# 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

## 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

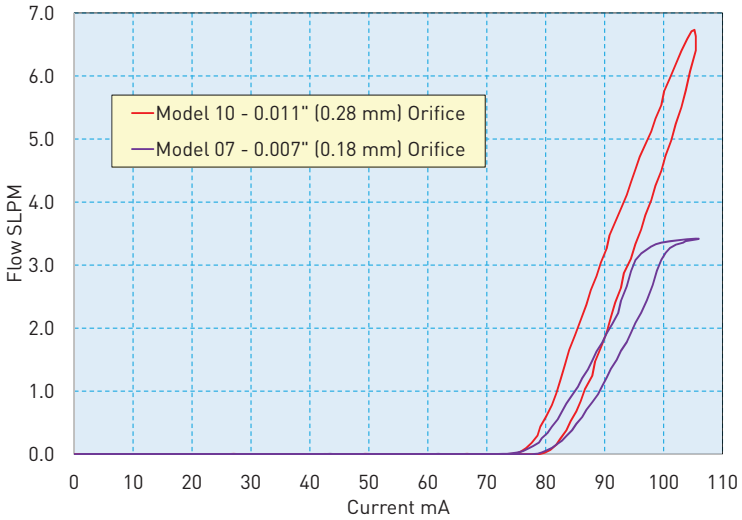
| |
|---|
| **Leak Rate: *** |
| Internal: 0.030 SCCM of Helium at pressure of 150 psid (10.3 bar) [consult factory for details] |
| External: 0.020 SCCM of Helium at pressure of 150 psid (10.3 bar) |
| **The leakage shall not exceed the above values.* |
| **Operating Pressure:** *See Table 1* |
| 0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

