



# HDD/ICM 09J Data sheet

## Electric data

Value	unit	Winding			
		Pa	Ma	Kb	Fa
Number of poles		20	20	20	20
Number of pole pairs		10	10	10	10
Inductance/Phase	mH	7.6	2.2	0.62	0.061
Resistance/Phase	Ohm	3.7	1.16	0.29	0.030
Resistance/Phase-Phase	Ohm	7.4	2.32	0.58	0.060
Back EMF/Phase-Phase RMS	Vs/rad	0.69	0.38	0.19	0.062
Back EMF @ 1000 rpm	V	72	39	20	6.5
Torque constant (RMS)	Nm/A	1.20	0.65	0.33	0.11
Max rail voltage	V	750	750	750	750
Recommended peak current	A	7	14	24	78
Torque at recommended peak current	Nm	7.35	7.35	7.35	7.35

## Mechanical data (resolver feedback)

Value	unit	HDD09J		ICM09J	
		no brake	brake	no brake	brake
J	kgcm <sup>2</sup>	2.8	3.2	2.6	3.0
Mass	kg	2.4	3.0	2.1	2.7

## Holding brake

Torque	Nm	9
J	kgcm <sup>2</sup>	0.4
Voltage	V DC	24
Power	W	12

## Insulation class

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

## Protection class

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

## Thermistor

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

Other options are available, see [www.hdd.se](http://www.hdd.se).

## Motor name structure

Type	Flange size	Stator length	Winding	Feedback	Power connector	Brake	Shaft key	Options
HDD	09	J	-Pa	-A	-A	-A	-A	-AAA

**Type** HDD = shaft motor, ICM = internal coupling motor.

**Flange size** Approximate in cm. 09 = 92 mm.

**Stator length** E(shortest), J, N, Q, S (longest).

**Winding** Suitable rail voltage at 3000 rpm.

Pa	560V
Ma	320V
Kb	180V
Fa	48V

**Feedback** See the feedback list on [www.hdd.se/Available feedback](http://www.hdd.se/Available%20feedback)

**Power connector** Many different pinouts available; see [www.hdd.se/Connector pin-outs](http://www.hdd.se/Connector%20pin-outs)

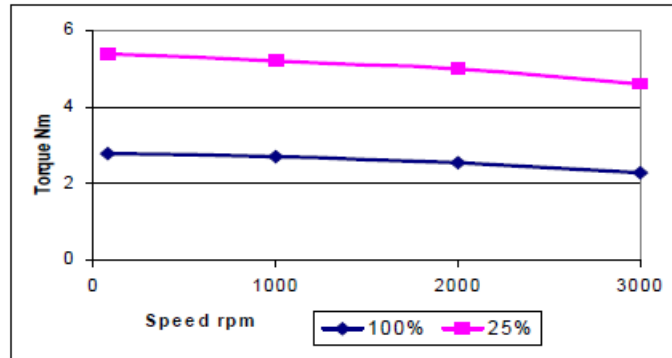
**Brake** A = no brake, D = holding brake. Data see above.

**Shaft key** A = shaft with key, B = shaft without key.

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

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

Speed	Duty cycle	
	100%	25%
100rpm	2.8	5.4
1000rpm	2.7	5.2
2000rpm	2.6	5.0
3000rpm	2.3	4.6



**Current** at 90°C temp rise, in Ampere rms

Duty cycle	100%				25%			
	Pa	Ma	Kb	Fa	Pa	Ma	Kb	Fa
locked rotor	2.2	3.9	7.8	24				
100rpm	2.5	4.3	8.6	28	4.4	7.7	15.4	49
1000rpm	2.5	4.3	8.6	28	4.4	7.7	15.4	49
3000rpm	2.3	4.0	8.0	28	4.2	7.3	14.5	47

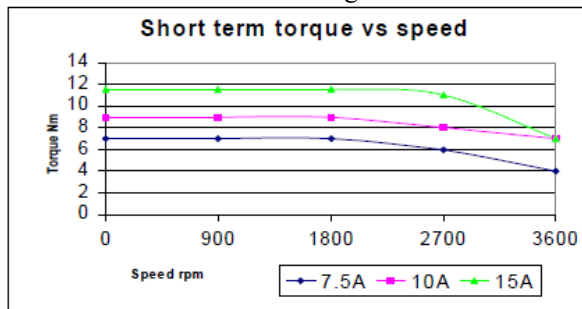
Data were measured on an HDD 09J-Pa series motor mounted on a vertical 260 x 200 x 12 mm aluminum plate in free air, with a winding temperature rise of 90°C and driven by a commercially available inverter. Data for Ma Kb and Fa windings were calculated.

### Important note on peak torque and currents

The HDD/ICM motors are capable of high peak torques. The coupling inside the ICM is however limited to 15 Nm peak. 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 10A rms current to a HDD09J-Pa will give some 11.5 Nm, but the copper winding temperature will increase with some 40°C per 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 2.7 A.

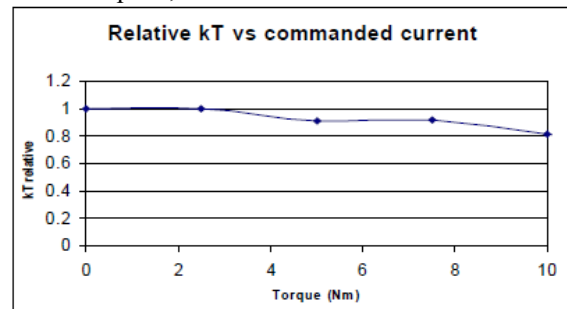
### Torque at various commanded currents

HDD 09J-Pa at 560V rail voltage



### kT derating factor

Low speed, HDD09J-Pa



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

Maximal axial load (push): 350 N at 500 rpm, 100 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.

