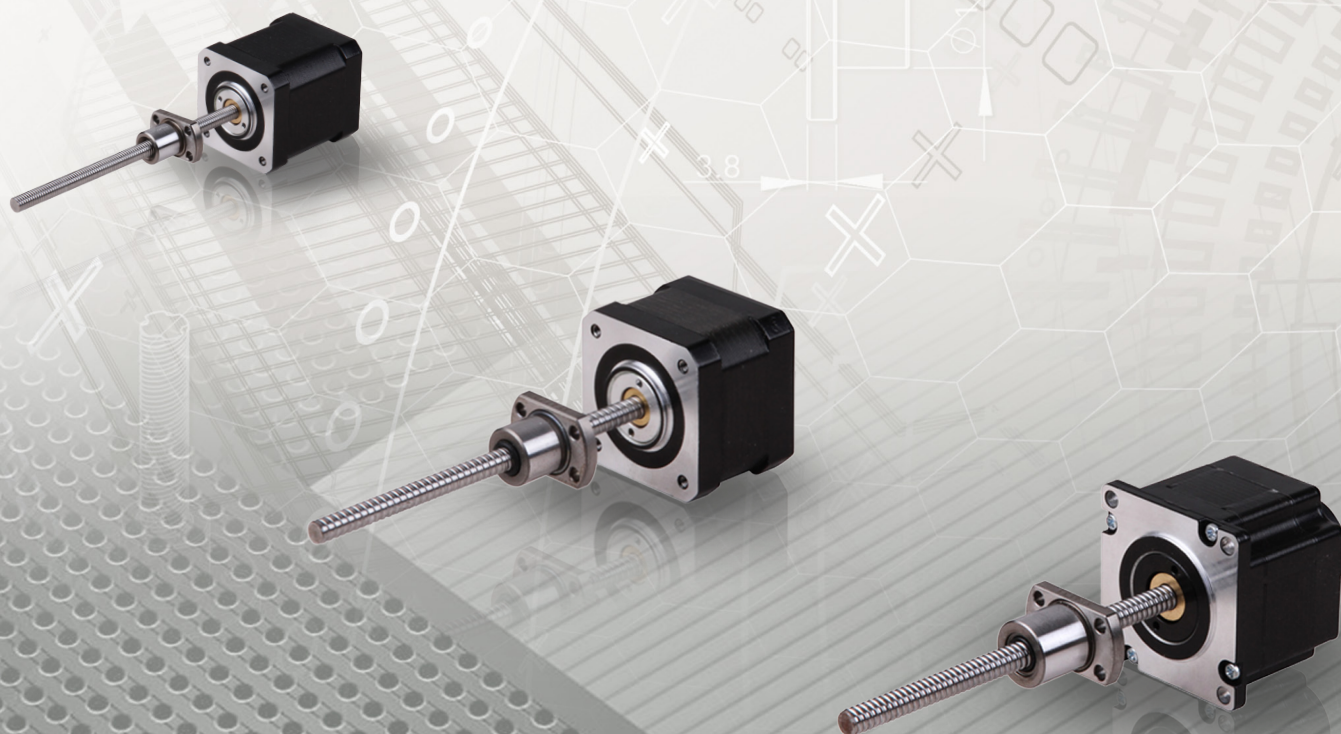


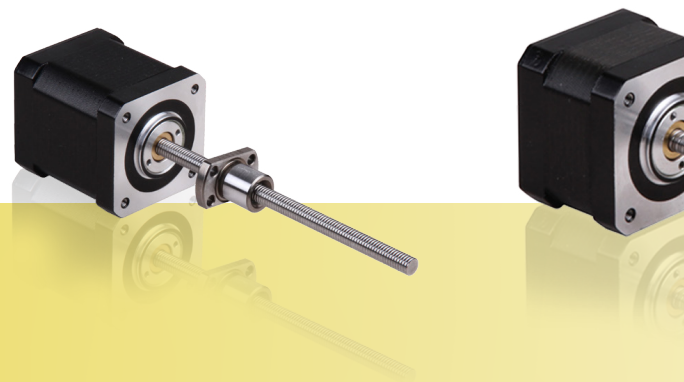
DINGS'

Precision Motion Specialist

STEPPER BALL SCREW LINEAR ACTUATOR PRODUCT CATALOG



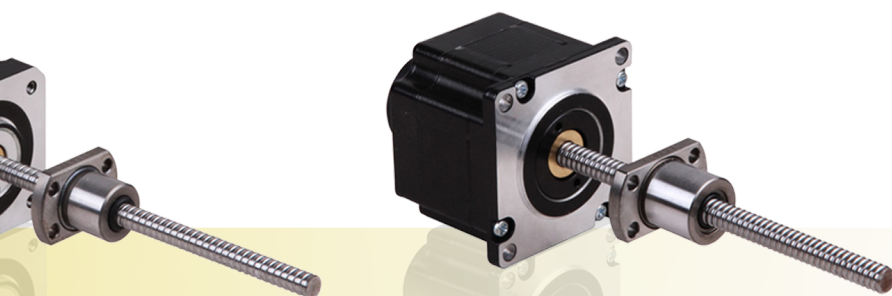
DINGS' External Ball Screw Linear Actuators come in 6 standard sizes, from 14mm to 57mm.
From 0.005mm/step to 0.1mm/step, with variety of resolution options available. Maximum thrust can reach 1600N.
Encoder options available.



Stepper Ball Screw Line

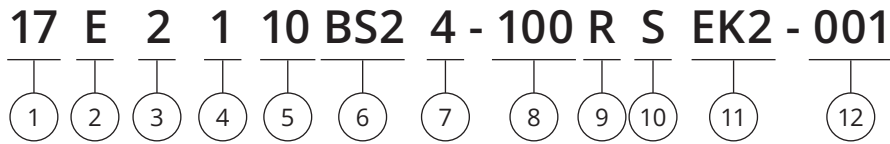
CONTENTS

Part number construction
Stepper Ball screw lead code selection
Size 6 · 14 mm
Size 8 · 20 mm
Size 11 · 28 mm
Size 14 · 35 mm
Size 17 · 42 mm
Size 23 · 57 mm
Accessories and options
Installation guide



Stepper Actuator

Part Number Construction



① Motor Size

MOTOR SIZE (mm)	14	20	28	35	42	57
MOTOR SIZE (NEMA)	6	8	11	14	17	23

② Motor Type

E = External Linear

③ Motor Step Angle

2 = 2 Phase with 1.8°

4 = 2 Phase with 0.9°

④ Motor Length

1 = Single stack

2 = Double stack

3 = Triple stack

⑤ Rated Current/Phase

XX = X.X(A) / phase

⑥ Ball Screw Code

BS2 = 2mm

⑦ Number of Lead Wires

4 = 4 flying lead wire

6 = 6 flying lead wire

⑧ Ball Screw Length

XXX = XXXmm

⑨ Thread Direction

R = right

⑩ Ball Screw End

M = Metric

U = UNC

S = Smooth

C = Customize

[Please provide customization requirements to DINGS']

N = None

⑪ Option

EKX = Encoder [X = Encoder Resolution]

P = Manual Knob

B = Brake

X = Rear shaft

R = Encoder Ready [Hole and Shaft]

[Please provide encoder ready requirements to DINGS']

C = Customize

[Please provide customization requirements to DINGS']

N = No processing at the rear end

⑫ Customer Sequence Number

Example

Part number	17E2110BS24-100RSEK22-001
Description	Size 17 Ball screw linear actuator 2 phase with 1.8° step angle Single stack 1.0A / Phase Ball screw lead 2mm 4 flying lead wire Screw length:100mm Right thread direction Smooth screw end EK2 Encoder with single output 192 lines

Stepper Ball Screw Lead Code Selection

	14	20	28		35		42		57	
Dia.	Φ4	Φ4	Φ5	Φ6	Φ6	Φ8	Φ6	Φ8	Φ10	Φ12
Lead										
1.0 mm	*	*		*	*	*	*	*		
2.0 mm	*	*		*	*	*	*	*	*	*
2.5 mm						*		*		
4.0 mm			*						*	
5.0 mm						*		*	*	
6.0 mm				*	*		*			
8.0 mm						*		*		
10.0 mm				*	*	*	*	*	*	*
12.0 mm						*		*		
15.0 mm									*	
20.0 mm									*	

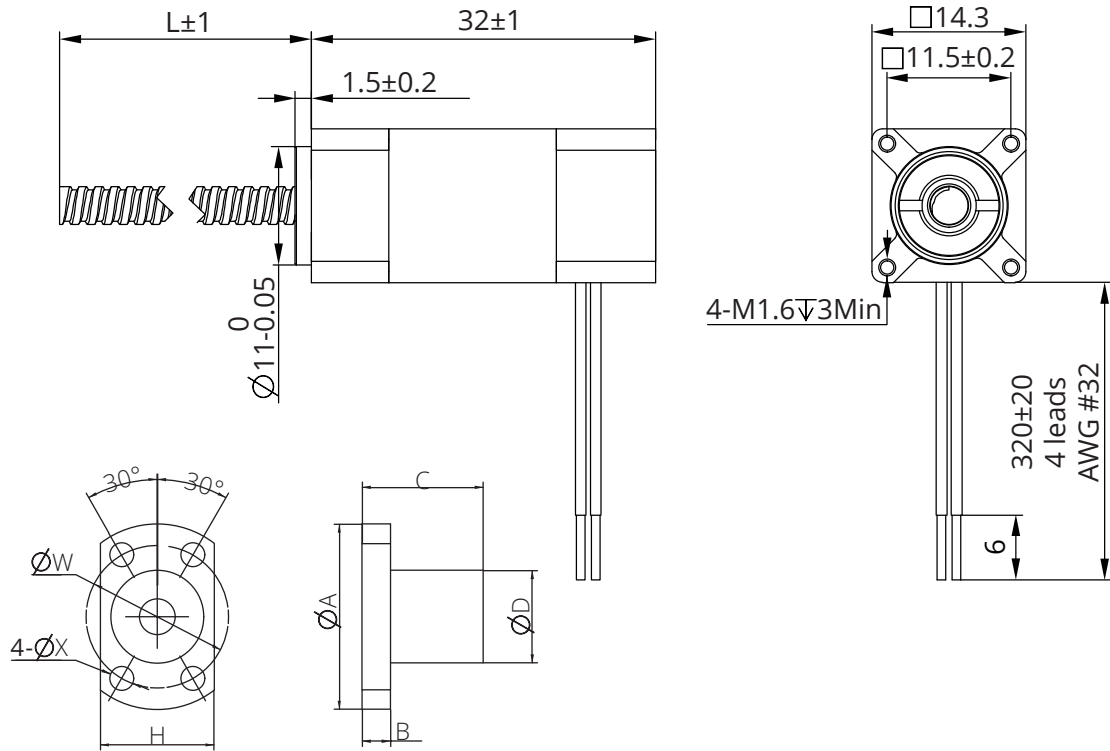
* Ball screw available for specific motor size

