M / P SERIES
STEP MOTORS

- Size 17
- Size 23
- Size 34
- Size 42

MOONS'
moving in better ways

M / P SERIES
STEP MOTORS

Index

MOONS' also offers NEMA size 8, 11, 14 and 24 motors, and 3 phase step motors.

PowerPlus Technology

Size 23 and larger motors are available with MOONS' PowerPlus technology. This technology provides 25% to 40% more torque across the entire speed range of the motor. The increased torque is a result of higher motor efficiency, and is available without increasing the drive voltage or current.

Typical Applications

Machine Upgrades
Changing existing machines to PowerPlus motors can be a quick path to new models with higher performance. Because the motor, drive and mechanical parts remain the same.benefits include:

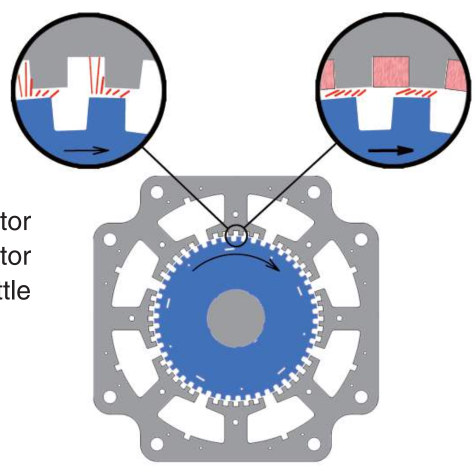
- **Faster new product introduction**
- **Reduced engineering costs**
- **Easy production phase in**
- **Reduced spare parts inventory**

Correct stalling problems with existing machines
Problems with occasional machine stalling are often due to unexpected field conditions that require more torque. These include: low temperature, dirt, and customers using machines in unexpected ways. UsingPowerPlus motors can be a quick effective solution.

Overcome drive or power supply limitations in new designs
Often a higher current drive or higher voltage power supply can provide needed extra torque. However, in many designs the drive current cannot be increased without switching to a larger, more expensive drive. Increasing drive voltage can be impractical, expensive, or may not be allowed for safety reasons. In these cases using PowerPlus motors can be especially useful.

Conventional Motor

Some of the flux linking the rotor to the stator is outside the stator teeth. This stray flux adds little to motor torque.



PowerPlus Technology

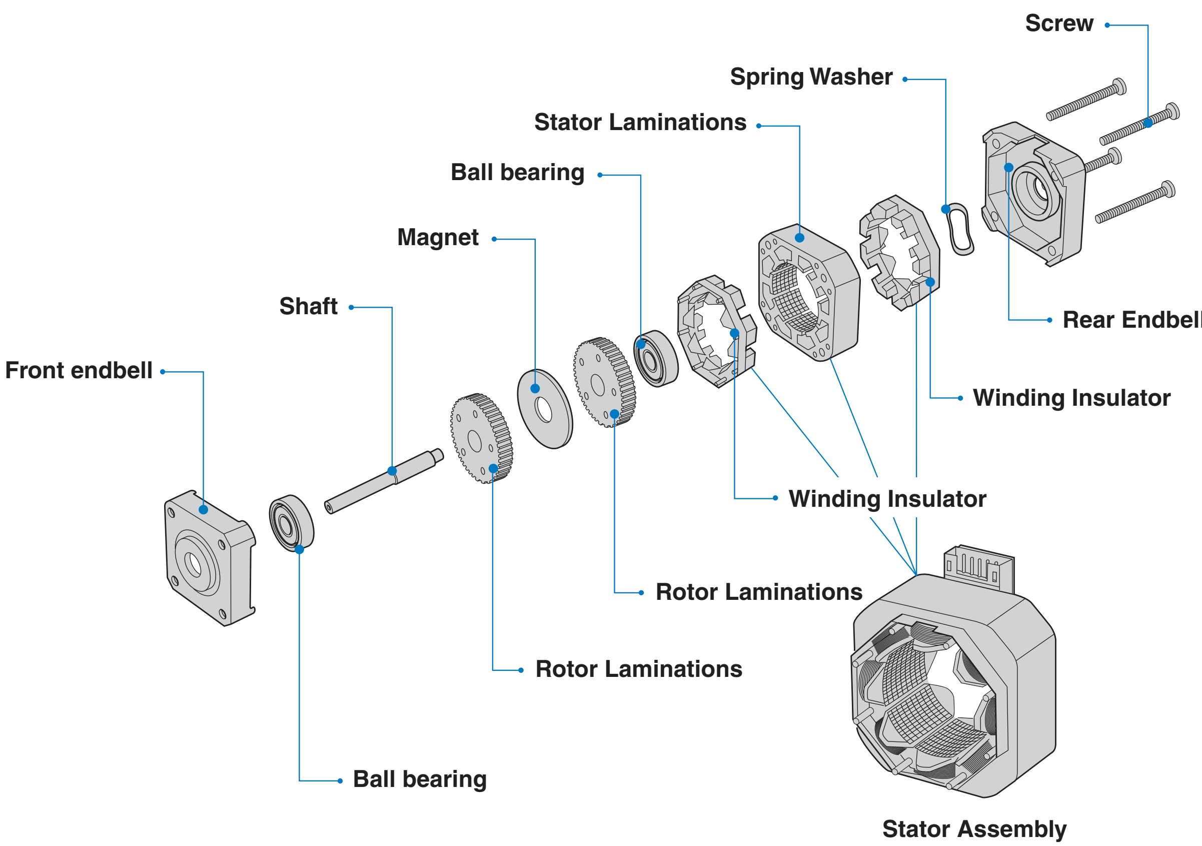
Magnets placed between the stator teeth redirect most of the stray flux into the stator teeth. This produces additional torque with the same input power.

M / P Series Step Motors

M / P Series step motors from MOONS' include a number of improvements for greater performance and value:

- Size 17, 23, 34…….. and now size 42 motors
- PowerPlus technology: boosts efficiency and performance at all speeds
- Lower inertia rotors provide faster acceleration
- High voltage insulation for use with high voltage, high performance drives
- Low loss stators have better high speed performance
- Standard windings with high fill for more low speed torque
- Updated model numbering includes a wider range of windings and standard options

Basic Structure



Construction
Model Numbers
Options

MS17HD
1.8°
Size 17

ML23HS
/ PL23HS
1.8°
Size 23

ML34HD
/ PL34HD
1.8°
Size 34

ML42HS
/ PL42HS
1.8°
Size 42

Technical
& Conversion
Charts

M / P Series Model Numbering System

M S 17 HD 2 P 4 040 -M

Stator - Series

M	Standard Step Motor
P	PowerPlus Step Motor

Rotor

S	Standard Inertia	Size 17
L	Lower Inertia	Size 23, 34, 42

Frame Size

##	17, 23, 34, 42

Motor Technology

HD or HS	Hybrid Step Motor, 2 Phase 1.8 degree

Length Code

	Traditional Stacks	1/2	1	2	3
MS17HD	Length Code	4	2	6	B
	Basic Motor Length (Max. mm)	34.3	39.8	48.3	62.8
ML23HS	Length Code	0	8	A	
	Basic Motor Length (Max. mm)	39	55	77	
ML34HD	Length Code		0	1	2
	Basic Motor Length (Max. mm)		67	97	126
ML42HS	Length Code		0	2	3
	Basic Motor Length (Max. mm)		100	151	202

Connection Construction / IP Rating

L	Leads	IP40
P	Plug In Connector - Standard	IP40

Number of connections / Winding Type

4	Bipolar
6	Unipolar (can be used bipolar)
8	Can be connected any way

Winding Current

###	Current rating x 100. 050 = 0.5 amps, 500 = 5 amps
X##	for 11 to 19 amps: X10= 11 amps, X40 = 14 amps

Options

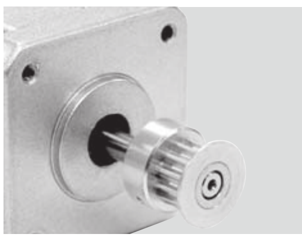
Omit	No Options
-E	Standard English rear shaft
-M	Standard Metric rear shaft

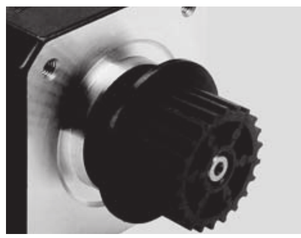
Custom Motors

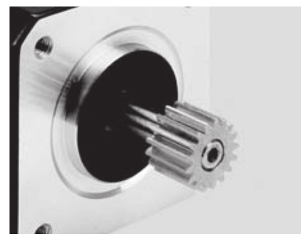
MOONS' provides motors to meet the needs of many applications. Common modifications include:

- Corrosion resistant motors. These are often used in outdoor equipment where humidity and temperature changes can cause corrosion.
- Sealed motors to keep out dust and water
- Special shaft sizes and features
- Pulleys, gears and couplings mounted on the shaft
- Encoders and other feedback devices
- Special lead lengthsor cables, with many different connectors

Press Fit Pulley & Gears

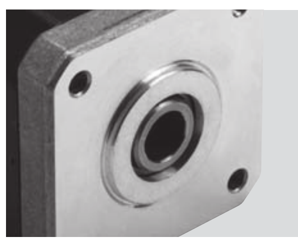

Metal Pulley

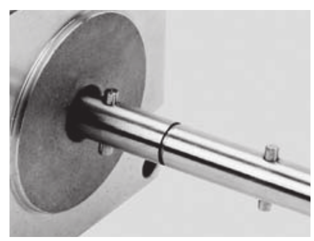

Plastic Pulley


Gear

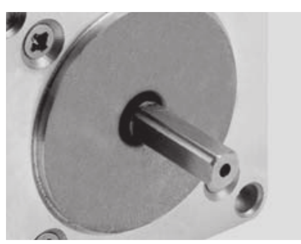
Shaft Options


Worm Shaft

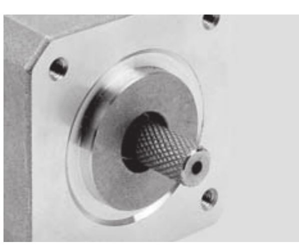

Hollow Shaft

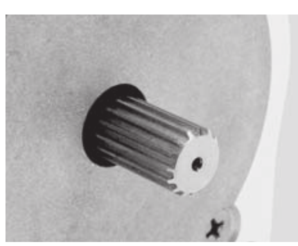

Dowel

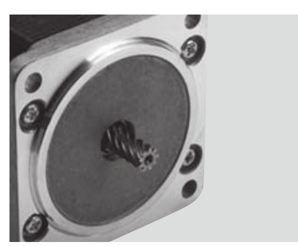

Single Flat


Double Flat


Key Way


Knurl


Hobbed Gear


Helical Cut

MS17HD Series:1.8° - Size 17

• Phases	2
• Steps / Revolution	200
• Step Accuracy	±5%
• Shaft Load (20,000 Hours at 1000 RPM)	
• Axial	25 N (5.6 Lbs.) Push
•	65 N (15 Lbs.) Pull
• Radial	29 N (6.5 Lbs.)At Flat Center
• IP Rating	40
• Approvals	RoHS
• Operating Temp.	-20°C to +40°C
• Insulation Class B,	130°C
• Insulation Resistance	100 MegOhms

MS17HD 4 P 4 040 -M

Basic Motor Length (Max)

4	34.3 mm (1.35")
2	39.8 mm (1.57")
6	48.3 mm (1.90")
B	62.8 mm (2.47")

Electrical Connection

P Plug-In Connector

Number of Connections

4 4 Lead - Bipolar
6 6 Lead - Unipolar (or Bipolar)

