Model	Matching Drivers
35HS01	M422
39HS02	M422
42HS03	M422
57HS09	M542
57HS13	M542
57HS22	M542
86HS35	MA860H/M880A/M542
86HS45	MA860H/M880A
86HS85	MA860H/M880A
86HS120	MA860H/M880A
110HS12	DM1182/DM2282
110HS20	DM1182/DM2282
110HS28	DM1182/DM2282
130HS27	DM1182/DM2282
130HS33	DM1182/DM2282
130HS40	DM1182/DM2282
130HS45	DM1182/DM2282
573S09	3DM580/3DM683
573S15	3DM580/3DM683
863S22	3DM683/3DM580
863S42	3DM683/3DM580
863S68H	3DM683/3DM580

42HS Series Hybrid Stepping Motors

General Specifications

Step Angle Degree	1.8°
Step Angle Accuracy	±5%(full step no load)
Temperature Rise	80°CMax
Amblent Temperature	-10°C —— +50°C
Insulatl on Reslstance	100MΩmln.500VDC
Dielectric Strength	500VAC for one mlnute
Shaft Radlal Play	0.06 Max.(450g-load)
Shaft Axlal Play	0.08 max.(450g-load)

Eleatrical Specifications

Model Number	Connection	Motor Length L inch (mm)	Holding Torque Oz-in (Nm)	Number of Leads	Phase Current (Amps)	Phase Resistance (Ohm)	Phase Inductance (mH)	Rotor Inertia Oz-in-sec²(g.cm²)	Detent Torque Oz-in (g.cm)	Weight Oz (kg)
42HS02		1.34 (40)	31.15 (0.22)	4	0.4	12.5±10%	21±20%	0.000809 (57)	2.21 (153)	8.47 (0.24)
42HS03	(Bipolar) Parallel	1.89 (48)	66.55 (0.47)	8	1.4	2.3±10%	4±20%	0.001164 (82)	2.83 (204)	11.99 (0.34)
	(Bipolar) Series		66.55 (0.47)		0.7	9.2±10%	16±20%			
	Unipolar		48.14 (0.34)		1.0	4.6±10%	4±20%			

* **Above motor is our typical model, and if you need a customization motor, please contact us.**
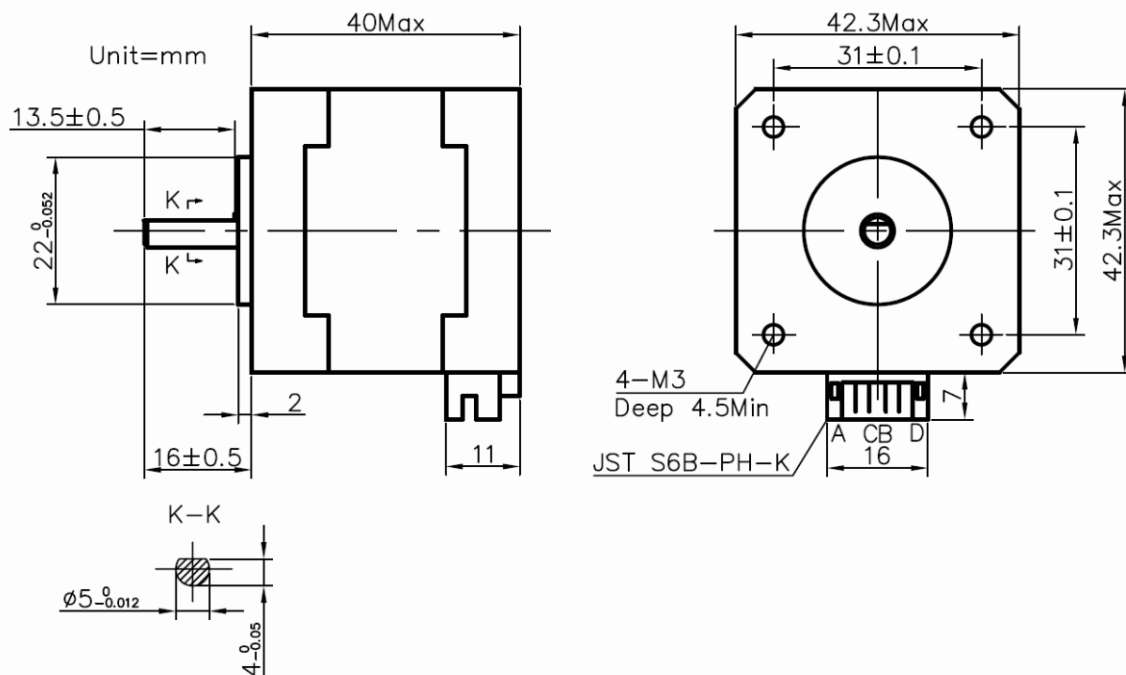
Mechanical Specifications (Unit=mm, 1inch=25.4mm)

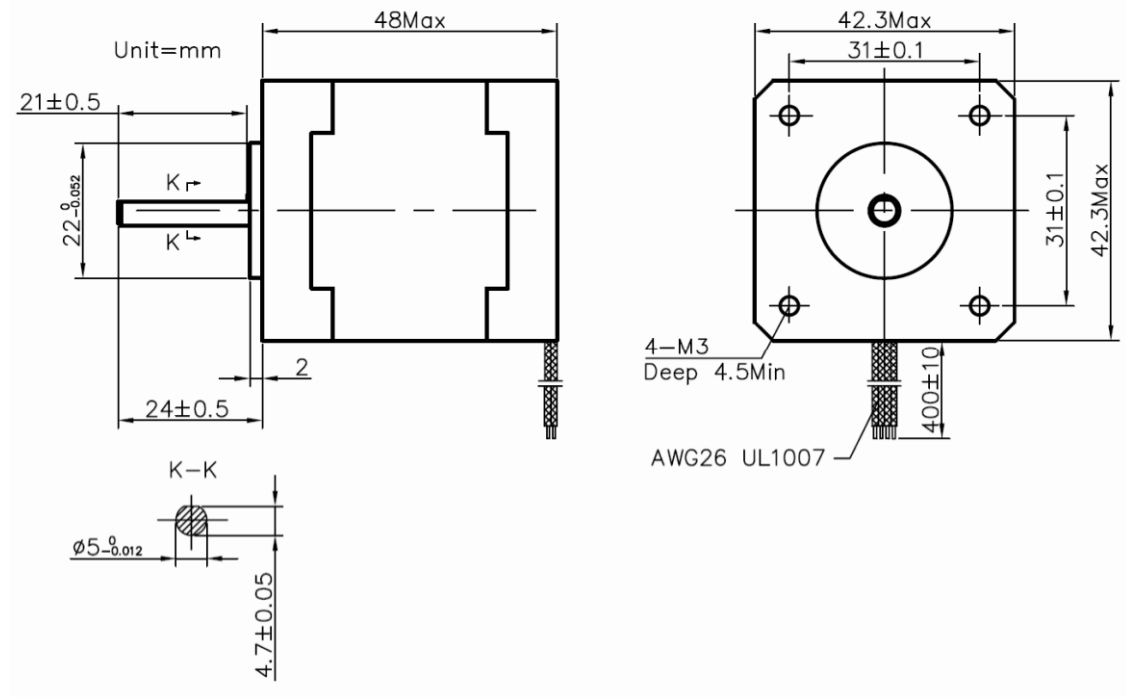Figure 1: Mechanical specification of 42HS02

