APPLICATION
For low pressure or vacuum- to “make” or “break” electrical circuits on small changes in the differential between two pressures. Examples: to indicate a change in resistance through a filter; to indicate a change in differential due to a change in air flow conditions; to indicate interruption of air flow.

These controls incorporate two pressure chambers separated by a sensitive diaphragm. Each pressure chamber is connected to a separate pressure source and the control is set to operate as the relationship of the two pressures change.

The operating difference required to operate the switch is adjustable within the limits shown in the table. The switch operating range is obtainable throughout the control range. The change in pressure difference required to restore the switch to its original position is not adjustable - this reset value is the fixed sensitivity. Once the operating pressure difference has been established, it will remain constant over the control range.

SINGLE STAGE OPERATION
Differential Pressure Controls Types PPQ, PPQW and PPQE (with suffix -2 or -3) are single contact mercury switch equipped controls providing single stage operation for single pole, single throw make and break.

TWO-STAGE OPERATION
Types PPQ, PPQW and PPQE with suffixes -4122, -4123, -4129 or -4132, incorporate two SP-ST mercury switches and provide two-stage operation, that is, for operating one contact at a value different than that operating the other contact.

LOCATION
Mercoid® Differential pressure controls are extremely sensitive to small pressure changes and, therefore, require special consideration to avoid mechanical vibration and pressure pulsations. They must be secured firmly in a level position on a panel or even wall surface which is free from vibration.

SPECIFICATIONS
Temperature Limits: -10°F to 180°F (-23°C to 82°C).
Pressure Connections: (2) 1/8” NPT(F).
Electrical Rating: 0.3A @ 115 VAC, 0.15A @ 230 VAC, 0.9A @ 24 VAC, 0.15A @ 115 VDC, 0.07A @ 230 VDC.
Conduit Opening: 1/4” hole for 1/2” HUB.
Switch Type: Mercury.
Wiring Connections: Screw type.
Setpoint Adjustment: Screw type, internal.
Housing: Painted steel STD or W, aluminum E type.
Wetted Parts: Nylon reinforced Buna-N, steel, brass, aluminum.
Weight: PPQ 4 1/2 lbs. (2 kg); PPQW 5 1/2 lbs. (2.5 kg); PPQE 25 lbs. (11 kg)
Installation: Vertical, in a vibration free area.

Types PPQ (general purpose) controls. Place the 1/8” pressure connection at the bottom so that the conduit connection is to the left. Use the mounting studs and do not attempt to support the control solely by the pressure connection. To level sight across the two cover screws to be sure control is lined up horizontally.

Types PPQW (weather-resistant) controls. Use the mounting studs and do not attempt to support control solely by the pressure connection. Be sure pipe connection is in a vertical position. After cover is securely attached with name plate on bottom of cover, sight across the lower end of nameplate to see that control is lined up vertically.

Types PPQE (explosion proof). Mount controls by means of mounting lugs attached to control housing. Line up horizontally by sighting across the left and right conduit hubs.
Ranges and Differentials

<table>
<thead>
<tr>
<th>Range No.</th>
<th>Working Range</th>
<th>Switch Range Operating Difference Adjusted Between</th>
<th>Fixed Switch Sensitivity (Reset Value)</th>
<th>Surge Pressure Must Not Exceed</th>
</tr>
</thead>
<tbody>
<tr>
<td>X2A</td>
<td>6.0″ Vac. to 6.0″ Press.</td>
<td>.03″ to 2.0″</td>
<td>.03″</td>
<td>10.0″</td>
</tr>
<tr>
<td>X3A</td>
<td>30.0″ Vac. to 30.0″ Press.</td>
<td>.2″ to 12.0″</td>
<td>1″ to 2″</td>
<td>60.0″</td>
</tr>
</tbody>
</table>

PRESSURE CONNECTION

Connect HIGH pressure source to rear pressure connection. See Fig. 3.

OPERATION

Types PPQ, PPQW, PPQE with Suffix -2. As pressure difference between the pressure chambers increases (high side pressure increases, or low side pressure decreases) switch contact opens circuit. As pressure differences between chamber decreases, switch contact will close its circuit (reset value).

The change in pressure difference to reset the control (sensitivity) is not adjustable.

ADJUSTMENT

Controls with suffix -2: If mercury contact (Switch 9-81) is open when the pressure difference is below the cut-out (Operating Difference) turn adjustment screw “S” clockwise to close the switch contact.

Controls With Suffix -3: Incorporate normally closed mercury switch contacts. If the mercury switch (9-83) contact is open when pressure difference is above the cut-out (Operating Difference) turn adjustment screw “S” counter-clockwise to close the switch contact. To increase (Widen) operating differences required to open switch contact (cut-out) turn adjustment screw “S” clockwise (Fig. 3). To decrease (Narrow) operating difference turn screw “S” counter-clockwise.