Size 6 (14mm) Series

Motor Characteristics

Motor	Voltage (V)	Current (A [RMS])	Resistance (Ω)	Inductance (mH)	Lead Wire No.	Motor Length (mm)
6E2103	6.6	0.3	22.0	3.6	4	32

Dimensional Drawings



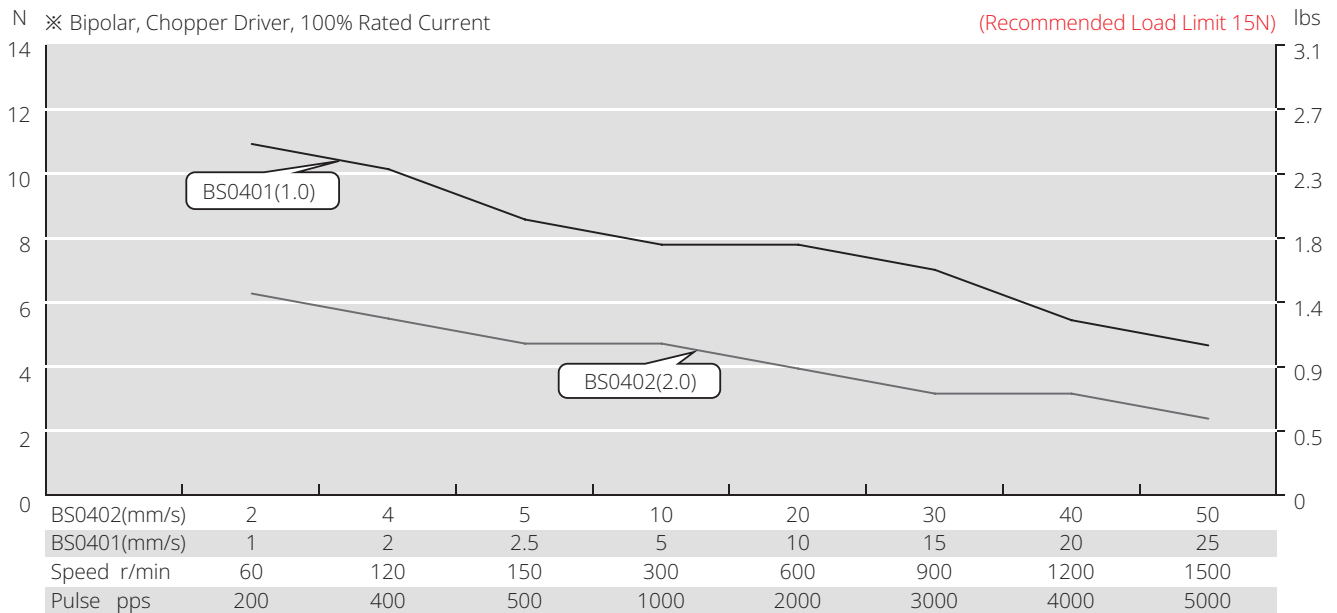
Stepper Ball Screw Specification

Ball screw type	0401		0402									
Ball size	$\Phi 0.8$		$\Phi 0.8$									
Number of thread	1		1									
Thread direction	Right											
Shaft root dia.	$\Phi 3.3$		$\Phi 3.3$									
Number of circuit	3.7×1		2.7×1									
Shaft, nut material	SCM415H											
Surface hardness	HRC 58~62											
Anti-rust treatment	Anti-rust oil											
Grade	C7											
Nut Size	A	B	C	D	H	W	X	Position accuracy	Total run out	Axial play	Dynamic load (N)	Static load (N)
BS0401	23	4	17	11	15	17	3.4	± 0.05	0.12	≤ 0.03	560	790
BS0402	23	4	19	11	15	17	3.4	± 0.05	0.12	≤ 0.03	420	570

Size 6 (14mm) Series

Speed Thrust Curves

Size 6 Single Stack Speed Thrust Curves



TEST CONDITION

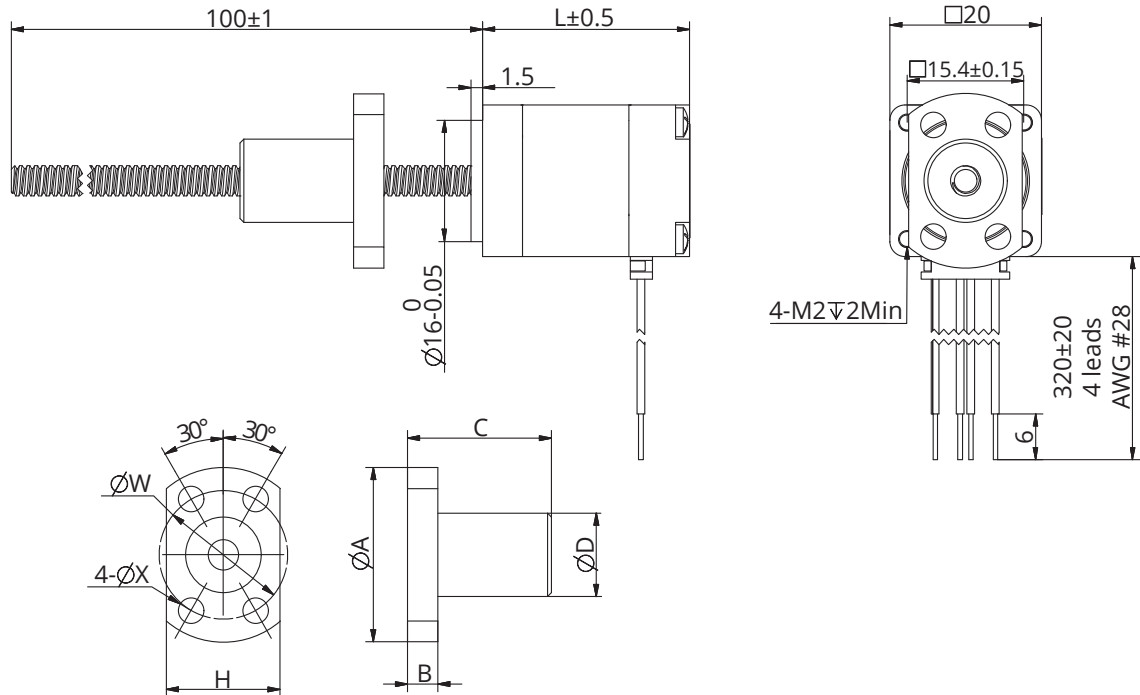
Testing Voltage: 12Vdc, Driver Model: DS-OLS2-FPD bipolar, chopper driver at rated current (rms).
Motor's thrust will be changed with different voltage and driver. 50% thrust margin is recommended.

Size 8 (20mm) Series

Motor Characteristics

Motor	Voltage (V)	Current (A (RMS))	Resistance (Ω)	Inductance (mH)	Lead Wire No.	Motor Length (mm)
8E2105	2.55	0.5	5.1	1.5	4	27.2
8E2205	4.4	0.5	8.8	2.7	4	38.1

Dimensional Drawings



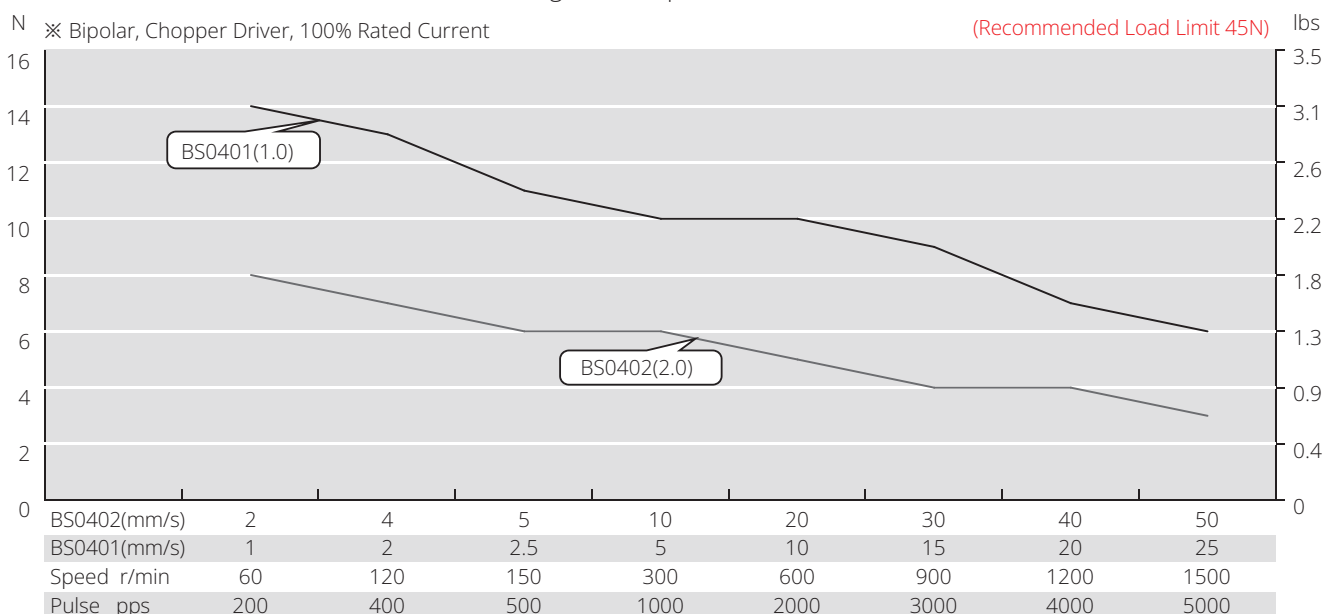
Stepper Ball Screw Specification

Ball screw type	0401		0402									
Ball size	$\Phi 0.8$		$\Phi 0.8$									
Number of thread	1		1									
Thread direction	Right											
Shaft root dia.	$\Phi 3.3$		$\Phi 3.3$									
Number of circuit	3.7×1		2.7×1									
Shaft, nut material	SCM415H											
Surface hardness	HRC 58~62											
Anti-rust treatment	Anti-rust oil											
Grade	C7											
Nut Size	A	B	C	D	H	W	X	Position accuracy	Total run out	Axial play	Dynamic load (N)	Static load (N)
BS0401	23	4	17	11	15	17	3.4	±0.05	0.12	≤0.03	560	790
BS0402	23	4	19	11	15	17	3.4	±0.05	0.12	≤0.03	420	570