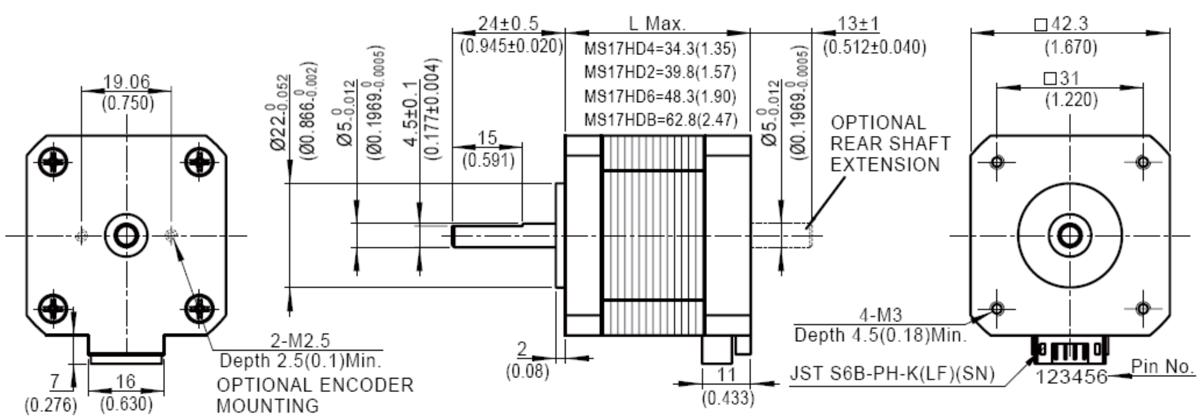
Winding

Current rating x 100

Options

Omit	No Options
-M	5 mm diameter rear shaft with encoder mounting holes

Dimensions: mm (in)



MS17HD - 4 Lead Bi-Polar

Length	Model Number / Single Shaft	Connect: P=Plug L=Leads	Mounted: Rated Current (Amps)	Mounted: Holding Torque Nm Typ.	Mounted: Holding Torque oz-in Typ.	Winding Ohms ±10% @20℃	Winding mH Typ.	Detent Torque mNm	Detent Torque oz-in	Rotor Inertia g cm2	Rotor Inertia oz-in2	Motor Weight kg	Motor Weight Lbs
34.3 mm (1.35 in.) Short	^ MS17HD4P4040	p	0.4	0.34	48	30	51	12	1.7	38	0.21	0.21	0.46
	^ MS17HD4P4065	p	0.65	0.32	45	8.7	15.4						
	^ MS17HD4P4100	p	1	0.33	47	4.2	7.5						
	^ MS17HD4P4150	p	1.5	0.32	45	1.7	2.9						
39.8 mm (1.57 in.) 1 Stack	^ MS17HD2P4040	p	0.4	0.48	68	24	56	15	2.1	57	0.31	0.28	0.62
	^ MS17HD2P4100	p	1	0.48	68	3.9	8.9						
	^ MS17HD2P4150	p	1.5	0.50	71	1.98	4.3						
	^ MS17HD2P4200	p	2	0.48	68	1.04	2.2						
48.3 mm (1.9 in.) 2 Stack	^ MS17HD6P4050	p	0.5	0.67	95	24	53	25	3.5	82	0.45	0.36	0.79
	^ MS17HD6P4100	p	1	0.63	89	4.9	11.5						
	^ MS17HD6P4150	p	1.5	0.62	88	2.2	4.9						
	^ MS17HD6P4200	p	2	0.63	89	1.3	2.9						
62.8 mm (2.47 in.) 3 Stack	^ MS17HDBP4100	p	1	0.82	120	5.6	14.6	30	4.2	123	0.67	0.6	1.3
	^ MS17HDBP4150	p	1.5	0.88	120	3	7.7						
	^ MS17HDBP4200	p	2	0.83	120	1.49	3.8						

^ Preferred model

MS17HD - 6 Lead Uni-Polar

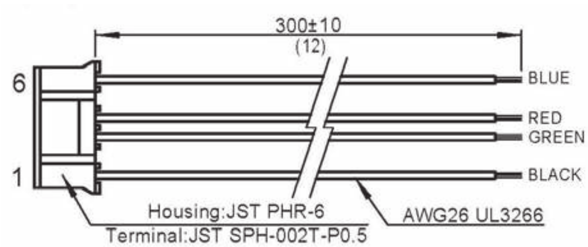
Length	Model Number / Single Shaft	Connect: P=Plug L=Leads	Mounted: Rated Current (Amps)	Mounted: Holding Torque Nm Typ.	Mounted: Holding Torque oz-in Typ.	Winding Ohms ±10% @20℃	Winding mH Typ.	Detent Torque mNm	Detent Torque oz-in	Rotor Inertia g cm2	Rotor Inertia oz-in2	Motor Weight kg	Motor Weight Lbs
34.3 mm (1.35 in.) Short	MS17HD4P6038	p	0.38	0.26	37	31	27	12	1.7	38	0.21	0.21	0.46
	MS17HD4P6085	p	0.85	0.24	34	5.1	4.5						
	MS17HD4P6120	p	1.2	0.25	35	2.9	2.5						
39.8 mm (1.57 in.) 1 Stack	MS17HD2P6040	p	0.4	0.38	54	28	31	15	2.1	57	0.31	0.28	0.62
	MS17HD2P6085	p	0.85	0.38	54	6	6.7						
	MS17HD2P6130	p	1.3	0.38	54	2.5	2.8						
48.3 mm (1.9 in.) 2 Stack	MS17HD6P6040	p	0.4	0.48	68	29	33	25	3.5	82	0.45	0.36	0.79
	MS17HD6P6080	p	0.8	0.49	69	7.6	8.6						
	MS17HD6P6130	p	1.3	0.51	72	3.2	3.6						
	MS17HD6P6200	p	2	0.50	71	1.3	1.4						

^ Preferred model

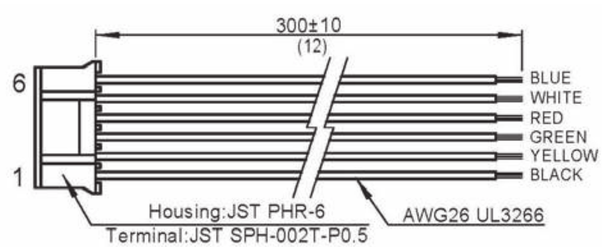
Mating Connector With Leads (order separately)

Dimensions: mm (in)

