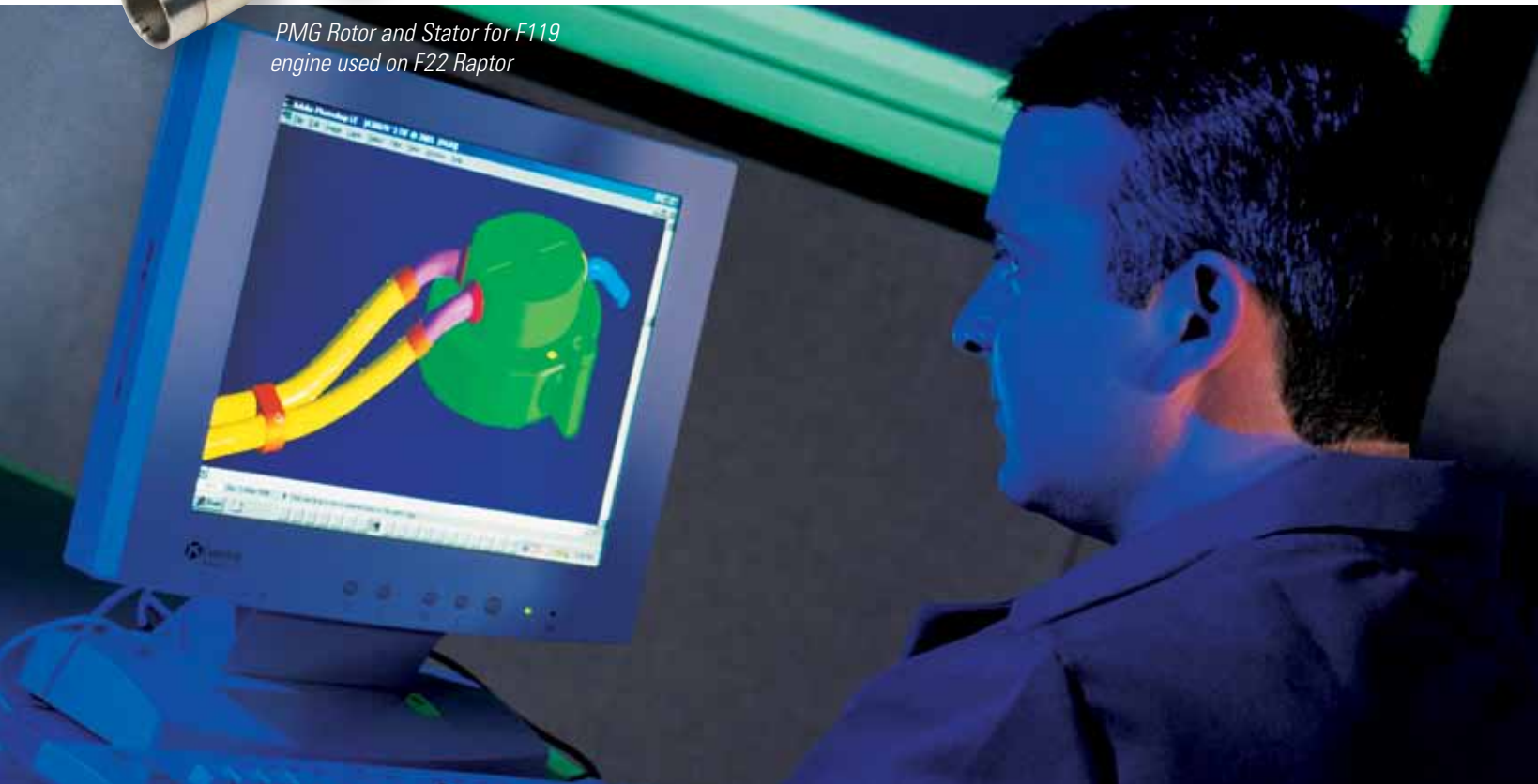




**Call Us.**  
*The power is always in your hands.*

*PMG Rotor and Stator for F119 engine used on F22 Raptor*



Let Unison customize a power generation solution for your application. To place an order, learn more, or receive technical assistance, call Unison at (607) 355-5000 or visit [www.unisonindustries.com](http://www.unisonindustries.com).

