



ALTERGY FREEDOM POWER™ SYSTEM ENGINE - FPS SERIES

The heart of the Altery Freedom Power™ System (FPS) is an advanced fuel cell engine offered in either 24 VDC or 48 VDC configuration. The cells that make up a fuel cell stack are constructed from durable stainless steel and plastic. The fuel cell stack is integrated with the balance of plant including thermal management, fuel management, power and voltage management, creating a complete FPS Engine. The engines are designed with a plug-n-play feature that allows them to operate in a stand-alone mode or to be combined with additional engines to produce a range of power outputs up to 30 kW. The Altery® plug-n-play design also allows optional peripherals to interface seamlessly into the FPS system.



Front View



Rear View

Each engine features an integrated supervisory control system that consists of a 32-bit digital signal controller with on-board diagnostics. This control system manages the function of the fuel cell, including real-time system monitoring and control, as well as thermal management. Sensors include fuel pressure, leak detection, ambient temperature and humidity, stack and electronics temperature, mass air flow, fan and filter conditions, stack and output currents and voltages, and tampering detection and reporting. In addition to optional user-definable factors, it communicates via a Graphic User Interface (GUI) to provide system and site status and allows user input of operating parameters. External communications and monitoring are facilitated by USB, RS-232 and ethernet connections, as well as four user-defined digital Input/Outputs. Power conditioning and regulation is performed by a fully digital, multi-phase, interleaved DC/DC converter that delivers precisely regulated DC power output.

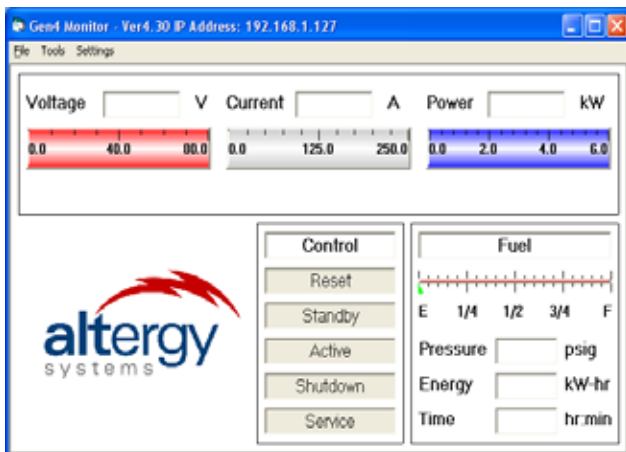
THE ALTERGY FREEDOM POWER™ SYSTEM (FPS)¹ SPECIFICATIONS

Model Number		FPS -524	FPS -548	FPS -1024	FPS -1048	FPS -1524	FPS -1548	FPS -2024	FPS -2048	FPS -2524	FPS -2548	FPS -3024	FPS -3048
Output	Rated Standby Power (kW)	5		10		15		20		25		30	
	Rated Current (A)	210	105	420	210	630	315	840	420	1050	525	1260	630
Voltage	Rated (VDC)	24	48	24	48	24	48	24	48	24	48	24	48
	Range (VDC)	21 to 29	42 to 58	21 to 29	42 to 58	21 to 29	42 to 58	21 to 29	42 to 58	21 to 29	42 to 58	21 to 29	42 to 58
Physical (Engine Only)	Dimensions ² (w x d x h in.)	21 x 33 x 25		21 x 33 x 50		21 x 33 x 75		46 x 33 x 50		69 x 33 x 50		69 x 33 x 50	
	Weight (lbs)	179		378		557		746		945		1144	
	Mounting	Standard 23" rack, shelf mount or Alteryg approved enclosure											
Fuel	Type and Grade	Gaseous hydrogen, industrial grade, 99.95% pure											
	Supply Pressure	40 to 100 psig											
	Consumption (SLPM)	70	140		210		280		350		420		
Operational	Ambient Temperatures ³	-40°C (-40°F) to 50°C (122°F)											
	Relative Humidity	5 % to 100 % non-condensing											
	Location	Indoors with suitable air management or outdoors with suitable enclosure											
	Altitude	10,000 ft											
Environmental	Clean	California Air Resources Board (CARB) certified as a zero emission electrical power generator. By-product is water											
	Green	Can recycle residual heat to increase fuel and system efficiency. Can use "Green" hydrogen fuel (generated from biomass, hydroelectric, solar or wind powered electrolysis)											
	Noise	<60dBA @ 1 meter											
Control Electronics	Supervisory Control	32-Bit Digital Signal Controller w/on-board, real time diagnostics, communications, thermal & systems management. Sensorless brushless direct current motor control.											
	Power Conditioning	Fully digital, multi-phase, interleaved DC/DC converter											
	Monitoring Software	Real time control communicates with GUI to provide system and site status and allow user input of operating parameters. Field upgrades through communication port											
	I/O Interfaces	USB, RS-232, RS-485 and Ethernet supported. Four user defined dry contacts. Optional wireless											
	Sensors	Fuel pressure, leak detection, ambient temperature & humidity, stack & electronics temperatures, fan & filter conditions, stack & output currents and voltages, tampering											
Safety/Certification/Compliance ⁴	CSA/ANSI FC 1-2004 Standard, FCC 47CFR Part 15, Subpart B, Class A, NEBS Level 3, NEMA 3R												

- Up to six 5 kW FPS Engines can be paralleled to achieve between 5 to 30 kW of rated standby power output.
- Dimensions include additional clearance to assure proper airflow and cooling in an enclosure. See Alteryg[®] installation manual for details.
- 10°C (50°F) and below requires low temperature configuration, 40°C (104°F) or higher requires high temperature configuration.
- Some certifications pending

Specifications subject to change without notice

COMMUNICATIONS - FPS 500 SERIES

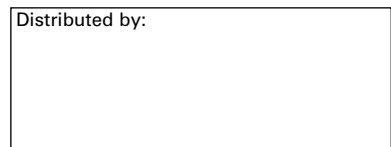


FPS Monitor Control and Monitor Interface

Remote monitoring and control of the Alteryg[®] Freedom Power™ System can be provided using integrated ethernet communications protocols. Wireless communications is an option. Utilizing the FPS Monitor software you can remotely monitor and/or control the following:

- DC Plant Operations.
- Fuel Cell Operations (see FPS Engine Specifications for Monitored Functions).
- Fuel Pressure.
- Disconnect Grid Power and Verify Fuel Cell Operations.
- Cat # Ethernet 500 or Wireless 510

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www.enersys.com

EnerSys
 P.O. Box 14145
 Reading, PA 19612-4145
 USA
 Tel: +1-610-208-1991
 +1-800-538-3627
 Fax: +1-610-372-8613

EnerSys EMEA
 Brussels, Belgium
 Tel: +32 (0)2 247 94 47

EnerSys Asia
 Guangdong, China
 Tel: +86-755-2689 3639