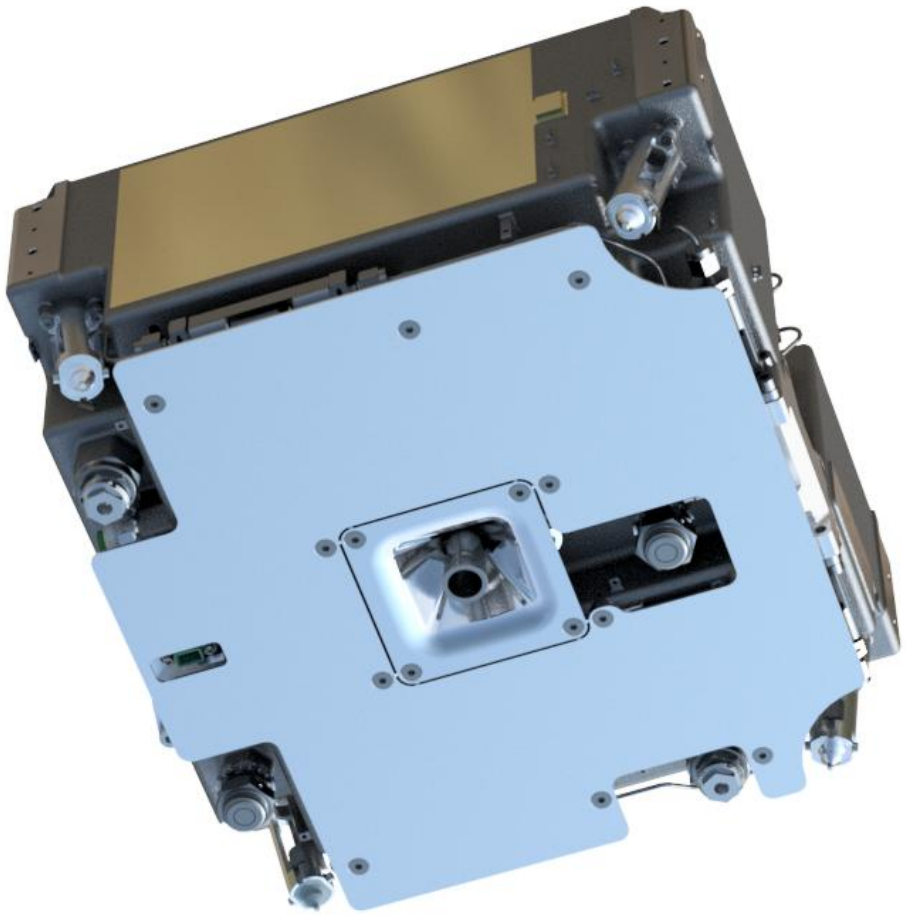
ISP Tech



HYNOX 4U CUBESAT PROPULSION MODULE

PUBLIC DATASHEET

LAST UPDATE: 2025-06-12

This document contains public information about the product.
For detailed information, please request the extended datasheet:
contact@ISPTech.space

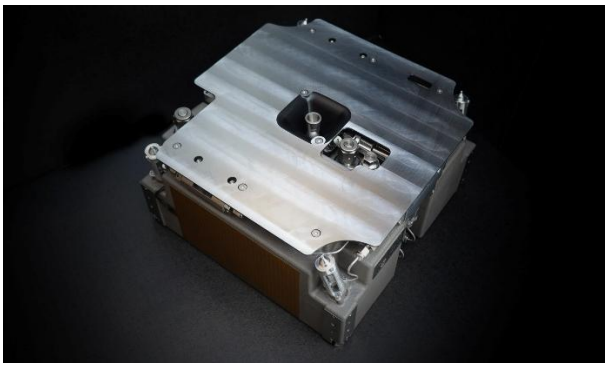
About the Product

Building on years of green propellant research at DLR's Institute of Space Propulsion, ISPTech brings low cost, reliable, and high performance propulsion to commercial and institutional markets.

The HyNOx 4U CubeSat Module enables significant deltaV in a short amount of time for 12U and larger CubeSats. It utilizes ISPTechs high performance, steady-state capable HyNOx-1 thruster, allowing for rapid orbit changes, collision avoidance or de-orbiting. The module also provides roll, pitch and yaw control.

In its standard configuration (110 mm overall length) it can deliver more than 4,000 Ns impulse or 200 m/s deltaV for a 20 kg CubeSat. And if that is not enough, the tank length can be customized to customer needs.

HyNOx-1 thruster during hot fire



Propulsion System Engineering Model

Your Advantages

- Green, affordable and easily available propellants: N_2O + C_2H_6
- Simple system architecture – self-pressurized system
- Thrust level can be controlled by propellant temperature control
- Thermal steady-state operation of the thruster allows significant deltaV from a single maneuver
- Pulse mode operation allows for precise attitude control
- ITAR free and REACH compliant
- Cold-start capable

Capabilities

- Main propulsion with HyNOx-1 thruster (z-direction): **0.5-2 N**, depending on propellant conditions
- **900 Ns** impulse bit in one continuous firing demonstrated at DLR vacuum facilities
- **Roll, pitch and yaw** via 4 attitude control thrusters
- **Redundant** thrust capability in z-direction via attitude control thrusters (supplied by independent isolation valve)
- HYNOX-1 Thruster operatable in **cold gas mode** as back-up option
- Propellant **heating** with up to 14 W

Status

Two in-orbit demonstrations scheduled for 2026.

Specifications

Specification	Value	Comment
Dimensions	X: 209.3 mm Y: 209.3 mm Z: 110 mm	Compatible to12-24U CubeSats. z-length customizable on request.
Main Propulsion: **HyNOx-1 Thruster**	1x 1 N Thruster ISP up to 270 s	throttle 50-200%, details see HyNOx-1 datasheet
Total Impulse	> 4000 Ns	for standard z-length
Maximum Impulse Bit **(Main Propulsion)**	900 Ns	in one continuous firing demonstrated in vacuum can be increased
Attitude Control	4x 100 mN ISP > 60 s	Cold gas thrusters, performance demonstrated in vacuum
Survivability Temperature Range	-34°C to +71°C	maximum
Operating Temperature Range	-34°C to +32°C	customizable
Wet Mass	up to 6.8 kg	depending on mission requirements, propellant mass can be decreased

For detailed information, please request the extended datasheet.
Drawings and CAD files are available on request.

Electrical Interface

Specification	Value	Comment
Supply Voltage	20-33 VDC	customizable on request
Power Consumption	< 5 W idle < 20 W heating < 47 W peak (10 ms) < 10 W cont. firing	-
Communication	RS-485	customizable on request

Mounting

The module can be mounted with a total 16 M3 bolts, see Figure 1. Positions of the threaded holes and vent holes alternate from side to side. A CAD model for fit check purposes can be shared on request.

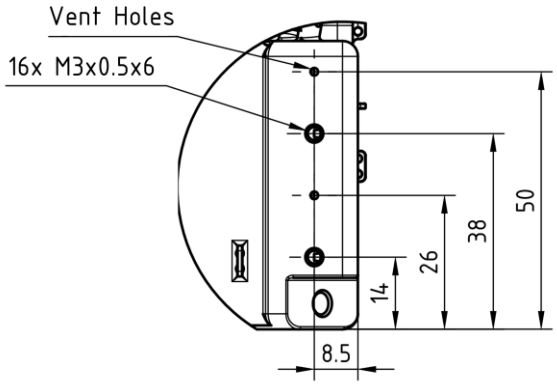


Figure 1: Mounting positions