4 Lead Part Number 4634 1402 00723

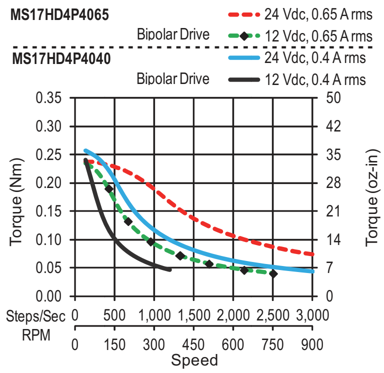


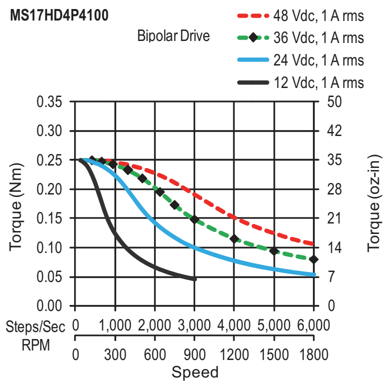
6 Lead Part Number 4634 1402 00922

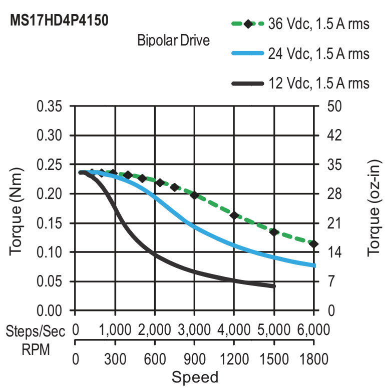


Dynamic Torque Curves

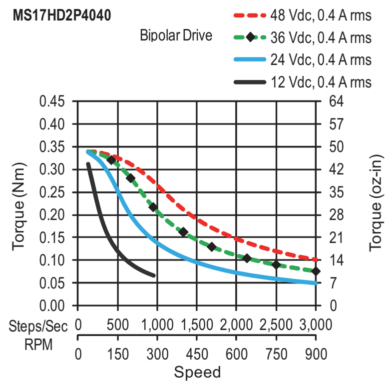
MS17HD4 - Bipolar

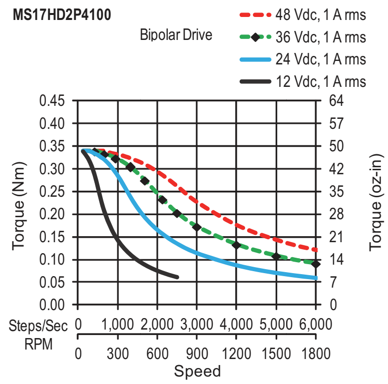


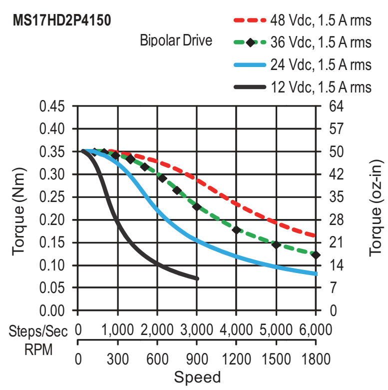


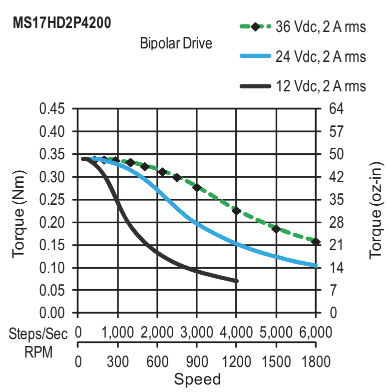


MS17HD2 - Bipolar

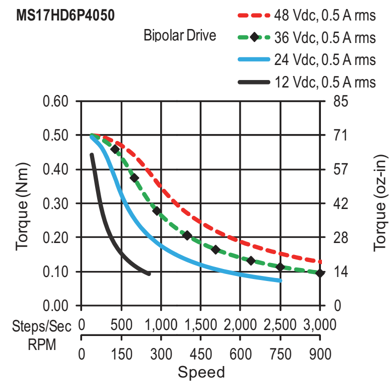


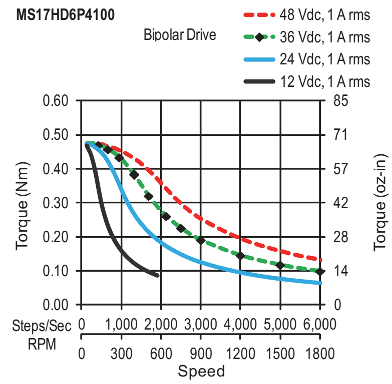


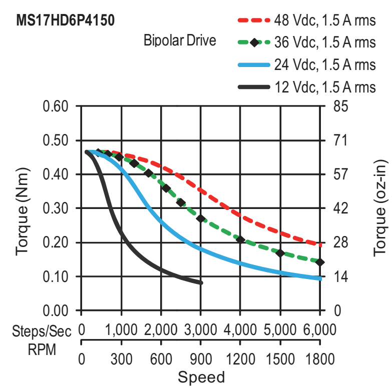


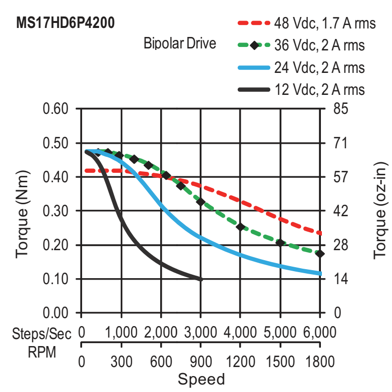


MS17HD6 - Bipolar







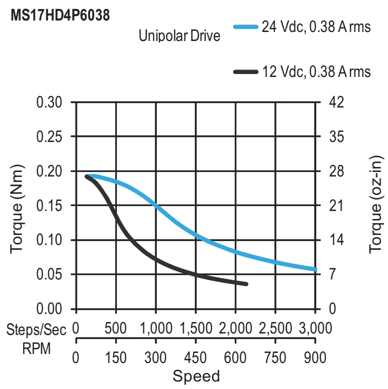


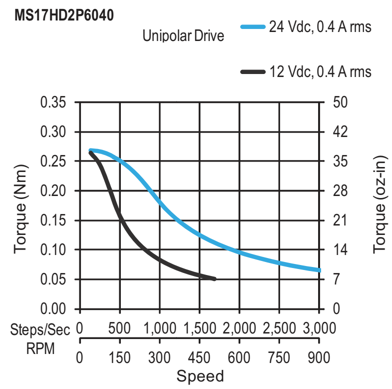
Dynamic Torque Curves

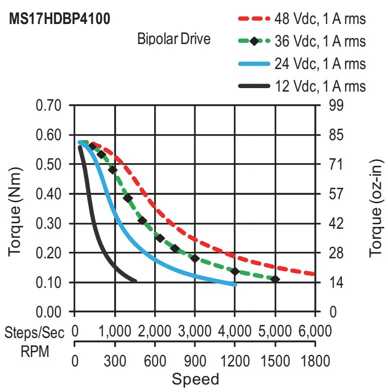
MS17HDB - Bipolar

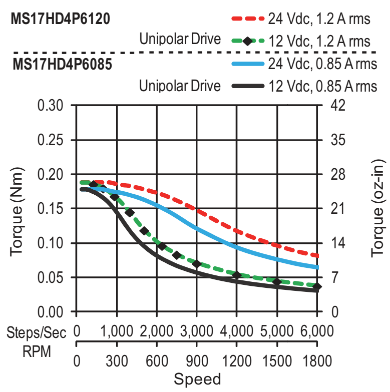
MS17HD4 - Unipolar

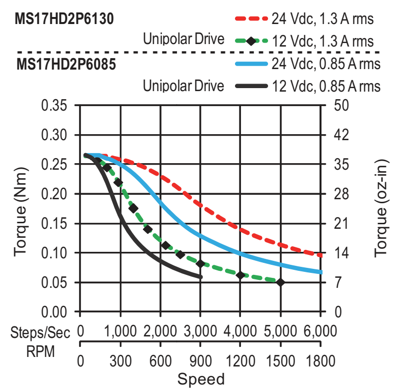
MS17HD2 - Unipolar

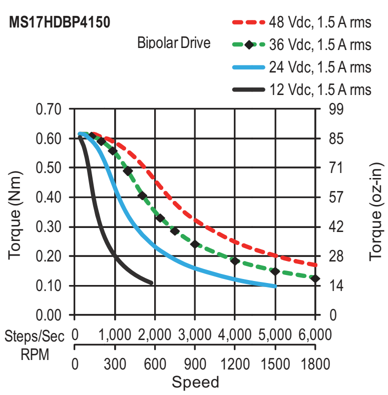




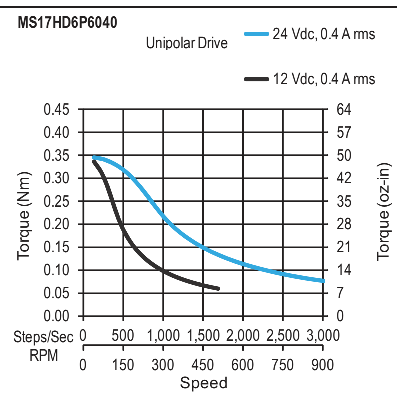


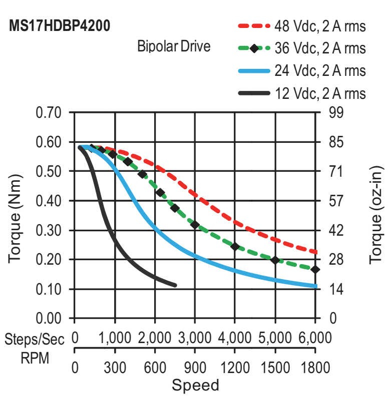


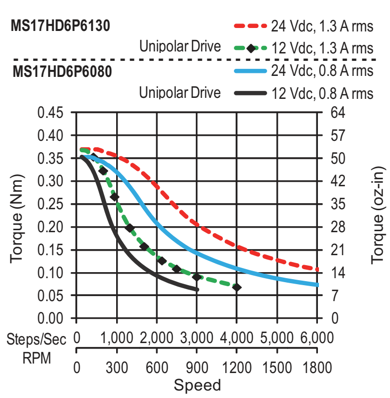


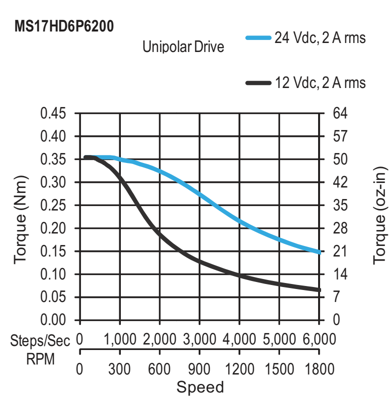


MS17HD6 - Unipolar









ML23HS / PL23HS Series:1.8° - Size 23

• Phases	2
• Steps / Revolution	200
• Step Accuracy	±5%
• Shaft Load (20,000 Hours at 1000 RPM)	
• Axial	40 N (9 Lbs.) Push
•	130 N (30 Lbs.) Pull
• Radial	70 N (15.5 Lbs.) At Flat Center
• IP Rating	40
• Approvals	RoHS
• Operating Temp.	-20°C to +40°C
• Insulation Class B,	130°C
• Insulation Resistance	100 MegOhms

M L23HS 0 P 4 100 -E

Motor Technology

M	High Torque Step Motor
P	**PowerPlus** Step Motor

Basic Motor Length (Max)

0	39 mm (1.54")
8	55 mm (2.17")
A	77 mm (3.03")

Electrical Connection

L	Leads
P	Plug-In Connector

Number of Connections

4	4 Lead - Bipolar
6	6 Lead - Unipolar (or Bipolar)
8	8 Lead - Connect as Needed

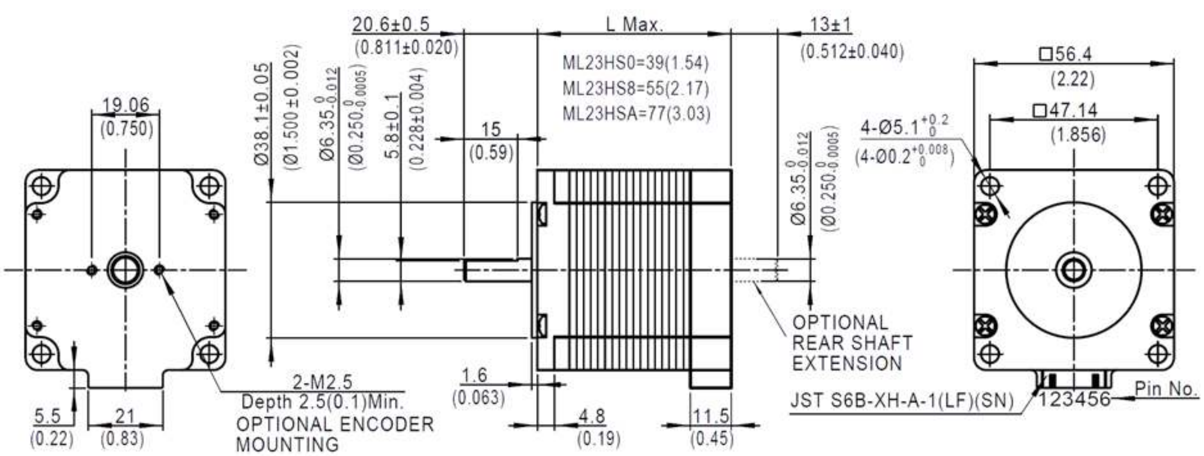
Winding

###	Current rating x 100

Options

Omit	No Options
-E	0.25 inch diameter rear shaft with encoder mounting holes

Dimensions: mm (in)



Motors with leads:Lead wire is 22 AWG UL3266, 300 ± 10 (12 ± .5) long

ML23HS - 4 Lead Bi-Polar

	Model Number	Connect	Mounted: Rated Current	Mounted: Holding Torque		Winding: Ohms	Winding: mH	Detent Torque		Rotor Inertia		Motor Weight	
Length	Single Shaft	P=Plug L=Leads	Amps	Nm Typ.	oz-in Typ.	±10% @20℃	Typ.	mNm	oz-in	g cm2	oz-in2	kg	Lbs
39 mm (1.54 in.) Short	^ ML23HS0P4100	p	1	0.82	120	6.3	15.9	28	4	120	0.66	0.42	0.93
	^ ML23HS0P4160	p	1.6	0.83	120	2.6	6.5						
	^ ML23HS0P4220	p	2.2	0.84	120	1.39	3.5						
	^ ML23HS0L4350	L	3.5	0.82	120	0.56	1.3						
55 mm (2.17 in.) 1 Stack	^ ML23HS8P4100	p	1	1.50	210	7.6	33	45	6.4	220	1.2	0.6	1.3
	^ ML23HS8P4150	p	1.5	1.50	210	3.1	13.6						
	^ ML23HS8P4220	p	2.2	1.50	210	1.6	6.9						
	^ ML23HS8L4360	L	3.6	1.50	210	0.63	2.6						
	^ ML23HS8L4550	L	5.5	1.50	210	0.28	1.03						
77 mm (3.03 in.) 2 Stack	^ ML23HSAP4100	p	1	2.30	330	8.8	39	75	11	390	2.1	1	2.2
	^ ML23HSAP4150	p	1.5	2.30	330	4.3	18.5						
	^ ML23HSAP4200	p	2	2.30	330	2.3	9.8						
	^ ML23HSAP4300	p	3	2.30	330	1.1	4.5						
	^ ML23HSAL4500	L	5	2.30	330	0.39	1.53						

^ Preferred model

PL23HS - PowerPlus - 4 Lead Bi-Polar

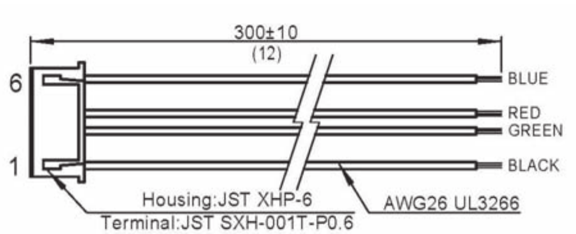
	Model Number	Connect	Mounted: Rated Current	Mounted: Holding Torque		Winding: Ohms	Winding: mH	Detent Torque		Rotor Inertia		Motor Weight	
Length	Single Shaft	P=Plug L=Leads	Amps	Nm Typ.	oz-in Typ.	±10% @20℃	Typ.	mNm	oz-in	g cm2	oz-in2	kg	Lbs
55 mm (2.17 in.) 1 Stack	^ PL23HS8P4100	p	1	2.30	330	7.6	26	100	14	220	1.2	0.65	1.4
	^ PL23HS8P4150	p	1.5	2.20	310	3.1	10.7						
	^ PL23HS8P4220	p	2.2	2.30	330	1.6	5.4						
	^ PL23HS8L4360	L	3.6	2.30	330	0.63	2						
	^ PL23HS8L4550	L	5.5	2.20	310	0.28	0.8						
77 mm (3.03 in.) 2 Stack	^ PL23HSAP4100	p	1	3.30	470	8.8	32	150	21	390	2.1	1.1	2.4
	^ PL23HSAP4150	p	1.5	3.40	480	4.3	15.2						
	^ PL23HSAP4200	p	2	3.30	470	2.3	8.1						
	^ PL23HSAP4300	P	3	3.30	470	1.1	3.7						
	^ PL23HSAL4500	L	5	3.30	470	0.39	1.27						

^ Preferred model

Mating Connector With Leads (order separately)

