VACCO®

Integrated Propulsion System

X18069000-1

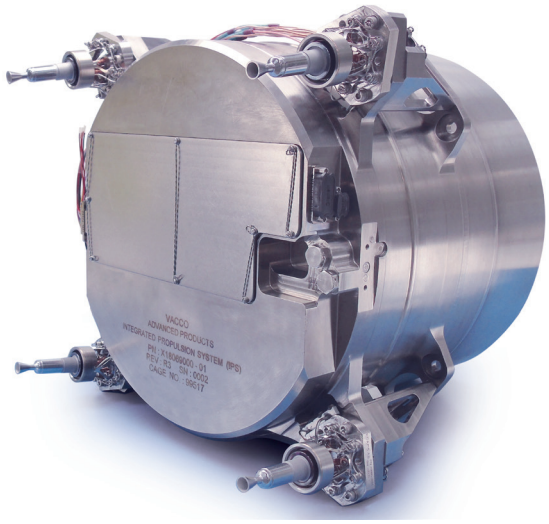
SPACE

VACCO's Integrated Propulsion System (IPS) provides a highly reliable, intelligent, attitude control and delta-V solution capable of delivering 12,000 N-sec total impulse to any SmallSat. IPS is a complete, bolt-on propulsion module including propellant storage, feed system, thrusters and controller. Components and manufacturing methods used are the product of 57 years of space experience including propulsion systems that powered both highly successful Mars Cube One (MarCO) CubeSats.

The IPS features four, flight-proven, 1N LMP-103S green monopropellant thrusters double-canted for a net axial thrust of 3.97N. First launched in 2010, fifty six of these 1N thrusters have been successfully flown. During delta-V operations individual thrusters can be off-pulsed to achieve thrust vector control, roll control or reaction wheel desaturation. Given high thruster throughput capability, propellant and pressurant capacity can be expanded to increase total impulse with minimal impact to the overall design.

Flight systems currently in production.

Performance Density: 1,079 N-sec/L



Features:

- Range Safety Friendly
- Three interrupts against propellant leakage
- Leak before burst pressure boundary
- Separate power inputs for "Safe" and "Arm"
- Integral Microcontroller with RS422 digital interface
- Radiation resistant components with integral shielding
- Robust, sophisticated flight-proven software
- Redundant electronic pressure regulators
- <1W required for communication and health monitoring
- 50W peak power
- Frictionless high reliability micro valves
- All-welded, high strength titanium alloy structure
- Fully manifolded components (no tubing)
- Performance density 1,079 N-sec/L

Operating Parameters:

Propellant	LMP-103S
Net Axial Thrust	Throttlable from 1 to 3.97 N
Total Impulse	12,000 N-sec
MEOP	22 bar (320 psia)
MDP	63.4 bar (920 psia)
Proof Pressure	95.1 bar (1380 psia)
Burst Pressure	126.8 bar (1840 psia)
Internal Leakage	-1.0 x 10-4 sccs GHe
External Leakage	<1.0 x 10-6 sccs GHe
Operating Temperature	+10°C to +40°C
Non-Operating Temperature	-34°C to +40°C
Dry Mass	9.0 kg (19.8 lbm)
Wet Mass	14.7 kg (39 lbm)
Safe Power Input	12 ±0.3V, 24W max.
Arm Input Power	28 ±4V, 50W max.
Data Interface	RS-422

Performance characteristics are based on customer requirements. As such, they are not representative of component capabilities or limitations.

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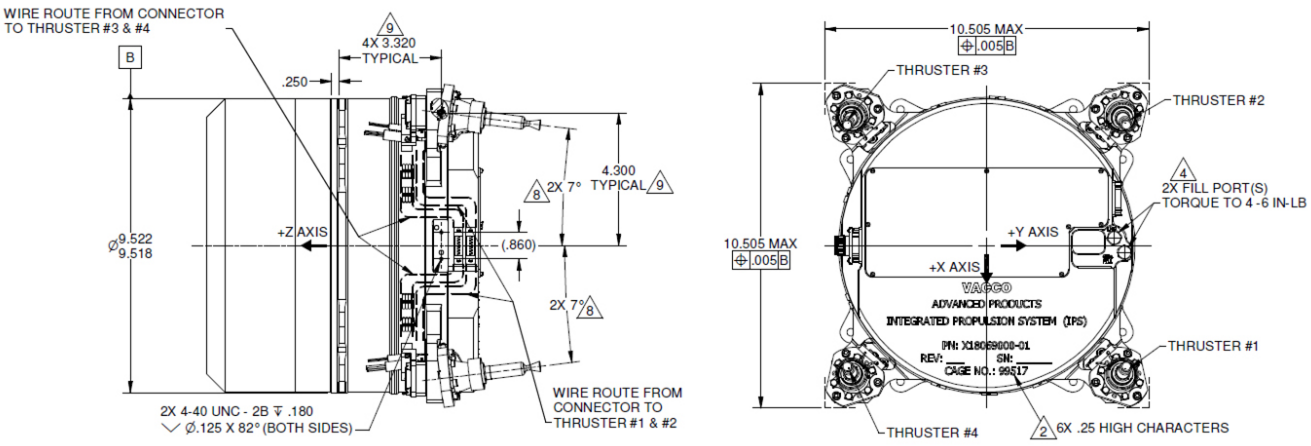
Envelope Drawing:



Flow Schematic: