Research Series

$\frac{1}{16}'' - \frac{1}{4}''$ Back Pressure Regulators

LOW FLOW, LABORATORY SCALE FOR GAS, LIQUID, & MIXED PHASE SERVICE
Traditional back pressure regulators set the upstream pressure with a spring. These designs utilize springs, sliding seals and other moving parts that can introduce hysteresis and other undesired effects into a process. The Equilibar® back pressure regulator uses a thin supple diaphragm as the only moving part. This allows frictionless operation without cracking pressure or hysteresis. The accuracy of the Equilibar® back pressure regulator is limited by the accuracy of the pilot setpoint.

OUR PERFORMANCE.
Equilibar® back pressure regulators outperform the competition particularly in applications with low flow rates, mixed phase fluids, corrosive media, or extreme temperatures.

OUR PEOPLE.
Every inquiry gets special attention from our Engineering team to determine the best possible product for your needs. Every back pressure regulator is hand assembled and tested to meet our stringent quality standards.

OUR PRIORITIES.
Our goal is to exceed your expectations. In an industry where delivery times frequently exceed 6 weeks, we offer many of our standard products with delivery in about a week.
How it Works

Simply “load” the Equilibar® back pressure regulator with a pilot pressure equal to your desired back pressure and the Equilibar does the rest. This pressure forces the flexible diaphragm down onto a plate of orifices. A rise in inlet pressure lifts the diaphragm up to allow excess pressure to be relieved through the outlet orifices. Similarly, a loss of pressure at the inlet causes the diaphragm to be pushed closer to the orifices, restricting flow and rebuilding pressure upstream.

<table>
<thead>
<tr>
<th>TYPE</th>
<th>PRESSURE REDUCING REGULATOR</th>
<th>BACK PRESSURE REGULATOR</th>
</tr>
</thead>
<tbody>
<tr>
<td>SCHEMATIC</td>
<td><img src="image" alt="Diagram" /></td>
<td><img src="image" alt="Diagram" /></td>
</tr>
<tr>
<td>CONTROLS PRESSURE</td>
<td>Downstream</td>
<td>Upstream</td>
</tr>
<tr>
<td>OPENS TO</td>
<td>Increase downstream pressure</td>
<td>Decrease upstream pressure</td>
</tr>
<tr>
<td>CLOSES TO</td>
<td>Decrease downstream pressure</td>
<td>Increase upstream pressure</td>
</tr>
</tbody>
</table>

BACK PRESSURE REGULATORS VS PRESSURE REDUCING REGULATORS

Pressure reducing regulators reduce a higher supply pressure at the inlet down to a regulated lower pressure at the outlet (downstream). Back pressure regulators work the opposite way. They regulate the inlet (upstream) pressure by opening up only as much as necessary to hold back the desired pressure at the inlet (upstream).
Applications

There are hundreds of potential applications for the unique capabilities of Equilibar back pressure regulators. The Research Series is specifically designed for gas, liquid, and mixed phase applications where precision and consistency are critical.

Equilibar® Research Series regulators are especially useful in processes with low flow rates, extreme high pressures, and other challenging laboratory scenarios. By using unique combinations of diaphragm and O-ring materials, Equilibar regulators are able to perform in the harshest environments, including those with high temperatures and aggressive chemicals.

CATALYST RESEARCH REACTORS

Many catalyst research applications rely on high performance back pressure regulators to maintain stable pressure at elevated temperatures and down to nano flow rates. Because of the Equilibar’s unique ability to handle two-phase flow, it is possible to substitute a low pressure liquid/gas separator for the high-pressure separator.

