

# VSO® Low Flow

## Thermally Compensated Proportional Valve



### Typical Applications


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

## Product Specifications

### Physical Properties

<b>Valve Type:</b>	2-Way Normally Closed
<b>Media:</b>	Air, argon, helium, hydrogen, methane, nitrogen, oxygen, & others
<b>Operating Environment:</b>	32 to 131°F (0 to 55°C)
<b>Storage Temperature:</b>	-40 to 158°F (-40 to 70°C)
<b>Length:</b>	1.79 in (45.3 mm)
<b>Width:</b>	0.63 in (15.9 mm)
<b>Height:</b>	0.67 in (17.0 mm)
<b>Porting:</b>	Manifold mount
<b>Weight:</b>	2.2 oz (63 grams)

### 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

<b>Internal Volume:</b>	0.031 in <sup>3</sup> (0.508 cm <sup>3</sup> )
<b>Filtration:</b>	5 Micron (Customer Supplied)
<b>Flow Direction:</b>	Inlet Port Port 2 Outlet Port Port 1
<b>Oxygen and Analytically Clean:</b>	Standard

### Electrical

<b>Power:</b>	2.0 Watts maximum
<b>Voltage:</b>	See Table 2
<b>Electrical Termination:</b>	18" (45.7 cm) Wire Leads

### Wetted Materials

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

### Performance Characteristics

<b>Leak Rate:</b>	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
<b>Pressure:</b>	0 to 150 psi (10.34 bar) See Table 1
<b>Vacuum:</b>	0-27 in Hg (0-686 mm Hg)
<b>Orifice Size:</b>	0.003" (0.076 mm)
<b>Hysteresis:</b>	7% of full scale current (Typical) 15% of full scale current (Max)

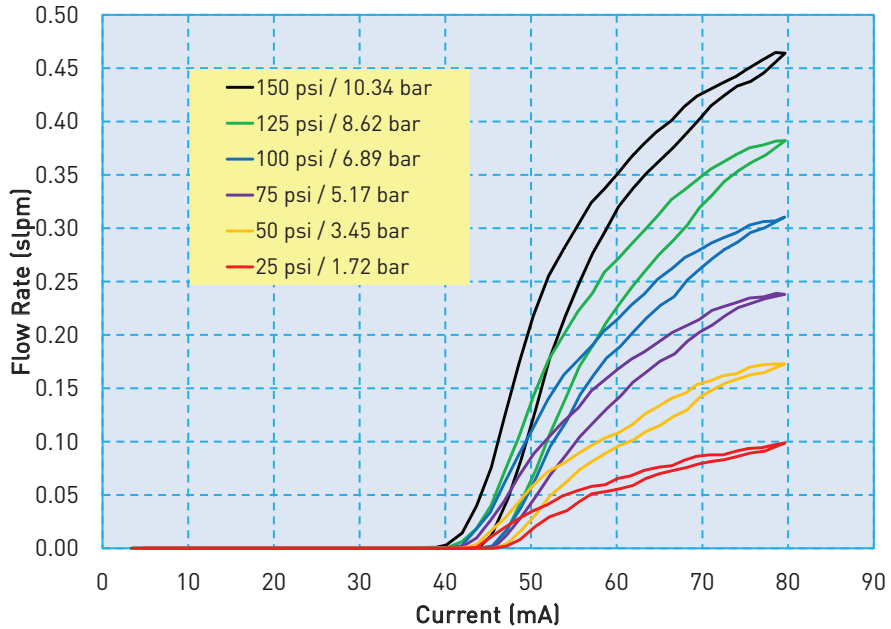
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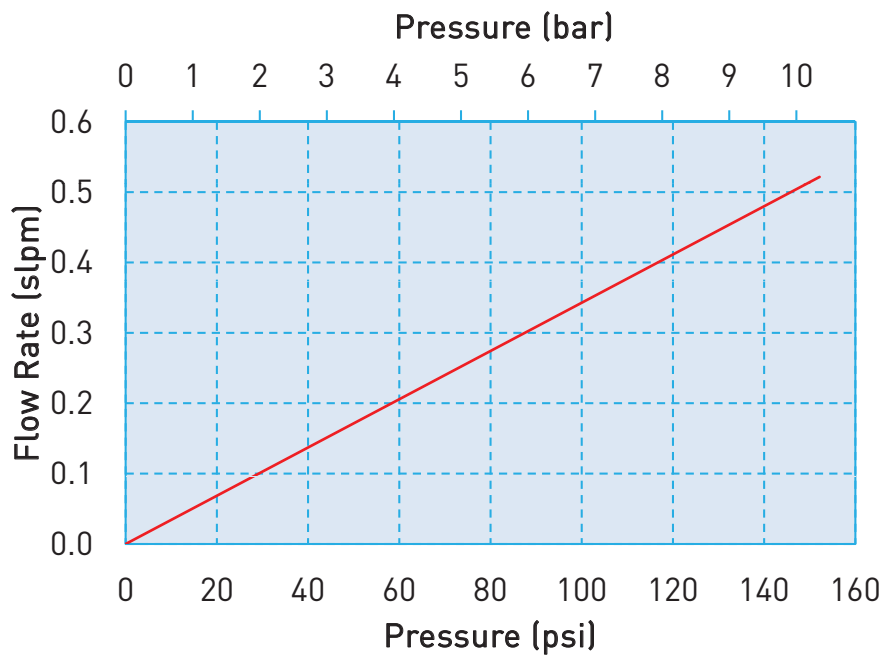
# VSO<sup>®</sup> Low Flow Thermally Compensated Proportional Valve

