

BE SERIES



Ball Screw Driven Linear Actuators

Ball Screw Motors

The BE Series products are designs based on the technology of hybrid step motors, ball screws and nuts. Provide high torque, high precision, and high efficiency to fit the application needs of designers. The combination of motor styles, motor sizes, ball screws and nuts, gives the freedom to use motors of different form factors to exactly fit in the application.



- Five frame sizes: NEMA 08, 11, 14, 17, 23
- Multiple motor lengths and motor sizes
- Each frame size motor has a variety of lead options
- Each frame size motor has a variety of nut options

The integrated ball screw actuators from PBC Linear provide a high quality innovate solution for high speed applications.

Features of BE Series

High mechanical efficiency

The ball screws of BE Series have outstanding transmission efficiency of over 90%. Their required torque is just less than a third of what the lead screws require. Therefore, it is easier to transfer a linear motion into a rotary motion.

Efficiency of ball screws (Rotary → Linear)

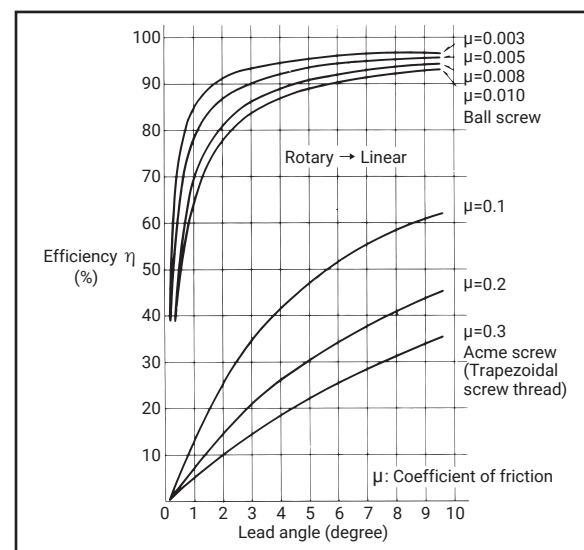
$$\text{Normal operation: } P = \frac{2\pi \eta_1 \times T}{\ell}$$

T= Load torque kgf x cm

P= Axial external load kgf

ℓ= lead cm

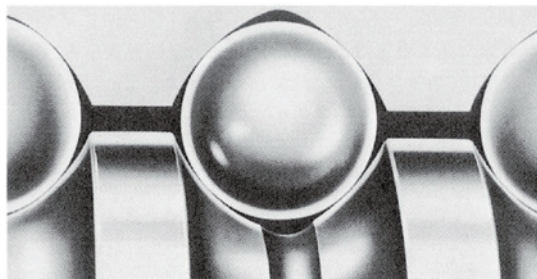
η₁ = Efficiency of ball screws



Mechanical efficiency of ball screws

Small axial clearance, High accuracy, High rigidity

The Ball screws of the BE Series adopt a gothic-arch groove profile, its axial clearance can be adjusted in a highly fine pitch as well as it can be lightly rotated. In addition, by giving a preload to the screw, the axial clearance could be adjusted to zero to achieve advanced rigidity.



Ball screw groove profile

High hardness, Excellent durability

The Ball screws of the BE Series maintain excellent durability achieved by carefully selected materials, proper heat treatment, and machining with advanced product technologies. Ball screws are generally manufactured to maintain the minimum standard hardness at 58 HRC with the materials listed in the table to the right.

	Material	Hardness
Screw shaft	SCM450 S55C	HRC 58° – 64°
Nut	SCM415H	HRC 58° – 64°
Steel balls	SUJ2	More than 60 HRC

Materials and hardness

For Safety Use

Lubrication

When using the BE series products, lubricant is required. If lubricant is not applied, problems such as increased torque and shortened life occur. Applying lubricant can minimize temperature increases, decline of mechanical efficiency due to friction, and deterioration of accuracy caused by wear.

Do not disassemble a nut.

When balls have been dropped off the nut or the nut has been removed from a shaft, do not attempt to reassemble them yourself and return them for repair.

(In this case, repairing charges are required.)

If necessary to disassemble the nut by yourself, Please consult with our technical department first.

Pay careful attention to mounting accuracy.

A moment load caused by misalignment of a ball screw, bearing, guide, nut, and housing and improper angularity may result in malfunction, extraordinary noise, abnormal vibration, shorter product life as well as breakage of screw shaft due to rotating bending fatigue. Use caution in the design and installation process as misapplication may lead to serious accident or injury.

Working Temperature

Normally, the BE Series work temperature range is 0–60°C. If it necessary to work beyond the recommended temperatures, Please consult with our technical department first.

