SCREW TECHNOLOGY CO., LIMITED
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E-mail: screwtech@screwtech.cn

Hybrid Stepper Motor

Stepper motors, highly precise, digitally controlled motors, which are able to provide reliable operation without using detectors to sense or indicate position. The operation of the motor is controlled through electrical pulses. The direction of current flowing through the windings of the motor is switched with each pulse. The electrical pulse is converted into shaft rotation in steps of a fixed angle. Together with the driver, it constitutes an open loop controlling system, which is of low cost and simple to construct.

Characteristics

Precise Position Control

The specified number of pulses determines the output degree(s) generated.

Linear Speed Selection

The running speed is linearly variable and determined by the frequency of the pulses.

Forward & Reverse, Pause and Holding Function

The forward & reverse rotation is controlled by the polarity. There is still holding torque even while the motor rotor is being locked. There is still current flowing through the motor winding, but no pulse signal creating rotation from the outside controller.

Low Speed Feature

Low frequency pulses being input, a stepper motor can operate at very low rotating speeds. This can be done without a speed reduction gearbox and thereby save power and maintain precision.

Long Life

The brushless design provides stepper motors with a very long life. In fact, the stepper motor life is determined by the life of the bearings. Stepper motors are widely being used in many types of digitally controlled motion control applications, such as printers, intelligent (performance) stage lighting, office, bank and industrial equipment, medical, packaging, textile, aerospace, robotics and automotive

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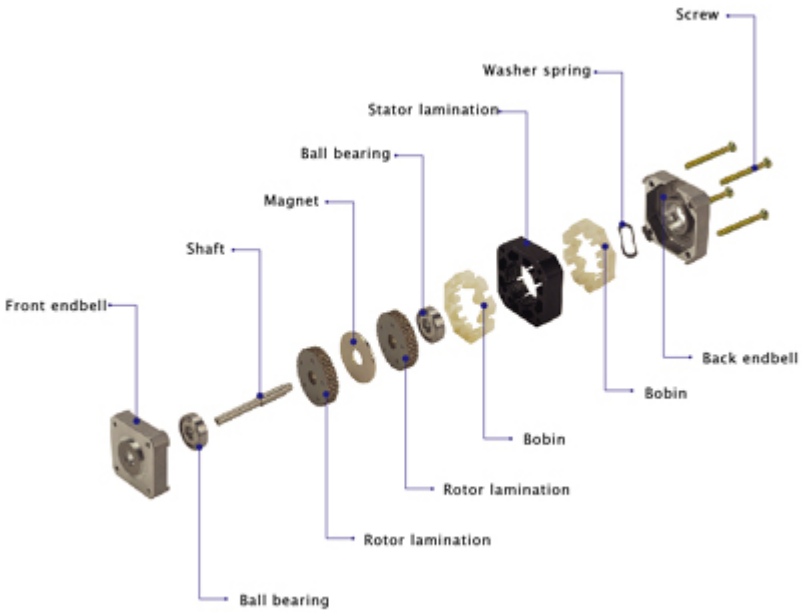
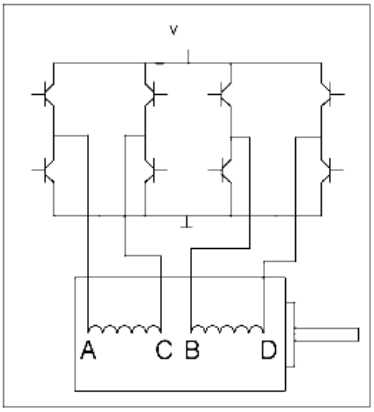
Basic Structure

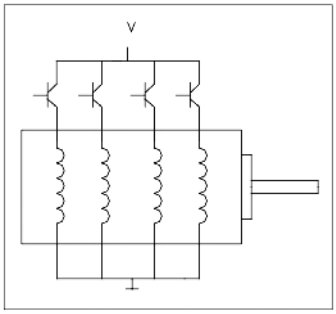


Operating Principles

The driver's internal logic circuit generates a series of pulses in a specified order that drive the stepper motor windings, causing the rotor to rotate forward, reverse, or lock in position. For example: a 2 phase 1.8 degree stepper motor normally is designed with two types of windings, i.e. 4-wire (bipolar) or 6-wire (unipolar).



4-wire Stepper Motor with Bipolar Driver



6-wire Stepper Motor with Unipolar Driver

When energizing its coils by special sequence (see item 3 in page 9) , this motor will rotate 1.8 degree per step. On average, a 4-wire stepper motor provides, 40% more holding torque than a 6-wire stepper motor, because 100% of the winding is used in a bipolar drive.

This is brief introduction to stepper motor operating principles. Various conditions and applications may need customized designs which we can provide.

Type of Load

Generally speaking, motor load
consists of torque and inertia load

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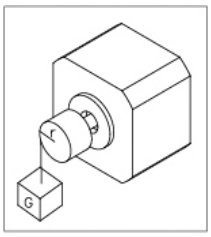
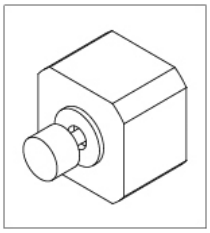
A. Torque load (Tf)

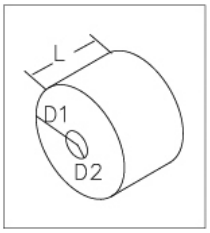
Tf=G*r
G: weight
r: radius



B. Inertia load (TJ)

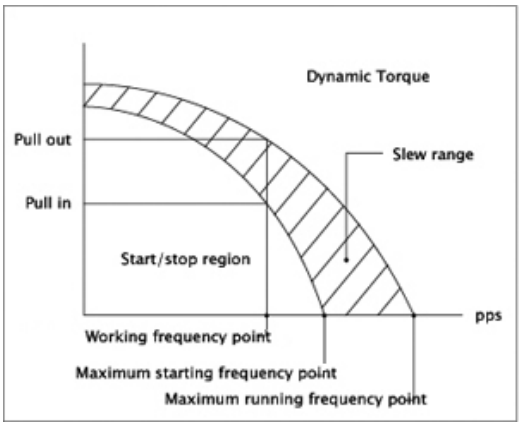
TJ:=J*dw/dt
J=M*(D12+D22)/8*(Kg* cm)
M: mass
D1:outside radius
D2:inside radius
dw/dt: angle acceleration





Explanation of the Dynamic Torque Curve

The dynamic torque curve is an important aspect of stepper motor's output performance.
The followings are some keyword explanations.



Keyword Explanation

1. Working Frequency Point: express the stepper motor's rotational speed value at this point.

Units: Hz
n=0*Hz/(360*D)
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E.g.: 1.8° stepper motor, in the condition of 1/2 subdividing (each step 0.9°) runs at 500Hz, its speed is 1.25r/s.

2. Start/Stop Region: the region in which a stepper motor can be directly started or stopped.

3. Slew Range: the motor cannot be started directly in this area. It must be started in the start/stop region first, and then accelerated to this area. In this area, the motor cannot be directly stopped, either. Otherwise this will lead to losing-step. The motor must be decelerated back to the start/stop region before it can be stopped.

4. Maximum starting frequency point: at this point, the stepper motor can reach its maximum starting speed under unloaded condition.

5. Maximum running frequency point: at this point, the stepper motor can reach its maximum running speed under an unloaded condition.

6. Pull-in Torque: the maximum dynamic torque value that a stepper motor can load directly at the particular operating frequency point.

7. Pull-out Torque: the maximum dynamic torque value that a stepper motor can load at the particular operating frequency point when the motor has been started. Because of the inertia of rotation, the Pull-Out Torque is always larger than the Pull-In Torque.

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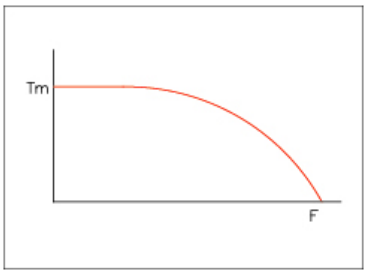
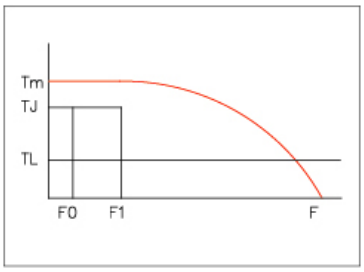
Control of Acceleration and Deceleration

How to accelerate or decelerate in the shortest time is most important when the system's operating frequency point is in the slew range of the dynamic torque curve graph.

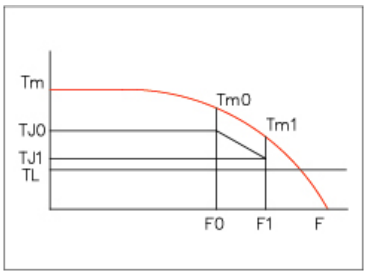


It is shown by the following graph: the dynamic torque's performance of stepper motor will always keep a horizontal straight line in low speed. But in high speed, the curve will slope down quickly influenced by the inductance.

(1)Accelerated Motion of Straight Line
Motor's load value is known as TL, it has to be accelerated from F0 to F1 in the shortest time(tr), what is the value of tr? What is the value of pulse frequency of the acceleration F(t)?
A. Generally TJ=70% Tm
B. tr=1.8*10-5*J*0* (F1-F0)/(TJ-TL)
C. F (t)=(F1-F0)*t/tr+F0, 0<t<tr



(2)Exponential Acceleration:
A. Generally TJ0=10%Tm0,
TJ1=70%Tm1,
TL = 60%Tm1
B. tr=F4*ln[(TJ0-TL)/(TJ1-TL)]
C. F(t)=F2*[1-e^(-t/F4)]+F0, 0<t<tr
F2=(TL-TJ0)* F1-F0)/(FJ1-TJ0)
F4=1.8*105*J*0*F2/(TJ0-TL)



Note: J is the torque inertia of motor rotor plus its load.
0 is the angle of each step, it equals to the step angle of stepper motor when motor runs in full step. As for the control of deceleration, it can be realized by turning the accelerate pulse frequency above-mentioned.

Reduction of Vibration and Noise

In a non-loading condition, stepper motors may appear to have vibration or even lose steps when the motor is running at or close to resonant frequency.

Solutions for These Conditions

A. Having the motor operate outside of this range.
B. By adopting the micro-step driving method, you can divide one step into multiple steps thereby reducing the vibration. Micro-step is used for increasing a motor's step resolution. This is accomplished by controlling the motor's phase current ratio. Micro-step does not increase step accuracy. However, it will allow a motor to run more smoothly and with less noise. When the motor runs in half step mode, the motor torque will be 15% less than running in full step mode. If the motor is controlled by sine wave current, the motor torque will be reduced by 30%.

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16HY EX Series

Positional error: ±5%;
Working Temperature: -10℃-+40℃;
Temperature rise: 85K;
Insulation resistance: 100Mohm min 500V DC;
Insulation class: B.

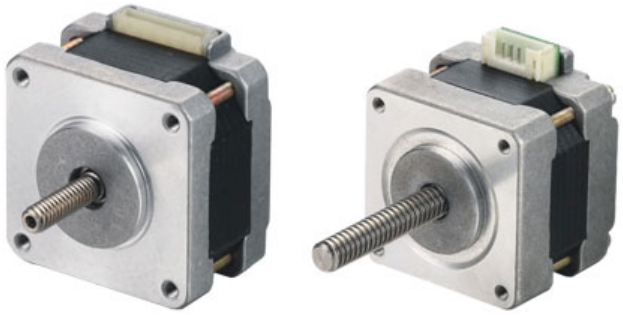
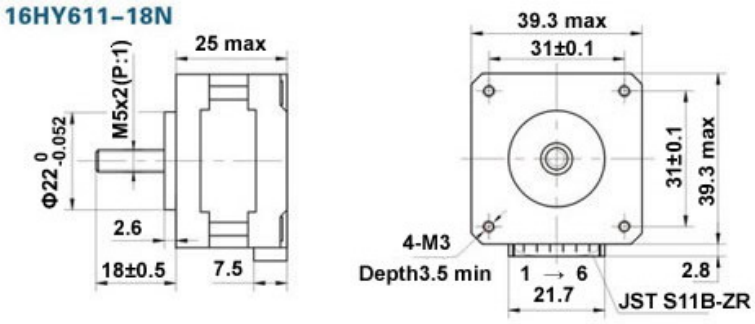
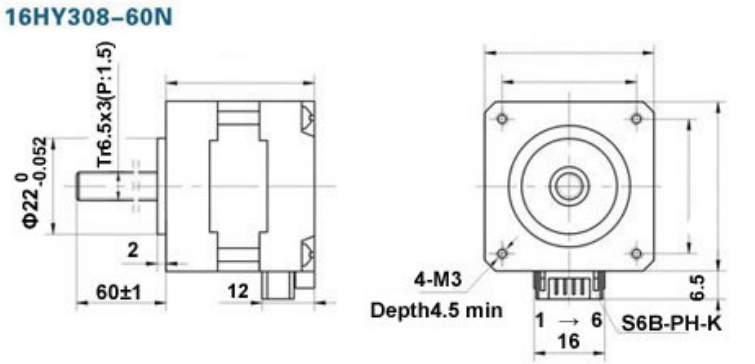
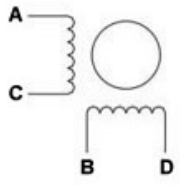


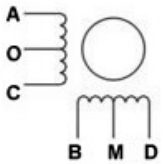
Figure Dimensions





Wiring Diagram





Modle	Step angle	Phases	Resolution (mm)	Rated current (A)	Resistance per phase (Ω)	Inductance per phase (mH)	Detent torque (mN.m)	Rotor inertia ($g.cm^2$)	Motor mass (g)
16HY611-18N	1.8°	2	0.010	0.4	30	35	12	48	0.18
16HY308-60N	1.8°	4	0.015	0.3	40	24	12	20	0.18

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Positional error: ±5%;
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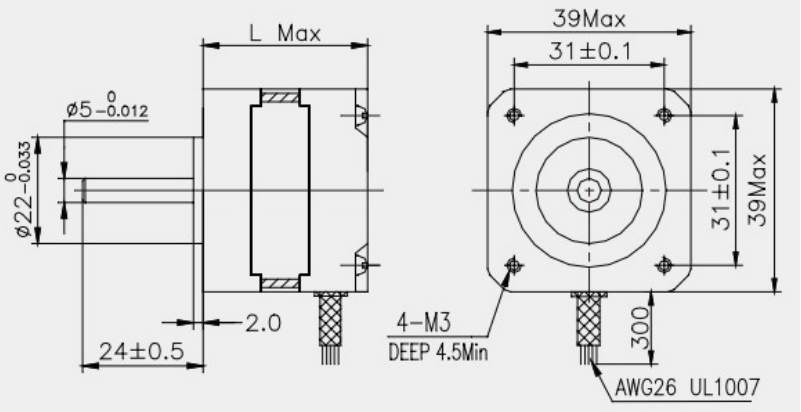
Temperature rise: 80℃ Max;
Insulation resistance: 100MΩ Min.50V DC;
Dielectric Strength: 500V AC 1minute
Insulation class: B

Code	Step angle	Rated current (A)	Resistance per phase (Ω)	Inductance per phase (mH)	Holding torque (mN.m)	Detent torque (mN.m)	Rotor inertia (g.cm2)	Wiring diagram	Motor mass (g)	Motor length "L"
16HY04042	1.8	20	0.42	18	12	8	0.5	12	4	100
16HY2406	1.8	26	0.6	9	10	14	0.8	14	4	120
16HY3406	1.8	34	0.6	12	13	18	1.0	19	4	160
16HY3412	1.8	34	1.2	3.2	3.0	16	1.0	19	4	160
16HY3604	1.8	34	0.4	30	14	12	1.0	19	6	160
16HY4406	1.8	40	0.6	12	20	24	1.2	24	4	210
16HY4412	1.8	40	1.2	3.8	6.5	24	1.2	24	4	210
16HY4604	1.8	40	0.4	30	22	18	1.2	24	4	210

Dimensions



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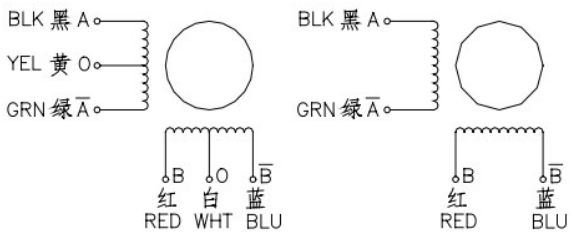

*We can manufacture products according to customer's requirement.

