HDD14N Data sheet

Electrical data

Value	unit	Winding	
		Pa	Ma
Number of poles		20	20
Number of pole pairs		10	10
Inductance/Phase	mH	2.25	0.89
Resistance/Phase	Ohm	0.32	0.14
Resistance/Phase-phase	Ohm	0.64	0.29
Back EMF/Phase-Phase RMS	Vs/rad	0.90	0.55
Back EMF @ 1000 rpm	V	95	58
Torque constant (RMS)	Nm/A	1.57	0.96
Max rail voltage	V	750	750
Recommended peak current	A	30	49
Torque at recommended peak current	Nm	45	45

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	HDD14N		ICM14N	
		no brake	brake	no brake	brake
J	kgcm²	32.6	33.0		
Mass	kg	10.0	10.5		

Holding brake

Torque	Nm	9
J	$kgcm^2$	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 termistors (one on each phase).

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

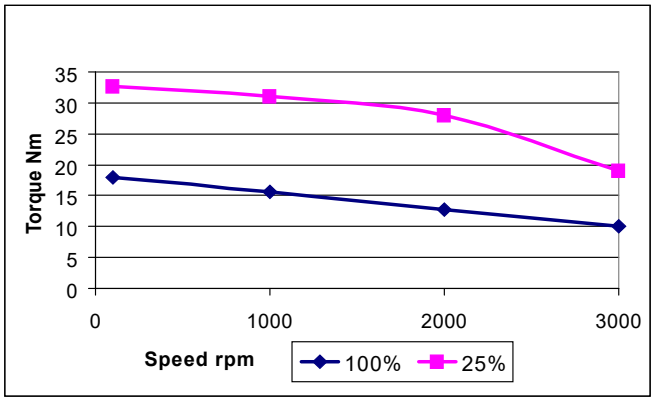
Motor name structure

Type	Flange size	Stator length	Winding	Feedback	Power connector	Brake	Shaft key	Options
HDD	14	N	- 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	18.0	32.7
1000rpm	15.7	31.0
2000rpm	12.7	28.0
3000rpm	10.0	19.0



Current at 90ºC temp rise, in Ampere rms

Duty cycle	100%		25%	
Winding	**Pa**	**Ma**	**Pa**	**Ma**
100rpm	12.5	20.5	23.2	38.0
1000rpm	11.2	18.3	22.3	36.5
2000rpm	9.2	15.1	21.0	34.4
3000rpm	7.7	12.6	19.0	31.1

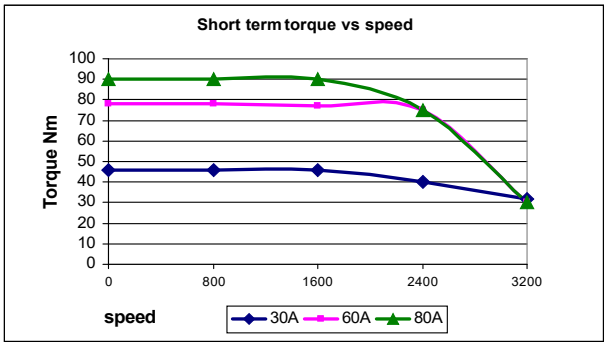
Data• were measured on an HDD14N-Pa series motor mounted on a vertical 450 x 375 x 30 mm steel plate in free air, with a winding temperature rise of 90ºC and driven by acommercially available inverter.

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 80A rms current to a HDD14N-Pa will give some 90 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 10 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 14N-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.