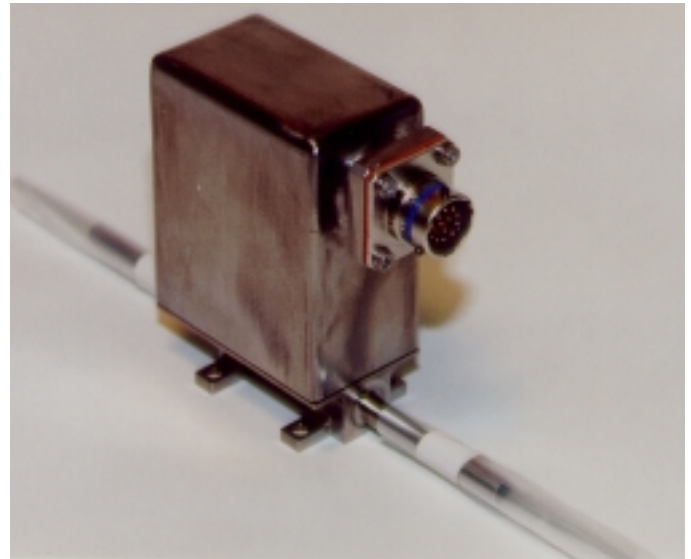


### DESCRIPTION

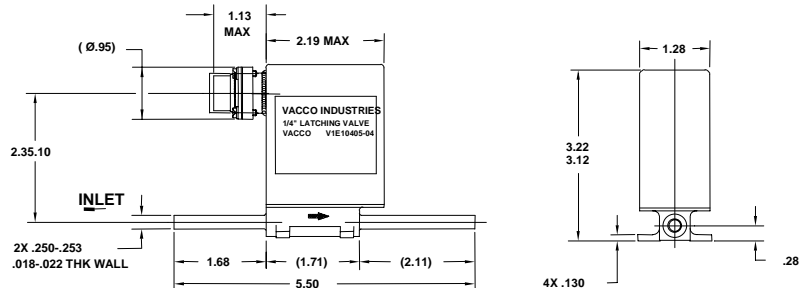
VACCO Industries maintains a product line of titanium latching valves designed to meet industry's demand for high reliability, tight leakage, and quick response capabilities.

The 1/4" low-pressure latch valve utilizes VACCO's proven torque tube technology. The all titanium construction helps reduce weight while bolstering reliability; qualified to a minimum 20,000 life cycles without deteriorating performance. The valve is fully flight-qualified and holds extensive heritage.



### FEATURES

- ⊕ 400 psi Operating Pressure
- ⊕ Flight Qualified
- ⊕ All Titanium Construction
- ⊕ Low Weight – 340g/0.75 lbm
- ⊕ Integral Microswitch
- ⊕ Bi-Directional Flow
- ⊕ 40μ Absolute Inlet Filter



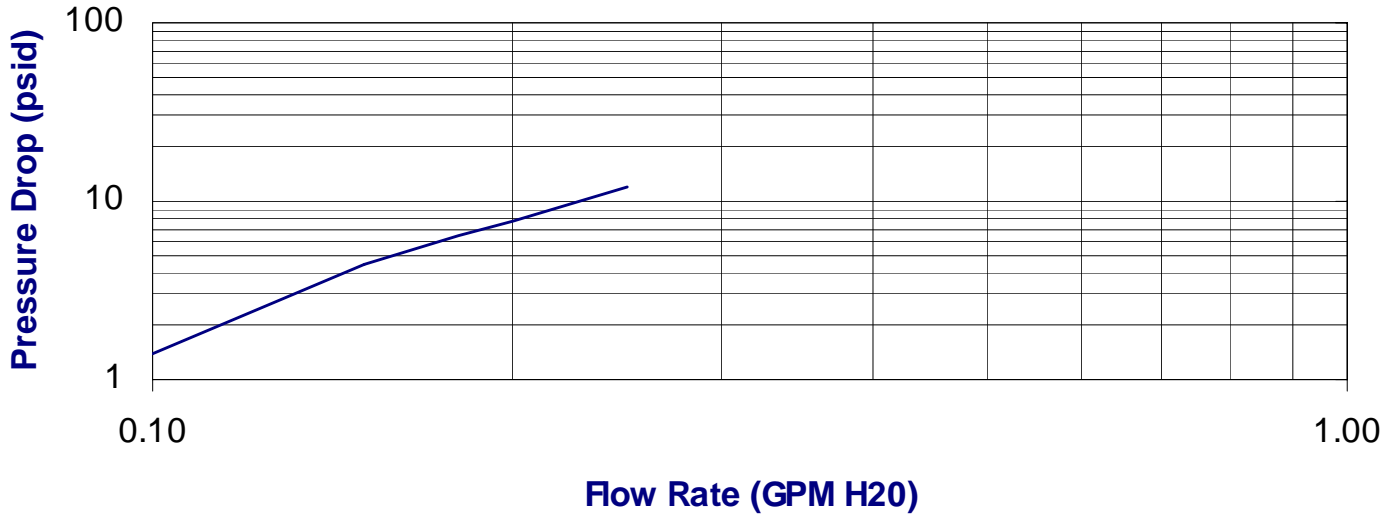
### OPERATING PARAMETERS

Operating Pressure Range .....	400 psig	Operating Temperature .....	+30° to 150° F
Proof Pressure .....	900 psig	Response Time	
Burst Pressure .....	2400 psig	Opening .....	50 msec @ 20 VDC
Flow .....	0.025 lbm/sec H <sub>2</sub> O	Closing .....	50 msec @ 20 VDC
Pressure Drop .....	<15 psid	Back Pressure Relief .....	350 psid
Internal Leakage .....	<5.0 scch GHe	Inlet Filter Rating .....	40 microns absolute
External Leakage .....	<1 X 10 <sup>-6</sup> sccs GHe	Operating Voltage .....	20 – 50 VDC
Weight .....	0.75 lbm (340 grams)	Dielectric Strength ....	500 VAC RMS @ 60 Hz – 1 min

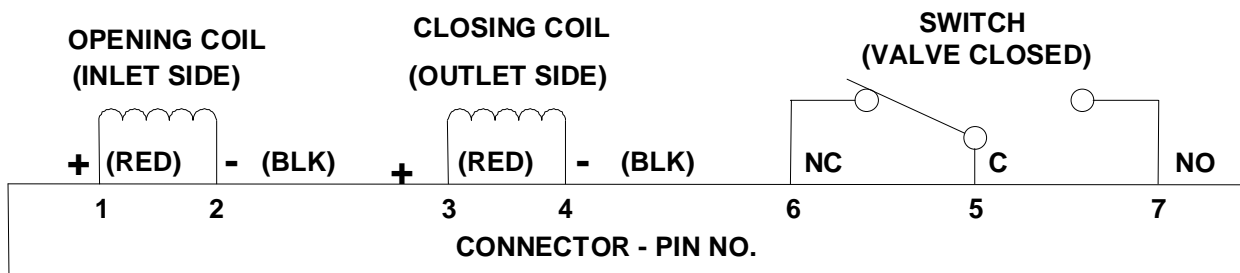
*Performance characteristics are based upon customer requirements, as such, are not representative of component capabilities or limitations*

**PERFORMANCE CHARACTERISTICS**

**Pressure Drop**



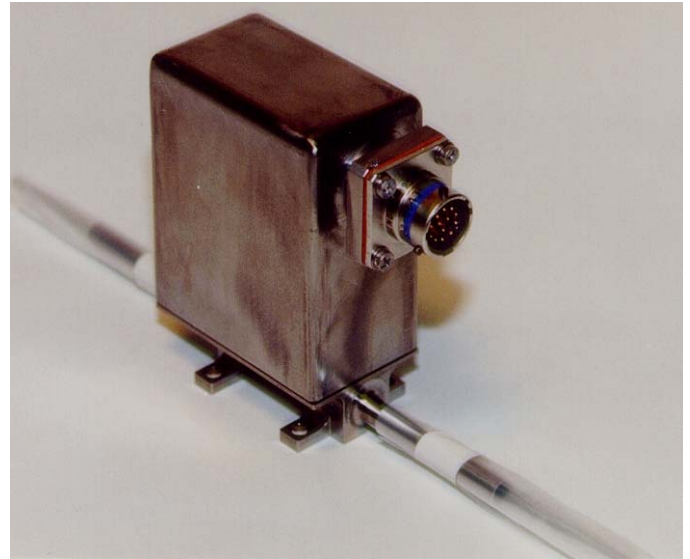
**ELECTRICAL SCHEMATIC**



## DESCRIPTION

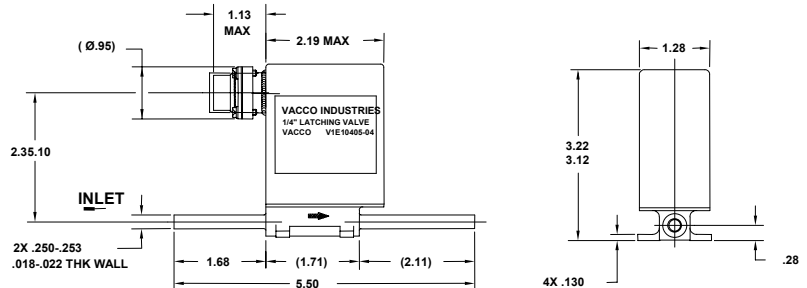
VACCO Industries maintains a product line of titanium latching valves designed to meet industry's demand for high reliability, tight leakage, and quick response capabilities.

