


# VSO<sup>®</sup>-EV Miniature Electronic Vacuum Controller

## Vacuum Controllers



The VSO<sup>®</sup>-EV is a Miniature Electronic Vacuum Controller specifically configured and optimized for precise vacuum control. The VSO<sup>®</sup>-EV converts a variable electrical control signal into a closed-loop, tightly regulated pneumatic output. Often used for aspirating liquid samples for pipette dispensers, the VSO<sup>®</sup>-EV offers closed loop control around critical system parameters through the use of an internal vacuum sensor. The VSO<sup>®</sup>-EV is well suited for high precision automated laboratory instruments, meeting the most stringent separation and detection requirements.

### Features

- Low power consumption reducing heat generation
- Ensures high accuracy and unparalleled resolution for improved results
- Tested for long life to improve system availability
- Offers an internal vacuum sensor for closed loop control capability to ease integration
- Analog control for added design flexibility
- RoHS compliant 

### Typical Applications

- Sample aspiration
- Liquid dispense meniscus pressure control
- Component pick and place

## Product Specifications

### Physical Properties

<b>Valve Technology:</b>
Thermally compensated VSO <sup>®</sup> proportional valve
<b>Media:</b>
Non-corrosive gases
<b>Operating Environment:</b>
32 to 131°F (0 to 55°C)
<b>Storage Temperature:</b>
-40 to 149°F (-40 to 65°C)
<b>Length:</b>
1.27 in (32.3 mm)
<b>Width:</b>
2.32 in (59.0 mm)
<b>Height:</b>
2.20 in (55.9 mm)
<b>Weight:</b>
5.6 oz (158.8 g)
<b>Porting:</b>
10-32 female ports Metric adaptor available

### Electrical

<b>Main Voltage:</b>
24 VDC $\pm$ 10%
<b>Input Control Signal:</b>
0-5 VDC standard
<b>Monitor Output Voltage:</b>
0-5 VDC
<b>Current Requirement:</b>
Maximum <400 mA
<b>Electrical Connector:</b>
RJ-45

### Wetted Materials

<b>Manifold:</b>
AL 6061-T6, FKM, 302 Series SS
<b>Valve:</b>
FKM, 300 Series SS Brass 36000 HO2
<b>Tubing:</b>
Esther-based Polyurethane
<b>Sensor:</b>
Glass, Silicon, Silicone, Polyphenylene sulfide

### Performance Characteristics

<b>Vacuum Ranges:</b>
863-1013 mBar * 668-1013 mBar * 530-1013 mBar *
<b>Pressure Accuracy:</b>
$\pm$ 1.5% Full Scale maximum
<b>Response:</b>
<15 ms (Response time to target pressure is output volume dependent)
<b>Linearity:</b>
< $\pm$ 1.5% Full Scale

\* All pressure in mBar absolute

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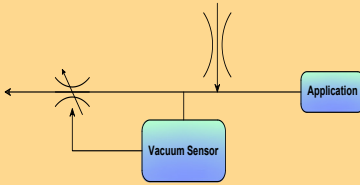


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## How Flow Effects Vacuum Control

The flow curves illustrate the flow capabilities of the two models of vacuum controllers.

Vacuum 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 some cases, the fixed orifice is the cumulative restriction of the application system requiring the vacuum. That fixed restriction, combined with atmosphere vented in through the internal fixed venting orifice, must be balanced against the sources vacuum level and its ability to generate flow. These are key factors in selecting the correct model of VSO®-EV.

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 Vacuum Controller can become unstable. When considering orifice size please remember that the effective control range is 10%-100% of full scale.

