

## B Series Linear Step Motors & Linear Intelligent Motors

### B Series Linear Step Motors

- BE Series
- SR Stepper Drivers
- STF Stepper Drivers

### Linear Intelligent Motors

- TSM Series
- AM Series
- SSDC Stepper Drivers
- RS Stepper Drivers





## Milestones

- FEB. 2020 MOONS' Intelligent motion system India Private Limited was established in Pune, India
- MAR. 2019 MOONS' Electric acquired Technosoft Motion AG
- MAR. 2018 MOONS' Electric acquired Changzhou Yunkong Electronic CO., LTD.
- MAY. 2017 AMP & MOONS' Automation (Germany) GmbH was officially registered in Frankfurt, Germany
- MAY. 2017 MOONS' Electric was successfully listed on the Shanghai Stock Exchange
- JUN. 2015 MOONS' acquired LIN ENGINEERING
- MAY. 2015 MOONS' Electric and PBC Linear officially established Joint Venture
- JUN. 2014 MOONS' acquired Applied Motion Products
- OCT. 2013 MOONS' Industries Japan was established in Yokohama
- JUN. 2010 MOONS' Industries (South-East Asia) Pte Ltd. was established in Singapore
- SEP. 2009 MOONS' Industries (Europe) S.R.L was established in Milan, Italy
- JAN. 2009 MOONS' Qingdao Branch Office opened
- FEB. 2007 MOONS' established joint venture with Applied Motion Products and a Drive company was set up
- MAY. 2006 MOONS' new facility was built and factory relocation was completed
- JAN. 2005 First LED Drive was introduced to the market
- DEC. 2000 MOONS' Industries (America), Inc. was established in Chicago, USA
- OCT. 2000 MOONS' Power Supply Factory was set up and production started
- APR. 1998 MOONS' International Trading Company was established
- FEB. 1998 MOONS' Motor Factory was set up and HB Stepper Motor production started
- FEB. 1994 MOONS' was founded

# Catalogue

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# Ball Screw Linear Motors

MOONS' BE Series products are designed based on the know-how technology of hybrid step motors , ball screws and nuts, which can 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. And, it provides the best performance with any drive and power supply.

- Multiple structure types available
- Each frame size has multiple motor length options
- Integrate any lead screw and ball nut from moons'
- Standardized product models for quick response

MOONS' has committed to product innovation design and technical improvement, with excellent product quality, application technology, fast and flexible services, which provide customers with high level motion control solutions.

## ■ Features of BE Series

### High mechanical efficiency

The Ball screws of BE Series have outstanding transmission efficiency of over 90%, incomparably higher than lead screws. 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 )

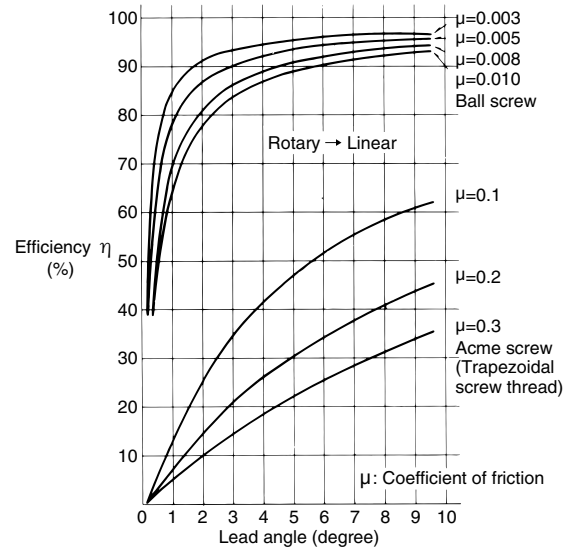
$$\text{Normal operation: } P = \frac{2\pi \eta_1 \times T}{\ell}$$

T=Load torque kgf x cm

P=Axial external load kgf

ℓ=lead cm

η<sub>1</sub>= Efficiency of ball screws



Mechanical efficiency of ball screws

### Small axial clearance, High accuracy, High rigidity

The Ball screws of 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 0 to achieve advanced rigidity.



Ball screw groove profile

# Ball Screw Linear Motors

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## Ball screw direct-connect motor

The BE Series connect the ball screws with the motors directly, non-couplings, has the merits of compact and high universality.

## High hardness, Excellent durability

The Ball screws of 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 standard hardness at 58 HRC or higher.

## ■ Application Information

### Applicability Statement

The transmission type of this series is ball-screw drive, so using in high operating frequency and high repetition accuracy application is recommended.

### Instructions for Vertical Installation

When the products are installed vertically, if the device suddenly loses power, the load may slide freely and cause injury to equipment or personnel owing to the low friction resistance of the ball screw. Therefore, when the products are used vertically, consideration should be given to adding brakes.

### Repeatability

The precision grade of ball-screw used in this product is C7, and the repetition accuracy is  $\pm 0.01$ mm by the runtime. For higher precision products, please contact the factory.

### Speed

Please refer to the specific series for the running speed of this product:  
B Series Linear Step Motors, the recommended motor rotate speed is not greater than 10rps.  
Linear Intelligent Motors, the recommended motor rotate speed is not greater than 50rps

### Operating Environment

Recommend working condition: : temperature range 0~50°C, under dry and clean conditions.  
If you need to use in special environment, please contact the factory.

# Ball Screw Linear Motors

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## Lubrication

The effect of lubricating: restrain friction, reduce temperature rise, improve efficiency, reduce noise, increase operating life, etc.

Grease has been applied to the lead screw before deliver. If grease is not needed, please contact the factory in advance.

(The reference grease: the base oil is synthetic oil, and the consistency grade is No. 2 lithium-based grease)

## Inspection and supply of lubricants

Please check the lubricant after 2 ~ 3 months of operation. If the dirt is obvious, it is recommended to wipe off the old lubricant and coat with the new one. The subsequent interval of inspection and supply is usually every other year, but there may be differences according to the different operation, please set the interval appropriately.

## Dustproof and anti-corrosion

Please use the product in clean environment. Any attachment of rubbish and foreign matter may cause poor operation. Don't use the product under corrosive conditions, otherwise the ball screw will be corroded and the action will not be smooth.

## Be careful with falling off of components due to their own weight

Since a ball screw has a low friction factor, its shaft or nut could potentially fall off due to its own weight. Be careful not to have your hand or fingers be caught under the fallen component.

## 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 to our company for repair.

(In this case, repairing charges are required.)

If it 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. Be careful with such defects because they may lead to a serious accident.

## Eccentric load

Ball screw is a kind of mechanical element which produces axial thrust. Its structure can not bear radial and torque load, otherwise it will lead to screw bending and life shortening. The misalignment between the motor and the nut mount can also cause eccentric load.

## Rocking motion

When the ball screw repeats the short-stroke and positive inversion, the dynamic torque tends to increase gradually due to the mutual extrusion of the balls. This problem can be solved by using the whole stroke at regular intervals.

## Storage and Safekeeping

Please storage the products horizontally and keep the environment dry.

The grease on the lead screw surface may volatilize and condense if storage for a long time, so it is recommended that the storage time should not exceed three months.

## BE Series Linear Step Motors

BE series (External Nut Type) is a type of linear step motor which makes a ball screw integrated with the motor to become the motor shaft and the ball nut is external to the motor. As the motor rotates, the ball nut moves linearly along the lead screw.

- Multiple structure types available
- Each frame size has multiple motor length options
- Integrate any lead screw and ball nut from moons'
- Standardized product models for quick response

The series match with high precision ball screw, using in high operating frequency and high repetition accuracy situations is recommended. The combination of lead screw motor styles, sizes, lead-screws, gives the freedom to use motors of different form factors to exactly fit in the application. And, it provides the best performance with any drive and power supply.



### ■ Numbering System

<b>BE</b>	<b>141S</b>	<b>-</b>	<b>B0801</b>	<b>-</b>	<b>100</b>	<b>-</b>	<b>AK1</b>	<b>-</b>	<b>0</b>	<b>-</b>	<b>XXX</b>
①	②		③		④		⑤		⑥		⑦
Series	Motor type		Lead screw type		Screw length (mm)		Nut type		Customized Code		Rated Current
									S=Screw End Machining		XXX=X.XX(A)

# Configuration Table

BE Series

Nominal Diameter (mm)	Lead (mm)	Lead screw type	Motor Options																		
			BE080K	BE081K	BE081B	BE081S	BE111S	BE113S	BE115S	BE141A	BE141S	BE143S	BE174A	BE174S	BE172S	BE176S	BE234S	BE236S	BE23AS	BE23ASP	
4	1	B0401	⊙	⊙																	
6	1	B0601				⊙		⊙													
6	2	B0602				⊙		⊙													
6	6	B0606				⊙		⊙													
6	12	B0612				⊙		⊙													
8	1	B0801							⊙					⊙							
8	2	B0802							⊙					⊙							
8	2.5	B08025							⊙					⊙							
8	5	B0805							⊙					⊙							
8	8	B0808							⊙					⊙							
10	2	B1002												⊙							⊙
10	4	B1004												⊙							⊙
10	5	B1005												⊙							⊙
10	10	B1010												⊙							⊙
12	2	B1202																			⊙
12	5	B1205																			⊙
12	10	B1210																			⊙

Note: Only marked with “⊙” is available, for more configurations please contact with MOONS.



# 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	P13
		B0602		FF1			
		B0606		FF1			
35X35	BE143S	B0801	75, 100, 125, 150, 175, 200, 225, 250	AK1	0, S	150	P16
		B0802		FF1			
		B0805					
		B0808					
42X42	BE172S	B0801	75, 100, 125, 150, 175, 200, 225, 250	AK1	0, S	200	P19
		B0802		FF1			
		B0805					
		B0808					
	BE176S	B0801	75, 100, 125, 150, 175, 200, 225, 250	AK1	0, S	200	
		B0802		FF1			
		B0805					
		B0808					
57X57	BE238S	B1002	100, 125, 150, 175, 200, 225, 250, 275, 300	AK1	0, S	220	P23
		B1004		AK2			
		B1010		FF1			

Note: Screw length < 150mm,no end machining; Screw length ≥ 150mm,standard end machining.  
no end machining code" 0" , standard end machining code" S" .

① Select configuration codes							
Order sample	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							
<b>BE111S – B0601 – 100 – AK1 – 0 – 100</b>							
*In addition to the standard order Models, we also provide a wealth of customized configuration options, for more information please contact the factory.							

# BE08 Series

<b>Phases</b>	2
<b>Step Accuracy</b>	± 5%
<b>Approvals</b>	RoHS
<b>Insulation Class</b>	B ( 130°C )
<b>Operating Temp</b>	0°C ~ +50°C



## Ordering Information

**BE 08 1S – B0401 – 100 – FF1 – 0 – XXX**

Lead Screw Motor Type Code

Code	Structure Type
BE	External Nut Type

Frame Size Code

Code	Frame Size
08	20mm

Motor Body Length Code

Code	Motor Body Length Max ( mm )	Step Angle ( ° )
0K	21.3	1.8
1K	28.3	1.8
1B	29.5	1.8
1S	29.5	1.8

Lead Screw Type Code

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

Rated Current Code

XXX=X.XX(A)

Special Custom Type Code

Code	Custom Type
0	No end machining
S	Lead Screw End Machining
E	Add Encoder
XX	Other Special Custom Type

Mating Nut Code

Code	Mating Screw
FF	B0401

The length of the screw Lx

###	Provided in 1 mm increments

Note: Choosing the standard order models can get the sample quickly, please see P9 for standard models.

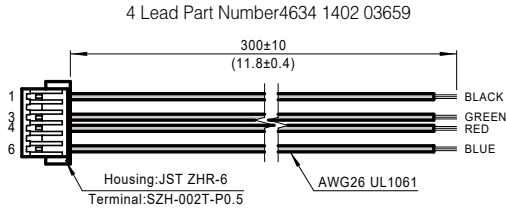
## Motor Technical Parameters

Motor Type Code	Motor Body Length (mm)	Step Angle ( ° )	Electrical Connection	Rated Current (Amps)
BE080K	21.3	1.8°	Leads	0.28
BE081K	28.3	1.8°	Leads	0.28
BE081B	29.5	1.8°	Plug In Connector	0.5
BE081S	29.5	1.8°	Plug In Connector	0.5

Note: Driver selection recommended P30–P37

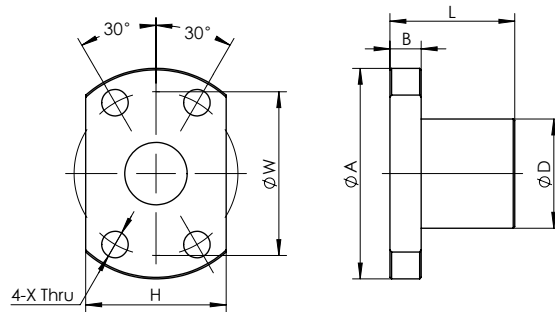
# BE08 Series

## ■ Mating Connector With Leads(Only used for BE081S and BE081B)



## ■ Nut Type

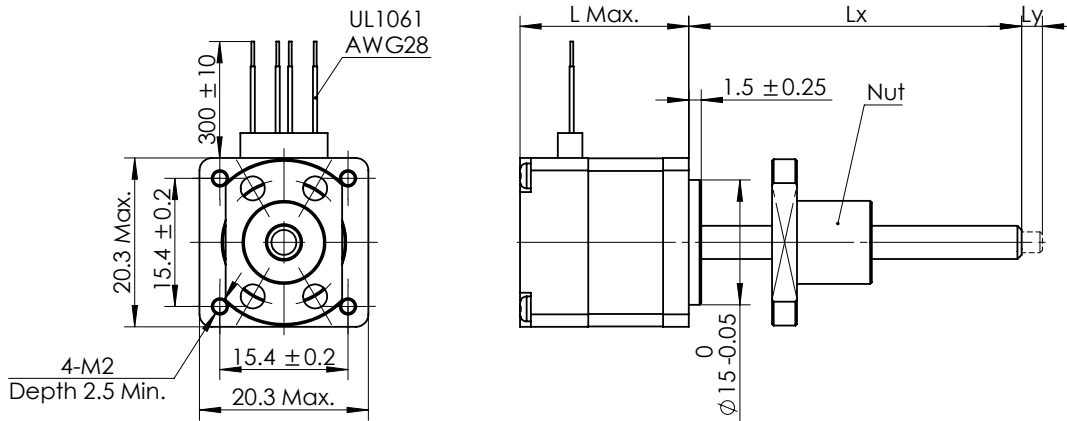
UNIT:mm



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

## ■ Dimensional Information

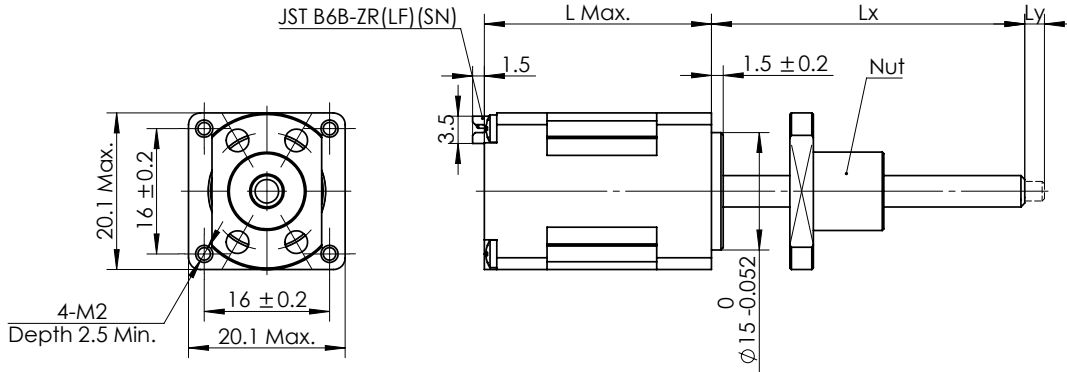
UNIT:mm



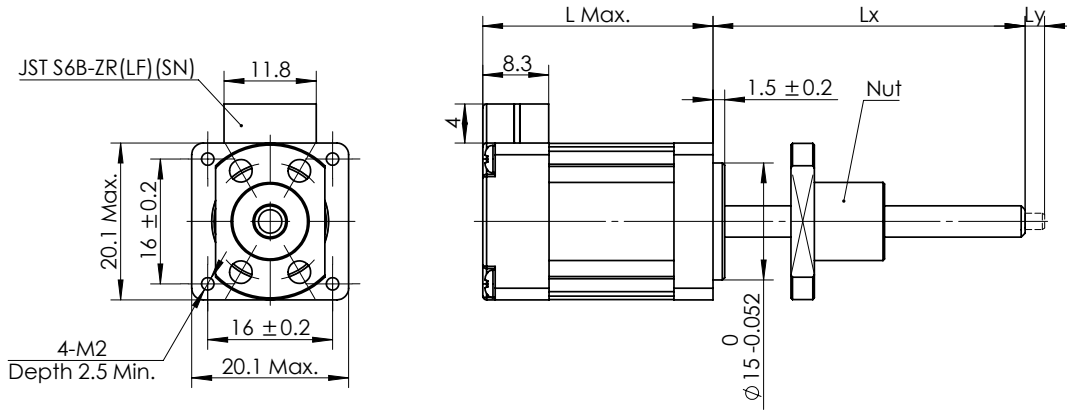
Motor Type	Dimension "L"
BE080K	21.3
BE081K	28.3

# BE08 Series

BE Series

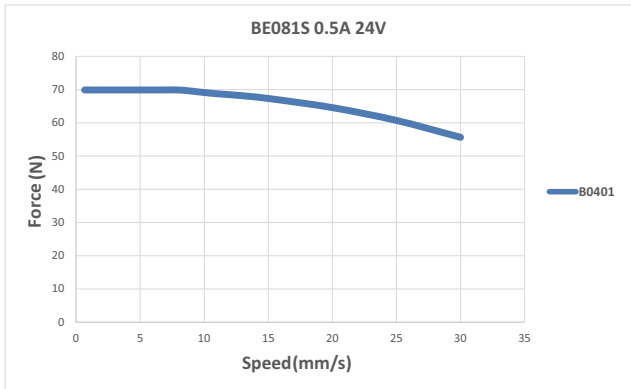


Motor Type	Dimension "L"
BE081B	29.5



Motor Type	Dimension "L"
BE081S	29.5

## Speed – Force Reference Curve



Note: The curves are reference values obtained by calculation. The actual output should consider the customer's unique application, including speed, acceleration and deceleration, frequency, stability of guidance mechanism, etc.

# BE11 Series

<b>Phases</b>	2
<b>Step Accuracy</b>	± 5%
<b>Approvals</b>	RoHS
<b>Insulation Class</b>	B ( 130°C )
<b>Operating Temp</b>	0°C ~ +50°C



## Ordering Information

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

<p>Lead Screw Motor Type Code</p> <table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th>Code</th> <th>Structure Type</th> </tr> </thead> <tbody> <tr> <td>BE</td> <td>External Nut Type</td> </tr> </tbody> </table> <p>Frame Size Code</p> <table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th>Code</th> <th>Frame Size</th> </tr> </thead> <tbody> <tr> <td>11</td> <td>28mm</td> </tr> </tbody> </table> <p>Motor Body Length Code</p> <table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th>Code</th> <th>Motor Body Length Max ( mm )</th> <th>Step Angle ( ° )</th> </tr> </thead> <tbody> <tr> <td>1S</td> <td>32</td> <td rowspan="3">1.8</td> </tr> <tr> <td>3S</td> <td>41</td> </tr> <tr> <td>5S</td> <td>52</td> </tr> </tbody> </table> <p>Lead Screw Type Code</p> <table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th rowspan="2">Code</th> <th rowspan="2">Nominal Diameter ( mm )</th> <th rowspan="2">Lead ( mm )</th> <th>Travel ( mm )</th> </tr> <tr> <th>Travel Per 1.8°</th> </tr> </thead> <tbody> <tr> <td>B0601</td> <td>6</td> <td>1</td> <td>0.005</td> </tr> <tr> <td>B0602</td> <td>6</td> <td>2</td> <td>0.01</td> </tr> <tr> <td>B0606</td> <td>6</td> <td>6</td> <td>0.03</td> </tr> </tbody> </table>	Code	Structure Type	BE	External Nut Type	Code	Frame Size	11	28mm	Code	Motor Body Length Max ( mm )	Step Angle ( ° )	1S	32	1.8	3S	41	5S	52	Code	Nominal Diameter ( mm )	Lead ( mm )	Travel ( mm )	Travel Per 1.8°	B0601	6	1	0.005	B0602	6	2	0.01	B0606	6	6	0.03	<p>Rated Current Code</p> <p>XXX=X.XX(A)</p> <p>Special Custom Type Code</p> <table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th>Code</th> <th>Custom Type</th> </tr> </thead> <tbody> <tr> <td>0</td> <td>No end machining</td> </tr> <tr> <td>S</td> <td>Lead Screw End Machining</td> </tr> <tr> <td>B</td> <td>Add Brake</td> </tr> <tr> <td>E</td> <td>Add Encoder</td> </tr> <tr> <td>XX</td> <td>Other Special Custom Type</td> </tr> </tbody> </table> <p>Mating Nut Code</p> <table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th>Code</th> <th>Mating Screw</th> </tr> </thead> <tbody> <tr> <td>AK</td> <td>1 B0601</td> </tr> <tr> <td rowspan="2">FF</td> <td>1 B0602</td> </tr> <tr> <td>B0606</td> </tr> </tbody> </table> <p>The length of the screw Lx</p> <table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th>###</th> <th>Provided in 1 mm increments</th> </tr> </thead> <tbody> <tr> <td> </td> <td> </td> </tr> </tbody> </table>	Code	Custom Type	0	No end machining	S	Lead Screw End Machining	B	Add Brake	E	Add Encoder	XX	Other Special Custom Type	Code	Mating Screw	AK	1 B0601	FF	1 B0602	B0606	###	Provided in 1 mm increments		
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Note: Choosing the standard order models can get the sample quickly, please see P9 for standard models.

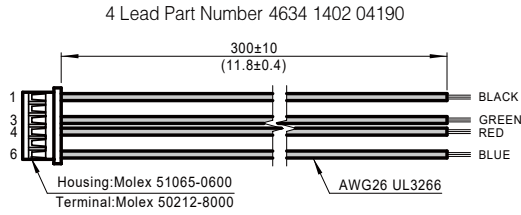
## Motor Technical Parameters

Motor Type Code	Motor Body Length (mm)	Step Angle ( ° )	Electrical Connection	Rated Current (Amps)
BE111S	32	1.8	Plug In Connector	0.5
				0.67
				1
BE113S	41		Plug In Connector	0.95
BE115S	52		Plug In Connector	1

Note: Driver selection recommended P30–P37

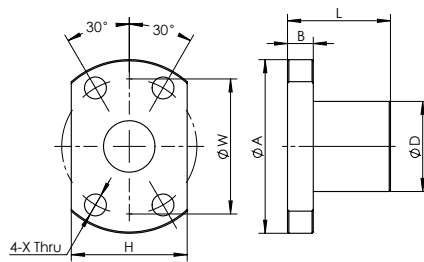
# BE11 Series

## ■ Mating Connector With Leads



## ■ Nut Type

UNIT:mm

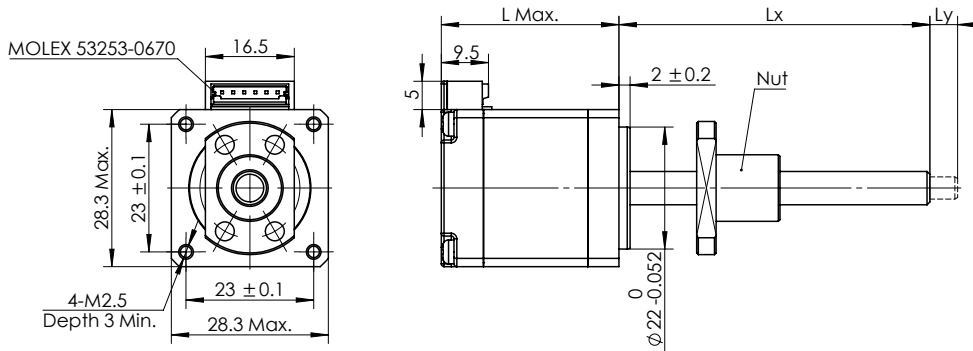


AK1/FF1

Lead Screw Code	Nut Code		D	D2	A	E	B	L	W	H	X
B0601	AK	1	12	-	24	-	3.5	15	18	16	3.4
B0602	FF	1	12	-	24	-	4	17	18	16	3.4
B0606	FF	1	12	-	24	-	4	22	18	16	3.4

## ■ Dimensional Information

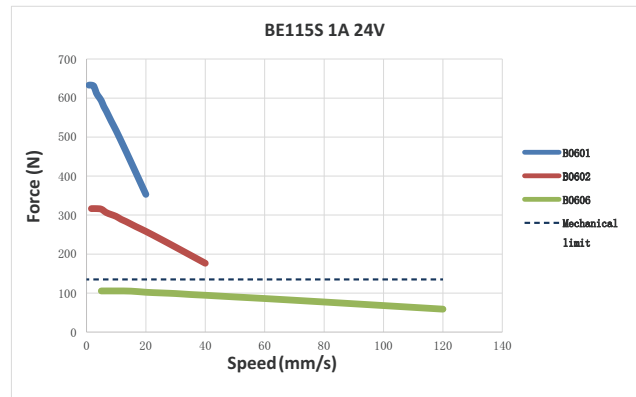
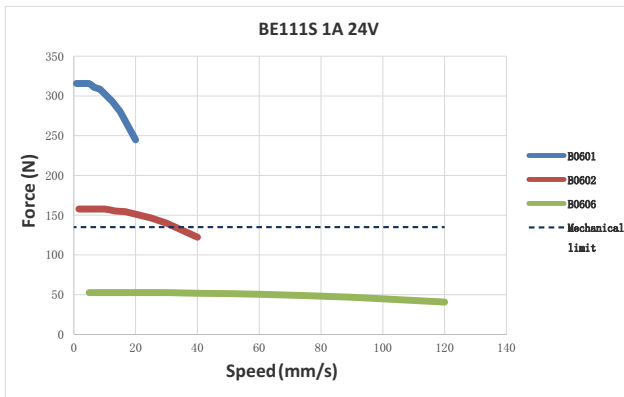
UNIT:mm



Motor Type	Dimension "L"
BE111S	32
BE113S	41
BE115S	52

# BE11 Series

## ■ Speed – Force Reference Curve



Note:

**1. Mechanical Limit Definition:**

Since the motor output may exceed the force which the bearing can bear, so we take the motor bearing limit as the mechanical limit. However, linear motor fatigue and resultant life are determined by each customer's unique application. Load, speed, frequency, temperature, stability of guidance mechanism, etc., should all be considered before choosing a linear motor.

2. The curves are reference values obtained by calculation. The actual output should consider the customer's unique application, including speed, acceleration and deceleration, frequency, stability of guidance mechanism, etc.

# BE14 Series

<b>Phases</b>	2
<b>Step Accuracy</b>	± 5%
<b>Approvals</b>	RoHS
<b>Insulation Class</b>	B ( 130°C )
<b>Operating Temp</b>	0°C ~ +50°C



## Ordering Information

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

Lead Screw Motor Type Code

Code	Structure Type
BE	External Nut Type

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	27.3	1.8
3S	35.3	1.8

Lead Screw Type Code

Code	Nominal Diameter ( mm )	Lead ( mm )	Travel ( mm )	
			Step Angle 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)

Special Custom Type Code

Code	Custom Type
0	No end machining
S	Lead Screw End Machining
B	Add Brake
E	Add Encoder
XX	Other Special Custom Type

Mating Nut Code

Code	Mating Screw
AK	1
	B0801
	B0802
FF	B0805
	B0808

The length of the screw Lx

### Provided in 1 mm increments

Note: Choosing the standard order models can get the sample quickly, please see P9 for standard models.