The 1/4" low-pressure latch valve utilizes VACCO's proven torque tube technology. The all titanium construction helps reduce weight while bolstering reliability; qualified to a minimum 20,000 life cycles without deteriorating performance. The valve is fully flight-qualified and holds extensive heritage.



## FEATURES

- ⊕ 450 psi Operating Pressure
- ⊕ Flight Qualified
- ⊕ All Titanium Construction
- ⊕ Low Weight – 340g/0.75 lbm
- ⊕ Integral Microswitch
- ⊕ Bi-Directional Flow



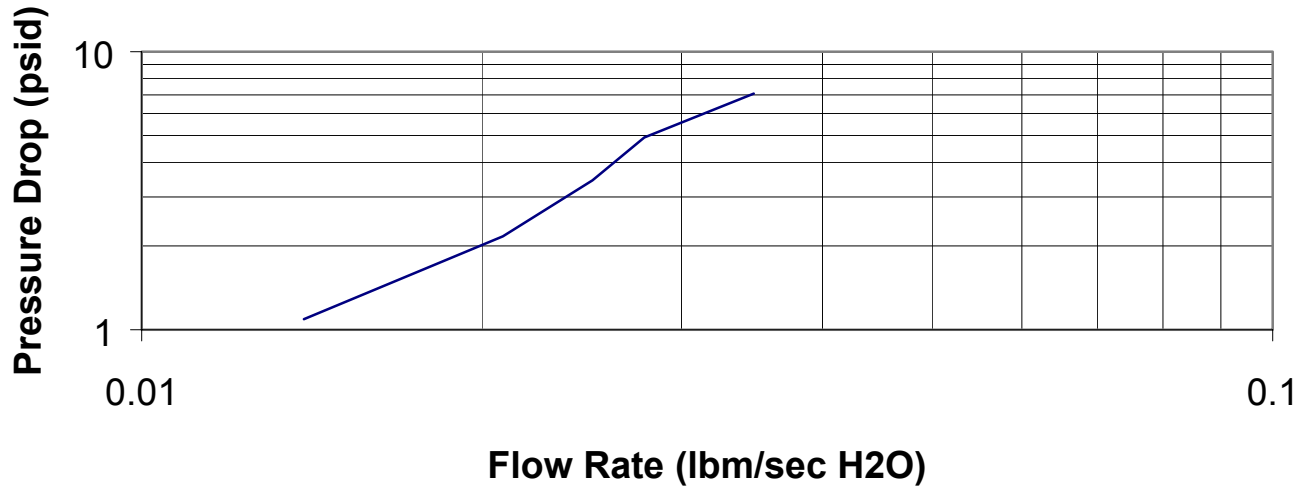
## OPERATING PARAMETERS

Operating Pressure Range..... 450 psig  
 Proof Pressure..... 900 psig  
 Burst Pressure..... 2400 psig  
 Flow..... 0.025 lbm/sec H<sub>2</sub>O  
 Pressure Drop..... <15 psid  
 Internal Leakage..... <5.0 sccm GHe  
 External Leakage..... <1 X 10<sup>-6</sup> sccs GHe  
 Weight..... 0.75 lbm (340 grams)

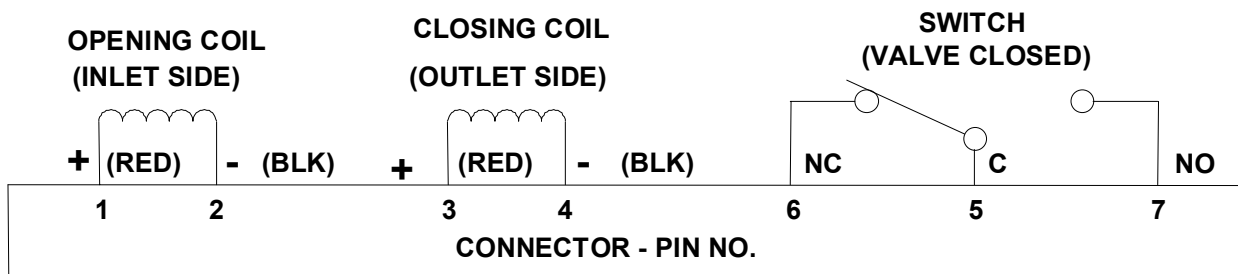
Operating Temperature..... +30° to 160° F  
 Response Time  
 Opening..... 50 msec @ 21 VDC  
 Closing..... 50 msec @ 21 VDC  
 Back Pressure Relief..... 50 to 200 psid  
 Operating Voltage..... 21 – 50 VDC  
 Dielectric Strength..... 500 VAC RMS @ 60 Hz – 1 min

**PERFORMANCE CHARACTERISTICS**

**Pressure Drop vs Flow Rate**



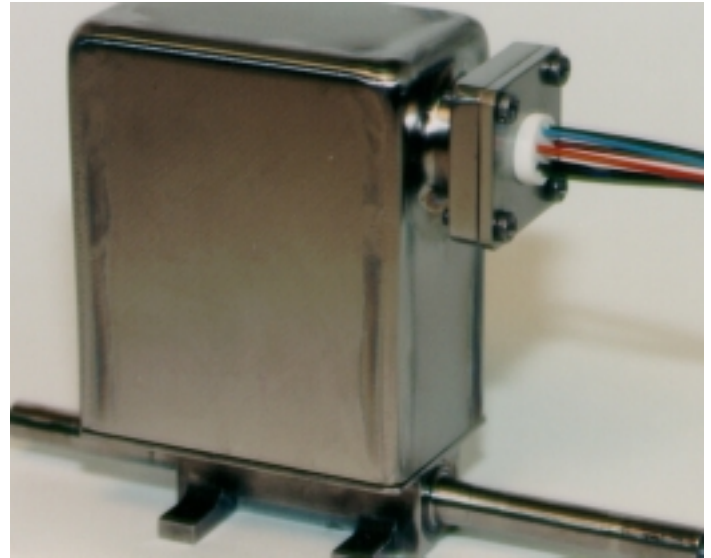
**ELECTRICAL SCHEMATIC**



## DESCRIPTION

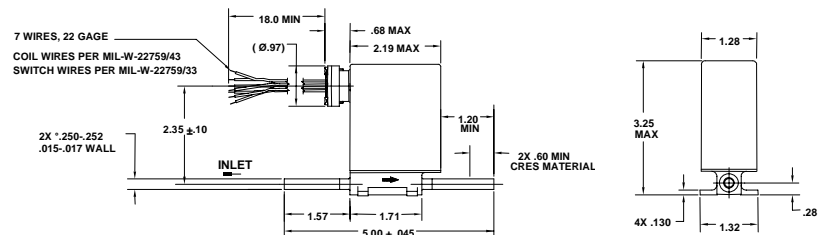
VACCO Industries maintains a product line of titanium latching valves designed to meet industry's demand for high reliability, tight leakage, and quick response capabilities.

The 1/4" low-pressure latch valve utilizes VACCO's proven torque tube technology. The all titanium construction helps maintain light weight while compatibility with stainless steel systems is achieved through transition tubing. The valve is fully flight-qualified and holds extensive heritage.



## FEATURES

- ⊕ 450 psi Operating Pressure
- ⊕ Flight Qualified
- ⊕ All Titanium Construction With 304L Stainless Steel Interface
- ⊕ Low Weight – 340g/0.75 lbm
- ⊕ Integral Microswitch
- ⊕ 40μ Absolute Inlet Filter



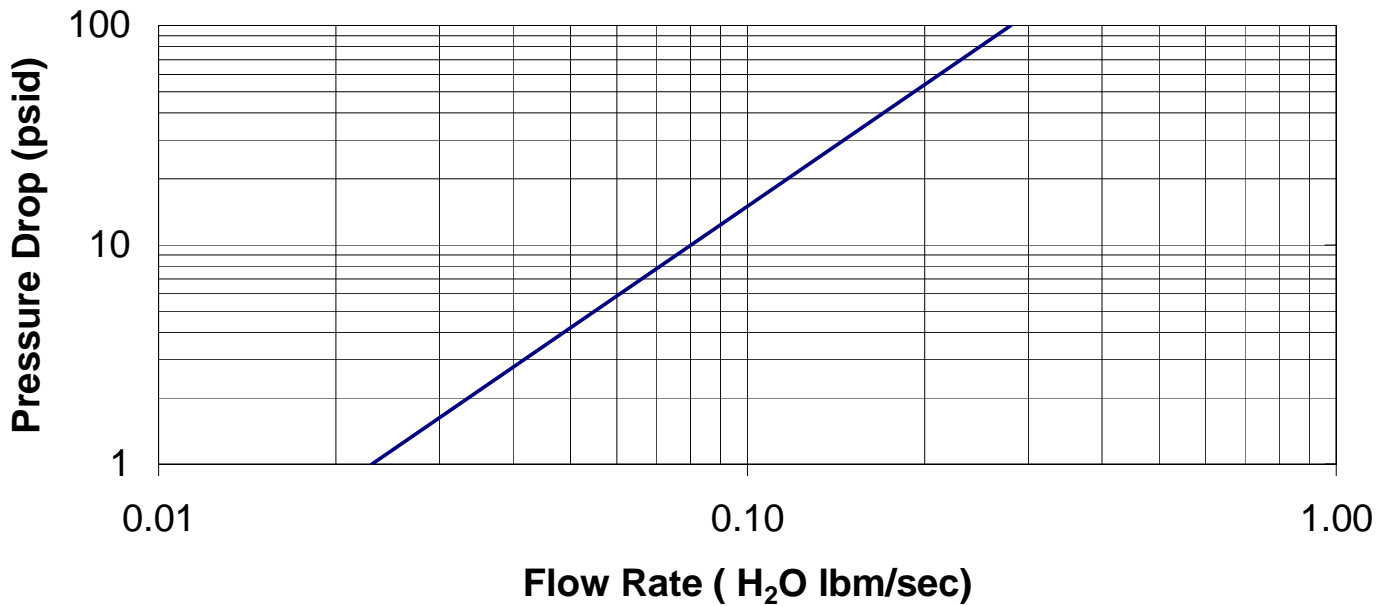
## OPERATING PARAMETERS

Operating Pressure Range ..... 450 psig  
 Proof Pressure ..... 975 psig  
 Burst Pressure ..... 1625 psig  
 Flow ..... 0.07 lbm/sec H<sub>2</sub>O  
 Pressure Drop ..... <12 psid  
 Internal Leakage ..... <10.0 scch GN<sub>2</sub>  
 External Leakage ..... <1 X 10<sup>-6</sup> sccs GHe  
 Weight ..... 0.75 lbm (340 grams)