**Electrical and Mechanical Systems for Aircraft Engines and Airframes**

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**It's not just about generating power.**

**It's about generating long-term relationships.**

**Get The Power To Succeed.**

Whether you call them PMGs (Permanent Magnet Generators), PMAs (Permanent Magnet Alternators) or EDAs (Engine Dedicated Alternators), you'll find them on virtually every military and commercial aircraft in service today. Effective power generation is critical. So it should come as little surprise that Unison is the world's leading supplier of PMGs for the aerospace industry. Of course, our electrical power generation capabilities don't stop there.

Unison combines engineering expertise and a commitment to deliver custom solutions. Thanks to innovative product development and superior customer support, we can design and build to match any application. From commercial aircraft where our PMGs power engine FADECs to cruise missile ignition, ground-based microturbine electrical generators and oil wells, our highly reliable, extremely durable PMGs have proven effective for a variety of applications over a wide range of markets.



Rotor and Stator for F100 engine used on F15 Eagle and F16 Falcon

**Yes, We Can Do That.**

**Now What Is Your Question?**

Your needs are unique. Fortunately, so are our solutions. Whatever the operating environment, Unison PMGs utilize advanced technologies and materials to provide the ideal solution for you. Our vertically integrated lean manufacturing facilities are designed to produce affordable products at any volume. We automate such processes as coil winding and acceptance testing to improve cycle times and repeatability. In-house balancing, heat stabilization, metal joining, plating, nondestructive testing, and CNC machining equipment allow us to handle high volumes in short time frames. Dedicated flow lines, statistical process control, and operator inspection yield a quality product at a competitive cost. When cost, size, weight, and thermal management matter, Unison can provide a design that meets your needs.

PMG Stator and Rotor for PW4000 engine used on commercial aircraft

Key market segments for electrical power generation products include:

**Aerospace**

- Main Propulsion—Engine and Ignition Control
- Auxiliary Power Units (APUs)
- Aircraft Systems and Sub-Systems
- Ground Power Units (GPUs)
- Unmanned Aerial Vehicles (UAVs)

**Industrial**

- Ground-Based Power
- Microturbine Generators
- Transportation System Power
- Portable Power Generators
- Oil Platforms



**Power Generation And Control Technologies**

Our power generation capabilities fall into two main categories: Rare-earth Permanent Magnet (PM) and Field Regulated Hybrid. Both design types can be customized to fit any application.

18-kilowatt, high-power density, air cooled PMG for industrial applications

**Permanent Magnet (PM)**

The most widely used topology in our production base, our PM Generators can be designed to operate in voltage mode (open circuit) or current mode (short circuit). These designs offer the highest power density when optimized for cost.

**Field Regulated Hybrid**

Unison holds patents on several Field Regulated Hybrid generators. Although these designs offer lower power density than PM designs, they provide the advantage of regulated output over a wide range of operating speeds.

**Customized Power Regulation**

Modern electrical systems require precise power regulation. Whether your application demands high or low power, AC or DC, Unison can help. Our standard converters for lower power applications are used on aircraft like the Boeing 757. Our field controlled regulators can reliably regulate multi-kilowatts at better than 95% efficiency! Standard output voltage ranges are 28V to 270V AC or DC, with any number of custom voltages available. And our regulators are built to survive harsh environments, including temperature extremes from -67°F to 257°F. Unison regulators also meet tough EMI, environmental, and power standards such as MIL-STD-461, DO-160, MIL-STD-810, and MIL-STD-704.

**Other Marine And Land-Based Applications**

- Commercial
- Military

**Performance Parameters**

Unison manufactures a wide range of PMGs with a varied cross section of operational parameters.\*

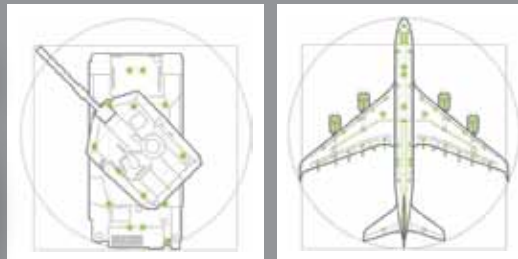
If your application does not fall within the minimums and extremes shown below, we may still be able to meet your needs. Give us a call for more information.