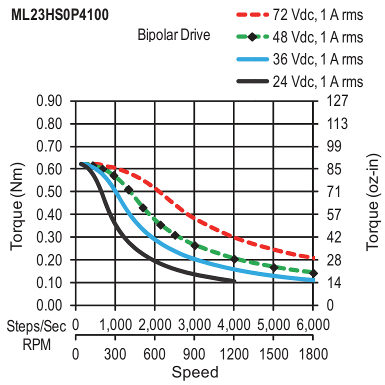
Dimensions: mm (in)

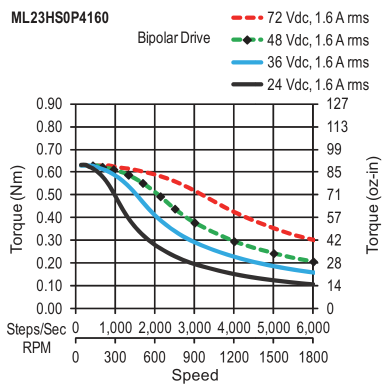
4 Lead Part Number 4634 1402 01891

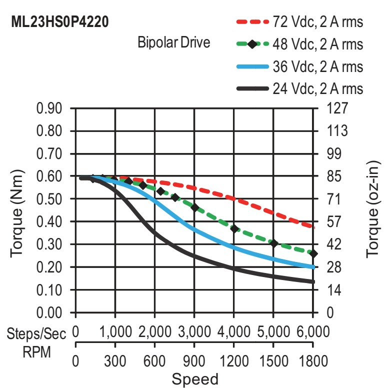


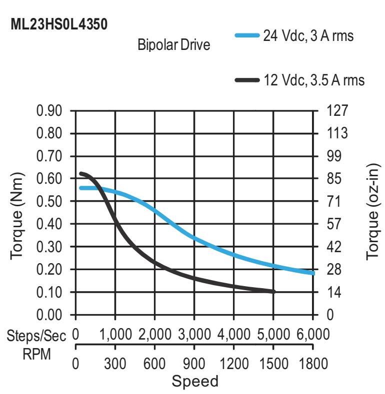
Dynamic Torque Curves

ML23HS0 - Bipolar

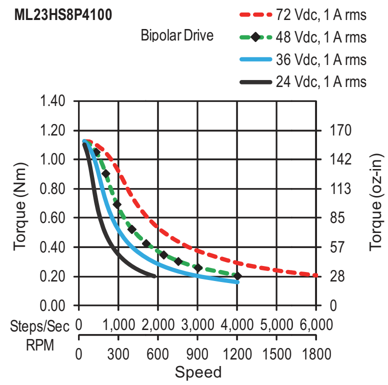


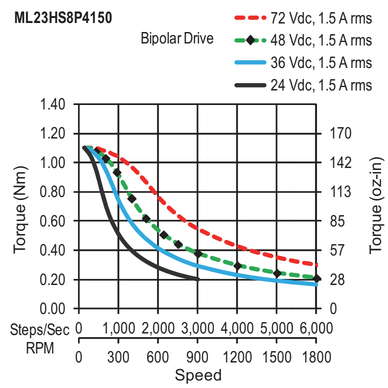


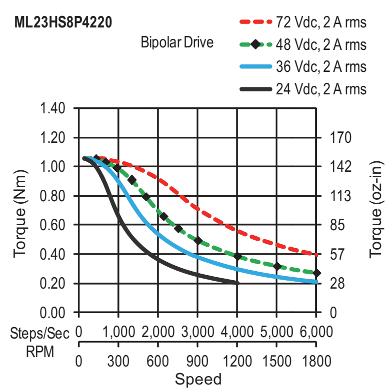


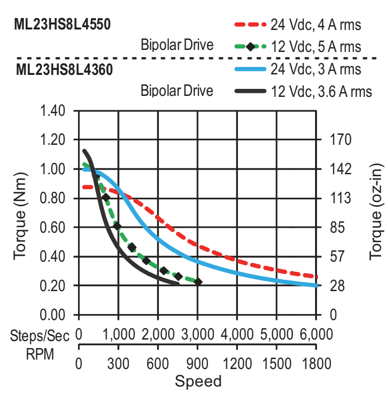


ML23HS8 - Bipolar

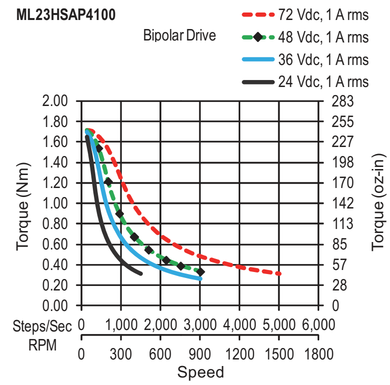


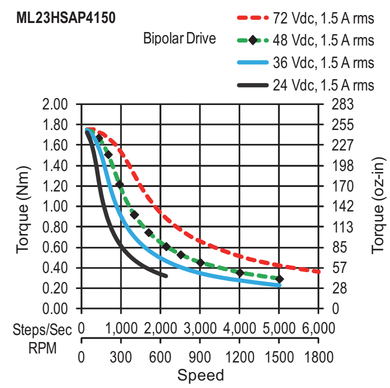


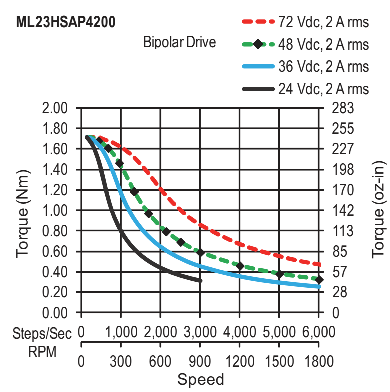


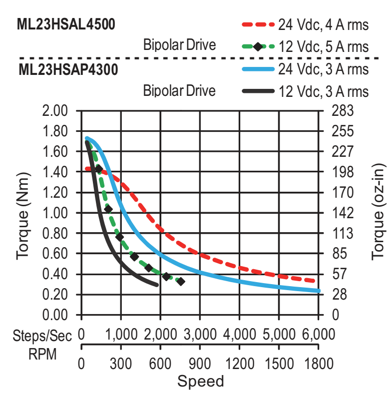


ML23HSA - Bipolar



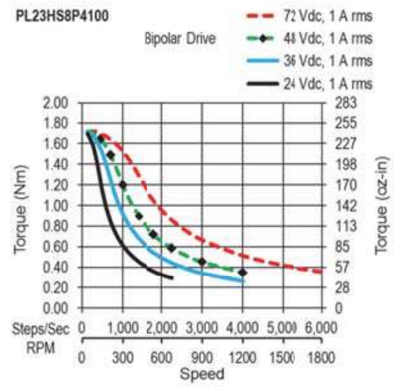


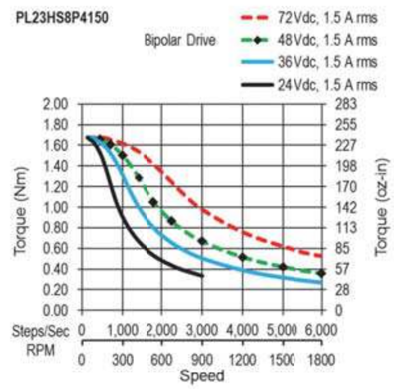


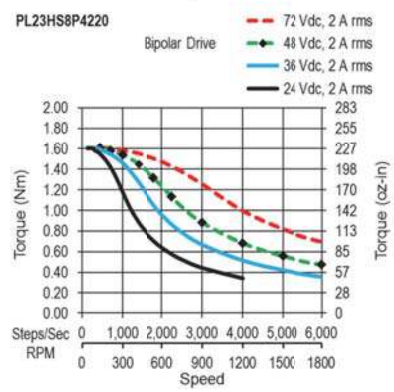


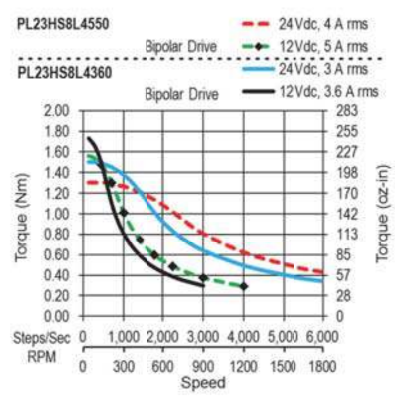
Dynamic Torque Curves

PowerPlus PL23HS8 - Bipolar

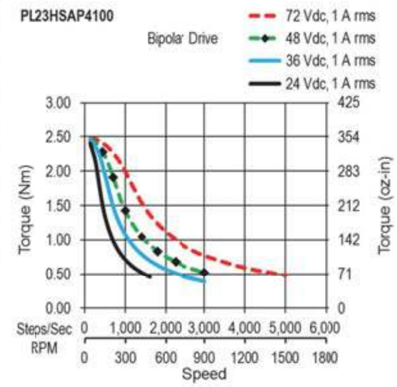


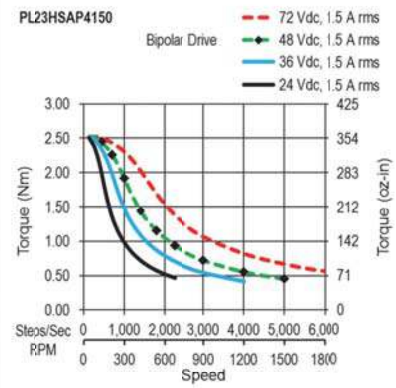


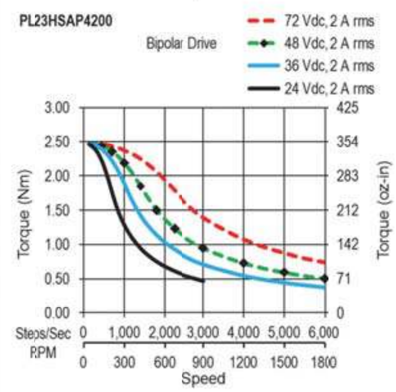


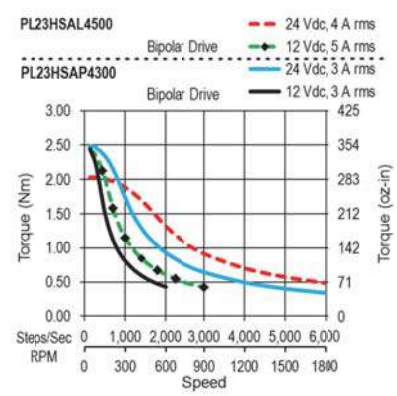


PowerPlus PL23HSA - Bipolar



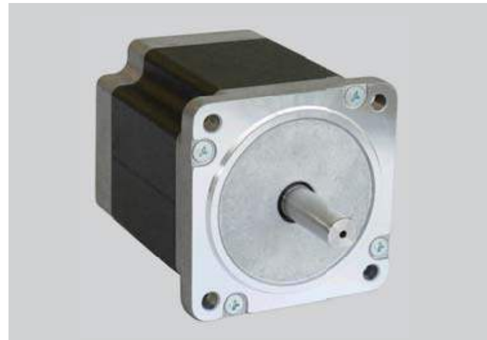






ML34HD / PL34HD Series:1.8° - Size 34

- Phases 2
- Steps / Revolution 200
- Step Accuracy ±5%
- Shaft Load (20,000 Hours at 1000 RPM)
- Axial 65 N (15 Lbs.) Push
- 155 N (35 Lbs.) Pull
- Radial 220 N (50 Lbs.) At Flat Center
- IP Rating 40
- Approvals RoHS
- Operating Temp. -20°C to +40°C
- Insulation Class B, 130°C
- Insulation Resistance 100 MegOhms



M L34HD 0 L 8 350 -E

Motor Technology

M	High Torque Step Motor
P	**PowerPlus** Step Motor

Basic Motor Length (Max)