Model Numbering System

BE 172S - B0801 - 100 - AK1 - 0 - XXX

Ball Screw Motor Type Code

Code	Structure Type
BE	External Nut - Ball screw Shaft

Motor Size Code

Code	Motor Body Length Max(mm)	Step Angle (°)
08	0S	28.3
	0G	29.5
11	1S	32
	5S	52
14	1A	28
	1S	28
	3S	36
17	4A	34.3
	4S	34.3
	6S	48.3
23	8S	57
	AS	79

Ball Screw Type Code

Code	Nominal Diameter (mm)	Lead (mm)	Code	Nominal Diameter (mm)	Lead (mm)
B0401	4	1	B1002	10	2
B0601	6	1	B1004	10	4
B0602	6	2	B1010	10	10
B0801	8	1	B1202	12	2
B0802	8	2	B1204	12	4
B08025	8	2.5	B1205	12	5
B0805	8	5	B1210	12	10
B0808	8	8			

Ball Screw Lengths(Lx)

###	Provided in 1 mm increments

Rated Current Code

XXX=X.XX(A)	This code defines by our technical department
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Special Custom Type

Code	Custom Type
0	Non Special Custom
S	Lead Screw End Machining
E	Add Encoder
B	Add Brake
C	Other Special Custom Type

Nut Type Code

Code	Mating Ball Screw
AK	1
	B0401
	B0601
	B0801
	B0802
	B08025
BU	2
	B1004
BM	1
	B1004
	B0805
AV	1
	B0808
	B1010
AV	2
	B1204
	B1205
AV	1
	B1210

BE Series Standard Models for stock

Size (mm)	Motor Series	Lead Screw Options	Screw Length Options	Nut Options	End Machining Code	Rated Current Options	Page
28X28	BE111S	- B0601 -	50, 75, 100, 125, 150	- AK1 -	0, S	100	P7
		- B0602 -	50, 75, 100, 125, 150	- AK1 -	0, S	100	
35X35	BE143S	- B0801 -	75, 100, 125, 150, 175, 200, 225, 250	- AK1 -	0, S	150	P10
	BE143S	- B0802 -		- AK1 -	0, S	150	
	BE143S	- B0805 -		- BU1 -	0, S	150	
	BE143S	- B0808 -		- BM1 -	0, S	150	
42X42	BE172S	- B0801 -	75, 100, 125, 150, 175, 200, 225, 250	- AK1 -	0, S	200	P13
	BE172S	- B0802 -		- AK1 -	0, S	200	
	BE172S	B0805		- BU1 -	0, S	200	
	BE172S	- B0808 -		- BM1 -	0, S	200	
	BE176S	- B0801 -	75, 100, 125, 150, 175, 200, 225, 250	- AK1 -	0, S	200	
	BE176S	- B0802 -		- AK1 -	0, S	200	
	BE176S	- B0805 -		- BU1 -	0, S	200	
	BE176S	- B0808 -		- BM1 -	0, S	200	
57X57	BE238S	- B1002 -	100, 125, 150, 175, 200, 225, 250, 275, 300	- AK1 -	0, S	220	P16
	BE238S	- B1004 -		- AK2 -	0, S	220	
	BE238S	- B1010 -		- BM1 -	0, S	220	

Note: The screws length ≤ 150 mm don't have end machining, please choice the code "0". The screws length ≥ 150 mm have end machining, please choice the code "S".

Order sample	① Select configuration codes						
	Motor Series	Lead Screw Options	Screw Length Options	Nut Options	End Machining Code	Rated Current Options	
	BE111S	- B0601 -	50, 75, 100, 125, 150	- AK1 -	0, S	100	
② Determine the order Models							
BE111S - B0601 - 100 - AK1 - 0 - 100							
In addition to the standard order Models, also provides a wealth of customized configuration options, for more information please contact the factory.							

Configuration Table

Nominal Diameter (mm)	Lead (mm)	Ball Screw Code	Motor Options											
			BE080S	BE080G	BE111S	BE115S	BE141A	BE141S	BE143S	BE174A	BE174S	BE176S	BE238S	BE23AS
4	1	B0401	●	●	—	—	—	—	—	—	—	—	—	—
6	1	B0601	—	—	●	●	—	—	—	—	—	—	—	—
6	2	B0602	—	—	●	●	—	—	—	—	—	—	—	—
8	1	B0801	—	—	—	—	●	●	●	●	●	●	—	—
8	2	B0802	—	—	—	—	●	●	●	●	●	●	—	—
8	2.5	B08025	—	—	—	—	●	●	●	●	●	●	—	—
8	5	B0805	—	—	—	—	●	●	●	●	●	●	—	—
8	8	B0808	—	—	—	—	●	●	●	●	●	●	—	—
10	2	B1002	—	—	—	—	—	—	—	●	●	●	●	●
10	4	B1004	—	—	—	—	—	—	—	●	●	●	●	●
10	10	B1010	—	—	—	—	—	—	—	●	●	●	●	●
12	2	B1202	—	—	—	—	—	—	—	—	—	—	●	●
12	4	B1204	—	—	—	—	—	—	—	—	—	—	●	●
12	5	B1205	—	—	—	—	—	—	—	—	—	—	●	●
12	10	B1210	—	—	—	—	—	—	—	—	—	—	●	●

BE08 Series

Phases	2
Step Accuracy	±5 %
IP Rating	40
Approvals	RoHS
Operating Temp.	-20°C–+50°C
Insulation Class	B (130°C)
Insulation Resistance	100MegOhms



