

# Powers™ Controls

## RL 243 SW Switching Relay



**Description** The Powers 243 SW Switching Relay is a two-position, pilot-operated auxiliary device used for switching a common part from one pneumatic circuit to another.  
A mounting bracket is provided for mounting on a vertical or horizontal surface.

**Product Number** 243-0001

### Warning/Caution Notations

<b>WARNING</b>		Personal injury/loss of life may occur if you do not perform a procedure as specified.
<b>CAUTION</b>		Equipment damage, or loss of data may occur if you do not perform a procedure as specified.

<b>Specifications</b>	Maximum Instrument Air Supply	30 psi (207 kPa)
	Changeover Range	3 to 25 psi (21 to 172 kPa)
<b>Operating</b>	Standard Changeover Setting	9 psi (62 kPa)
	Changeover Differential (Nominal)	1.5 psi (10.3 kPa)
	Maximum Ambient Temperature	160°F (71.1°C)
	Minimum Ambient Temperature	-20°F (-28.8°C)
	Air Connection	1/8-inch NPT
	Shipping Weight	2 lb (.9 kg)
	Nominal Capacity	@ 2 psi Δ P
	A Port	800 scim
	B Port	1100 scim

**Typical Specifications** Provide a pneumatic switching relay to deliver, stop or divert instrument air from one pneumatic circuit to another. Relay to be of non-bleed, force-balance type operation with adjustable changeover (switching) point.

## Operation

With an increase in air pressure at Port C, the diaphragm in Chamber E is forced upward to overcome the adjustment spring setting. As the diaphragm moves upward, the return spring moves the floating piston upward to unseat the small ball valve and seat the large ball valve. Ports A and D are now connected and Port B is closed.

With a decrease in air pressure at Port C, the adjustment spring pushes the floating piston downward to seat the small ball valve and unseat the large ball valve. Ports B and D are now connected and Port A is closed.

To increase the air pressure set point for changeover, turn the adjustment screw clockwise. This compresses the adjustment spring to require a higher air pressure for changeover.

To decrease the changeover set point, turn the adjustment screw counterclockwise. This decreases the compression on the adjustment spring so less air pressure is needed to cause changeover.

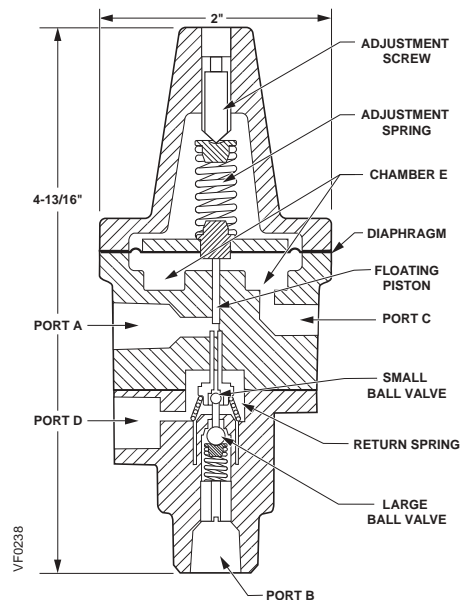


Figure 1. Operation.

## Application

There are applications that require a low differential switching relay that can be triggered by a gradual input signal. The following describes ways of connecting the 243-0001 switching relay to achieve this.

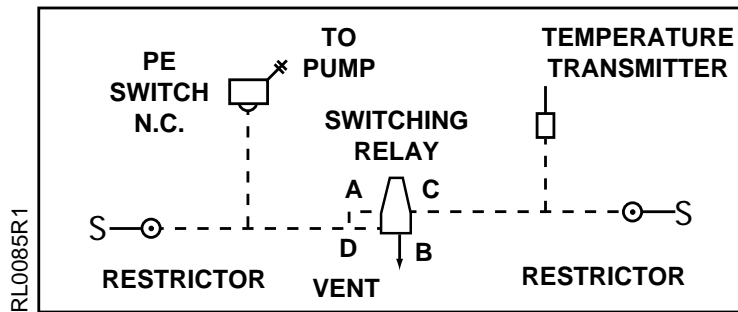
The low differential is achieved by connecting the relay so its differential is the opening and closing of only one valve of the two-valve relay mechanism. A restrictor must be used in the output ("D" port) of the relay to make sure the relay valve can bleed the output signal down to approximately zero. Since a restrictor is used in the output of the relay, the switching relay becomes a low capacity device. Its air capacity is limited by the size of the restrictor.