Figure 2: Mechanical specification of 42HS03

Wiring Diagram

！a〞42HS02 connection

！b〞42HS03 (bipolar)series connection

！c〞42HS03 (bipolar) parallel connection

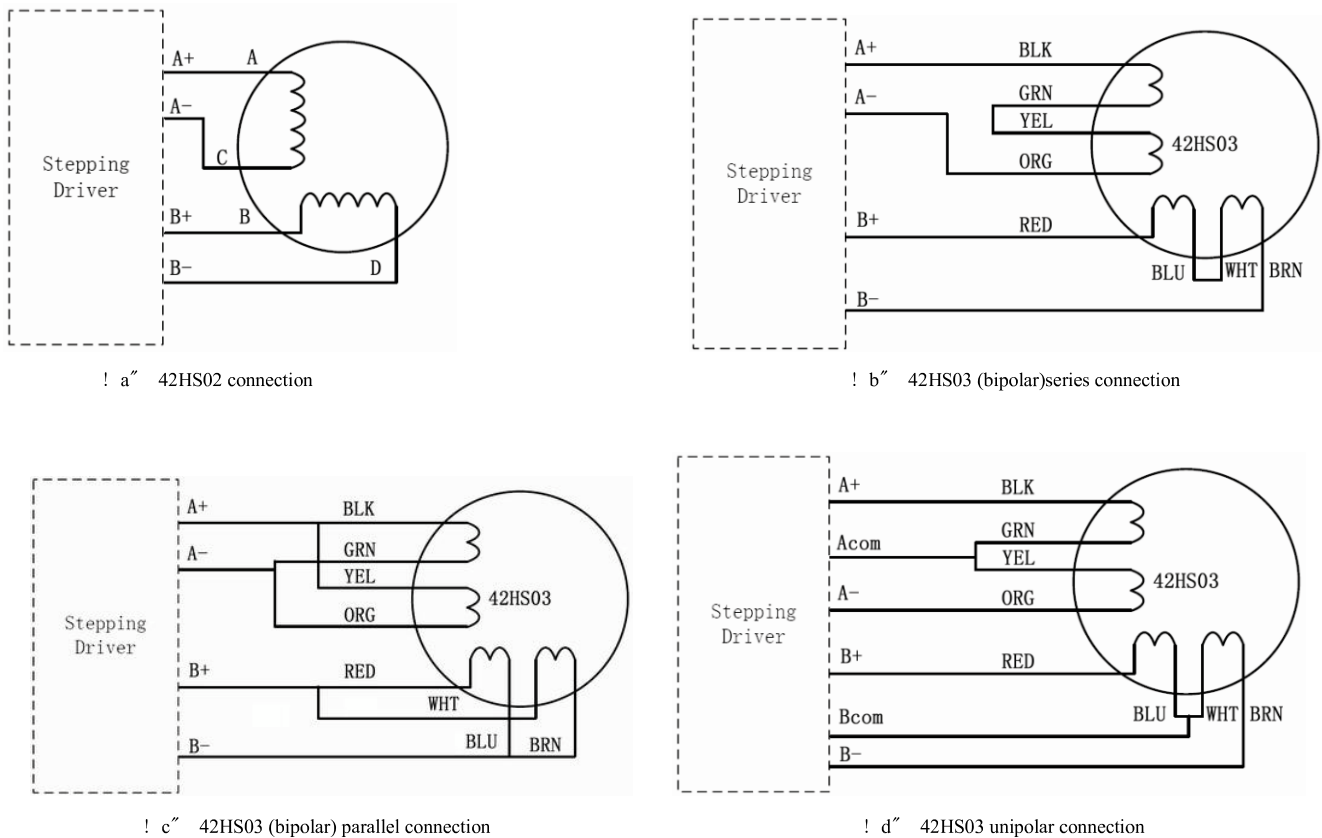！d〞42HS03 unipolar connection

Figure 3: Wiring diagram

Speed-Torque Characteristics

Unipolar and bipolar half coil, because we're using less turns, doesn't give us great low speed torque, but because of the low inductance, holds the torque out to high speeds. Bipolar series uses the full coil so it gives very good low speed torque. But because of the high Inductance, the torque drops off rapidly. Bipolar parallel also uses the full coil so it gives good low speed performance. And its low Inductance allows the torque to be held out to high speeds. But remember, we must increase current by 40% to get those advantag Speed-torque curves show the maximum torques that can be output at a given speed. When selecting a motor, make sure the required to falls within the particular curve.
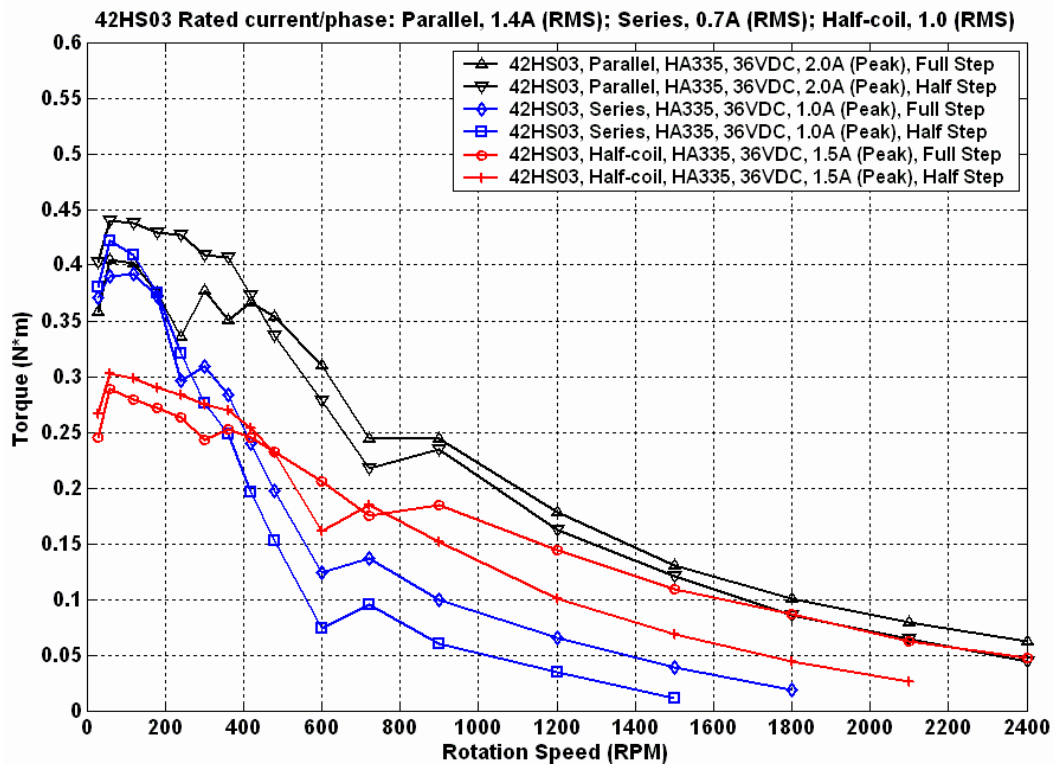
⑩   42HS03

Figure 4: Speed-torque curves of the 42HS03

Remarks:

1. Title "42HS03 Rated current/phase: Parallel, 1.4A (RMS); Series, 0.7A (RMS); Half-coil, 1.0A (RMS)" means "When the 42HS03 used in parallel mode, its current/phase is 1.4A (RMS); When the 42HS03 used in series mode, its current/phase is 0.7A (RMS); When the 42HS03 used in half-coil or unipolar mode, its current/phase is 1.0A (RMS)".

