

Přílohy

Parametry motorů z RMxprrt

Tabulka .1: Parametry motoru z RMXprrt

	IPM1	IPM1	IPM2	IPM2	SPM	SPM
Coil type	Whole	Half	Whole	Half	Whole	Half
Rated Output Power (kW):	15	15	15	15	15	15
Rated Voltage (V):	183	183	183	183	183	183
Number of Poles:	6	6	6	6	6	6
Frequency (Hz):	300	300	300	300	300	300
Frictional Loss (W):	12	12	12	12	12	12
Windage Loss (W):	0	0	0	0	0	0
Rotor Position:	Inner	Inner	Inner	Inner	Inner	Inner
Type of Circuit:	L3	L3	L3	L3	L3	L3
Type of Source:	Sine	Sine	Sine	Sine	Sine	Sine
Domain:	Time	Time	Time	Time	Time	Time
Operating Temperature (C):	120	120	120	120	120	120
STATOR DATA						
No. of Stator Slots:	36	36	36	36	36	36
Outer Diameter of Stator (mm):	150	150	150	150	150	150
Inner Diameter of Stator (mm):	105,3	105,3	105,3	105,3	105,3	105,3
Type of Stator Slot:	2	3	2	3	2	3

	IPM1	IPM1	IPM2	IPM2	SPM	SPM
Stator Slot						
hs0 (mm):	0,5	0,5	0,5	0,5	0,5	0,5
hs1 (mm):	1	1	1	1	1	1
hs2 (mm):	7,82	9,25	8,24	10,93	9,7	11,19
bs0 (mm):	2,5	2,5	2,5	2,5	2,5	2,5
bs1 (mm):	4,65	4,65	4,65	4,65	4,65	4,65
bs2 (mm):	6,18	6,54	6,25	6,62	6,40	6,78
rs (mm):		0		0		0
Top Tooth Width (mm):	4,63	4,63	4,63	4,63	4,63	4,63
Bottom Tooth Width (mm):	4,63	4,63	4,63	4,63	4,63	4,63
Skew Width (No. of Slots):	0	0	0	0	0	0
Length of Stator Core (mm):	45	45	45	45	45	45
Stacking Factor of Core:	0,95	0,95	0,95	0,95	0,95	0,95
Type of Steel:	H50A	H50A	H50A	H50A	H50A	H50A
Designed Wedge Th (mm):	1	0,999	0,999	0,999	0,999	0,999
Slot Insulation Th (mm):	0,3	0,3	0,3	0,3	0,3	0,3
Layer Insulation Th (mm):	0	0	0	0	0	0
End Length Adjust (mm):	0	0	0	0	0	0
No. of Parallel Branches:	2	2	2	2	2	2
No. of Cond. per Slot:	23	24	28	28	31	31
Type of Coils:	11	12	11	12	11	12
Average Coil Pitch:	5	6	5	6	5	6

	IPM1	IPM1	IPM2	IPM2	SPM	SPM
No. of Wires per Cond.:	2	2	2	2	2	2
Wire Diameter (mm):	0,8118	0,8118	0,8118	0,7229	0,8118	0,7229
Wire Wrap Thickness (mm):	0	0	0	0	0	0
Slot Area (mm ²):	62,97	61,05	65,96	63,99	71,89	69,84
Net Slot Area (mm ²):	47,54	45,34	50,24	47,99	55,62	53,26
Limited Slot FF (%):	75	75	75	75	75	75
Stator Slot FF (%):	63,76	69,77	73,46	60,98	73,47	60,83
Coil Half-Turn L. (mm):	115,59	127,39	116,14	127,94	117,22	129,01
Wire Resist (ohm,mm ² /m):	0,0217	0,0217	0,0217	0,0217	0,0217	0,0217
ROTOR DATA						
Minimum Air Gap (mm):	0,15	0,15	0,15	0,15	0,65	0,65
Inner Diameter (mm):	26	26	80	80	70	70
Length of Rotor (mm):	45	45	45	45	45	45
Stack. Fact of Core:	0,95	0,95	0,95	0,95	0,95	0,95
Type of Steel:	M400	M400	M400	M400	M400	M400
Shaft Diameter (mm):	20	20	1	1	52	52
Emnrace (mm):			0	0	0,7	0,7
Mechanical Pole Embrace:	0,7813	0,7813	0,7617	0,7617	0,7000	0,7000
Electrical Pole Embrace:	0,7957	0,7957	0,7633	0,7633		
Max, Thick. of PM (mm):	12	12	4	4	3,5	3,5
Width of Magnet (mm):	37	37	40	40	37	37
Type of Magnet:	NdFe35	NdFe35	NdFe35	NdFe35	NdFe35	NdFe35

