MILSPEC Alternators and Power Systems

Milspec
MANUFACTURING

SUBSYSTEMS MANUFACTURER TO DEFENCE AND INDUSTRIES

History & Quality

Starting out with just one client, our first product was our 100A alternator. From there we have worked hard to become the premier designer and manufacturer of brushless alternators and portable power systems for defence forces across the world, offering an extensive range of alternators from 120 - 900 amps.

With over 15,000 Milspec alternators in the Australian Defence Force alone, this is a testament to our ability to consistently delivery quality, on-time products, with a commitment to continuous development.

Hanwha

JSW
THE JAPAN STEEL WORKS, LTD.

RHEINMETALL MAN
MILITARY VEHICLES

BAE SYSTEMS
INSPIRED WORK

BHARAT FORGE
KALYANI

Australian Government
Department of Defence
Capability Acquisition and Sustainment Group

KONGSBERG

THALES

CERTIFIED LR AS 9100

UKAS MANAGEMENT SYSTEMS 001

CERTIFIED LR ISO 9001

JAS-ANZ

Weld Australia Welding Integrity Assured

iiw

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THALES Bushmaster

NAVISTAR Husky

BAE M113

Permanent Magnet vs Inductor

Inductor alternator technology is a synchronous arrangement in which the output windings and field windings both reside within the stator. The Magnetic flux is produced by introducing a DC voltage into the static field coils. An AC voltage is then generated within the output windings as the toothed rotor periodically passes through the magnetic field. Inductor alternators are a staple in military power generation due to the conformance to EMC standards and high reliability achieved by having no electrical connections to the rotor.

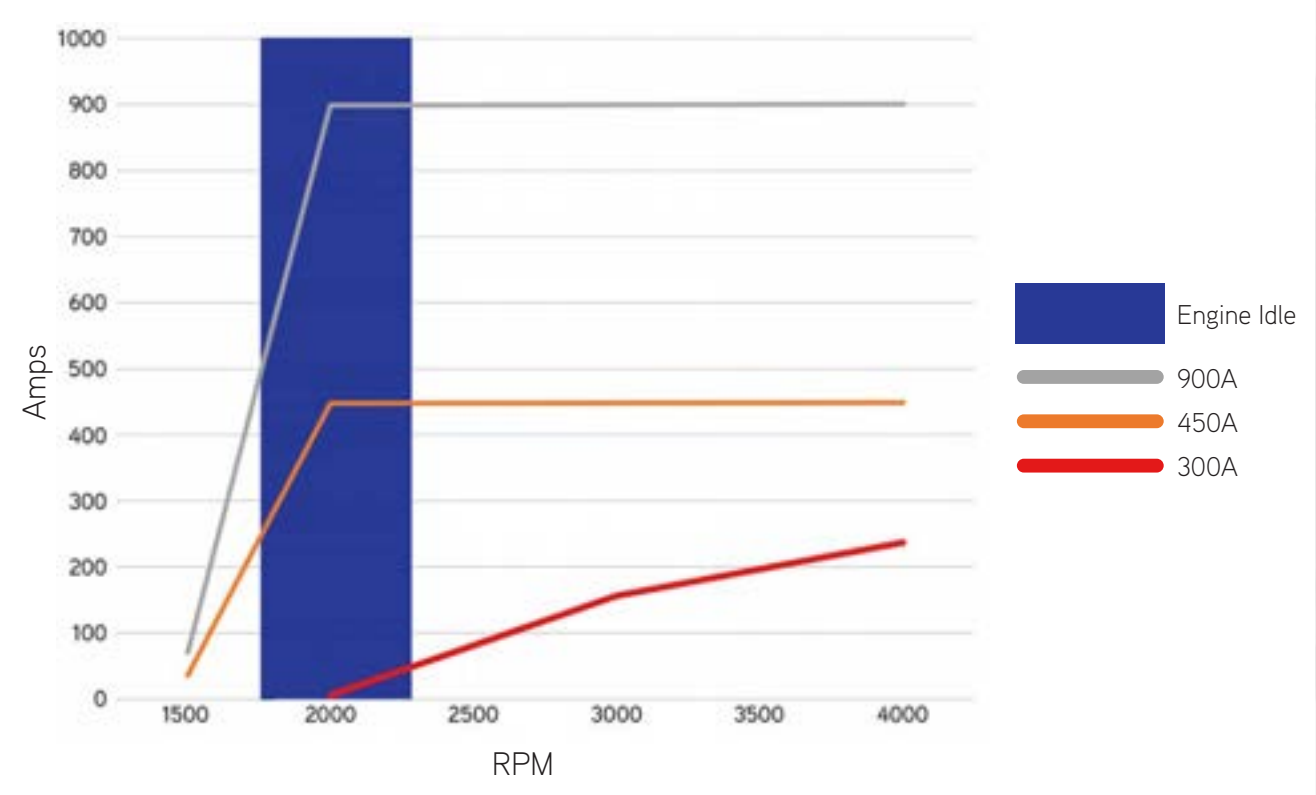
However, the technology has performance limitations in efficiency and power output response. A typical output graph shows a relationship between the engine RPM and output. The trend shows minimal output at idle and maximum current output is only achieved with a significantly increased RPM. Often modifications are required to elevate the engine idle to boost the alternator output level to reach the minimum requirement.

