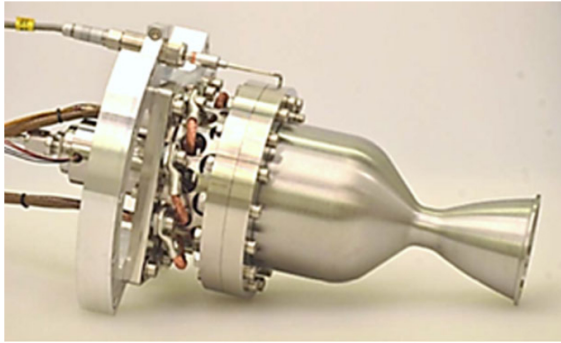


# 200N HPGP Thruster



## 200N HPGP Thruster

Bradford ECAPS's **200N HPGP Thruster** is designed for launch vehicle upper-stage reaction control and potential defense applications, such as missile defense. Much of the work into the **200N HPGP** has been to investigate potential uses on various launch vehicle upper stage programs, including the **Ariane 5ME**, and for various spacecraft orbit-raising applications. This thruster is currently in development and looking for partners to bring the prior work into fruition.

- **Propellant loading is simple**, fast and avoids the cost associated with loading hydrazine. Allows the operator to spend less time on ground operations and more time on space operations.
- 'Fuel at the factory' – be ready for launch vehicle integration upon arrival at the launch pad. Eliminates significant time and cost from lengthy pre-launch campaigns.
- **Non-toxic propellant** is suitable for a new class of responsive small satellite launchers, where handling hazardous hydrazine may impede operations or where fully equipped hydrazine processing facilities may be non-existent at the launch site.
- **Higher performance** over hydrazine allows for more payload or longer mission durations.
- Allows for **more agile mission profiles** than electric propulsion. Spacecraft take significantly less time to execute maneuvers and orbit changes.

## Specifications Table

Thruster Type	HPGP	HPGP
Propellant	LMP-103S	LMP-103S
Thrust Class	200 N	200 N
Primary Operational Mode	RCS	$\Delta v$
Inlet Pressure Range	5 - 26 Bar	5 - 26 Bar
Thrust Range	50 - 200 N	55 - 220 N
Nozzle Expansion Ratio	30:1	150:1
Steady State ISP (vacuum) Typical	2020 - 2300 Ns/Kg (206 - 234 s)	2385 - 2500 Ns/Kg (243 - 255 s)
Density Impulse (vacuum)	2050 - 2852 Ns/L	2957 - 3100 Ns/L
Minimum Impulse Bit	$\leq 9$ Ns	N/A
Overall Length	280 mm	390 mm
Mass	5.7 kg	6 kg
FCV Type	Solenoid	Solenoid
- No of Seats	Single Seat	Single Seat
- Pull-in Voltage	28 $\pm$ 4 VDC	28 $\pm$ 4 VDC
- Holding Voltage	10 + 1 VCD	10 + 1 VCD

- Coil Resistance (each coil)	27 $\Omega$	27 $\Omega$
Nominal Reactor Pre-heating Voltage	55 VDC	55 VDC
Regulated Reactor Ore-heating Power	150 - 250 W TBC	150 - 250 W
<b>Target Life - Qual. Level</b>		
Pulses	2,000	10
Propellant Throughput	150 kg	25 kg
Longest Continues Firing	10 minutes	200 s
Accumulated Firing Time	40 minutes	400 s
Firing Sequences	100	10
<b>Demonstrated Life</b>		
Pulses	1,500	1,500
Propellant Throughput	24 kg	24 kg
Longest Continues Firing Time	20 seconds	20 seconds
Accumulated Firing Time	7.7 minutes	7.7 minutes
Firing Sequences	100	100
Maturation Level	TRL 5	TRL 3
<b>Current Status</b>		
	Ariane 5 ME Demonstrator Hot Fired	Orbit Raiser Phase A Development