RESERVOIR CORE ANALYSIS

There are many types of upstream petroleum core analysis applications that depend on back pressure regulators to maintain the pressure of the sample. Core flooding (as shown at right), PVT analysis, pyrolysis, and slim tube analysis can all benefit from the ultra-low flow capability of Equilibar’s Research Series. The ZF (Zero Flow) Series in particular was developed to address the demanding requirements of this industry.
**Key Advantages of Equilibar® Back Pressure Regulators**

<table>
<thead>
<tr>
<th>EXTREMELY WIDE RANGE OF CV</th>
<th>RUGGED CONSTRUCTION &amp; EASE OF SERVICE</th>
</tr>
</thead>
<tbody>
<tr>
<td>Control flow over 100,000:1 turndown ratio. Use just one Equilibar back pressure regulator to replace multiple control valves.</td>
<td>Equilibar back pressure regulators are machined directly from bar stock metals. Each Equilibar back pressure regulator consists of just a body, bolts, O-rings, and diaphragm. Equilibar back pressure regulators can be completely cleaned and rebuilt in minutes. Rebuild kits are always in stock and ready to ship.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>HIGH PRESSURE CAPABILITIES</th>
<th>FRICTIONLESS OPERATION</th>
</tr>
</thead>
<tbody>
<tr>
<td>Equilibar Research Series back pressure regulators can operate at pressures up to 10,000 psig (690 bar(g)).</td>
<td>Equilibar back pressure regulators are free of springs and valve seats that add friction and reduce precision.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>CHEMICAL COMPATIBILITY</th>
<th>LOW PRESSURE CAPABILITIES</th>
</tr>
</thead>
<tbody>
<tr>
<td>Equilibar back pressure regulators are made in many exotic metal alloys and polymers including Hastelloy, Titanium, Zirconium, PTFE, PVDF, with dozens of diaphragm and O-ring options available.</td>
<td>Equilibar’s direct diaphragm sealing technology controls down to 0.5 in WC.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>HIGH TEMPERATURE CAPABILITIES</th>
<th>COMPUTER AUTOMATION</th>
</tr>
</thead>
<tbody>
<tr>
<td>Equilibar Research Series back pressure regulators can be used up to 450°C (842°F) to allow hot media and/or oven installation.</td>
<td>All Equilibar back pressure regulators can be controlled both manually and electronically. Verify the system design with manual control, then automate it later by adding an electronic pilot regulator.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>MULTI-PHASE FLOW COMPATIBILITY &amp; PATENTED MULTI-ORIFICE DESIGN</th>
<th>ENGINEER DIRECT CUSTOMER SUPPORT</th>
</tr>
</thead>
<tbody>
<tr>
<td>Traditional back pressure regulators consist of a single orifice and valve seat, while Equilibar back pressure regulators have multiple orifices in parallel. This patented multi-orifice design controls liquid and gas flow simultaneously without the pressure spikes seen in traditional regulators. This multi-orifice design allows pressure control of slurries and viscous fluids as well.</td>
<td>Call an Equilibar application engineer to assist with questions or issues.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>INSTANT RESPONSE TIME</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Equilibar back pressure regulators instantly respond to changes in either line pressure or set point pressure.</td>
<td></td>
</tr>
</tbody>
</table>

Equilibar Research Series regulators are widely used in catalyst research systems because of their high temperature tolerance, two-phase flow capability, and ease of computer automation. (Photo courtesy Integrated Lab Solutions, Gmbh)
Standard Multi-Orifice Series Back Pressure Regulators

Our unique, patented multi-orifice technology has an extremely wide flow range and superior two phase flow performance.