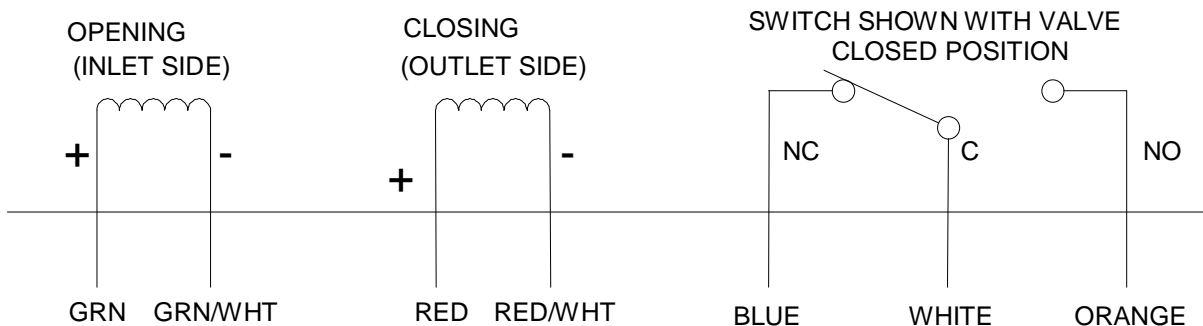
Operating Temperature ..... +40° to 120° F  
 Response Time  
   Opening ..... 30 msec @ 20 VDC  
   Closing ..... 20 msec @ 20 VDC  
 Back Pressure Relief ..... 200 psid max  
 Inlet Filter Rating ..... 40 microns absolute  
 Operating Voltage ..... 21 – 38.6 VDC  
 Dielectric Strength .... 500 VAC RMS @ 60 Hz – 1 min

**PERFORMANCE CHARACTERISTICS**

**Pressure Drop**



**ELECTRICAL SCHEMATIC**





# 1/4" LOW PRESSURE PROPELLANT LATCH VALVE V1E10406-02

## DESCRIPTION

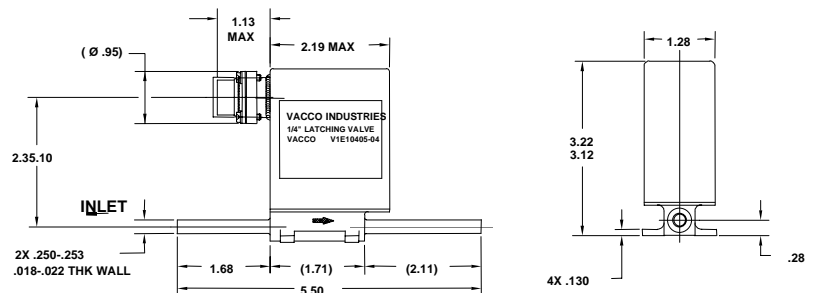
VACCO Industries maintains a product line of titanium latching valves designed to meet industry's demand for high reliability, tight leakage, and quick response capabilities.

The 1/4" low-pressure latch valve utilizes VACCO's proven torque tube technology. The all titanium construction helps reduce weight while bolstering reliability; qualified to a minimum 20,000 life cycles without deteriorating performance. The valve is fully flight-qualified and holds extensive heritage.



## FEATURES

- ⊕ 450 psi Operating Pressure
- ⊕ Flight Qualified
- ⊕ All Titanium Construction
- ⊕ Low Weight – 340g/0.75 lbm
- ⊕ Integral Microswitch
- ⊕ 20,000 Cycle Life
- ⊕ 40µ Absolute Inlet Filter



## OPERATING PARAMETERS

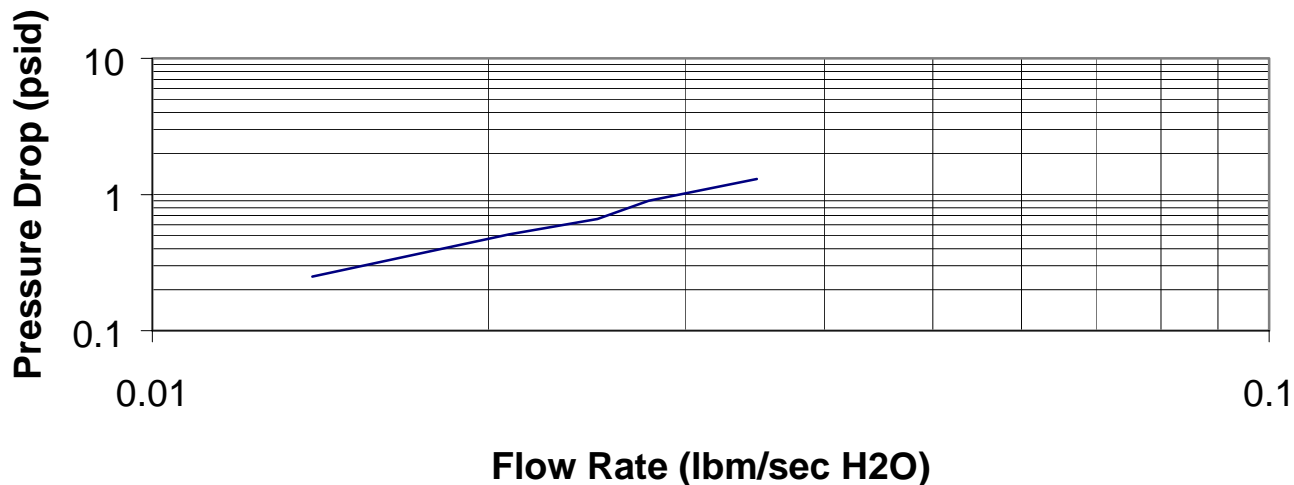
Operating Pressure Range ..... 450 psig  
 Proof Pressure ..... 900 psig  
 Burst Pressure ..... 2400 psig  
 Flow ..... 0.025 lbm/sec H<sub>2</sub>O  
 Pressure Drop ..... 5 psid (at rated flow)  
 Internal Leakage ..... <5.0 sccm GHe  
 External Leakage ..... <1 X 10<sup>-6</sup> sccs GHe  
 Weight ..... 0.75 lbm (340 grams)

Operating Temperature ..... +10° to 170° F  
 Response Time:  
     Opening ..... 50 msec @ 21 VDC  
     Closing ..... 50 msec @ 21 VDC  
 Back Pressure Relief ..... 50 to 200 psid  
 Inlet Filter Rating ..... 40 microns absolute  
 Operating Voltage ..... 21 – 50 VDC  
 Dielectric Strength ... 500 VAC RMS @ 60 Hz – 1 min.

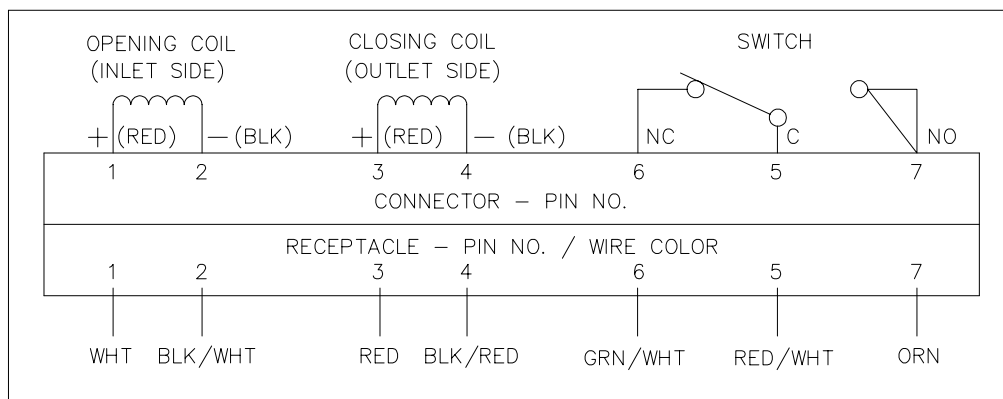
*Performance characteristics are based upon customer requirements, as such, are not representative of component capabilities or limitations*