0	67 mm (2.64")	1 Stack
1	97 mm (3.82")	2 Stack
2	126 mm (4.96")	3 Stack

Electrical Connection

L	Leads

Option

Omit	No Options
-E	0.375 inch diameter rear shaft with encoder mounting holes

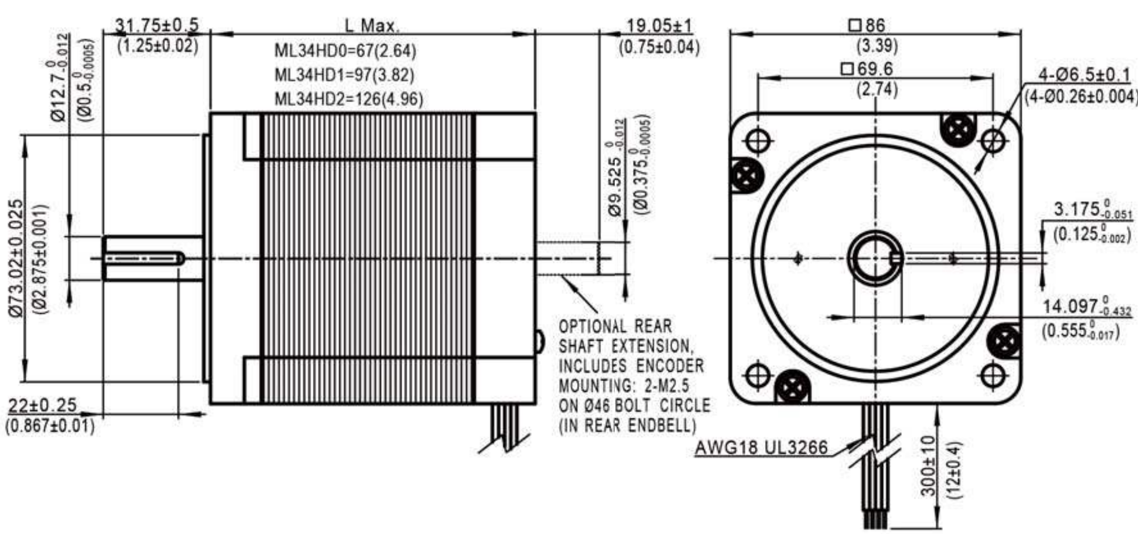
Winding

###	Current rating x 100
X##	for 11 to 19 amps: X10= 11 amps, X40 = 14 amps

Number of Connections

4	4 Lead - Bipolar
8	8 Lead - Connect as Needed

Dimensions: mm (in)



ML34HD - 4 Lead & 8 Lead

		Model Number	Connect	Mounted: Rated Current	Mounted: Holding Torque		Winding: Ohms	Winding: mH	Detent Torque		Rotor Inertia		Motor Weight	
	Length	Single Shaft	P=Plug L=Leads	Amps	Nm Typ.	oz-in Typ.	±10% @20℃	Typ.	mNm	oz-in	g cm2	oz-in2	kg	Lbs
4 Lead	67 mm (2.64 in.) 1 Stack	^ ML34HD0L4160	L	1.6	3.7	520	3.9	42	90	13	950	5.2	1.6	3.5
		ML34HD0L4350	L	3.5	3.8	540	0.95	9.5						
		ML34HD0L4500	L	5	3.8	540	0.48	4.5						
		ML34HD0L4700	L	7	3.8	540	0.26	2.4						
		ML34HD0L4X00	L	10	3.8	540	0.138	1.13						
	97 mm (3.82 in.) 2 Stack	^ ML34HD1L4200	L	2	7.2	1000	3.6	50	150	21	1600	8.8	2.7	6
		ML34HD1L4350	L	3.5	7.2	1000	1.34	15.9						
		ML34HD1L4500	L	5	7.2	1000	0.61	8						
		ML34HD1L4700	L	7	7.2	1000	0.36	4						
		ML34HD1L4X00	L	10	7.2	1000	0.188	2						
	126 mm (4.96 in.) 3 Stack	^ ML34HD2L4200	L	2	10.0	1400	4.1	63	200	28	2350	13	3.8	8.4
		ML34HD2L4350	L	3.5	10.0	1400	1.44	20						
		ML34HD2L4500	L	5	10.0	1400	0.72	9.4						
		ML34HD2L4700	L	7	10.0	1400	0.38	5						
		ML34HD2L4X00	L	10	10.0	1400	0.22	2.3						
8 Lead	67 mm (2.64 in.) 1 Stack	^ ML34HD0L8350	L-Series	3.5	3.8	540	0.98	9.5	90	13	950	5.2	1.6	3.5
			L-Parallel	7	3.8	540	0.25	2.4						
		^ ML34HD0L8500	L-Series	5	3.8	540	0.5	4.5						
			L-Parallel	10	3.8	540	0.126	1.13						
	97 mm (3.82 in.) 2 Stack	^ ML34HD1L8350	L-Series	3.5	7.2	1000	1.37	15.9	150	21	1600	8.8	2.7	6
			L-Parallel	7	7.2	1000	0.34	4						
		^ ML34HD1L8500	L-Series	5	7.2	1000	0.71	8						
			L-Parallel	10	7.2	1000	0.177	2						
	126 mm (4.96 in.) 3 Stack	^ ML34HD2L8350	L-Series	3.5	10.0	1400	1.48	20	200	28	2350	13	3.8	8.4
			L-Parallel	7	10.0	1400	0.37	5						
		^ ML34HD2L8500	L-Series	5	10.0	1400	0.82	9.4						
			L-Parallel	10	10.0	1400	0.21	2.3						

^ Preferred model

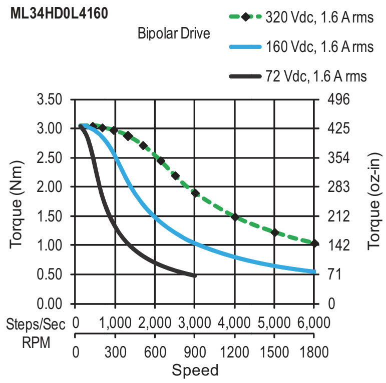
PL34HD - PowerPlus - 4 Lead & 8 Lead

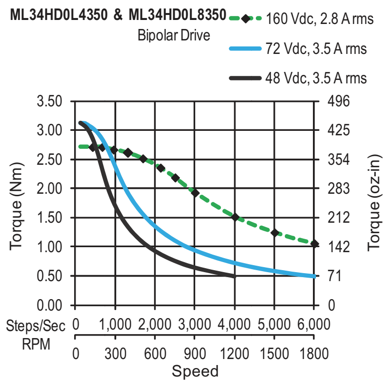
		Model Number	Connect	Mounted: Rated Current	Mounted: Holding Torque		Winding: Ohms	Winding: mH	Detent Torque		Rotor Inertia		Motor Weight	
	Length	Single Shaft	P=Plug L=Leads	Amps	Nm Typ.	oz-in Typ.	±10% @20℃	Typ.	mNm	oz-in	g cm2	oz-in2	kg	Lbs
4 Lead	67 mm (2.64 in.) 1 Stack	^ PL34HD0L4160	L	1.6	4.7	670	3.9	33	135	19	950	5.2	1.6	3.5
		PL34HD0L4350	L	3.5	4.8	670	0.95	7.6						
		PL34HD0L4500	L	5	4.8	670	0.48	3.6						
		PL34HD0L4700	L	7	4.8	670	0.26	1.89						
		PL34HD0L4X00	L	10	4.8	670	0.138	0.91						
	97 mm (3.82 in.) 2 Stack	^ PL34HD1L4200	L	2	9.0	1300	3.6	40	225	32	1600	8.8	2.7	6
		PL34HD1L4350	L	3.5	9.0	1300	1.34	12.8						
		PL34HD1L4500	L	5	9.0	1300	0.61	6.4						
		PL34HD1L4700	L	7	9.0	1300	0.36	3.2						
		PL34HD1L4X00	L	10	9.0	1300	0.188	1.6						
	126 mm (4.96 in.) 3 Stack	^ PL34HD2L4200	L	2	12.7	1800	4.1	51	300	42	2350	13	3.8	8.4
		PL34HD2L4350	L	3.5	12.3	1700	1.44	16.1						
		PL34HD2L4500	L	5	12.3	1700	0.72	7.5						
		PL34HD2L4700	L	7	12.3	1700	0.38	4						
		PL34HD2L4X00	L	10	12.3	1700	0.22	1.87						
8 Lead	67 mm (2.64 in.) 1 Stack	^ PL34HD0L8350	L-Series	3.5	4.8	670	0.98	7.6	135	19	950	5.2	1.6	3.5
			L-Parallel	7	4.8	670	0.25	1.89						
		^ PL34HD0L8500	L-Series	5	4.8	670	0.5	3.6						
			L-Parallel	10	4.8	670	0.126	0.91						
	97 mm (3.82 in.) 2 Stack	^ PL34HD1L8350	L-Series	3.5	9.0	1300	1.37	12.8	225	32	1600	8.8	2.7	6
			L-Parallel	7	9.0	1300	0.34	3.2						
		^ PL34HD1L8500	L-Series	5	9.0	1300	0.71	6.4						
			L-Parallel	10	9.0	1300	0.177	1.6						
	126 mm (4.96 in.) 3 Stack	^ PL34HD2L8350	L-Series	3.5	12.3	1700	1.48	16.1	300	42	2350	13	3.8	8.4
			L-Parallel	7	12.3	1700	0.37	4						
		^ PL34HD2L8500	L-Series	5	12.3	1700	0.82	7.5						
			L-Parallel	10	12.3	1700	0.21	1.87						

