Allied Motion
An Allient Company

Brushless DC Outer-Rotor Motors

KINETIMAX HPD - 083

83 mm diameter, 0.58 to 1.63 Nm continuous torque, up to 460 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 0.58 Nm to 1.63 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 timeper 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.

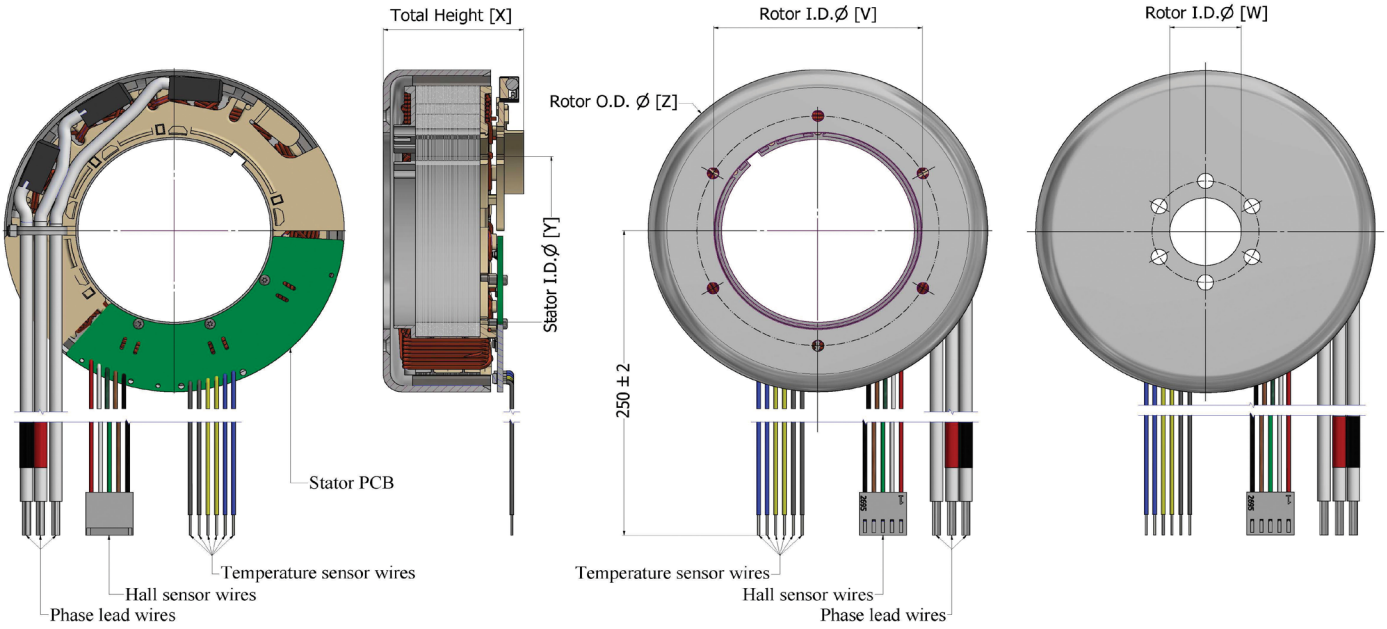
APPLICATIONS

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



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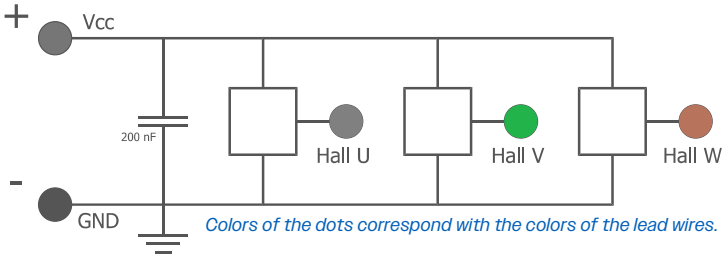
HALL SENSORS