Two Stage/Two Contact

Series PPQ, PPQW, PPQE:
Specification Nos. 4129, 4122, 4132, 4123

Switch Operating Specifications-Stage Operation

<table>
<thead>
<tr>
<th>Type No.</th>
<th>Switch</th>
<th>Low Differential Pressure</th>
<th>Intermediate Differential Pressure (Neutral Zone)</th>
<th>High Differential Pressure</th>
<th>With High Pressure or Lo VAC Connected to</th>
</tr>
</thead>
<tbody>
<tr>
<td>PPQ-4129</td>
<td>Front Contact 9-81 Rear Contact 9-83</td>
<td>OFF</td>
<td>ON</td>
<td>OFF</td>
<td>Rear</td>
</tr>
<tr>
<td>PPQ-4122</td>
<td>Front Contact 9-83 Rear Contact 9-81</td>
<td>ON</td>
<td>OFF</td>
<td>OFF</td>
<td>Rear</td>
</tr>
<tr>
<td>PPQ-4123</td>
<td>Front Contact 9-81 Rear Contact 9-81</td>
<td>OFF</td>
<td>ON</td>
<td>OFF</td>
<td>Rear</td>
</tr>
<tr>
<td>PPQ-4123</td>
<td>Front Contact 9-83 Rear Contact 9-83</td>
<td>ON</td>
<td>OFF</td>
<td>ON</td>
<td>Rear</td>
</tr>
</tbody>
</table>
TWO CONTACTS: Close one contact upon an increase in pressure difference and close another upon a further increase.

PRESSURE CONNECTIONS
Connect HIGH pressure source to REAR pressure connection and LOW pressure source to FRONT pressure connection (Fig. 5).

OPERATION-ADJUSTMENT
The two switch contacts are successively opened one after the other as the pressure operating difference increases from the low differential pressure setting to the high differential setting. With both switches closed (low differential pressure) the REAR SWITCH (9-81) will open as the pressure difference between the pressure chambers increases (high side pressure increases or low side pressure decreases). The FRONT SWITCH (9-83) will open as the pressure difference increases further to the high differential pressure setting. With decreasing pressure differences the order of operation is reversed with the FRONT SWITCH first to close the thereafter the REAR switch. The change in pressure difference to reset each contact (sensitivity) is not adjustable.

ADJUSTING SCREW “S” changes the operating pressure difference for the two switch contacts. Turning knurled adjusting screw “S” clockwise increases (widens) pressure difference between the pressure chambers, necessary to open the switch contacts. Turning screw “S” counter-clockwise decreases (narrows) the difference. Adjustment screw “S” in increasing (widen) or decreasing (narrow) the operating difference will, at the same time, establish the low operating differential pressure setting for the REAR switch. If the rear switch is open, turning screw “S” clockwise will close it.

ADJUSTMENT SCREW “D” (small slotted screw located on magnet arm) adjusts the spread between the pressure difference operating the rear contact (low differential) and the difference to operate the front contact (high differential). Adjustment screw “D” in changing the spread between switch operations will also establish the high operating differential pressure setting for the FRONT switch. In using adjustment screw “D”, loosen locknut, adjust and retighten nut. Turn “D” clockwise to increase (widens) spread and counter-clockwise to decrease (narrow) spread.

OPERATING DIFFERENCES when changed with adjustment “S” may require readjustment for FRONT switch with adjustment “D”.

TWO CONTACTS: Open one contact upon an increase in pressure difference and open another upon a decrease in pressure difference

PRESSURE CONNECTIONS
Connect HIGH pressure source to REAR pressure connection and LOW pressure source to FRONT pressure connection (Fig. 6).

OPERATION-ADJUSTMENT
With both mercury switch contacts closed (neutral zone) the FRONT contact (9-83) will open as the pressure difference between chambers increases (high side pressure rises, or low side pressure drops). As the difference decreases, the FRONT contact will reclose. When the pressure difference between the chambers decreases below the neutral zone (high side pressure drops, or low side pressure rises) the REAR contact (9-83) will open. As the difference increases, the REAR contact will reclose. The change in pressure difference to reset each contact (sensitivity) is not adjustable.

ADJUSTMENT SCREW “S” changes the operating differences for the two switch contacts. Turning knurled adjustment screw “S” clockwise increases (widens) the operating difference between the pressure chambers necessary to open the switch, contacts. Turning screw “S” counter-clockwise decreases (narrows) the difference. Adjustment “S” in increasing (widen) or decreasing (narrow) the operating difference will at the same time establish the low operating differential pressure setting for the rear switch. If the rear switch is open, turning screw “S” counter-clockwise will close it.

