

## VB Series Volume Booster

### Stroking Speed of Control Instrumentation on Large Actuators

#### Description

VB Series Volume Boosters are utilized in conjunction with Becker control instrumentation to provide adequate instrumentation flow volume for larger volume piston actuators. VB are typically only required for Ball Valve Regulators using a model 12T or larger actuator. Additionally, VB may be utilized to provide increased actuator stroking speed when applications demand them, such as power plant and other short system applications. Quick stroking applications require the VB Volume Booster on Ball Valve Regulators 4" bore and larger. As with most Becker instrumentation, VB may be discharged into a lower pressure system to eliminate atmospheric bleed.



Figure 1 – VB-250 Volume Booster

#### Features

- 1:1 pressure ratio—the output pressure from the booster changes 1 psi for each 1 psi signal change
- Two piece body construction allows for easy maintenance
- Outlet pressure up to 250 psig
- Supply pressure up to 400 psig

#### Benefits

- Provides quick stroking of control valves for high speed applications
- Allows implementation of Becker instrumentation on large control valve actuators
- May be discharged into a lower pressure system to eliminate atmospheric bleed
- ZERO steady state bleed
- Simple construction without any adjustments

#### Usage

- To increase stroking speed of control valves for high speed applications
- To increase volume output of Becker control instrumentation
- Necessary for Ball Valve Regulators 18" bore and larger
- Always consult Becker regarding application of Volume Boosters

#### Schematic Legend

- Instrument Signal ( $P_2$ )
- Upstream Pressure ( $P_1$ )
- Exhaust (Discharge)
- Supply Gas (Regulated)
- Intermediate Pressure (Loading)

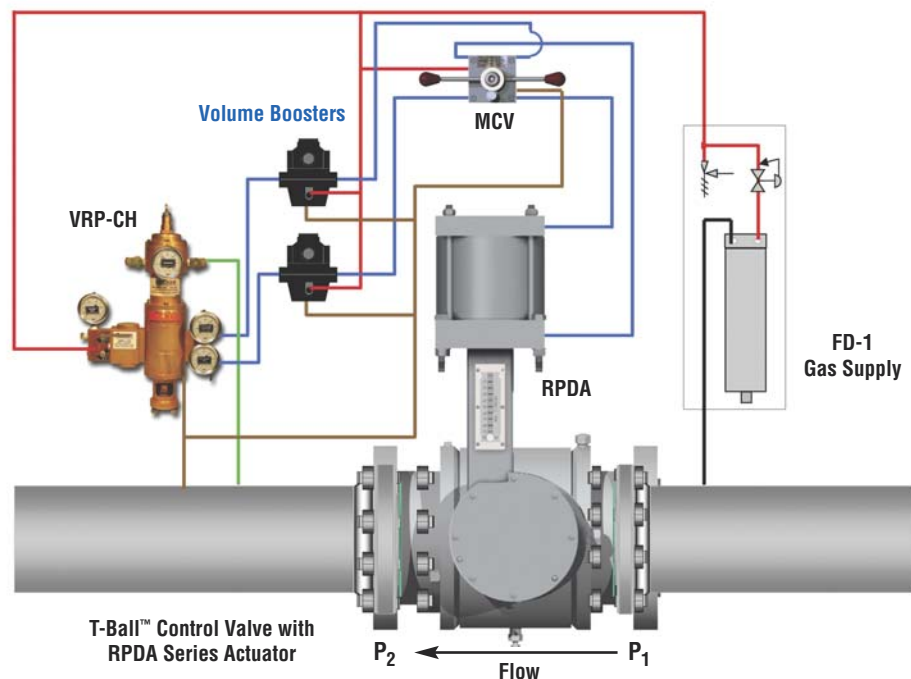


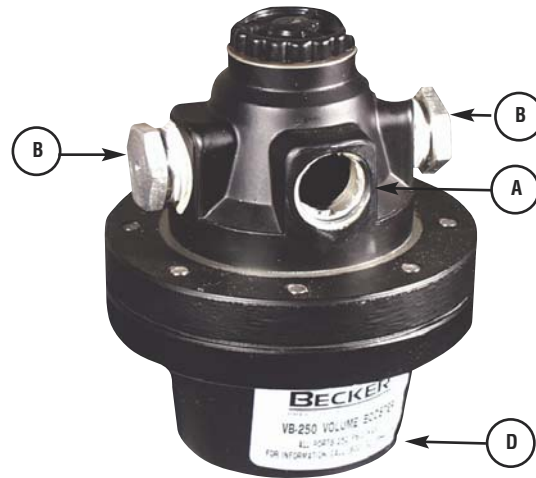
Figure 2 – A pair of VB Volume Boosters installed on VRP-CH series pilot to increase stroking speed.