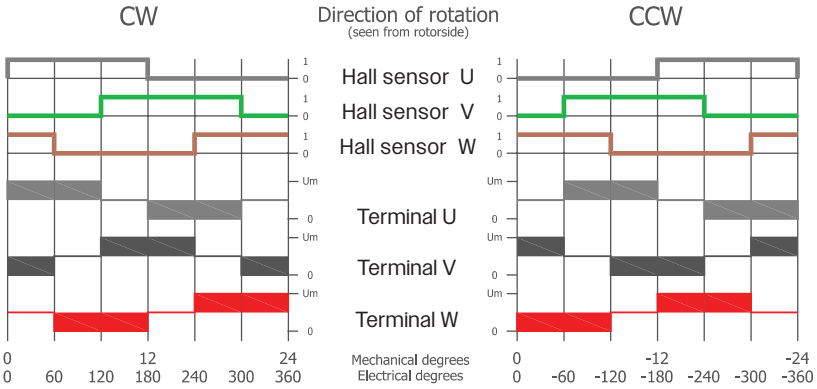
Connections/Specifications:



Colors of the dots correspond with the colors of the lead wires.

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

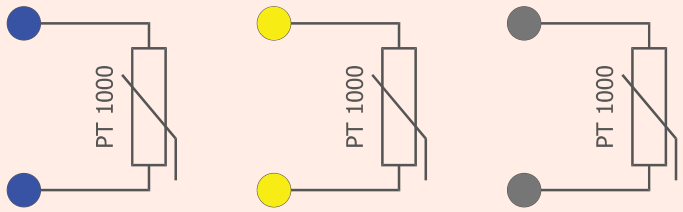
Switching Sequence:



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
ΔT (1)	T.B.D.

Colors of the dots correspond with the colors of the lead wires, each wire color is used for a different motor phase.

(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).

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SPECIFICATIONS

		KMF 083 01							
Winding Identification[3]		**C**	**D**	**E**	**F**	**G**	**H**	**J**	**K**
Nominal Supply Voltage DC Link	Volt	18	24	30	36	48	72	72	72
Rated Output Power[1]	Watt	241	258	232	223	214	242	185	136
Rated Speed	RPM	3973	4252	3822	3665	3526	3982	3039	2240
Rated Torque[1]	Nm	0.58							
Rated Line Current[1][4]	Arms	11.4	9.1	6.6	5.3	3.8	2.8	2.2	1.6
Max Efficiency	%	87							
No Load Speed (@ nominal voltage)	RPM	4126	4401	3970	3811	3667	4126	3176	2382
BEMF Constant Ke	V/kRPM	4.4	5.5	7.6	9.4	13.1	17.5	22.7	30.2
Motor Speed Constant Kv (=1/Ke)	RPM/V	229.2	183.4	132.3	105.9	76.4	57.3	44.1	33.1
Continuous Stall Torque[1]	Nm	0.75							
Continuous Stall Line Current (rms)[1]	Arms	14.7	11.8	8.5	6.8	4.9	3.7	2.8	2.1
Peak Torque	Nm	2.00							
Max. Demagnetization Line Current	A	92	74	53	43	31	23	18	13
Torque/Rms Line Current Kt[4]	Nm/Arms	0.051	0.064	0.088	0.110	0.153	0.204	0.265	0.354
Resistance (terminal-to-terminal)	mOhm	48	73	140	214	399	723	1162	2133
Inductance (terminal-to-terminal)	µH	30	47	91	142	273	485	819	1456
Back EMF (@1000 RPM terminal-to-terminal)	Vrms	3.1	3.9	5.3	6.7	9.3	12.3	16.0	21.4
Thermal Resistance (stator/rotor to ambient)[1]	°C/W	2.39							
Thermal Resistance Winding-Housing	°C/W	2.10							
Max. Winding Temperature	°C	160							
Number of Pole Pairs		15							
Weight	kg	0.34							
Rotor Inertia - Large I.D.	kgm²*E-6	208							
Rotor Inertia - Small I.D.	kgm²*E-6	219							
Mechanical Time Constant	ms	3.8							
Electrical Time Constant	ms	0.6							
Motor Constant Km	Nm/ sqrt(W)	0.195							

(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.

