HIGH POWER MOTOR - Hall sensors or Sin/Cos speed sensors

It is a Permanent Magnet Synchronous Motor (PMSM) with a RADIAL Rotor. AIR Cooled motor is designed for 48V / 60V / 72V battery packs. *Other windings are available on custom requirements.

These motors has the same stator and rotor, the main difference is kind of winings.	AIR cooled (IP65) ME MAX		AIR cooled (IP65) ME MAX	
	1716 -Sin/Cos	1717 - Hall	1718 - Sin/Cos	1719 - Hall
• Maximum Temperature: 140C • **Rotor Specifications** Neodymium Magnets 150 C rating (180 C Option) Sinusoidal Back-EMF (3 Hall optional) Magnets Pass GM Salt Spray Test Nichol Plated **Designed for Field Weakening**				
Maximum rotor speed:	5500 rpm / (6000 for short time*)		5500 rpm / (6000 for short time*)	
Structure of the motor:	10 poles motor			
Recommended Voltage [V]	48V / 60V / 72V / 96V			
	4kW @48V motor		**6kW@60V motor**	
Rated Speed (**with nominal load**)	@24V ~ 2000 RPM / 9.55Nm **@48V ~ 4000 RPM / 9.55Nm** @60V ~ 5000 RPM / 9.55Nm @72V ~ 6000 RPM / 9.55Nm		@24V ~ 1600 RPM / 14.3 Nm @48V ~ 3200 RPM / 14.3 Nm **@60V ~ 4000 RPM / 14.3 Nm** @72V ~ 4800 RPM /14.3 Nm @96V ~ 6400 RPM / 14.3 Nm	
Continuous current (Phase AC) :	100 Amps RMS		100 Amps RMS	
Peak current (Phase AC) :	300 Amps RMS		300 Amps RMS	
Continuous Power [kW]	4kW @48V		6kW @60V	
Peak Power [kW]	8kW @48V		12kW @60V	
Torque Constant:	0.0955 Nm/Amp		0.143 Nm/Amp	
Continuous Torque:	9.55Nm@100A		14.3Nm @100A	
Maximum Torque:	22 Nm		39 Nm	
Windings resistance	4.9mΩ		5.06 - 5.28mΩ	
Windings Insulation grade	H		H	
Protection level	IP65		IP65	
Magnets	N38UH, 180C		N38UH, 180C	
Speed sensor:	Sin/Cos – 5V or Hall sensor		Sin/Cos – 5V or Hall sensor	
Temperature sensor	KTY84-130		KTY84-130	
Shaft diameter:	22,23mm		22,23mm	
Weight **Netto** / **Brutto**:	**9kg** / 24.3 lbs / 11kg		**11kg / 28.7 lbs / 13,8 kg.**	
Packaging:	33x33x33cm		33x33x33cm	

*We are working on a new motor that will run at 8000 rpm in this Case (same extruded case), but the tooling is being released now

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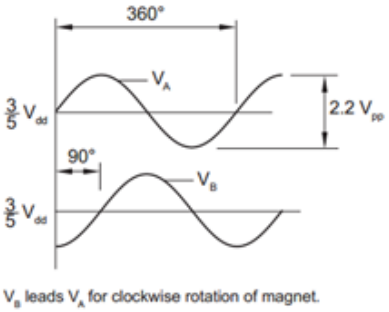
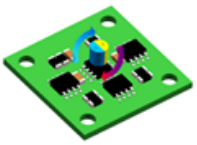
Options:

3 Hall Sensors, 120 electrical degrees
Metric Shaft and Mounting face
Windings for maximum speeds of 300-8000 rpm
Voltages form 24 to 700 VDC systems
10,000 hour bearing set
Longer motors (In axial direction) due to extruded case design
Custom Colors – Private Label markings

Timing diagram

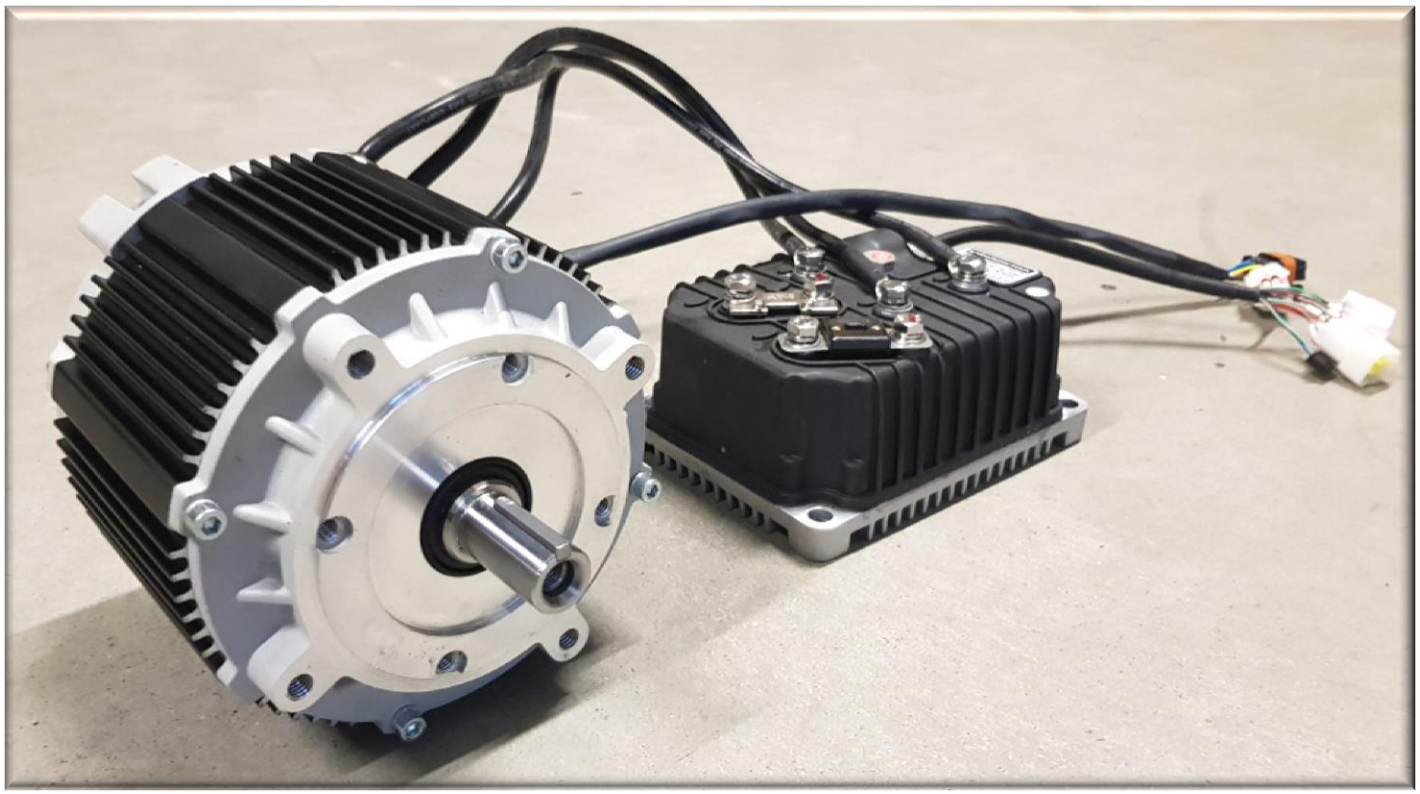


V_B leads V_A for clockwise rotation of magnet.



Sin/Cos Encoder parameters

Power supply	Vdd= 5 V ± 5 %
Operating Temperature	-40～+105℃
Maximum speed	60,000 rpm
Resolution	one sine/cosine wave per revolution
Sin/Cos outputs	Signal amplitude: 1.1 V ± 0.2 V
Power consumption	20mA
Accuracy	±0.6°
Hysteresis	1.62° at 30000 rpm



If the internal magnets go above 180 C, then they will become de-magnetized. Due to tolerances in the Temperature Sensor and the Motor Control measurements, the max parameters we recommend as following settings below:

For example:
When it's **130** ℃ inside of motor (in 30s), the current should be limited 50%.
When it's **150** ℃, the controller shut down. When it drop down to 70℃, the controller work again.

