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climate control
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pneumatics
process control
sealing & shielding



Miniature Proportional Valves

Precision Fluidics



ENGINEERING YOUR SUCCESS.











ENGINEERING **YOUR** SUCCESS.

When you partner with the global leader in motion and control technologies, expect to move your business and the world forward. From miniature solenoid valves to highly integrated automation systems, our innovations are critical to life-saving medical devices and scientific instruments used for drug discovery and pathogen detection. Not to mention, critical to decreasing time to market and lowering your overall cost of ownership. So partner with Parker, and get ready to move, well, anything.



www.parker.com/precisionfluidics 1 800 525-2857

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VSO® Miniature Proportional Valve

Thermally Compensated Proportional Valve



Typical Applications:

- Gas Chromatography
- Mass Spectrometry
- Ventilators
- O₂ Concentrators/Conservers
- Anaesthesia Delivery & Monitors
- Pressure & Flow Control
- Mass Flow Control


Performance Data

Physical Properties

Valve Type:
2-Way Normally Closed
Media:
Air, argon, helium, hydrogen, methane, nitrogen, oxygen, & others
Operating Environment:
32 to 131°F (0 to 55°C)
Storage Temperature:
-40 to 158°F (-40 to 70°C)
Length:
1.785 in (45.34 mm)
Width:
0.625 in (16.51 mm)
Height:
0.67 in (17.02 mm)
Porting:
Barbs or 10-32 female; manifold mount (with screens available)
Weight:
2.2 oz (62.86 grams)

The VSO®, Voltage Sensitive Orifice, is a miniature solenoid valve that controls the flow of gas in proportion to input current. You can drive the valve with either DC current or pulse width modulation and use closed loop feedback to deliver optimal system performance. Medical and analytical OEMs worldwide choose the VSO® as their preferred miniature proportional valve.

Features

- Operating pressures up to 150 psig and a range of orifice sizes.
- Satisfies a 0.2 sccm leakage specification of He for 100 million life cycles and offers high repeatability.
- Thermally compensated to maintain ideal flow.
- All valves are cleaned for Oxygen and Analytical Service use.
- Serialized performance traceability.
- Uses either DC current or pulse width modulation with closed loop feedback to deliver optimal system performance.
- RoHS compliant. 

Physical Properties

Internal Volume:
0.031 in ³ (0.508 cm ³)
Filtration: (Suggested and Available)
Models 1 & 2: 17 micron Models 3, 4, 5, & 6: 40 micron
Flow Direction:
Inlet Port Port 2 Outlet Port Port 1

Electrical

Power:
2.0 Watts maximum
Voltage:
See Table 2
Electrical Termination:
18 in Wire Leads, PC Mount, Quick Disconnect Spade

Wetted Materials

Series 11 Body:
360 HO ₂ Brass
Series 25 Body:
Nickel-Plated Brass
Stem Base:
430 FR Stainless Steel and Brass 360 HT
All Others:
FKM; FFKM; 430 FR Stainless Steel; 300 Series Stainless Steel

Performance Characteristics

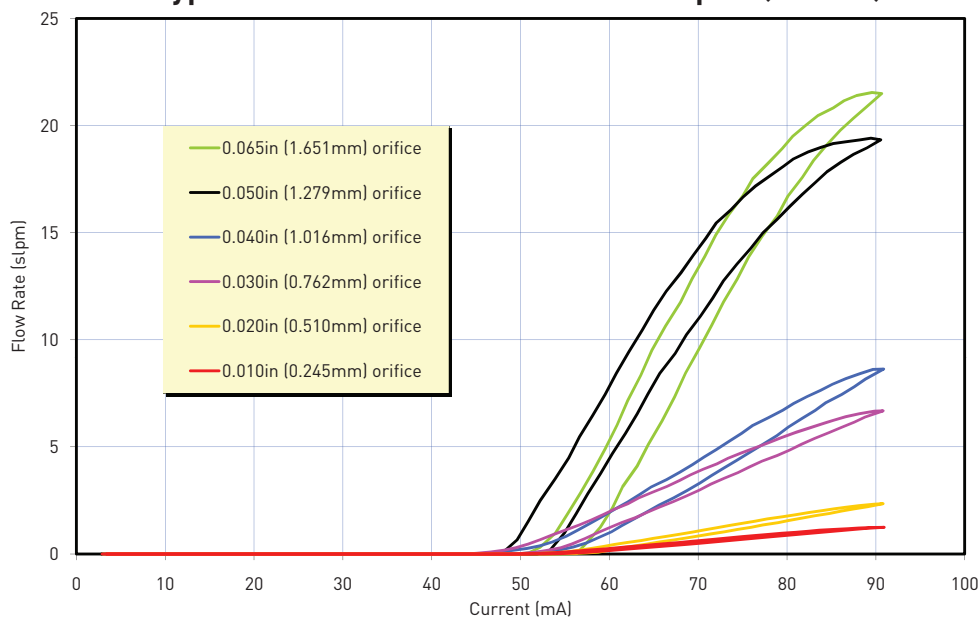
Leak Rate:
The leakage shall not exceed the following values: Internal 0.2 SCCM of He with a differential pressure of 1 psid, 25 psid and 150 psid External 0.016 SCCM of He at 150 psi
Pressure:
0 to 50 psi (3.45 bar) 0 to 75 psi (5.17 bar) 0 to 100 psi (6.89 bar) 0 to 150 psi (10.34 bar) See Table 1
Vacuum:
0-27 in Hg (0-686 mm Hg)
Orifice Sizes:
0.010 in (0.245 mm) 0.020 in (0.510 mm) 0.030 in (0.762 mm) 0.04 in (1.016 mm) 0.05 in (1.270 mm) 0.065 in (1.651 mm)
Hysteresis:
7% of full scale current (Typical) 15% of full scale current (Max)



VSO is a registered trademark of Parker Hannifin Corporation.

VSO® Thermally Compensated Proportional Valve

Typical Air Flow with 20 VDC Coil @ 25psid (1.7 bar)



VSO® Pressure vs Flow Curves Model 1-6

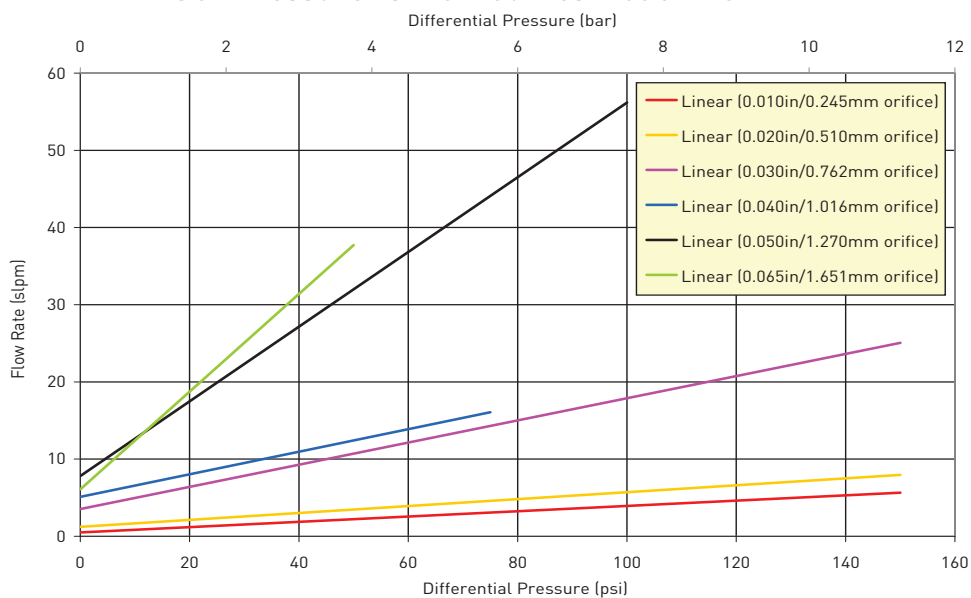


Table 1: Pressure and Flow Capabilities

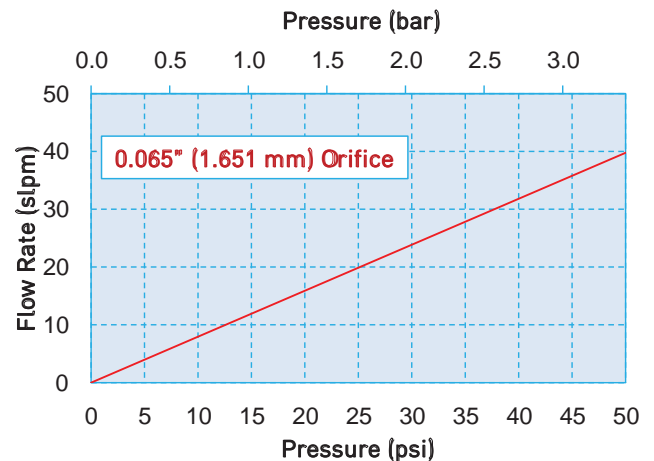
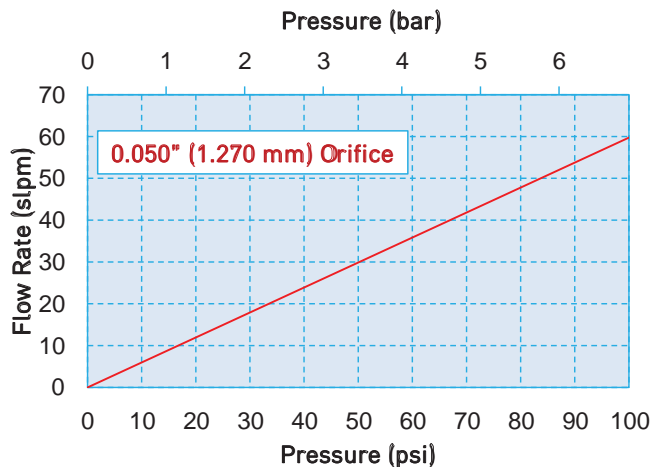
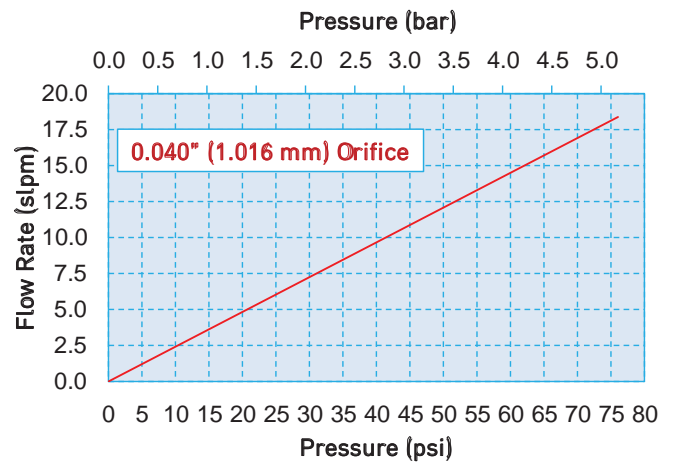
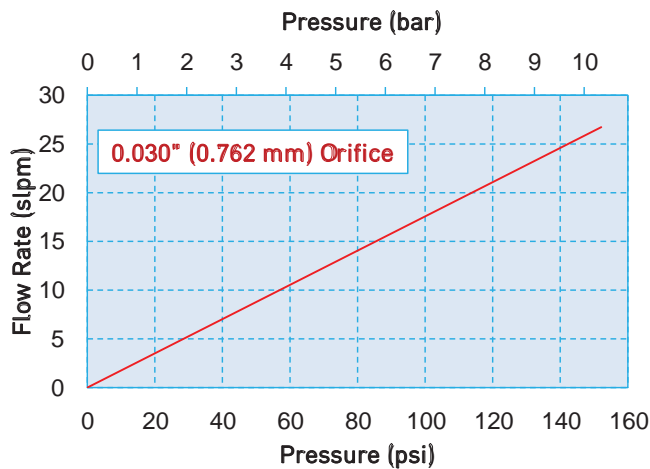
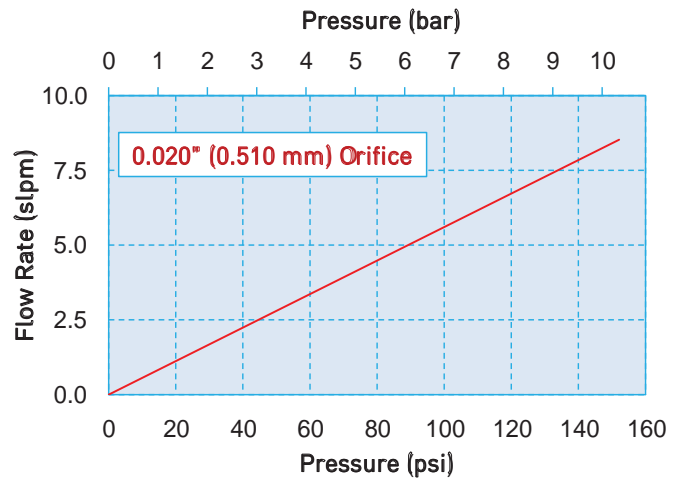
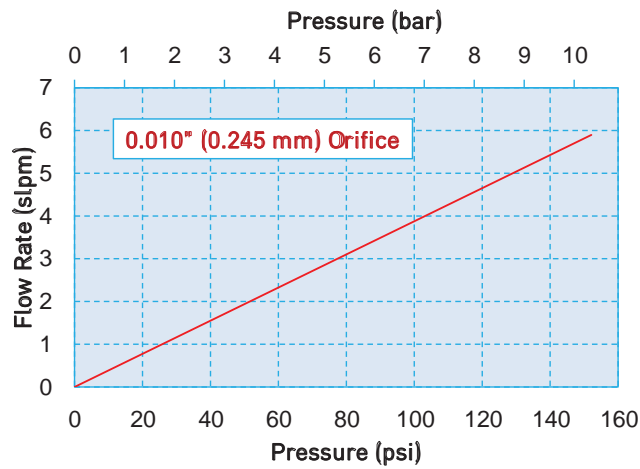
Orifice Diameter	Maximum Operating Inlet Pressure	Maximum Operating Pressure Differential
0.010in (0.245mm)	150 psig (10.34 bar)	150 psid (10.34 bar)
0.020in (0.510mm)	150 psig (10.34 bar)	150 psid (10.34 bar)
0.030in (0.762mm)	150 psig (10.34 bar)	150 psid (10.34 bar)
0.040in (1.016mm)	150 psig (10.34 bar)	75 psid (5.17 bar)
0.050in (1.270mm)	150 psig (10.34 bar)	100 psid (6.89 bar)
0.065in (1.651mm)	150 psig (10.34 bar)	50 psid (3.45 bar)

Table 2: Electrical Requirements

Minimum Available Voltage (VDC)	Nominal Coil Resistance @ 20°C (Ohms)	Input Current for Full Flow (mA)
5.5	11	304
8.0	23	212
11.5	47	152
13.5	68	125
20.0	136	91
29.0	274	66
41.0	547	47
56.0	1094	32

