

DESCRIPTION

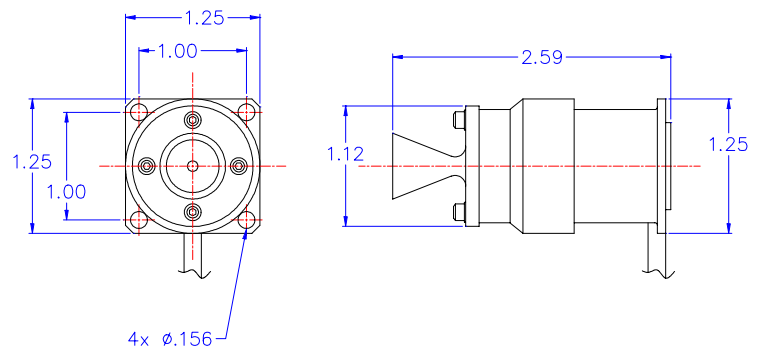
The VACCO Cold Gas Thruster is a flight qualified design featuring an electrically operated, fast-response solenoid valve. These rugged CRES units are designed for use with 220 to 260 psia gaseous nitrogen provided by a VACCO Regulator/Relief Valve.

Twelve of these extremely robust, man-rated thrusters are used in each Space Shuttle Manned Maneuvering Unit for pitch, yaw, roll and delta V.



FEATURES

- ⊕ 2.0 lbf Thrust at 260 psia GN2
- ⊕ Man-Rated CRES/Silicone Construction
- ⊕ Qualified to 150,000 Operating Cycles
- ⊕ Flat-Faced, Bi-Pole Solenoid Valve
- ⊕ Weight: 0.83 lbm



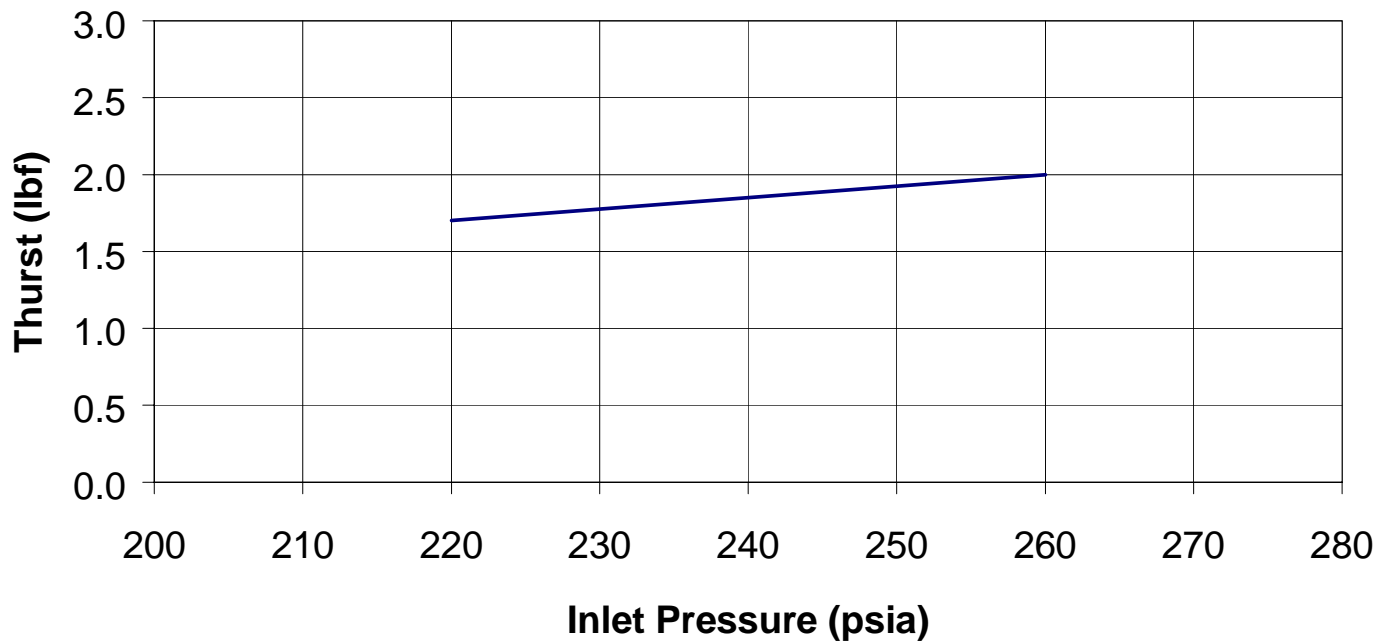
OPERATING PARAMETERS

Operating Pressure.....	260 psia
Proof Pressure.....	630 psia
Burst Pressure.....	840 psia
Thrust @ 250 psia GN2 Inlet.....	2.0 lbf
Internal Leakage.....	3.6 scc/hr GN2 @ 300 psig.
External Leakage.....	1.08 scc/hr GN2 @ 300 psig
Operating Temperature.....	-20 F to + 150 F
Vibration.....	6.28 Grms
Cycle Life.....	150,000 cycles