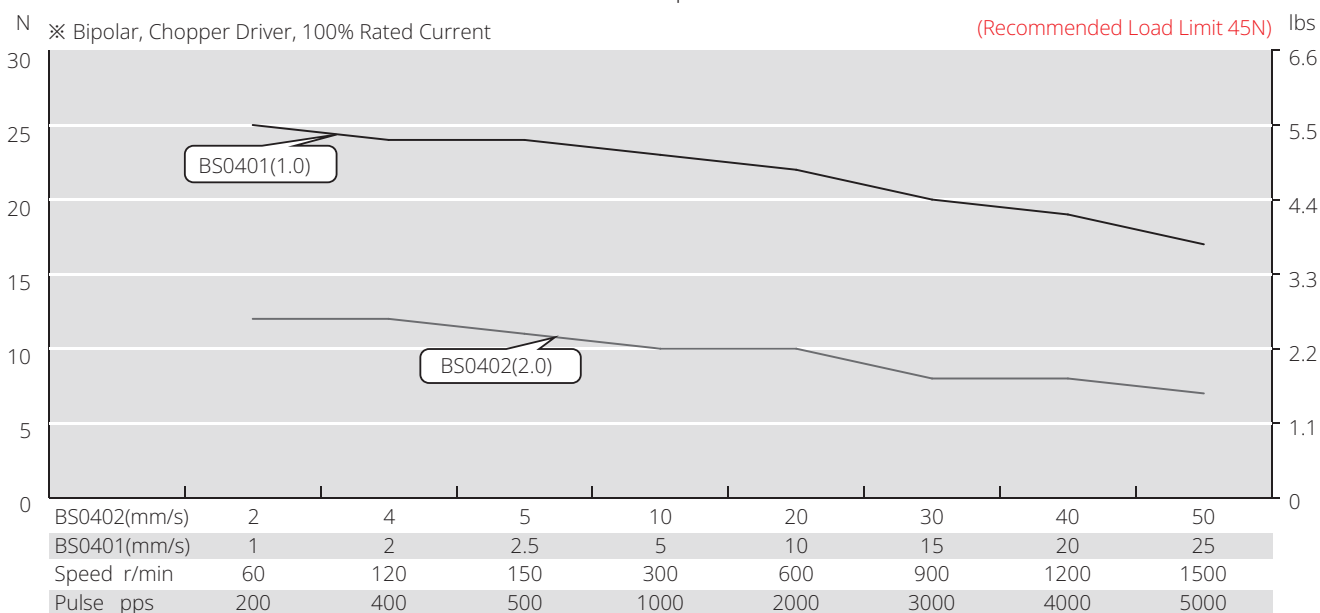
Size 8 (20mm) Series

Speed Thrust Curves

Size 8 Single Stack Speed Thrust Curves



Size 8 Double Stack Speed Thrust Curves



TEST CONDITION

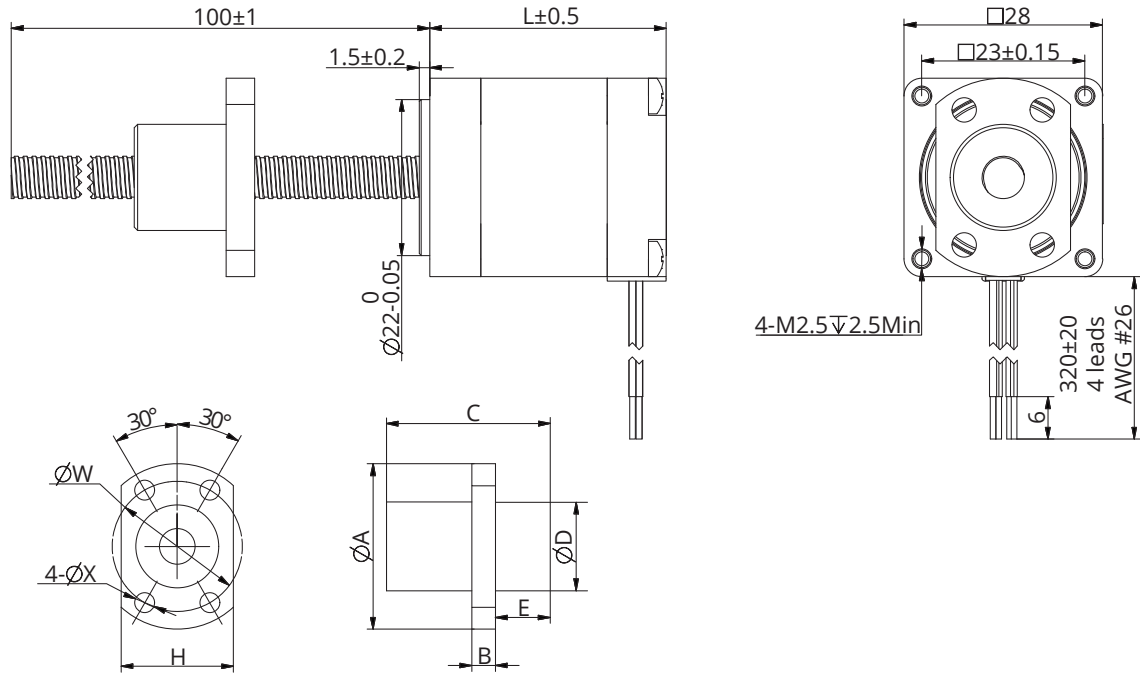
Testing Voltage: 24Vdc, Driver Model: DS-OLS2-FPD bipolar, chopper driver at rated current (rms).
Motor's thrust will be changed with different voltage and driver. 50% thrust margin is recommended.

Size 11 (28mm) Series

Motor Characteristics

Motor	Voltage (V)	Current (A _{RMS})	Resistance (Ω)	Inductance (mH)	Lead Wire No.	Motor Length (mm)
11E2110	2.1	1	2.1	1.5	4	33.35
11E2209	3.9	0.95	4.1	4	4	45

Dimensional Drawings



Stepper Ball Screw Specification

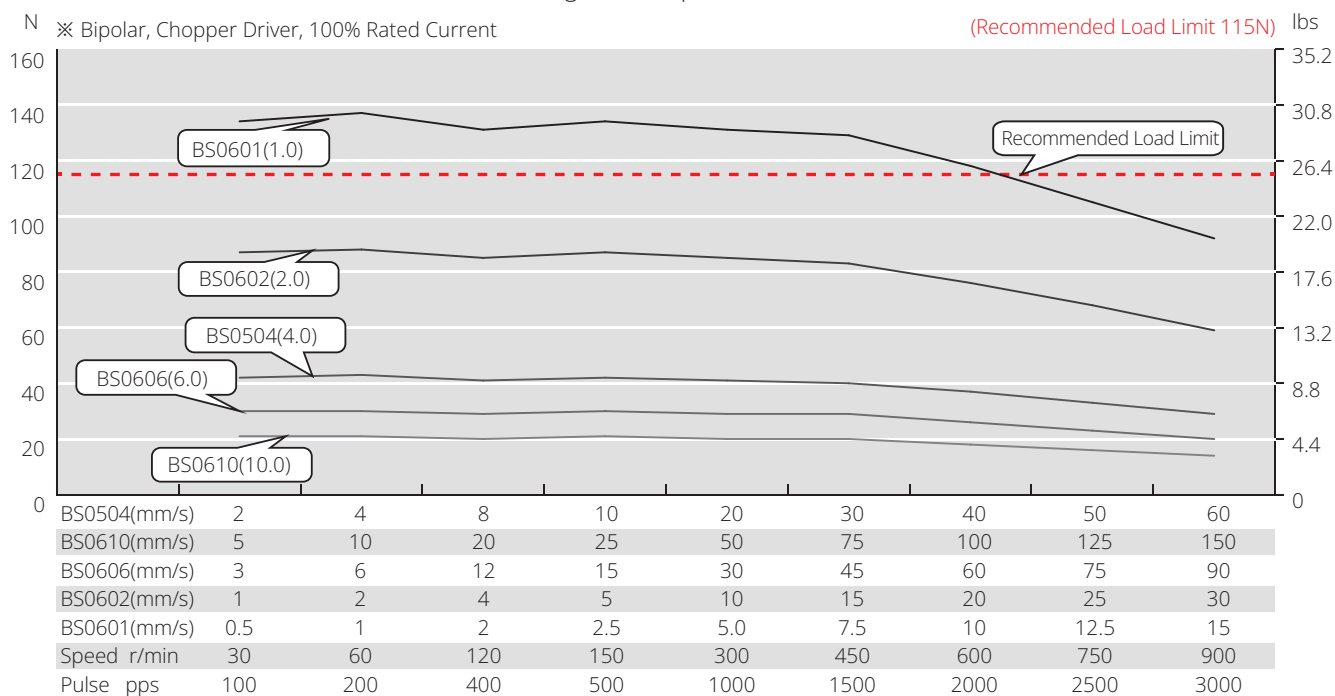
Ball screw type	0601	0602	0606	0610	0504								
Ball size	Φ0.8	Φ0.8	Φ0.8	Φ1.2	Φ0.8								
Number of thread	1	1	2	2	1								
Thread direction	Right												
Shaft root dia	Φ5.3	Φ5.1	Φ5.2	Φ5.0	Φ4.3								
Number of circuit	3.7×1	2.7×1	1.6×2	1.2×2	2.7×1								
Shaft, nut material	SCM415H												
Surface hardness	HRC 58-62												
Anti-rust treatment	Anti-rust oil												
Grade	C7												
Nut Size	A	B	C	D	H	W	X	E	Position accuracy	Total run out	Axial play	Dynamic load (N)	Static load (N)
BS0601	26	4	17	13	16	20	3.4		±0.05	0.12	≤0.03	680	1200
BS0602	28	4	17	15	19	22	3.4		±0.05	0.12	≤0.03	750	1450
BS0606	27	4	17	14	16	21	3.4	5	±0.05	0.12	≤0.03	870	1600
BS0610	27	4	23	14	16	21	3.4	7.5	±0.05	0.12	≤0.03	950	1650
BS0504	24	4	22	12	16	18	3.4		±0.05	0.12	≤0.03	470	720