## Motor Technical Parameters

Motor Type Code	Motor Body Length (mm)	Step Angle ( ° )	Electrical Connection	Rated Current (Amps)
BE141A	28	0.9	Plug In Connector	0.6
BE141S	27.3	1.8	Plug In Connector	0.7
BE143S	35.3			1
			Plug In Connector	0.5
				0.75
			1	
			1.5	

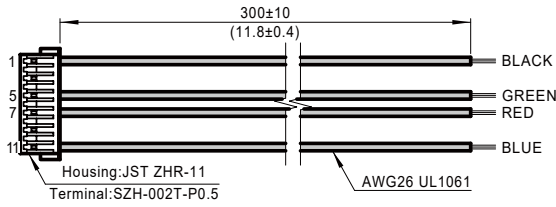
Note: Driver selection recommended P30–P37



# BE14 Series

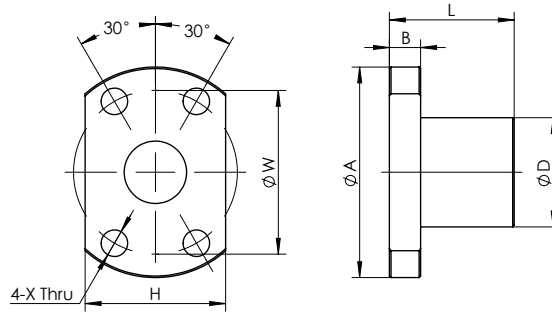
## Mating Connector With Leads

4 Lead Part Number 4634 1402 04581



## Nut Type

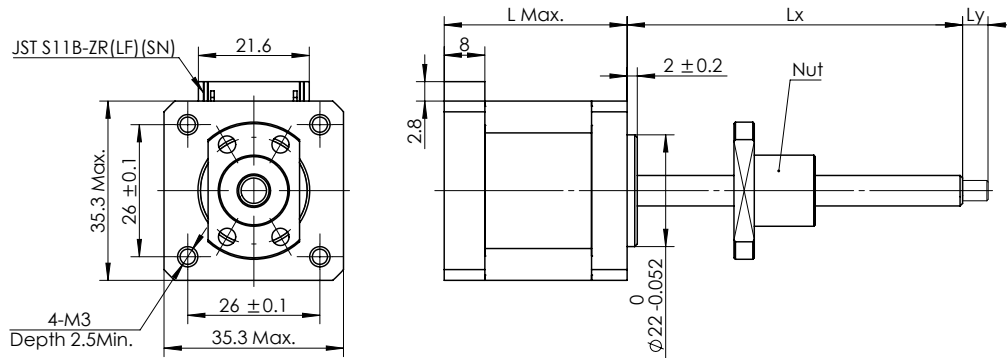
UNIT:mm



Lead Screw Code	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	FF	1	18	31	4	28	25	20	3.4
B0808	FF	1	18	31	4	28	25	20	3.4

## Dimensional Information

UNIT:mm

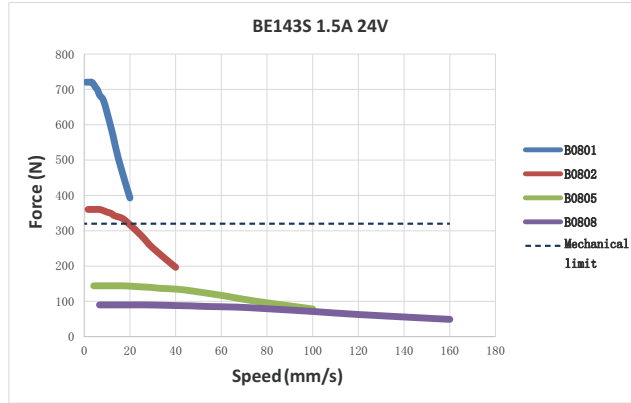
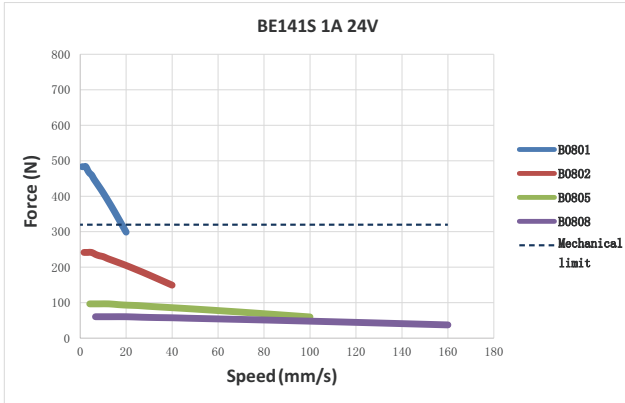


Motor Type	Dimension "L"
BE141A	28
BE141S	27.3
BE143S	35.3

# BE14 Series

BE Series

## ■ Speed – Force Reference Curve



Note:

**1. Mechanical Limit Definition:**

Since the motor output may exceed the force which the bearing can bear, so we take the motor bearing limit as the mechanical limit. However, linear motor fatigue and resultant life are determined by each customer's unique application. Load, speed, frequency, temperature, stability of guidance mechanism, etc., should all be considered before choosing a linear motor.

2. The curves are reference values obtained by calculation. The actual output should consider the customer's unique application, including speed, acceleration and deceleration, frequency, stability of guidance mechanism, etc.

# BE17 Series

<b>Phases</b>	2
<b>Step Accuracy</b>	± 5%
<b>Approvals</b>	RoHS
<b>Insulation Class</b>	B ( 130°C )
<b>Operating Temp</b>	0°C ~ +50°C



## Ordering Information

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

Lead Screw Motor Type Code

Code	Structure Type
BE	External Nut Type

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	
2S	39.8	1.8
6S	48.3	

Lead Screw Type Code

Code	Nominal Diameter ( mm )	Lead ( mm )	Travel ( mm )	
			Step Angle 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
B1005	10	5	0.0125	0.025
B1010	10	10	0.025	0.05

The length of the screw Lx

###	Provided in 1 mm increments

Rated Current Code

XXX=X.XX(A)

Special Custom Type Code

Code	Custom Type
0	No end machining
S	Lead Screw End Machining
B	Add Brake
E	Add Encoder
XX	Other Special Custom Type

Mating Nut Code

	Code	Mating Screw
AK	1	B0801
		B0802
	2	B08025
		B1002
FF	1	B1004
		B0805
	1	B0808
		B1005
		B1010

Note: Choosing the standard order models can get the sample quickly, please see P9 for standard models.

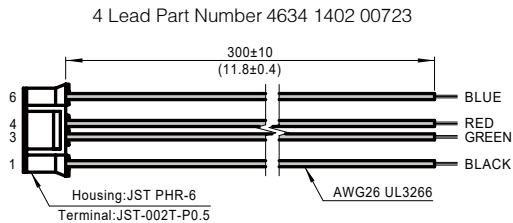
# BE17 Series

## Motor Technical Parameters

Motor Type Code	Motor Body Length (mm)	Step Angle ( ° )	Electrical Connection	Rated Current (Amps)
BE174A	34.3	0.9	Plug In Connector	0.7
BE174S	34.3	1.8	Plug In Connector	0.65
				1
				1.5
BE172S	39.8		Plug In Connector	1
				1.5
BE176S	48.3		Plug In Connector	2
		1		
		1.5		
				2

Note: Driver selection recommended P30–P37

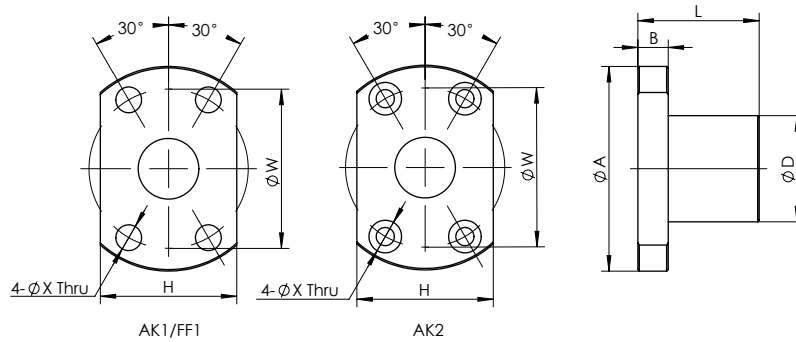
## Mating Connector With Leads



# BE17 Series

## Nut Type

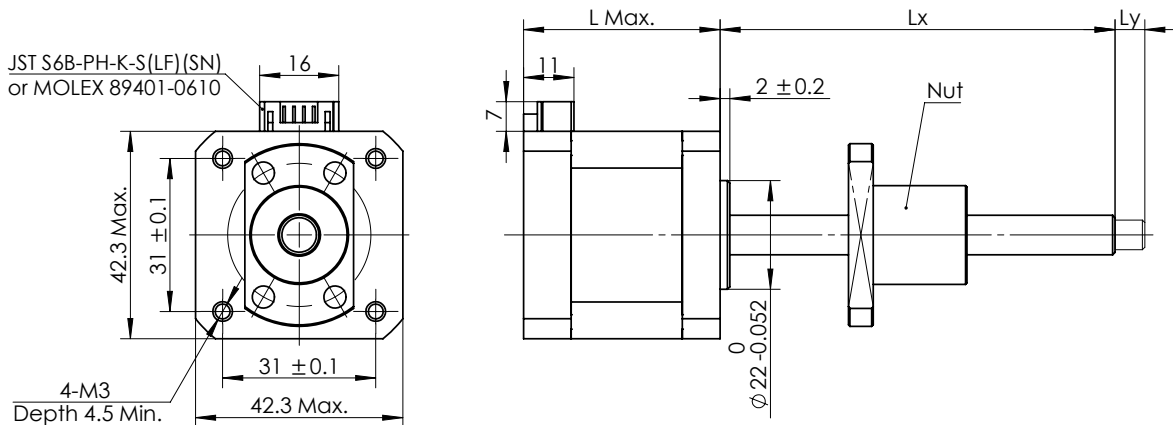
UNIT:mm



Lead Screw Code	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	FF	1	18	31	4	28	25	20	3.4	-	-
B0808	FF	1	18	31	4	28	25	20	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	4.5
B1005	FF	1	22	41	10	32	31	25	4.5	-	-
B1010	FF	1	22	41	10	36	31	25	4.5	-	-

## Dimensional Information

UNIT:mm

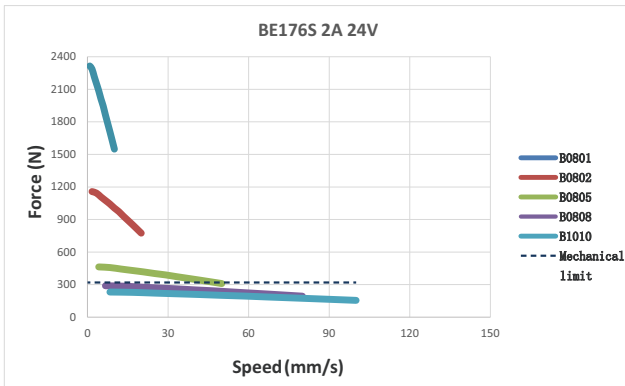
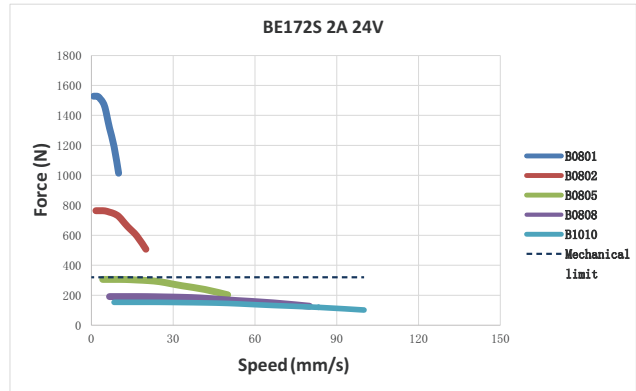
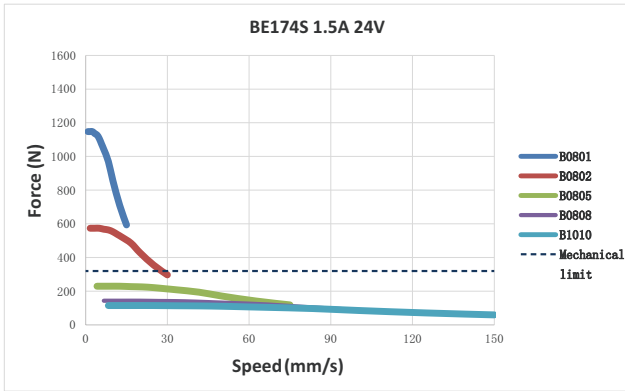


Motor Type	Dimension "L"
BE174A	34.3
BE174S	34.3
BE172S	39.8
BE176S	48.3

# BE17 Series

BE Series

## Speed – Force Reference Curve



**Note:**

**1. Mechanical Limit Definition :**

Since the motor output may exceed the force which the bearing can bear, so we take the motor bearing limit as the mechanical limit. However, linear motor fatigue and resultant life are determined by each customer's unique application. Load, speed, frequency, temperature, stability of guidance mechanism, etc., should all be considered before choosing a linear motor.

2. The curves are reference values obtained by calculation. The actual output should consider the customer's unique application, including speed, acceleration and deceleration, frequency, stability of guidance mechanism, etc.

# BE23 Series

<b>Phases</b>	2
<b>Step Accuracy</b>	± 5%
<b>Approvals</b>	RoHS
<b>Insulation Class</b>	B ( 130°C )
<b>Operating Temp</b>	0°C ~ +50°C



## Ordering Information

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

Lead Screw Motor Type Code

Code	Structure Type
BE	External Nut Type

Frame Size Code

Code	Frame Size
23	57mm

Motor Body Length Code

Code	Motor Body Length Max ( mm )	Step Angle ( ° )
4S	45	1.8
8S	57	
AS	79	
ASP ( Power Plus )	79	

Lead Screw Type Code

Code	Nominal Diameter ( mm )	Lead ( mm )	Travel ( mm )
			Travel Per 1.8°
<b>B1002</b>	10	2	0.01
<b>B1004</b>	10	4	0.02
<b>B1005</b>	10	5	0.025
<b>B1010</b>	10	10	0.05
<b>B1202</b>	12	2	0.01
<b>B1205</b>	12	5	0.025
<b>B1210</b>	12	10	0.05

The length of the screw Lx

###	Provided in 1 mm increments

Rated Current Code

XXX=X.XX(A)

Special Custom Type Code

Code	Custom Type
0	No end machining
S	Lead Screw End Machining
B	Add Brake
E	Add Encoder
XX	Other Special Custom Type

Mating Nut Code

Code	Code	Mating Screw
AK	1	B1002
	2	B1004
FF	1	B1005
		B1010
AA	3	B1205
AV	2	B1210

Note: Choosing the standard order models can get the sample quickly, please see P9 for standard models.

# BE23 Series

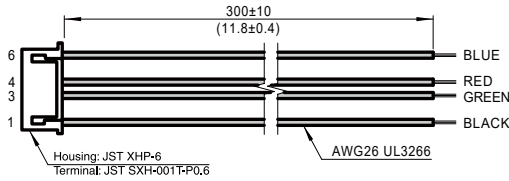
## Motor Technical Parameters

Motor Type Code	Motor Body Length (mm)	Step Angle ( ° )	Electrical Connection	Rated Current (Amps)
BE234S	45	1.8	Plug In Connector	1.5
				2.1
BE238S	57		Plug In Connector	1.5
				2.2
BE23AS	79		Plug In Connector	1.5
BE23ASP ( Power Plus )	79		Plug In Connector	3
				3

Note: Driver selection recommended P30–P37

## Mating Connector With Leads

4 Lead Part Number 4634 1402 01891

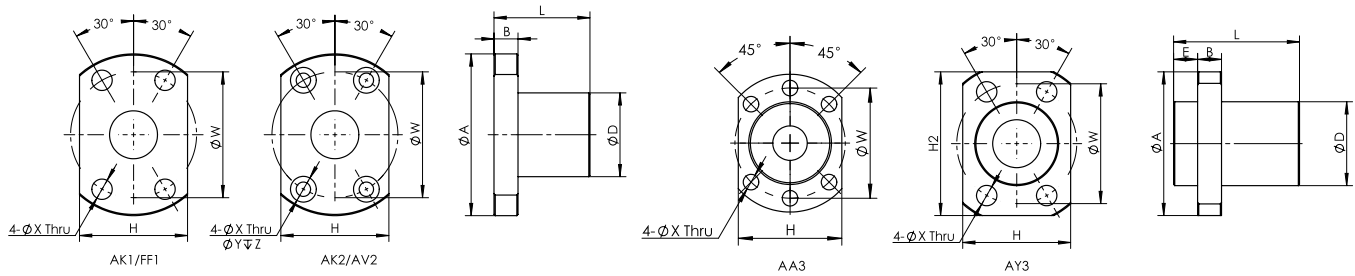




# BE23 Series

## Nut Type

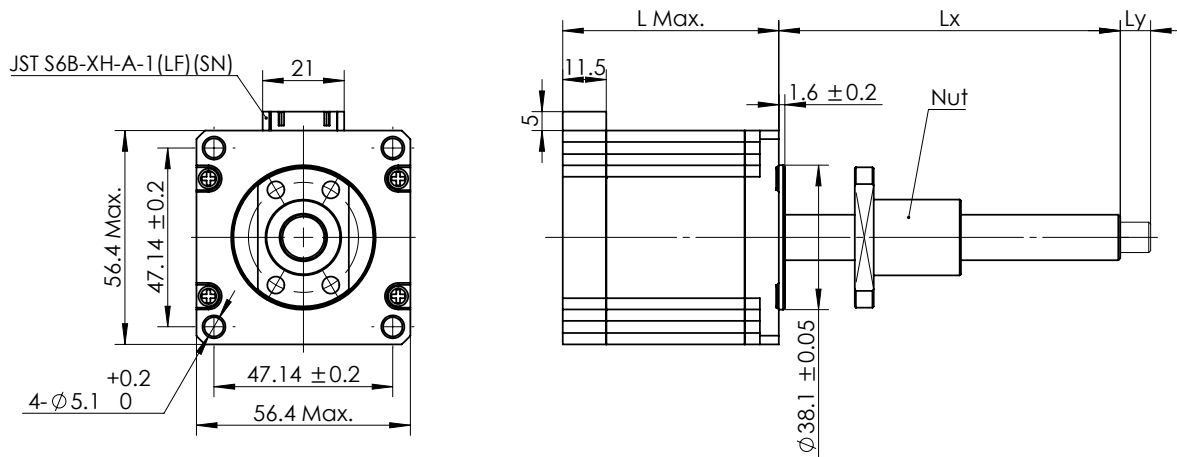
UNIT:mm



Lead screw type	Nut Code		D	A	E	B	L	W	H	H2	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
B1005	FF	1	22	41	-	10	32	31	25	-	4.5	-	-
B1010	FF	1	22	41	-	10	36	31	25	-	4.5	-	-
B1202	AK	1	20	37	-	5	28	29	24	-	4.5	-	-
B1205	AA	3	24	40	5	10	30	32	30	-	4.5	-	-
B1210	AV	2	30	50	-	10	53	40	32	-	4.5	8	4.5

## Dimensional Information

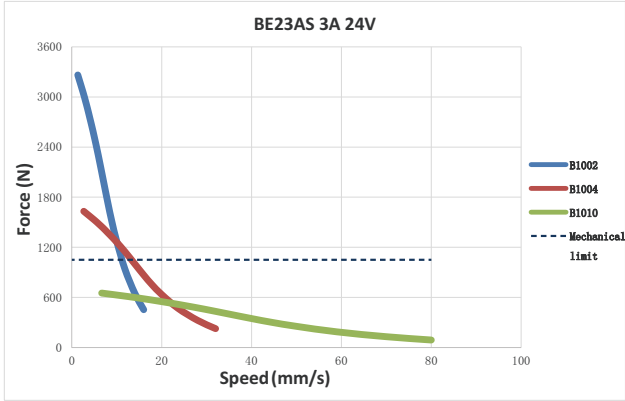
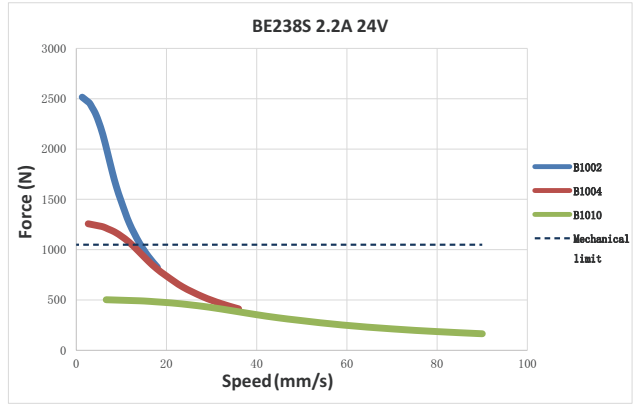
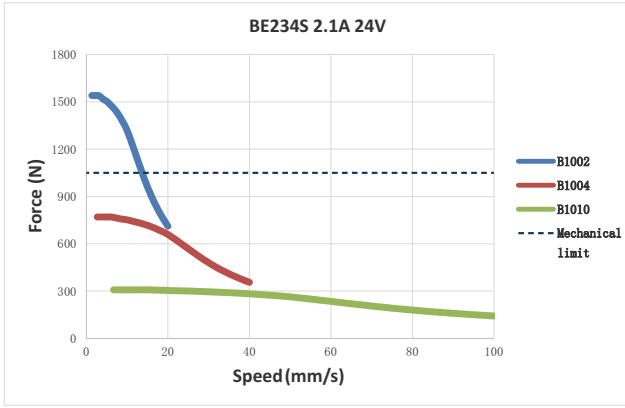
UNIT:mm



Motor Type	Dimension "L"	Note
BE234	45	Standard
BE238S	57	Standard
BE23AS	79	Standard
BE23ASP	79	Power Plus

# BE23 Series

## Speed – Force Reference Curve



**Note:**

**1.Mechanical Limit Definition :**

Since the motor output may exceed the force which the bearing can bear, so we take the motor bearing limit as the mechanical limit. However, linear motor fatigue and resultant life are determined by each customer’s unique application. Load, speed, frequency, temperature, stability of guidance mechanism, etc., should all be considered before choosing a linear motor.

2.The curves are reference values obtained by calculation. The actual output should consider the customer’s unique application, including speed, acceleration and deceleration, frequency, stability of guidance mechanism, etc.

# Encoder Options-Be suitable for applications that requiring feedback

## Parameter

Mating Motor	Supply Voltage (VDC)			CPR	PPR	Output	
	Min.	Typ.	Max.				
BE08/11	4.5	5	5.5	400	1600	Single-ended Electrical	Differential Electrical
BE14/17/23				1000	4000		



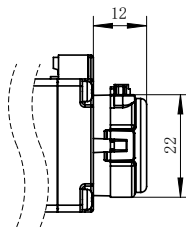
BE11 with encoder



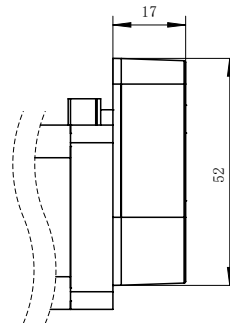
BE17 with encoder

## Dimensional Information

Unit: mm



The encoder mating BE08/11

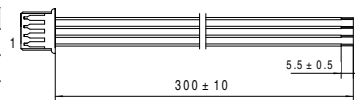


The encoder mating BE14/17/23

## Mating Connector With Leads

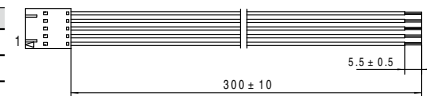
### Single-ended Electrical

Pin	Function	Color
1	+5VDC Power	Black
2	A Channel	Green
3	Ground	Red
4	B Channel	Blue



For the encoder mating BE08/11  
Part Number: 4634140206404

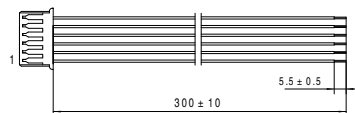
Pin	Function	Color
1	Ground	Black
2	Index	Green
3	A Channel	Red
4	+5VDC Power	Blue
5	B Channel	Yellow



For the encoder mating BE14/17/23  
Part Number: 4634140206402

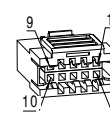
### Differential Electrical

Pin	Function	Color
1	Ground	Black
2	A+Channel	Green
3	A- Channel	Red
4	Power	Blue
5	B+Channel	Yellow
6	B- Channel	White



For the encoder mating BE08/11  
Part Number: 4634140206403

Pin	Function	Color
1	-	-
2	Ground	Black
3	I- Channel	Green
4	I+Channel	Red
5	A- Channel	Blue
6	A+Channel	Yellow
7	Power	White
8	-	-
9	B- Channel	Orange
10	B+Channel	Brown



For the encoder mating BE14/17/23  
Part Number: 4634140206405

# Brake Options

## Parameter

Mating Motor	Supply Voltage (VDC)	Braking Torque (N·M)	Power (W)	Reaction Time (ms)	Insulation Grade
BE11	24	0.3	4.8	15	B
BE14	24	0.3	4.8	15	B
BE17	24	1.2	4.5	50	B
BE23	24	2.5	4.5	50	B

**Note:**

1. All the brakes with 280mm leads.
2. 12 VDC brake options are available, please consult our technical department for further information.



BE11 with brake



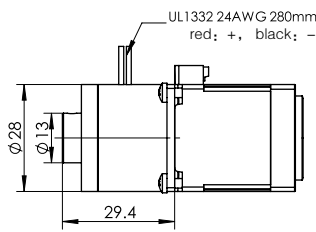
BE17 with brake



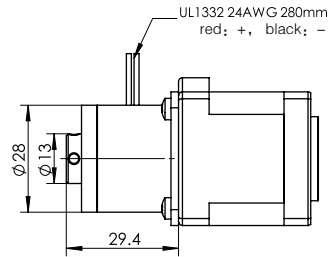
BE23 with brake

## Dimensional Information

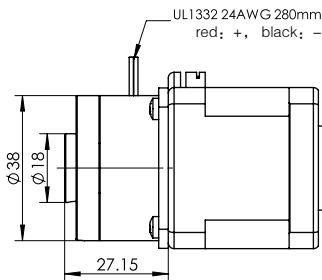
Unit: mm



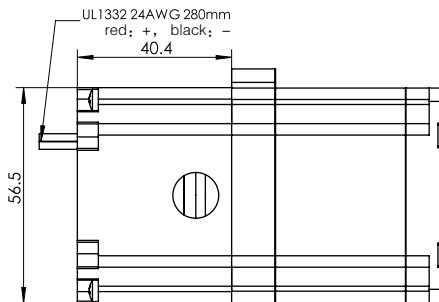
The brake mating BE11



The brake mating BE14



The brake mating BE17



The brake mating BE23

## Optional Construction & Modifications

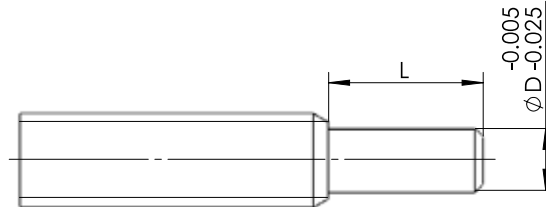
MOONS' has provided multiple custom design to fit the application needs of designers.

Typical product customization includes:

- Lead screws: screws length, screw end machining and so on.
- Nut: basic style, materials, lengths, mounting and so on.

Note: Choosing a standard configuration can significantly reduce delivery times.

### ■ Lead Screw End Machining



Lead Screw Nominal Diameter (mm)	Dimension	
	D(mm)	L(mm)
4	2.5	2.5
6	4	5
8	6	6
10	6	6
12	8	8

## Integrated Slides Customization

MOONS' Linear Slides are designed to fit the requirement of customer for compact structure. These products provide many advantages such as high integration, small size, quieter operation, stable product quality and lower cost, which not only provide the best performance but also easier to use, to help customers shorten the cycle of new products development and the time of system assembly in the mass production process (labor cost), so as to reduce the overall cost.



MS28 Series



MS35 Series



MS42 Series

# DC Input Stepper Drive-SR Series

## SR Series Drives

The SR series are compact, powerful, digital stepper drives feature advanced microstepping performance and sophisticated current control. All drive setup is done via dip or rotary switches.

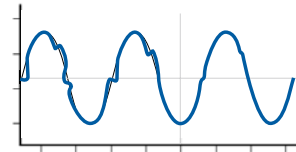
- **Advanced Current Control**
- **Torque Ripple Smoothing**
- **Self Test**
- **Anti-Resonance**
- **Microstep Emulation**



## ■ Features

### Anti-Resonance

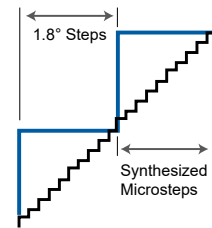
Step motor systems have a natural tendency to resonate at certain speeds. The SR drives automatically calculate the system's natural frequency and apply damping to the control algorithm. This greatly improves midrange stability, allows higher speeds and greater torque utilization, and also improves settling times.



**Provides better motor performance and higher speeds**

### Microstep Emulation

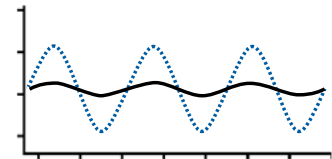
With Microstep Emulation, low resolution systems can still provide smooth motion. The drive can take low resolution step pulses and create fine resolution motion.



**Delivers smoother motion in any application**

### Torque Ripple Smoothing

All step motors have an inherent low speed torque ripple that can affect the motion profile of the motor. By analyzing this torque ripple the system can apply a negative harmonic to counter this effect. This gives the motor much smoother motion at low speed.



**Produces smoother motion at low speeds**

### Command Signal Smoothing

Command Signal smoothing can soften the effect of immediate changes in velocity and direction, making the motion of the motor less jerky. An added advantage is that it can reduce the wear on mechanical components.