Ordering Information

BE 08 0S – B0401 – 100 – AK1 – 0 – XXX

Ball Screw Motor Type Code

Code	Structure Type
BE	External Nut - Ball screw Shaft

Frame Size Code

Code	Frame Size
08	20mm

Motor Body Length Code

Code	Motor Body Length Max(mm)	Step Angle (°)
0S	28.3	1.8
0G	29.5	5

Ball Screw Type Code

Code	Nominal Diameter(mm)	Lead (mm)	Travel(mm)	
			Travel Per 1.8°	Travel Per 5°
B0401	4	1	0.005	0.013889

Rated Current Code

XXX=X.XX(A)	This code defines by our technical department
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Special Custom Type Code

Code	Custom Type
0	Non Special Custom
S	Lead Screw End Machining
C	Other Special Custom Type

Nut Type Code

Code	Nut Type
AK	1 B0401

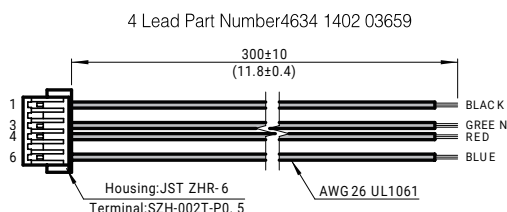
Lx

Provided in 1 mm increments

BE08 Step Motor - 4 Lead Bi-Polar

Motor Type Code	Motor Body Length (mm)	Step Angle (°)	Electrical Connection	Rated Current (Amps)	Winding	
					Resistanc(Ohms) ±10%@20°C	Inductance(mH) Typ.
BE080S	28.3	1.8°	Plug In Connector	0.4	12.65	4.1
BE080G	29.5	5°	Plug In Connector	0.6	6.2	1.6

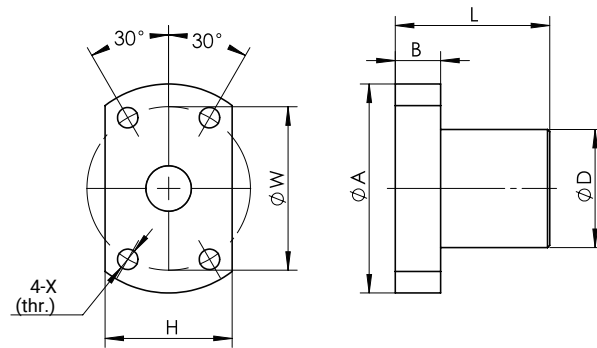
Mating Connector With Leads (order separately)



BE08 Series

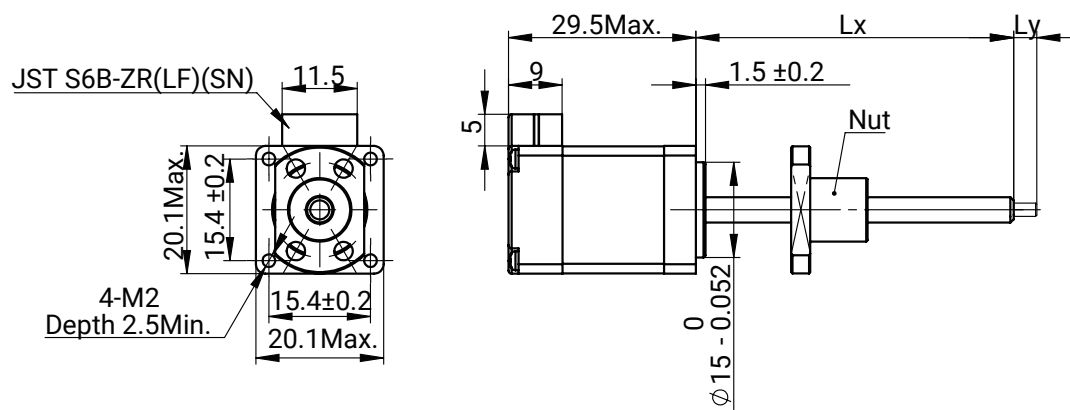
Nut Dimension

UNIT:mm



Screw Type	Nut Code	D	A	B	L	W	H	X
B0401	AK 1	10	20	3	12	15	14	2.9

Motor Dimension



Note: The Mounting hole size of BE080G is 16 ± 0.2 mm.