**PERFORMANCE CHARACTERISTICS**

**Pressure Drop vs Flow Rate**



**ELECTRICAL SCHEMATIC**





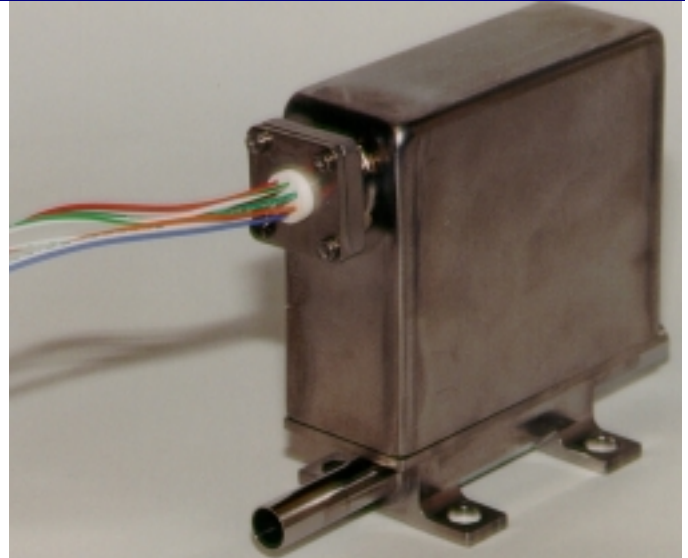


# 3/8" LOW PRESSURE PROPELLANT LATCH VALVE V1E10453-01

## DESCRIPTION

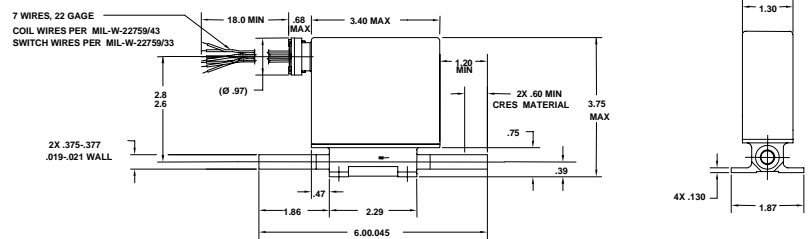
VACCO Industries maintains a product line of titanium latching valves designed to meet industry's demand for high reliability, tight leakage, and quick response capabilities.

The 3/8" low-pressure latch valve utilizes VACCO's proven torque tube technology. The all titanium construction helps maintain light weight while stainless steel systems are achieved through transition tubing. The valve is fully flight-qualified and holds extensive heritage.



## FEATURES

- ⊕ 300 psi Operating Pressure
- ⊕ Flight Qualified
- ⊕ All Titanium Construction With 304L Stainless Steel Interface
- ⊕ Low Weight – 725g/1.60 lbm
- ⊕ Integral Microswitch
- ⊕ 150,000 Cycle Life
- ⊕ 40μ Absolute Inlet Filter



## OPERATING PARAMETERS

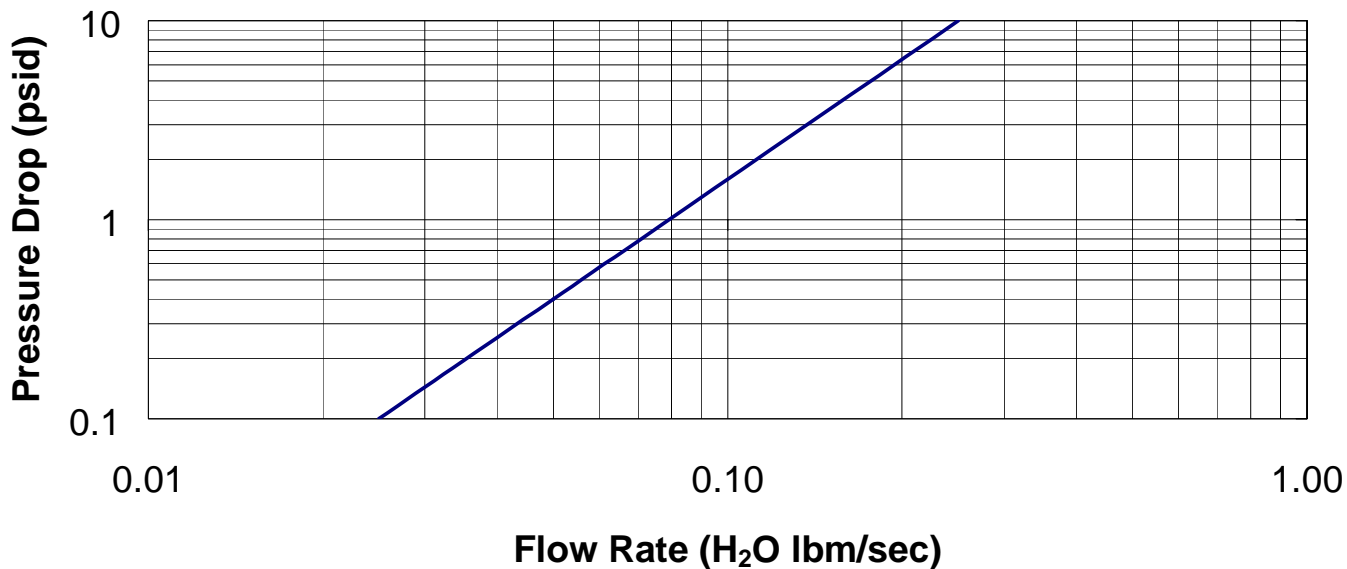
Operating Pressure Range ..... 300 psig  
 Proof Pressure ..... 750 psig  
 Burst Pressure ..... 1250 psig  
 Flow ..... 0.4 lbm/sec H<sub>2</sub>O  
 Pressure Drop ..... 19 psid (at rated flow)  
 Internal Leakage ..... 10.0 scch GHe  
 External Leakage ..... <1 X 10<sup>-6</sup> sccs GHe  
 Weight ..... 1.60 lbm (725 grams)

Operating Temperature ..... +40° to 120° F  
 Response Time:  
     Opening ..... 40 msec @ 20 VDC  
     Closing ..... 40 msec @ 20 VDC  
 Back Pressure Relief ..... 40 to 200 psid  
 Inlet Filter Rating ..... 40 microns absolute  
 Operating Voltage ..... 20 – 38.6 VDC  
 Dielectric Strength ..... 500 VAC RMS @ 60 Hz – 1 min

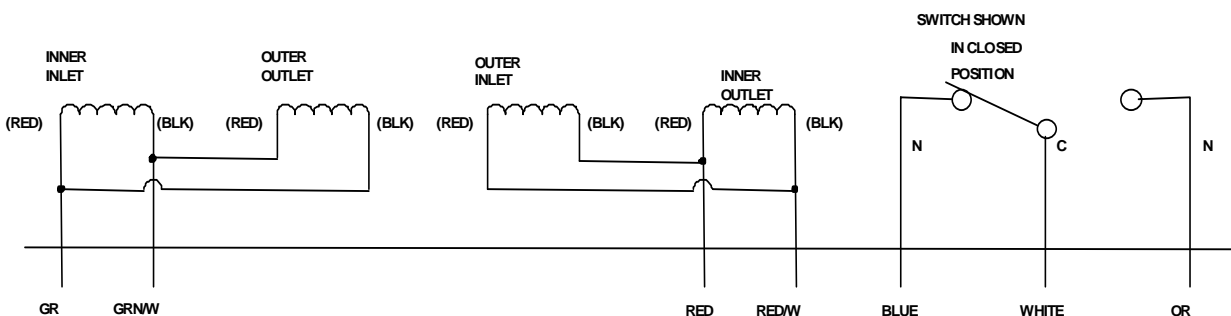
*Performance characteristics are based upon customer requirements, as such, are not representative of component capabilities or limitations*

**PERFORMANCE CHARACTERISTICS**

**Pressure Drop**



**ELECTRICAL SCHEMATIC**



## DESCRIPTION

VACCO Industries maintains a product line of titanium latching valves designed to meet industry's demand for high reliability, tight leakage, and quick response capabilities.

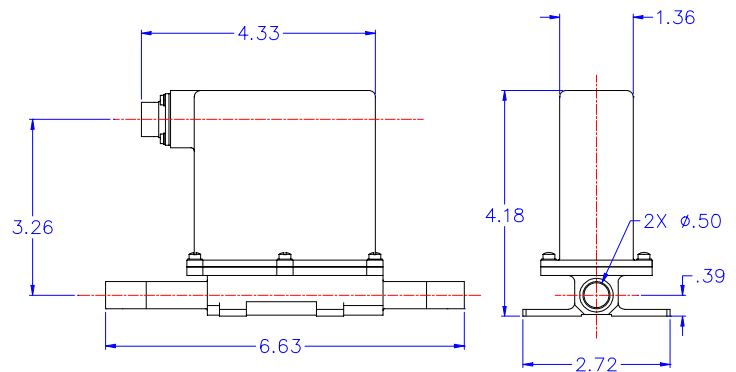
The 1/2" low pressure latch valve utilizes VACCO's proven torque tube technology. The all titanium construction helps maintain light weight while compatibility with stainless steel systems are achieved through transition tubing. The valve is fully flight qualified and holds extensive heritage.

The V1E10689-01 is identical to the V1E10691 except for lower back pressure relief.



