

PROGEN

FUEL CELL POWER **1kW Fuel Cell System for Industrial Robotics,** **UAV and Aerospace Applications**

Plug Power's ProGen 1kW fuel cell engines are lightweight and rugged propulsion systems designed specifically to deliver extended flight endurance and runtime under the most demanding operating conditions. The product combines a patented construction method with its proprietary air-cooled, closed-cathode technology, increasing simplicity and system performance, delivering several key advantages over market competitors.

Powerful Benefits

COMPLETE FUEL CELL SYSTEM

To ensure seamless integration into your robotics platform or UAV airframe, the ProGen 1kW fuel cell is fully-integrated and self-contained, including all of the necessary subsystems to provide reliable and efficient propulsion power. Its design has been optimized based on extensive UAV flight testing in many different platform configurations and environmental conditions.

HIGH SPECIFIC ENERGIES

Plug Power's 1kW ProGen engine is designed to deliver high specific energies (Wh/kg) for extended flight endurance and runtime. With a compressed hydrogen fuel source, the system outperforms the average lithium battery in terms of endurance by a factor of three to four. With liquid hydrogen fueling systems, this endurance advantage is extended to a factor of up to nine times.

FLEXIBLE ARCHITECTURE AND SCALABLE POWER

ProGen engines are designed with simplicity in mind. Their design allows for packaging flexibility including both complete, integrated systems and those with distributed air and cooling sub-systems.

RUGGED RELIABILITY

ProGen provides superior power even in the most rugged conditions, operating in a wide range of climates including sub-freezing temperatures. System reliability is backed by Plug Power's experience operating more than 35,000 fuel cell systems in the field.



Powering Your Possibilities.



SYSTEM EFFICIENCY

What separates the ProGen 1kW fuel cell engine from the competition is its system efficiency. We produce more power with less hydrogen, making our fuel cell systems lighter. Designed for operation at very high efficiency, the total net energies available are at a usable power level that will actually fly your UAV or power your robotics platform.

FUEL CELLS VS. LIPO

Plug Power fuel cell systems provide up to 9x the energy available from rechargeable lithium polymer (LiPo) batteries, the incumbent electric UAV propulsion technology. The output voltage range of the fuel cell system is similar to that of an 8 to 10S LiPo battery pack, eliminating the need for any power conditioning between the fuel cell system and your propulsion motor - no DC/DC converter required.

SYSTEM FEATURES

- Hybrid battery for peak power demands
- In-flight battery charging to ensure high power is available in the most demanding weather conditions
- Modular design for optimal platform integration
- Exceptional system efficiency for longer flight endurance
- Low heat and noise signature

FULL PRODUCT CONFIGURATION

- Fully integrated fuel cell stack
- Hybrid LiPo batteries
- Electronic controller & power distribution board
- Proprietary power management system, including battery charging
- Air delivery & cooling subsystems
- Hydrogen valves
- Hydrogen delivery system with regulator & integrated pressure sensor
- Human machine interface for system monitoring while on the ground or in the air
- Data link for all fuel cell system parameters

Other product configurations available depending on specific mission and platform requirements.

PRODUCT SPECIFICATIONS

PERFORMANCE	RATED NET OUTPUT POWER	1,000W
	MAX CONTINUOUS NET OUTPUT POWER	1,200W ¹
	PEAK NET OUTPUT POWER - TAKEOFF	Up to 3,000W
	DC OUTPUT VOLTAGE RANGE	32V to 45V
	SYSTEM EFFICIENCY @ 1,000W	50%
	DESIGN LIFETIME	Up to 3,000 hours
ENVIRONMENTAL	AMBIENT TEMPERATURE (MAX)	40°C ²
	FLIGHT ALTITUDE	1,000M ³
COMPONENT / SUB-SYSTEM MASS	FUEL CELL MODULE	3.2KG ⁴
	AIR DELIVERY MODULE	0.4KG
	HYDROGEN RECIRCULATION	0.2KG
	CONTROLLER / POWER BOARD / BATTERY CHARGING	0.3KG
	HYBRID BATTERY (W)	Depends on peak power requirements
	HYDROGEN DELIVERY SYSTEM (WH)	Depends on energy requirements
	DIMENSIONS / VOLUME	Fully configurable depending on UAV airframe or robotics platform

Product specifications are subject to change without notice. ¹ At STP (20°C, 1 atm); ² System configurations for ambient temperatures up to 45°C available; ³ Higher altitudes available on request; ⁴ Includes fuel cell stack, cooling fans, shroud, hydrogen valve, etc.

Corporate Headquarters
968 Albany Shaker Road
Latham, NY 12110
518.738.0320



PLUGPOWER.COM
progen@plugpower.com

092020