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The specified number of pulses determines the output degree(s) generated.

Linear Speed Selection

The running speed is linearly variable and determined by the frequency of the pulses.

Forward & Reverse, Pause and Holding Function

The forward & reverse rotation is controlled by the polarity. There is still holding torque even while the motor rotor is being locked. There is still current flowing through the motor winding, but no pulse signal creating rotation from the outside controller.

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Low frequency pulses being input, a stepper motor can operate at very low rotating speeds. This can be done without a speed reduction gearbox and thereby save power and maintain precision.

Long Life

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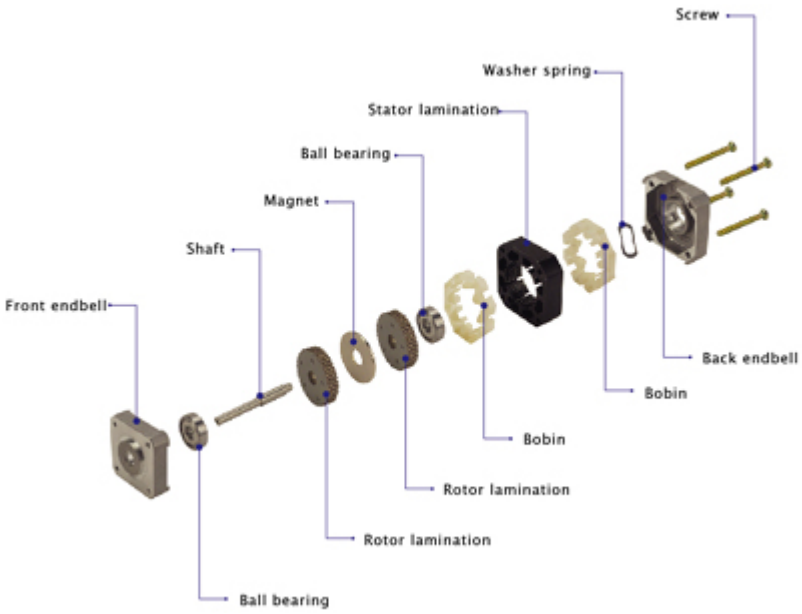
Basic Structure



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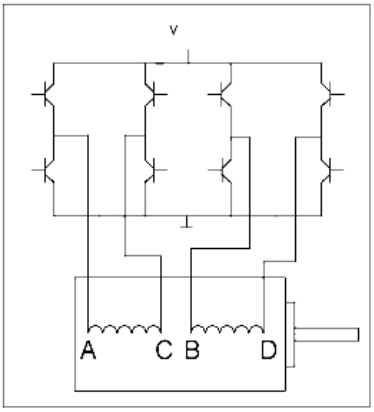
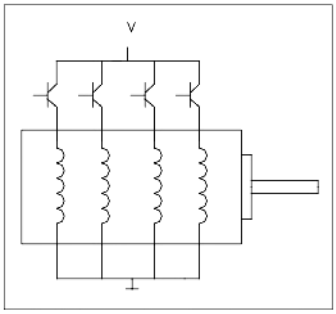


4-wire Stepper Motor with Bipolar Driver



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When energizing its coils by special sequence (see item 3 in page 9) , this motor will rotate 1.8 degree per step. On average, a 4-wire stepper motor provides, 40% more holding torque than a 6-wire stepper motor, because 100% of the winding is used in a bipolar drive.

This is brief introduction to stepper motor operating principles. Various conditions and applications may need customized designs which we can provide.

Type of Load

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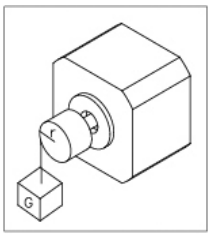

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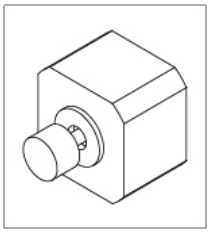

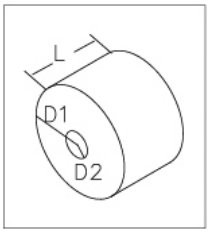

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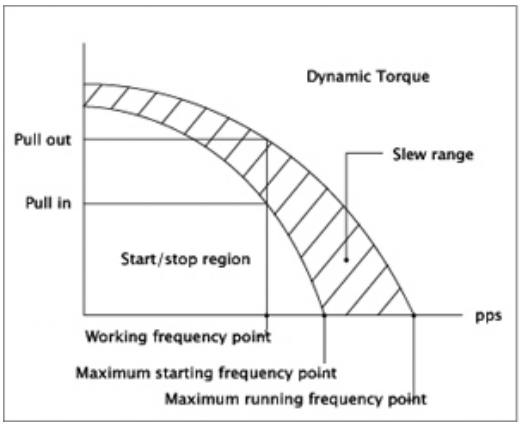

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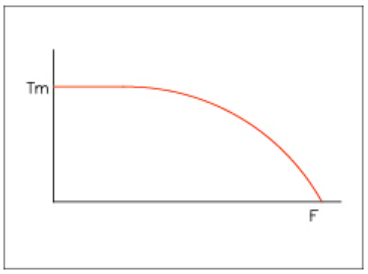

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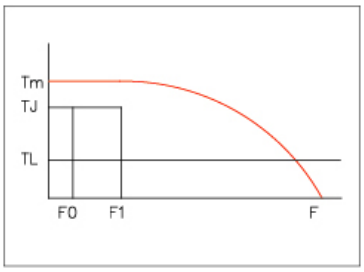

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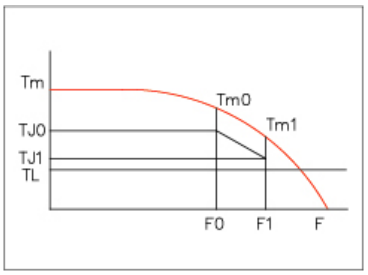

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Solutions for These Conditions

A. Having the motor operate outside of this range.
B. By adopting the micro-step driving method, you can divide one step into multiple steps thereby reducing the vibration. Micro-step is used for increasing a motor's step resolution. This is accomplished by controlling the motor's phase current ratio. Micro-step does not increase step accuracy. However, it will allow a motor to run more smoothly and with less noise. When the motor runs in half step mode, the motor torque will be 15% less than running in full step mode. If the motor is controlled by sine wave current, the motor torque will be reduced by 30%.

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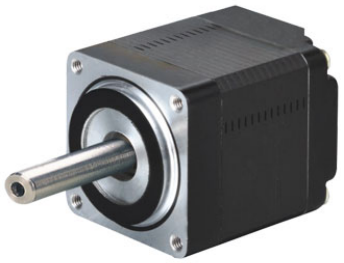
8HY Series

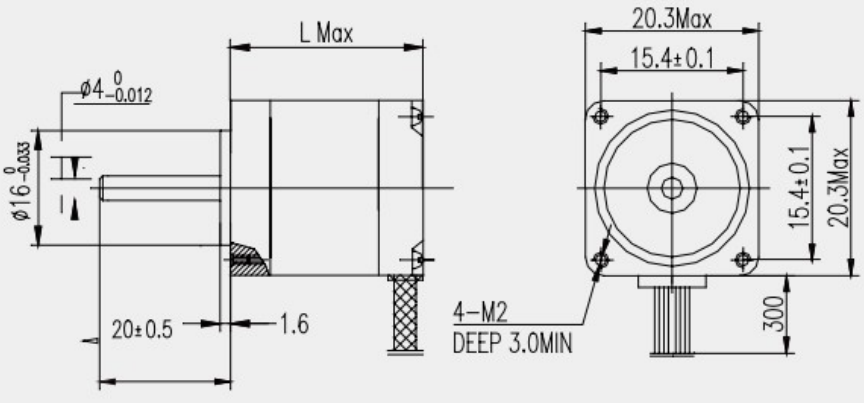
Positional error: ±5%;
Working Temperature: -20℃~+50℃;
Temperature rise: 80℃ Max;
Insulation resistance: 100MΩ Min.50V DC;
Dielectric Strength: 500V AC 1minute
Insulation class: B.



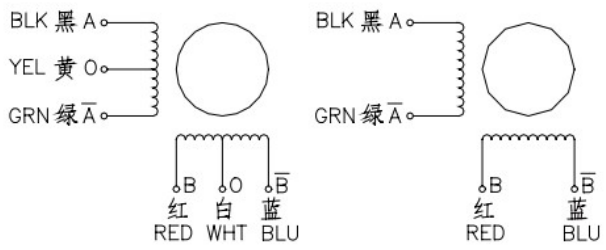
8HY001-2, 8HY002-2

Code	Step angle	Motor length (mm)	Rated current (A)	Resistance per phase (Ω)	Inductance per phase (mH)	Holding torque (mN.m)	Detent torque (mN.m)	Rotor inertia (g.cm2)	Lead Wire	Motor weight (g)
8HY2402	1.8	28	0.2	23	8.2	1.4	0.2	2.5	4	50
8HY2406	1.8	28	0.6	3.2	0.9	1.4	0.2	2.5	4	50
8HY3402	1.8	34	0.2	25	8.4	1.8	0.3	3.2	4	70
8HY3406	1.8	34	0.6	4.5	1.2	1.8	0.3	3.2	4	70
8HY4402	1.8	40	0.2	32	8.8	2.6	0.5	4.5	4	82
8HY4406	1.8	40	0.6	5.8	1.6	2.6	0.5	4.5	4	82

Dimensions



Wiring Diagram



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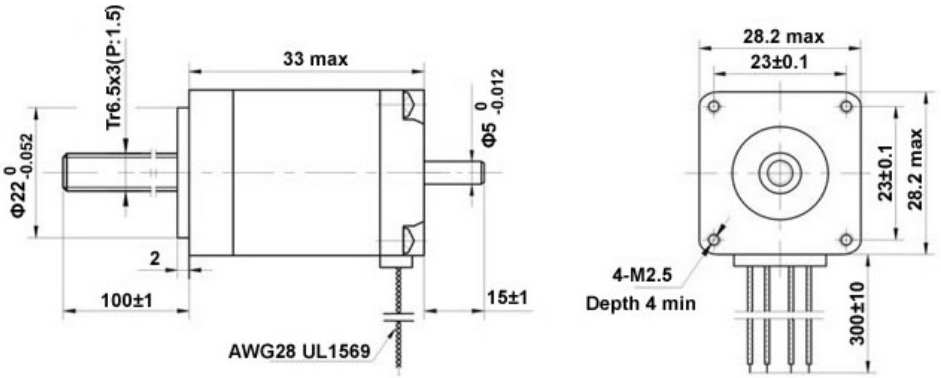
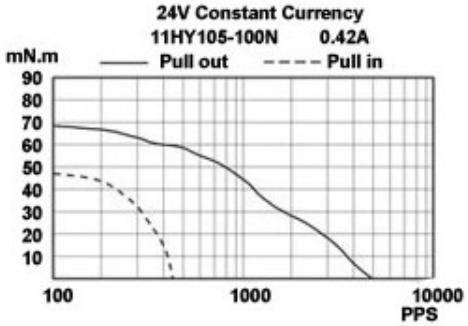
11HY EX Series

Positional error: ±5%;
Working Temperature: -10℃-+40℃;
Temperature rise: 85K;
Insulation resistance: 100Mohm min 500V DC;
Insulation class: B.

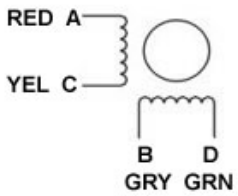
Figure Dimensions



Pulse-torque characteristics



Wiring Diagram



Modle	Step angle	Phases	Resolution (mm)	Rated current (A)	Resistance per phase (Ω)	Inductance per phase (mH)	Detent torque (mN.m)	Rotor inertia ($g.cm^2$)	Motor mass (g)
11HY105-100N	1.8°	2	0.015	0.42	11.9	10	4	9	0.12

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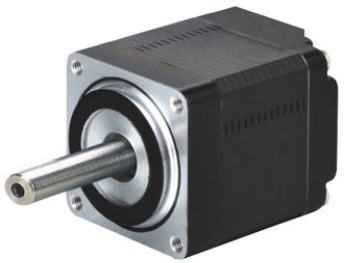
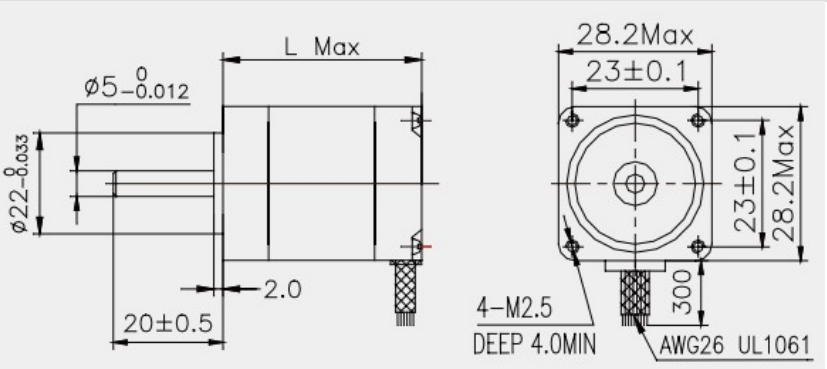
11HY Series

Positional error: ±5%;
Working Temperature: -20℃~+50℃;
Temperature rise: 80℃ Max;
Insulation resistance: 100MΩ Min.50V DC;
Dielectric Strength: 500V AC 1minute
Insulation class: B.

