



# JRU CONTTROL PVT LTD

(FORMERLY PLACKA INSTRUMENTS & CONTTROL PVT LTD)

An ISO 9001:2000  
COMPANY

## TYPE JAVB INSTRUCTION MANUAL VOLUME BOOSTER



QMS 009  
Reg No: RQ91/4527

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No person may install, operate, or maintain a Type JAVB Series Volume Booster without first (1) being fully trained and qualified in valve, actuator and accessory installation, operation and maintenance, and (2) carefully reading and understanding the contents of this manual. If you have any questions regarding these instructions, contact your JRU Control sales office before proceeding.

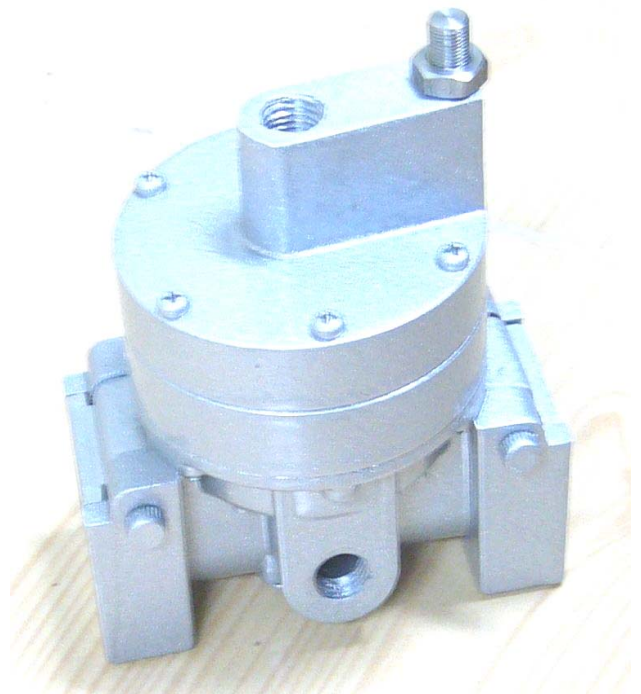
### INTRODUCTION

#### Scope of Manual

This instruction manual provides installation, operation, maintenance, and parts information for the type JAVB Series Volume Boosters (Figure 1).

### NOTE

JRU Control does not assume responsibility for the selection, use, or maintenance of any product. Responsibility for the selection, use, or maintenance of any JRU Control product remains with the purchaser and end-user.

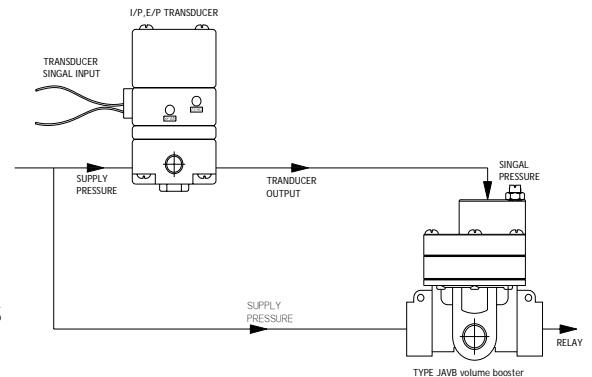


**Table 1: Specifications**

Input Signal Pressure	: Positioner Output – usually 3 – 15 psig
Maximum Input Signal Pressure	: 150 psig (10.3 bar) 10.6 Kg/Sq.cm
Fixed Input – to – output Pressure Ratio	: 1 to 1
Nominal Dead band	: 1 Psig or 5% of output span whichever is greater
Ratio Accuracy	: 1% of output span with 3-15 psig signal
Flow Capacity	: 30 SCFM For a supply of 100 psig and output of 20psig
Body Material	: Aluminium
Diaphragm	: Nylon impregnated Nitrile/Neoproe
Upper and Lower Valves	: Nitrile rubber on Aluminium / Stainless Steel
O – Rings	: Nitrile
Other Internal Trim Materials	: Stainless Steel / Brass / Aluminium
Operative Temperature Limits	: - 40 to 160 <sup>0</sup> F (-40 to 71 <sup>0</sup> C)
Connections:	
Input Signal	: ¼" NPT / BSP
Supply and Output: ¼", ½", ¾" NPT / BSP	

### Model Nos.:

- JAVB 014:** ¼" Input and ¼" Supply Output connections  
**JAVB 012:** ¼" Input and ½" Supply and output connections  
**JAVB 013:** ¼" Input and ¾" Supply and Output connections  
**JAVB 02 series Volume Boosters are for high capacity.**  
**Approximate weight - Aluminium Body: 1 Kg**



**Figure 1**

### DESCRIPTION

The types JAVB Series Volume Boosters are used in conjunction with a positioner on a throttling control valve to increase stroking speed. The booster has a fixed deadband (controlled by the Seat – to – seat dimension of the supply and exhaust plugs) which is factory set during assembly and testing. In addition, the booster incorporates 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. Adjustment of the integral bypass restriction is necessary for system stability. This adjustment does not affect the deadband of the booster, but does permit the control valve to respond to small input signal changes from the positioner 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.