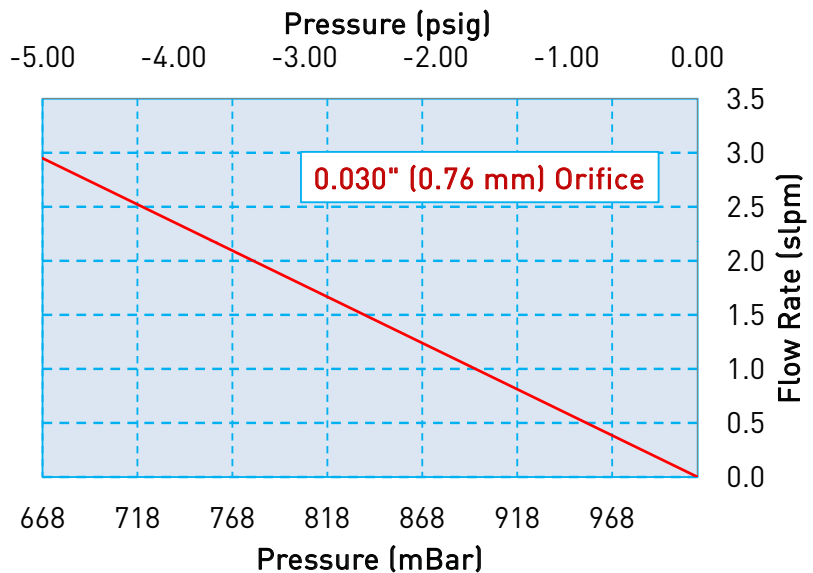
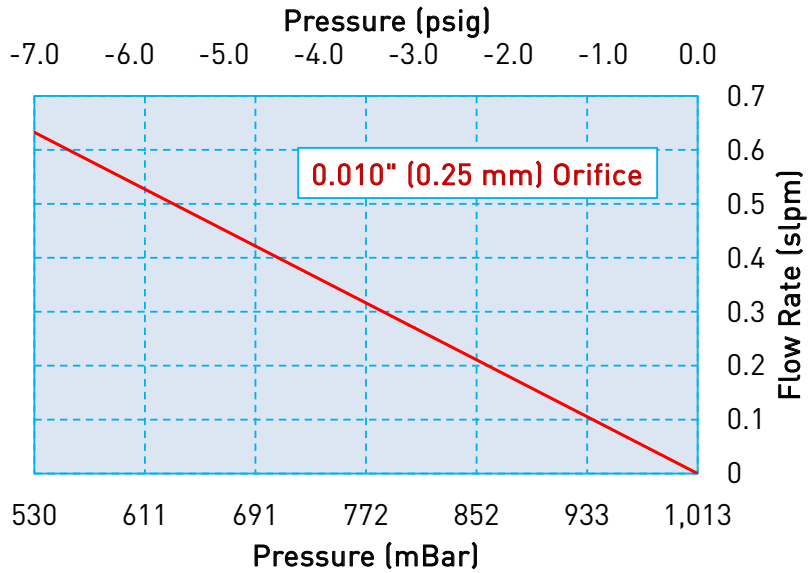
### EXAMPLE:

Please refer to flow chart labeled 0.010" (0.25mm) orifice. If your application requires 713 mBar of vacuum at 0.3 SLPM of flow, you would need a 0.010" orifice vacuum controller.

This graph shows that a 0.010" orifice will flow up to 0.4 SLPM at 713 mBar of vacuum making it the right choice for your application.