2. Legend "42HS03, Parallel, HA335, 35VDC, 2.0A (Peak), Half Step" means "This speed-torque curve of the 42HS03 (connected ir parallel mode)was done with the HA335 driver. The settings of the HA335 are 2.0A (Peak), Half Step and use 35VDC power supply ".

3. The actual characteristics will vary depending on the driver used. Please use these curves only for reference purposes when selectin motor. You must also conduct a thorough evaluation with the actual driver to be used. Please "consul Leadshtine Motor and Driver Package's for more information about this issue.

57HS Series Hybrid Stepping Motors

General Specifications

Step Angle Degree	1.8°
Step Angle Accuracy	±5%(full step no load)
Temperature RIse	80°CMax
Amblent Temperature	-10°C —— +50°C
Insulatlon Reslstance	100MΩmln.500VDC
Dlelectrlc Strength	500VAC for one mlnute
Shaft Radlal Play	0.06 Max.(450g-load)
Shaft Axlal Play	0.08 max.(450g-load)

Eleatrical Specifications

Model Number	Connection	Motor Length L inch (mm)	Holding Torque Oz-in (Nm)	Number of Leads	Phase Current (Amps)	Phase Resistance (Ohm)	Phase Inductance (mH)	Rotor Inertia Oz-in-sec²(g.cm²)	Detent Torque Oz-in (g.cm)	Weight Oz (kg)
57HS04	(Bipolar) Series	1.61 (41)	56.64 (0.4)	6	2.0	1.4±10%	1.4 ±20%	0.001917 (135)	-	15.87 (0.45)
	Unipolar		39.65 (0.28)		2.8	0.7±10%	0.35 ±20%			
57HS09	(Bipolar) Parallel	2.13 (54)	184.08 (1.3)	8	4.0	0.4±10%	1.2 ±20%	0.003692 (260)	5.664 (408)	21.16 (0.6)
	(Bipolar) Series		184.08 (1.3)		2.0	1.6±10%	4.8 ±20%			
	Unipolar		127.44 (0.9)		2.8	0.8±10%	1.2 ±20%			
57HS13	(Bipolar) Parallel	2.99 (76)	254.88 (1.8)	8	4.0	0.5±10%	2.1 ±20%	0.006532 (460)	9.912 (714)	35.27 (1.0)
	(Bipolar) Series		254.88 (1.8)		2.0	2.0±10%	8.4 ±20%			
	Unipolar		184.08 (1.3)		2.8	1.0±10%	2.1 ±20%			
57HS22	(Bipolar) Parallel	3.19 (81)	311.52 (2.2)	8	5.7	0.4±10%	1.8 ±20%	0.006816 (480)	-	40.57 (1.15)
	(Bipolar) Series		311.52 (2.2)		2.8	1.6±10%	7.2 ±20%			
	Unipolar		212.4 (1.5)		4.0	0.8±10%	1.8 ±20%			

*Above motor is our typical model, and if you need a customization motor, please contact us.

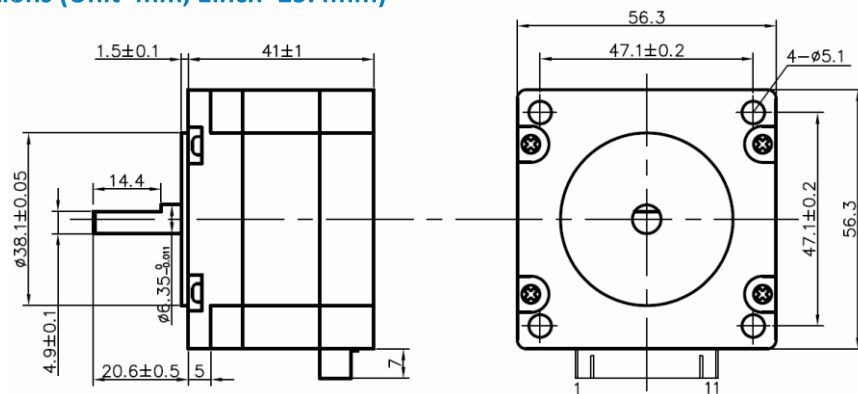## Mechanical Specifications (Unit=mm, 1inch=25.4mm)
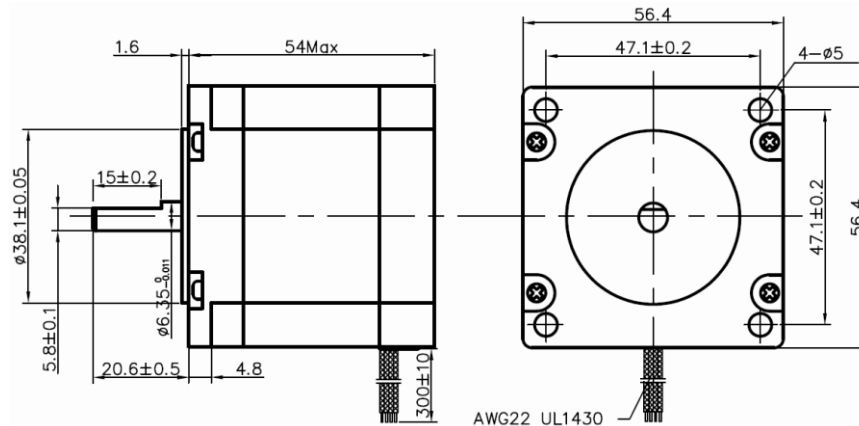

Figure 1: Mechanical specification of 57HS04
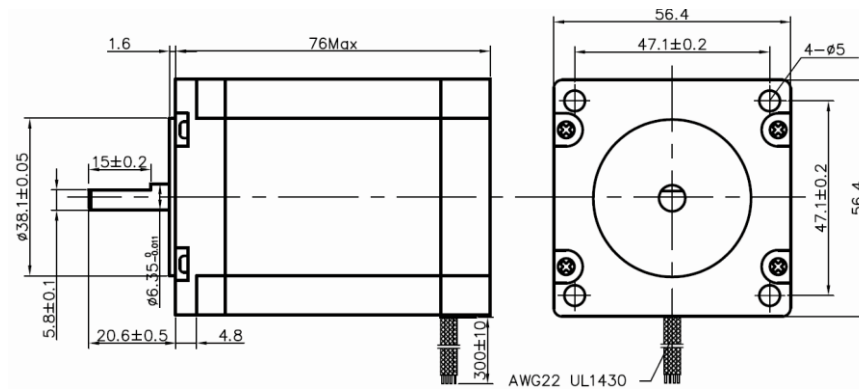
Figure 2: Mechanical specification of 57HS09
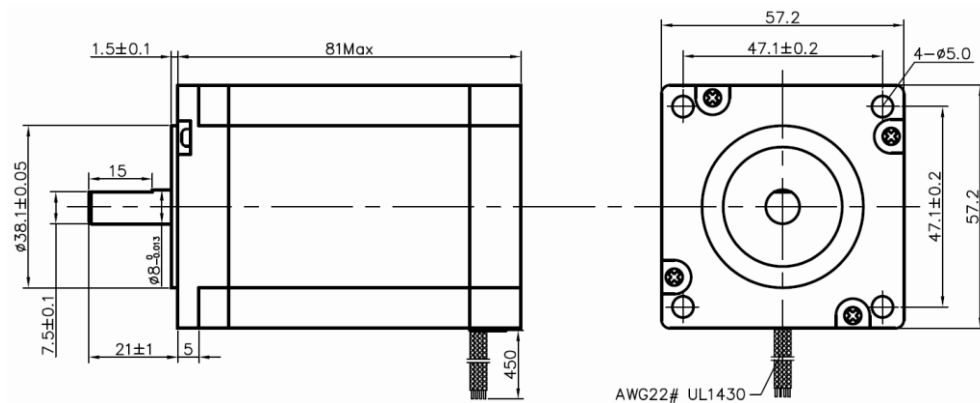

