

# VOLUME BOOSTERS



**RK CONTROL  
INSTRUMENTS**

Mastering Flow Since 1969

An ISO 9001 Certified Company



RK Volume Boosters are normally used to reproduce pneumatic signals in 1:1 ratio whenever input isolation or increased flow capacity is required .

The booster incorporates fixed deadband, soft seat construction, and an integral bypass restriction to eliminate positioner saturation problems that can occur with volume boosters that do not have these features. Adjustable integral bypass restriction is necessary for system stability. This adjustment does not affect the deadband of the volume booster, but instead permits the control valve to respond to small input signal changes without sacrificing steady-state accuracy.

It also allows the booster to deliver high-volume output for fast stroking when large, rapid input signal changes occur.

These high capacity Volume Boosters with fixed minimum dead band are designed to substantially improve the stroking speeds of large actuators.

Actuators retain their normal slow and stable responses as long as the signal fluctuations remain within the dead band limits that are determined by adjustment of the equalizing / bypass valve within the Booster

### PRINCIPLE OF OPERATION

Refer to Figures 1 and 2. Due to the bypass restriction, large input signal changes register on the booster input diaphragm sooner than in the actuator. A sudden large change in input signal will cause a pressure differential to exist between the input signal and the output of the booster. When this occurs, the diaphragms move to open either the supply port or the exhaust port, whichever action is required to reduce the differential. The port remains open until the difference between the booster input and output pressures returns to within the deadband limit of the booster. With the bypass restriction adjusted for stable operation, a signal with small magnitude and rate changes passes through the bypass restriction and into the actuator without initiating booster operation.

Both supply and exhaust ports remain closed, preventing unnecessary air consumption and possible saturation of positioner relays.

### DESIGN FEATURES

- Built –in adjustable bypass valve with Fine Control
- Capable of using high pressure plant air supplies
- Different Booster sizes available to suit wide range of actuator sizes.
- Robust parts for trouble free service
- Highly Corrosion resistant with external stainless steel retaining screws and internal wear parts
- Stainless Steel and Aluminium construction materials available
- Fast Response. Booster delivers the volume needed for rapid actuator stroking when large input changes suddenly occur.

- Maintains correct actuator positioning at high stroking speeds
- Adjustable Response: Integral bypass restriction tunes the booster response so that smooth actuator motion follows the slow signal changes.
- Efficient Operation: Soft seats provide tight shutoff to reduce unnecessary air consumption and eliminate saturation of positioner relays.
- Maintains Accuracy: Booster permits high actuator stroking speeds upon demand without degrading the positioner steady-state accuracy.

### PERFORMANCE BENEFITS

- Extremely fast and responsive during operations
- Versatile to meet most control element requirements
- Minimal Air Consumption
- Very Low Maintenance
- Isolates the diaphragm from the main flow to eliminate hunting and buzzing
- Allows for tuning for best optimum dynamic response (1:1 ratio only) and cycle free operation with valve positioners
- Allows use in precision applications

### SPECIFICATIONS

**Ambient Operating Conditions :- 40 Deg C to 70 Deg C**

**Volume Booster Models and Sizes**

**Model 1000- Sizes :** ¼" For Supply, Output and Signal

**Model 3000 –Sizes:** ½" & ¾" for supply and output, ¼" NPT for signal

### Pneumatic Supply Pressures

Model 1000 (6.9 Bar / 100 Psig)

Model 3000 (10.3 Bar / 150 Psig)

### Flow Capacity

Model 1000 : 10 SCFM

Model 3000 : 43 SCFM

**Operating Supply Gases :** Air , Nitrogen, Methane

(Filter regulator recommended to ensure clean supply)

**Dead Band Width : 1 Psig (0.07 Bar) or 5 % of Output Span whichever is greater**

Fixed Input /Output Ratio : 1:1

Materials of Construction : Aluminium /

Stainless Steel SS316

### INSTALLATION

For Optimum Performance, the Volume Booster should be fitted as close as possible to the actuator.

Where Multiple Boosters are used then these should be connected to the actuators individually.

### Model Decodification

DECODIFICATION FOR VOLUME BOOSTERS								
Accessories	Size	Code	Body Material	Code	Size	Code	Soft Parts	Code
VOLUME BOOSTER	¼"	VB1000	ALUMINIUM	AL	¼" NPT(F)	1	NITRILE	
	½" TO ¾"	VB3000	SS316	SS	½" NPT(F)	2	EPDM	EP
			SS316L	SSL	¾" NPT(F)	3	SILICON	SI
							VITON	VI



**RK VOLUME BOOSTERS - MODELS 1000 AND 3000**

**Table 1. Construction Materials Model 1000 Booster.**

Item	Description	Materials
1.	Bottom Nut	Brass*
2.	Body Gasket	Neoprene
3.	Spring	Stainless Steel
4.	Plug	Stainless Steel
5.	Soft Seat	Teflon
6.	Body	Aluminium*
7.	Area Plate Assembly	Aluminium*
8.	Diaphragm	Neoprene
9.	Socket Head Screw	Stainless Steel
10.	Top Cover	Aluminium*
11.	O' Ring	Nitrile
12.	Adjusting Screw	Stainless Steel
13.	Spacer	Aluminium*