## Typical Flow Curve

Typical Air Flow with 13.5 VDC Coil @ 25 psid (1.7 bar)



Model L3 - 0.003" (0.076 mm) Orifice  
Pressure vs Flow Curve



## Pressure and Flow Capabilities

Table 1

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)



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## Pneumatic Interface

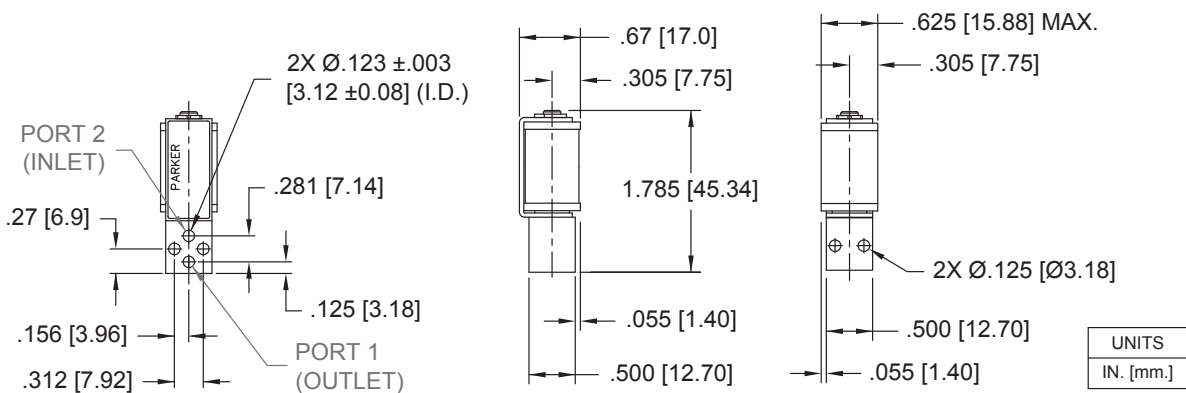
### VSO® Low Flow Manifold Mount



## Mechanical Integration

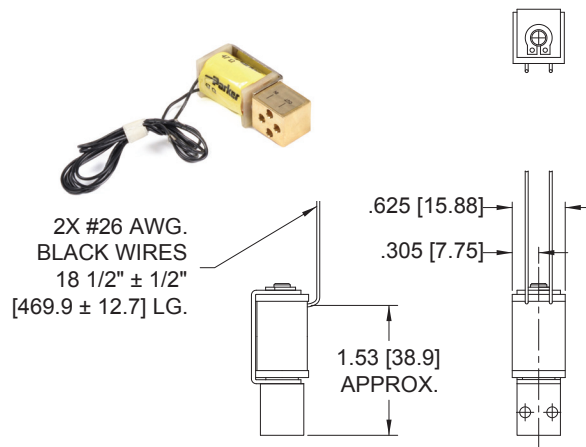
### Dimensions

#### VSO® Low Flow Basic Valve Dimensions



## Electrical Interface

### Coil Type: 18" Wire Lead



## Electrical Requirements

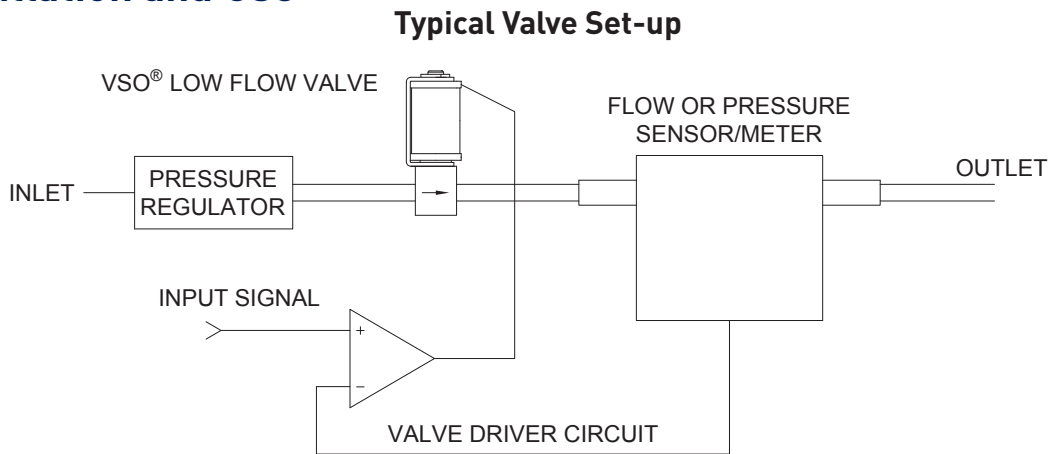
Table 2

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<sup>®</sup> Low Flow Thermally Compensated Proportional Valve

## Installation and Use



### Valve Electrical Control

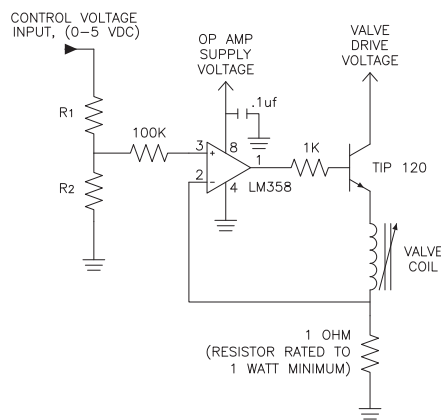
#### Basic Control:

The VSO<sup>®</sup> 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<sup>®</sup> 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<sup>®</sup> 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.