## VSO®-EV Flow Capability Sizing Charts

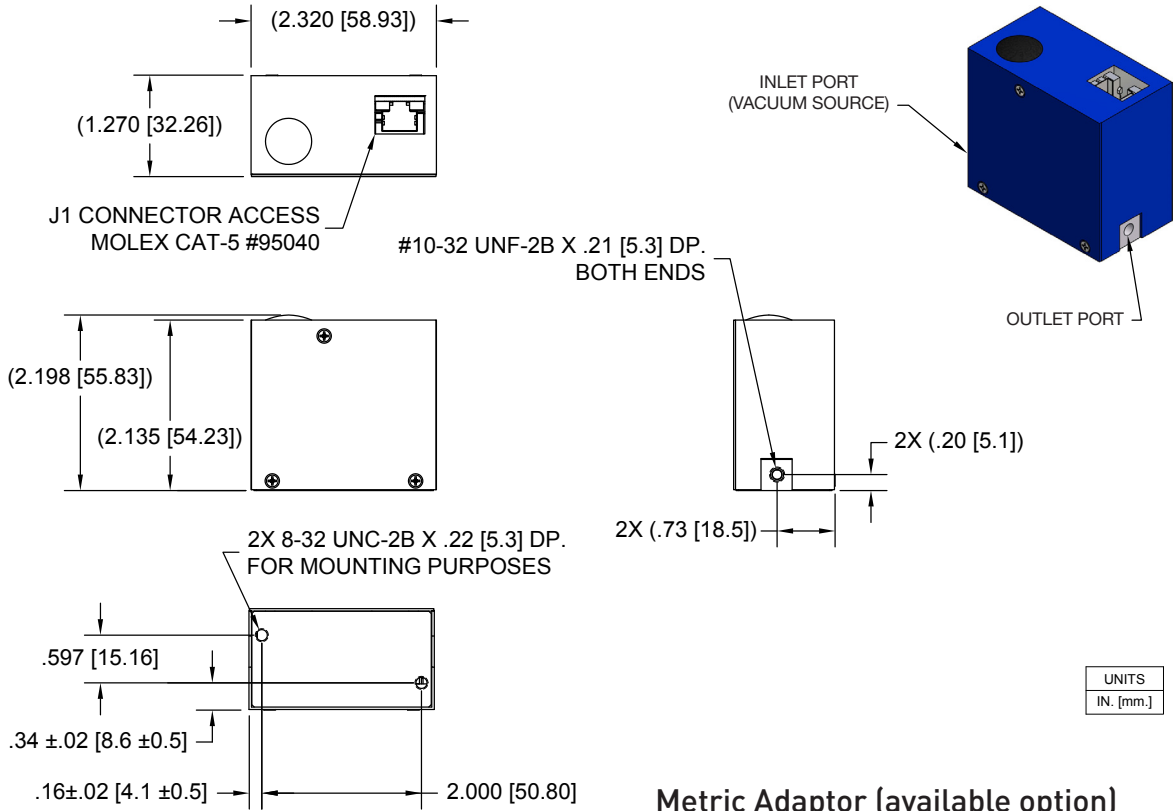
Typical Flow vs Vacuum @ 25°C



# VSO®-EV Miniature Electronic Vacuum Controllers

## Mechanical Integration Dimensions

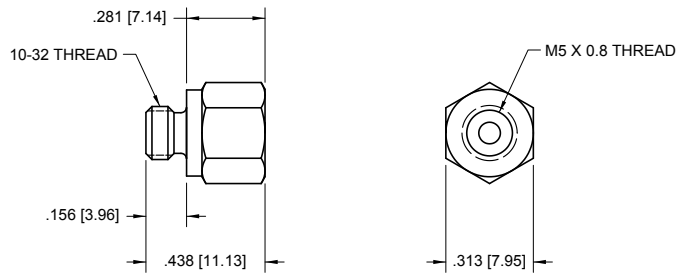
### VSO-EV Basic Dimensions



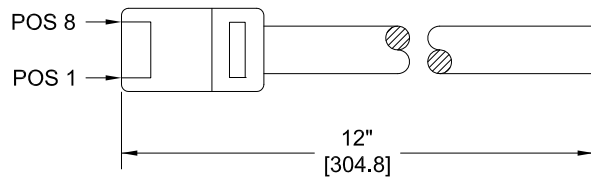
## Electrical Interface

CAT 5e Plug-in (RJ-45) Connector (included)	
Signal	RJ-45 Pin No. Color
Main Power, 24 VDC	1 White w/ Orange
Input Control Signal, 0-5 VDC	2 Solid Orange
Monitor Signal Output, 0-5 VDC	3 White w/ Green
System Ground	4 Solid Blue

### Metric Adaptor (available option)



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



## VSO<sup>®</sup>-EV Miniature Electronic Vacuum Controllers

### Installation Guide

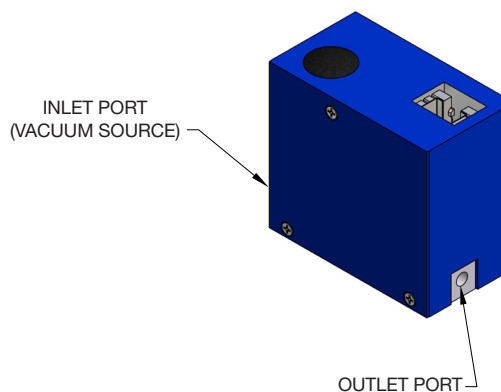
The VSO<sup>®</sup>-EV is a dynamic vacuum controller that uses proportional valve technology to supply an accurate and stable vacuum source for a variety of application requirements. Installation of this device requires the completion of a few easy steps.

