

# Fisher™ SS-263 Volume Booster

The Fisher SS-263 volume booster is used in conjunction with Fisher control valves with double-acting piston actuators. Large piston actuators require proportionally larger volumes of air to stroke; typical valve positioner output cannot usually provide enough of a volume of air to quickly and fully stroke actuators such as these. The SS-263 volume booster solves this by amplifying the output from the valve positioner to increase actuator stroking speed. The dual-ported design of the booster amplifies both the supply and exhaust flow, which are both precisely controlled by means of a pneumatic signal from the valve positioner.

The booster incorporates fixed deadband, soft seat construction, and an integral bypass restriction. The booster can be tuned by adjusting the bypass restriction to respond to small or large input signal changes, without sacrificing steady-state accuracy. The SS-263 is essentially a higher capacity Fisher 2625 booster allowing up to three 2625's to be replaced with just one SS-263. The booster also incorporates a robust flanged-style mounting that increases the unit's resilience to vibration damage, while allowing for easy removal during field maintenance.

The standard noise attenuating exhaust trim allows air to be exhausted quickly and quietly from the actuator. Several integrated diagnostic connections on the body of the booster allow connections to be made without the need to remove the unit from the actuator. Such connections allow for diagnostic testing, actuator bypass assembly hook-up for use with handwheel operated actuators, and multiple accessory connections. Multiple accessories can be connected directly to the booster, eliminating long lengths of tubing and simplifying the overall hook-up schematic for easy field maintenance.

The SS-263 complies with the requirements of ATEX Group II Category 2 Gas and Dust and is certified for use in Safety Instrumented Systems (SIS) applications. Compliance is identified on the product by labels affixed to the housing.



## Features

- **Fast Response** – The SS-263 delivers high-volume output for fast stroking speeds when responding to large input signal changes and low-volume output when responding to small input changes.
- **High Capacity** – Flow capacities of roughly three times higher than the 2625 booster result in the need for fewer fittings, tubing, and units.
- **Noise Attenuation** – Exhaust is passed through specially designed passages to reduce the amount of ambient noise that is generated.
- **Adjustable Response** – The integral bypass restriction allows the booster to be easily and readily tuned to operate under small or large input signal changes.

(continued on page 3)

## Specifications

### Supply Pressure Ranges

Maximum pressure must not exceed 10.3 bar (150 psig).

### Input Signal

Positioner output

### Maximum Input Signal Pressure<sup>(1)</sup>

10.3 bar (150 psig)

### Input-to-Output Pressure Ratio

Fixed at 1 to 1

### Construction Materials

Body: Aluminum, S31600

Seat Ring: Brass, S31600

Diaphragms: Nitrile/Nylon

Upper and Lower Valves: Nitrile/Aluminum

O-Rings: Nitrile and Fluorocarbon

Cap Screws: SAE GR 5 NCF3, 316 SST

Mounting Adaptor: S17400 DBL 1150

Mounting Studs: SA193-B7 NCF2

Mounting Nuts: SA194-2H NCF2

Mounting Washers: Plated Carbon Steel

### Operative Temperature Limits<sup>(1)</sup>

-40 to 71°C (-40 To 160°F)

### Connections:

Input Signal: 1/4 NPT

Supply: 1 NPT

Output: 1 NPT or 1-1/4 NPT<sup>(2)</sup>

### Port Diameters

Supply Port: 19 mm (0.750 inch)

Exhaust Port: 19 mm (0.750 inch)

### Maximum Flow Coefficients

Supply: 9.5 Cv

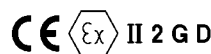
Exhaust: 9.5 Cv

C1: 35

Xt: 0.77

### Hazardous Area Classification

Complies with the requirements of ATEX Group II Category 2 Gas and Dust

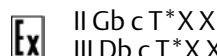

 Ex h IIC Tx Gb  
Ex h IIIC Tx Db

Maximum surface temperature depends on operating conditions

Gas: T6...T2

Dust: T85...T208

Meets Customs Union technical regulation TP TC 012/2011 for Groups II/III Category 2 equipment

### Safety Instrumented System (SIS) Classification

SIL3 capable - certified by exida Consulting LLC

### Approximate Weight

Aluminum: 3.6 kg (8 lbs)

Stainless Steel: 10.8 kg (24 lbs)

1. The pressure/temperature limits in this manual and any applicable standard or code limitation for valve should not be exceeded.

