MOTORS

ENCAPSULATED HYBRID STEPPING MOTORS
NEW RELEASED HYBRID STEPPING MOTORS
2 PHASE HYBRID STEPPING MOTORS
3 PHASE HYBRID STEPPING MOTORS

MOONS'
moving in better ways

MOTORS

Contents

MOONS'

Introduction of Stepping Motors

Applications

MOONS' stepping motors are widely used to create the motion needed in many types of equipment. Examples include:

- office automation: printers, scanners, copy machines
- stage lighting: pointing, focus, color changes, spot size, special effects
- banking: check processing, credit card manufacturing, money scanners & counters
- medical: body scanning, blood analyzers, chemical analysis
- industrial: textile, packaging, robotics, conveyers, assembly, labeling
- telecommunication: phase shift, Tuning, mobile antenna positioning
- security: camera movement
- automotive: fuel metering, steering control

What is Stepping Motor

Stepping Motors provide precise position and speed control, without the need for feedback devices to sense position. The operation of step motors is controlled through electrical pulses that the drive converts to current flowing through the windings of the motor. As the current is switched the motor rotates in precise steps of a fixed angle. The motor and drive constitutes a low cost control system that is precise and simple to construct.

Performance Features of MOONS' Stepping Motors

- **Accurate Position Control**
  The number of control pulses defines the motor shaft position. Position error is very small (less than 1/10th of a degree), and non cumulative.

- **Precise Motor Speed**
  Step motor running speed, is exactly determined by the frequency of the control pulses. Because the speed is very precise and easy to control, step motors are often used where coordinated motion control is needed.

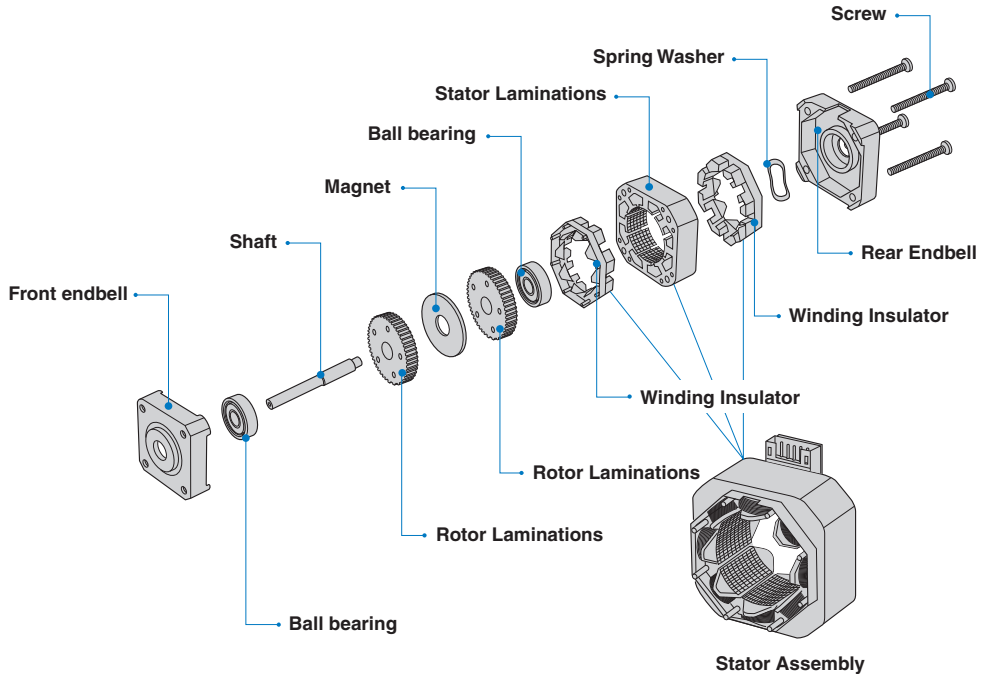
- **Forward & Reverse, Pause and Holding Function**
  Motor torque and position control is effective throughout the entire speed range, including zero speed holding torque. The zero speed holding torque locks the shaft at the desired position to hold the load in place.

- **Low Speed Operation**
  Step motors produce a large amount of torque, and are easy to control, at low speeds. This often eliminates the need for speed reduction gearboxes, reduces costs and saves space.

- **Long Life**
  The brushless design of step motors leads to motors with a very long life. Step motor life is usually determined by the life of the bearings.

Basic Structure and Motor Operation

- **Basic Structure**

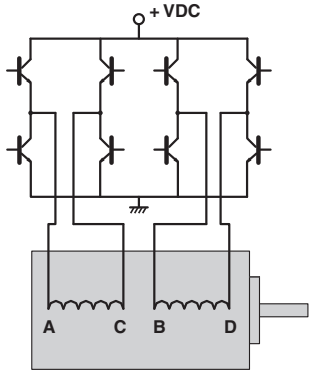


- **Operating Principles**

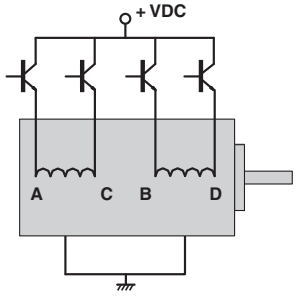
In response to each individual control pulse and direction signal, the drive applies power to the motor windings to cause the rotor to take a step forward, a step in reverse, or lock in position.

For example, in a 1.8 degree two phase step motor: When both phases are energized with DC current, the motor will stop rotating and hold in position. The maximum torque the motor can hold in place with rated DC current, is the rated holding torque. If the current in one phase is reversed, the motor will move 1 step (1.8 degrees) in a known direction. If the current in the other phase had been reversed, the motor would move 1 step (1.8 degrees) in the other direction. As current is reversed in each phase in sequence, the motor continues to step in the desired direction. These steps are very accurate. For a 1.8 degree step motor, there are exactly 200 steps in one revolution.

Two phase stepping motors are furnished with two types of windings: bipolar or unipolar. In a bipolar motor there is one winding on each phase. The motor moves in steps as the current in each winding is reversed. This requires a drive with eight electronic switches. In a unipolar motor there are two windings on each phase. The two windings on each phase are connected in opposite directions. Phase current is reversed by turning on alternate windings on the same phase. This requires a drive with only four electronic switches. Bipolar operation typically provides 40% more holding torque than unipolar, because 100% of the winding is energized in the bipolar arrangement.



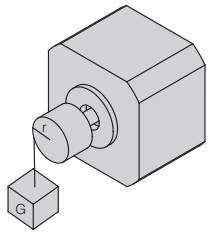
2 phase step motor with bipolar driver



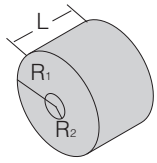
2 phase step motor with unipolar driver

Technical Data and Terminology

- **Load Calculations**



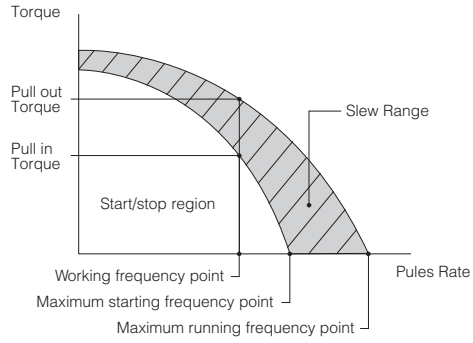
A. Torque load (Tf)
Tf = G * r
G: weight
r: radius



B. Inertia load (TJ)
TJ = J * dw/dt
$J = M * (R_1^2+R_2^2) / 2$ (Kg * cm)
M: mass
R1: outside radius
R2: inside radius
dw/dt: angle acceleration

- **Speed-Torque Characteristics**

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



A. Working frequency point express the stepping motors rotational speed value at this point
n = q * Hz / (360 * D)
n: rev/sec
Hz: the frequency value at this point
D: the subdividing value of motor driver
q: the step angle of stepping motor

E.g.: 1.8° stepping motor, in the condition of I/2 subdividing (each step 0.9°) runs at 500Hz its speed is 1.25r/s.

B. Start/Stop region: the region in which a stepping motor can be directly started or stopped.

C. 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 can not 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.

D. Maximum starting frequency point at this point, the stepping motor can reach its maximum starting speed under unloaded condition.

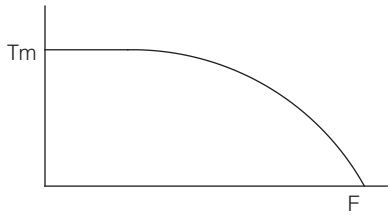
E. Maximum running frequency point at this point the stepping motor can reach its maximum running speed under an unloaded condition.

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

G. Pull-out Torque: the maximum dynamic torque value that a stepping 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.

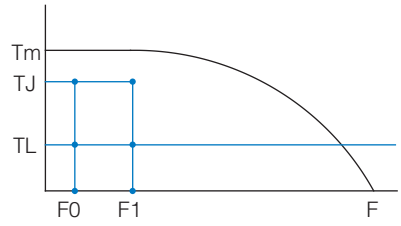
- **Calculate the Acceleration Torque**

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

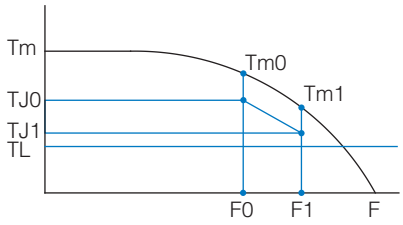


It is shown by the following graph: the dynamic torque's performance of stepping motor will always keep a horizontal straight line in low speed. But in high speed, the curve will slope down quickly influenced by the inductance.

A. 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?
(1). Generally TJ = 70%Tm
(2). $tr = 1.8 * 10^{-5} * J * q * (F1-F0)/(TJ-TL)$
(3). F (t) = (F1-F0) * t/tr + F0, 0<t<tr



B. Exponential Acceleration
(1). Generally
TJ0 = 70%Tm0,
TJ1 = 70%Tm1,
TL = 60%Tm1
(2). tr = F4 * In [(TJ0-TL)/(TJ1-TL)]
(3). F (t) = F2 * [1 – e^(-t/F4)] + F0, 0<t<tr
F2 = (TL-TJ0) * (F1-F0)/(FJ1-TJ0)
F4 = $1.8 * 10^{-5} * J * q * F2/(TJ0-TL)$



Note:
J is the torque inertia of motor rotor plus its load, q is the angle of each step, it equals to the step angle of stepping 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, stepping 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. Have the motor operate outside of this speed 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%.

Model Numbering System

17	H	D	0	0	01	-	01
a	b	c	d	e	f		g

a Frame Size
motor outside diameter in tenths of an inch (example: size 17 = 1.7")

b Type of Stepping Motor
"H" means Hybrid Stepping Motor

c Type of Step Angle
A/K: step angle 0.9°, stator: 8 polar
C: step angle 1.2°
D: step angle 1.8°, stator: 8 polar, teeth distributing asymmetrically
E: step angle 3.6°, stator: 8 polar
F: step angle 3.75°, stator: 8 polar
S: step angle 1.8°, stator: 8 polar, large rotor
Y: step angle 1.8°, stator: 8 polar, small rotor

d Stator Length

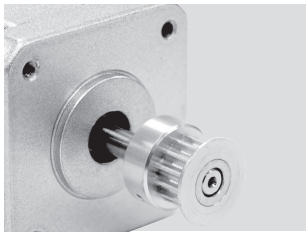
e Type of Lead Wires
"0" indicates connector only, "4" "5" "6" "8" indicates number of lead wires

f Electric Variation
variety of current, torque, etc.

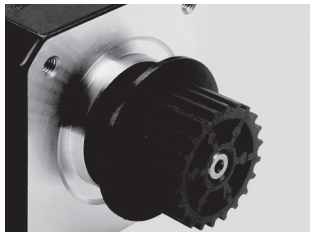
g Mechanical Variation
variety of shaft, lead wires, screws, etc.

Shaft Options

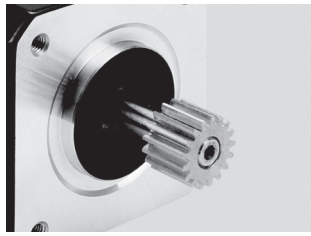
- **Press Fit Pulley & Gear**



Metal Pulley

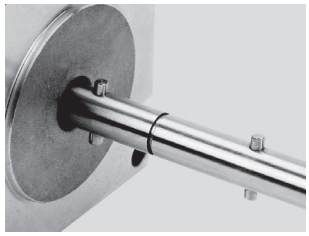


Plastic Pulley

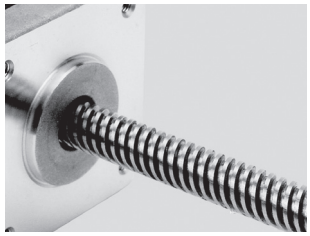


Gear

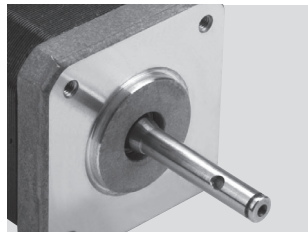
- **Shaft Options**



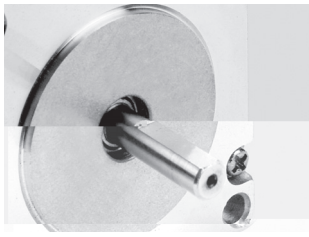
Dowel



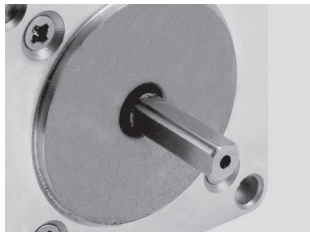
Worm Shaft



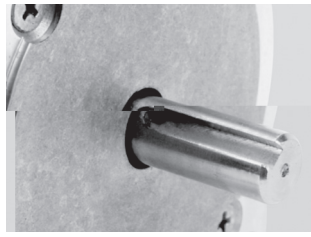
Cross Drilled Shaft



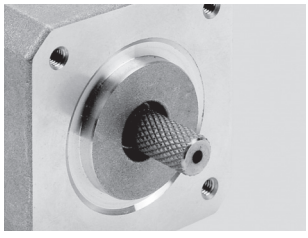
Single Flat



Double Flat



Key Way



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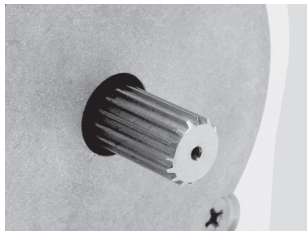
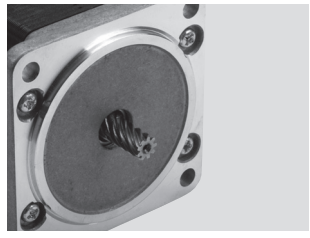
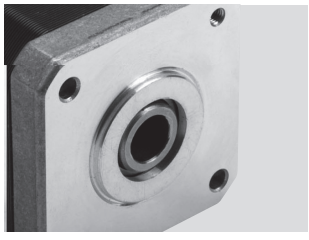


Hobbed Gear



Helical Cut



Hollow Shaft

- Many other special shafts are available.

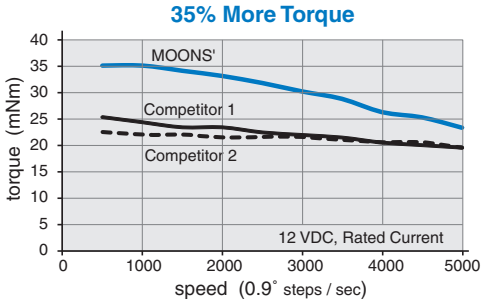
Encapsulated Stepping Motors

New Encapsulation Technology From MOONS' Offers Many Advantages

- **Ideal for Security Cameras**
  In addition to all the advantages of normal step motors, these new encapsulated motors can help achieve a breakthrough in miniaturization of security cameras. Small step motors are a core component in security camera systems. With MOONS' encapsulation technology, the 36mm diameter motor is now available with a thickness as little as 12.8mm.

- **Low Temperature Rise**
  The winding resistance of these new motors is nearly 30% lower than other motors with the same thickness and output-torque. In addition, the new encapsulation technology increases the heat-conducting property of these motors. The lower winding resistance and improved thermal conductivity combine to drastically lower the temperature of these motors to less than 80% of standard motors.

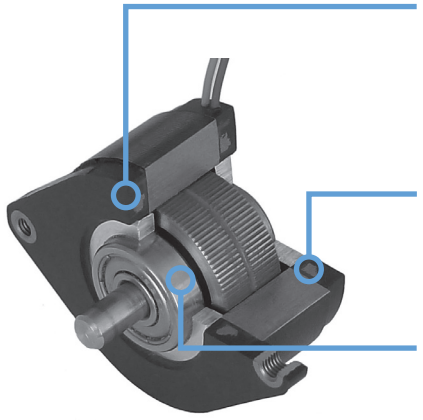
- **35% More Torque**
  Lower resistance coils allows these encapsulated motors to handle more power. With the same temperature rise the new motors can produce 35% more torque while dissipating the same amount of heat.



- **Quieter & Smoother**
  New materials and improved manufacturing processes, means these motors have a higher precision, more stable design. This controls vibration and reduces noise. It also makes the motor run smoothly.

- **More Load & Longer Life**
  MOONS' encapsulated stepping motors use large bearings that can handle large axial and radial loads, and ensure long life.

- **RoHS**
  Encapsulated stepping motors are RoHS compliant.



- **Molded Construction**
  Encapsulated winding.....Runs cooler – Longer life
  Better sealing.....Longer life
  Reduced vibration.....Smoother moves - Quieter

- **High Slot Fill**
  Larger wire size.....More torque
  Uses less energy.....Longer battery life

- **Large Ball Bearings**
  Large shaft loads.....Fewer design restrictions
  Long Life.....27 times with same load

14HK SERIES 0.9°

Encapsulated Stepping Motor

Key Features

- 35% More Torque
- Quieter & Smoother
- Longer Life

General Specifications

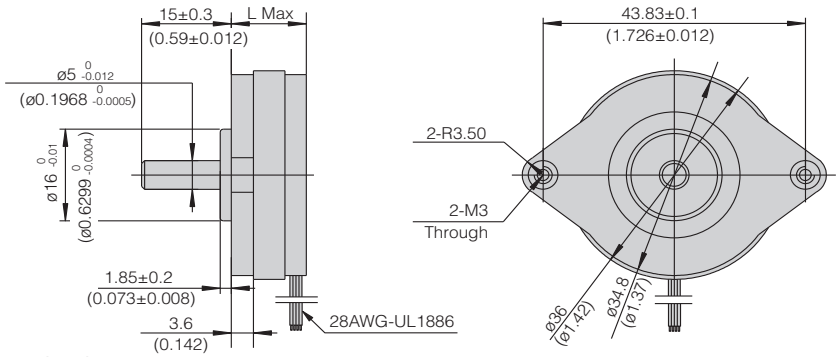
- Bi-polar

Series & Length	Model Number	Holding Torque		Rated Current	Resistance per Phase	Inductance per Phase	Detent Torque		Rotor Inertia	
		mNm	oz-in	A	ohm	mH	mNm	oz-in	g.cm²	oz-in²
14HK0 12.8 mm (0.50 in.)	14HK0402N	40	5.64	0.3	12	8	2	0.28	4	0.022
14HK2 20.2 mm (0.80 in.)	14HK2401N	100	14.1	0.45	8.4	7.3	5	0.71	11	0.060

• Wiring Connection, Lead Wires, Schematic Diagrams & Stepping Sequence.....Page 60 - 62

Mechanical Dimension

Series	L	Mass
	mm (in.)	kg (lb.)
14HK0	12.8 (0.50)	0.06 (0.13)
14HK2	20.2 (0.80)	0.11 (0.24)



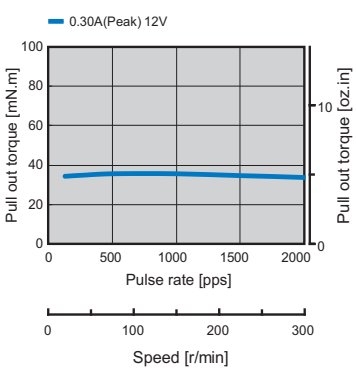
Unit: mm(inch)

Dynamic Torque Curves

- Bi-polar

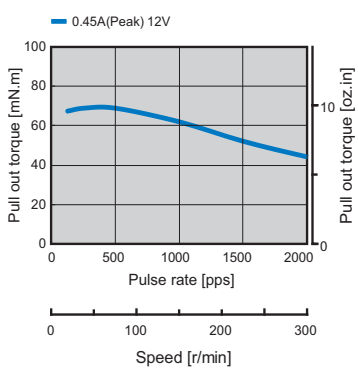
14HK0402N

Conditions:Bi-polar Constant Current Driver
Driver: AMA MS3540M
Mode:Full Step



14HK2401N

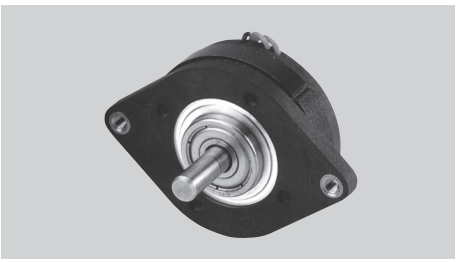
Conditions:Bi-polar Constant Current Driver
Driver: AMA MS3540M
Mode:Full Step



14HC SERIES 1.2° Encapsulated Stepping Motor

Key Features

- 35% More Torque
- Quieter & Smoother
- Longer Life



General Specifications

Series & Length	Model Number	Holding Torque		Rated Current	Resistance per Phase	Inductance per Phase	Detent Torque		Rotor Inertia	
		mNm	oz-in	A	ohm	mH	mNm	oz-in	g.cm²	oz-in²
14HC0 12.8 mm (0.50 in.)	14HC0301N	33	4.7	1	1.68	0.82	4	0.57	4	0.022
14HC2 20.2 mm (0.80 in.)	14HC2301N	90	12.7	1.25	1.45	0.85	10	1.4	11	0.060

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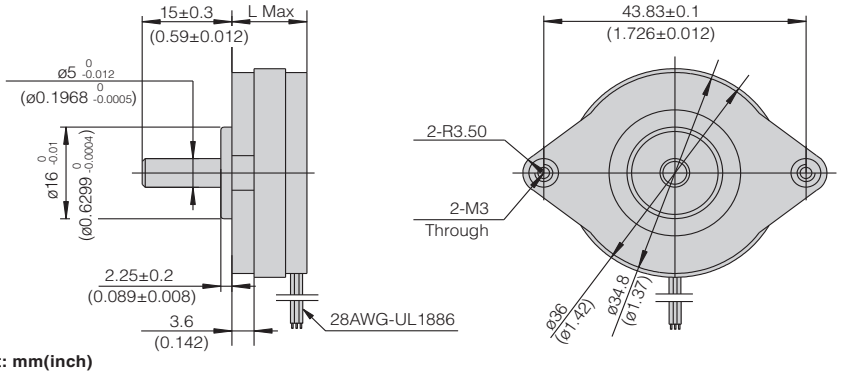
Mechanical Dimension

Series	L	Mass
	mm (in.)	kg (lb.)
14HC0	12.8 (0.50)	0.06 (0.13)
14HC2	20.2 (0.80)	0.11 (0.24)

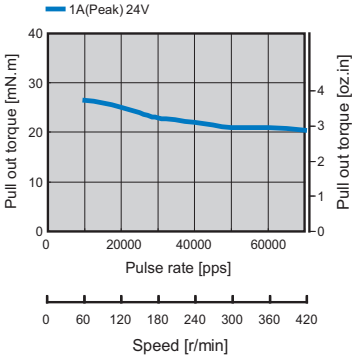


Unit: mm(inch)

