



Available Feedback Alternatives - HDD Servo Motors

Name	Type	Description	Information
A	Resolver	7 V input, 1 pole pair, 0.5 transf. ratio	
D	Resolver	9 V input, 1 pole pair, 0.3 transf. ratio	
EC	Endat 2.1 singleturn	32 lines (19 bits) per rev.	ECI 119
ED	Endat 2.2 singleturn	32 lines (19 bits) per rev.	EBI 135
EE	Endat 2.2 singleturn, SIL2	25 bits per rev.	ECN 1325
EF	Endat 2.2 multiturn, SIL2	25 bits per rev.	ECN 1337
EH	Endat 2.2	32 lines (19 bits) per rev.	ECI 119
EM	Endat 2.1 multiturn	512 lines per rev.	EQN 1325
EN	Endat 2.1 multiturn	2048 lines per rev.	EQN 1325
EO	Sincos, commutation signal	2048 lines per rev.	ERN 1387
EP	Endat 2.2 battery buffered multiturn	18 bits per rev.	EBI 1135
EQ	Endat 2.1 singleturn	18 bits per rev.	ECI 1118
ES	Endat 2.1 singleturn	512 lines per rev.	ECN 1313
ET	Endat 2.1 singleturn	2048 lines per rev.	ECN 1313
EV	Endat 2.2 singleturn	19 bits per rev.	ECI 1319
EW	Endat 2.2 multiturn	19 bits per rev.	EQI 1331
EY	Endat 2.2 singleturn	18 bits per rev.	ECI 1118
SS	Hiperface Sincos singleturn	1024 lines per rev.	Electrically equivalent to SRS50
SM	Hiperface Sincos multiturn	1024 lines per rev.	Electrically equivalent to SRM50



Over Temperature Protection and Thermistors

As a standard, HDD motors are equipped with overtemperature protection. The protection consists of three PTC thermistors in series, one for each phase. The PTC thermistors are manufactured according to norms DIN 44081 and DIN 44082. According to these norms, the resistance for a single thermistor at room temperature is in the range 20 Ohms – 250 Ohms. For three thermistors in series, the total room temperature resistance is typically between 150 Ohms – 300 Ohms (50 Ohms – 100 Ohms per thermistor) but can be as high as 750 Ohm without indicating malfunction.

The PTC thermistors have a switch temperature of 150 C. When $T < 145\text{ C}$, $R < 550\text{ Ohm}$ for each thermistor ($R < 1650\text{ Ohms}$ for the whole triplet), and when $T > 155\text{ C}$, $R > 1330\text{ Ohm}$ for each thermistor ($R < 4990\text{ Ohms}$ for the whole triplet). The resistance should be measured with a d.c. voltage no greater than 2.5V. More detailed information about the PTC resistors can be found [here](#).

As an option, HDD motors can be equipped with a temperature measurement device of type KTY84-130. Detailed information about this device can be found [here](#). The resistance of the KTY device depends continuously on temperature, as described in this document.