This limitation in performance has driven the need for better technology, where maximum electrical output can be attained at engine idle. Technology that supports the need for an ever increasing demand for power and zero compromise for safety with the ability to run all electrical systems, all the time.

Permanent magnet power generation is the technology that excels and future proofs the electrical supply demand.

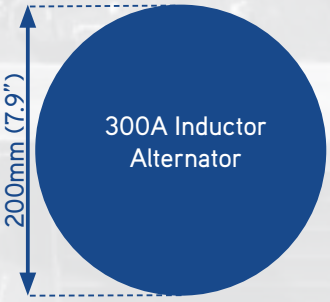
The power in this instance is created as the rotor's permanent magnetic fields transfer through the static output windings. The fixed magnetic field strength does not require excitement and thus a superior output can be achieved at a lower RPM. Milspec Engineering and university lead research has developed patent pending technology to solve the variable speed AC regulation where other have failed. The high reliability of the system is sustained by maintaining no electrical connections to the rotor and through the expertise of 30 years of Alternator development.

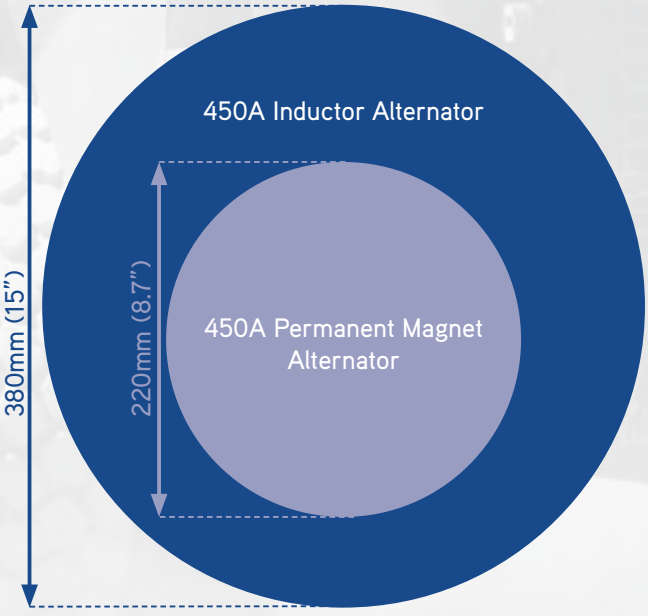
Milspec's range of 28V Permanent Magnet Alternators generate in excess of 450A (12kW) at engine idle.