<table>
<thead>
<tr>
<th>PART #</th>
<th>BASE PRESSURE RTG</th>
<th>FLOW COEFF. (CV)</th>
<th>PORT SIZE</th>
<th>WEIGHT</th>
<th>Dead Volume</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>PSIG (BAR)</td>
<td>MIN</td>
<td>MAX</td>
<td></td>
<td></td>
</tr>
<tr>
<td>STD Low Flow Models</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>LF0</td>
<td>1000 (68)</td>
<td>1E-08</td>
<td>1/16”</td>
<td>0.01</td>
<td>1.67</td>
</tr>
<tr>
<td>LF1</td>
<td>1000 (68)</td>
<td>1E-08</td>
<td>1/8”</td>
<td>0.07</td>
<td>2.09</td>
</tr>
<tr>
<td>H3P0</td>
<td>3000 (200)</td>
<td>1E-08</td>
<td>1/16”</td>
<td>0.01</td>
<td>1.67</td>
</tr>
<tr>
<td>H3P1</td>
<td>3000 (200)</td>
<td>1E-08</td>
<td>1/8”</td>
<td>0.07</td>
<td>2.09</td>
</tr>
<tr>
<td>H3P2</td>
<td>3000 (200)</td>
<td>1E-08</td>
<td>1/4”</td>
<td>0.07</td>
<td>3.15</td>
</tr>
<tr>
<td>H6P0</td>
<td>6000 (400)</td>
<td>1E-08</td>
<td>1/16”</td>
<td>0.01</td>
<td>1.67</td>
</tr>
<tr>
<td>H6P1</td>
<td>6000 (400)</td>
<td>1E-08</td>
<td>1/8”</td>
<td>0.07</td>
<td>2.09</td>
</tr>
<tr>
<td>H6P2</td>
<td>6000 (400)</td>
<td>1E-08</td>
<td>1/4”</td>
<td>0.07</td>
<td>3.15</td>
</tr>
<tr>
<td>H10P1</td>
<td>10000 (680)</td>
<td>1E-06</td>
<td>1/8”</td>
<td>0.07</td>
<td>2.09</td>
</tr>
<tr>
<td>Hig Flow Models</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>HF1</td>
<td>1000 (68)</td>
<td>1E-05</td>
<td>1/8”</td>
<td>0.41</td>
<td>5.65</td>
</tr>
<tr>
<td>H3P2</td>
<td>3000 (200)</td>
<td>1E-05</td>
<td>1/4”</td>
<td>0.35</td>
<td>3.75</td>
</tr>
<tr>
<td>H6P2</td>
<td>6000 (400)</td>
<td>1E-05</td>
<td>1/4”</td>
<td>0.35</td>
<td>3.75</td>
</tr>
<tr>
<td>HT1</td>
<td>6000 (400)</td>
<td>1E-05</td>
<td>1/8”</td>
<td>0.07</td>
<td>2.09</td>
</tr>
<tr>
<td>HT2</td>
<td>6000 (400)</td>
<td>1E-05</td>
<td>1/4”</td>
<td>0.07</td>
<td>3.15</td>
</tr>
<tr>
<td>HTF1</td>
<td>6000 (400)</td>
<td>1E-05</td>
<td>1/8”</td>
<td>0.35</td>
<td>3.75</td>
</tr>
<tr>
<td>HTF2</td>
<td>6000 (400)</td>
<td>1E-05</td>
<td>1/4”</td>
<td>0.35</td>
<td>3.75</td>
</tr>
</tbody>
</table>

PORTING OPTIONS

- **N:** NPT (Standard) Full
- **A:** HIP (High Pressure) 0.072
- **B:** BSPP Full
- **C:** Custom –
- **O:** Swagelok VCO® 0.072
- **R:** Swagelok VCR® 0.072
- **T:** Tube Stub 0.072
- **V:** HPLC .001 - 0.018
- **W:** Autoclave Speed-Bite .07

TECHNICAL SPECIFICATIONS

- **Max Operating Pressure:** Pressure ratings listed in the table are the maximum possible pressure that a unit may be configured to. Units can be configured for optimum performance at lower pressures. Speak with an Application Engineer for more information.
- **Proof Pressure:** 150% Rated Pressure
- **Design Pressure:** 400% Maximum Body Pressure
- **Temperature Capabilities:** Up to 150°C (Metallic Body, PTFE Diaphragm, Viton® O-rings) Up to 200°C (Metallic Body, Metallic Diaphragm, Viton® O-rings) Up to 300°C (Metallic Body, Metallic Diaphragm, Kelrez® O-rings) Up to 450°C (HT/HTF Models, Metallic Body, Grafoil Gaskets)

WETTED MATERIALS

- **Body Material:** Stainless Steel 316/316L (standard)
  - Also available: Hastelloy C276, Titanum, Zirconium, PTFE®, PVDF®, PEEK®, PVC®, Monel
- **O-Rings:** Viton® (FKM) (standard)
  - Also available: Kelrez® (FKM), PTFE, EPDM, Buna-N, Grafoil® (HT Only)
- **Diaphragm:** PTFE/Glass Laminate (standard)
  - Also available: Stainless Steel SS316/316L, Hastelloy C276, Virgin PTFE, FKM, Polymide, Buna-N, PEEK, EPDM

Viton® and Kelrez® are registered trademarks of DuPont. VCO® and VCR® are trademarks of Swagelok. Grafoil® is a trademark of GrafTech.

