

### Section 3

# Diaphragm Valve Actuation



#### Contained in this section:

- Pneumatic Actuation
- Types
- Features
- Sizing Charts
- Other Available Actuator Options

# Dia-Flo® Pneumatic Actuators

## Introduction

Dia-Flo® pneumatic actuators are rugged, durable and long lasting. Properly maintained, a service life of 20+ years is not uncommon. The actuator wear parts are limited to the nylon reinforced diaphragm and Buna N "O" rings that require infrequent replacement.

## Modes of Operation

- On / Off control operation
- Automatic throttling

## Design Features

- **Compact** – Close-coupled actuators combine minimum space with maximum economy.
- **Rugged** – Aluminum or ductile iron motor cases provide maximum strength.
- **Low Maintenance** – Only diaphragm and O-Ring seals need occasional replacement.
- **Efficient** – Seven interchangeable actuator sizes allow maximum efficiency of available power.
- **Minimum Number of Parts** – Enclosed and protected from atmospheric conditions.
- **Adaptability** – Suitable for pneumatic or hydraulic operation in various pressure ranges.
- **Flexibility** – Can be mounted on any manual valve body already in service.
- **Accessories** – Wide variety available, including: handwheel closing device, positioner, adjustable travel stop, position indicator, adjustable opening stop, limit switches and proximity switches.
- **Actuator diaphragm** – Molded, nylon reinforced oil resistant elastomer. Designed for long life at air pressures up to 85 psi.



# Actuator Series

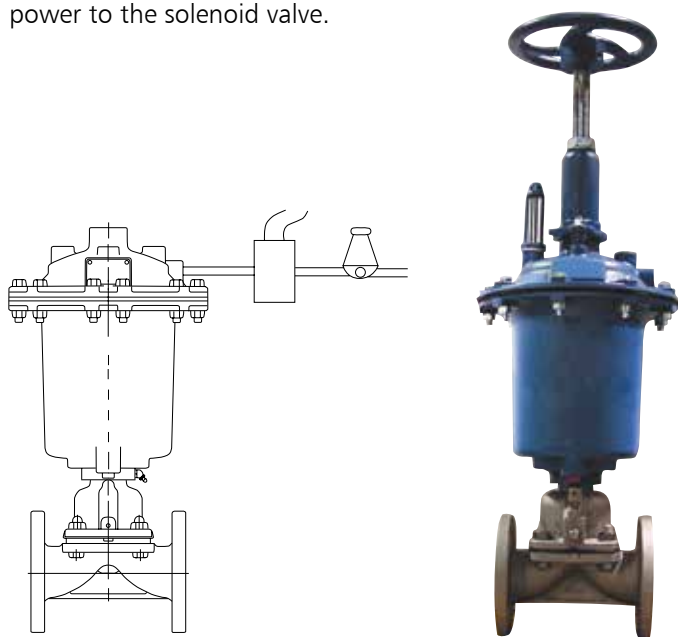
## 3100 Series

### Fail Open (Spring-to-Open, Air-to-Close)

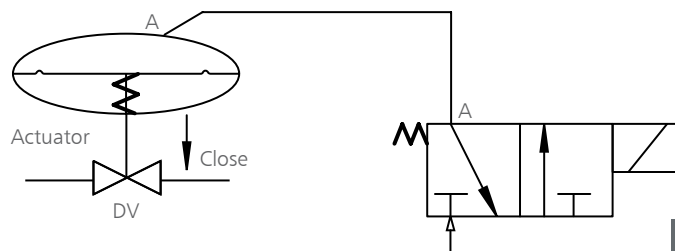
The actuator is spring-to-open, air-to-close type.

Operation is via a normally closed 3 way, 2 position (3/2) solenoid valve. When the solenoid is energized, valve closes and when de-energized, the valve opens.