2. Consult your [Emerson sales office](#) for additional sizes.

## Table of Contents

Features .....	1
Specifications .....	2
Principle of Operation .....	3

Fisher Optimized Digital Valve Package .....	5
Installation .....	7
Ordering Information .....	7

## Features (continued)

- **Auxiliary Supply Connections** – Supply air is readily available through two 1/4 NPT connections that are built into both sides of the unit for use with a Fisher 377 trip valve or other accessory.
- **3 in 1 Connection** – This special connection can provide any of the following connections, if needed.
  - 1/4 NPT diagnostic connection for easy testing
  - 1/4 NPT actuator bypass assembly connection for use on an actuator with a handwheel
  - 3/4 NPT connection, with the removal of a bushing, for use with a high capacity dump valve
- **Soft Seated Construction** - Soft seated exhaust and supply valves provide for bubble tight shutoff to reduce unnecessary air consumption and ensure fail mode upon loss of plant air.
- **Robust Mounting** – Flanged-style actuator mounting provides ease of maintenance, simplified tubing, compactness, and high vibration resistance.

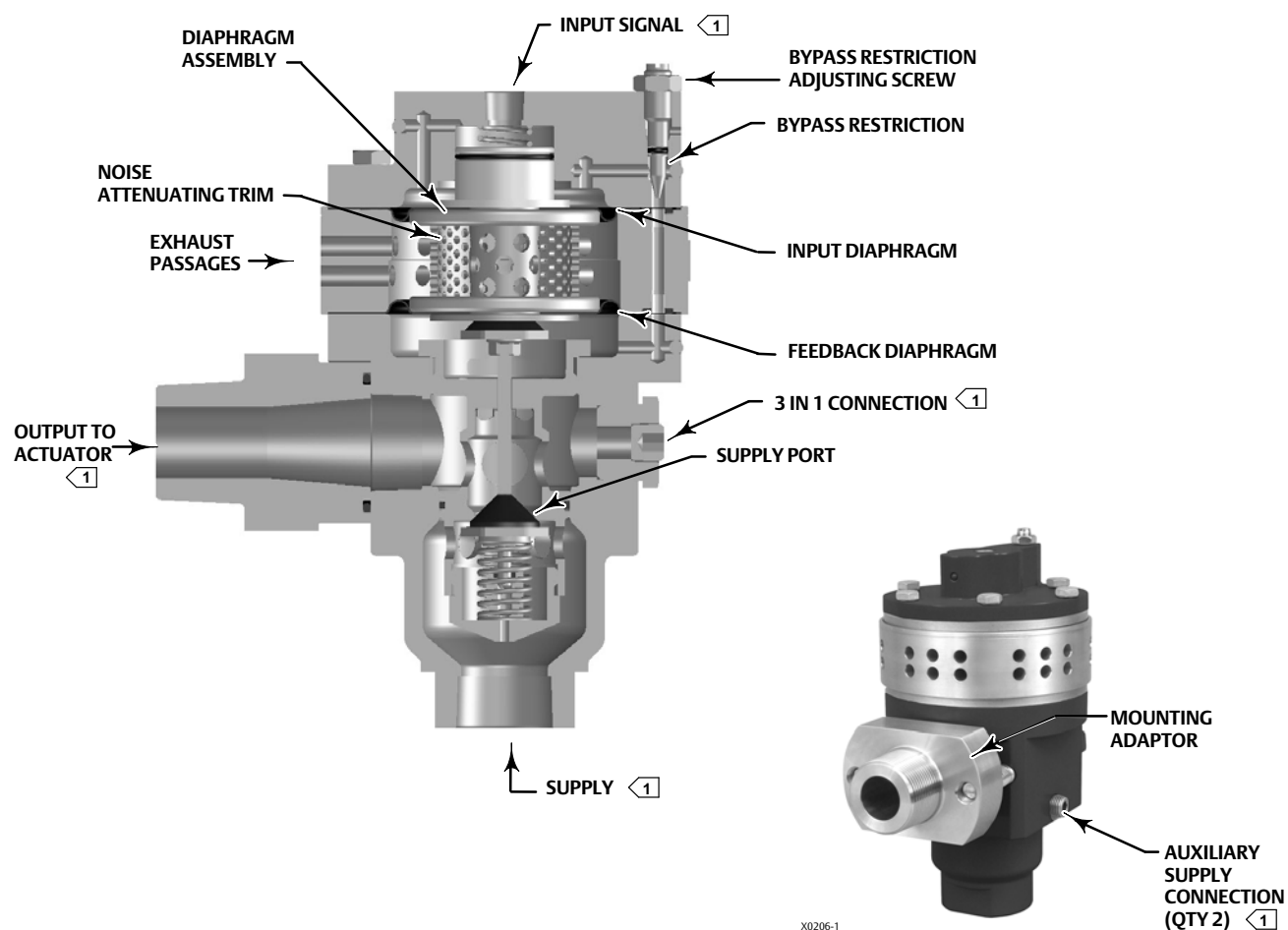
## Principle of Operation

Refer to figure 1.

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 feedback diaphragm 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 deadband 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, allowing the output of the digital valve controller to act directly on the actuator piston.

Figure 1. Sectional View



See figure 2 for pressure connection information.

## Fisher Optimized Digital Valve Package

The SS-263 volume booster is available as an accessory(s) in Fisher Optimized Digital Valve (ODV) packages, see figure 2 for a typical installation in a compressor antisurge application. An ODV package is a complete, engineered solution designed for demanding applications including, but not limited to, compressor antisurge and turbine bypass. The package includes the actuator, FIELDVUE digital valve controller, and all other accessories; everything necessary for a complete installation.

ODV packages are suited towards applications that typically require fast stroking time and the ability to respond accurately to small travel setpoint changes. Applications such as compressor antisurge and turbine bypass can call for very large valves, over NPS 36,

