H3 Dynamics

Hydrogen Air Mobility

Power Solutions and Accessories

2022

www.h3dynamics.com

Range of Products

HYCOPTER

AEROSTAK
Fuel Cell Systems

H_2 Refilling Station

H_2 Pressure Regulator

H_2 Cylinders

H_2 Boost Compressor

H3Dynamics

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Up to 3.5 hours Flight Endurance

Compatible With
AEROSTAK 1500 Fuel Cell
A Series & F Series Cylinders

HYCOPTER

Hydrogen Electric Drone

The H3 Dynamics HYCOPTER is a hydrogen electric hexacopter drone capable of long endurance flight, making large-scale inspections easier and faster, compared to conventional battery UAVs.

The HYCOPTER integrates a lightweight airframe that houses an open cargo bay allowing multiple payload options. Featuring a modular design and an adjustable centre of gravity (CG), the HYCOPTER can be perfectly balanced regardless of the payload and cylinder configuration.

The HYCOPTER is powered by H3 Dynamics AEROSTAK 1500 fuel cell, carries one hydrogen gas cylinder and has an emergency battery backup on board as a failsafe.

Aircraft	
MTOW	16.5 kg
Dimensions [1]	D : 1 450 mm | H : 500 mm
Flight Time [2]	Up to 3.5 h
FC Nominal Power	1 500 W
LiPo Peak Power	4 000 W (< 10 s)
Oper. Temperature	-5 °C to 45 °C
Flight Controller	Pixhawk 2.0
Max. Speed [3]	48 km/h
Max. Ascendent Speed [3]	3.2 m/s
Max. Descendent Speed [3]	2.2 m/s
Max. Tilt Angle	32 °
Pitch	150 °°/s
Yaw	80 °°/s
Wind Survivability	32 km/h

Payload	
Volume	L : 260 mm | W : 330 mm | H :200 mm
Max. Weight	2.5 kg
Voltage	5 - 32 V
Max. Power [4]	180 W

Remote Controller	
Model	HereLink
Operational Frequency	2.4 Ghz
Battery	4 950 mAh LiPo
Max. Transmitting Distance	FCC : 20 km | CE , SRRC : 12 km

[1] Excluding propellers
[2] Depending on H_2 cylinder and payload
[3] Payload dependent
[4] Optional

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H_2 Refilling Station

A available source of hydrogen is one of the limiting factors for the adoption of hydrogen fuel cell powered vehicles. H3 Dynamics provides a mobile automatic refilling trailer to directly produce hydrogen from water. This trailer has the capability of refilling a 9L - 350 bar cylinder in under 4 hours when supplied with only water and electricity.

The Refilling Station is an automated turnkey system, easy to operate with little to no user intervention once started. The system fully controls the production of hydrogen gas and safely monitors the high-pressure filling of the hydrogen cylinder. The system is designed to minimize maintenance and consumable requirements.

Water Supply → Water Purification System → Water Storage → Electrolyzer → Dryer → Accumulator → Booster Pump → Accumulator → Hydrogen Cylinder

Water Purification System

Input Water	500 NL or 1.0785 kg / h
Input Water Maximum Salinity	> 99.999 %
Input Water Pressure Range	2.5 - 5.0 bar
Input Water Temperature Range	10 - 25 °C
Output Water Production Rate [2]	1.3 L / min
Power Consumption	80 W
Power Supply	100 - 240 VAC | 50 / 60 Hz

Water Storage

Capacity	35 L
Max. Outlet Water Flow Rate	3.8 L / min
Operative Power Consumption	50 W
Power Supply	100 - 240 VAC | 50 / 60 Hz

Electrolyzer

H_2 Production Rate	500 NL or 1.0785 kg / h
H_2 Output Purity	> 99.999 %
Operative Power Consumption	200 W
Stand-by Power Consumption	15 W
Power Supply	200 - 240 VAC | 50 / 60 Hz
Water Consumption	0.4 L / h
Weight	55 kg

Dryer

H_2 Flow Rate	Up to 1 Nm^3/h
H_2 Output Purity	> 99.999 %
Average Dew Point [1]	< - 70°C
Operative Power Consumption	200 W
Power Supply	100 - 240 VAC | 50 / 60 Hz