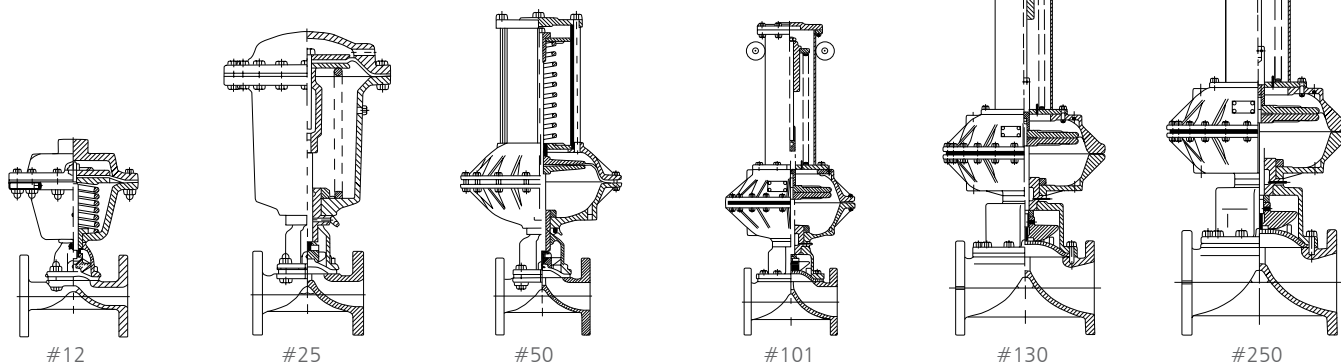
The valve will fail open in the event of loss of electrical power to the solenoid valve.



Piping Schematic for 3/2 Solenoid Valve Normally Closed



Air pressure on the top side of the actuator diaphragm closes the valve; a spring opens the valve. Springs are available to open valve against full vacuum in the line. (Be sure to specify when vacuum is involved.) The Dia-Flo® air to close, spring to open actuator is available in sizes #12, #25, #50, #101, #130, #250.

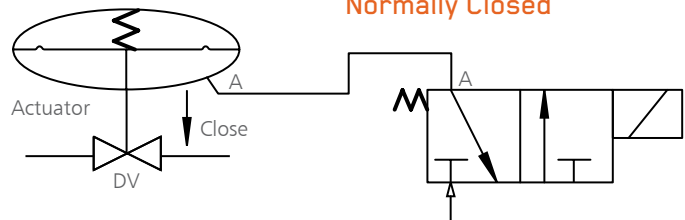
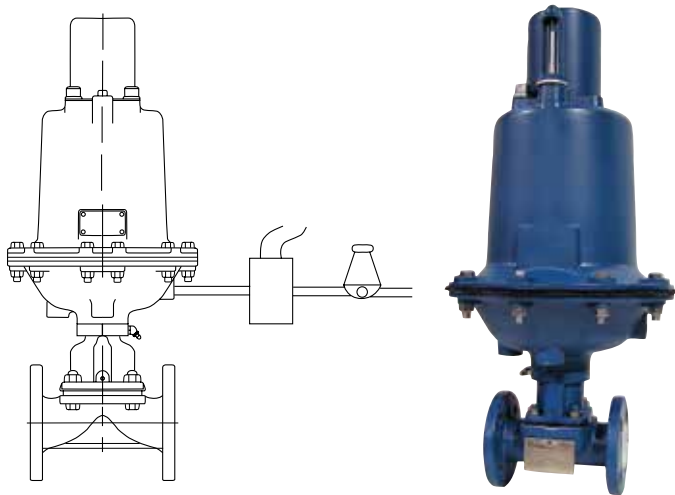


