

Brushless DC Outer-Rotor Motors **KINETIMAX HPD - 095**

95 mm diameter, 0.92 to 2.52 Nm continuous torque, up to 580 Watts



The KinetiMax HPD (High Power Density) Series motors are frameless, outer-rotor brushless DC motors designed as stator-rotor part sets. With an exceptional torque-to-weight ratio, these motors are ideal for weight-sensitive applications.

The large stator inner diameter (ID) accommodates larger ball bearings, while the clear aperture allows cabling to pass through the motor. Additionally, low cogging torque and high peak torque characteristics enhance performance in demanding servo applications. The HPD series provides flexible configuration options to deliver optimal performance tailored to your application's needs.

KEY FEATURES & BENEFITS

Efficiency:

Exceptional efficiency ranging from 81% to 91% across a broad speed-torque range, ensuring optimal performance near the nominal working point.

High Torque-to-Weight Ratio:

Delivers powerful torque while keeping weight to a minimum, critical in battery-operated and portable systems.

Torque Range:

Rated torque from 0.92 Nm to 2.52 Nm for diverse.

Multiple Voltage Options:

Winding selections available to match specific voltage requirements.

Battery Optimization:

High efficiency is ideal for battery-powered applications, maximizing operational time per charge.



OPTIONS & ACCESSORIES

Frame Sizes & Stack Heights:

Available in six frame sizes with three different stack heights to suit various space and performance constraints.

Commutation Sensors:

Integrated Hall effect sensor board for precise commutation.

Thermal Monitoring:

Stator-mounted temperature sensor for thermal management and protection.

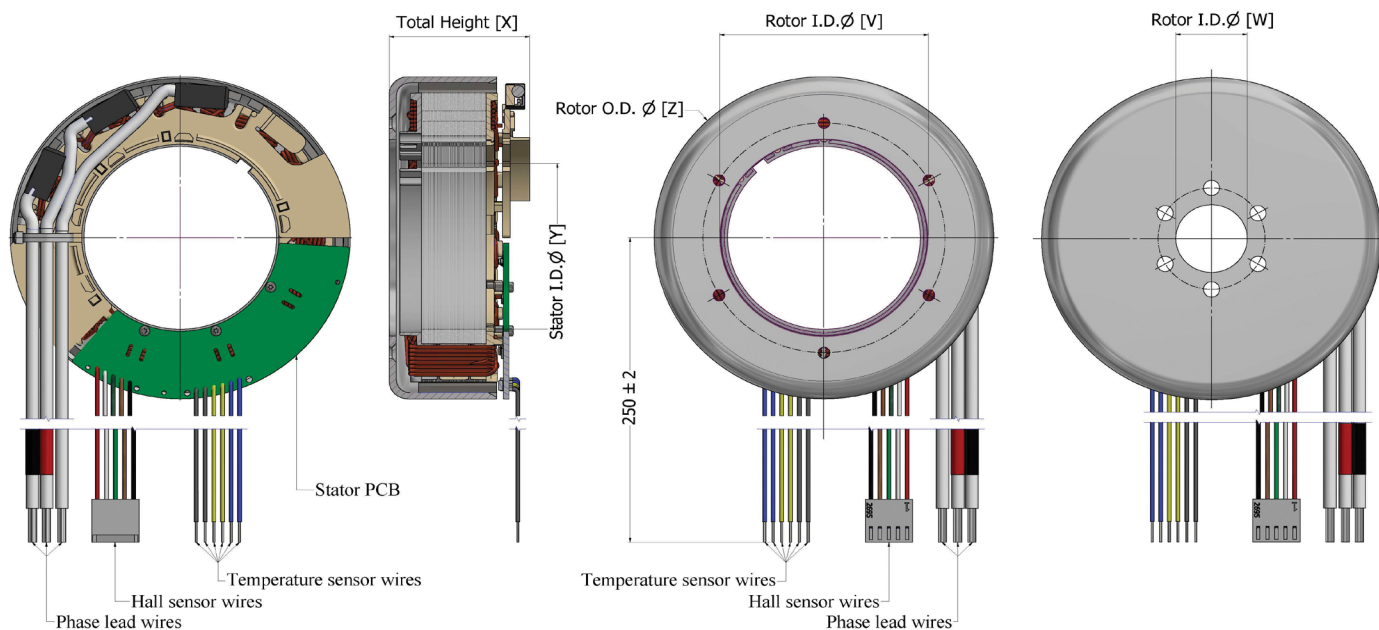
APPLICATIONS

The KinetiMax HPD Series motors are well-suited for a variety of high-performance applications:

Including

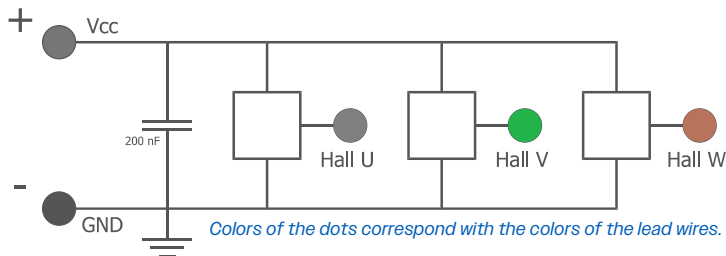
- Automated Guided Vehicles (AGVs)
- Robotics (arms, joints, end-effectors)
- Handheld hydraulic power tools
- Material handling systems
- Medical devices and equipment
- Rotary actuators and gimbals

DIMENSIONS



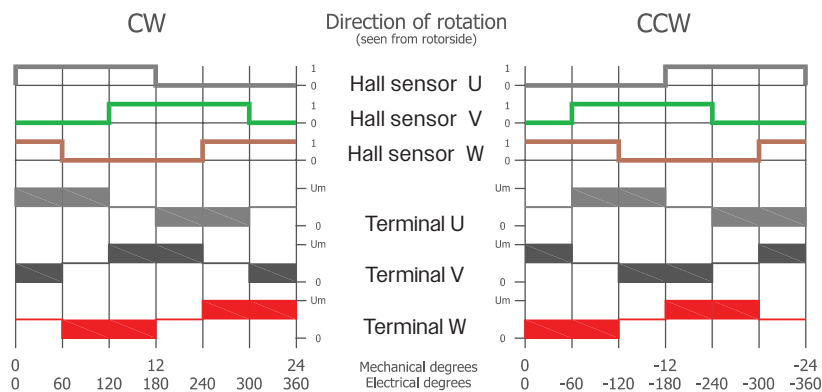
HALL SENSORS

Connections/Specifications:



Specification Item	Value [typ.]
Supply Voltage [VCC]	3.0-32V
Supply Current	4.8 mA
Temperature Range	-40 °C +170 °C
Output Type	Open drain
Max Output Voltage	32 V
Max Output Current	25 mA

Switching Sequence:

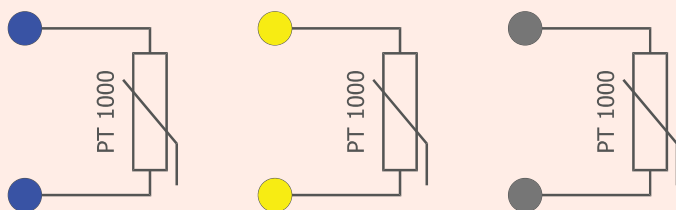


The colors of the 3 Hall sensor signals correspond with the 3 colors of the Hall lead wires.

The colors of the 3 signals of the terminals U, V, W, correspond with the 3 colors of the motor lead wires.

TEMPERATURE SENSORS

Connections/Specifications:



Specification Item	Value [typ.]
Resistance at 0°C	1000 Ohm
Temperature Coefficient	+ 3850 ppm/K
Temperature Range	-40 °C / +175 °C
$\Delta T^{(1)}$	T.B.D.

(1) Due to the thermal coupling between the winding and sensor, the temperature measured by the sensor will be lower than the actual temperature of the winding.

Optional sensor types are possible after consulting the factory (PTC, NTC).