If a high capacity switching device is required, two switching relays can be used, one piloting the other.

For a single switching relay configuration as shown in Figures 2 and 3, the switching differential is 0.5 to 1.0 psi (3.4 to 6.9 kPa). For a double switching relay configuration as shown in Figure 4, the switching differential is approximately 0.5 psi (3.4 kPa).

**Direct Acting, Low Capacity, Low Differential Switching Relay**

An increasing input ("C" port) signal switches the output ("D" port) signal from approximately zero to supply air pressure. In a typical application, a pump through a PE switch is started or stopped by the switching relay in response to a signal from a temperature transmitter. The capacity of the switching relay is limited by the size of the restrictor in the output ("D" port) line.

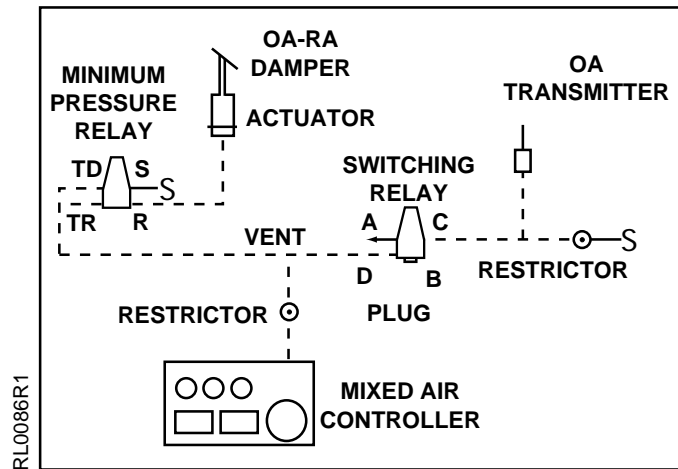


**Figure 2. Direct Acting, Low Capacity, Low Differential Switching Relay.**

**Reverse Acting, Low Capacity, Low Differential Switching Relay**

An increasing input ("C" port) signal switches the output ("D" port) signal to approximately zero. A typical application is mixed air economizer control. The controller signal, through a restrictor, either passes through the switching relay to the minimum pressure relay or is vented to zero in response to the outside air (OA) temperature transmitter signal. The minimum pressure relay positions the outdoor air and return air damper actuators.

The capacity of the switching relay is limited by the size of the restrictor in the output ("D" port) line.



**Figure 3. Reverse Acting, Low Capacity, Low Differential Switching Relay.**

### High Capacity, Low Differential Switching Relay

To provide high capacity at low differential, one switching relay must be used to pilot a second switching relay. The transmitter input ("C" port) to the first switching relay switches it. The output ("D" port) on the first relay is the input ("C" port) to the second switching relay, therefore both switch at approximately the same time.

The second switching relay can be used to open or close large valves or actuators because its capacity is not restricted.

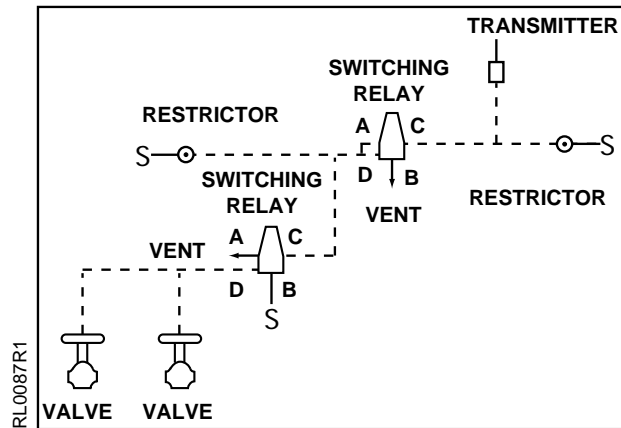


Figure 4. High Capacity, Low Differential Switching Relay.