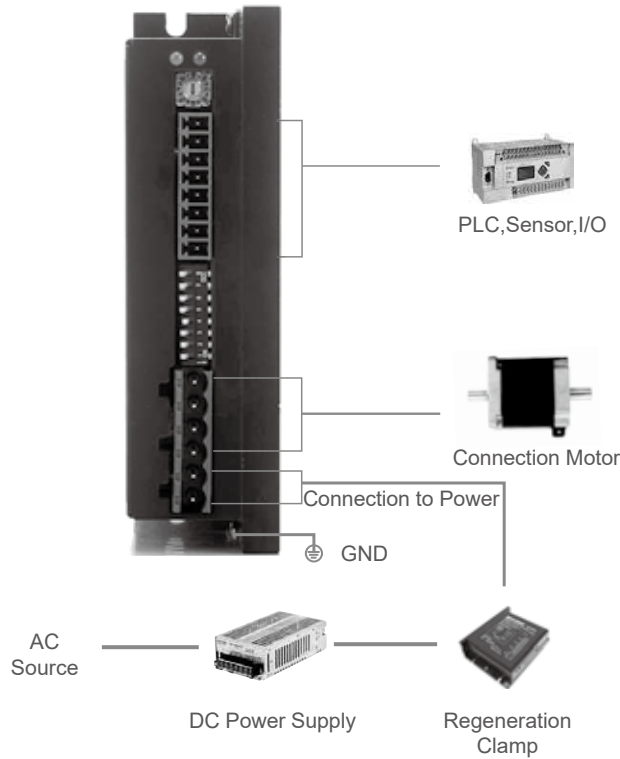


**Improves overall system performance**

### Auto Setup & Self Test

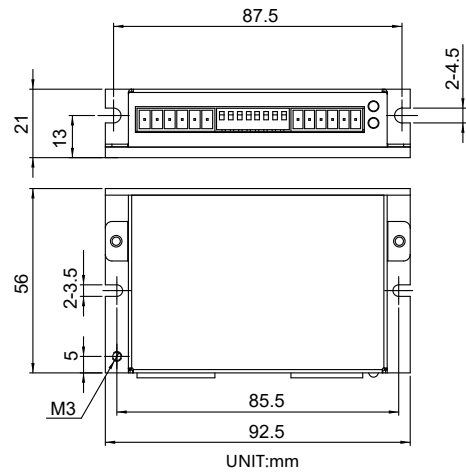
At start-up the drive measures motor parameters, including the resistance and inductance, then uses this information to optimize system performance. The drive can also detect open and short circuits.

## System Configuration

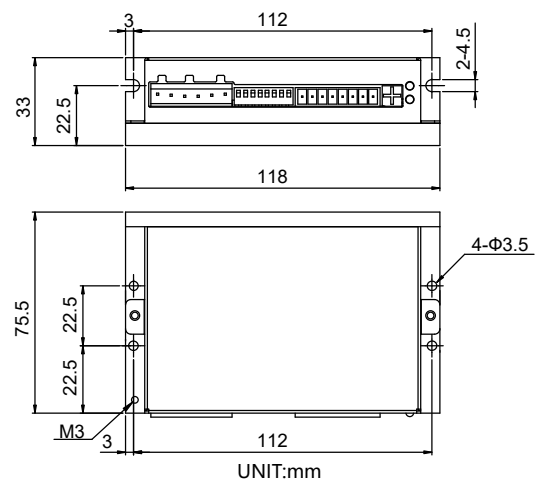


## Dimensional Information UNIT:mm

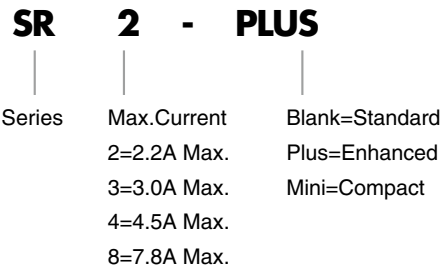
SR2-Plus



SR4/8-Plus



## Numbering System



## Ordering Information

Model	Current	Voltage	Microstep Selection	Current Selection
SR2-Plus	0.3-2.2A	12-48VDC	16	8
SR3-mini	0.4-3.0A	12-48VDC	16	8
SR4-Plus	1.0-4.5A	24-48VDC	16	8
SR8-Plus	2.4-7.8A	24-75VDC	16	8

## ■ Drive Specifications

Specification	
Speed Range	Up to 3000RPM
Operating Temperature	0 - 40C°
Ambient Humidity	90% or less(non-condensing)
Vibration Resistance	5.9m/s <sup>2</sup> maximum
Storage Temperature	-10 - 70C°
Heat Sinking Method	Natural cooling or fan-forced cooling
Atmosphere	Avoid dust, oily mist and corrosive air
Mass	SR2-Plus/SR3-mini: Approx. 120g
	SR4/8-Plus: Approx. 310g
Certification	RoHS , CE (EMC): EN 61800-3:2004
Features	
Idle Current	Automatic idle current reduction to reduce heat after motor stops moving for 1 second Dip switch selectable 50% or 90%
Anti-Resonance	Raises the system-damping ratio to eliminate midrange instability and allow stable operation throughout the speed range of the motor, dip switch selectable load inertia
Control Mode	Pulse input control Step&Dir
Inupt Signal Filter	Digital filters prevent position error from electrical noise on command signals, Dip switch selectable 2MHz or 150KHz
Microstep Emulation	Switch selectable microstep emulation provides smoother, more reliable motion
Motor Database	Rotary switch easily selects from many popular motors
Self Test	Switch selectable automatic self test, while self test, drive will rotate the motor back and forth, two turns in each direction
Fault output	Optically isolated,30VDC max, 100mA max

## ■ Electrical Specifications

### SR2-Plus

Parameter	Min.	Typical	Max.	UNIT
Power Supply	12	-	42	VDC
Output Current (Peak)	0.3	-	2.2	Amps
Cost current of digital input signal	6	10	15	mA
Step Frequency	2	-	2M	Hz
STEP minimum pulse width	250	-	-	ns
DIR minimum pulse width	80	-	-	us
Under Voltage Protection	-	10	-	VDC
Over Voltage Protection	-	52	-	VDC
Input Signal Voltage	4	-	28	VDC
Initialization time	-	-	2.5	S
OUT maximum output current	-	-	100	mA
OUT maximum voltage	-	-	30	VDC

### SR4-Plus

Parameter	Min.	Typical	Max.	UNIT
Power Supply	24	-	48	VDC
Output Current (Peak)	1	-	4.5	Amps
Cost current of digital input signal	6	10	15	mA
Step Frequency	2	-	2M	Hz
STEP minimum pulse width	250	-	-	ns
DIR minimum pulse width	80	-	-	us
Under Voltage Protection	-	20	-	VDC
Over Voltage Protection	-	60	-	VDC
Input Signal Voltage	4	-	28	VDC
Initialization time	-	-	2.5	S
OUT maximum output current	-	-	100	mA
OUT maximum voltage	-	-	30	VDC

### SR3-mini

Parameter	Min.	Typical	Max.	UNIT
Power Supply	12	-	48	VDC
Output Current (Peak)	0.4	-	3	Amps
Cost current of digital input signal	6	10	15	mA
Step Frequency	2	-	500K	Hz
STEP minimum pulse width	1000	-	-	ns
DIR minimum pulse width	80	-	-	us
Under Voltage Protection	-	10	-	VDC
Over Voltage Protection	-	53	-	VDC
Input Signal Voltage	4	-	28	VDC
Initialization time	-	-	2.5	S

### SR8-Plus

Parameter	Min.	Typical	Max.	UNIT
Power Supply	24	-	75	VDC
Output Current (Peak)	2.4	-	7.8	Amps
Cost current of digital input signal	6	10	15	mA
Step Frequency	2	-	2M	Hz
STEP minimum pulse width	250	-	-	ns
DIR minimum pulse width	80	-	-	us
Under Voltage Protection	-	20	-	VDC
Over Voltage Protection	-	85	-	VDC
Input Signal Voltage	4	-	28	VDC
Initialization time	-	-	2.5	S
OUT maximum output current	-	-	100	mA
OUT maximum voltage	-	-	30	VDC



# DC Input Intelligent Fieldbus Control Stepper Driver-STF Series

## STF Series Drives

The STF series are high performance fieldbus control stepper drive which also integrates with built-in motion controller. The drives can be controlled by SCL, Modbus, CANopen, eSCL, EtherNet/IP or EtherCAT in real time. Motion profiles can also be programmed and stored in drives(Q Program) and then be triggered by fieldbus commands.



- Compact size
- Anti resonance
- Advanced current control
- Torque ripple smoothing

## Feature

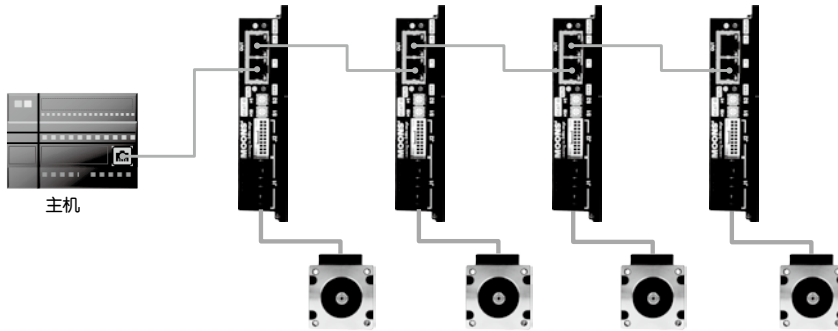
### Host Control

- Accepts commands from host PC or PLC
- Real time control
- Multi-axes capable



### Stand Alone Programmable

- Stored program execution
- Multi-tasking
- Conditional processing
- Math functions
- Data registers



### Safe & convenient

- Support communication and motor power cables disconnected protection
- Make equipments more safer
- Support on-line configuration by fieldbus
- Make operation more convenient

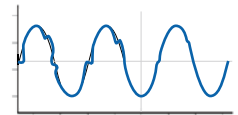
### Rich and flexible I/O

- 8 Digital Inputs, 4 Digital Outputs
- Support for more feature settings
- Dual Port RJ45 Bus Communication Control
- Support daisy chain connection

### Anti-Resonance

Step motor systems have a natural tendency to resonate at certain speeds. The STF drives automatically calculate the system's natural frequency and apply damping to the control algorithm. This greatly improves midrange stability, allows higher speeds and greater torque utilization, and also improves settling times.

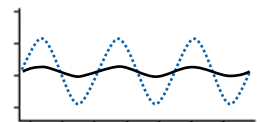
Provides better motor performance and higher speeds



### Torque Ripple Smoothing

All step motors have an inherent low speed torque ripple that can affect the motion profile of the motor. By analyzing this torque ripple the system can apply a negative harmonic to counter this effect. This gives the motor much smoother motion at low speed.

Produces smoother motion at low speed running

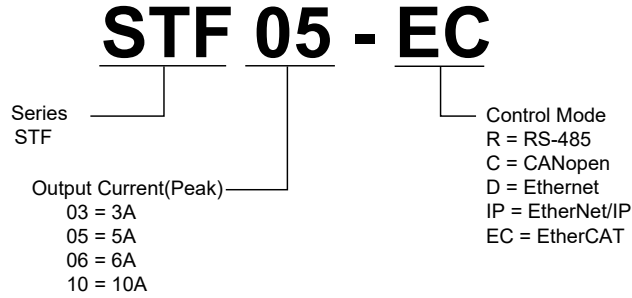


### Auto Setup & Self Test

At start-up the drive measures motor parameters, including the resistance and inductance, then uses this information to optimize the system performance. The drive can also detect open and short circuits.

# DC Input Intelligent Fieldbus Control Stepper Driver-STF Series

## ■ Numbering System



## ■ Ordering Information

Model	Current	Voltage	RS-485	Modbus/RTU	CANopen	Q Program
STF03-R	0.1 – 3.0 A	12 – 48 VDC	✓	✓		✓
STF05-R	0.1 – 5.0 A	24 – 48 VDC	✓	✓		✓
STF06-R	0.1 – 6.0 A	12 – 48 VDC	✓	✓		✓
STF10-R	0.1 – 10.0 A	24 – 70 VDC	✓	✓		✓
STF03-C	0.1 – 3.0 A	12 – 48 VDC			✓	✓
STF05-C	0.1 – 5.0 A	24 – 48 VDC			✓	✓
STF06-C	0.1 – 6.0 A	12 – 48 VDC			✓	✓
STF10-C	0.1 – 10.0 A	24 – 70 VDC			✓	✓

Model	Current	Voltage	Ethernet	Modbus/TCP	EtherNet/IP	EtherCAT	Q Program
STF03-D	0.1 – 3.0 A	12 – 48 VDC	✓	✓			✓
STF05-D	0.1 – 5.0 A	24 – 48 VDC	✓	✓			✓
STF06-D	0.1 – 6.0 A	12 – 48 VDC	✓	✓			✓
STF10-D	0.1 – 10.0 A	24 – 70 VDC	✓	✓			✓
STF03-IP	0.1 – 3.0 A	12 – 48 VDC	✓		✓		✓
STF05-IP	0.1 – 5.0 A	24 – 48 VDC	✓		✓		✓
STF06-IP	0.1 – 6.0 A	12 – 48 VDC	✓		✓		✓
STF10-IP	0.1 – 10.0 A	24 – 70 VDC	✓		✓		✓
STF03-EC	0.1 – 3.0 A	12 – 48 VDC				✓	✓
STF05-EC	0.1 – 5.0 A	24 – 48 VDC				✓	✓
STF06-EC	0.1 – 6.0 A	12 – 48 VDC				✓	✓
STF10-EC	0.1 – 10.0 A	24 – 70 VDC				✓	✓

# DC Input Intelligent Fieldbus Control Stepper Driver-STF Series

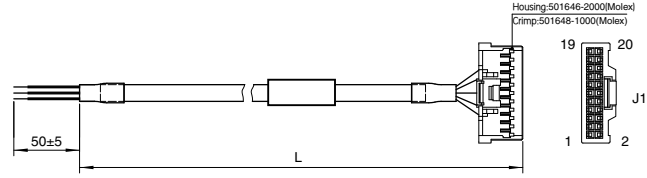
## ■ Drive Specifications

Power Amplifier	
Amplifier Type	Dual H-Bridge, 4 Quadrant
Current Control	PWM at 20 KHz
Output Current	STF03: 0.1 - 3.0A/phase (peak-of-sine) in 0.01 amp increments
	STF05: 0.1 - 5.0A/phase (peak-of-sine) in 0.01 amp increments
	STF06: 0.1 - 6.0A/phase (peak-of-sine) in 0.01 amp increments
	STF10: 0.1 - 10.0A/phase (peak-of-sine) in 0.01 amp increments
Input Voltage Range	STF03: 12 - 48VDC
	STF05: 24 - 48VDC
	STF06: 12 - 48VDC
	STF10: 24 - 70VDC
Maximum Input Voltage Range	STF03: 11 - 53VDC
	STF05: 18 - 53VDC
	STF06: 11 - 53VDC
	STF10: 18 - 75VDC
Protection	Over voltage, under voltage, over temp, over current, open winding, communication cable disconnection
Idle Current Reduction	Reduction range of 0 - 90% of running current after a delay selectable in milliseconds
Controller	
Anti-Resonance	Raises the system-damping ratio to eliminate midrange instability and allow stable operation throughout the speed range of the motor
Torque Ripple Smoothing	Allows for fine adjustment of phase current waveform harmonic content to reduce low-speed torque ripple in the range of 0.25 to 1.5 rps
Auto Test & Auto Setup	Auto test and setup at power on (ie. motor resistance and Inductance) to optimize your system performance.
Non-Volatile Storage	Configurations are saved in FLASH memory on-board the DSP
Operation Mode	-R Type: SCL, Q, Modbus/RTU
	-C Type: CANopen (CiA301 and CiA402 protocol). Q program can also be triggered via CANopen Command
	-D Type: eSCL, Q, Modbus/TCP
	-IP Type: EtherNet/IP, Q program also can be triggered via EtherNet/IP Command
	-EC Type: EtherCAT (CoE) with full support of CiA402, Support PP, PV, CSP&HM mode and Q mode
Digital Input	8 digital inputs
	X1, X2: Optically isolated, differential, 5-24VDC for high level voltage, minimum pulse width = 250ns, maximum pulse frequency = 2MHz
	X3, X4: Optically isolated, differential, 5-24VDC for high level voltage, minimum pulse width = 100µs, maximum pulse frequency = 5KHz
	X5 - X8: Optically isolated, single-ended, 5-24VDC for high level voltage, minimum pulse width = 100µs, maximum pulse frequency = 5KHz
Digital Output	4 digital outputs
	Y1 ~ Y4: Optically isolated, maximum voltage 30V, maximum sinking or sourcing current 100mA
Communication Port	-R Type: Dual port RS-485 (RJ45 connector)
	-C Type: Dual port CANopen (RJ45 connector) RS-232 included
	-D Type: Dual port Ethernet (RJ45 connector)
	-IP Type: Dual port Ethernet (RJ45 connector)
	-EC Type: Dual port Ethernet(RJ45 connector)and RS-232(RS-232 serial port for configuration)
Physical	
Ambient Temperature	0 - 40°C when mounted to a suitable heat sink
Humidity	90% non-condensing
Mass	STF03: 0.36kg
	STF05: 0.4kg
	STF06: 0.36kg
	STF10: 0.4kg

# DC Input Intelligent Fieldbus Control Stepper Driver-STF Series

## I/O Cable

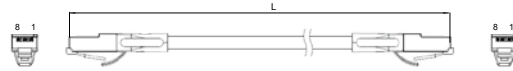
P/N	Length (L)
1015-030	0.3m
1015-100	1m
1015-200	2m



Pin No.	Assignment	Description	Color	Pin No.	Assignment	Description	Color
1	X1+	X1 Digital Input	Blue/White	11	X7	X7 Digital Input	Yellow
2	X1-		Blue/Black	12	X8	X8 Digital Input	Green
3	X2+	X2 Digital Input	Green/White	13	SHIELD	Shield	Shield
4	X2-		Green/Black	14	XCOM	X5-X8 Digital Input COM	Red
5	X3+	X3 Digital Input	Yellow/White	15	Y1	Y1 Digital Output	Brown
6	X3-		Yellow/Black	16	Y2	Y2 Digital Output	Gray
7	X4+	X4 Digital Input	Orange/White	17	Y3	Y3 Digital Output	White
8	X4-		Orange/Black	18	YCOM	Y1-Y3 Digital Output COM	Black
9	X5	X5 Digital Input	Blue	19	Y4+	Y4 Digital Output	Purple/White
10	X6	X6 Digital Input	Purple	20	Y4-		Purple/Black

## Bus Communication Daisy Chain Cable

Common Type	Shielded Type	Length (L)
2012-030 *	2013-030	0.3m
2012-300	2013-300	3m



\* 2012-030 is included in the drive package.

## RC-880 Regeneration Clamp

RC-880 can clamp the regeneration and prevent the power supply and/or drive being damaged or destroyed. Connect the RC-880 between the power supply and the drive.

Max. Supply Voltage: 80V

Max. Output Current: 8A(rms)

Continuous Power: 50W

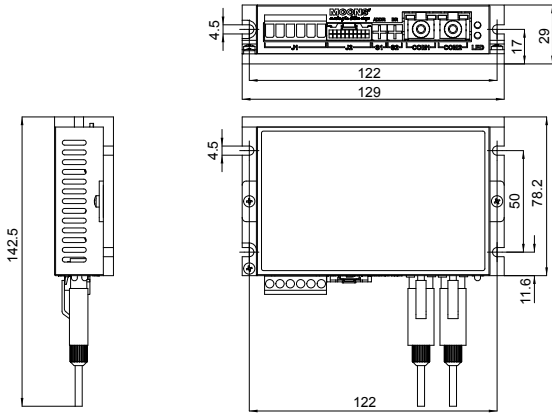


# DC Input Intelligent Fieldbus Control Stepper Driver-STF Series

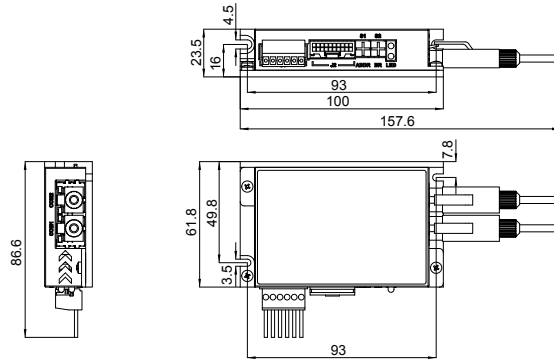
## ■ Ordering Information

UNIT:mm

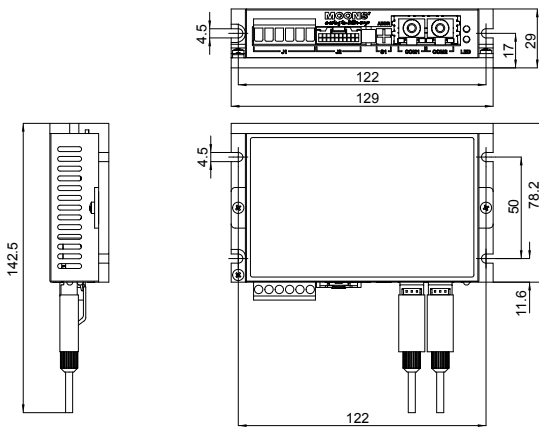
STF05/10-R, STF05/10-C



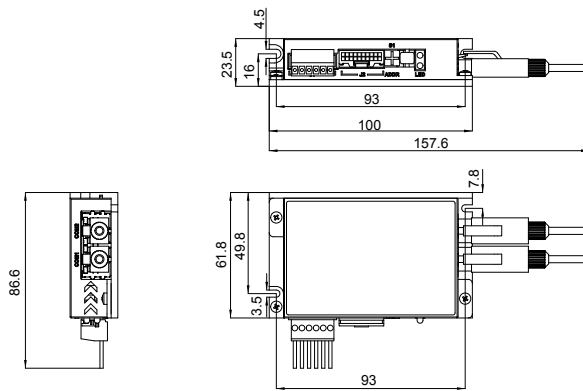
STF03/06-R, STF03/06-C



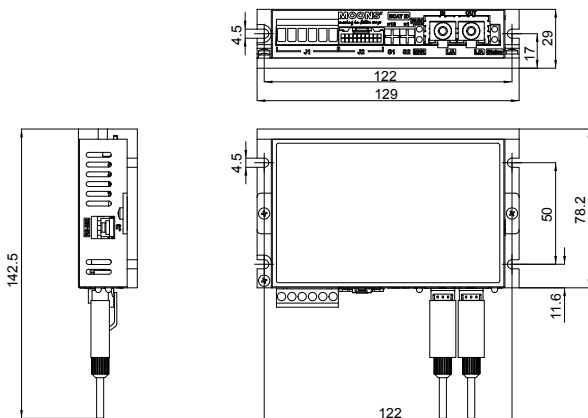
STF05/10-D, STF05/10-IP



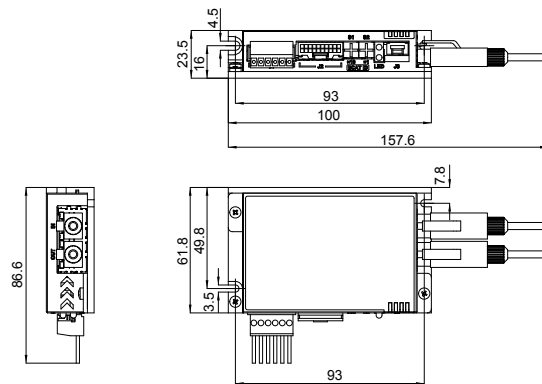
STF03/06-D, STF03/06-IP



STF05/10-EC



STF03/06-EC



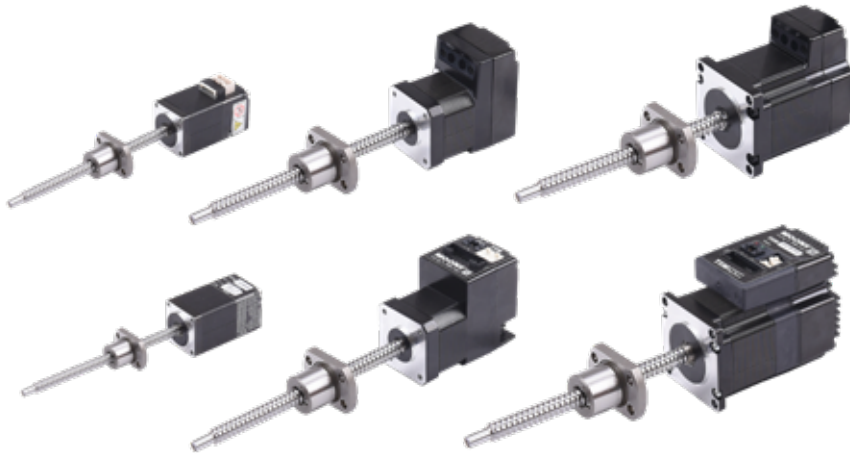
# Linear Intelligent Motors – Mating ball screws

The linear Intelligent motors integrate ball screw, drive, encoder and controller into stepper motors, providing customers with an all-in-one solution. According to the different combination of drives, it can be divided into: TSM series(drivers integrated) & AM series(drivers separated). Compared with the ordinary linear step motors, these products run in higher efficiency and more intelligent.

- 3 frame sizes: NEMA11,17,23
- Each size has multiple lead screw options
- Standardized product models for quick response

MOONS' has committed to product innovation design and technical improvement, with excellent product quality, application technology, fast and flexible services, which provide customers with high level motion control solutions.

Linear Intelligent Motors



## ■ Numbering System

**TSM23Q-2RG - B1002 - 100 - AK1 - 0 - XXX**

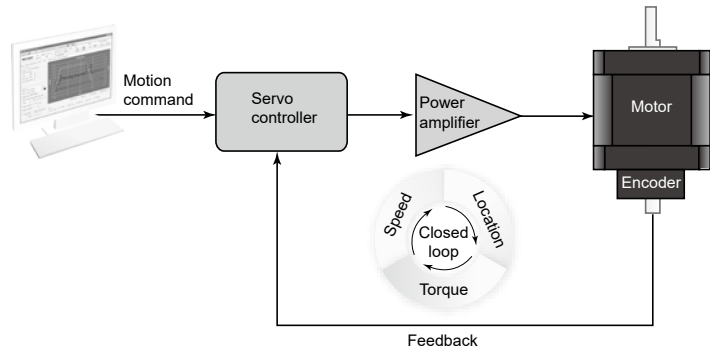
①	②	③	④	⑤	⑥
Motor type	Lead screw type	Screw length ( mm )	Nut type	Customized Code	Rated Current
				S=Screw End Machining	XXX=X.XX(A)

# Linear Intelligent Motors – Mating ball screws

## ■ Features

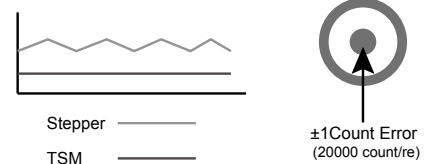
### Closed-loop Step-Servo mode

- Precisely position and velocity control can match the harsh applications.
- Highly robust servo control accommodates a wide range of inertial loads and friction load changes.
- The TSM17/23 achieve precise positioning to within  $\pm 1$  count ( $0.018^\circ$ ) using a high resolution (20000 counts/rev) encoder.
- The TSM11 achieves precise positioning to within  $\pm 1$  count ( $0.2^\circ$ ) using a high resolution (4096 counts/rev) encoder.



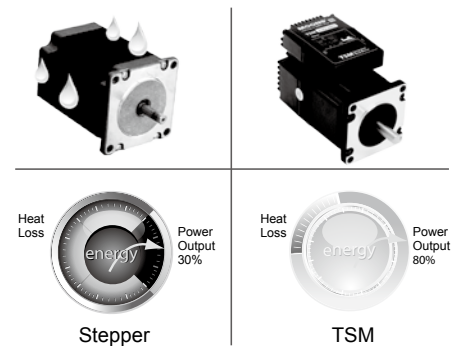
### Smooth & Accurate

- Space vector current control with a high resolution encoder gives smooth and quiet operation, especially at low speeds  
--A feature not found with traditional stepper motors.
- High stiffness due to the nature of the stepping motor combined with the highly responsive servo control.  
--Accurate position control both while running and static positioning.

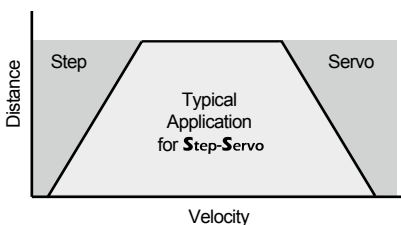


### Low Heating / High Efficiency

- The TSM uses only the current required by the application, generating minimum heat output.
- When the motor is not moving, the current can be nearly zero resulting in extremely low heat output.
- Being able to use almost 100% of the available torque allows for more efficient operation and may allow a smaller motor size.



