VSO® LowPro GC Miniature Proportional Valve

Low Profile Proportional Valve

The VSO® LowPro GC is a robust miniature proportional valve that controls the flow rate of common carrier gases from less than 1 SCCM up to 6.5 SLPM. At less than half the size and weight of competitor valves, the LowPro GC isolates the carrier gas from the valve coil with excellent leak rate performance, very high resolution and best in class flow control stability while operating in extreme environmental conditions.

Markets

- Analytical Chemistry

Typical Applications

- Gas Chromatography

Features

- Lower power to minimize oxygen permeation into the system.
- Media isolated from the coil to prevent chemical outgassing into the system.
- Small size, less weight with simplified mounting enables smaller system volume.
- Cleaned for Analytical Service use.
- Reach, RoHS, ISO 15001, IP65, and CE compliant.

Product Specifications

Physical Properties

Valve Type:
2-Way Normally Closed
Media:
Air, Argon, Helium, Hydrogen, Nitrogen *(Others, consult factory)*
Operating Environment:
-4 to 185°F (-20°C to 85°C)
Storage Temperature:
-40 to 185°F (-40 to 85°C)
Length:
0.80 in (20 mm)
Width:
0.63 in (16 mm)
Height:
0.53 in (13.5 mm)
Porting:
Face Seal to Manifold with integrated FKM seal
Weight:
0.56 oz (16 g)

Electrical

Power:
0.7 Watt (Nominal) @ 20 °C (See Electrical Table 2)
Voltage:
3, 9 and 16 VDC *See Table 2*
Electrical Termination:
4.5" (114 mm) Wire leads [26 AWG] with Molex 50-57-9402 connector

Wetted Materials

Body & Cover:
C36000 Brass, 400 Stainless Steel
Armature & Spring:
Carbon Steel (Nickel Plated) Stainless Steel
All Others:
FFKM* or FKM (plunger seal), Loctite 648 and bonding agent. *(*FFKM plunger seal option uses FKM static seals)*
Regulatory:
Compliant with RoHS directive (2011/65/EU), REACH EC 1907/2006, ISO 15001, IP65(IEC/EN 60529), and CE (EN 61010-1:2010)

Performance Characteristics

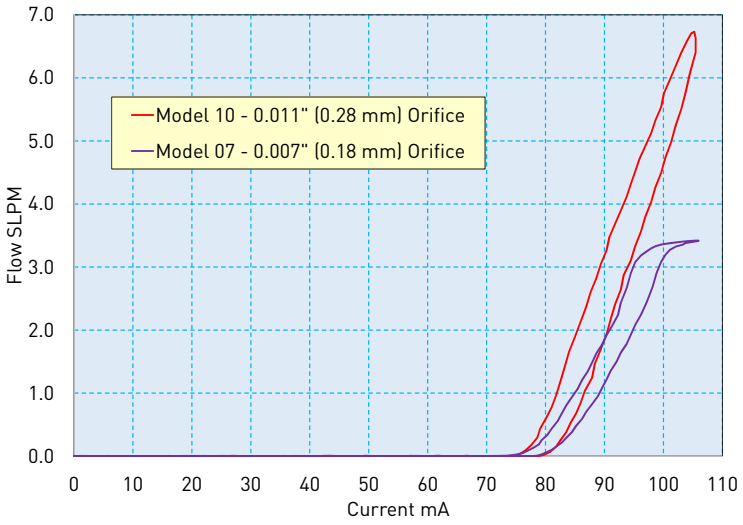
Leak Rate: *
Internal: 0.030 SCCM of Helium at pressure of 150 psid (10.3 bar) [consult factory for details]
External: 0.020 SCCM of Helium at pressure of 150 psid (10.3 bar)
**The leakage shall not exceed the above values.*
Operating Pressure: *See Table 1*
0 - 150 psi (0 - 10.3 bar)
Vacuum:
0-27 in Hg (0-686 mm Hg)
Proof Pressure:
300 psi (20.7 bar)
Orifice Sizes:
0.007 in (0.18 mm) Model 07 0.011 in (0.28 mm) Model 10
Hysteresis:
6% of full scale current (Typical) 15% of full scale current (Maximum)
Recommended Filtration:
17 µm (Included)
Response Time:
10 msec Typical
Reliability:
100 Million Cycles 0.95 Reliability Factor 97% Confidence

VSO® LowPro GC Low Profile Proportional Valve

Typical Flow Curve

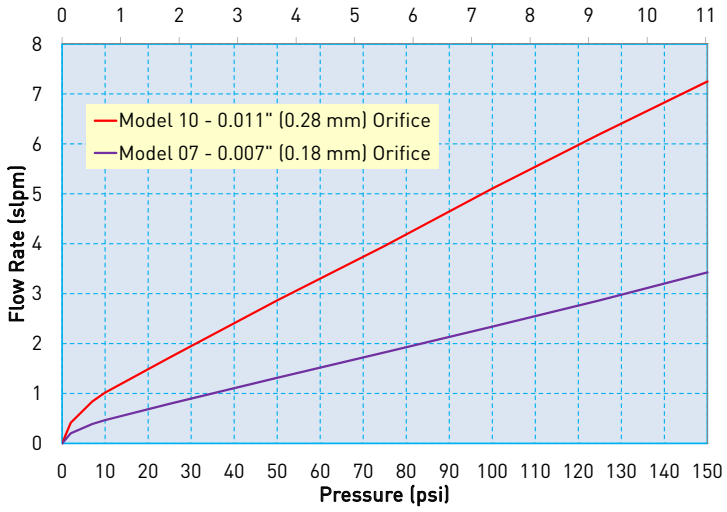
All Models

Typical Air Flow with 9 VDC Coil @ 150 psid (10.3 bar) @ 22C



Pressure vs Flow Curve

The curve below shows the maximum output flow for each orifice size as a function of inlet pressure up to the maximum rated pressure for the valve.



Pressure and Flow Capabilities

Table 1

Model No.	Orifice Diameter	Cv at Maximum Pressure	Maximum Inlet Pressure	Maximum Differential Pressure
10	0.011 in (0.28 mm)	0.0026	150 psi (10.3 bar)	150 psi (10.3 bar)
07	0.007 in (0.18 mm)	0.0012	150 psi (10.3 bar)	150 psi (10.3 bar)

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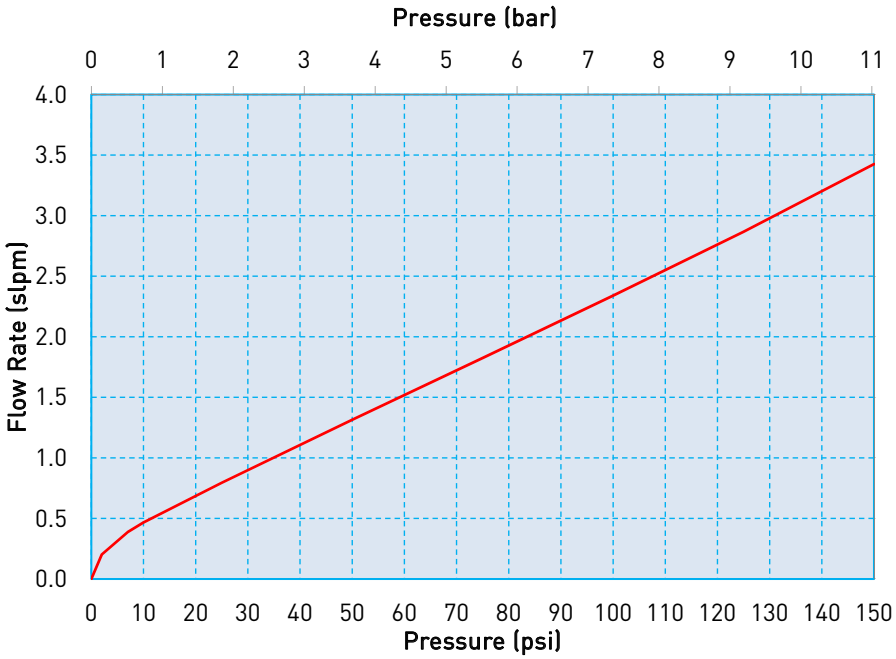
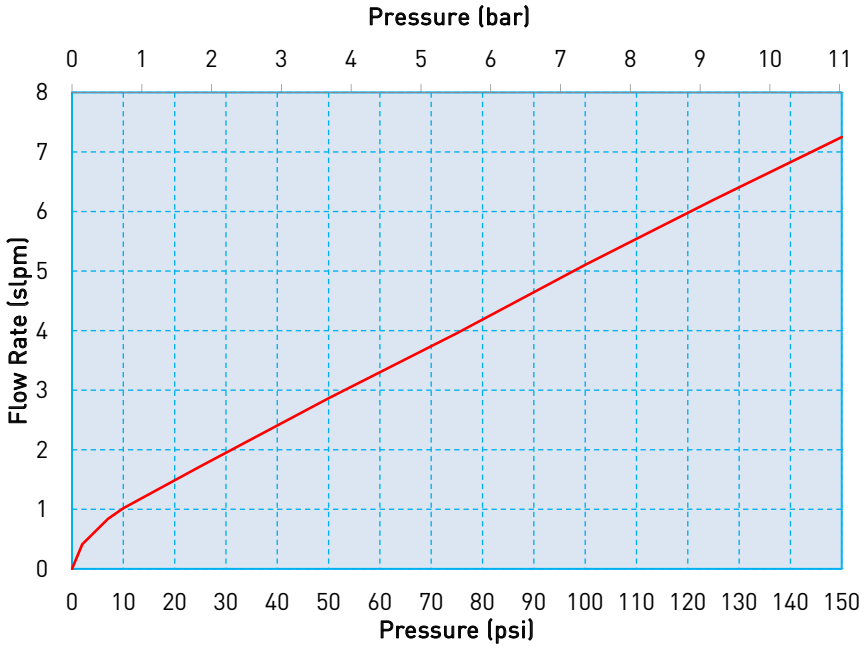
VSO® LowPro Sizing Charts

Model 07 - 0.007" (0.18 mm)



Model 10 - 0.011" (0.28 mm)



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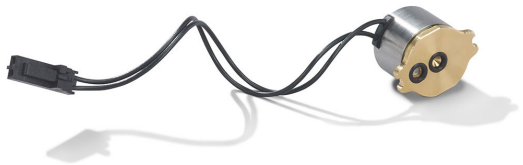
Pneumatic Interface

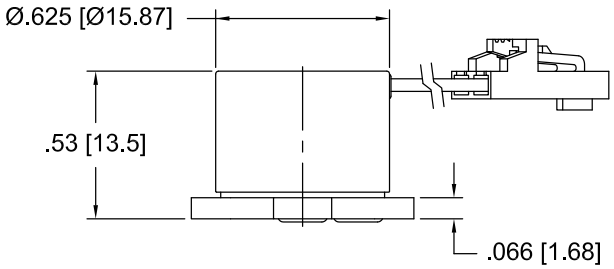
VSO® LowPro Manifold Mount

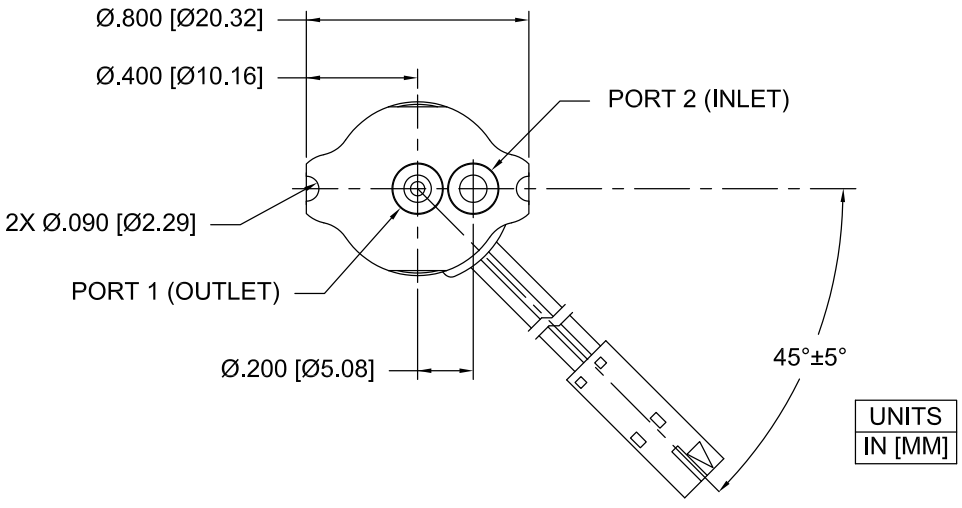


Mechanical Integration

Dimensions

VSO® LowPro Basic Valve Dimensions





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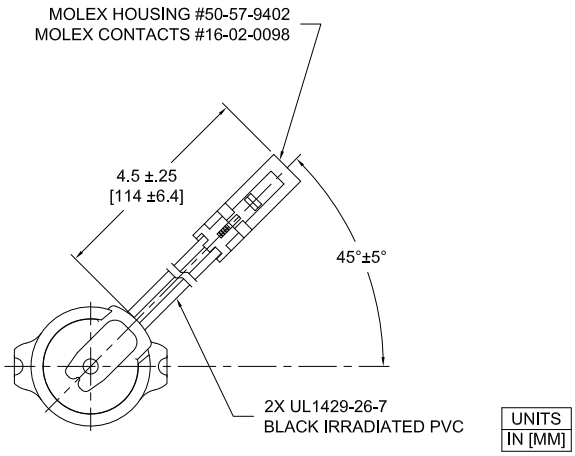
Electrical Interface



Electrical Requirements

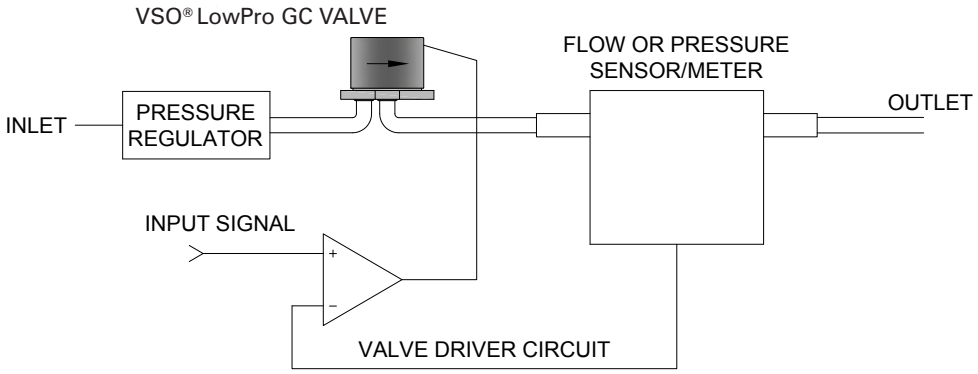
Table 2

Rated Voltage*	Nominal Coil Resistance (Ohms) @ 20°C *	Control Current at Maximum Flow	
		Model 07	Model 10
3 VDC	10	263 mA	263 mA
9 VDC	61	107 mA	107 mA
16 VDC	179	63 mA	63 mA

TOLERENCE +/- 10%

Installation and Use

Typical Valve Set-up



Valve Electrical Control

Basic Control:
The VSO® LowPro GC 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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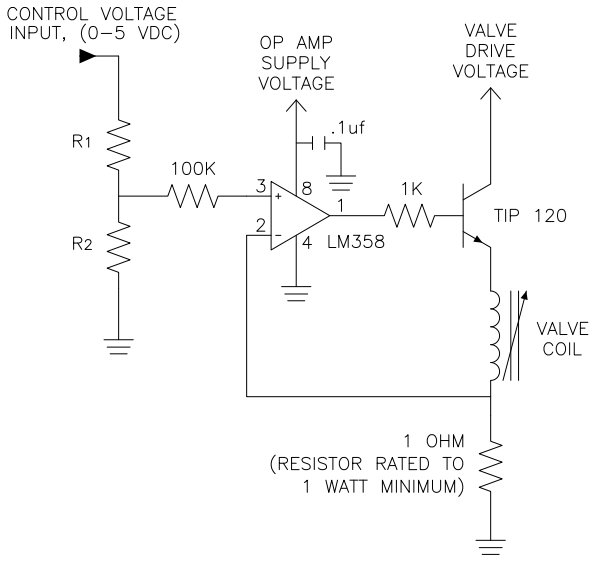
Installation and Use

Suggested VSO® LowPro GC Current Driver Schematic



This simple current driver circuit draws only 1 mA at the input control (0-5VDC) and provides control for any VSO® LowPro GC valve 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 (1 mA) LM358-Based Current Driver (All Models)

Valve Drive Voltage, Input (VDC)	Valve Coil Voltage, Resulting (VDC)	Nominal Coil Resistance @ 20°C (Ohms)	Input Current for Full Flow (mA)	R1 (Ohms)	R2 (Ohms)
5	3	10	266	8660	487
9	7	61	108	8660	191
13	12	180	63	8660	110

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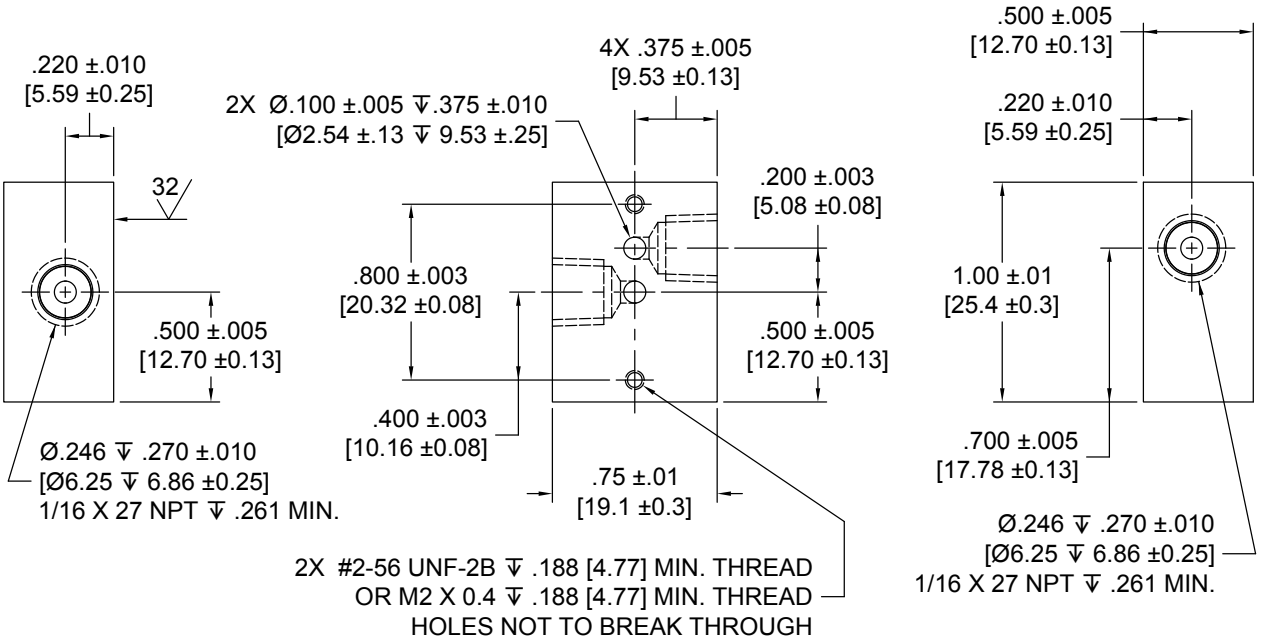
Installation and Use

Manifold Dimensions & Design

Not shipped with valves.



UNITS
IN [MM]

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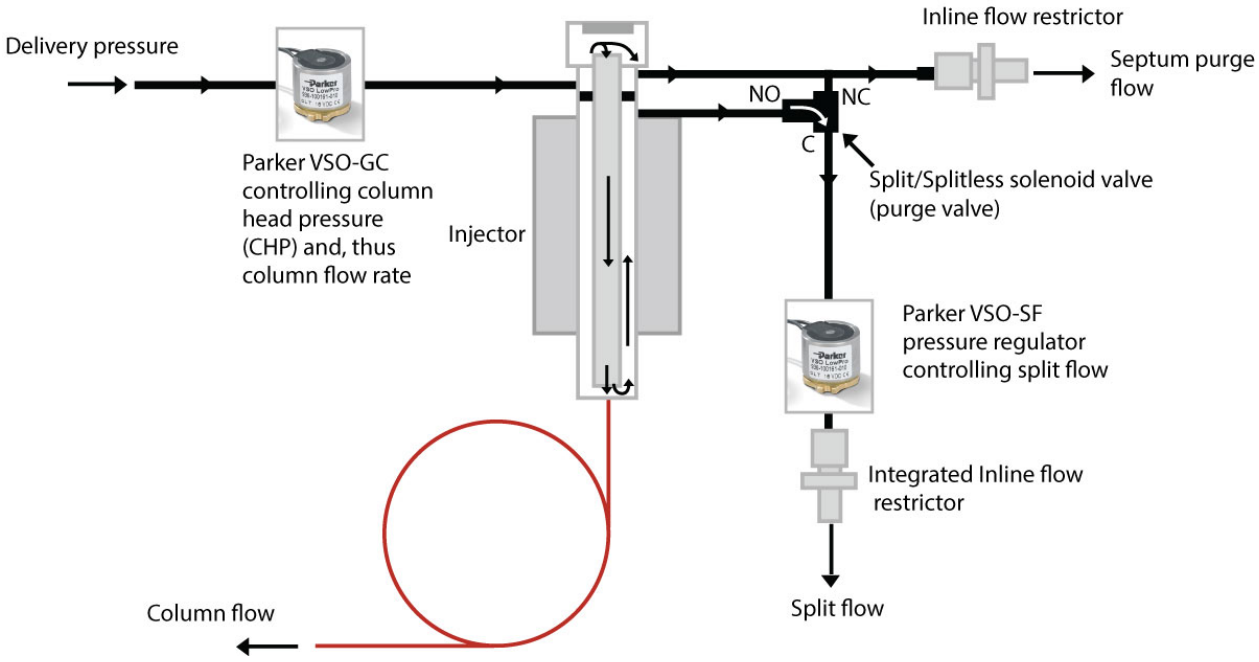
Typical Flow Diagram

Typical Gas Chromatograph Schematic



Accessories

12.5 in (318 mm) Adapter Wire Leads
290-006061-003

Single Station Manifold
890-009042-001

Screw #2-56 x 3/16" Socket Head Cap Screw
191-000112-404

Manifold O-Ring (FKM)
190-007059-001
(supplied with valve)

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Ordering Information

Sample Part ID	93	6	-	07	0	03	1	-	01	0
Description	**Family**	**Isolation**		**Model Number: Orifice Size**	**Elastomer**	**Coil Voltage**	**Body Material**		**Pneumatic Interface**	**Electrical Interface**
Options	93	6: Isolated		07: 0.007 in (0.18 mm) 10: 0.011 in (0.28 mm)	0: FKM 1: FFKM	03: 3 VDC 09: 09 VDC 16: 16 VDC	1: Brass		01: Manifold Mount w/ Filter	0: Wire Leads, w/Connector

Accessories	
290-006061-003: 12.5 in (318 mm) Adapter Wire Leads	**Not supplied with the valve.
890-009042-001: Manifold, Single Station, 1/8 in NPT	**Not supplied with the valve.
890-009042-002: Manifold, Single Station, M5	**Not supplied with the valve.
190-007059-001: Manifold O-Ring (FKM)	**Supplied with the valve.
191-000112-404 Screw#2-56 x 2/16 in Socket Head Cap Screw	**Not supplied with the valve. See Valve Mounting Recommendations above

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 to configure your VSO® LowPro GCProportional Valve (or go to www.parker.com/precisionfluidics/VSOLowProGCMiniatureProportionalValve).
For more detailed information, visit us on the Web, or call and refer to VSO® LowPro Performance Spec. 790-002490-001.

Parker Hannifin Precision Fluidics Division reserves the right to make changes. Drawings are for reference only.

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