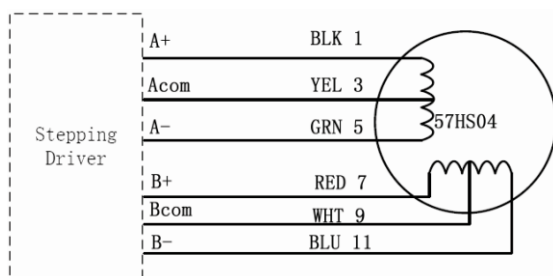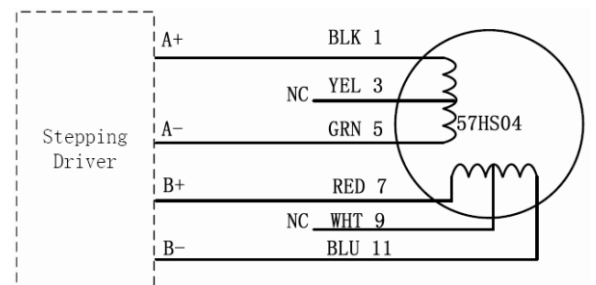Figure 3: Mechanical specification of 57HS13

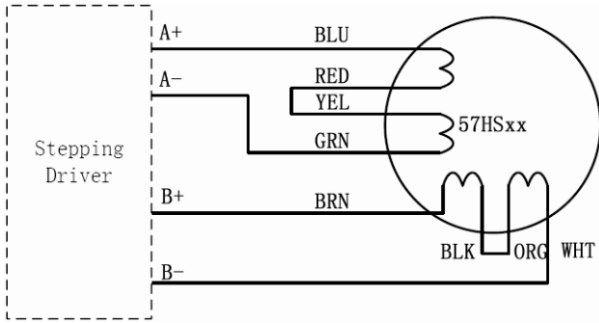Figure 4: Mechanical specification of 57HS22

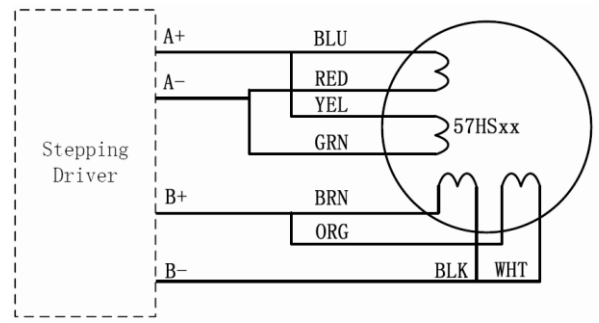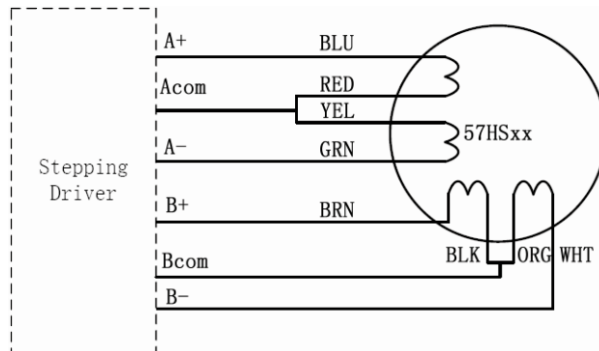## Wiring Diagram

a! 57HS04 unipolar connection

b! 57HS04 bipolar (series) connection

c！ 57HSxx series connection(8 leads)

d！ 57HSxx parallel connection(8 leads)

e！ 57HSxx unipolar connection(8 leads)

Figure 5: Wiring diagrams

Speed-Torque Characteristics

Unipolar and bipolar half coil, because we're using less turns, doesn't give us great low speed torque, but because of the low inductance, holds the torque out to high speeds. Bipolar series uses the full coil so it gives very good low speed torque. But because of the high inductance, the torque drops off rapidly. Bipolar parallel also uses the full coil so it gives good low speed performance. And its low inductance allows the torque to be held out to high speeds. But remember, we must increase current by 40% to get those advantages. Speed-torque curves show the maximum torques that can be output at a given speed. When selecting a motor, make sure the required torque falls within the particular curve.
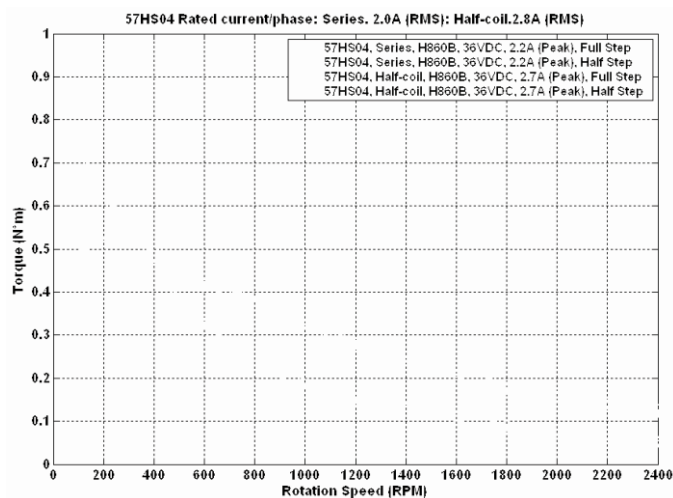
● 57HS04
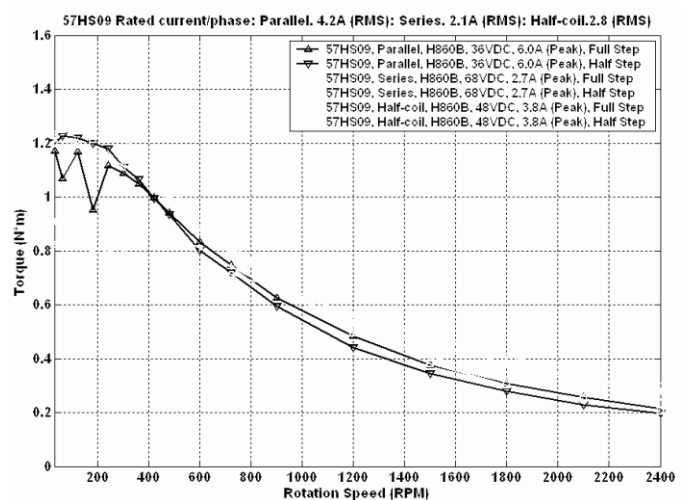