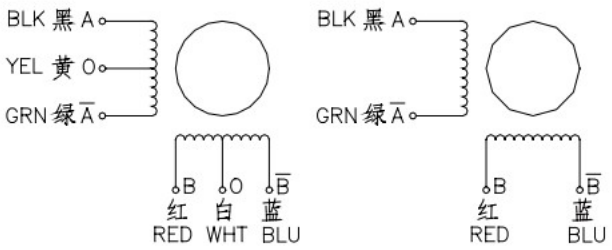


Code	Step angle	Motor length (mm)	Rated current (A)	Resistance per phase (Ω)	Inductance per phase (mH)	Holding torque (mN.m)	Detent torque (mN.m)	Rotor inertia (g.cm2)	Lead Wire	Motor weight (g)
11HY2406	1.8	28	0.6	4.2	2.2	4.5	0.3	6	4	105
11HY24035	1.8	28	0.35	12	5.8	4.5	0.3	6	4	105
11HY3406	1.8	33	0.6	5.5	3.2	6.0	0.4	8	4	110
11HY34035	1.8	33	0.35	15	9.2	6.0	0.4	8	4	110
11HY4406	1.8	41	0.6	7.0	6.0	6.0	0.5	11	4	140
11HY44035	1.8	41	0.35	20	15	6.0	0.5	11	4	140
11HY2406	1.8	28	0.6	4.2	2.2	4.5	0.3	6	4	105
11HY24035	1.8	28	0.35	12	5.8	4.5	0.3	6	4	105

Dimensions



Wiring Diagram



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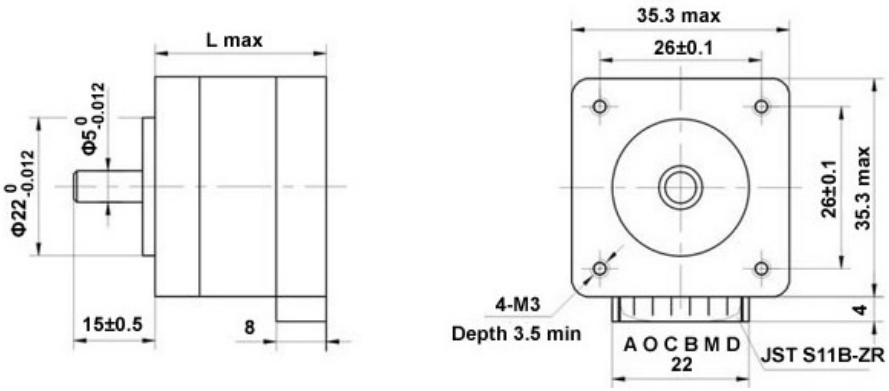
14HA Series

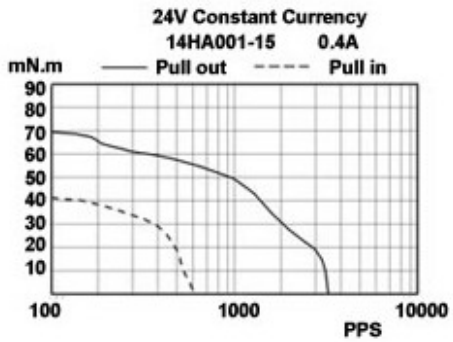
Positional error: ±5%;
Working Temperature: -10℃-+40℃;
Temperature rise: 85K;
Insulation resistance: 100Mohm min 500V DC;
Insulation class: B.

14HA001-15, 14HA005-15

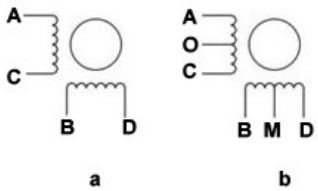
Figure Dimensions



Pulse-torque characteristics



Wiring Diagram



Code	Step angle	Rated current (A)	Resistance per phase (Ω)	Inductance per phase (mH)	Holding torque (mN.m)	Detent torque (mN.m)	Rotor inertia (g.cm2)	Wiring diagram	Motor mass (g)	Motor length "L"
14HA001-15	0.9°	0.40	20	18	80	12	10	a	0.16	28
14HA005-15	0.9°	0.16	30	26	50	12	10	b	0.16	28

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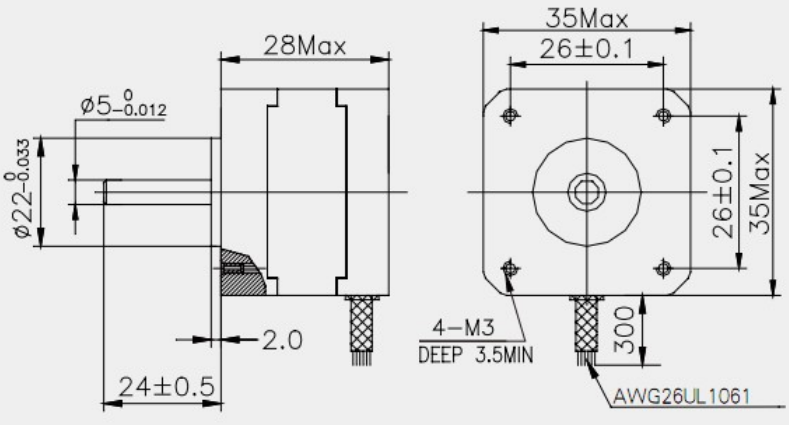
Screwtech Stepper Motor

14HM Series

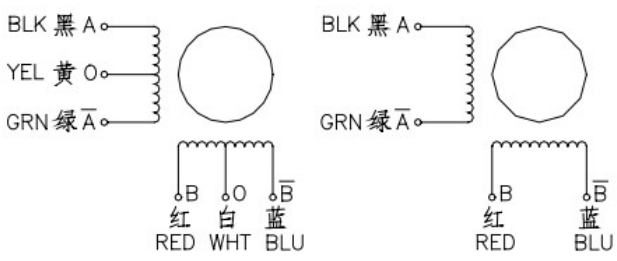
Positional error: ±5%;
Working Temperature: -20℃~+50℃;
Temperature rise: 80℃ Max;
Insulation resistance: 100MΩ Min.50V DC;
Dielectric Strength: 500V AC 1minute
Insulation class: B

Code	Step angle	Rated current (A)	Resistance per phase (Ω)	Inductance per phase (mH)	Holding torque (mN.m)	Detent torque (mN.m)	Rotor inertia (g.cm2)	Wiring diagram	Motor mass (g)	Motor length "L"
14HM2408	0.9	28	0.8	4.5	4.2	9	0.3	12	4	130
14HM24055	0.9	28	0.55	10	9.5	9	0.3	12	4	130
14HM24036	0.9	28	0.36	22	20	9	0.3	12	4	130
14HM2604	0.9	28	0.4	30	12	8	0.3	12	6	130
14HM3408	0.9	34	0.8	6	10	14	0.6	18	4	190
14HM34055	0.9	34	0.55	12	19	14	0.6	18	4	190
14HM34036	0.9	34	0.36	28	42	14	0.6	18	4	190
14HM3604	0.9	34	0.4	30	18	10	0.6	18	6	190

Dimensions



Wiring Diagram



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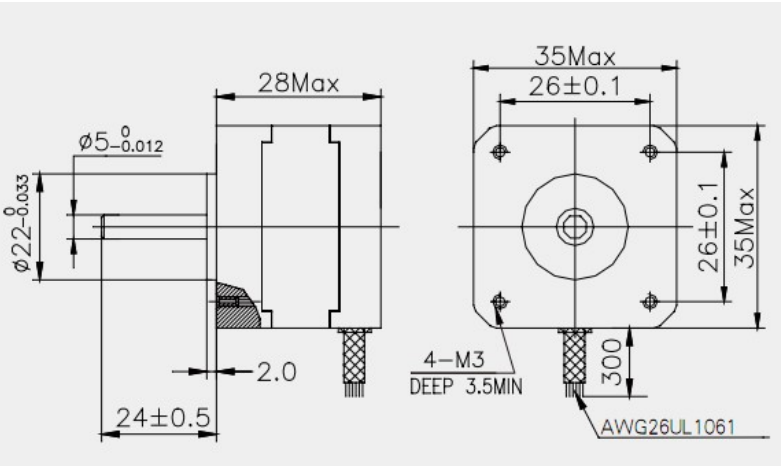
Screwtech Stepper Motor

14HM1 Series

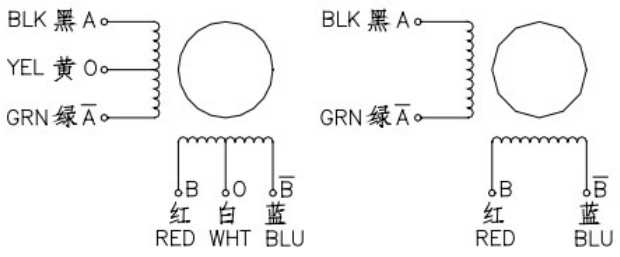
Positional error: ±5%;
Working Temperature: -20℃~+50℃;
Temperature rise: 80℃ Max;
Insulation resistance: 100MΩ Min.50V DC;
Dielectric Strength: 500V AC 1minute
Insulation class: B

Code	Step angle	Rated current (A)	Resistance per phase (Ω)	Inductance per phase (mH)	Holding torque (mN.m)	Detent torque (mN.m)	Rotor inertia (g.cm2)	Wiring diagram	Motor mass (g)	Motor length "L"
14HM2408	0.9	28	0.8	4.5	4.2	9	0.3	12	4	130
14HM24055	0.9	28	0.55	10	9.5	9	0.3	12	4	130
14HM24036	0.9	28	0.36	22	20	9	0.3	12	4	130
14HM2604	0.9	28	0.4	30	12	8	0.3	12	6	130
14HM3408	0.9	34	0.8	6	10	14	0.6	18	4	190
14HM34055	0.9	34	0.55	12	19	14	0.6	18	4	190
14HM34036	0.9	34	0.36	28	42	14	0.6	18	4	190
14HM3604	0.9	34	0.4	30	18	10	0.6	18	6	190

Dimensions



Wiring Diagram



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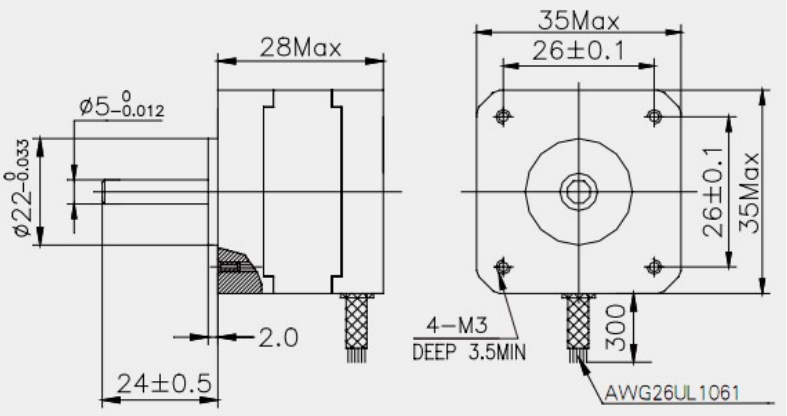
14HY Series

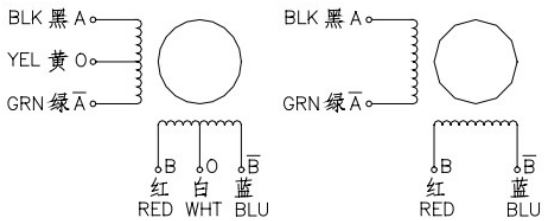
Positional error: ±5%;
Working Temperature: -20℃~+50℃;
Temperature rise: 80℃ Max;
Insulation resistance: 100MΩ Min.50V DC;
Dielectric Strength: 500V AC 1minute
Insulation class: B

Code	Step angle	Rated current (A)	Resistance per phase (Ω)	Inductance per phase (mH)	Holding torque (mN.m)	Detent torque (mN.m)	Rotor inertia (g.cm2)	Wiring diagram	Motor mass (g)	Motor length "L"
14HY24046	1.8	28	0.46	20	14	12	0.8	11	4	120
14HY2408	1.8	28	0.8	5.0	5.0	12	0.8	11	4	120
14HY2604	1.8	28	0.4	30	11	9	0.8	11	6	120
14HY34042	1.8	34	0.42	25	32	18	1.0	13	4	160
14HY3408	1.8	34	0.8	6.5	9.8	18	1.0	13	4	160
14HY3604	1.8	34	0.4	30	22	12	1.0	13	6	160

Dimensions



Wiring Diagram



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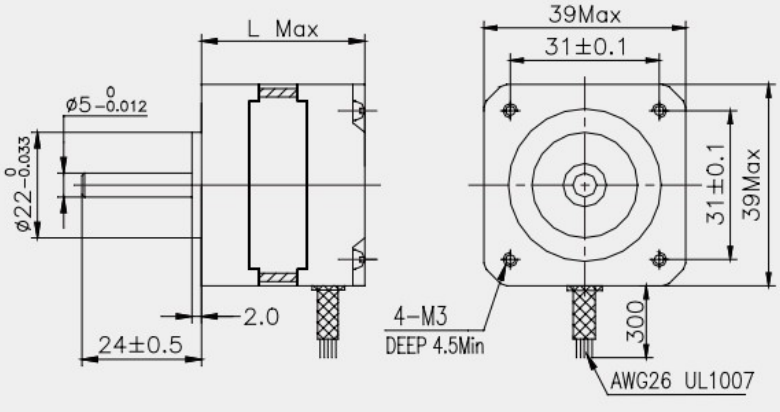
16HM Series

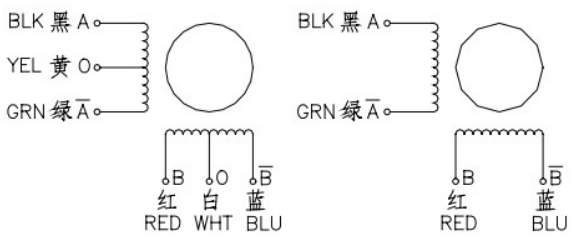
Positional error: ±5%;
Working Temperature: -20℃~+50℃;
Temperature rise: 80℃ Max;
Insulation resistance: 100MΩ Min.50V DC;
Dielectric Strength: 500V AC 1minute
Insulation class: B

Code	Step angle	Rated current (A)	Resistance per phase (Ω)	Inductance per phase (mH)	Holding torque (mN.m)	Detent torque (mN.m)	Rotor inertia (g.cm2)	Wiring diagram	Motor mass (g)	Motor length "L"
16HM04042	0.9	20	0.42	20	16	8	0.5	15	4	100
16HM2406	0.9	26	0.6	9	16	14	0.8	18	4	120
16HM3406	0.9	34	0.6	9	15	16	1.1	23	4	160
16HM3412	0.9	34	1.2	2.5	3.6	16	1.1	23	4	160
16HM3604	0.9	34	0.4	30	16	12	1.1	23	6	160
16HM4406	0.9	40	0.6	12	20	22	1.4	30	4	210
16HM4412	0.9	40	1.2	3.2	5.5	22	1.4	30	4	210
16HM4604	0.9	40	0.4	30	26	18	1.4	30	6	210