### Fast Response

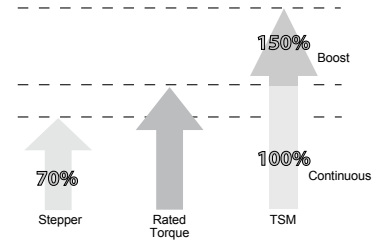


When performing fast point-to-point moves, the high torque output and advanced servo control provides a very responsive system far exceeding what can be done with a conventional stepper system.

# Linear Intelligent Motors – Mating ball screws

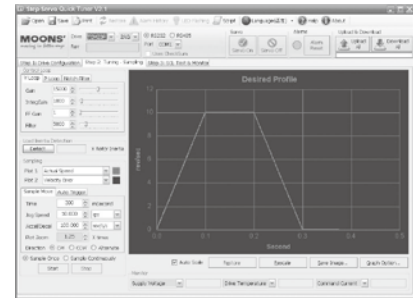
## High Torque

- Because the TSM operates in full servo mode, all the available torque of the motor can be used.
- The motor can provide as much as 50% more torque in many applications. High torque capability often eliminates the need for gear reduction.
- Boost torque capability can provide as much as 50% more torque for short, quick moves.

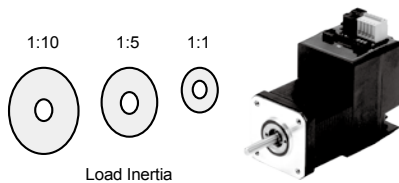


## Motion Monitoring

- For applications where extreme real-time motion is critical, the Step-Servo Quick Tuner provides a simple and practical tool for monitoring actual motion trajectories.
- It can be used to monitor common metrics such as actual velocity and position error to assess the current actual performance of the system.
- An interactive monitoring and tuning interface provides the fastest possible performance output.



## Easy Tuning



- Pre-defined tuning parameters quickly allow maximum control performance and stability.
- A selection list provides an easy method to achieve the desired level of control.
- In most cases NO extra manual tuning is required.

## Key Enhancement

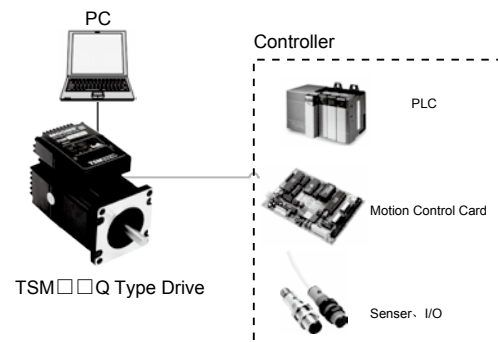
- A/B/Z differential encoder signal output supported for P type (TSM17/23 only)
- Automatic load inertia detection
- Multiple homing features for S/Q types
- Software limit for S/Q types

## Built-in programmable motion controller(Includes Modbus/RTU Type)

Run stand-alone with sophisticated and functional programs. Commands for controlling motion, inputs & outputs, drive configuration and status, as well as math operations, register manipulation, and multi-tasking.

### Main Features

- Stand-alone operation plus Serial host control
- Math operations
- Register manipulation
- Multi-tasking
- Includes all features of S type
- Modbus/RTU network, up to 32 axes per channel





# Configuration Table

Nominal Diameter ( mm )	Lead ( mm )	Lead screw type	Motor Options		
			TSM11/AM11	TSM17/AM17	TSM23/AM23
6	1	B0601	⊙		
6	2	B0602	⊙		
6	6	B0606	⊙		
6	12	B0612	⊙		
8	1	B0801		⊙	
8	2	B0802		⊙	
8	2.5	B08025		⊙	
8	5	B0805		⊙	
8	8	B0808		⊙	
10	2	B1002		⊙	⊙
10	4	B1004		⊙	⊙
10	5	B1005		⊙	⊙
10	10	B1010		⊙	⊙
12	2	B1202			⊙
12	5	B1205			⊙
12	10	B1210			⊙

Linear Intelligent Motors

Note: Only marked with “ ⊙ ” is available, for more configurations please contact with MOONS'.

# TSM/AM Series Standard Models for stock

Linear Intelligent Motors

Size mm	Motor Series	Lead Screw Options	Screw Length Options	Nut Options	End Machining Code	Page	
28X28	TSM11Q-2RM	B0601	55, 65, 75, 90, 105, 115, 130, 150, 170, 190, 210, 230, 255	AK1	0, S	P43	
		B0602		FF1			
		B0606					
	AM11RS2DMA	B0601		55, 65, 75, 90, 105, 115, 130, 150, 170, 190, 210, 230, 255	AK1		0, S
		B0602			FF1		
		B0606					
42X42	TSM17Q-2RG	B0801	65, 75, 90, 95, 105, 120, 135, 150, 165, 185, 205, 230, 265, 290, 320, 355	AK1	0, S	P46	
		B0802					
		B0805		FF1			
		B0808					
	AM17RS2DMA	B0801		65, 75, 90, 95, 105, 120, 135, 150, 165, 185, 205, 230, 265, 290, 320, 355	AK1		0, S
		B0802					
		B0805			FF1		
		B0808					
57X57	TSM23Q-2RG	B1002	105, 120, 140, 155, 165, 180, 200, 225, 250, 285, 320, 375, 395	AK1	0, S	P50	
		B1004		AK2			
		B1010		FF1			
	AM23RS2DMA	B1002		105, 120, 140, 155, 165, 180, 200, 225, 250, 285, 320, 375, 395	AK1		0, S
		B1004			AK2		
		B1010			FF1		

Note: Nominal diameter 6mm, Screw length < 115mm, no end machining; Screw length ≥ 115mm, standard end machining.  
 Nominal diameter 8mm, Screw length < 165mm, no end machining; Screw length ≥ 165mm, standard end machining.  
 Nominal diameter 10mm, Screw length < 200mm, no end machining; Screw length ≥ 200mm, standard end machining.  
 no end machining code" 0" , standard end machining code" S" .

<b>Order sample</b>	<b>① Select configuration codes</b>					
	<b>Motor Series</b>	<b>Lead Screw Options</b>	<b>Screw Length Options</b>	<b>Nut Options</b>	<b>End Machining Code</b>	
	TSM11Q-2RM	B0601	55, 65, 75, 90, 105, 115, 130, 150, 170, 190, 210, 230, 255	AK1	0, S	
	<b>② Determine the order Models</b>					
	<b>TSM11Q-2RM - B0601 - 105 - AK1 - 0</b>					
In addition to the standard order Models, we also provide a wealth of customized configuration options, for more information please contact the factory.						

# TSM11/AM11 Series

<b>Phases</b>	2
<b>Step Accuracy</b>	± 5%
<b>Approvals</b>	RoHS
<b>Insulation Class</b>	B ( 130℃ )
<b>Operating Temp</b>	0℃ ~ +50℃



Linear Intelligent Motors

## Ordering Information

**TSM11Q-2RM - B0601 - 55 - AK1 - 0**

<p>Motor Series</p> <table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th style="width: 20%;">Code</th> <th>Motor Type Code</th> </tr> </thead> <tbody> <tr> <td>TSM11Q-2RM</td> <td>Drive integrated</td> </tr> <tr> <td>AM11RS2DMA</td> <td>Drive divided</td> </tr> </tbody> </table> <p>Lead Screw Type Code</p> <table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th rowspan="2">Code</th> <th rowspan="2">Nominal Diameter ( mm )</th> <th rowspan="2">Lead ( mm )</th> <th>Travel ( mm )</th> </tr> <tr> <th>Travel Per 1.8°</th> </tr> </thead> <tbody> <tr> <td>B0601</td> <td>6</td> <td>1</td> <td>0.005</td> </tr> <tr> <td>B0602</td> <td>6</td> <td>2</td> <td>0.01</td> </tr> <tr> <td>B0606</td> <td>6</td> <td>6</td> <td>0.03</td> </tr> </tbody> </table> <p>The length of the screw Lx</p> <table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th style="width: 10%;">###</th> <th>Provided in 1 mm increments</th> </tr> </thead> <tbody> <tr> <td> </td> <td> </td> </tr> </tbody> </table>	Code	Motor Type Code	TSM11Q-2RM	Drive integrated	AM11RS2DMA	Drive divided	Code	Nominal Diameter ( mm )	Lead ( mm )	Travel ( mm )	Travel Per 1.8°	B0601	6	1	0.005	B0602	6	2	0.01	B0606	6	6	0.03	###	Provided in 1 mm increments			<p>Special Custom Type Code</p> <table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th style="width: 20%;">Code</th> <th>Custom Type</th> </tr> </thead> <tbody> <tr> <td>0</td> <td>No end machining</td> </tr> <tr> <td>S</td> <td>Lead Screw End Machining</td> </tr> <tr> <td>XX</td> <td>Special Custom Code</td> </tr> </tbody> </table> <p>Mating Nut Code</p> <table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th style="width: 15%;">Code</th> <th style="width: 15%;">Mating Screw</th> </tr> </thead> <tbody> <tr> <td rowspan="2">AK</td> <td>1</td> <td>B0601</td> </tr> <tr> <td> </td> <td>B0602</td> </tr> <tr> <td rowspan="2">FF</td> <td>1</td> <td>B0606</td> </tr> <tr> <td> </td> <td> </td> </tr> </tbody> </table>	Code	Custom Type	0	No end machining	S	Lead Screw End Machining	XX	Special Custom Code	Code	Mating Screw	AK	1	B0601		B0602	FF	1	B0606		
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Note: Choosing the standard order models can get the sample quickly, please see P42 for standard models.

## Electrical Specifications

	Control Command	Pulse Command Type	Max. pulse input frequency	Digital Input Number	Digital Output Number	Analog Input Number	Encoder Feedback Output	Digital Input Specifications	Digital Output Specifications
<b>TSM11Q-2RM</b>	Pulse Command, SCL Motion control Command, Q program, Modbus/RTU Communication Control	Pulse+Direction CW/CCW Double-pulse A/B differential pulse	2MHz, Min.Pulse Width=250ns	4	2	-	-	5-24VDC	30VDC /100mA
	<b>Input Power</b>			<b>Protect Power</b>		<b>Communication Interface</b>		<b>Communication Protocol</b>	
	Rated voltage 24VDC, Min/Max voltage 15-30VDC			Overvoltage、Undervoltage、Overheated、Motor winding short circuit ( phase to phase and ground )		RS-485 4-wire		Modbus/RTU or SCL	

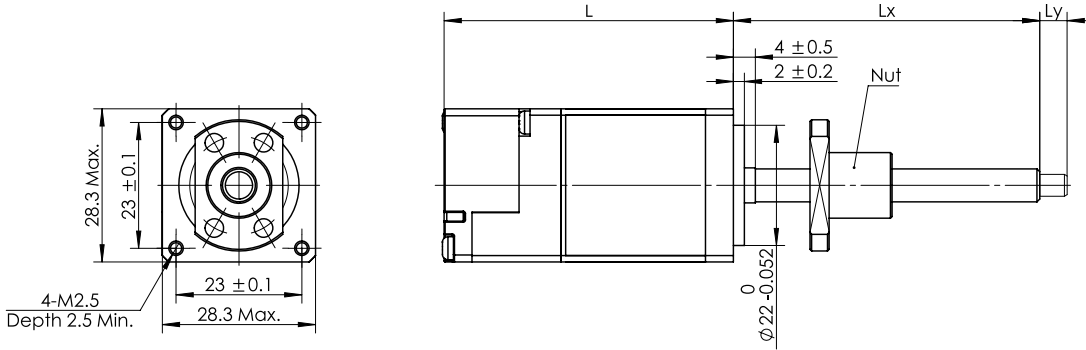
Note: 1. The above electrical spec is only used for TSM series, AM series mating drivers refer to p61-p83.

2.TSM series motor operation and control instructions,please see p54-p60.

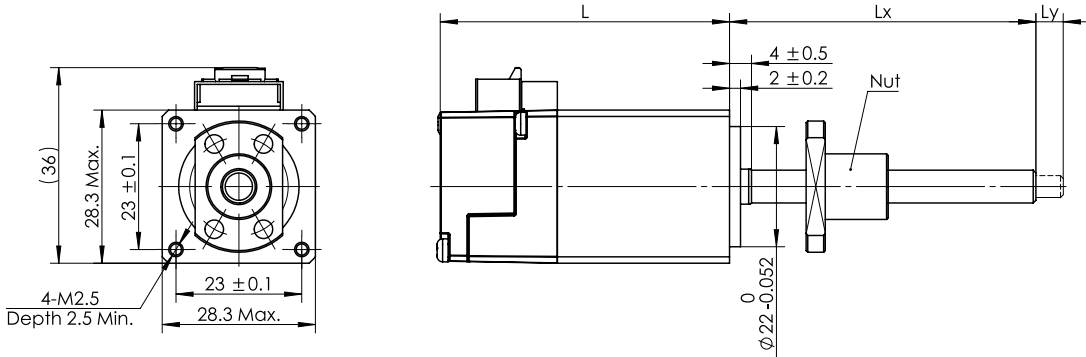
# TSM11/AM11 Series

## Dimensional Information

UNIT:mm

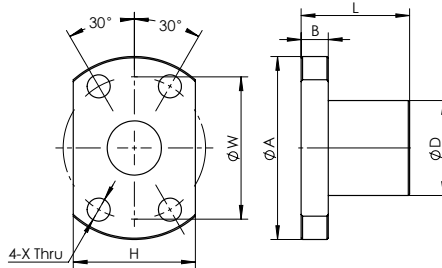


Motor Type	Dimension "L"
TSM11Q-2RM	52.9



Motor Type	Dimension "L"
AM11RS2DMA	52.9

### Nut Type

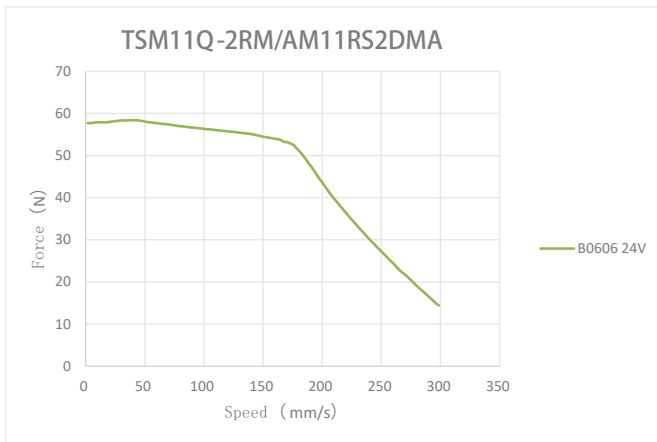
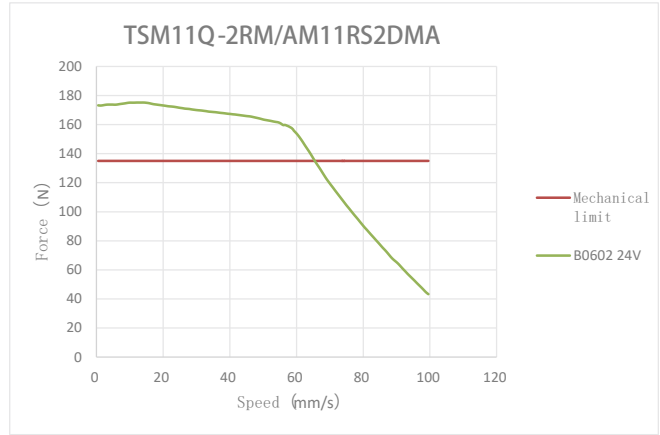
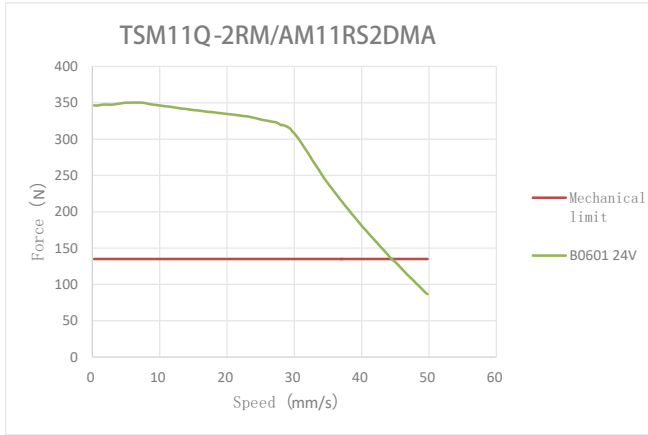


AK1/FF1

Lead Screw Code	Nut Code		D	D2	A	E	B	L	W	H	X
B0601	AK	1	12	-	24	-	3.5	15	18	16	3.4
B0602	FF	1	12	-	24	-	4	17	18	16	3.4
B0606	FF	1	12	-	24	-	4	22	18	16	3.4

# TSM11/AM11 Series

## ■ Speed – Force Reference Curve



**Note:**

**1. Mechanical Limit Definition :**

Since the motor output may exceed the force which the bearing can bear, so we take the motor bearing limit as the mechanical limit. However, linear motor fatigue and resultant life are determined by each customer's unique application. Load, speed, frequency, temperature, stability of guidance mechanism, etc., should all be considered before choosing a linear motor.

2. The curves are reference values obtained by calculation. The actual output should consider the customer's unique application, including speed, acceleration and deceleration, frequency, stability of guidance mechanism, etc.

Linear Intelligent Motors

# TSM17/AM17 Series

<b>Phases</b>	2
<b>Step Accuracy</b>	± 5%
<b>Approvals</b>	RoHS
<b>Insulation Class</b>	B ( 130°C )
<b>Operating Temp</b>	0°C ~ +50°C



Linear Intelligent Motors

## Ordering Information

**TSM17Q-2RG - B0801 - 90 - AK1 - 0**

Motor Series				Special Custom Type Code	
<b>Code</b>	<b>Motor Type Code</b>			<b>Code</b>	<b>Custom Type</b>
TSM17Q-2RG	Drive integrated			0	No end machining
AM17RS2DMA	Drive divided			S	Lead Screw End Machining
				XX	Special Custom Code
Lead Screw Type Code				Mating Nut Code	
<b>Code</b>	<b>Nominal Diameter ( mm )</b>	<b>Lead ( mm )</b>	<b>Travel ( mm )</b>	<b>Code</b>	<b>Mating Screw</b>
			<b>Travel Per 1.8°</b>		
B0801	8	1	0.005	AK	B0801
B0802	8	2	0.01		B0802
B08025	8	2.5	0.0125		B08025
B0805	8	5	0.025		B1002
B0808	8	8	0.04		B1004
B1002	10	2	0.01	FF	B0805
B1004	10	4	0.02		B0808
B1005	10	5	0.025		B1005
B1010	10	10	0.05		B1010
The length of the screw Lx					
<b>###</b>	<b>Provided in 1 mm increments</b>				

Note: Choosing the standard order models can get the sample quickly, please see P42 for standard models.

# TSM17/AM17 Series

## Electrical Specifications

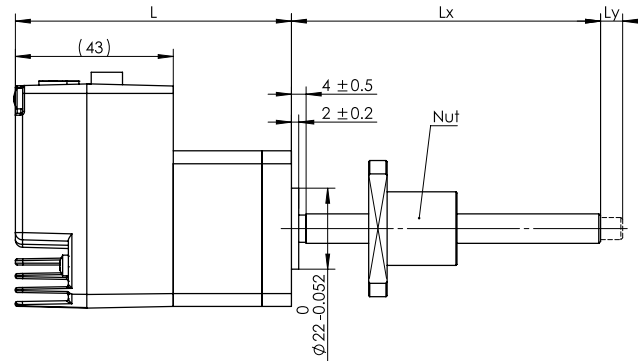
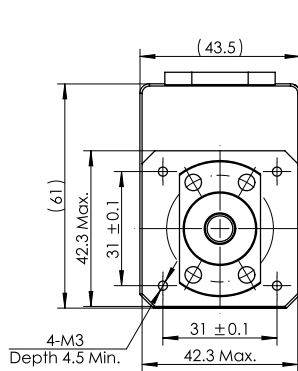
	Control Command	Pulse Command Type	Max. pulse input frequency	Digital Input Number	Digital Output Number	Analog Input Number	Encoder Feedback Output	Digital Input Specifications	Digital Output Specifications
TSM17Q-2RG	Pulse Command, Analog command, SCL Motion control Command, Q program, Modbus/RTU Communication Control	Pulse+Direction CW/CCW Double-pulse A/B differential pulse	2MHz, Min.Pulse Width=250ns	8	4	1	-	5-24VDC	30VDC /100mA
	Analog input specification	Input Power	Protect Power	Communication Interface	Communication Protocol				
	0-5VDC, Analog input resolution: 12bits	12-48VDC	Overvoltage、Undervoltage、Overheated、Motor winding short circuit ( phase to phase and ground )	RS-485	Modbus/RTU or SCL				

Note: 1. The above electrical spec is only used for TSM series, AM series mating drivers refer to p61-p83.

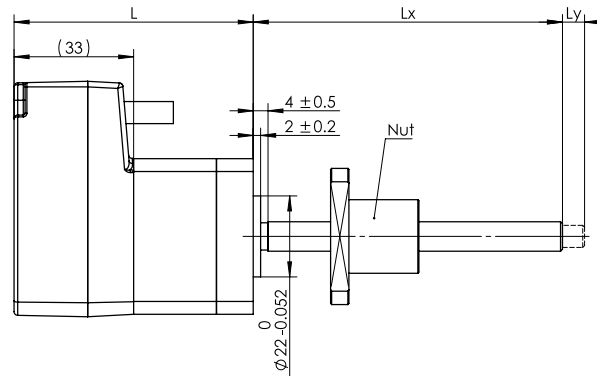
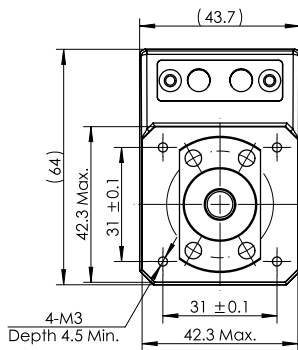
2.TSM series motor operation and control instructions,please see p54-p60.

## Dimensional Information

UNIT:mm



Motor Type	Dimension "L"
TSM17Q-2RG	75

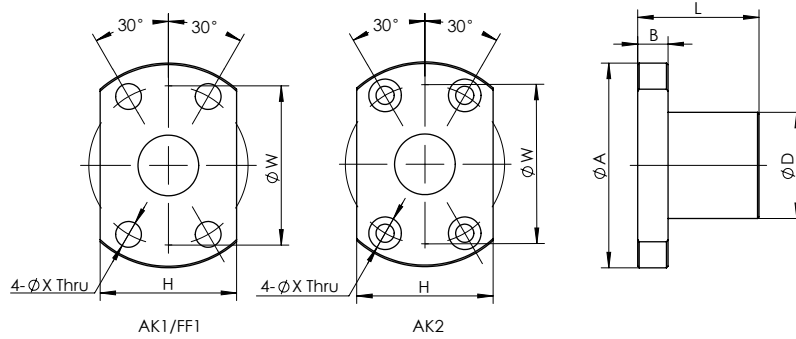


Motor Type	Dimension "L"
AM17RS2DMA	65

# TSM17/AM17 Series

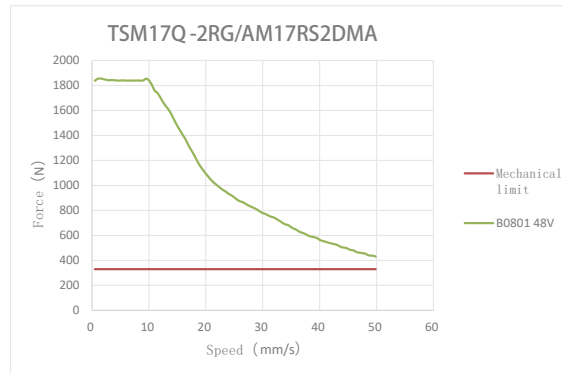
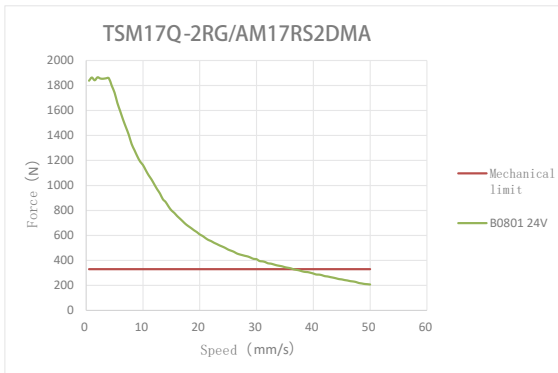
Linear Intelligent Motors

## Nut Type



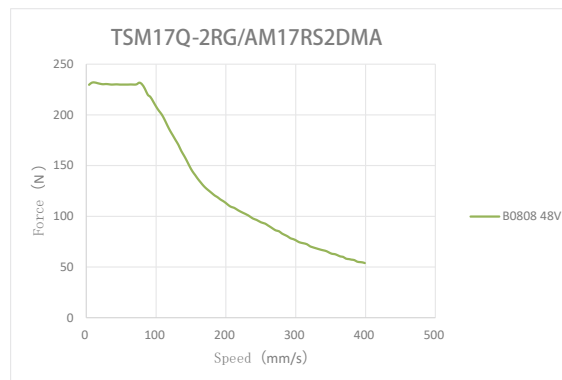
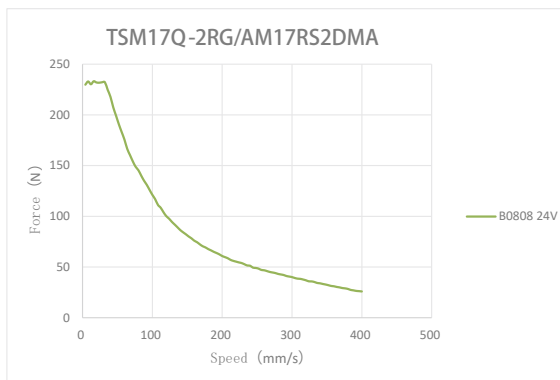
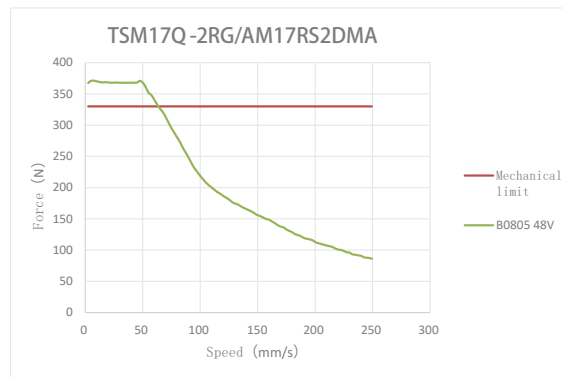
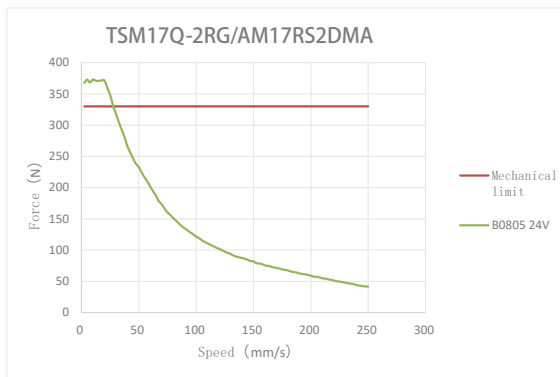
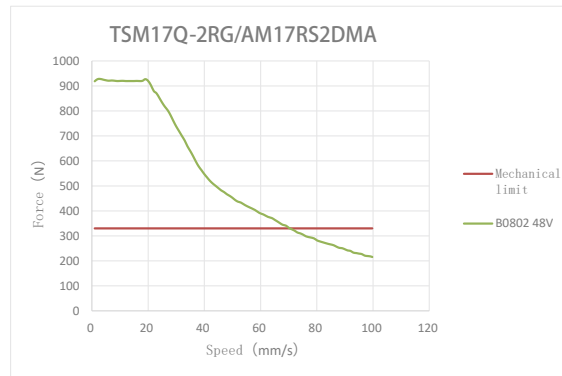
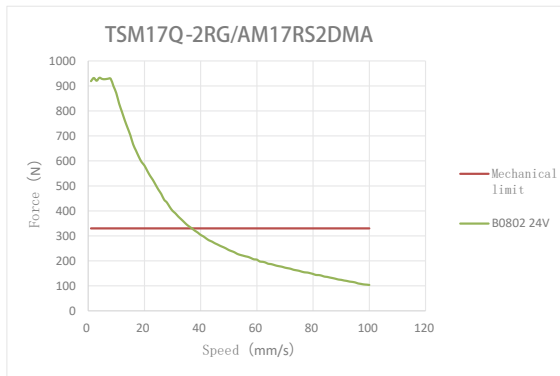
Lead Screw Code	Nut Code		D	A	B	L	W	H	X	Y	Z
B0801	AK	1	14	27	4	16	21	18	3.4	-	-
B0802	AK	1	14	27	4	16	21	18	3.4	-	-
B08025	AK	1	16	29	4	26	23	20	3.4	-	-
B0805	FF	1	18	31	4	28	25	20	3.4	-	-
B0808	FF	1	18	31	4	28	25	20	3.4	-	-
B1002	AK	1	18	35	5	28	27	22	4.5	-	-
B1004	AK	2	26	46	10	34	36	28	4.5	8	4.5
B1005	FF	1	22	41	10	32	31	25	4.5	-	-
B1010	FF	1	22	41	10	36	31	25	4.5	-	-

## Speed – Force Reference Curve





# TSM17/AM17 Series



**Note:**

**1. Mechanical Limit Definition:**

Since the motor output may exceed the force which the bearing can bear, so we take the motor bearing limit as the mechanical limit. However, linear motor fatigue and resultant life are determined by each customer's unique application. Load, speed, frequency, temperature, stability of guidance mechanism, etc., should all be considered before choosing a linear motor.