Figure 6: Speed-torque curves of the 57HS04

● 57HS09

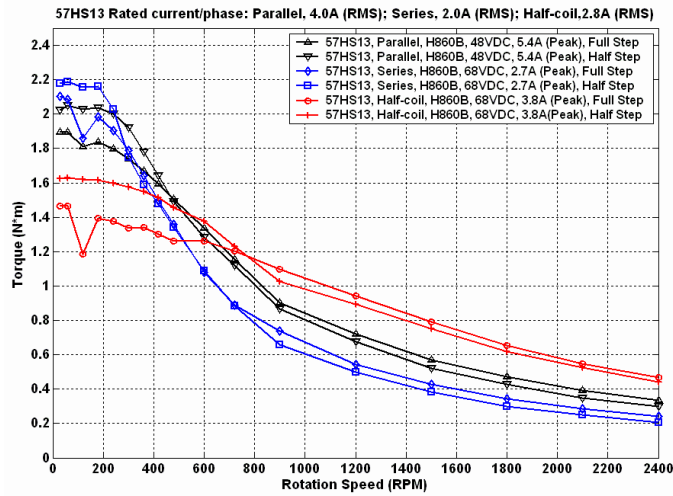Figure 7: Speed-torque curves of the 57HS09

● **57HS13**

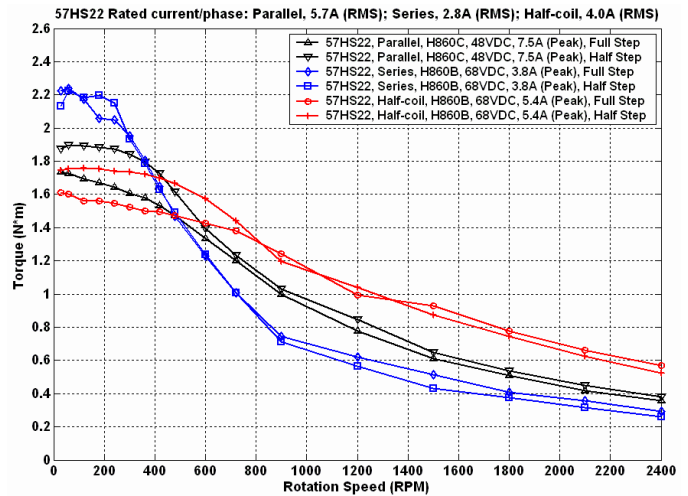Figure 8: Speed-torque curves of the 57HS13

● **57HS22**

Figure 9: Speed-torque curves of the 57HS22

Remarks:

1. Title "57HS09 Rated current/phase: Parallel, 4.2A (RMS); Series, 2.1A (RMS); Half-coil, 2.8A (RMS)" means "When the 57HS09 used in parallel mode, its current/phase is 4.2A (RMS); When the 57HS09 used in series mode, its current/phase is 2.1A (RMS); When the 57HS09 used in half-coil or unipolar mode, its current/phase is 2.8A (RMS)".

2. Legend "57HS09, Parallel, H860B, 36VDC, 6.0A (Peak), Half Step" means "This speed-torque curve of the 57HS09 (connected in parallel mode) was done with the H860B driver. The settings of the H860B are 6.0A (Peak), Half Step and use 36VDC power supply ".

3. The actual characteristics will vary depending on the driver used. Please use these curves only for reference purposes when selecting a motor. You must also conduct a thorough evaluation with the actual driver to be used. Please consult "Leadshine Motor and Driver Packages" for more information about this issue.

86HS Series Hybrid Stepping Motors

General Specifications

Step Angle Degree	1.8°
Step Angle Accuracy	±5%(full step no load)
Temperature Rise	80°CMax
Ambient Temperature	-10°C —— +50°C
Insulation Resistance	100MΩmin.500VDC
Dielectric Strength	500VAC for one minute
Shaft Radial Play	0.06 Max.(450g-load)
Shaft Axial Play	0.08 max.(450g-load)

Eleatrical Specifications

Model Number	Connection	Motor Length L inch (mm)	Holding Torque Oz-in (Nm)	Number of Leads	Phase Current (Amps)	Phase Resistance (Ohm)	Phase Inductance (mH)	Rotor Inertia Oz-in-sec² (g.cm²)	Detent Torque Oz-in (g.cm)	Weight Oz (kg)
86HS24	Bipolar (Parallel)	2.48 (63)	283.2 (2.0)	8	4.3	0.45±10%	2.5 ±20%	0.007952 (560)	8.4 (600)	52.91 (1.5)
	Bipolar (Series)		283.2 (2.0)		2.2	1.8 ±10%	10± 20%			
	Unipolar		199.66 (1.41)		3.1	0.9 ±10%	2.5±20%			
86HS26	Bipolar (Parallel)	2.48 (63)	453.12 (3.2)	8	6.0	0.27 ±10%	2± 20%	0.007952 (560)	8.4 (600)	52.91 (1.5)
	Bipolar (Series)		453.12 (3.2)		3.0	1.1 ±10%	8± 20%			
	Unipolar		328.57 (2.3)		4.3	0.55±10%	2± 20%			
86HS38	Bipolar (Parallel)	3.58 (91)	651.36 (4.6)	8	6.0	0.3 ±10%	2.7 ±20%	0.01704 (1200)	11.2 (800)	91.71 (2.6)
	Bipolar (Series)		651.36 (4.6)		3.0	1.2 ±10%	10.8 ±20%			
	Unipolar		467.28 (3.3)		4.3	0.6 ±10%	2.7 ±20%			
86HS35	Bipolar (Parallel)	2.56 (65)	495.6 (3.5)	8	4.0	0.7 ±10%	3.9 ±20%	0.0142 (1000)	11.2 (800)	59.97 (1.7)
	Bipolar (Series)		495.6 (3.5)		2.0	2.8 ±10%	15.6 ±20%			
	Unipolar		311.52 (2.2)		2.8	1.4 ±10%	3.9 ±20%			
86HS45	Bipolar (Parallel)	3.13 (80)	637.2 (4.5)	8	6.0	0.375±10%	3.4 ±20%	0.01988 (1400)	18.2 (1300)	81.1 (2.3)
	Bipolar (Series)		637.2 (4.5)		3.0	1.5 ±10%	14± 20%			
	Unipolar		453.12 (3.2)		4.2	0.75 ±10%	3.4 ±20%			
86HS85	Bipolar (Parallel)	4.65 (118)	1203.6 (8.5)	8	6.8	0.45 ±10%	6± 20%	0.03834 (2700)	35 (2500)	134.04 (3.8)
	Bipolar (Series)		1203.6 (8.5)		3.4	1.8 ±10%	24± 20%			
	Unipolar		849.6 (6.0)		4.9	0.9 ±10%	6± 20%			

* Above motor is our typical model, and if you need a customization motor, please contact us.

