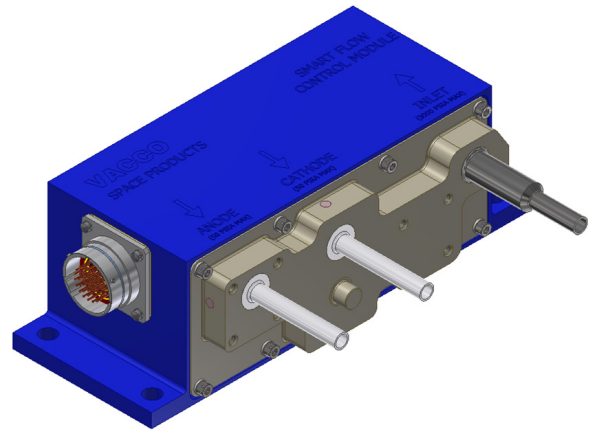


Smart Flow Control Module

VACCO's Smart Flow Control Module (SFCM) is a highly integrated ChEM™ assembly designed for high reliability, tight leakage, and precise flow accuracy in a lightweight module that consumes almost no power. The SFCM accepts Xenon directly from the storage tank, eliminating the need for a pressure regulator. Maximizing reliability, the SFCM is designed with series redundancy against leakage. Currently, it is in qualification testing for NASA at Glenn Research Center with an estimated completion date of December 2014.

The SFCM is an all-welded manifold assembly of eight components: system filter, proportional valve, pressure switch, isolation valves, and pressure/temperature sensors. Each SFCM can independently control anode and cathode flow to an HET.



Features

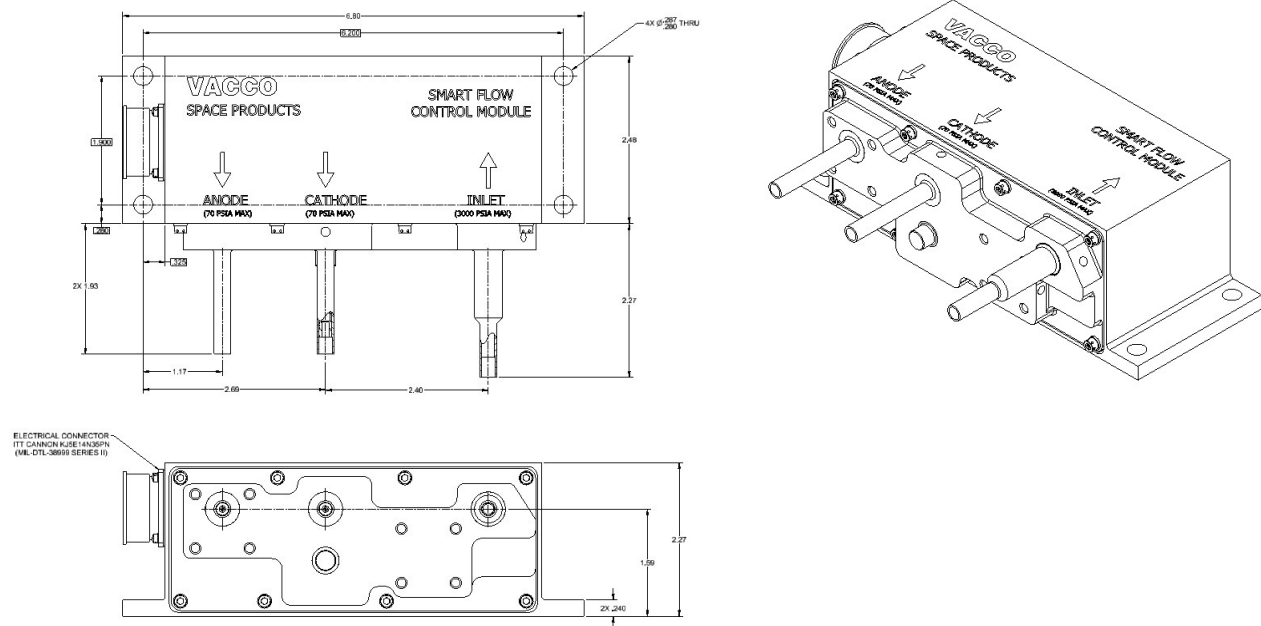
- Inlet pressure from 3,000 psi to 10 psi
- Two-channel flow from 3 to 160 sccm
- +/-1% closed-loop flow control accuracy
- Integral 10 micron etched system filter
- Inlet high pressure and temperature sensors
- Low pressure switch to prevent over-pressurization
- Dual redundant against internal leakage
- All-welded machined titanium manifold
- Low weight: 1.6 Kg (3.2 lbm)

