

VSO® LowPro – low profile proportional valve



The VSO® LowPro is a miniature proportional valve that controls the flow rate of inert gases at pressures up to 100 psig (6.9 bar). Typical flow rates up to 57 SLPM with a typical power of 1 Watt at room temperature. At just 16 mm wide by 14 mm tall, the valve can be populated into the smallest portable device improving performance, size and weight. With orifice sizes ranging from 0.030 in (0.76 mm) up to 0.080 in (2.03 mm) and a weight of 12 g, the VSO® LowPro can perform the function of valves three times its size without sacrificing the power. Mounting only requires a simple, machined manifold.

Features

- 2-way NC
- Very low power required of typically 1 watt enables portable capability and low power control increasing battery life or reducing the size of the power supply or battery
- Low profile design simplifies mounting and eliminates cartridge configurations that require complex and expensive machining
- Delivers consistent performance on every valve
- Life cycle rating of 100 million

Certificates

- RoHS
- Reach
- ISO 15001
- IP65
- CE

Media compatibility

Air, oxygen or any non-reactive, non-condensing gases

Applications

- Portable oxygen concentrators
- Ventilators
- Patient monitors
- Pressure control
- Volumetric flow control
- Pulse dose control
- Negative pressure wound therapy

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Product specifications

Parameter	
Operating temperature	32 ... 131 °F (0 ... 55 °C)
Storage temperature	-40 ... 158 °F (-40 ... 70 °C)
Weight	0.42 oz (12 g)

Wetted materials

Parameter	
Body & cover	Aluminum, 430 stainless steel
Armature & spring	Carbon steel (nickel plated), stainless steel
Coil	Urethane, polyvinyl butyral
All others	FKM, epoxy

Filtration

40 micron recommended

Performance characteristics

Part no.	Pressure ⁽¹⁾	Vacuum	Orifice size / nominal Cv	Leak rate (tested with air @ 50 psid)	Response	Power	Hysteresis
TV2P050C080...	0 to 50 psi		0.080 in (2.03 mm) / 0.045				
TV2P100C050...	0 to 100 psi	0 to 27 in Hg	0.050 in (1.27 mm) / 0.027	< 0.5 sccm internal, < 0.2 sccm external	10 ms typical	1 W typical, 2 W max.	10 % of full scale current typical 15 % of full scale current max.
TV2P100C040...	0 to 100 psi	(0 to 686 mm Hg)	0.040 in (1.02 mm) / 0.022				
TV2P100C030...	0 to 100 psi		0.030 in (0.76 mm) / 0.015				

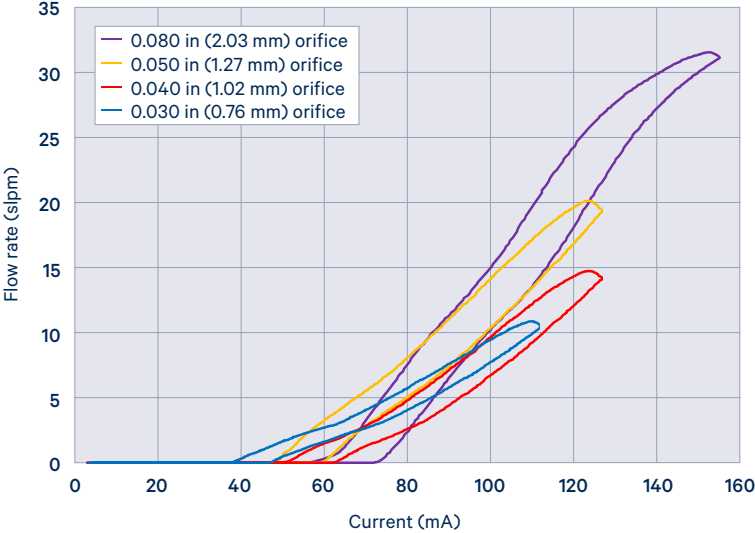
Specification notes

(1) Maximum inlet pressure for all valves is 100 psi.
Proof pressure is 300 psi (20.7 bar).