VSO® Thermally Compensated Proportional Valve

VSO® Sizing Charts



VSO® Thermally Compensated Proportional Valve

Pneumatic Interface

VSO® Series 11 Manifold Mount



VSO® Series 11 Barbed



VSO® Series 25 10-32 Threaded



Electrical Interface

18" Wire Lead



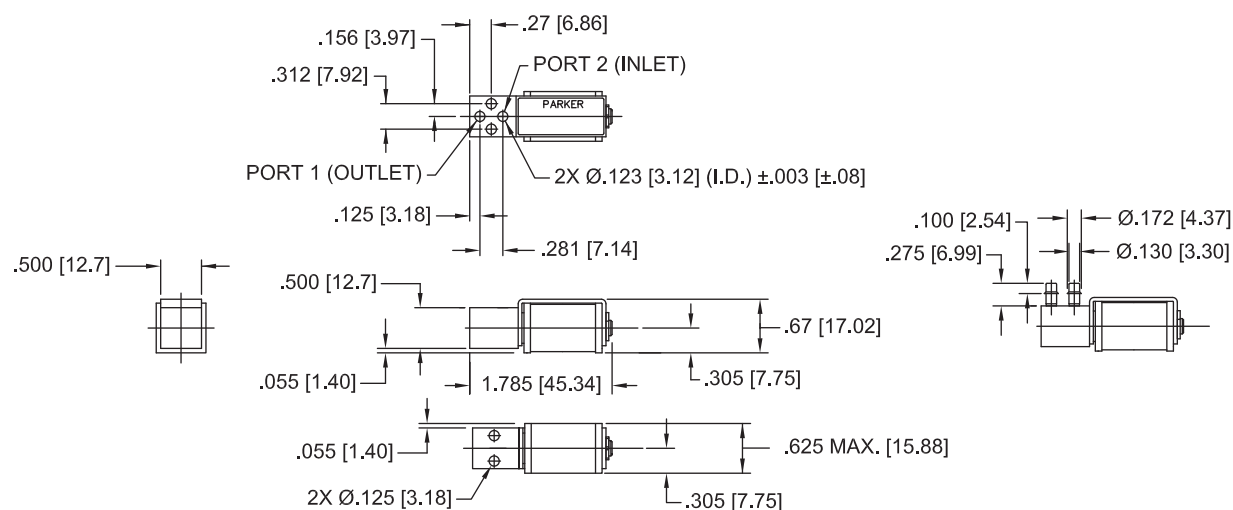
4 PC Pin



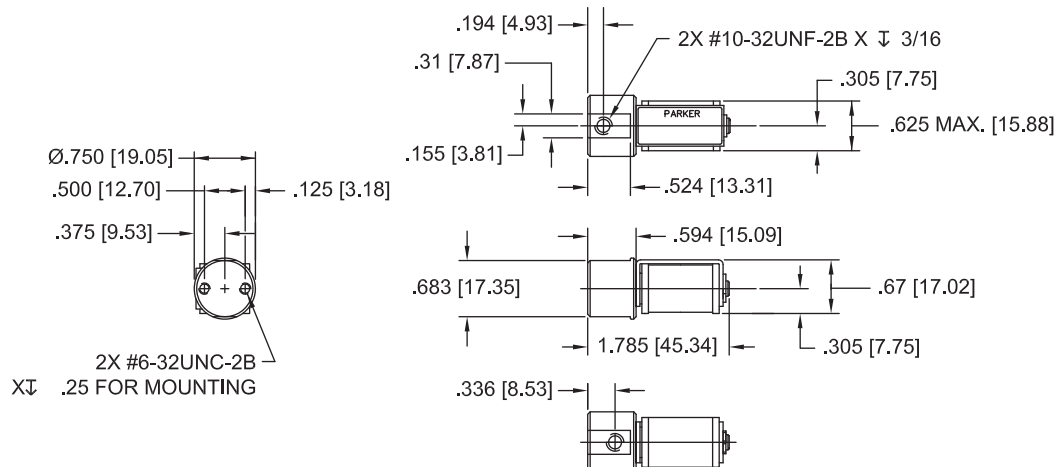
Quick Connect Spade



VSO® Series 11 Manifold Mount and Barbed Body Basic Valve Dimensions



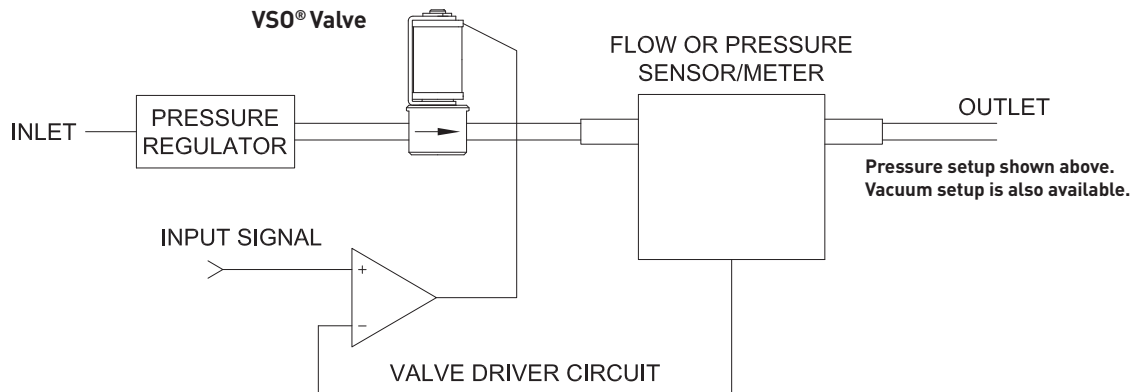
VSO® Series 25 10-32 Threaded Body Basic Valve Dimensions



VSO® Thermally Compensated Proportional Valve

VSO® Installation and Use

Typical Valve Set-up



Valve Electrical Control

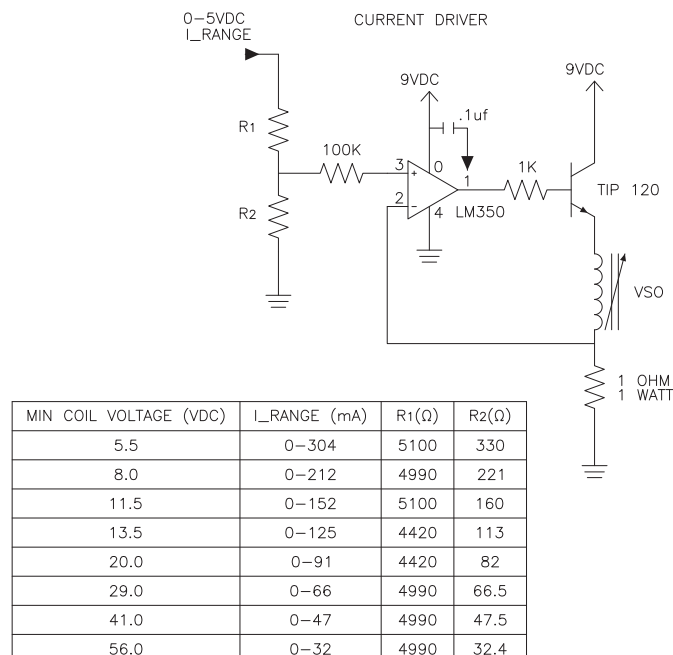
Basic Control:

The VSO® valve can be controlled by either voltage or current; however, it is highly recommended that current control be employed to ensure the most repeatable valve flow performance.

PWM Control:

For PWM control, the signal applied to the valve should have a frequency between 5-12kHz. Optimum frequency will be application dependent.

Suggested VSO® Current Driver Schematic



VSO[®] Thermally Compensated Proportional Valve



VSO® Low Flow

Thermally Compensated Proportional Valve




Typical Applications:

- Gas Chromatography
- Mass Spectrometry
- Pressure & Flow Control
- Mass Flow Control

The VSO® LF (Low Flow) offers the same benefits as the VSO® valve with enhanced flow control for applications where control is critical or flow is required between 0 - 500 sccm. This miniature solenoid-operated valve automates the flow of gas in proportion to the input current.

Features

- Lowest flow of any proportional valve on the market.
- Uses either DC current or pulse width modulation; closed loop feedback delivers optimal system performance.
- Offers computer automated calibrations and full calibration traceability.
- Rated for 10 million life cycles.
- Maintains ideal flow through thermal compensation.
- Highly repeatable.
- RoHS compliant. 

Performance Data

Physical Properties

Valve Type:
2-Way Normally Closed
Media:
Air, argon, helium, hydrogen, methane, nitrogen, oxygen, & others
Operating Environment:
32 to 122°F (0 to 50°C)
Storage Temperature:
-40 to 158°F (-40 to 70°C)
Length:
1.785 in (45.34 mm)
Width:
0.625 in (16.51 mm)
Height:
0.67 in (17.02 mm)
Porting:
Manifold mount
Weight:
2.2 oz (62.86 grams)

Physical Properties

Internal Volume:
0.031 in ³ (0.508 cm ³)
Filtration: (Suggested and Available)
Flow Direction:
Inlet Port Port 2
Outlet Port Port 1
Oxygen and Analytically Clean:
Standard

Electrical

Power:
2.0 Watts maximum
Voltage:
See Table 2
Electrical Termination:
18 in Wire Leads

Wetted Materials

Body: 360 HO2 Brass
Stem Base:
430 FR Stainless Steel and Brass 360 HT
All Others:
FKM; 430 FR Stainless Steel; 300 Series Stainless Steel

Performance Characteristics

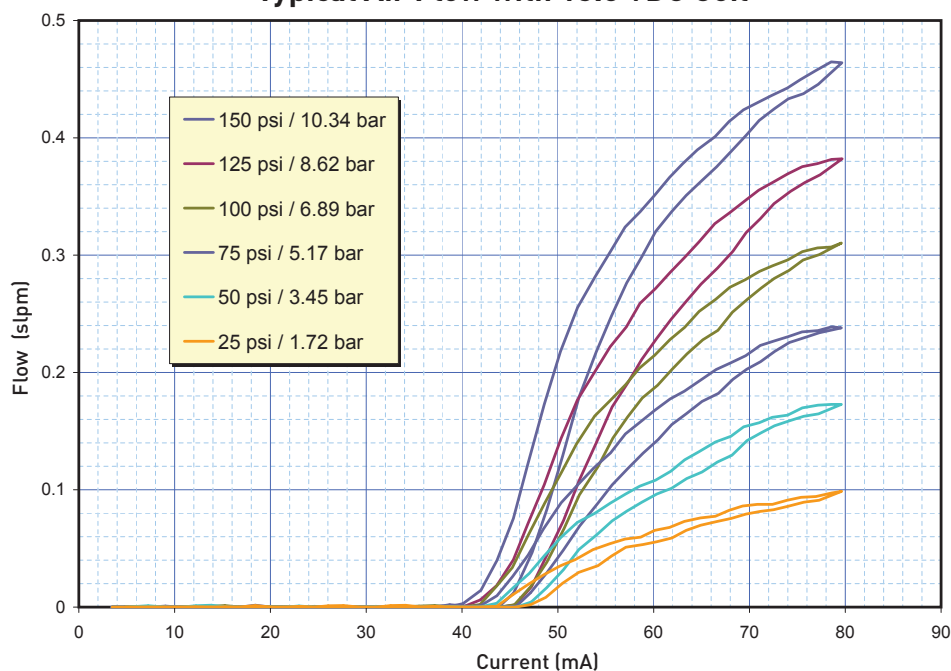
Leak Rate:
The leakage shall not exceed the following values:
Internal 0.2 SCCM of He with a differential pressure of 1 psid, 25 psid and 150 psid
External 0.016 SCCM of He at 150 psi
Pressure:
0 to 150 psi (10.34 bar)
See Table 1
Vacuum:
0-27 in Hg (0-686 mm Hg)
Orifice Size:
0.003" (0.076 mm)
Hysteresis:
7% of full scale current (Typical)
15% of full scale current (Max)

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VSO® Low Flow Thermally Compensated Proportional Valve

Typical Air Flow with 13.5 VDC Coil



VSO® Low Flow Pressure vs Flow Curve

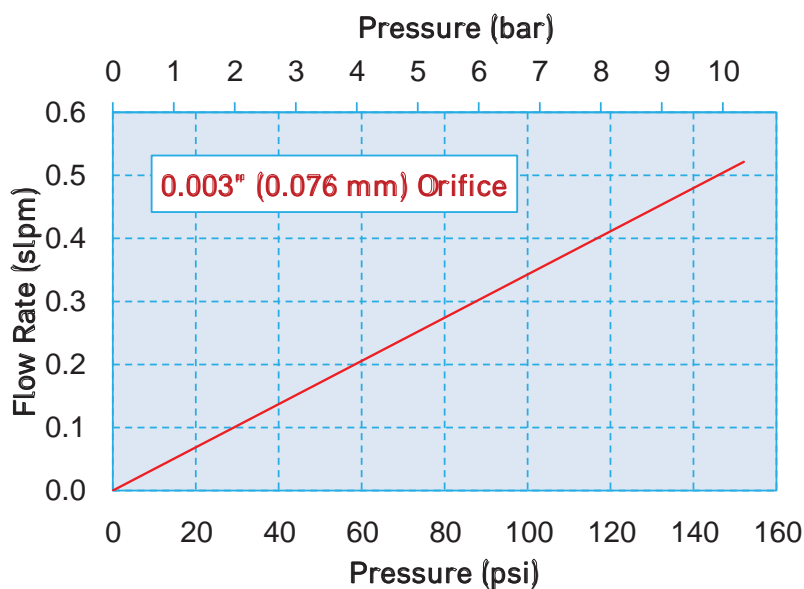


Table 1: Pressure and Flow Capabilities

Orifice Diameter	Maximum Operating Inlet Pressure	Maximum Operating Pressure Differential
0.003in (0.076mm)	150 psig (10.34 bar)	150 psid (10.34 bar)

Table 2: Electrical Requirements

Minimum Available Voltage (VDC)	Nominal Coil Resistance @ 20°C (Ohms)	Input Current for Full Flow (mA)
6.5	47	130
8.0	68	115
12.0	136	80
18.0	274	60
24.0	547	43

VS0[®] Low Flow Thermally Compensated Proportional Valve

Pneumatic Interface

VS0[®] Low Flow Manifold Mount

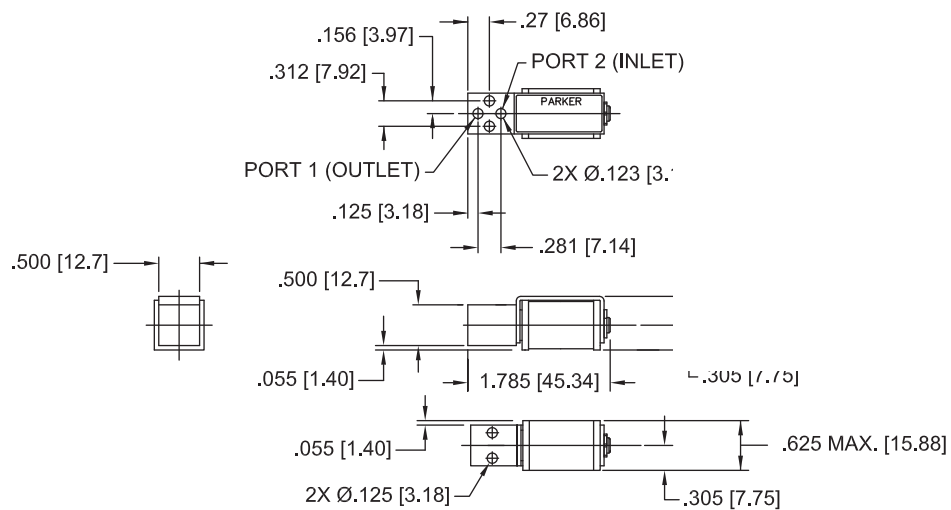


Electrical Interface

VS0[®] Low Flow 18" Wire Lead



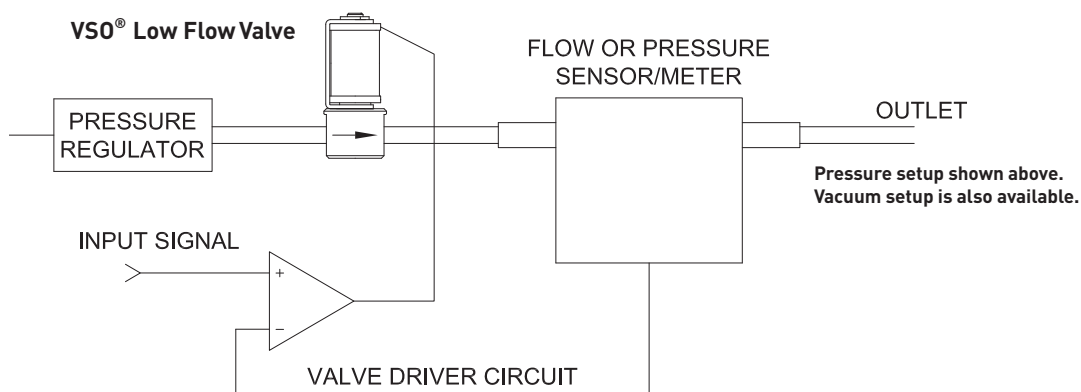
VS0[®] Low Flow Manifold Body Basic Valve Dimensions



VSO® Low Flow Thermally Compensated Proportional Valve

VSO® Low Flow Installation and Use

Typical Valve Set-up



Valve Electrical Control

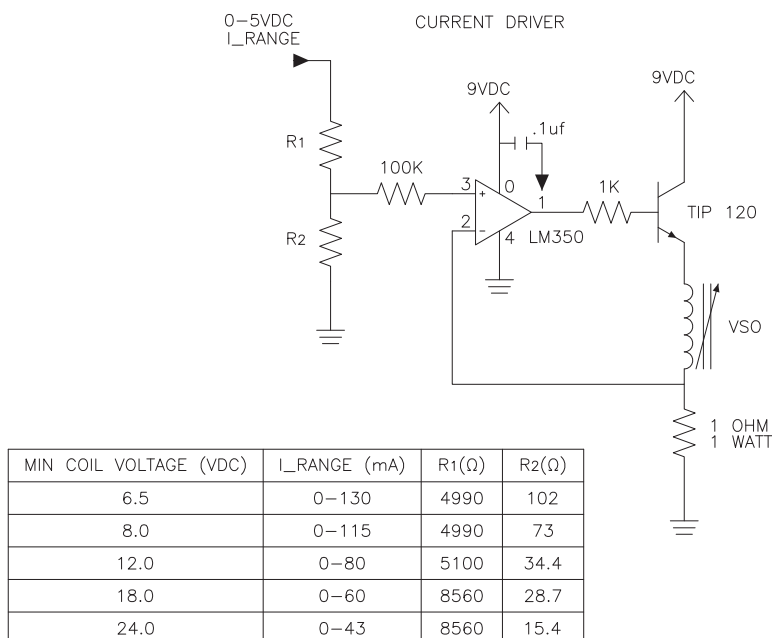
Basic Control:

The VSO® Low Flow valve can be controlled by either voltage or current; however, it is highly recommended that current control be employed to ensure the most repeatable valve flow performance.