# VSO® LowPro GC Low Profile Proportional Valve

## Typical Flow Curve

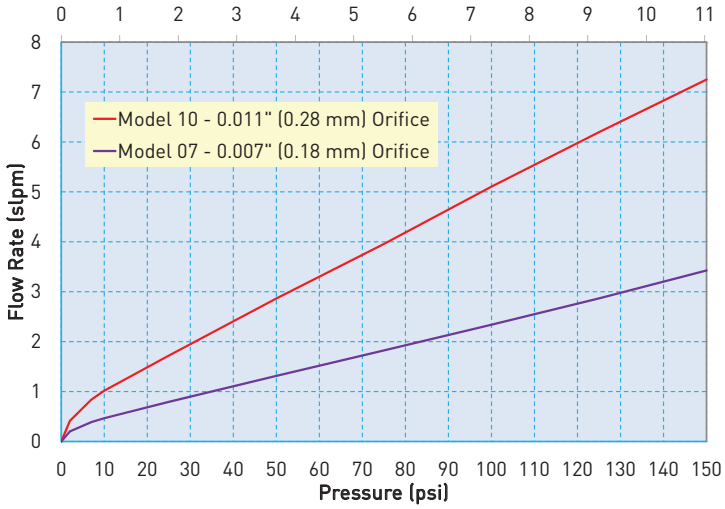
**All Models**

**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

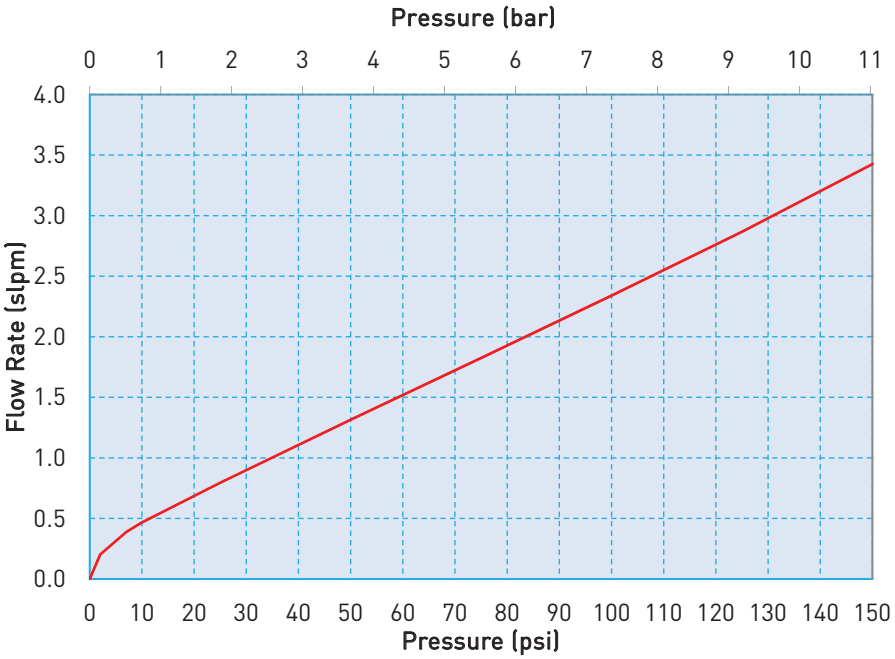
**Table 1**

| 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) |

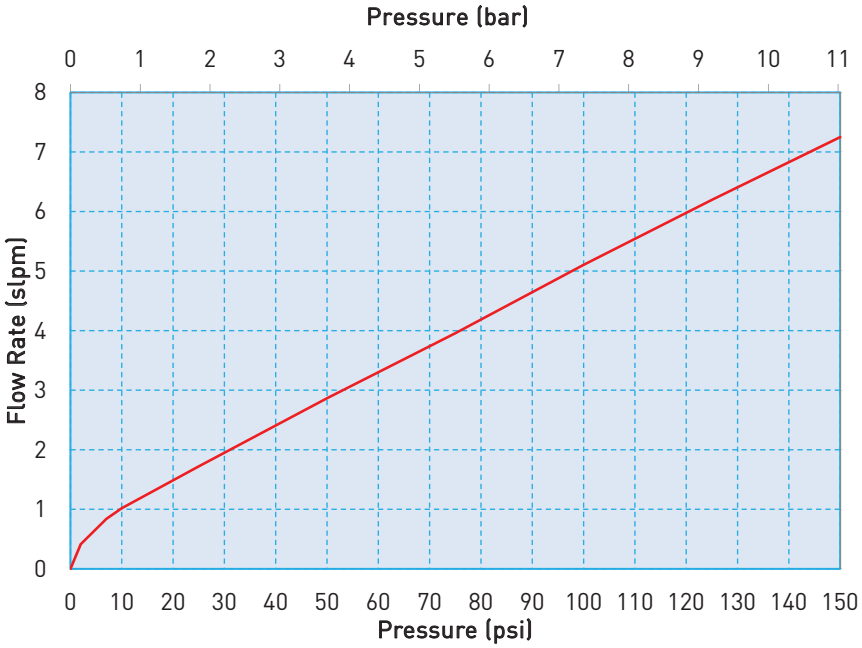
# VSO® LowPro GC Low Profile Proportional Valve