The volume booster, when used in conjunction with a positioner /actuator, is used only to improve stroking speed. It is not recommended for other applications requiring a high – accuracy, instrument type volume booster. If you use the volume booster only with an actuator, for on – off control, the integral bypass restriction on the volume booster must be closed (turned fully clockwise).

## SPECIFICATIONS:

Specifications for the Type JAVB Series volume boosters are listed in table 1. Information for an individual unit as it comes from the factory appears on the name plate figure 2)


 J R U C C O N T T R O L P V T . L T D . V O L U M E B O O S T E R			
MODEL NO.	JAVB 02	I/L PORT	1/4"NPT
O/L PORT	1/4"NPT	RATIO	1:1
SIGNAL PORT	1/4"NPT	MAX. SUPPLY PR.	150 PSIG
SERIAL.:			

Figure 2

## INSTALLATION:

### WARNING

Always wear protective clothing and eyewear when performing any maintenance procedure to avoid personal injury.

System damage may result if a volume booster is installed in a way that it can be physically damaged.

Personal injury or system damage may result when service conditions exceed booster or other equipment ratings. Exceeding the pressure specified in specifications may cause leakage, part damage, or personal injury due to bursting of pressure – containing parts or explosion of accumulated gas.

Check with your process or safety engineer for any additional measures that must be taken to protect against process media.

### CAUTION

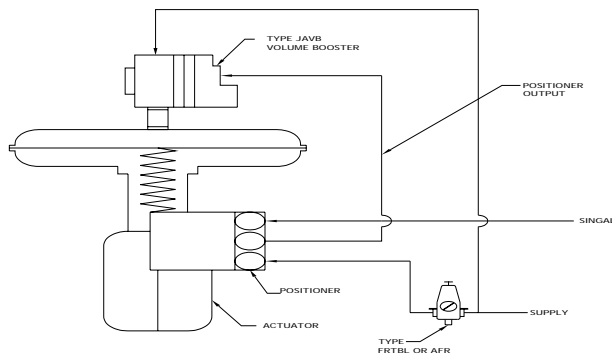
Do not use separate pressure supplies for the volume booster and associated positioner.

The volume booster may not exhaust immediately upon loss of a separate pressure supply. However, if the system is in a transient state at the time of pressure supply loss or if changes to the booster's input signal are sufficient to overcome the deadband, the booster will exhaust.

A loss of a pressure supply (either separate or common) to any positioner will cause the positioner's output pressure (booster's input pressure) to decay.

Always pipe the positioner and the volume booster with one common supply. See figure 3 for typical installation examples. A type JAVB series regulator is required to provide sufficient capacity to supply both components. A high-capacity filter, such as the type FTB should be installed in the supply line to the Regulator.

Figure 3



### PRESSURE CONNECTIONS:

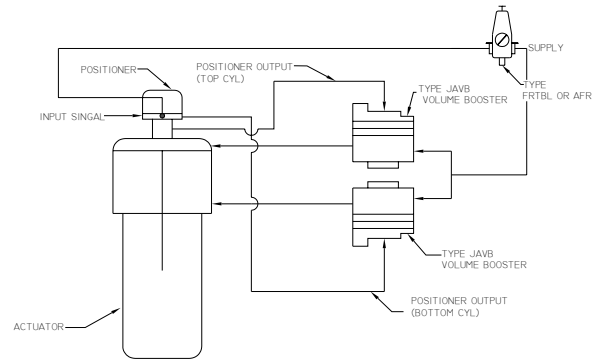
The input signal connection is 1/4" NPT. The supply and output connections are 1/4", 1/2", 3/4" NPT (pipe size recommended for nipple mounting is 1/2" NPT). Connections to the volume booster should be made as indicated in figure 3. Connections for two typical applications are shown in figure 3. Ensure that the piping is of proper size to meet the capacity demands of the booster and that you equip the actuator with properly sized input connections.

