SERIES DP-7000 DIFFERENTIAL PRESSURE CONTROLS

INSTALLATION AND OPERATING INSTRUCTIONS

LOCATION
Install control in location recommended by equipment manufacturer. Select a location that is reasonably free from vibration caused by reciprocating or rotating machinery.

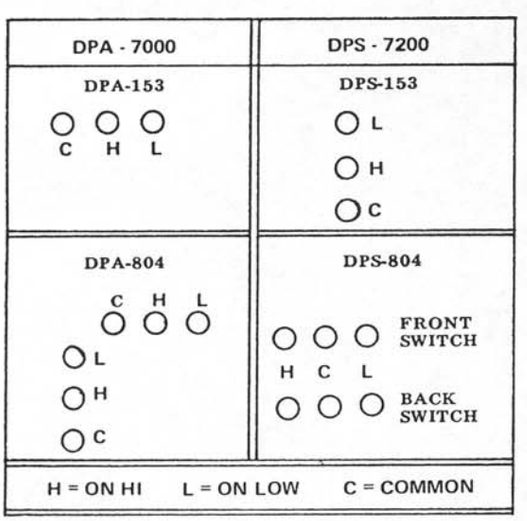
MOUNTING
GENERAL PURPOSE TYPES DPA, DPS, DPR, and WEATHERPROOF TYPES DPAW, DPSW, DPRW: Do not support control by its pressure connections — attach control to wall or post by means of the 3 holes in flange attached to control.

EXPLOSION PROOF TYPES DPAE, DPSE, DPRE: Mount by means of mounting lugs attached to the control housing.

PIPING
Connect HIGH PRESSURE source to the 1/8" N.P.T. pressure connection located on left side of control case. Connect LOW PRESSURE source to the other 1/8" N.P.T. pressure connection located on the right side of case.

WIRING
Wire in accordance with the National Electrical Code and local regulations. For general purpose controls use a short piece of BX between the rigid conduit and control so that the control will not be subjected to conduit expansion and contraction. Where control is directly connected into load circuit it should be connected into hot side of line.

Do not exceed electrical rating as stamped on control nameplate.



SWITCH OPERATING INDICATOR
Some types equipped with switch indicator. Orange indicates switch is in the high pressure position on DPA-7000 series and arrow indicates position of DPS-7200-153 series. DPS-7200-804 Does Not have indicator.

HOW TO SET OPERATING POINT

DOUBLE ADJUSTMENT TYPES — FULLY AUTOMATIC DPA 7000
Prefixed by the letters DPA, DPAW, DPAE: The value indicated by the position of the UPPER POINTER is the pressure difference (PSID) required to operate the switch or switches on an INCREASE in pressure difference. The value indicated by the position of the LOWER POINTER is the pressure difference (PSID) required to RESET the switch on a decrease in pressure difference.

EXAMPLE SETTING —
With UPPER POINTER set at 8 psi,, the high pressure source must increase to 8 psi. above low pressure source regardless of the actual pressure of either source for control to operate the switch contact.

With LOWER POINTER set at 5 psi., as pressure decreases from 8 psi. or more, it must decrease to 5 psi. before control will function to reclose switch circuits. Three psi difference (8 minus 5) is the DEADBAND OR RESET VALUE. Table shows maximum and minimum DEADBAND (RESET VALUE) for each range.

SINGLE ADJUSTMENT TYPES — FULLY AUTOMATIC DPA 7200
Prefixed by letters DPS, DPSE, DPSW: A single outside adjustment is used to set the pointer on the visible calibrated dial for switch operation. The deadband (RESET VALUE) is fixed and cannot be changed in the field.

Example setting: Range R-62, 30" vac. to 100 psig. (SP-DT suffix -153). If pointer is set at 10 psi., the control will operate switch when the difference between the high and low pressure sources increases to 10 psi., and will restore the circuit when the pressure difference decreases by the fixed deadband of 1.0 psid.