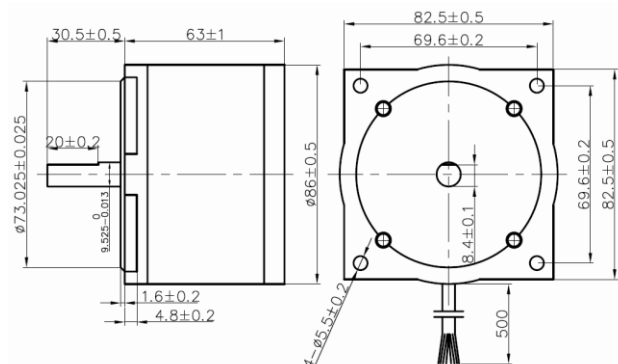## Mechanical Specifications (Unit=mm, 1inch=25.4mm)

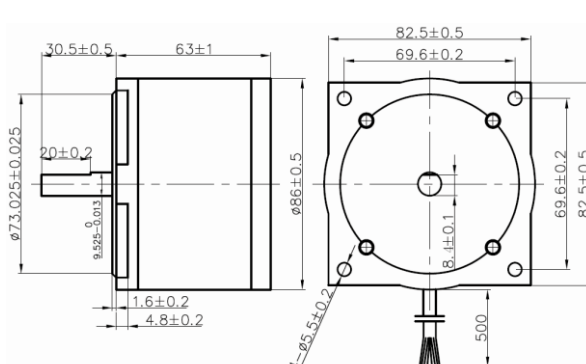Figure 1: Mechanical specification of the 86HS24

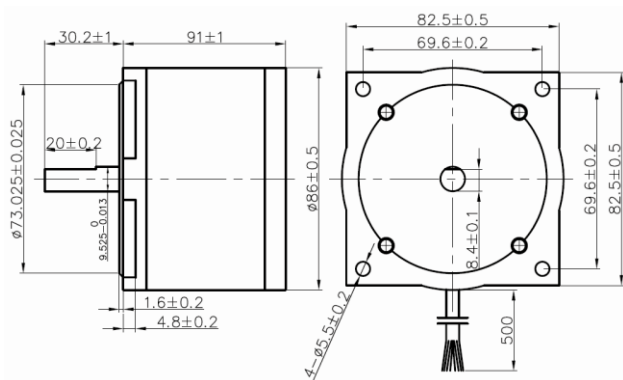Figure 2: Mechanical specification of the 86HS26
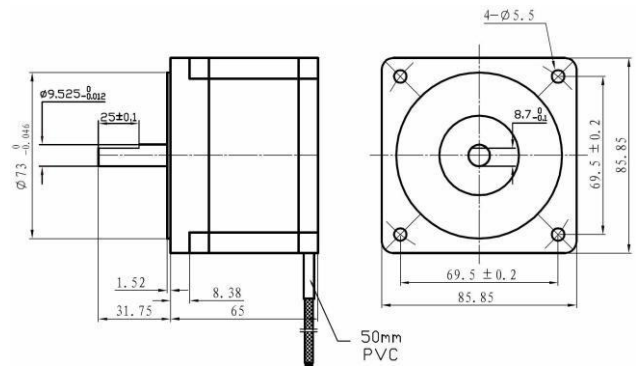
Figure 3: Mechanical specification of 86HS38

Figure 4: Mechanical specification of 86HS35
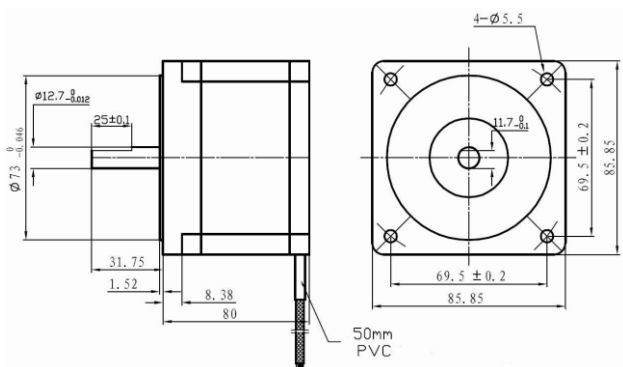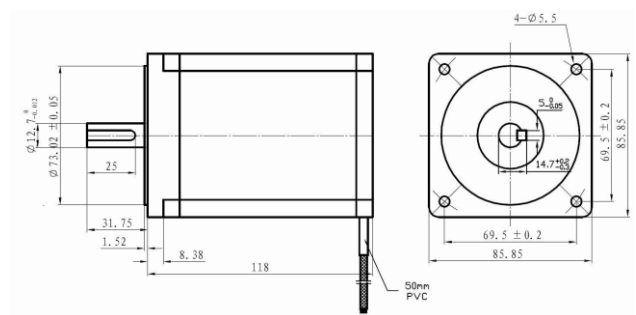

Figure 5: Mechanical specification of 86HS45
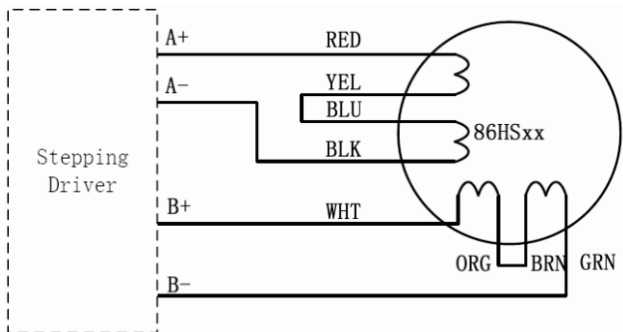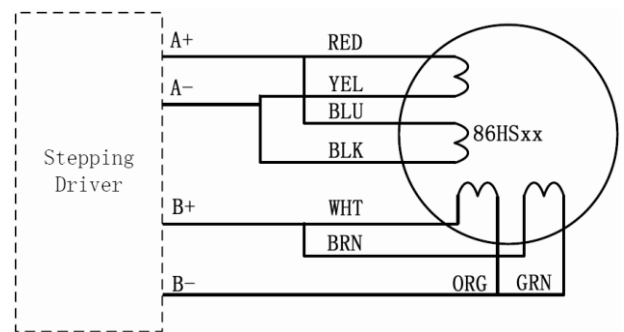

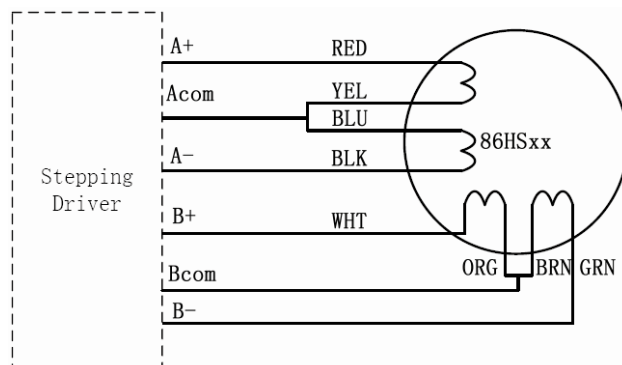Figure 6: Mechanical specification of 86HS85

Wiring Diagram

a! 86HSxx series connection (8 leads)

b! 86HSxx parallel connection (8 leads)

c! 86HSxx unipolar connection (8 leads)

