**VSO®-EP**

*Miniature Electronic Pressure Controllers*

The **VSO®-EP** Miniature Electronic Pressure Control Unit converts a variable electrical control signal into a variable pneumatic output. Used to control critical pressure, the **VSO®-EP** replaces manual regulators, needle valves, flow controllers, and vent orifices, providing integral closed loop proportional control. This product uses Parker Hannifin’s patented **VSO®** proportional valve and offers significant improvements over dual valve controllers. **VSO®-EP** is used for carrier gas flow control, microfluidic flow control, vacuum pump control, and for aspirate/dispense applications.

**Features**
- Offers silent operation to reduce system noise levels
- Ensures high accuracy and unparalleled resolution for improved results
- Tested for long life to improve system availability
- Offers internal closed loop control to minimize system development time
- OEM application-specific configurations available
- Analog control for added design flexibility
- RoHS compliant

**Valve Technology:**
Thermally compensated **VSO®** proportional valves.

**Media:**
Non-corrosive gases

**Operating Environment:**
32 to 131°F (0 to 55°C)

**Storage Temperature:**
-40 to 149°F (-40 to 65°C)

**Length:**
1.27 in (32.3 mm)

**Width:**
2.32 in (59.0 mm)

**Height:**
2.20 in (55.9 mm)

**Weight:**
5.6 oz (158.8 g)

**Porting:**
10-32 female ports
Metric adaptor available

**Pressure Ranges:**
- 0-5 psig (0-0.35 bar)
- 0-15 psig (0-1.03 bar)
- 0-30 psig (0-2.07 bar)
- 0-50 psig (0-3.45 bar)
- 0-100 psig (0-6.89 bar)
(Effective control range is 10%-100% of full scale)

**Pressure Accuracy:**
± 1.5% Full Scale maximum

**Response:**
<15 ms
(Response time to target pressure is output volume dependent)

**Linearity:**
≤ ±1.5% Full Scale

**Typical Applications**
- Volumetric Flow Control
- Carrier Gas Pressure Control
- Air over Liquid Flow Control
- Electronic Pressure Regulation
- Vacuum Generator Control

**Wetted Materials**

**Manifold:**
AL 6061-T6, FKM, 302 Series SS

**Valve:**
FKM, 300 Series SS
Brass 36000HT

**Tubing:**
Ester Based Polyurethane

**Sensor:**
Glass, Silicon, Silicone, Polyphenylene Sulfide

---

VSO is a registered trademark of Parker Hannifin Corporation.
How Flow Effects Pressure Control

The flow curves illustrate the flow capabilities of the three models of pressure controllers.

Pressure control using a constant flow approach requires the system to manage pressure drops across a variable orifice and a fixed orifice (see below).

Choosing the Right Model

In many cases, the fixed orifice is the cumulative restriction of the application system consuming gas. That fixed restriction and the inlet supply pressure level are key factors when selecting the correct model number for the VSO®-EP.

If the orifice is too small, it may fail to generate enough flow to drop the required pressure across the fixed orifice. If the orifice is too large, the Pressure Controller can become unstable. When considering orifice size please remember that the effective control range is 10%-100% of full scale.

EXAMPLE:

Please refer to flow chart labeled 0.010” [0.25mm] orifice. If your application requires 40 PSIG of pressure at 1 SLPM of flow, you would need a 0.010” orifice pressure controller.

This graph shows that a 0.010” orifice will flow up to 1.5 SLPM at 40 PSIG making it the right choice for your application.
**VS0®-EP** Miniature Electronic Pressure Controllers

**Mechanical Integration**

Dimensions

**VS0-EP Basic Dimensions**

- **INLET PORT**
  - 2X Ø.170 [Ø4.32]
  - 2X Ø.130 [Ø3.30]
- **OUTLET PORT**
  - 2X Ø.080 [Ø2.03] (I.D.)