Dynamic Torque Curves

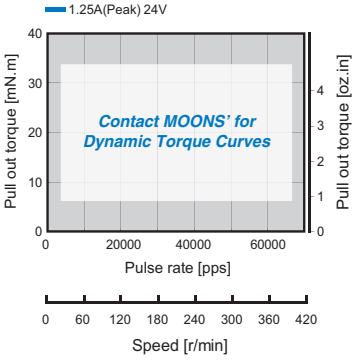
14HC0301N

Conditions:
Driver: MS3ST10
Mode:10000 Step/Revolution



14HC2301N

Conditions:
Driver: MS3ST10
Mode:10000 Step/Revolution



17HC SERIES 1.2° Encapsulated Stepping Motor

Key Features

- 35% More Torque
- Quieter & Smoother
- Longer Life

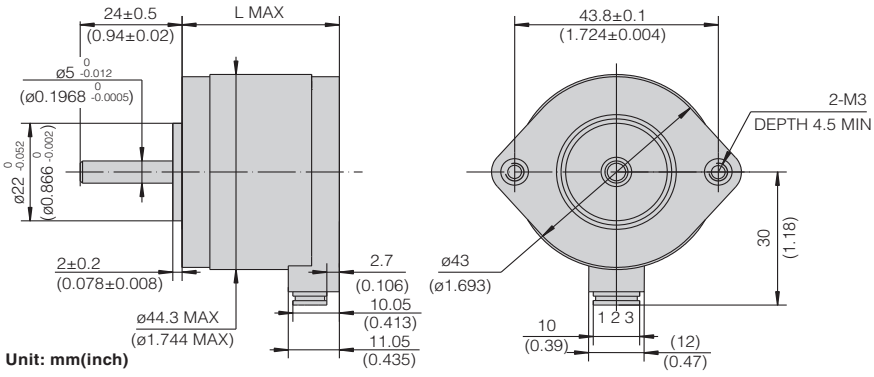
General Specifications

Series & Length	Model Number	Holding Torque		Rated Current	Resistance per Phase	Inductance per Phase	Detent Torque		Rotor Inertia	
		mNm	oz-in	A	ohm	mH	mNm	oz-in	g.cm²	oz-in²
17HC2 34 mm (1.34 in.)	17HC2001-01N	360	51.0	0.8	12.4	16.5	14	2	57	0.311
	17HC2002-02N	348	49.3	2.3	1.65	2.4	14	2	57	0.311

• Wiring Connection, Lead Wires, Schematic Diagrams & Stepping Sequence.....Page 60 - 62

Mechanical Dimension

Series	L	Mass
	mm (in.)	kg (lb.)
17HC2	34 (1.34)	0.245 (0.54)

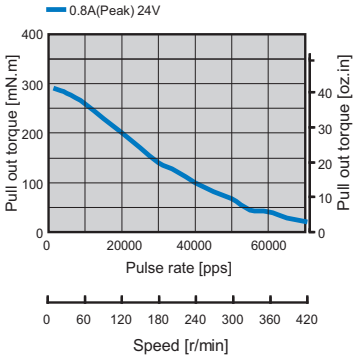


Unit: mm(inch)

Dynamic Torque Curves

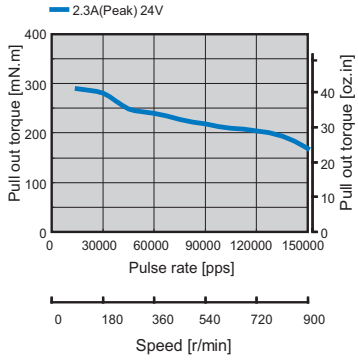
17HC2001-01N

Conditions:
Driver: MS3ST10
Mode:10000 Step/Revolution



17HC2002-02N

Conditions:
Driver: MS3ST10
Mode:10000 Step/Revolution

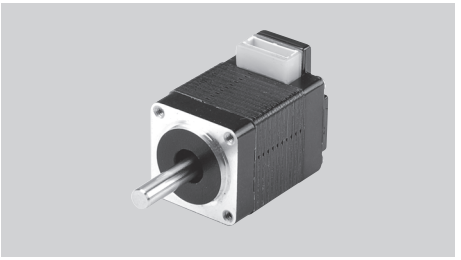


Why Stepping Motor
encapsulated 2 phase NEMA 14
encapsulated 3 phase NEMA 14 NEMA 17
new release 2 phase NEMA 8
new release 2 phase NEMA 14
new release 2 phase NEMA 16
2 phase NEMA 10 25.0 mm (1.00 inch)
2 phase NEMA 11 28.0 mm (1.10 inch)
2 phase NEMA 14 35.0 mm (1.38 inch)
2 phase NEMA 16 39.0 mm (1.53 inch)
2 phase NEMA 17 42.0 mm (1.65 inch)
2 phase NEMA 23 56.0 mm (2.22 inch)
2 phase NEMA 24 60.0 mm (2.36 inch)
2 phase NEMA 34 86.0 mm (3.39 inch)
3 phase NEMA 24 60.0 mm (2.36 inch)
3 phase NEMA 34 86.0 mm (3.39 inch)
how to select

8HY SERIES 1.8°

Key Features

- Small Size
- Smooth Movement
- Low Inertia



General Specifications

- Bi-polar

Series & Length	Model Number	Holding Torque		Rated Current	Resistance per Phase	Inductance per Phase	Detent Torque		Rotor Inertia	
		mNm	oz-in	A	ohm	mH	mNm	oz-in	g.cm²	oz-in²
8HY2 29.5 mm (1.16 in.)	8HY2041	17	2.4	0.4	9	1.85	2.5	0.4	2	0.011
8HY4 47 mm (1.85 in.)	8HY4041	32	4.5	0.4	14	4.6	4	0.6	4	0.022

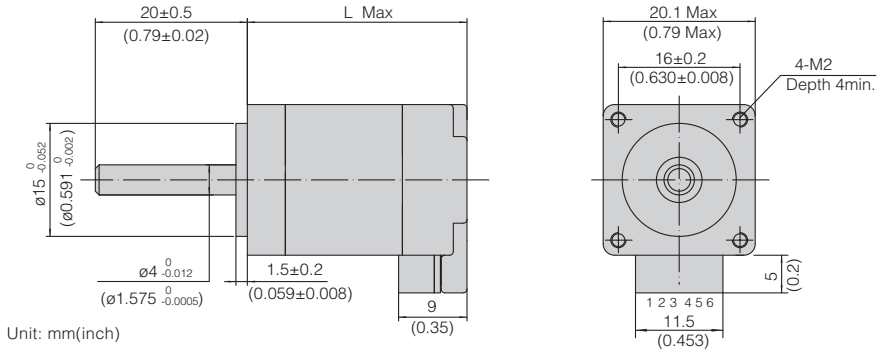
- Uni-polar

Series & Length	Model Number	Holding Torque		Rated Current	Resistance per Phase	Inductance per Phase	Detent Torque		Rotor Inertia	
		mNm	oz-in	A	ohm	mH	mNm	oz-in	g.cm²	oz-in²
8HY2 29.5 mm (1.16 in.)	8HY2061	13	1.8	0.4	10	2.4	2.5	0.4	2	0.011
8HY4 47 mm (1.85 in.)	8HY4062	24	3.4	0.4	20	4.6	4	0.6	4	0.022

- Wiring Connection, Lead Wires, Schematic Diagrams & Stepping Sequence.....Page 60 - 62

Mechanical Dimension

Series	L
	mm (in.)
8HY2	29.5 (1.16)
8HY4	47 (1.85)



Unit: mm(inch)

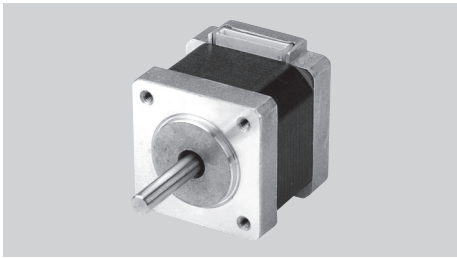
Dynamic Torque Curves

- Contact MOONS' for dynamic torque curves

14HS SERIES 1.8°

Key Features

- High Torque
- Small Size
- Smooth Movement



General Specifications

- Bi-polar

Series & Length	Model Number	Holding Torque		Rated Current	Resistance per Phase	Inductance per Phase	Detent Torque		Rotor Inertia	
		mNm	oz-in	A	ohm	mH	mNm	oz-in	g.cm²	oz-in²
14HS3 36 mm (1.41 in.)	14HS3042	150	21.2	0.85	5.4	6.5	18	2.5	20	0.109
14HS5 55 mm (2.16 in.)	14HS5042	270	38.2	0.7	7.7	8.4	30	4.2	35	0.191

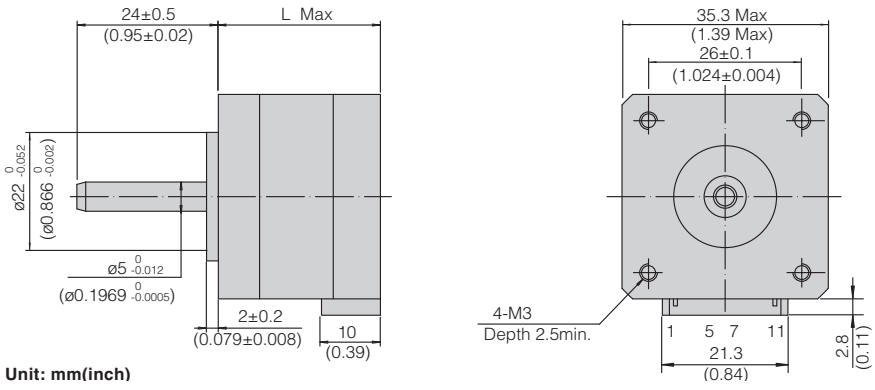
- Uni-polar

Series & Length	Model Number	Holding Torque		Rated Current	Resistance per Phase	Inductance per Phase	Detent Torque		Rotor Inertia	
		mNm	oz-in	A	ohm	mH	mNm	oz-in	g.cm²	oz-in²
14HS3 36 mm (1.41 in.)	14HS3062	110	15.6	1.2	2.7	1.6	18	2.5	20	0.109
14HS5 55 mm (2.16 in.)	14HS5062	200	28.3	1.2	3.9	2.1	30	4.2	35	0.191

- Wiring Connection, Lead Wires, Schematic Diagrams & Stepping Sequence.....Page 60 - 62

Mechanical Dimension

Series	L
	mm (in.)
14HS3	36 (1.41)
14HS5	55 (2.16)



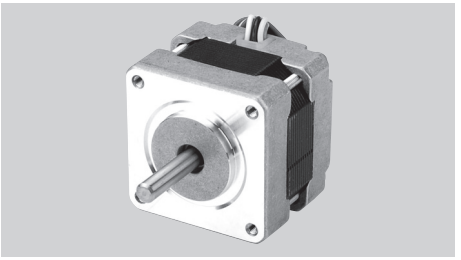
Unit: mm(inch)

Dynamic Torque Curves

- Contact MOONS' for dynamic torque curves

16HF SERIES 3.75°

Key Features



- High Speed
- Small Size
- High Acceleration

General Specifications

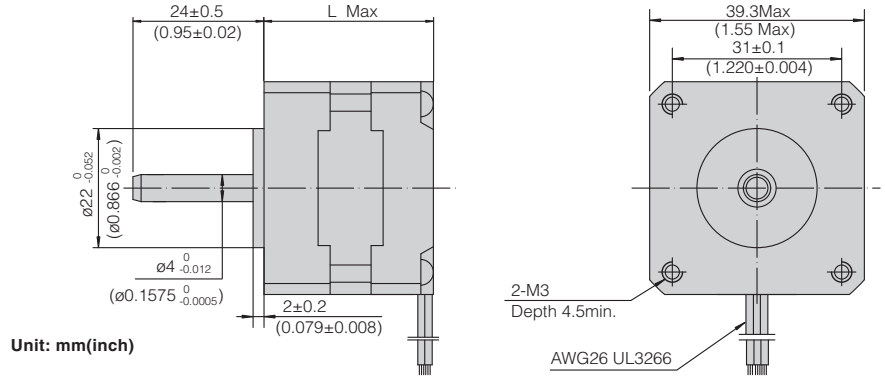
- Bi-polar

Series & Length	Model Number	Holding Torque		Rated Current	Resistance per Phase	Inductance per Phase	Detent Torque		Rotor Inertia	
		mNm	oz-in	A	ohm	mH	mNm	oz-in	g.cm²	oz-in²
16HF1 33.3 mm (1.31 in.)	16HF1408	100	14.2	0.73	7.3	6	12	1.7	15	0.082

- Wiring Connection, Lead Wires, Schematic Diagrams & Stepping Sequence.....Page 60 - 62

Mechanical Dimension

Series	L
	mm (in.)
16HF1	33.3 (1.31)



Unit: mm(inch)

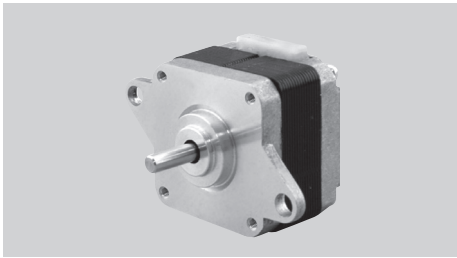
Dynamic Torque Curves

- Contact MOONS' for dynamic torque curves

10HF SERIES 3.75°

Key Features

- High Speed
- High Acceleration
- Low Noise



General Specifications

- Bi-polar

Series & Length	Model Number	Holding Torque		Rated Current	Resistance per Phase	Inductance per Phase	Detent Torque		Rotor Inertia	
		mNm	oz-in	A	ohm	mH	mNm	oz-in	g.cm²	oz-in²
10HF3 18 mm (0.71 in.)	10HF3001	12	1.70	0.3	14	5.8	2.9	0.411	2	0.011
	10HF3002	12	1.70	0.6	3.6	1.6	2.9	0.411	2	0.011
10HF7 18.5 mm (0.72 in.)	10HF7402-02	15	2.13	0.143	84	18	3	0.42	2	0.01
10HF5 22 mm (0.87 in.)	10HF5001	19	2.69	0.3	18	10.7	3.9	0.553	3	0.016
	10HF5002	19	2.69	0.6	4.6	3	3.9	0.553	3	0.016

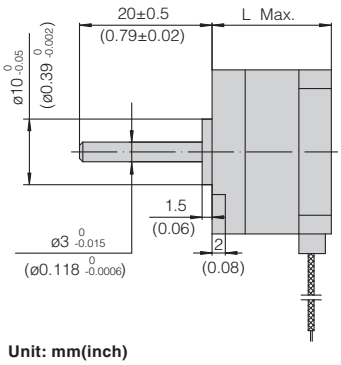
- Uni-polar

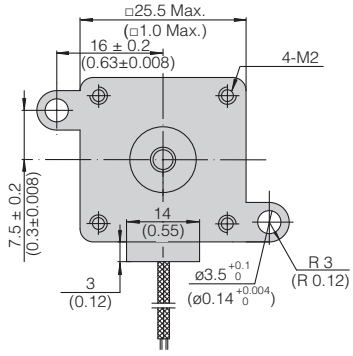
Series & Length	Model Number	Holding Torque		Rated Current	Resistance per Phase	Inductance per Phase	Detent Torque		Rotor Inertia	
		mNm	oz-in	A	ohm	mH	mNm	oz-in	g.cm²	oz-in²
10HF7 18.5 mm (0.72 in.)	10HF7602-03	9	1.28	0.2	42	4.5	3	0.42	2	0.01

- Wiring Connection, Lead Wires, Schematic Diagrams & Stepping Sequence.....Page 60 - 62

Mechanical Dimension

Series	L	Mass
	mm (in.)	kg (lb.)
10HF3	18 (0.71)	0.044 (0.10)
10HF7	18.5 (0.72)	0.045 (0.10)
10HF5	22 (0.87)	0.054 (0.12)





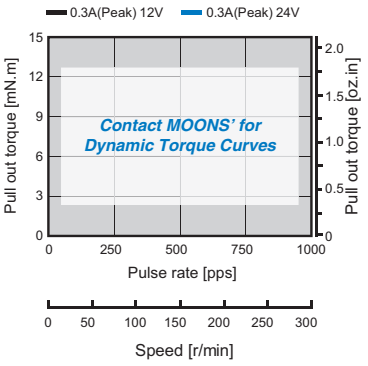
Unit: mm(inch)

Dynamic Torque Curves

- Bi-polar

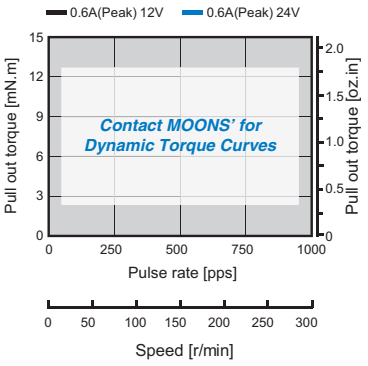
10HF3001

Conditions: Bi-polar Constant Current Driver
Driver: AMA MS3540M
Mode: Full Step



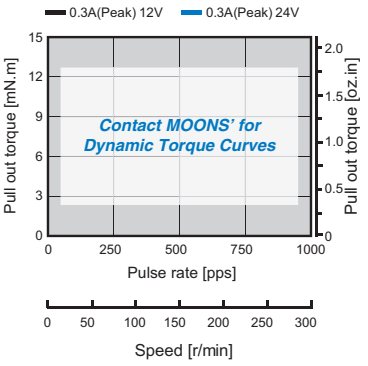
10HF3002

Conditions: Bi-polar Constant Current Driver
Driver: AMA MS3540M
Mode: Full Step



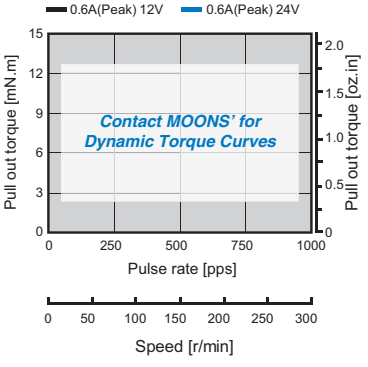
10HF5001

Conditions: Bi-polar Constant Current Driver
Driver: AMA MS3540M
Mode: Full Step



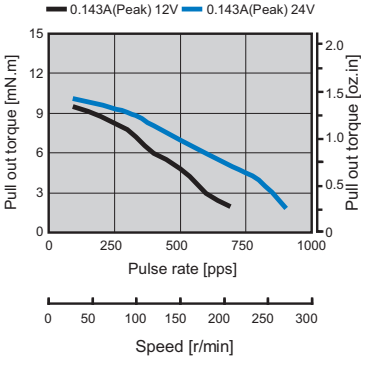
10HF5002

Conditions: Bi-polar Constant Current Driver
Driver: AMA MS3540M
Mode: Full Step



10HF7402-02

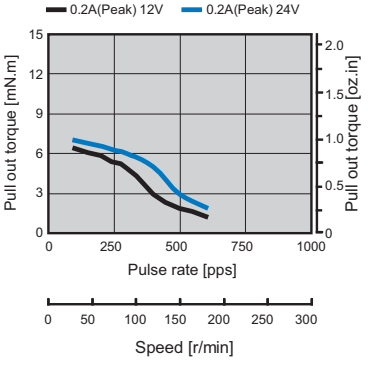
Conditions: Bi-polar Constant Current Driver
Driver: AMA MS3540M
Mode: Full Step



- Uni-polar

10HF7602-03

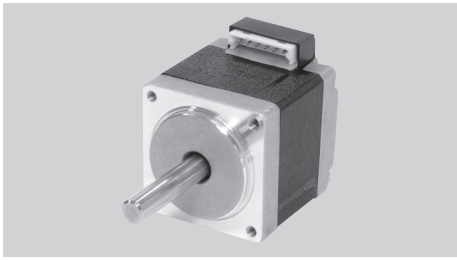
Conditions: Uni-polar Constant Current Driver
Driver: AMA MSU3040M
Mode: Full Step



11HS SERIES 1.8°

Key Features

- High Accuracy
- Low Inertia
- Small Size



General Specifications

- Bi-polar

Series & Length	Model Number	Holding Torque		Rated Current	Resistance per Phase	Inductance per Phase	Detent Torque		Rotor Inertia	
		mNm	oz-in	A	ohm	mH	mNm	oz-in	g.cm²	oz-in²
11HS1 31 mm (1.22 in.)	11HS1006	65	9.21	0.67	5.6	4.3	5	0.71	9	0.05
	11HS1007	65	9.21	0.5	10.4	7.6				
	11HS1008	65	9.21	1	2.5	2.2				
11HS3 40 mm (1.57 in.)	11HS3005	105	14.88	0.67	6.8	6.0	6	0.85	12	0.07
11HS5 51 mm (2.01 in.)	11HS5005	120	17.01	0.5	12	12	8	1.13	18	0.10
	11HS5007	120	17.01	0.25	51.8	30.7				
	11HS5008	120	17.01	1	3.5	2.3				

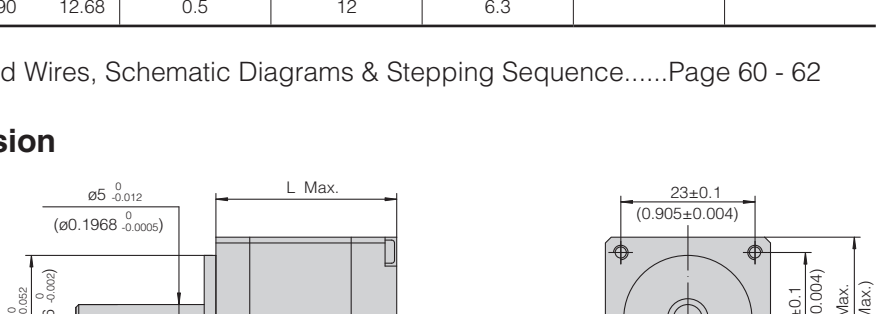
- Uni-polar

Series & Length	Model Number	Holding Torque		Rated Current	Resistance per Phase	Inductance per Phase	Detent Torque		Rotor Inertia	
		mNm	oz-in	A	ohm	mH	mNm	oz-in	g.cm²	oz-in²
11HS1 31 mm (1.22 in.)	11HS1003	48	6.8	0.95	3.1	1.3	5	0.71	9	0.05
	11HS1009	43	6.06	0.25	40	12				
	11HS1010	43	6.06	0.5	9.4	3				
11HS3 40 mm (1.57 in.)	11HS3002-01	80	11.34	0.95	3.4	1.6	6	0.85	12	0.07
11HS5 51 mm (2.01 in.)	11HS5002-01	90	12.68	0.95	4.6	2.3	8	1.13	18	0.10
	11HS5003	90	12.68	0.5	12	6.3				

- Wiring Connection, Lead Wires, Schematic Diagrams & Stepping Sequence.....Page 60 - 62

Mechanical Dimension

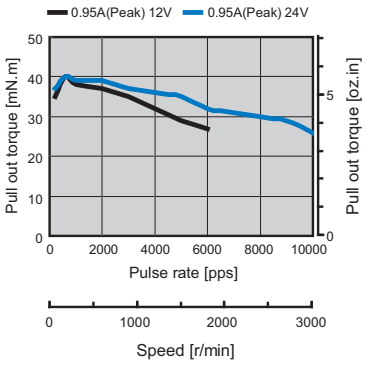
Series	L	Mass
	mm (in.)	kg (lb.)
11HS1	31 (1.21)	0.10 (0.22)
11HS3	40 (1.56)	0.15 (0.33)
11HS5	51 (2.01)	0.20 (0.44)