Equilibar regulators are control devices, not safety devices or shut-off devices and should not be used as such.

*Dead volumes are approximate and for reference only. Approximations are made assuming the diaphragm is in the "down" position.*
Performance below and left of the blue curve is configuration dependent. Higher flow models exhibit similar performance at greater flow capacity. While these performance curves are for Nitrogen, Equilibar Back Pressure Regulators may be used for gas, liquid, or mixed phase service.
Ultra Low Flow Series Back Pressure Regulators

The Ultra Low Flow Series performs similarly to the Standard Multi-Orifice Series, but can operate at lower flow rates.

<table>
<thead>
<tr>
<th>BASE</th>
<th>MAX PRESSURE RATING</th>
<th>FLOW COEFF. (CV)</th>
<th>INLET/OUTLET PORT SIZE</th>
<th>REFERENCE PORT SIZE</th>
<th>PORT THREADS</th>
<th>DIM A (INCH)</th>
<th>DIM B (INCH)</th>
<th>WEIGHT (LB)</th>
<th>Dead Volume (ml)</th>
</tr>
</thead>
<tbody>
<tr>
<td>U3L0</td>
<td>3000 (200)</td>
<td>1E-09</td>
<td>1/16&quot;</td>
<td>1/8&quot;</td>
<td>V (HPLC)</td>
<td>A, N, C</td>
<td>2.5 (64)</td>
<td>1.7 (42)</td>
<td>2.0 (0.9)</td>
</tr>
<tr>
<td>U3L1</td>
<td>3000 (200)</td>
<td>0.05</td>
<td>1/8&quot;</td>
<td>1/8&quot;</td>
<td>N (NPT)</td>
<td>A, B, C, O, R, T, V, W</td>
<td>2.5 (64)</td>
<td>1.7 (42)</td>
<td>2.0 (0.9)</td>
</tr>
<tr>
<td>U3L2</td>
<td>3000 (200)</td>
<td>0.05</td>
<td>1/4&quot;</td>
<td>1/4&quot;</td>
<td>N (NPT)</td>
<td>A, B, C, O, R, T, V, W</td>
<td>2.8 (70)</td>
<td>1.7 (42)</td>
<td>2.5 (1.1)</td>
</tr>
<tr>
<td>U6L0</td>
<td>6000 (400)</td>
<td>0.01</td>
<td>1/16&quot;</td>
<td>1/8&quot;</td>
<td>V (HPLC)</td>
<td>A, N, C</td>
<td>2.8 (70)</td>
<td>1.7 (42)</td>
<td>2.5 (1.1)</td>
</tr>
<tr>
<td>U6L1</td>
<td>6000 (400)</td>
<td>0.05</td>
<td>1/8&quot;</td>
<td>1/8&quot;</td>
<td>N (NPT)</td>
<td>A, B, C, O, R, T, V, W</td>
<td>2.8 (70)</td>
<td>1.7 (42)</td>
<td>2.5 (1.1)</td>
</tr>
<tr>
<td>U6L2</td>
<td>6000 (400)</td>
<td>0.05</td>
<td>1/4&quot;</td>
<td>1/4&quot;</td>
<td>N (NPT)</td>
<td>A, B, C, O, R, T, V, W</td>
<td>2.8 (70)</td>
<td>1.7 (42)</td>
<td>2.5 (1.1)</td>
</tr>
<tr>
<td>U10L0</td>
<td>10,000 (680)</td>
<td>0.01</td>
<td>1/16&quot;</td>
<td>1/8&quot;</td>
<td>N (NPT)</td>
<td>A, N, C</td>
<td>3.0 (76)</td>
<td>2.1 (53)</td>
<td>3.0 (1.4)</td>
</tr>
<tr>
<td>U10L1</td>
<td>10,000 (680)</td>
<td>0.05</td>
<td>1/8&quot;</td>
<td>1/8&quot;</td>
<td>N (NPT)</td>
<td>A, C, W</td>
<td>3.0 (76)</td>
<td>2.1 (53)</td>
<td>3.0 (1.4)</td>
</tr>
</tbody>
</table>

*Dead volumes are approximate and for reference only. Approximations are made assuming diaphragm is in the “down” position.*

Speak with an application engineer to find out if the Ultra Low Flow Series is right for your application.