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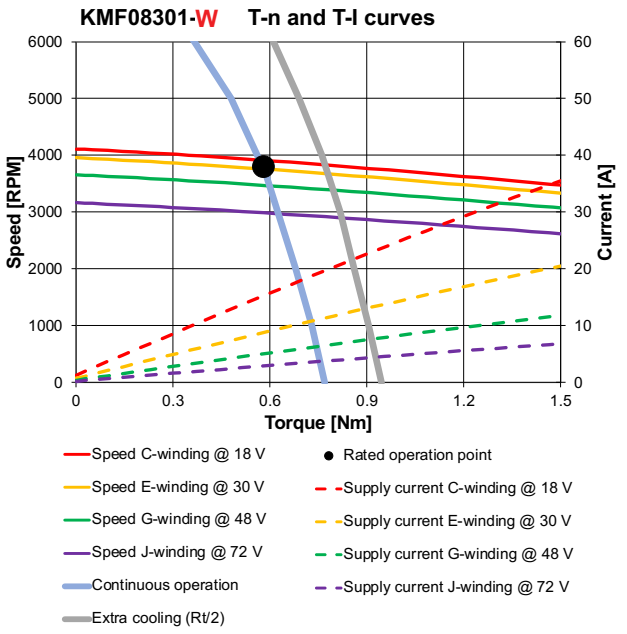
SPECIFICATIONS

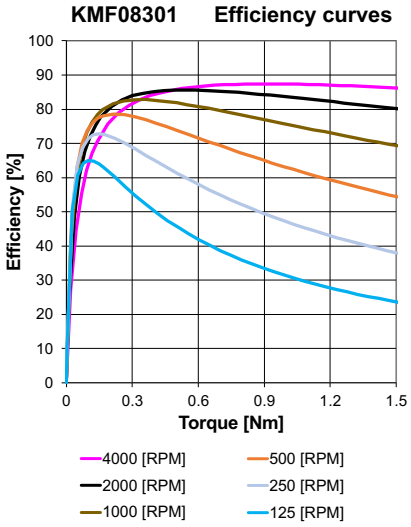
		KMF 083 01							
Winding Identification[3]		**C**	**D**	**E**	**F**	**G**	**H**	**J**	**K**
Cogging Torque (typical, peak to peak)	Nm	0.015							
Drag Torque	Nm	0.020							
Viscous Damping	Nm/RPM	8.0E-06							
Thermal Time Constant of Winding Only	s	24							
Adiabatic Heating of Winding at Peak Torque	K/s	5							
Rotor Inner Diameter [V] [2]	mm	51							
Rotor Inner Diameter [W] [2]	mm	20							
Rotor Outer Diameter [Z] [2]	mm	83.9							
Stator Inner Diameter [Y] [2]	mm	45.5							
Total Height [X] [2]	mm	26.5							
Motor Lead Wire AWG Size		12	12	14	14	20	20	20	20

(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.

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.



