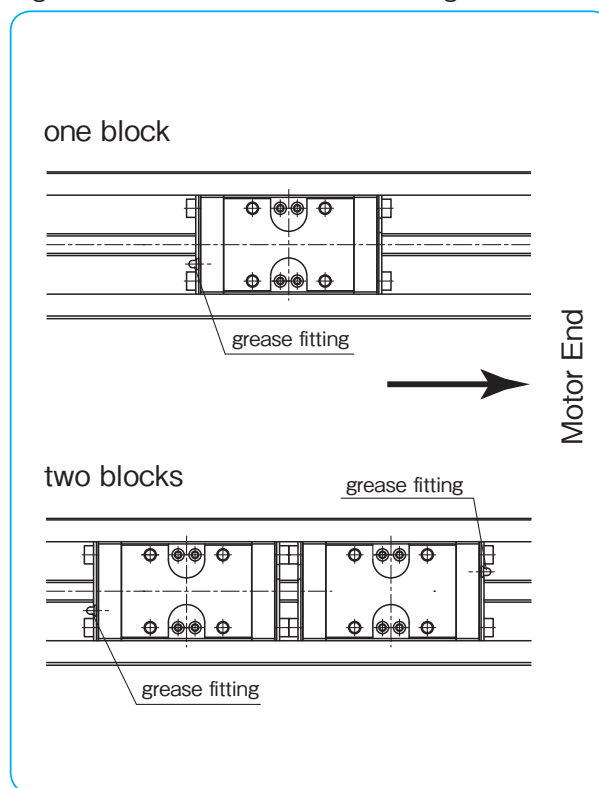
LUBRICATION

- BH 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.
- For BH23, 30 use the grease fitting to lubricate the slide block. For ballscrew portion apply grease directly to the surface of screw shaft.
BH15 slide block has $\phi 2\text{mm}$ oil holes instead of grease fitting.
BH45 does not have grease fitting, apply grease directly to the raceway surface of ballscrew shaft and guide.
- Unless otherwise instructed, a grease fitting is located as shown in Figure H-27.
- 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-33 for the grease type.

Table H-33 Applicable Grease

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

Figure H-27 Location of Grease Fitting



ACTUATOR

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 and BH type is preadjusted before delivery.
- 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 foreign particles may contaminate actuator and disrupt the ball circulation and precision performance.
- Please never touch the area at both stroke ends during operation. There is a danger for the fingers to be caught at the stroke end. Please pay enough attention to the guide rail area even when not in operation. There is a danger for the fingers to be injured by the dust cover.
- Anti-rust oil with little affect on the lubricant is applied to the guide rail and the block top surface. When mounting it is recommended that the turbine oil (ISO standard VG32- 64) is applied to the mounting surface for antirust effect after cleaning the contact surface.

OPERATING TEMPERATURE

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

LUBRICATION

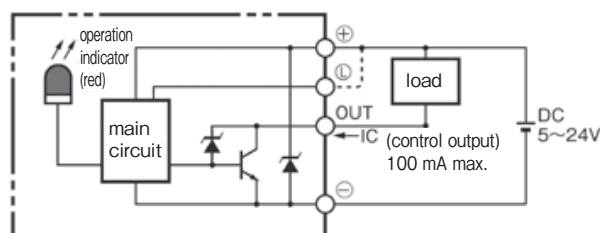
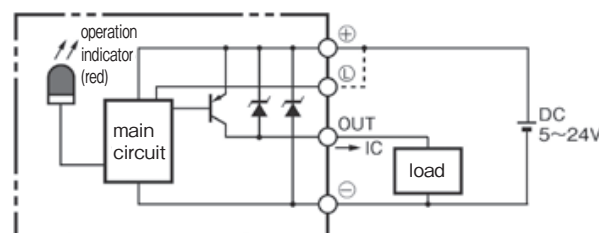
- The objective of lubrication includes the reduction of friction among the rolling elements as well as between the rolling elements and the raceway, prevention of sintering, reduction of wear, and the prevention of rust by forming a film over the surfaces. Please relubricate periodically depending on the operating conditions. The recommended relubrication interval is either of earlier period of about 6 months (3 months in case of 24 hours operation) or 1,000km of travel distance under normal conditions.