Operating Parameters

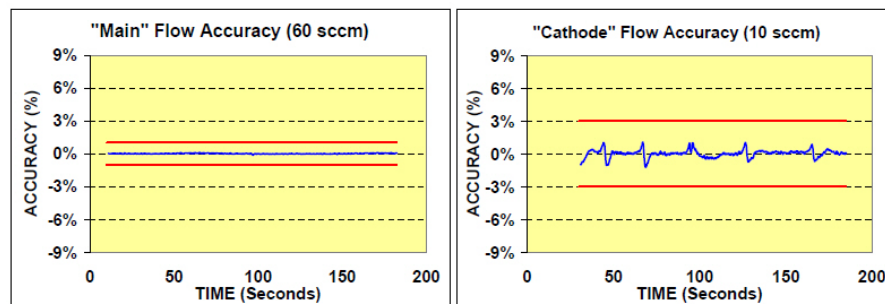
Inlet Pressure Range 3000 to 10 psia
 Proof Pressure 4500 psia
 Burst Pressure 7500 psia
 Outlet Pressure Set Point Range 0 to 70 psia
 Operating Temperature 0°C to +70°C
 Flow Range 3 to 160 sccm Xenon
 Anode Control Accuracy (closed loop) +/-1%
 Internal Leakage $<1 \times 10^{-3}$ sccs GHe
 External Leakage $<1 \times 10^{-6}$ sccs GHe
 Inlet/Outlet Tubes 1/4" Ti (CRES optional)

Proportional Valve:
 Voltage Control Mode 0 to 130 vdc
 Current Control Mode .. 0 to 130 MA (12.6 vdc max)
 Iso Valve Voltage 24 to 33 vdc
 Iso Valve Response 50 mSec max @ 24.5 vdc
 Pressure Transducer Output 0 to 5 vdc
 Pressure Transducer Accuracy +/-0.5% full scale
 Temperature Sensors 1000 Ω RTD
 Inlet Filter 10 microns absolute
 Mass <1.6 Kg (3.52 lbm)

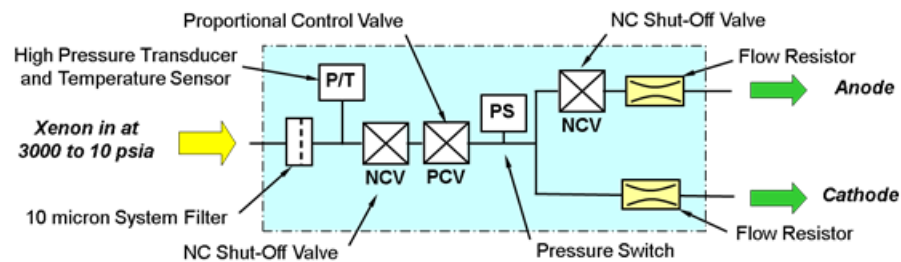
Performance characteristics are based on customer requirements. As such, they are not representative of component capabilities or limitations.