SPECIFICATIONS

		KMF 095 01							
Winding Identification ³		C	D	E	F	G	H	J	K
Nominal Supply Voltage DC Link	Volt	18	24	36	42	60	72	72	72
Rated Output Power ¹	Watt	291	312	338	315	325	292	222	164
Rated Speed	RPM	3019	3233	3510	3270	3369	3027	2298	1698
Rated Torque ¹	Nm	0.92							
Rated Line Current ^{1,4}	Arms	13.8	11.0	7.9	6.4	4.6	3.4	2.6	2.0
Max Efficiency	%	88							
No Load Speed (@ nominal voltage)	RPM	3149	3359	3637	3394	3499	3149	2424	1818
BEMF Constant Ke	V/kRPM	5.7	7.1	9.9	12.4	17.1	22.9	29.7	39.6
Motor Speed Constant Kv (=1/Ke)	RPM/V	175.0	140.0	101.0	80.8	58.3	43.7	33.7	25.3
Continuous Stall Torque ¹	Nm	1.15							
Continuous Stall Line Current (rms) ¹	Arms	17.2	13.8	9.9	7.9	5.7	4.3	3.3	2.5
Peak Torque	Nm	3.00							
Max. Demagnetization Line Current	A	106	85	61	49	35	26	20	15
Torque/Rms Line Current Kt ⁴	Nm/Arms	0.067	0.084	0.116	0.145	0.201	0.267	0.347	0.463
Resistance (terminal-to-terminal)	mOhm	44	67	129	197	398	666	1159	1963
Inductance (terminal-to-terminal)	μH	35	54	104	163	312	555	937	1666
Back EMF (@1000 RPM terminal-to-terminal)	Vrms	4.0	5.1	7.0	8.8	12.1	16.2	21.0	28.0
Thermal Resistance (stator/rotor to ambient) ¹	°C/W	1.83							
Thermal Resistance Winding-Housing	°C/W	1.60							
Max. Winding Temperature	°C	160							
Number of Pole Pairs		15							
Weight	kg	0.45							
Rotor Inertia - Large I.D.	kgm ² *E-6	348							
Rotor Inertia - Small I.D.	kgm ² *E-6	366							
Mechanical Time Constant	ms	3.4							
Electrical Time Constant	ms	0.8							
Motor Constant Km	Nm/ sqrt(W)	0.264							

(1) Assuming the stator-rotor set is mounted on a bracket with an aluminium flange diameter 1.5 times rotor diameter.

(2) See the dimensions in the drawing (page 6).

(3) Windings C, D, G and H are delta connected, windings E, F, J and K are wye connected.

(4) Line currents are the AC currents running into the three terminals of the stator.

SPECIFICATIONS

		KMF 095 01							
Winding Identification ³		C	D	E	F	G	H	J	K
Cogging Torque (typical, peak to peak)	Nm	0.023							
Drag Torque	Nm	0.022							
Viscous Damping	Nm/RPM	1.5E-05							
Thermal Time Constant of Winding Only	s	28							
Adiabatic Heating of Winding at Peak Torque	K/s	5							
Rotor Inner Diameter [V] ²	mm	58							
Rotor Inner Diameter [W] ²	mm	20							
Rotor Outer Diameter [Z] ²	mm	95.2							
Stator Inner Diameter [Y] ²	mm	54.0							
Total Height [X] ²	mm	28.0							
Motor Lead Wire AWG Size		12	12	14	14	20	20	20	20