## VSO® LowPro Sizing Charts

### Model 07 - 0.007" (0.18 mm)



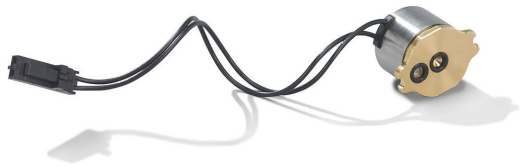

### Model 10 - 0.011" (0.28 mm)



# VSO® LowPro GC Low Profile Proportional Valve

## Pneumatic Interface

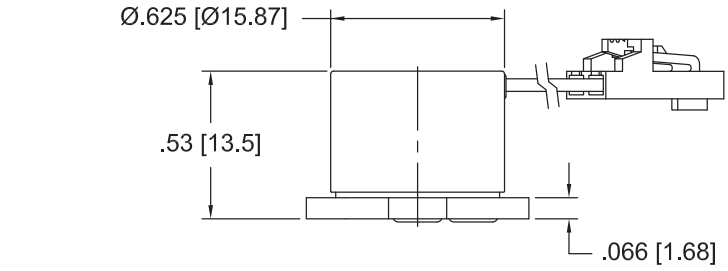
**VSO® LowPro Manifold Mount**

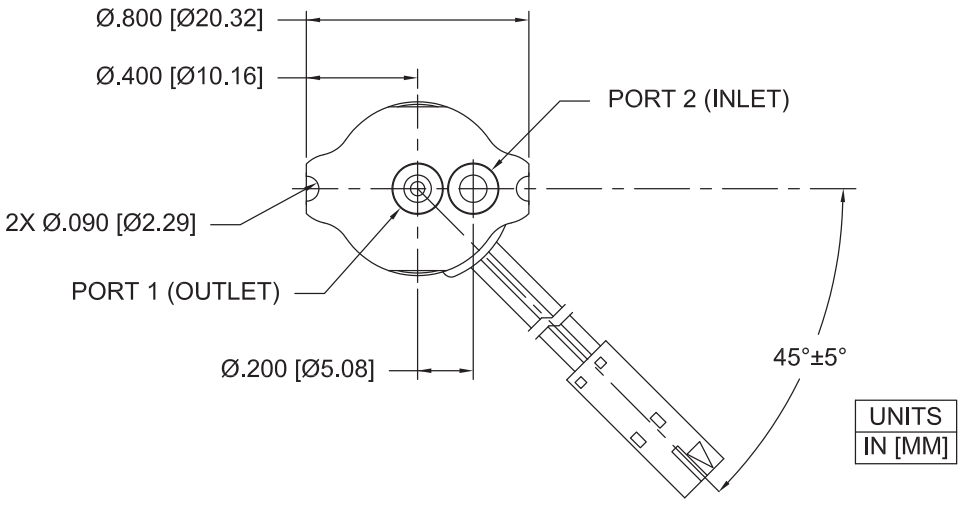


## Mechanical Integration

### Dimensions

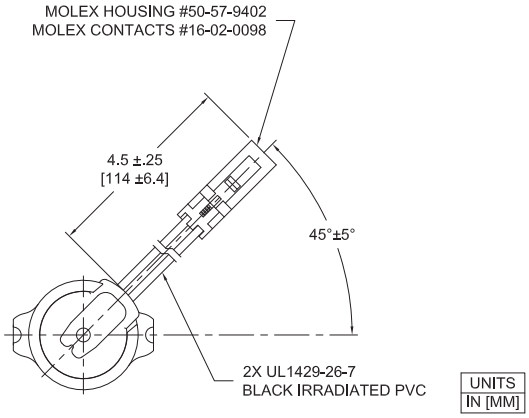
**VSO® LowPro Basic Valve Dimensions**



# VSO® LowPro GC Low Profile Proportional Valve

## Electrical Interface




## Electrical Requirements

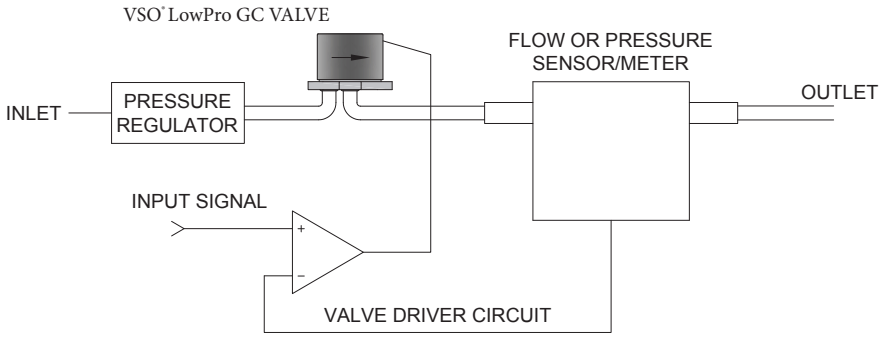
**Table 2**

| 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**