BE11 Series

Phases	2
Step Accuracy	±5%
IP Rating	40
Approvals	RoHS
Operating Temp.	-20°C – +50°C
Insulation Class	B(130°C)
Insulation Resistance	100MegOhms



Ordering Information

BE 11 1S – B0601 – 100 – AK1 – 0 – XXX

Ball Screw Motor Type Code

Code	Structure Type
BE	External Nut - Ball screw Shaft

Frame Size Code

Code	Frame Size
11	28mm

Motor Body Length Code

Code	Motor Body Length Max(mm)	Step Angle (°)
1S	32	1.8
5S	52	1.8

Ball Screw Type Code

Code	Nominal Diameter(mm)	Lead (mm)	Travel(mm) Travel Per 1.8°
B0601	6	1	0.005
B0602	6	2	0.010

Rated Current Code

XXX=X.XX(A)	This code defines by our technical department
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Special Custom Type Code

Code	Custom Type
0	Non Special Custom
S	Lead Screw End Machining
C	Other Special Custom Type

Nut Type Code

Code	Nut Type
AK 1	B0601

Lx

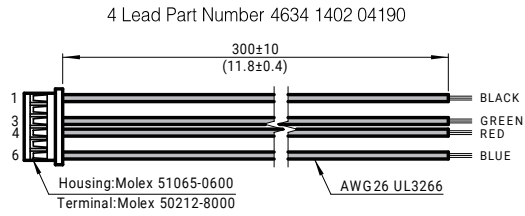
Provided in 1 mm increments

BE11 Step Motor - 4 Lead Bi-Polar

Motor Type Code	Motor Body Length (mm)	Step Angle (°)	Electrical Connection	Rated Current (Amps)	Winding	
					Resistanc(Ohms) ±10%@20°C	Inductance(mH) Typ.
BE111S	32	1.8°	Plug In Connector	1	2.7	2.5
BE115S	52	1.8°	Plug In Connector	1.5	1.65	1.48

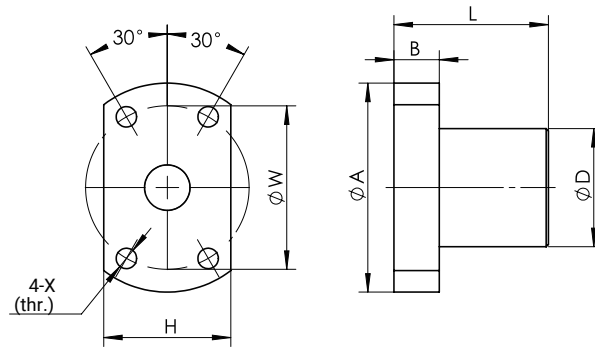
BE11 Series

Mating Connector With Leads (order separately)



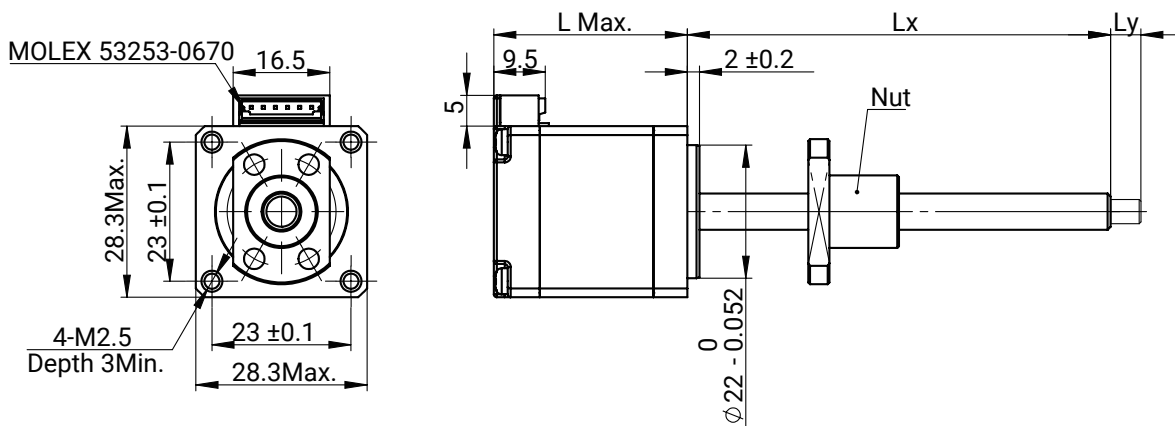
Nut Dimension

UNIT:mm



Screw Type	Nut Code		D	A	B	L	W	H	X
B0601	AK	1	12	24	3.5	15	18	16	3.4
B0602									

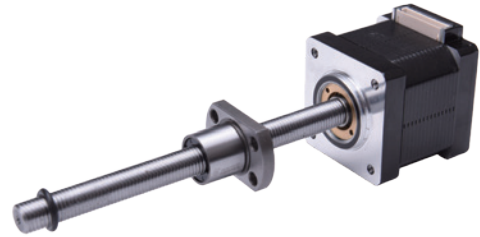
Motor Dimension



Motor type	Dimension "L"
BE111S	32 mm
BE115S	52 mm

BE14 Series

Phases	2
Step Accuracy	±5 %
IP Rating	40
Approvals	RoHS
Operating Temp.	-20°C–+50°C
Insulation Class	B (130°C)
Insulation Resistance	100MegOhms