Note : All drawings are 1st Angle Projection - ISO Compliant (3D models available)

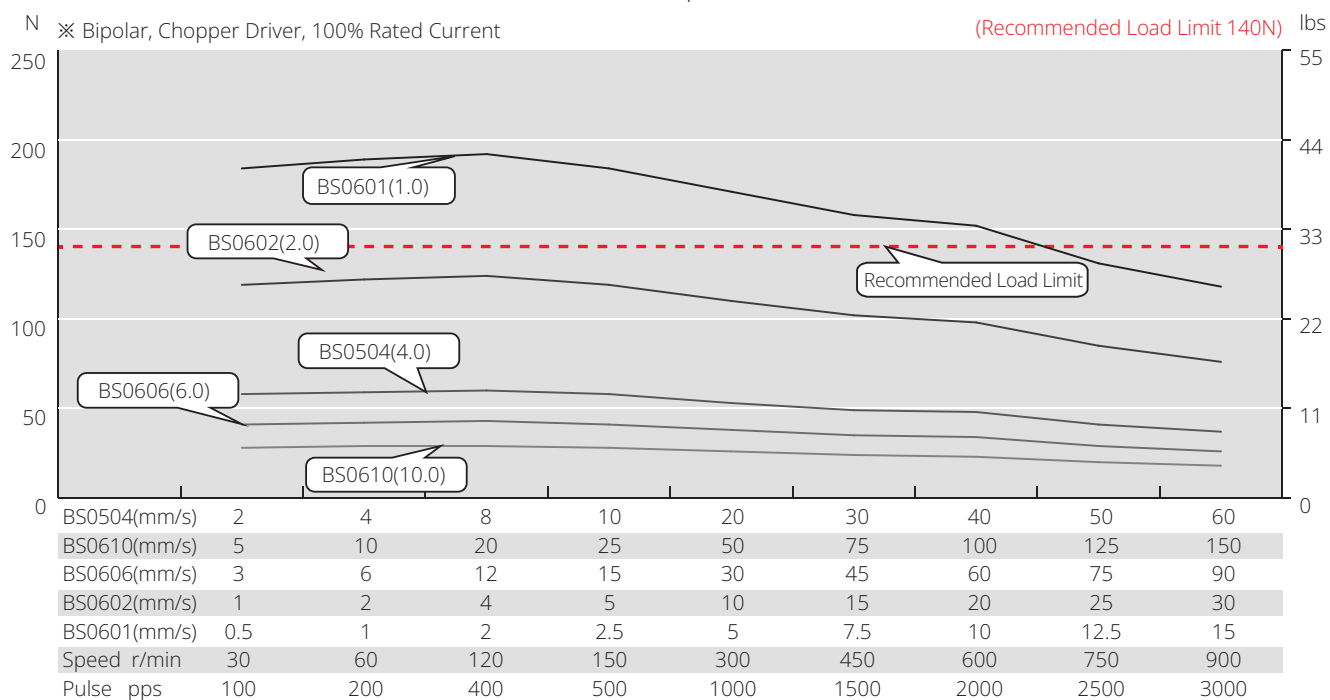
Size 11 (28mm) Series

Speed Thrust Curves

Size 11 Single Stack Speed Thrust Curves



Size 11 Double Stack Speed Thrust Curves



TEST CONDITION

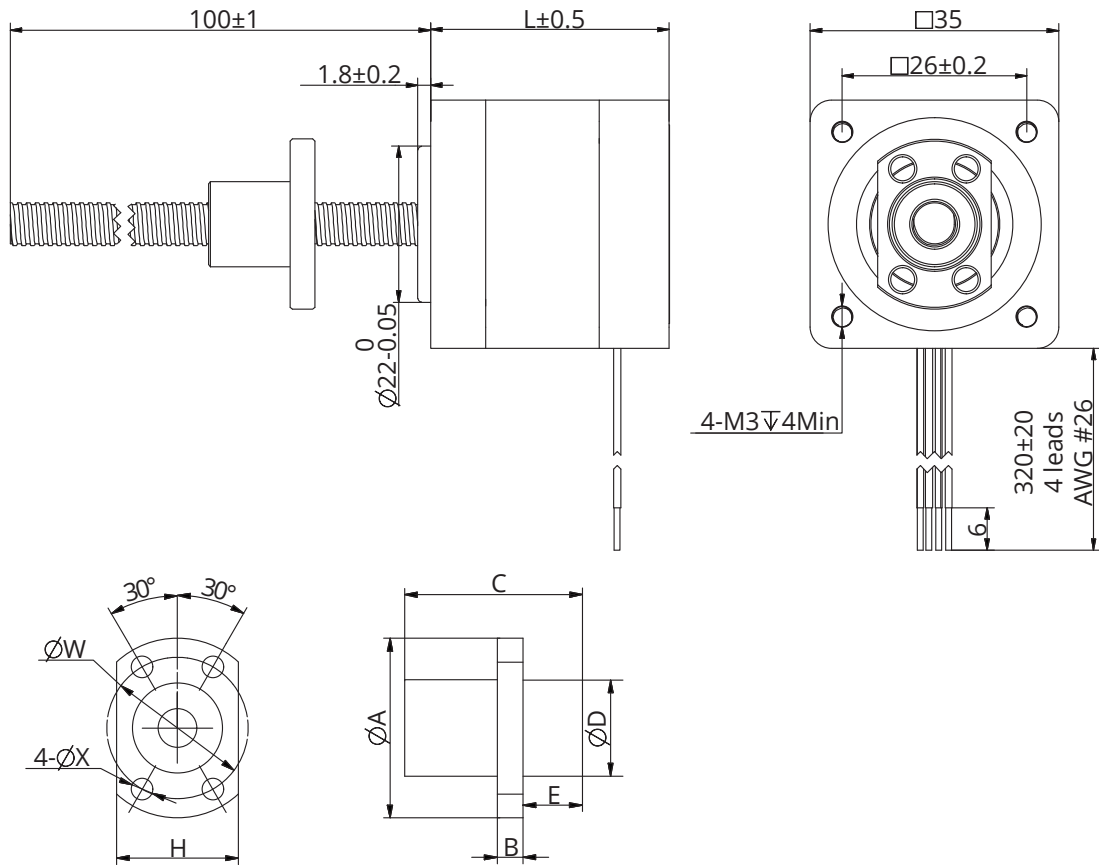
Testing Voltage: 24Vdc, Driver Model: DS-OLS2-FPD bipolar, chopper driver at rated current (rms).
Motor's thrust will be changed with different voltage and driver. 50% thrust margin is recommended.

Size 14 (35mm) Series

Motor Characteristics

Motor	Voltage (V)	Current (A _{RMS})	Resistance (Ω)	Inductance (mH)	Lead Wire No.	Motor Length (mm)
14E2110	3.5	1	3.5	3.6	4	33.6
14E2115	2.7	1.5	1.8	1.9	4	33.6
14E2210	6	1	6	7.2	4	45.6
14E2215	4	1.5	2.7	3.2	4	45.6

Dimensional Drawings

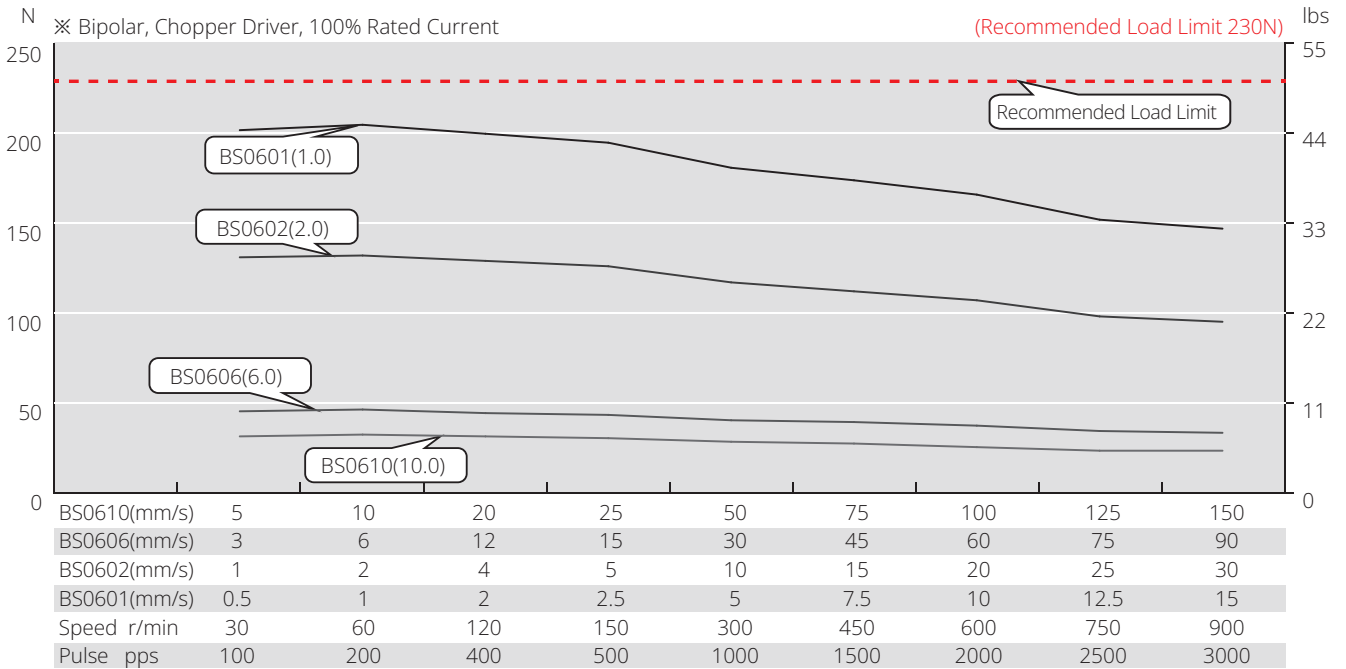


Note : All drawings are 1st Angle Projection - ISO Compliant (3D models available)