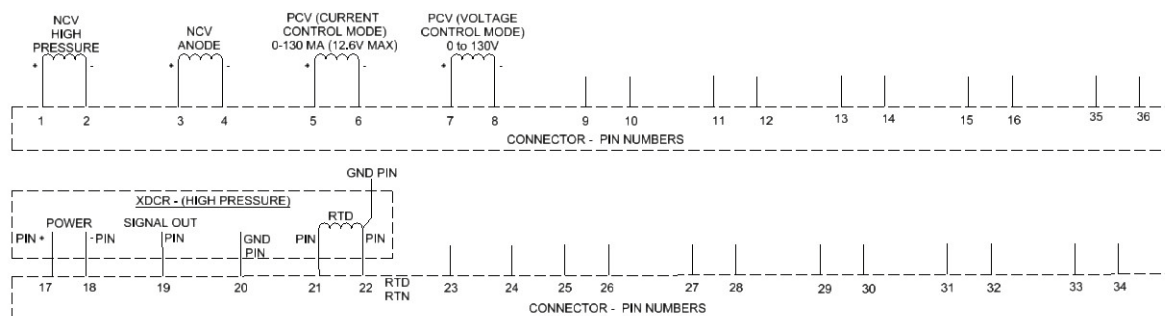
Performance Characteristics



Schematic Flow



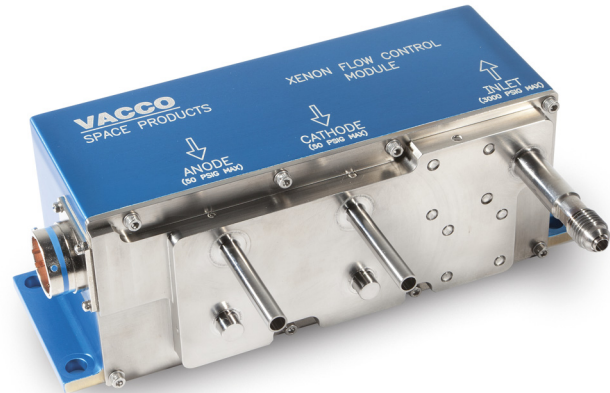
Electrical Schematic



Xenon Flow Control Module

VACCO's Xenon Flow Control Module (XFCM) is a highly integrated ChEM™ assembly designed for high reliability, tight leakage, and precise flow accuracy in a lightweight module that consumes almost no power. The XFCM accepts Xenon directly from the storage tank, eliminating the need for a pressure regulator. To maximize reliability, the SFCM is triple redundant against leakage and has been tested to NASA Technology Readiness Level 6. The XFCM is qualified for flight.

The XFCM is an all-welded manifold assembly of ten components: system filter, isolation valves, proportional valves and pressure temperature sensors. Each XFCM can independently control anode and cathode flow to an HET.



Features

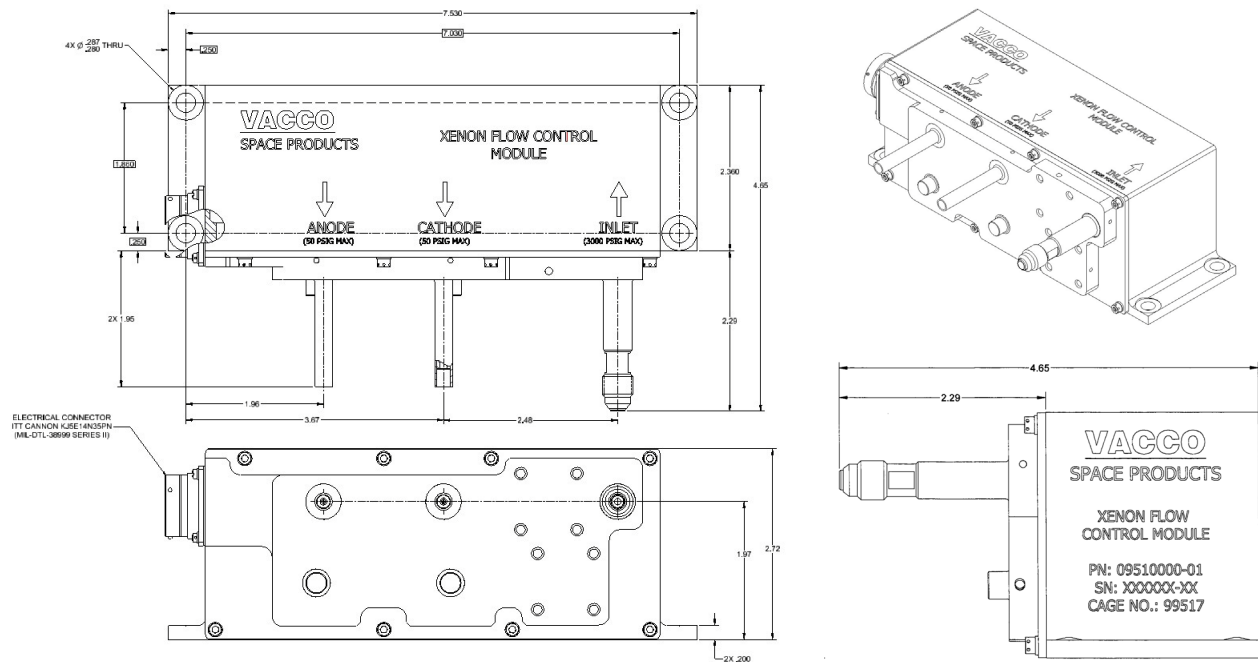
- Inlet pressure from 3,000 psi to 20 psi
- Two-channel flow from 0.1 to 80 sccm (at -2°C)
- +/-1% closed-loop flow control accuracy
- Integral 10 micron etched system filter
- Inlet high pressure and temperature sensor
- Three pressure and temperature sensors
- Triple redundant against internal leakage
- All-welded machined titanium manifold
- Low weight: 1.4 Kg (3.1lbm)