## FEATURES

- ⊕ 250 psi Operating Pressure
- ⊕ All Titanium Construction with 304L Stainless Steel Interface
- ⊕ Low Weight – 750 g / 1.65 lbm
- ⊕ Two Integral Microswitches
- ⊕ > 150,000 Cycle Life
- ⊕ Bi-Directional Flow



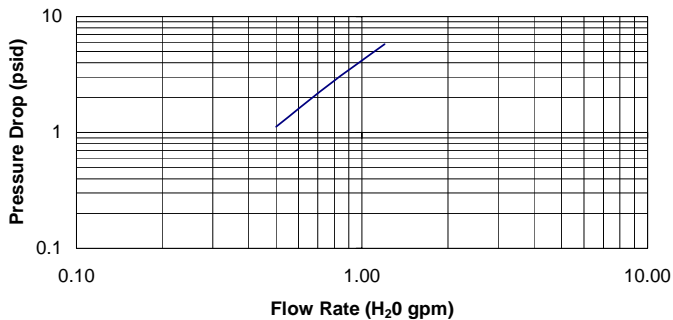
## OPERATING PARAMETERS

Operating Pressure Range ..... 250 psig  
 Proof Pressure..... 1,950 psig  
 Burst Pressure ..... 2,600 psig  
 Back Pressure Relief ..... 40-100 psid  
 Flow ..... 1.0 GPM H<sub>2</sub>O  
 Pressure Drop..... 6 psid (Forward Direction)  
 Pressure Drop..... 5 psid (Reverse Direction)  
 Internal Leakage ..... < 20.0 scch GHe  
 External Leakage..... < 5 X 10<sup>-6</sup> scch GHe

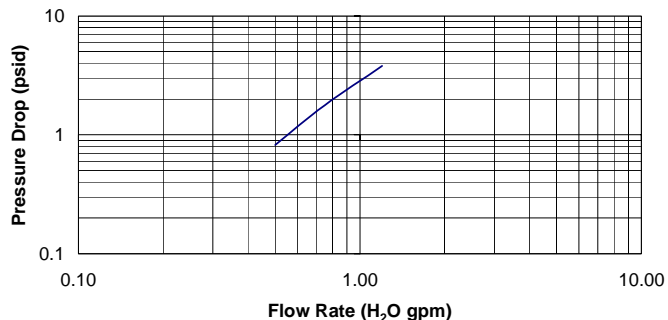
Weight ..... 1.65 lbm (750 grams)  
 Operating Temperature..... 30° to 150° F  
 Response Time ..... 80 ms @ 28 VDC @ 350 psig  
 Response Time ..... 80 ms @ 28 VDC @ 0 psig  
 Pull-In Voltage ..... 18VDC Max @ 250 psig & 150° F  
 Power ..... 90 Watts Max @ 32VDC & 32° F  
 Operating Voltage ..... 18 – 32 VDC  
 Dielectric Strength ..... 500 VAC RMS  
 Inlet/Outlet Filter Rating..... 100 Microns Absolute

## PERFORMANCE CHARACTERISTICS

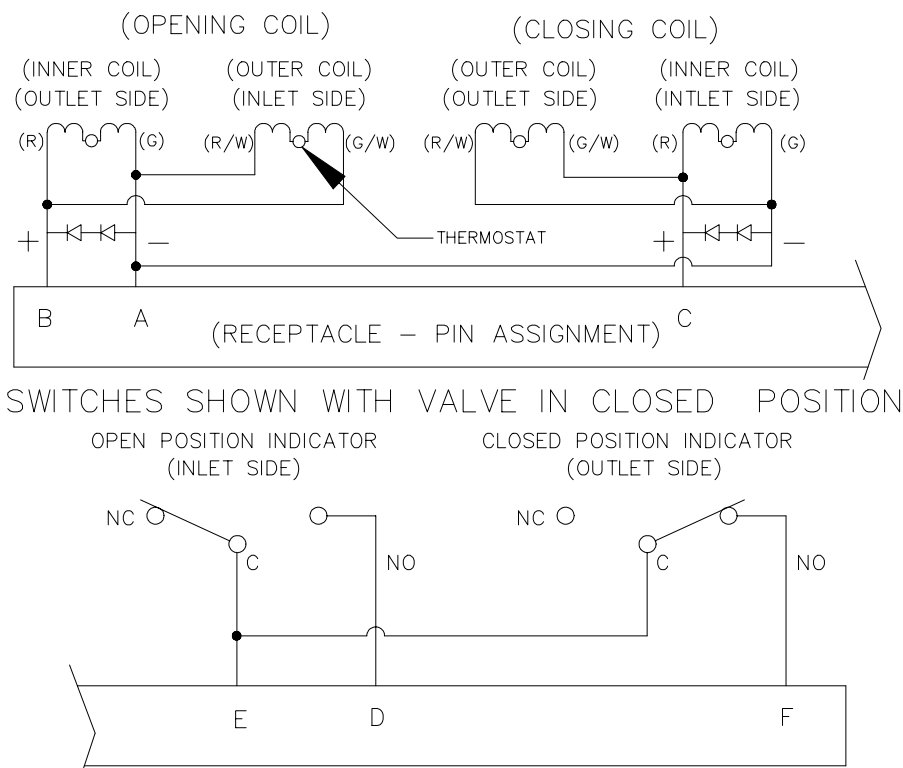
Forward Pressure Drop @ 250 psig, 70 F



Reverse Pressure Drop @ 250 psig, 70F



## SCHEMATIC



**DESCRIPTION**

VACCO Industries maintains a product line of titanium latching valves designed to meet industry's demand for high reliability, tight leakage, and quick response capabilities.

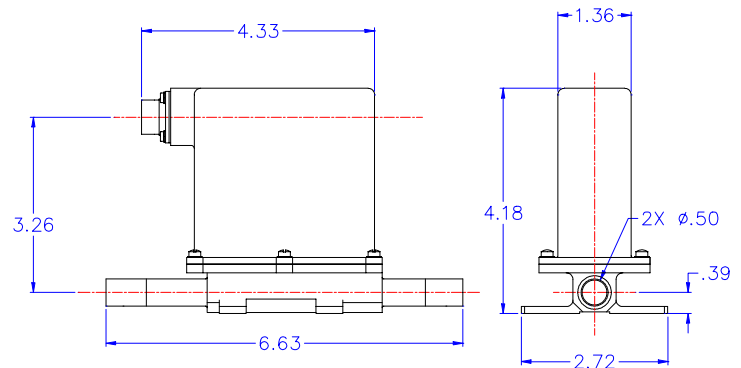
The 1/2" low pressure latch valve utilizes VACCO's proven torque tube technology. The all titanium construction helps maintain light weight while compatibility with stainless steel systems are achieved through transition tubing. The valve is fully flight qualified and holds extensive heritage.

The V1E10691 is identical to the V1E10689 except for back pressure relief.



**FEATURES**

- ⊕ 250 psi Operating Pressure
- ⊕ All Titanium Construction With 304L Stainless Steel Interface
- ⊕ Low Weight – 750 g / 1.65 lbm
- ⊕ Two Integral Microswitches
- ⊕ > 150,000 Cycle Life
- ⊕ Bi-Directional Flow



**OPERATING PARAMETERS**

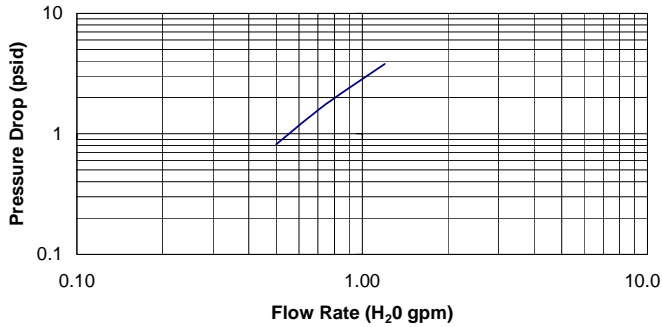
Operating Pressure Range ..... 250 psig  
 Proof Pressure ..... 1,950 psig  
 Burst Pressure ..... 2,600 psig  
 Back Pressure Relief ..... 260 – 300 psid  
 Flow ..... 1.0 GPM H<sub>2</sub>O  
 Pressure Drop ..... 5 psid (Forward Direction)  
 Pressure Drop ..... 6 psid (Reverse Direction)  
 Internal Leakage ..... < 20.0 scch GHe  
 External Leakage ..... < 5 X 10<sup>-6</sup> scch GHe

Weight ..... 1.65 lbm (750 grams)  
 Operating Temperature ..... 30° to 150° F  
 Open Response Time .. 80 ms @ 28 VDC @ 350 psig  
 Close Response Time ..... 80 ms @ 28 VDC @ 0 psig  
 Pull-In Voltage ..... 18VDC Max @ 250 psig & 150° F  
 Power ..... 90 Watts Max @ 32VDC & 32° F  
 Operating Voltage ..... 18 – 32 VDC  
 Dielectric Strength ..... 500 VAC RMS  
 Inlet/Outlet Filter Rating ..... 100 Microns Absolute

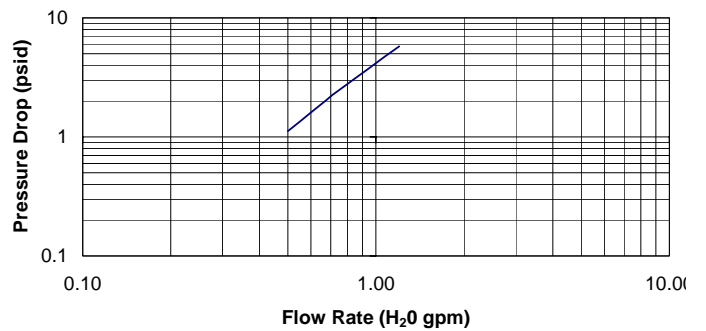
*Performance characteristics are based upon customer requirements, as such, are not representative of component capabilities or limitations*

