

Permanent Magnet Alternators

Product Guide



A complete line of alternators for...

- Aerospace
- Auxiliary Power Generation
- Commercial Aircraft
- Downhole Drilling
- Military
- Solar Co Generation
- UAVs
- Wind Energy

MOOG
COMPONENTS GROUP

Permanent Magnet Alternators

Heritage

Moog Components Group's experience in designing and manufacturing motion technology components spans over 50 years and encompasses numerous programs. This extensive history has provided opportunity to develop motion technologies that not only meet, but exceed the demanding requirements of military and aerospace rated hardware. These efforts include structural analysis for strength and stiffness through Finite Element Analysis, material analysis for strength and outgassing properties to NASA requirements and the study of high permeability materials and rare earth magnetics. Motion technology components are our traditional business and core competence. Integrating these components onto assemblies with bearings and ancillary devices, such as the potentiometers, brakes and resolvers, is Moog's expertise as well.

Moog Components Group is a premier technology company with unique design and manufacturing capabilities in electromechanical and fiber optic products. Moog has a legacy of providing high quality products used in critical defense and space applications. Over the years, this foundation has expanded into a broad spectrum of commercial applications including medical, industrial automation and communications.

Moog's family of motors include brushless and brush DC torque motors, brushless and brush high speed DC motors, servomotors, toroidal motors, cube motors, sectional motors, linear and stepper motors. We also offer a complete line of resolvers, RVDT's, synchros and rotary transformers.

Brushless DC torque motors are known for their high quality, high energy density and ruggedness. In addition to standard products, Moog creates custom designs for challenging applications. Some of the key features of our brushless DC torque motors are:

- Higher torque per unit volume
- Higher torque to inertia ratio
- Compact
- Environmental ruggedness
- Superior insulation

Moog offers full support capabilities to compliment our products. This includes an experienced engineering staff of design, manufacturing, quality and application engineers. We have a complete lab for testing and characterizing products. And we continually push technology advances through research and development efforts.

Moog's heritage and expertise in motor design lets us easily transition into a more recent development of alternators. Manufacturing techniques and tooling are in place, along with engineering tools and expertise.

Alternator Definition

A permanent magnet alternator is a power generating device that produces a sinusoidal output when a mechanical input to its hub or shaft is applied. This device is constructed very much like a brushless motor with the appropriate selection of insulation materials and winding to match the environment and application. Essentially, an alternator is to a brushless motor what a tachometer is to a brush-type motor except that the alternator's application is power generation instead of rate feedback.

Design Range

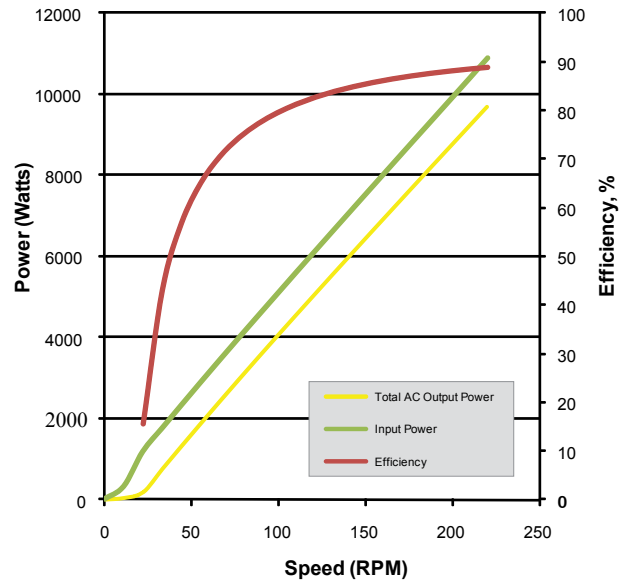
- Outside diameter 1 to 30 inches (25.4 to 762 mm)
- Pancake style
- 3-phase "Y" connected brushless
- Housed or frameless
- Continuous AC output power up to 50 kW peak
- Standard speeds to 10,000 RPM, other speeds as required
- Rotor sleeves available
- Special features available at customer's request
- Proprietary design software with modeling functions
- Existing motor designs and tooling that can be used for alternators