Figure 7: Wiring diagrams

Speed-Torque Characteristics

Unipolar and bipolar half coil, because we're using less turns, doesn't give us great low speed torque, but because of the low inductance, holds the torque out to high speeds. Bipolar series uses the full coil so it gives very good low speed torque. But because of the high inductance, the torque drops off rapidly. Bipolar parallel also uses the full coil so it gives good low speed performance. And its low inductance allows the torque to be held out to high speeds. But remember, we must increase current by 40% to get those advantages. Speed-torque curves show the maximum torques that can be output at a given speed. When selecting a motor, make sure the required torque falls within the particular curve.
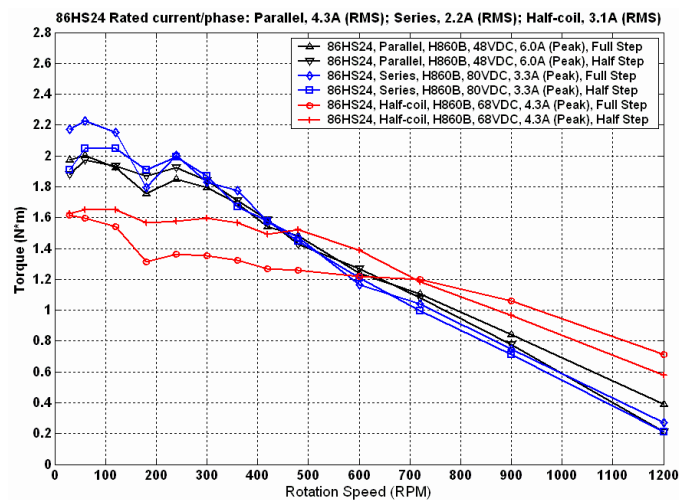
● 86HS24

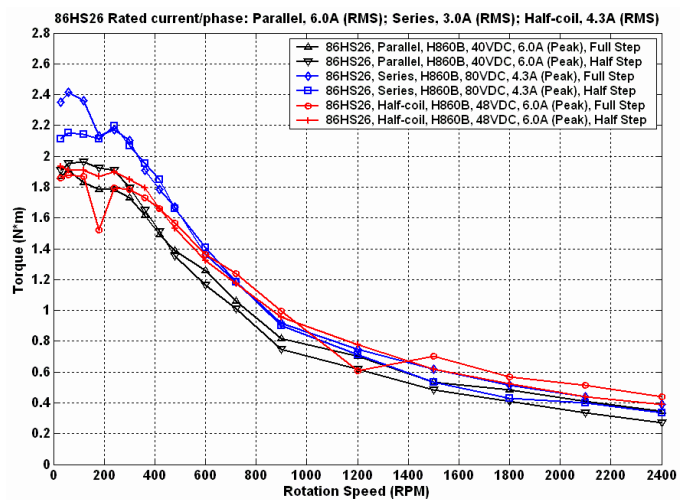Figure 7: Speed-torque curves of the 86HS24

●86HS26

Figure 8: Speed-torque curves of the 86HS26

● 86HS38
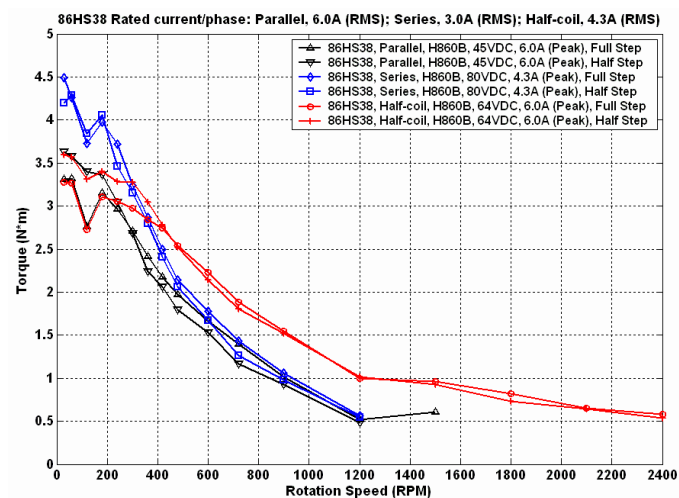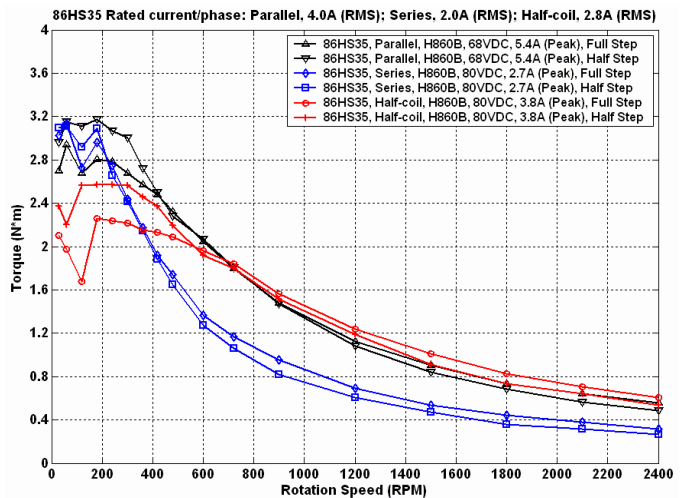

Figure 9: Speed-torque curves of the 86HS38
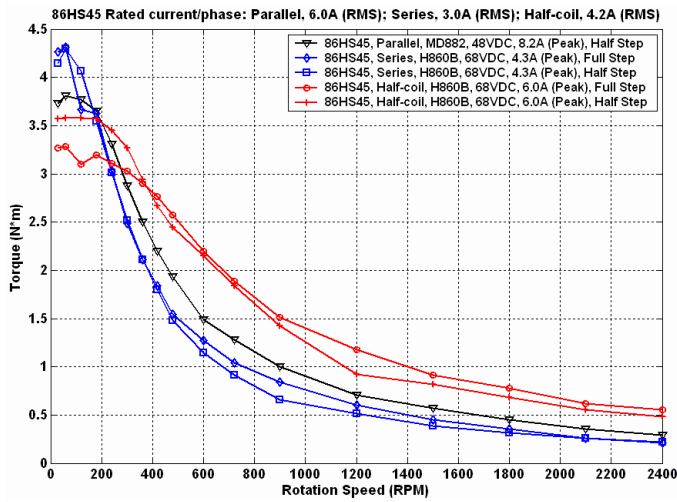
● 86HS35

Figure 10: Speed-torque curves of the 86HS35
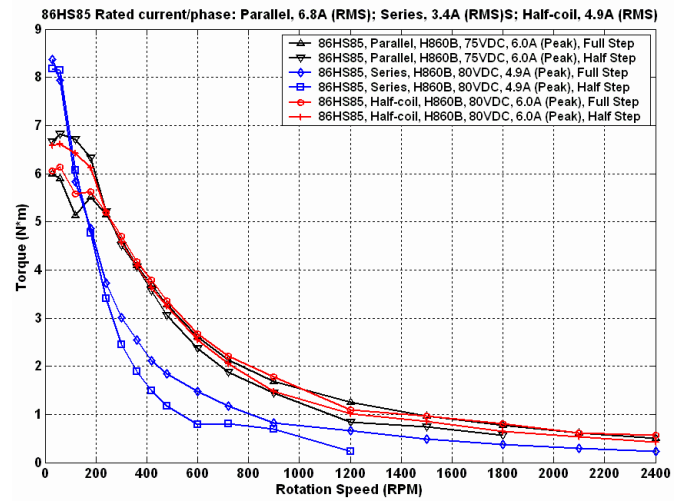
Figure 11: Speed-torque curves of the 86HS45

Figure 12: Speed-torque curves of the 86HS85

Remarks:

1. Title "86HS24 Rated current/phase: Parallel, 4.3A (RMS); Series, 2.2A (RMS); Half-coil, 3.1A (RMS)" means "When the 86HS24 used in parallel mode, its current/phase is 4.3A (RMS); When the 86HS24 used in series mode, its current/phase is 2.2A (RMS); When the 86HS24 used in half-coil or unipolar mode, its current/phase is 3.1A (RMS)".