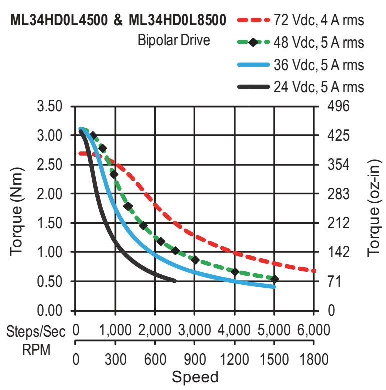
^ Preferred model

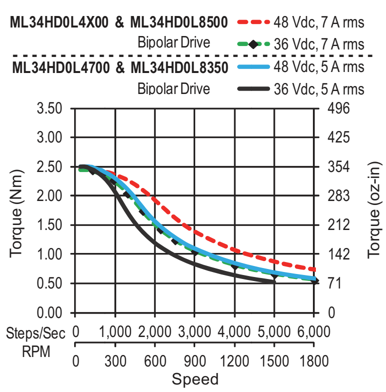
Dynamic Torque Curves

ML34HD0

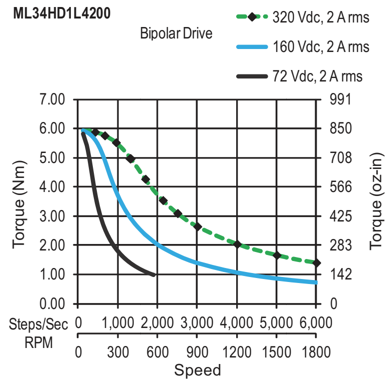


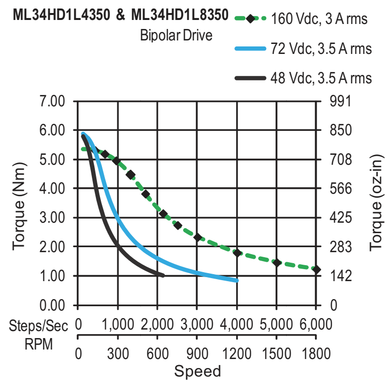


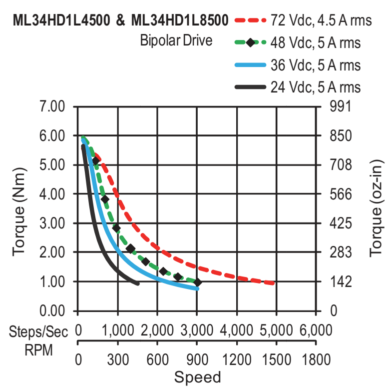


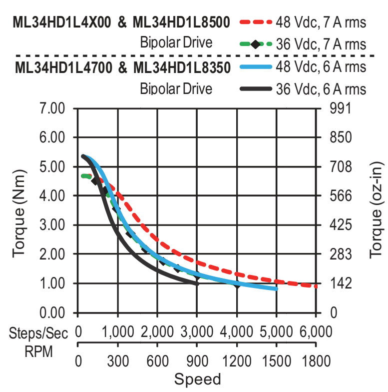


ML34HD1

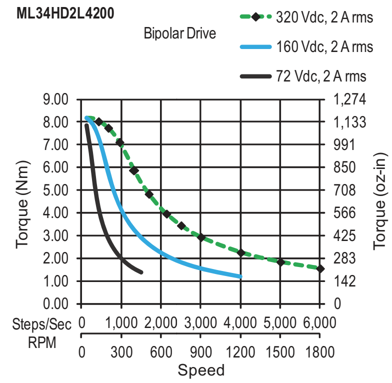


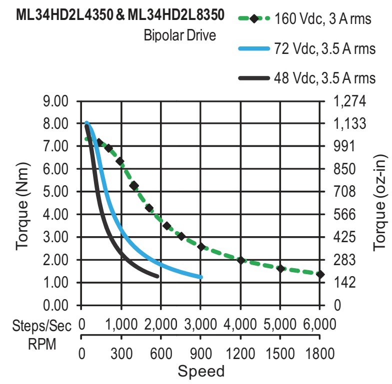


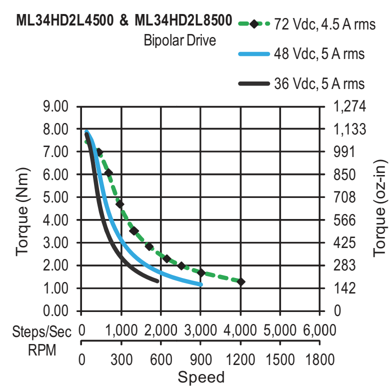


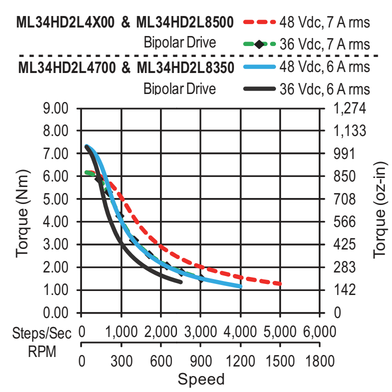


ML34HD2



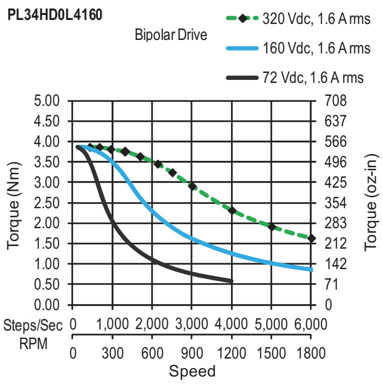


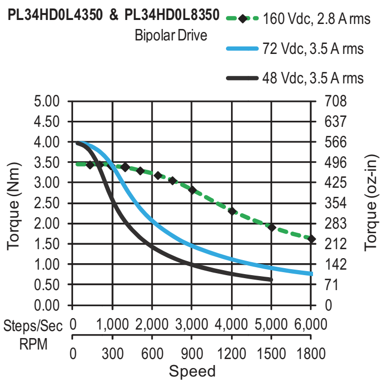


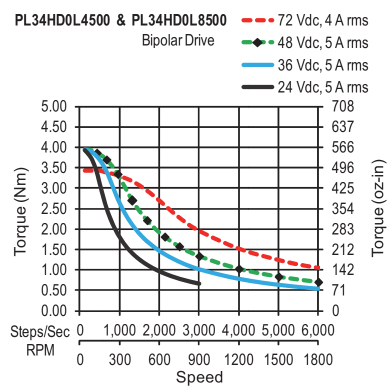


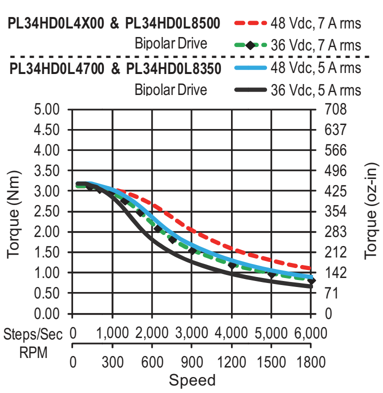
Dynamic Torque Curves

PowerPlus PL34HD0

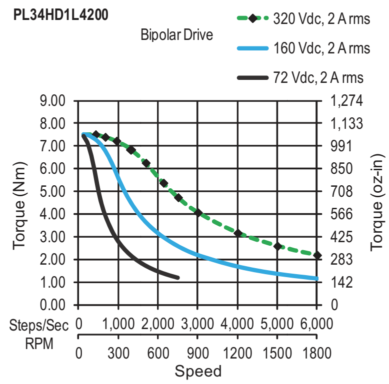


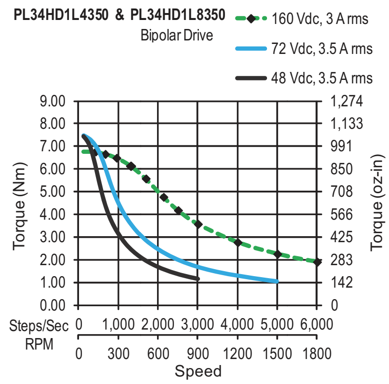


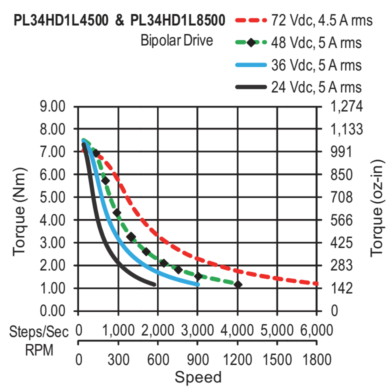


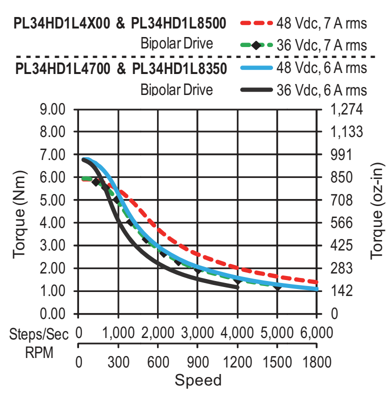


PowerPlus PL34HD1

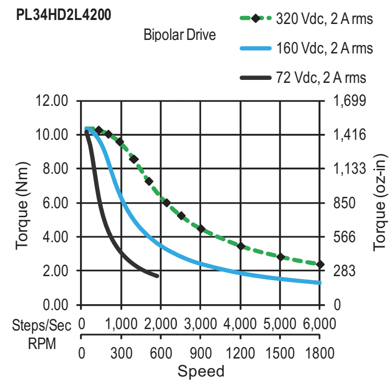


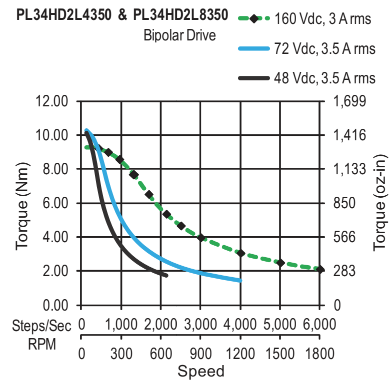


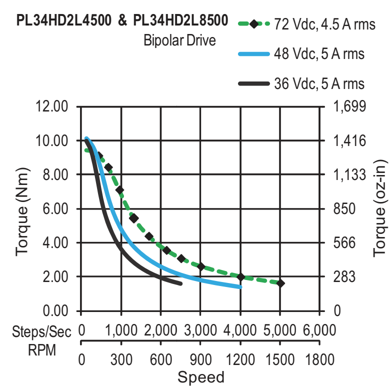


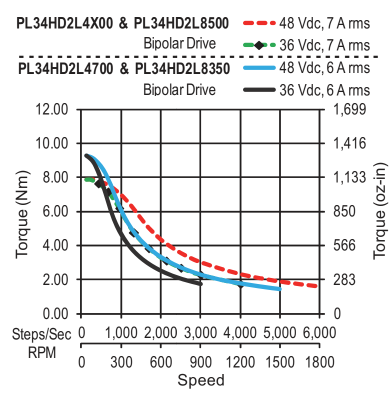


PowerPlus PL34HD2









ML42HS / PL42HS Series:1.8° - Size 42

- Phases 2
- Steps / Revolution 200
- Step Accuracy ±5%
- Shaft Load (20,000 Hours at 1000 RPM)
- Axial 550 N (125 Lbs.) Push & Pull
- Radial 450 N (100 Lbs.) At Keyway Center
- IP Rating 40
- Approvals RoHS
- Operating Temp. -20°C to +40°C
- Insulation Class B, 130°C
- Insulation Resistance 100 MegOhms

M L42HS 0 L 8 350

Motor Technology

M	High Torque Step Motor
P	**PowerPlus** Step Motor

Basic Motor Length (Max)

0	100 mm (3.94")
2	151 mm (5.95")
3	202 mm (7.95")

Electrical Connection

L	Leads

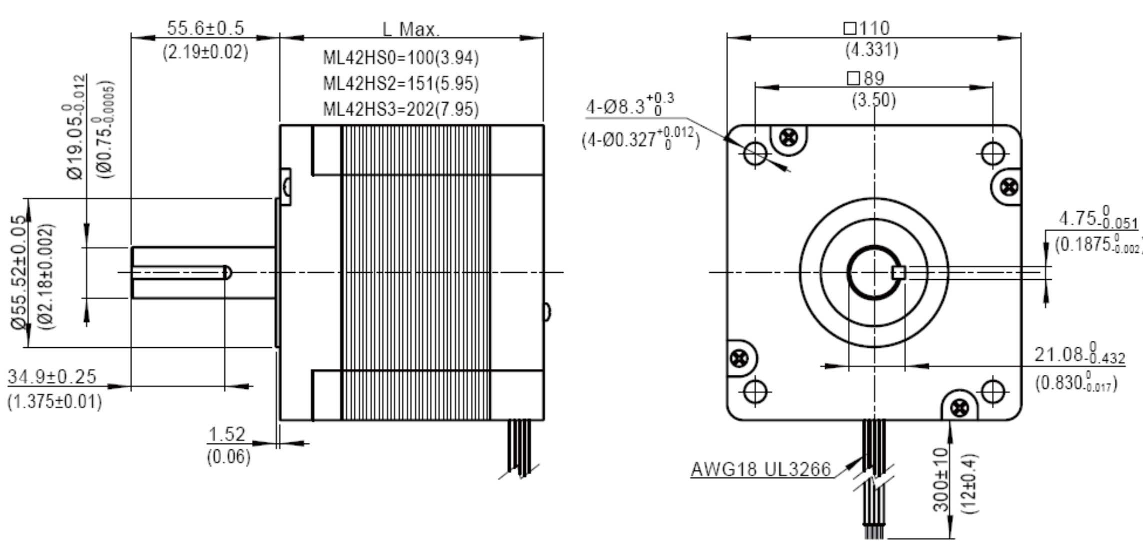
Number of Connections

4	4 Lead - Bipolar
8	8 Lead - Connect as Needed

Winding

###	Current rating x 100
X##	for 11 to 19 amps: X10= 11 amps, X40 = 14 amps

Dimensions: mm (in)