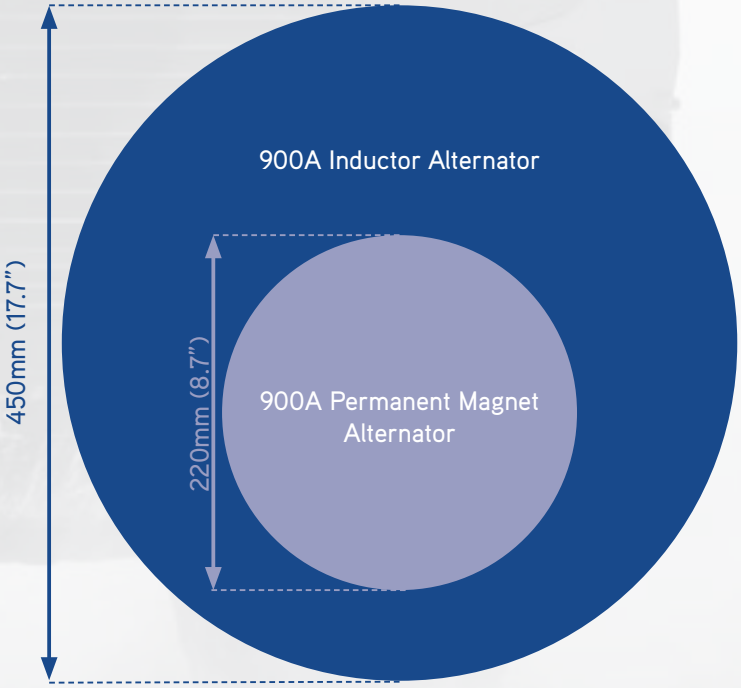


Specifications	Units	Alternators		
Model		**300A Air Cooled**	**450A Liquid Cooled**	**900A Liquid Cooled**
Type		Brushless	Brushless	Brushless
Cut in Speed	RPM	**1700**	**1500**	**1500**
Max Output	Amps	300	450	900
Max Continuous Output #1	Amps	285	450	900
Weight	kg	**24 (53 lbs)**	**38 (84 lbs)**	**76 (168 lbs)**
Voltage Regulation	Volts	28.3	14-30 Programmable	14-30 Programmable
Ambient Operating Temp	Celsius	-15˚C to +92˚C (5˚F to 198˚F)	-40˚C to +105˚C (-40˚F to 221˚F)	
Maximum Rotor Speed	RPM	13000	10000	10000
Mounting	Specific	SAE J 180	Custom	Custom

#1 Coolant Temperature Dependent







300A Alternator Case Study

In 2004 Milspec was approached by Thales to develop a 300A alternator for the Bushmaster vehicle to replace the current 100A unit.

Working closely with Thales, our alternator was designed and developed around exact requirements. Trials were conducted in the vehicle for EMC, temperature and reliability, proving that we were able to design and develop an alternator that fit into the confines available, our alternator was selected for the highly successful Bushmaster vehicle.

Given the success of our alternator in the Bushmaster, Navistar assessed our unit during the process of identifying a suitable alternator for their Husky vehicle. Navistar found that our unit was the worlds smallest military spec alternator in their capacity range. Our 300A alternator was selected by Navistar to be installed in their Husky vehicle.

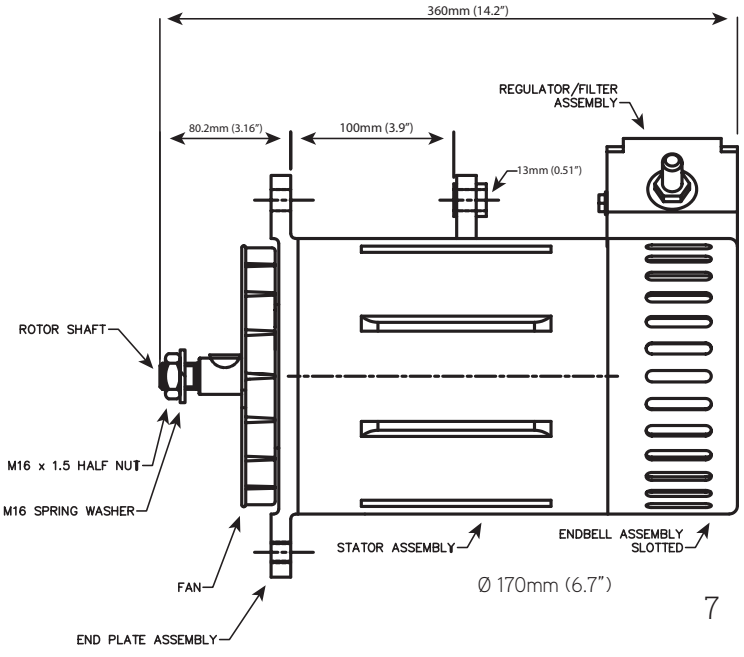
Our 300A alternator is now in service with at least a dozen armed forces worldwide, with more than 1000 units of different variants in service in the Australian Defence Force.