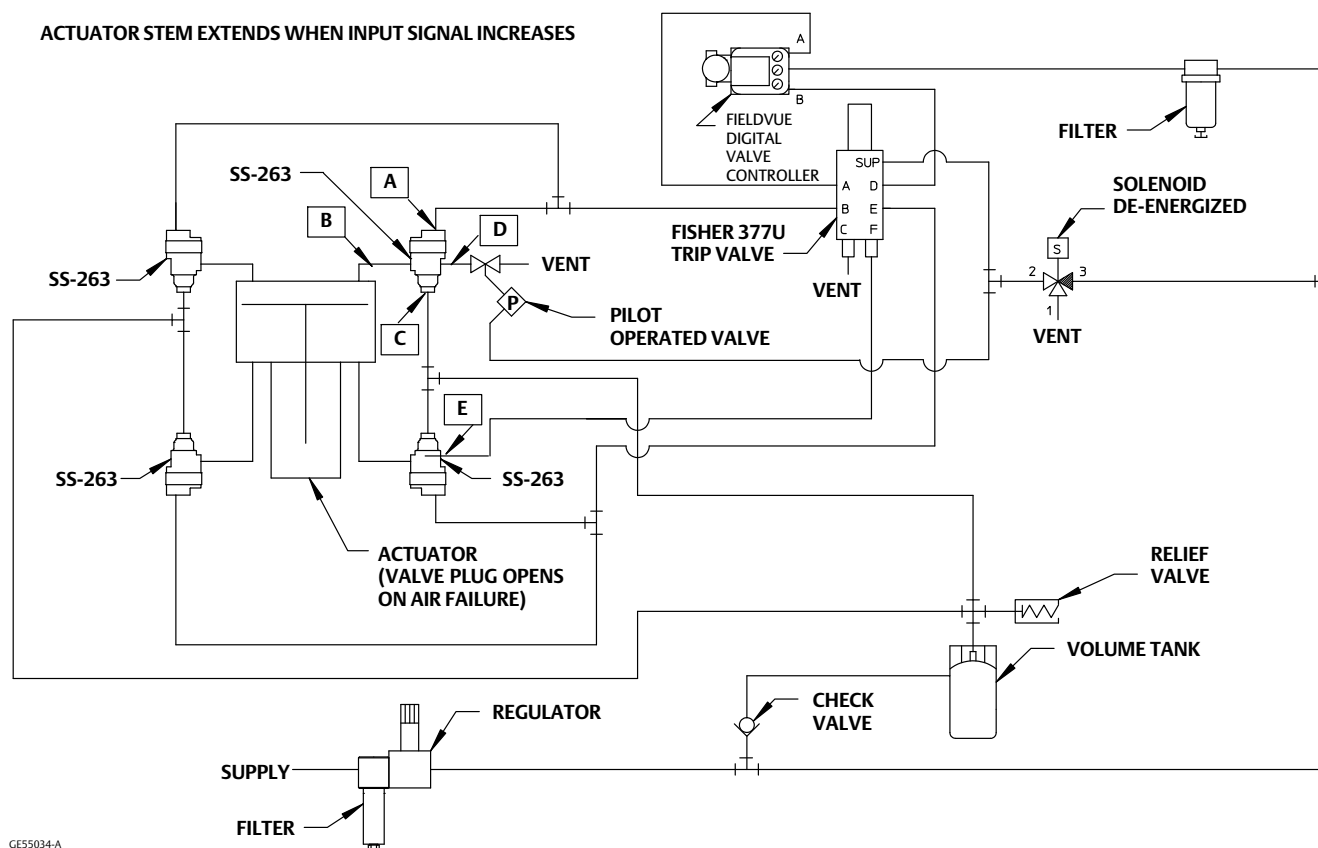
which require full travels of up to 23-7/8 inches. Typically valves such as these will need large pneumatic double acting piston actuators, to provide the thrust needed for excellent dynamic performance and ANSI Class V seat leakage.

The SS-263 provides the necessary flow capacity to quickly fill and quietly exhaust either side of the piston cylinder in these large actuators, providing full stroke times in less than 2 seconds on positioner control and in under 1 second on solenoid trip.

Existing installations including, but not limited to the applications above can greatly benefit with a retrofit ODV package including the SS-263 volume booster by not only simplifying piping and connections, but also by increasing performance and reliability of the installation.

Contact your [Emerson sales office](#) for more information on Optimized Digital Valve packages.

### Figure 2. Typical Installation



### SS-263 Pressure Connections:

A: Input Signal

B: Output

C: Supply

D: Diagnostics, dump valve, or actuator bypass assembly connection

E: Auxiliary Supply

## Installation

Figure 2 shows a typical installation for the SS-263 volume booster on the Fisher 685 double-acting piston actuator. A single regulator that supplies both the positioner and booster (or boosters) is recommended. The supply medium must be clean, dry, oil-free air.

Due to the large size of the supply connection and weight of the volume booster the special mounting adaptor should be used when possible. This adaptor is provided by Emerson as a component of the SS-263.

The SS-263 exhausts air through specially designed ports located on the perimeter of the diaphragm spacer assembly. These passages must be kept clear and free of debris or foreign materials for proper performance.

## Ordering Information

The SS-263 will only be available to order as an accessory for Fisher control valve assemblies and will not be sold individually. Please contact your [Emerson sales office](#) for more information or to request a quote.

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Emerson Automation Solutions  
Marshalltown, Iowa 50158 USA  
Sorocaba, 18087 Brazil  
Cernay 68700 France  
Dubai, United Arab Emirates  
Singapore 128461 Singapore

[www.Fisher.com](http://www.Fisher.com)