2. The curves are reference values obtained by calculation. The actual output should consider the customer's unique application, including speed, acceleration and deceleration, frequency, stability of guidance mechanism, etc.

# TSM23/AM23 Series

<b>Phases</b>	2
<b>Step Accuracy</b>	± 5%
<b>Approvals</b>	RoHS
<b>Insulation Class</b>	B ( 130°C )
<b>Operating Temp</b>	0°C ~ +50°C



Linear Intelligent Motors

## Ordering Information

**TSM23Q-2RG - B1002 - 165 - AK1 - 0**

Motor Series

Code	Motor Type Code
TSM23Q-2RG	Drive integrated
AM23RS2DMA	Drive divided

Lead Screw Type Code

Code	Nominal Diameter ( mm )	Lead ( mm )	Travel ( mm )
			Travel Per 1.8°
<b>B1002</b>	10	2	0.01
<b>B1004</b>	10	4	0.02
<b>B1005</b>	10	5	0.025
<b>B1010</b>	10	10	0.05
<b>B1202</b>	12	2	0.01
<b>B1205</b>	12	5	0.025
<b>B1210</b>	12	10	0.05

The length of the screw Lx

###	Provided in 1 mm increments
-----	-----------------------------

Special Custom Type Code

Code	Custom Type
0	No end machining
S	Lead Screw End Machining
XX	Special Custom Code

Mating Nut Code

Code		Mating Screw
AK	1	B1002
	2	B1202
FF	1	B1004
	1	B1005
AA	1	B1010
	3	B1205
AV	2	B1210

Note: Choosing the standard order models can get the sample quickly, please see P42 for standard models.

# TSM23/AM23 Series

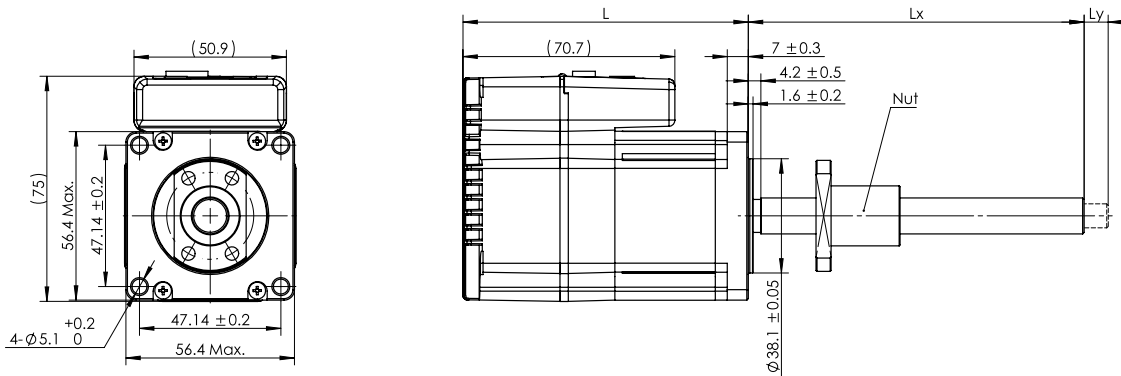
## Electrical Specifications

	Control Command	Pulse Command Type	Max. pulse input frequency	Digital Input Number	Digital Output Number	Analog Input Number	Encoder Feedback Output	Digital Input Specifications	Digital Output Specifications
TSM23Q-2RG	Pulse Command, Analog command, SCL Motion control Command, Q program, Modbus/RTU Communication Control	Pulse+Direction CW/CCW Double-pulse A/B differential pulse	2MHz, Min.Pulse Width=250ns	8	4	1	20000 pulse/cycle A/B/Z differential signal	5-24VDC	30VDC /100mA
	Analog input specification	Input Power		Protect Power		Communication Interface	Communication Protocol		
	0-5VDC, Analog input resolution: 12bits	12-70VDC		Overvoltage、Undervoltage、Overheated、Motor winding short circuit ( phase to phase and ground )		RS-485	Modbus/RTU or SCL		

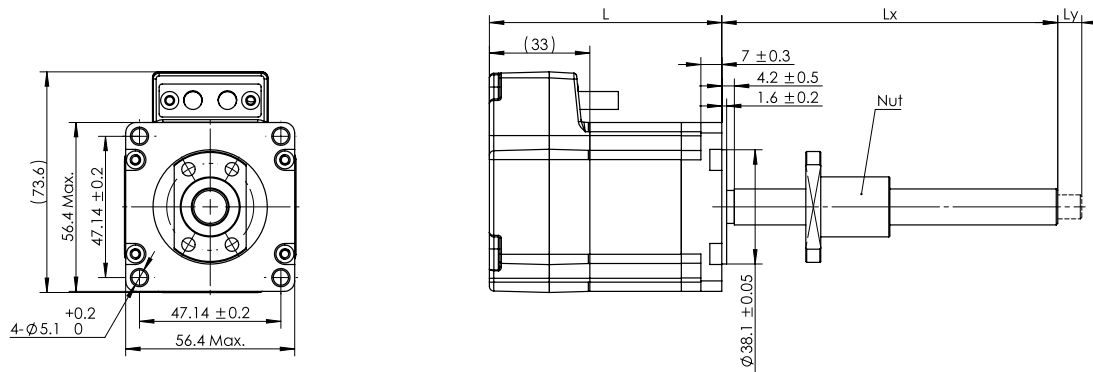
Note: 1. The above electrical spec is only used for TSM series, AM series mating drivers refer to p61-p83.  
2.TSM series motor operation and control instructions,please see p54-p60.

## Dimensional Information

UNIT:mm



Motor Type	Dimension "L"
TSM23Q-2RG	95.2

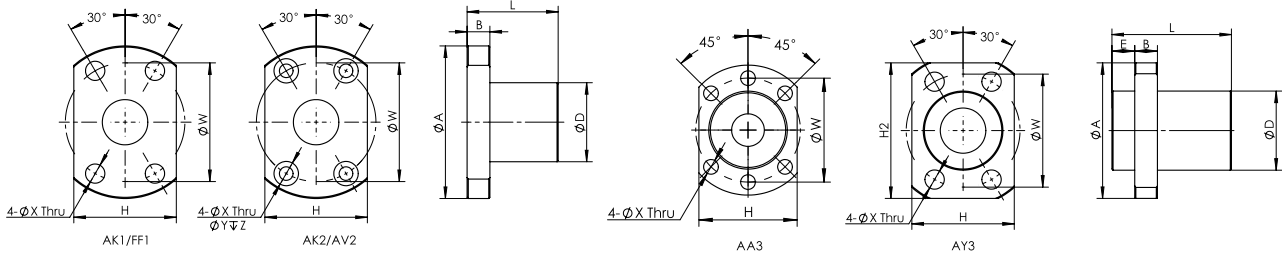


Motor Type	Dimension "L"
AM23RS2DMA	77.5

Linear Intelligent Motors

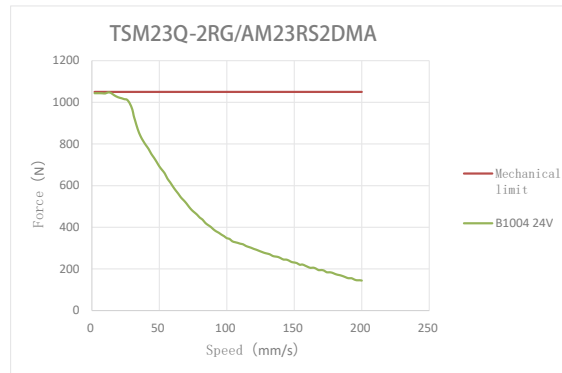
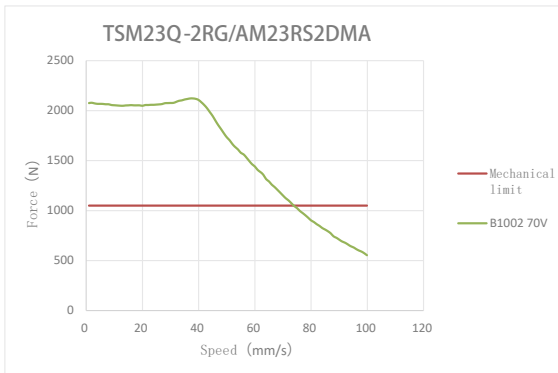
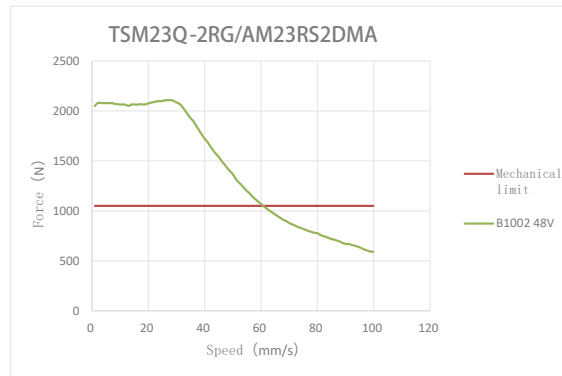
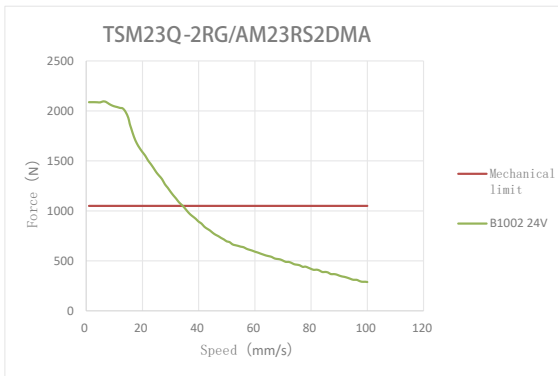
# TSM23/AM23 Series

## Nut Type

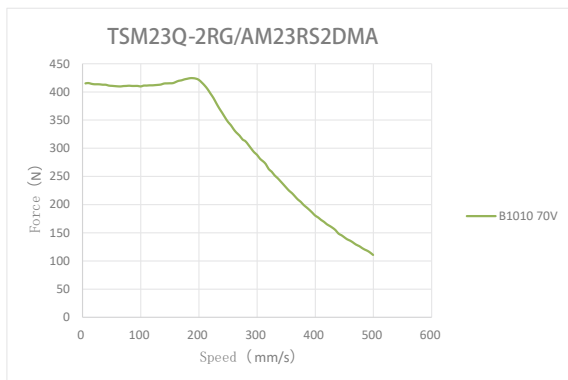
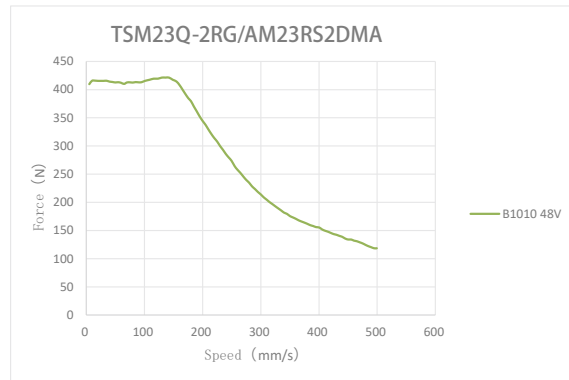
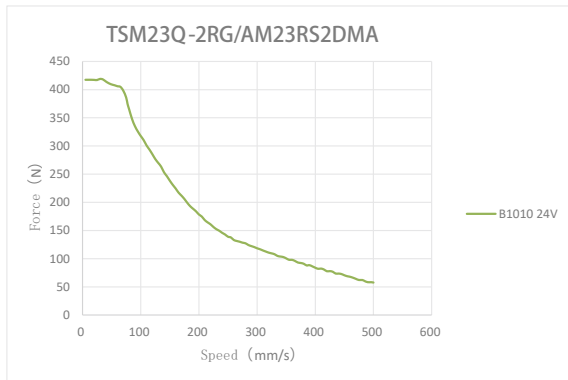
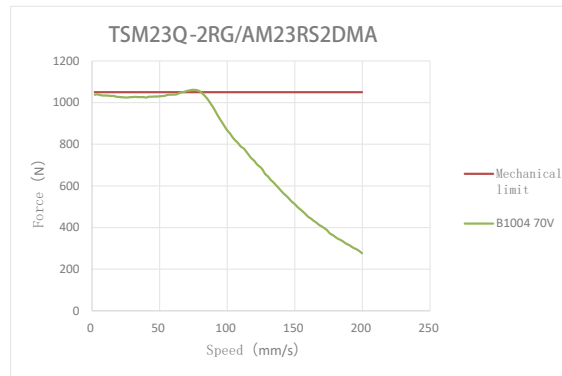
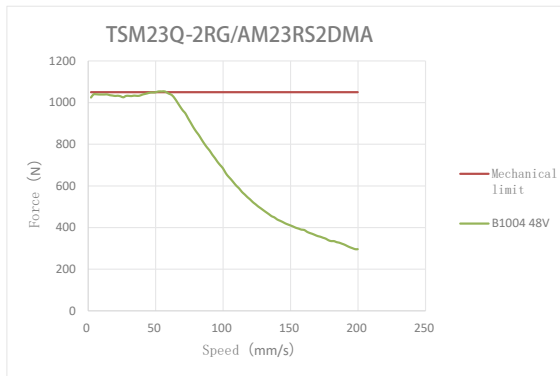


Lead Screw Code	Nut Code		D	A	E	B	L	W	H	H2	X	Y	Z
B1002	AK	1	18	35	-	5	28	27	22	-	4.5	-	-
B1004	AK	2	26	46	-	10	34	36	28	-	4.5	8	4.5
B1005	FF	1	22	41	-	10	32	31	25	-	4.5	-	-
B1010	FF	1	22	41	-	10	36	31	25	-	4.5	-	-
B1202	AK	1	20	37	-	5	28	29	24	-	4.5	-	-
B1205	AA	3	24	40	5	10	30	32	30	-	4.5	-	-
B1210	AV	2	30	50	-	10	53	40	32	-	4.5	8	4.5

## Speed – Force Reference Curve



# TSM23/AM23 Series



**Note:**

**1. Mechanical Limit Definition:**

Since the motor output may exceed the force which the bearing can bear, so we take the motor bearing limit as the mechanical limit. However, linear motor fatigue and resultant life are determined by each customer's unique application. Load, speed, frequency, temperature, stability of guidance mechanism, etc., should all be considered before choosing a linear motor.

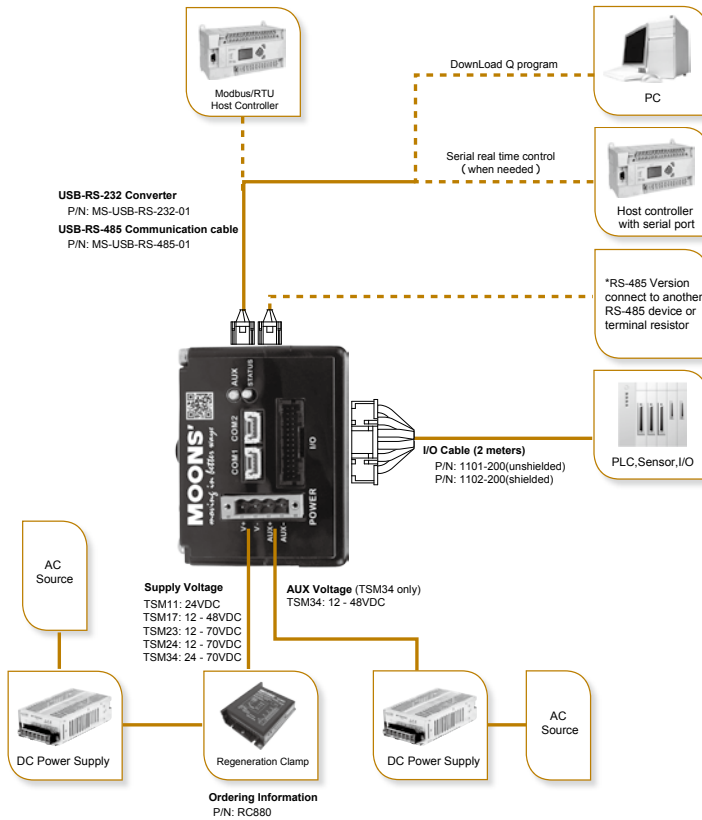
2. The curves are reference values obtained by calculation. The actual output should consider the customer's unique application, including speed, acceleration and deceleration, frequency, stability of guidance mechanism, etc.

# TSM Series Motors Operation And Control

## Control Model

Interface	RS-485 or Modbus/RTU
Baud Rate(bps)	9600/19200/38400/57600/115200
Maximum Distance	Due to transmission baud rate
Maximum Connections	32 axes per channel
Communication Cable	Twisted Shielded Cable
Address Setting	Via <b>Step-Servo</b> Quick Tuner

## System Configuration Diagram



## Optional Accessories

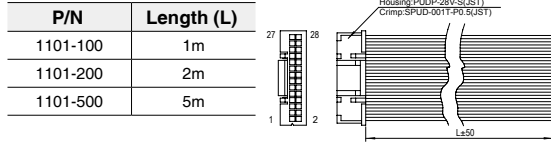
P/N	Category	Technical Specification
RC880	Regeneration Clamp	80VDC Max. 50W
MS-USB-RS-232-01	USB Converter	USB to RS-232
MS-USB-RS-485-01	USB Converter	USB to RS-485
MS-USB-CAN-01	USB Converter	USB to CAN
1101- □□□	Cable	I/O cable, unshielded
1116- □□□	Cable	I/O cable, shielded
2101-150	Cable	RS-232 communication cable (P/Q type)
2113-150	Cable	RS-232 communication cable (C type)
2111- □□□	Cable	RS-485 Daisy Chain
2112- □□□	Cable	CANopen Daisy Chain
2012-030	Cable	CAT5e UTP 0.3m
2012-300	Cable	CAT5e UTP 3m
2013-030	Cable	CAT5e STP 0.3m
2013-300	Cable	CAT5e STP 3m

\* □□□ stands for length, unit:cm, ex.100 stands for 100cm

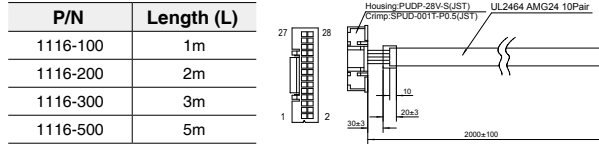
# TSM Series Motors Operation And Control

## Leads spec

### General Purpose I/O Cable(unshielded) (TSM17/23)



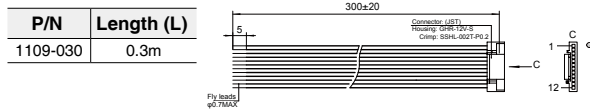
### General Purpose I/O Cable(shielded) (TSM17/23)



Pin No.	Assignment	Description	Color
1	X1+	High Speed Digital Input	BLU
2	X1-		BLU/WHT
3	X2+	High Speed Digital Input	YEL
4	X2-		YEL/WHT
5	X3	X3 Digital Input	GRN
6	X4	X4 Digital Input	ORG
7	X5	X5 Digital Input	GRY
8	X6	X6 Digital Input	PUR
9	XCOM	X Digital Input COM	WHT
10	+5V	+5V Analog Voltage	RED
11	AIN	Analog Input	BLU
12	GND	Analog Input Ground	BLK
13	X7+	X7 Digital Input	ORG
14	X7-		ORG/WHT
15	X8+	X8 Digital Input	GRN
16	X8-		GRN/WHT
17	Y1	Y1 Digital Output	BLU
18	Y2	Y2 Digital Output	YEL
19	Y3	Y3 Digital Output	BRN
20	YCOM	Y Output COM	BLK
21	Y4+	Y4 Digital Output	RED
22	Y4-		RED/WHT
23	Z+	Encoder Output Z (if applicable)	BLK
24	Z-		BLK/WHT
25	B+	Encoder Output B (if applicable)	GRN
26	B-		GRN/WHT
27	A+	Encoder Output A (if applicable)	ORG
28	A-		ORG/WHT

Pin No.	Assignment	Description	Color
1	X1+	High Speed Digital Input	BLU/WHT
2	X1-		BLU/BLK
3	X2+	High Speed Digital Input	GRN/WHT
4	X2-		GRN/BLK
5	X3	X3 Digital Input	BLU
6	X4	X4 Digital Input	PUR
7	X5	X5 Digital Input	YEL
8	X6	X6 Digital Input	GRN
9	XCOM	X Digital Input COM	ORG
10	+5V	+5V Analog Voltage	RED
11	AIN	Analog Input	WHT
12	GND	Analog Input Ground	BLK
13	X7+	X7 Digital Input	BRN/WHT
14	X7-		BRN/BLK
15	X8+	X8 Digital Input	GRY/WHT
16	X8-		GRY/BLK
17	Y1	Y1 Digital Output	BRN
18	Y2	Y2 Digital Output	GRY
19	Y3	Y3 Digital Output	PNK
20	YCOM	Y Output COM	YEL/GRN
21	Y4+	Y4 Digital Output	PUR/WHT
22	Y4-		PUR/BLK
23	Z+	Encoder Output Z (if applicable)	YEL/WHT
24	Z-		YEL/BLK
25	B+	Encoder Output B (if applicable)	ORG/WHT
26	B-		ORG/BLK
27	A+	Encoder Output A (if applicable)	RED/WHT
28	A-		RED/BLK

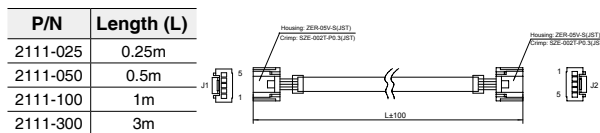
### Power + Comm + I/O Cable (Flying leads,TSM11 only)



Pin No.	Assignment	Description	Color
1	Y2	Y2 Digital Output	PUR
2	Y1	Y1 Digital Output	ORN
3	X4	X4 Digital Input	WHT

Pin No.	Assignment	Description	Color
4	X3	X3 Digital Input	BRN
5	X2	High Speed Digital Input	YEL
6	X1	High Speed Digital Input	GRY
7	RXD-	RS-422/485 Data Receive-	GRN/WHT
8	RXD+	RS-422/485 Data Receive+	GRN
9	TXD-	RS-422/485 Data Transmit-	BLU/WHT
10	TXD+	RS-422/485 Data Transmit+	BLU
11	V+	Power Supply +	RED
12	V-	Power GND	BLK

### RS-485 Daisy Chain Communication Cable (TSM17/23)



# TSM Series Motors Operation And Control

## Regeneration Clamp

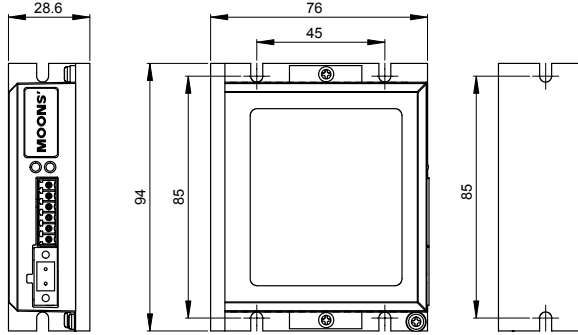
**P/N: RC880**

When using regulated power supply you may encounter a problem with regeneration. The kinetic energy caused by regeneration is transferred back to the power supply. This can trip the overvoltage protection of a switching power supply, causing it to shut down.

MOONS' offer the RC880 "regeneration clamp" to solve this problem. If in doubt, use an RC880 for your first installation. If the "regen" LED on the RC880 never flashes, you don't need the clamp.



### Dimensions(Unit:mm)



Linear Intelligent Motors

## USB Converter

Model: MS-USB-RS-232-01

Description: USB-RS-232 converter



Model: MS-USB-RS-485-01

Description: USB-RS-485 converter



Model: MS-USB-CAN-01

Description: USB-CAN converter

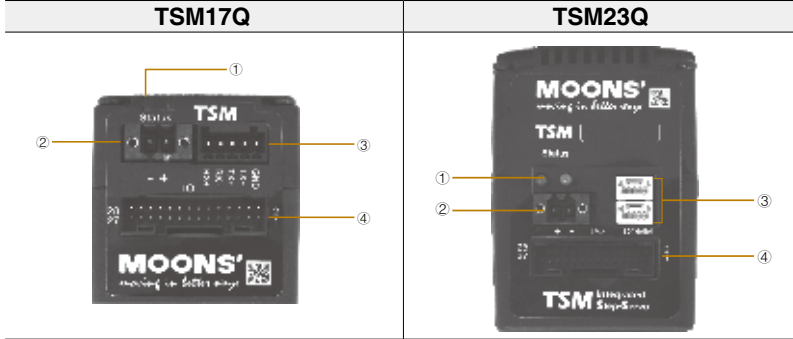




# TSM Series Motors Operation And Control

## Connection and Operation(Q Controller Type)

### Names and Functions of Parts



### ① LED Displays

Indication	Color	Function	When Activated
Operation	Green	Power on indication	When driver is powered up
Alarm	Red	Alarm indication	Flashes when in protection
Operation	Yellow	Auxiliary Power on indication	When AUX powered up

### LED Error Codes

TSM uses red and green LEDs to indicate status. When the motor is enabled, the green LED flashes slowly. When the green LED is solid, the motor is disabled. Errors are indicated by combinations of red and green flashes as shown in [Page of Alarm information](#).

Apart from the main power supply, TSM34 also has an auxiliary power input (AUX power) for keep alive function of the drive. When the main power supply is off, the AUX power will keep the logic power on, allowing the drive to remember its state data (motor position, etc.). This allows the motor to resume operation from its previous position without a homing routine when the main power is switched back on.

