Hybrid Servo Motors

Stepping Motors with Encoders, 0.9 Nm to 8.0 Nm

Descriptions

Leadshine hybrid servo motors, or stepping motors with encoders, are designed to work with Leadshine HBS series hybrid servo drives including HBS57, HBS86, and HBS86H. They are currently available in frame size NEMA 23 with holding torque of 0.9, 1.0, or 2.0 Nm, and NEMA 34 with holding torque of 4.0 or 8.0 Nm. All those hybrid servo motors are integrated with 4,000 PPR (1,000-line) optical incremental encoders.

Part Number

86 HS 40- EC-1000

① ②

① Motor Size
86: NEMA34 / ☐ 86 mm
57: NEMA23 / ☐ 57 mm

② Motor Type:
HS: 2-phase
3S: 3-phase

③ Holding Torque
10: 1.0 N*m
20: 2.0 N*m
40: 4.0 N*m
80: 8.0 N*m

④ Come with a 1000-line encoder

Encoder Specifications

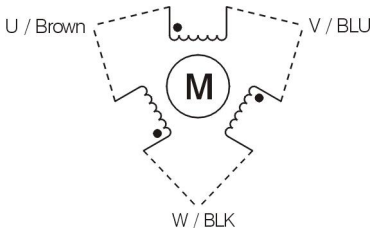
Parameter	Min	Typical	Max	Unit
Operating Temperature	-40	-	100	℃
Supply Voltage	4.5	5	5.5	VDC
Output Current per Channel	-1	-	5	mA
Low Level Output Voltage	-	-	0.4	VDC
High Level Output Voltage	2.4	-	-	VDC

Motor Specifications

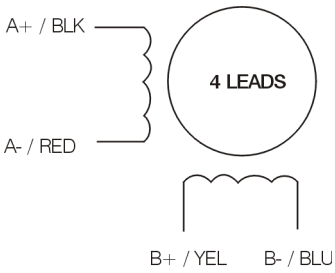
Model	Phase	Step Angle (Degree)	Leads	Holding Torque (N.m)	Phase Current (A)	Phase Resistance (Ohm)	Phase Inductance (mH)	Rotor Inertia ($g.cm^2$)	Weight (Kg)	Encoder (lines)
573S09-EC-1000	3	1.2°	3	0.9	5.8	0.35	0.72	280	0.75	1000
573S20-EC-1000	3	1.2°	3	2.0	5.8	0.62	1.85	580	1.3	1000
57HS10-EC-1000	2	1.8°	4	1.0	4.2	0.4	2.0	200	0.8	1000
57HS20-EC-1000	2	1.8°	4	2.0	5.8	0.37	2.0	480	1.25	1000
86HS40-EC-1000	2	1.8°	4	4.0	5.5	0.46	4.0	1500	1.5	1000
86HS80-EC-1000	2	1.8°	4	8.0	6.0	0.44	3.73	2580	3.8	1000

Motor Wiring Diagram

573S09-EC-1000
573S20-EC-1000



57HS10-EC-1000,
57HS20-EC-1000
86HS40-EC-1000,
86HS80-EC-1000

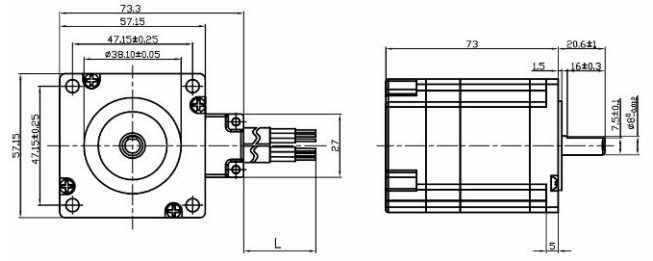


Cable Specifications

Model	Motor Cables			Encoder Cables		
	Standard	Extension		Standard	Extension	
	Length	Length	Part Number	Length	Length	Part Number
573S09-EC-1000	0.55±0.02m	*	*	0.55±0.02m	3m	CABLE-ENCODER-03
					5m	CABLE-ENCODER-05
573S20-EC-1000	0.55±0.02m	*	*	0.55±0.02m	3m	CABLE-ENCODER-03
					5m	CABLE-ENCODER-05
57HS10-EC-1000	0.80±0.02m	*	*	0.30±0.02m	3m	CABLEH-BM3M0
					8m	CABLEH-BM8M0
57HS20-EC-1000	0.80±0.02m	*	*	0.30±0.02m	3m	CABLEH-BM3M0
					8m	CABLEH-BM8M0
86HS40-EC-1000	0.52±0.02m	*	*	0.30±0.02m	3m	CABLEH-BM3M0
					8m	CABLEH-BM8M0
86HS80-EC-1000	0.52±0.02m	*	*	0.30±0.02m	3m	CABLEH-BM3M0
					8m	CABLEH-BM8M0

*Contact Leadshine if you need motor extension cable.