Ordering Information

BE 14 1S – B0801 – 100 – AK1 – 0 – XXX

Ball Screw Motor Type Code

Code	Structure Type
BE	External Nut - Ball screw Shaft

Frame Size Code

Code	Frame Size
14	35mm

Motor Body Length Code

Code	Motor Body Length Max(mm)	Step Angle (°)
1A	28	0.9
1S	28	1.8
3S	36	1.8

Ball Screw Type Code

Code	Nominal Diameter(mm)	Lead (mm)	Travel(mm)	
			Travel Per 0.9°	Travel Per 1.8°
B0801	8	1	0.0025	0.005
B0802	8	2	0.005	0.01
B08025	8	2.5	0.00625	0.0125
B0805	8	5	0.0125	0.025
B0808	8	8	0.02	0.04

Rated Current Code

XXX=X.XX(A)	This code defines by our technical department
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Special Custom Type Code

Code	Custom Type
0	Non Special Custom
S	Lead Screw End Machining
E	Add Encoder
B	Add Brake
C	Other Special Custom Type

Nut Type Code

Code		Nut Type
AK	1	B0801
		B0802
		B08025
BU	1	B0805
BM	1	B0808

Lx

Provided in 1 mm increments

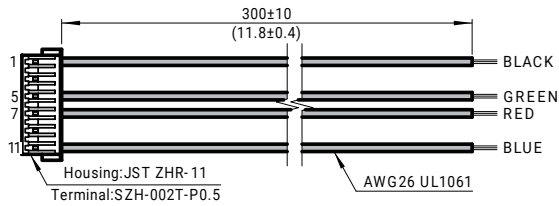
BE14 Step Motor - 4 Lead Bi-Polar

Motor Type Code	Motor Body Length (mm)	Step Angle (°)	Electrical Connection	Rated Current (Amps)	Winding	
					Resistanc(Ohms)	Inductance(mH)
					±10%@20°C	Typ.
BE141A	28	0.9°	Plug In Connector	0.6	10.6	12.6
BE141S	28	1.8°	Plug In Connector	1.5	1.55	1.53
BE143S	36	1.8°	Plug In Connector	1.5	1.61	2.5

BE14 Series

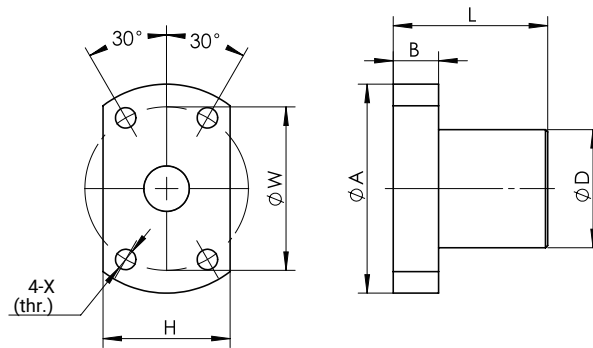
Mating Connector With Leads (order separately)

4 Lead Part Number 4634 1402 04581



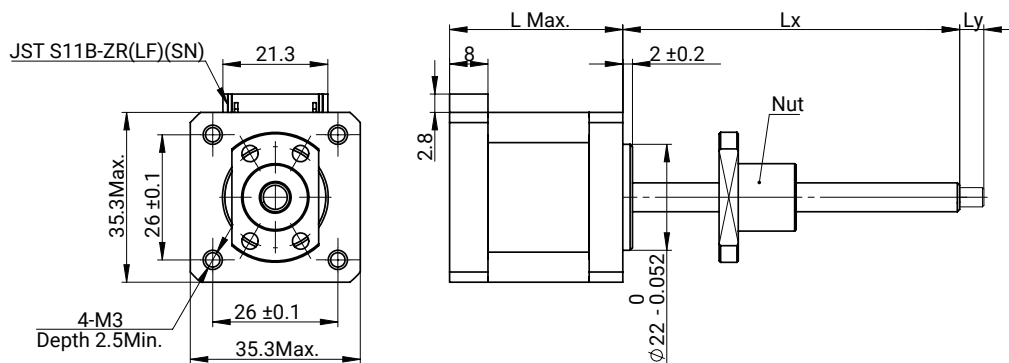
Nut Dimension

UNIT:mm



Screw Type	Nut Code	D	A	B	L	W	H	X	
B0801	AK	1	14	27	4	16	21	18	3.4
B0802	AK	1	14	27	4	16	21	18	3.4
B08025	AK	1	16	29	4	26	23	20	3.4
B0805	BU	1	22	38	6	27	29	22	3.4
B0808	BM	1	23	38	5	28	30	24	3.4

Motor Dimension



Motor type	Dimension "L"
BE141A	28 mm
BE141S	28 mm
BE143S	36 mm

BE17 Series

Phases	2
Step Accuracy	±5 %
IP Rating	40
Approvals	RoHS
Operating Temp.	-20°C--+50°C
Insulation Class	B (130°C)
Insulation Resistance	100MegOhms



Ordering Information

BE 17 4S – B0801 – 100 – AK1 – 0 – XXX

Ball Screw Motor Type Code

Code	Structure Type
BE	External Nut - Ball screw Shaft

Frame Size Code

Code	Frame Size
17	42mm

Motor Body Length Code

Code	Motor Body Length Max(mm)	Step Angle (°)
4A	34.3	0.9
4S	34.3	1.8
6S	48.3	1.8

