QBS Electronic Control Valve
For Pressures Up To 500 psi
The Equilibar QBS is an electronic pressure regulator designed to accurately control the pressure of gaseous media proportional to an electronic signal. It is primarily used for pressures up to 500psi (35 Bar).

The QBS operates using two normally closed solenoid valves, a pressure sensor, and a control circuit. One valve is actuated to allow unregulated supply media to flow in and raise the system pressure. The second valve is actuated to allow working media to vent to atmosphere and lower the pressure in the system. An internal pressure sensor provides feedback to the control circuit. The control circuit compares the pressure sensor feedback to the user supplied electronic command signal and actuates the appropriate solenoid valve until the two signals match.

The QBS is most often used to provide the pilot reference pressure to an Equilibar® back pressure regulator. However, the QBS is useful in any application where a relatively small closed volume requires the pressure to be either accurately or remotely controlled.

The QBS series product comes with an electronic monitor output signal. This monitor output is an electrical signal originating from the internal pressure transducer used in the control circuit. The signal allows the system pressure to be remotely monitored and also provides a useful signal for data acquisition needs. The output of this signal can be configured to either 0-10Vdc or 4-20mA.

The QBS is built using a rugged stainless steel manifold and is contained within a protective NEMA4/IP65 enclosure.

The QBS2 is similar to the QBS1 but uses a double loop control scheme. In addition to the internal pressure transducer, the QBS2 also receives a 0-10Vdc feedback signal from an external pressure sensing device. The external pressure signal functions as the primary feedback and is compared directly to the command signal.

A difference between the two comparisons causes one of the two solenoid valves to open allowing flow in or out of the system as required. The QBS2 second loop is used in a narrow range of applications and is especially useful when pilot operating a pressure reducing regulator (also known as a volume booster). This allows the QBS2 to compensate for any mechanical errors or hysteresis of the volume booster.

An Equilibar DSY or DSTY will work as a second loop feedback to the QBS2. The QBS2 monitor signal mimics the external pressure sensor signal.
## QB General Specifications

### ELECTRICAL

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Specification</th>
</tr>
</thead>
<tbody>
<tr>
<td>SUPPLY VOLTAGE</td>
<td>15 to 24 VDC</td>
</tr>
<tr>
<td>SUPPLY CURRENT</td>
<td>250 mADC</td>
</tr>
<tr>
<td>COMMAND VDC</td>
<td>0 to 10 VDC</td>
</tr>
<tr>
<td>COMMAND (CURRENT option)</td>
<td>4 to 20 mADC Differential</td>
</tr>
<tr>
<td>MONITOR VDC</td>
<td>0 to 10 VDC</td>
</tr>
<tr>
<td>MONITOR (CURRENT option)</td>
<td>4 to 20 mADC</td>
</tr>
<tr>
<td>COMMAND SIGNAL IMPEDANCE</td>
<td>Voltage=10 KΩ Current=100 Ω</td>
</tr>
</tbody>
</table>

### PNEUMATIC

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Specification</th>
</tr>
</thead>
<tbody>
<tr>
<td>INLET PRESSURE</td>
<td>Full Vac - 550 psig</td>
</tr>
<tr>
<td>CALIBRATED PRESSURE RANGE</td>
<td>Full Vac up to 500 psig</td>
</tr>
<tr>
<td>FILTRATION REQUIRED</td>
<td>40 Micron</td>
</tr>
<tr>
<td>ACCURACY (PRESSURE)</td>
<td>±0.25% F.S.</td>
</tr>
<tr>
<td>HYSTERESIS</td>
<td>±0.2% F.S.</td>
</tr>
<tr>
<td>REPEATABILITY</td>
<td>±0.05% F.S.</td>
</tr>
<tr>
<td>PORT SIZE</td>
<td>1/8” NPT Female</td>
</tr>
<tr>
<td>CRITICAL VOLUME</td>
<td>1 in³</td>
</tr>
</tbody>
</table>

### WETTED PARTS

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Material</th>
</tr>
</thead>
<tbody>
<tr>
<td>WETTED PARTS</td>
<td>Fluorocarbon, Brass, Nickel-Plated Brass, Silicon and Aluminum, Stainless Steel</td>
</tr>
</tbody>
</table>