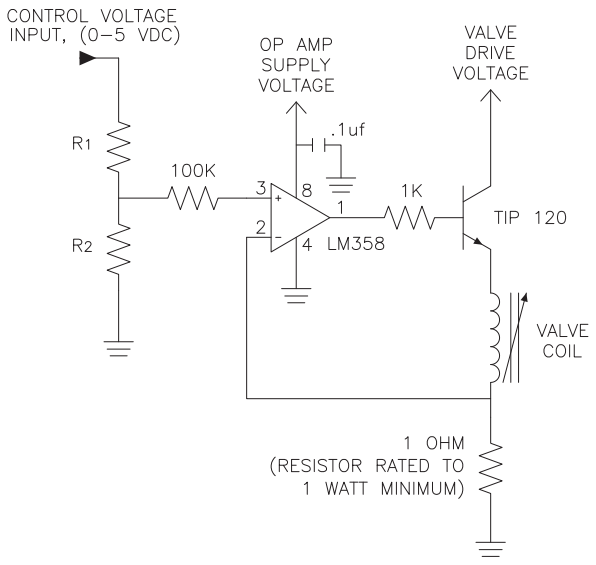

**Valve Electrical Control**

**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.

# VSO® LowPro GC Low Profile Proportional Valve
## 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)

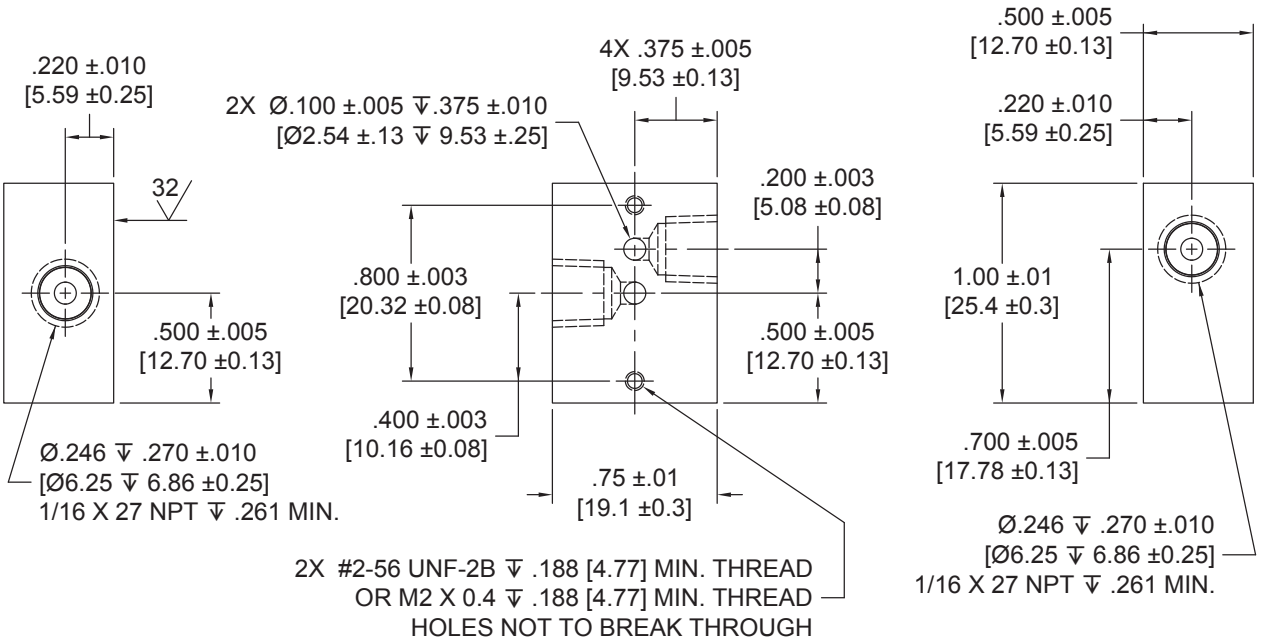
| Valve Drive Voltage, Input (VDC) | Valve Coil Voltage, Resulting (VDC) | Nominal Coil Resistance @ 20°C (Ohms) | Input Current for Full Flow (mA) | R1 (Ohms) | R2 (Ohms) |
|---|---|---|---|---|---|
| 5 | 3 | 10 | 266 | 8660 | 487 |
| 9 | 7 | 61 | 108 | 8660 | 191 |
| 13 | 12 | 180 | 63 | 8660 | 110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