They are as follows:

- Ensure that any gas drawn into the unit is non corrosive, clean and dry.
- Connect the vacuum source to the Inlet Port on the VSO<sup>®</sup>-EV.
- Connect a line requiring the controlled vacuum to the Outlet Port on the VSO<sup>®</sup>-EV.
- Pneumatic ports are 10-32 UNF-2B Female. Metric Adapter 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.

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### Key Things to Remember:

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

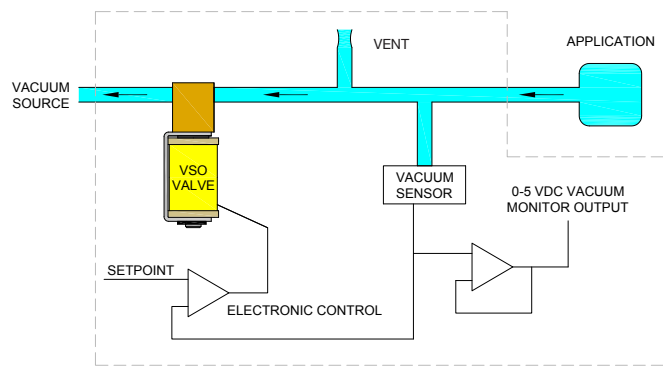
- Use a venting controller. The venting controller is configured with an internal vent orifice that is roughly 40% of the controller valve orifice size. This configuration of controller can supply vacuum to an application with a effective downstream restriction that represents 30% of the controller orifice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

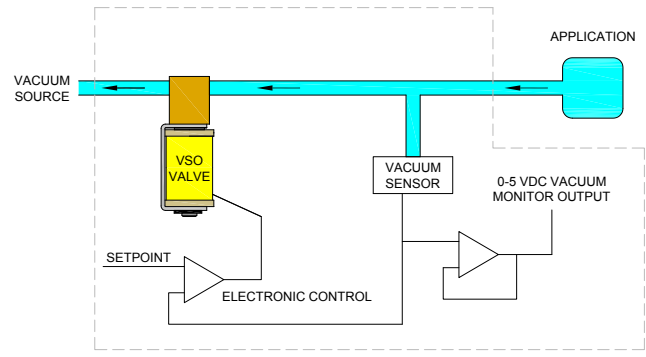
# VSO®-EV Miniature Electronic Vacuum Controllers Configurations

## Vacuum Controller with Internal Vent



**With Internal Vent.**  
An internal vent constantly draws air from atmosphere into the system.

## Vacuum Controller with No Internal Vent



**With No Internal Vent.**  
An internal vent may not be required when the application vents some air into the vacuum controller.

## Ordering Information

Part Number	990-005203-005	990-005201-002	990-005211-007
Series	VSO-EV	VSO-EV	VSO-EV
Configuration	Internal Vent	Internal Vent	No Internal Vent
Effective Orifice	0.030" (0.76 mm)	0.010" (0.25 mm)	0.010" (0.25 mm)
Main Voltage	24 VDC	24 VDC	24 VDC
Control Voltage	0-5 VDC	0-5 VDC	0-5 VDC
Pressure Range	668-1013 mBar	863-1013 mBar	530-1013 mBar

Accessories	
Part Number	190-008246-001
Configuration	10-32 Male to M5 x 0.8 mm Female Adaptor w/O-ring
Wetted Materials	FKM & Brass



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/vsoev](http://www.parker.com/precisionfluidics/vsoev)) to configure your VSO-EV Miniature Electronic Vacuum Controller. For more detailed information, visit us on the Web, or call and refer to Performance Spec. #790-002219-001 and Drawing #890-003153-001.

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



## NOTES

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