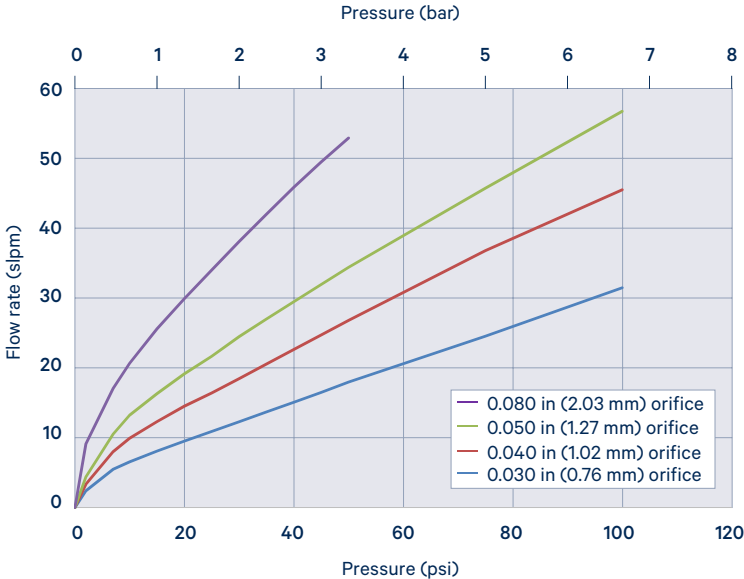
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Typical flow curve

Typical air flow with 12 VDC coil @ 25 psid (1.7 bar)

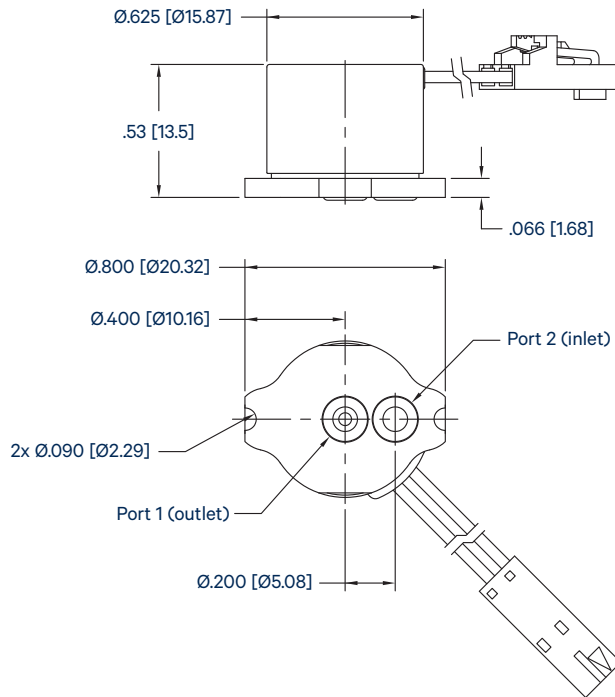


Pressure vs flow curves



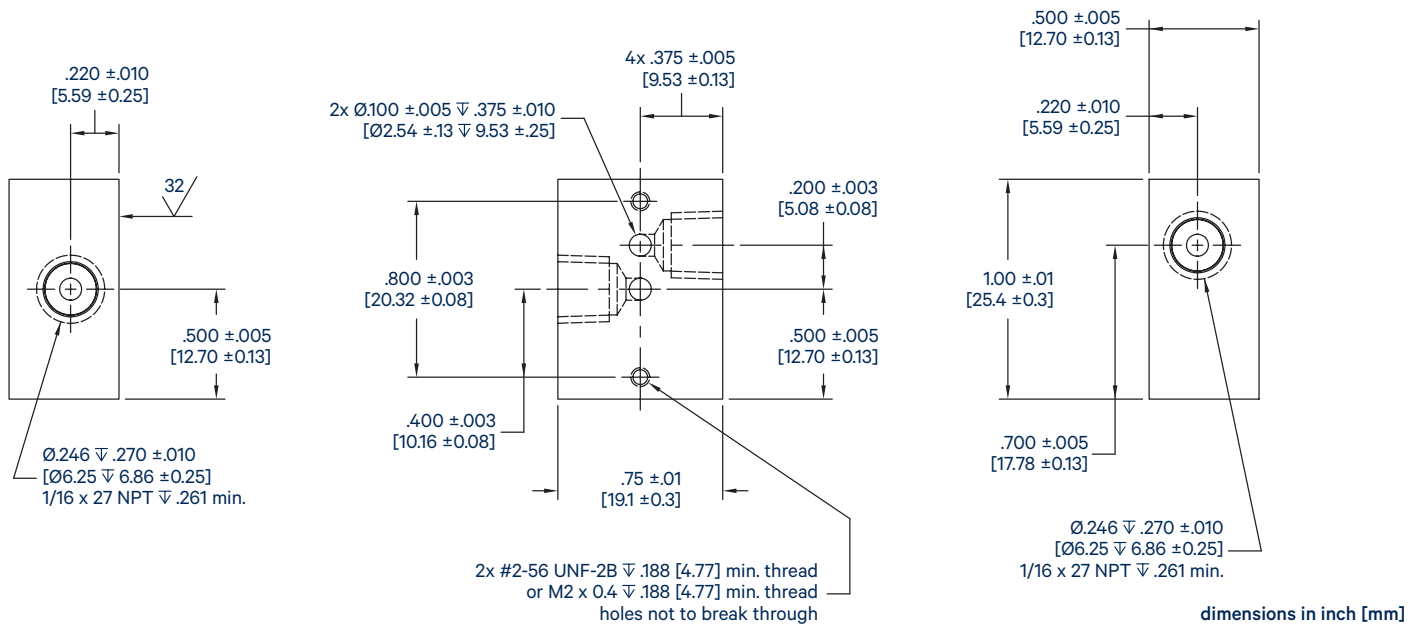
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Dimensional drawing



dimensions in inch [mm]