Dimensions



Wiring Diagram



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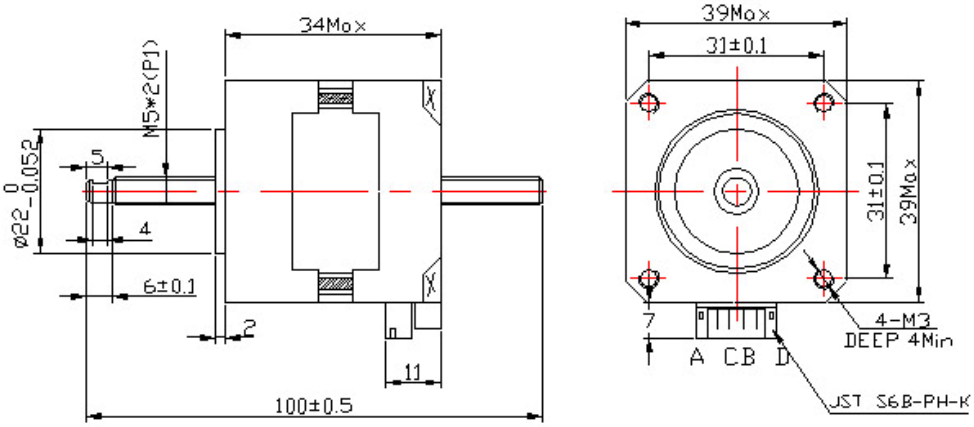
16HSL Series

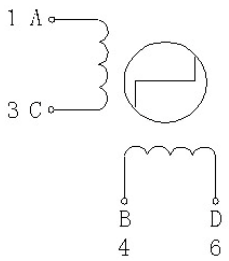
Positional error: ±5%;
Working Temperature: -20℃~+50℃;
Temperature rise: 80℃ Max;
Insulation resistance: 100MΩ Min.50V DC;
Dielectric Strength: 500V AC 1minute
Insulation class: B

Code	Step angle	Rated current (A)	Resistance per phase (Ω)	Inductance per phase (mH)	Holding torque (mN.m)	Detent torque (mN.m)	Rotor inertia (g.cm2)	Wiring diagram	Motor mass (g)	Motor length "L"
16HSL3404	0.01	34	12	0.4	30	42	0.21	4	0.12	0.02

Dimensions



Wiring Diagram



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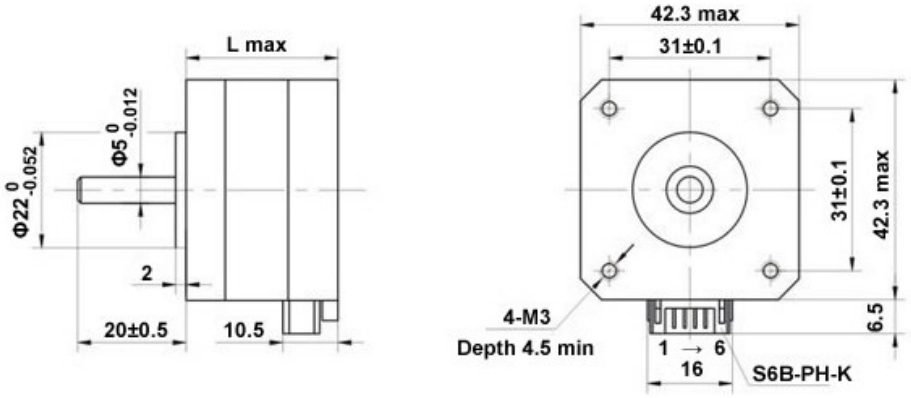
17HA Series

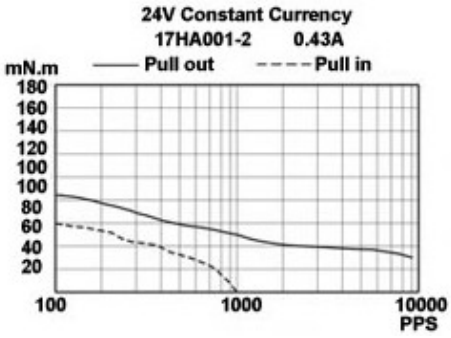
Positional error: ±5%;
Working Temperature: -10℃-+40℃;
Temperature rise: 85K;
Insulation resistance: 100Mohm min 500V DC;
Insulation class: B.

17HA001-2, 17HA002-3, 17HA101-2

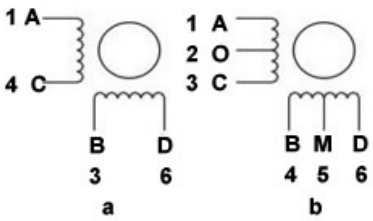
Figure Dimensions



Pulse-torque characteristics



Wiring Diagram



Code	Step angle	Rated current (A)	Resistance per phase (Ω)	Inductance per phase (mH)	Holding torque (mN.m)	Detent torque (mN.m)	Rotor inertia (g.cm2)	Wiring diagram	Motor mass (g)	Motor length "L"
17HA001-2	0.9°	0.43	8.0	11	100	8	20	a	0.19	29.5
17HA002-3	0.9°	0.40	16.8	7	70	8	20	b	0.19	29.5
17HA101-2	0.9°	0.40	30	33	150	12	38	b	0.23	34.0

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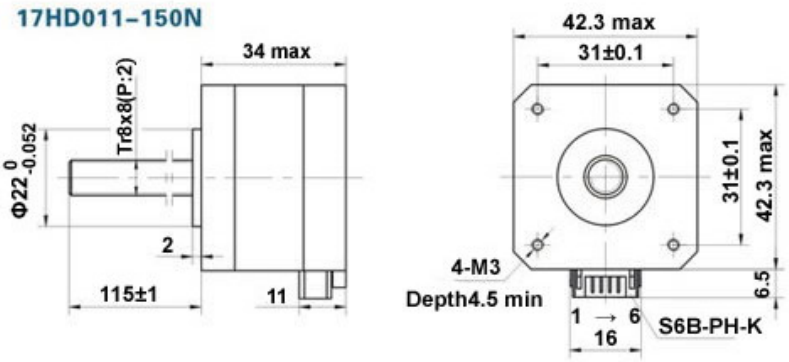
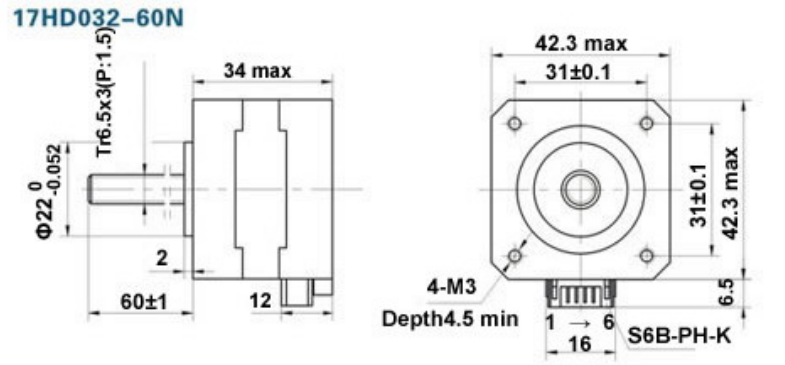
17HD EX Series

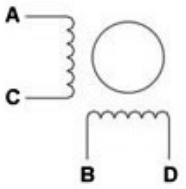
Positional error: ±5%;
Working Temperature: -10℃-+40℃;
Temperature rise: 85K;
Insulation resistance: 100Mohm min 500V DC;
Insulation class: B.

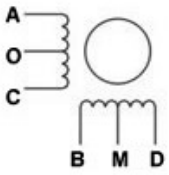
Figure Dimensions





Wiring Diagram





Modle	Step angle	Phases	Resolution (mm)	Rated current (A)	Resistance per phase (Ω)	Inductance per phase (mH)	Detent torque (mN.m)	Rotor inertia ($g.cm^2$)	Motor mass (kg)
17HD011-115N	1.8°	2	0.040	0.40	30	37	12	38	0.2
17HD032-60N	1.8°	4	0.015	0.28	44	21	12	38	0.2

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17HD NC Series

Positional error: ±5%;
Working Temperature: -10℃-+40℃;
Temperature rise: 85K;
Insulation resistance: 100Mohm min 500V DC;
Insulation class: B.

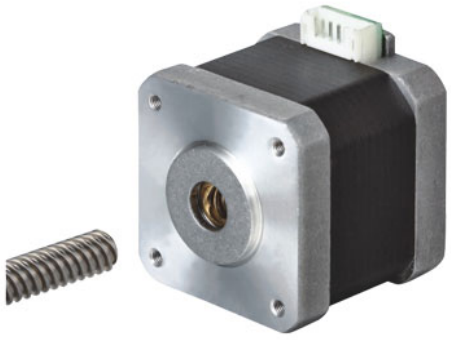
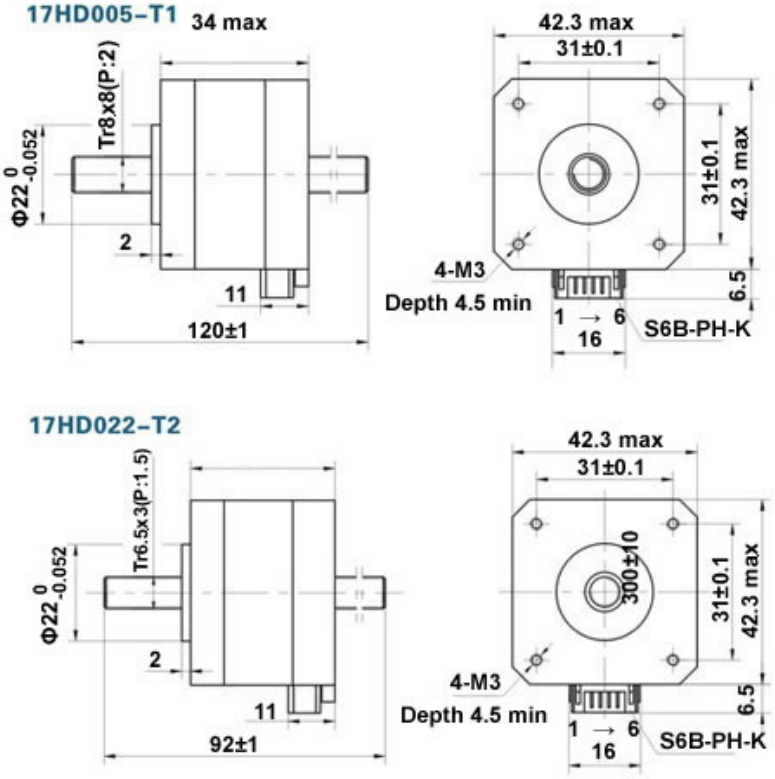
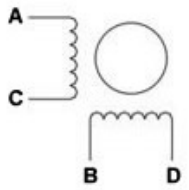
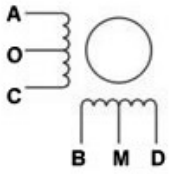


Figure Dimensions



Wiring Diagram





Modle	Step angle	Phases	Resolution (mm)	Rated current (A)	Resistance per phase (Ω)	Inductance per phase (mH)	Detent torque (mN.m)	Rotor inertia ($g.cm^2$)	Motor mass (kg)
17HD005-T1	1.8°	2	0.040	0.60	22	28	12	38	0.2
17HD022-T2	1.8°	4	0.015	0.75	4.2	2.5	12	38	0.2

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17HD-C Series

Positional error: ±5%;
Working Temperature: -10℃-+40℃;
Temperature rise: 85K;
Insulation resistance: 100Mohm min 500V DC;
Insulation class: B.

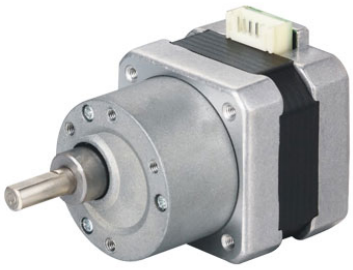
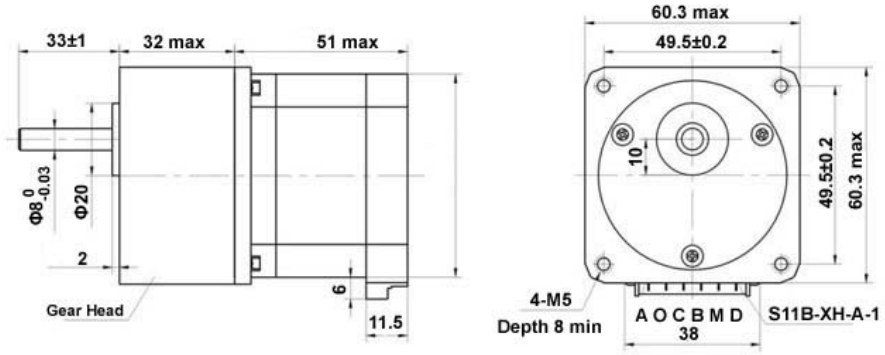
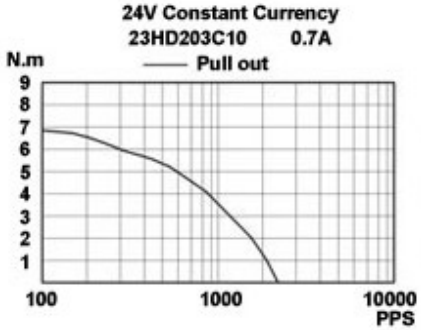


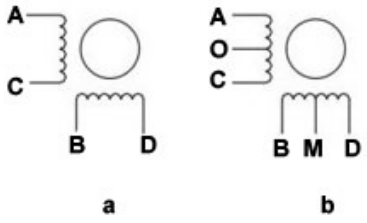
Figure Dimensions



Pulse-torque characteristics



Wiring Diagram



Code	Step angle	Rated current (A)	Resistance per phase (Ω)	Inductance per phase (mH)	Holding torque (mN.m)	Wiring diagram	Motor mass (g)	Gear redution rate
17HD202C10	1.8°	0.5	30.0	60	2.0	a	0.35	1:10
17HD205C30	1.8°	0.6	13.5	13.5	5.2	b	0.35	1:30
17HD003	1.8°	0.4	30.0	37	150	b	0.20	1:30
17HD003N	1.8°	0.4	30.0	37	150	b	0.20	1:30
17HD004	1.8°	0.4	55.0	37	150	b	0.20	1:30
17HD005	1.8°	0.4	22.0	30	150	b	0.20	1:30
17HD005N	1.8°	0.6	22.0	28	150	b	0.20	1:30

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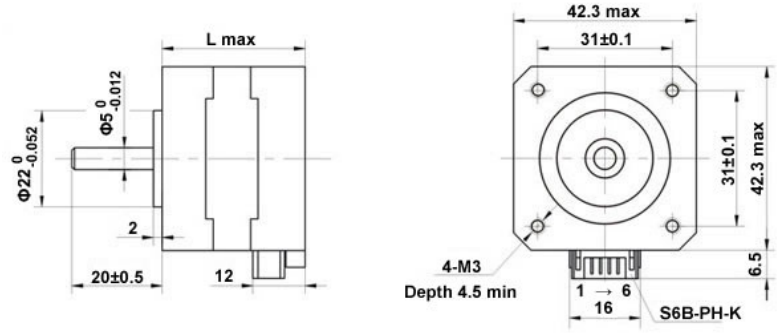
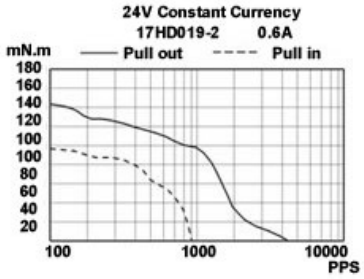
17HD Series

Positional error: ±5%;
Working Temperature: -10℃-+40℃;
Temperature rise: 85K;
Insulation resistance: 100Mohm min 500V DC;
Insulation class: B.