[1] Compliant with ISO 14687
[2] Edith 500 mg/L TDS and 20 °C input water

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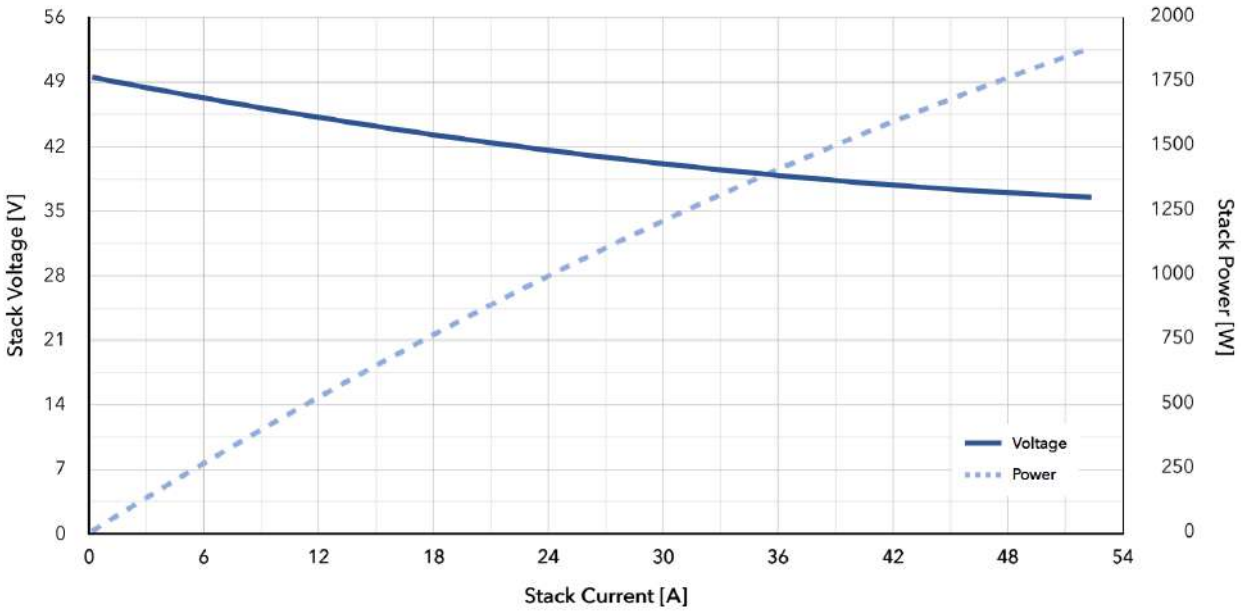
AEROSTAK 1500

ADVANCED LIGHTWEIGHT FUEL CELL SYSTEM

The AEROSTAK 1500 is suitable for larger payload multi rotor UAV's as well as for fixed wing, VTOL and other higher power mobile applications.

Stack Design	55 cells
Rated Power (FC)	1500 W
Peak Power (FC + battery)	4000 W
Voltage	32.0 - 51.3 V
Current	0 - 50 A
Weight	3 000 g
Specific Power	500 W/kg
Power Density	180 W/L

Dimensions	339 x 143 x 172 mm
Cooling	Air
Air Input Temperature	0 - 35°C
Hydrogen Input Pressure	0.6 - 0.8 bar
Hydrogen Purity Required	99,998%
Max. Consumption	< 16.8 L/min
Start Up Time	< 20 s
Suggested Hybrid LiPo	9S (>100C)



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Compatible With
AEROSTAK PEM Fuel Cells Systems
H_2 Pressure Regulator

Series A 350 bar Cylinders

With Pressure Regulator

The Series A cylinders are designed and manufactured following the best practices in the industry, in order to guarantee safety and security. The Series A have a working pressure up to 350 bar and a M18x1.5 thread compatible with our ultra-light pressure regulator.

	Weight [1]	Water Capacity	Hydrogen Mass	Dimensions	Specific Energy	Energy Density	Electrical Energy [2]
A5	1.65 kg	5 L	120 g	⌀ : 152 mm L : 395 mm	8 725 kJ/kg	2 879 kJ/L	2 000 Wh
A9	2.65 kg	9 L	216 g	⌀ : 173 mm L : 528 mm	9 779 kJ/kg	2 879 kJ/L	3 600 Wh
A12	3.30 kg	12 L	288 g	⌀ : 196 mm L : 532 mm	10 471 kJ/kg	2 879 kJ/L	4 800 Wh
A20	7.05 kg	20 L	480 g	⌀ : 230 mm L : 655 mm	8 169 kJ/kg	2 879 kJ/L	8 000 Wh

[1] Excluding Pressure Regulator
[2] Estimated at 50 % efficiency

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EN 12245 CERTIFICATION

COMPATIBLE WITH
AEROSTAK PEM FUEL CELLS SYSTEMS
H_2 PRESSURE REGULATOR

SERIES F 300 BAR CYLINDERS

WITH PRESSURE REGULATOR

The Series F cylinders are designed and manufactured in conformity with EN 12245. The Series F have a working pressure up to 300 bar and a M18x1.5 thread compatible with our ultra-light pressure regulator.