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SPECIFICATIONS

		KMF 083 02							
Winding Identification[3]		**C**	**D**	**E**	**F**	**G**	**H**	**J**	**K**
Nominal Supply Voltage DC Link	Volt	24	30	36	48	60	72	72	72
Rated Output Power[1]	Watt	327	327	281	301	271	242	184	134
Rated Speed	RPM	2761	2764	2378	2546	2290	2047	1555	1135
Rated Torque[1]	Nm	1.13							
Rated Line Current[1][4]	Arms	11.6	9.3	6.7	5.4	3.9	2.9	2.2	1.7
Max Efficiency	%	88							
No Load Speed (@ nominal voltage)	RPM	2879	2879	2493	2660	2399	2159	1662	1247
BEMF Constant Ke	V/kRPM	8.3	10.4	14.4	18.0	25.0	33.3	43.3	57.8
Motor Speed Constant Kv (=1/Ke)	RPM/V	120.0	96.0	69.3	55.4	40.0	30.0	23.1	17.3
Continuous Stall Torque[1]	Nm	1.40							
Continuous Stall Line Current (rms)[1]	Arms	14.4	11.5	8.3	6.6	4.8	3.6	2.8	2.1
Peak Torque	Nm	4.00							
Max. Demagnetization Line Current	A	97	77	56	45	32	24	19	14
Torque/Rms Line Current Kt[4]	Nm/Arms	0.097	0.122	0.169	0.211	0.292	0.390	0.507	0.675
Resistance (terminal-to-terminal)	mOhm	69	106	204	314	580	1057	1704	3135
Inductance (terminal-to-terminal)	µH	55	86	165	258	496	882	1489	2647
Back EMF (@1000 RPM terminal-to-terminal)	Vrms	5.9	7.4	10.2	12.8	17.7	23.6	30.6	40.8
Thermal Resistance (stator/rotor to ambient)[1]	°C/W	2.12							
Thermal Resistance Winding-Housing	°C/W	1.05							
Max. Winding Temperature	°C	160							
Number of Pole Pairs		15							
Weight	kg	0.51							
Rotor Inertia - Large I.D.	kgm²*E-6	293							
Rotor Inertia - Small I.D.	kgm²*E-6	304							
Mechanical Time Constant	ms	2.1							
Electrical Time Constant	ms	0.8							
Motor Constant Km	Nm/ sqrt(W)	0.309							

(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.

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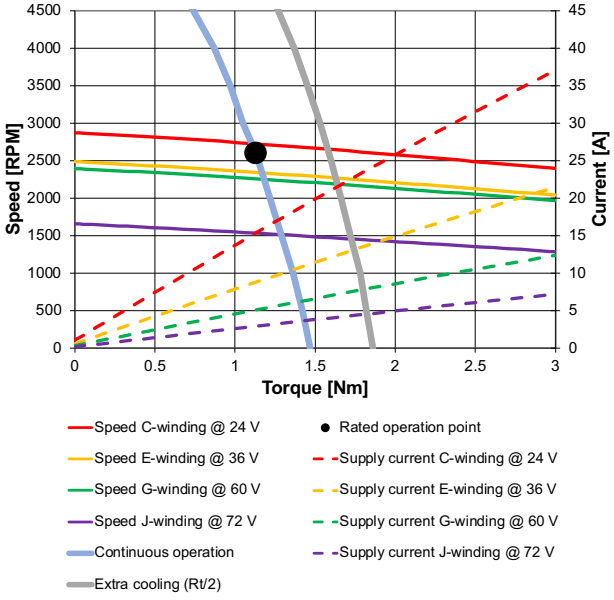
SPECIFICATIONS

		KMF 083 02							
Winding Identification[3]		**C**	**D**	**E**	**F**	**G**	**H**	**J**	**K**
Cogging Torque (typical, peak to peak)	Nm	0.028							
Drag Torque	Nm	0.035							
Viscous Damping	Nm/RPM	1.6E-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	51							
Rotor Inner Diameter [W] [2]	mm	20							
Rotor Outer Diameter [Z] [2]	mm	83.9							
Stator Inner Diameter [Y] [2]	mm	45.5							
Total Height [X] [2]	mm	34.5							
Motor Lead Wire AWG Size		12	12	14	14	20	20	20	20

(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.

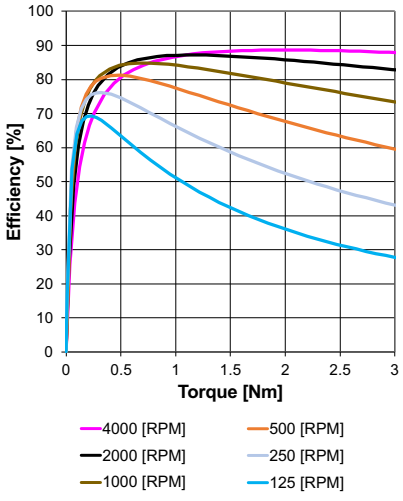
PERFORMANCE

KMF08302-W T-n and T-I curves



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.