Lead Screw Type Code

Code	Nominal Diameter (mm)	Lead (mm)	Travel(mm)	
			Travel Per 0.9°	Travel Per 1.8°
B0801	8	1	0.0025	0.005
B0802	8	2	0.05	0.01
B08025	8	2.5	0.00625	0.0125
B0805	8	5	0.0125	0.025
B0808	8	8	0.02	0.04
B1002	10	2	0.005	0.01
B1004	10	4	0.01	0.02
B1010	10	10	0.025	0.05

Lx

###	Provided in 1 mm increments
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Rated Current Code

XXX=X.XX(A)	This code defines by our technical department
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Special Custom Type Code

Code	Custom Type
0	Non Special Custom
S	Lead Screw End Machining
E	Add Encoder
B	Add Brake
C	Other Special Custom Type

Nut Type Code

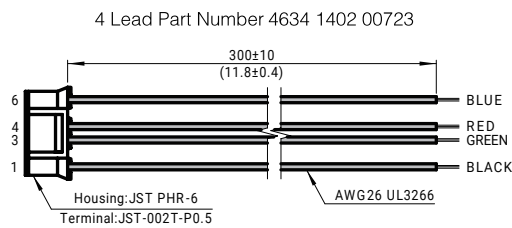
	Code	Nut Type
AK	1	B0801
		B0802
		B08025
		B1002
	2	B1004
BU	1	B0805
BM	1	B0808
		B1010

BE17 Series

BE17 Step Motor - 4 Lead Bi-Polar

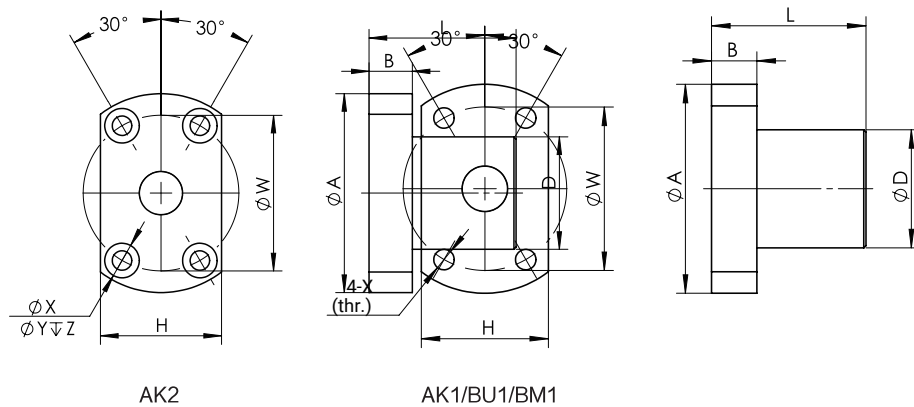
Motor Type Code	Motor Body Length (mm)	Step Angle (°)	Electrical Connection	Rated Current (Amps)	Winding	
					Resistanc(Ohms) ±10%@20°C	Inductance(mH) Typ.
BE174A	34.3	0.9°	Plug In Connector	0.7	5.4	14
BE174S	34.3	1.8°	Plug In Connector	1	4.3	7.7
BE176S	48.3	1.8°	Plug In Connector	2	1.3	2.9

Mating Connector With Leads (order separately)



Nut Dimension

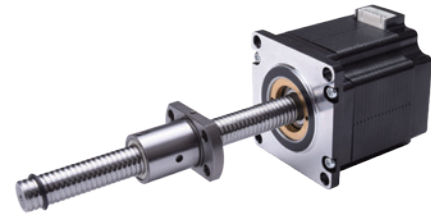
UNIT:mm



Screw Type	Nut Code	D	A	B	L	W	H	X	Y	Z
B0801	AK	1	14	27	4	16	21	18	3.4	-
B0802	AK	1	14	27	4	16	21	18	3.4	-
B08025	AK	1	16	29	4	26	23	20	3.4	-
B0805	BU	1	22	38	6	27	29	22	3.4	-
B0808	BM	1	23	38	5	28	30	24	3.4	-
B1002	AK	1	18	35	5	28	27	22	4.5	-
B1004	AK	2	26	46	10	34	36	28	4.5	8
B1010	BM	1	28	47	8	34	36	30	4.5	-

BE23 Series

Phases	2
Step Accuracy	±5 %
IP Rating	40
Approvals	RoHS
Operating Temp.	-20°C–+50°C
Insulation Class	B(130°C)
Insulation Resistance	100MegOhms