**PORTING OPTIONS**

<table>
<thead>
<tr>
<th>Notation</th>
<th>Type</th>
<th>Max Cv</th>
</tr>
</thead>
<tbody>
<tr>
<td>N</td>
<td>NPT (Standard)</td>
<td>Full</td>
</tr>
<tr>
<td>A</td>
<td>HiP (High Pressure)</td>
<td>Full</td>
</tr>
<tr>
<td>B</td>
<td>BSPP</td>
<td>Full</td>
</tr>
<tr>
<td>C</td>
<td>Custom</td>
<td>–</td>
</tr>
<tr>
<td>O</td>
<td>Swagelok VCO©</td>
<td>Full</td>
</tr>
<tr>
<td>R</td>
<td>Swagelok VCR©</td>
<td>Full</td>
</tr>
<tr>
<td>T</td>
<td>Tube Stub</td>
<td>Full</td>
</tr>
<tr>
<td>V</td>
<td>HPLC</td>
<td>.001 - 0.018</td>
</tr>
<tr>
<td>W</td>
<td>Auto clave Speed-Bite W125</td>
<td>Full</td>
</tr>
</tbody>
</table>

**WETTED MATERIALS**

- **Body Material**: Stainless Steel 316/316L (standard)
  Also available: Hastelloy C276, Titanium, Zirconium, PTFE, PVDF, PEEK, PVC, Monel

- **O-Rings**: Viton© (FKM) (standard)
  Also available: Kalrez© (FFKM), PTFE, EPDM, Buna-N

- **Diaphragm**: PTFE/Glass Laminate (standard)
  Also available: Stainless Steel SS316/316L, Hastelloy C276, Virgin PTFE, FKM, Polymide, Buna-N, PEEK, EPDM

3All Equilibar units are tested to 150% of their rated pressure prior to shipment.
4Designed according to ASME B31.3, which incorporates an approximate 4X safety factor.
5Polymer units reduce maximum allowable working pressure, consult an application engineer for additional information.
6Viton" and Kalrez® are registered trademarks of DuPont. VCO© and VCR® are trademarks of Swagelok.
7Equilibar regulators are control devices, not safety devices or shut-off devices and should not be used as such.

© 2011-2019 Equilibar, LLC
Zero Flow Series Back Pressure Regulator

Operates similarly to the Standard Multi-Orifice design, but utilizes a soft-seat to provide effective zero flow pressure control.

<table>
<thead>
<tr>
<th>PART #</th>
<th>BASE MAX PRESSURE RATING</th>
<th>FLOW COEFF. (CV)</th>
<th>INLET/OUTLET PORT SIZE</th>
<th>REFERENCE PORT SIZE</th>
<th>PORT THREADS</th>
<th>DIM A</th>
<th>DIM B</th>
<th>WEIGHT</th>
<th>Dead Volume</th>
</tr>
</thead>
<tbody>
<tr>
<td>ZFO</td>
<td>3000 (200)</td>
<td>0.015</td>
<td>1/16”</td>
<td>1/8”</td>
<td>V (HPLC)</td>
<td>A, C, N</td>
<td>2.0</td>
<td>0.25 (0.02)</td>
<td></td>
</tr>
<tr>
<td>ZF1</td>
<td>3000 (200)</td>
<td>0.015</td>
<td>1/8”</td>
<td>1/8”</td>
<td>N (NPT)</td>
<td>A, B, C, O, R, T, V, W</td>
<td>2.0</td>
<td>2.16 (0.13)</td>
<td></td>
</tr>
</tbody>
</table>

1 Dead volumes are approximate and for reference only. Approximations are made assuming diaphragm is in the “down” position. Speak with an Application Engineer to find out if the Zero Flow Series is right for your application.