# Actuator Series

## 3200 Series

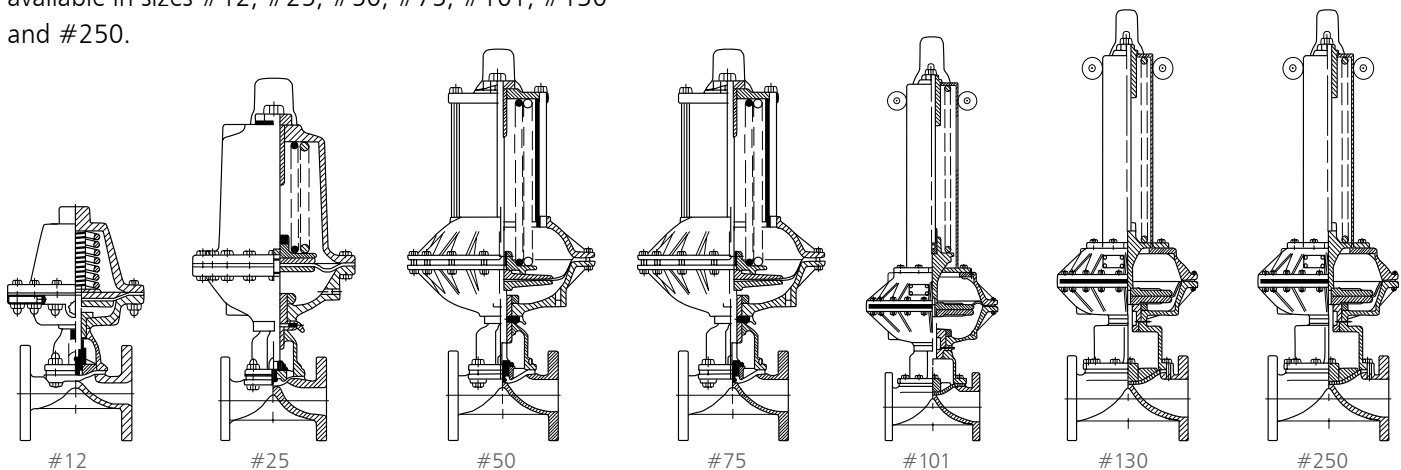
### Fail Close (Spring-to-Close, Air-to-Open)

This is the reverse of the 3100 Series. The valve is spring-to-close and air-to-open. Operation is via a normally closed 3 way, 2 position (3/2) solenoid valve. When the solenoid is energized, the valve opens and when de-energized, the valve closes. The valve will fail closed in the event of loss of electrical power to the solenoid valve.



Piping Schematic  
for 3/2 Solenoid Valve  
Normally Closed

Air pressure on the underside of the actuator diaphragm opens the valve. A spring or set of springs closes the valve. This Dia-Flo<sup>®</sup> air-to-open / spring-to-close actuator is available in sizes #12, #25, #50, #75, #101, #130 and #250.