\*Stainless Steel construction can be supplied

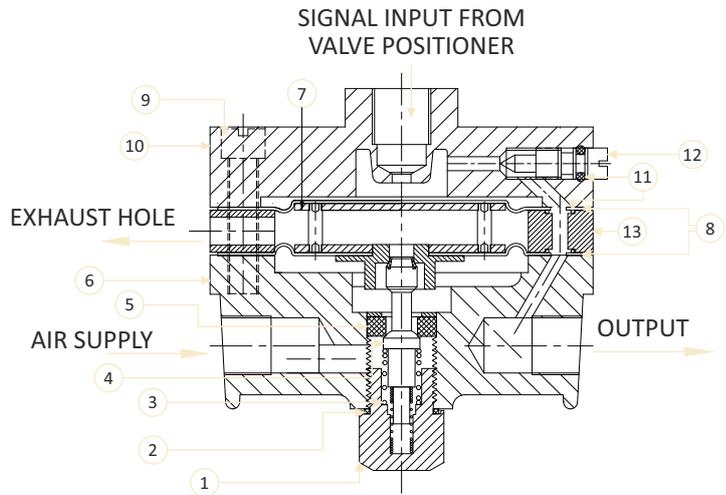


Figure 1. Sectional View Model 1000

**Table 2. Construction Materials Model 3000 Booster.**

Item	Description	Materials
1.	Body	Aluminium*
2.	Gasket 'O' Ring	Nitrile
3.	Blind Nut	Brass*
4.	Spring	Stainless Steel
5.	Plug	Stainless Steel / Nitrile
6.	O' Ring	Nitrile
7.	Seat Ring	Brass*
8.	Lock Nut	Stainless Steel
9.	Exhaust Seat	Aluminium*
10.	Diaphragm Plate	Aluminium*
11.	Diaphragm	Nitrile / Nylon
12.	Spacer	Aluminium*
13.	Spring Housing	Stainless Steel
14.	Spring	Stainless Steel
15.	Cover	Aluminium*
16.	O' Ring	Nitrile
17.	Lock Nut	Stainless Steel
18.	Adjusting Screw	Stainless Steel
19.	Backing Plate	Aluminium*
20.	Cover Screw	Stainless Steel

\*Stainless Steel construction can be supplied

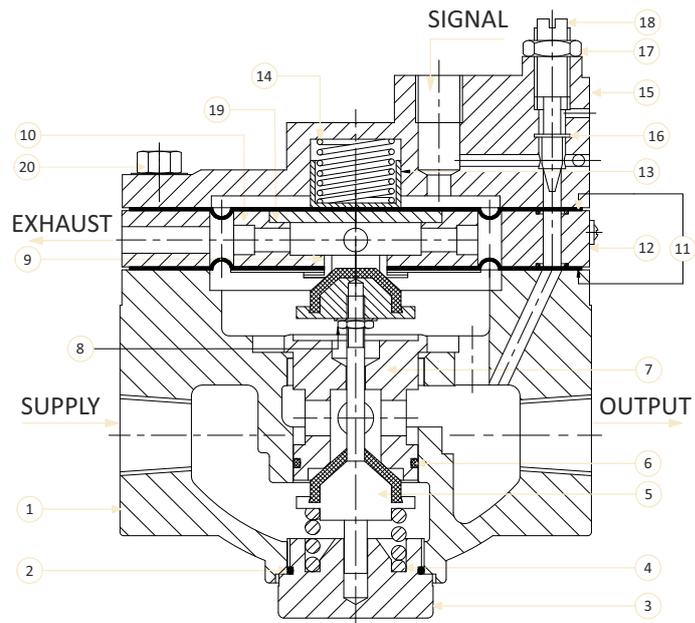
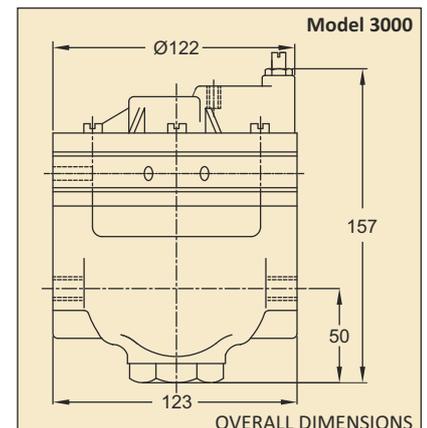
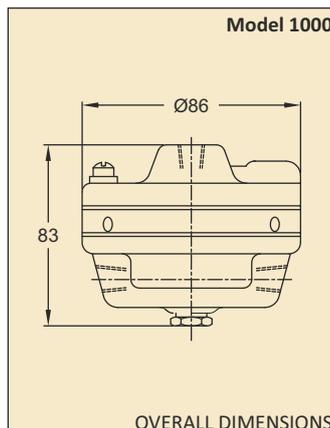
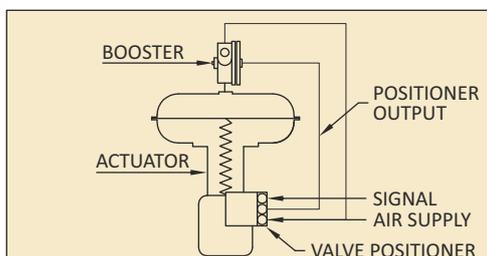


Figure 2. Sectional View Model 3000

**Typical Application Schematics for Volume Boosters**  
Spring Diaphragm Fitted with Booster and positioner





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