PORTING OPTIONS

<table>
<thead>
<tr>
<th>Notation</th>
<th>Type</th>
<th>Max Cv</th>
</tr>
</thead>
<tbody>
<tr>
<td>N</td>
<td>NPT (Standard)</td>
<td>Full</td>
</tr>
<tr>
<td>A</td>
<td>HIP (High Pressure)</td>
<td>Full</td>
</tr>
<tr>
<td>B</td>
<td>BSPP</td>
<td>Full</td>
</tr>
<tr>
<td>C</td>
<td>Custom</td>
<td>–</td>
</tr>
<tr>
<td>O</td>
<td>Swagelok VCO®</td>
<td>Full</td>
</tr>
<tr>
<td>R</td>
<td>Swagelok VCR®</td>
<td>Full</td>
</tr>
<tr>
<td>T</td>
<td>Tube Stub</td>
<td>Full</td>
</tr>
<tr>
<td>V</td>
<td>HPLC</td>
<td>.001 - 0.018</td>
</tr>
<tr>
<td>W</td>
<td>Autoclave Speed-Bite W125</td>
<td>Full</td>
</tr>
</tbody>
</table>

WETTED MATERIALS

- **Body Material**: Stainless Steel 316/316L (standard)
  - Also available: Hastelloy C276, Titanium, Zirconium, PTFE, PVDF, PEEK, Polyimide, Buna-N (Nitrile).
- **O-Rings**: Viton® (FKM) (standard)
  - Also available: Kalrez® (FFKM), PTFE, EPDM, Buna-N (Nitrile).
- **Diaphragm**: Stainless Steel SS316/316L (standard)
  - Also available: Hastelloy C276, PTFE/Glass Laminate, Virgin PTFE, FKM, Polyimide, Buna-N (Nitrile) PEEK, EPDM.

TECHNICAL SPECIFICATIONS

- **Max Operating Pressure**: Pressure ratings listed in the table are the maximum possible pressure that a unit may be configured to. Units can be configured for optimum performance at lower pressures. Speak with an Application Engineer for more information.
- **Proof Pressure**: 150% Rated Pressure
- **Design Pressure**: 400% Maximum Body Pressure
- **Temperature Rating**: 200°C (Metallic Body, Metallic Diaphragm, Viton® O-rings)
  - 300°C (Metallic Body, Metallic Diaphragm, Kalrez® O-rings)

*All Equilibar units are tested to 150% of their rated pressure prior to shipment.
*Designed according to ASME B31.3, which incorporates an approximate 4X safety factor.
*Polymer units reduce maximum allowable working pressure, consult an application engineer for additional information.

Viton® and Kalrez® are registered trademarks of DuPont. VCO® and VCR® are trademarks of Swagelok.

Equilibar®, VCO®, VCR®, and Speed-Bite W125 are registered trademarks of Equilibar.

**Performance of Zero Flow Series (Nitrogen)**

*While these performance curves are for Nitrogen, Equilibar Back Pressure Regulators may be used for gas, liquid, or mixed phase service.

PATENTS

These regulators are subject to one or more of these patents: US6,886,591, US7,080,660, US7,673,650, US8,215,336, US9,447,890, DE60322443D1, GB1639282, FR1639282, CH1639282.
## Ordering Information

### EXAMPLE

<table>
<thead>
<tr>
<th>LF</th>
<th>1</th>
<th>S</th>
<th>N</th>
<th>N</th>
<th>X</th>
<th>–</th>
<th>N</th>
<th>S</th>
<th>X</th>
<th>P</th>
<th>500</th>
<th>T</th>
<th>150</th>
<th>G</th>
<th>X</th>
<th>V</th>
<th>V</th>
<th>B</th>
</tr>
</thead>
<tbody>
<tr>
<td>N</td>
<td>X</td>
<td>–</td>
<td>7</td>
<td>8</td>
<td>9</td>
<td>10</td>
<td>11</td>
<td>12</td>
<td>13</td>
<td>14</td>
<td>15</td>
<td>16</td>
<td>17</td>
<td>18</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### Model
- **Up to 1000 psig**
  - LF: Cv: 1E-7 to 0.07
  - HF: Cv: 1E-4 to 0.5 Cv
- **Up to 3000 psig**
  - U3L: Cv: 1E-8 to 0.05
  - H3P: Cv: 1E-6 to 0.07
  - H3PF: Cv: 1E-4 to 0.5
- **Up to 6000 psig**
  - U6L: Cv: 1E-8 to 0.05
  - H6P: Cv: 1E-6 to 0.07
  - H6PF: Cv: 1E-4 to 0.5
- **Up to 10,000 psig**
  - U10L: Cv: 1E-8 to 0.05
  - H10P: Cv: 1E-6 to 0.07
  - H10PF: Cv: 1E-4 to 0.5