ML42HD - 4 Lead & 8 Lead

	Length	Model Number	Connect	Mounted: Rated Current	Mounted: Holding Torque		Winding		Detent Torque		Rotor Inertia		Motor Weight	
		Single Shaft	P=Plug L=Leads	Amps	Nm Typ.	oz-in Typ.	Ohms ±10% @20℃	mH Typ.	mNm	oz-in	g cm2	oz-in2	kg	Lbs
4 Lead	100 mm (3.94 in.) 1 Stack	^ ML42HS0L4210	L	2.1	12	1700	4.1	78	300	42	5500	30	5	11
		^ ML42HS0L4420	L	4.2	12	1700	1.16	19.8						
		^ ML42HS0L4600	L	6	12	1700	0.61	10.1						
		^ ML42HS0L4840	L	8.4	12	1700	0.31	5						
		^ ML42HS2L4X20	L	12	12	1700	0.167	2.5						
	151 mm (5.94 in.) 2 Stack	^ ML42HS2L4240	L	2.4	22	3100	4.2	90	600	85	10900	60	8.3	18
		^ ML42HS2L4600	L	6	22	3100	0.75	14.5						
		^ ML42HS2L4800	L	8	22	3100	0.41	8.5						
		^ ML42HS2L4X20	L	12	22	3100	0.177	3.6						
		^ ML42HS2L4X60	L	16	22	3100	0.116	2.1						
	202 mm (7.95 in.) 3 Stack	^ ML42HS3L4270	L	2.7	31	4400	4.2	100	800	110	16200	89	11.6	26
		^ ML42HS3L4600	L	6	31	4400	1.02	22						
		^ ML42HS3L4800	L	8	32	4500	0.55	13						
		^ ML42HS3L4X20	L	12	31	4400	0.24	5.5						
		^ ML42HS3L4X60	L	16	32	4500	0.152	3.2						
8 Lead	100 mm (3.94 in.) 1 Stack	^ ML42HS0L8420	L-Series	4.2	12	1700	1.19	19.8	300	42	5500	30	5	11
			L-Parallel	8.4	12	1700	0.3	5						
		^ ML42HS0L8600	L-Series	6	12	1700	0.64	10.1						
			L-Parallel	12	12	1700	0.159	2.5						
	151 mm (5.94 in.) 2 Stack	^ ML42HS2L8600	L-Series	6	22	3100	0.68	14.5	600	85	10900	60	8.3	18
			L-Parallel	12	22	3100	0.17	3.6						
		^ ML42HS2L8800	L-Series	8	22	3100	0.43	8.5						
			L-Parallel	16	22	3100	0.108	2.1						
	202 mm (7.95 in.) 3 Stack	^ ML42HS3L8600	L-Series	6	31	4400	0.91	22	800	110	16200	89	11.6	26
			L-Parallel	12	31	4400	0.23	5.5						
		^ ML42HS3L8800	L-Series	8	32	4500	0.58	13						
			L-Parallel	16	32	4500	0.144	3.2						

^ Preferred model

PL42HS - PowerPlus - 4 Lead & 8 Lead

	Length	Model Number	Connect	Mounted: Rated Current	Mounted: Holding Torque		Winding		Detent Torque		Rotor Inertia		Motor Weight	
		Single Shaft	P=Plug L=Leads	Amps	Nm Typ.	oz-in Typ.	Ohms ±10% @20℃	mH Typ.	mNm	oz-in	g cm2	oz-in2	kg	Lbs
4 Lead	100 mm (3.94 in.) 1 Stack	^ PL42HS0L4210	L	2.1	16	2300	4.1	60	450	64	5500	30	5	11
		^ PL42HS0L4420	L	4.2	16	2300	1.16	15.4						
		^ PL42HS0L4600	L	6	16	2300	0.61	7.8						
		^ PL42HS0L4840	L	8.4	16	2300	0.31	3.8						
		^ PL42HS0L4X20	L	12	16	2300	0.167	1.96						
	151 mm (5.94 in.) 2 Stack	^ PL42HS2L4240	L	2.4	28	4000	4.2	69	900	130	10900	60	8.3	18
		^ PL42HS2L4600	L	6	28	4000	0.75	11.1						
		^ PL42HS2L4800	L	8	29	4100	0.41	6.5						
		^ PL42HS2L4X20	L	12	28	4000	0.177	2.8						
		^ PL42HS2L4X60	L	16	29	4100	0.116	1.62						
	202 mm (7.95 in.) 3 Stack	^ PL42HS3L4270	L	2.7	40	5700	4.2	77	1200	170	16200	89	11.6	26
		^ PL42HS3L4600	L	6	41	5800	1.02	17.1						
		^ PL42HS3L4800	L	8	42	5900	0.55	10						
		^ PL42HS3L4X20	L	12	41	5800	0.24	4.3						
		^ PL42HS3L4X60	L	16	42	5900	0.152	2.5						
8 Lead	100 mm (3.94 in.) 1 Stack	^ PL42HS0L8420	L-Series	4.2	16	2300	1.19	15.4	450	64	5500	30	5	11
			L-Parallel	8.4	16	2300	0.3	3.8						
		^ PL42HS0L8600	L-Series	6	16	2300	0.64	7.8						
			L-Parallel	12	16	2300	0.159	1.96						
	151 mm (5.94 in.) 2 Stack	^ PL42HS2L8600	L-Series	6	28	4000	0.68	11.1	900	130	10900	60	8.3	18
			L-Parallel	12	28	4000	0.17	2.8						
		^ PL42HS2L8800	L-Series	8	29	4100	0.43	6.5						
			L-Parallel	16	29	4100	0.108	1.62						
	202 mm (7.95 in.) 3 Stack	^ PL42HS3L8600	L-Series	6	41	5800	0.91	17.1	1200	170	16200	89	11.6	26
			L-Parallel	12	41	5800	0.23	4.3						
		^ PL42HS3L8800	L-Series	8	42	5900	0.58	10						
			L-Parallel	16	42	5900	0.144	2.5						

^ Preferred model

Construction
Model Numbers
Options

MS17HD
1.8°
Size 17

ML23HS
/ PL23HS
1.8°
Size 23

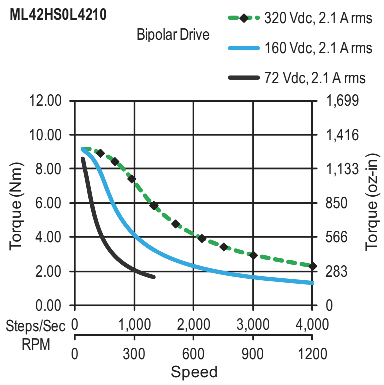
ML34HD
/ PL34HD
1.8°
Size 34

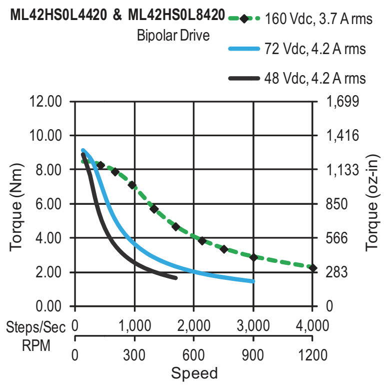
ML42HS
/ PL42HS
1.8°
Size 42

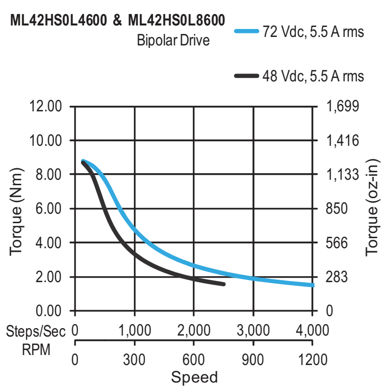
Technical
& Conversion
Charts

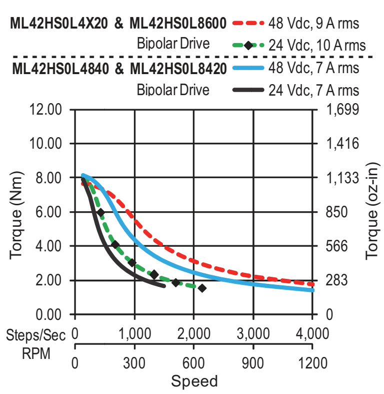
Dynamic Torque Curves

ML42HS0









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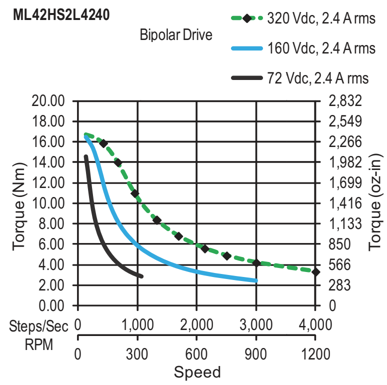
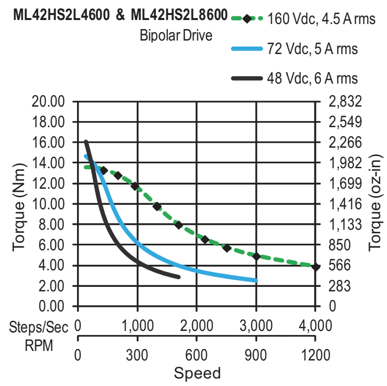
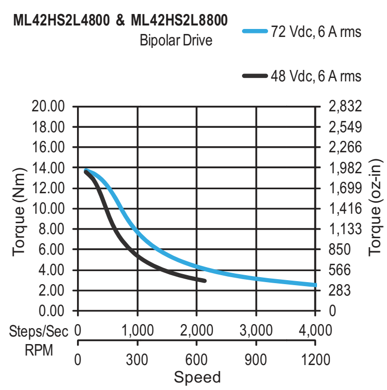
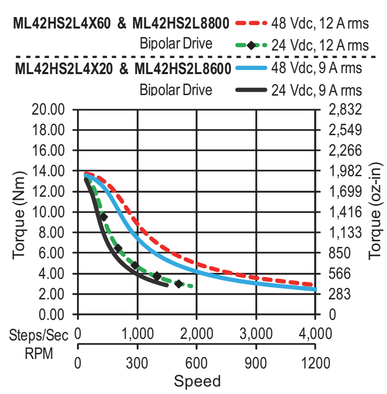
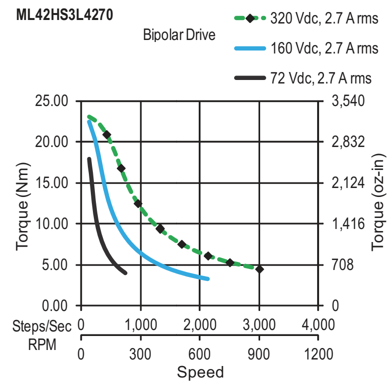