Ordering Information

BE 23 8S – B1002 – 100 – AK1 – 0 – XXX

Ball Screw Motor Type Code				Rated Current Code	
Code	Structure Type			XXX=X.XX(A)	
BE	External Nut - Ball screw Shaft			This code defines by our technical department	
Frame Size Code				Special Custom Type Code	
Code	Frame Size			Code	
23	57mm			0	
Motor Body Length Code				Lead Screw Type Code	
Code	Motor Body Length Max(mm)	Step Angle (°)		Code	
8S	57	1.8		1	
AS	79	1.8		2	
Lead Screw Type Code				Nut Type Code	
Code	Nominal Diameter (mm)	Lead (mm)	Travel Per 1.8° (mm)	Code	
B1002	10	2	0.01	AK	
B1004	10	4	0.02	1	
B1010	10	10	0.05	2	
B1202	12	2	0.01	BM	
B1204	12	4	0.02	1	
B1205	12	5	0.025	2	
B1210	12	10	0.05	AV	
Lx					
###		Provided in 1 mm increments			
				Nut Type	
				B1002	
				B1202	
				B1004	
				B1204	
				B1010	
				B1205	
				B1210	

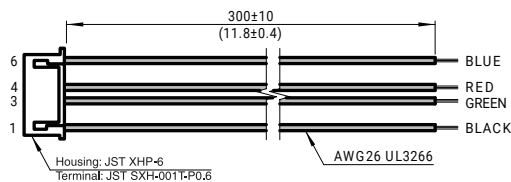
BE23 Series

BE23 Step Motor - 4 Lead Bi-Polar

Motor Type Code	Motor Body Length (mm)	Step Angle (°)	Electrical Connection	Rated Current (Amps)	Winding	
					Resistanc(Ohms) ±10%@20°C	Inductance(mH) Typ.
BE238S	57	1.8°	Plug In Connector	2.2	1.6	7.2
BE23AS	79	1.8°	Plug In Connector	3	1.1	5.0

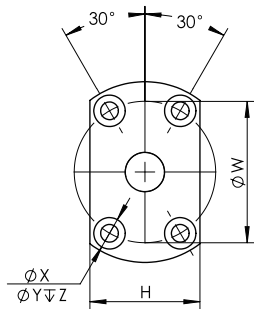
Mating Connector With Leads (order separately)

4 Lead Part Number 4634 1402 01891

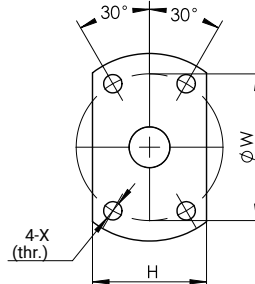


Nut Dimension

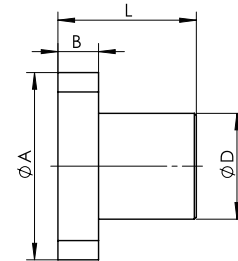
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AK2/AV2

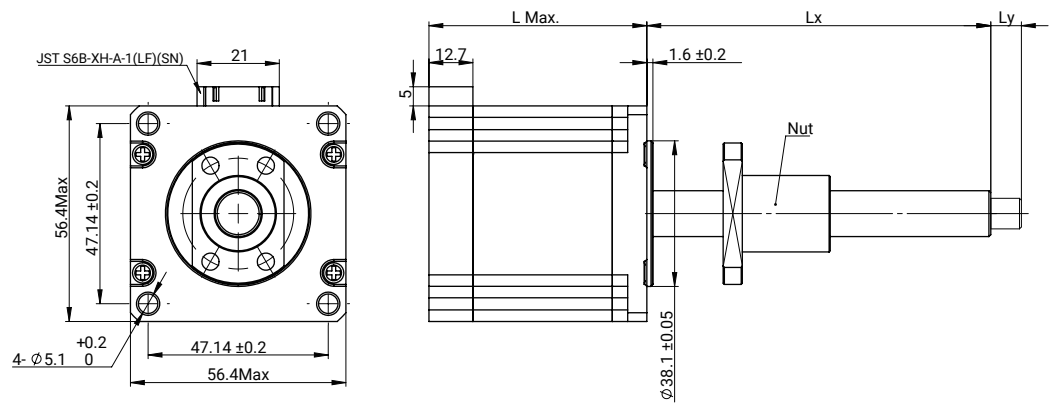


AK1/BU1/BM1



Screw Type	Nut Code		D	A	B	L	W	H	X	Y	Z
B1002	AK	1	18	35	5	28	27	22	4.5	-	-
B1004	AK	2	26	46	10	34	36	28	4.5	8	4.5
B1010	BM	1	28	47	8	34	36	30	4.5	-	-
B1202	AK	1	20	37	5	28	29	24	4.5	-	-
B1204	BM	1	24	40	10	40	32	30	4.5	-	-
B1205	AV	2	30	50	8	35	40	30	4.5	8	4.5
B1210			30	50	10	42	40	32	4.5	8	4.5

Motor Dimension



Motor type	Dimension "L"
BE238S	57 mm
BE23AS	79 mm

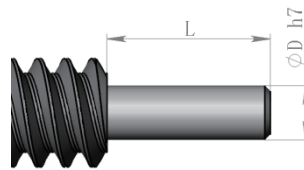
Optional Construction & Modifications

PBC Linear often modifies linear actuators to meet application needs. Typical changes include:

- Ball screws: lengths, end machining and so on.
- Nuts: basic style, mounting and so on.