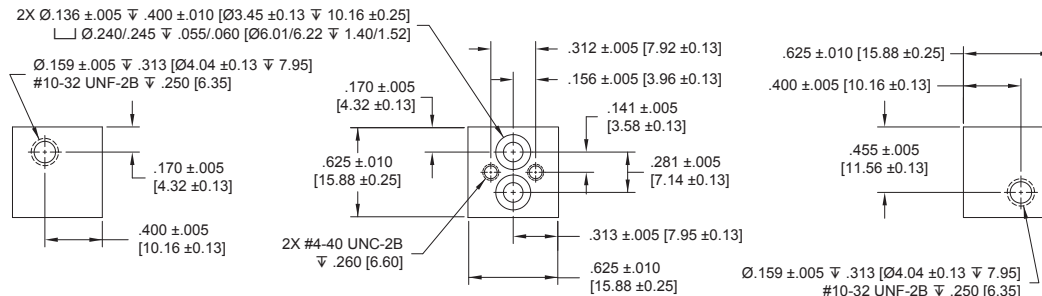
**Table 3: Selectable Resistor Values for a Low Current (1mA) LM358-Based Current Driver**

Voltage Supplied to Valve Coil (Reference)	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<sup>®</sup> Low Flow Thermally Compensated Proportional Valve Installation and Use

## Manifold & O-Ring Dimensions & Design

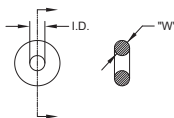
Not shipped with valves.



## Accessories

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

I.D. =  $\varnothing$ .114 ±.005 [ $\varnothing$ 2.90 ±0.13]  
W = .070 ±.003 [1.78 ±0.08]  
O.D. =  $\varnothing$ .254 [ $\varnothing$ 6.45] 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](http://www.parker.com/precisionfluidics/lowflow)) to configure your VSO<sup>®</sup> 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 August 2013

For more information call +1 603 595 1500 or email [ppinfo@parker.com](mailto:ppinfo@parker.com)  
Visit [www.parker.com/precisionfluidics](http://www.parker.com/precisionfluidics)



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