The success of our 300A alternator has allowed us to develop our range of permanent magnet and inductor alternators to extend up to a 900A alternator. Contact Milspec today to see how we can work with you to develop an alternator to suit your needs.

300A Air Cooled Alternator

The Milspec 300A alternator has been in use in both Australian and International Defence Forces, and is currently installed and in service on the highly successful Thales Bushmaster and Navistar Husky vehicles. Manufactured and tested in-house to meet standards Mil STD 461, Mil STD 810, and Mil STD 1275, our alternators are lighter than competitors and feature a double seal on the ball bearing, increasing the life span to 11,000hrs.

Specifications	
Part Number:	930213-300
Type	Inductor Alternator
Cut in Speed	1700 RPM (Alternator)
Maximum Output	300A
Weight	24kg (53 lbs)
Voltage Regulator	28.6 V
Voltage Range	26 - 30 V
Operating Ambient Temperature	-40˚C to 93˚C (-40˚F to 199˚F)
Maximum Rotor Speed	13,000 RPM
Regulator Unit	Integrated, Solid State.
Max Continuous Output	280 A
Mounting	J-180
Ignition Warning Light	Optional
Electrical Connection	M12 +ve, M10 -ve
Cooling	Air Cooled



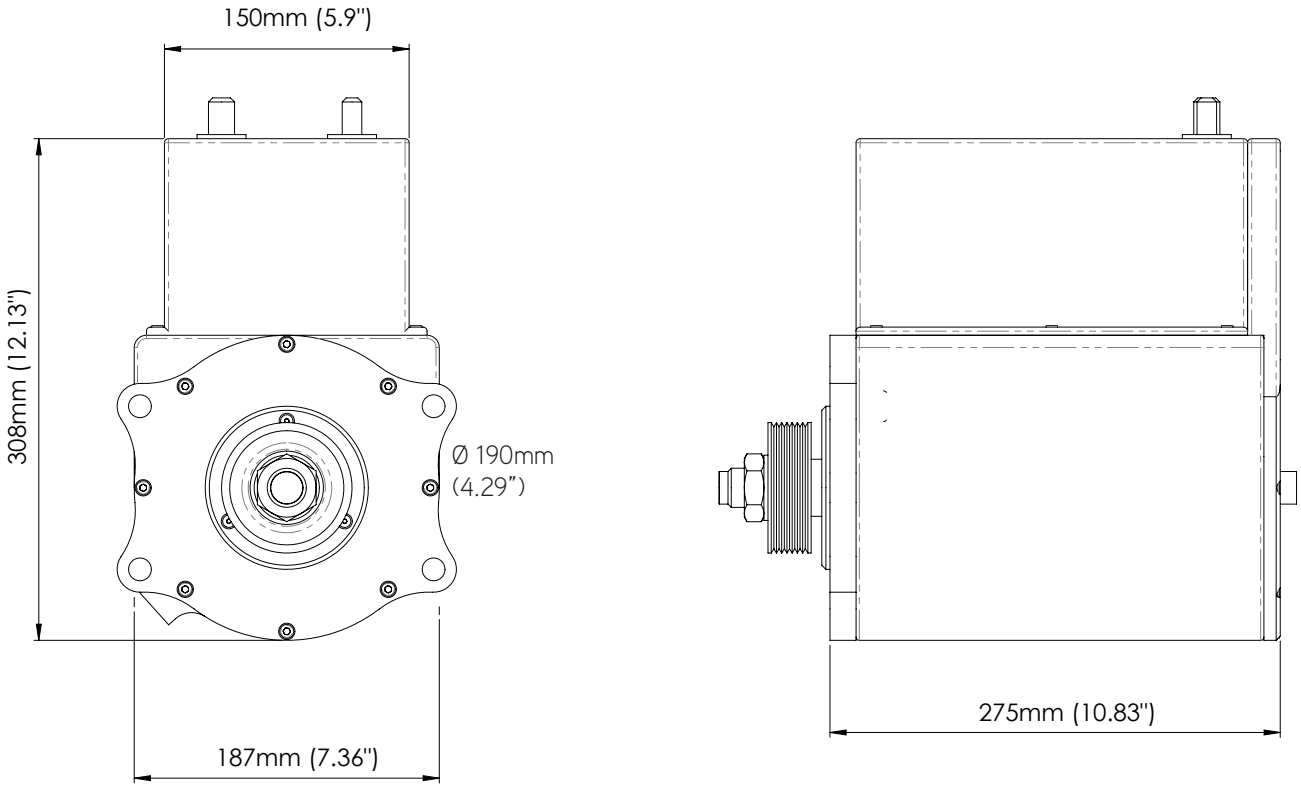
450A Liquid Cooled Alternator

- Brushless design.
- Meets military standards Mil STD 461, Mil STD 810 and Mil STD 1275.
- Compact and reliable, weighing 38kg.
- Long service life 11,000+ hours.
- Designed for the harshest environments from sub-zero temperatures to desert climates.
- Alternator output available from 1500RPM.
- Maximum current output 450 Amps.
- Factory configurable voltage and current limits.
- Maximum operating speed - 10,000RPM.
- Engine idle output of 450 Amps.
- CAN J-1939 interface.

Specifications	
Part Number:	450A-000-001
Type	Brushless Permanent Magnet
Cut in Speed	1500 RPM (Alternator)
Maximum Output	450 Amps
Weight	38 kg (84 lbs)
Voltage Regulator	Programmable, typical 28.3 Volts
Voltage Range	14 - 30 Volts DC
Operating Ambient Temperature	-40˚ to 105 ˚C (-40˚F to 221˚F)
Maximum Rotor Speed	10,000 RPM
Regulator Unit	Integrated, Solid State.
Max Continuous Output #1	450A
Mounting	Custom
Ignition Warning Light	Yes
Electrical Connection	M16 (+ve), M12 (-ve)
Cooling	Liquid Cooled
Coolant Temperature	-40˚ to +85 ˚C (-40˚F to 185˚F)
Coolant Flow Rate	>3 LMP (0.79 GPM)