To help our customers design efforts, standardized leadscrew features are available.

Ball screw End Machining



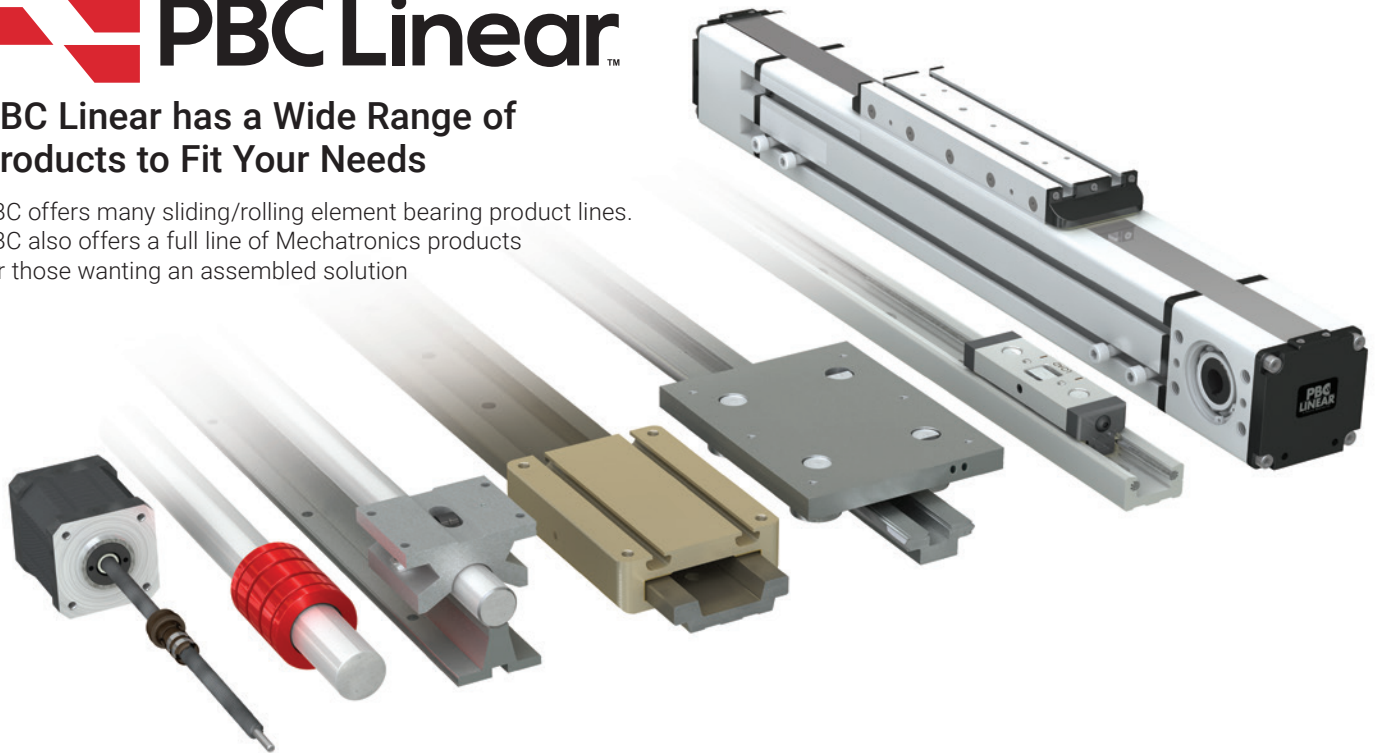
NO.	Nominal Diameter (mm)	Dimension	
		D(mm)	L(mm)
1	4	2.5	2.5
2	6	4	5
3	8	6	6
4	10	6	6
5	12	8	8

Additional Application Specific Technologies



PBC Linear has a Wide Range of Products to Fit Your Needs

PBC offers many sliding/rolling element bearing product lines. PBC also offers a full line of Mechatronics products for those wanting an assembled solution



PBC Technologies	Lead Screw	Simplicity	Roller Pillow Block	Glide Surface	Integral-V	Cam Roller	Mechatronics
Inexpensive	•	•	•	•	•	•	•
Low Maintenance	•	•	•	•			•
Compact Size	•			•			•
Low Noise	•	•					•
Multiple Configurations	•	•	•	•	•	•	•
Washdown Applications	•	•		•			•
Custom Design Support	•	•	•	•	•	•	•
Moderate to High Speed	•	•	•	•	•	•	•
Vacuum and Cleanroom Applications	•	•		•			•
Food Processing	•	•	•	•			
Ease of Installation	•				•	•	•



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However, in some instances adjustments need to be made, and this may cause specific information to become outdated.

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The data and specifications in this publication have been carefully compiled and are believed to be accurate and correct. However, it is the responsibility of the user to determine and ensure the suitability of PBC Linear® products for a specific application. PBC Linear only obligation will be to repair or replace without charge, any defective components if returned promptly. No liability is assumed beyond such replacement. Specifications are subject to change without notice. LITBE-001 r1 (04-2020)