Unit: mm(inch)

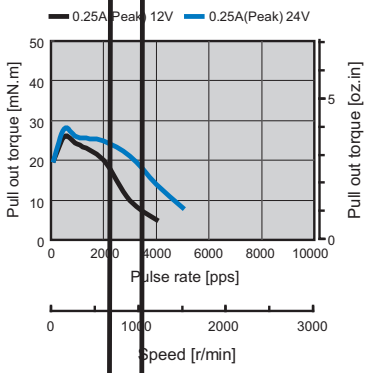
11HS1003

Conditions: Uni-polar Constant Current Driver
Driver: AMA MSU3040M
Mode: Full Step



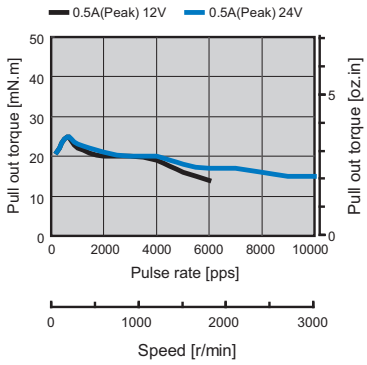
11HS1009

Conditions:Uni-polar Constant Current Driver
Driver: AMA MSU3040M
Mode:Full Step



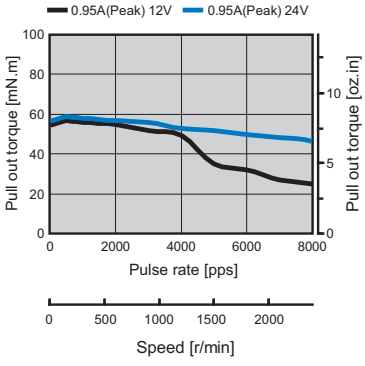
11HS1010

Conditions:Uni-polar Constant Current Driver
Driver: AMA MSU3040M
Mode:Full Step

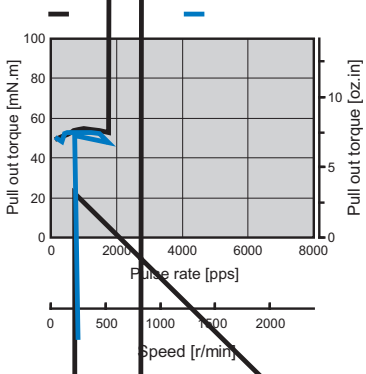


11HS3002-01

Conditions:Uni-polar Constant Current Driver
Driver: AMA MSU3040M
Mode:Full Step



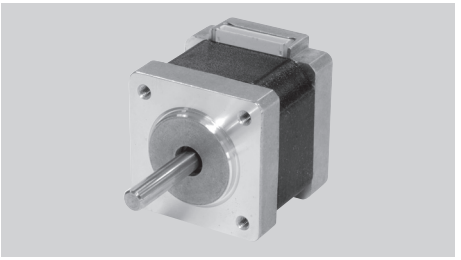
11HS3002-01



14HA SERIES 0.9°

Key Features

- High Accuracy
- Low Noise
- Smooth Movement



General Specifications

- Bi-polar

Series & Length	Model Number	Holding Torque		Rated Current	Resistance per Phase	Inductance per Phase	Detent Torque		Rotor Inertia	
		mNm	oz-in	A	ohm	mH	mNm	oz-in	g.cm²	oz-in²
14HA0 28 mm (1.10 in.)	14HA0001N	100	14.17	0.4	23	25	10	1.42	14	0.08
	14HA0004N	95	13.46	0.6	6.6	6	10	1.42	14	0.08

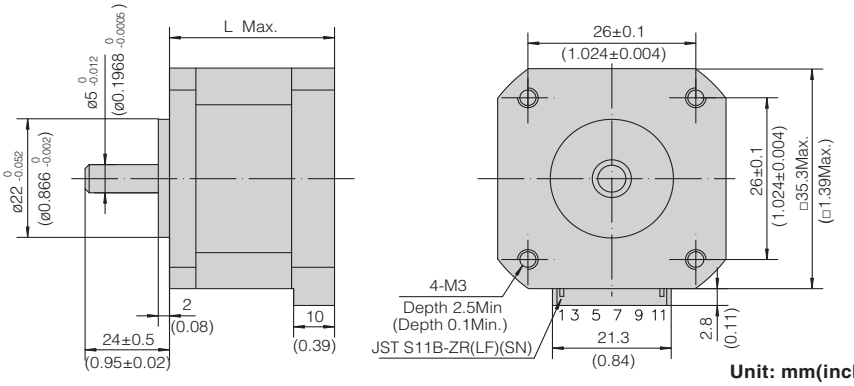
- Uni-polar

Series & Length	Model Number	Holding Torque		Rated Current	Resistance per Phase	Inductance per Phase	Detent Torque		Rotor Inertia	
		mNm	oz-in	A	ohm	mH	mNm	oz-in	g.cm²	oz-in²
14HA0 28 mm (1.10 in.)	14HA0005N	75	10.63	0.6	6.6	2.7	10	1.42	14	0.08
	14HA0006N	75	10.63	0.4	23	13	10	1.42	14	0.08

- Wiring Connection, Lead Wires, Schematic Diagrams & Stepping Sequence.....Page 60 - 62

Mechanical Dimension

Series	L	Mass
	mm (in.)	kg (lb.)
14HA0	28 (1.10)	0.16 (0.35)



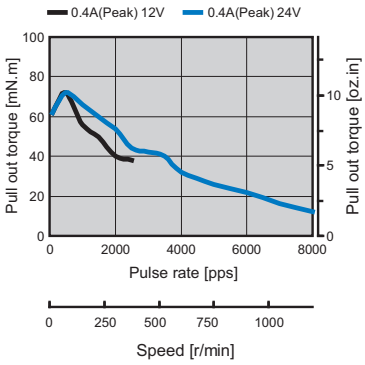
Unit: mm(inch)

Dynamic Torque Curves

- Bi-polar

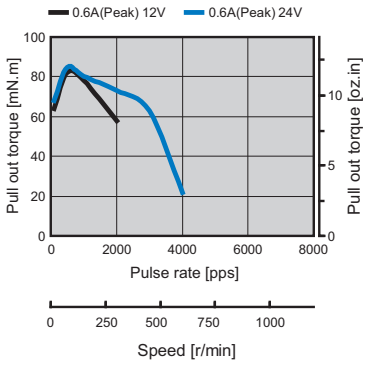
14HA0001N

Conditions:Bi-polar Constant Current Driver
Driver: AMA MS3540M
Mode:Full Step



14HA0004N

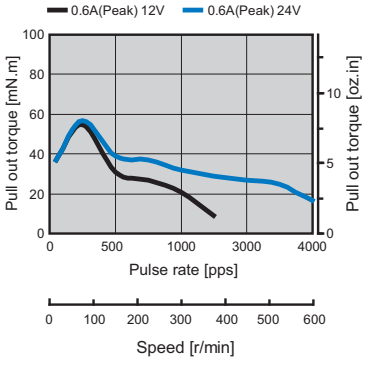
Conditions:Bi-polar Constant Current Driver
Driver: AMA MS3540M
Mode:Full Step



- Uni-polar

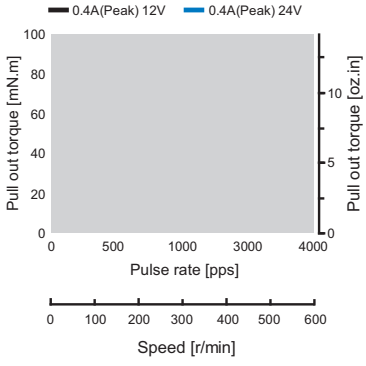
14HA0005N

Conditions:Uni-polar Constant Current Driver
Driver: AMA MSU3040M
Mode:Full Step



14HA0006N

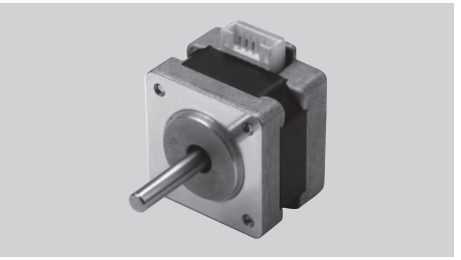
Conditions:Uni-polar Constant Current Driver
Driver: AMA MSU3040M
Mode:Full Step



14HY SERIES 1.8°

Key Features

- Low Inertia
- Small Size
- High Acceleration



General Specifications

- Bi-polar

Series & Length	Model Number	Holding Torque		Rated Current	Resistance per Phase	Inductance per Phase	Detent Torque		Rotor Inertia	
		mNm	oz-in	A	ohm	mH	mNm	oz-in	g.cm²	oz-in²
14HY5 26 mm (1.01 in.)	14HY5010	68	9.64	0.4	9	8	10	1.42	12	0.07
14HY8 37 mm (1.44 in.)	14HY8002	115	16.30	0.85	5.5	5	15	2.12	20	0.11

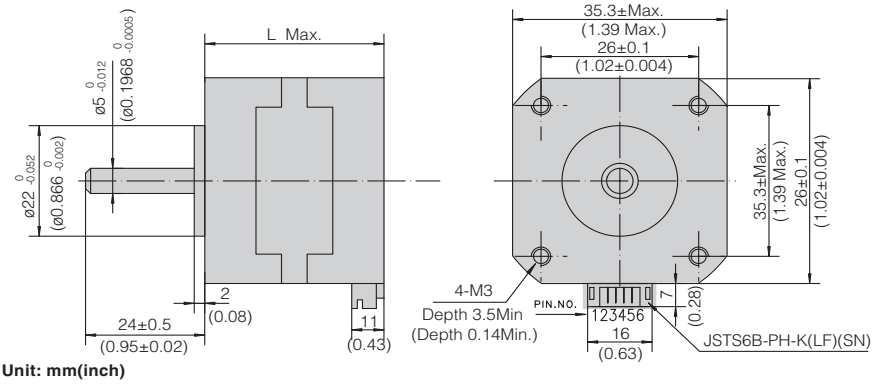
- Uni-polar

Series & Length	Model Number	Holding Torque		Rated Current	Resistance per Phase	Inductance per Phase	Detent Torque		Rotor Inertia	
		mNm	oz-in	A	ohm	mH	mNm	oz-in	g.cm²	oz-in²
14HY5 26 mm (1.01 in.)	14HY5011	50	7.09	0.4	9	4.2	10	1.42	12	0.07
14HY8 37 mm (1.44 in.)	14HY8001	110	15.49	1.2	2.7	1.7	15	2.12	20	0.11

- Wiring Connection, Lead Wires, Schematic Diagrams & Stepping Sequence.....Page 60 - 62

Mechanical Dimension

Series	L	Mass
	mm (in.)	kg (lb.)
14HY5	26 (1.01)	0.15 (0.33)
14HY8	37 (1.44)	0.21 (0.46)



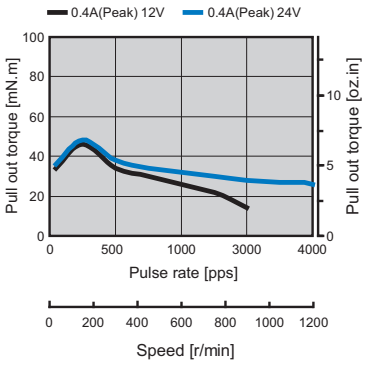
Unit: mm(inch)

Dynamic Torque Curves

- Bi-polar

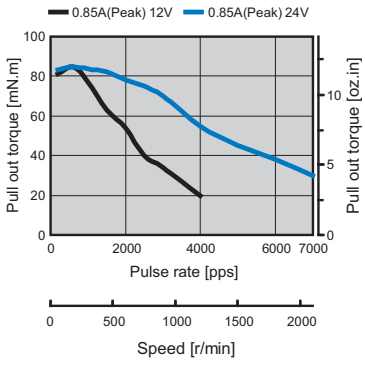
14HY5010

Conditions:Bi-polar Constant Current Driver
Driver: AMA MS3540M
Mode:Full Step



14HY8002

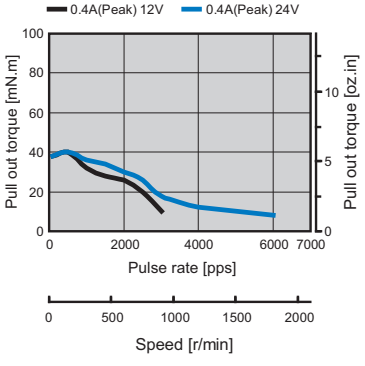
Conditions:Bi-polar Constant Current Driver
Driver: AMA MS3540M
Mode:Full Step



- Uni-polar

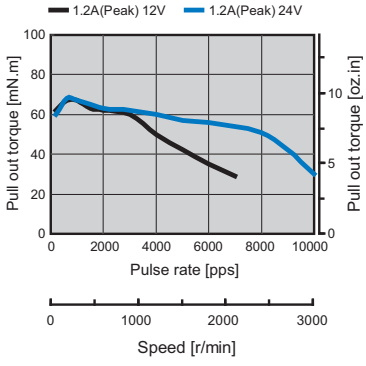
14HY5011

Conditions:Uni-polar Constant Current Driver
Driver: AMA MSU3040M
Mode:Full Step



14HY8001

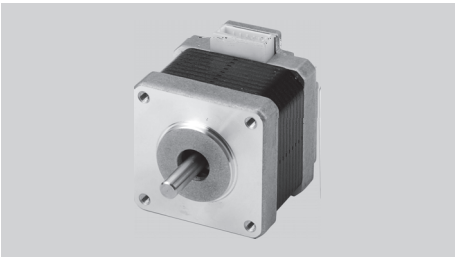
Conditions:Uni-polar Constant Current Driver
Driver: AMA MSU3040M
Mode:Full Step



16HS SERIES 1.8°

Key Features

- High Torque
- Smooth Movement
- Small Size



General Specifications

- Bi-polar

Series & Length	Model Number	Holding Torque		Rated Current	Resistance per Phase	Inductance per Phase	Detent Torque		Rotor Inertia	
		mNm	oz-in	A	ohm	mH	mNm	oz-in	g.cm²	oz-in²
16HS4 36 mm (1.40 in.)	16HS4003-06N	260	36.85	0.40	29	38	15	2.12	30	0.17
	16HS4007-01N	220	31.18	0.65	7	9.6	15	2.12	30	0.17

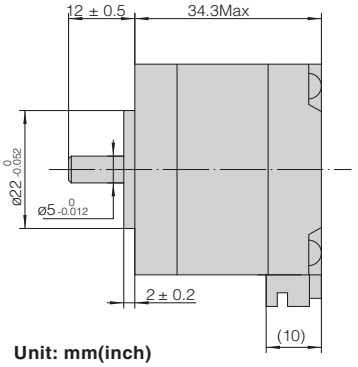
- Uni-polar

Series & Length	Model Number	Holding Torque		Rated Current	Resistance per Phase	Inductance per Phase	Detent Torque		Rotor Inertia	
		mNm	oz-in	A	ohm	mH	mNm	oz-in	g.cm²	oz-in²
16HS4 36 mm (1.40 in.)	16HS4005-01N	165	23.38	0.65	7	5.6	15	2.12	30	0.17
	16HS4006-01N	155	21.97	0.30	40	27	15	2.12	30	0.17

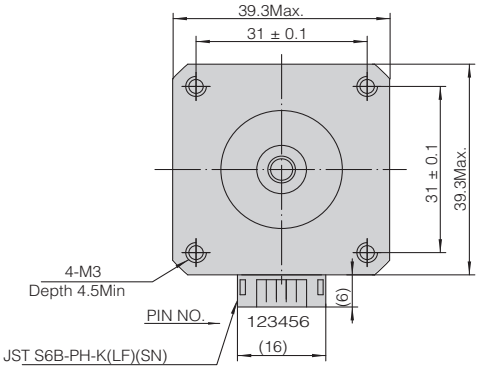
- Wiring Connection, Lead Wires, Schematic Diagrams & Stepping Sequence.....Page 60 - 62

Mechanical Dimension

Series	L	Mass
	mm (in.)	kg (lb.)
16HS4	36 (1.40)	0.21 (0.46)



Unit: mm(inch)

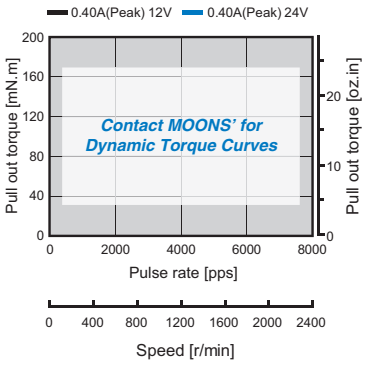


Dynamic Torque Curves

- Bi-polar

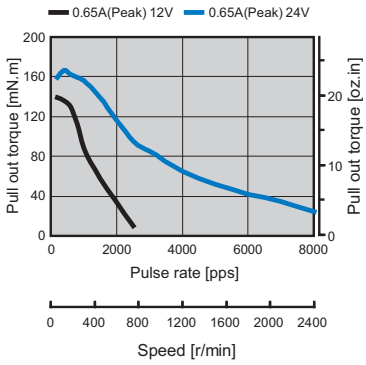
16HS4003-06N

Conditions: Bi-polar Constant Current Driver
Driver: AMA MS3540M
Mode: Full Step



16HS4007-01N

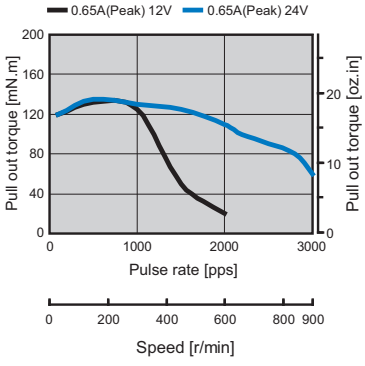
Conditions: Bi-polar Constant Current Driver
Driver: AMA MS3540M
Mode: Full Step



- Uni-polar

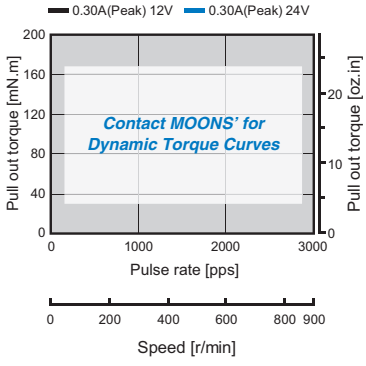
16HS4005-01N

Conditions: Uni-polar Constant Current Driver
Driver: AMA MSU3040M
Mode: Full Step



16HS4006-01N

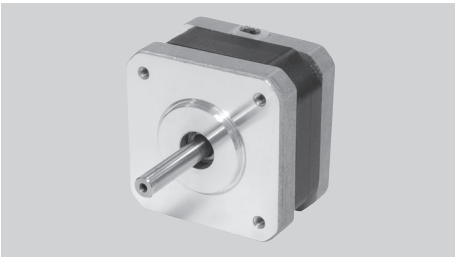
Conditions: Uni-polar Constant Current Driver
Driver: AMA MSU3040M
Mode: Full Step



17HA SERIES 0.9°

Key Features

- High Accuracy
- Low Noise
- Smooth Movement



General Specifications

- Bi-polar

Series & Length	Model Number	Holding Torque		Rated Current	Resistance per Phase	Inductance per Phase	Detent Torque		Rotor Inertia	
		mNm	oz-in	A	ohm	mH	mNm	oz-in	g.cm²	oz-in²
17HA7 20 mm (0.79 in.)	17HA7402-06	78	11.05	0.65	6.6	7	5	0.71	20	0.08
17HA0 28 mm (1.10 in.)	17HA0403-44N	110	15.59	0.43	8	11	8	1.13	20	0.11
17HA4 34.3 mm (1.35 in.)	17HA4401-05N	220	31.18	0.87	3.1	3.6	12	1.70	38	0.21
	17HA4402-16N	250	35.43	0.5	20	23	12	1.70	38	0.21

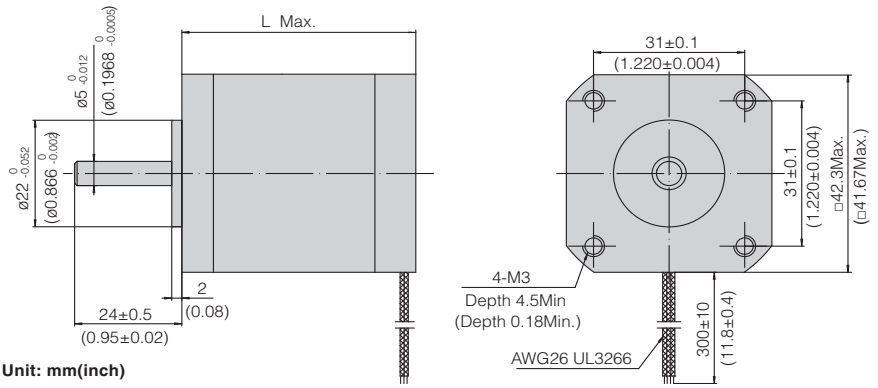
- Uni-polar

Series & Length	Model Number	Holding Torque		Rated Current	Resistance per Phase	Inductance per Phase	Detent Torque		Rotor Inertia	
		mNm	oz-in	A	ohm	mH	mNm	oz-in	g.cm²	oz-in²
17HA7 20 mm (0.79 in.)	17HA7602	35	4.96	0.65	6.6	2.9	5	0.71	20	0.08
17HA0 28 mm (1.10 in.)	17HA0601N	60	8.50	0.43	8	4	8	1.13	20	0.11
17HA4 34.3 mm (1.35 in.)	17HA4605N	170	24.09	0.87	3.1	2.3	12	1.70	38	0.21
	17HA4606N	200	28.17	0.5	20	13	12	1.70	38	0.21

- Wiring Connection, Lead Wires, Schematic Diagrams & Stepping Sequence.....Page 60 - 62

Mechanical Dimension

Series	L	Mass
	mm (in.)	kg (lb.)
17HA7	20 (0.79)	0.12 (0.26)
17HA0	28 (1.10)	0.19 (0.42)
17HA4	34.3 (1.35)	0.23 (0.51)



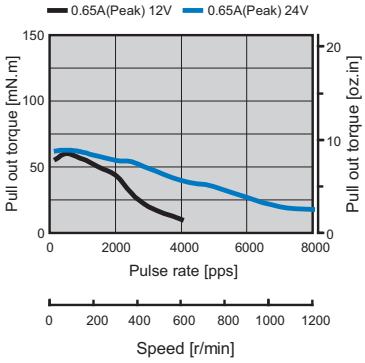
Unit: mm(inch)

