HDD/ICM 14J

Data sheet

Electrical data

Value	unit	Pa winding	Ma winding
Number of poles		20	20
Number of pole pairs		10	10
Inductance/Phase	mH	4.4	1.1
Resistance/Phase	Ohm	0.77	0.19
Resistance/Phase-Phase	Ohm	1.5	0.38
Back EMF/Phase-Phase RMS	Vs/rad	0.90	0.45
Back EMF @ 1000 rpm	V	94	47
Torque constant (RMS)	Nm/A	1.56	0.78
Max rail voltage	V	750	750
Recommended peak current	A	15	30
Torque at recommended peak current	Nm	22.5	22.5

For higher torques, see next page. The torque constant is defined as the back EMF; friction losses are ignored.
Data are based on a small sample and not definitive.

Mechanical data (resolver feedback)

Value	unit	HDD14J		ICM14J	
		no brake	brake	no brake	brake
J	$kgcm^2$	13.3	13.7		
Mass	kg	6.0	6.5		

Holding brake

Torque	Nm	9
J	$kgcm^2$	0.4
Voltage	V DC	24

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 termistors (one on each phase).

R @ 25 C	100 to 350 Ohm
R @ 145 C	< 1650 Ohm
R @ 155 C	> 4 kOhm

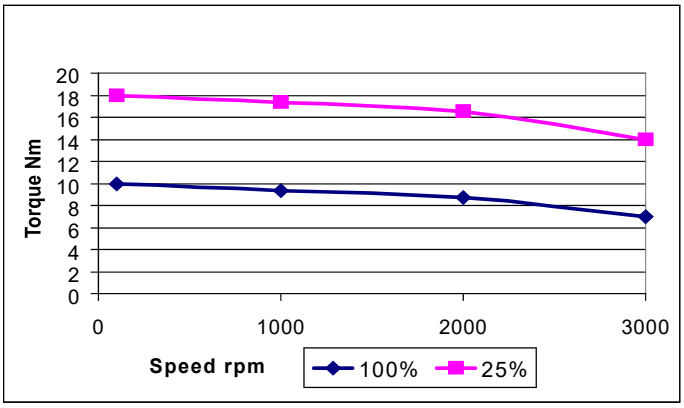
Motor name structure

Type	Flange size	Stator length	Winding	Feedback	Power connector	Brake	Shaft key	Options
HDD	14	J	- Pa	- A	- A	- A	- A	- AAA

Type	HDD = shaft motor, ICM = internal coupling motor.
Flange size	Approximate in cm. 14 = 140 mm.
Stator length	J(shortest), N (longest).
Winding	Pa suitable for 3000 rpm at rail voltage 560V Ma suitablefor 3000 rpm at rail voltage 320V
Feedback	See the feedback list on www.hdd.se/Available feedback
Power connector	Many different pinouts available; see www.hdd.se/Connector pin-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 90ºC temp rise (median temp rise, i.e. average between min and max temp for 25% cycle).

Speed	Duty cycle	
	100%	25%
100rpm	10.0	18.0
1000rpm	9.3	17.3
2000rpm	8.7	16.5
3000rpm	7.0	14.0



Current at 90ºC temp rise, in Ampere rms

Dutycycle	100%	25%	100%	25%
Winding	Pa	Pa	Ma	Ma
100rpm	7.0	13.0	14	26
1000rpm	6.6	12.7	13.2	25.4
2000rpm	6.0	12.3	12	24.6
3000rpm	5.3	10.6	10.6	21.2

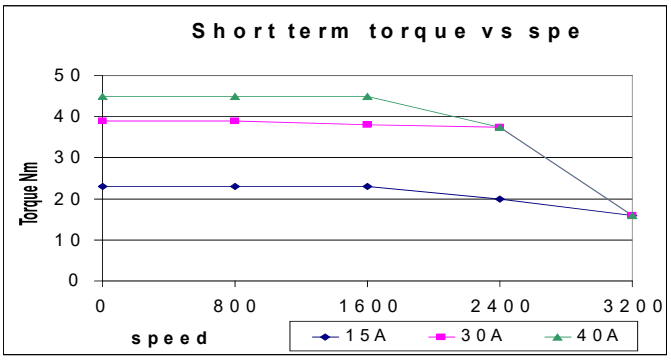
Data• were measured on an HDD14J-Pa series motor mounted on a vertical 450 x 375 x 30 mm steel plate in free air, with a winding temperature rise of 90ºC and driven by a commercially available inverter.

Important note on peak torque and currents

The HDD/ICM 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 40A rms current to a HDD14J-Pa will give some 45 Nm, but the copper winding temperature will increase with some 40ºC **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 7 A. The short term torque graph below represents acceleration ramps at various commanded currents; the actual currents may be lower if the driver has not been able to compensate for the high acceleration.

Torque at various commanded currents

HDD 14J-Pa at 560V rail voltage



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

Maximal axial load (push): 1000 N at 500 rpm, 300 at 3000 rpm.
Maximal axial load (pull): 100 N at all speeds.
Maximal radial load is given by the curves below.