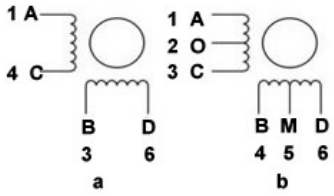
Figure Dimensions



Pulse-torque characteristics



Wiring Diagram



Code	Step angle	Rated current (A)	Resistance per phase (Ω)	Inductance per phase (mH)	Holding torque (mN.m)	Detent torque (mN.m)	Rotor inertia (g.cm2)	Wiring diagram	Motor mass (g)	Motor length "L"
17HD019-2	1.8°	0.6	9	5	160	12	38	b	0.2	34
17HD212-3	1.8°	0.6	7	15	280	15	57	a	0.24	40
17HD401-2	1.8°	0.4	30	45	160	20	82	a	0.38	48
17HD050W	1.8°	0.36	33	17	/	/	38	/	/	34
17HD102	1.8°	0.4	30	37	/	/	54	/	/	38
17HD033	1.8°	0.4	30	27	/	/	38	/	/	34
17HD033N	1.8°	0.4	30	27	/	/	38	/	/	34
17HD301	1.8°	0.33	46.5	110	/	/	72	/	/	44
17HD305N	1.8°	0.5	15	15	/	/	72	/	/	44
17HD401	1.8°	0.4	30	45	/	/	82	/	/	48
17HD403	1.8°	1.5	2	3.85	/	/	82	/	/	48
17HD202	1.8°	0.5	25	50	/	/	57	/	/	40
17HD003	1.8°	0.4	30	37	/	/	38	/	/	34
17HD003N	1.8°	0.4	30	37	/	/	38	/	/	34
17HD004	1.8°	0.28	55	30	/		38	/	/	34
17HD005	1.8°	0.6	22	28	/	/	38	/	/	34

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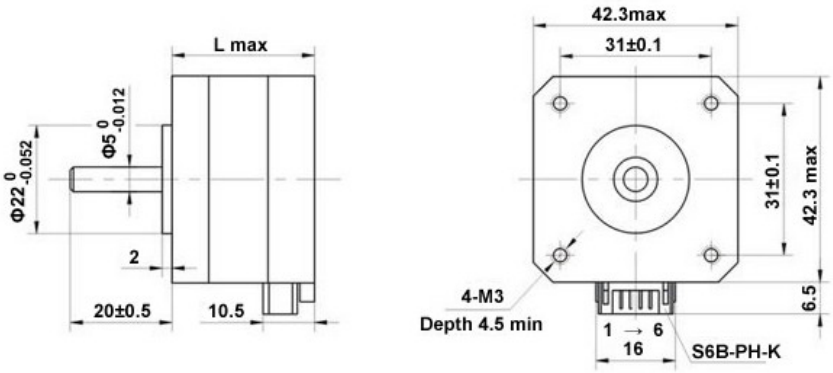
17HE Series

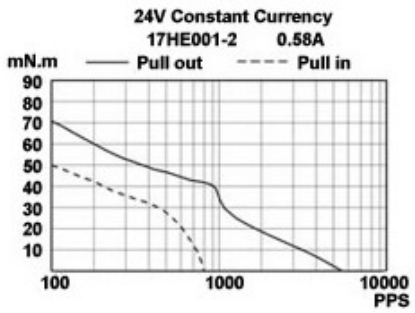
Positional error: ±5%;
Working Temperature: -10℃-+40℃;
Temperature rise: 85K;
Insulation resistance: 100Mohm min 500V DC;
Insulation class: B.

17HE001-2, 17HE501

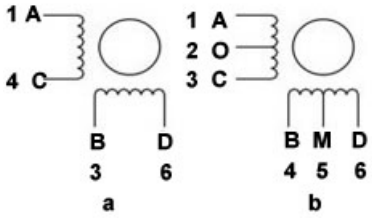
Figure Dimensions



Pulse-torque characteristics



Wiring Diagram



Code	Step angle	Rated current (A)	Resistance per phase (Ω)	Inductance per phase (mH)	Holding torque (mN.m)	Detent torque (mN.m)	Rotor inertia (g.cm2)	Wiring diagram	Motor mass (g)	Motor length "L"
17HE001-2	3.6°	0.58	12	11.5	15	12	20	/	0.20	/
17HE501	3.6°	0.58	9.6	10.0	/	50	20	/	0.15	/

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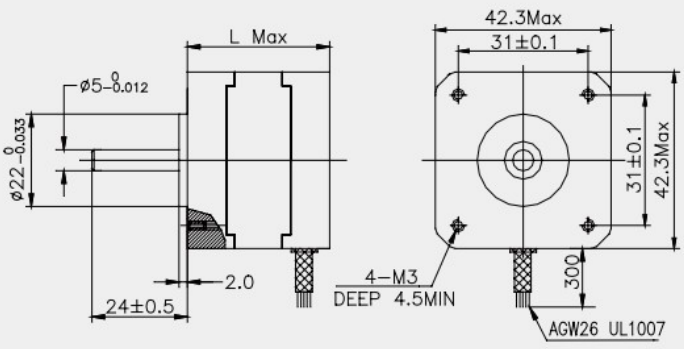
17HM Series

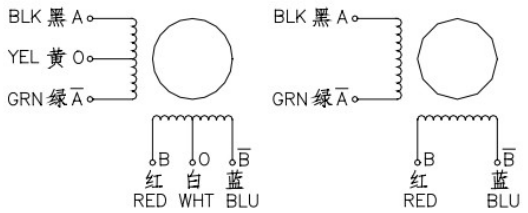
Positional error: ±5%;
Working Temperature: -20℃~+50℃;
Temperature rise: 80℃ Max;
Insulation resistance: 100MΩ Min.50V DC;
Dielectric Strength: 500V AC 1minute
Insulation class: B

Code	Step angle	Rated current (A)	Resistance per phase (Ω)	Inductance per phase (mH)	Holding torque (mN.m)	Detent torque (mN.m)	Rotor inertia (g.cm2)	Wiring diagram	Motor mass (g)	Motor length "L"
17HM2406	0.9	28	0.6	9	9	10	0.9	20	4	130
17HM3413	0.9	34	1.3	2.4	3.6	24	1.2	34	4	220
17HM3417	0.9	34	1.7	1.2	2.2	24	1.2	34	4	220
17HM3404	0.9	34	0.4	30	45	24	1.2	34	4	220
17HM3604	0.9	34	0.4	30	22	20	1.2	34	6	220
17HM36016	0.9	34	0.16	75	54	12	1.2	34	6	220
17HM4417	0.9	40	1.7	1.5	3.8	36	1.8	54	4	280
17HM4413	0.9	40	1.3	2.5	6.2	36	1.8	54	4	280
17HM4612	0.9	40	1.2	3.2	3.8	26	1.8	54	6	280
17HM4604	0.9	40	0.4	30	34	26	1.8	54	6	280
17HM0417	0.9	48	1.7	1.8	4.0	42	2.2	68	4	350
17HM0413	0.9	48	1.3	3.0	7.0	36	2.2	68	4	350
17HM0423	0.9	48	2.3	1.2	2.0	42	2.2	68	4	350
17HM80604	0.9	48	0.4	30	28	27	2.2	68	6	350

Dimensions



Wiring Diagram



*We can manufacture products according to customer's requirement.

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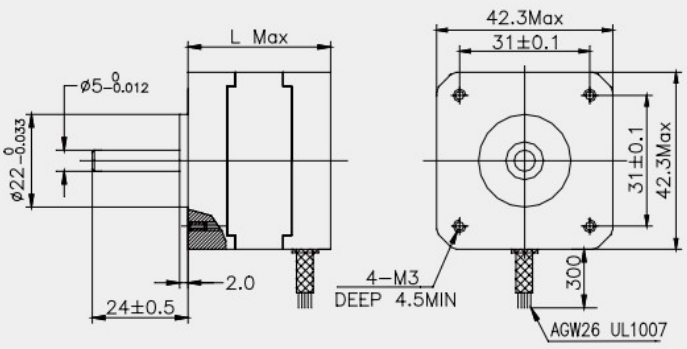
17HS Series

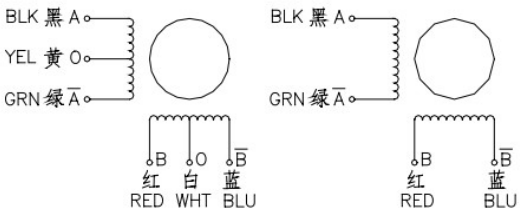
Positional error: ±5%;
Working Temperature: -20℃~+50℃;
Temperature rise: 80℃ Max;
Insulation resistance: 100MΩ Min.50V DC;
Dielectric Strength: 500V AC 1minute
Insulation class: B

Code	Step angle	Rated current (A)	Resistance per phase (Ω)	Inductance per phase (mH)	Holding torque (mN.m)	Detent torque (mN.m)	Rotor inertia (g.cm2)	Wiring diagram	Motor mass (g)	Motor length "L"
17HS2406	1.8	28	0.6	8	10	12	1.6	34	4	150
17HS3413	1.8	34	1.3	2.4	2.8	28	1.6	34	4	220
17HS3417	1.8	34	1.7	1.2	1.8	28	1.6	34	4	220
17HS3404	1.8	34	0.4	30	35	28	1.6	34	4	220
17HS3604	1.8	34	0.4	30	18	21	1.6	34	6	220
17HS36016	1.8	34	0.16	75	40	14	1.6	34	6	220
17HS4417	1.8	40	1.7	1.5	2.8	40	2.2	54	4	280
17HS4413	1.8	40	1.3	2.5	5.0	40	2.2	54	4	280
17HS4612	1.8	40	1.2	3.2	2.8	28	2.2	54	6	280
17HS4604	1.8	40	0.4	30	28	28	2.2	54	6	280
17HS0417	1.8	48	1.7	1.8	3.2	52	2.6	68	4	350
17HS0413	1.8	48	1.3	3.2	5.5	52	2.6	68	4	350
17HS0423	1.8	48	2.3	1.2	1.6	46	2.6	68	4	350
17HS0604	1.8	48	0.4	30	38	34	2.6	68	6	350

Dimensions



Wiring Diagram



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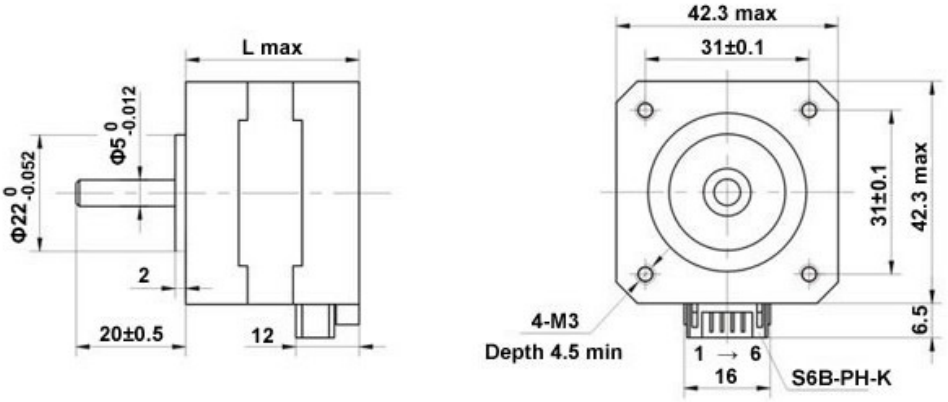
17HY Series

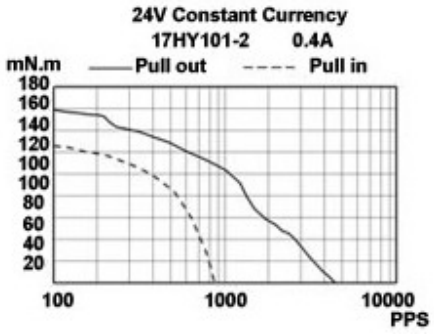
Positional error: ±5%;
Working Temperature: -10℃-+40℃;
Temperature rise: 85K;
Insulation resistance: 100Mohm min 500V DC;
Insulation class: B.

17HY001-2, 17HY101-2

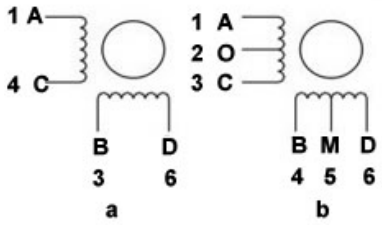
Figure Dimensions



Pulse-torque characteristics



Wiring Diagram



Code	Step angle	Rated current (A)	Resistance per phase (Ω)	Inductance per phase (mH)	Holding torque (mN.m)	Detent torque (mN.m)	Rotor inertia (g.cm2)	Wiring diagram	Motor mass (g)	Motor length "L"
17HY001-2	1.8°	0.8	3.5	2.5	130	12	20	b	0.20	34
17HY101-2	1.8°	0.4	30	24	180	15	24	a	0.23	38

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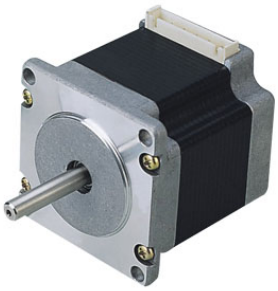
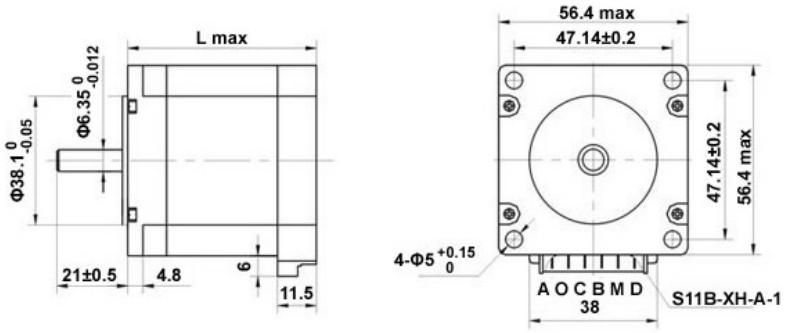
23HD Series

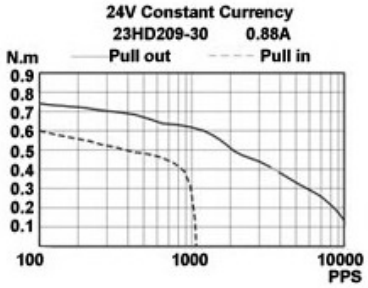


Positional error: ±5%;
Working Temperature: -10℃-+40℃;
Temperature rise: 85K;
Insulation resistance: 100Mohm min 500V DC;
Insulation class: B.