### PERFORMANCE CHARACTERISTICS

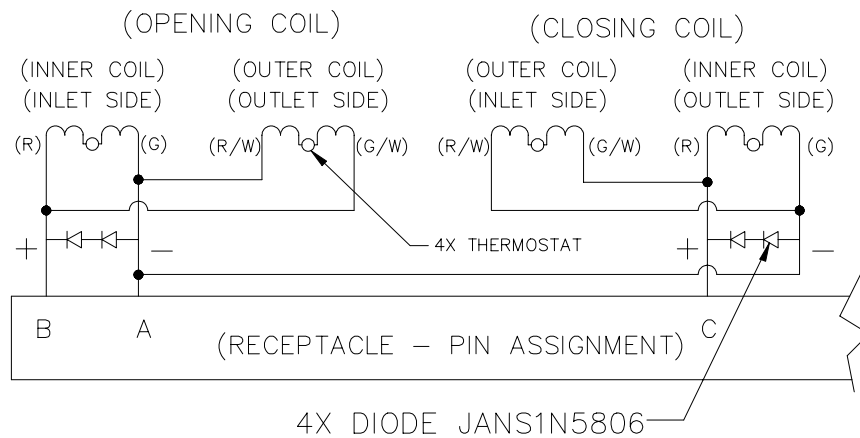
Forward Pressure Drop @ 250 psig, 70F



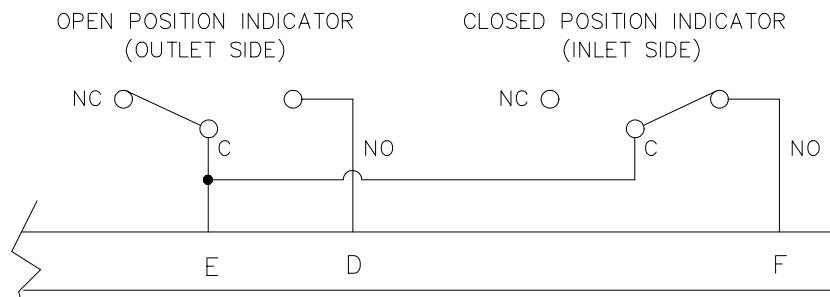
Reverse Pressure Drop @ 250 psig, 70F



### SCHEMATIC



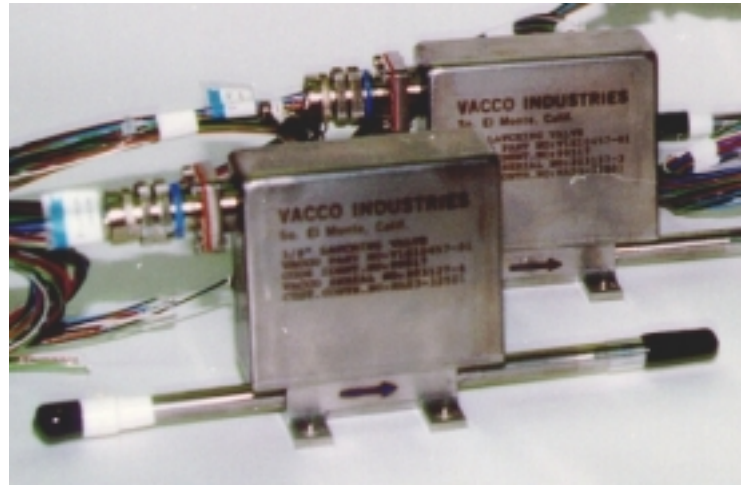
SWITCHES SHOWN WITH VALVE IN CLOSED POSITION



**DESCRIPTION**

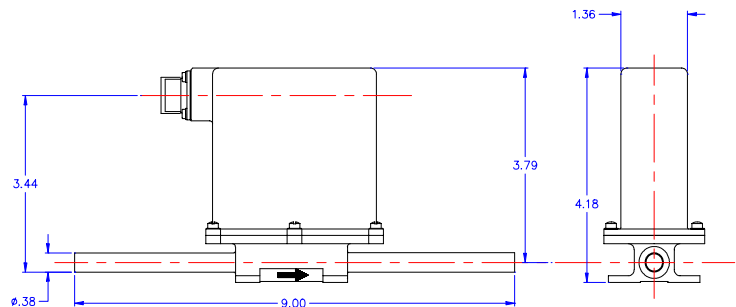
VACCO Industries maintains a product line of titanium latching valves designed to meet industry's demand for high reliability, tight leakage, and quick response capabilities.

The 3/8" low-pressure latch valve utilizes VACCO's proven torque tube technology. The all titanium construction helps maintain its light weight while the dual coils are provided for redundancy. The valve is fully flight-qualified and holds extensive heritage.



**FEATURES**

- ⊕ 260 psi Operating Pressure
- ⊕ Flight Qualified
- ⊕ All Titanium Construction
- ⊕ Low Weight – 750g/1.65 lbm
- ⊕ Integral Microswitch
- ⊕ 150,000 Cycle Life
- ⊕ 40μ Absolute Inlet Filter



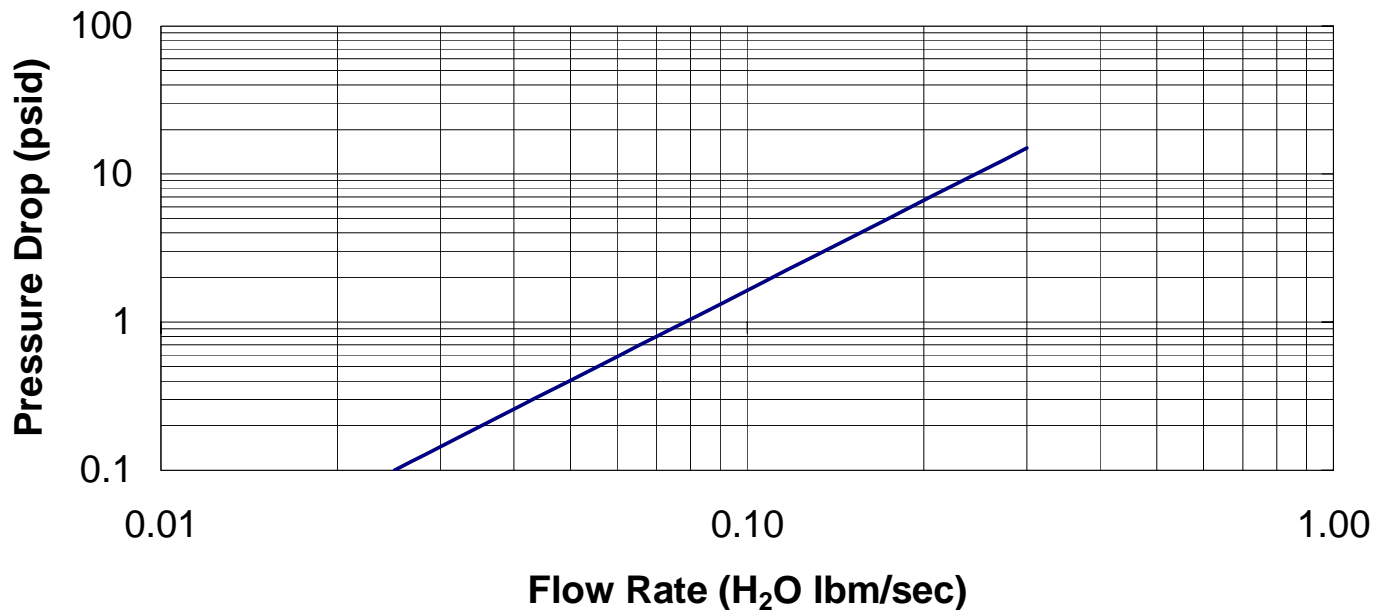
**OPERATING PARAMETERS**

Operating Pressure Range .....	260 psig	Operating Temperature .....	14° to 150° F
Proof Pressure .....	600 psig	Response Time	
Burst Pressure .....	1600 psig	Opening .....	50 msec @ 43 VDC
Flow .....	0.175 lbm/sec H <sub>2</sub> O	Closing .....	50 msec @ 21.5 VDC
Pressure Drop .....	4 psid	Back Pressure Relief .....	50 to 160 psid
Internal Leakage .....	<5.0 scch GHe	Inlet Filter Rating .....	40 microns absolute
External Leakage .....	<1 X 10 <sup>-6</sup> sccs GHe	Operating Voltage .....	21.5 – 54 VDC
Weight .....	1.60 lbm (725 grams)	Dielectric Strength .....	500 VAC RMS @ 60 Hz – 1 min