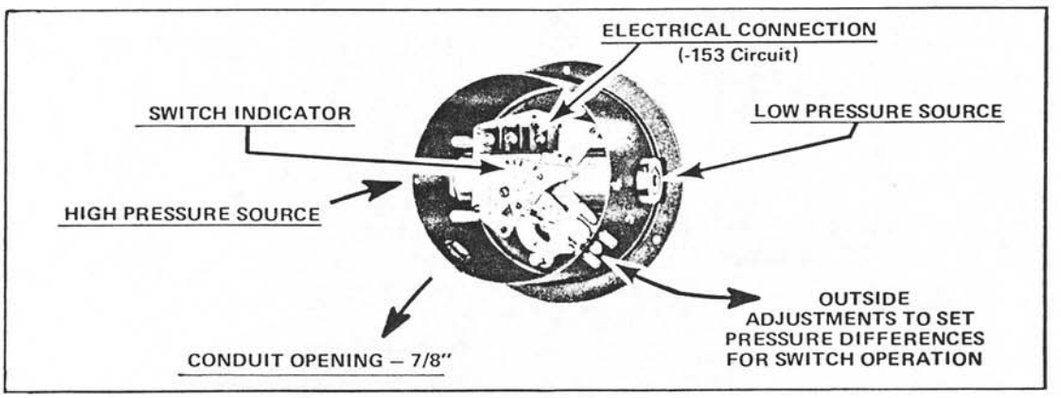
SEMI-AUTOMATIC WITH MANUAL RESET
Prefixed by letters DPR, DPRW, DPRE with letters "L" and "U" after suffix number designating the direction of automatic operation. Example: DPR-7033-153U (SP-DT). A single outside adjustment sets the operating point to actuate the circuit automatically on a *decrease* in differential pressure. Manual reset push button restores switch to normal position after pressure difference has increased. Suffix "L" denotes automatic operation on increase of pressure difference. Suffix "U" denotes automatic operation on decrease of pressure difference.

LOCKING DEVICE
After control has been set for the required operating range, the locking bar may be inserted between the adjustment screws with slot passing over the projecting lug. By placing a sealing wire between the locking bar and the hole in the lug protruding from adjustment assembly, adjustments cannot be tampered with.

CAUTIONS
Control movement must not be oiled. Do not overload electrically — check electrical rating on nameplate and be sure total current passing thru switch is within specified rating. Do not use for pressures higher than those listed in table.

SERIES DP-7000 DIFFERENTIAL PRESSURE CONTROLS

Equipped With Enclosed Metal Snap-Action Contacts



Series DP-7000 differential pressure controls actuate one or two SP-DT snap-action switches on changes in the difference between two pressures. Two opposed bellows, each responsive to a different pressure condition operate a snap-action switch as the difference between the pressures increase or decrease. The operating points are adjustable from outside by means of two knurled knobs. Two pointers indicate the operating points or the differences in pressure between the two bellows at which switch operation occurs. (DPS Types have one pointer.)

Typical applications involve making or breaking an electrical circuit on changes in pressure differences due to changes in flow through orifices, venturis, heat exchangers, condensers or filters.

VISIBLE SCALE — POINTERS SHOW ACTUAL VALUES IN P.S.I. OF PRESSURE DIFFERENCE AT WHICH CONTROL HAS BEEN SET TO OPERATE

OPERATING RANGES — ADJUSTMENT — DEADBAND — SINGLE POLE-DOUBLE THROW

With Snap Switch Operation

Range No.*	Working Pressure Range	Press Diff. Adj. Between (PSID)	DEADBAND (PSID) ONE SPDT Adj. (Min.)	ONE SPDT Fixed	TWO SPDT Fixed
			DPA-7033-153	DPS-7233-153	DPS-7233-804
61	30"Hg.Vac.- 50 psig	0-10	1.5	0.5	0.6
62	30"Hg.Vac.-100 psig	0-20	2.5	1.0	1.0
64	30"Hg.Vac.-300 psig	0-30	6.0	1.5	1.5
			DPA-7043-153	DPS-7243-153	DPS-7243-804
62E	30"Hg.Vac.-100 psig	0-20	3.0	1.5	1.5
64E	30"Hg.Vac.-300 psig	0-30	6.0	2.0	2.5
65E	30"Hg.Vac.-600 psig	0-80	20	6	8
Electrical Rating			Code D	Code E	Code F

*"E" after Range No. indicates 316 S.S. bellows.

ELECTRICAL RATINGS

Code	Suffix	AC Capacity 120V	240V	440V	DC Capacity 120V	240V	HP AC	DC
D	-153	15A	15A	15A	0.5A	0.25A	1/8	NA
E	-153	15A	15A	NA	(3)	(3)	(2)	NA
F	-804	5A	5A	NA	(4)	(4)	NA	NA