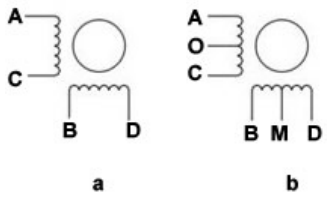
Figure Dimensions



Pulse-torque characteristics



Wiring Diagram



Code	Step angle	Rated current (A)	Resistance per phase (Ω)	Inductance per phase (mH)	Holding torque (mN.m)	Detent torque (mN.m)	Rotor inertia (g.cm2)	Wiring diagram	Motor mass (g)	Motor length "L"
23HD002-1	1.8°	0.60	12.0	25	0.50	22	135	a	0.42	41
23HD003-1	1.8°	1.50	1.5	1.5	0.35	22	135	b	0.42	41
23HD209-30	1.8°	0.88	7.0	22	0.82	32	220	a	0.55	51
23HD219-18	1.8°	1.00	5.1	9	0.62	32	220	a	0.55	51
23HD906-29	1.8°	0.60	14.0	55	1.5	78	520	a	1.2	82
23HD001	1.8°	0.50	12.0	20	/	/	135	/	0.42	41
23HD006	1.8°	1.00	5.0	5	/	/	135	/	0.42	41
23HD101	1.8°	0.60	12.0	28	/	/	155	/	0.5	45
23HD203	1.8°	0.70	12.0	40	/	/	220	/	0.55	51
23HD401	1.8°	0.60	12.0	43	/	/	260	/	0.6	54
23HD402	1.8°	0.88	7.5	21	/	/	260	/	0.6	54
23HD601	1.8°	0.60	12.0	35	/	/	280	/	0.62	56
23HD606	1.8°	0.60	2.0	3.5	/	/	280	/	0.62	56
23HD701	1.8°	5.00	0.75	1.5	/	/	380	/	0.82	65
23HD801	1.8°	0.75	16.0	60	/	/	460	/	1	76
23HD802	1.8°	4.20	20.5	2.1	/	/	460	/	1	76

SCREW TECHNOLOGY CO., LIMITED
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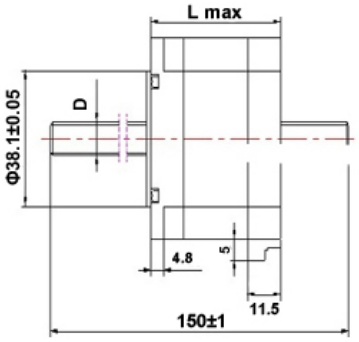
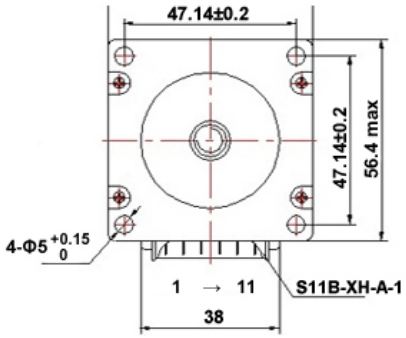
E-mail: screwtech@screwtech.cn

23HD-NC Series

Positional error: ±5%;
Working Temperature: -10℃-+40℃;
Temperature rise: 85K;
Insulation resistance: 100Mohm min 500V DC;
Insulation class: B.

Figure Dimensions

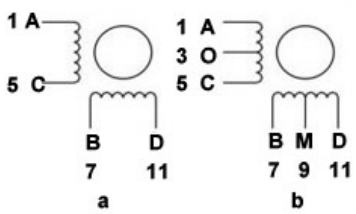




Dimension of the Lead Screw

Norminal Dia. (mm)	Resolution (mm)
Φ8	0.04
Φ11	0.01
Φ11	0.02

Wiring Diagram



Code	Step angle	Phases	Resolution (mm)	Rated current (A)	Resistance per phase (Ω)	Inductance per phase (mH)	Holding torque (mN.m)	Rotor Inertia (g.cm²)	Motor mass (Kg)	Length (mm)
23HD002-T150	1.8°	2	0.04	0.5	12	20	22	135	0.42	41
23HD006-T150	1.8°	4	0.02	1.0	5.0	5	22	135	0.42	41
23HD029-T150	1.8°	2	0.04	2.0	1.4	2	22	135	0.42	41
23HD033-T150	1.8°	4	0.01	0.7	17	15	22	135	0.42	41
23HD202-T150	1.8°	2	0.02	0.88	7.0	21	32	220	0.55	51
23HD202-T150	1.8°	2	0.04	0.88	7.0	21	32	220	0.55	51
23HD228-T150	1.8°	4	0.01	2.0	1.72	2.86	32	220	0.55	51

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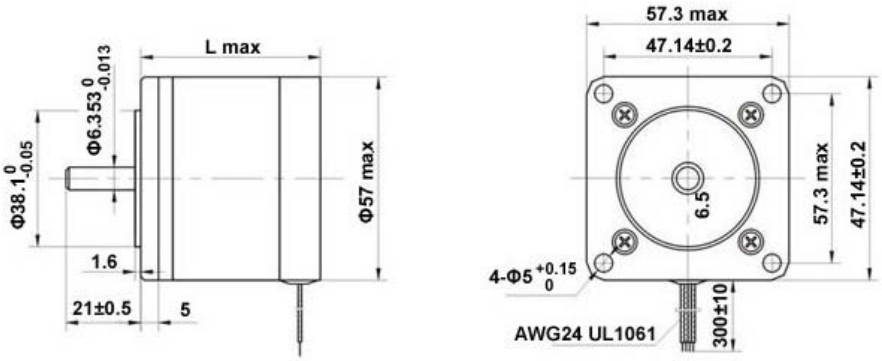
23HY Series

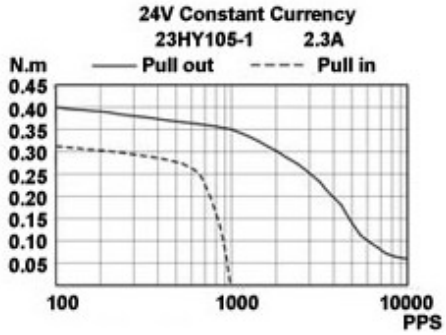
Positional error: ±5%;
Working Temperature: -10℃-+40℃;
Temperature rise: 85K;
Insulation resistance: 100Mohm min 500V DC;
Insulation class: B.

23HY001-1, 23HY101-1, 23HY105-1, 23HY302-1

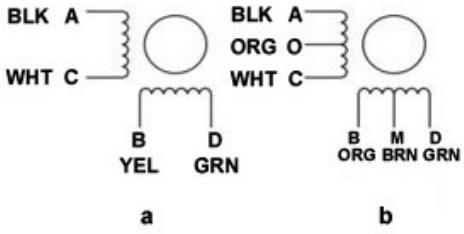
Figure Dimensions



Pulse-torque characteristics



Wiring Diagram



Code	Step angle	Rated current (A)	Resistance per phase (Ω)	Inductance per phase (mH)	Holding torque (mN.m)	Detent torque (mN.m)	Rotor inertia (g.cm2)	Wiring diagram	Motor mass (g)	Motor length "L"
23HY001-1	1.8°	1.4	2.3	4.0	0.5	18	55	a	0.36	39
23HY101-1	1.8°	2.5	1.0	2.0	0.6	35	120	a	0.52	51
23HY105-1	1.8°	2.3	1.0	1.1	0.5	35	120	b	0.52	51
23HY302-1	1.8°	3.0	0.9	1.3	1.06	72	200	b	0.95	76

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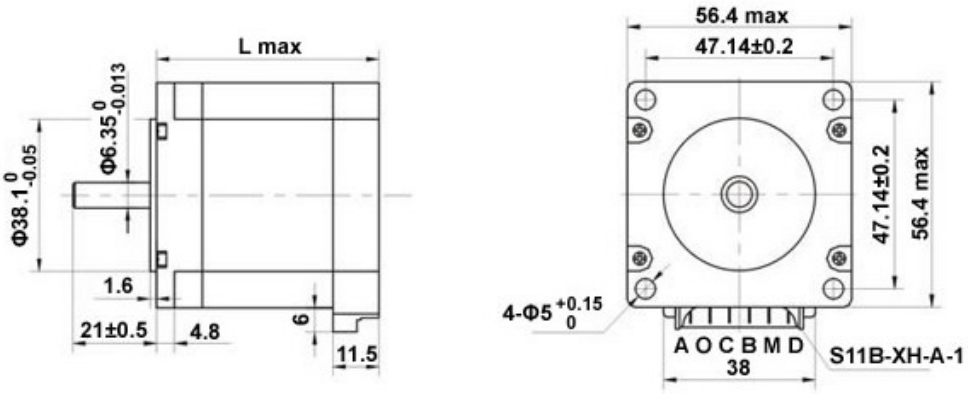
23HA Series

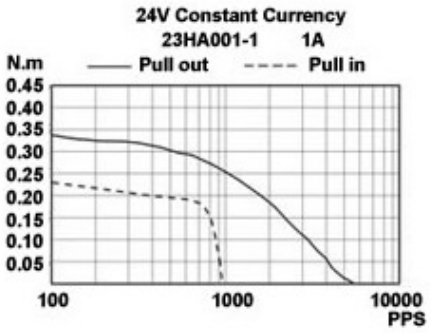
Positional error: ±5%;
Working Temperature: -10℃-+40℃;
Temperature rise: 85K;
Insulation resistance: 100Mohm min 500V DC;
Insulation class: B.

23HA001-1, 23HA002-1, 23HA101-1

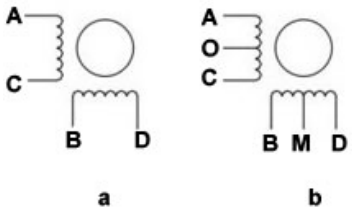
Figure Dimensions



Pulse-torque characteristics



Wiring Diagram



Code	Step angle	Rated current (A)	Resistance per phase (Ω)	Inductance per phase (mH)	Holding torque (mN.m)	Detent torque (mN.m)	Rotor inertia (g.cm2)	Wiring diagram	Motor mass (g)	Motor length "L"
23HA001-1	0.9°	1.0	4	6	0.42	22	135	b	0.42	41
23HA002-1	0.9°	0.6	20	45	0.60	22	135	a	0.42	41
23HA101-1	0.9°	0.8	6	10	0.60	25	135	b	0.50	45

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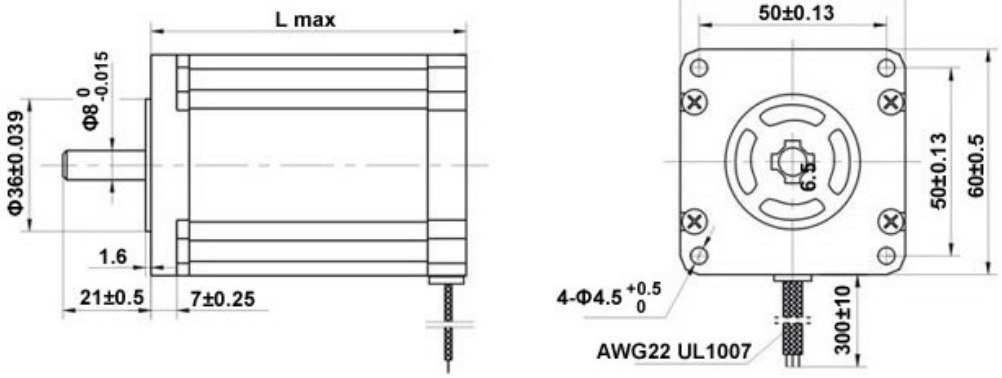
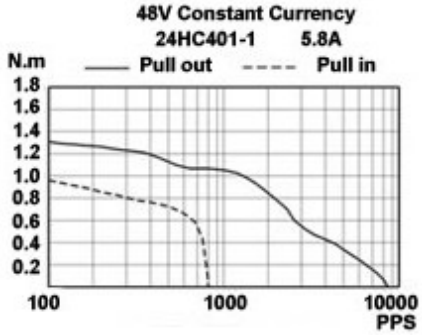
24HC Series

24HC001-1, 24HC101-1

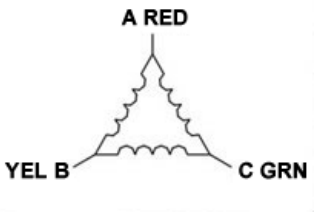
Figure Dimensions



Pulse-torque characteristics



Wiring Diagram



Code	Step angle	Rated current (A)	Resistance per phase (Ω)	Inductance per phase (mH)	Holding torque (mN.m)	Detent torque (mN.m)	Rotor inertia (g.cm2)	Motor mass (g)	Motor length "L"
24HC001-1	1.2°	3	5.8	0.47	0.8	0.9	0.04	0.8	54
24HC101-1	1.2°	3	5.8	0.68	1.36	1.5	0.07	1.3	76

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23HD EX Series

Positional error: ±5%;
Working Temperature: -10℃-+40℃;
Temperature rise: 85K;
Insulation resistance: 100Mohm min 500V DC;
Insulation class: B.