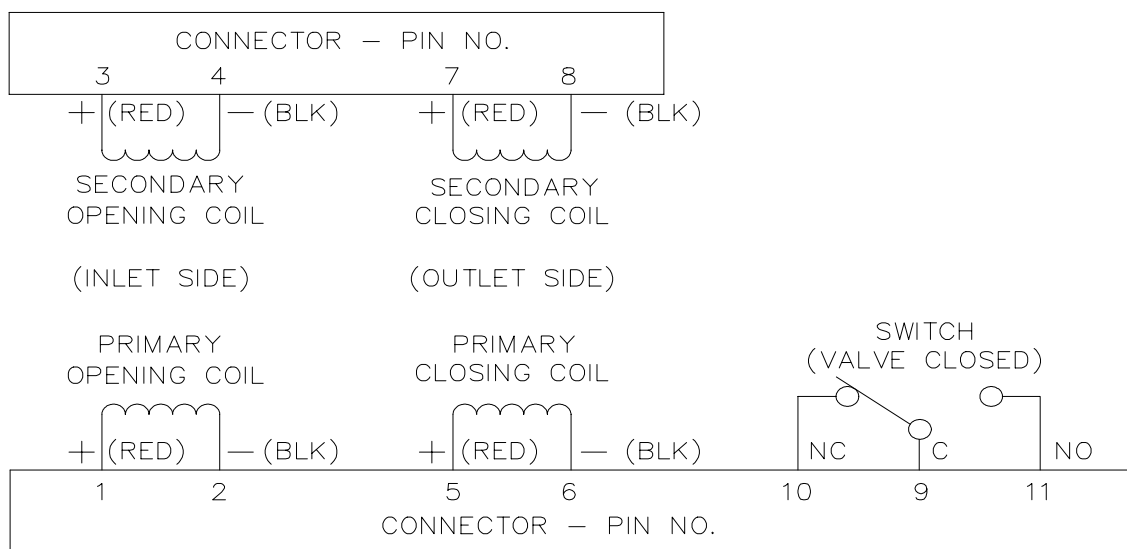
*Performance characteristics are based upon customer requirements, as such, are not representative of component capabilities or limitations*

**PERFORMANCE CHARACTERISTICS**

**Pressure Drop**



**ELECTRIC SCHEMATIC**

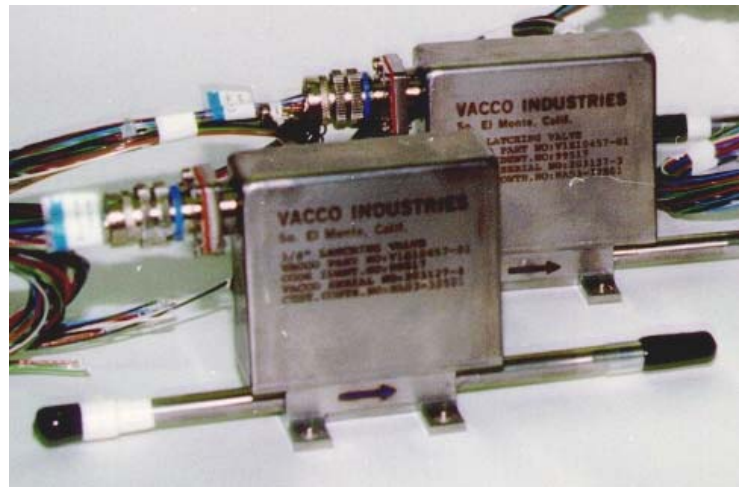




## DESCRIPTION

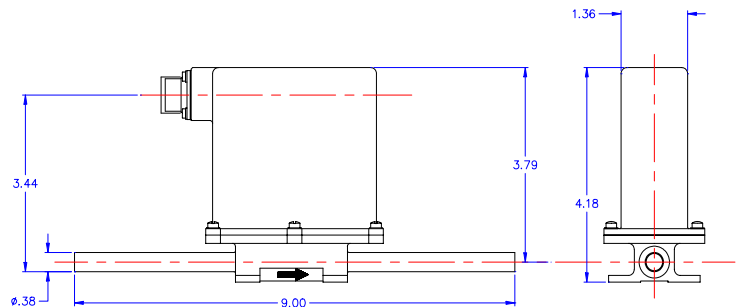
VACCO Industries maintains a product line of titanium latching valves designed to meet industry's demand for high reliability, tight leakage, and quick response capabilities.

The 3/8" low-pressure latch valve utilizes VACCO's proven torque tube technology. The all titanium construction helps maintain its light weight while the dual coils are provided for redundancy. The valve is fully flight-qualified and holds extensive heritage.



## FEATURES

- ⊕ 260 psi Operating Pressure
- ⊕ Flight Qualified
- ⊕ All Titanium Construction
- ⊕ Low Weight – 750g/1.65 lbm
- ⊕ Integral Microswitch
- ⊕ 150,000 Cycle Life
- ⊕ 40μ Absolute Inlet Filter

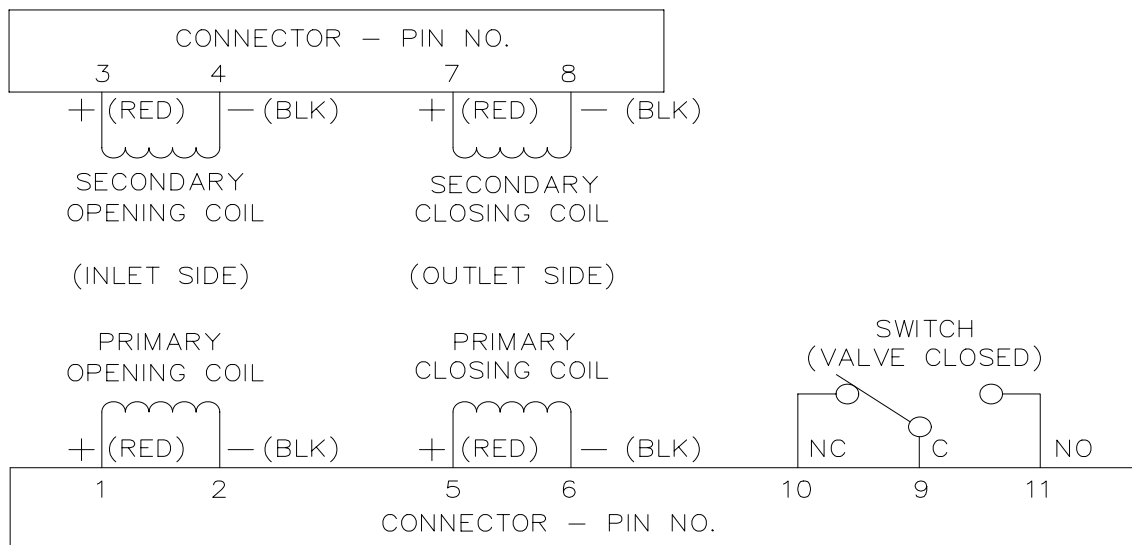


## OPERATING PARAMETERS

Operating Pressure Range .....	260 psig	Operating Temperature .....	14° to 150° F
Proof Pressure .....	600 psig	Response Time	
Burst Pressure.....	1600 psig	Opening .....	50 msec @ 43 VDC
Flow .....	0.175 lbm/sec H <sub>2</sub> O	Closing .....	50 msec @ 21.5 VDC
Pressure Drop .....	4 psid	Back Pressure Relief .....	50 to 160 psid
Internal Leakage.....	<5.0 scch GHe	Inlet Filter Rating.....	40 microns absolute
External Leakage .....	<1 X 10 <sup>-6</sup> sccs GHe	Operating Voltage .....	21.5 – 54 VDC
Weight .....	1.60 lbm (725 grams)	Dielectric Strength .....	500 VAC RMS @ 60 Hz – 1 min

**PERFORMANCE CHARACTERISTICS**

**ELECTRIC SCHEMATIC**



**DESCRIPTION**

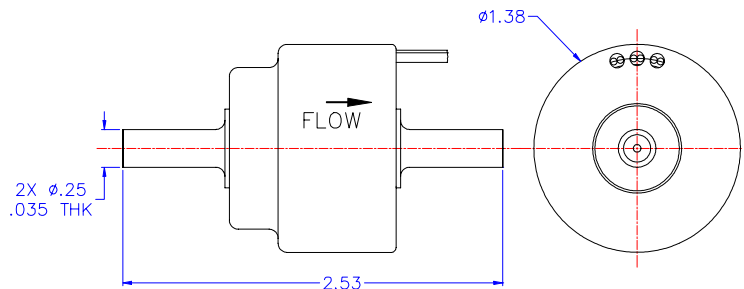
VACCO Aerospace Products produces a product line of latching valves designed to meet industry's demand for high reliability, tight leakage, and quick response capabilities.

The ¼" Low Pressure Miniature Latch Valve is designed as a light weight and low cost alternative for propulsion systems that requires small flow capacity. This valve was qualified for a Xenon Electric Propulsion system. A derivative has been developed with modifications to the orifice and poppet which is capable of 3,000 psi MEOP.



