

3D Printed 3-Phase BLDC (PMSM) Motor

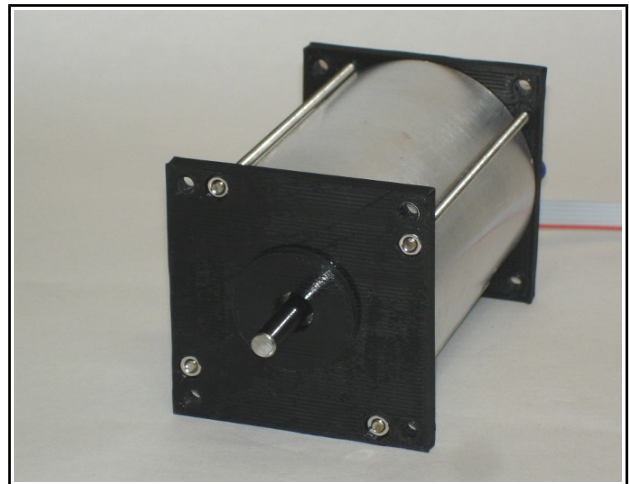
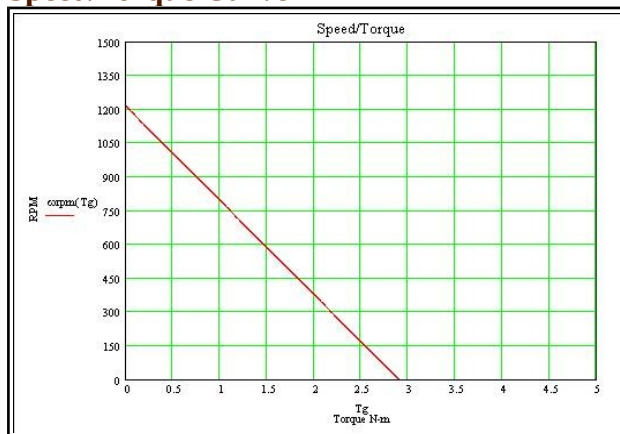
Features

- Electronically Commutated
- Slotless Permanent Magnet Motor
- Class A Operation (105°C)
- 48V
- Sine Wave BackEMF
- Continuous Stall Torque
- Zero Cogging
- Zero Detente Torque
- Optional Winding Configurations

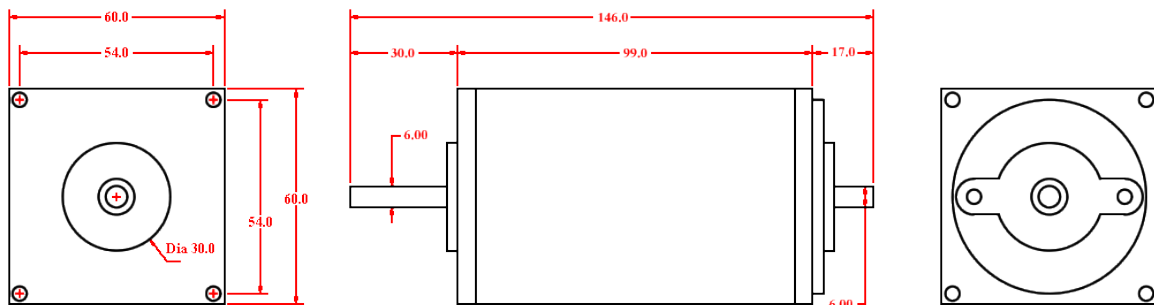
Description

This machine is a BLDC (PMSM) permanent magnet motor with pure sine wave BackEMF. The slotless construction exhibits continuous stall torque with zero cogging and zero detente torque. The standard winding topology is a 3-Phase Y. Optional windings provide a broad range of input voltages and speed/torque variations. An encoder for conventional 3-phase electronic commutation is integrated. All polymer based parts are 3D printed.

Speed/Torque Curve



Outline Drawing



(4 mm Mounting Holes)

Operational Characteristics

PARAMETER	SYMBOL	VALUE	UNITS
Power	Watts	30	Watts
Speed at Rated Power	N Rated	1200	RPM
Continuous Torque	Tc	x	N-m
Stall Torque	Tp	2.8	N-m
Continuous Line Current	Ic	x	Adc
Torque Sensitivity (DC Amps)	Kt	0.8	N-m/Adc
Back EMF (line-to-line)	Ke	28.3	VRMS/KRPM
Motor Constant	Km	0.51	N-m/√Watt
DC Resistance (line-to-neutral)	Rm	9.4	Ohms
Inductance (line-to-neutral)	Lm	3.6	mH
Rotor Inertia	Jm	2.39x10 ⁻⁴	kg-m ²
Weight	Wt	0.80	kg
Static Friction	Tf	0.04	N-m
Thermal Time Constant	tc	x	°C/minutes
Thermal Resistance @ Stall	Rth	TBD	°C/Watt
Number of Poles		4	

Hall Sensor Tachometer Cable

Gnd	1	2	+12V
Phase C	3	4	Phase A
Phase B	5	6	NC
NC	7	8	NC
NC	9	10	NC

Power Cable

Wire Color Code	Function
Red	A
Green	B
Blue	C
Black	Neutral

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