2. Legend "86HS24, Parallel, H860B, 48VDC, 6.0A (Peak), Half Step" means "This speed-torque curve of the 86HS24 (connected in parallel mode) was done with the H860B driver. The settings of the H860B are 6.0A (Peak), Half Step and use 48VDC power supply ".

3. The actual characteristics will vary depending on the driver used. Please use these curves only for reference purposes when selecting a motor. You must also conduct a thorough evaluation with the actual driver to be used. Please consult "Leadshine Motor and Driver Packages" for more information about this issue.
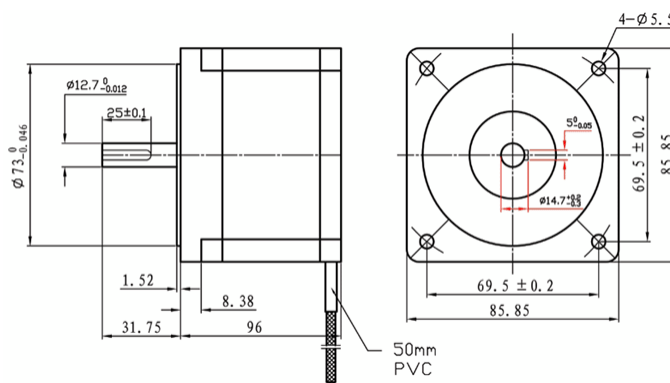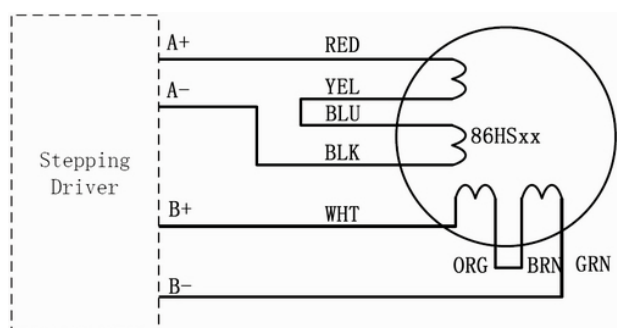
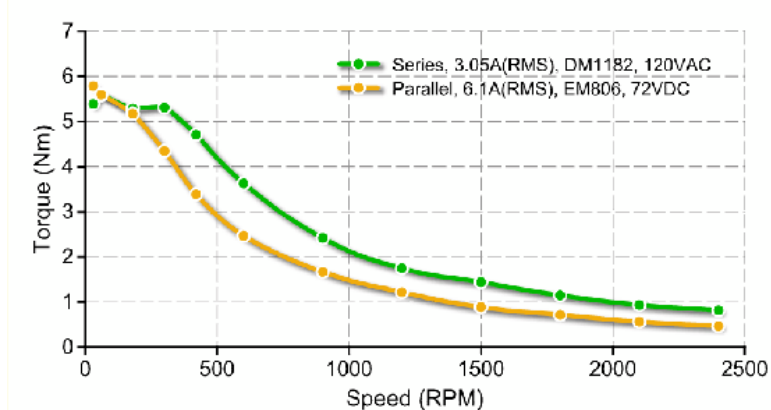# 86HS Series Hybrid Stepping Motors

General Specifications

Step Angle Degree	1.8°
Step Angle Accuracy	±5%(full step no load)
Temperature Rise	80°CMax
Ambient Temperature	-10°C ⎯⎯ +50°C
Insulation Resistance	100MΩmin.500VDC
Dielectric Strength	500VAC for one minute
Shaft Radial Play	0.06 Max.(450g-load)
Shaft Axial Play	0.08 max.(450g-load)

Eleatrical Specifications

Model Number	Connection	Motor Length L inch (mm)	Holding Torque Oz-in (Nm)	Number of Leads	Phase Current (Amps)	Phase Resistance (Ohm)	Phase Inductance (mH)	Rotor Inertia Oz-in-sec² (g.cm²)	Weight Oz (kg)
86HS 65	Bipolar (Parallel)	3.78 (96)	991.2 (7.0)	8	6.1	0.355±10%	3.3±20%	0.01988 (1400)	81.1 (2.3)
	Bipolar (Series)		991.2 (7.0)		3.05	1.4±10%	13.2±20%		
	Unipolar		693.8 (4.9)		4.3	0.7±10%	3.3±20%		

Stepper Motor: 86HS65; Microstep: 8 (1600 steps/rev.)

110HSxx Series

General Specifications

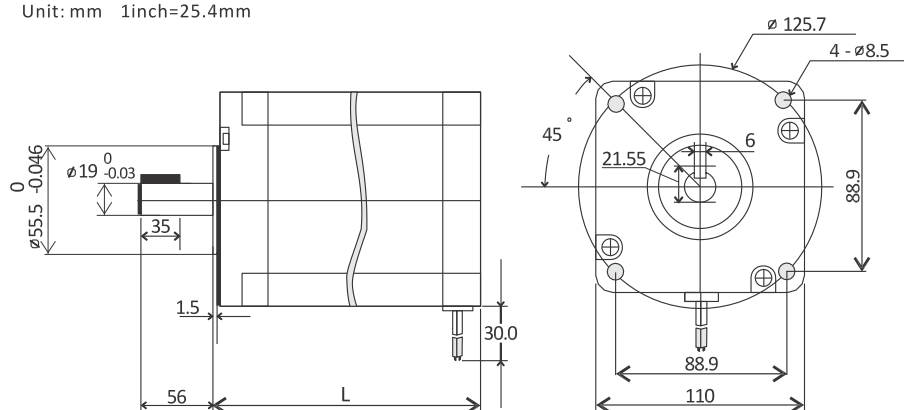|	
Angle Accuracy	± 5%(full step, no load)
Temperature Rise	80 °C Max
Ambient Temperature	-10 °C — +50 °C
Insulation Resistance	100M Ω min. 500VDC
Dielectric Strength	500VAC for one minute
Shaft Radial Play	0.06 Max. (450g-load)
Shaft Axial Play	0.08 Max. (450g-load)

Selection Table

Phase	NEMA Size	Model	Step Angle (°)	# of Leads	Connection	Current/Phase (A)	Holding Torque (Nm)	Length L (mm)	Weight (kg)	Match Drives
2	42	110HS12	1.8	4	-	6.0	12	115	6.0	DM2282 / DM1182
		110HS20	1.8	4	-	6.0	20	150	8.4	DM2282 / DM1182
		110HS28	1.8	4	-	6.5	28	201	11.7	DM2282 / DM1182

Mechanical Specifications

Unit: mm   1inch=25.4mm

Wiring Diagram

RED

4 LEADS

GRN

YEL   BLU