### Port Size
- 0: 1/16"
- 1: 1/8"
- 2: 1/4"

### Body Material
- S: Stainless Steel 316/316L
- H: Hastelloy C276
- T: Titanium
- Z: Zirconium
- F: PTFE
- K: PEEK
- D: PVDF

### Port Threads
- N: NPT
- B: BSP
- W: Autoclave Speed-Bite
- O: VCO*
- R: VCR*
- V: HPLC
- A: HiP

### Recess
- N: None

### Mod #
- X: (Factory Selected)

### Reference Port Threads
- N: NPT
- B: BSP
- W: Autoclave Speed-Bite
- O: VCD
- R: VCR
- V: HPLC
- A: HiP

### Cap Material (Non Wetted)
- S: Stainless Steel 316/316L
- P: PVC
- F: PTFE
- K: PEEK
- D: PVDF

### Bolts
- X: (Factory Selected)

### Pressure Rating (psi)
- This is the maximum pressure you would like your unit to be configured to accept. Must be equal to or less than the maximum body pressure (in psi).

### Temperature Rating
- Temperature Limitations:
  - 40°C for most polymer bodies
  - 150°C for most PTFE diaphragms
  - 200°C for Viton O-rings
  - 300°C for Kalrez O-rings

### Diaphragm Material
- G: PTFE (Glass Reinforced)
- B: Buna-N (Nitrile)
- V: FKM Fluoroelastomer
- M: EPDM
- E: Polyethylene
- F: PTFE (Virgin)
- S: Stainless Steel 316/316L
- H: Hastelloy C276
- I: Polyimide
- K: PEEK
- L: Kel-F
- C: FEP

### Diaphragm Thickness
- (Factory Selected)

### O-ring (Wetted)
- V: Viton® FKM Shore 75
- W: Viton® FKM Shore 90
- K: Kalrez® FFKM Grade 7075
- L: Kalrez® FFKM Grade 7090
- F: PTFE Grade 55
- M: EPDM Grade 70
- B: Buna-N Grade 70 (Nitrile)
- G: Grafoil® (HT Only)

### O-ring (Non Wetted)
- V: Viton® FKM Shore 75
- W: Viton® FKM Shore 90
- K: Kalrez® FFKM Grade 7075
- L: Kalrez® FFKM Grade 7090
- F: PTFE Grade 55
- M: EPDM Grade 70
- B: Buna-N Grade 70 (Nitrile)
- G: Grafoil® (HT Only)

### O-ring (Wetted)
- U3L, U6L, U10L, ZF Only
- Leave blank for all other models
- (Blank): None

### O-ring (Non Wetted)
- V: Viton® FKM Shore 75
- W: Viton® FKM Shore 90
- K: Kalrez® FFKM Grade 7075
- L: Kalrez® FFKM Grade 7090
- F: PTFE Grade 55
- M: EPDM Grade 70
- B: Buna-N Grade 70 (Nitrile)

### Special Options
- (Blank): None
- B: Mounting Bracket
- O: Oxygen Cleaning

Options listed in blue are typically in stock for quick shipment.
For custom options contact an applications engineer.
Viton® and Kalrez® are registered trademarks of DuPont. VCO® and VCR® are trademarks of Swagelok. Grafoil® is a trademark of GraTech.
Each application is reviewed by our engineering team to ensure quality performance of our products.

Have a special application? Equilibar also offers custom designed solutions to meet your needs.