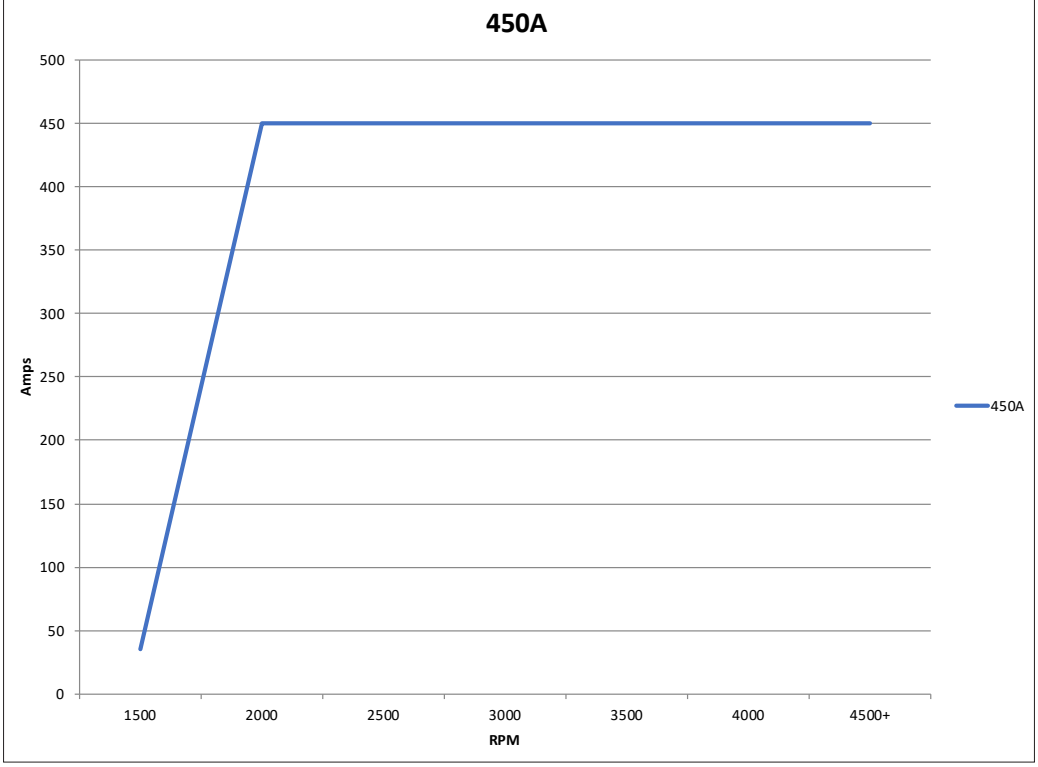
#1 Coolant Temperature Dependent

450A Liquid Cooled Alternator



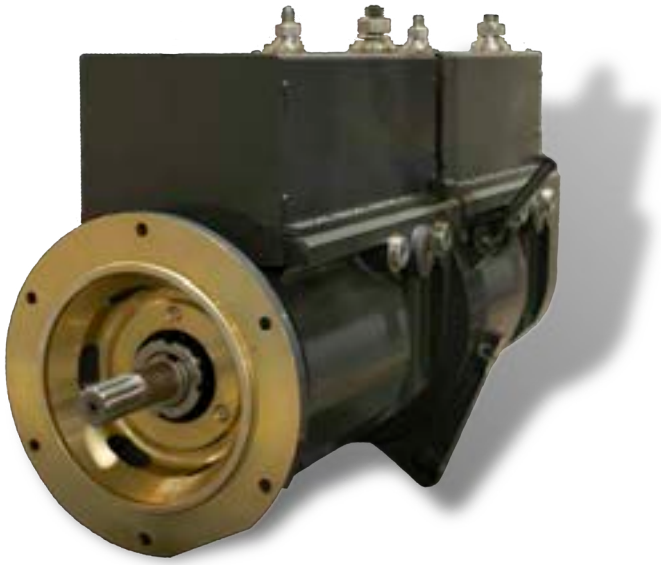
Customisable mounting and form factor

Alternator Performance Curve



900A Liquid Cooled Alternator

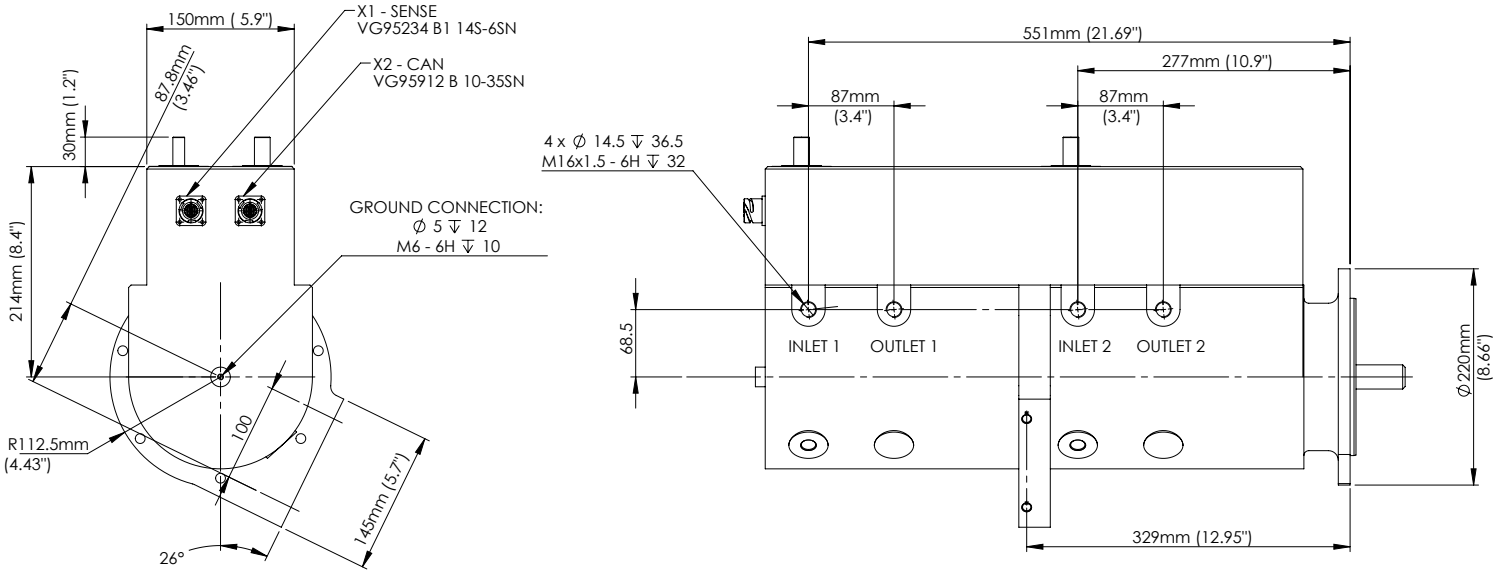
- Brushless design.
- Meets military standards Mil STD 461, Mil STD 810 and Mil STD 1275.
- Compact and reliable, weighing 76kg.
- Long service life 11,000+ hours.
- Designed for the harshest environments from sub-zero temperatures to desert climates.
- Alternator output available from 1500RPM.
- Maximum current output 900 Amps.
- Factory configurable voltage and current limits.
- Maximum operating speed 10,000RPM.
- Engine idle output of 900 amps.
- CAN J-1939 interface.