Permanent Magnet Alternators

AG-15275-F-1 SPECIFICATIONS @ 25°C

Size Constants	Value	Units
Peak Total Power, P_p	15768	watts
Max. Continuous Power, P_c	10025	watts
Input Torque, P_c	353 (479)	lb.ft (N.m)
Poles	24	
Static Friction, T_F	3.0 (4.1)	lb.ft (N.m)
Number of Phases	3	
Winding Connection	"Y"	
Temperature Rise, TPR' Mounted	0.13	°C / W
Max. Winding Temperature	155	°C
Rotor Inertia, J_A	0.378 (0.513)	lb.ft.s ² (N.m.s ²)
Rated Speed, ω_R	23	rad / s
Max. No-load Speed, ω_{NL}	105	rad / s
Weight	171 (64)	lb (kg)
Winding Constants*	Value	Units
DC Resistance, R_A	±10% 0.944	ohms
Load Current, I_L	Rated 65	amps _{RMS}
Continuous Load Current, I_C	Nom. 21.6	amps _{RMS}
No-load AC Volts, $V_{AC\ No-Load}$	±10% 332	volts _{RMS}
Loaded AC Volts, $V_{AC\ Load}$	±10% 260	volts _{RMS}
Voltage Sensitivity, K_A	±10% 19.6	V.s / rad
Inductance, L_M	±30% 10	mH

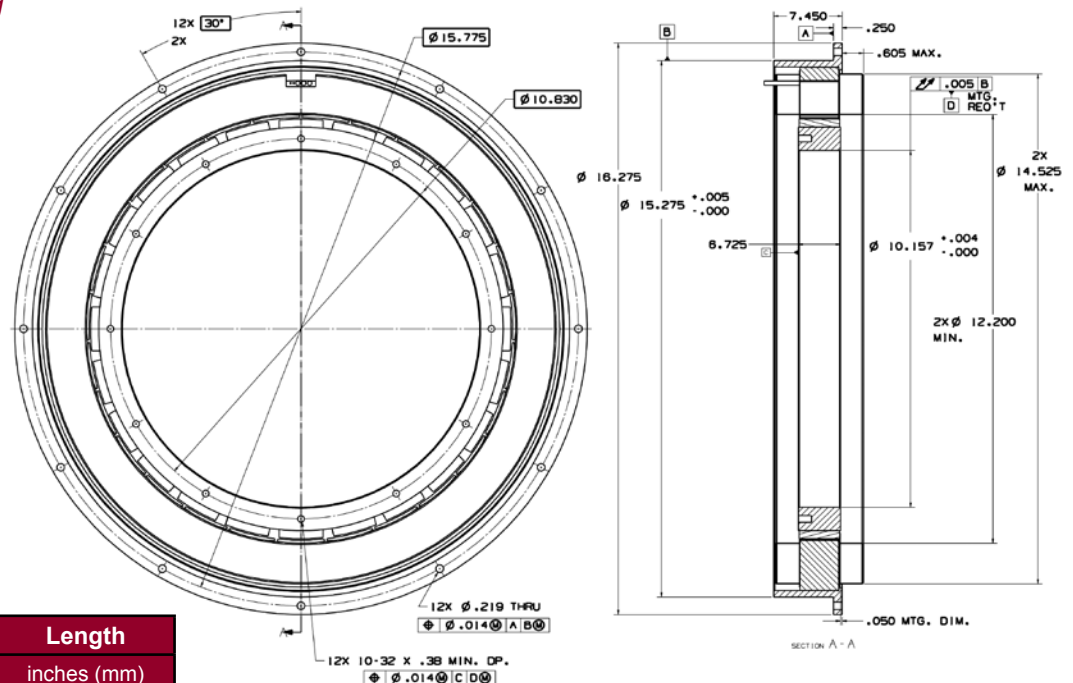
Power vs. Efficiency Curve



*Winding constants are phase-to-phase and at 25°C

Actual performance will depend upon external environment and mounting conditions.

AG-15275-F-1 Outline Drawing



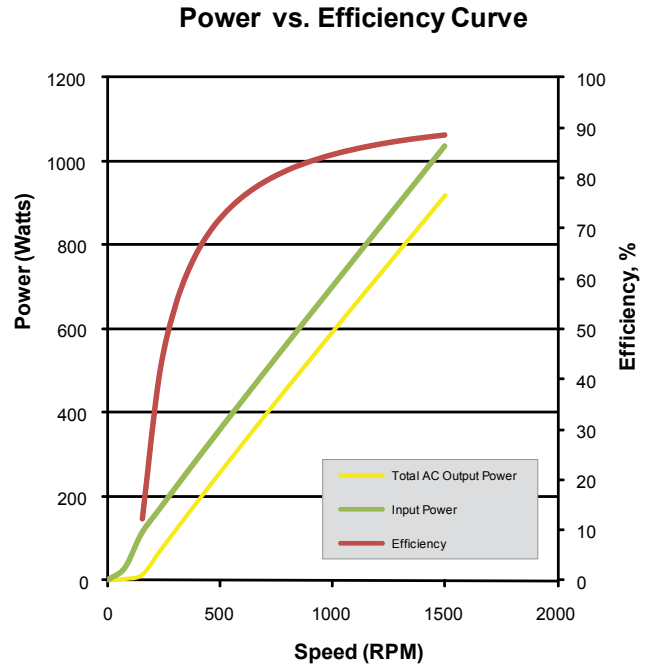
OD	ID	Length
inches (mm)	inches (mm)	inches (mm)
14.900 (378.46)	10.157 (257.99)	8.005 (203.33)