KMF08302 Efficiency curves



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SPECIFICATIONS

		KMF 083 03							
Winding Identification[3]		**C**	**D**	**E**	**F**	**G**	**H**	**J**	**K**
Nominal Supply Voltage DC Link	Volt	30	42	54	72	72	72	72	72
Rated Output Power[1]	Watt	411	463	428	458	326	240	181	131
Rated Speed	RPM	2408	2712	2508	2684	1912	1406	1063	768
Rated Torque[1]	Nm	1.63							
Rated Line Current[1][4]	Arms	11.7	9.4	6.8	5.4	3.9	2.9	2.3	1.7
Max Efficiency	%	88							
No Load Speed (@ nominal voltage)	RPM	2517	2819	2616	2790	2013	1510	1162	872
BEMF Constant Ke	V/kRPM	11.9	14.9	20.6	25.8	35.8	47.7	61.9	82.6
Motor Speed Constant Kv (=1/Ke)	RPM/V	83.9	67.1	48.4	38.7	28.0	21.0	16.1	12.1
Continuous Stall Torque[1]	Nm	2.00							
Continuous Stall Line Current (rms)[1]	Arms	14.3	11.5	8.3	6.6	4.8	3.6	2.8	2.1
Peak Torque	Nm	6.00							
Max. Demagnetization Line Current	A	101	81	59	47	34	25	20	15
Torque/Rms Line Current Kt[4]	Nm/Arms	0.139	0.174	0.241	0.302	0.418	0.558	0.724	0.966
Resistance (terminal-to-terminal)	mOhm	91	139	268	413	760	1391	2246	4138
Inductance (terminal-to-terminal)	µH	81	127	244	381	732	1300	2195	3901
Back EMF (@1000 RPM terminal-to-terminal)	Vrms	8.4	10.5	14.6	18.2	25.3	33.7	43.8	58.4
Thermal Resistance (stator/rotor to ambient)[1]	°C/W	1.91							
Thermal Resistance Winding-Housing	°C/W	0.70							
Max. Winding Temperature	°C	160							
Number of Pole Pairs		15							
Weight	kg	0.69							
Rotor Inertia - Large I.D.	kgm²*E-6	377							
Rotor Inertia - Small I.D.	kgm²*E-6	388							
Mechanical Time Constant	ms	1.8							
Electrical Time Constant	ms	0.9							
Motor Constant Km	Nm/ sqrt(W)	0.386							

(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.

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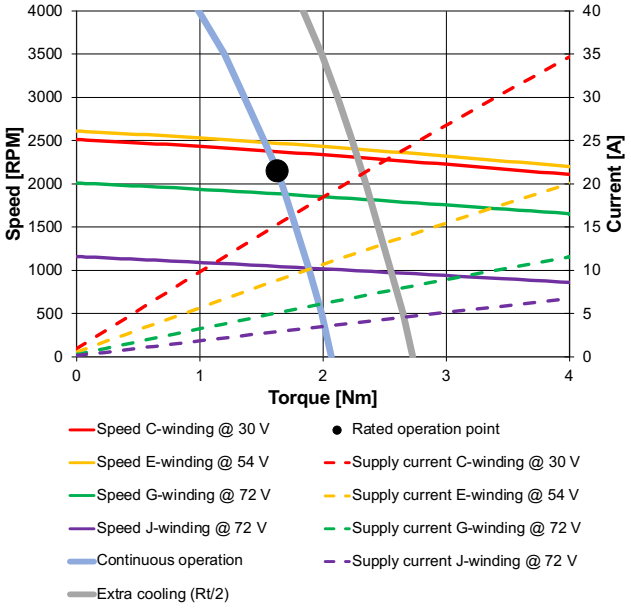
SPECIFICATIONS

		KMF 083 03							
Winding Identification[3]		**C**	**D**	**E**	**F**	**G**	**H**	**J**	**K**
Cogging Torque (typical, peak to peak)	Nm	0.041							
Drag Torque	Nm	0.042							
Viscous Damping	Nm/RPM	2.3E-05							
Thermal Time Constant of Winding Only	s	16							
Adiabatic Heating of Winding at Peak Torque	K/s	6							
Rotor Inner Diameter [V] [2]	mm	51							
Rotor Inner Diameter [W] [2]	mm	20							
Rotor Outer Diameter [Z] [2]	mm	83.9							
Stator Inner Diameter [Y] [2]	mm	45.5							
Total Height [X] [2]	mm	42.5							
Motor Lead Wire AWG Size		12	12	14	14	20	20	20	20

(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.