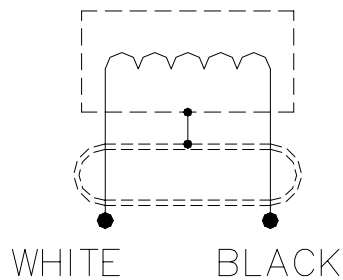
Response Time:	
Opening.....	7 msec @ 16.8 VDC, 230 psig
Closing.....	4 msec @ 230 psig
Flow.....	0.0267 lbm/sec GN2
	@ 235 psia inlet, 0.01 psia outlet
Power.....	20 watts @ 17 VDC
Operating Voltage.....	12 – 21 VDC
Pull-In Voltage.....	10 VDC max @ 70 F
Drop Out Voltage.....	1.0 VDC min @ 70 F
Weight.....	0.83 lbm

PERFORMANCE CHARACTERISTICS

Thrust vs Inlet Pressure



Electrical Schematic



DESCRIPTION

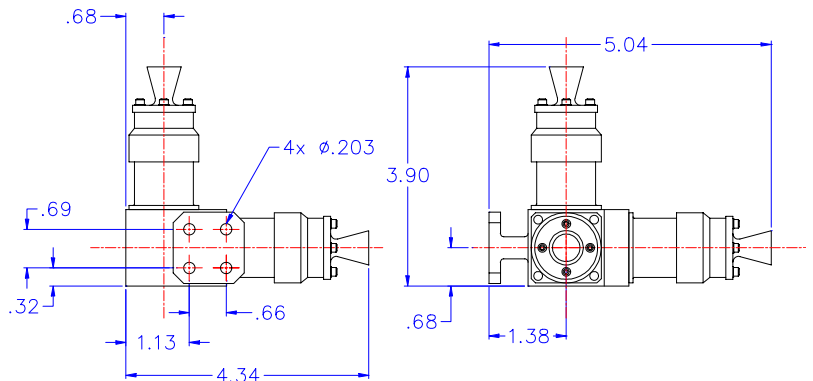
The VACCO Cold Gas Thruster Triad is an assembly of three identical 2 lbf thrusters mounted to a common manifold block along X, Y and Z axis. Each Thruster is operated by a normally-closed, fast-response solenoid valve.

Four of these extremely robust, man-rated triad assemblies are used in each Space Shuttle Manned Maneuvering Unit. These rugged CRES units are designed for use with 220 psia gaseous nitrogen provided by a VACCO Regulator/Relief Valve.



FEATURES

- ⊕ (3) Thrusters Along X, Y, Z Axis
- ⊕ 2.0 lbf Thrust @ 260 psia GN2
- ⊕ Man-Rated / Flown on Shuttle
- ⊕ 150,000 Operating Cycles
- ⊕ CRES / Silicone Construction
- ⊕ Weight: 3.1 lbm