### Power Connector

#### ② TSM17/23

P/N: Weidmuller 1615780000

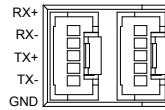
	Description
+	Power Supply +
-	Power Supply -

### ③ Communication Connector

#### TSM17/23Q(RS-485)

Housing P/N: JST ZER-05V-S  
Crimp P/N: JST SZE-002T-P0.3

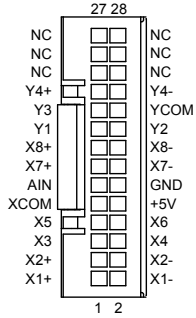
#### RS-485



Connector	Assignment
RX+	Receive+
RX-	Receive-
TX+	Transmit+
TX-	Transmit-
GND	GND

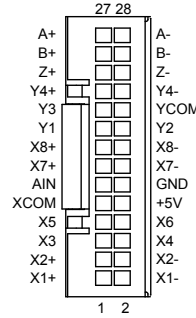
# TSM Series Motors Operation And Control

## ④ TSM17Q I/O Signal Connector



Housing P/N: JST PUDP-28V-S  
Crimp P/N: JST SPUD-001T-P0.5

## TSM23Q I/O Signal Connector



Housing P/N: JST PUDP-28V-S  
Crimp P/N: JST SPUD-001T-P0.5

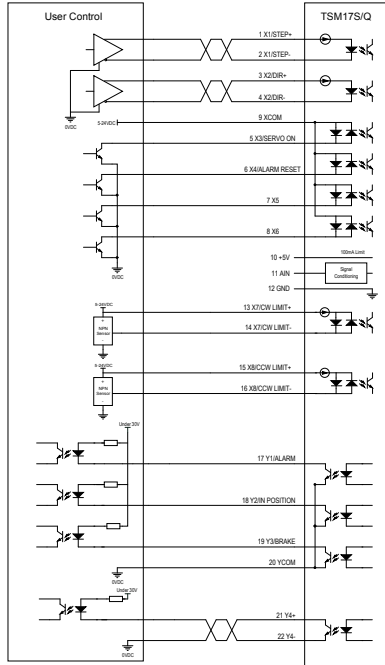
Pin no.	Assignment	Description
1	X1+/STEP+	High Speed Digital Input
2	X1-/STEP-	
3	X2+/DIR+	High Speed Digital Input
4	X2-/DIR-	
5	X3	X3 Digital Input
6	X4	X4 Digital Input
7	X5	X5 Digital Input
8	X6	X6 Digital Input
9	XCOM	Digital Input COM
10	+5	+5V OUT 100mA max.
11	AIN	Analog Input
12	GND	Analog Ground
13	X7+	X7 Digital Input
14	X7-	
15	X8+	X8 Digital Input
16	X8-	
17	Y1	Y1 Digital Output
18	Y2	Y2 Digital Output
19	Y3	Y3 Digital Output
20	YCOM	Digital Output COM
21	Y4+	Y4 Digital Output
22	Y4-	
23	NC	N/C
24	NC	
25	NC	
26	NC	
27	NC	
28	NC	

Pin no.	Assignment	Description
1	X1+/STEP+	High Speed Digital Input
2	X1-/STEP-	
3	X2+/DIR+	High Speed Digital Input
4	X2-/DIR-	
5	X3	X3 Digital Input
6	X4	X4 Digital Input
7	X5	X5 Digital Input
8	X6	X6 Digital Input
9	XCOM	Digital Input COM
10	+5	+5V OUT 100mA max.
11	AIN	Analog Input
12	GND	Analog Ground
13	X7+	X7 Digital Input
14	X7-	
15	X8+	X8 Digital Input
16	X8-	
17	Y1	Y1 Digital Output
18	Y2	Y2 Digital Output
19	Y3	Y3 Digital Output
20	YCOM	Digital Output COM
21	Y4+	Y4 Digital Output
22	Y4-	
23	Z+	Encoder Output Z
24	Z-	
25	B+	Encoder Output B
26	B-	
27	A+	Encoder Output A
28	A-	

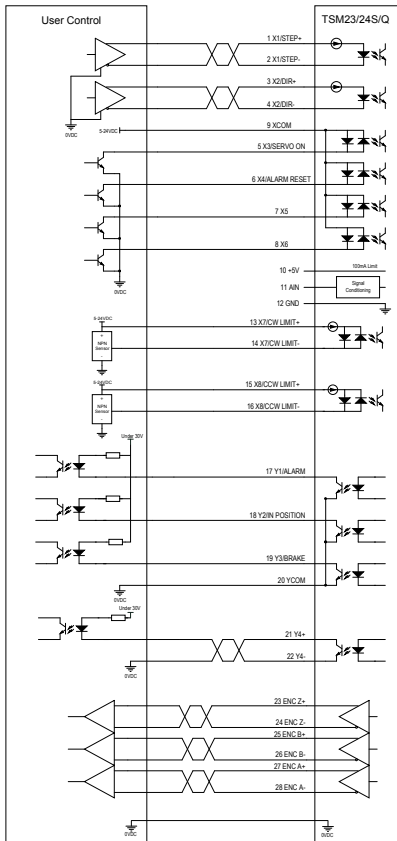
# TSM Series Motors Operation And Control

## Wiring Diagram

### TSM17Q



### TSM23Q



## Description of Input/Output Signals

Input (output) "ON" indicates that the current is sent into the photocoupler (transistor) inside the driver. Input (output) "OFF" indicates that the current is not sent into the photocoupler (transistor) inside the driver. The input/output remains "OFF" if nothing is connected.

Circuit above shows when pulse input is line driver type

Pulse signal input range 5-24VDC

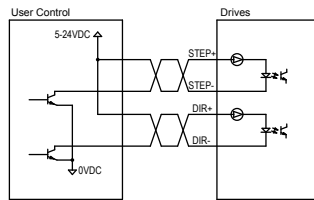
Digital signal input range 5-24VDC

Use a multi-core, twisted-pair shielded wire of AWG28 to 24 for the control input/output signal line, and keep wiring as short as possible

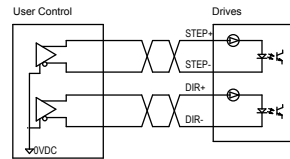
Provide safety distance between the control I/O signal lines and power lines

### Pulse Input Circuit and Sample Connection

With Open Collector Output



With Line Driver Output



### Pulse Input Mode

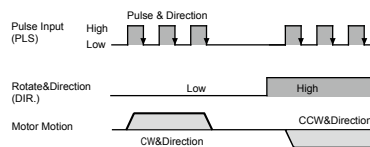
#### Pulse & Direction

When the Pulse input is turned ON while the DIR input is ON, the motor will rotate by one step in one direction.

When the Pulse input is turned ON while the DIR input is OFF, the motor will rotate by one step the other direction.

\*Direction definition of DIR input can be configured via **Step-Servo** Quick Tuner.

The chart below shows motor configured as while the DIR input is ON, the motor will rotate by CW direction

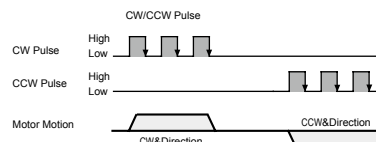


#### CW/CCW Pulse

When the X1 input is turned ON, the motor will rotate by one step in One direction. When the X2 input is turned ON, the motor will rotate by one step in the other direction.

\*Direction definition can be configured via **Step-Servo** Quick Tuner.

The chart below shows motor configured as while the X1 input is ON, the motor will rotate by one step in CW direction



# TSM Series Motors Operation And Control

Linear Intelligent Motors

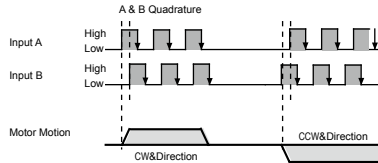
## A & B Quadrature

The motor will move according to signals that are fed to the drive from a two channel incremental master encoder.

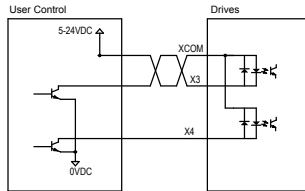
Direction definition can be configured **Step-Servo Quick Tuner**.

Direction is determined via which channel leads the other.

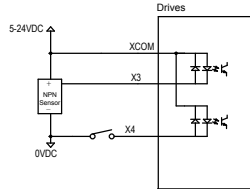
The chart below shows motor configured as while X1 Leads X2, the motor will rotate by CW direction.



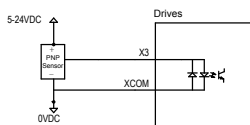
## Digital Input Circuit and Sample Connection With Open Collector Output



## With NPN type Sensor



## With PNP type Sensor



## Servo ON Input

X3 can be configured as Enable signal to excite the motor.

## Alarm Reset Input

X4 can be configured as Reset signal to clear the alarm and turns to normal status as Servo OFF.

**Caution:** Please make sure there's no error in system before you clear an Alarm.

## CW/CCW Limit Input

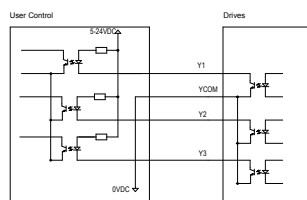
X7 can be configured as CW limit signal input, X8 can be configured as CCW limit signal input.

When either limit signal activates, motor will stop immediately and indicate an Alarm. (Unless motors works in Homing mode and defined otherwise)

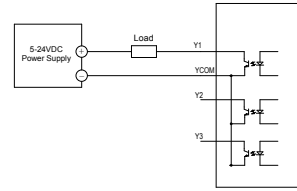
## Connecting using Digital Outputs

### Output Circuit and Sample Connection

#### Open Collector Output



## Driving external load



## Alarm Output

Y1 can be configured as signal output if a fault occurs, meanwhile the red LED will flash.

## In Position Output

Y2 can be configured as signal output when position error less than a user-defined count value.

## Moving Output

Y2 can be configured as signal output when motor is moving.

## Brake Output

Y3 can be configured as signal output to release brake.

## Timing Output

Y4 can be configured as Timing signal output, it will turn ON every time the motor output shaft rotates by 7.2°.50 pulses output with one rotation.

## Tach Output

Y4 can be configured as Tach signal output, tach output produces pulses relative to the motor position with configurable resolution: 100, 200, 400, 800, 1600.

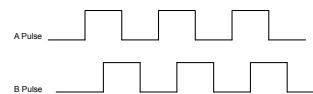
## Encoder Output

Differential pulse output with channel A/B/Z

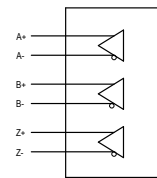
While motor rotates one revolution, A-Phase/B Phase generate total 20,000 counts, Z-Phase generates one signal.

The B-Phase output has a 90° phase difference with respect to the A-Phase output. Phase A Leads B 90° while motor rotates by CW direction, phase B leads A 90° while motor rotates by CCW direction.

## Pulse Output Signal Chart

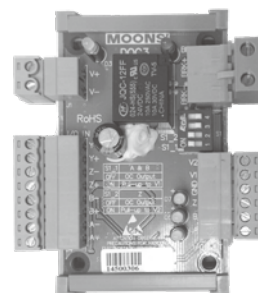


## Encoder Output Circuit



**Note:** If the controller cannot support differential signal input, you can choose the module that it can convert the differential signal into open-collector output.

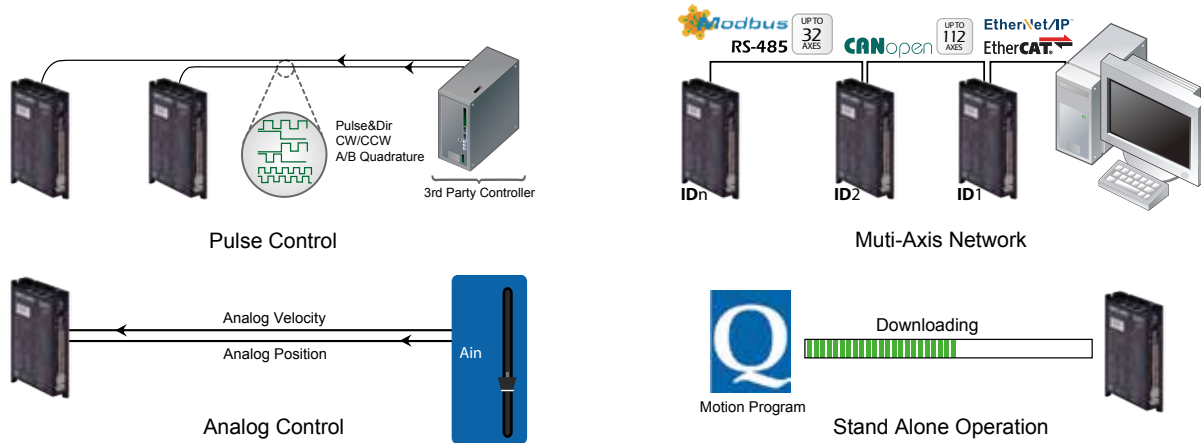
Module part number: DOC3



# SSDC Step-Servo System ( Mating AM Series Motors )

The SSDC series is a high performance, intelligent Step-Servo system with multi-axes field bus control. Enhancing a stepper motor with servo technology has created a product with exceptional features and broad capability. It supports pulse/direction control, analog control and multiple field bus controls such as Modbus, CANopen, SCL/ eSCL commands, EtherNet/IP and EtherCAT protocol. And the SSDC series also supports the stand alone function(Q programmer) called by field bus control.

## Multi-functional Capability

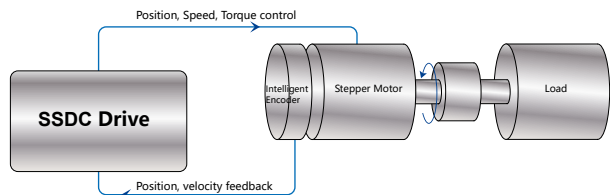


## Closed-Loop Control

The step-servo motor has a built-in high-resolution encoder, which provides accurate position accuracy. In order to adapt to different applications, two kinds of high-resolution encoders ( 20000 counts/rev, 4096 counts/rev ) can be selected, and support multiple closed-loop control modes.

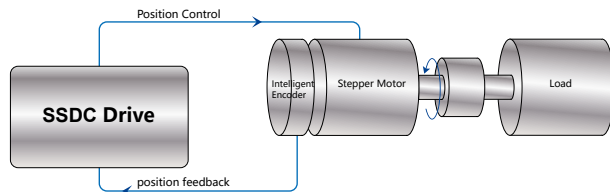
- Closed-loop Step-Servo mode

Position, velocity and current closed loop control. Precisely position and velocity control can match the harsh applications. Adjust the current in real time according to the actual load situation. Highly robust servo control accommodates a wide range of inertial loads and friction load changes.



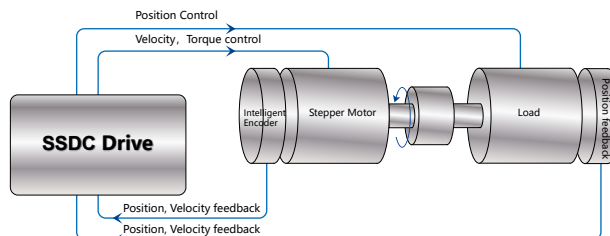
- Closed-loop Step mode **NEW**

Position Closed-loop control. No tuning, no vibration, stall prevention. This mode is suitable for some special applications where the vibration is particularly demanding, such as vision systems, nano-technology, semiconductor manufacturing, ink jet printers, and so on.



- Full Closed-loop mode - 2-way feedback **NEW**

Support 2-way feedback, one way connect to the motor encoder position feedback, the other way connect to the load side position feedback, to avoid the position error caused by the mechanical error of the transmission mechanism, to achieve more precisely position control. Load side feedback support: single-ended or differential incremental encoder, scale.



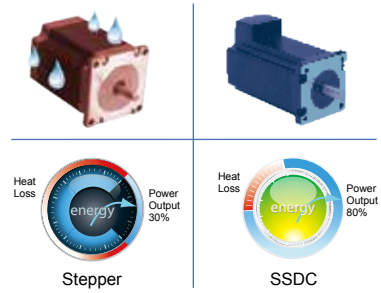
# SSDC Step-Servo System ( Mating AM Series Motors )

## Safe & Convenient

- Support communication and motor power cables disconnection protection - **Make equipments safer** **NEW**
- Support on-line configuration by fieldbus - **Make operation more convenient** **NEW**

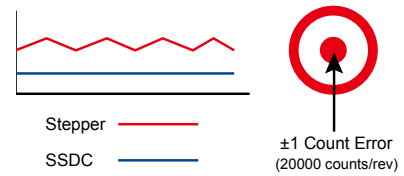
## Low Heating / High Efficiency

- The SSDC uses only the current required by the application, generating minimum heat output.
- When the motor is not moving, the current can be nearly zero resulting in extremely low heat output.
- Being able to use almost 100% of the available torque allows for more efficient operation and may allow a smaller motor size.



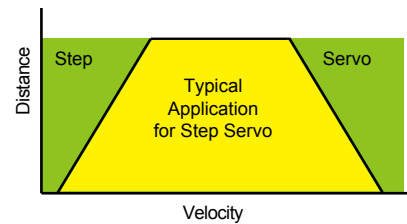
## Smooth & Accurate

- Space vector current control with a high resolution encoder gives smooth and quiet operation, especially at low speeds - a feature not found with traditional stepper motors.
- High stiffness due to the nature of the stepper motor combined with the highly responsive servo control results in accurate position control both while running and when standing still.



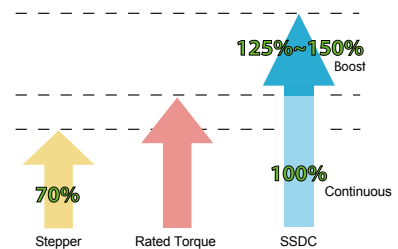
## Fast Response

- When performing fast point-to-point moves, the high torque output and advanced servo control provides a very responsive system far exceeding what can be done with a conventional stepper system



## High Torque

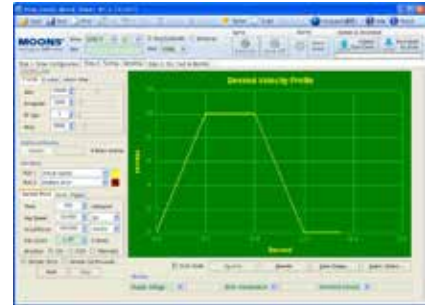
- Because the TSM operates in full servo mode, all the available torque of the motor can be used. The motor can provide as much as 50% more torque in many applications.
- High torque capability often eliminates the need for gear reduction.
- Boost torque capability can provide as much as 50% more torque for short, quick moves.



## SSDC Step-Servo System ( Mating AM Series Motors )

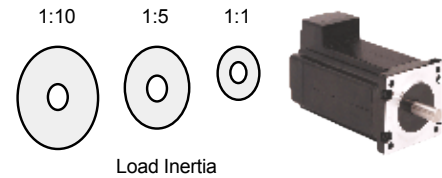
### ■ Motion Monitoring

- For applications where extreme real-time motion is critical, the Step-Servo Quick Tuner provides a simple and practical tool for monitoring actual motion trajectories.
- It can be used to monitor common metrics such as actual velocity and position error to assess the current actual performance of the system.
- An interactive monitoring and tuning interface provides the fastest possible performance output.



### ■ Easy Tuning

- Pre-defined tuning parameters quickly allow Max. control performance and stability.
- A selection list provides an easy method to achieve the desired level of control.
- In most cases NO extra manual tuning is required.
- There is no need to do tuning in closed- step mode.



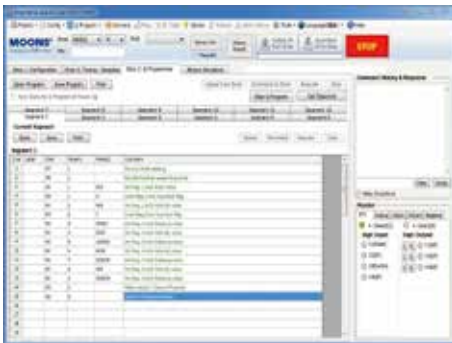
# SSDC Step-Servo System ( Mating AM Series Motors )

## Software



### Stepper Suite

- Friendly User Interface
- Easy setup within just three steps
- Drive setup and configuration
- Servo Tuning and Sampling
- Built-in Q programmer
- Motion testing and monitoring
- Write and save SCL command scripts
- Online help integrated
- Support all products in RSM/SSM/TSM/TXM/RS/SS/SSDCSeries and STF Stepper Drive



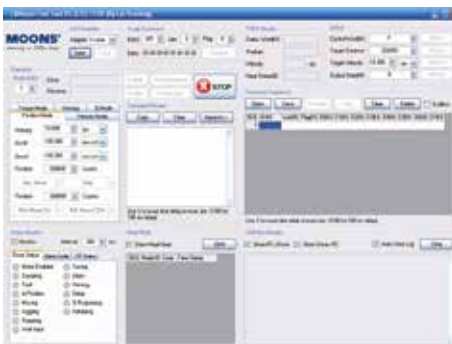
### Built-in Q Programmer

- Single-axis motion control
- Stored program execution
- Multi-tasking
- Conditional processing
- Math functions
- Data registers
- Motion Profile simulation
- Online help integrated



### RS485 Bus Utility

- Stream SCL commands from the command line
- Simple interface with powerful capability
- Easy setup with RS-485 for 32 axis network motion control
- Monitoring Status of I/O, drive, alarm and the other nine most
- Useful motion parameters
- Write and save SCL command scripts
- Online help integrated
- Supports all RS-485 drives



### CANopen Test Tool

- Friendly User Interface
- Multiple operation Mode Support
- Multi-Thread, High Performance
- CAN bus monitor and log function
- Kvaser/PEAK adapter support

**FREE DOWNLOAD**

Our software and user manual can be downloaded from our website:

[www.moonsindustries.com](http://www.moonsindustries.com)

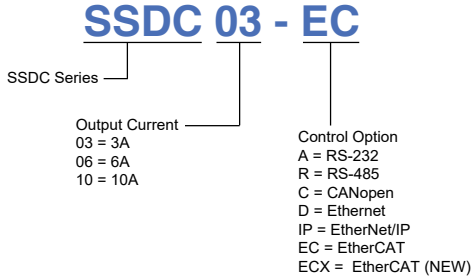
SSDC Stepper Drivers



# SSDC Step-Servo System ( Mating AM Series Motors )

## ■ Numbering System

### ◇ Drive Numbering System



Motor Model	Recommended Drives
AM11RS2DMA	SSDC03
AM17RS2DMA	SSDC03 or SSDC06
AM23RS2DMA	SSDC06 or SSDC10

## ■ Ordering Information

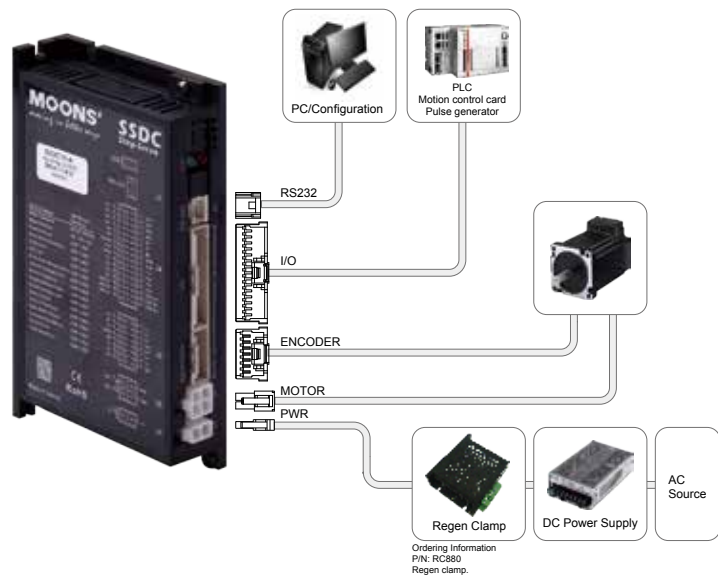
Model	Current	Voltage	RS-232	Modbus/RTU	RS-485	CANopen	Q Program
SSDC03-A	0.1-3.0A	12-48VDC	√	√			√
SSDC06-A	0.1-6.0A	24-70VDC	√	√			√
SSDC10-A	0.1-10.0A	24-70VDC	√	√			√
SSDC03-R	0.1-3.0A	12-48VDC		√	√		√
SSDC06-R	0.1-6.0A	24-70VDC		√	√		√
SSDC10-R	0.1-10.0A	24-70VDC		√	√		√
SSDC03-C	0.1-3.0A	12-48VDC				√	√
SSDC06-C	0.1-6.0A	24-70VDC				√	√
SSDC10-C	0.1-10.0A	24-70VDC				√	√
Model	Current	Voltage	Ethernet	Modbus/TCP	EtherNet/IP	EtherCAT	Q Program
SSDC03-D	0.1-3.0A	12-48VDC	√	√			√
SSDC06-D	0.1-6.0A	24-70VDC	√	√			√
SSDC10-D	0.1-10.0A	24-70VDC	√	√			√
SSDC03-IP	0.1-3.0A	12-48VDC	√	√	√		√
SSDC06-IP	0.1-6.0A	24-70VDC	√	√	√		√
SSDC10-IP	0.1-10.0A	24-70VDC	√	√	√		√
SSDC03-EC	0.1-3.0A	12-48VDC				√	√
SSDC06-EC	0.1-6.0A	24-70VDC				√	√
SSDC10-EC	0.1-10.0A	24-70VDC				√	√

# SSDC Step-Servo System ( Mating AM Series Motors )

## System Configuration

### SSDC-A, RS232 Communication type

- Support SCL command
- Accepts three types of pulse signal input as
- Pulse&Direction, CW/CCW and A/B Quadrature
- Stand alone(Q programmer)
- Analog control
- Modbus/RTU (single axis)

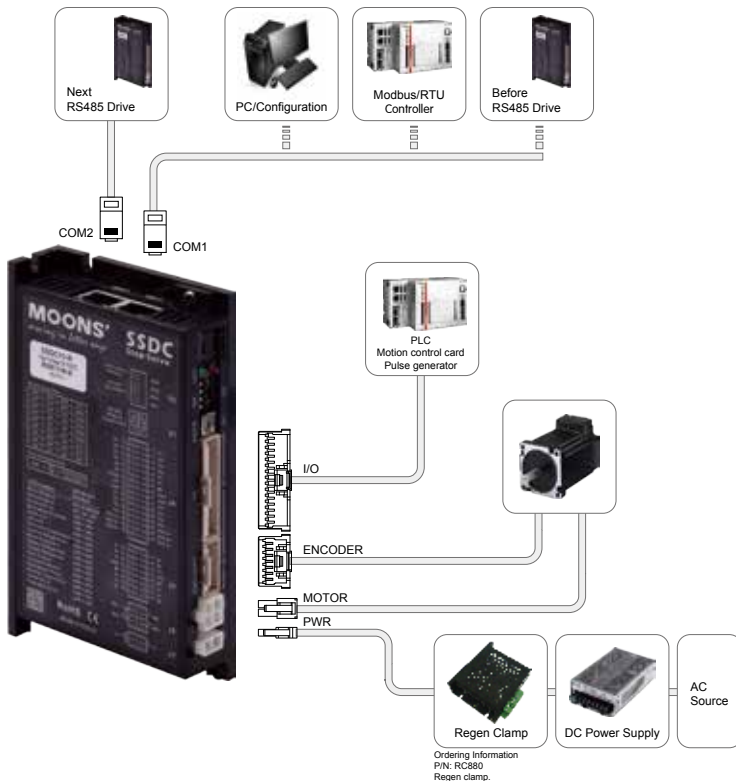


SSDC Stepper Drivers



### SSDC-R, RS485 Communication type

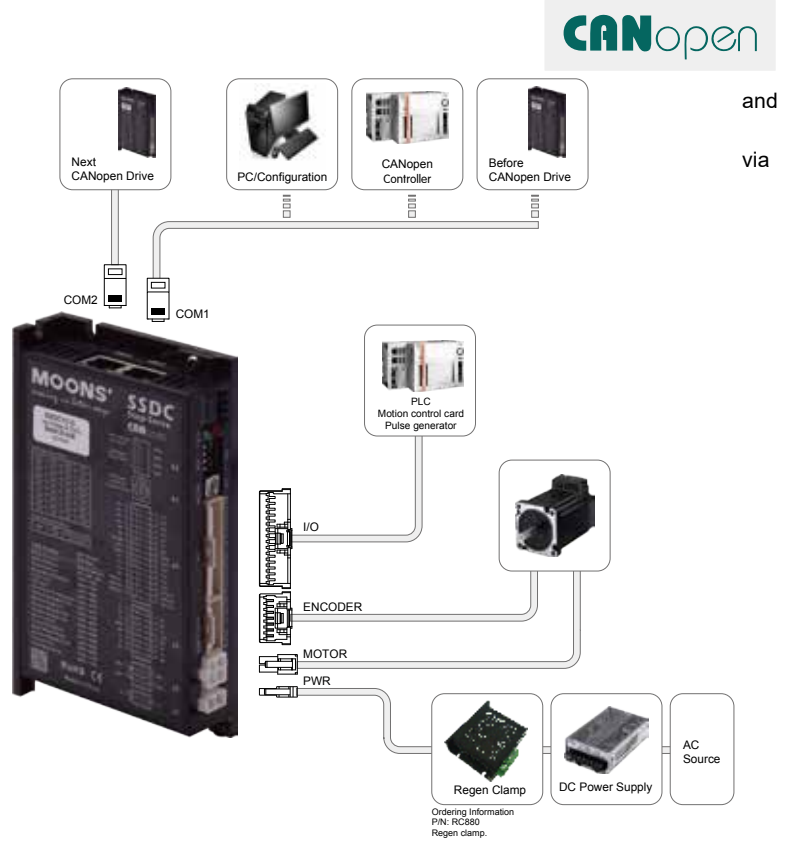
- RS-485/422 field bus control
- Modbus/RTU (Multi-axes) network, up to 32 axes per channel
- Accepts three types of pulse signal input as
- Pulse&Direction, CW/CCW and A/B Quadrature
- Analog control
- Stand alone program (Q programmer)



# SSDC Step-Servo System ( Mating AM Series Motors )

## ◇ SSDC-C, CANopen Communication type

- Operates on a CANopen communication network conforms to CiA301 and CiA402. It supports running stored Q programs MOONS' -specific CANopen objects.
- Up to 112 axes per channel
- Analog control