### OPERATING TEMP

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Temperature Range</th>
</tr>
</thead>
<tbody>
<tr>
<td>OPERATING TEMP</td>
<td>32°F to 158°F</td>
</tr>
</tbody>
</table>

### PROTECTION

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Protection Type</th>
</tr>
</thead>
<tbody>
<tr>
<td>PROTECTION</td>
<td>NEMA 4/IP65</td>
</tr>
</tbody>
</table>

### WEIGHT

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Weight</th>
</tr>
</thead>
<tbody>
<tr>
<td>WEIGHT</td>
<td>1 lbs.</td>
</tr>
</tbody>
</table>
Performance Specifications

LINEARITY

![Graph showing linear characteristics of QB products when given a ramp signal from 0 to 10 volts. Characteristics would be similar for 4 to 20 mA units.]

RESPONSE TO STEP INPUT

![Graph showing the time for QB to fill/exhaust a closed chamber. Step command signal is superimposed over pressure trace. Time is determined by the difference between command signal and pressure achieved.]

GENERAL INLET PRESSURE RATING

<table>
<thead>
<tr>
<th>For valve that is ordered with maximum calibrated pressure of:</th>
<th>Maximum inlet pressure is:</th>
</tr>
</thead>
<tbody>
<tr>
<td>up to 300 psig (20.7 bar)</td>
<td>330 psig (22.8 bar)</td>
</tr>
<tr>
<td>301 to 500 psig (20.8 to 34 bar)</td>
<td>550 psig (37.9 bar)</td>
</tr>
</tbody>
</table>
PRE-ASSEMBLED QBT POWER CORD
Part Number: QBT-C- Length in feet*

*6 ft is typical. Other lengths are available [from 1 to 25 feet (8 meters), 1 foot increments]

WARRANTY
Equilibar products are warranted to the original purchaser only against defects in material or workmanship for one (1) year from the date of manufacture. The extent of Equilibar’s liability under this warranty is limited to repair or replacement of the defective unit at Equilibar’s option. Equilibar, LLC shall have no liability under this warranty where improper installation or filtration occurred.
All specifications are subject to change without notice. THIS WARRANTY IS GIVEN IN LIEU OF, AND BUYER HEREBY EXPRESSLY WAIVES, WARRANTIES OR LIABILITIES, EXPRESS, IMPLIED OR STATUTORY, INCLUDING WITHOUT LIMITATION ANY OBLIGATION OF Equilibar, LLC WITH REGARD TO CONSEQUENTIAL DAMAGES, WARRANTIES OF MERCHANTABILITY, DESCRIPTION, AND FITNESS FOR A PARTICULAR PURPOSE.
WARNING: Installation and use of this product should be under the supervision and control of properly qualified personnel in order to avoid the risk of injury or death.
A common application for the QBS is to pilot operate an Equilibar® Back Pressure Regulator (BPR).

Equilibar® back pressure regulators function with a 1:1 inlet pressure to pilot reference pressure ratio, so supplying 1 unit pressure to the pilot reference port yields 1 unit pressure on the inlet of the Equilibar® BPR.

Using the QBS as a pilot regulator for an Equilibar® BPR creates a precision electronic back pressure control loop as shown below. The frictionless Equilibar design allows the back pressure control to make use of the high resolution of the QBS.

Many applications have stringent requirements for accuracy and stability that a traditional spring loaded regulator simply cannot meet.

