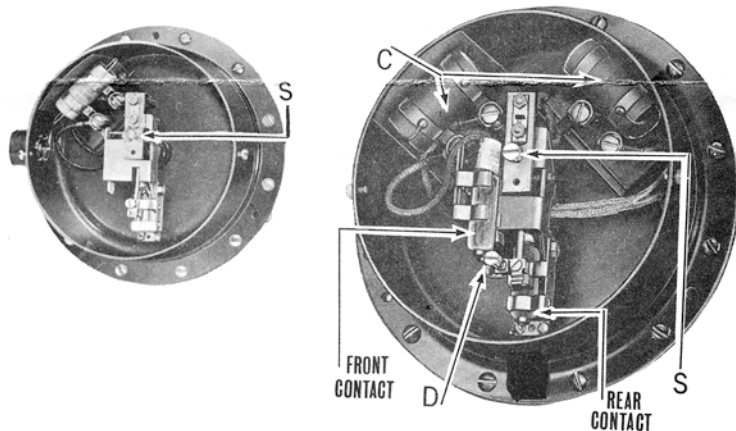


# DIAPHRAGM OPERATED CONTROLS SERIES PQ

## INSTALLATION INSTRUCTIONS

TYPE PQ (GENERAL PURPOSE) TYPE PQW (WEATHER RESISTANT) TYPE PQE (EXPLOSION PROOF)



### RANGE ADJUSTMENT TYPES PQ-2, PQW-2, PQE-2, PQ-3, PQW-3, PQE-3

In order to accurately determine the points at which the control is being set to operate, a water column gauge is essential. It is advisable that a pressure tapping be provided for such a gauge at the time the control is piped.

To alter the range setting, change the knurled screw "S" (see illustration No. 3). This is done by turning screw "S" to the left or counter-clockwise to lower the operating point. To raise the pressure adjustment turn screw "S" clockwise.

**Differential Adjustment for above Series:** The differential is fixed and cannot be changed.

**RANGE ADJUSTMENT—Series PQ, PQE, PQW; Spec. Nos. 4122, 4129, 4132, 4123.** The range setting is governed by the screw "S" (see illustration No. 4). To raise the operating pressure, turn the knurled screw clockwise, and to lower the setting, turn screw "S" counter-clockwise. As the range adjustment is varied, the differential between the two switches will remain relatively constant, but should be rechecked. With vacuum controls turn screw "S" clockwise to lower the vacuum setting and counter-clockwise to raise the setting.

**Differential Adjustment for above Series with Spec. Nos. 4122, 4129, 4132, 4123.** The differential or pressure difference between the operation of the "high" and "low" switches can be adjusted within certain limits by the knurled screw "D". To widen the differential, turn screw "D" clockwise, to decrease, turn screw "D" counter-clockwise. **Do not turn this screw too far in either direction**, otherwise the magnetic switch to the left will not operate in the proper sequence.

#### Sequence of Switch Operation—

SPECIFICATION NO.		LOW PRESSURE (HIGH VAC.)	INTERMEDIATE POSITION	HIGH PRESSURE (LOW VAC.)
PQ-4122	Front Contact	ON	OFF	OFF
	Rear Contact	ON	ON	OFF
PQ-4129	Front Contact	OFF	ON	ON
	Rear Contact	OFF	OFF	ON
PQ-4132	Front Contact	ON	OFF	OFF
	Rear Contact	OFF	OFF	ON
PQ-4123	Front Contact	OFF	ON	ON
	Rear Contact	ON	ON	OFF

**Pressure Controls:** On a pressure increase "low" pressure switch should operate first, and upon a further pressure increase "high" pressure switch should then operate. On decreasing pressure "high" switch operates, and upon a further decrease "low" switch operates.

**Vacuum Controls:** On a decrease in vacuum "high" vacuum switch operates first, and upon a further decrease "low" vacuum switch operates. On an increase in vacuum "low" vacuum switch operates, and upon a further increase in vacuum "high" vacuum switch operates.

**Pressure Rating and Ambient Temperature:** Excess pressure will damage the control. Do not exceed the maximum pressure rating stamped on the name plate. Since wide variations in ambient temperature may cause erratic operation, a reasonably constant ambient temperature should be maintained. Never use oil on movements.

**Mounting:** Mercoid Diaphragm 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. Place the  $\frac{1}{8}$ " pressure connection at the bottom so that the conduit connection and terminal posts are to the left. **Use the mounting studs and do not attempt to support the control solely by the pressure connection.**

**Orifices:** Each control is shipped with a .028" orifice inside of the pressure connection to help dampen the surges. The orifice is located inside the pressure connection and can easily be changed by the use of a small screw driver.

Gases or liquids containing excess dirt or scale may close the orifice so that periodic servicing may be required.

**Pressure Connection:** When the control is piped, use a flexible connection to prevent undue strains from expansion and contraction. On any application on which the small orifice does not sufficiently check the pressure surges, the pulsations must be dampened by a capillary tube or pressure surge chamber, otherwise the instrument will follow the pulsations and cause contact fluttering.

**Wiring and Electrical Capacity:** 115 volts or 230 volts; 0.9 amperes - 24 volts AC; 0.45 amperes - 24 volts DC; 0.3 amperes - 115 volts AC; 0.15 amperes - 115 volts DC; 0.15 amperes - 230 volts AC; 0.07 amperes - 230 volts DC. **Be sure the electrical load does not exceed these ratings and, if there is any question, use a relay.**

Attach only flexible BX cable directly to the control case. If rigid conduit is employed, insert a short piece of BX cable between the conduit and control case to take up strain. Scrape all wires clean before attaching to the binding posts.

