

VSO® Low Flow

Thermally Compensated Proportional Valve




Typical Applications

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

The VSO® Low Flow valve provides enhanced flow control for applications where precise control flow control is required between 0 - 500 sccm. Like the VSO® miniature proportional valve, the VSO® Low Flow miniature proportional valve provides precise flow control of gas in proportion to input current. The valve can be controlled with either DC current or pulse width modulation along with closed loop feedback to deliver optimal system performance. Together with its ability to provide precise control over a wide range of media, the VSO® Low Flow miniature proportional valve is ideally suited for manufacturers of Gas Chromatography and Mass Spectrometry equipment.

Features

- Enables precise low flow (0 - 500 sccm) control for improved instrument accuracy
- Thermally compensated to maintain precise flow over a wide range of media
- Computer automated calibration and serialization for performance traceability
- Cleaned for Oxygen and Analytical Service use
- Proven performance tested to 10 million life cycles
- RoHS compliant 

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: | 1.79 in (45.3 mm) |
| Width: | 0.63 in (15.9 mm) |
| Height: | 0.67 in (17.0 mm) |
| Porting: | Manifold mount |
| Weight: | 2.2 oz (63 grams) |

Physical Properties

| | |
|---------------------------------------|---|
| Internal Volume: | 0.031 in ³ (0.508 cm ³) |
| Filtration: | 5 Micron (Customer Supplied) |
| 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" (45.7 cm) 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

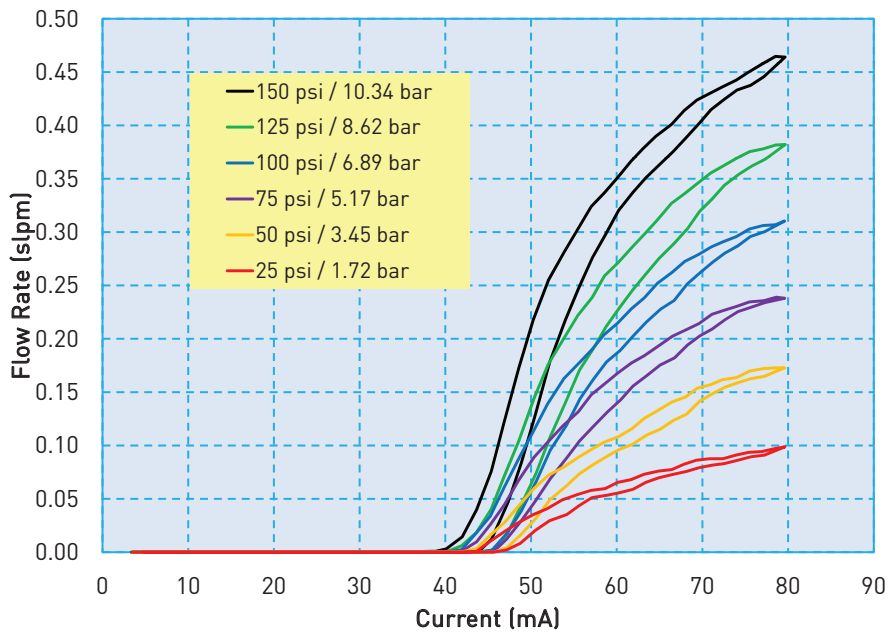
| | |
|----------------------|--|
| Leak Rate: | The leakage shall not exceed the following values: Internal 0.2 SCCM of He with a differential pressure of 1 psid, 25 psid and 150 psid External 0.016 SCCM of He at 150 psi |
| Pressure: | 0 to 150 psi (10.34 bar) See Table 1 |
| Vacuum: | 0-27 in Hg (0-686 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

