The VACCO Normally Closed Positive Isolation Valve (PIV) is an ordinance-free “Drop-In” replacement for Pyrovalve applications. Features include all-welded titanium construction and a robust, electrically redundant non-pyro actuator. The normally closed PIV features a Frangible Seat that provides a positive seal against internal leakage before actuation. The thick-walled, all-welded titanium pressure boundary prevents external leakage when open or closed.

The PIV actuation mechanism opens the valve with a 100% force margin independent of inlet pressure. The PIV eliminates the explosion hazard, blow-by and shock loads inherent to traditional Pyro Valves.

**DESCRIPTION**

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**FEATURES**

- High Operating Pressure (5,000 psi/ 345 bar)
- Positive Isolation:
  - Hermetic Titanium Barrier
  - Burst Tested to 20,000 psi
- All Welded Against Leakage
- Robust Actuation Mechanism:
  - Eliminates Pyrotechnic Charge
  - Low Shock
  - Precludes Blow-By
  - Electrically Redundant
  - Uses Existing Driver Circuits
- Frangible Seat:
  - High Flow Capacity
  - Minimal Debris Generation
  - Positive Retention of Seat Parts
- Thermistors:
  - Space Rated
  - Platinum Type (Resistance: 10 to 2000 ohms)
  - High Reliability
  - Screened to ESA 4006 Requirements

**OPERATING PARAMETERS**

<table>
<thead>
<tr>
<th>Feature</th>
<th>Specification</th>
</tr>
</thead>
<tbody>
<tr>
<td>Burst Pressure</td>
<td>20,000 psi</td>
</tr>
<tr>
<td>MEOP</td>
<td>310 Bar</td>
</tr>
<tr>
<td>Pre-Actuation Proof</td>
<td>2X MEOP</td>
</tr>
<tr>
<td>Post Actuation Proof</td>
<td>1.5X MEOP</td>
</tr>
<tr>
<td>Tubes Burst</td>
<td>4X MEOP</td>
</tr>
<tr>
<td>Body Burst</td>
<td>2.5X MEOP</td>
</tr>
<tr>
<td>Temperature</td>
<td>253 to 361 K</td>
</tr>
<tr>
<td>Mass</td>
<td>154 grams max</td>
</tr>
<tr>
<td>Operating Voltage</td>
<td>23 Vdc</td>
</tr>
<tr>
<td>Operating Current</td>
<td>3.5 Amps max.</td>
</tr>
<tr>
<td>Actuation Time</td>
<td>120 sec. max.</td>
</tr>
</tbody>
</table>

**Flow Media**

- Helium, GN2O, Argon, IPA, Deionised Water, HFE-7100, Monomethyl Hydrazine & Nitrogen Tetroxide

**Leakage**

- Internal: $1 \times 10^{-6}$ scc/sec of Helium
- External: $1 \times 10^{-6}$ scc/sec of Helium

**Flow Rate**

- $0.44$ g/s Helium at 311K
- $0.47$ g/s Helium at 293K
- $0.62$ g/s Helium at 311K
- $0.11$ kg/s Nitrogen Tetroxide at 311K
- $0.067$ kg/s Monomethyl Hydrazine at 311K
POSITIVE ISOLATION VALVE – NORMALLY CLOSED
X13097000-01

FUNCTIONAL DIAGRAM

Actuator Mechanism maintains valve in the closed condition until actuated

When an electrical pulse is applied, Actuator fractures Frangible Seat to open flow path with 100% force margin

Hermetic Frangible Seat has been hydrostatically tested up to 20,000 psi without failure

ELECTRICAL SCHEMATIC

28 VDC
GND
28 VDC
GND

PRIMARY COIL
REDUNDANT COIL

T
PRIMARY THERMISTOR
T
REDUNDANT THERMISTOR

OPTIONAL

ENVELOPE