The VB Volume Boosters may be configured with Becker pilots and positioners to increase stroking speed of large actuators or to give the control increased speed of response in demanding applications such as pressure control to power plant.

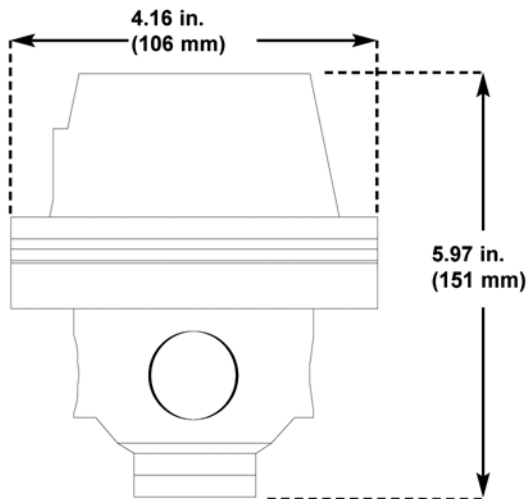
**Table 1 – Technical Specifications for VB-250 Volume Booster**

Technical Specifications	
Maximum Outlet Pressure	250 psig
Inlet Pressure Range	10-400 psig (0.7-27.6 bar)
Steady State Consumption	ZERO
Ambient Temperature Range	32°F to +175°F (0°C to +79°C)
Supply and Outlet Port Size	1/2" FNPT
Single Port Size	1/4" FNPT
Exhaust Port Size	3/4" FNPT
Approximate Weight	3 lbs (1.36 kg)
Materials of Construction	
Body and Bonnet	Zinc
Bottom Plug	Acetal
Valve	Brass
Seals	Buna-n

VB Port Definitions	Port Size	Item
Input	1/2" FNPT	A
Output	1/2" FNPT	B
Signal	1/2" FNPT	C
Exhaust	3/4" FNPT	D



**Figure 4 – Volume Booster Ports**



**Figure 3 – Overall Dimensions of VB**

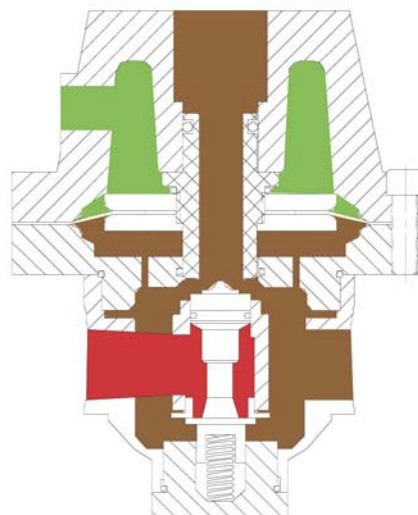
**Repair or Rebuild?**

Becker Instrumentation rebuild kits are available from stock for regular maintenance or emergency needs. To order repair kits for your Becker products call us at (800) 323-8844, or contact your local Becker sales representative.

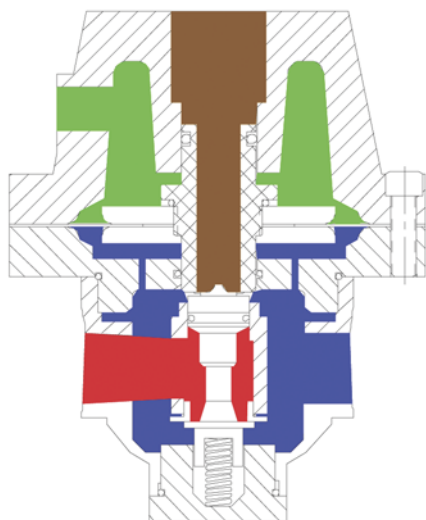
VB-250 Rebuild Kit  
Becker Part Number 01-7263