Model L3 - 0.003" (0.076 mm) Orifice

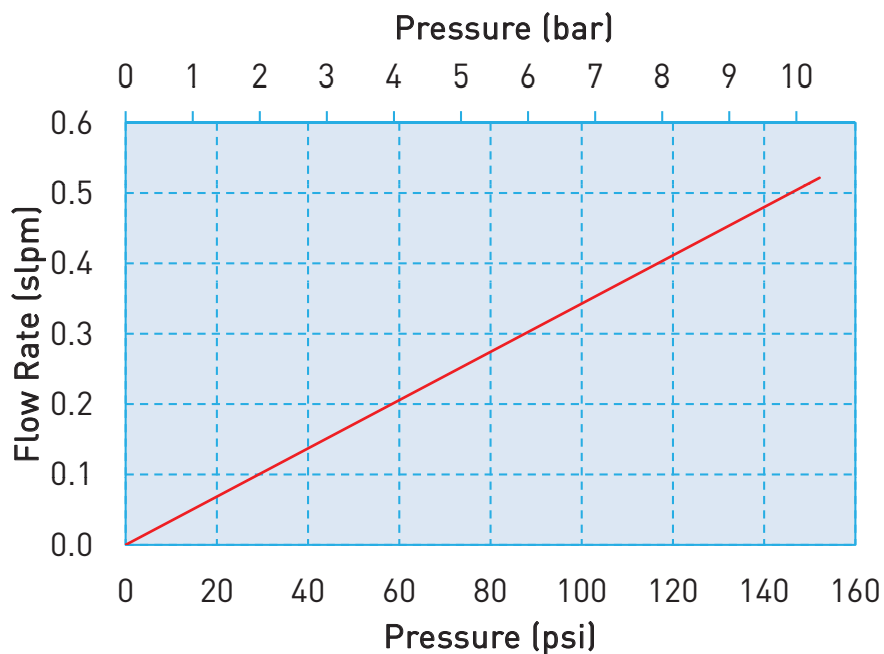


Table 1: Pressure and Flow Capabilities

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

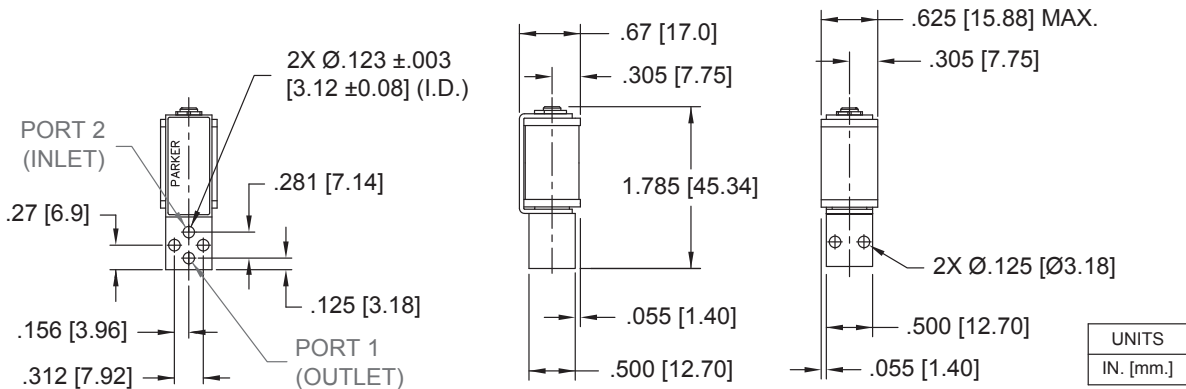
VSO® Low Flow Thermally Compensated Proportional Valve

Pneumatic Interface

VSO® Low Flow Manifold Mount



VSO® Low Flow Basic Valve Dimensions



Electrical Interface

Coil Type: 18" Wire Lead

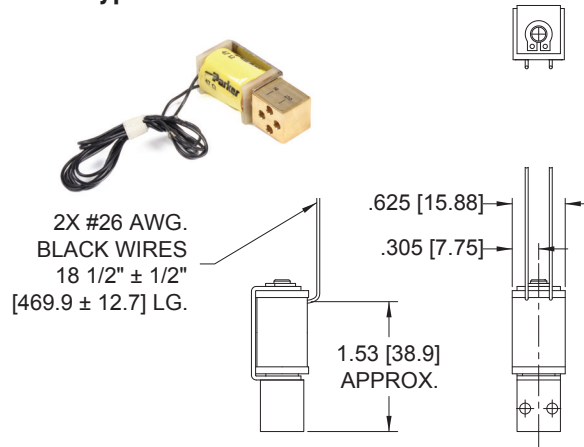


Table 2: Electrical Requirements

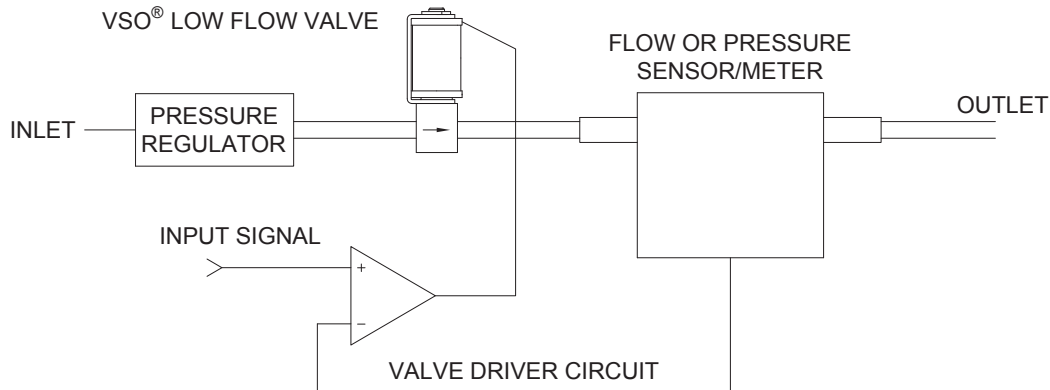
| Minimum Available Voltage (VDC) | Nominal Coil Resistance @ 20 °C (Ohms) | Input Current for Full Flow (mA) |
|---------------------------------|--|----------------------------------|
| 6.5 | 47 | 130 |
| 8.0 | 68 | 115 |
| 12 | 136 | 80 |
| 18 | 274 | 60 |
| 24.0 | 547 | 43 |