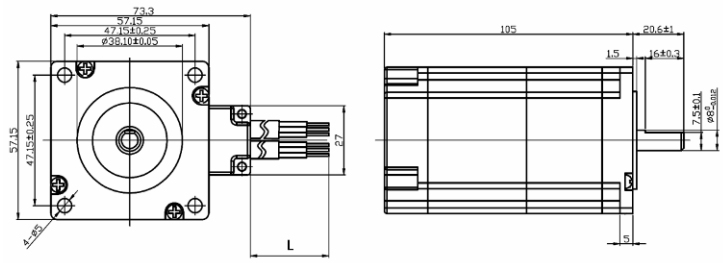
Mechanical Specifications – with Encoder



L	573S09-EC-1000		57HS10-EC-1000	
	Motor Cable	Encoder Cable	Motor Cable	Encoder Cable
	550±20mm	550±20mm	800±20mm	300±20mm

Note: Shaft Diameter 6.35mm optional.

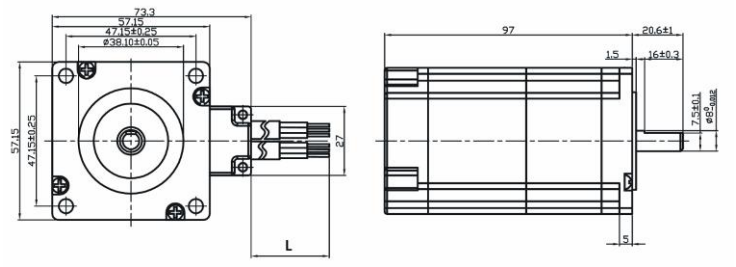
Figure 1: Mechanical Specification of 573S09-EC-1000 and 57HS10-EC-1000



L	573S20-EC-1000	
	Motor Cable	Encoder Cable
	550±20mm	550±20mm

Note: Shaft Diameter 6.35mm optional.

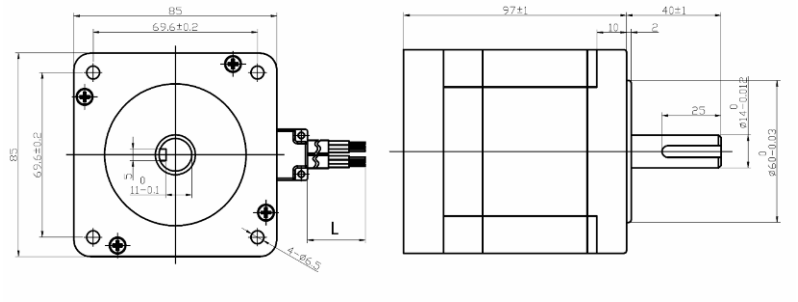
Figure 2: Mechanical Specification of 573S20-EC-1000



L	57HS20-EC-1000	
	Motor Cable	Encoder Cable
	800±20mm	300±20mm

Note: Shaft Diameter 6.35mm optional.

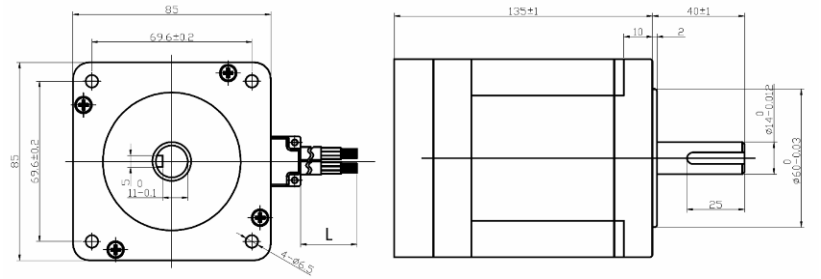
Figure 3: Mechanical Specification of 57HS20-EC-1000



L	86HS40-EC-1000	
	Motor Cable	Encoder Cable
	520±20mm	300±20mm

Note: Shaft Diameter 12.7mm optional.