PWM Control:

For PWM control, the signal applied to the valve should have a frequency between 5-12kHz. Optimum frequency will be application dependent.

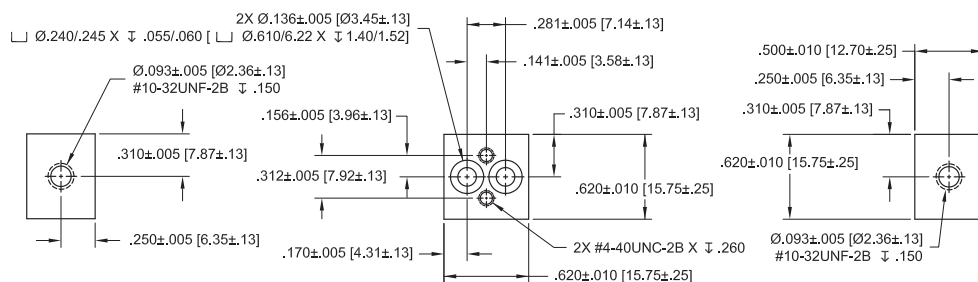
Suggested VSO® Low Flow Current Driver Schematic



VSO® Low Flow Thermally Compensated Proportional Valve

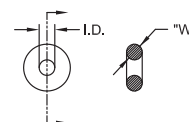
Manifold & O-Ring Dimensions & Design

Not shipped with valves.



O-RING DIMENSIONS

I.D. = .144±.005 [2.90±.13]
W = .070±.003 [1.78±.08]
O.D. = .254 [6.45] REFERENCE



Ordering Information

Sample Part ID	910	—	000200	—	001	
Description	Series	—	Model Number	—	Coil Selection	Accessories
Options			VSO, Low Flow, 0.003" Orifice Size		X: Max Voltage* 001: 6.5 VDC 002: 8 VDC 003: 12 VDC 004: 18 VDC 007: 24 VDC * Max Voltage for continuous full flow, ambient Temp 55°C,	Manifold Mount O-Rings: 190-007024-002 (FKM) Recommended Mounting Hardware: Mounting Screw, 4-40 x 5/8" 191-000115-010 Set Torque: 5.0 in-lb. (6.8 N-m) Recommended Tubing Internal Diameter: 0.125 in (3.0 mm)

ORDER
ONLINE

In order to provide the best possible solution for your application, please provide the following requirements when contacting Applications Engineering:

- Media, Inlet & Outlet Pressures
- Minimum Required Flow Rate
- System Supply Voltage
- Media & Ambient Temperature Range.

NOTE: Please consult Parker Precision Fluidics for other considerations.

For more detailed information, visit us on the Web, or call and refer to Performance Spec. #790-002160-002 and Drawing #890-003022-022.

For more information call +1 603 595 1500 or email ppinfo@parker.com
Visit www.parker.com/precisionfluidics

PPF-MPV-002/US September 2011



NOTES

Lone Wolf


Normally Open Miniature Proportional Valve

Thermally Compensated Proportional Valve



With its patented technology, the Lone Wolf valve has the highest performance characteristics of any Normally Open proportional valve available on the market. The Lone Wolf valve offers silent operation, provides repeatable high-speed performance, and ensures maximum accuracy.

Features

- Achieves rapid, stable performance.
- Enhances system control and patient comfort.
- Maintains ideal flow through Normally Open valve with thermal compensation.
- Extremely reliable.
- RoHS compliant. 

Typical Applications:

- Blood Pressure Monitoring
- Vitreo Retinal Surgery

Performance Data

Physical Properties

Valve Type:
2-Way Normally Open
Media:
Air, argon, helium, hydrogen, methane, nitrogen, oxygen, & others
Operating Environment:
32 to 122°F (0 to 50°C)
Storage Temperature:
-40 to 158°F (-40 to 70°C)
Length:
1.785 in (45.34 mm)
Width:
0.625 in (16.51 mm)
Height:
0.67 in (17.02 mm)
Porting:
Barbs; manifold mount (with screens available)
Weight:
2.2 oz (62.86 grams)

Physical Properties

Internal Volume:
0.031 in ³ (0.508 cm ³)
Filtration: (Suggested and Available)
40 micron
Flow Direction:
Inlet Port Port 1
Outlet Port Port 2

Electrical

Power:
2.0 Watts maximum
Voltage:
See Table 2
Electrical Termination:
18 in Wire Leads, PC Mount

Wetted Materials

Body:
360 HO ₂ Brass
Stem Base:
430 FR Stainless Steel and Brass
360 HT
All Others:
FKM; 430 FR Stainless Steel; 300 Series Stainless Steel

Performance Characteristics

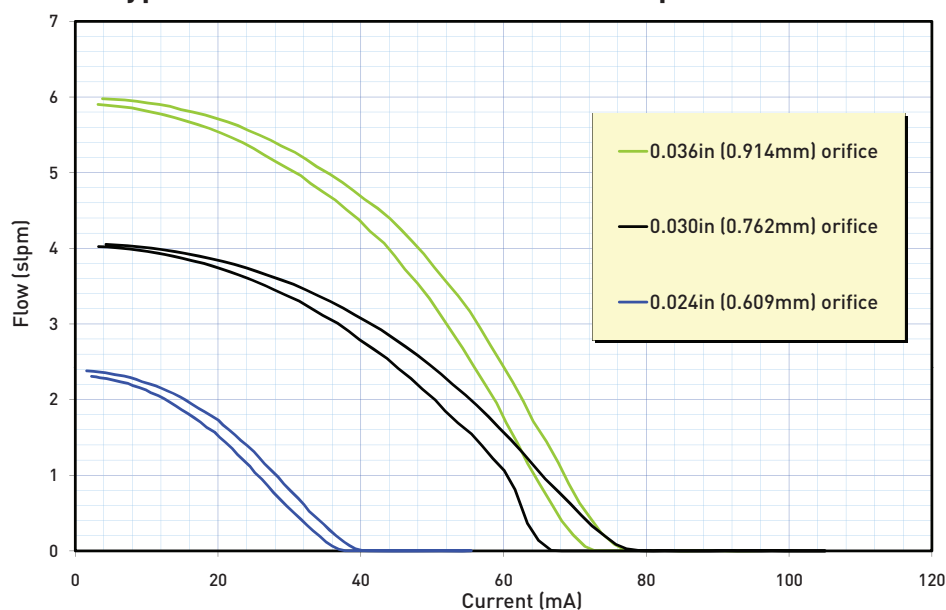
Leak Rate:
The leakage shall not exceed the following values:
Internal 0.2 SCCM of He with a differential pressure of 1 psid, 25 psid and 150 psid
External 0.016 SCCM of He at 150 psi
Pressure:
0 to 10 psi (0.69 bar)
0 to 20 psi (1.37 bar)
0 to 25 psi (1.72 bar)
See Table 1
Vacuum:
0-20 in Hg (0-508 mm Hg)
Orifice Sizes:
0.024 in (0.609 mm)
0.030 in (0.762 mm)
0.036 in (0.914 mm)
Hysteresis:
7% of full scale current (Typical)
15% of full scale current (Max)

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Lone Wolf Thermally Compensated Proportional Valve

Typical Air Flow with 13.5 VDC Coil @ 5psid (0.34 bar)



Lone Wolf Pressure vs Flow Curves Model 1-3

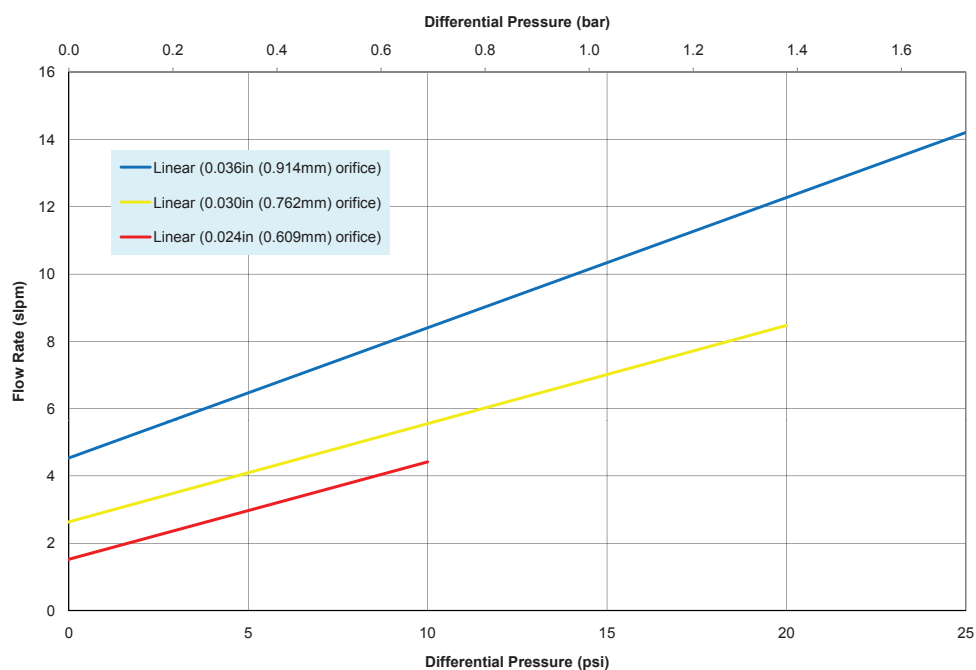


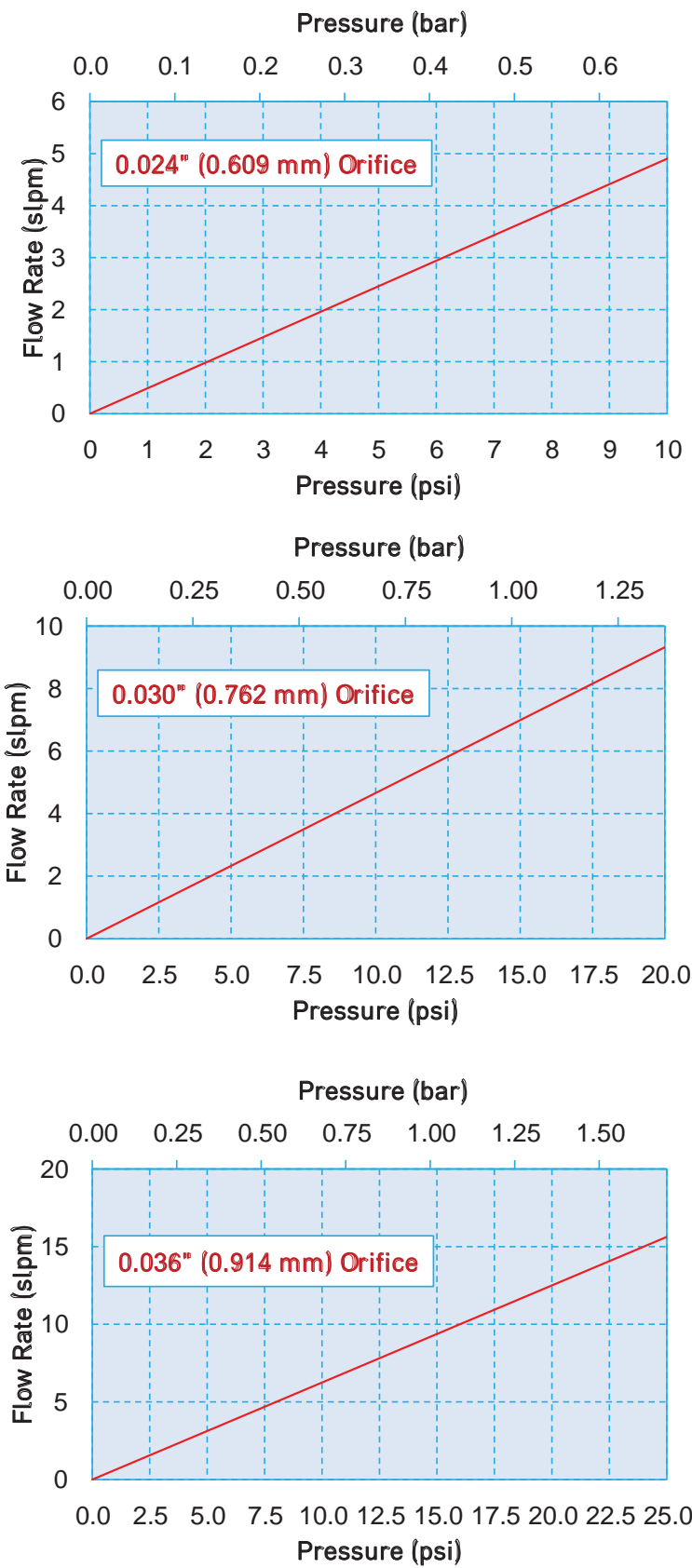
Table 1: Pressure and Flow Capabilities

Orifice Diameter	Maximum Operating Inlet Pressure	Maximum Operating Pressure Differential
0.024in (0.609mm)	0-10 psig (0.69bar)	150 psid (10.34 bar)
0.030in (0.762mm)	0-20 psig (1.37bar)	150 psid (10.34 bar)
0.036in (0.914mm)	0-25 psig (1.72bar)	150 psid (10.34 bar)

Table 2: Electrical Requirements

Minimum Available Voltage (VDC)	Model 1 (0.024" orifice)		Model 2 (0.030" orifice)		Model 3 (0.036" orifice)	
	Nominal Coil Resistance @ 20°C (Ohms)	Input Current for Full Shut Off (mA)	Nominal Coil Resistance @ 20°C (Ohms)	Input Current for Full Shut Off (mA)	Nominal Coil Resistance @ 20°C (Ohms)	Input Current for Full Shut Off (mA)
5.5	47	92	23	177	11	335
8.0	68	76	47	127	23	233
11.5	136	55	68	105	47	168
13.5	274	40	136	76	68	138
20.0	547	28	274	55	136	100
29.0	1094	20	547	40	274	73