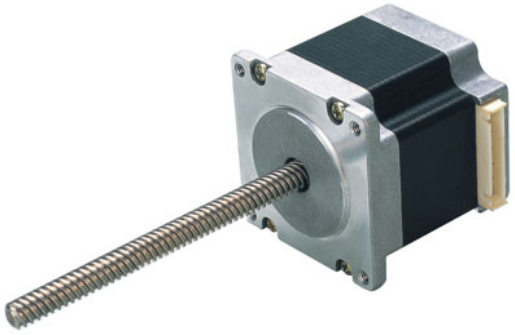
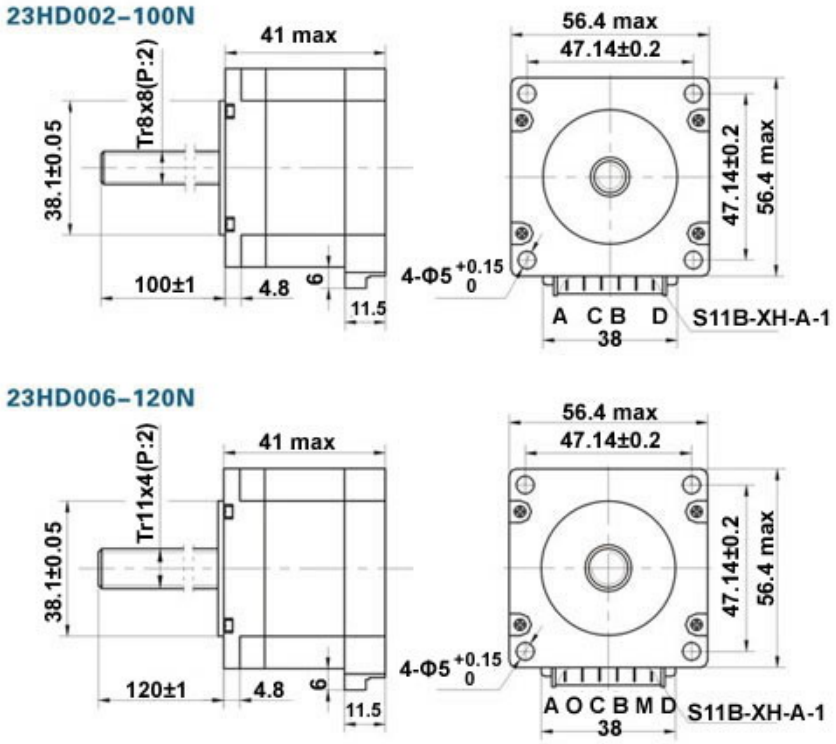


Figure Dimensions



Wiring Diagram

Modle	Step angle	Phases	Resolution (mm)	Rated current (A)	Resistance per phase (Ω)	Inductance per phase (mH)	Detent torque (mN.m)	Rotor inertia ($g.cm^2$)	Motor mass (kg)
23HD002-100N	1.8°	2	0.04	0.5	12	20	55	135	0.42
23HD006-120N	1.8°	4	0.02	1.0	5	5	55	135	0.42

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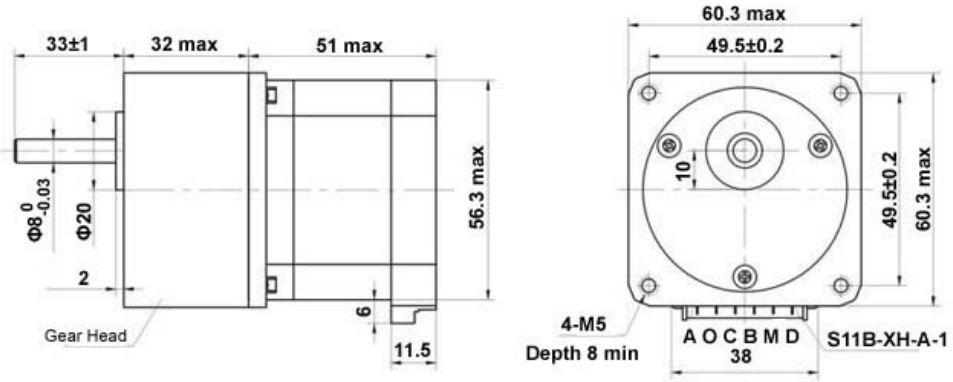
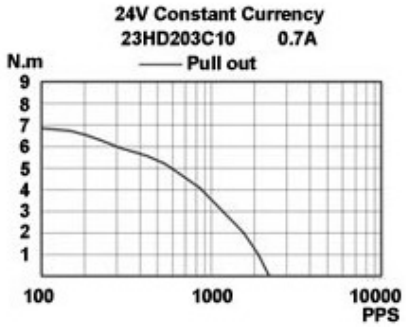
23HD-C Series

Positional error: ±5%;
Working Temperature: -10℃-+40℃;
Temperature rise: 85K;
Insulation resistance: 100Mohm min 500V DC;
Insulation class: B.

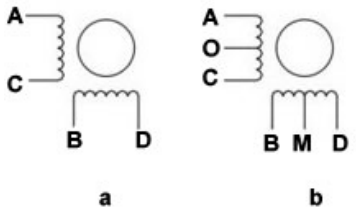
Figure Dimensions



Pulse-torque characteristics



Wiring Diagram



Code	Step angle	Rated current (A)	Resistance per phase (Ω)	Inductance per phase (mH)	Holding torque (mN.m)	Wiring diagram	Motor mass (g)	Gear redution rate
23HD203C10	1.8°	0.7	12.0	40	7.0	a	0.35	1:10
23HD218C10	1.8°	1.3	3.1	5	3.5	b	0.35	1:30

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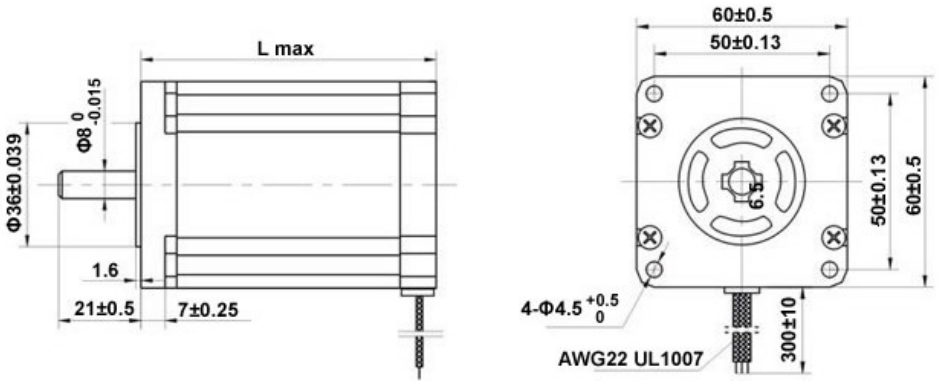
24HC Series

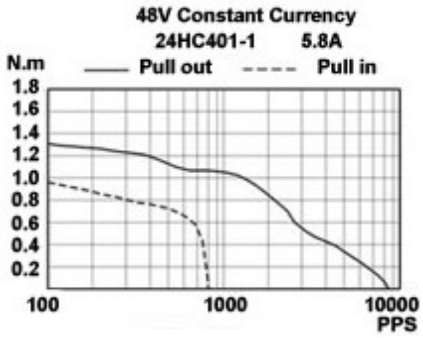
Positional error: ±5%;
Working Temperature: -10℃-+40℃;
Temperature rise: 85K;
Insulation resistance: 100Mohm min 500V DC;
Insulation class: B.

24HC101-1, 24HC401-1

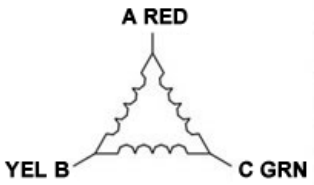
Figure Dimensions



Pulse-torque characteristics



Wiring Diagram



Code	Step angle	Rated current (A)	Resistance per phase (Ω)	Inductance per phase (mH)	Holding torque (mN.m)	Detent torque (mN.m)	Rotor inertia (g.cm2)	Motor mass (g)	Motor length "L"
24HC101-1	1.2°	3	5.8	0.47	0.8	0.9	0.04	0.8	54
24HC401-1	1.2°	3	5.8	0.68	1.36	1.5	0.07	1.3	76

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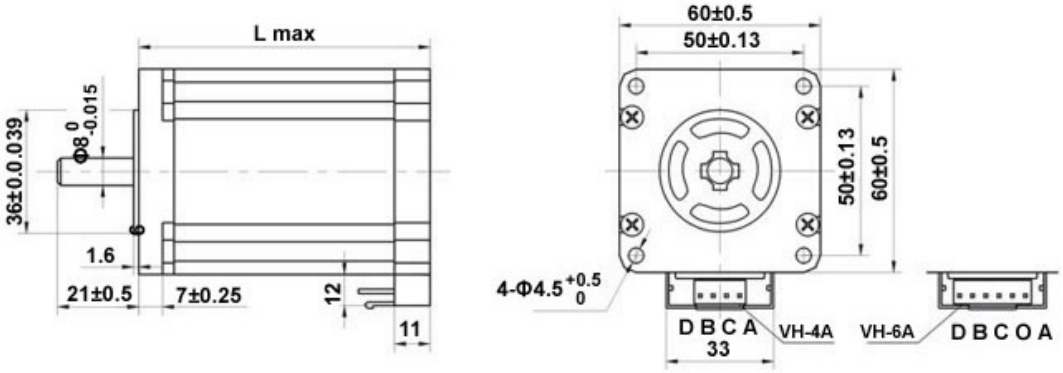
24HD Series

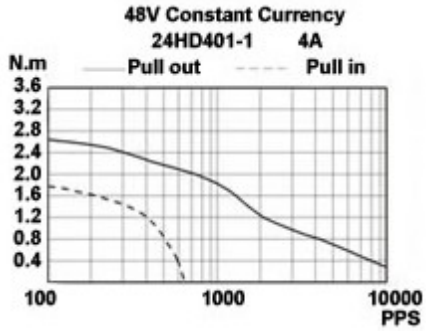
Positional error: ±5%;
Working Temperature: -10℃-+40℃;
Temperature rise: 85K;
Insulation resistance: 100Mohm min 500V DC;
Insulation class: B.

24HD401-1, 24HD401-1

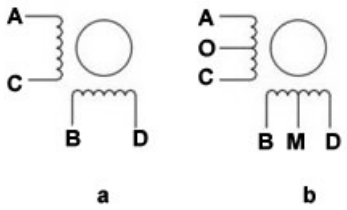
Figure Dimensions



Pulse-torque characteristics



Wiring Diagram



Code	Step angle	Rated current (A)	Resistance per phase (Ω)	Inductance per phase (mH)	Holding torque (mN.m)	Detent torque (mN.m)	Rotor inertia (g.cm2)	Wiring diagram	Motor mass (g)	Motor length "L"
24HD401-1	1.8°	4.0	0.65	2.4	3.0	0.16	840	a	1.35	86
24HD401-1	1.8°	2.8	0.32	0.6	1.8	0.16	840	b	1.35	86

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34HD Series

Positional error: ±5%;
Working Temperature: -10℃-+40℃;
Temperature rise: 85K;
Insulation resistance: 100Mohm min 500V DC;
Insulation class: B.

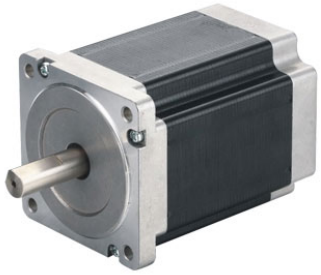
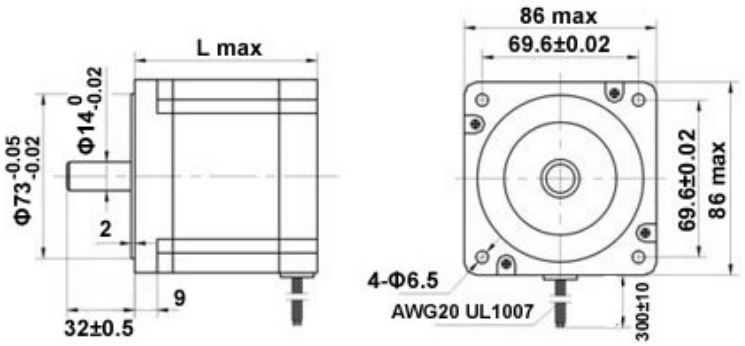
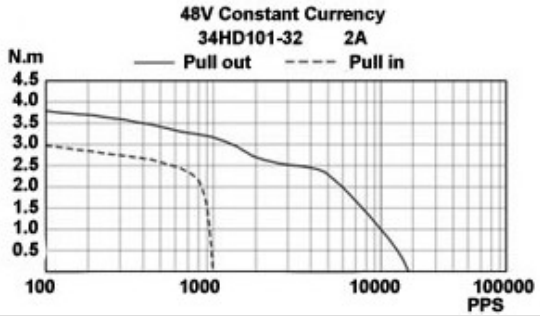


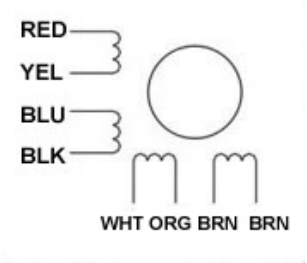
Figure Dimensions



Pulse-torque characteristics



Wiring Diagram



Code	Step angle	Rated current (A)	Resistance per phase (Ω)	Inductance per phase (mH)	Holding torque (mN.m)	Detent torque (mN.m)	Rotor inertia (g.cm2)	Motor mass (kg)	Motor length "L"
34HD001-32	1.8°	4	2.0	2.2	10	2.1	0.10	0.8	1.7
34HD001-32	1.8°	4	2.0	3.2	18	4.1	0.18	1.6	2.8
34HD001-32	1.8°	4	3.0	1.2	1.6	4.2	0.24	2.8	3.2
34HD401-30	1.8°	4	4.0	0.75	3.6	/	/	1.4	1.6
34HD001-32	1.8°	4	2.0	2.2	2	/	/	1.4	1.7
34HD501-37	1.8°	4	4.0	0.3	3.2	/	/	3.3	2.0
34HD101-32	1.8°	4	2.0	3.2	18	/	/	2.7	2.0
34HD105-32	1.8°	4	4.0	0.98	4.1	/	/	2.7	2.8
34HD201-32	1.8°	4	4.0	0.6	6.5	/	/	4.0	3.8

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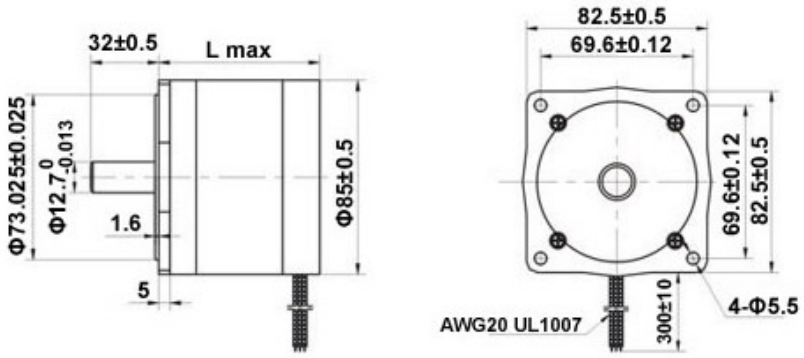
34HY Series

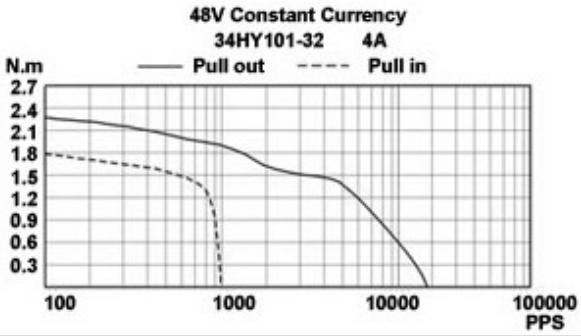
Positional error: ±5%;
Working Temperature: -10℃-+40℃;
Temperature rise: 85K;
Insulation resistance: 100Mohm min 500V DC;
Insulation class: B.