With Series Spec. Nos. 4122 and 4132, having two tubes, run the wires to the right side terminals over the top movement support so that they will not interfere with the free motion of the mechanism.

The condensers "C" (illustration 3 & 4) reduce the excess arcing and should not be removed.

NOTE: The rubber band holding the magnet assembly in place must be removed (it is used for shipping purposes only.)

# MERCOID DIAPHRAGM PRESSURE CONTROLS

## SERIES PQ

Mercoid Diaphragm Pressure Controls are intended for any low pressure applications for regulating the pressures of gases in inches of water, either pressure or vacuum. The standard instruments may be used with any pressure medium which does not effect steel or brass.

Large diaphragms actuate the magnetic mercury switches through compounding mechanisms and, on a pressure increase, the magnets move away from the mercury switches to open the circuit in the Fig. 9-81 switch, or to close the circuit in the Fig. 9-83 mercury switch.

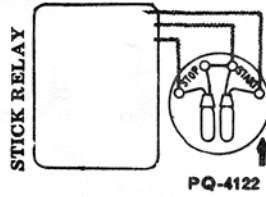
**Series PQ-2, PQE-2, PQW-2:** These instruments are single pole and have an adjustable range with a fixed differential. The mercury switch opens on a rise of pressure.

**Series PQ-3, PQE-3, PQW-3:** Identical to Type PQ except that the circuit closes on a rise of pressure or decreases of vacuum. For ranges see table below.

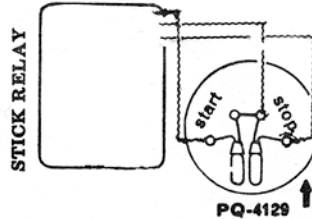
**Series PQ, PQE, PQW with Spec. No. -4122:** Equipped with two normally closed switches and two adjustments for varying the operating point of each switch.

With the switches in the normally closed position, an increase of pressure will open one circuit and a further increase to a predetermined pressure opens the second circuit. On a small decrease in pressure, the second switch will close and on a further decrease the first switch closes. One switch is adjustable as to range and the other adjustment will vary the differential or pressure difference between the operation of the two switches.

Generally, this type of diaphragm control is used with a relay in order



PQ-4122 control operates to start on low pressure and stop on high pressure.



PQ-4129 operates to start on high pressure and stop on low pressure.

to provide an adjustable differential. (see illustration.)

**Series PQ, PQE, PQW with Spec. No. -4129:** Identical to Spec. No. -4122 except that both mercury switches are normally open and close on an increase of pressure or decrease of vacuum.

**Series PQ, PQE, PQW with Spec. No. -4132:** Equipped with two switches and adjustments for varying the operating points. At a predetermined pressure, both switches are open (neutral). The two switches give the effect of a single pole-double throw contact with a neutral position. Assuming that one circuit has just closed, a slight pressure change in the reverse direction will open the circuit. A further change in pressure will close the other circuit while a slight pressure change in the reverse direction will open the contact. This unit is commonly used with reversing type regulating motors requiring floating contacts. If the control contacts are not of sufficient capacity to handle the motor directly, each individual mercury switch should be wired to a Relay which in turn will control the motor load.

In the table of ranges and differentials, the minimum differential represents the difference in pressure between "on" and "off" for each individual switch. The maximum differential figures represent the maximum adjustable spread of the pressures between the contact operation.

**Series PQ, PQE, PQW with Spec. No. -4123:** Identical to Spec. No. -4132, except at a predetermined pressure, both switches are closed (neutral).

For ranges and adjustable differentials see table below.

(See Opposite Side for Installation Instructions)

### ADJUSTABLE RANGES AND DIFFERENTIALS

#### SERIES PQ, PQE, PQW WITH SUFFIX -2 or -3 With Range Adjustments Only - No Differential Adjustment

Range No.	Operating Range Adjust. (In. of H <sub>2</sub> O)	Fixed Switch Differential (In. of H <sub>2</sub> O)	Max. Surge Not to Exceed (In. of H <sub>2</sub> O)
1	0-0.1 In. Press.	0.01 In.	1.0 In.
2	0.1-1.0 In. Press.	0.02 In.	10 In.
2.6	0.1-6.0 In. Press.	0.02 In.	10 In.
3	1.0-30 In. Press.	0.1-0.2 In.	60 In.
4	0-0.1 In. Vac.	0.01 In.	1.0 In.
5	0.1-1.0 In. Vac.	0.01-0.02 In.	10 In.
6	1.0-30 In. Vac.	0.1-0.2 In.	60 In.

#### SERIES PQ, PQE, PQW With SPEC NOS. -4122, -4123, -4129, -4132 With Both Range and Differential Adjustment

Range No.	Operating Range Adjust. (In. of H <sub>2</sub> O)	Fixed Switch Differential (In. of H <sub>2</sub> O)	Max. Spread Adjust. Between Switch Operations (In. of H <sub>2</sub> O)	Max. Surge Not to Exceed (In. of H <sub>2</sub> O)
1	0-0.1 In. Press.	0.01 In.	0.05 In.	1.0 In.
2	0.1-1.0 In. Press.	0.02 In.	0.3 In.	10 In.
2.6	0.1-6.0 In. Press.	0.02 In.	0.3 In.	10 In.
3	1.0-30 In. Press.	0.1-0.2 In.	3.0 In.	60 In.
4	0-0.1 In. Vac.	0.01 In.	0.05 In.	1.0 In.
5	0.1-1.0 In. Vac.	0.01-0.02 In.	0.3 In.	10 In.
6	1.0-30 In. Vac.	0.1-0.2 In.	3.0 In.	60 In.

Form B-59C-R