Lone Wolf Thermally Compensated Proportional Valve
Lone Wolf Sizing Charts



Lone Wolf Thermally Compensated Proportional Valve

Pneumatic Interface

Lone Wolf Manifold Mount



**Lone Wolf
Barbed**



Electrical Interface

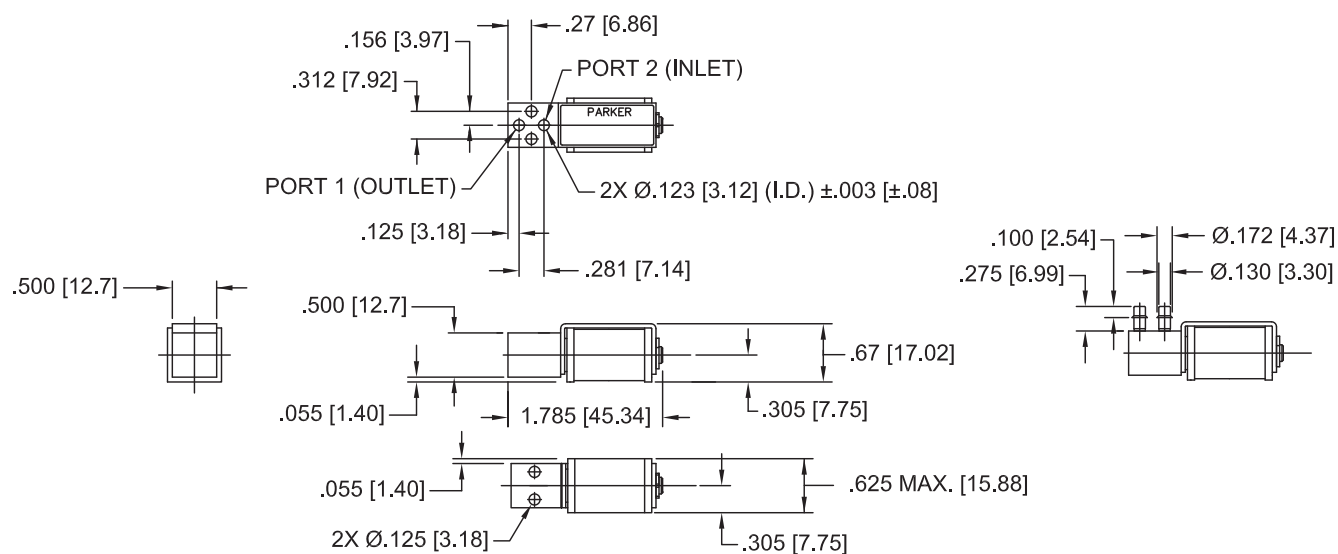
18" Wire Lead



4 PC Pin



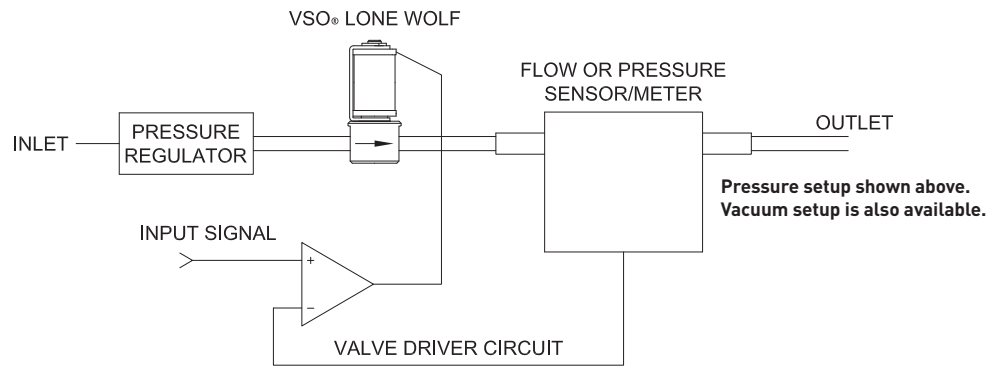
Lone Wolf Manifold Mount and Barbed Body Basic Valve Dimensions



Lone Wolf Thermally Compensated Proportional Valve

Lone Wolf Installation and Use

Typical Valve Set-up



Valve Electrical Control

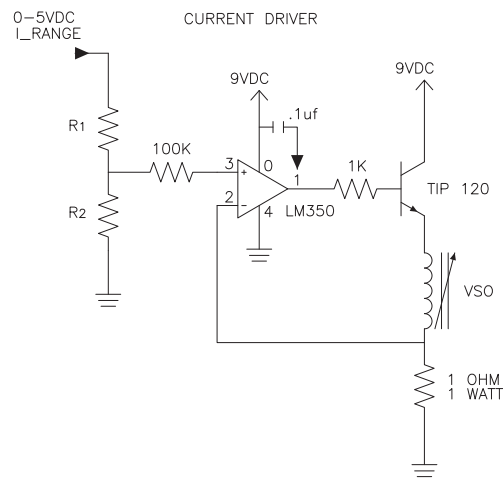
Basic Control:

The Lone Wolf valve can be controlled by either voltage or current; however, it is highly recommended that current control be employed to ensure the most repeatable valve flow performance.

PWM Control:

For PWM control, the signal applied to the valve should have a frequency between 5-12kHz. Optimum frequency will be application dependent.

Suggested Lone Wolf Current Driver Schematic



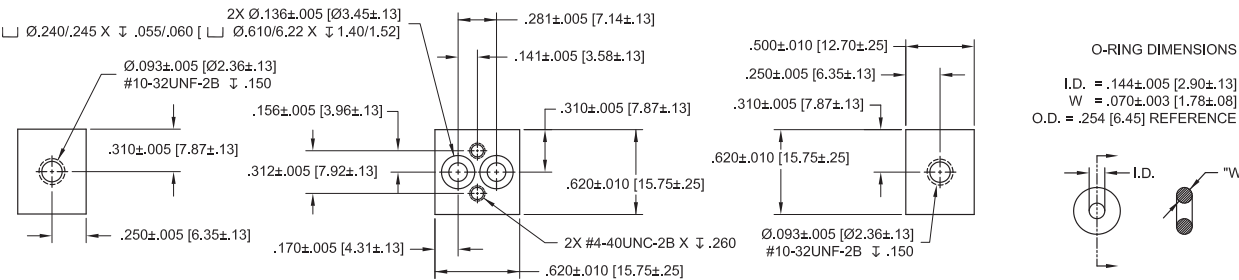
Min. Coit Voltage (VDC)	Model 1 (0.024" orifice)			Model 2 (0.030" orifice)			Model 3 (0.030" orifice)		
	I_RANGE (mA)	R1 (Ω)	R2 (Ω)	I_RANGE (mA)	R1 (Ω)	R2 (Ω)	I_RANGE (mA)	R1 (Ω)	R2 (Ω)
5.5	0 - 92	5600	95.3	0 - 177	3000	100	0 - 335	1540	100
8.0	0 - 76	9880	95.3	0 - 127	6260	101	0 - 233	3300	98.8
11.5	0 - 55	9880	47.5	0 - 105	4990	45.9	0 - 168	6260	93.1
13.5	0 - 40	9880	29.4	0 - 76	4990	28.4	0 - 138	9650	100
29.0	0 - 20	9880	6.9	0 - 40	9880	13.7	0 - 73	9650	24.3



Lone Wolf Thermally Compensated Proportional Valve

Manifold & O-Ring Dimensions & Design

Not shipped with valves.



Ordering Information

Sample Part ID	LW	1	B	V	A	F	8
Description	Series	Model Number	Body/Material	Elastomer	Coil Selection	Electrical Interface	Pneumatic Interface
		#: Max Operating Pressure/Orifice Size 1: 0-10 psi/0.024" 2: 0-20 psi/0.030" 3: 0-25 psi/0.036"	B: Brass	V: FKM	X: Max Voltage* A: 5 VDC B: 8 VDC C: 11.5 VDC D: 13.5 VDC F: 29 VDC *Max Voltage for continuous full flow, ambient temperature 55°C	F: Wire Leads, 18"-19" P: PC Board Mount, 4 PC Pins	0: Manifold Mount 1: Manifold Mount with Screens 8: 1/8" Barbs Accessories Mounting Screw, 4-40 x 5/8" 191-000115-010

In order to provide the best possible solution for your application, please provide the following requirements when contacting Applications Engineering:

- Media, Inlet & Outlet Pressures
- Minimum Required Flow Rate
- System Supply Voltage
- Media & Ambient Temperature Range.

NOTE: Please consult Parker Precision Fluidics for other considerations.

For more detailed information, visit us on the Web, or call and refer to Performance Spec. #790-002130-001 and Drawings #890-003079-001 and #890-003079-004.

For more information call +1 603 595 1500 or email ppfinfo@parker.com
Visit www.parker.com/precisionfluidics

PPF-MPV-002/US September 2011




MD PRO Miniature Proportional Valve

Non-Thermally Compensated Proportional Valve



The MD PRO is a miniature solenoid-operated valve that controls gas flow proportionally to input current. This non-thermally compensated MD PRO valve is the solution for pressure and flow control.

Features

- Provides repeatability across its operating range.
- Offers a superior combination of value and performance.
- Rated for 10 million life cycles.
- RoHS compliant. 

Typical Applications:

- O₂ Concentrators/Conservers
- Ventilators
- Anaesthesia
- Pressure & Flow Control
- Patient Monitors

Physical Properties

Valve Type:

2-Way Normally Closed

Media:

Air, argon, helium, hydrogen, methane, nitrogen, oxygen, & others

Operating Environment:

32 to 140°F (0 to 60°C)

Storage Temperature:

-40 to 158°F (-40 to 70°C)

Length:

1.785 in (45.34 mm)

Width:

0.625 in (16.51 mm)

Height:

0.67 in (17.02 mm)

Porting:

1/8" barbs; manifold mount

Weight:

2.2 oz (62.86 grams)

Internal Volume:

0.031 in³ (.508 cm³)

Filtration (Suggested and Available):

43 micron

Flow Direction:

Inlet Port Port 2
Outlet Port Port 1

Electrical

Power:

2.0 Watts maximum

Voltage:

See table 2

Electrical Termination:

18" Wire Leads 33.5 AWG,
PC Mount, Quick Disconnect Spade

Wetted Materials

Body:

360 HO₂ Brass

Stem Base:

430 FR Stainless Steel and
Brass 360 HT

All Others:

FKM; 430 FR Stainless Steel;
300 Series Stainless Steel

Performance Characteristics

Leak Rate:

The leakage shall not exceed the following values:

Internal 0.2 SCCM of air with a differential pressure of 1 psid, 25 psid and 150 psid

External 0.016 SCCM of air at 150 psi

Pressure:

0 to 50 psi (3.45 bar)

0 to 75 psi (5.17 bar)

0 to 100 psi (6.89 bar)

See Table 1

Vacuum:

0-27 in Hg (0-686 mm Hg)

Orifice Sizes:

0.040 in (1.016 mm)

0.050 in (1.270 mm)

0.065 in (1.651 mm)

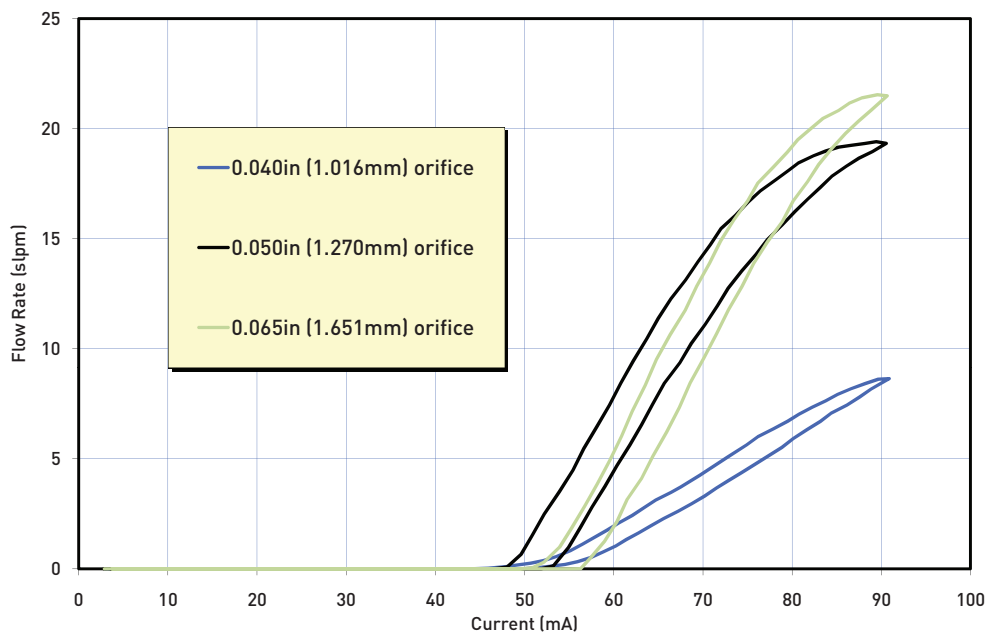
Hysteresis:

7% of full scale current (Typical)

15% of full scale current (Max)

MD PRO Non-Thermally Compensated Proportional Valve

Typical Air Flow with 20 VDC Coil @ 25psid (1.7 bar)