NIPPON BEARING

SENSOR SPECIFICATIONS

slim-type photomicro sensor (symbol: S) / OMRON CORPORATION

type	NPN type	EE-SX674
	PNP type	EE-SX674P
sensing distance	5 mm (slot width)	
standard sensing object	2 x 0.8 mm min. opaque object	
differential travel	0.025mm	
power supply voltage	5 to 24 V DC $\pm 10\%$, ripple(P-P): 1.0% max.	
current consumption	12 mA max. (NPN), 12 mA max. (PNP)	
control output	NPN type	NPN open collector output models: At 5 to 24 V DC: 100 mA load current (Ic) with a residual voltage of 0.8 V max. When driving TTL: 40 mA load current (Ic) with a residual voltage of 0.4 V max.
	PNP type	PNP open collector output models: At 5 to 24 V DC: 50 mA load current (Ic) with a residual voltage of 1.3 V max.
output operation	Dark-On (+, L terminal open-circuit), Light-On (+, L terminal short-circuit)	
response frequency	1 kHz max. (3 kHz average)	
operation indicator	operation indicator (red) lit with incident	
ambient illumination (on receiver lens)	fluorescent light: 1000 lx max.	
ambient temperature	operating: -25 to 55 °C, storage: -30 to 80 °C	
ambient humidity	operating: 5 to 85 %RH, storage: 5 to 95 %RH	
vibration resistance	destruction: 20 to 2000 Hz, (with a peak acceleration of 100 m/s ²) 1.5 mm double amplitude for 2 hrs (with 4-minute cycles) each in X, Y, and Z directions	
shock resistance	destruction: 500 m/s ² for 3 times each in X, Y, and Z directions	
degree of protection	IEC 60529 IP 50	
connection method	connector type (direct soldering possible)	
weight	approx. 3 g	
material	case	Polybutylene terephthalate (PBT)
	cover	Polycarbonate (PC)
	emitter/receiver	

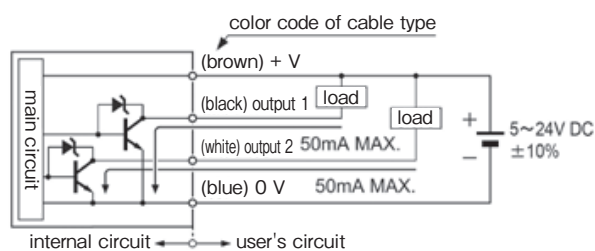
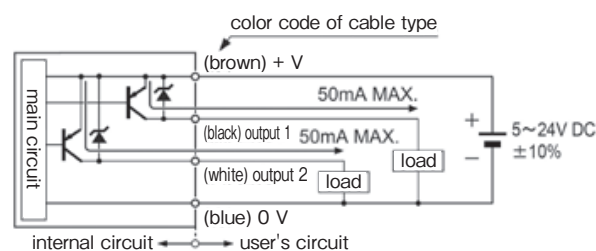
NPN type
CIRCUIT DIAGRAMPNP type
CIRCUIT DIAGRAM

Please read the specifications and precautions of the manufacture's catalogs or instruction manuals.

ACTUATOR

compact photomicro sensor (symbol: S) / Panasonic Industrial Devices SUNX Co., Ltd.