**Electrical Interface**

<table>
<thead>
<tr>
<th>CAT 5e Plug-in (RJ-45) Connector (included)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Signal</strong></td>
</tr>
<tr>
<td>Main Power, 24 VDC</td>
</tr>
<tr>
<td>Input Control Signal, 0-5 VDC</td>
</tr>
<tr>
<td>Monitor Signal Output, 0-5 VDC</td>
</tr>
<tr>
<td>System Ground</td>
</tr>
</tbody>
</table>

**CAT 5e to flying lead Plug-in Cable (included)**

- **POS 8**
- **POS 1**

**Metric Adaptor (available option)**

- **1.050 [26.67]**
- **1.980 [50.3]**

**UNITS**

- **IN. [mm]**
Installation Guide

The VSO®-EP is a dynamic pressure controller that uses proportional valve technology to supply an accurate and stable pressure source for a variety of application requirements. Installation of this device requires the completion of a few easy steps. They are as follows:

- Ensure that the gas is non corrosive, clean and dry.
- Connect the gas supply to the Inlet Port on the VSO®-EP.
- Connect a line requiring the controlled pressure to the Outlet Port on the VSO®-EP.
- Pneumatic ports are 10-32 UNF-2B Female. Metric Adaptor option is available.
- The EPC effective control range is 10%-100% of full scale.
- Electrical connections are made through the connector at the top of the unit.

They are as follows:

<table>
<thead>
<tr>
<th>Signal Description</th>
<th>RJ-45 Pin No.</th>
<th>Color</th>
</tr>
</thead>
<tbody>
<tr>
<td>Main Power, 24 VDC</td>
<td>1</td>
<td>White w/ Orange</td>
</tr>
<tr>
<td>Input Control Signal, 0-5 VDC</td>
<td>2</td>
<td>Solid Orange</td>
</tr>
<tr>
<td>Monitor Signal Output, 0-5 VDC</td>
<td>3</td>
<td>White w/ Green</td>
</tr>
<tr>
<td>System Ground</td>
<td>4</td>
<td>Solid Blue</td>
</tr>
</tbody>
</table>

Key Things to Remember:

The pressure controller requires downstream restriction to build pressure. There are two ways to accomplish this:

- Use a venting controller. The venting controller is configured with an internal vent orifice that is roughly 40% of the controller orifice size. This configuration of controller can supply pressure to an application with an effective downstream restriction that represents 30% of the controller orifice size down to a completely restricted application.

- Use of a non-venting controller. The non-venting controller does not incorporate an internal vent orifice and will require a downstream restriction of roughly 20% to 60% of the controller’s orifice size.

For example:
A non-vented controller with an orifice size of 0.010” should have 0.002” to 0.006” effective downstream restriction.
**VSO®-EP Miniature Electronic Pressure Controllers**

### Configurations

**Pressure Controller with Internal Vent**

![Diagram of pressure controller with internal vent]

With Internal Vent. A vent is required when the application does not consume any gas. For example, pressurizing a piloted regulator.

### Ordering Information

<table>
<thead>
<tr>
<th>Part Number</th>
<th>990-005001-015</th>
<th>990-005001-050</th>
<th>990-005001-100</th>
<th>990-005003-005</th>
</tr>
</thead>
<tbody>
<tr>
<td>Configuration</td>
<td>Internal Vent</td>
<td>Internal Vent</td>
<td>Internal Vent</td>
<td>Internal Vent</td>
</tr>
<tr>
<td>Effective Orifice</td>
<td>0.010” (0.25 mm)</td>
<td>0.010” (0.25 mm)</td>
<td>0.010” (0.25 mm)</td>
<td>0.030” (0.76 mm)</td>
</tr>
<tr>
<td>Main Voltage</td>
<td>24 VDC</td>
<td>24 VDC</td>
<td>24 VDC</td>
<td>24 VDC</td>
</tr>
<tr>
<td>Control Voltage</td>
<td>0-5 VDC</td>
<td>0-5 VDC</td>
<td>0-5 VDC</td>
<td>0-5 VDC</td>
</tr>
<tr>
<td>Pressure Range</td>
<td>0-15 psig</td>
<td>0-50 psig</td>
<td>0-100 psig</td>
<td>0-5 psig</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Part Number</th>
<th>990-005003-015</th>
<th>990-005003-050</th>
<th>990-005003-100</th>
</tr>
</thead>
<tbody>
<tr>
<td>Configuration</td>
<td>Internal Vent</td>
<td>Internal Vent</td>
<td>Internal Vent</td>
</tr>
<tr>
<td>Effective Orifice</td>
<td>0.003” (0.076 mm)</td>
<td>0.010” (0.25 mm)</td>
<td>0.010” (0.25 mm)</td>
</tr>
<tr>
<td>Main Voltage</td>
<td>24 VDC</td>
<td>24 VDC</td>
<td>24 VDC</td>
</tr>
<tr>
<td>Control Voltage</td>
<td>0-5 VDC</td>
<td>0-5 VDC</td>
<td>0-5 VDC</td>
</tr>
<tr>
<td>Pressure Range</td>
<td>0-15 psig</td>
<td>0-50 psig</td>
<td>0-100 psig</td>
</tr>
</tbody>
</table>