	IPM1	IPM1	IPM2	IPM2	SPM	SPM
PERMANENT MAGNET DATA						
Residual Flux Density (Tesla):	1,23	1,23	1,23	1,23	1,23	1,23
Coercive Force (kA/m):	890	890	890	890	890	890
Max. Energy Density (kJ/m ³):	273,7	273,7	273,7	273,7	273,7	273,7
Relative Recoil Permeability:	1,099	1,099	1,099	1,099	1,099	1,099
Demagnetized Flux Density (Tesla):	0	0	0	0	0	0
Recoil Resid Flux Density (Tesla):	1,23	1,23	1,23	1,23	1,23	1,23
Recoil Coercive Force (kA/m):	890	890	890	890	890	890
MATERIAL CONSUMPTION						
Arm. Wire Density (kg/m ³):	8900	8900	8900	8900	8900	8900
Permanent Magnet Density (kg/m ³):	7400	7400	7400	7400	7400	7400
Arm. Core Steel Density (kg/m ³):	7872	7872	7872	7872	7872	7872
Rotor Core Steel Density (kg/m ³):	7872	7872	7872	7872	7872	7872
Arm. Copper Weight (kg):	0,88	1,01	1,08	0,94	1,21	1,05
Permanent Magnet Weight (kg):	0,89	0,89	0,32	0,32	0,26	0,26
Arm. Core Steel Weight (kg):	2,25	2,28	2,22	2,24	2,15	2,17
Rotor Core Steel Weight (kg):	1,78	1,78	0,90	0,90	1,19	1,19
Total Net Weight (kg):	5,80	5,96	4,51	4,40	4,99	4,67
Arm. Core Steel Consumption (kg):	4,95	4,95	4,95	4,95	5,47	5,47
Rotor Core Steel Consumption (kg):	2,93	2,93	2,93	2,93	2,64	2,64

	IPM1	IPM1	IPM2	IPM2	SPM	SPM
STEADY STATE PARAMETERS						
Stator Winding Factor:	0,966	0,966	0,966	0,966	0,966	0,966
D-Axis Reactive Reactance X_{ad} (ohm):	2,012	2,191	2,618	2,618	2,318	2,318
Q-Axis Reactive Reactance X_{aq} (ohm):	15,753	17,153	22,033	22,033	2,318	2,318
D-Axis Reactance X_1+X_{ad} (ohm):	2,530	2,805	3,235	3,303	3,080	3,163
Q-Axis Reactance X_1+X_{aq} (ohm):	16,271	17,768	22,649	22,718	3,080	3,163
Arm. Leakage Reactance X_1 (ohm):	0,518	0,615	0,617	0,685	0,762	0,845
Zero-Sequence Reactance X_0 (ohm):	0,518	0,615	0,617	0,685	0,762	0,845
Arm. Phase Resistance R_1 (ohm):	0,191	0,220	0,234	0,325	0,262	0,363
Arm. Phase Resistance at 20C (ohm):	0,138	0,158	0,168	0,234	0,188	0,261
NO-LOAD MAGNETIC DATA						
Stator-Teeth Flux Density (Tesla):	2,311	2,293	1,986	1,976	1,892	1,883
Stator-Yoke Flux Density (Tesla):	2,187	2,184	1,860	1,863	1,791	1,520
Rotor-Yoke Flux Density (Tesla):	0,607	0,603	1,565	1,558	1,280	1,273
Air-Gap Flux Density (Tesla):	1,032	1,024	0,887	0,883	0,827	0,823
Magnet Flux Density (Tesla):	0,712	0,708	1,014	1,009	0,891	0,887
Stator-Teeth By-Pass Factor:	0,07678	0,07411	0,02129	0,02104	0,01382	0,01384
Stator-Yoke By-Pass Factor:	0,015022	0,014728	0,000774	0,000784	0,000584	0,000598
Rotor-Yoke By-Pass Factor:	5,32E-05	5,32E-05	0,00016	0,00015	8,05E-05	7,98E-05
Stator-Teeth Ampere Turns (A,T):	1069,0	1103,2	264,3	279,2	174,7	185,9