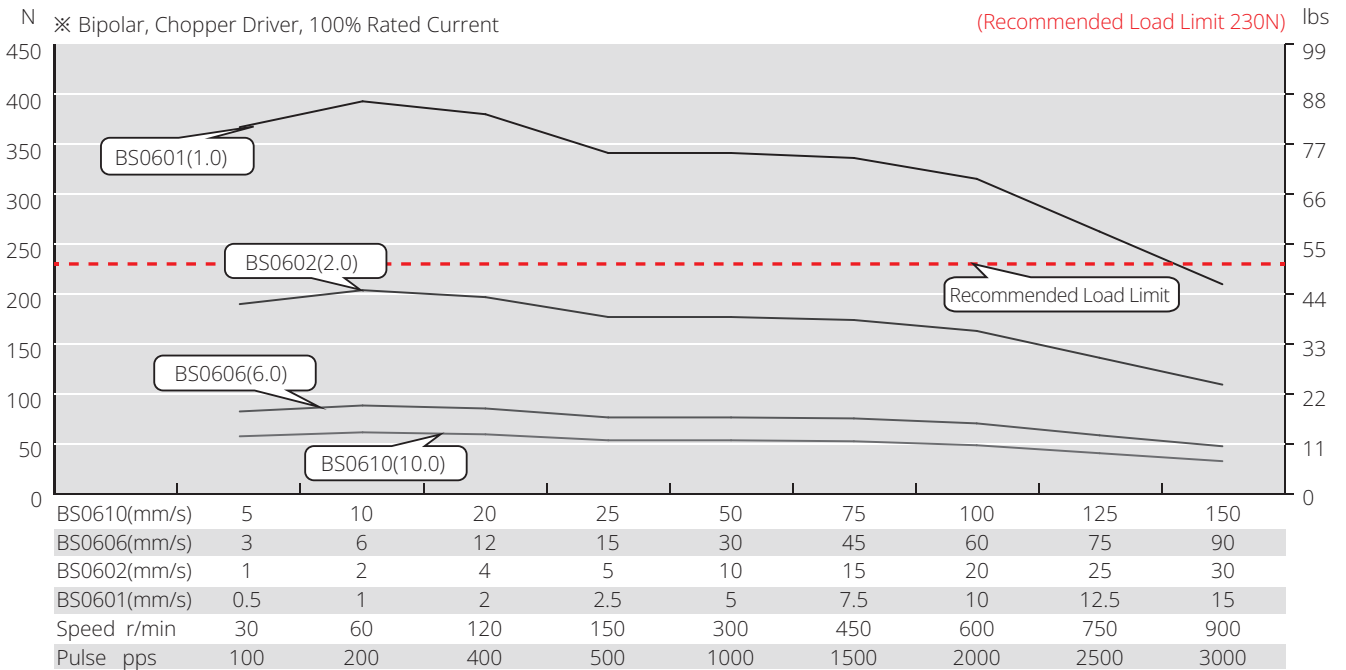
Size 14 (35mm) Series

Speed Thrust Curves

Size 14 Single Stack Speed Thrust Curves



Size 14 Double Stack Speed Thrust Curves



TEST CONDITION

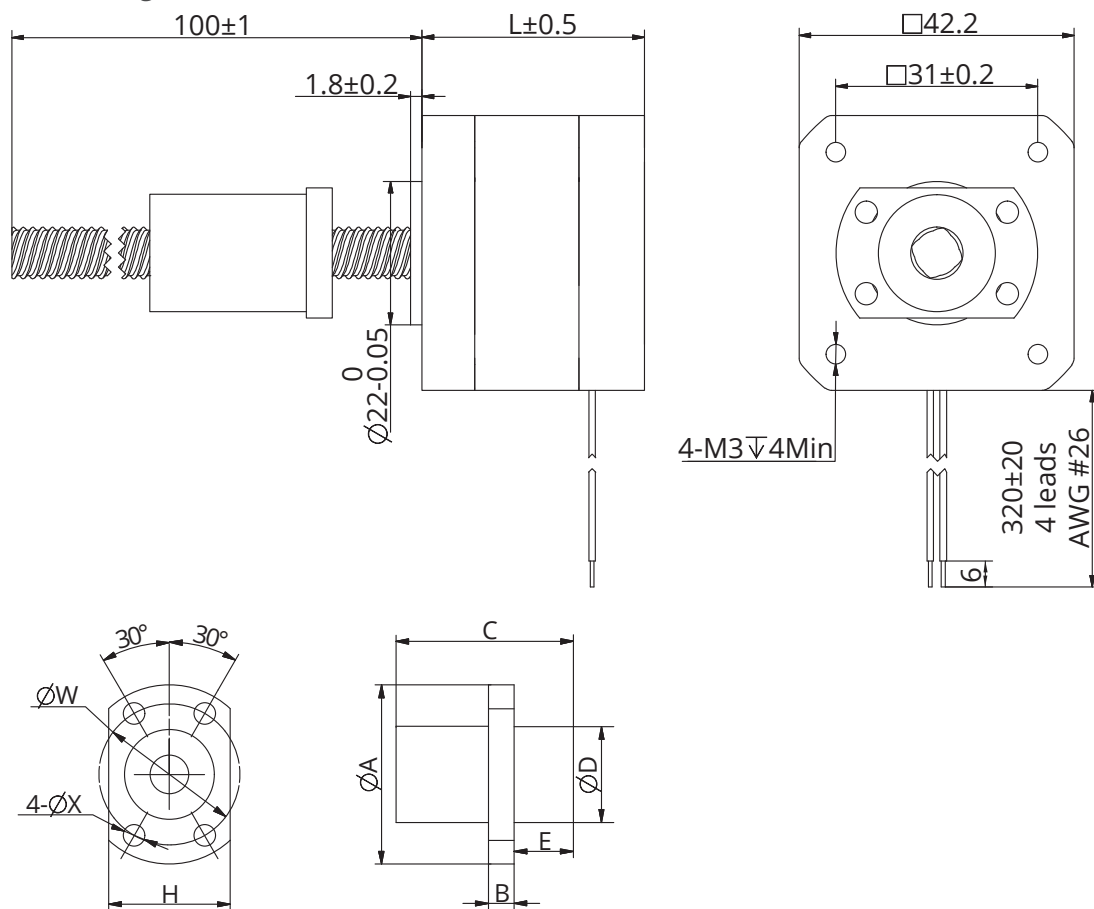
Testing Voltage: 24Vdc, Driver Model: DS-OLS2-FPD bipolar, chopper driver at rated current (rms).
Motor's thrust will be changed with different voltage and driver. 50% thrust margin is recommended.

Size 17 (42mm) Series

Motor Characteristics

Motor	Voltage (V)	Current (A _{RMS})	Resistance (Ω)	Inductance (mH)	Lead Wire No.	Motor Length (mm)
17E2110	3.8	1	3.8	5	4	34.1
17E2115	2.78	1.5	1.85	2.2	4	34.1
17E2212	4.56	1.2	3.8	8	4	48.1
17E2225	2.5	2.5	1	1.8	4	48.1

Dimensional Drawings



Note : All drawings are 1st Angle Projection - ISO Compliant (3D models available)