Figure 4: Mechanical Specification of 86HS40-EC-1000



L	86HS80-EC-1000	
	Motor Cable	Encoder Cable
	520±20mm	300±20mm

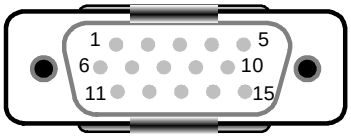
Figure 5: Mechanical Specification of 86HS80-EC-1000

Encoder Extension Cable Pin Out

Pin	Color	Name	Description	Pin	Color	Name	Description
1	**Red**	VCC	+5V power input	4	**Green**	B-	Encoder Channel B-
2	**White**	GND	+5V GND	5	**Black**	A+	Encoder Channel A+
3	**Yellow**	B+	Encoder Channel B+	6	**Blue**	A-	Encoder Channel A-

Encoder Connector

Encoder Connector – HDD15 Male



573S09-EC-1000, 573S20-EC-1000

Pin	Name	Color	I/O	Description
1	EA+	Black	O	Encoder channel A+ output
2	EB+	Yellow	O	Encoder channel B+ output
3	GND	White	GND	Ground
4	NC	-	-	Not Connected
5	NC	-	-	Not Connected
6	FG	-	-	Ground terminal for shielded
7	NC	-	-	Not Connected
8	NC	-	-	Not Connected
9	NC	-	-	Not Connected
10	NC	-	-	Not Connected
11	EA-	Blue	O	Encoder channel A- output
12	EB-	Green	O	Encoder channel B- output
13	VCC	Red	I	+5V power input
14	NC	-	-	Not Connected
15	NC	-	-	Not Connected

57HS10-EC-1000, 573S20-EC-1000
86HS40-EC-1000, 86HS80-EC-1000

Pin	Name	Color	I/O	Description
1	EA+	Black	O	Encoder channel A+ output
2	VCC	Red	I	+5V power input
3	GND	White	GND	Ground
4	NC	-	-	Not Connected
5	NC	-	-	Not Connected
6	FG	-	-	Ground terminal for shielded
7	NC	-	-	Not Connected
8	NC	-	-	Not Connected
9	NC	-	-	Not Connected
10	NC	-	-	Not Connected
11	EB+	Yellow	O	Encoder channel B+ output
12	EB-	Green	O	Encoder channel B- output
13	EA-	Blue	O	Encoder channel A- output
14	NC	-	-	Not Connected
15	NC	-	-	Not Connected

Speed-Torque Curves

Note: The following curves are based on 40% holding torque percentage of HBS57. If higher torque at high speed is required, you can change the holding torque percentage to 100%. See software manual.

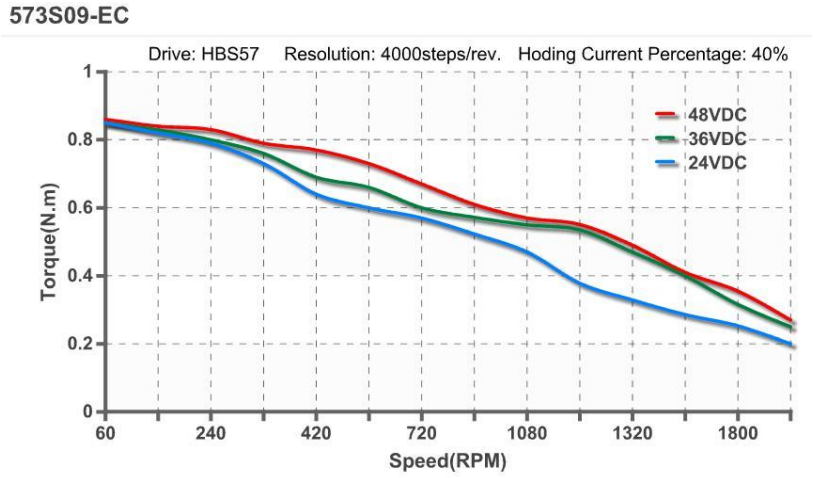


Figure 6: Speed Torque Curve of 573S09-EC and HBS57

Speed-Torque Curves (Continued)

Note: These curves are based on 40% holding torque percentage of HBS57. If higher torque at high speed is required, you can change the holding torque percentage to 100%. See software manual.