MD PRO Pressure vs Flow Curves Model 4-6

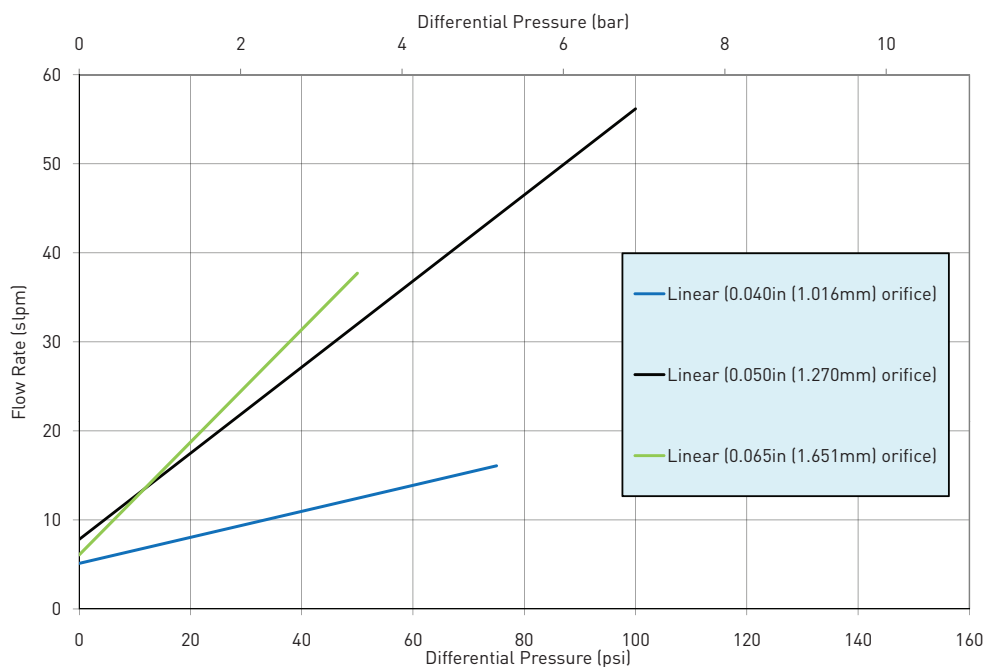


Table 1: Pressure Capabilities

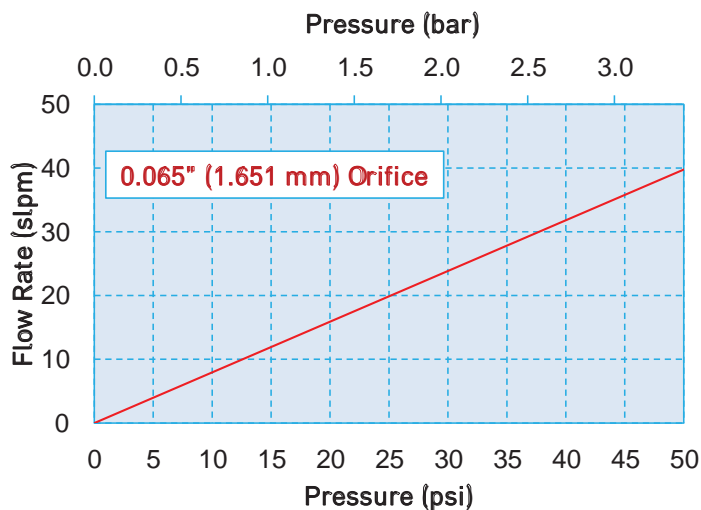
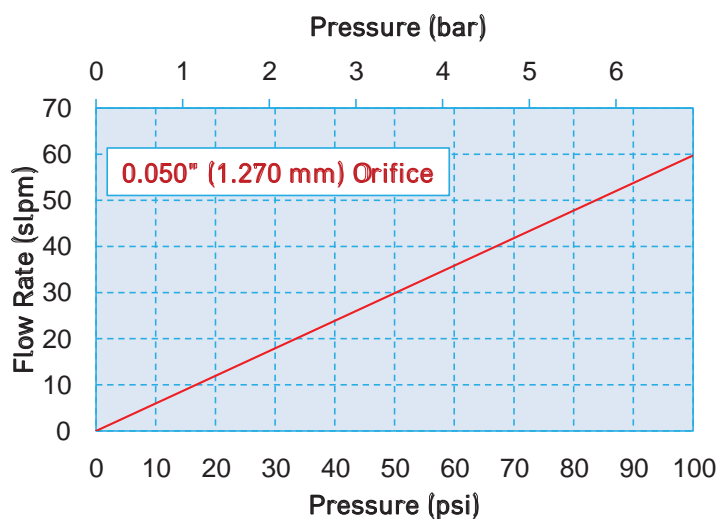
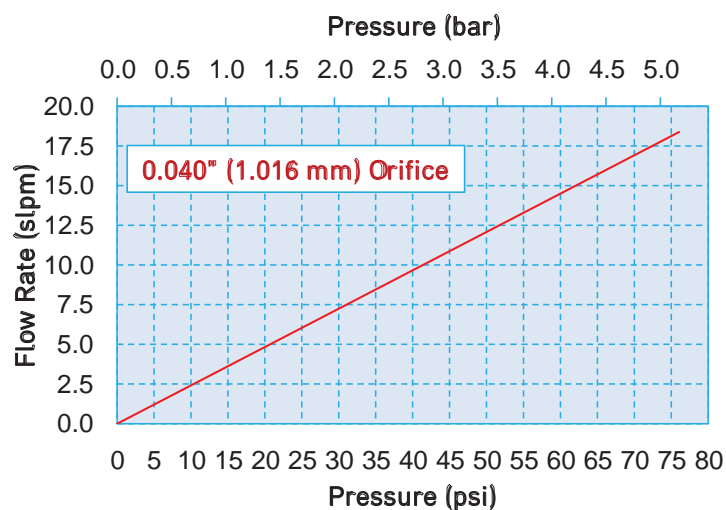
Orifice Diameter	Maximum Operating Inlet Pressure	Maximum Operating Pressure Differential
0.040in (1.016mm)	150 psig (10.34 bar)	75 psid (5.17 bar)
0.050in (1.270mm)	150 psig (10.34 bar)	100 psid (6.89 bar)
0.065in (1.651mm)	150 psig (10.34 bar)	50 psid (3.45 bar)

Table 2: Electrical Requirements

Minimum Available Voltage (VDC)	Nominal Coil Resistance @ 20°C (Ohms)	Input Current for Full Flow (mA)
5.5	11	304
8.0	23	212
11.5	47	152
13.5	68	125
20.0	136	91
29.0	274	66

MD PRO Non-Thermally Compensated Proportional Valve

MD PRO Sizing Charts



MD PRO Non-Thermally Compensated Proportional Valve

Pneumatic Interface

**MD PRO
Manifold Mount**



**MD PRO
Barbed**



Electrical Interface

18" Wire Lead



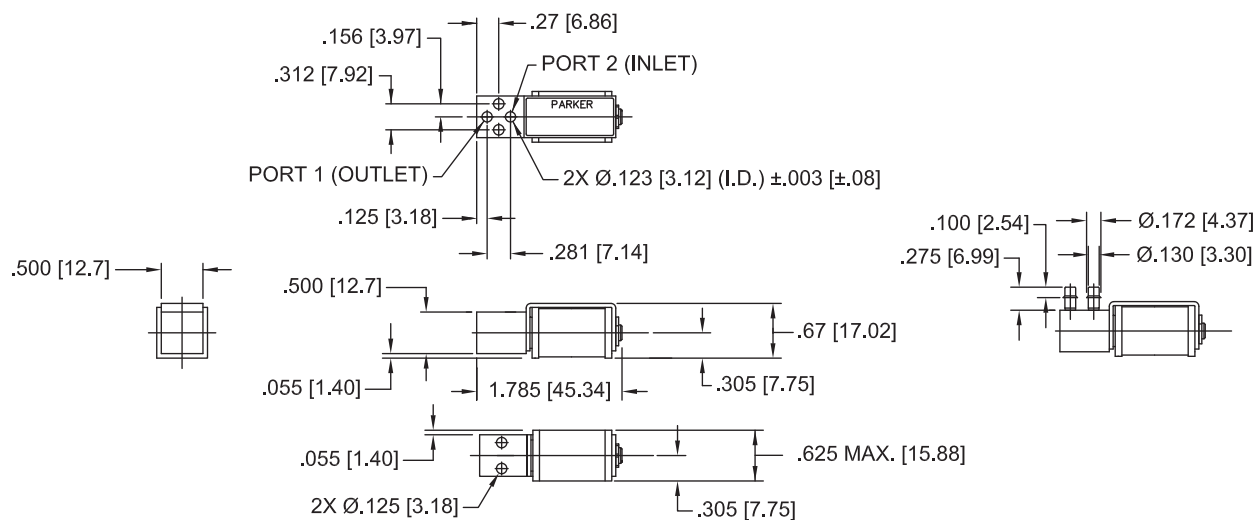
4 PC Pin



Quick Connect Spade



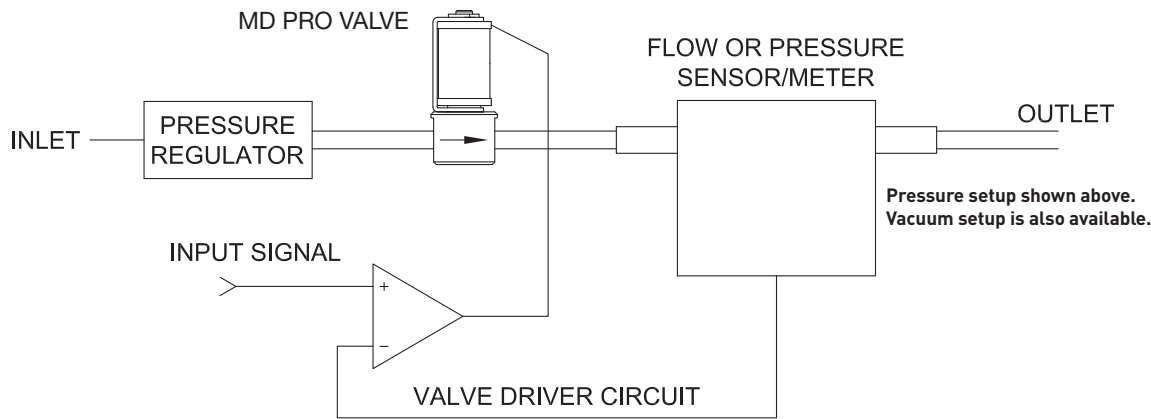
MD PRO Manifold Mount and Barbed Body Basic Valve Dimensions



MD PRO Non-Thermally Compensated Proportional Valve

MD PRO Installation and Use

Typical Valve Set-up



Valve Electrical Control

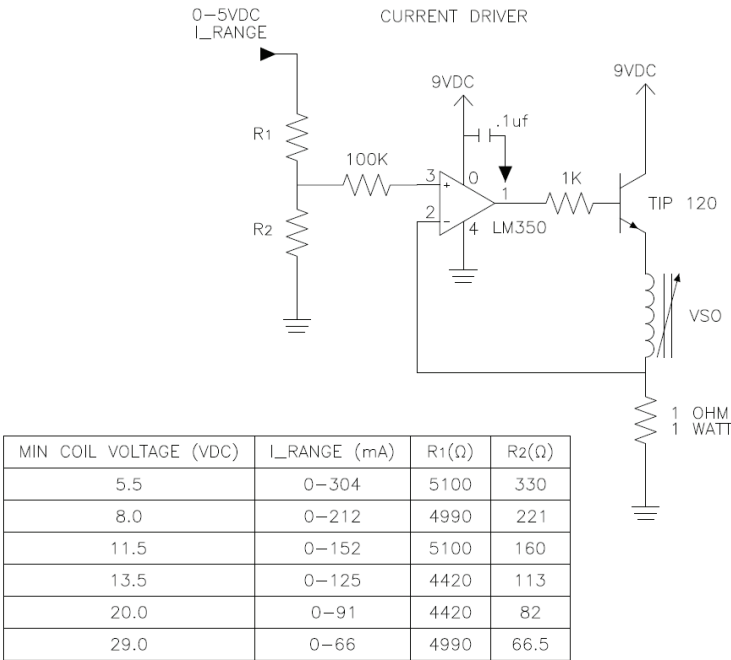
Basic Control:

The MD PRO valve can be controlled by either voltage or current; however, it is highly recommended that current control be employed to ensure the most repeatable valve flow performance.

PWM Control:

For PWM control, the signal applied to the valve should have a frequency between 5-12kHz. Optimum frequency will be application dependent.


Suggested MD PRO Current Driver Schematic




Not shipped with valves.



Sample Part ID	MDPRO	4	V	A	F	8	S
Description	Standard	Model Number	Elastomer/Body	Coil Selection*	Electrical Interface	Pneumatic Interface	Cleaning
Options		#: Max. Operating Pressure/Orifice Size 4: 75 psid/0.040" 5: 100 psid/0.050" 6: 50 psid/0.065" * Max Operating Pressure/Orifice Size	V: FKM/Brass	X: Max Voltage* A: 5.5 VDC/11 Ohms/0.304 amsp B: 8 VDC/23 Ohms/0.212 amps C: 11.5 VDC/47 Ohms/0.152 amps D: 13.5 VDC/68 Ohms/0.125 amps E: 20 VDC/136 Ohms/0.091 amps F: 29 VDC/274 Ohms/0.066 amps * Max Voltage for continuous full flow, ambient temperature 55°C	F: Wire Leads, 18" P: PC Board Mount 4 PC Pins Q: Quick Connect Spade	1: Manifold Mount with Screen* 8: 1/8" Barbs * 40 Micron Screen (Port 3)	S: Standard Cleaning O: Oxygen Service
							Accessories Manifold Mount O-Rings: 190-007024-002 (FKM) Recommended Mounting Hardware: Mounting Screw, 4-40 x 5/8 191-000115-010 Set Torque: 5.0 in-lb. (6.8 N-m) Recommended Tubing Internal Diameter: 0.125 in (3.0 mm)



ORDER
ONLINE



- Media, Inlet & Outlet Pressures
- Minimum Required Flow Rate
- System Supply Voltage
- Media & Ambient Temperature Range.

NOTE: Please consult Parker Precision Fluidics for other considerations.
For more detailed information, visit us on the Web, or call and refer to
Performance Spec. #790-002206-001 and Drawings #890-003022-001
and #890-003022-003.

For more information call +1 603 595 1500 or email ppinfo@parker.com
Visit www.parker.com/precisionfluidics

PPF-MPV-002/US September 2011



PACE Hf


Miniature Ultra High Flow, Low Power Proportional Valve

Maximum Flow Proportional Valve



The PACE Hf is a high flow proportional valve utilizing a Parker Advanced Technology actuator to deliver precise control, elevated flow, and minimal power consumption in a small package. The PACE Hf is the ideal solution for applications sensitive to repeatability, hysteresis, and response time, delivering 180 slpm of air at 30 psi while consuming less than 1 watt of power.

Features

- Wide controllable range and tight control under varying inlet pressures.
- High inlet pressure capable (100 psi).
- Inlet and outlet pressure balanced make it ideal for pressure control
- Low power consumption, low heat generation.
- Proven performance tested to 100 million cycles.
- Small size and light weight, highest flow capacity in class.
- RoHS compliant. 

Typical Applications:

- Acute & Sub-Acute Ventilators
- Portable Ventilators
- Anaesthesia
- Pressure & Flow Control
- Mass Flow Controllers

Performance Data

Physical Properties

Valve Type:
2-Way Normally Closed
Media:
Air, oxygen, hydrogen, heliox, carbon dioxide, argon, nitrogen & others
Operating Environment:
32 to 131°F (0 to 55°C)
Storage Temperature:
-40 to 158°F (-40 to 70°C)
Length:
1.35 in (58 mm)
Width:
1.0 in (25 mm)
Height:
2.29 in (35 mm)
Porting:
Manifold Mount; 1/8 NPT Optional Manifold
Weight:
0.104 lbs (47 grams)
Filtration:
40 Micron (Customer Supplied)
Oxygen Service Clean:
Standard

Electrical

Power Steady State:
Rapid Response - 0.45 Watts
Digital Compensation - 0.6 Watts
Power:
Steady state 0.6 Watts (MAX)
Cycling 15Hz 1.2 Watts
Supply Voltage:
12 VDC (-5% + 10%)
Control Voltage:
0 to 10 VDC

Wetted Materials

Body:
C36000 Brass
All Others:
FKM; 17-4 PH Stainless Steel

Two Versions Available

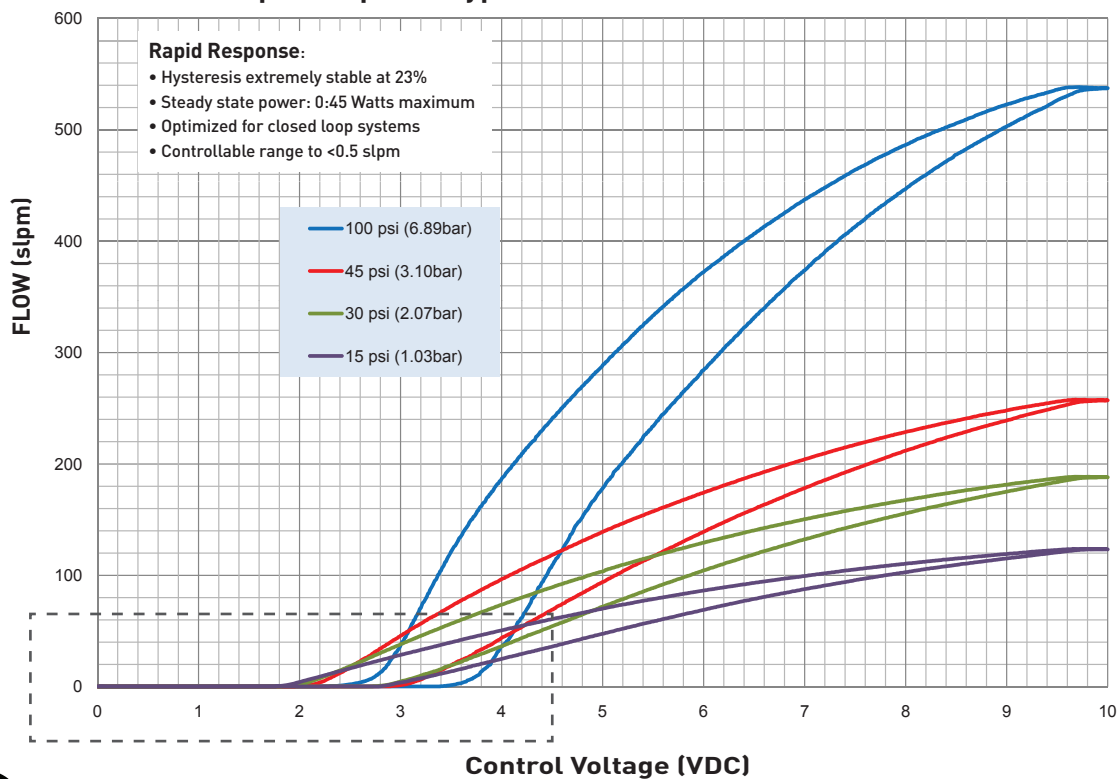
Rapid Response:
Ideal for applications requiring rapid response and repeatable hysteresis (23% typical) in closed loop applications.
Digital Compensation:
Ideal for applications requiring tightly controlled hysteresis (3% typical), or use in open loop applications.