Dynamic Torque Curves

- Bi-polar

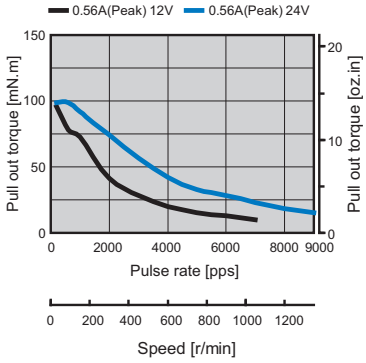
17HA7402-06

Conditions:Bi-polar Constant Current Driver
Driver: AMA MS3540M
Mode:Full Step



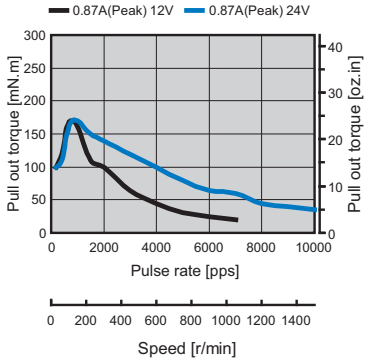
17HA0403-44N

Conditions:Bi-polar Constant Current Driver
Driver: AMA MS3540M
Mode:Full Step



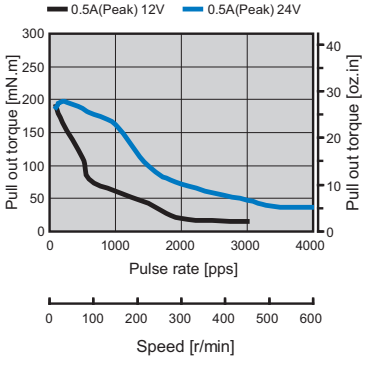
17HA4401-05N

Conditions:Bi-polar Constant Current Driver
Driver: AMA MS3540M
Mode:Full Step



17HA4402-16N

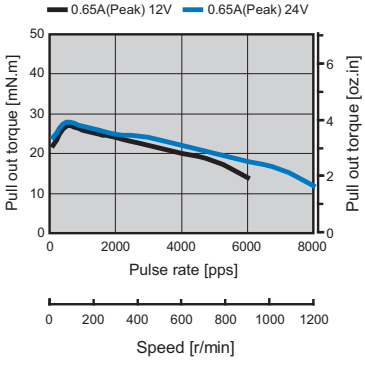
Conditions:Bi-polar Constant Current Driver
Driver: AMA MS3540M
Mode:Full Step



- Uni-polar

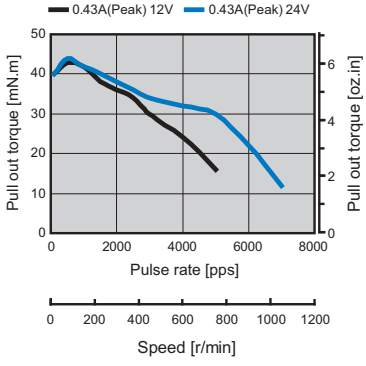
17HA7602

Conditions:Uni-polar Constant Current Driver
Driver: AMA MSU3040M
Mode:Full Step



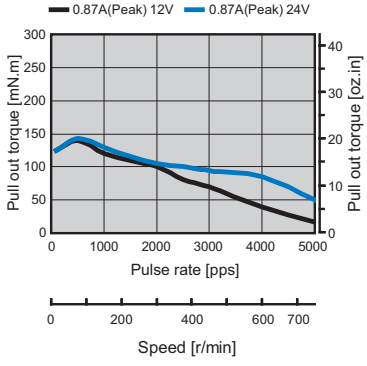
17HA0601N

Conditions:Uni-polar Constant Current Driver
Driver: AMA MSU3040M
Mode:Full Step



17HA4605N

Conditions:Uni-polar Constant Current Driver
Driver: AMA MSU3040M
Mode:Full Step

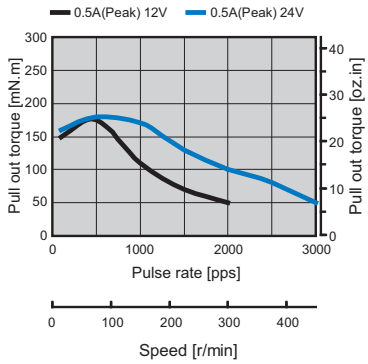


Dynamic Torque Curves

- Uni-polar

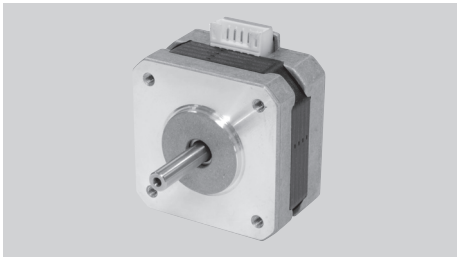
17HA4606N

Conditions:Uni-polar Constant Current Driver
Driver: AMA MSU3040M
Mode:Full Step



17HD SERIES 1.8°

Key Features



- High Torque
- Low Noise
- Small Size

General Specifications

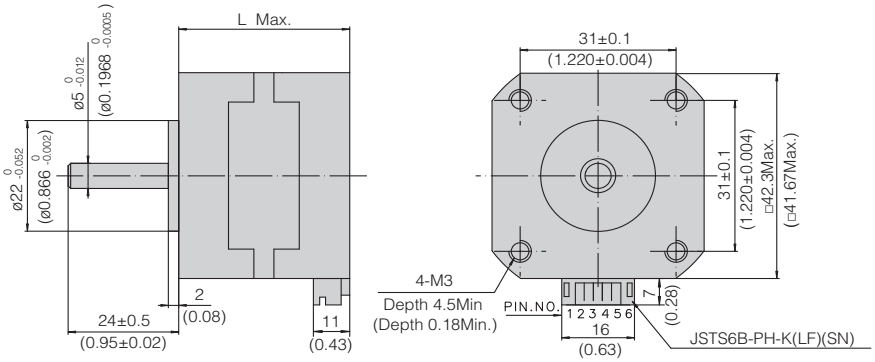
- Bi-polar

Series & Length	Model Number	Holding Torque		Rated Current	Resistance per Phase	Inductance per Phase	Detent Torque		Rotor Inertia	
		mNm	oz-in	A	ohm	mH	mNm	oz-in	g.cm²	oz-in²
17HD5 25.3 mm (0.99 in.)	17HD5003-10	220	31.18	0.4	24	36	5	0.71	20	0.11
17HD0 33.3 mm (1.30 in.)	17HD0013	285	40.39	0.4	30	27	12	1.70	38	0.21
17HD1 39.3 mm (1.53 in.)	17HD1004-01	450	63.78	0.5	25	50	15	2.12	57	0.31
17HD3 47.3 mm (1.84 in.)	17HD3005-10	500	70.86	0.4	30	45	25	3.54	82	0.45

• Wiring Connection, Lead Wires, Schematic Diagrams & Stepping Sequence.....Page 60 - 62

Mechanical Dimension

Series	L	Mass
	mm (in.)	kg (lb.)
17HD5	25.3 (0.99)	0.15 (0.33)
17HD0	33.3 (1.30)	0.21 (0.46)
17HD1	39.3 (1.53)	0.28 (0.62)
17HD3	47.3 (1.84)	0.36 (0.79)



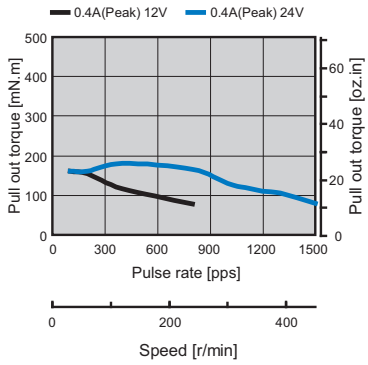
Unit: mm(inch)

Dynamic Torque Curves

- Bi-polar

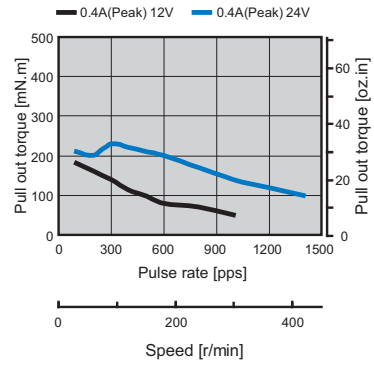
17HD5003-10

Conditions:Bi-polar Constant Current Driver
Driver: AMA MS3540M
Mode:Full Step



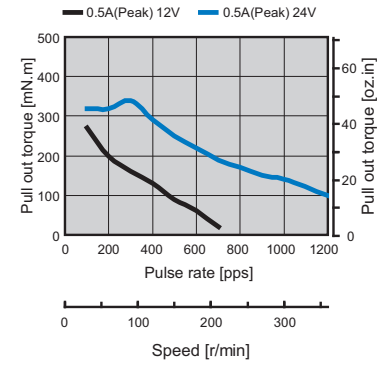
17HD0013

Conditions:Bi-polar Constant Current Driver
Driver: AMA MS3540M
Mode:Full Step



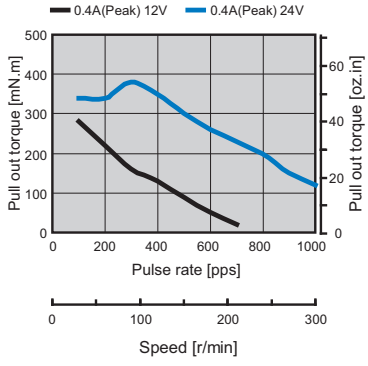
17HD1004-01

Conditions:Bi-polar Constant Current Driver
Driver: AMA MS3540M
Mode:Full Step



17HD3005-10

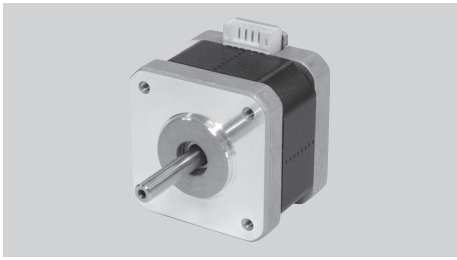
Conditions:Bi-polar Constant Current Driver
Driver: AMA MS3540M
Mode:Full Step



17HDN SERIES 1.8°

Key Features

- High Torque
- High Accuracy
- Smooth Movement



General Specifications

- Bi-polar

Series & Length	Model Number	Holding Torque		Rated Current	Resistance per Phase	Inductance per Phase	Detent Torque		Rotor Inertia	
		mNm	oz-in	A	ohm	mH	mNm	oz-in	g.cm²	oz-in²
17HD4N 34.3 mm (1.35 in.)	17HD4022-01N	220	31.18	1.1	3	4.2	12	1.7	38	0.21
	17HD4024N	300	42.52	0.5	15	20				
	17HD4025N	250	35.43	0.25	54	78				
17HD2N 39.8 mm (1.57 in.)	17HD2011N	380	53.85	1.5	1.9	4	15	2.12	57	0.31
	17HD2018N	450	63.78	0.85	8	14				
	17HD2026N	460	65.19	1	4.4	10				
	17HD2027N	450	63.78	0.25	71.4	140				
17HD6N 48.3 mm (1.90 in.)	17HD6012N	430	60.94	1.5	2.4	5.1	25	3.54	82	0.45
	17HD6016N	600	85.03	1	5.3	10				
	17HD6017N	480	68.03	0.85	7.5	14				
	17HD6019N	500	70.86	0.25	80	130				
	17HD6020N	540	76.53	0.5	20	35				
17HDBN 62.8 mm (2.47 in.)	17HDB001N	730	103.5	1.5	2.3	4.6	30	4.25	123	0.68
	17HDB002N	800	113.4	2	1.6	3				

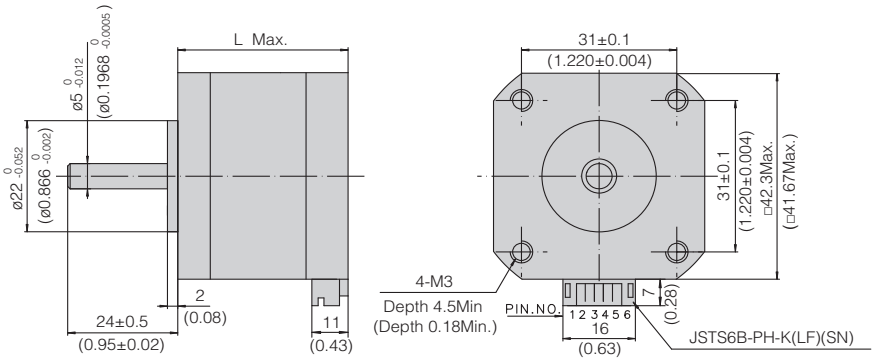
- Uni-polar

Series & Length	Model Number	Holding Torque		Rated Current	Resistance per Phase	Inductance per Phase	Detent Torque		Rotor Inertia	
		mNm	oz-in	A	ohm	mH	mNm	oz-in	g.cm²	oz-in²
17HD4N 34.3 mm (1.35 in.)	17HD4030N	220	31.18	1.2	2.4	2	12	1.7	38	0.21
	17HD4031N	200	28.34	0.95	4.2	2.4				
	17HD4032N	220	31.18	0.4	24	13				
	17HD4033N	220	31.18	0.31	38.5	21				
17HD2N 39.8 mm (1.57 in.)	17HD2032N	260	36.85	1.4	1.8	1.7	15	2.12	57	0.31
	17HD2033N	280	39.68	0.8	7.5	6.9				
17HD6N 48.3 mm (1.90 in.)	17HD6023N	360	51.02	1	4.6	4	25	3.54	82	0.45
	17HD6024N	330	46.77	0.4	30	21.6				
	17HD6025N	390	55.27	0.8	7.5	7.3				
	17HD6026N	360	51.02	1.4	2.4	2.2				
17HDBN 62.8 mm (2.47 in.)	17HDB003N	460	65.19	1.5	2.3	2.4	30	4.25	123	0.68
	17HDB004N	500	70.86	2	1.6	1.6				

• Wiring Connection, Lead Wires, Schematic Diagrams & Stepping Sequence.....Page 60 - 62

Mechanical Dimension

Series	L	Mass
	mm (in.)	kg (lb.)
17HD4N	34.3 (1.35).	0.21 (0.46)
17HD2N	39.8 (1.57)	0.28 (0.62)
17HD6N	48.3 (1.90)	0.36 (0.79)
17HDBN	62.8 (2.47)	0.60 (1.32)



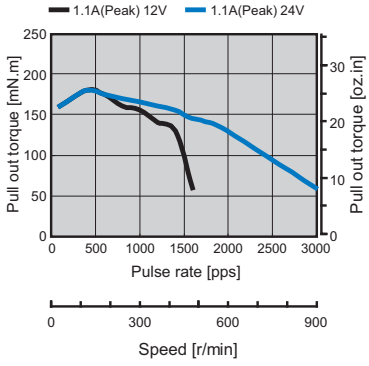
Unit: mm(inch)