Size 17 (42mm) Series

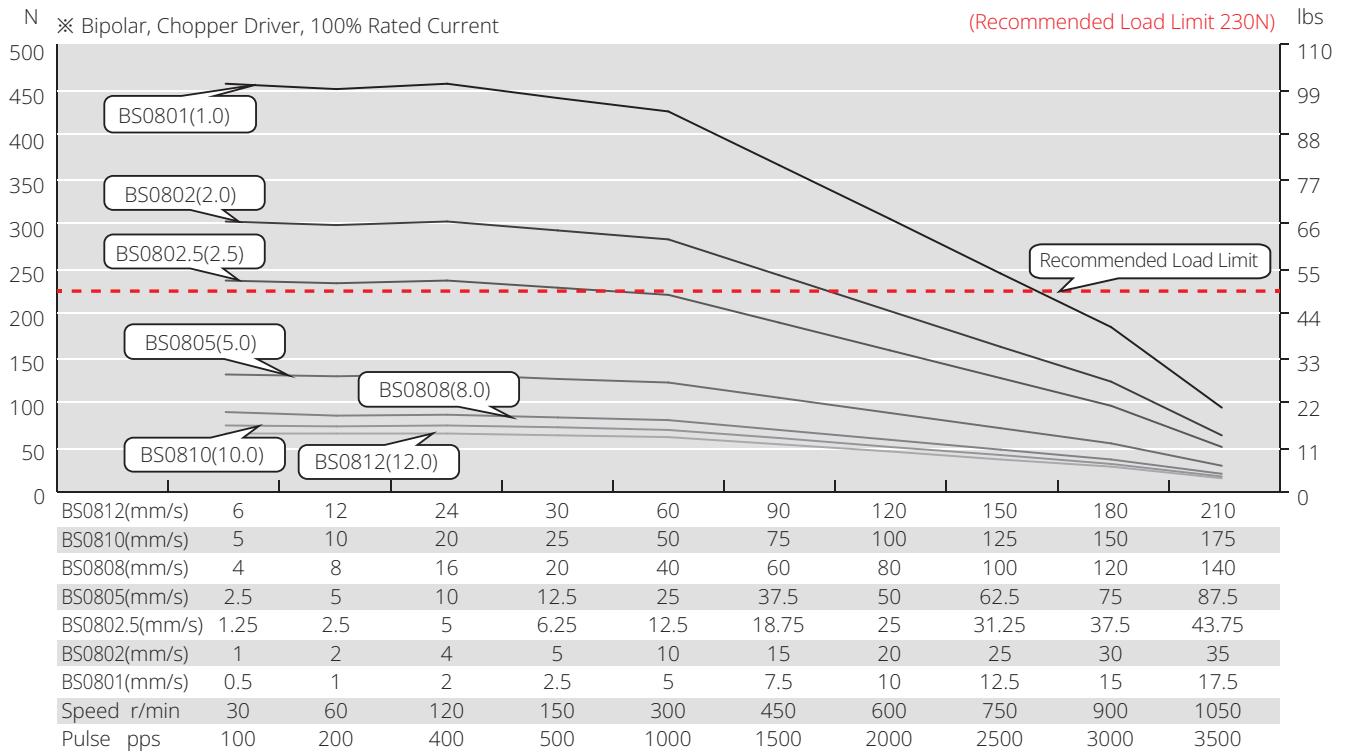
Stepper Ball Screw Specification

Ball screw type	0801	0802	0802.5	0805	0808	0810	0812						
Ball size	Φ0.8	Φ1.5875	Φ1.5875	Φ1.5875	Φ1.5875	Φ1.5875	Φ1.5875						
Number of thread	1	1	1	1	2	2	2						
Thread direction	Right												
Shaft root dia	Φ7.3	Φ6.6	Φ6.3	Φ6.6	Φ6.7	Φ6.7	Φ6.7						
Number of circuit	3.7×1	3.7×1	2.7×1	2.7×1	1.6×2	1.6×2	1.6×2						
Shaft, nut material	SCM415H												
Surface hardness	HRC 58~62												
Anti-rust treatment	Anti-rust oil												
Grade	C7												
Nut Size	A	B	C	D	H	W	X	E	Position accuracy	Total run out	Axial play	Dynamic load (N)	Static load (N)
BS0801	29	4	17	16	18	23	3.4		±0.05	0.12	≤0.03	780	1650
BS0802	37	5	24	20	22	29	4.5		±0.05	0.12	≤0.03	2400	4100
BS0802.5	29	4	16	16	18	23	3.4		±0.05	0.12	≤0.03	1850	3000
BS0805	31	4	28	18	20	25	3.4		±0.05	0.12	≤0.03	1850	3000
BS0808	31	4	20	18	20	25	3.4	6	±0.05	0.12	≤0.03	2200	3800
BS0810	31	4	20	18	20	25	3.4	7	±0.05	0.12	≤0.03	2200	3800
BS0812	31	4	24	18	20	25	3.4	6	±0.05	0.12	≤0.03	2200	3800

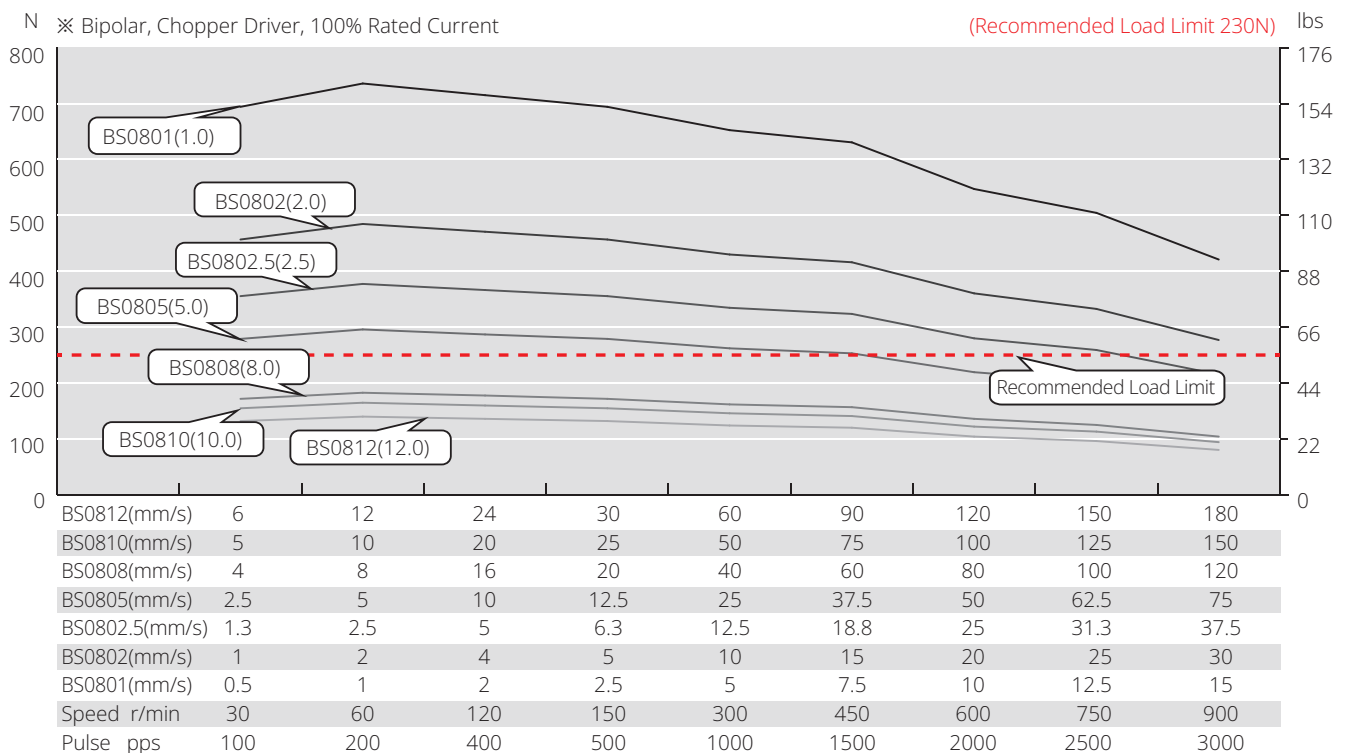
Size 17 (42mm) Series

Speed Thrust Curves

Size 17 Single Stack Speed Thrust Curves



Size 17 Double Stack Speed Thrust Curves



TEST CONDITION

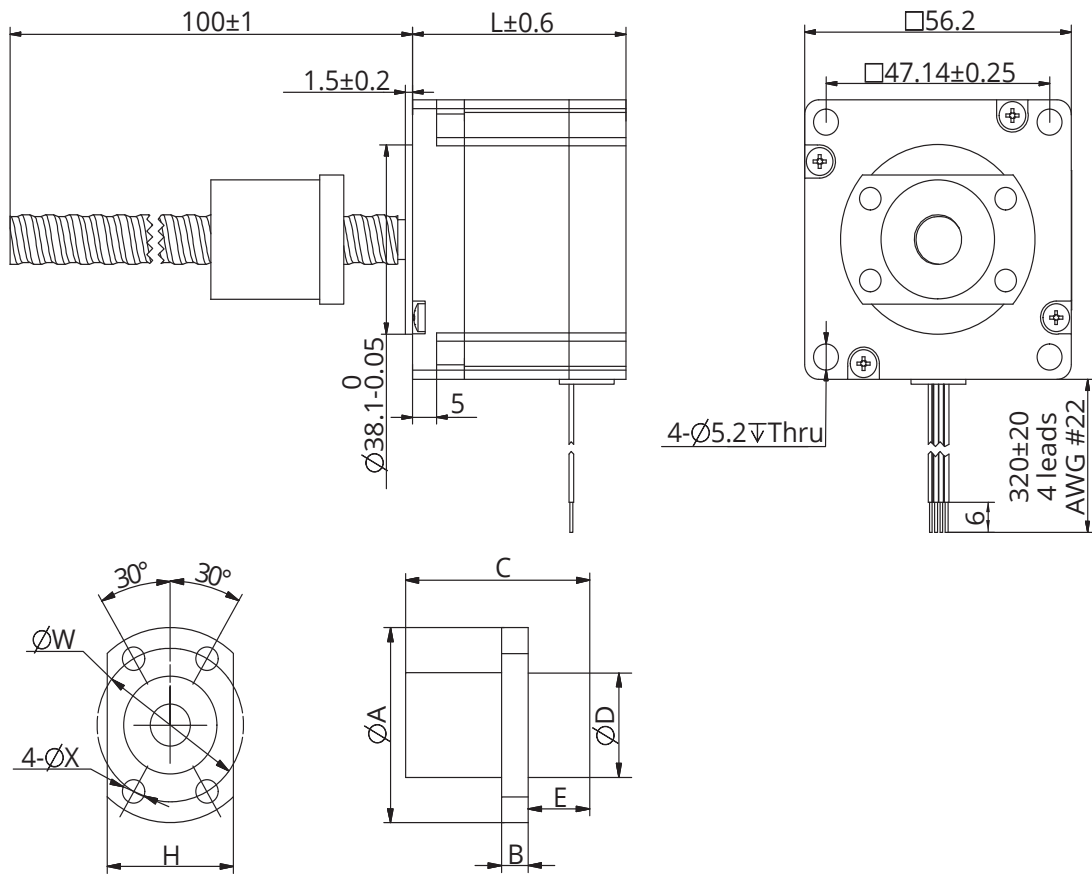
Testing Voltage: 24Vdc, Driver Model: DS-OLS2-FPD bipolar, chopper driver at rated current (rms).
Motor's thrust will be changed with different voltage and driver. 50% thrust margin is recommended.