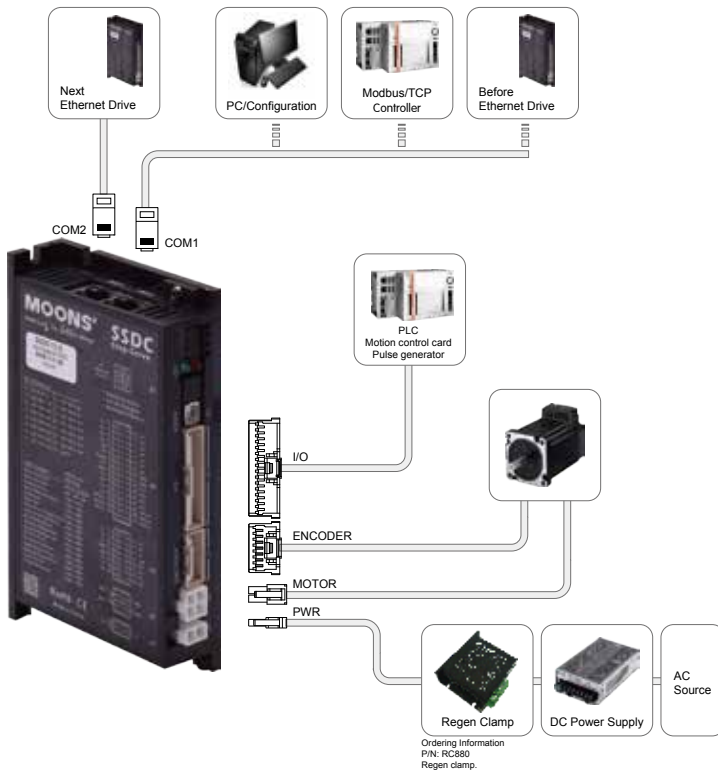


SSDC Stepper Drivers



## ◇ SSDC-D, Ethernet Communication type

- eSCL, Modbus/TCP protocol
- Stand alone(Q programmer)
- Analog control

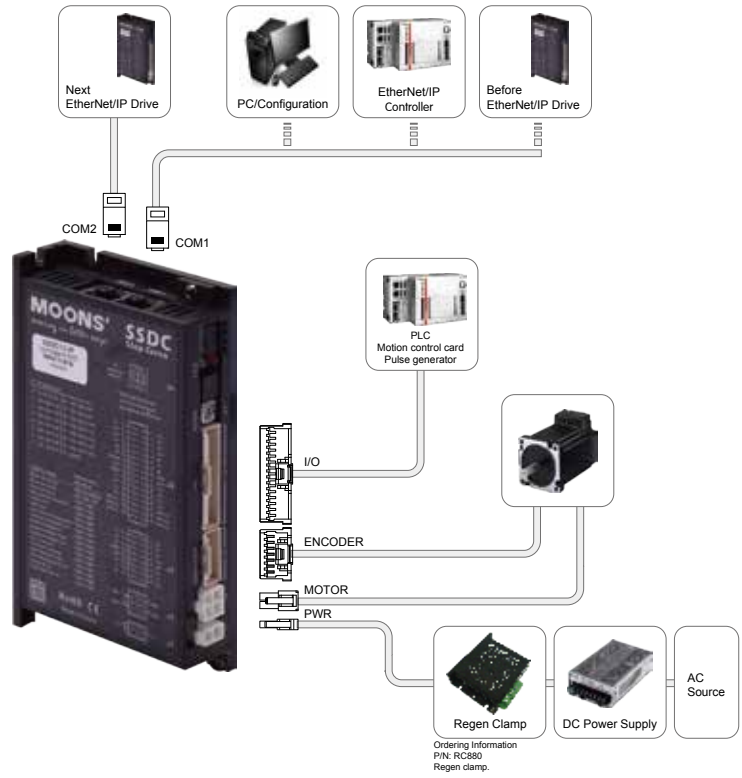


# SSDC Step-Servo System ( Mating AM Series Motors )

## ◇ SSDC-IP, Ethernet/IP Communication type

- EtherNet/IP protocol
- Stand alone(Q programmer)
- Analog control

**EtherNet/IP™**

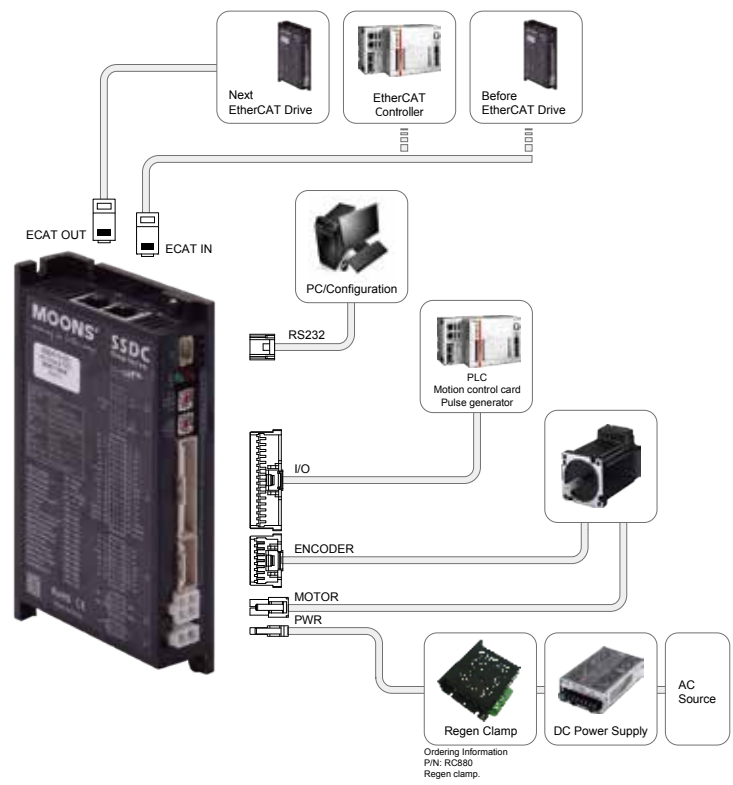


SSDC Stepper Drivers

**EtherCAT®**

## ◇ SSDC-EC, EtherCAT Communication type

- EtherCAT protocol, via CoE (conforms to CiA402).
- Stand alone(Q programmer)
- Analog control



# SSDC Step-Servo System ( Mating AM Series Motors )

## Specifications

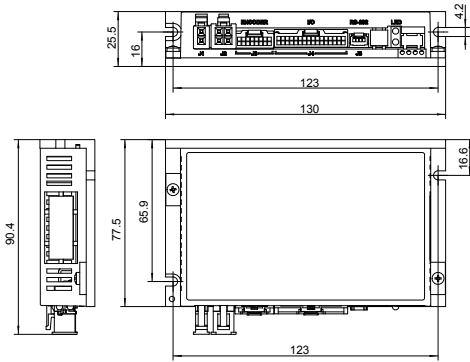
### ◇ Drive Specifications

Power Amplifier	
Amplifier Type	Dual H-Bridge, 4 Quadrant
Current Control	4 state PWM at 20 KHz
Output Current	SS03: Continuous Current 3A max, Boost Current 4A max (1.5s), current limitation auto set-up by attached motor SS06: Continuous Current 6A max, Boost Current 7.5A max (1.5s), current limitation auto set-up by attached motor SS05: Continuous Current 10A max, Boost Current 15A max (1.5s), current limitation auto set-up by attached motor
Power Supply	SSDC03: External nominal 12 - 48 volt DC power supply required, Absolute Max. input voltage range 10 - 53 VDC SSDC06: External nominal 24 - 70 volt DC power supply required, Absolute Max. input voltage range 18 - 75 VDC SSDC10: External nominal 24 - 70 volt DC power supply required, Absolute Max. input voltage range 18 - 75 VDC
Protection	Over-voltage, under-voltage, over-temp, motor/winding shorts (phase-to-phase, phase-to-ground)
Controller	
Electronic Gearing	Software selectable from 200 to 51200 steps/rev in increments of 2 steps/rev
Encoder Resolution	20000 counts/rev( for AM17/23/24/34SS-N motors) 4096 counts/rev( for AM11/17/23/24/34RS motors)
Speed Range	Up to 3600rpm
Filters	Digital input noise filter, Analog input noise filter, Smoothing filter, PID filter, Notch filter
Non-Volatile Storage	Configurations are saved in FLASH memory on-board the DSP
Modes of Operation	-A type: SCL Mode, Q -R type: SCL Mode, Q, Modbus/RTU -C type: CANopen, via CiA301 & CiA402, Q -D type: Q, Modbus/TCP, eSCL -IP type: EtherNet/IP, Q -EC type: CoE(via CiA 402), PP, PV, PT, CSP, CSV and HM mode, Q
Digital Inputs	8 digital inputs X1, X2: Optically isolated, differential, 5-24VDC; Minimum pulse width = 250ns, Max. pulse frequency = 2MHz; X3, X4: Optically isolated, differential, 5-24VDC; Minimum pulse width = 100µs, Max. pulse frequency = 5KHz; X5 ~ X8: Optically isolated, differential, 5-24VDC; Minimum pulse width = 100µs, Max. pulse frequency = 5KHz;
Digital Outputs	4 digital outputs Y1 ~ Y4; Optically isolated, Open Collector, 30V/100 mA max, Max. pulse frequency = 10KHz
Analog Inputs	Two analog inputs Analog resolution: 12bit Each input can accept a signal range of 0 to 5 VDC, ±5 VDC, 0 to 10 VDC or ±10 VDC
Encoder Outputs	Differential encoder outputs (A±, B±, Z±), 26C31 line Drive, 20 mA sink or source max
+5V Output	4.8~5V, 100 mA max
Communication	-A type: RS-232(crimp type connector) -R type: Dual-port RS-285/422(RJ45 connector) -C type: Dual-port CANopen(RJ45 connector) with RS-232 -D type: Dual-port Ethernet(RJ45 connector) -IP type: Dual-port Ethernet(RJ45 connector) -EC type: Dual-port Ethernet(RJ45 connector) with RS-232 for configuration
Physical	
Ambient Temperature	0 to 40°C (32 to 104°F) when mounted to a suitable heatsink
Ambient Humidity	90% Max., non-condensing

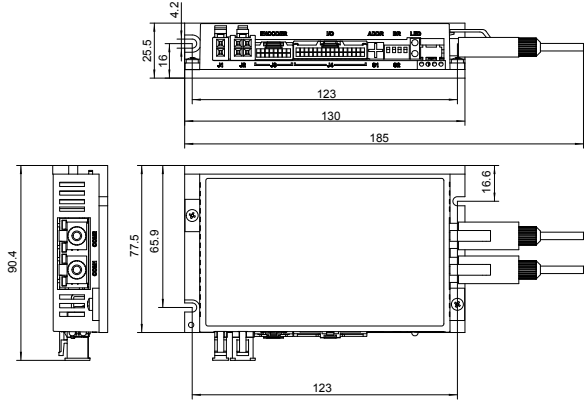
# SSDC Step-Servo System ( Mating AM Series Motors )

## ■ Drive Dimensions (Unit:mm)

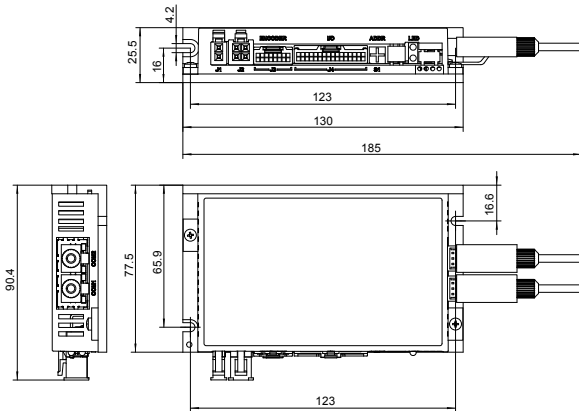
◇ SSDC03/06/10-A



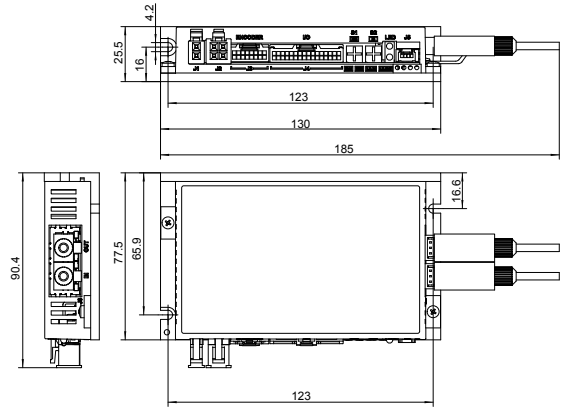
◇ SSDC03/06/10-R, SSDC03/06/10-C



◇ SSDC03/06/10-D, SSDC03/06/10-IP



◇ SSDC03/06/10-EC



SSDC Stepper Drivers

# SSDC Step-Servo System ( Mating AM Series Motors )

## Standard Accessories

### SSDC-EC Drive

Model	Qty	Category	Vendor	Description
1103-200	1	Cable	/	2m Power supply cable
39-01-3048	1	Housing	Molex	Motor connector housing (J2)
501646-1600	1	Housing	Molex	Encoder connector housing (J3)
501646-3200	1	Housing	Molex	I/O connector housing (J4)
39-00-0038	5	Crimp	Molex	Motor connector crimp
501648-1000	52	Crimp	Molex	Encoder & I/O connector crimp

### SSDC-R/C/D/IP Drive

Model	Qty	Category	Vendor	Description
1103-200	1	Cable	/	2m Power supply cable
2012-030	1	Cable	/	0.3m network cable
39-01-3048	1	Housing	Molex	Motor connector housing (J2)
501646-1600	1	Housing	Molex	Encoder connector housing (J3)
501646-3200	1	Housing	Molex	I/O connector housing (J4)
39-00-0038	5	Crimp	Molex	Motor connector crimp
501648-1000	52	Crimp	Molex	Encoder & I/O connector crimp

### SSDC-A Drive

Model	Qty	Category	Vendor	Description
1103-200	1	Cable	/	2m Power supply cable
2101-150	1	Cable	/	RS-232 configuration cable
39-01-3048	1	Housing	Molex	Motor connector housing (J2)
501646-1600	1	Housing	Molex	Encoder connector housing (J3)
501646-3200	1	Housing	Molex	I/O connector housing (J4)
39-00-0038	5	Crimp	Molex	Motor connector crimp
501648-1000	52	Crimp	Molex	Encoder & I/O connector crimp

### AM11RS Motor

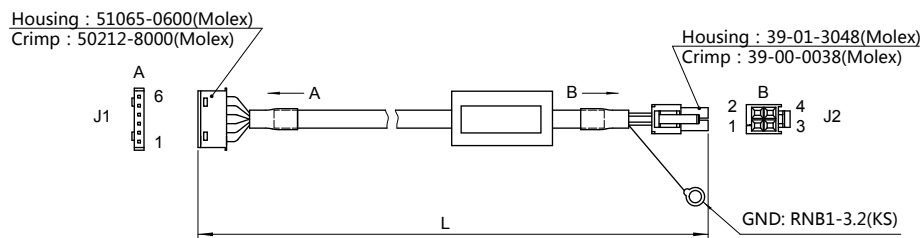
Model	Qty	Category	Vendor	Description
51065-0600	1	Housing	Molex	Motor connector housing
50212-8000	6	Crimp	Molex	Motor connector crimp
501646-1200	1	Housing	Molex	Encoder connector housing
501648-1000	15	Crimp	Molex	Encoder connector crimp

### AM17/23RS Motor

Model	Qty	Category	Vendor	Description
39-01-3049	1	Housing	Molex	Motor connector housing
39-00-0040	5	Crimp	Molex	Motor connector crimp
1-1903130-6	1	Housing	Tyco	Encoder connector housing
1903120-1	15	Crimp	Tyco	Encoder connector crimp

## Optional Accessories (Sold separately)

### Extended motor cable ( For AM11RS motor )

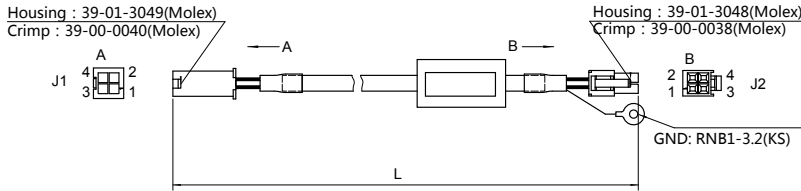


Model	Length(L)	Description
2109-100	1M	Standard type
2109-300	3M	Standard type
2109-500	5M	Standard type
2109-1000	10M	Standard type
2109-100-C02	1M	Flexibile type, 2 million times bends
2109-300-C02	3M	Flexibile type, 2 million times bends
2109-500-C02	5M	Flexibile type, 2 million times bends
2109-1000-C02	10M	Flexibile type, 2 million times bends

Wiring Diagram		
PIN (J1)	Color (Signal)	PIN (J2)
1	Blue (B-)	1
3	Red (B+)	2
4	Green (A-)	3
6	Black (A+)	4

# SSDC Step-Servo System ( Mating AM Series Motors )

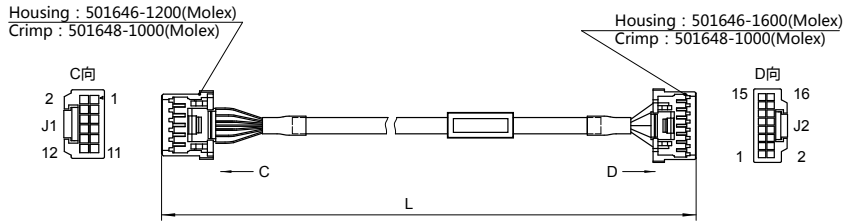
## ◇ Extended motor cable ( For AM17/23RS motor )



Model	Length(L)	Description
2103-100	1M	Standard type
2103-300	3M	Standard type
2103-500	5M	Standard type
2103-1000	10M	Standard type
2128-100-C05	1M	Flexbile type, 5 million times bends
2128-300-C05	3M	Flexbile type, 5 million times bends
2128-500-C05	5M	Flexbile type, 5 million times bends
2128-1000-C05	10M	Flexbile type, 5 million times bends

Wiring Diagram		
PIN (J1)	Color (Signal)	PIN (J2)
1	Blue (B-)	1
2	Red (B+)	2
3	Green (A-)	3
4	Black (A+)	4

## ◇ Extended encoder cable ( For AM11RS motor )



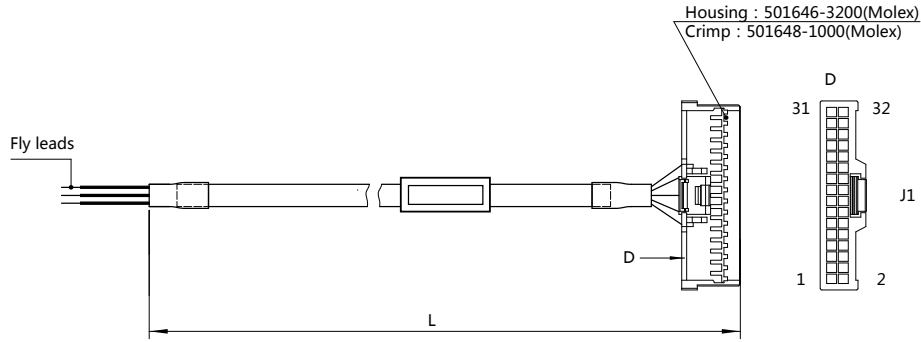
Model	Length(L)	Description
2118-100	1M	Standard type
2118-300	3M	Standard type
2118-500	5M	Standard type
2118-1000	10M	Standard type
2118-100-C02	1M	Flexbile type, 2 million times bends
2118-300-C02	3M	Flexbile type, 2 million times bends
2118-500-C02	5M	Flexbile type, 2 million times bends
2118-1000-C02	10M	Flexbile type, 2 million times bends

Wiring Diagram		
PIN (J1)	Color (Signal)	PIN (J2)
10	Blue (A+)	1
9	Blue/Black (A-)	2
8	Green (B+)	3
7	Green/Black (B-)	4
6	Yellow (Z+)	5
5	Yellow/Black (Z-)	6
3	Red (+5V)	7
4	Black (GND)	8
12	Shield	10
NC	Brown	NC
NC	Brown/Black	NC
NC	Gray	NC
NC	Gray/Black	NC
1	White (W+)	15
2	White/Black (W-)	16



# SSDC Step-Servo System ( Mating AM Series Motors )

◇ I/O Cable

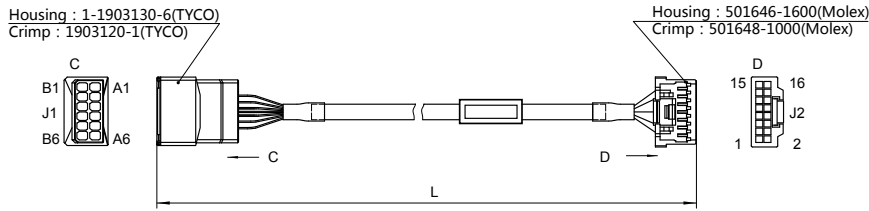


Model	Length(L)	Description
1117-100	1M	Shielded Type
1117-200	2M	Shielded Type

Wiring Diagram			
PIN (J1)	Color (Signal)	PIN (J1)	Color (Signal)
1	Blue/White (X1+)	17	NC
2	Blue/Black (X1-)	18	NC
3	Green/White (X2+)	19	Brown/White (Y1+)
4	Green/Black (X2-)	20	Brown/Black (Y1-)
5	Red (X3+)	21	Gray/White (Y2+)
6	Orange (X3-)	22	Gray/Black (Y2-)
7	Blue (X4+)	23	Violet/White (Y3+)
8	Violet (X4-)	24	Violet/Black (Y3-)
9	Yellow (X5)	25	Pink (Y4+)
10	Green (X6)	26	Yellow/Green (Y4-)
11	Brown (X7)	27	Red/White (ENC A+)
12	Gray (X8)	28	Red/Black (ENC A-)
13	Shield	29	Orange/White (ENC B+)
14	White (XCOM)	30	Orange/Black (ENC B-)
15	Black (GND)	21	Yellow/White (ENC Z+)
16	NC	32	Yellow/Black (ENC Z-)

# SSDC Step-Servo System ( Mating AM Series Motors )

## ◇ Extended encoder cable ( For AM17/23RS motor )



Model	Length(L)	Description
2116-100	1M	Standard type
2116-300	3M	Standard type
2116-500	5M	Standard type
2116-1000	10M	Standard type
2116-100-C05	1M	Flexible type, 5 million times bends
2116-300-C05	3M	Flexible type, 5 million times bends
2116-500-C05	5M	Flexible type, 5 million times bends
2116-1000-C05	10M	Flexible type, 5 million times bends

Wiring Diagram		
PIN (J1)	Color (Signal)	PIN (J2)
A6	Blue (A+)	1
B6	Blue/Black (A-)	2
A5	Green (B+)	3
B5	Green/Black (B-)	4
A4	Yellow (Z+)	5
B4	Yellow/Black (Z-)	6
A3	Red (+5V)	7
B3	Black (GND)	8
A1	Shield	10
NC	Brown	NC
NC	Brown/Black	NC
NC	Gray	NC
NC	Gray/Black	NC
A2	White (W+)	15
B2	White/Black (W-)	16

## ◇ Network Cable

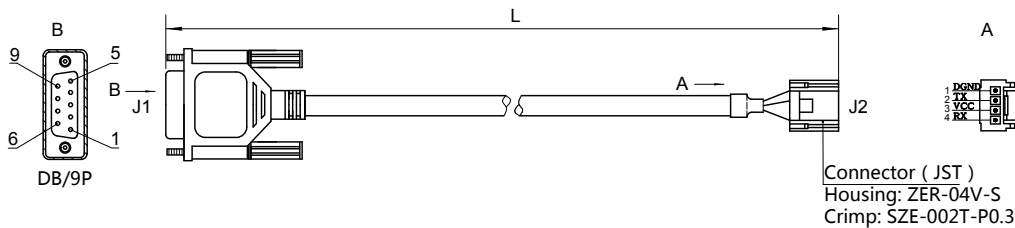


Model	Length(L)	Description
2012-030*	0.3m	Standard type
2012-300	3m	Standard type
2013-030	0.3m	Shielded Type
2013-300	3m	Shielded Type

\* 2012-030 is included in the drive package(except SSDC-A, SSDC-EC type).

## ◇ Configuration Cable

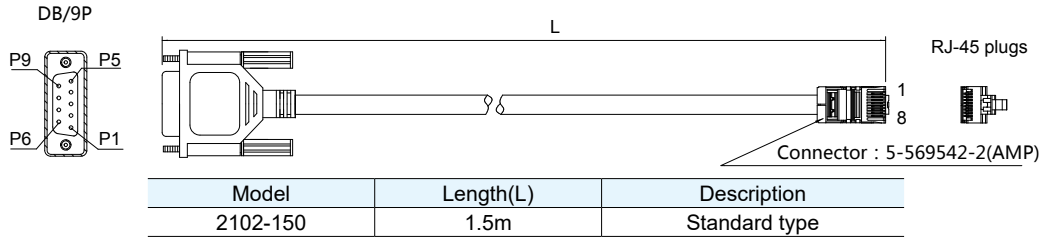
- SSDC-EC、SSDC-A configuration cable



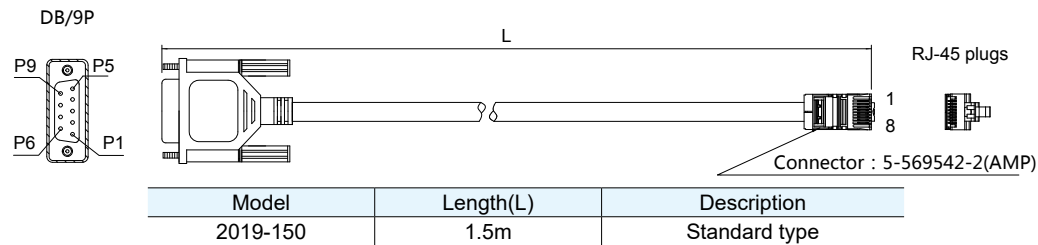
Model	Length(L)	Description
2101-150	1.5m	Standard type

# SSDC Step-Servo System ( Mating AM Series Motors )

■ SSDC-R Configuration cable



■ SSDC-C Configuration cable

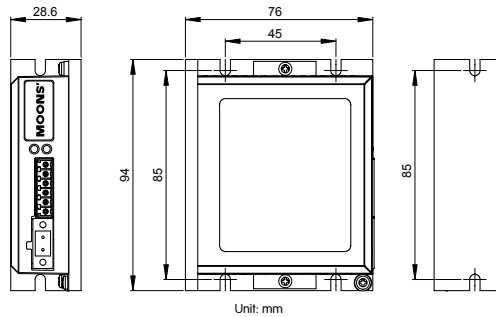


◇ **Regeneration Clamp**

**P/N : RC880**

When using a regulated power supply you may encounter a problem with regeneration. The kinetic energy caused by regeneration is transferred back to the power supply. This can trip the over-voltage protection of a switching power supply, causing it to shut down.

MOONS' offers the RC880 "regeneration clamp" to solve this problem. If in doubt, use an RC880 for your first installation. If the "Regen" LED on the RC880 never flashes, you don't need the clamp.



