

AEROSTAK

AST01-01 (200W)

Fuel cell-enabled power supply for electric mini-UAS

Technical data sheet



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AST01-01 200W Technical Data Sheet

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1. System Specification (25°C Ambient Temperature, Sea Level)

Type of fuel cell	PEM
Number of cells	35 cells
Rated voltage range	20-32 V
Rated current range	0-10A
Peak power	600W * 2min
Rated power	200W
Reactants	Hydrogen and Air
Hydrogen consumption at rated	2.8 L/min
Ambient temperature range	5°C – 35°C
Ambient humidity range	0 - 95% non-condensing
Membrane humidification	Self-humidification
Hydrogen inlet pressure	0.5 ~ 0.6 bar
Cooling	Air (integrated cooling fan)
Low stack voltage shutdown	17.5 V
Over temperature protection	65°C
Start up time	<30 sec (room temperature)
LiPo Battery	1350mAh 6S
Stack weight	470 ± 5% (g)
Controller Weight	80 ± 5% (g)
Communication	RS232 Serial port

2. AST01-01 Dimension and Airflow directions (inlet/outlet)

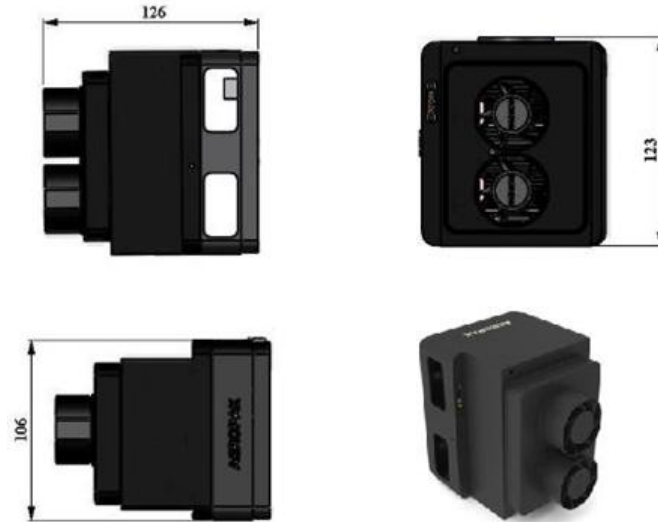


Fig AST01-01 drawings with dimensions

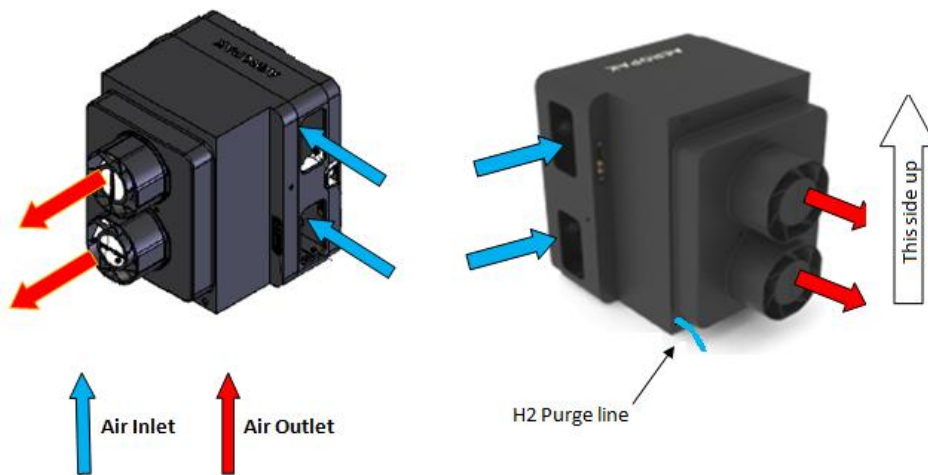
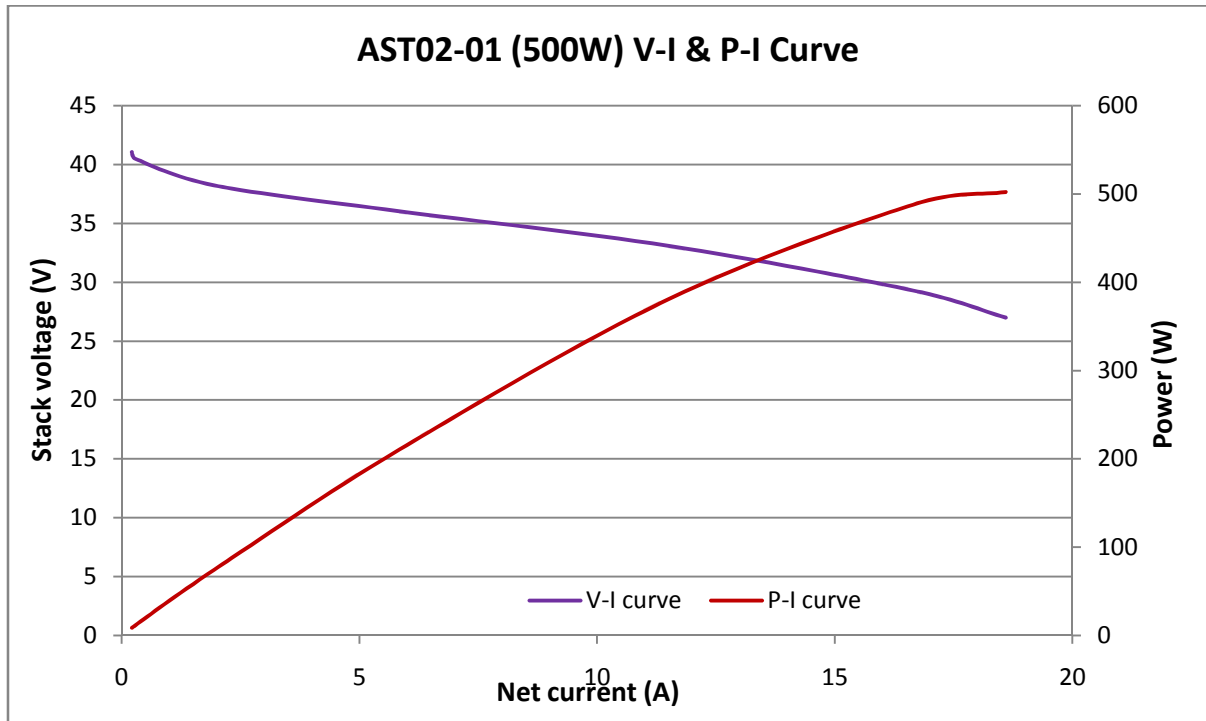
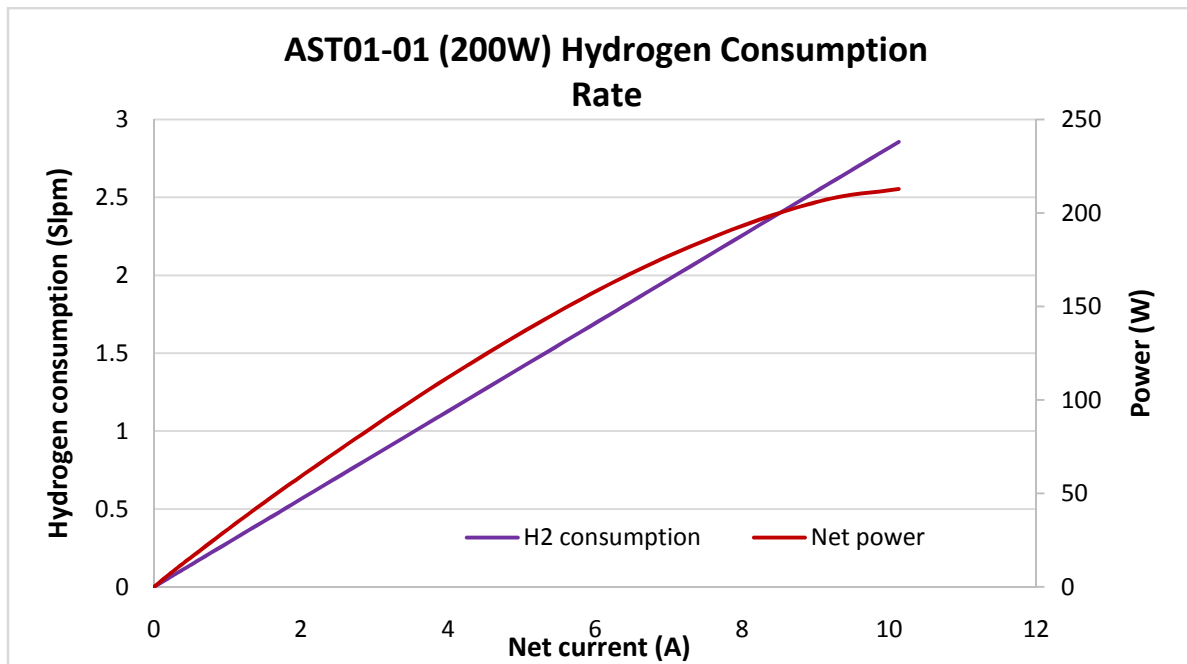


Fig Air inlet/outlet and Purging line of 200W aerostak

3. AST01-01 (200W) stack performance graph and H2 flow rate



This U-I curve is slightly depending on ambient temperature. High altitude has a more pronounced effect on the power output due to the reduced oxygen partial pressure in the air.



This curve shows the hydrogen consumption as a function of the net output current. The hydrogen consumption is proportional to the output net current. At rated power, the maximum hydrogen consumption is less than 3 slpm.

