



# HYPERION TECHNOLOGIES

## PM400 Series Propulsion Module



### DESCRIPTION

The PM400 is a bi-propellant propulsion module for 6-12U CubeSats. It allows manoeuvres of up to 230 m/s to be performed utilizing the non-toxic propellants nitrous oxide and propane in a self-pressurizing configuration.

Low system complexity and zero propellant toxicity allow for simple and robust operations, both on the ground and when in orbit. The medium tank pressure and high storage density of liquid propellants enables high safety factor tanks to be used with little mass penalty.

The standard configuration with a 2U propulsion module can be configured to suit any CubeSat structure and features an I<sup>2</sup>C or RS422/RS485 compliant interface.

Through the use of additive manufacturing, the system is highly customizable. Design parameters such as total system delta-V, interface style and thrust direction can be changed on request and adapted to an existing CubeSat architecture.

The PM400 can be seamlessly integrated with the iADCS400 to provide a fully integrated GNC and ADCS solution.

### HIGHLIGHTS

- Nominal thrust 1 N
- Specific impulse > 285 s
- $\Delta V$  (6U CubeSat) > 230 m/s
- Minimum impulse bit 75 mN.s
- Maximum impulse bit 11 N.s
- Repeatability (3  $\sigma$ ) +/- 9 mN.s
- Power requirement (firing) < 6 W
- Power requirement (sleep) < 0.1 W
- Storability > 5 years
- Ready to fire seconds after wake-up
- No measured thruster degradation
- Integrated thruster management system

### PERFORMANCE

The standard 2U configuration of the PM400 propulsion module can deliver in excess of 230 m/s of velocity increment to a 6U CubeSat of 8 kg.

The system utilizes a single 1 N thruster. This relatively high thrust allows manoeuvres to be completed in a timely manner as well as enabling the use of Hohmann transfer orbits.

The smallest deliverable impulse bit of 75 mN.s results in a velocity increment of 0.01 m/s of a 6U CubeSat. A velocity increment of up to 1.37 m/s can be imparted before cooldown is required. Impulse repeatability can be achieved to +/- 9 mN.s (3  $\sigma$ ).

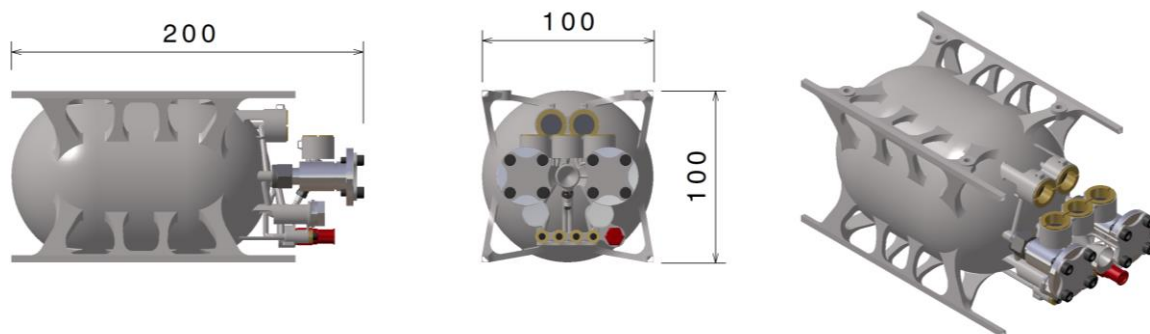
The system makes use of 5 pressure and temperature sensors to monitor system health and provide real-time thruster performance data.



## SPECIFICATIONS

Performance		
Total impulse	> 1750	N.s
Thrust	1	N
$I_{sp \text{ vac, Ae/At} = 100}$	> 285	s
$\Delta V$ (8kg satellite incl. HT-PM400.10)	> 230	m/s
Environmental		
Operating temperature	-5 to +35	°C
Electrical specifications		
Supply voltage	5	V
Power required (during firing)	< 6	W
Power required (sleep)	< 0.1	W
Mechanical		
Outer dimensions	200 x 100 x 100	mm
Nom. propellant storage pressures	45 (Ox) / 7.5 (Fuel)	bar
Dry mass (excluding propellant)	< 1400	g
Propellant mass	625	g

## MECHANICAL CHARACTERISTICS



All dimensions in [mm]. The above model shows a generic CubeSat structure interface. The module can be delivered compatible with all major CubeSat structure standards as well as customized mechanical interface.

For pricing, delivery, configuration and ordering information please contact Hyperion Technologies B.V. at [info@hyperiontechnologies.nl](mailto:info@hyperiontechnologies.nl), or visit Hyperion Technologies' website at [www.hyperiontechnologies.nl](http://www.hyperiontechnologies.nl).