OPERATING PARAMETERS

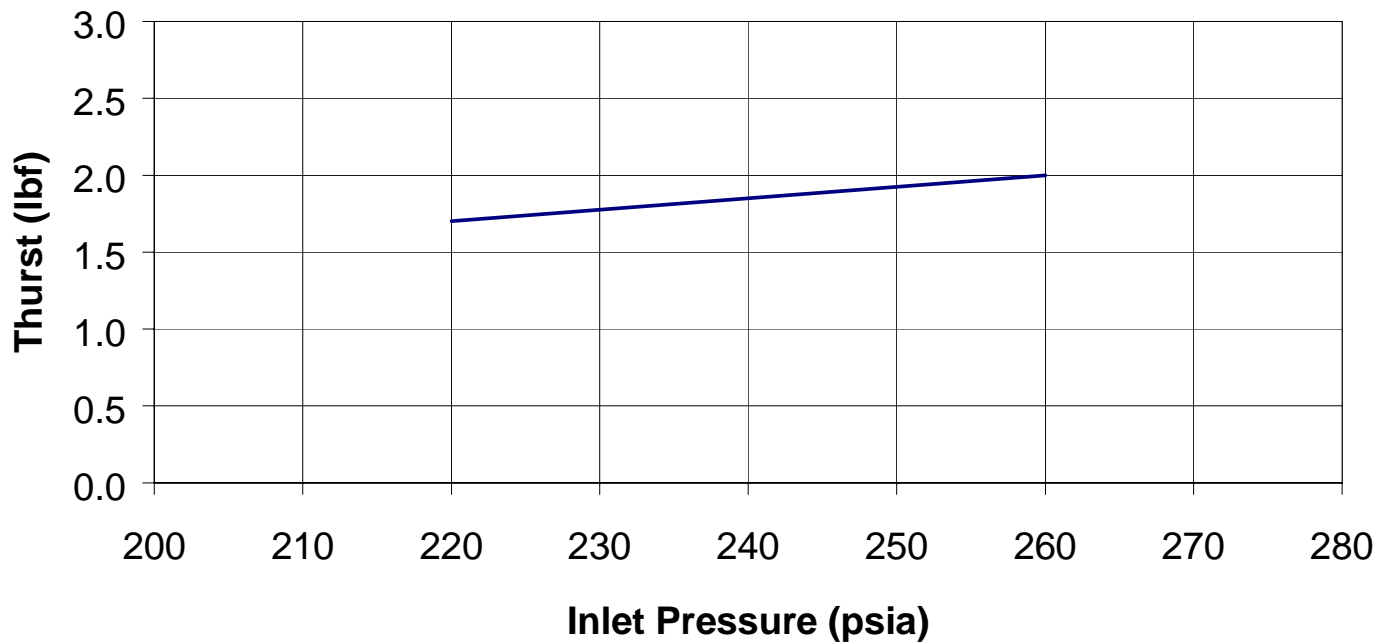
Operating Pressure.....	260 psia
Proof Pressure.....	630 psia
Burst Pressure.....	840 psia
Thrust @ 250 psia GN2 Inlet.....	2.0 lbf
Internal Leakage.....	3.6 scc/hr GN2 @ 300 psig.
External Leakage.....	1.08 scc/hr GN2 @ 300 psig
Operating Temperature.....	-20 F to + 150 F
Vibration.....	6.28 Grms
Cycle Life.....	150,000 cycles

Response Time:	
Opening.....	7 msec @ 16.8 VDC, 230 psig
Closing.....	4 msec @ 230 psig
Flow.....	0.0267 lbm/sec GN2 @ 235 psia inlet, 0.01 psia outlet
Coil Resistance.....	9.3 +/-0.5 Ω per coil
Operating Voltage.....	12 – 21 VDC
Pull-In Voltage.....	10 VDC max @ 70 F
Drop Out Voltage.....	1.0 VDC min @ 70 F
Weight.....	3.1 lbm

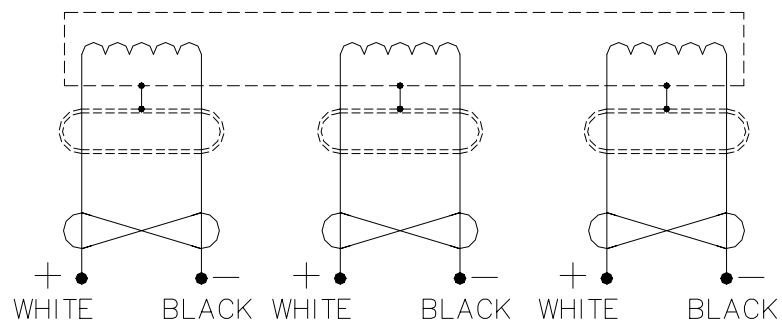
Performance characteristics are based upon customer requirements, as such, are not representative of component capabilities or limitations

PERFORMANCE CHARACTERISTICS

Thrust vs Inlet Pressure



ELECTRICAL SCHEMATIC



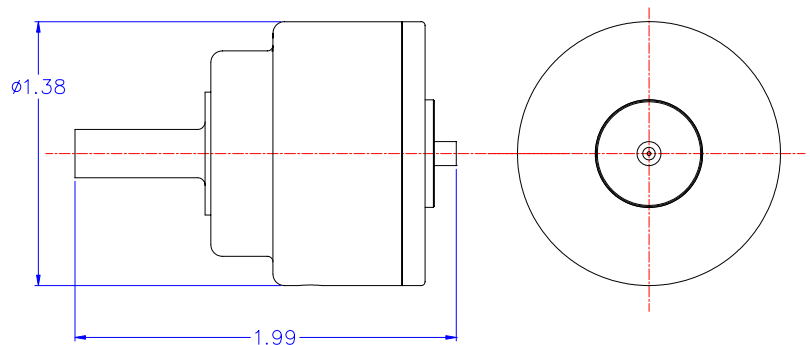
DESCRIPTION

The VACCO 5N Cold Gas Thruster is specifically designed for small spacecraft. Inlet pressures up to 3,000 psi are ideally suited to simple blow-down systems. Fast response and magnetic latching reduces the power consumption to less than 5% of conventional thrusters.