Performance Characteristics

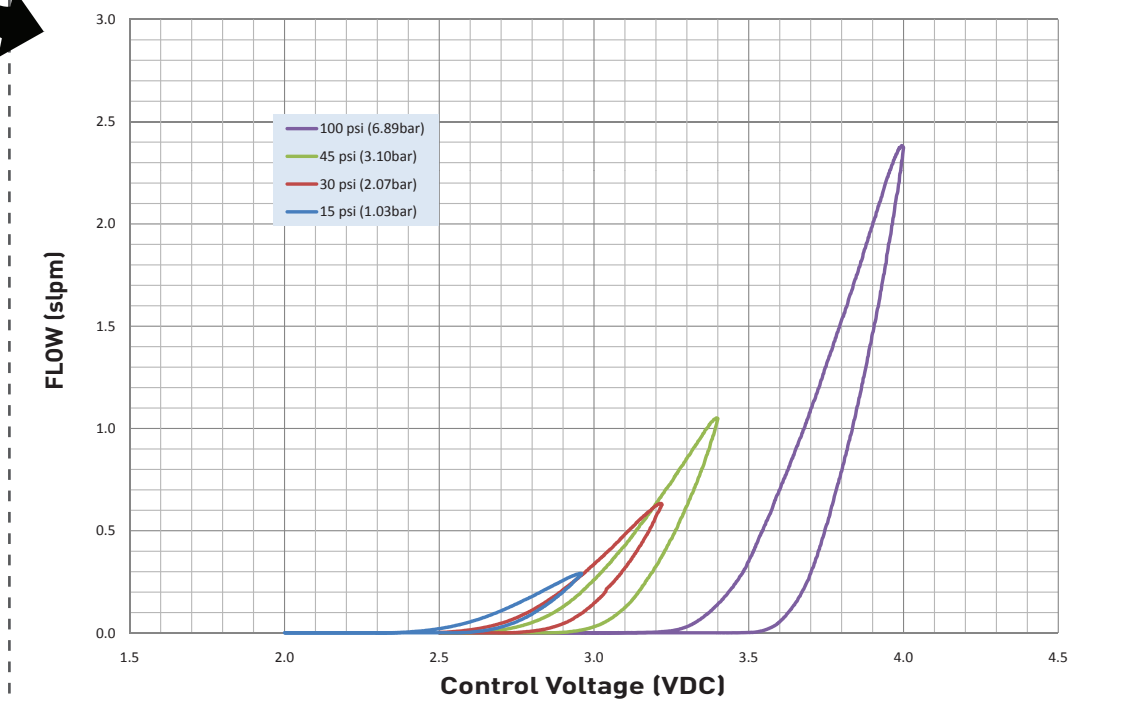
Internal Leak Rate:
< 5.0 sccm of air @ 100 psig (6.89 bar)
External Leak Rate:
< 1 sccm of air @ 100 psig (6.89 bar)
Pressure:
Operating -10 to 100 psig (6.89 bar)
Proof 150 psig (10.34 bar)
Orifice Size:
0.128" effective (3.35 mm)
Hysteresis:
Rapid Response - 23%
Digital Compensation - 3%
Response Time:
Rapid Response - 5 msec typical
Digital Compensation - 10 msec typical

PACE Hf Miniature Ultra High Flow, Low Power Proportional Valve

Rapid Response Typical Flow Curves (Tested w/air 20°C)

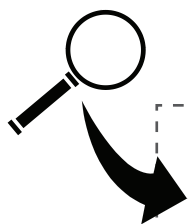
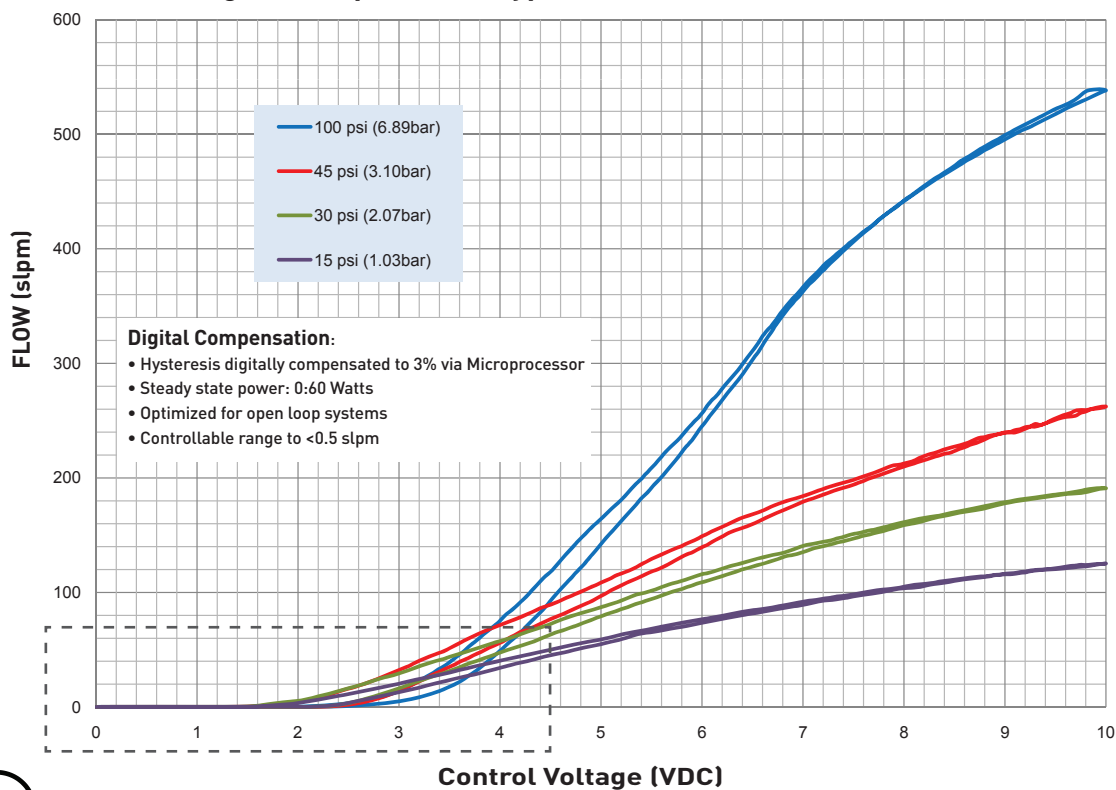


Rapid Response Typical Low Flow Curves (Tested w/air 20°C)

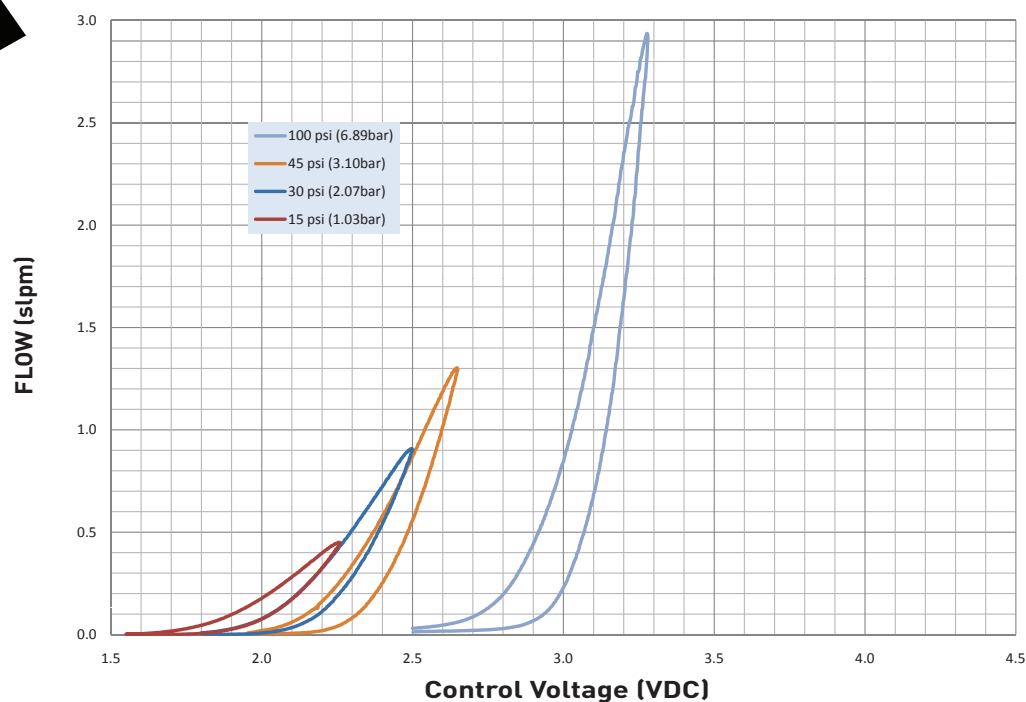


PACE Hf Miniature Ultra High Flow, Low Power Proportional Valve

Digital Compensation Typical Flow Curves (Tested w/air 20°C)

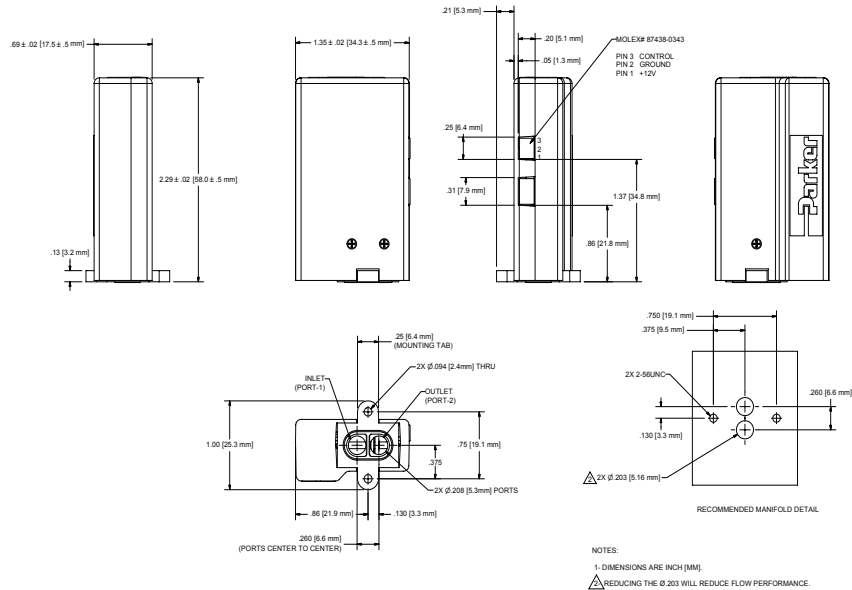


Digital Compensation Typical Low Flow Curves (Tested w/air 20°C)

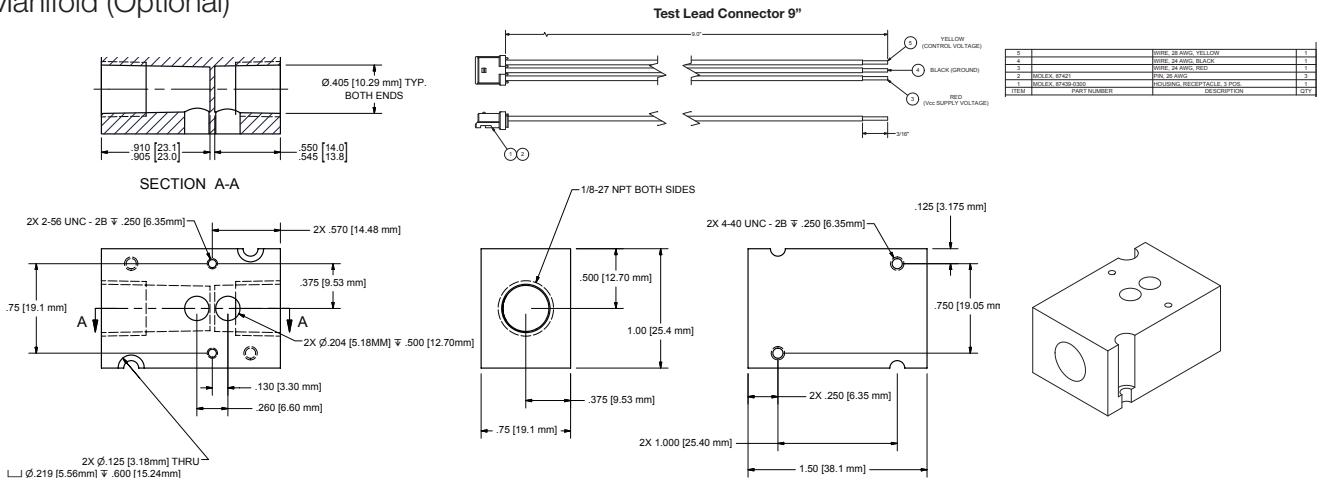


PACE Hf Miniature Ultra High Flow, Low Power Proportional Valve

Dimensions Manifold Mount



Manifold (Optional)



Ordering Information

Sample Part ID	941	1	1	1	2	1	1	001
Description	Series	Elastomer	Pneumatic Interface	Body	Control Method	Compensation	Calibration	
	1. FKM		1: Manifold Mount	1: Brass	2: 0 to 10 VDC	1: Rapid Response 2: Digital Compensation	1: 175 slpm @ 30 psi	
Options								Accessories
								Mounting Screw 191-000112-405 2-56 x 1/4 SHCS Manifold Gasket 890-001046-001 (FKM) Single Station Manifold 1/8 NPT, 890-001051-001 Test Lead Connector, 9" 590-000095-001

NOTE: Please consult Parker Precision Fluidics for other considerations. For more detailed information, visit us on the Web, or call and refer to Performance Spec. Digital Compensation #790-002309-001, Rapid Response #790-002309-002 and Drawing #890-003248-001.

For more information call +1 603 595 1500 or email ppinfo@parker.com
Visit www.parker.com/precisionfluidics

PPF-MPV-002/US September 2011



VSO® - MAX

Miniature High Flow Proportional Valve

Non-Thermally Compensated Proportional Valve




Typical Applications:

- Ventilators
- O₂ Concentrators/Conservers
- Anaesthesia Delivery & Monitors
- Pressure & Flow Control
- Mass Flow Control

The VSO®- MAX is a high flow proportional valve that provides maximum flow capabilities to 240 slpm while consuming less than two watts of power. By offering 18% more flow and using 25% less power than the nearest competitive valve on the market, VSO®- MAX becomes the ideal solution for applications requiring low hysteresis and fast response, such as ventilators with fresh breathing circuit gas delivery, as well as other medical, analytical, and pathogen detection devices. This valve can be used with inlet pressures of up to 60 psig (4 bar) and features three standard control voltage ranges, including 5, 12, and 24 VDC.

Features

- Capable of 240 slpm flow and pressures up to 60 psig (4 bar).
- Face seal manifold mount; manifold available with 1/8 NPT ports.
- Proven performance to minimum 25 million life cycles.
- Light weight (70 grams).
- Low power solution.
- RoHS compliant. 

Performance Data

Physical Properties

Valve Type:
2-Way Normally Closed
Media:
Air, argon, helium, hydrogen, methane, nitrogen, oxygen, & others
Operating Environment:
41 to 131°F (5 to 55°C)
Storage Temperature:
-40 to 158°F (-40 to 70°C)
Length:
2.02 in (51.3 mm)
Width:
0.625 in (16.51 mm)
Height:
0.68 in (17.01 mm)
Porting:
Manifold mount
Weight:
0.153 lbs. (70 gm)

Physical Properties

Filtration:
40 Micron (Customer Supplied)
Flow Direction:
Inlet Port Port 1
Outlet Port Port 2

Electrical

Power:
2.0 Watts maximum @ 20°C
Voltage:
See Table 2
Electrical Termination:
18 in Wire Leads

Wetted Materials

Body:
360 HO ₂ Brass
Stem Base:
430 FR Stainless Steel and Brass
360 HT
All Others:
FKM; 430 FR Stainless Steel; 300 Series Stainless Steel

Performance Characteristics

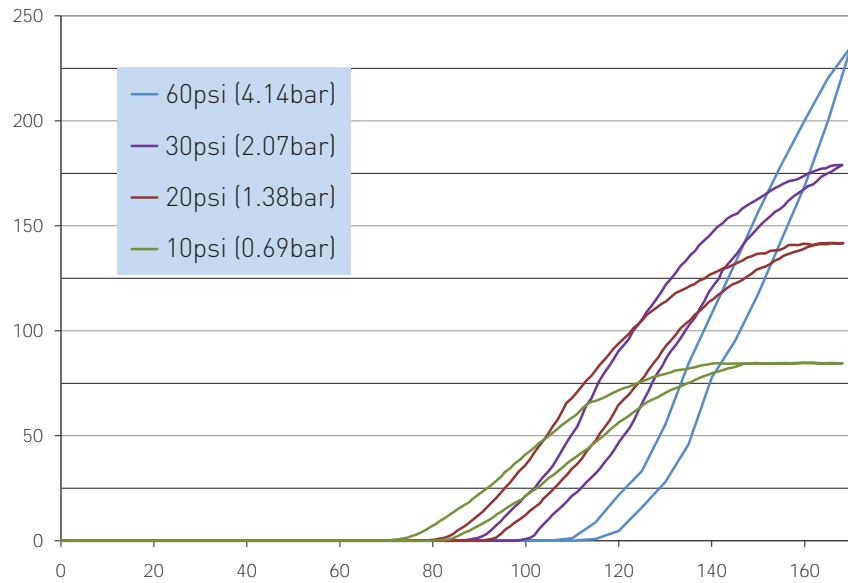
Leak Rate:
The leakage shall not exceed the following values:
Internal 5.0 SCCM of air with a differential pressure of 60 psi (4 bar)
External 0.5 SCCM of air at 60 psi (4 bar)
Pressure:
Operating 5 - 60 psig (4.14 bar)
Proof 160 psig (11 bar)
See Table 1
Orifice Sizes:
0.116" effective (2.946 mm)
Hysteresis:
7% of full scale current (Typical)
15% of full scale current (Max)

VSO is a registered trademark of Parker Hannifin Corporation.