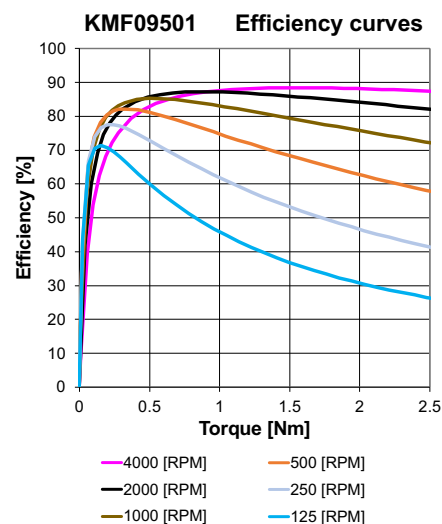
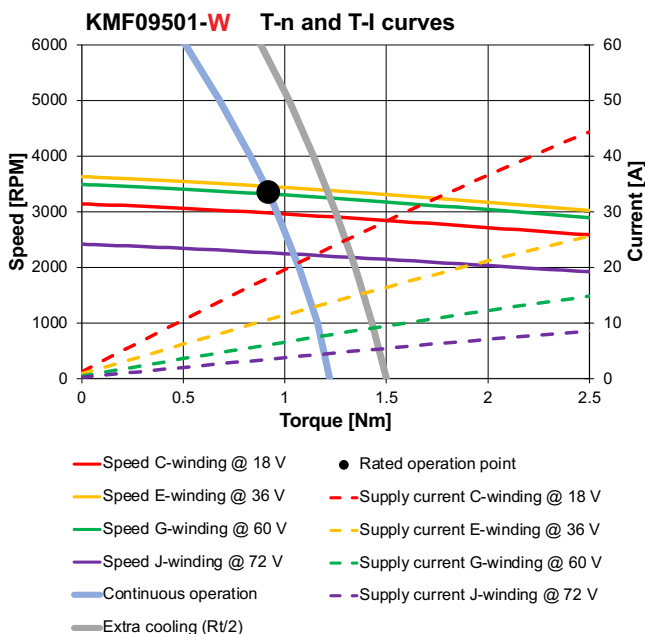
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(2) See the dimensions in the drawing (page 6).

(3) Windings C, D, G and H are delta connected, windings E, F, J and K are wye connected.

(4) Line currents are the AC currents running into the three terminals of the stator.

PERFORMANCE



SPECIFICATIONS

		KMF 095 02							
Winding Identification ³		C	D	E	F	G	H	J	K
Nominal Supply Voltage DC Link	Volt	30	36	48	60	72	72	72	72
Rated Output Power ¹	Watt	499	479	460	460	395	293	220	161
Rated Speed	RPM	2646	2539	2439	2441	2096	1552	1169	857
Rated Torque ¹	Nm	1.80							
Rated Line Current ^{1,4}	Arms	14.1	11.3	8.1	6.5	4.7	3.5	2.7	2.0
Max Efficiency	%	89							
No Load Speed (@ nominal voltage)	RPM	2747	2637	2538	2538	2198	1648	1269	952
BEMF Constant Ke	V/kRPM	10.9	13.7	18.9	23.6	32.8	43.7	56.7	75.7
Motor Speed Constant Kv (=1/Ke)	RPM/V	91.6	73.3	52.9	42.3	30.5	22.9	17.6	13.2
Continuous Stall Torque ¹	Nm	2.20							
Continuous Stall Line Current (rms) ¹	Arms	17.2	13.8	9.9	8.0	5.7	4.3	3.3	2.5
Peak Torque	Nm	6.00							
Max. Demagnetization Line Current	A	111	89	64	51	37	28	21	16
Torque/Rms Line Current Kt ⁴	Nm/Arms	0.128	0.160	0.221	0.277	0.383	0.511	0.664	0.885
Resistance (terminal-to-terminal)	mOhm	64	97	188	288	578	973	1699	2884
Inductance (terminal-to-terminal)	μH	63	99	189	296	568	1010	1704	3029
Back EMF (@1000 RPM terminal-to-terminal)	Vrms	7.7	9.7	13.4	16.7	23.2	30.9	40.1	53.5
Thermal Resistance (stator/rotor to ambient) ¹	°C/W	1.62							
Thermal Resistance Winding-Housing	°C/W	0.80							
Max. Winding Temperature	°C	160							
Number of Pole Pairs		15							
Weight	kg	0.69							
Rotor Inertia - Large I.D.	kgm ² *E-6	494							
Rotor Inertia - Small I.D.	kgm ² *E-6	513							
Mechanical Time Constant	ms	1.9							
Electrical Time Constant	ms	1.0							
Motor Constant Km	Nm/ sqrt(W)	0.418							

(1) Assuming the stator-rotor set is mounted on a bracket with an aluminium flange diameter 1.5 times rotor diameter.

(2) See the dimensions in the drawing (page 6).

(3) Windings C, D, G and H are delta connected, windings E, F, J and K are wye connected.