Manifold mount diagram ⁽²⁾



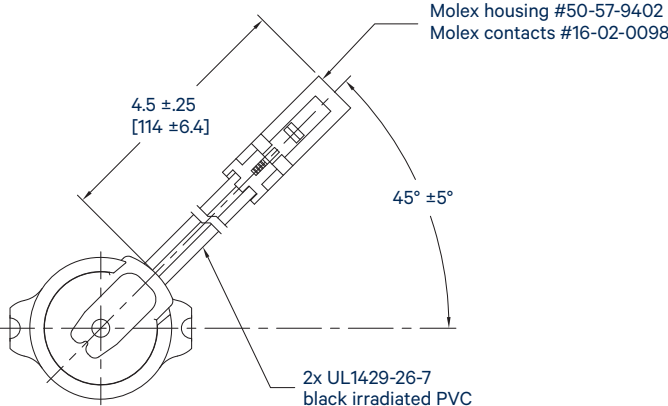
dimensions in inch [mm]

Specification note

(2) First Sensor recommends 24 in-oz (17 N-cm) of torque for the screws.

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Electrical interface



dimensions in inch [mm]

Electrical requirements

Rated voltage (VDC)	Control current at max. flow (mA)			Nominal coil resistance @ 20°C (ohms)
	TV2P050C080...	TV2P100C040... TV2P100C050...	TV2P100C030...	
5	385	311	275	10
12	156	127	112	61
24	92	75	65	179

Installation and use

Valve electrical control

Basic Control:

The VSO[®] LowPro 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.

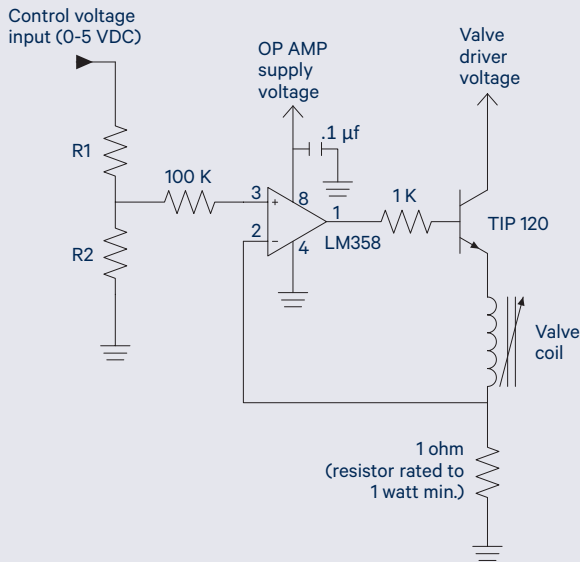
PWM Control:

For PWM control, the signal applied to the valve should have a frequency of 10 kHz or greater. Optimum frequency will be application dependent.

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Installation and use (cont.)

Suggested current driver schematic



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

The table below describes the recommended R1 and R2 resistor values based upon the full shut-off current.

Selectable resistor values for a low current (1 mA) LM358- based current driver

Max. solenoid voltage (VDC)	Circuit supply voltage (VDC)	Nominal coil resistance @ 20°C (ohms)	Max. output current from circuit (mA)	R1 (ohms)	R2 (ohms)
6	8	10.1	396	4910	422
13	15	61.3	160	3320	110
22	24	178.5	94	2100	40.2

Ordering information

Part	Ways	Pressure / Function / Orifice	Elastomer	Voltage	Electrical
TV	2 [2-way]	P050C080 50 psi, NC, 0.080 in (2.03 mm)	V [FKM]	05 5 VDC	F [Wire leads w/ connector]
		P100C050 100 psi, NC, 0.050 in (1.27 mm)		12 12 VDC	
		P100C040 100 psi, NC, 0.040 in (1.02 mm)		24 24 VDC	
		P100C030 100 psi, NC, 0.030 in (0.76 mm)			

Accessories

290-006061-003	12.5 in adapter wire leads	not supplied with the valve
890-009042-001	Single station manifold	not supplied with the valve
190-007059-001	Manifold O-ring (FKM)	supplied with each valve
191-000112-404	Screw #2-56 x 3/16 in, socket head cap screw	not supplied with the valve