Operating Parameters

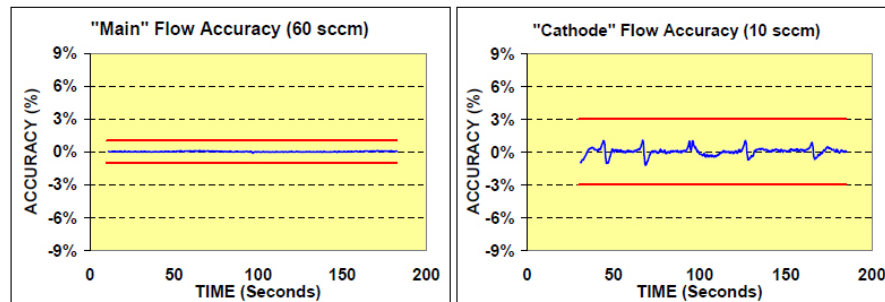
Inlet Pressure Range 3000 to 20 psia
 Proof Pressure 4500 psia
 Burst Pressure 7500 psia
 Outlet Pressure Set Point Range 0 to 50 psia
 Operating Temperature 0°C to +70°C
 Flow Range 0.1 to 80 sccm Xenon
 Anode Control Accuracy (closed loop) +/-1%
 Internal Leakage $<1 \times 10^{-3}$ sccs GHe
 External Leakage $<1 \times 10^{-6}$ sccs GHe

Inlet/Outlet Tubes 1/4" Ti (CRES optional)
 Proportional Valve Voltage 0 to 130 vdc
 Iso Valve Voltage 20 to 33 vdc
 Iso Valve Response <20 mSec @ 24 vdc
 Pressure Transducer Output 0 to 5 vdc
 Pressure Transducer Accuracy +/-0.5% full scale
 Temperature Sensors 1000 Ω RTD
 Inlet Filter 10 microns absolute
 Mass <1.4 Kg (3.1 lbm)

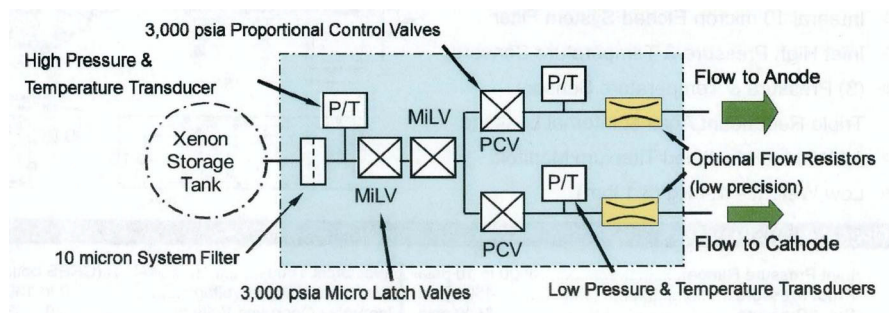
Performance characteristics are based on customer requirements. As such, they are not representative of component capabilities or limitations.



Performance Characteristics



Schematic Flow



Electrical Schematic