(4) Line currents are the AC currents running into the three terminals of the stator.

SPECIFICATIONS

		KMF 095 02							
Winding Identification ³		C	D	E	F	G	H	J	K
Cogging Torque (typical, peak to peak)	Nm	0.045							
Drag Torque	Nm	0.045							
Viscous Damping	Nm/RPM	3.0E-05							
Thermal Time Constant of Winding Only	s	20							
Adiabatic Heating of Winding at Peak Torque	K/s	5							
Rotor Inner Diameter [V] ²	mm	58							
Rotor Inner Diameter [W] ²	mm	20							
Rotor Outer Diameter [Z] ²	mm	95.2							
Stator Inner Diameter [Y] ²	mm	54.0							
Total Height [X] ²	mm	36.5							
Motor Lead Wire AWG Size		12	12	14	14	20	20	20	20

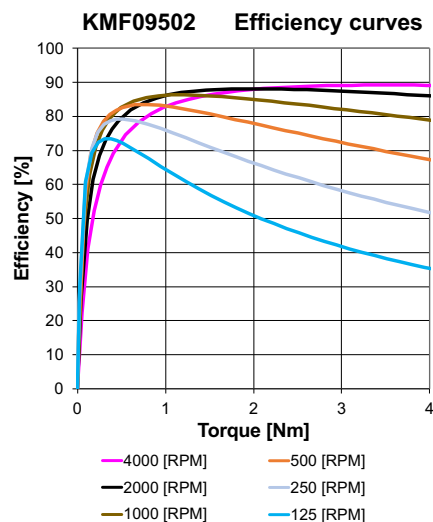
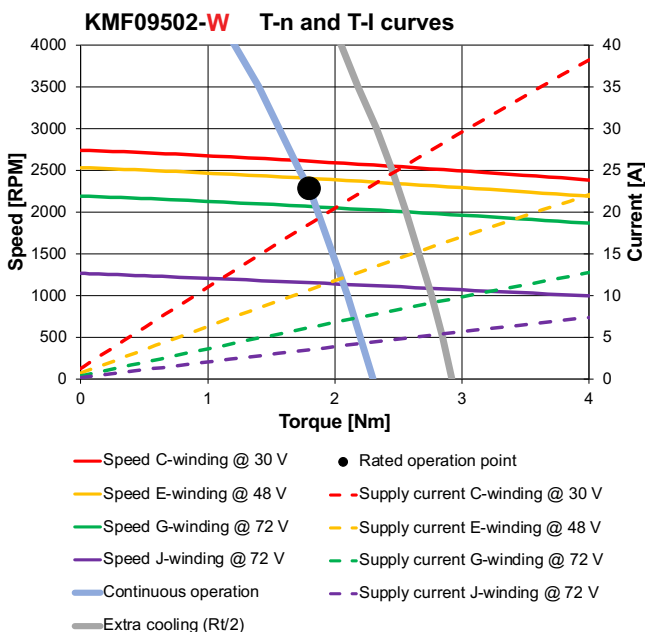
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(3) Windings C, D, G and H are delta connected, windings E, F, J and K are wye connected.

(4) Line currents are the AC currents running into the three terminals of the stator.