34HY001-32, 34HY101-32, 34HY102-32, 34HY103-32

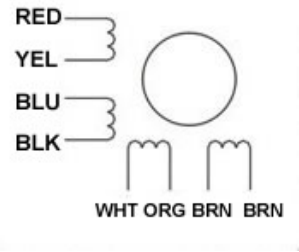
Figure Dimensions



Pulse-torque characteristics



Wiring Diagram



Code	Step angle	Rated current (A)	Resistance per phase (Ω)	Inductance per phase (mH)	Holding torque (mN.m)	Detent torque (mN.m)	Rotor inertia (g.cm2)	Motor mass (kg)	Motor length "L"
34HY001-32	1.8°	4	3.0	1.00	3.75	2.2	0.08	0.64	1.5
34HY101-32	1.8°	4	4.0	0.75	3.50	2.5	0.15	1.30	2.6
34HY102-32	1.8°	4	4.6	0.55	2.60	2.5	0.15	1.30	2.6
34HY103-32	1.8°	4	2.5	1.70	9.00	2.5	0.15	1.30	2.6

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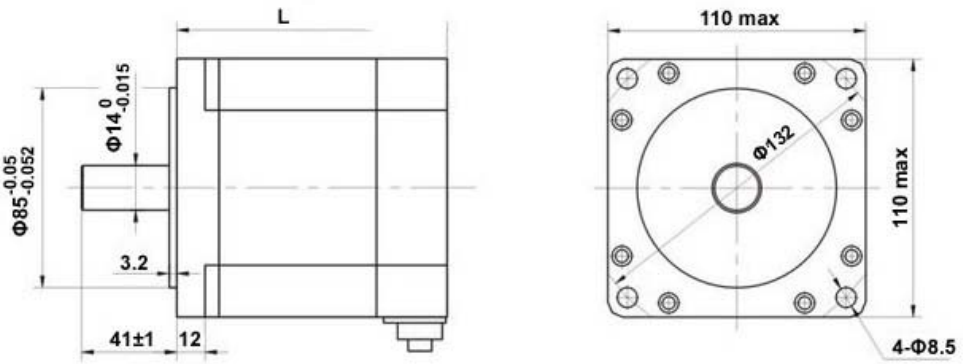
43HC Series

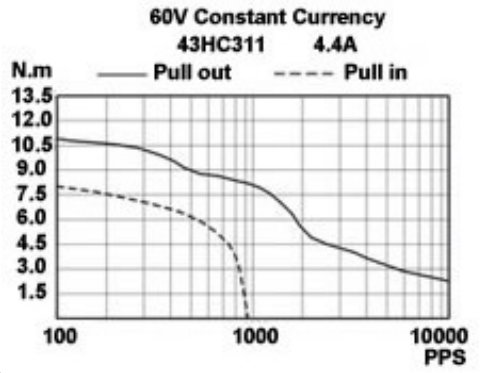
Positional error: ±5%;
Working Temperature: -10℃-+40℃;
Temperature rise: 85K;
Insulation resistance: 100Mohm min 500V DC;
Insulation class: B.

43HC301, 43HC311

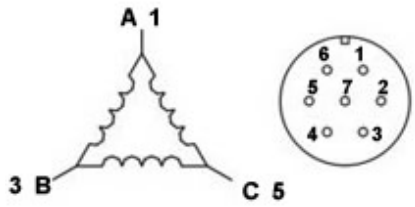
Figure Dimensions



Pulse-torque characteristics



Wiring Diagram



Code	Step angle	Rated current (A)	Resistance per phase (Ω)	Inductance per phase (mH)	Holding torque (mN.m)	Detent torque (mN.m)	Rotor inertia (g.cm2)	Motor mass (kg)	Motor length "L"
43HC301	1.2°	3	4.1	2	4.2	10	0.17	2.0	6
43HC311	1.2°	3	4.1	2	4.6	12	0.20	2.4	8

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Drives

2H042M

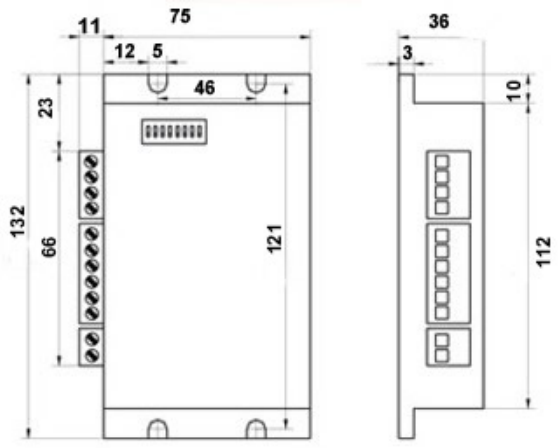
Fit for “11H”, “14H”, “16H” and “17H” Series Stepper Motors

Current/subdivision table

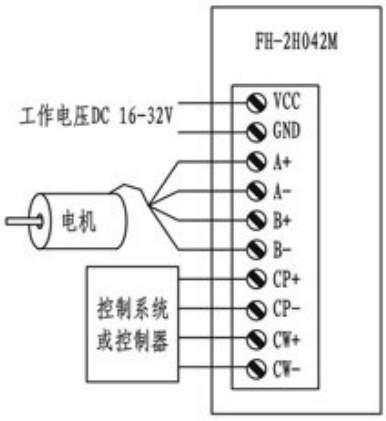
SW1	SW2	Subdivision
0	0	2
0	1	4
1	0	8
1	1	test

SW1	SW2	Current
0	0	0.5 Half
0	1	1.0 Half
1	0	0.5 Full
1	1	1.0 Full

Dimension



Wiring Diagram



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2H057M

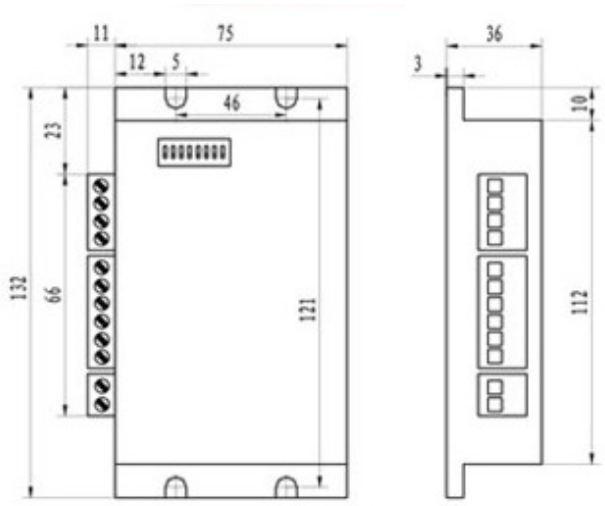
Fit for “17H”, “23H” and “24H” Series Stepper Motors

Current/subdivision table

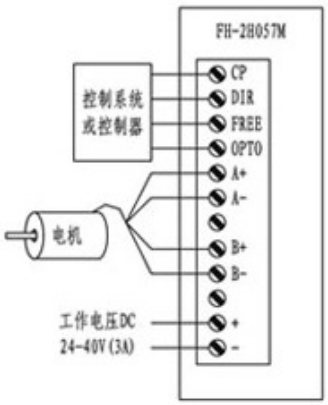
SW1	SW2	SW3	Subdivision
0	0	0	2
0	0	1	5
0	1	0	10
0	1	1	20
1	0	0	40

SW4, 5 keep “on”, (SW6, 7, 8) as follows:	Current		
SW	Current	SW2	Current
000	0.5A	100	1.7A
001	1.0A	101	2.0A
010	1.3A	110	2.4A
011	1.5A	111	3.0A

Dimension



Wiring Diagram



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2H090M

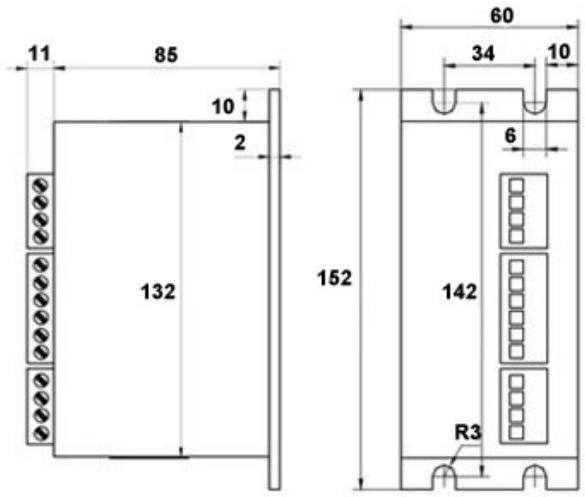
Fit for “23H”, “24H” and “34H” Series Stepper Motors

Current/subdivision table

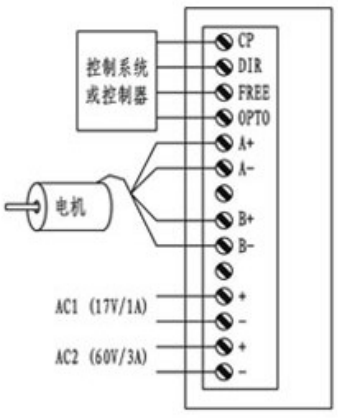
SW1	SW2	SW3	Subdivision
0	0	0	2
0	0	1	5
0	1	0	10
0	1	1	20
1	0	0	40

SW4, 5 keep “on”, (SW6, 7, 8) as follows:		Current	
SW	Current	SW2	Current
000	0.5A	100	1.7A
001	1.0A	101	2.0A
010	1.3A	110	2.4A
011	1.5A	111	3.0A

Dimension



Wiring Diagram



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Drives

2H042M

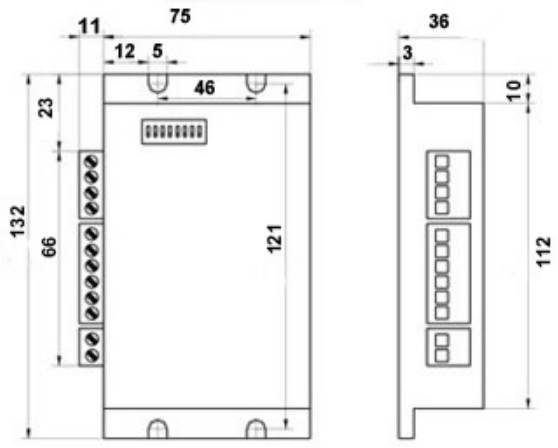
Fit for “11H”, “14H”, “16H” and “17H” Series Stepper Motors

Current/subdivision table

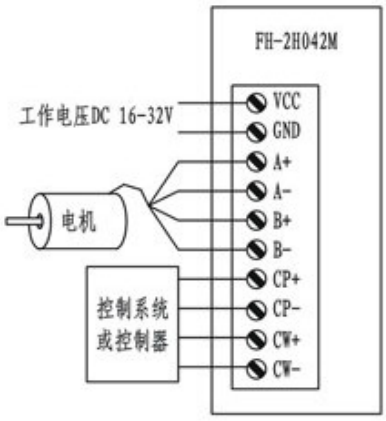
SW1	SW2	Subdivision
0	0	2
0	1	4
1	0	8
1	1	test

SW1	SW2	Current
0	0	0.5 Half
0	1	1.0 Half
1	0	0.5 Full
1	1	1.0 Full

Dimension



Wiring Diagram



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2H057M

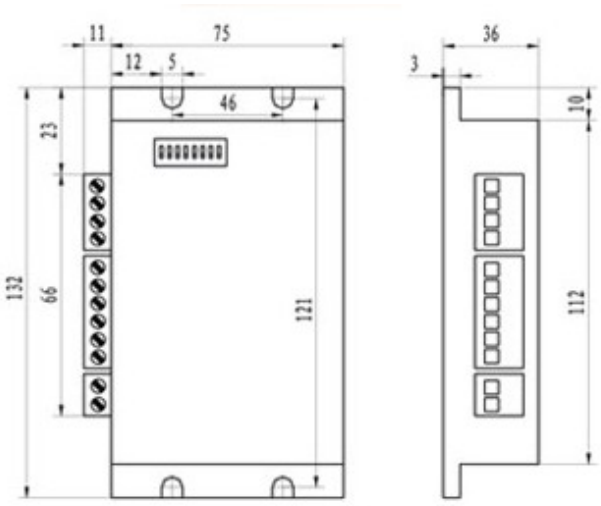
Fit for “17H”, “23H” and “24H” Series Stepper Motors

Current/subdivision table

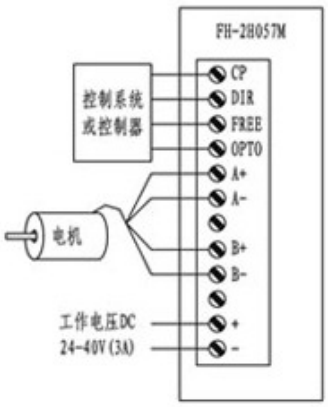
SW1	SW2	SW3	Subdivision
0	0	0	2
0	0	1	5
0	1	0	10
0	1	1	20
1	0	0	40

SW4, 5 keep “on”, (SW6, 7, 8) as follows:	Current		
SW	Current	SW2	Current
000	0.5A	100	1.7A
001	1.0A	101	2.0A
010	1.3A	110	2.4A
011	1.5A	111	3.0A

Dimension



Wiring Diagram



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2H090M

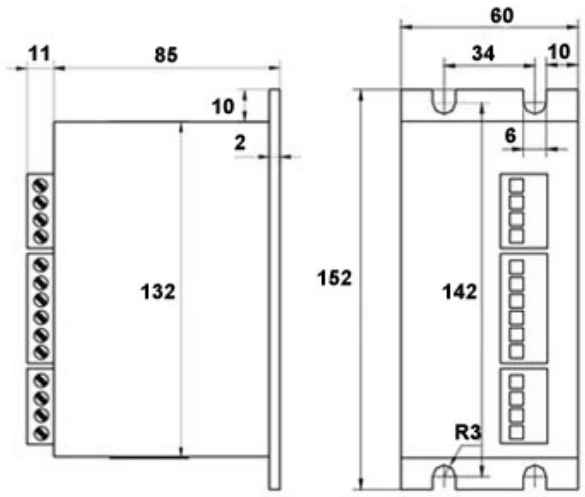
Fit for “23H”, “24H” and “34H” Series Stepper Motors

Current/subdivision table

SW1	SW2	SW3	Subdivision
0	0	0	2
0	0	1	5
0	1	0	10
0	1	1	20
1	0	0	40

SW4, 5 keep “on”, (SW6, 7, 8) as follows:		Current	
SW	Current	SW2	Current
000	0.5A	100	1.7A
001	1.0A	101	2.0A
010	1.3A	110	2.4A
011	1.5A	111	3.0A

Dimension



Wiring Diagram