### Supply pressure

Supply pressure must be clean dry air or non corrosive gas (2), and it should be filtered.

### WARNING

If a flammable or hazardous gas is to be used as the supply pressure medium, personal injury, property damage or equipment damage could result from fire or explosion of accumulated gas or from contact with hazardous gas. The volume booster has no provision for piping away the vented exhaust gas. Therefore, do not use Flammable or otherwise hazardous gas as a supply medium unless the unit is in a well – ventilated area.



### Exhaust Ports

Exhaust to the atmosphere is through exhaust ports in the side of the unit. Keep the exhaust ports free of any obstructions or foreign materials that might clog them.

### OPERATING INFORMATION

The only operating requirement of the volume booster is the adjustment of the bypass restriction for stable actuator performance. Although systems with different characteristics may require different adjusting techniques, the following adjustment procedure is recommended when using the actuator for throttling control.

### Note

When sizing the booster, select the lowest Cg that will meet the stroking speed specifications. Over sizing the booster in a closed loop may lead to stability problems, thus requiring the bypass to be opened so far that the booster will never operate.

Prior to operation, turn the bypass restriction adjusting screw (figure 5) four or five turns counterclockwise from the fully closed position. With the actuator in operation, slowly turn the restriction clockwise until the booster operates in response to large changes in the input signal, yet allows small changes to move the actuator without initiating booster operation. If the actuator is to be used for on-off control, the restriction should be closed. (turned fully clockwise).

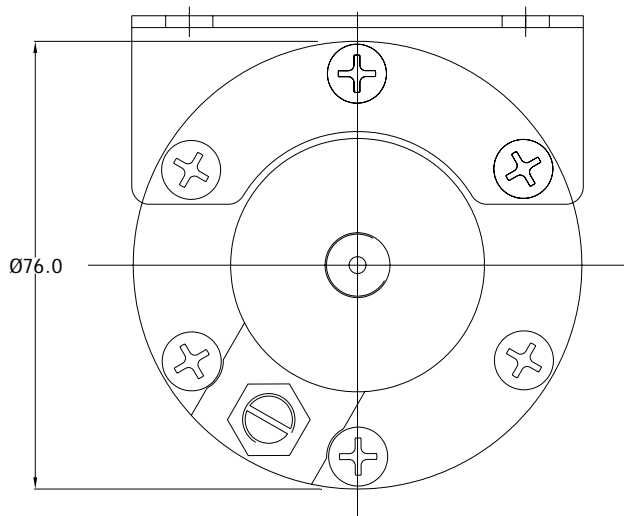
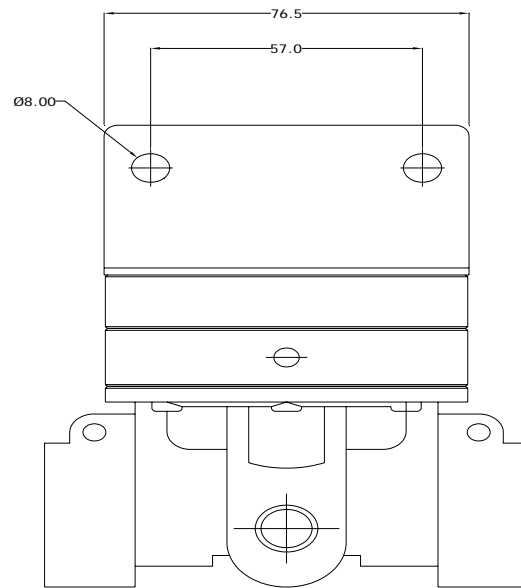


Figure 4

### MOUNTING

The Volume booster is typically nipple – mounted between the pneumatic supply source and the actuator, and may be used with piston or diaphragm actuators. Many actuators require larger casing or cylinder connections and modifications to allow the booster to deliver the higher volume output.



The booster may also be directly mounted to the actuator by using an actuator yoke mounting bracket (see figure 5).