PERFORMANCE



SPECIFICATIONS

		KMF 095 03							
Winding Identification ³		C	D	E	F	G	H	J	K
Nominal Supply Voltage DC Link	Volt	36	42	60	72	72	72	72	72
Rated Output Power ¹	Watt	585	544	562	539	382	281	210	153
Rated Speed	RPM	2215	2063	2129	2042	1446	1066	798	580
Rated Torque ¹	Nm	2.52							
Rated Line Current ^{1,4}	Arms	13.8	11.0	8.0	6.4	4.6	3.4	2.7	2.0
Max Efficiency	%	89							
No Load Speed (@ nominal voltage)	RPM	2305	2152	2218	2130	1537	1153	887	666
BEMF Constant Ke	V/kRPM	15.6	19.5	27.0	33.8	46.8	62.5	81.1	108.2
Motor Speed Constant Kv (=1/Ke)	RPM/V	64.0	51.2	37.0	29.6	21.3	16.0	12.3	9.2
Continuous Stall Torque ¹	Nm	3.16							
Continuous Stall Line Current (rms) ¹	Arms	17.3	13.8	10.0	8.0	5.8	4.3	3.3	2.5
Peak Torque	Nm	9.00							
Max. Demagnetization Line Current	A	116	93	67	54	39	29	22	17
Torque/Rms Line Current Kt ⁴	Nm/Arms	0.183	0.228	0.316	0.395	0.548	0.731	0.949	1.265
Resistance (terminal-to-terminal)	mOhm	83	128	247	379	758	1280	2240	3805
Inductance (terminal-to-terminal)	μH	93	145	279	436	837	1489	2512	4466
Back EMF (@1000 RPM terminal-to-terminal)	Vrms	11.0	13.8	19.1	23.9	33.1	44.2	57.4	76.5
Thermal Resistance (stator/rotor to ambient) ¹	°C/W	1.46							
Thermal Resistance Winding-Housing	°C/W	0.53							
Max. Winding Temperature	°C	160							
Number of Pole Pairs		15							
Weight	kg	0.93							
Rotor Inertia - Large I.D.	kgm ² *E-6	641							
Rotor Inertia - Small I.D.	kgm ² *E-6	659							
Mechanical Time Constant	ms	1.6							
Electrical Time Constant	ms	1.1							
Motor Constant Km	Nm/ sqrt(W)	0.521							

(1) Assuming the stator-rotor set is mounted on a bracket with an aluminium flange diameter 1.5 times rotor diameter.

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(4) Line currents are the AC currents running into the three terminals of the stator.

SPECIFICATIONS

		KMF 095 03							
Winding Identification ³		C	D	E	F	G	H	J	K
Cogging Torque (typical, peak to peak)	Nm	0.063							
Drag Torque	Nm	0.056							
Viscous Damping	Nm/RPM	4.0E-05							
Thermal Time Constant of Winding Only	s	18							
Adiabatic Heating of Winding at Peak Torque	K/s	6							
Rotor Inner Diameter [V] ²	mm	58							
Rotor Inner Diameter [W] ²	mm	20							
Rotor Outer Diameter [Z] ²	mm	95.2							
Stator Inner Diameter [Y] ²	mm	54.0							
Total Height [X] ²	mm	45.5							
Motor Lead Wire AWG Size		12	12	14	14	20	20	20	20

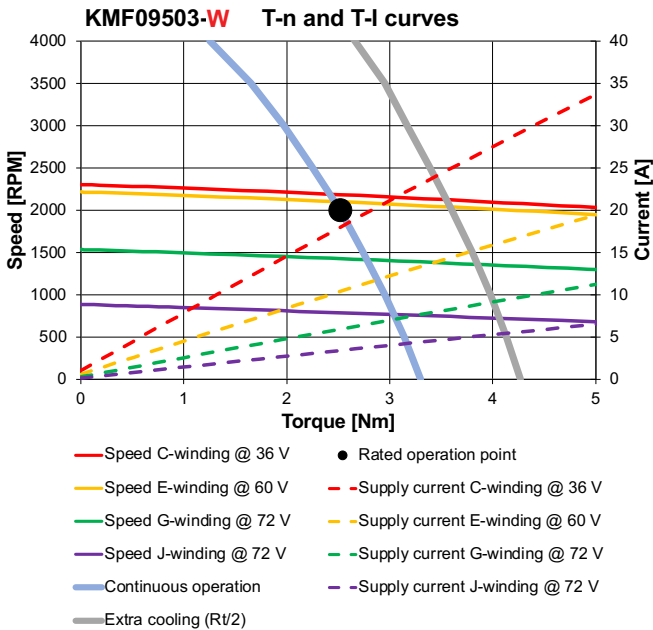
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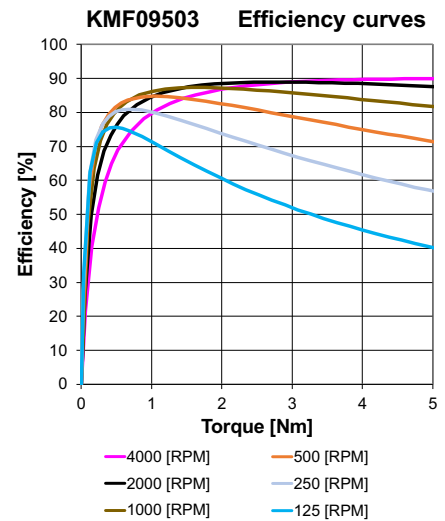
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PERFORMANCE