◇ **USB Converter**

Model: MS-USB-RS232-01  
Description: USB-RS232 Converter

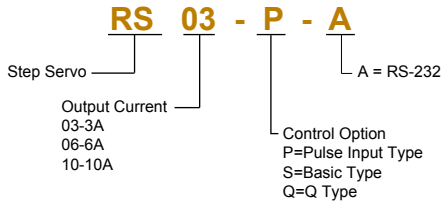
Model: MS-USB-RS485-01  
Description: USB-RS485 Converter

Model: MS-USB-CAN-01  
Description: USB-CAN Converter



# RS Series Drives ( Mating AM Series Motors )

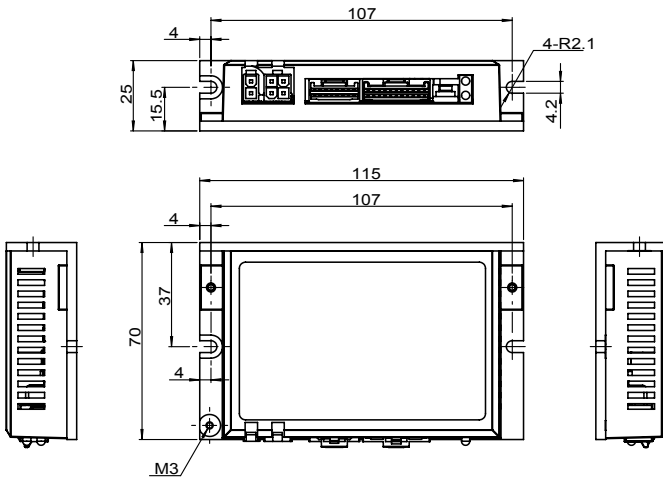
## Ordering Information



Drive Type	Motor Type	Control
RS03-P-A	AM11RS2DMA	P Type Pulse Input Type RS-232 Communication 4 Digital Inputs 3 Digital Outputs Encoder Output
	AM17RS2DMA	
RS06-P-A	AM23RS2DMA	
RS03-S-A	AM11RS2DMA	S Type Basic Type RS-232 Communication 4 Digital Inputs 3 Digital Outputs
	AM17RS2DMA	
RS06-S-A	AM23RS2DMA	
RS03-Q-A	AM11RS2DMA	Q Type Programm Type RS-232 Communication 4 Digital Inputs 3 Digital Outputs
	AM17RS2DMA	
RS06-Q-A	AM23RS2DMA	

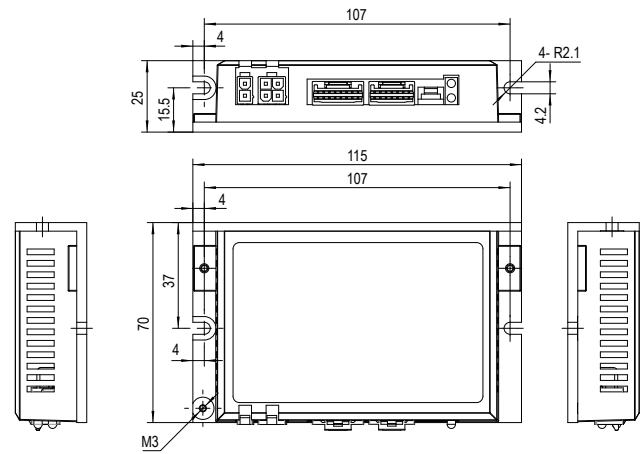
## Drive Dimension

RS03/06/10-P



Model		
RS03-P-A	RS06-P-A	RS10-P-A

RS03/06/10-S/Q

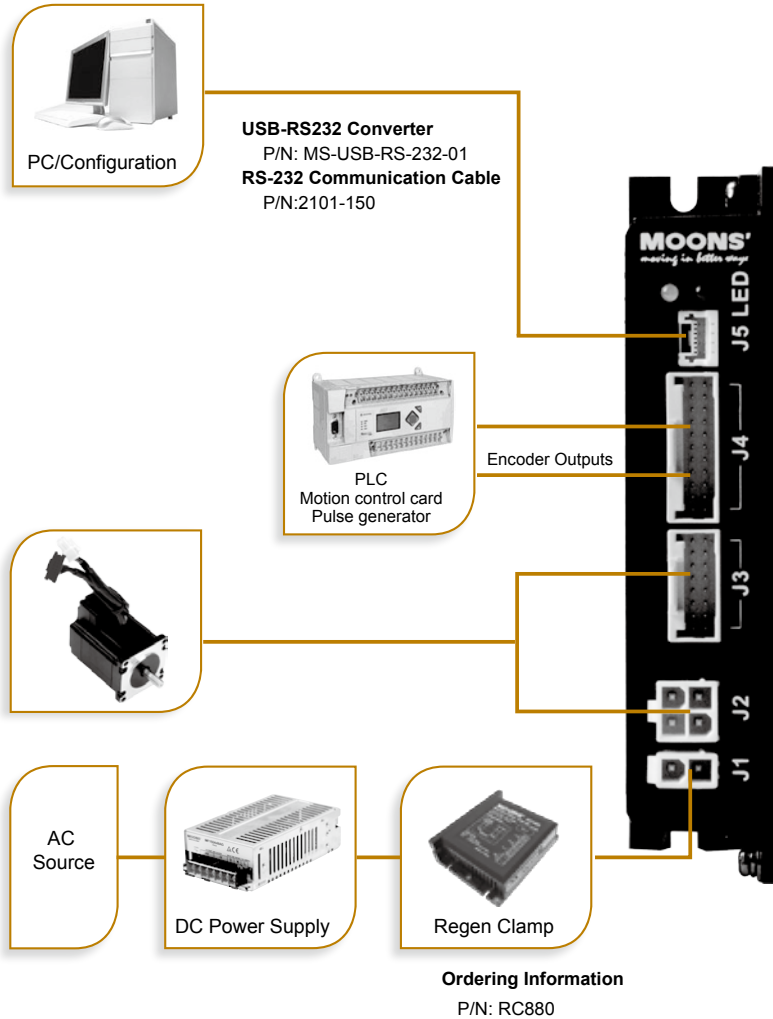


Model		
RS03-S-A	RS06-S-A	RS10-S-A
RS03-Q-A	RS06-Q-A	RS10-Q-A

# RS Series Drives ( Mating AM Series Motors )

## ■ System configuration

### -P Pulse input type



RS Stepper Drivers

### Standard Accessories

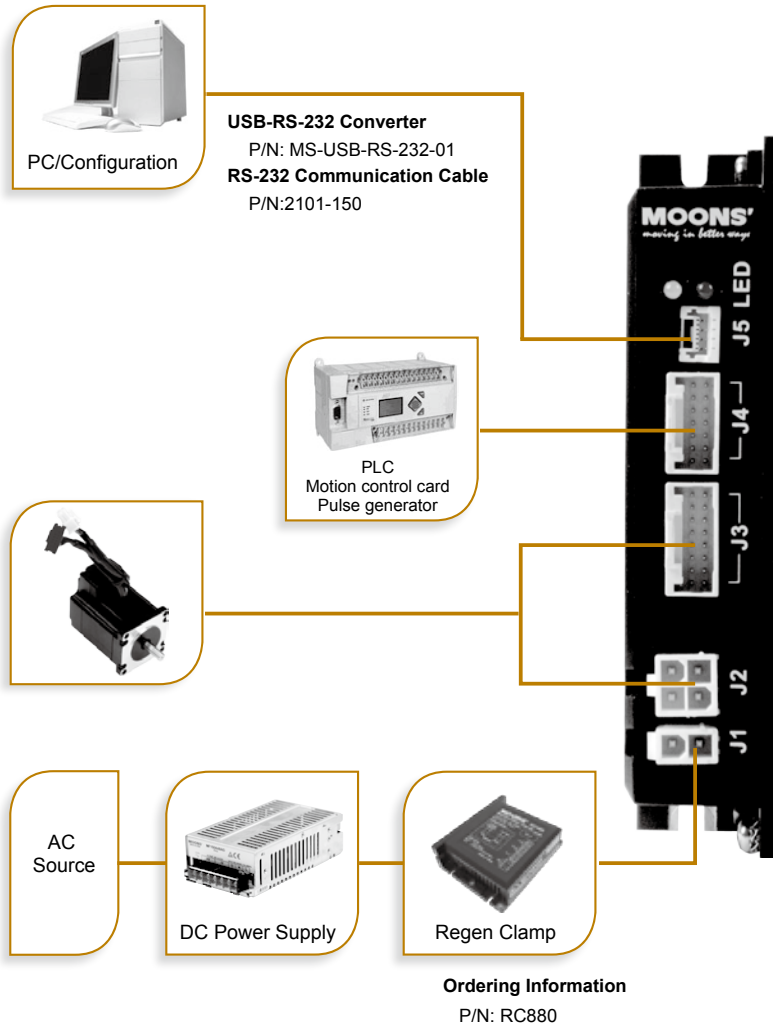
P/N	Catagory	Technical Specification
1103-200	Cable	Power Supply Cable, 2M
2101-150	Cable	RS-232 Communication Cable, 1.5M

### Optional Accessories (Sold separately)

P/N	Catagory	Technical Specification
RC880	Regeneration Clamp	80VDC Max. 50W
MS-USB-RS-232-01	USB Converter	USB-RS-232
1108-□□□	Cable	RS-S/Q Standard I/O Cable, Shield
1115-□□□	Cable	RS-P Standard I/O Cable, Shield
2103-□□□	Cable	Motor Extension Cable for AM17/23/24RS motor
2109-□□□	Cable	Motor Extension Cable for AM11RS motor
2116-□□□	Cable	Encoder Extension Cable for AM17/23/24RS motor
2118-□□□	Cable	Encoder Extension Cable for AM11RS motor

# RS Series Drives ( Mating AM Series Motors )

## -S Basic type with serial communication



### Standard Accessories

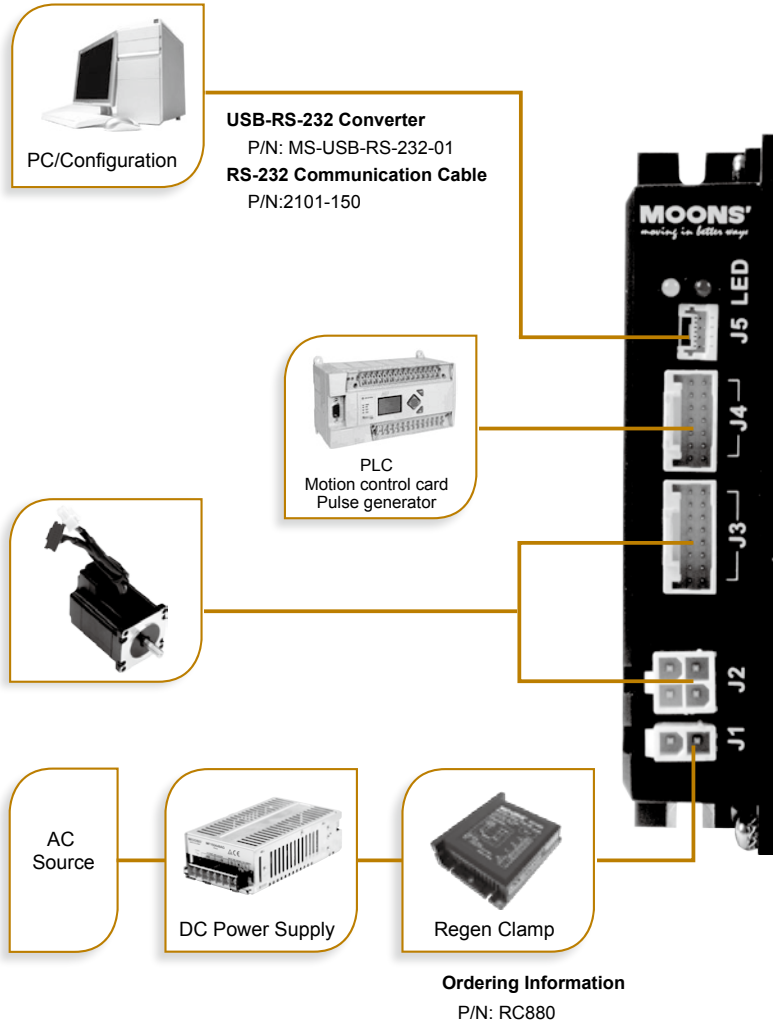
P/N	Category	Technical Specification
1103-200	Cable	Power Supply Cable, 2M
2101-150	Cable	RS-232 Communication Cable, 1.5M

### Optional Accessories (Sold separately)

P/N	Category	Technical Specification
RC880	Regeneration Clamp	80VDC Max. 50W
MS-USB-RS-232-01	USB Converter	USB-RS-232
1108-□□□	Cable	RS-S/Q Standard I/O Cable, Shield
1115-□□□	Cable	RS-P Standard I/O Cable, Shield
2103-□□□	Cable	Motor Extension Cable for AM17/23/24RS motor
2109-□□□	Cable	Motor Extension Cable for AM11RS motor
2116-□□□	Cable	Encoder Extension Cable for AM17/23/24RS motor
2118-□□□	Cable	Encoder Extension Cable for AM11RS motor

# RS Series Drives ( Mating AM Series Motors )

-Q Built-in programmable motion controller



RS Stepper Drivers

## Standard Accessories

P/N	Category	Technical Specification
1103-200	Cable	Power Supply Cable, 2M
2101-150	Cable	RS-232 Communication Cable, 1.5M

## Optional Accessories (Sold separately)

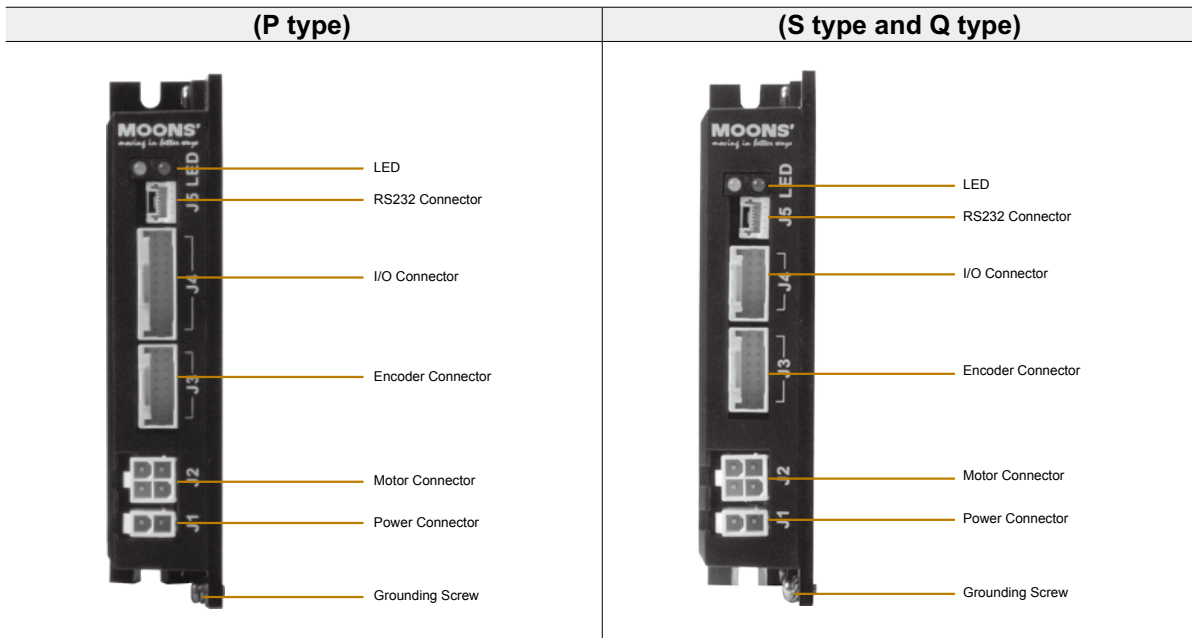
P/N	Category	Technical Specification
RC880	Regeneration Clamp	80VDC Max. 50W
MS-USB-RS-232-01	USB Converter	USB-RS-232
1108-□□□	Cable	RS-S/Q Standard I/O Cable, Shield
1115-□□□	Cable	RS-P Standard I/O Cable, Shield
2103-□□□	Cable	Motor Extension Cable for AM17/23/24RS motor
2109-□□□	Cable	Motor Extension Cable for AM11RS motor
2116-□□□	Cable	Encoder Extension Cable for AM17/23/24RS motor
2118-□□□	Cable	Encoder Extension Cable for AM11RS motor

# RS Series Drives ( Mating AM Series Motors )

## ■ Drive Specifications

Power Amplifier	
Amplifier Type	Dual H-Bridge, 4 Quadrant
Current Control	4 state PWM at 20 KHz
Output Current	RS03: Continuous Current 3A max, Boost Current 4.0A max (1.5s), current limitation auto set-up by attached motor
	RS06: Continuous Current 6A max, Boost Current 7.5A max (1.5s), current limitation auto set-up by attached motor
	RS06: Continuous Current 10A max, Boost Current 12A max (1.5s), current limitation auto set-up by attached motor
Power Supply	External nominal 24 - 70 volt DC power supply required, Absolute Max. input voltage range 18 - 75 VDC
Protection	Over-voltage, under-voltage, over-temp, motor/winding shorts (phase-to-phase, phase-to-ground)
Controller	
Electronic Gearing	Software selectable from 200 to 51200 steps/rev in increments of 2 steps/rev
Filters	Digital input noise filter, Smoothing filter, PID filter, Notch filter
Non-Volatile Storage	Configurations are saved in FLASH memory on-board the DSP
Modes of Operation	P type: Position Mode(Pulse & Direction, CW & CCW Pulse, A/B Quadrature) S type: Position Mode(Pulse & Direction, CW & CCW Pulse, A/B Quadrature); Torque Mode, Velocity Mode, SCL Mode Q type: Position Mode(Pulse & Direction, CW & CCW Pulse, A/B Quadrature); Torque Mode, Velocity Mode, SCL Mode, Q Programming
Digital Inputs	P/S/Q type: X1/STEP, X2/DIR, Optically isolated, differential, 5-24VDC; Minimum pulse width = 250 ns, Max. pulse frequency = 2 MHz; X3,X4:optically isolated, single-ended, sinking or sourcing, 5-24VDC, minimum pulse width 50µs, Max. pulse frequency 10KHz;
Digital Outputs	P/S/Q type: Y1/Alarm, Y2/In Position, Y3/Brake; Optically isolated, 30V/100 mA max
Encoder Outputs	P type: Differential encoder outputs (AOUT±, BOUT±, ZOUT±), 26C31 line Drive, 20 mA sink or source max
Communication	RS-232
Physical	
Ambient Temperature	0 to 40°C (32 to 104°F) when mounted to a suitable heatsink
Ambient Humidity	90% Max., non-condensing
Mass	Approx 0.2 Kg

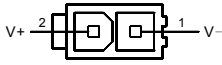
## ■ Connection and Operation





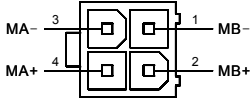
# RS Series Drives ( Mating AM Series Motors )

## Power Connector



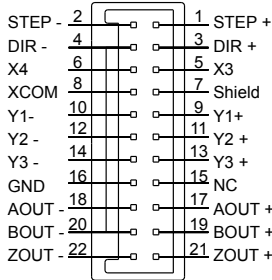
PIN	Description
1	Power Supply -
2	Power Supply +

## Motor Connector



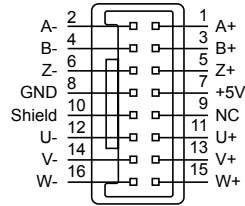
Pin.	Description
1	Motor Phase B-
2	Motor Phase B+
3	Motor Phase A-
4	Motor Phase A+

## I/O Connector(-P Type)



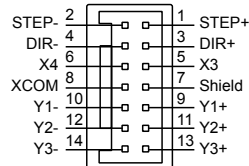
Pin.	Description
1 X1/STEP+	Digital Input 1/Step Input+
2 X1/STEP-	Digital Input 1/Step Input-
3 X2/DIR+	Digital Input 2/Direction Input+
4 X2/DIR-	Digital Input 2/Direction Input-
5 X3	Digital Input 3
6 X4	Digital Input 4
7 Shield	Shielded Ground
8 XCOM	Digital Input COM for X3, X4
9 Y1+	Digital Output 1+
10 Y1-	Digital Output 1-
11 Y2+	Digital Output 2+
12 Y2-	Digital Output 2-
13 Y3+	Digital Output 3+
14 Y3-	Digital Output 3-
15 NC	No Connection
16 GND	Digital Groud
17 AOOUT+	Encoder Output A+
18 AOOUT-	Encoder Output A-
19 BOOUT+	Encoder Output B+
20 BOOUT-	Encoder Output B-
21 ZOOUT+	Encoder Output Z+
22 ZOOUT-	Encoder Output Z-

## Encoder Connector



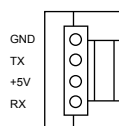
Pin.	Description
1	Encoder A+
2	Encoder A-
3	Encoder B+
4	Encoder B-
5	Encoder Z+
6	Encoder Z-
7	+5V Power Supply for Encoder
8	GND
9	NC
10	Earth GND
11	Encoder U+
12	Encoder U-
13	Encoder V+
14	Encoder V-
15	Encoder W+
16	Encoder W-

## I/O Connector(-S/Q Type)



Pin.	Description
1 X1/STEP+	Digital Input 1/Step+
2 X1/STEP-	Digital Input 1/Step-
3 X2/DIR+	Digital Input 2/DIR+
4 X2/DIR-	Digital Input 2/DIR-
5 X3	Digital Input 3
6 X4	Digital Input 4
7 Shield	Shielded Ground
8 XCOM	Digital Input COM for X3, X4
9 Y1+	Digital Output 1+
10 Y1-	Digital Output 1-
11 Y2+	Digital Output 2+
12 Y2-	Digital Output 2-
13 Y3+	Digital Output 3+
14 Y3-	Digital Output 3-

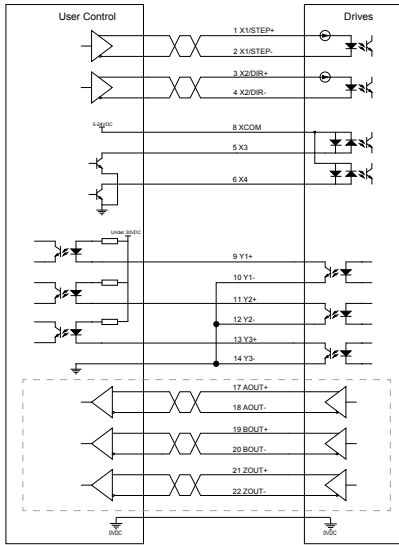
## Communication Connector



Pin.	Description
GND	GND
TX	RS-232 Data transmit
+5V	+5V
RX	RS-232 Data receive

# RS Series Drives ( Mating AM Series Motors )

## Wiring Diagram



The encoder output function in the dashed box is only supported by P type

## Description of Input/Output Signals

Input (Output) "ON" indicates that the current is flowing into or out of an input or output.

Input (Output) "OFF" indicates that there is no current flowing into or out of an input or output.

Circuit above shows when pulse input is line Drive type

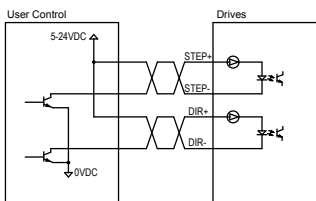
Pulse signal input range 5-24VDC

Digital signal input range 5-24VDC

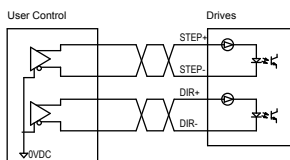
Use a multi-core, twisted-pair shielded wire of AWG28 to 24 for the control input/output signal line, and keep wiring as short as possible  
Provide safety distance between the control I/O signal wires and power wires.

### Pulse Input Circuit and Sample Connection

With Open Collector Output



With Line Drive Output



## Pulse Input Mode

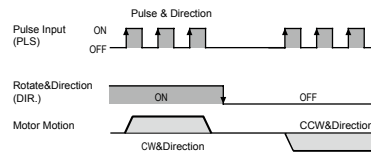
### Pulse & Direction

When the Pulse input is turned ON while the DIR input is ON, the motor will rotate by one step in one direction.

When the Pulse input is turned ON while the DIR input is OFF, the motor will rotate by one step the other direction.

\*Direction definition of DIR input can be configured via **Step-Servo Quick Tuner**.

The chart below shows motor configured as while the DIR input is ON, the motor will rotate by CW direction



### CW/CCW Pulse

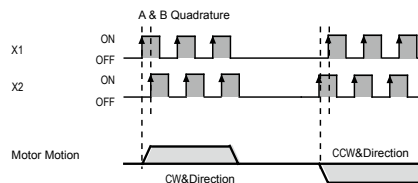
When the X1 input is turned ON, the motor will rotate by one step in one direction. When the X2 input is turned ON, the motor will rotate by one step in the other direction.

\*Direction definition can be configured via **Step-Servo Quick Tuner**.

The chart below shows motor configured as while the X1 input is ON, the motor will rotate by one step in CW direction

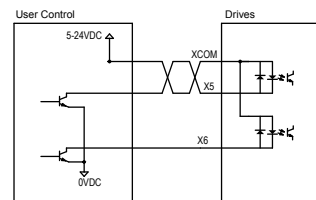
### A & B Quadrature

The motor will move according to signals that are fed to the drive from a two channel incremental master encoder. Direction is determined via which channel leads the other. The chart below shows motor configured as while X1 Leads X2, the motor will rotate by CW direction.



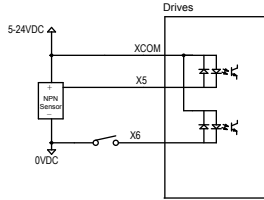
### Digital Input Circuit and Sample Connection

With Open Collector Output



# RS Series Drives ( Mating AM Series Motors )

## With NPN type Sensor



## With PNP type Sensor



## Servo On Input

X3 can be configured as Enable signal to excite the motor.

## Alarm Reset Input

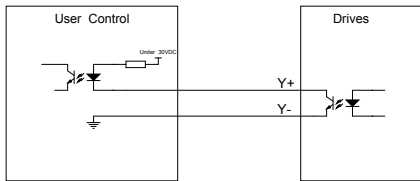
X4 can be configured as Reset signal to clear the alarm.

**Caution:** Please make sure there's no error in system before you clear an Alarm.

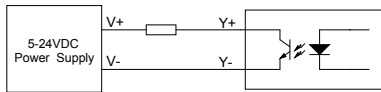
## Connecting using Digital Outputs

Output Circuit and Sample Connection

Open Collector Output



## Driving external load



## Alarm Output

Y1 can be configured as signal output if a fault occurs, meanwhile the LED will display the error code.

## In Position Output

Y2 or Y3 can be configured as signal output when position error is less than a user-defined count value.

## Timing Output

Y2 can be configured as Timing signal output, it will turn ON every time the motor output shaft rotates by 7.2°, 50 pulses output with one rotation.

## Tach Output

Y2 can be configured as Tach signal output. Tach output produces pulses relative to the motor position with configurable resolution: 100, 200, 400, 800, 1600.

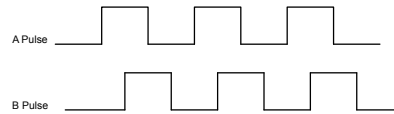
## Encoder Output

Differential pulse output with channel A/B/Z

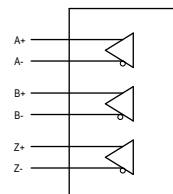
While motor rotates one revolution, A-Phase/B-Phase generate total 20,000 counts, Z-Phase generates one signal.

The B-Phase output has a 90° phase difference with respect to the A-Phase output. Phase A Leads B 90° while motor rotates by CW direction, phase B leads A 90° while motor rotates by CCW direction.

Pulse Output Signal Chart

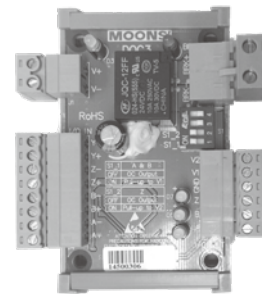


## Encoder Output Circuit



**Note:** If the controller cannot support differential signal input, you can choose the module that it can convert the differential signal into open-collector output.

Module part number: DOC3



## How To Get Samples Quickly

If you require a specific configuration, and wish for our engineering department to provide samples that meet your critical parameters, please fill out the application data sheet below and sent to MOONS' .

( E-mail : info@moons.com.cn )

### Application info. of Linear Step Motors & Linear Slides

#### Customer Info.

Customer: \_\_\_\_\_ Contact Info.: \_\_\_\_\_

Project No.: \_\_\_\_\_ Telephone: \_\_\_\_\_

#### Project Info.

Products Category :  Linear Step Motors  Linear Slides  Stepper Drive

Background:  New Design ,Competitor: \_\_\_\_\_  Substitution Project ,Current State: \_\_\_\_\_

Quantity of samples: \_\_\_\_\_ EAU: \_\_\_\_\_ Pain: \_\_\_\_\_

Expected Delivery Time: \_\_\_\_\_ Target Price: \_\_\_\_\_ USD/EA

#### Design Info.

Installation:  Horizontal  Vertical

Driving Condition: Voltage : \_\_\_\_\_ V Current : \_\_\_\_\_ A

Thrust Force: \_\_\_\_\_ N Working Speed: \_\_\_\_\_ mm/s

Stroke: \_\_\_\_\_ mm Repeatability:  $\pm$  \_\_\_\_\_ mm

Working Frequency: \_\_\_\_\_ cycles per hour, \_\_\_\_\_ hours per day.

Additional Options :  Add Encoder  Add Brake  No additional

Environment :  Indoor(Normal)  Indoor(Dust-free)  Medium or Heavy Dust  Sticky Substance

High Humidity  Salt Spray  High Temp. \_\_\_\_\_ °C  Low Temp. \_\_\_\_\_ °C

Vacuum  Others: \_\_\_\_\_

#### Industry

Factory Automation  Biochemical Analysis  Medical Science  3D Printer  Automatic Vending

Semiconductor Mfg.  Lithium Battery Mfg.  Photovoltaic Mfg.  Electron Mfg.  Measuring Instrument

Coordinate Robot  Packaging Equipment  Others: \_\_\_\_\_

#### Application Description

( Please describe your application so we can ensure the best possible solution. )

## Worldwide Service Map



## MOONS' Business Philosophies

### • Customer satisfaction

MOONS' aims to enhance customer satisfaction through the provision of innovative solutions, development of high quality products, on-time delivery and outstanding customer support.

### • Employee satisfaction

MOONS' values and respects our employees' input and encourages them to grow together with the company. We have been working to develop tools and trainings to build a thriving culture of excellence internally to support the future growth of our employees and the company.

### • Partnership

MOONS' strongly believes in a true integrated partnership between all partners in business including customers, distributors and all these in supply chain. As a result of this philosophy, we endeavor to provide the best value contribution to all partners, which can help our partners improve their competitiveness to achieve the win-win situation.

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Fax: +86 (0)21 52634098

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### APPLIED MOTION PRODUCTS, INC.

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E-mail: [info@moons.com.cn](mailto:info@moons.com.cn)

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