Cryogenic ½” Combination Pressure Builder / Economizer
CBE504 Series

**Application**

CBE504 series regulators maintain the pressure of the cryogenic vessels (Bulk Tanks or Micro bulks) during the operation or usage. The pressure building and economizer function are both combined in one unit, saving space and weight on the tank, simplifying the tank plumbing and reducing potential leak points. Designed and suitable for use in various cryogenic industrial gases, including Nitrogen, Oxygen, Argon, CO2 and LNG. For optimum performance with carbon dioxide and nitrous oxide, use in gas phase only.

**Features**

- Compact design fits well in tight plumbing geometries
- Built-in economizer check included on all models to prevent reverse flow during filling and operational upset conditions
- Up to 2 times higher pressure build flow than competition as proven through PB504 design and internal testing
- Lateral economizer port provides 1.7 times larger flow area, allowing for faster response time & reducing the potential for product loss.
- Economizer seal ring between PB (pressure build) OUT and EC (economizer) OUT (as compared to PB IN and EC OUT) prevents pressure runaways
- Diaphragm senses EC OUT pressure (as compared to PB OUT), accelerating pressure building function during gas use
- Improved calibrated pressure adjustment feature on bonnet cap aids in easier, more accurate pressure adjustment
- All parts are copper alloy (brass), PTFE, and stainless steel—materials selected specifically for compatibility with cryogenic temperatures down to -320°F (-196°C)
- PTFE seat provides positive shut off at cryogenic temperatures
- Maximum inlet pressure of 600 psig (41.4 barg)
- Pressure setting range from 25 psig to 550 psig (1.7 barg to 37.9 barg) preset and tested in factory to ensure quality performance
- Monel screens included on pressure builder (PB) inlet and outlet
- Cleaned per CGA G-4.1 for oxygen service
- May be mounted vertically or horizontally (EC port pointed up) based on customer preference; horizontal installation allows for easier pressure setting adjustment

**Materials**

Body  CDA 377 (UNS C37700) Commercial Brass Alloy per ASTM B283
Bonnet ....................Commercial Yellow Brass Alloy per ASTM B283
Delivery Spring ...........302 / 17-7PH Stainless Steel per ASTM A313
Return Spring ...................... 304 Stainless Steel per ASTM A313
Diaphragm Gasket................. Filled PTFE
Diaphragm.............Phosphor Bronze (UNS C51000) per ASTM B103
EC Poppet Seal Ring.........................PTFE
PB Seat ....................................Modified PTFE
Backcap Gasket .............. Copper (UNS C11000) per ASTM B152

**Ordering Information**

<table>
<thead>
<tr>
<th>Part Number</th>
<th>Inlet/Outlet Connections in. (DN)</th>
<th>Operating Range psig (barg)</th>
<th>Weight lb (kg)</th>
</tr>
</thead>
<tbody>
<tr>
<td>CBE504-025 to 075</td>
<td>Pressure Build Inlet/Outlet: ½” (15) Economizer Outlet: ¼” (8)</td>
<td>25 - 85 (1.7 - 5.9)</td>
<td>4.4 (2.0)</td>
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<tr>
<td>CBE504-076 to 155</td>
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<td>50 - 170 (3.4 - 11.7)</td>
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<tr>
<td>CBE504-156 to 260</td>
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<td>100 - 280 (6.9 - 19.3)</td>
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<tr>
<td>CBE504-261 to 450</td>
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<td>200 - 460 (13.8 - 31.7)</td>
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<tr>
<td>CBE504-451 to 550</td>
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<td>400 - 550 (27.6 - 37.9)</td>
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* Add “A” suffix to Part Number to include ½” NPTF economizer port adapter, e.g. CBE504-120A. Adapter 489-09P also sold separately.
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CBE504B Flow Performance

CBE504B Cryogenic Pressure Builder-Economizer Regulator
- Delivery Pressure Range: 50-170 psig
- Inlet & Outlet Ports: 1/2” npt
- Cv Flow Factor: Typically 1.8 when the tank pressure is much lower than the PB setting

Use these steps to determine Cv for specific conditions:
1. You need to know what the PB setting of the regulator is.
2. Subtract the tank pressure of interest from the PB setting to determine the tank delta-P (ΔP) below set point.
3. Locate this ΔP on the horizontal axis and trace this upward until it intersects the PB set point curve of interest.
4. Extrapolate between curves if necessary.
5. From this intersection point, trace leftward to find the Cv value on the vertical axis.
6. You can use the accompanying calculator to determine the flow rate for a particular gas.

Example: a set point of 145 psig and a tank pressure of 120 psig yields a Cv of 0.62

* NOTE: Pressure build speed performance not impacted by use with or without internal EC Check Valve; only economizer speed impacted.