Specifications	
Part Number:	900A-000-001
Type	Brushless Permanent Magnet
Cut in Speed	1500 RPM (Alternator)
Maximum Output	900 Amps
Weight	76 kg (168 lbs)
Voltage Regulator	Programmable, typical 28.8 Volts
Voltage Range	14 - 30 Volts DC
Operating Ambient Temperature	-40° to 105 °C (-40°F to 221°F)
Maximum Rotor Speed	10,000 RPM
Regulator Unit	Integrated, Solid State.
Max Continuous Output #1	900A
Mounting	Custom
Ignition Warning Light	Yes
Electrical Connection	2x M16 (+), 2x M12 (-)
Cooling	Liquid Cooled
Coolant Temperature	-40° to +85 °C (-40°F to 185°F)
Coolant Flow Rate	>6 LPM = 2x 3LPM (>1.58 GPM = 2x 0.79 GPM)

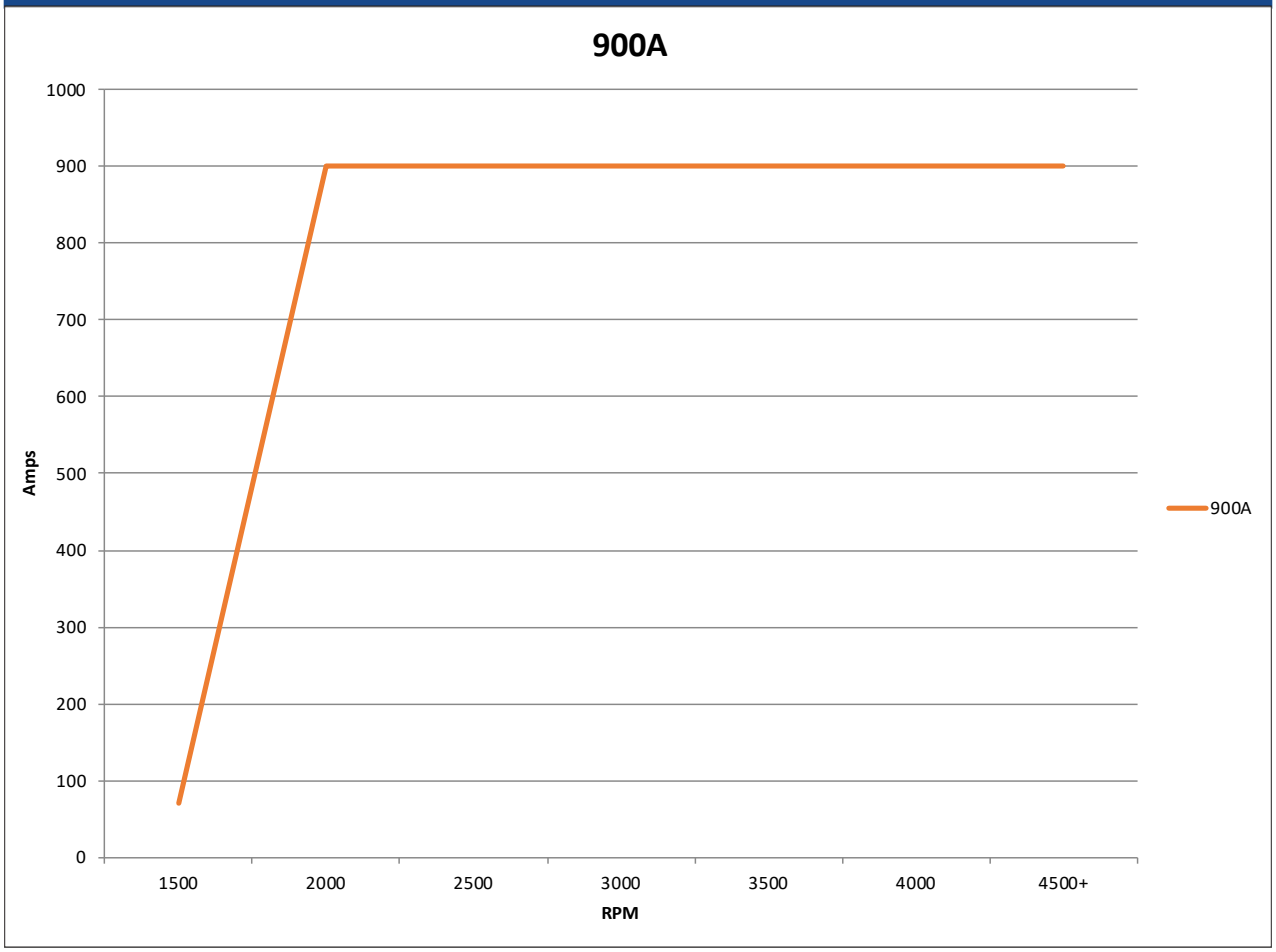
#1 Coolant Temperature Dependent

900A Liquid Cooled Alternator



Customisable mounting and form factor

Alternator Performance Curve



MILSPEC Portable Power

C4I KITS

AUXILIARY POWER UNITS

PORTABLE DISTRIBUTION UNITS

Milspec's Portable Power product range has developed as a result of our experience in designing and manufacturing military grade alternator products. This alternator technology was leveraged to produce a high performance, low weight range of units designed to meet MIL STD 461 and tailored to meet numerous applications. Milspec is working with world leading diesel and hydraulic technology companies to deliver a state of the art product to our customers. Contact Milspec today to see how we can meet your Portable Power needs.