Parameter*	Minimum	Typical	Extreme
<b>Power</b>	1.5W	3kW	200kW
<b>Speed</b>	3,000 RPM	30,000 RPM	120,000 RPM
<b>Temperature</b>	-65°F	300°F	500°F
<b>Vibration</b>	nil	10G's	100G's

\*Individual performance and operating parameters may be mutually exclusive.

**Complete System Capabilities**

As part of GE Aviation Systems, Unison is able to offer a complete end-to-end power system, including generation, conversion, and distribution. Our integrated solutions offer superior, high density electrical power products and integrated systems for starting, generation, control, primary/secondary power management and distribution, and power conversion.



**Imagination At Work**

As a General Electric Company business, Unison has access to GE's Global Research Center (GRC), which is one of the world's largest industrial research organizations. For over 100 years, GRC has been the center of GE technology development and innovation.



**Technical And Manufacturing Excellence**

Unison is a certified ISO 9001 supplier, providing a complete engineering staff, world-class vertically integrated manufacturing facilities, and full-service product support. From prototype to production, our complete design and analysis capabilities enable us to optimize designs and shorten development lead times. Using state-of-the-art tools, we are able to produce electrical, mechanical, and electromagnetic designs through:

- Structural and Thermal Finite Element Analysis – Nastran/Patran
- Magnetic Finite Element Analysis – Ansoft
- Integrated CAD/CAM and 3D Solid Modeling – Unigraphics
- Circuit Simulation – Spice

**We Care About The Environment. Especially Yours.**

Unison's electrical power generation products are built to endure the harshest operating environments. We can customize your PMGs to include innovative design features such as heat shielding, ablative fire-resistant coatings, and integral air/fluid cooling, as well as a variety of insulation materials and magnet retention methods. Our ability to use composite materials enables our generators to operate at very high speeds. Where applicable, our integral bearings, drive shafts, and leads give our customers the added system flexibility they need.

All products are thoroughly tested in-house by Unison for compliance with the latest environmental and electrical performance standards. Test capabilities include:

Ambient Temperature	- 275 to 600 Degrees F
Flange Temperature	- 65 to 500 Degrees F
Temperature w/Vibration	- 65 to 350 Degrees F
Thermal Shock	- 85 to 375 Degrees F
Thermal Cycling	-100 to 600 Degrees F
Altitude	To 250,000 Feet
Salt Spray	At Ambient Temperature
Humidity	-15 to 150 Degrees F
Vibration	Sinusoidal 60g to 3000Hz / Random 25g to 3000Hz
Impact	100g, 11ms Half Sine
Fluid Exposure	Ambient or Elevated Temperature



**Build-To-Print Capabilities**

In addition to manufacturing products of our own proprietary design, Unison is a cost-effective "build-to-print" manufacturer serving aerospace and industrial markets. Unison fully integrates these operations into our highly developed quality and production control systems, while maintaining a low cost base that "build-to-print" customers expect.

Unison improves existing non-Unison PMG designs and reduces manufacturing costs



**Unison Service Express<sup>SM</sup>**

No one knows Unison products better than Unison. As the original equipment manufacturer and FAA-PMA Approval holder, Unison has the best understanding of the methods needed to ensure product quality and reliability. For those customers who elect not to perform their own service, Unison Service Express<sup>SM</sup> overhaul and repair programs offer a fast, reliable means for product service. Unison's Alternator Express<sup>SM</sup> exchange program provides remanufactured replacement parts within a 4-day turnaround time, and repair programs deliver your original part back to you within 20 days. Every stator undergoes full-function dynamic testing, and all rotors are checked and balanced to exacting standards.

Integral Rotor and Stator PMG for A250 engine