Size 23 (57mm) Series

Motor Characteristics

Motor	Voltage (V)	Current (A _{RMS})	Resistance (Ω)	Inductance (mH)	Lead Wire No.	Motor Length (mm)
23E2120	3.5	2	1.75	4.1	4	45
23E2130	2.4	3	0.8	1.7	4	45
23E2225	5	2.5	2	5.2	4	65
23E2240	2.8	4	0.7	2	4	65

Dimensional Drawings



Note : All drawings are 1st Angle Projection - ISO Compliant (3D models available)

Size 23 (57mm) Series

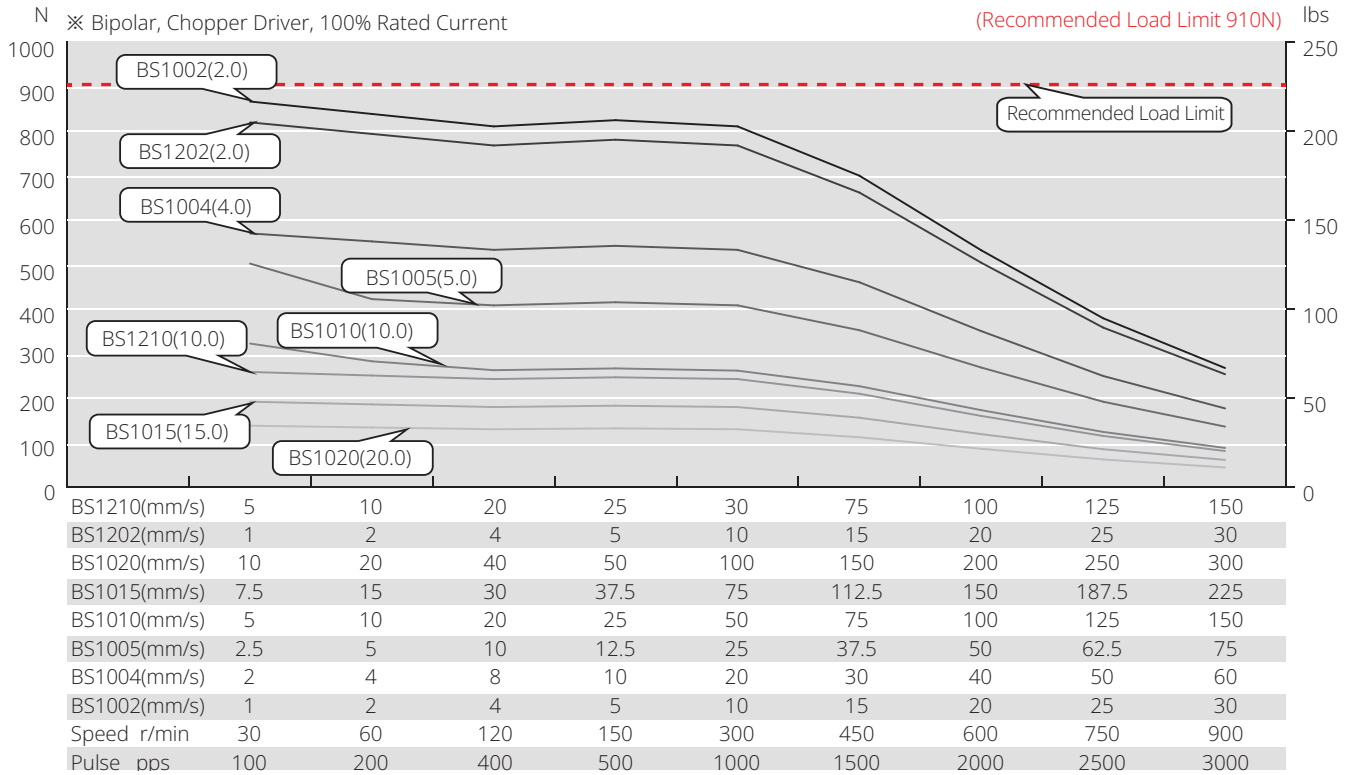
Stepper Ball Screw Specification

Ball screw type	1002	1004	1005	1010	1015	1020	1202	1210					
Ball size	Φ1.5875	Φ2.0	Φ2.0	Φ2.0	Φ2.0	Φ1.5875	Φ1.5875	Φ2.381					
Number of thread	1	1	1	2	2	4	1	2					
Thread direction	Right												
Shaft root dia	Φ8.6	Φ8.2	Φ8.2	Φ8.4	Φ8.4	Φ8.7	Φ10.6	Φ10.2					
Number of circuit	3.7×1	2.7×1	2.7×1	1.6×2	1.6×2	0.7×4	3.7×1	1.7×2					
Shaft, nut material	SCM415H												
Surface hardness	HRC58-62												
Anti-rust treatment	Anti-rust oil												
Grade	C7												
Nut Size	A	B	C	D	H	W	X	E	Position accuracy	Total run out	Axial play	Dynamic load (N)	Static load (N)
BS1002	40	5	24	23	25	32	4.5		±0.05	0.12	≤0.03	2700	5300
BS1004	41	5	28	24	26	33	4.5		±0.05	0.12	≤0.03	3000	5200
BS1005	40	5	26	23	25	32	4.5		±0.05	0.12	≤0.03	3000	5200
BS1010	40	5	24	23	25	32	4.5	6	±0.05	0.12	≤0.03	3300	5900
BS1015	40	5	33	23	25	32	4.5	6	±0.05	0.12	≤0.03	3300	6400
BS1020	37	5	23	20	22	29	4.5	5	±0.05	0.12	≤0.03	2100	4000
BS1202	42	5	24	25	27	34	4.5		±0.05	0.12	≤0.03	3000	6400
BS1210	41	5	30	24	26	33	4.5	9.5	±0.05	0.12	≤0.03	5100	9800

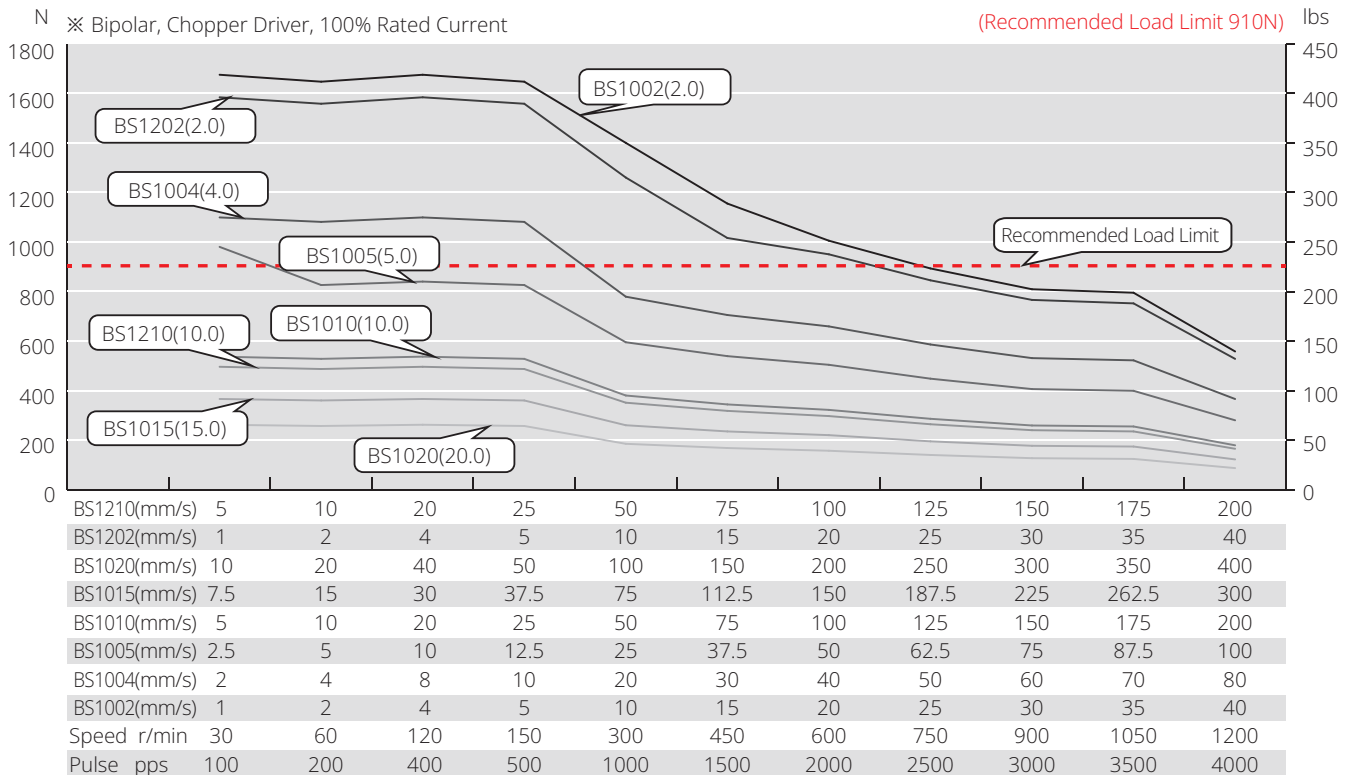
Size 23 (57mm) Series

Speed Thrust Curves

Size 23 Single Stack Speed Thrust Curves



Size 23 Double Stack Speed Thrust Curves







TEST CONDITION

Testing Voltage: 40Vdc, Driver Model: DS-OLS4-FPD bipolar, chopper driver at rated current (rms).
Motor's thrust will be changed with different voltage and driver. 50% thrust margin is recommended.