MILSPEC APU-H-8.4/D-8.4

	Hydraulic	Diesel
Length	700mm (27.6”)	700mm (27.6”)
Width	280mm (11”)	400mm (15.8”)
Height	280mm (11”)	600mm (23.6”)
Weight	38kg (83.8 lbs)	166kg (366 lbs)
Output Voltage	28Vdc	28Vdc
Output Current	300A	300A
Output Power	8.4kW	8.4kW
Fuel Consumption	N/A	265g/kWh

MILSPEC APU-D-12

Length	720mm (28.4”)
Width	490mm (19.3”)
Height	620mm (24.4”)
Weight	145kg (319 lbs)
Output Voltage	28Vdc
Output Current	430A
Output Power	12kW
Fuel Consumption	212g/kWh

MILSPEC APU-D-22

Length	1650mm (65”)
Width	650mm (25.6”)
Height	800mm (31.5”)
Weight	380kg (838 lbs)
Output Voltage	28Vdc
Output Current	800A
Output Power	22.4kW
Fuel Consumption	212g/kWh

THALES PDU

Length	330mm (13")
Width	200mm (7.87")
Height	100mm (3.9")
Weight	5kg (11 lbs)
Input Voltage	20-36Vdc
Output Power	100W @ 12V

MILSPEC 60 kVA PDU

Length	940mm (37")
Width	450mm (17.7")
Height	555mm (21.9")
Weight	70kg (154.3 lbs)
Input Voltage	415V
Output Voltage	415V

MILSPEC 120 kVA PDU

Length	1152mm (45.4")
Width	550mm (21.7")
Height	600mm (23.6")
Weight	80kg (176.4 lbs)
Input Voltage	415V
Output Voltage	415V

Milspec MANUFACTURING

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