	IPM1	IPM1	IPM2	IPM2	SPM	SPM
Stator-Yoke Ampere Turns (A,T):	1003,4	987,2	175,0	176,8	157,8	160,5
Rotor-Yoke Ampere Turns (A,T):	6,2	6,1	41,1	40,2	20,8	20,6
Air-Gap Ampere Turns (A,T):	169,5	168,2	145,7	144,9	505,1	502,6
Magnet Ampere Turns (A,T):	-2247,4	-2264,7	-626,4	-640,8	-858,0	-869,4
Leakage-Flux Factor:	1,1568	1,1592	1,0913	1,0913	1	1
Correction Factor for Magnetic Circuit Length of Stator Yoke:	0,2213	0,2215	0,3137	0,3133	0,3776	0,3764
Correction Factor for Magnetic Circuit Length of Rotor Yoke:	0,734	0,734	0,443	0,447	0,625	0,627
No-Load Line Current (A):	6,383	0,793	1,726	2,200	0,619	1,153
No-Load Input Power (W):	171,26	145,07	98,25	108,07	20,76	22,14
Cogging Torque (N,m):	1,356	1,335	0,959	0,950	1,423	1,409
FULL-LOAD DATA						
Max. Line Induced Voltage (V):	250	259	258	257	263	262
Root-Mean-Square Line Current (A):	53	54	52	53	50	51
Root-Mean-Square Phase Current (A):	35	34	32	32	29	29
Arm. Thermal Load (A ² /mm ³):	726	737	760	956	687	892
Specific Electric Loading (A/mm):	43	45	49	49	49	50
Arm. Current Density (A/mm ²):	17	17	16	20	14	18
Frictional and Windage Loss (W):	12	12	12	12	12	12
Iron-Core Loss (W):	309,26200	315,3	221,73800	227,71800	198,09150	203,69700

	IPM1	IPM1	IPM2	IPM2	SPM	SPM
Arm. Copper Loss (W):	552	617	580	805	530	757
Total Loss (W):	861	933	802	1032	728	961
Output Power (W):	14991	14999	14998	14994	15006	15000
Input Power (W):	15852	15932	15800	16027	15734	15961
Efficiency (%):	94,5	94,7	93,7	93,3	95,1	95
Synchronous Speed (rpm):	6000	6000	6000	6000	6000	6000
Rated Torque (N,m):	30,8589	23,8715	49,8699	50,8644	26,883	26,8733
Torque Angle (degree):	47,4391	48,0717	57,2638	58,3755	25,7223	26,9969
Max. Output Power (W):	57290,2	51504	328691,6	31720	29084,5	30412,9
Torque Constant KT (Nm/A):	0,100615	0,0150167	0	0,00533663	0,0927496	0,256445
WINDING ARRANGEMENT						
Angle per slot (elec, degrees):	30	30	30	30	30	30
Phase-A axis (elec, degrees):	105	105	105	105	105	105
First slot center (elec, degrees):	0	0	0	0	0	0
TRANSIENT FEA INPUT DATA						
For Arm. Winding:						
No. of Turns:	138	144	168	168	186	186
Parallel Branches:	2	2	2	2	2	2
Terminal Resistance (ohm):	0,191	0,220	0,234	0,325	0,261	0,363
End Leakage Inductance (H):	6,98E-05	0,000104	0,000106	0,00014	0,000138	0,00018

	IPM1	IPM1	IPM2	IPM2	SPM	SPM
2D Equivalent Value:						
Equivalent Model Depth (mm):	45	45	45	45	45	45
Equivalent Stator Stacking Factor:	0,95	0,95	0,95	0,95	0,95	0,95
Equivalent Rotor Stacking Factor:	0,95	0,95	0,95	0,95	0,95	0,95
Equivalent Br (Tesla):	1,23	1,23	1,23	1,23	1,23	1,23
Equivalent Hc (kA/m):	890	890	890	890	890	890
Rotor Inert. Moment (kg m ²):	0,00418	0,00418	0,00418	0,00418	0,00403	0,00403

Datový list IGBT modulu

4. Absolute Maximum Ratings						
T _c =25°C, V _{cc} =15V unless otherwise specified.						
Items		Symbol	Min.	Max.	Units	
Collector-Emitter Voltage *1		V _{CES}	0	600	V	
Short Circuit Voltage		V _{sc}	200	400	V	
Inverter	Collector Current	DC	I _c	-	400	A
		1ms	I _{CP}	-	800	A
		Duty=68.6% *2	-I _c	-	400	A
Collector Power Dissipation		1 device *3	P _c	-	1086	W
Brake	Collector Current	DC	I _c	-	200	A
		1ms	I _{CP}	-	400	A
	Forward Current of Diode		I _F	-	200	A
	Collector Power Dissipation		1 device *3	P _c	-	714
Supply Voltage of Pre-Driver *4		V _{cc}	-0.5	20	V	
Input Signal Voltage *5		V _{in}	-0.5	V _{cc} +0.5	V	
Alarm Signal Voltage *6		V _{ALM}	-0.5	V _{cc}	V	
Alarm Signal Current *7		I _{ALM}	-	20	mA	
Junction Temperature		T _j	-	150	°C	
Operating Case Temperature		T _{opr}	-20	110	°C	
Storage Temperature		T _{stg}	-40	125	°C	
Solder Temperature *8		T _{sol}	-	260	°C	
Isolating Voltage *9		V _{iso}	-	AC2500	V _{rms}	
Screw Torque		Terminal (M5)	-	-	3.5	Nm
		Mounting (M5)	-	-	3.5	Nm

Notes

*1: V_{CES} shall be applied to the input voltage between all Collector and Emitter.