FEATURES

- ⊕ CRES/Kel-F Construction
- ⊕ Unique Latching Valve Design
- ⊕ 20 msec Pulse to Open/Close Valve
- ⊕ Power Consumption Reduced by 95%
- ⊕ 5.0N @ 3000 psia
- ⊕ 0.5N @ 300 psia



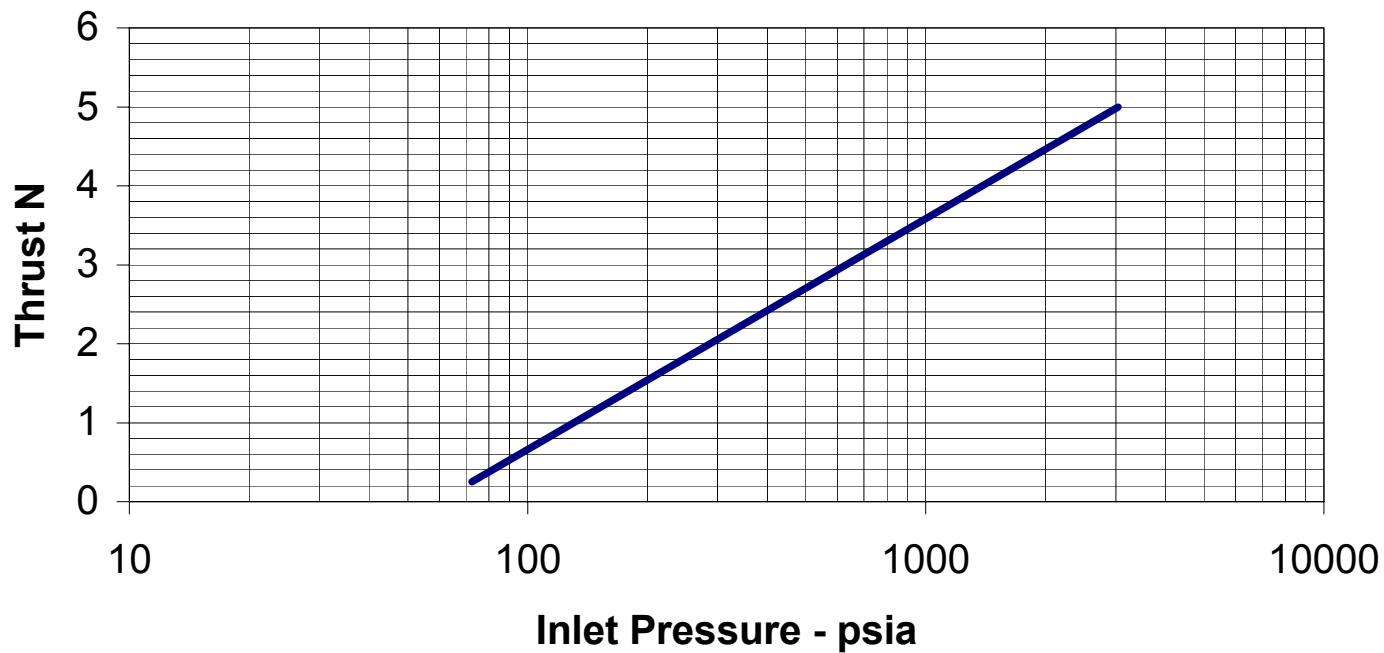
OPERATING PARAMETERS

Operating Pressure Range 0-3000 psia
 Proof Pressure 5400 psia
 Burst Pressure..... 7500 psia
 Flow at 300 psid 1.45 scfm
 Flow at 500 psig 2.40 scfm
 Operating Temp 17°C to 50°C

Leakage:
 Internal < 1.0 scch GHe @ MEOP
 External..... 1x10E-06 sccs GHe @ MEOP
 Response:
 Opening 8 ms @ 17.2 Vdc
 Closing 7 ms @ 17.2 Vdc
 Operating Voltage..... 21 to 32 Vdc
 Power..... 30 Watts max@ 30 Vdc & 17°C

PERFORMANCE CHARACTERISTICS

Thrust vs. Inlet Pressure



SCHEMATIC