Dynamic Torque Curves

- Bi-polar

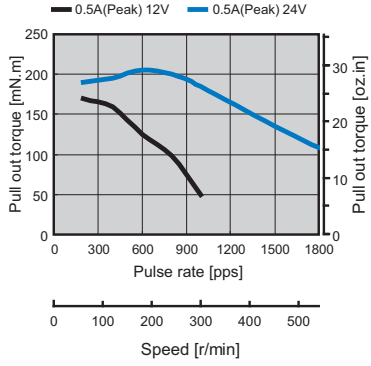
17HD4022-01N

Conditions:Bi-polar Constant Current Driver
Driver: AMA MS3540M
Mode:Full Step



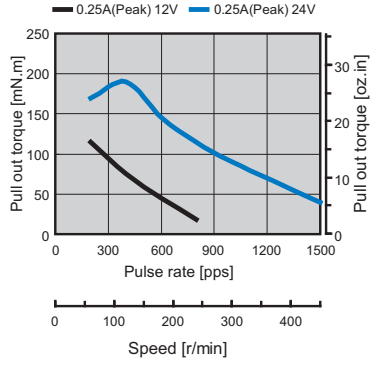
17HD4024N

Conditions:Bi-polar Constant Current Driver
Driver: AMA MS3540M
Mode:Full Step



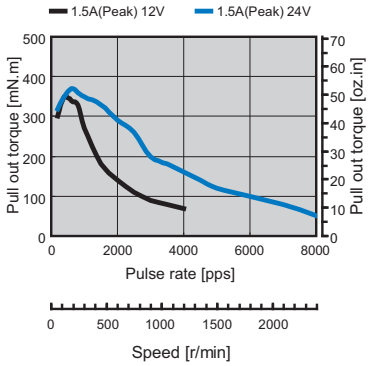
17HD4025N

Conditions:Bi-polar Constant Current Driver
Driver: AMA MS3540M
Mode:Full Step



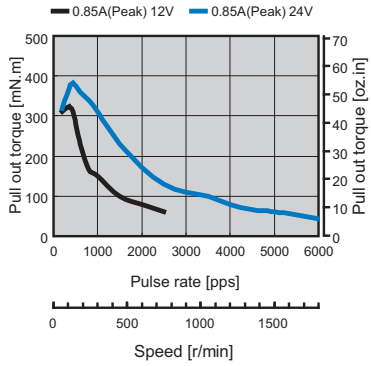
17HD2011N

Conditions:Bi-polar Constant Current Driver
Driver: AMA MS3540M
Mode:Full Step



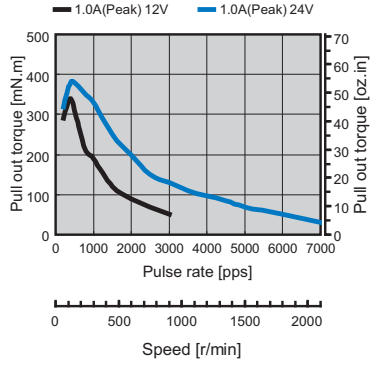
17HD2018N

Conditions:Bi-polar Constant Current Driver
Driver: AMA MS3540M
Mode:Full Step



17HD2026N

Conditions:Bi-polar Constant Current Driver
Driver: AMA MS3540M
Mode:Full Step

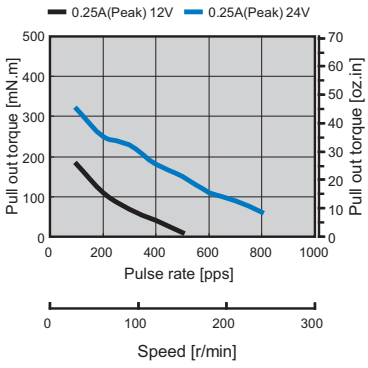


Dynamic Torque Curves

- Bi-polar

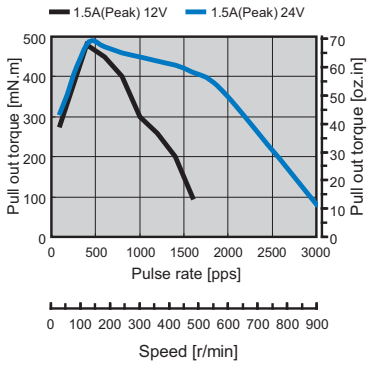
17HD2027N

Conditions:Bi-polar Constant Current Driver
Driver: AMA MS3540M
Mode:Full Step



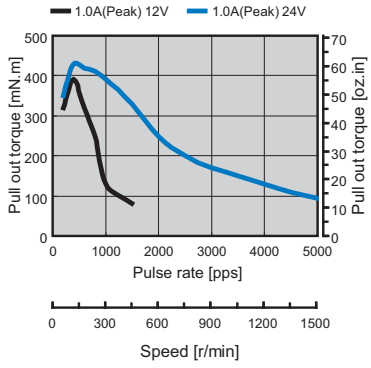
17HD6012N

Conditions:Bi-polar Constant Current Driver
Driver: AMA MS3540M
Mode:Full Step



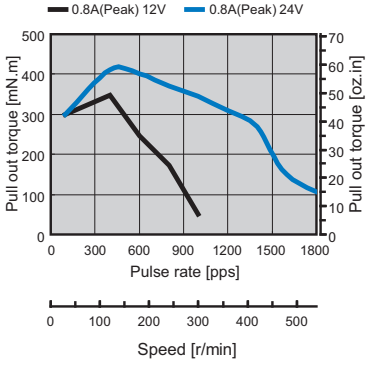
17HD6016N

Conditions:Bi-polar Constant Current Driver
Driver: AMA MS3540M
Mode:Full Step



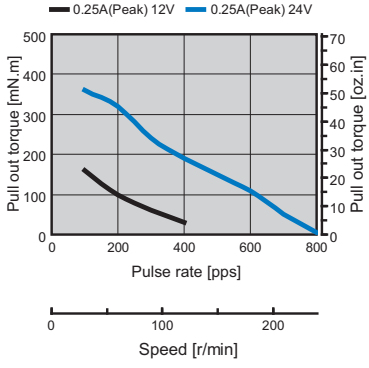
17HD6017N

Conditions:Bi-polar Constant Current Driver
Driver: AMA MS3540M
Mode:Full Step



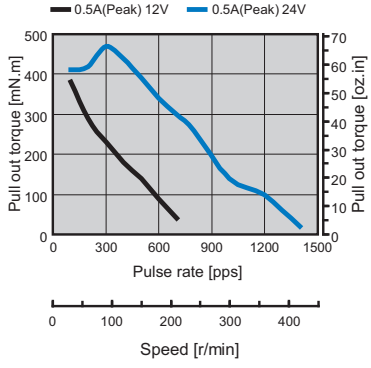
17HD6019N

Conditions:Bi-polar Constant Current Driver
Driver: AMA MS3540M
Mode:Full Step



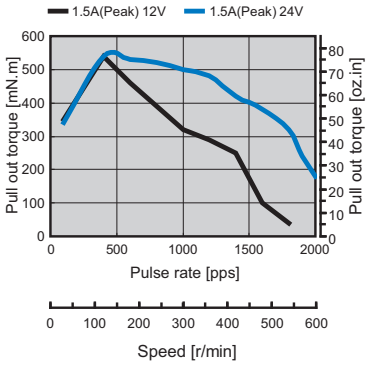
17HD6020N

Conditions:Bi-polar Constant Current Driver
Driver: AMA MS3540M
Mode:Full Step



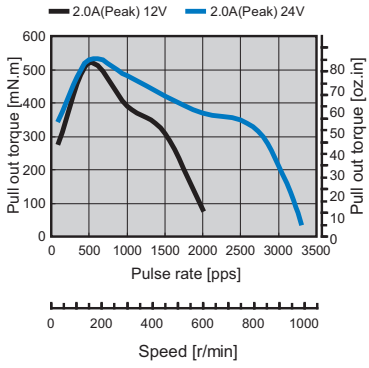
17HDB001N

Conditions:Bi-polar Constant Current Driver
Driver: AMA MS3540M
Mode:Full Step



17HDB002N

Conditions:Bi-polar Constant Current Driver
Driver: AMA MS3540M
Mode:Full Step

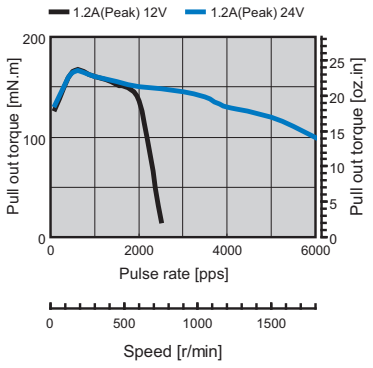


Dynamic Torque Curves

- Uni-polar

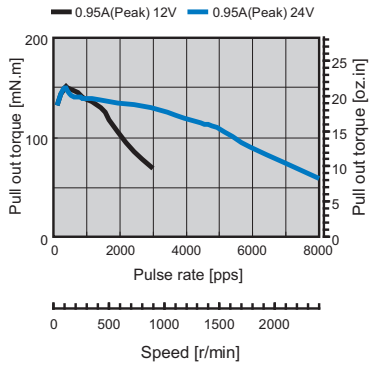
17HD4030N

Conditions:Uni-polar Constant Current Driver
Driver: AMA MSU3040M
Mode:Full Step



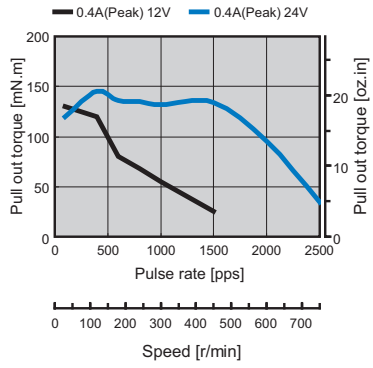
17HD4031N

Conditions:Uni-polar Constant Current Driver
Driver: AMA MSU3040M
Mode:Full Step



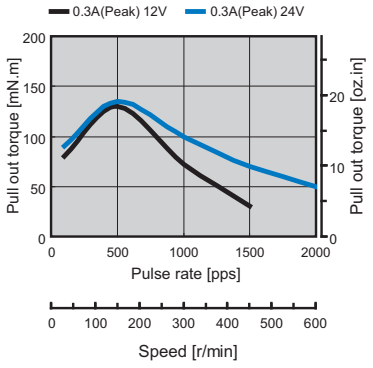
17HD4032N

Conditions:Uni-polar Constant Current Driver
Driver: AMA MSU3040M
Mode:Full Step



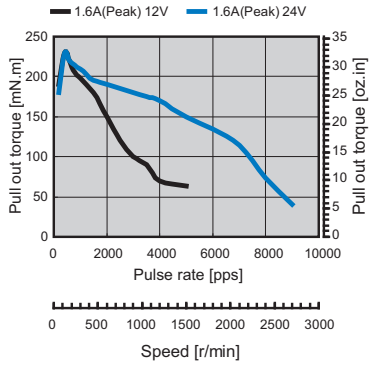
17HD4033N

Conditions:Uni-polar Constant Current Driver
Driver: AMA MSU3040M
Mode:Full Step



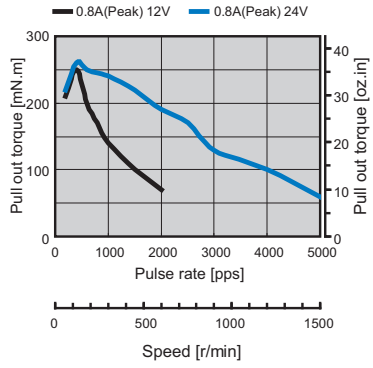
17HD2032N

Conditions:Uni-polar Constant Current Driver
Driver: AMA MSU3040M
Mode:Full Step



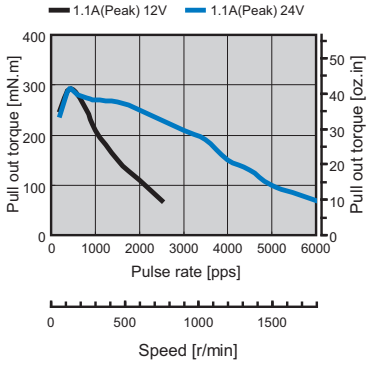
17HD2033N

Conditions:Uni-polar Constant Current Driver
Driver: AMA MSU3040M
Mode:Full Step



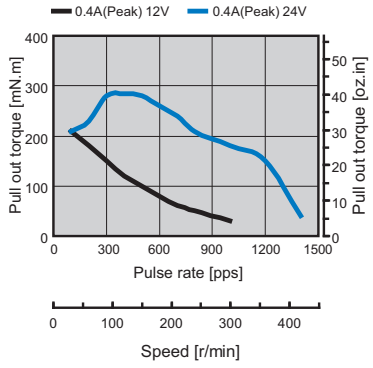
17HD6023N

Conditions:Uni-polar Constant Current Driver
Driver: AMA MSU3040M
Mode:Full Step



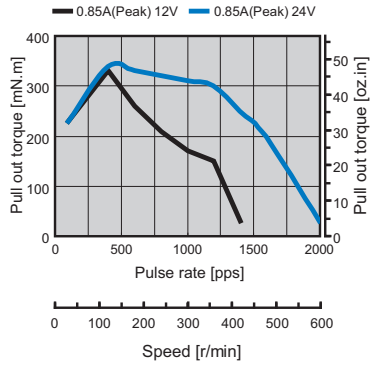
17HD6024N

Conditions:Uni-polar Constant Current Driver
Driver: AMA MSU3040M
Mode:Full Step



17HD6025N

Conditions:Uni-polar Constant Current Driver
Driver: AMA MSU3040M
Mode:Full Step

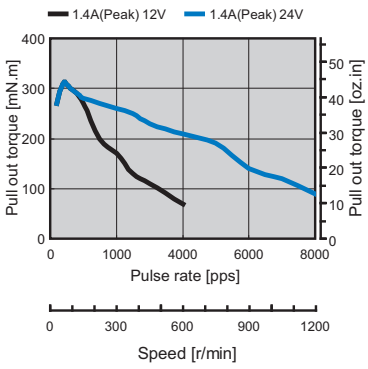


Dynamic Torque Curves

- Uni-polar

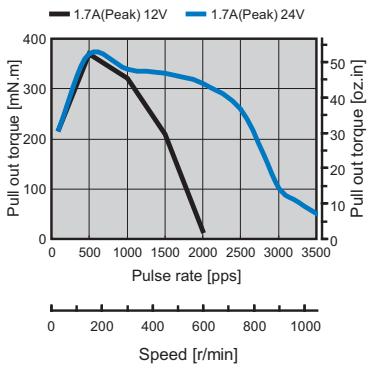
17HD6026N

Conditions:Uni-polar Constant Current Driver
Driver: AMA MSU3040M
Mode:Full Step



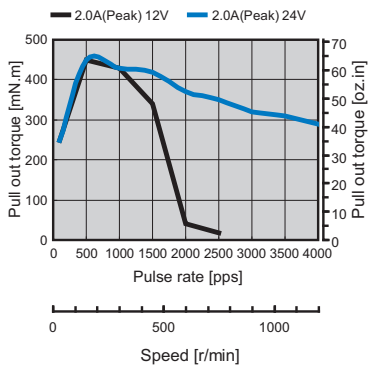
17HDB003N

Conditions:Uni-polar Constant Current Driver
Driver: AMA MSU3040M
Mode:Full Step



17HDB004N

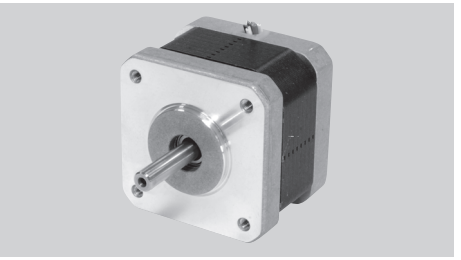
Conditions:Uni-polar Constant Current Driver
Driver: AMA MSU3040M
Mode:Full Step



17HE SERIES 3.6°

Key Features

- High Speed
- Low Inertia
- High Acceleration



General Specifications

- Bi-polar

Series & Length	Model Number	Holding Torque		Rated Current	Resistance per Phase	Inductance per Phase	Detent Torque		Rotor Inertia	
		mNm	oz-in	A	ohm	mH	mNm	oz-in	g.cm²	oz-in²
17HE1 34.3 mm (1.35 in.)	17HE1401-01	115	16.30	0.58	12	9.4	15	2.12	20	0.11
	17HE1402-01	115	16.30	0.16	150	100				
	17HE1403-01	120	17.01	2.5	0.85	0.7				

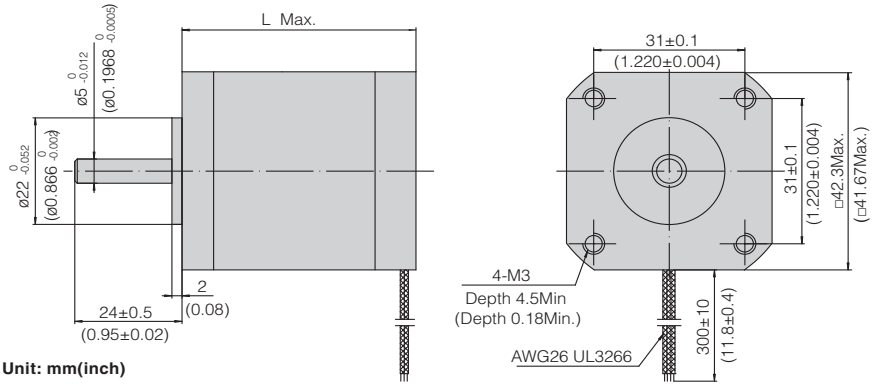
- Uni-polar

Series & Length	Model Number	Holding Torque		Rated Current	Resistance per Phase	Inductance per Phase	Detent Torque		Rotor Inertia	
		mNm	oz-in	A	ohm	mH	mNm	oz-in	g.cm²	oz-in²
17HE1 34.3 mm (1.35 in.)	17HE1603-02	88	12.47	0.2	75	35	15	2.12	20	0.11
	17HE1604-01	88	12.47	0.25	50	25				
	17HE1606-02	88	12.47	0.58	12	5.5				

- Wiring Connection, Lead Wires, Schematic Diagrams & Stepping Sequence.....Page 60 - 62

Mechanical Dimension

Series	L	Mass
	mm (in.)	kg (lb.)
17HE1	34.3 (1.35)	0.2 (0.44)



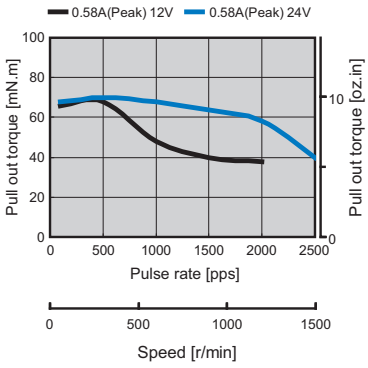
Unit: mm(inch)

Dynamic Torque Curves

- Bi-polar

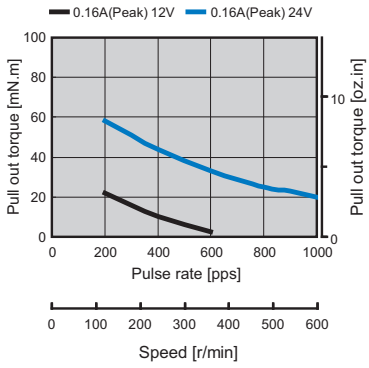
17HE1401-01

Conditions:Bi-polar Constant Current Driver
Driver: AMA MS3540M
Mode:Full Step



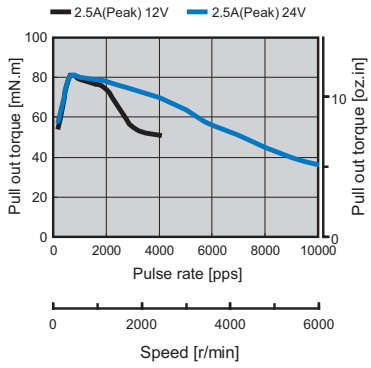
17HE1402-01

Conditions:Bi-polar Constant Current Driver
Driver: AMA MS3540M
Mode:Full Step



17HE1403-01

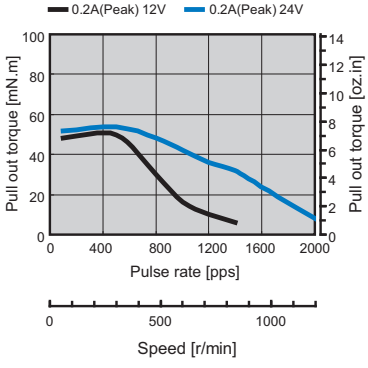
Conditions:Bi-polar Constant Current Driver
Driver: AMA MS3540M
Mode:Full Step



- Uni-polar

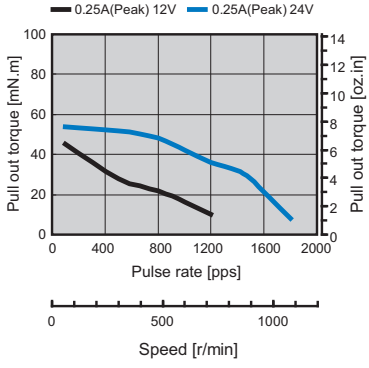
17HE1603-02

Conditions:Uni-polar Constant Current Driver
Driver: AMA MSU3040M
Mode:Full Step



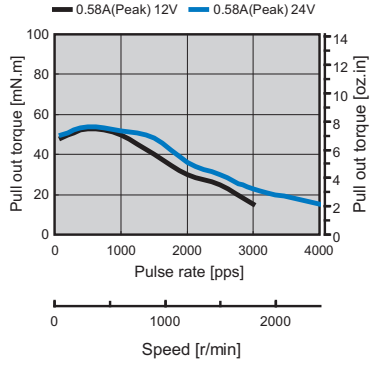
17HE1604-01

Conditions:Uni-polar Constant Current Driver
Driver: AMA MSU3040M
Mode:Full Step



17HE1606-02

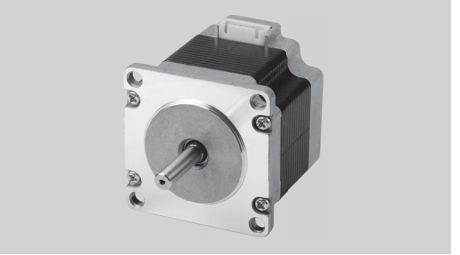
Conditions:Uni-polar Constant Current Driver
Driver: AMA MSU3040M
Mode:Full Step



23HS SERIES 1.8°

Key Features

- High Torque
- High Accuracy
- Smooth Movement



General Specifications

- Bi-polar

Series & Length	Model Number	Holding Torque		Rated Current	Resistance per Phase	Inductance per Phase	Detent Torque		Rotor Inertia	
		mNm	oz-in	A	ohm	mH	mNm	oz-in	g.cm²	oz-in²
23HS0 41 mm (1.61 in.)	23HS0030	550	77.95	2.1	1.0	2.3	22	3.12	135	0.74
	23HS0036	550	77.95	1.5	1.6	4.4				
23HS4 45 mm (1.77 in.)	23HS4008	880	124.7	3	0.65	1.68	28	3.96	180	0.99
	23HS4009	880	124.7	2.1	1.7	4.2				
23HS1 50 mm (1.97 in.)	23HS1033	900	127.6	1.5	2.5	7.5	32	4.53	220	1.21
	23HS1034	900	127.6	2.1	1.5	3.7				
23HS2 54 mm (2.13 in.)	23HS2067	1100	155.9	1.5	3.3	10.2	40	5.66	260	1.43
	23HS2068	1100	155.9	2.1	2	7				
23HS3 76 mm (2.99 in.)	23HS3001-09	1900	269.3	1.5	4.2	18.5	70	9.91	460	2.53
	23HS3027-07	1900	269.3	3	1	3.4				
	23HS3045	1650	233.8	2.1	2	8.45				
23HS5 111 mm (4.37 in.)	23HS5402-08*	3200	453.5	6	0.5	2.1	120	16.99	750	4.13
	23HS5408*	3200	453.5	3	1.9	8.5				

* Lead wire connecting type

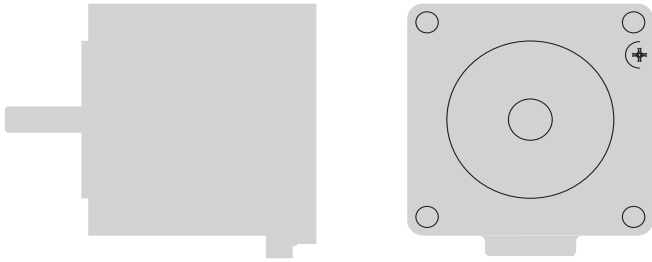
- Uni-polar

Series & Length	Model Number	Holding Torque		Rated Current	Resistance per Phase	Inductance per Phase	Detent Torque		Rotor Inertia	
		mNm	oz-in	A	ohm	mH	mNm	oz-in	g.cm²	oz-in²
23HS0 41 mm (1.61 in.)	23HS0007-25	470	66.61	2.1	1.4	1.6	22	3.12	135	0.74
	23HS0030-02	470	66.61	1.5	2	2.1				
23HS1 50 mm (1.97 in.)	23HS1026	850	120.5	2.1	1.6	2.5	32	4.53	220	1.21
	23HS1035	850	120.5	1.5	2.75	4				
23HS2 54 mm (2.13 in.)	23HS2005-06	950	134.6	2.1	1.9	3.2	40	5.66	260	1.43
	23HS2069	950	134.6	1.5	3.4	5.5				
23HS3 76 mm (2.99 in.)	23HS3004-15	1500	212.6	3	1	2.2	70	9.91	460	2.53
	23HS3045-03	1500	212.6	1.5	4	8.2				

- Wiring Connection, Lead Wires, Schematic Diagrams & Stepping Sequence.....Page 60 - 62

Mechanical Dimension

Series	L	Mass
	mm (in.)	kg (lb.)
23HS0	41 (1.61)	0.42 (0.93)
23HS4	45 (1.77).	0.48 (1.06)
23HS1	50 (1.97)	0.55 (1.21)
23HS2	54 (2.13).	0.60 (1.32)
23HS3	76 (2.99).	1.00 (2.20)
23HS5	111 (4.37).	1.50 (3.30)



Dynamic Torque Curves

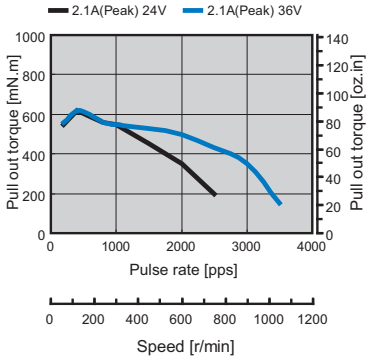
- Bi-polar

Dynamic Torque Curves

- Bi-polar

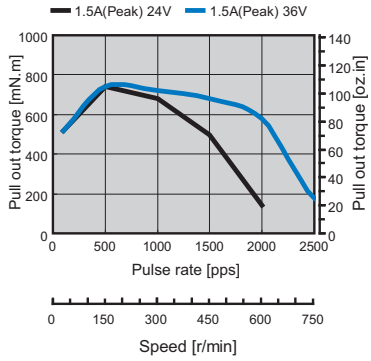
23HS4009

Conditions: Bi-polar Constant Current Driver
Driver: AMA MS3540M
Mode: Full Step



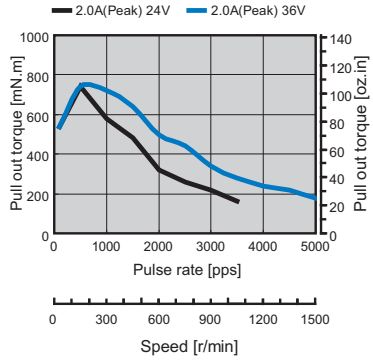
23HS1033

Conditions: Bi-polar Constant Current Driver
Driver: AMA MS3540M
Mode: Full Step



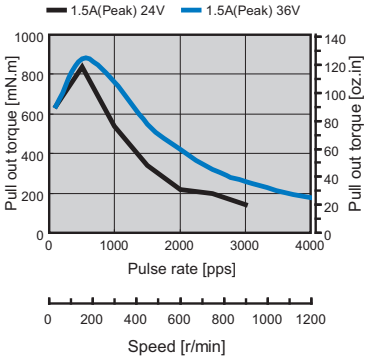
23HS1034

Conditions: Bi-polar Constant Current Driver
Driver: AMA MS3540M
Mode: Full Step



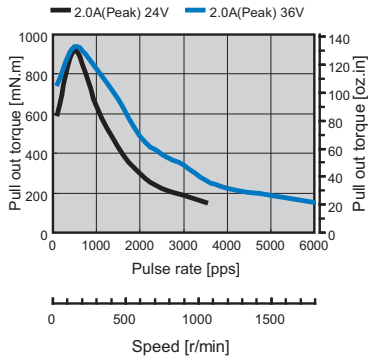
23HS2067

Conditions: Bi-polar Constant Current Driver
Driver: AMA MS3540M
Mode: Full Step



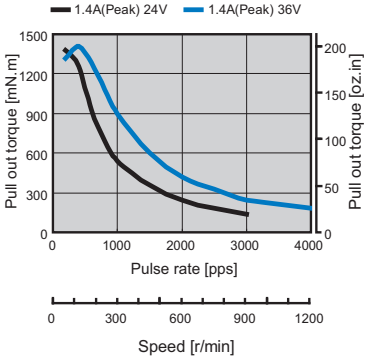
23HS2068

Conditions: Bi-polar Constant Current Driver
Driver: AMA MS3540M
Mode: Full Step



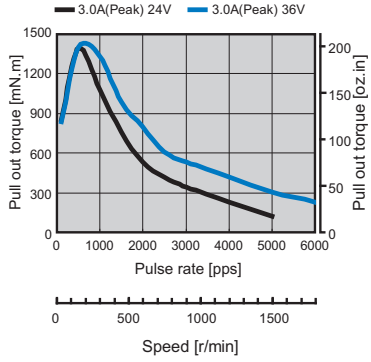
23HS3001-09

Conditions: Bi-polar Constant Current Driver
Driver: AMA MS3540M
Mode: Full Step



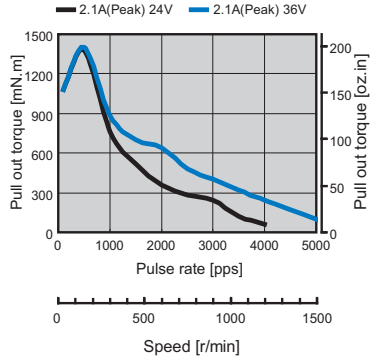
23HS3027-07

Conditions: Bi-polar Constant Current Driver
Driver: AMA MS3540M
Mode: Full Step



23HS3045

Conditions: Bi-polar Constant Current Driver
Driver: AMA MS3540M
Mode: Full Step

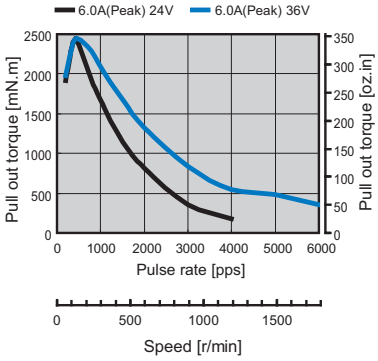


Dynamic Torque Curves

- Bi-polar

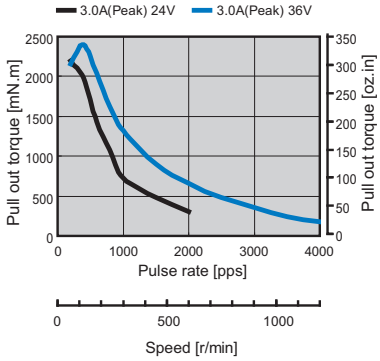
23HS5402-08

Conditions: Bi-polar Constant Current Driver
Driver: AMA MS3540M
Mode: Full Step



23HS5408

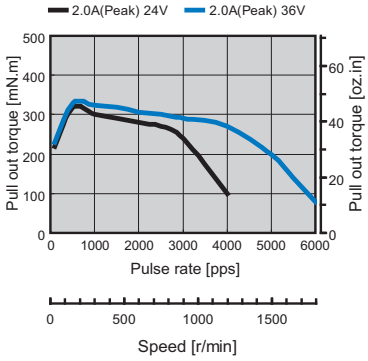
Conditions: Bi-polar Constant Current Driver
Driver: AMA MS3540M
Mode: Full Step



- Uni-polar

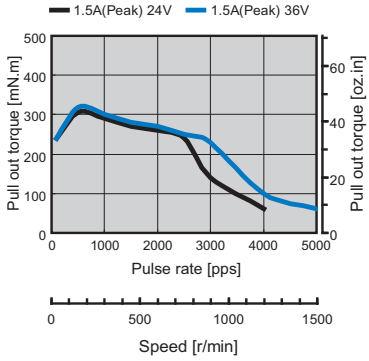
23HS0007-25

Conditions:Uni-polar Constant Current Driver
Driver: AMA MSU3040M
Mode:Full Step



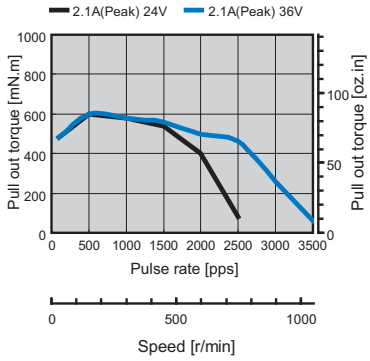
23HS0030-02

Conditions:Uni-polar Constant Current Driver
Driver: AMA MSU3040M
Mode:Full Step



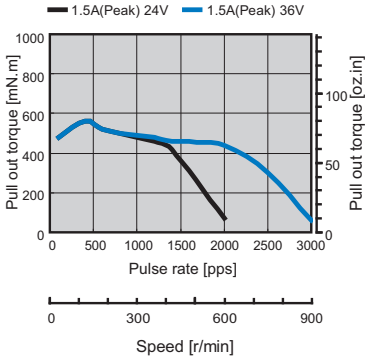
23HS1026

Conditions: Uni-polar Constant Current Driver
Driver: AMA MSU3040M
Mode: Full Step



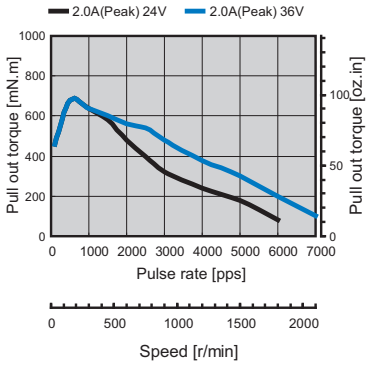
23HS1035

Conditions: Uni-polar Constant Current Driver
Driver: AMA MSU3040M
Mode: Full Step



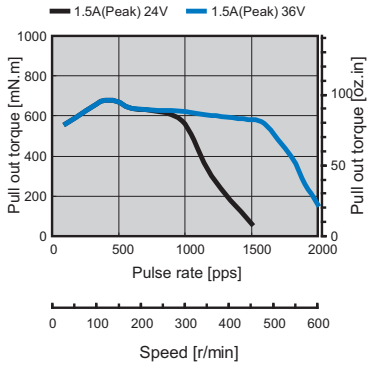
23HS2005-06

Conditions: Uni-polar Constant Current Driver
Driver: AMA MSU3040M
Mode: Full Step



23HS2069

Conditions: Uni-polar Constant Current Driver
Driver: AMA MSU3040M
Mode: Full Step

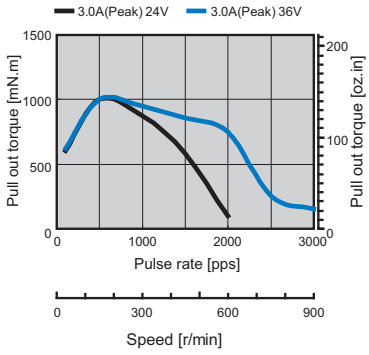


Dynamic Torque Curves

- Uni-polar

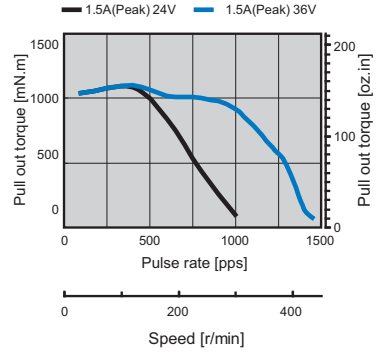
23HS3004-15

Conditions: Uni-polar Constant Current Driver
Driver: AMA MSU3040M
Mode: Full Step



23HS3045-03

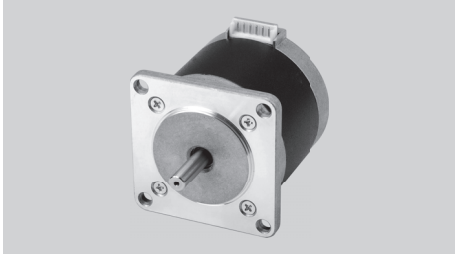
Conditions: Uni-polar Constant Current Driver
Driver: AMA MSU3040M
Mode: Full Step



23HY SERIES 1.8°

Key Features

- High Acceleration
- High Accuracy
- Very Low Inertia



General Specifications

- Bi-polar

Series & Length	Model Number	Holding Torque		Rated Current	Resistance per Phase	Inductance per Phase	Detent Torque		Rotor Inertia	
		mNm	oz-in	A	ohm	mH	mNm	oz-in	g.cm²	oz-in²
23HY0 39 mm (1.54 in.)	23HY0001N	380	53.85	1.5	1.8	3.2	18	2.55	55	0.30
	23HY0002N	380	53.85	1	3.7	7.2				
23HY1 50.5 mm (1.99 in.)	23HY1001N	690	97.79	1.5	2.7	7.2	35	4.96	120	0.66
	23HY1002N	690	97.79	1	4.5	11.6				
23HY2 54.5 mm (2.15 in.)	23HY2001N	730	103.5	1.5	2.5	6.9	42	5.95	145	0.80
	23HY2002N	730	103.5	1	7	15				

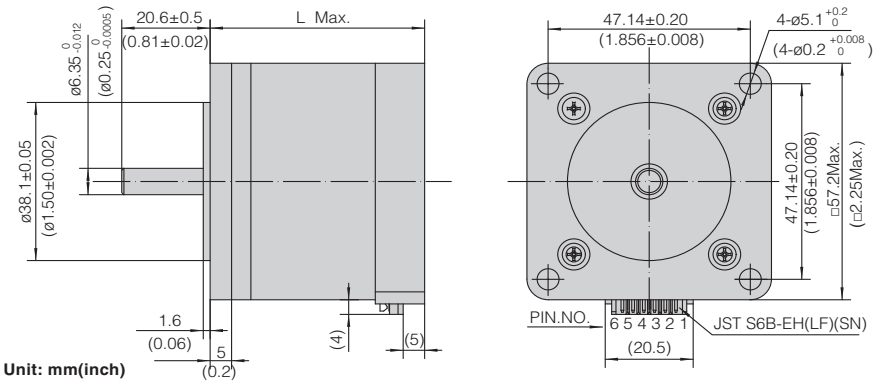
- Uni-polar

Series & Length	Model Number	Holding Torque		Rated Current	Resistance per Phase	Inductance per Phase	Detent Torque		Rotor Inertia	
		mNm	oz-in	A	ohm	mH	mNm	oz-in	g.cm²	oz-in²
23HY0 39 mm (1.54 in.)	23HY0001-01N	320	45.35	1.5	1.8	1.5	18	2.55	55	0.30
	23HY0002-01N	320	45.35	1	3.6	3.6				
23HY1 50.5 mm (1.99 in.)	23HY1001-01N	530	75.11	1.5	3	3.5	35	4.96	120	0.66
	23HY1002-01N	530	75.11	1	5.4	7.5				
23HY2 54.5 mm (2.15 in.)	23HY2001-01N	640	90.70	1.5	2.8	3.3	42	5.95	145	0.80
	23HY2001-02N	640	90.70	1	7	8.7				

• Wiring Connection, Lead Wires, Schematic Diagrams & Stepping Sequence.....Page 60 - 62

Mechanical Dimension

Series	L	Mass
	mm	kg
23HY0	39 (1.54)	0.36 (0.79)
23HY1	50.5 (1.99)	0.52 (1.14)
23HY2	54.5 (2.15)	0.60 (1.32)



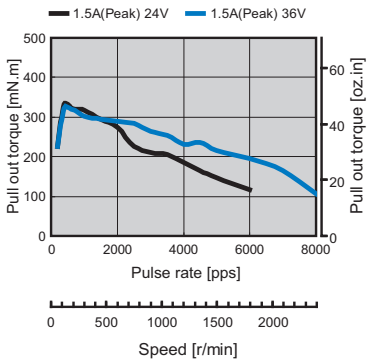
Unit: mm(inch)

Dynamic Torque Curves

- Bi-polar

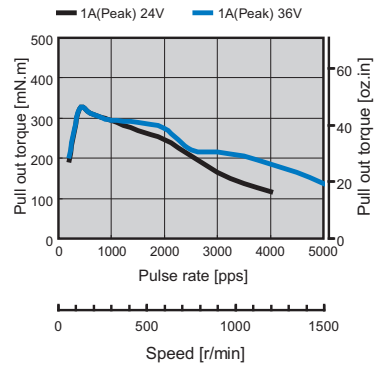
23HY0001N

Conditions:Bi-polar Constant Current Driver
Driver: AMA MS3540M
Mode:Full Step



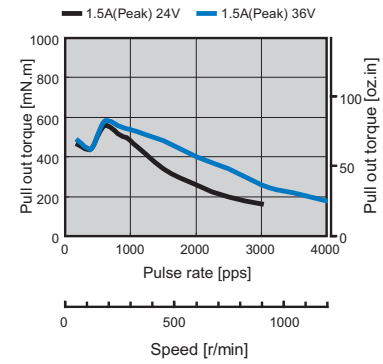
23HY0002N

Conditions:Bi-polar Constant Current Driver
Driver: AMA MS3540M
Mode:Full Step



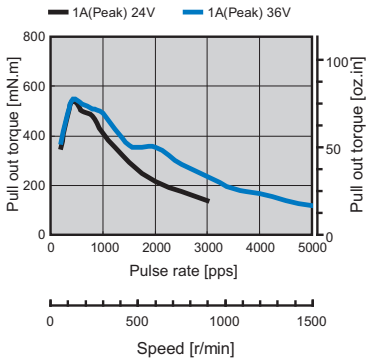
23HY1001N

Conditions:Bi-polar Constant Current Driver
Driver: AMA MS3540M
Mode:Full Step



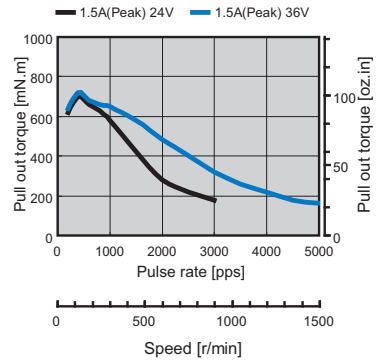
23HY1002N

Conditions:Bi-polar Constant Current Driver
Driver: AMA MS3540M
Mode:Full Step



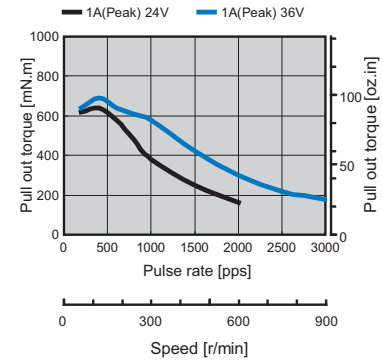
23HY2001N

Conditions:Bi-polar Constant Current Driver
Driver: AMA MS3540M
Mode:Full Step



23HY2002N

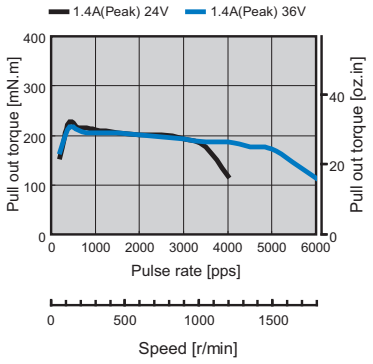
Conditions:Bi-polar Constant Current Driver
Driver: AMA MS3540M
Mode:Full Step



- Uni-polar

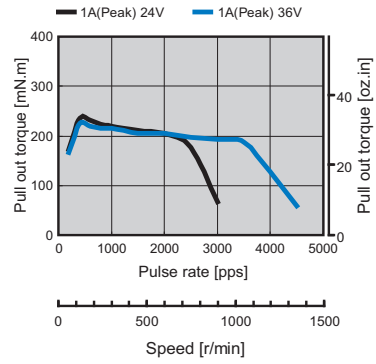
23HY0001-01N

Conditions:Uni-polar Constant Current Driver
Driver: AMA MSU3040M
Mode:Full Step



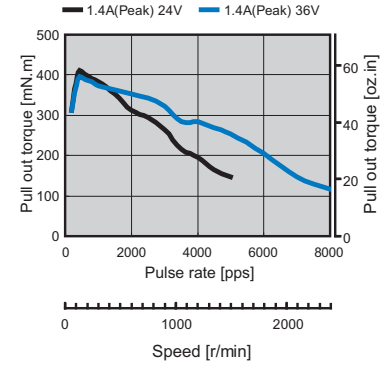
23HY0002-01N

Conditions: Uni-polar Constant Current Driver
Driver: AMA MSU3040M
Mode: Full Step



23HY1001-01N

Conditions: Uni-polar Constant Current Driver
Driver: AMA MSU3040M
Mode: Full Step

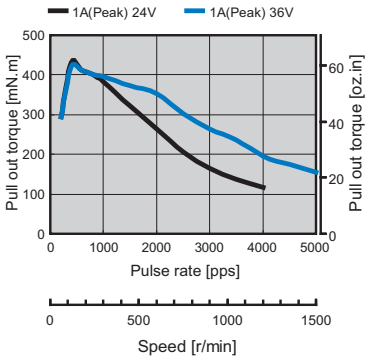


Dynamic Torque Curves

- Uni-polar

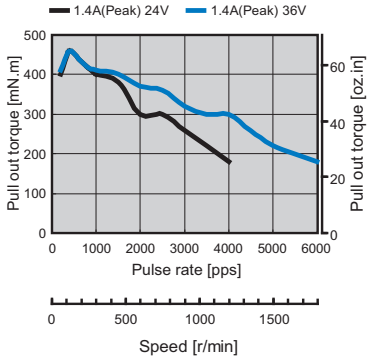
23HY1002-01N

Conditions: Uni-polar Constant Current Driver
Driver: AMA MSU3040M
Mode: Full Step



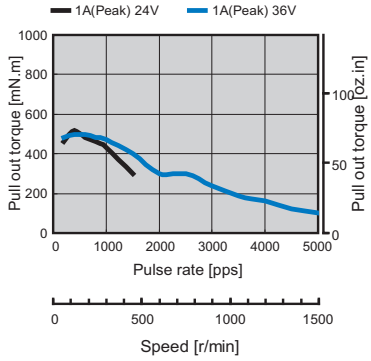
23HY2001-01N

Conditions: Uni-polar Constant Current Driver
Driver: AMA MSU3040M
Mode: Full Step



23HY2001-02N

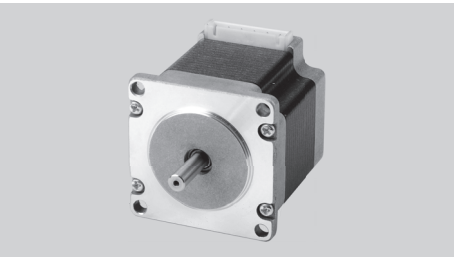
Conditions: Uni-polar Constant Current Driver
Driver: AMA MSU3040M
Mode: Full Step



24HS SERIES 1.8°

Key Features

- Very High Torque
- Smooth Movement
- Low Speed



General Specifications

- Bi-polar

Series & Length	Model Number	Holding Torque		Rated Current	Resistance per Phase	Inductance per Phase	Detent Torque		Rotor Inertia	
		mNm	oz-in	A	ohm	mH	mNm	oz-in	g.cm²	oz-in²
24HS1 44 mm (1.73 in.)	24HS1001N	1100	155.9	1.4	2.9	6.6	40	5.67	280	1.54
	24HS1002N	1100	155.9	2.8	0.75	1.6				
	24HS1003N	1100	155.9	4	0.35	0.85				
24HS2 54 mm (2.13 in.)	24HS2002N	1400	198.4	4	0.42	1.2	90	12.75	450	2.47
	24HS2001N	1800	255.1	2.8	1.1	3.5				
24HS3 65 mm (2.56 in.)	24HS3003N	2100	297.6	1.4	4.3	13.5	95	13.46	560	3.08
	24HS3004N	2100	297.6	2.8	1.1	3.3				
24HS5 85 mm (3.35 in.)	24HS5001N	3000	425.2	2.8	1.49	6.5	100	14.16	900	4.95
	24HS5002N	3000	425.2	4	0.65	2.45				
	24HS5003N	3000	425.2	1.4	5.96	25				

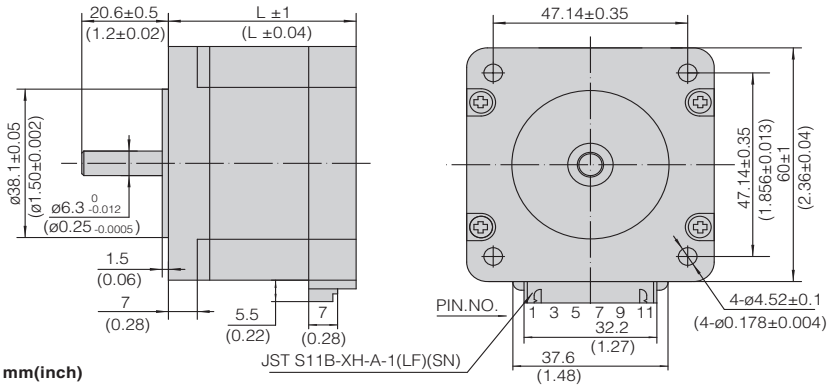
- Uni-polar

Series & Length	Model Number	Holding Torque		Rated Current	Resistance per Phase	Inductance per Phase	Detent Torque		Rotor Inertia	
		mNm	oz-in	A	ohm	mH	mNm	oz-in	g.cm²	oz-in²
24HS1 44 mm (1.73 in.)	24HS1002-01N	950	134.6	2	1.46	1.8	40	5.67	280	1.54
	24HS1003-01N	950	134.6	2.8	0.74	0.85				
	24HS1004N	950	134.6	1	5.7	6.8				
24HS2 54 mm (2.13 in.)	24HS2003N	1200	170.1	3	0.85	1.34	90	12.75	450	2.47
	24HS2004N	1200	170.1	2	1.9	3.27				
	24HS2005N	1200	170.1	1	6.9	11.5				
24HS3 65 mm (2.56 in.)	24HS3005N	1500	212.6	2	2.2	3.5	95	13.46	560	3.08
24HS5 85 mm (3.35 in.)	24HS5001-01N	2300	326.0	2	2.8	6.4	100	14.16	900	4.95
	24HS5002-01N	2300	326.0	3	1.2	2.54				
	24HS5004N	2300	326.0	1	10	19.5				

- Wiring Connection, Lead Wires, Schematic Diagrams & Stepping Sequence.....Page 60 - 62

Mechanical Dimension

Series	L	Mass
	mm (in.)	kg (lb.)
24HS1	44 (1.73)	0.60 (1.32)
24HS2	54 (2.13)	0.83 (1.83)
24HS3	65 (2.56)	1.05 (2.31)
24HS5	85 (3.35)	1.40 (3.09)



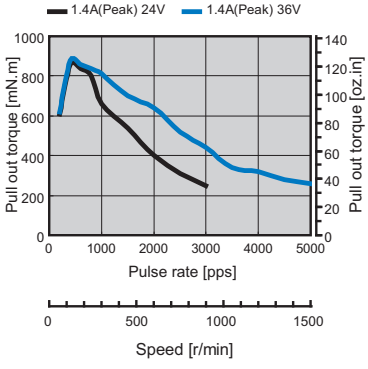
Unit: mm(inch)

Dynamic Torque Curves

- Bi-polar

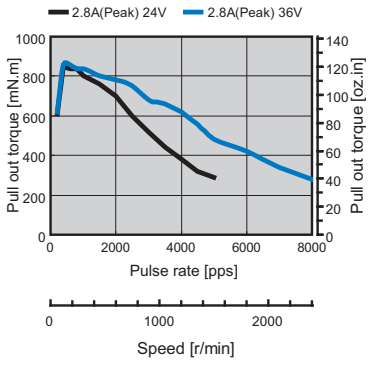
24HS1001N

Conditions: Bi-polar Constant Current Driver
Driver: AMA MS3540M
Mode: Full Step



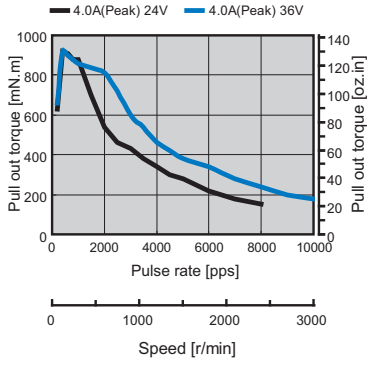
24HS1002N

Conditions:Bi-polar Constant Current Driver
Driver: AMA MS3540M
Mode:Full Step



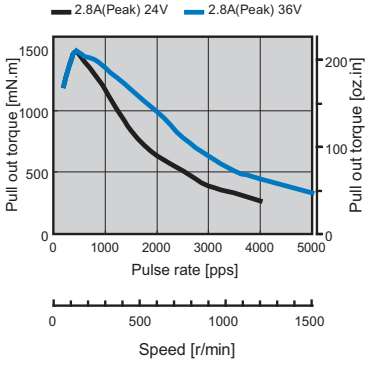
24HS1003N

Conditions: Bi-polar Constant Current Driver
Driver: AMA MS3540M
Mode: Full Step



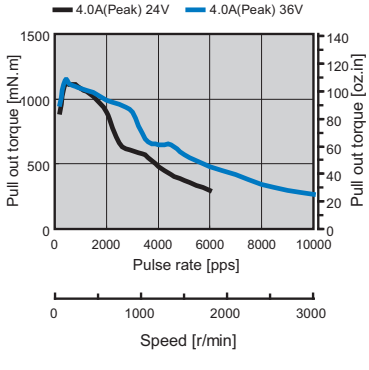
24HS2001N

Conditions: Bi-polar Constant Current Driver
Driver: AMA MS3540M
Mode: Full Step



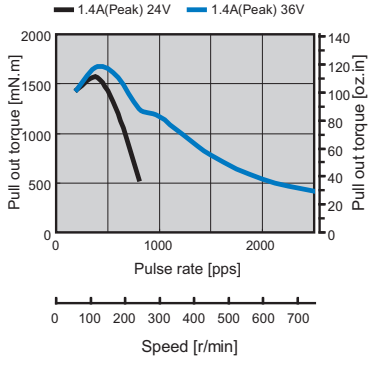
24HS2002N

Conditions: Bi-polar Constant Current Driver
Driver: AMA MS3540M
Mode: Full Step



24HS3003N

Conditions: Bi-polar Constant Current Driver
Driver: AMA MS3540M
Mode: Full Step

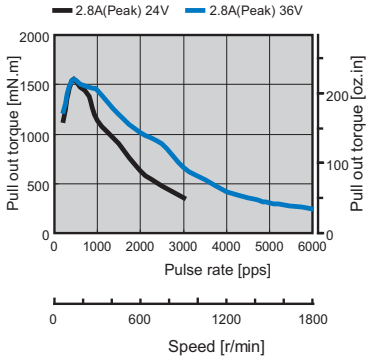


Dynamic Torque Curves

- Bi-polar

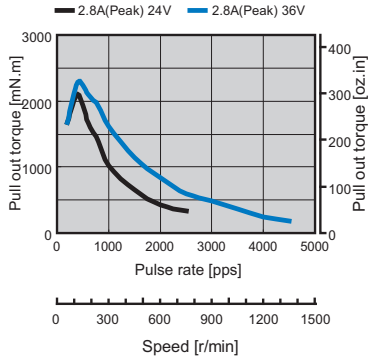
24HS3004N

Conditions: Bi-polar Constant Current Driver
Driver: AMA MS3540M
Mode: Full Step



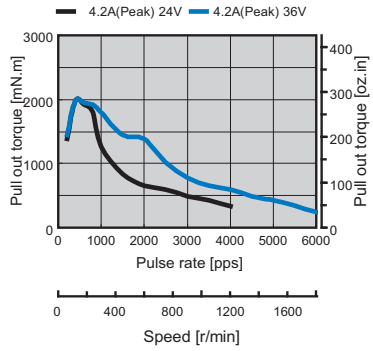
24HS5001N

Conditions: Bi-polar Constant Current Driver
Driver: AMA MS3540M
Mode: Full Step



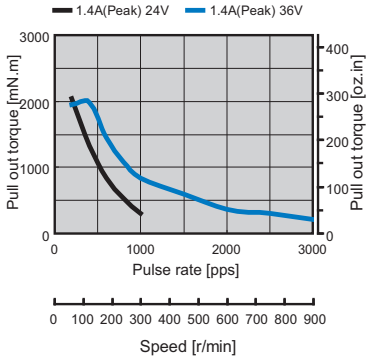
24HS5002N

Conditions: Bi-polar Constant Current Driver
Driver: AMA MS3540M
Mode: Full Step



24HS5003N

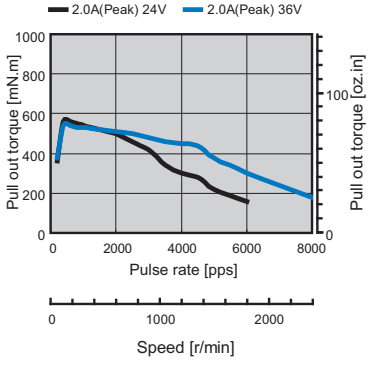
Conditions: Bi-polar Constant Current Driver
Driver: AMA MS3540M
Mode: Full Step