VSO®- MAX Non-Thermally Compensated Proportional Valve

Typical Air Flow with 12VDC 68 Ohm coil (Tested w/air 20°C)



VSO®- MAX Pressure vs Flow

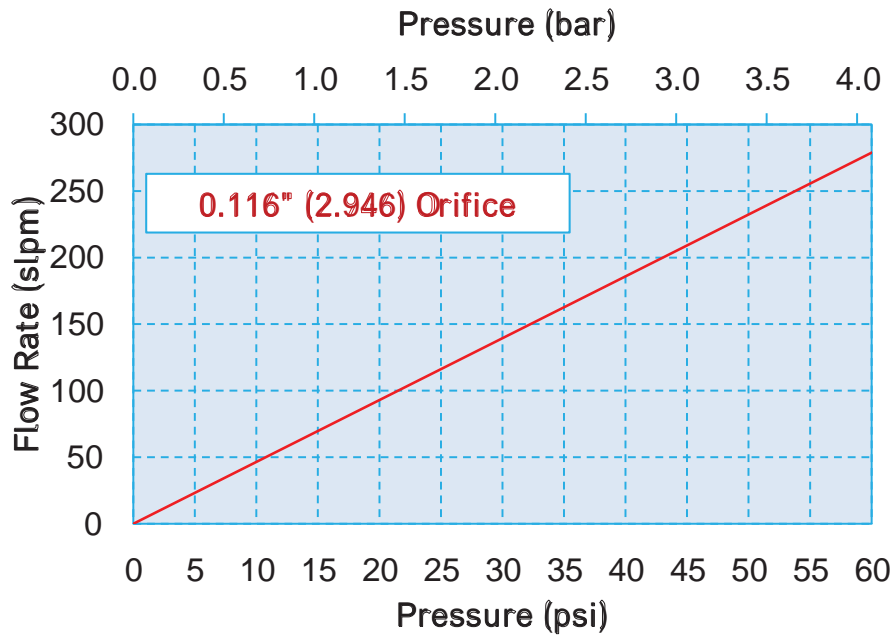


Table 1: Pressure and Flow Capabilities

Orifice Diameter	Maximum Operating Inlet Pressure	Maximum Operating Pressure Differential
0.116in (2.95mm)	60 psig (4.14 bar)	60 psid (4.14 bar)

Table 2: Electrical Requirements

Minimum Available Voltage (VDC)	Nominal Coil Resistance @ 20°C (Ohms)	Input Current for Full Flow (mA)
5	11.9	423
12	68.4	170
24	273.6	85

VSO®- MAX Non-Thermally Compensated Proportional Valve

Pneumatic Interface

VSO®- MAX Manifold Mount

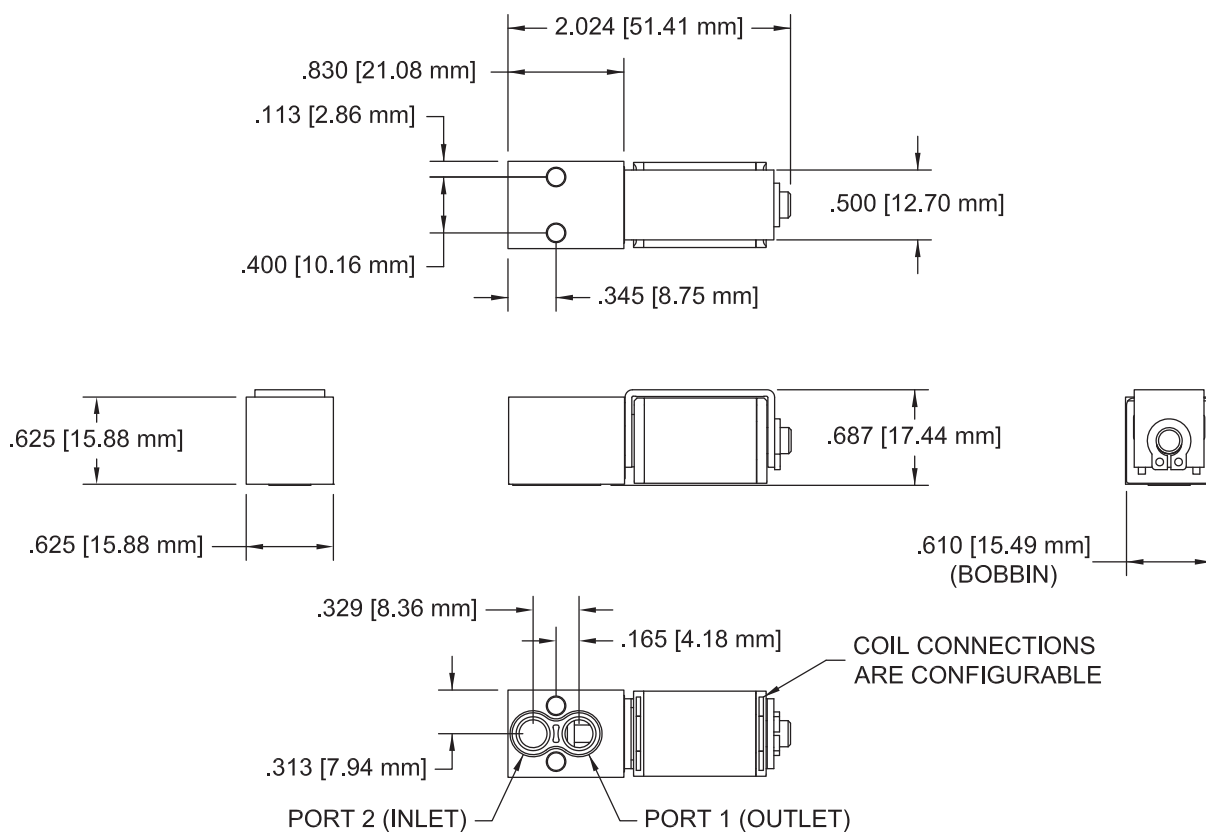


Electrical Interface

18" Wire Lead



VSO® - MAX Manifold Body Basic Valve Dimensions



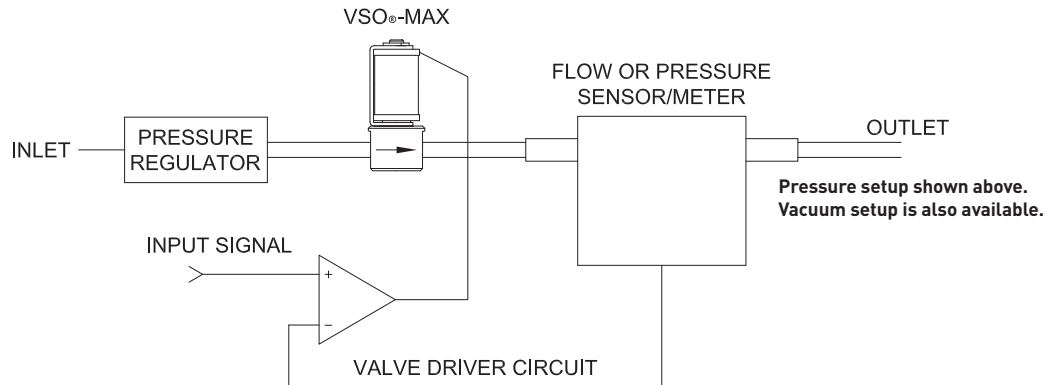
NOTES:

- 1- ALL DIMENSIONS ARE REFERENCE.
- 2- DIMENSIONS ARE INCH[MM].

VSO®- MAX Non-Thermally Compensated Proportional Valve

VSO® - MAX Installation and Use

Typical Valve Set-up



Valve Electrical Control

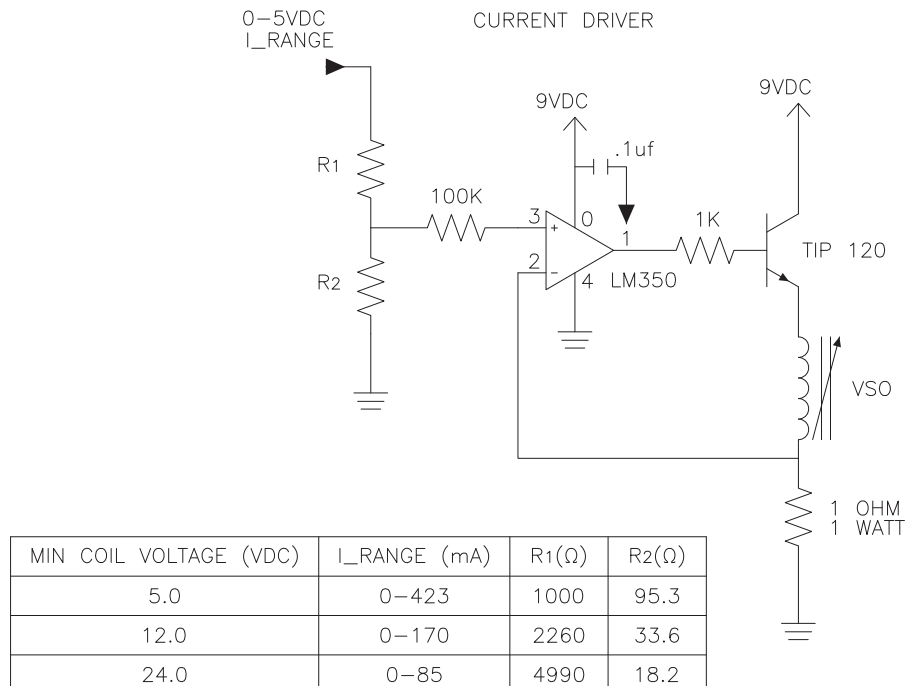
Basic Control:

The VSO® - MAX valve can be controlled by either voltage or current; however, it is highly recommended that current control be employed to ensure the most repeatable valve flow performance.

PWM Control:

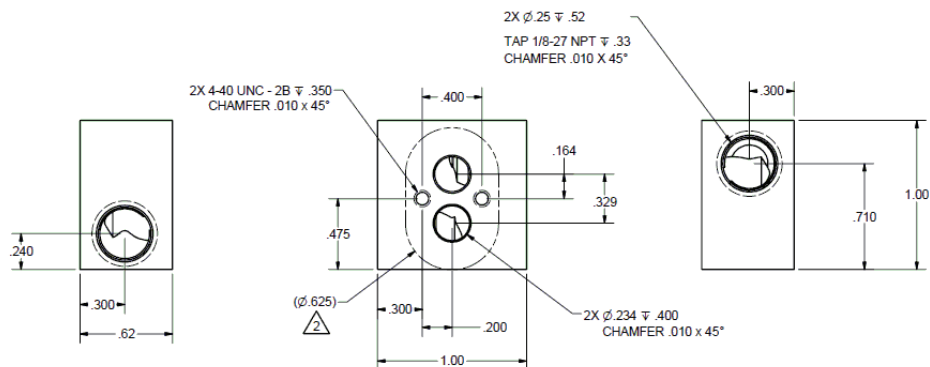
For PWM control, the signal applied to the valve should have a frequency between 5-12kHz. Optimum frequency will be application dependent.

Suggested VSO®- MAX Current Driver Schematic



VSO®- MAX Non-Thermally Compensated Proportional Valve

Manifold Dimensions & Design



Ordering Information

Sample Part ID	921	1	1	1	05	1	000	
Description	Series	Elastomer	Pneumatic Interface	Body	Voltage	Electrical Interface		Accessories
Options		1. FKM	1: Manifold Mount	1: Brass	05: 5 VDC 12: 12 VDC 24: 24 VDC	1: Wire Leads, 18"		Mounting Screw SHCS, 4-40 X 7/8, SS 191-000214-002 Spare Manifold Gasket, Body, VSO MAX 190-007057-001 (FKM) Single Station Manifold 1/8 NPT 890-009034-001

In order to provide the best possible solution for your application, please provide the following requirements when contacting Applications Engineering:

- Media, Inlet & Outlet Pressures
- Minimum Required Flow Rate
- System Supply Voltage
- Media & Ambient Temperature Range.

NOTE: Please consult Parker Precision Fluidics for other considerations.
For more detailed information, visit us on the Web, or call and refer to
Performance Spec. #790-002288-001 and Drawing #890-003230-001.

For more information call +1 603 595 1500 or email ppfinfo@parker.com
Visit www.parker.com/precisionfluidics

PPF-MPV-002/US September 2011



NOTES


HF PRO High Flow Proportional Valve

Non-Thermally Compensated Proportional Valve



The HF PRO controls the flow of gas proportionally to input current. The valve may be driven with DC current or Pulse Width Modulation. HF PRO achieves optimal system performance when it uses closed loop feedback.

Features

- Capable of 60 lpm flow and pressures up to 50 psig.
- Face seal manifold mount or 5mm barbed body options.
- Proven performance to minimum 35 million life cycles.
- Non-thermally compensated proportional valve.
- RoHS compliant. 