**How It Works:**

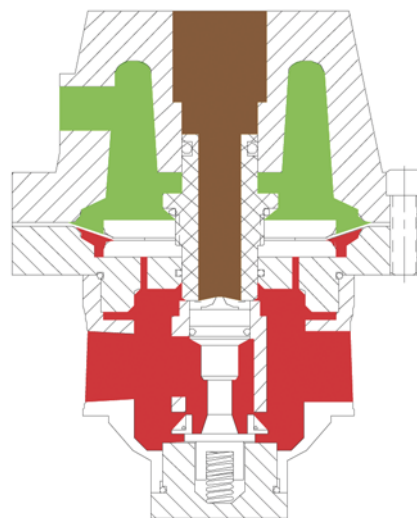
The VB Series Volume Booster is a high capacity device that reacts to a pressure signal from control instrumentation. The booster has an independent pressure supply source to feed the actuator. The VB receives signal pressure from the control instrumentation which acts on the upper side of a diaphragm inside the booster. The actuator pressure or output pressure of the booster acts on the lower side of the diaphragm. When the signal pressure and output pressure are equal the booster remains in an equalized steady state position (Figure 5.0) keeping the actuator stationary. As the signal increases from the control instrumentation, the signal pressure rises above the output pressure opening the supply valve loading the actuator cylinder with high volume pressure (Figure 5.1). When the output pressure under the diaphragm is approximately equal to the signal pressure above the diaphragm, the supply valve closes and a steady state position is achieved. As the signal decreases from the control instrumentation, the supply valve remains closed. The output pressure rises above the signal pressure causing the diaphragm to open the exhaust valve (Figure 5.2). Output pressure is exhausted until the pressure on both sides of the diaphragm are again equalized at which point the exhaust valve closes and steady state is again achieved.



**Figure 5.1 – VB Series**  
Volume Booster with exhaust valve open



**Figure 5.0 – VB Series**  
Volume Booster at steady state condition



**Figure 5.2 – VB Series**  
Volume Booster with supply valve open loading actuator

**Schematic Legend**

- Atmospheric Pressure
- High Pressure Gas (Regulated)
- Instrument Sensing
- Actuator Pressure (Output pressure)

**Table 2** – Application Guidelines for AB Series Atmospheric Bleed Control

	VRP-CH Pilot	VRP-B-CH Pilot	VRP-SB-CH	VRP-SB-PID	HPP-4 Positioner	HPP-5 Positioner	HPP-SB Positioner	DNGP - Positioner	Notes
<b>Instrumentation Options</b>									
<b>Bleed to Pressure System BPS™</b>	•	•	•	•	•	•	•	•	1
<b>AB Series Atmospheric Bleed Control</b>	•	•	•	•	•	•	•	•	
<b>NBV Series No-Bleed Valve</b>	•	•			•	•			2
<b>DPS-2 Series Non-Bleed Sensor</b>	•	•			•	•			3
<b>PS-2 Series Non-Bleed Sensor</b>	•				•				3
<b>SP Series Setpoint Pump</b>	•	•	•	•					
<b>RSM Series Remote Setpoint Module</b>	•	•	•	•					
<b>Panel Mounting</b>	•	•	•	•				•	
<b>Stainless Steel Option</b>	•	•	•	•	•	•	•		
<b>VB Series Volume Booster</b>	•		•	•	•		•		4
<b>QEV Series Quick Exhaust Valve</b>							•		
<b>I/P Transducer</b>					•	•	•		
<b>SLV Series Signal Lock Valve</b>					•	•	•		

1. BPS™ is limited to pressure systems below 300 psig. Consult Becker for assistance.
2. NBV may only be utilized when  $P_{Discharge} \leq 60$  psig (414 kPa) and/or  $P_{Supply} \leq 150$  psig (1034 kPa).
3. PS-2 and DPS-2 Non-Bleed Sensors must be utilized when  $P_{Discharge} > 60$  psig (414 kPa) and/or  $P_{Supply} > 150$  psig (1034 kPa).
4. Volume Boosters are necessary for power plant regulator, surge control applications, or when Large Model RPDA and LPDA Series Actuators are utilized.

**\*CAUTION:** This information is intended as a guideline for application of Becker Precision Equipment products. Becker strongly recommends consulting Becker Engineering prior to application of any product.

Additional resources are available on our website. Sales literature, sizing software, and technical manuals are available for download at [www.dresser.com/becker](http://www.dresser.com/becker)



**Figure 6** – A pair of Volume Boosters installed on a VRP-600-CH pilot feeding a large double-acting rotary piston actuator installed on a 30" ball type control valve to increase stroking speed. Note pilot is panel mounted.

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