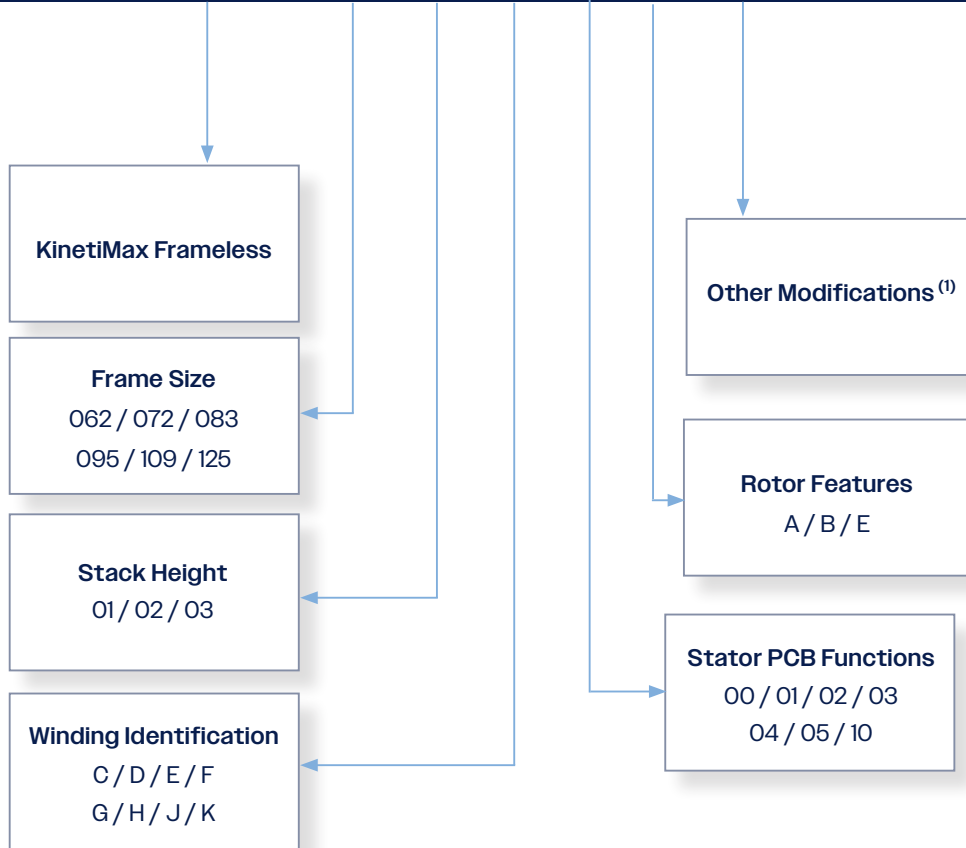


Supply current is the DC current taken from the DC power supply by the drive. The torque-speed curves and torque-current curves are made assuming a FOC drive is used.



COMMERCIAL PART NUMBERING KMF HPD STATOR-ROTOR SETS

KMF xxx yy - W zz R - vv



ZZ	Stator PCB functions	R	Rotor features
00	No PCB	A	Large bore hole, G40 balancing class
01	PCB with 3 Hall sensors	B	Small bore hole, G40 balancing class
02	PCB with 1 temperature sensor only	E	Custom rotor or balancing
03	PCB with 3 Hall sensors and 1 temperature sensor		
04	PCB with 3 temperature sensors only		
05	PCB with 3 Hall sensors and 3 temperature sensors		
10	Starting with 1 are custom PCB's		

(1) Other modifications are meant custom added parts to stator or rotor like a stator bracket, other leadwires with connector or a rotor nave/shaft etc.