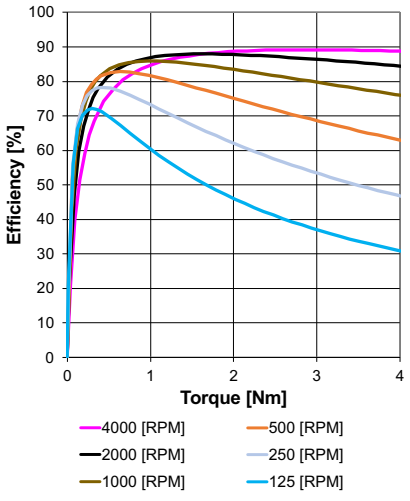
PERFORMANCE

KMF08303-W T-n and T-I curves



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.

KMF08303 Efficiency curves



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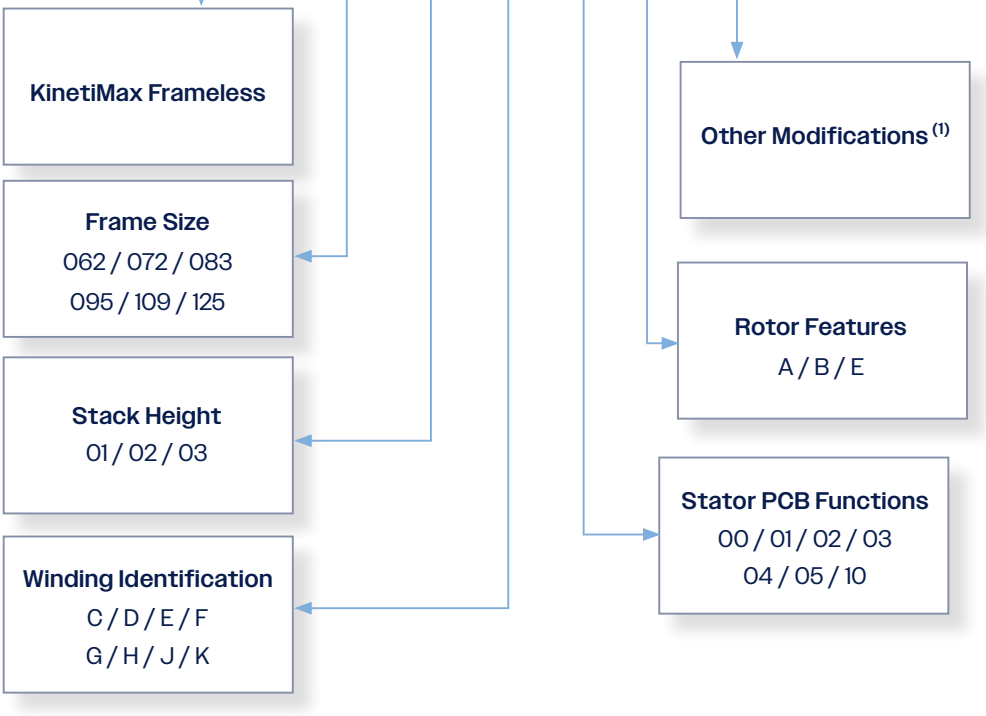
COMMERCIAL PART NUMBERING KMF HPD STATOR-ROTOR SETS

KMF xxx yy-W zz R-vv



ZZ	Stator PCB functions
00	No PCB
01	PCB with 3 Hall sensors
02	PCB with 1 temperature sensor only
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 senors
10	Starting with 1 are custom PCB's

R	Rotor features
A	Large bore hole, G40 balancing class
B	Small bore hole, G40 balancing class
E	Custom rotor or balancing

(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.

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