- Uni-polar

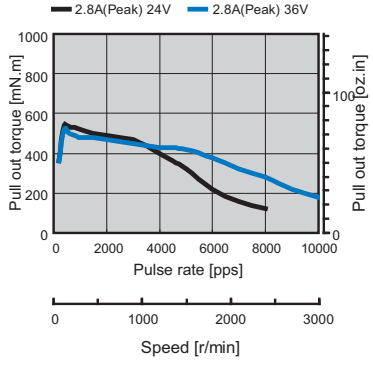
24HS1002-01N

Conditions: Uni-polar Constant Current Driver
Driver: AMA MSU3040M
Mode: Full Step



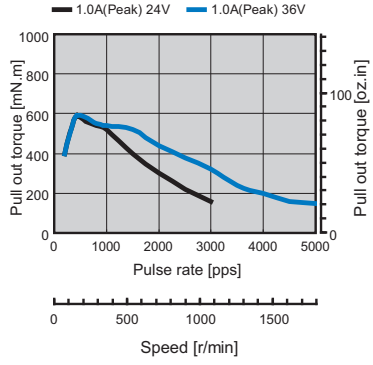
24HS1003-01N

Conditions: Uni-polar Constant Current Driver
Driver: AMA MSU3040M
Mode: Full Step



24HS1004N

Conditions: Uni-polar Constant Current Driver
Driver: AMA MSU3040M
Mode: Full Step

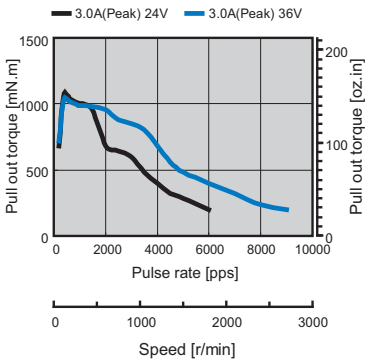


Dynamic Torque Curves

- Uni-polar

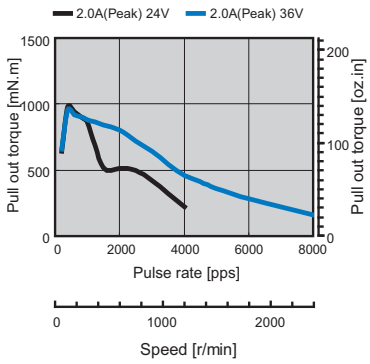
24HS2003N

Conditions: Uni-polar Constant Current Driver
Driver: AMA MSU3040M
Mode: Full Step



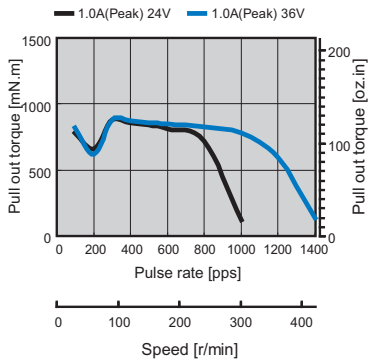
24HS2004N

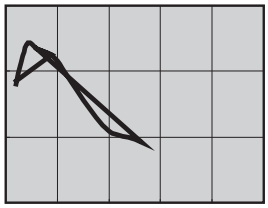
Conditions: Uni-polar Constant Current Driver
Driver: AMA MSU3040M
Mode: Full Step



24HS2005N

Conditions: Uni-polar Constant Current Driver
Driver: AMA MSU3040M
Mode: Full Step

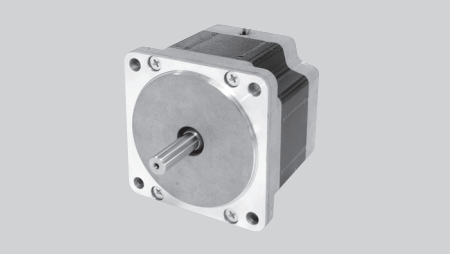




34HD SERIES 1.8°

Key Features

- High Torque
- High Accuracy
- Smooth Movement



General Specifications

- Bi-polar

Series & Length	Model Number	Holding Torque		Rated Current	Resistance per Phase	Inductance per Phase	Detent Torque		Rotor Inertia	
		mNm	oz-in	A	ohm	mH	mNm	oz-in	g.cm²	oz-in²
34HD0 66.5 mm (2.62 in.)	34HD0401	3300	467.7	1.4	4.4	29.6	150	21.25	1100	6.05
	34HD0402	3300	467.7	2.1	2.2	7.4				
	34HD0403	3300	467.7	3.18	0.96	6.8				
	34HD0404	3300	467.7	6.3	0.24	1.7				
34HD1 96 mm (3.78 in.)	34HD1401	6000	850.3	1.4	6.4	56	250	35.41	1850	10.17
	34HD1402	6000	850.3	2.1	3.2	14				
	34HD1403	6000	850.3	3.18	1.32	10.8				
	34HD1404	6000	850.3	6.3	0.33	2.7				
34HD2 125.5 mm (4.94 in.)	34HD2401	8800	1247.2	1.4	7.6	86.4	350	49.58	2750	15.12
	34HD2402	8800	1247.2	2.8	1.94	21.6				
	34HD2403	8800	1247.2	5.6	0.49	5.6				

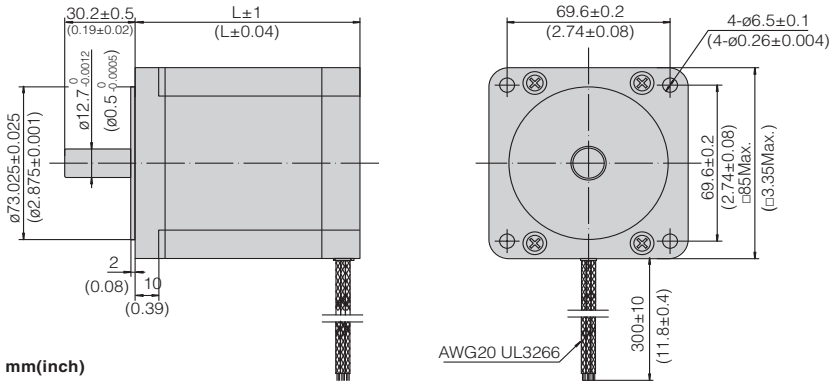
- 8-Leadwire Motors

Series & Length	Model Number	Holding Torque		Rated Current	Resistance per Phase	Inductance per Phase	Detent Torque		Rotor Inertia	
		mNm	oz-in	A	ohm	mH	mNm	oz-in	g.cm²	oz-in²
34HD0 66.5 mm (2.62 in.)	34HD0801 Bi-polar Parallel	2800	396.8	6.3	0.24	1.7	150	21.25	1100	6.05
	34HD0801 Bi-polar Series	2800	396.8	3.18	0.96	6.8				
34HD1 96 mm (3.78 in.)	34HD1801 Bi-polar Parallel	5600	793.7	6.3	0.33	2.5	250	35.41	1850	10.17
	34HD1801 Bi-polar Series	5600	793.7	3.18	1.32	10				
34HD2 125.5 mm (4.94 in.)	34HD2801 Bi-polar Parallel	8400	1190.5	5.6	0.49	5.6	350	49.58	2750	15.12
	34HD2801 Bi-polar Series	8400	1190.5	2.8	1.94	21.6				

- Wiring Connection, Lead Wires, Schematic Diagrams & Stepping Sequence.....Page 60 - 62

Mechanical Dimension

Series	L	Mass
	mm (in.)	kg (lb.)
34HD0	66.5 (2.62)	1.6 (3.52)
34HD1	96 (3.78)	2.7 (5.94)
34HD2	125.5 (4.94)	3.8 (8.36)



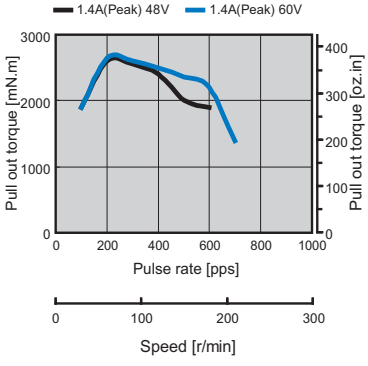
Unit: mm(inch)

Dynamic Torque Curves

- Bi-polar

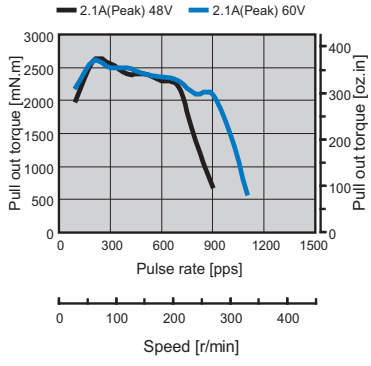
34HD0401 Bi-polar series

Conditions: Bi-polar Constant Current Driver
Driver: AMA MS7080M
Mode: Full Step



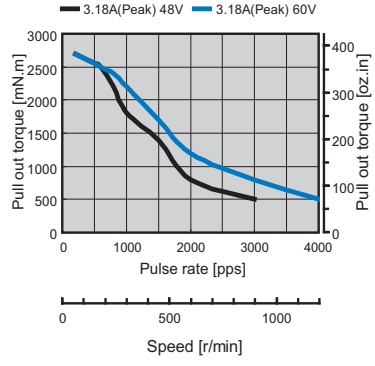
34HD0402 Bi-polar series

Conditions:Bi-polar Constant Current Driver
Driver: AMA MS7080M
Mode:Full Step



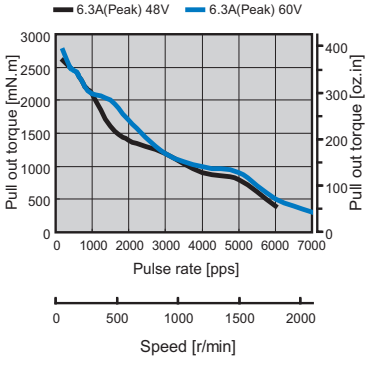
34HD0403 Bi-polar

Conditions:Bi-polar Constant Current Driver
Driver: AMA MS7080M
Mode:Full Step



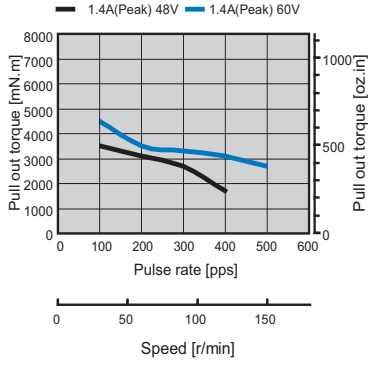
34HD0404 Bi-polar parallel

Conditions:Bi-polar Constant Current Driver
Driver: AMA MS7080M
Mode:Full Step



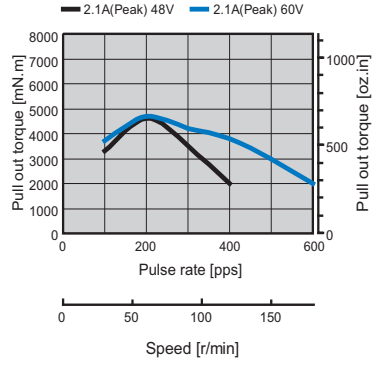
34HD1401 Bi-polar series

Conditions:Bi-polar Constant Current Driver
Driver: AMA MS7080M
Mode:Full Step



34HD1402 Bi-polar series

Conditions:Bi-polar Constant Current Driver
Driver: AMA MSST10
Mode:Full Step

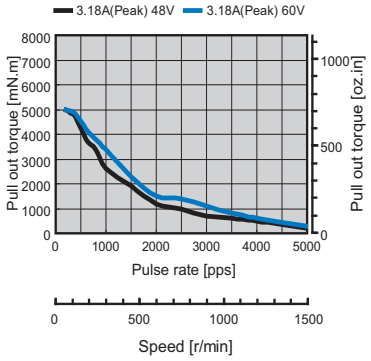


Dynamic Torque Curves

- Bi-polar

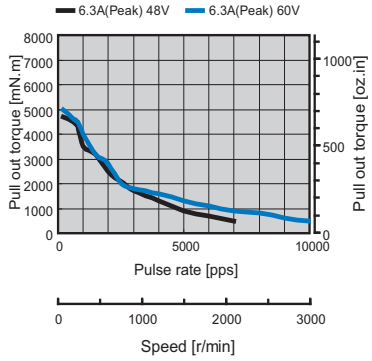
34HD1403 Bi-polar series

Conditions:Bi-polar Constant Current Driver
Driver: AMA MS7080M
Mode:Full Step



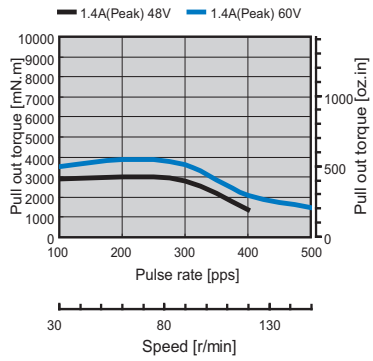
34HD1404 Bi-polar parallel

Conditions:Bi-polar Constant Current Driver
Driver: AMA MS7080M
Mode:Full Step



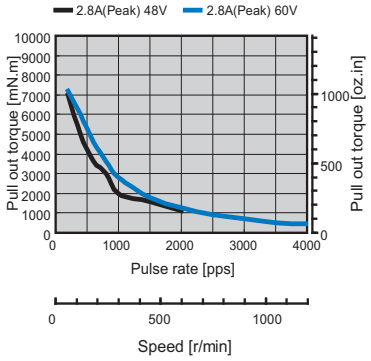
34HD2401 Bi-polar series

Conditions:Bi-polar Constant Current Driver
Driver: AMA MS7080M
Mode:Full Step



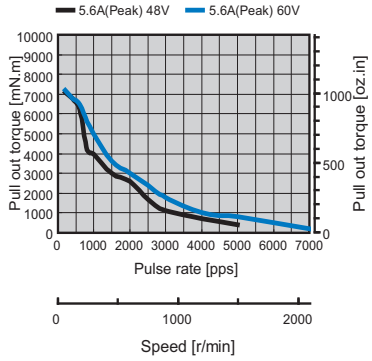
34HD2402 Bi-polar series

Conditions:Bi-polar Constant Current Driver
Driver: AMA MS7080M
Mode:Full Step



34HD2403 Bi-polar parallel

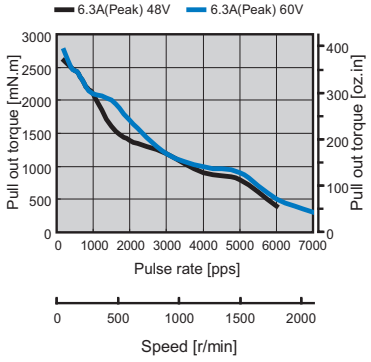
Conditions:Bi-polar Constant Current Driver
Driver: AMA MS7080M
Mode:Full Step



- 8-Leadwire Motors

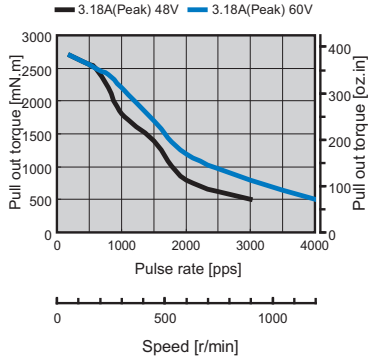
34HD0801 Bi-polar parallel

Conditions:Bi-polar Constant Current Driver
Driver: AMA MS7080M
Mode:Full Step



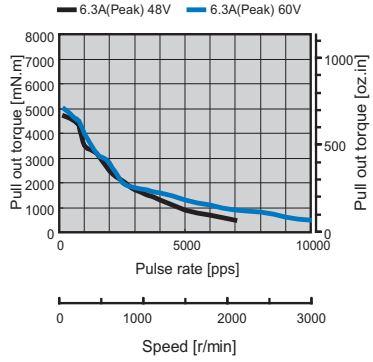
34HD0801 Bi-polar series

Conditions:Bi-polar Constant Current Driver
Driver: AMA MS7080M
Mode:Full Step



34HD1801 Bi-polar parallel

Conditions:Bi-polar Constant Current Driver
Driver: AMA MS7080M
Mode:Full Step

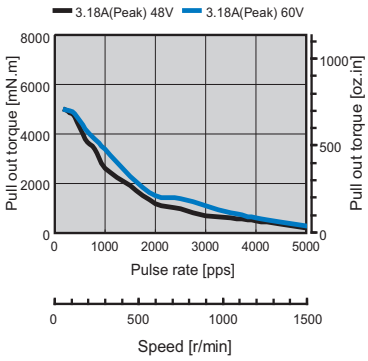


Dynamic Torque Curves

- 8-Leadwire Motors

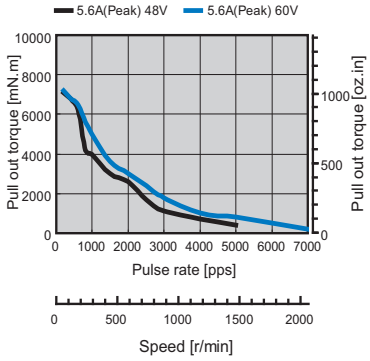
34HD1801 Bi-polar series

Conditions:Bi-polar Constant Current Driver
Driver: AMA MS7080M
Mode:Full Step



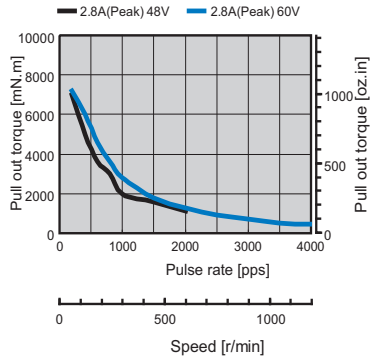
34HD2801 Bi-polar parallel

Conditions:Bi-polar Constant Current Driver
Driver: AMA MS7080M
Mode:Full Step



34HD2801 Bi-polar series

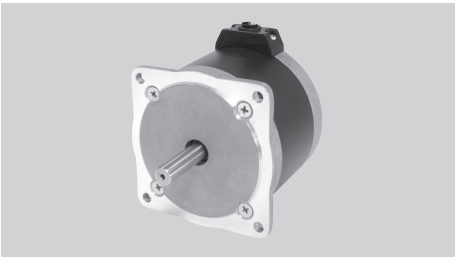
Conditions:Bi-polar Constant Current Driver
Driver: AMA MS7080M
Mode:Full Step



34HY SERIES 1.8°

Key Features

- Low Noise
- Low Inertia
- High Acceleration



General Specifications

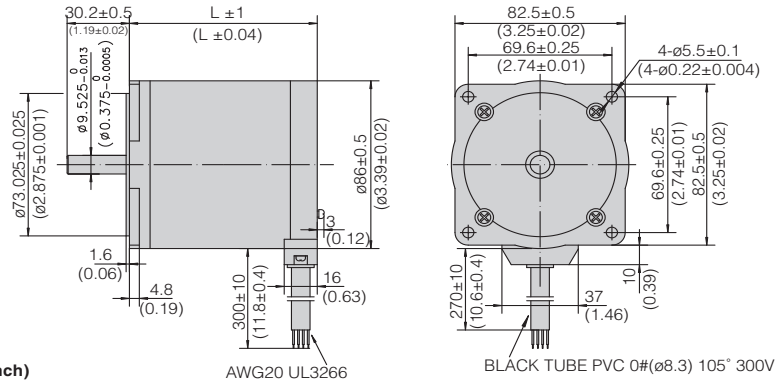
- 8-Leadwire Motors

Series & Length	Model Number	Holding Torque		Rated Current	Resistance per Phase	Inductance per Phase	Detent Torque		Rotor Inertia	
		mN.m	oz-in	A	ohm	mH	mN.m	oz-in	g.cm²	oz-in²
34HY0 63 mm (2.48 in.)	34HY0809 Bi-polar Parallel	2300	326.0	1.8	2.3	18	120	17.00	560	3.08
	34HY0809 Bi-polar Series	2300	326.0	0.9	9.2	72				
	34HY0809 Unipolar	1800	255.1	1.3	4.6	18				
	34HY0810 Bi-polar Parallel	2300	326.0	4.2	0.6	3.6				
	34HY0810 Bi-polar Series	2300	326.0	2.1	2.4	14.4				
	34HY0810 Unipolar	1800	255.1	3	1.2	3.6				
34HY1 91 mm (3.58 in.)	34HY1801-10 Bi-polar Parallel	4000	566.9	5.6	0.3	2.4	210	29.75	1200	6.60
	34HY1801-10 Bi-polar Series	4000	566.9	2.8	1.2	9.6				
	34HY1801-10 Unipolar	3100	439.3	4	0.6	2.4				
	34HY1803 Bi-polar Parallel	4600	651.9	3.9	0.8	6.7				
	34HY1803 Bi-polar Series	4600	651.9	1.9	3.2	26.8				
	34HY1803 Unipolar	3500	496.0	2.8	1.6	6.7				
34HY2 130 mm (5.12 in.)	34HY2801 Bi-polar Parallel	7800	1105.4	8.4	0.47	4	180	25.50	2100	11.55
	34HY2801 Bi-polar Series	7800	1105.4	4.2	1.88	16				
	34HY2801 Unipolar	6000	850.3	6	0.94	4				
	34HY2802 Bi-polar Parallel	5600	793.7	9.4	0.19	1.6				
	34HY2802 Bi-polar Series	5600	793.7	4.7	0.76	6				
	34HY2802 Unipolar	4300	609.4	6.7	0.38	1.5				

- Wiring Connection, Lead Wires, Schematic Diagrams & Stepping Sequence.....Page 60 - 62

Mechanical Dimension

Series	L	Mass
	mm (in.)	kg (lb.)
34HY0	63 (2.48)	1.5 (3.31)
34HY1	91 (3.58)	2.6 (5.73)
34HY2	130 (5.12)	3.6 (7.94)



