

# B1 THRUSTER

Available in various form factors, the B1 thruster is currently utilized as the central thruster in Dawn's CubeDrive propulsion modules and as a modular building block within Dawn's turn-key SatDrive systems. They can be positioned throughout the spacecraft, in clusters, and at various cant-angles. The B1's assembly includes the thruster body, valves, and control electronics. Thruster bodies are additively manufactured as a single structure using Inconel 718 and include the injector, combustion chamber, and nozzle. Health monitoring instrumentation includes an integrated and isolated thermocouple and chamber pressure sensor. With standard data and power interfaces, thrusters are easy to command and operate.

## Green propellants

The B1 utilizes nitrous oxide ( $N_2O$ ) and propylene ( $C_3H_6$ ). Propellants are widely available, with low costs and lead times from domestic suppliers.

## Dual firing modes

Unique for rendezvous and proximity operations, all thrusters can operate in both a bi-propellant and cold-gas mode by controlling the spark igniter. Achieve tiny impulse bits for RPO, pointing, and servicing.

## Modular and scalable

Achieve 6DOF control for your satellite. Position B1 thrusters throughout the spacecraft, in clusters, and at your desired cant-angle. They all connect to common tank and control systems.

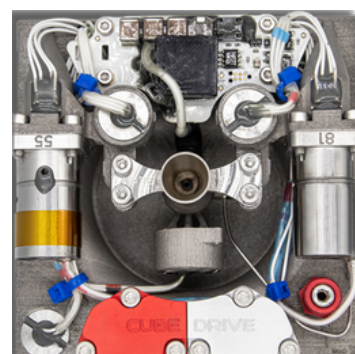
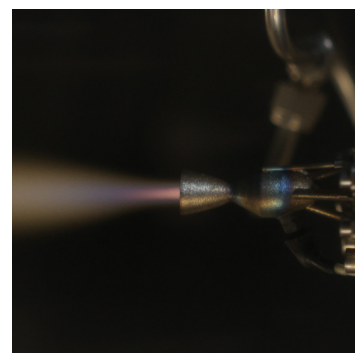
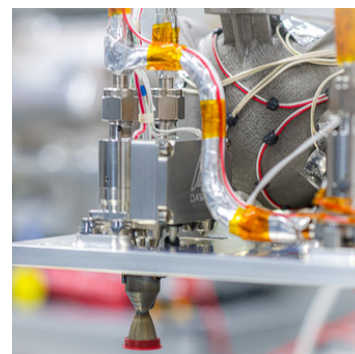
## Less parts = higher reliability

Propellants are self-pressurizing and don't require external pressurants, high-pressure regulators, or mechanical PMDs. There are no rare-Earth materials, catalyst beds, or proprietary propellants. The result: low part count, low weight, low cost, and high reliability.

# Thruster specifications



Physical	
Thruster dimensions	108 x 79 x 40 mm (4.25 x 3.11 x 1.58 in) incl. keep-out zones
Dry mass	260 g (0.57 lbm)
Nozzle expansion ratio	100:1
Valves	Normally-closed solenoid Two per thruster
Environmental	
Operational temperature	-5°C to 30°C (23°F to 86°F)
Survival temperature	-30°C to 40°C (-22°F to 104°F)
Performance	
Thrust range	0.49 to 1.35 N (0.11 to 0.30 lbf)
Specific impulse	≥ 248 s
Minimum impulse bit	Bi-prop: 74 mN.s (0.016 lbf.s) Cold-gas: 1.4 mN.s (3.1e-4 lbf.s)
Ignition	Spark-based igniter
Pulse frequency	4 Hz
Restarts	18,000+ per thruster
Control	Operable together or independently. Select your desired quantity. Pair with B20 thrusters.
Firing modes	Bi-prop & cold-gas. Switch at will. Achieved by not engaging the spark-igniter.
Cold-start capable	Yes. Highly repeatable.
Interfaces	
Mounting	4x 3.2 mm holes
Valve power	Hit: 14.4 W for 25 ms (per valve) Hold: 0.75 W (per valve)
Igniter	6.4 W max for 50 ms



**Not sold separately**  
Please note that all Dawn thrusters are only supplied as part of a turn-key propulsion system. Thrusters cannot be purchased individually.