# VSO® LowPro GC Low Profile Proportional Valve

## Installation and Use

### Manifold Dimensions & Design

**Not shipped with valves.**

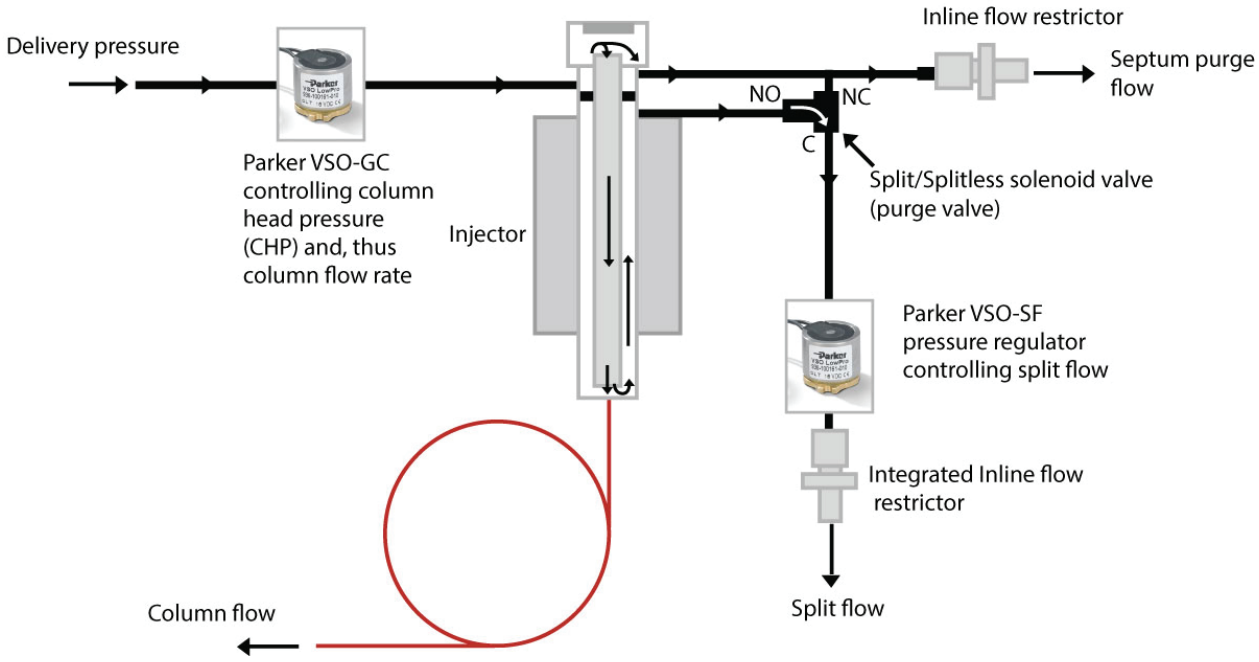



| UNITS |
| --- |
| IN [MM] |

# VSO® LowPro GC Low Profile Proportional Valve

## 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)

# VSO® LowPro GC Low Profile Proportional Valve

## 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)<br>10: 0.011 in (0.28 mm) | 0: FKM<br>1: FFKM | 03: 3 VDC<br>09: 09 VDC<br>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/vso-lowpro-miniature-analytical-proportional-valve). 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.**