The QBS allows a user to very easily reach the desired pressure within 0.25% of setpoint. The QBS's ability to track closely with its command signal makes ramping, falling, and pulsing pressure profiles possible with a properly configured PLC.
# QBS Ordering Information

## Example Part Number

<table>
<thead>
<tr>
<th>EXAMPLE PART NUMBER</th>
<th>QB</th>
<th>2</th>
<th>SS</th>
<th>E</th>
<th>E</th>
<th>Z</th>
<th>P</th>
<th>0</th>
<th>P</th>
<th>500</th>
<th>PSI</th>
<th>G</th>
</tr>
</thead>
<tbody>
<tr>
<td>QB1SSNEE2P300P5G</td>
<td>QB</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
<td>6</td>
<td>7</td>
<td>8</td>
<td>9</td>
<td>10</td>
<td>11</td>
</tr>
</tbody>
</table>

## Ordering Information

**Your Part Number:**

1. **TYPE**
   - 1 Single Loop
   - 2 Double Loop (External Feedback)

2. **MANIFOLD MATERIAL**
   - SS 303 Stainless Steel

3. **THREAD TYPE**
   - N NPT (Standard)
   - P BSPP

4. **INPUT SIGNAL RANGE**
   - E 0 to 10 Vdc (Single Ended)
   - I 4 to 20 mADC (Differential)
   - K 0 to 5 Vdc
   - V 1 to 5 Vdc*  
   
   *Requires V for MONITOR SIGNAL RANGE

5. **MONITOR SIGNAL RANGE**
   - X No Monitor
   - E 0 to 10 Vdc
   - K 0 to 5 Vdc*
   - V 1 to 5 Vdc**
   - C 4 to 20 mADC (Sinking)
   - S 4 to 20 mADC (Sourcing)

   *Requires E, I, or K for INPUT SIGNAL RANGE
   **Requires V for INPUT SIGNAL RANGE

6. **ZERO OFFSET**
   - N 0% Pressure Starts Below Atmosphere
   - P 0% Pressure Starts Above Atmosphere
   - Z 0% Pressure Starts at Zero (Typical)

7. **ZERO OFFSET PRESSURE**
   - Typical is 0* - If Greater than 30% of Full Scale Pressure (#9 below) Please Consult Factory.
   - *If Z for ZERO OFFSET (#6), please leave blank

8. **FULL SCALE PRESSURE TYPE**
   - P 100% Pressure Ends Above Atmosphere

9. **FULL SCALE PRESSURE**
   - Must be less than or equal to 500 psig
   - *For maximum pressures less than 150 psig the QPV series may offer higher performance at lower cost

10. **PRESSURE UNIT**
   - PS PSI
   - IH Inches Hg
   - MB Millibars
   - IW Inches H2O
   - BR Bar
   - MW mm H2O
   - KP Kilopascal
   - KG Kilograms/cm²
   - MP Megapascal
   - TR Torr*
   - MH mm Hg
   - CW Centimeters H2O

   *Requires A for PRESSURE UNIT OF MEASURE

11. **PRESSURE UNIT OF MEASURE**
    - A Absolute Pressure
    - G Gage Pressure

   Please Consult Factory For More Options And Application Assistance

## Recommended Accessories

- QBT-C-6 6 ft. Power Cable
- QBT-01 Wrap-Around Bracket
- QBT-02 Foot-Mount Bracket (Installed)*

### Typically In Stock Parts

<table>
<thead>
<tr>
<th>PART NUMBER</th>
<th>TYPE</th>
<th>MANIFOLD MATERIAL</th>
<th>CONNECTION</th>
<th>INPUT SIGNAL RANGE</th>
<th>MONITOR SIGNAL RANGE</th>
<th>FULL SCALE PRESSURE</th>
<th>AVAILABILITY</th>
</tr>
</thead>
<tbody>
<tr>
<td>QB1SSNEE2P300P5G</td>
<td>Single Loop</td>
<td>Stainless Steel</td>
<td>1/8” NPT</td>
<td>0-10 Vdc</td>
<td>0-10 Vdc</td>
<td>0-300 psig</td>
<td>1-2 Days</td>
</tr>
<tr>
<td>QB1SSNEE2P500P5G</td>
<td>Single Loop</td>
<td>Stainless Steel</td>
<td>1/8” NPT</td>
<td>0-10 Vdc</td>
<td>0-10 Vdc</td>
<td>0-500 psig</td>
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About Equilibar

Equilibar provides innovative and robust pressure control technology for researchers and engineers worldwide. We are proud to design, manufacture, and test our patented back pressure regulators in our factory overlooking the Blue Ridge Mountains near Asheville, NC.

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.

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