Swedish Innovative Servo Motion Engineering Since 1994

HSM 09N - Data sheet

Electric data

Value	Unit	Winding		
		Pa (400VAC)	Ma (230VAC)	Fa (48V)
Number of poles		20	20	20
Number of pole pairs		10	10	10
Inductance/Phase	mH	4.9	1.23	0.034
Resistance/Phase	Ohm	1.9	0.47	0.013
Resistance/Phase-Phase	Ohm	3.9	0.94	0.026
Back EMF/Phase-Phase RMS	Vs/rad	0.84	0.42	0.070
Back EMF @ 1000 rpm	V	88	44	7.3
Torque constant (RMS)	Nm/A	1.46	0.73	0.12
Max rail voltage	V	750	750	750
Recommended peak current	A	13	26	156
Torque at recommended peak current	Nm	16.4	16.4	16.4

For higher torques, see next page.

Mechanical data (resolver feedback)

Value	Unit	Singelturn		Multiturn	
		no brake	brake	no brake	brake
J	kgcm2	7.8	-	8.2	-
Mass	kg	3.8	-	4.1	-

Holding brake

Holding brake is not available as standard for HSM-motors. For custom solutions please contact HDD.

Thermistors

Overheat protection consists of triple PTC thermistors. One on each phase.	
R @ 25 C	100 to 350 Ohm
R @ 145 C	< 1650 Ohm
R @ 155 C	> 4 kOhm

Protection class

HDD motors comply with the requirements for IP 65. IP-67 is available on request.

Insulation class

The insulation system complies with the requirements of EEC LV Directive 73/23/EEC and 93/68/EEC. Test report E9911111E01.

Motor name structure

Type	Flange size	Stator length	Winding	Feedback	Power connector	Brake	Shaft	Options
HSM	09	- N	-Pa	- EC	- A	-A	-A30	-AAA

Type HSM = Hollow Shaft Motor

Flange size Approximate in cm. 09 = 92 mm.

Stator length J (shortest), N, Q (longest).

Winding Suitable rail voltage at 3000 rpm.

Pa	560V
Ma	320V
Fa	48V

Feedback EC = Endat ECI 119. Other options available on request.

Power connector Many different pinouts available; see www.hddservo.com/product-options/

Brake A = no brake. No other option available for HSM motors as standard.

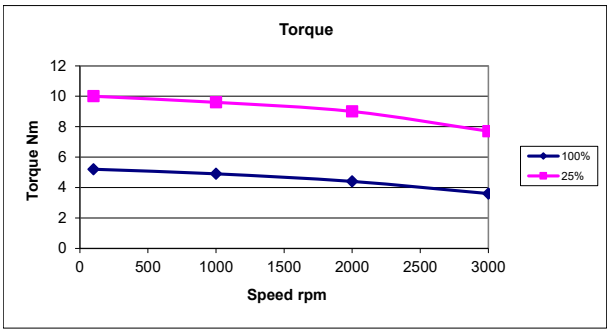
Shaft A30 = ø30 thru hollow shaft. Other options available on request.

Options AAA = standard. For other options please contact HDD.

Torque

Torque in Nm at 90ºC temp rise (median temp rise, i.e. average between min and max temp for 25% cycle).

Duty cycle	100%	25%
100rpm	5.2	10.0
1000rpm	4.9	9.6
2000rpm	4.4	9.0
3000rpm	3.6	7.7



Current

Current at 90ºC temp rise, in Ampere rms.

Winding	Pa	Ma	Fa	Pa	Ma	Fa
Duty cycle		100%			25%	
locked rotor	3.4	6.3				
100rpm	3.9	7.4	47	7.8	14.7	94
1000rpm	3.8	7.2	46	7.6	14.4	91
3000rpm	3.3	6.3	40	6.9	13.0	83

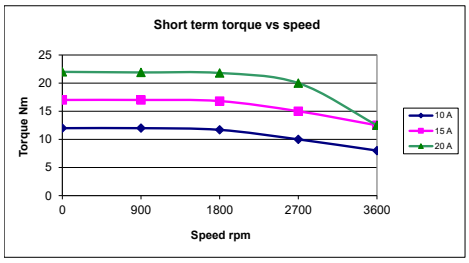
Data were measured on an HSM 09N-Pa series motor mounted on a vertical 260 x 200 x 12 mm aluminum plate in free air, with a winding temperature rise of 90ºC and driven by a commercially available inverter. Data for other windings are calculated.

Important note on peak torque and currents

The HSM motors are capable of high peak torques. At very high peak torques the permitted pulse time is very limited as a high current in a very small motor causes rapid temperature rise in the copper winding. The protection thermistor will not react fast enough to protect the winding during high pulse loads. A 20A rms current to a HSM09N-Pa will give some 23.3 Nm, but the copper winding temperature will increase with some 42ºCper second. This is not a problem for short pulses of < 0.5 seconds as long as the rms value of the current is kept below some 3.3 A. The short term torque graph below represents acceleration ramps at various commanded currents.

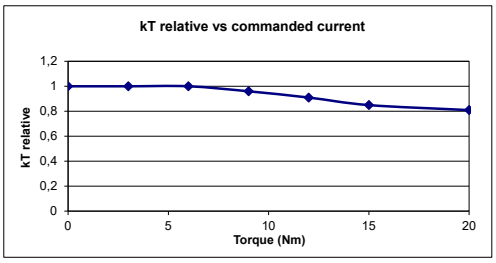
Torque at various commanded currents

HSM 09N-Pa at 560V rail voltage



kT derating factor

Low speed, HSM09N-Pa



Maximum load on shaft at life expectancy 20,000 h (shaft motors only)

Maximal axial load (push): 1600 N at 500 rpm, 650 N at 3000 rpm. Maximal axial load (pull): 50 N at all speeds. Maximal radial load at zero axial load is given by the curves below. For special cases please contact HDD for calculations.