#### Accessories

- **10-32 Male to M5 x 0.8 mm Female Adaptor w/O-ring**
- **FKM & Brass**
**VS0®-EP** Miniature Electronic Pressure Controllers

### Configurations

**Pressure Controller with No Internal Vent**

![Pressure Controller Diagram](image)

With No Internal Vent. An internal vent may not be required when the application consumes a high rate of gas or the gas is coming from a limited source and/or is flammable.

### Ordering Information

<table>
<thead>
<tr>
<th>Part Number</th>
<th>Series</th>
<th>Configuration</th>
<th>Effective Orifice</th>
<th>Main Voltage</th>
<th>Control Voltage</th>
<th>Pressure Range</th>
</tr>
</thead>
<tbody>
<tr>
<td>990-005010-100</td>
<td>VSO-EP</td>
<td>No Internal Vent</td>
<td>0.010&quot; (0.25 mm)</td>
<td>24 VDC</td>
<td>0-5 VDC</td>
<td>0-100 psig</td>
</tr>
<tr>
<td>990-005011-015</td>
<td>VSO-EP</td>
<td>No Internal Vent</td>
<td>0.010&quot; (0.25 mm)</td>
<td>24 VDC</td>
<td>0-5 VDC</td>
<td>0-50 psig</td>
</tr>
<tr>
<td>990-005011-050</td>
<td>VSO-EP</td>
<td>No Internal Vent</td>
<td>0.010&quot; (0.25 mm)</td>
<td>24 VDC</td>
<td>0-5 VDC</td>
<td>0-5 psig</td>
</tr>
<tr>
<td>990-005011-100</td>
<td>VSO-EP</td>
<td>No Internal Vent</td>
<td>0.030&quot; (0.76 mm)</td>
<td>24 VDC</td>
<td>0-5 VDC</td>
<td>0-30 psig</td>
</tr>
<tr>
<td>990-005013-030</td>
<td>VSO-EP</td>
<td>No Internal Vent</td>
<td>0.030&quot; (0.76 mm)</td>
<td>24 VDC</td>
<td>0-5 VDC</td>
<td>0-100 psig</td>
</tr>
<tr>
<td>990-005010-100</td>
<td>VSO-EP</td>
<td>No Internal Vent</td>
<td>0.003&quot; (0.076 mm)</td>
<td>24 VDC</td>
<td>0-5 VDC</td>
<td>0-100 psig</td>
</tr>
<tr>
<td>990-005011-015</td>
<td>VSO-EP</td>
<td>No Internal Vent</td>
<td>0.010&quot; (0.25 mm)</td>
<td>24 VDC</td>
<td>0-5 VDC</td>
<td>0-50 psig</td>
</tr>
<tr>
<td>990-005011-050</td>
<td>VSO-EP</td>
<td>No Internal Vent</td>
<td>0.010&quot; (0.25 mm)</td>
<td>24 VDC</td>
<td>0-5 VDC</td>
<td>0-5 psig</td>
</tr>
<tr>
<td>990-005011-100</td>
<td>VSO-EP</td>
<td>No Internal Vent</td>
<td>0.030&quot; (0.76 mm)</td>
<td>24 VDC</td>
<td>0-5 VDC</td>
<td>0-30 psig</td>
</tr>
</tbody>
</table>

### Accessories

<table>
<thead>
<tr>
<th>Part Number</th>
<th>Configuration</th>
<th>Wetted Materials</th>
</tr>
</thead>
<tbody>
<tr>
<td>190-008246-001</td>
<td>10-32 Male to M5 x 0.8 mm Female Adaptor w/O-ring</td>
<td>FKM &amp; Brass</td>
</tr>
</tbody>
</table>

**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/vs0ep) to configure your VSO-EP Miniature Electronic Pressure Controller. For more detailed information, visit us on the Web, or call and refer to Performance Spec. #790-002202-001 and Drawing #890-003146-001.