VSO® Low Flow Thermally Compensated Proportional Valve

VSO® Low Flow Installation and Use

Typical Valve Set-up



Valve Electrical Control

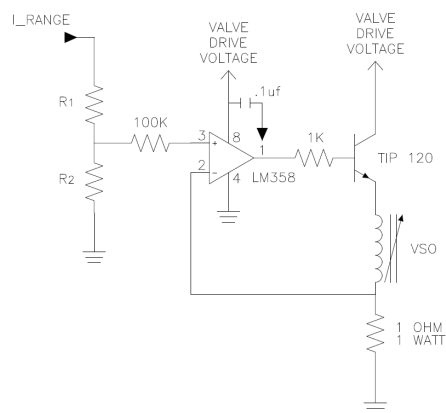
Basic Control:

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



This simple current driver circuit draws only 1 mA at the input control (0-5VDC) and provides control for any VSO® Low Flow configuration regardless of valve voltage or resistance.

Table 3 (below) describes the recommended R1 and R2 resistor values based upon the full shut-off current.

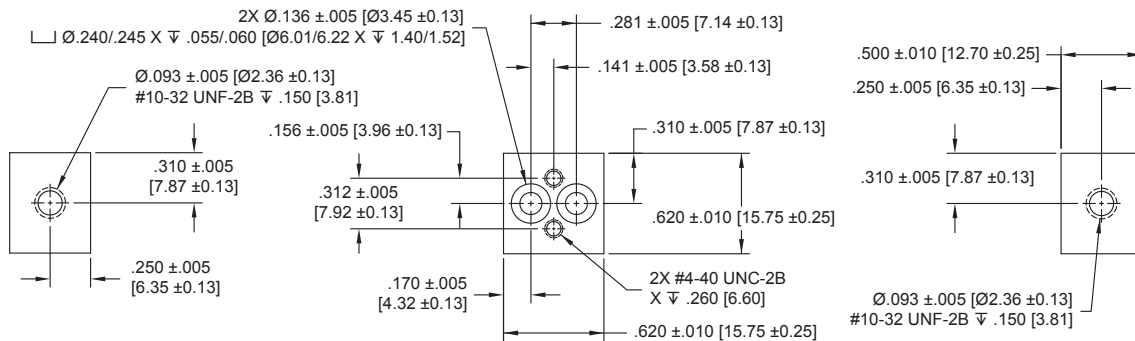
Table 3: Selectable Resistor Values for a Low Current (1mA) LM358-Based Current Driver

| Minimum Available Voltage (VDC) | Valve Drive Voltage (VDC) | Nominal Coil Resistance @ 20° C (Ohms) | Input Current for Full Flow (mA) | R1 (Ohms) | R2 (Ohms) |
|---------------------------------|---------------------------|--|----------------------------------|-----------|-----------|
| 6.5 | 8.5 | 47 | 130 | 4990 | 102 |
| 8.0 | 10.0 | 68 | 115 | 4990 | 73 |
| 12.0 | 14.0 | 136 | 80 | 5100 | 34.4 |
| 18.0 | 20.0 | 274 | 60 | 8560 | 28.7 |
| 24.0 | 26.0 | 547 | 43 | 8560 | 15.4 |

VSO® Low Flow Thermally Compensated Proportional Valve

Manifold & O-Ring Dimensions & Design

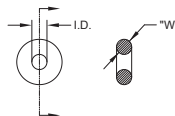
Not shipped with valves.



Accessories

O-Ring (Manifold Seal) Dimensions
190-007024-002 (2 required for each valve)

I.D. = Ø.114 ±.005 [Ø2.90 ±.013]
W = .070 ±.003 [1.78 ±.008]
O.D. = Ø.254 [Ø6.45] REFERENCE



Screw 4-40 x 5/8" Pan Head, Phillips
191-000115-010 (2 required for each valve)



Ordering Information

| Sample Part ID | 910 | - | 000200 | - | 001 |
|----------------|--------|---|---|---|---|
| Description | Series | - | Model Number: | - | Coil Voltage* |
| Options | | | VSO Low Flow, 0.003" (0.076 mm) Orifice | | 001: 6.5 VDC 002: 8 VDC 003: 12 VDC 004: 18 VDC 007: 24 VDC * Maximum voltage for continuous full flow, ambient temperature 55°C |

Accessories

| | |
|--|--|
| 190-007024-002: O-ring, FKM, 0.114" ID x 0.070" Thick* | * Not supplied with the valve. Used as a seal between the valve body and manifold. |
| 191-000115-010: Screw 4-40 x 5/8" Pan Head ** | **Not supplied with the valve. Used to mount the valve to a manifold. |

NOTE: 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



Please click on the Order On-line button (or go to www.parker.com/precisionfluidics/lowflow) to configure your VSO® Low Flow Thermally Compensated Proportional Valve. For more detailed information, visit us on the Web, or call and refer to Performance Spec. #790-002160-002 and Drawing #890-003022-022.

PPF-MPV-002/US February 2013

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



NOTES
