Hybrid ADN Delta-V / RCS System

The VACCO / ECAPS CubeSat Hybrid ADN Delta-V / Reaction Control System is a high performance micro propulsion system (MiPS) specifically designed for CubeSats.

The Hybrid ADN MiPS is a self-contained sub-system that can be scaled from 0.5U to >1U. A single axial high-thrust, high specific impulse (I_sp) ADN thruster delivers up to 1,036 N-sec of total impulse using only integral propellant.

The smart feed system automatically provides closed-loop thrust vector control during delta-v burns. Reliability is ensured through simplicity of design, welded titanium construction and frictionless valve technology.

Features

- Smart, self-contained propulsion system
- 1,036 N-sec total impulse / 206 m/s delta-v assuming 5.3 kg CubeSat
- One 100 mN ECAPS ADN thruster
- Four 10 mN cold gas ACS thrusters

- Low Power:
  - <15 watts during hot-fire
  - <0.055 watts in standby mode
  - Reliable, frictionless valves

Operating Parameters

- Max Operating Pressure: 244 psia
- Proof Pressure: 366 psia
- Burst Pressure: 610 psia
- Delta-V Thrust: 100 mN
- ACS Thrust: 10 mN
- Internal Leakage: 3.0 scc/hr
- External Leakage: 1.0 x 10⁻⁶ scch
- Operating Temperature: 0°C to +50°C
- Non-Operating Temperature: -10°C to +60°C
- Vibration: 23 Grms
- Cycle Life: 900,000 firings
- Total Delta-V Impulse: 1,036 N-sec
- Total RCS Impulse: 69 N-sec
- RCS Minimum Impulse Bit: <0.1 mN/sec
- Operating Voltage: 9 to 12.6 vdc
- Dry Mass: 1,093 grams
- ADN Propellant Mass: 528 grams
- ACS Propellant Mass: 176 grams
- Total Mass: 1,797 grams

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

<table>
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<tr>
<th>Wire</th>
<th>Color</th>
<th>Terminal</th>
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<tbody>
<tr>
<td>30 AWG 40&quot; MIN LG</td>
<td>WHITE (+)</td>
<td>RS422_Y</td>
</tr>
<tr>
<td>30 AWG 40&quot; MIN LG</td>
<td>GREEN (-)</td>
<td>RS422_Z</td>
</tr>
<tr>
<td>30 AWG 40&quot; MIN LG</td>
<td>BLUE (+)</td>
<td>RS422_A</td>
</tr>
<tr>
<td>30 AWG 40&quot; MIN LG</td>
<td>YELLOW (-)</td>
<td>RS422_B</td>
</tr>
<tr>
<td>26 AWG 40&quot; MIN LG</td>
<td>RED (+)</td>
<td>9 - 12.6 V</td>
</tr>
<tr>
<td>26 AWG 40&quot; MIN LG</td>
<td>BLACK (-)</td>
<td>GND</td>
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