Frameless dimensions only

Permanent Magnet Alternators

AG-5000-A-2 SPECIFICATIONS @ 25°C

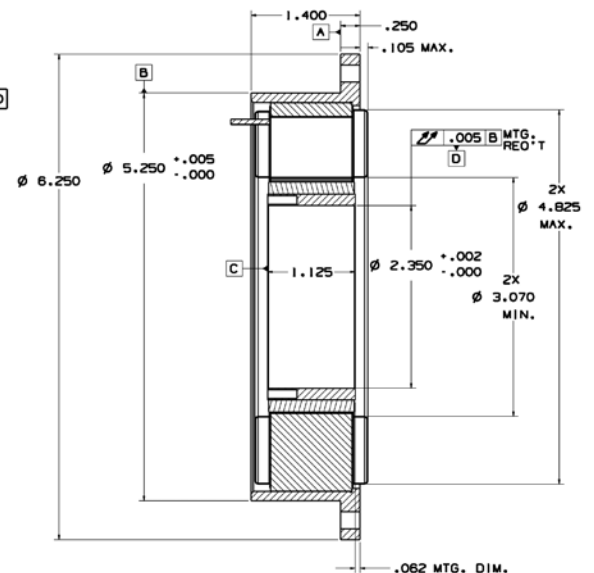
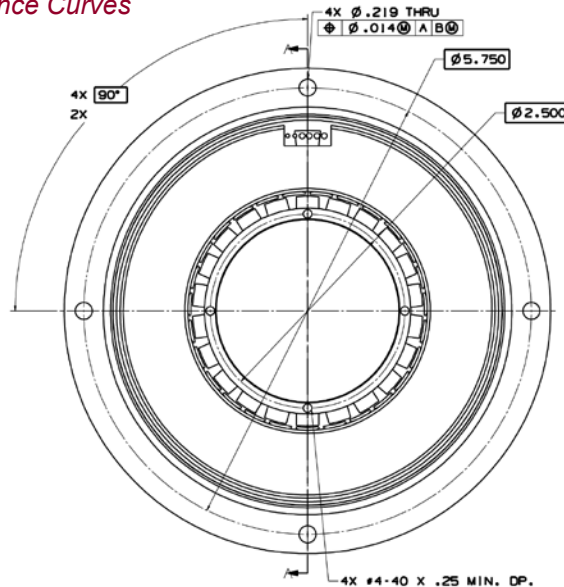
Size Constants	Value	Units
Peak Total Power, P_P	1550	watts
Max. Continuous Power, P_C	945	watts
Input Torque, P_C	945 (6.67)	oz.in (N.m)
Poles	22	
Static Friction, T_F	10 (0.071)	oz.in (N.m)
Number of Phases	3	
Winding Connection	"Y"	
Temperature Rise, TPR' Mounted	1.33	°C / W
Max. Winding Temperature	155	°C
Rotor Inertia, J_A	5.05E-02 (3.57E-04)	oz.in.s ² (N.m.s ²)
Rated Speed, ω_R	157	rad / s
Max. No-load Speed, ω_{NL}	209	rad / s
Weight	61 (1.7)	oz (kg)
Winding Constants*	Value	Units
DC Resistance, R_A	±10% 8.25	ohms
Load Current, I_L	Rated 6.12	amps _{RMS}
Continuous Load Current, I_C	Nom. 2.30	amps _{RMS}
No-load AC Volts, $V_{AC\ No-Load}$	±10% 292	volts _{RMS}
Loaded AC Volts, $V_{AC\ Load}$	±10% 231	volts _{RMS}
Voltage Sensitivity, K_A	±10% 2.54	V.s / rad
Inductance, L_M	±30% 13	mH



*Winding constants are phase-to-phase and at 25°C

Actual performance will depend upon external environment and mounting conditions.

AG-5000-A-2 Performance Curves



OD	ID	Length
inches (mm)	inches (mm)	inches (mm)
5.000 (127.00)	2.350 (59.69)	1.455 (36.96)

Frameless dimensions only

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