	Weight [1]	Water Capacity	Hydrogen Mass	Dimensions	Specific Energy	Energy Density	Electrical Energy [2]
F2	1.46 kg	2 L	42 g	⌀ : 114 mm L : 371 mm	3 173 kJ/kg	2 538 kJ/L	705 Wh
F3	1.75 kg	3 L	63 g	⌀ : 120 mm L : 445 mm	4 008 kJ/kg	2 538 kJ/L	1 055 Wh
F6	2.89 kg	6 L	127 g	⌀ : 161 mm L : 481 mm	4 479 kJ/kg	2 538 kJ/L	2 115 Wh
F6.8	3.09 kg	6.8 L	144 g	⌀ : 161 mm L : 520 mm	4 665 kJ/kg	2 538 kJ/L	2 400 Wh
F7.2	3.29 kg	7.2 L	152 g	⌀ : 166 mm L : 550 mm	4 809 kJ/kg	2 538 kJ/L	2 540 Wh
F9	4.06 kg	9 L	190 g	⌀ : 186 mm L : 545 mm	4 759 kJ/kg	2 538 kJ/L	3 175 Wh

[1] Excluding Pressure Regulator, in Light Version
[2] Estimated at 50 % efficiency

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For Unmanned Aerial Vehicle

Compatible With
A Series & F Series Cylinders
AEROSTAK PEM Fuel Cells Systems

Ultralight H_2 Gas Pressure Regulator

The pressure regulator provides safety and performance in an ultralight package of only 200 grams (250g with accessories). The single-stage regulator reduces pressure up to 350 bar storage to less than 1 bar with accurate reliable control.

Gas	Hydrogen
Material	Aluminium
Weight	200 g (250 g with accessories)
Type	Single Stage
Max Input Pressure	350 bar
Adjustable Output Pressure [1]	0-1 bar
Cylinder Thread	M18 x 1.5
Outlet Port	1/8" NPT
Fill Port	1/8" NPT
Length	107 mm
Max Flow	< 45 slpm at 0.5 bar

[1] Higher output pressures available

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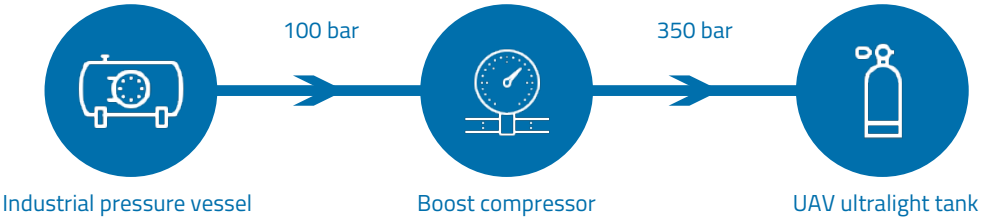
For Unmanned Aerial Vehicle

Compatible With
A Series & F Series Cylinders
H_2 Pressure Regulator

Electric Boost Compressor

Fills up to 300 or 350 bar

The H3 Dynamics electric gas booster pump system increases a low-pressure hydrogen supply to allow filling of high pressure (300-350 bar) composite cylinders. The pump is self-contained with gauges, valves, an hour meter and a power switch. The pump includes a high and low pressure safety switch as well as a high pressure safety relief valve.



Dimensions	L: 940 mm | H: 292 mm | D: 559 mm
Weight	65.9 kg
Voltage [1]	120 or 240 VAC single phase
Motor Frequency	60/50 Hz
Operational Speed [2]	70 cycles/min
Cooling	Air cooled
Noise	< 63 dB
Maximum Inlet Pressure	372 bar
Minimum Inlet Pressure	34 bar
Maximum Outlet Pressure	386 bar
Maximum Flow Rate [3]	617 slpm

[1] Other voltages available as well as 3 phases
[2] Variable Speed Option
[3] Dependent on input pressure

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