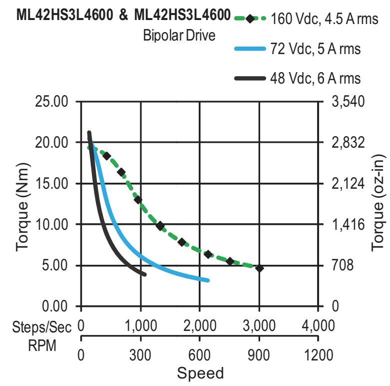


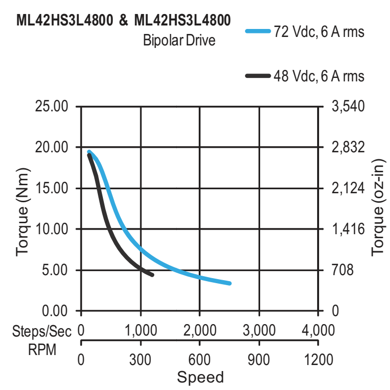


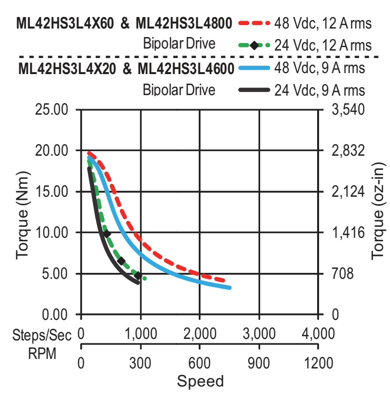


ML42HS3



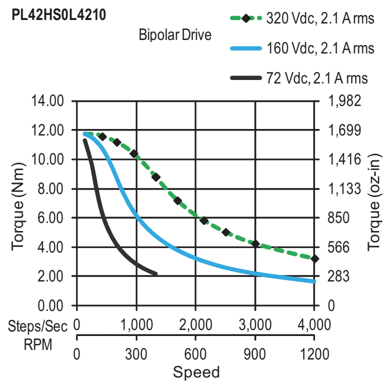


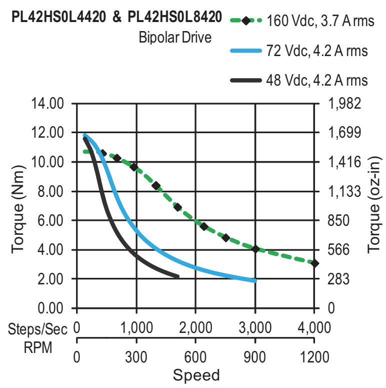


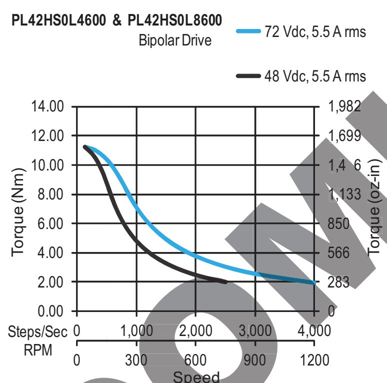


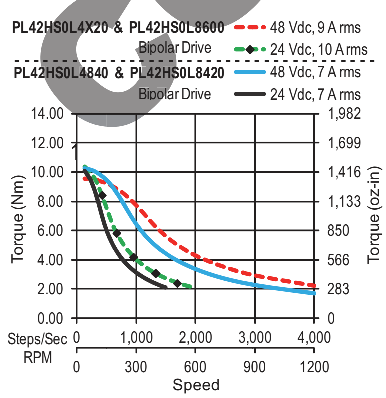
Dynamic Torque Curves

PowerPlus PL42HS0

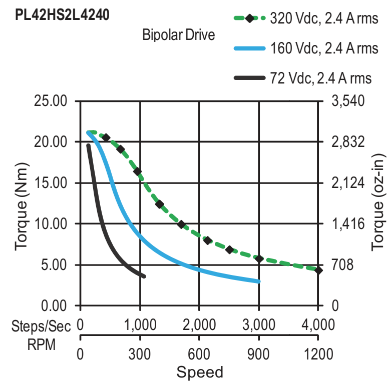


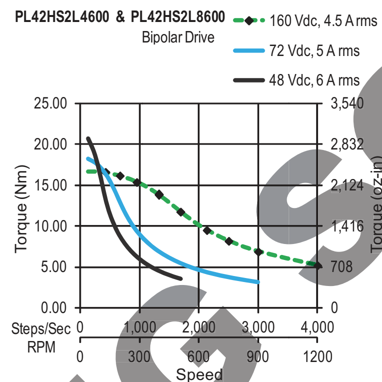


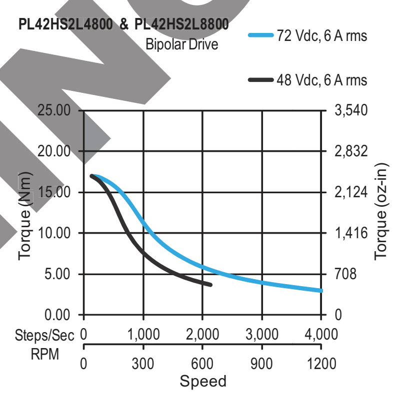


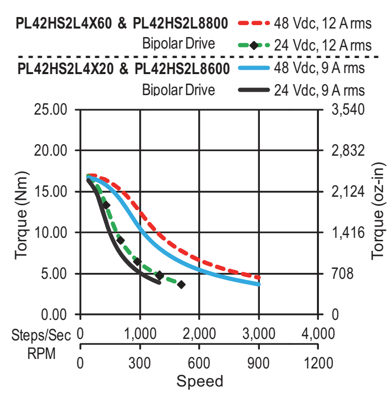


PowerPlus PL42HS2









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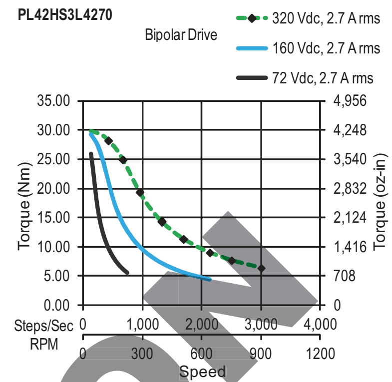
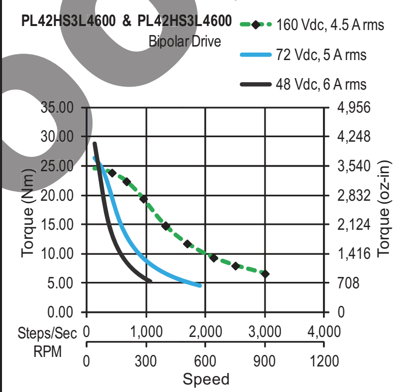
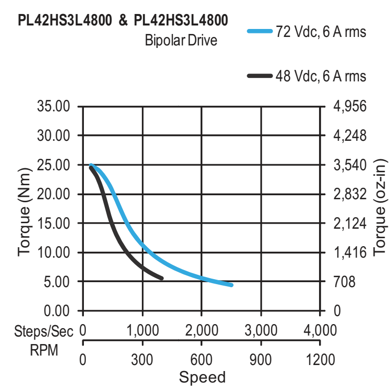
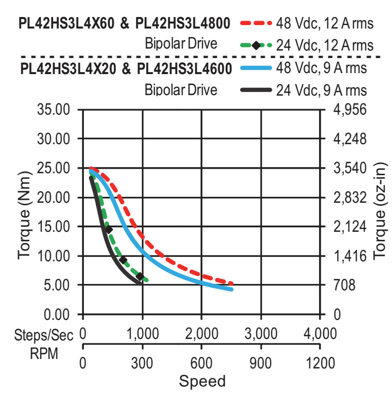








Technical Information

Step Sequence

Bipolar, Full step

CW ↓ / CCW ↑

STEP	Phase 1 A	Phase 1 C	Phase 2 B	Phase 2 D
1	+	−	+	−
2	−	+	+	−
3	−	+	−	+
4	+	−	−	+

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

Unipolar, Full step

CW ↓ / CCW ↑

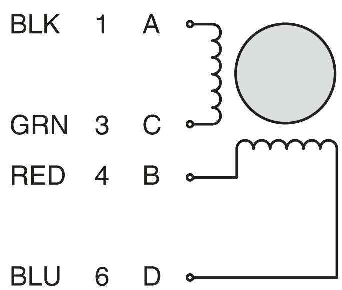
STEP	Phase 1 A	Phase 1 O	Phase 1 C	Phase 2 B	Phase 2 M	Phase 2 D
1	−	+		−	+	
2		+	−	−	+	
3		+	−		+	−
4	−	+			+	−

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

Schematic Diagrams

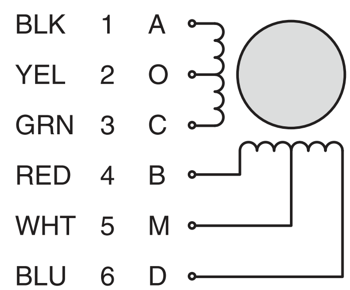
-------- 4 Lead（Bipolar）--------

Lead Connector
Color Pin #

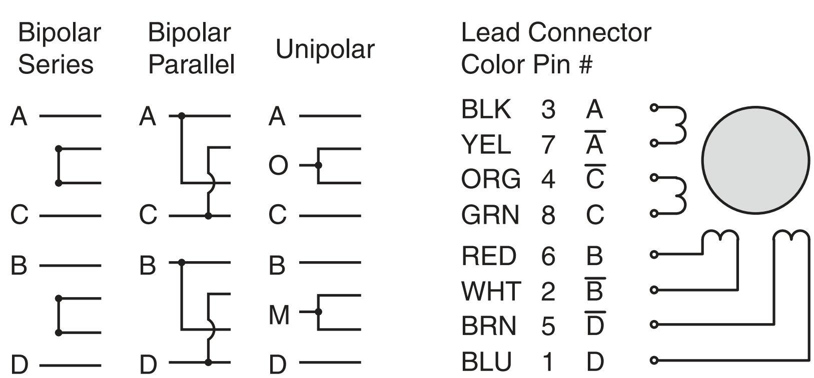


-------- 6 Lead（Unipolar）--------

Lead Connector
Color Pin #



---------------- 8 Lead ----------------



Conversion Factors

Length

A \ B	mm	cm	m	inch	feet
mm	=====	0.1	0.001	0.03937	0.003281
cm	10	=====	0.01	0.3937	0.03281
m	1000	100	=====	39.37	3.281
inch	25.4	2.54	0.0254	=====	0.08333
feet	304.8	30.48	0.3048	12	=====

Multiply "A" units by conversion factor to obtain "B" units

Force

A \ B	g	kgf	oz	lb	Newton
g	=====	0.001	0.03527	0.002205	0.0098
kgf	1000	=====	35.27	2.205	9.807
oz	28.35	0.02835	=====	0.0625	0.278
lb	453.6	0.4536	16	=====	4.448
Newton	102	0.102	3.597	0.2248	=====

Torque

	Nm	Ncm	mNm	kgm*	kgcm*	gcm*	oz-in	lb-ft	lb-in
Nm	=====	100	1000	0.102	10.2	10200	141.6	0.7376	8.851
Ncm	0.01	=====	10	0.00102	0.102	102	1.416	0.007376	0.08851
mNm	0.001	0.1	=====	0.000102	0.0102	10.2	0.1416	0.000738	0.008851
kgm*	9.807	980.7	9807	=====	100	100000	1389	7.233	86.8
kgcm*	0.09807	9.807	98.07	0.01	=====	1000	13.89	0.07233	0.868
gcm*	9.81E-05	0.009807	0.09807	0.00001	0.001	=====	0.01389	7.23E-05	0.000868
oz-in	0.007062	0.7062	7.062	0.00072	0.07201	72.01	=====	0.00521	0.0625
lb-ft	1.356	135.6	1356	0.1383	13.83	13830	192	=====	12
lb-in	0.113	11.3	113	0.01152	1.152	1152	16	0.0833	=====

Inertia

	kgm²	kgcm²	gcm²	oz-in²	oz-in-sec²	lb-in²	lb-in-sec²	lb-ft²	lb-ft-sec² (slug ft²)
kgm²	=====	10000	10000000	54700	142	3420	8.85	23.7	0.738
kgcm²	0.00001	=====	1000	5.47	0.0142	0.342	0.000885	0.00237	7.38E-05
gcm²	1E-07	0.001	=====	0.00547	1.42E-05	0.000342	8.85E-07	2.37E-06	7.38E-08
oz-in²	1.83E-05	0.1829	183	=====	0.00259	0.0625	0.000162	0.000434	1.35E-05
oz-in-sec²	0.00706	70.62	70600	386	=====	24.1	0.0625	0.168	0.00521
lb-in²	0.000293	2.926	2930	16	0.0414	=====	0.00259	0.00694	0.000216
lb-in-sec²	0.113	1130	1130000	6180	1.6	386	=====	2.68	0.0833
lb-ft²	0.0421	421.4	421000	2300	5.97	144	0.373	=====	0.0318
lb-ft-sec² (slug ft²)	1.36	13600	13600000	74100	192	4630	12	32.2	=====

MOONS' Industries was founded in 1994 and has grown to become one of the largest manufactures of step motors in the world. MOONS' growth has been driven by our founding principles of "world class" quality, outstanding value, and customer support.

In addition to hybrid step motors, MOONS' also designs and manufactures:

- **PM Step Motors**
- **Servo Motors**
- **Brushless DC Motors**
- **Motor Drives**
- **Wire Harnesses**
- **Industrial Controls**

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