BR Series
Blockage Resistance Back Pressure Regulator
GAS, LIQUID & MIXED PHASE SERVICE: DESIGNED FOR SUPERCRITICAL APPLICATIONS
APPLICATION HIGHLIGHT

Pressure Control for Supercritical Extraction

In supercritical carbon dioxide (SCO2) extraction processes, pressure control is extremely important for product quality and consistency. The schematic below is a simplified version for illustration purposes but shows how an Equilibar BR Series back pressure regulator (BPR) can be used in this process.

The Equilibar BR series BPR controls pressure very accurately and is able to hold the extraction pressure precisely at the required setpoint regardless of fluctuations in the system flow rate or variations in the system temperature. This allows for more precise targeting of the desired extract. The BR design also resists blockage from oils that have become highly viscous due to the extreme cold of the expanding gasses.

In the final stage of the process, during separation, the SCO2 is decompressed for recycling and the blockage resistant design of the BR Series becomes even more important. The expansion of the supercritical fluid during this pressure let down stage is often problematic. The Joules-Thompson effect causes a dramatic temperature drop which can lead to ice formation that may block the internal passages of the BPR. The Equilibar BR Series BPR is specifically designed to resist the buildup of ice in its internal passages.

OTHER APPLICATIONS

There are numerous potential applications for the unique capabilities of the Equilibar BR Series, designed for gas, fluid, and mixed flow applications where precision is paramount. Suggested uses include:

- Controlling refrigerant vapor pressure for isothermal evaporator control
- Supercritical Fractional Separation
- Plant matter extraction

Please contact an Equilibar engineer to discuss your application.

PATENTS

These regulators are subject to one or more of these patents: US6,886,591, US7,080,660, US7,673,650, US8,215,336, DE60322443D1, GB1639282, FR1639282
The Equilibar® B6R and BR models are variants of the popular Equilibar back pressure regulators. This series integrates technology optimizing for supercritical applications. These features maintain high precision control while reducing the Joule-Thomson effect of supercritical process fluids passing through the outlet orifices.

Equilibar has had great success in supercritical applications with the standard Research Series models, and these BR Series improvements were designed with the help and feedback from customers operating our units.

**UNIQUE EQUILIBAR TECHNOLOGY**

- Dome-loaded pilot regulated design is 5X more precise than traditional spring-loaded regulators
- Frictionless flexible diaphragm is the only moving part
- Apply pressure to the dome of the Equilibar back pressure regulator at the desired setpoint and the BPR does the rest
- Two modes of operation
  1. Manual adjustment by mechanical pilot regulator
  2. Computer automation by electronic pilot regulator

**SUPERCritical DESIGN ADVANTAGES**

- Precision within 2%
- Pressure up to 6000 psig (413 Bar)
- Temperature up to 300°C (572°F)
- Blockage and freezing resistant
- Excellent performance in mixed phase conditions
- Suitable for ultrapure and aggressive chemicals
- Custom options for specific applications
- Follow this link to watch how it works

**BR Series Ordering Information**

<table>
<thead>
<tr>
<th>PART NUMBER</th>
<th>INLET / OUTLET PORT</th>
<th>PILOT PORT</th>
<th>WETTED MATERIALS</th>
<th>MAX PRESSURE</th>
<th>MAX TEMP</th>
<th>CV RANGE</th>
</tr>
</thead>
<tbody>
<tr>
<td>B6R-2E</td>
<td>1/4” NPT</td>
<td>1/8” NPT</td>
<td>Stainless Steel 316/316L, EPDM, Polyimide</td>
<td>6000 psi</td>
<td>150°C</td>
<td>1E-5 to 0.64</td>
</tr>
<tr>
<td>B6R-2K</td>
<td>1/4” NPT</td>
<td>1/8” NPT</td>
<td>Stainless Steel 316/316L, Kalrez, Polyimide</td>
<td>6000 psi</td>
<td>300°C</td>
<td>1E-5 to 0.64</td>
</tr>
<tr>
<td>B6R-3E</td>
<td>3/8” NPT</td>
<td>1/8” NPT</td>
<td>Stainless Steel 316/316L, EPDM, Polyimide</td>
<td>6000 psi</td>
<td>150°C</td>
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Equilibar also offers custom supercritical back pressure regulators with special features such as a heating cartridge, thermocouple ports, or flanged outlets for connection to a collection vessel. Contact an application engineer for assistance.
Each application is reviewed by our engineering team to ensure quality performance of our products.

APPLICATION ENGINEERING—WHAT SETS US APART

Unlike mass-market regulator distributors, we focus on working with you, the scientist or engineer with a complex pressure control scenario.

Our application engineers work collaboratively with clients to identify the optimal model, trim, and diaphragm for each application’s unique challenges. No matter where you are on the globe, you can stay in close contact with your engineer by email, telephone, videoconferencing, or fax.

After installation, your application engineer will support you with start-up information and fine-tuning as needed.

Equilibar’s quality system is ISO 9001:2015 certified.