### PRINCIPLE OF OPERATION:

Refer to figures 3 & 5

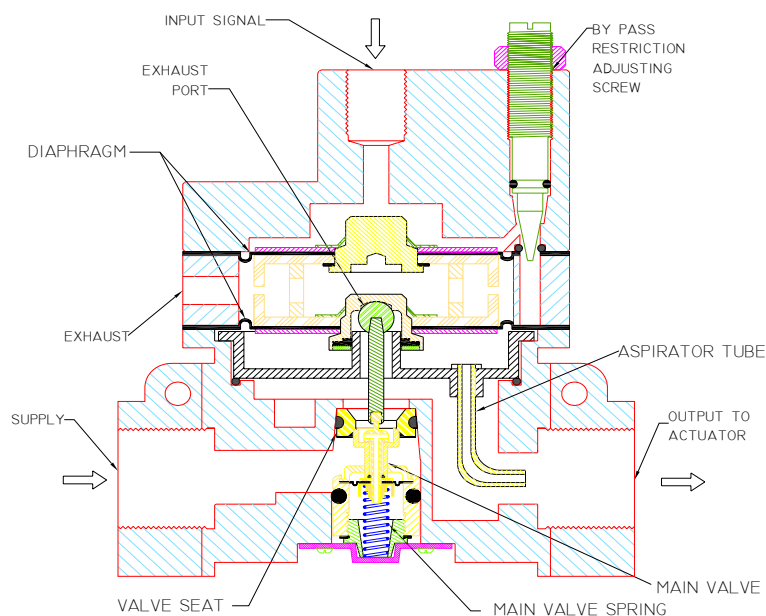


Figure 5

Because of the restriction, large input signal changes register on the booster input diaphragm sooner than in the actuator. A large, sudden change in the input signal causes 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 pressure differential. The port remains open until the difference between the booster input and output pressures returns to within the dead band limits of the booster. With

the bypass restriction adjusted for stable operation, signals having small magnitude and rate changes pass through the bypass restriction and into the actuator without initiating booster

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

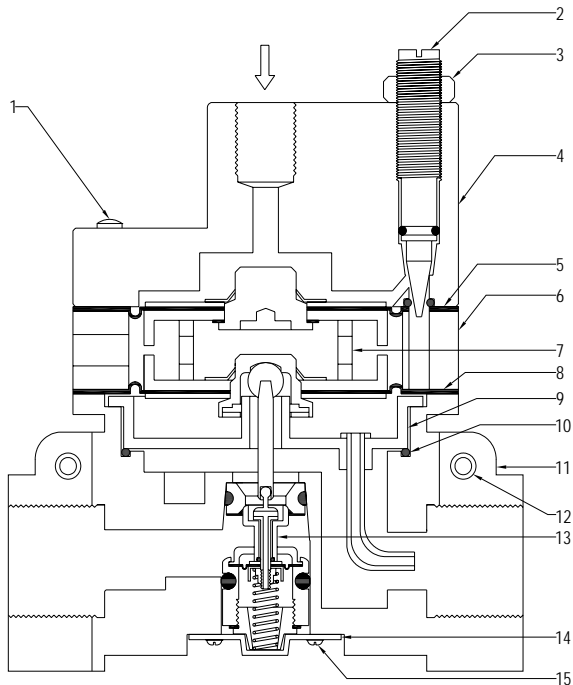
## MAINTENANCE

### WARNING

Always wear protective clothing and eyewear when performing any maintenance procedures to avoid personal injury.

Maintenance requires taking the volume booster out of service periodically. To avoid personal injury or equipment damage, disconnect or bypass any pressure lines to the booster, and vent any pressure locked in the unit before you begin maintenance.

Check with your process or safety engineer for any additional measures that must be taken to protect against process media.



## DIAPHRAGM ASSEMBLY REPLACEMENT

1. Remove the Volume Booster Screw (Key 1)
2. Remove the Top Casting (key 4) separately
3. Take the upper diaphragm assembly and clean with water. Do not use any solvent for cleaning. Replace with new diaphragm assembly (5) Spare Part no. AVB/TDA/01 if the diaphragm is torn/punctured/cracked
4. To remove the lower diaphragm assembly (key 8) remove the spacer (key 7)
5. Take the lower diaphragm assembly and clean with clear water. Do not use any solvents for cleaning. Replace with new diaphragm assembly (Spare part No. AVB/LDA/02) if the diaphragm is torn/punctured/ cracked.
6. Reassembly in the same way as removed.

## VALVE ASSEMBLY REPLACEMENT

### CAUTION

Ensure that the Inlet Pressure is totally closed and the Volume Booster is completely depressurized.

1. Remove the back plate screws (key 16) from the bottom
2. Remove the valve assembly (key 14)
3. Clean the valve seating area with clean water  
If any damage or deep impression is present replace with new valve (spare Part No. AVB/TV/03)
4. If the valve spring (key 17) has deteriorated change the valve spring (spare part no. AVB/VS/04)
5. Reassembly in the same way as removed.