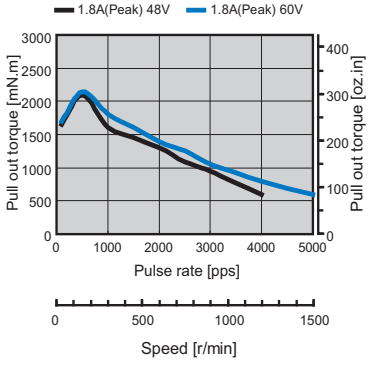
Unit: mm(inch)

Dynamic Torque Curves

- 8-Leadwire Motors

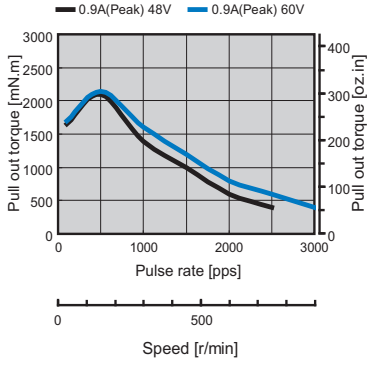
34HY0809 Bi-polar Parallel

Conditions:Bi-polar Constant Current Driver
Driver: AMA MS7080M
Mode:Full Step



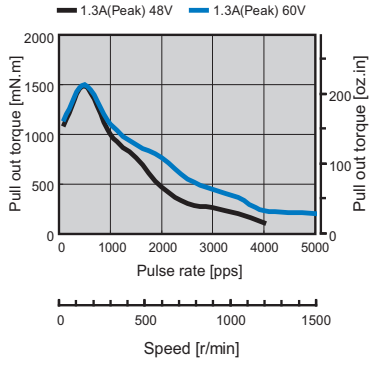
34HY0809 Bi-polar series

Conditions:Bi-polar Constant Current Driver
Driver: AMA MS7080M
Mode:Full Step



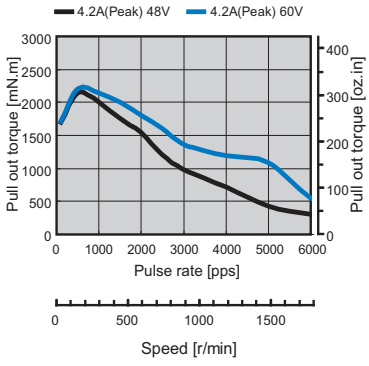
34HY0809 Uni-polar

Conditions:Uni-polar Constant Current Driver
Driver: AMA MSU8080M
Mode:Full Step



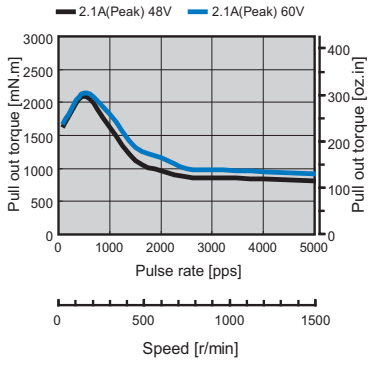
34HY0810 Bi-polar Parallel

Conditions:Bi-polar Constant Current Driver
Driver: AMA MS7080M
Mode:Full Step



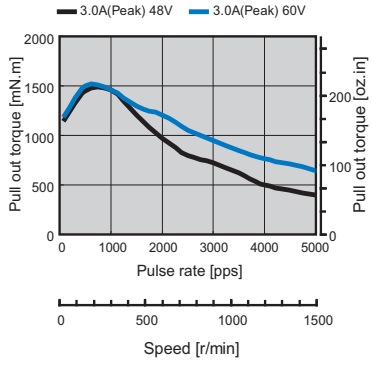
34HY0810 Bi-polar series

Conditions:Bi-polar Constant Current Driver
Driver: AMA MS7080M
Mode:Full Step



34HY0810 Uni-polar

Conditions:Uni-polar Constant Current Driver
Driver: AMA MSU8080M
Mode:Full Step

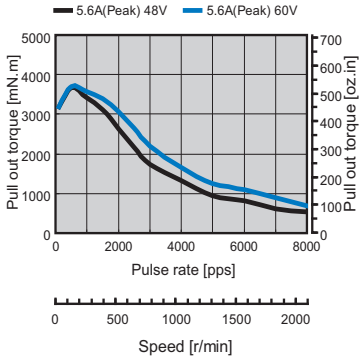


Dynamic Torque Curves

- 8-Leadwire Motors

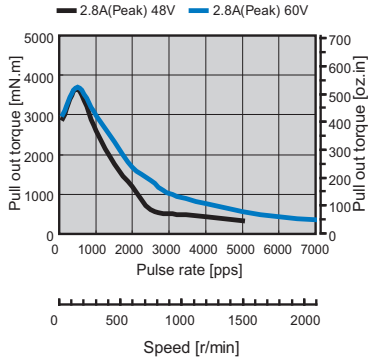
34HY1801-10 Bi-polar Parallel

Conditions:Bi-polar Constant Current Driver
Driver: AMA MSU8080M
Mode:Full Step



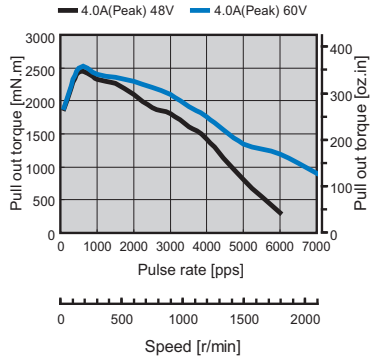
34HY1801-10 Bi-polar Series

Conditions:Bi-polar Constant Current Driver
Driver: AMA MSU8080M
Mode:Full Step



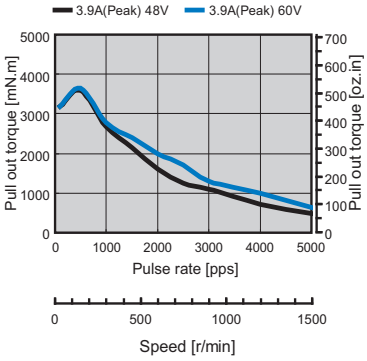
34HY1801-10 Uni-polar

Conditions:Uni-polar Constant Current Driver
Driver: AMA MSU8080M
Mode:Full Step



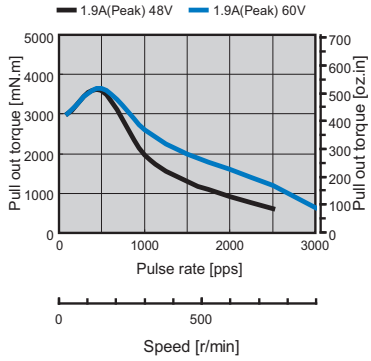
34HY1803 Bi-polar Parallel

Conditions:Bi-polar Constant Current Driver
Driver: AMA MS7080M
Mode:Full Step



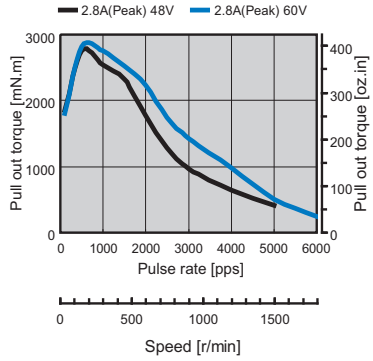
34HY1803 Bi-polar Series

Conditions:Bi-polar Constant Current Driver
Driver: AMA MS7080M
Mode:Full Step



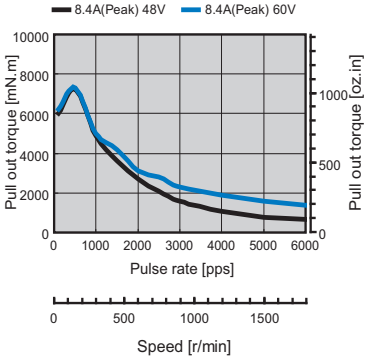
34HY1803 Uni-polar

Conditions:Uni-polar Constant Current Driver
Driver: AMA MSU8080M
Mode:Full Step



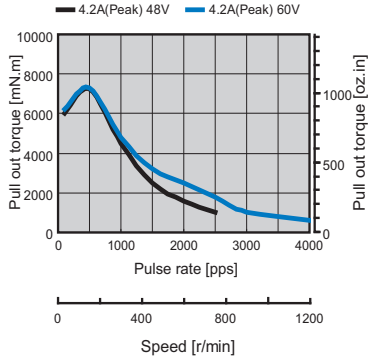
34HY2801 Bi-polar Parallel

Conditions:Bi-polar Constant Current Driver
Driver: AMA MS7080M
Mode:Full Step



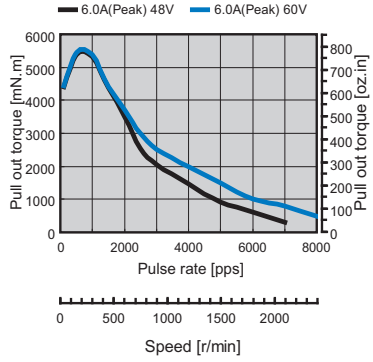
34HY2801 Bi-polar Series

Conditions:Bi-polar Constant Current Driver
Driver: AMA MS7080M
Mode:Full Step



34HY2801 Uni-polar

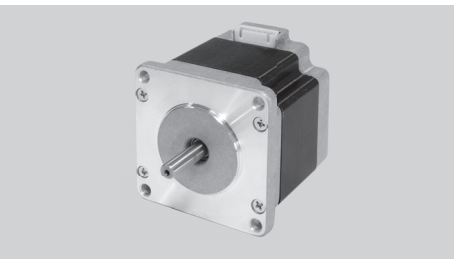
Conditions:Uni-polar Constant Current Driver
Driver: AMA MSU8080M
Mode:Full Step



24HC SERIES 1.2°

Key Features

- Very Low Noise
- Very Smooth Movement
- Low Vibration



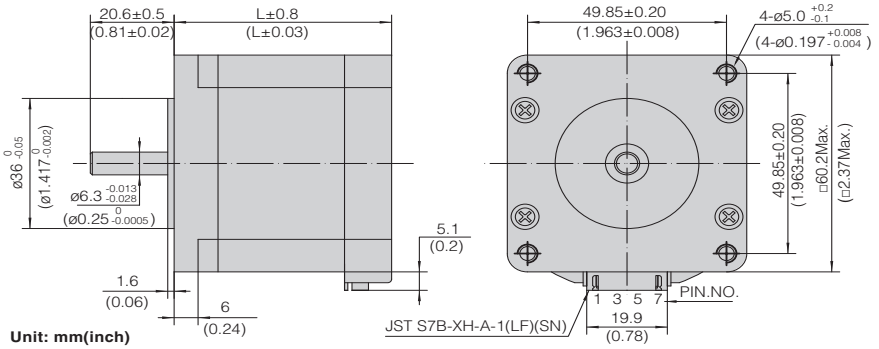
General Specifications

Series & Length	Model Number	Holding Torque		Rated Current	Resistance per Phase	Inductance per Phase	Detent Torque		Rotor Inertia	
		mN.m	oz-in	A	ohm	mH	mN.m	oz-in	g.cm²	oz-in²
24HC4 45.5 mm (1.79 in.)	24HC4001-01	540	76.53	1.5	6	10.2	25	3.54	180	0.99
24HC2 54.5 mm (2.15 in.)	24HC2002-01	800	113.4	1.5	4.8	11.4	40	5.67	260	1.43
24HC3 76.5 mm (3.01 in.)	24HC3001-01	1100	155.9	1.5	3	11.6	70	9.92	460	2.53

- Wiring Connection, Lead Wires, Schematic Diagrams & Stepping Sequence.....Page 60 - 62

Mechanical Dimension

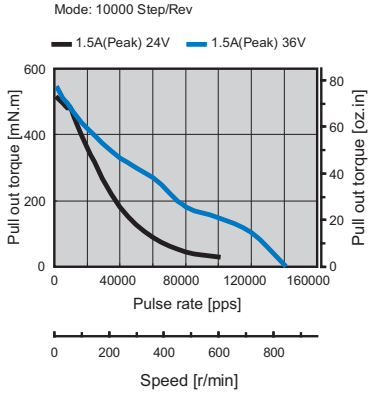
Model Number	L	Mass
	mm (in.)	kg (lb.)
24HC4	45.5 (1.79)	0.5 (1.10)
24HC2	54.5 (2.15)	0.8 (1.76)
24HC3	76.5 (3.01)	1.3 (2.87)



Dynamic Torque Curves

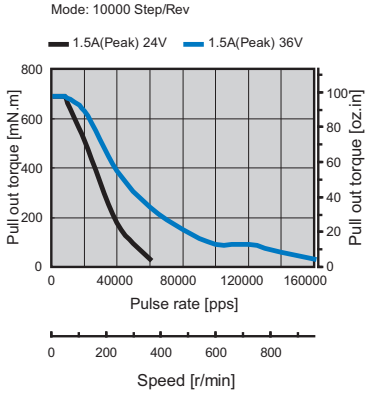
24HC4001-01

Conditions: 3-Phase Constant Current Driver
Driver: Moons' MS3ST10
Mode: 10000 Step/Rev



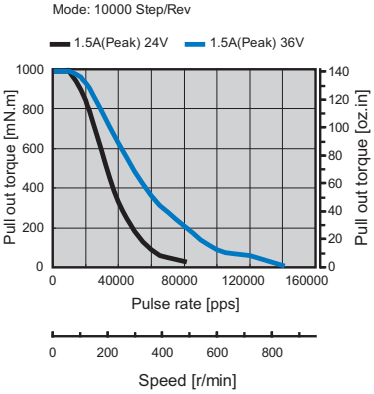
24HC2002-01

Conditions: 3-Phase Constant Current Driver
Driver: Moons' MS3ST10
Mode: 10000 Step/Rev



24HC3001-01

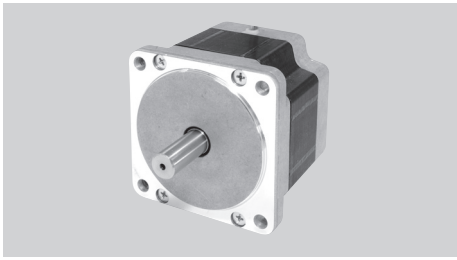
Conditions: 3-Phase Constant Current Driver
Driver: Moons' MS3ST10
Mode: 10000 Step/Rev



34HC SERIES 1.2°

Key Features

- Very Low Noise
- Very Smooth Movement
- Low Vibration



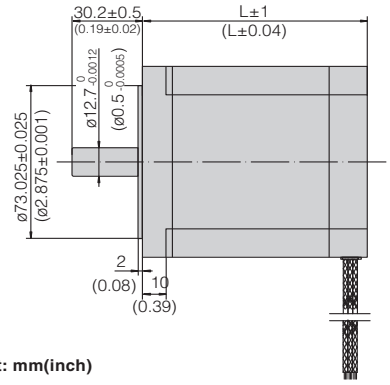
General Specifications

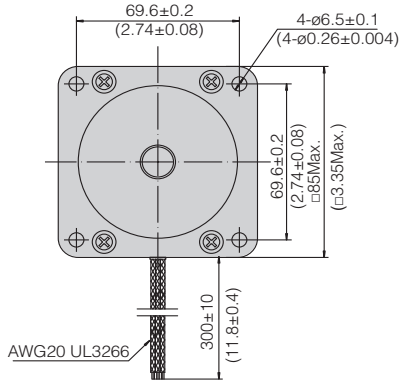
Series & Length	Model Number	Holding Torque		Rated Current	Resistance per Phase	Inductance per Phase	Detent Torque		Rotor Inertia	
		mNm	oz-in	A	ohm	mH	mNm	oz-in	g.cm²	oz-in²
34HC0 66.5 mm (2.62 in.)	34HC0301	2200	311.8	3	1.8	11.5	100	14.16	1100	6.05
34HC1 96 mm (3.78 in.)	34HC1301	4800	680.3	2	4.6	37	150	21.25	1850	10.17
34HC2 125.5 mm (4.94 in.)	34HC2301	6600	935.4	5.2	1.2	10.5	200	28.33	2750	15.12

- Wiring Connection, Lead Wires, Schematic Diagrams & Stepping Sequence.....Page 60 - 62

Mechanical Dimension

Series	L	Mass
	mm (in.)	kg (lb.)
34HC0	66.5 (2.62)	1.6 (3.53)
34HC1	96 (3.78)	2.7 (5.95)
34HC2	125.5 (4.94)	3.8 (8.38)



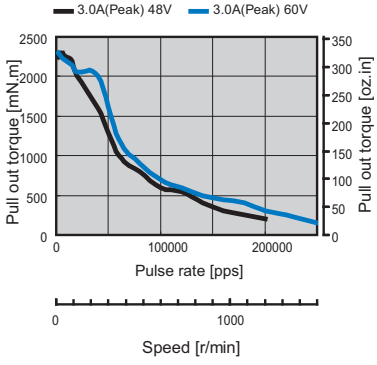


Unit: mm(inch)

Dynamic Torque Curves

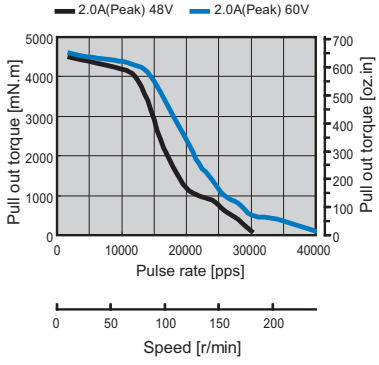
34HC0301

Conditions: 3-Phase Constant Current Driver
Driver: Moons' MS3ST10
Mode: 10000 Step/Rev



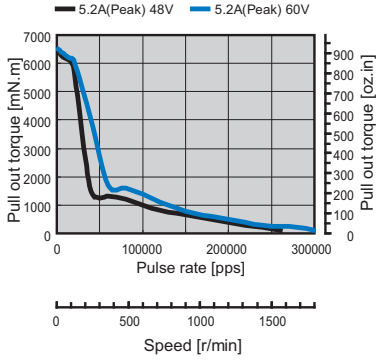
34HC1301

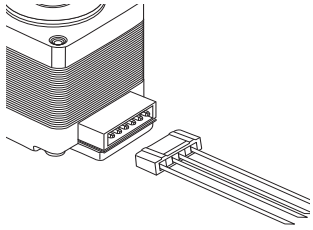
Conditions: 3-Phase Constant Current Driver
Driver: Moons' MS3ST10
Mode: 10000 Step/Rev



34HC2301

Conditions: 3-Phase Constant Current Driver
Driver: Moons' MS3ST10
Mode: 10000 Step/Rev

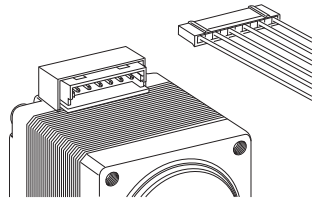




8HY series

Motor side: JST S6B-ZR (LF)(SN)

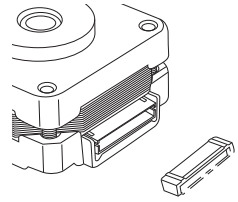
Mate with: JST ZHR-6



11HS series

Motor side: Molex 53253-0610

Mate with: Molex 51065-0600



14HA 14HS 14HY 16HS series

Motor side: JST S11B-ZR (LF)(SN)

Mate with: JST ZHR-11

17HD series

Motor side: Molex 89401-1160

Mate with: Molex 87369-1100

16HS 17HD 17HDN series

Motor side: JST S6B-PH-K (LF)(SN)

Mate with: JST PHR-6

23HY series

Motor side: JST S6B-EH (LF)(SN)

Mate with: JST EHR-6

23HS 24HS series

Motor side: JST S11B-XH-A-1 (LF)(SN)

Mate with: JST XHP-11

23HS series

Motor side: JST S6B-XH-A-1 (LF)(SN)

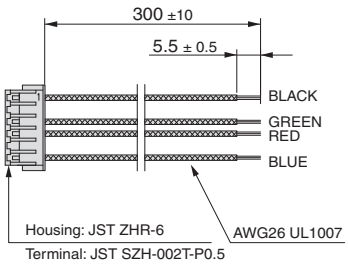
Mate with: JST XHP-6

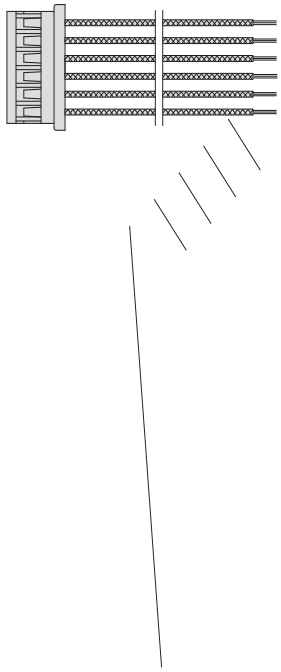
24HC series

Motor side: JST S7B-XH-A-1 (LF)(SN)

Mate with: JST XHP-7

- The styles above are in normal way. Other special connectors can be customized.


300 ±10
5.5 ± 0.5
BLACK
GREEN
RED
BLUE
Housing: JST ZHR-6
Terminal: JST SZH-002T-P0.5
AWG26 UL1007

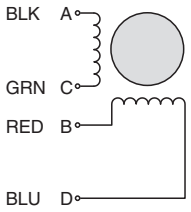


Schematic Diagrams & Stepping Sequence

• 2 PHASE

4 lead wire (bipolar)

Lead Wire Configuration



Sequence Model

Bi-Polar full step

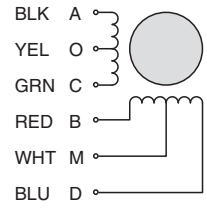
step	A	B	C	D
1	+	+	−	−
2	−	+	+	−
3	−	−	+	+
4	+	−	−	+

CW ↓ CCW ↑

CW(clockwise) & CCW(counter clockwise) rotation when seen from the flange side of the motor

6 lead wire (unipolar)

Lead Wire Configuration



Sequence Model

Uni-Polar full step

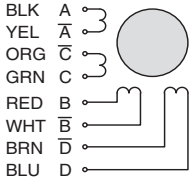
step	A	B	C	D	O	M
1	−	−			+	+
2		−	−		+	+
3			−	−	+	+
4	−			−	+	+

CW ↓ CCW ↑

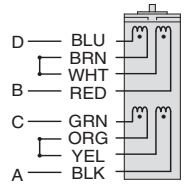
CW(clockwise) & CCW(counter clockwise) rotation when seen from the flange side of the motor

8 lead wire

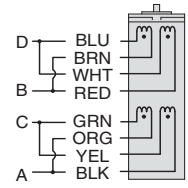
Lead Wire Configuration



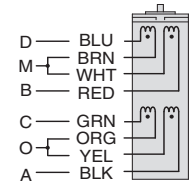
Option 1: Bi-Polar Series



Option 2: Bi-Polar Parallel



Option 3: Uni-Polar Series



Sequence Model

Bi-Polar full step

step	A	B	C	D
1	+	+	−	−
2	−	+	+	−
3	−	−	+	+
4	+	−	−	+

CW ↓ CCW ↑

Uni-Polar full step

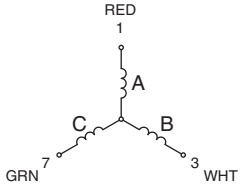
step	A	B	C	D	O	M
1	−	−			+	+
2		−	−		+	+
3			−	−	+	+
4	−			−	+	+

CW ↓ CCW ↑

CW(clockwise) & CCW(counter clockwise) rotation when seen from the flange side of the motor

• 3 PHASE

Lead Wire Configuration



Sequence Model

step	A	B	C
1	+	−	
2		−	+
3	−		+
4	−	+	
5		+	−
6	+		−

CW ↓ CCW ↑

CW & CCW rotation when seen from the flange side of the motor