ADJUSTMENT SCREW “D” (small slotted screw located on magnet arm) adjusts the spread between the pressure difference operating the FRONT contact (low differential) and the difference to operate the FRONT contact (high differential). Adjustment “D” in changing the spread between switch operations will also establish the high operating differential pressure setting for the FRONT switch. In using adjustment “D” loosen lock-nut, adjust and retighten nut. Turn screw “D” clockwise to increase (widens) spread and counter-clockwise to decrease (narrow) spread.

OPERATING DIFFERENCES when changed with adjustment screw “S” may require readjustment for FRONT switch with adjustment “D”.

Mercoid® Diaphragm Differential Pressure Controls
Two Stage Types - Two SPST Magnetic Mercury Switches Independently Adjustable

Piping - Operating Characteristics - Adjustments

![Fig. 5](image_url)

![Fig. 6](image_url)
TWO CONTACTS: Close one contact upon an increase in pressure difference and close another upon a further increase.

PRESSURE CONNECTION
Connect HIGH pressure source to REAR pressure connection and LOW pressure source to FRONT pressure connection (Fig. 7).

OPERATION-ADJUSTMENT
The two switch contacts are successively closed, one after the other as the pressure operating difference increases from the low differential pressure setting to the high differential setting.

With both switches open (low differential pressure) the REAR switch (9-83) will close as the pressure difference between the pressure chambers increases (high side pressure increases, or low side pressure decreases). The FRONT switch (9-81) will close as the pressure difference increases further to the high differential pressure setting. With decreasing pressure differences the order of operation is reversed with the FRONT switch - first to open and thereafter the REAR switch.

The change in pressure difference to reset each contact (sensitivity) is not adjustable.

ADJUSTMENT SCREW “S” changes the operating differences for the two switch contacts.

Turning knurled adjustments screw “S” Clockwise increases (widens) the pressure operating difference between the pressure chambers necessary to close the switch contacts. Turning screw “S” Counter-clockwise decreases (narrows) the difference.

Adjustment screw “S” in increasing (widens) or decreasing (narrows) the operating difference will at the same time, establish the low operating differential pressure setting for the REAR switch is closed turning screw “S” Clockwise will open it.

ADJUSTMENT SCREW “D” (small slotted screw located on magnet arm) adjusts the spread between the pressure difference operating the rear contact (low differential) and the difference to operate the front contact (high differential).

Adjustment screw “D” in changing the spread between switch operations will also establish the high operating differential pressure setting for FRONT switch. In using screw “D”, loosen lock-nut, adjust, and retighten nut. Turn “D” Clockwise to increase (widens) spread and Counter-clockwise to decrease (narrow) spread.

OPERATING DIFFERENCE when changed with adjustment “S” may require readjustment for FRONT switch with adjustment “D”.

TWO CONTACTS: Close one contact upon an increase in pressure difference and close another contact upon a decrease in pressure difference.

PRESSURE CONNECTION
Connect HIGH pressure source to REAR pressure connection and LOW pressure source to FRONT pressure connection (Fig. 8).

OPERATION-ADJUSTMENT
With both mercury switch contacts open (neutral zone) the FRONT contact (9-81) will close as the pressure difference between chambers increases (high side pressure rises or low side pressure drops). As the difference decreases the FRONT contact will reopen.

When pressure difference between the chambers decreases below the neutral zone (high side pressure drops, or low side pressure rises) the REAR contact (9-81) will close. As the difference increases the REAR contact will reopen.

The minimum change in pressure difference to reset each contact (sensitivity) is not adjustable.

ADJUSTMENT SCREW “S” changes the operating differences for the two switch contacts.

Turning knurled adjustment screw “S” clockwise increases (widens) the operating difference between the pressure chambers necessary to close the switch contact. Turning screw “S” Counter-clockwise decreases (narrows) the difference.

Adjustment screw “S” in increasing (widens) or decreasing (narrows) the operating difference will at the same time establish the low operating differential pressure setting for the REAR switch. If the rear switch is closed, turning screw “S” Counter-clockwise will open it.

ADJUSTMENT SCREW “D” (located on magnet arm) adjusts the spread between the pressure difference operating the rear contact (low differential) and the difference to operate the front contact (high differential).

Adjustment screw “D” in changing the spread between switch operations will also establish the high operating differential pressure setting for the FRONT switch. In using adjustment “D” loosen lock-nut, adjust and retighten nut. Turn screw “D” Clockwise to increase (widens) spread and Counter-clockwise to increase (widens) spread and Counter-clockwise to decrease (narrow) spread.

OPERATING DIFFERENCES when changed with adjustment screw “S” may require readjustment for FRONT switch with adjustment “D”.

©Copyright 2010 Dwyer Instruments, Inc. Printed in U.S.A. 2/10