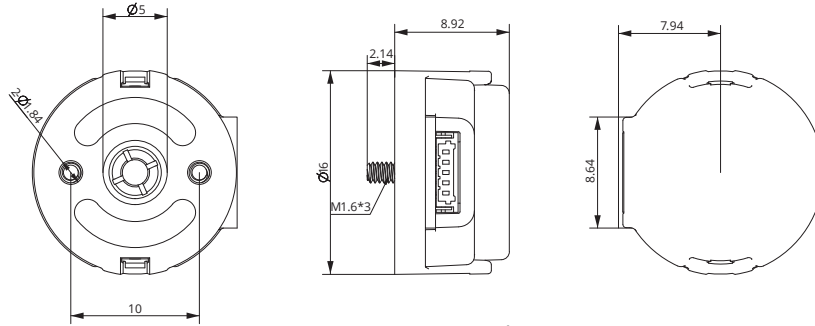
Accessories and Options

Stepper Ball Screw End Machining

	Thread End	<p>Screw end machining depends on screw diameter. For customized screw end machining are available, please contact DINGS' representatives for more details.</p>
	Smooth End	
	None	
	Customized	

Accessories and Options

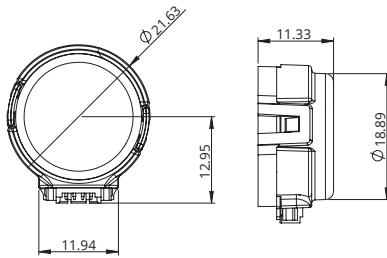
Encoder



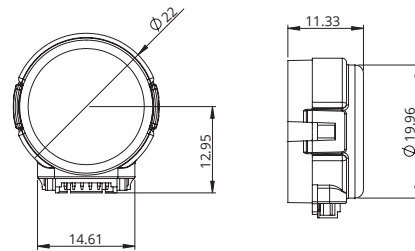
EK 6 Encoder

- EK 6 Encoder (Used for size 6 motors) * No Index

Resolution (CPR)	250	256	500	512	1000	1024	2000	2048	4000	4096
Single ended output	0	1	2	3	4	5	6	7	8	9



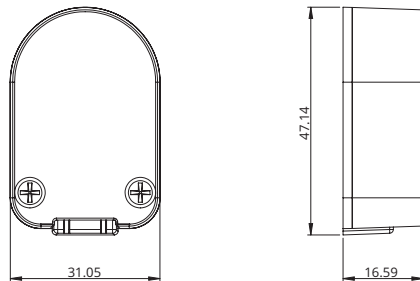
EK 1 Encoder - single ended output



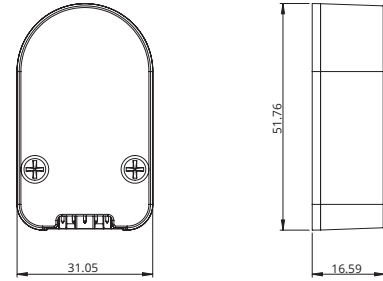
EK 1 Encoder - differential output

- EK 1 Encoder (Used for size 8, 11, 14, 17 motors) * No Index

Resolution (CPR)	100	108	120	125	128	200	250	256	300	360	400	500	1000	512	720	800
Single ended output	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
Differential output	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P



EK 2 Encoder - single ended output

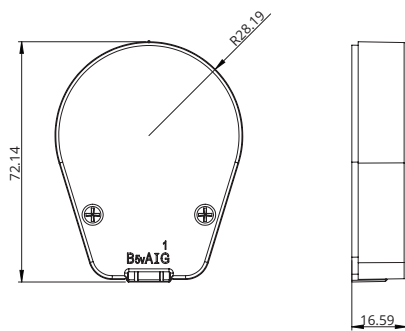


EK 2 Encoder - differential output

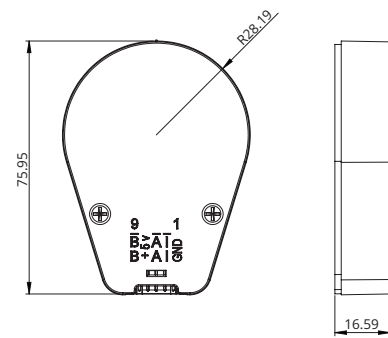
- EK 2 Encoder (Used for size 14, 17, 23, 24 motors)

Resolution (CPR)	50	100	192	200	250	256	360	400	500	720	900	1000	1250	2000	2500	4000	5000
Single ended output	0	1	2	3	4	5	6	7	8	9	10	11	12				
Differential output	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q

Accessories and Options



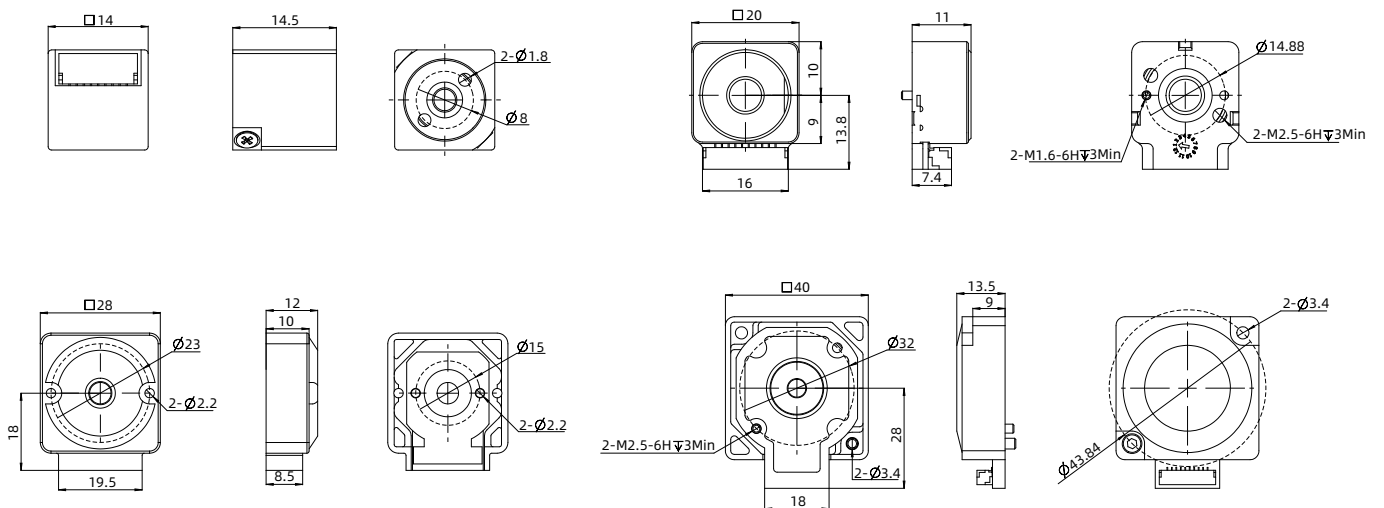
EK 3 Encoder - single ended output



EK 3 Encoder - differential output

- EK 3 Encoder (Used for size 23, 24, 34 motors)

Resolution (CPR)	64	100	200	500	1000	1800	2000	2500	3600	4000	5000	7200	8000	10000
Single ended output	0	1	2	3	4	5	6	7	8					
Differential output		A	B	C	D	E	F	G	H	I	J	K	L	M



- EK 7 Encoder (Used for size 6, 8, 11, 14, 17, 23, 24 External, Non-Captive motors)

Resolution (CPR)	-	-	-	1000	-	-	2000	-	-	-
Single ended output	0	1	2	3	4	5	6	7	8	9
Differential output	A	B	C	D	E	F	G	H	I	J

Installation Guide

■ Precaution of handling and operation

This product integrates the motor and screw together, and repair is not possible for either of these components. Please handle with care to avoid damage to the assembly.

● 1. Precaution for operation

1. Before use, please read instruction manuals and follow the precautions below.
2. Do not hit or drop the shaft, do not apply Axial load or radial load exceeding specifications, it may cause malfunction.
3. Before use, please check that the product has no defect, and product is the same as your order.
4. Do not disassemble each component, dust may get inside the product. It may deteriorate accuracy.
5. Please prevent contamination from dust or swarf. Dust or swarf may cause damage to ball screw, Which lead to deteriorating the function.
6. Lubrication is required under the ball screw operation. Lubrication condition should be checked every 2-3 months. If grease is contaminated, remove old grease and replace with new one.
7. Do not use the motor exceeding our specification in load or speed.
8. Allowing ball screw nut to over-run may result in malfunctioning due to balls escaping, damage to recycling parts, and indentation on the raceways. Therefore ball screw nut must never be allowed to over-run. If over- running occurs, contact us for an inspection with charge.
9. Do not hold the motor lead wire. It is for fixation, do not use it as movement.
10. The motor torque and speed characteristics may vary from the specifications, depending on the load conditions or Driver used. Please adjust as appropriate.
11. The motor has a resonant point within the specifications. Please avoid it when in use.

● 2. Precaution for safety

1. If abnormal odor,noise,smoke,overheating,or vibration occurs,stop operation immediately and turn the power off.
2. Do not use the exceeding rated current.
3. The motor may overheat depending on the load condition or Driver used. Make sure that the motor surface temperature dose not exceed 80°C when in use.
4. Check the wire connection type,Drive system, and phase sequence. Inappropriate connection leads to malfunction.
5. Do not bend ,pull or pinch the motor lead wire.
6. Do not touch moving parts during operation.
7. Disconnect from the controller before performing dielectric withstanding voltage test of the motor or Insulation test.
8. Please switch off the Driver ,when inspection or maintenance.

● 3. Operating environment

1. Operating environment should be 0-40°C in temperature and 20-80%RH in humidity. Do not use it under dew condensation, corrosive gas or inflammable gas environment.
2. Do not use it under strong electric field, strong magnetic field.
3. Please prevent from swarf, oil mist, cutting fluid, water/moisture, salt spray, organic solvent and other contamination.
4. The motor can not be used under the vibration, impact, vacuum, and other special environment.

● 4. Ball screw maintenance

1. Ball screw pair protection device

- (1) The use of the ball screw in the use of the process, is strictly prohibited dust or dirt entering, and therefore must be equipped with protective device.
- (2) The ball screw pair is exposed on the machine tool, and a closed protective cover shall be adopted, such as the use of a coil spring steel tape sleeve, a telescopic sleeve and a folding sleeve, etc.. When you install, connect one end of the shield to the side of the ball nut. The other end is fixed on the supporting seat of the ball screw.
- (3) The position of the ball screw is located in a position, and the sealing ring is used to protect the ball screw. Sealing ring is arranged on both ends of the nut. Contact and non contact type two sealing ring.

2. Lubrication of Ball screw

- (1) The ball screw pair is usually used for two kinds of lubricants, lithium based grease and the main shaft oil. Lubricating grease generally and in the thread rolling and nut shell space, spindle oil through the shell of an oil hole injection nut of the space.
- (2) Use of the process, every half a year to replace the grease, clean the old grease, coated with new grease. The ball screw pair lubricated with spindle oil can be oiled once before each operation of the machine.

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