### Piping Diagram

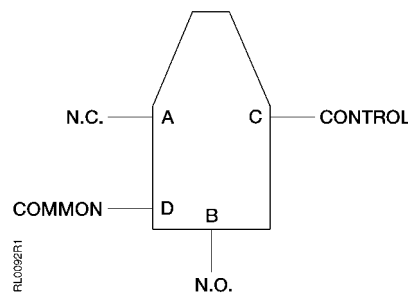


Figure 5. Piping Diagram.

### Installation

Switching relay can be installed to panels, ducts, unit ventilators, or any other vertical or horizontal surface. Control air piping can also support relay.

1. Use self-tapping screws or bolt and nut to secure relay-mounting bracket to any vertical or horizontal surface.
2. Secure switching relay to mounting bracket with locknut furnished with each assembly. Tighten locknut securely with pliers or wrench.

The installation is now complete.

### Adjustments

#### Changeover Point See Figure 6.

The switching relay is factory-set to 9psi changeover. The changeover point is adjustable from 3 to 25 psi. To increase changeover point, turn adjustment screw clockwise with Allen wrench. To decrease changeover point, turn adjustment screw counterclockwise.



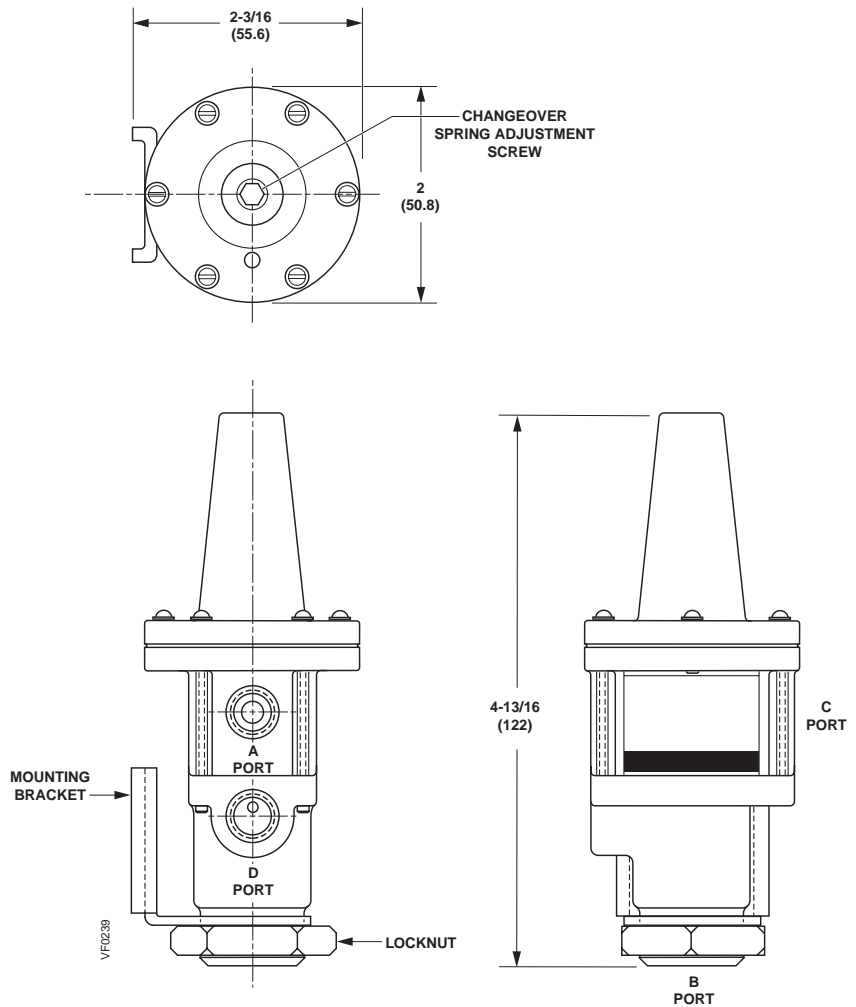
#### CAUTION:

Do not attempt to disassemble switching relay.

**Maintenance**

If inoperable replace entire unit.

**Dimensions**



**Figure 6. Dimensions in Inches (Millimeters).**

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