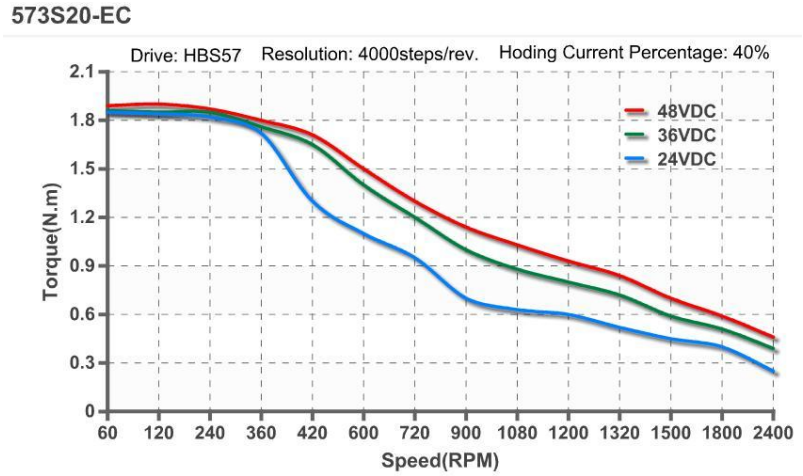


Figure 7: Speed Torque Curve of 573S20-EC and HBS57

Note: These curves are based on 40% holding torque percentage of HBS86. If higher torque at high speed is required, you can change the holding torque percentage to 100%. See software manual.

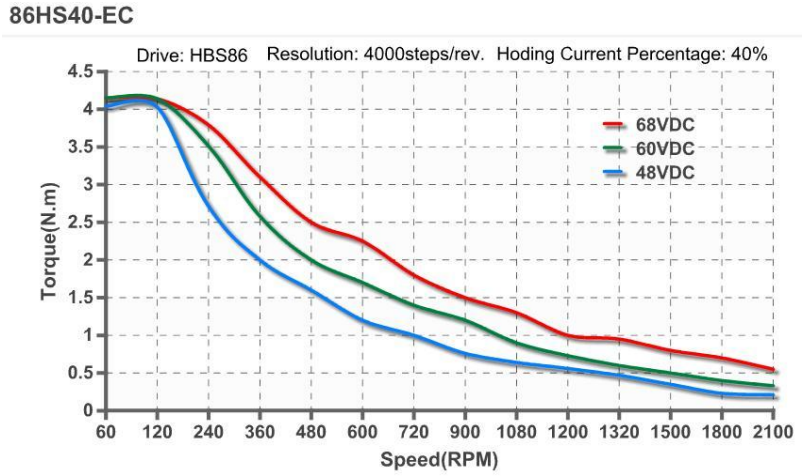


Figure 8: Speed Torque Curve of 86HS40-EC and HBS86

Note: These curves are based on 40% holding torque percentage of HBS86. If higher torque at high speed is required, you can change the holding torque percentage to 100%. See software manual.

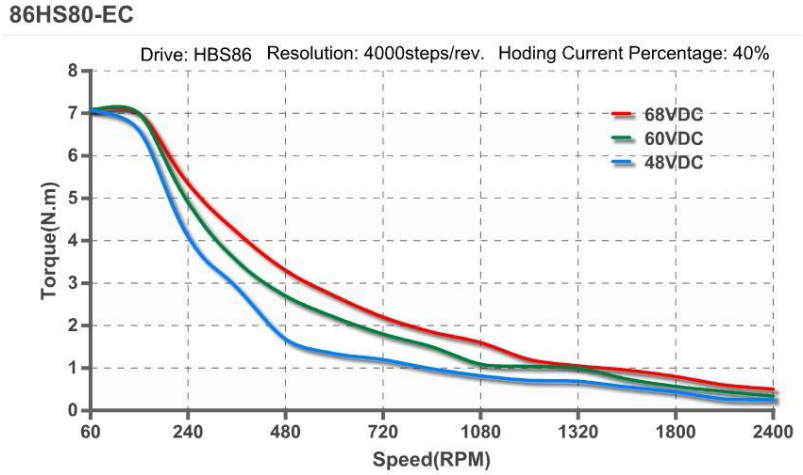


Figure 9: Speed Torque Curve of 86HS80-EC and HBS86