[P1-(U,V,W,B) , P2-(U,V,W,B) , (U,V,W,B)-N1 , (U,V,W,B)-N2]

*2: Duty=125°C/R_{th(j-c)D}/(I_F×V_F Max.)×100

*3: P_c=125°C/R_{th(j-c)Q} (Inverter & Brake)

*4: V_{cc} shall be applied to the input voltage between terminal No.3 and 1, 7 and 5, 11 and 9, 14 and 13.

*5: V_{in} shall be applied to the input voltage between terminal No.2 and 1, 6 and 5, 10 and 9, 15~18 and 13.

*6: V_{ALM} shall be applied to the voltage between terminal No.4 and 1, 8 and 5, 12 and 9, 19 and 13.

*7: I_{ALM} shall be applied to the input current to terminal No.4,8,12 and 19.

*8: Immersion time 10±1sec. 1 time

*9: Terminal to base, 50/60Hz sine wave 1min. All terminals should be connected together during the test.

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Datový list materiálu Hiperco 50A

22.5.2015

ImageDisplay

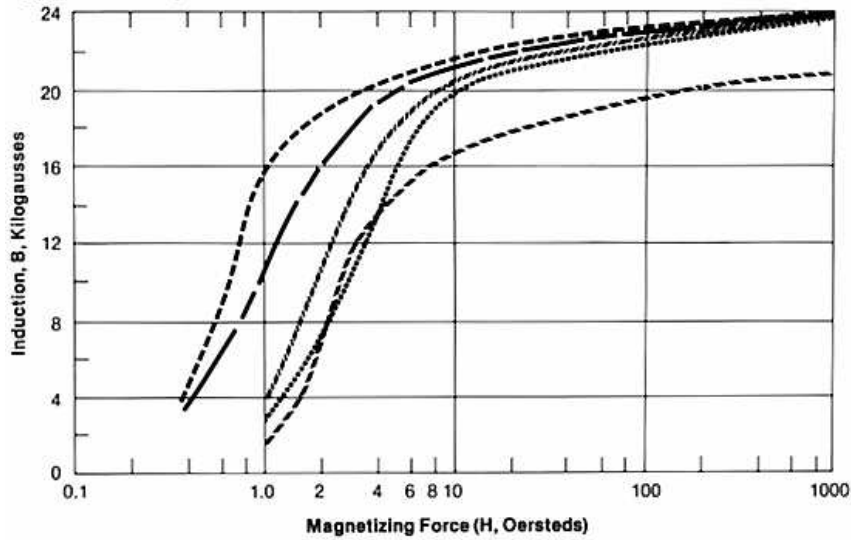
Technical
Datasheet



Hiperco® 50A Alloy

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Typical D.C. Magnetization Curves—Hiperco 50A Alloy vs. Electrical Iron



- Hiperco 50A strip, .035" (.89 mm) thick, 1600°F (871°C), 2 hr., dry H₂.
- Hiperco 50A bar, 1875°F (1010°C), water quenched plus 1600°F (871°C), 2 hr., dry H₂.
- · - · - · Hiperco 50A bar, 1600°F (871°C), 2 hr., dry H₂.
- Hiperco 50A bar, 1533°F (820°C), 2 hr., dry H₂.
- Electrical Iron bar, 1550°F (843°C), 4 hr., wet H₂, FC.

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Datový list motoru TG Drives N6-1800

RATED DATA

Motor type

	N6	1800	80	280
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Special condition - cooling

Rated Speed	n_n	8000 min^{-1}
DC Bus Voltage	U_{dc}	280 V
Nominal AC Voltage	U_n	190 V
Rated Motor Voltage	U_m	150 V
Rated Torque	M_n	10,0 Nm
Rated AC Current	I_n	40,7 A
Stall Torque	M_o	25,0 Nm
Stall AC Current	I_o	76 A
Peak Torque	M_{max}	51 Nm
Peak Current	I_{max}	202 A
Max. Speed	n_{max}	6000 min^{-1}
EMF Constant	K_E	20,0 V/1000
Torque Constant	K_T	0,33 Nm/A
Terminal Resistance	R_{2ph}	0,03 Ω
Terminal Inductance	L_{2ph}	0,37 mH
Number of poles	$2p$	10

No Load Speed	n_o	9490 min^{-1}
Torque at I_{max}/U_n	M_z	50 Nm
Speed at I_{max}/U_n	n_z	4240 min^{-1}
Max. Torque at n_n	M_x	19,8 Nm

El. Time Constant	T_{el}	12,3 ms
Mech. Time Constant	T_{mech}	0,88 ms
Thermal Time Constant	T_{th}	42 min
Rotor Inertia	J	18,5 kgcm^2



15.10.2014