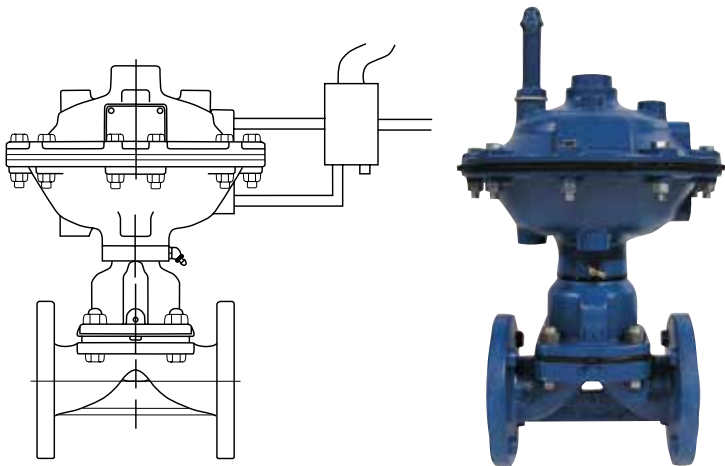


# Actuator Series

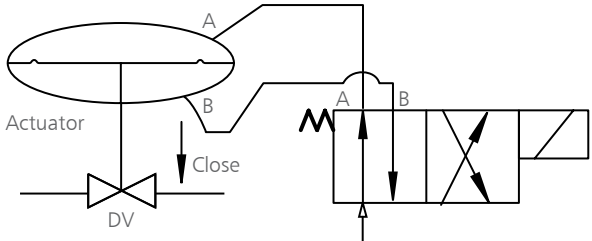
## 3300 Series

### Double Acting (Air-to-Close, Air-to-Open)

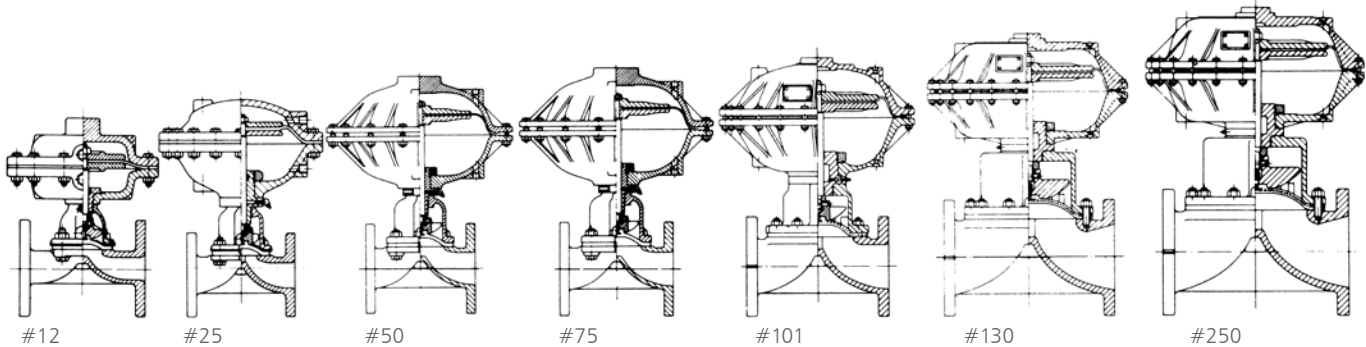
This type of actuator is similar in functionality as a double acting piston cylinder. Operation is via a 4 way, 2 position (4/2) solenoid valve. Standard set-up is valve closed when solenoid valve is de-energized and opens when energized. There is no fail position unless provided with an auxiliary source of air supply. Note that diaphragm valves will tend to open when line pressure is present.



Piping Schematic  
for 4/2 Solenoid Valve



Double-acting (air-to-close, air-to-open) Dia-Flo® actuators are available in seven diaphragm sizes: #12, #25, #50, #75, #101, #130 and #250.



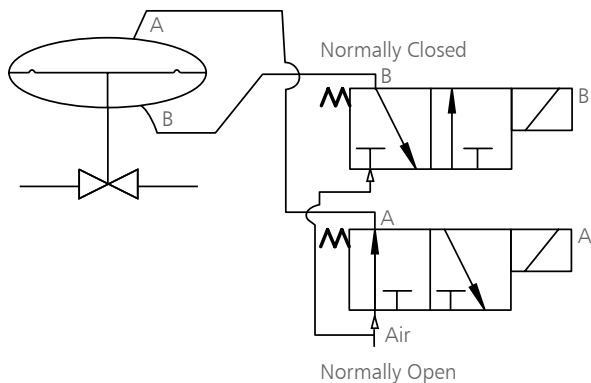
# Actuator Series

## 3300 Series

### Double Acting (Air-to-Close, Air-to-Open)

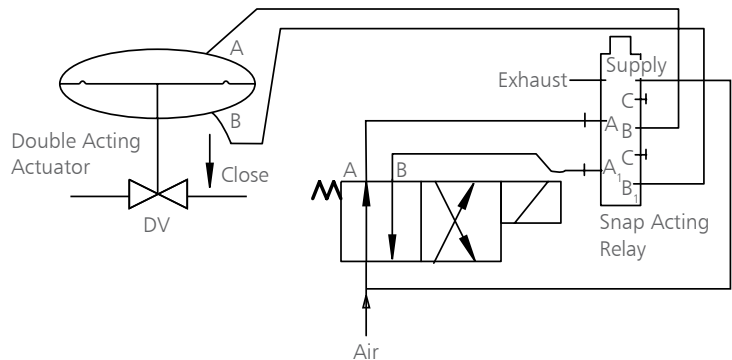
Alternatively, the valve can be controlled by means of two 3 way, 2 position (3/2) solenoid valves in lieu of one 4 way, 2 position (4/2) solenoid valve. In this arrangement, one solenoid valve is allowing air to one side of actuator chamber and the other solenoid valve is venting trapped air from the other chamber via the exhaust port.

### Piping Schematic for Two (2) 3/2 Solenoid Valves



### Piping Schematic for 4/2 Solenoid Valve with Auxiliary Air Pressure

In this schematic, snap acting relay is added to the control circuit and utilizing the normal air supply for pilot pressure source. This arrangement can be used to lock the actuator in its last position in the event of loss of pilot pressure but the auxiliary air source port will be plugged.



Note: We recommend use of dedicated air filter-regulator for each valve assembly because of different supply air pressure requirements.

This will extend valve diaphragm service life and keep speed of operation of valve unaffected by the fluctuating of supply air pressure.