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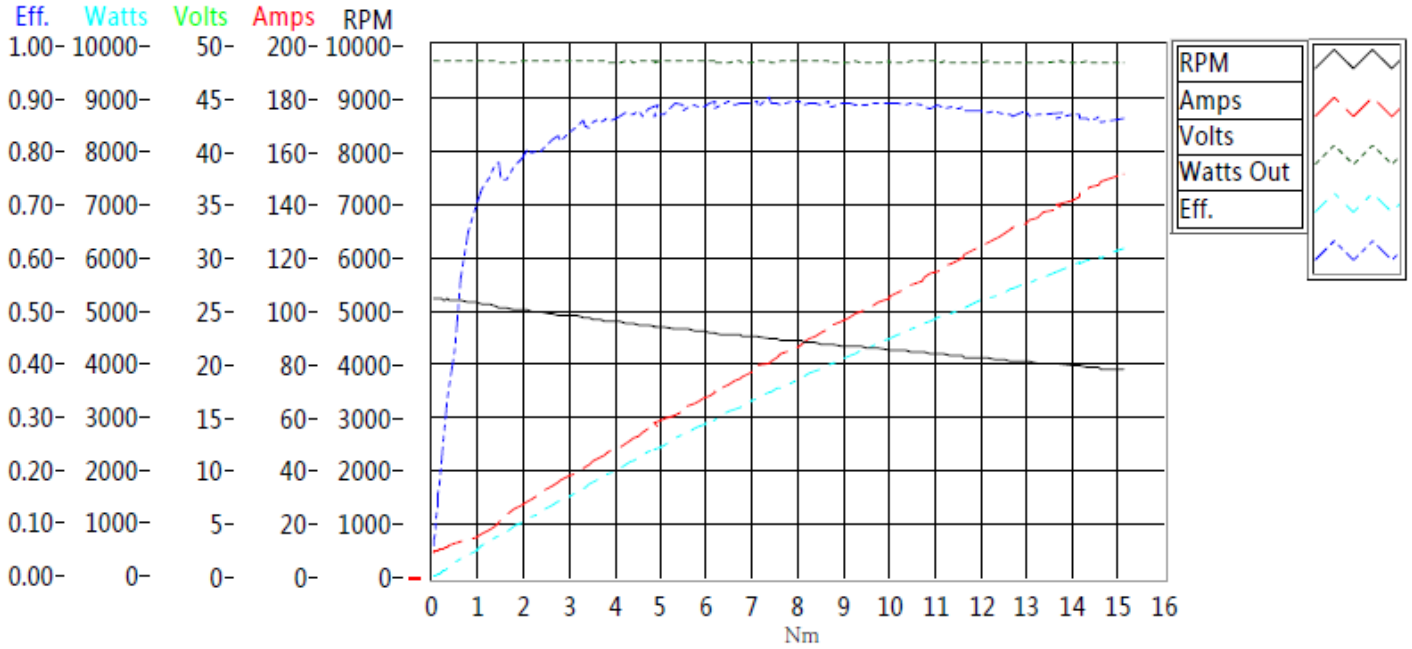
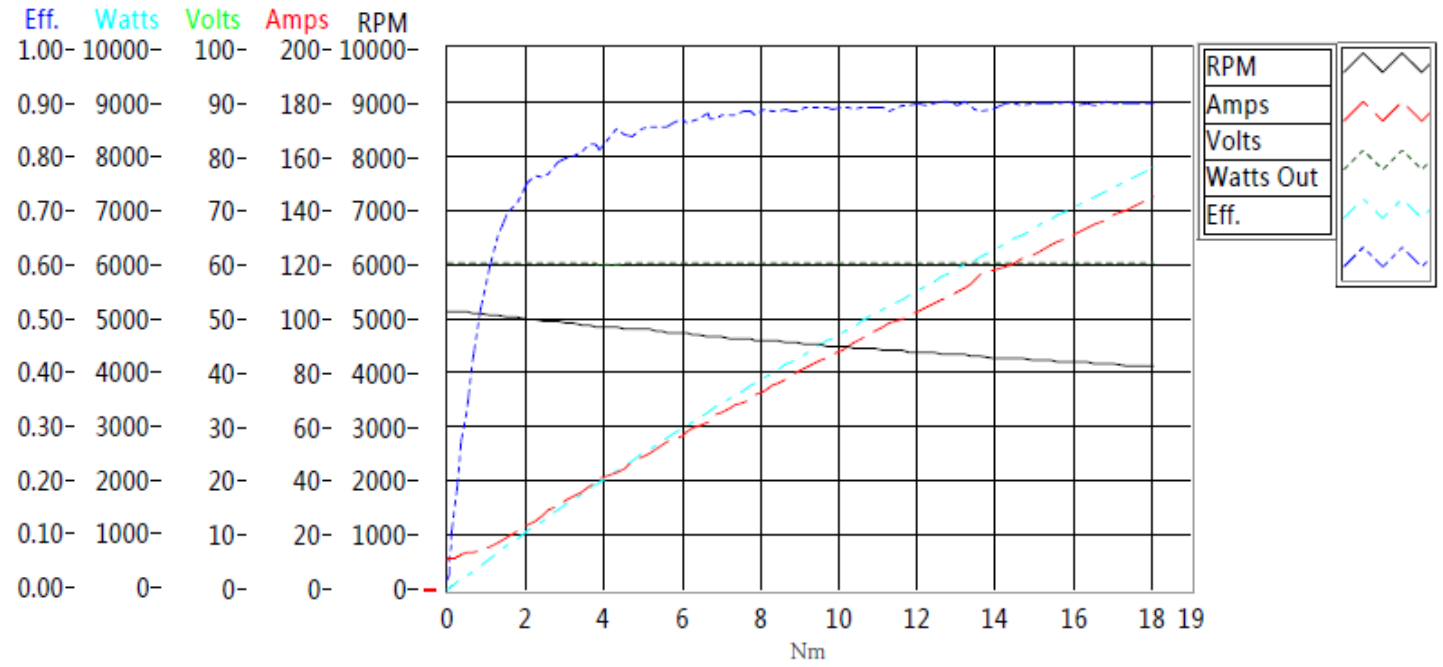
Test Curve of the motor 4kW motor:



Test Curve of the motor 6kW motor:



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Regarding Motor Supply Voltage / RPM and Power.

For example if motor is with windings 60V, this motor can also be run at lower (or Higher) voltages, such as 48V (or 72V). The difference is that you wouldn't get as much power output since a lower voltage is associated a lower max attainable rpm. As power (W or Nm/s) is the product of angular speed (1/seconds) and torque (nm), with the same amount of torque and a lower rpm, you would have a lower power output.

You can achieve the same amount of torque at any voltage as torque is directly dependent on current. You may see something called a torque constant, such as Nm/A or ft-lbs/A. Simply multiply by the current, and you'll get the torque output before accounting for mechanical and electrical losses.

The main limiting factor on the amount of current you can pump into a motor is heat, which can melt the insulating varnish if too high.

At respectively currents **the motor torque** at any supply voltage (48V or 72V) **will be the same**.

Duration of max Power / Torque is defined by motor (& controller) overheating.
Therefore if motor (& controller) cooling is very good duration time of max Power / Torque can be more longer.

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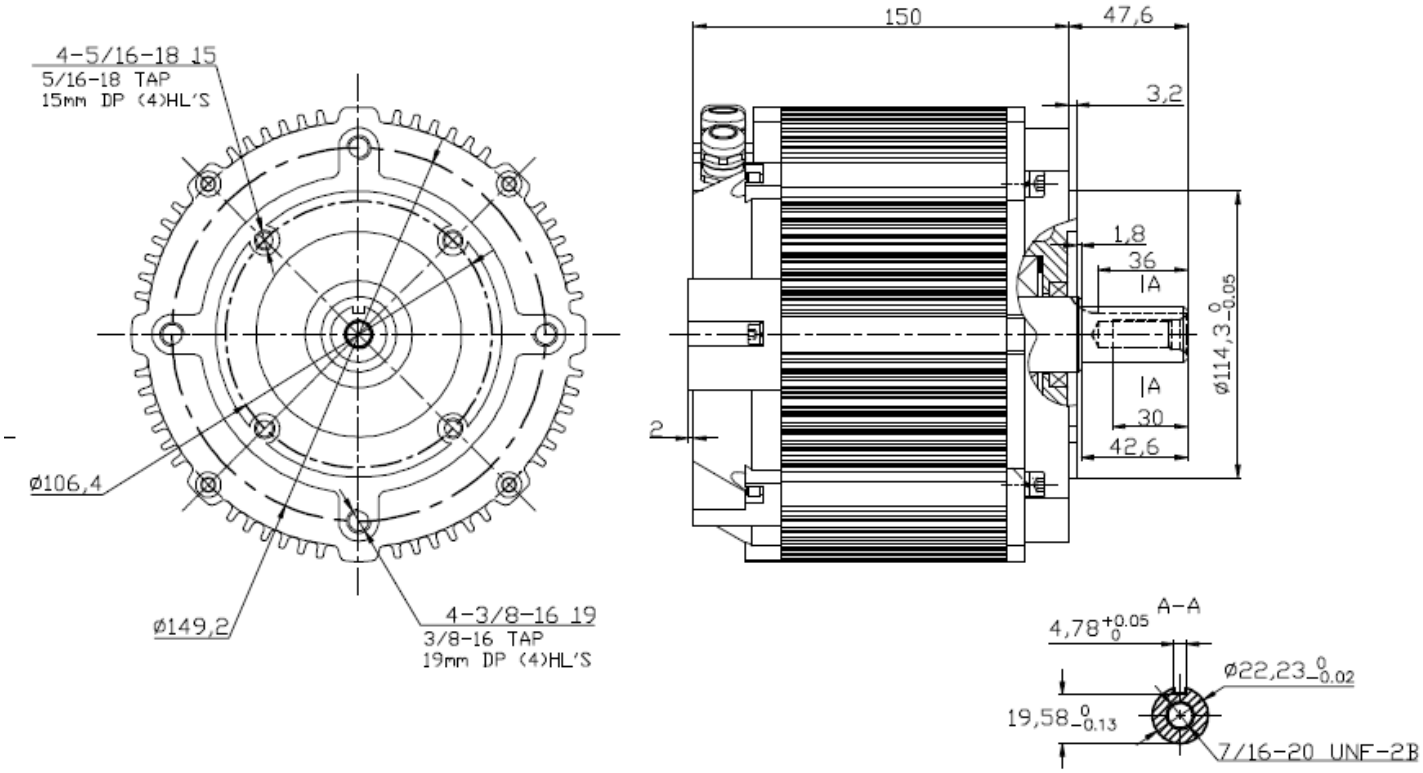
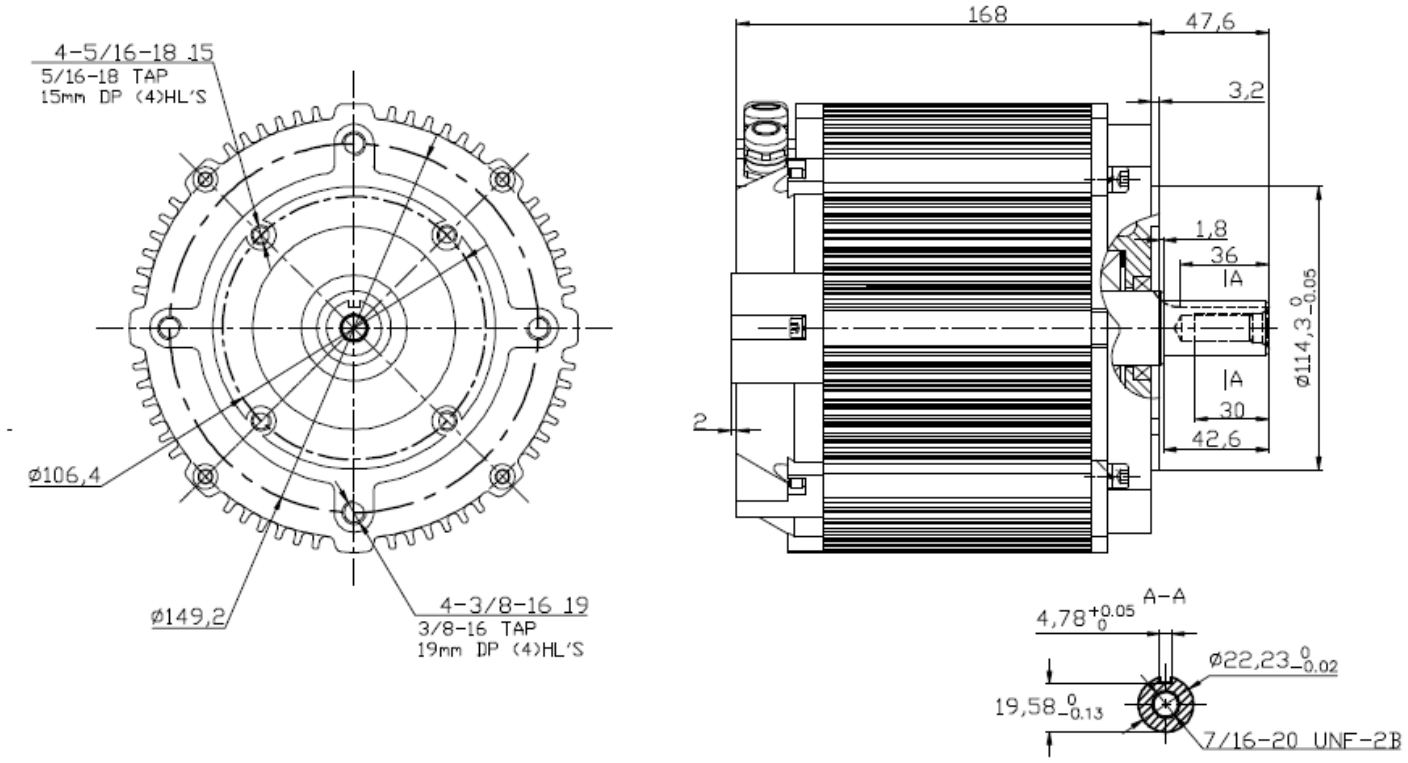
DRAWING of 4kW motor :



DRAWING of 6kW motor :



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