**FEATURES**

- ⊕ 73 psig Operating Pressure
- ⊕ CRES Interface
- ⊕ Low Weight – 0.37 lbm (168 grams)
- ⊕ Integral Position Indicator
- ⊕ 1,000 Open/Closing Operating Cycles
- ⊕ Viton Poppet
- ⊕ Fully Qualified per Flow Control Module



**OPERATING PARAMETERS**

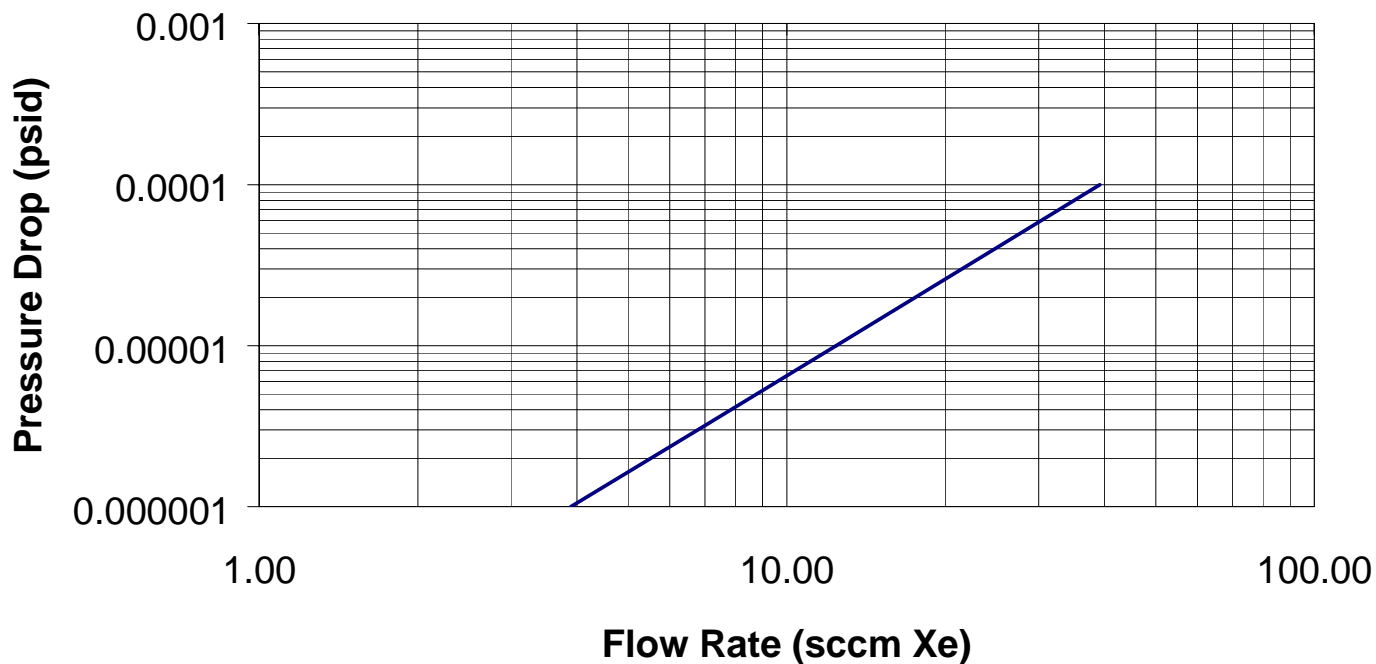
Operating Pressure Range ..... 0-73 psia  
 Proof Pressure ..... 109 psig  
 Burst Pressure ..... 181 psig  
 Flow ..... 2 sccm Xe  
 Pressure Drop ..... 0.001 psid max.  
 Internal Leakage ..... 1.0 scc/hr GHe @ MEOP  
 External Leakage ..... <1 X 10<sup>-6</sup> sccs GHe @ MEOP  
 Weight ..... 0.37 lbm (168 grams)

Operating Temperature ..... +17° to +70° C  
 Non-operating Temperature ..... -40° to +70° C  
 Response Time:  
     Opening ..... 50 msec @ 21 VDC  
     Closing ..... 50 msec @ 21 VDC  
 Operating Voltage ..... 21-32 VDC  
 Dielectric Strength .... 500 VAC RMS @ 60 Hz – 1 min

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

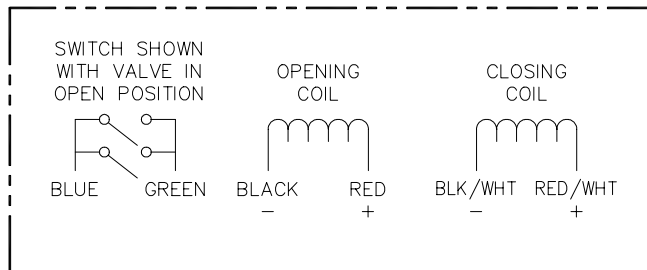
**PERFORMANCE CHARACTERISTICS**

**Flow vs Pressure Drop @ 40 psia\***



\*Analytical Estimate

**ELECTRIC SCHEMATIC**



## DESCRIPTION

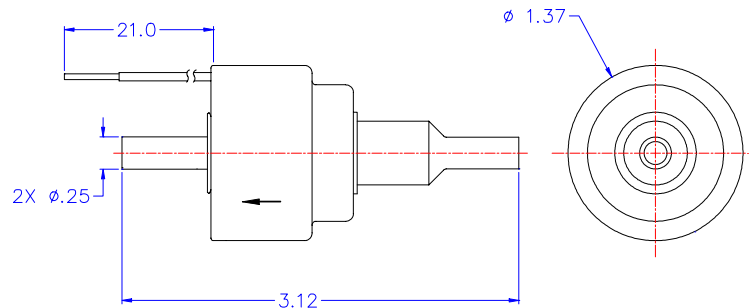
VACCO Aerospace Products produces a product line of latching valves designed to meet industry's demand for high reliability, tight leakage, and quick response capabilities.

The 1/4" Low Pressure Miniature Latch Valve is designed as a light weight and low cost alternative propulsion system that requires small flow capacity. This valve was qualified for a Hydrazine propellant system. A derivative has been developed with modifications to the orifice and poppet which is capable of 3,000 psi MEOP.



## FEATURES

- ⊕ 400 psig Operating Pressure
- ⊕ CRES Interface
- ⊕ Low Weight – 0.37 lbm (168 grams)
- ⊕ Integral Position Indicator
- ⊕ 40 μ Absolute Etched Disc Inlet Filter
- ⊕ 1,000 Open/Closing Operating Cycles
- ⊕ Teflon Poppet
- ⊕ Fully Qualified



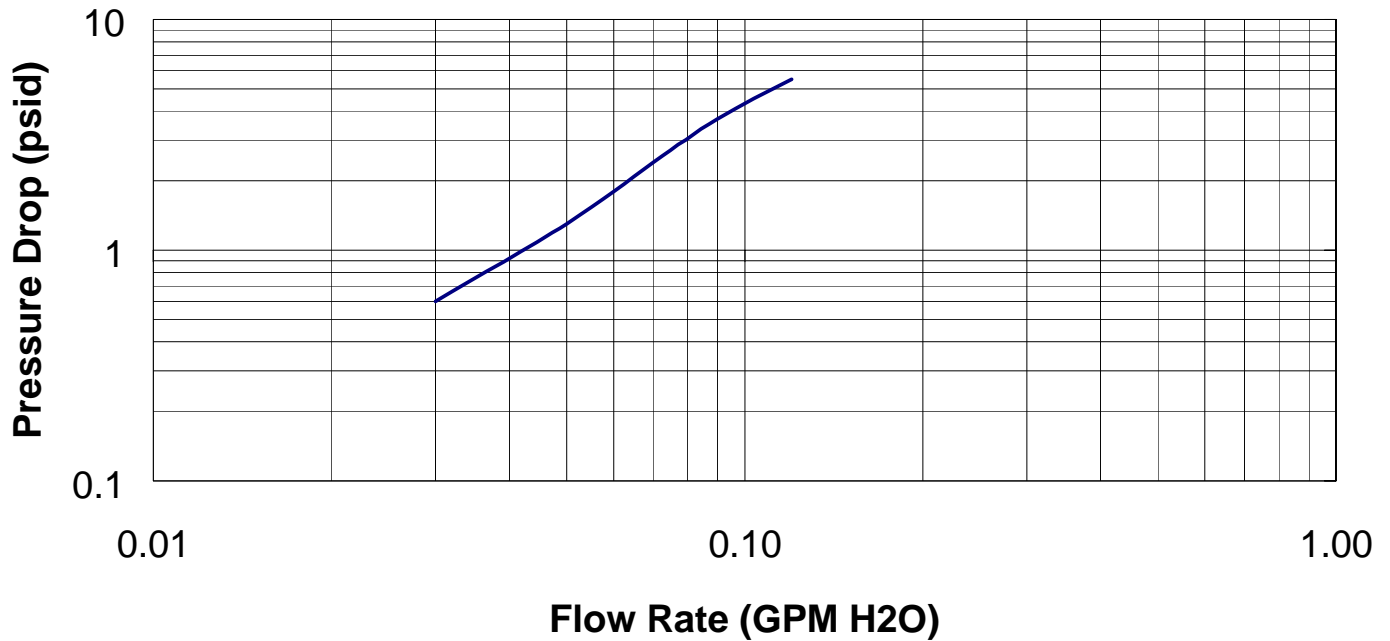
## OPERATING PARAMETERS

Operating Pressure Range .....0-400 psig  
 Proof Pressure..... 600 psig  
 Burst Pressure ..... 1,000 psig  
 Flow ..... 0.01 lbm/sec (0.08 gpm )H2O  
 Pressure Drop..... 3 psid max.  
 Internal Leakage ..... 1.0 scc/hr GHe @ MEOP  
 External Leakage ..... <1 X 10<sup>-6</sup> sccs GHe @ MEOP  
 Weight..... 0.37 lbm (168 grams)

Operating Temperature ..... +10° to +50° C  
 Non-operating Temperature..... -30° to +60° C  
 Response Time:  
     Opening ..... 15 msec @ 20 VDC  
     Closing ..... 15 msec @ 20 VDC  
 Back Pressure Relief..... 325 ± 200 psid  
 Inlet Filter Rating ..... 40 microns absolute  
 Operating Voltage ..... 11-17 VDC  
 Dielectric Strength .... 500 VAC RMS @ 60 Hz – 1 min

**PERFORMANCE CHARACTERISTICS**

**Pressure Drop @ 400 psig**



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