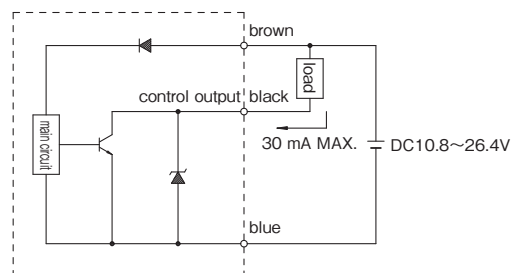
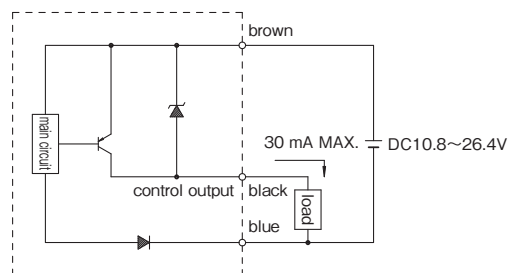
type	NPN type	PM-L25
	PNP type	PM-L25-P
sensing range	6 mm (fixed)	
minimum sensing object	0.8 x 1.2 mm opaque object	
hysteresis	0.05 mm or less	
repeatability	0.01 mm or less	
supply voltage	5 to 24 V DC $\pm 10\%$, ripple (P-P): 10 % or less	
current consumption	15 mA or less	
control output	NPN type	NPN open-collector transistor maximum sink current: 50 mA, applied voltage: 30 V DC or less (between output and 0 V) residual voltage: 2 V or less (at 50 mA sink current) 1 V or less (at 16 mA sink current)
	PNP type	PNP open-collector transistor maximum source current: 50 mA, applied voltage: 30 V DC or less (between output and + V) residual voltage: 2 V or less (at 50 mA sink current) 1 V or less (at 16 mA sink current)
output operation	incorporated with 2 outputs: Light-ON/Dark-ON	
response time	under light received condition: 20 μ s or less, under light interrupted condition: 80 μ s or less (response frequency: 3 kHz or more)	
operation indicator	orange LED (lights up under light received condition)	
ambient illuminance	fluorescent light: 1000 lx at the light-receiving face	
ambient temperature	operating: -25 to 55 °C (No dew condensation or icing allowed.), storage: -30 to 80 °C	
ambient humidity	5 to 85 %RH, storage: 5 to 95 %RH	
voltage withstandability	1000 V AC for one min. between all supply terminals connected together and enclosure	
insulation resistance	20 M Ω , or more, with 250 V DC megger between all supply terminals connected together and enclosure	
vibration resistance	10 to 2,000 Hz frequency, 1.5 mm double amplitude (maximum acceleration 196 m/s ²) in X, Y, and Z directions for two hours each	
shock resistance	15,000 m/s ² acceleration (1,500 G approx.) in X, Y, and Z directions three times each	
cable	0.09 mm ² 4-core cabtyre cable, PVC, 1 m long	
weight	Net weight: 10 g approx., Gross weight: 15 g approx.	
material	case	Polybutylene telephthalate (PBT)
	cover	Polycarbonate (PC)

NPN type
CIRCUIT DIAGRAMPNP type
CIRCUIT DIAGRAM

Please read the specifications and precautions of the manufacture's catalogs or instruction manuals.

proximity sensor (symbol: K)/ Azbil CORPORATION

type	NPN type	APM-D3B1,APM-D3B1F (different-frequency type)
	PNP type	APM-D3E1,APM-D3E1F (different-frequency type)
rated sensing distance	2.5mm±15%	
standard target object	15x15 mm, 1 mm thick iron	
differential travel	15 % max. of sensing distance	
rated supply voltage	12/24 V DC	
operating voltage range	10.8 to 26.4 V DC	
current consumption	10 mA max.	
control output	NPN type	NPN transistor open collector switching current: 30 mA max. (resistive load) voltage drop: 1 V max. (switching current 30 mA) output dielectric strength: 26.4 V
	PNP type	PNP transistor open collector switching current: 30 mA max. (resistive load) voltage drop: 1 V max. (switching current 30 mA) output dielectric strength: 26.4 V
operation mode	normally closed (N.C.)	
operating frequency	120Hz	
indicator lamps	lights (red) when object approaches	
operating temperature range	-10 to 55 °C , storage: -25 to 70 °C	
operating humidity range	35 ~ 85%RH	
dielectric strength	1000 V AC (50/60 Hz) for one min. between case and electrically live metals	
insulation resistance	50 MΩ min. (by 500 V DC megger)	
vibration resistance	10 to 55 Hz, 1.5 mm peak-to-peak amplitude, 2 hrs in X, Y, and Z directions	
shock resistance	500 m/s ² 3 times in X, Y, and Z directions	
protection	IP 67 (IEC 529)	
weight	approx. 10 g excl. cable (length of cable: 1 m)	

NPN type
CIRCUIT DIAGRAMPNP type
CIRCUIT DIAGRAM

Please read the specifications and precautions of the manufacturer's catalogs or instruction manuals.