4. Altitude & temperature

Operating altitude affects the aerostak performance. At higher altitude, there is a reduced level of oxidant for reaction, leading to lower single cell voltages within the fuel cell stack. A slight drop in performance (power output level) can be expected typically at altitude 1000m above sea level.

Another factor that affects the STACK performance is ambient temperature. Higher temperature leads to the drying up of the proton exchange membranes inside the fuel cell stack, reducing proton conductivity and consequently the power output of the fuel cell.

5. Other factors

5.1. Radiation and neutron radiation effects on the stack

Impacts of radiation and neutron radiation on the stack have yet to be tested. Strong radiation and neutron radiation might cause damage to the fuel cell.

5.2. Shock and vibration

The fuel cell undergoes vibration and shock tests according to UL2267 standards (for vibration tests), and IEC-68227Ea and IEC68229Eb (for shock tests).

5.3. Lifetime and Performance Degradation

The STACK standard warranty is 500 operating hours at its rated performance. After 500 hours operation, power degradation rate will be approximately 5% per 100 hour operation.

Fuel cartridge is meant for one-time use. Cartridges are disposable or returnable to Horizon Energy Systems for refurbish.

The fuel cell system will undergo reversible performance degradation after long term storage, up to a maximum power loss of 30%. System performance can be recovered after some conditioning. It is recommended that the STACK is used at least once a month.