Typical Applications:

- Ventilators
- O₂ Concentrators/Conservers
- Anaesthesia
- Patient Monitors
- Pressure & Flow Control

Performance Data

Physical Properties

Valve Type:

2-Way Normally Closed

Media:

Air, argon, helium, hydrogen, methane, nitrogen, oxygen, & others

Operating Environment:

32 to 131°F (0 to 55°C)

Storage Temperature:

-40 to 158°F (-40 to 70°C)

Length:

1.785 in (45.34 mm)

Width:

0.625 in (16.51 mm)

Height:

0.67 in (17.02 mm)

Porting:

1/8" Barbs, Manifold Mount

Weight:

2.2 oz (62.86 grams)

Physical Properties

Internal Volume:

0.031 in³ (0.508 cm³)

Filtration:

43 micron

Flow Direction:

Inlet Port Port 2

Outlet Port Port 1

Oxygen and Analytically Clean:

Standard

Electrical

Power:

3.0 Watts maximum

Voltage:

See Table 2

Electrical Termination:

18 in Wire Leads

Wetted Materials

Body: 360 HO2 Brass

Stem Base:

430 FR Stainless Steel and
Brass 360 HT

All Others:

FKM; 430 FR Stainless Steel;
300 Series Stainless Steel

Performance Characteristics

Leak Rate:

The leakage shall not exceed the following values:

Internal 0.5 SCCM of N₂
External 0.016 SCCM of N₂

Pressure:

0 to 50 psi (3.45 bar)

See Table 1

Vacuum:

0-27 in Hg (0-686 mm Hg)

Orifice Size:

0.070" (1.8 mm)

Hysteresis:

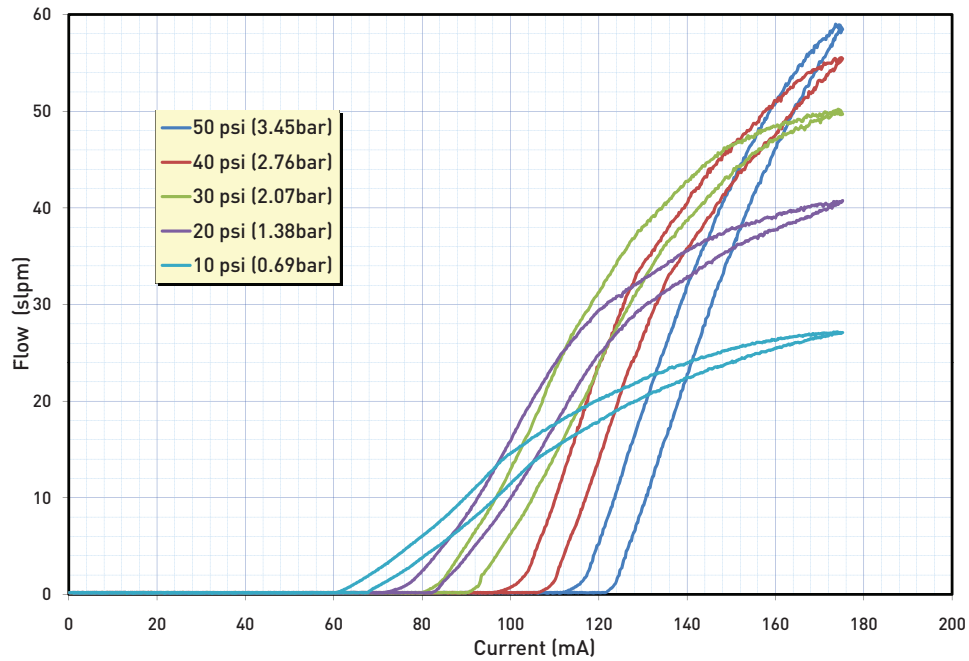
7% of full scale current (Typical)
15% of full scale current (Max)

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HF PRO Non-Thermally Compensated Proportional Valve

Typical Air Flow with 20 VDC Coil



HF PRO Pressure vs Flow Curve

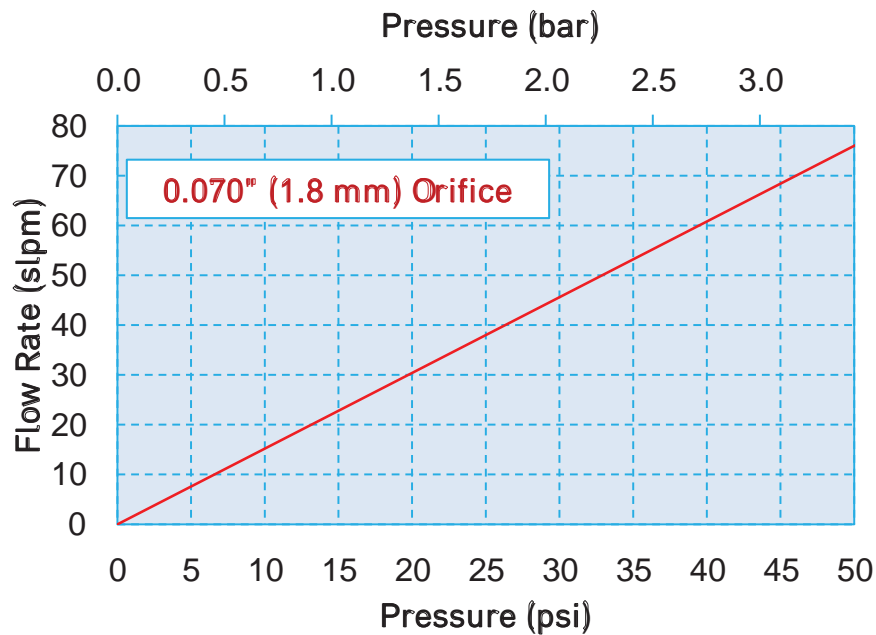


Table 1: Pressure and Flow Capabilities

Orifice Diameter	Maximum Operating Inlet Pressure	Maximum Operating Pressure Differential
0.070in (1.8 mm)	150 psig (10.34 bar)	50 psid (3.45 bar)

Table 2: Electrical Requirements

Minimum Available Voltage (VDC)	Nominal Coil Resistance @ 20°C (Ohms)	Input Current for Full Flow (mA)
5	11.9	435
12	68	175
24	274	87

HF PRO Non-Thermally Compensated Proportional Valve

Pneumatic Interface

**HF PRO
Manifold Mount**



**HF PRO
Barbed**

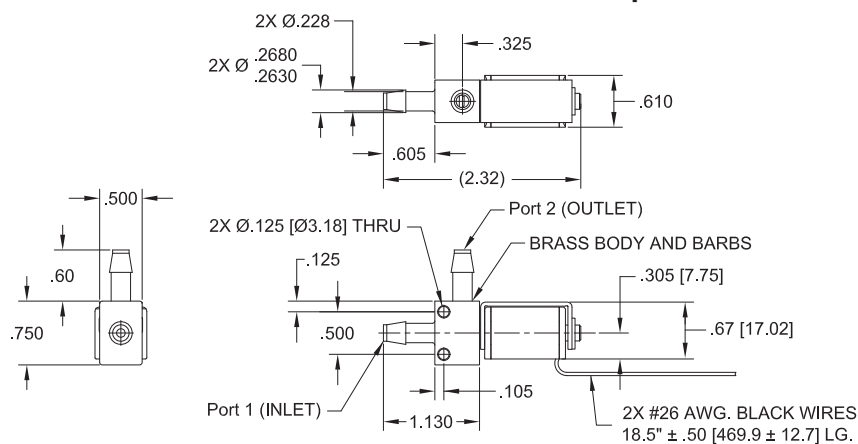


Electrical Interface

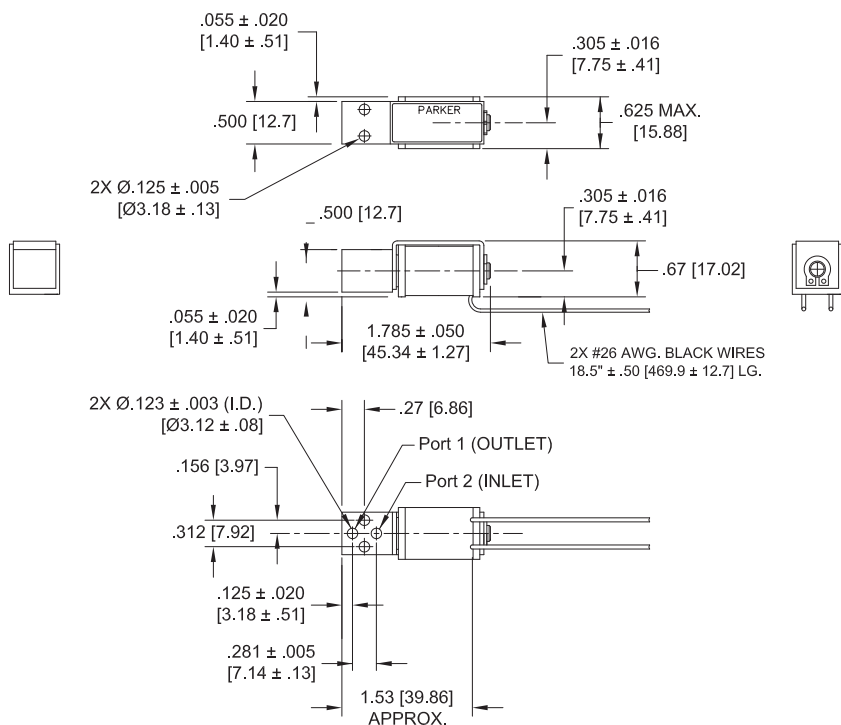
HF PRO 18" Wire Lead



HF PRO Manifold Mount Option



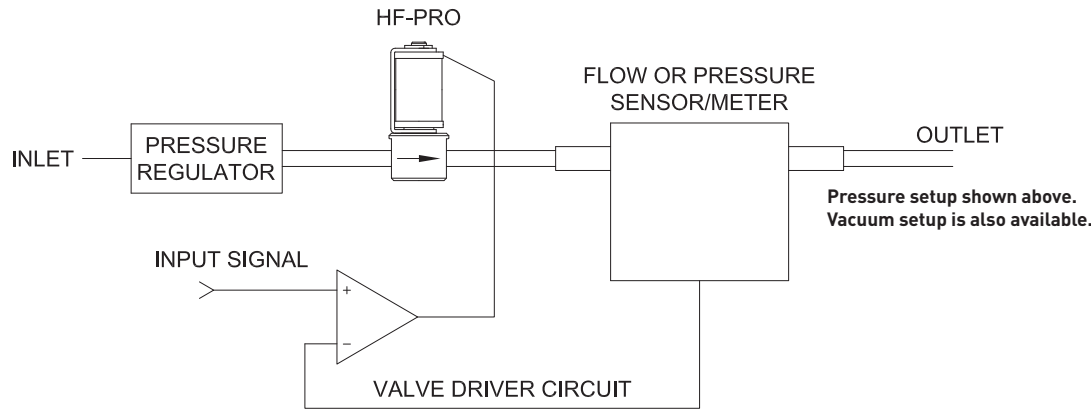
HF PRO Barbed Mount Option



HF PRO Non-Thermally Compensated Proportional Valve

HF PRO Installation and Use

Typical Valve Set-up



Valve Electrical Control

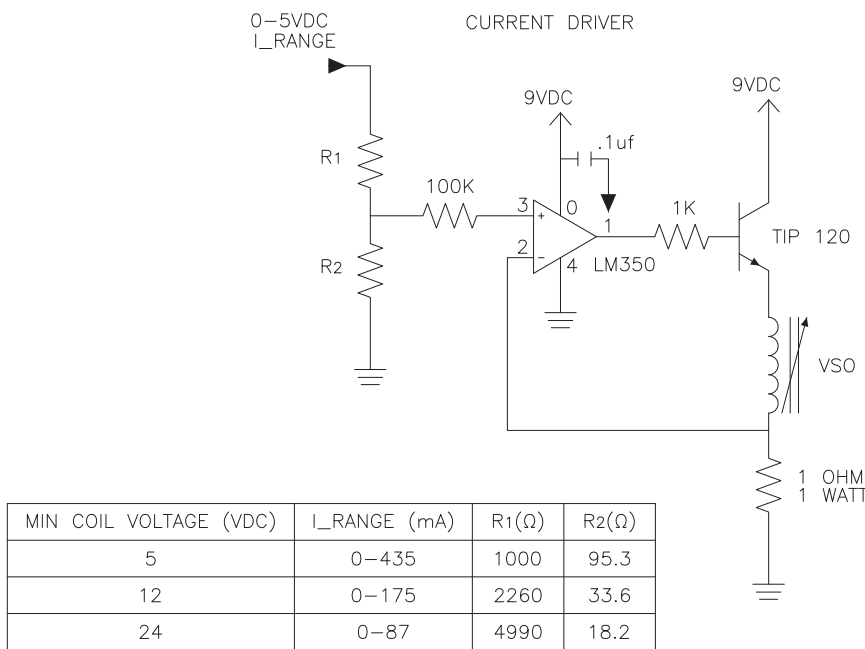
Basic Control:

The HF PRO valve can be controlled by either voltage or current; however, it is highly recommended that current control be employed to ensure the most repeatable valve flow performance.

PWM Control:

For PWM control, the signal applied to the valve should have a frequency between 5-12kHz. Optimum frequency will be application dependent.

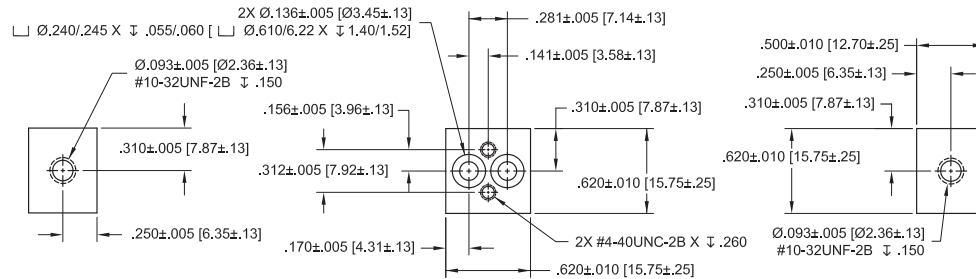
Suggested HF PRO Current Driver Schematic



HF PRO Non-Thermally Compensated Proportional Valve

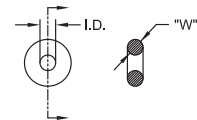
Manifold & O-Ring Dimensions & Design

Not shipped with valves.



O-RING DIMENSIONS

I.D. = .144±.005 [2.90±.13]
W = .070±.003 [1.78±.08]
O.D. = .254 [6.45] REFERENCE



Ordering Information

Sample Part ID	HFPRO	7	V	A	F	8	O
Description	Series	Model Number	Elastomer/Body	Coil Selection	Electrical Interface	Pneumatic Interface	Cleaning
Options		#: Max. Operating Pressure/Orifice Size 7: 50 psid/0.070"	V: FKM/Brass	X: Max Voltage* A: 5 VDC D: 12 VDC F: 24 VDC * Max Voltage for continuous full flow, ambient temperature 55°C	F: Wire Leads, 18"	1: Manifold Mount 8: Barbed Body	0: Oxygen Service
							Accessories
							Manifold Mount O-Rings: 190-007024-002 (FKM) Recommended Mounting Hardware: Mounting Screw, 4-40 x 5/8" 191-000115-010 Set Torque: 5.0 in-lb. (6.8 N-m) Recommended Tubing Internal Diameter: 0.125 in (3.0 mm)



In order to provide the best possible solution for your application, please provide the following requirements when contacting Applications Engineering:

- Media, Inlet & Outlet Pressures
- Minimum Required Flow Rate
- System Supply Voltage
- Media & Ambient Temperature Range.

NOTE: Please consult Parker Precision Fluidics for other considerations.

For more detailed information, visit us on the Web, or call and refer to Performance Spec. #790-002243-001 and HF PRO Barbed Drawing #890-003192-001 and HF PRO Manifold Mount Drawing #890-003191-001.

For more information call +1 603 595 1500 or email ppinfo@parker.com
Visit www.parker.com/precisionfluidics

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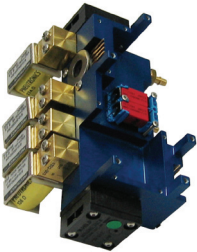
NOTES

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Value Added Application-Specific Solutions

Gassing Control System



- Mixed gassing logic design includes VSO® proportional valves, X-Valve®, pressure switch, pressure sensors, and PCB interface

Pneumatic Module



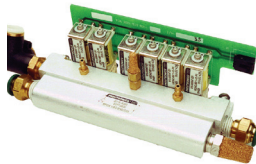
- Integrated valve manifold
- Compact design
- Single electrical connection
- Valves configured per specifications

Vacuum Gas Control Module



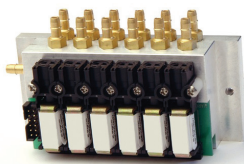
- Tested to 1×10^7 cc/sec/atm Helium
- Assembly tested on mass spectrometer

6 Position VSO® Proportional Pneumatic Manifold Assembly



- Quick connect fittings
- Circuit board with mass electrical termination

Magnum Manifold Assembly



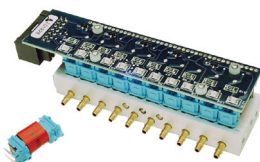
- Integrated circuit board with single connection
- Compact design
- Easily adaptable
- 2 way and 3 way designs

8 Position SRS Model Pneumatic Manifold



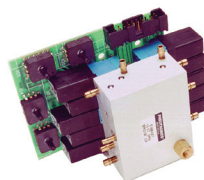
- Integrated pressure/vacuum sensors
- Mixed pneumatic logic design
- Ultem® manifold pressure/vacuum sensors

10 Position X-Valve® Pneumatic Manifold



- Mixed pneumatic logic design
- Ultra-miniature design with PCB for mass termination

10 Position SRS Model Pneumatic Manifold



- Integrated pressure/vacuum sensors
- Mixed pneumatic logic design
- Ultem® manifold pressure/vacuum sensors



WARNING

FAILURE OR IMPROPER SELECTION OR IMPROPER USE OF THE PRODUCTS AND/OR SYSTEMS DESCRIBED HEREIN OR RELATED ITEMS CAN CAUSE DEATH, PERSONAL INJURY, AND PROPERTY DAMAGE.

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