(2) 1/4 HP at 120V AC, 1/2 HP at 240V AC

(3) DC controls up to 10A

(4) 5A 30V DC resistive

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INSTALLATION INSTRUCTIONS

DIAPHRAGM OPERATED CONTROLS SERIES CPV

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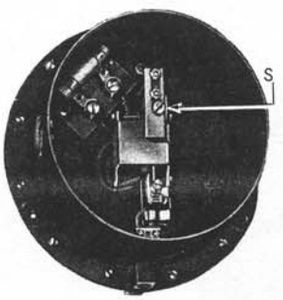
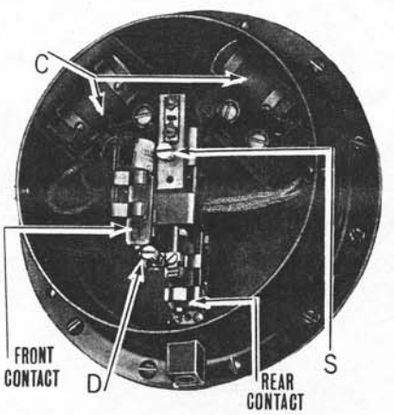


SUFFIX -2 or -3



Specification Nos.
-4122, -4129, -4132, -4123

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. 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: 120 Volts or 240 Volts; 0.9 amperes, 24 volts AC; 0.45 amperes, 24 volts DC; 0.3 amperes, 120 volts AC; 0.15 amperes, 120 volts DC; 0.15 amperes, 240 volts AC; 0.07 amperes, 240 volts DC. **Be sure the electrical load does not exceed there ratings** and, if there is any question, use a Type V 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 Specification 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).

RANGE ADJUSTMENT
Suffix -2 Or -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 IS FIXED AND CANNOT BE CHANGED

RANGE ADJUSTMENT
Specification 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
Specification 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 –

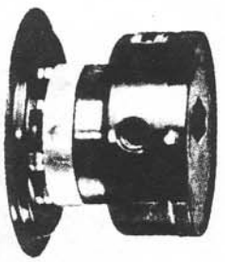
SPECIFICATION NO.		LOW PRESSURE (HIGH VAC.)	INTERMEDIATE POSITION	HIGH PRESSURE (LOW VAC.)
–4122	Front Contact	ON	OFF	OFF
	Rear Contact	ON	ON	OFF
–4129	Front Contact	OFF	ON	ON
	Rear Contact	OFF	OFF	ON
–4132	Front Contact	ON	OFF	OFF
	Rear Contact	OFF	OFF	ON
–4123	Front Contact	OFF	ON	ON
	Rear Contact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

Ambient Temperature: Since wide variations in ambient temperature may cause erratic operation, a reasonably constant ambient temperature should be maintained. Never use oil on movements.

Type CPV Lo Pressure Diaphragm Control With Over-Range Protection to 600 Psig. and Full Vacuum



GENERAL PURPOSE

Opens and closes a Mercoid magnetic operated mercury switch at very low pressures and withstands pressures to 30" hg. vacuum or 600 psi.

The control incorporates an integral over-pressure seal. When the actuating pressure or vacuum rises above the adjustable range of the control, the diaphragm seats and no further motion can be transmitted to the control mechanism.

Examples:

(A) a lead lined tank is used for process under normal pressures of 40 psig. Since any vacuum within the tank would cause the lead lining to collapse, a control is necessary to open a relief valve just below atmospheric pressure (figuratively 2", H_2O vacuum). The control must be able to withstand the 40 psi normal operating pressure. (B) an interlock on a tire moulding press or autoclave to prevent the press from being opened if the internal pressure is even a fraction of an inch of water pressure above atmospheric pressure. The control to withstand up to 600 psi. pressure when the press is in operation.

AVAILABLE CONSTRUCTION

Series CPV: General Purpose (NEMA 1). For indoor and other general applications. Control case-steel with solid cover. Internal parts are brass and steel. Finished in baked enamel. Pressure connection 1/4" male I.P.S. Electrical connection 1/2" conduit opening: 1/2" NPT hub available. Dimensions overall 7" diaphragm — depth 4-11/16."

Series CPW and CVW: Weather Resistant (NEMA 2 & 3R). For outdoor use and other applications. Heavy gauge steel case with solid cover. 1/2" conduit hub available. Neoprene gasket between cover and case. Three 13/64" mounting holes. Pressure connection 1/4" I.P.S. Electrical connection 1/2" conduit opening.

Series CPVE: Explosion-Proof (Class 1, Group C and D, Class 2, Group E, F and G); (NEMA 7C, 7D, 9E, 9F, 9G). For hazardous locations. Has removable glass fronted cover. Mounting by means of four mounting lugs. Equipped with three 3/4" openings for electrical connections. Finished in natural aluminum. Pressure connection 1/4" I.P.S. (Female).

SERIES CPV (Single Circuit SP-ST) OPERATING RANGES

Range No.	Adjustable Range	Fixed Switch Sensitivity	Maximum Positive Pressure PSIG.	Maximum Negative Pressure (Inches hg.)
	INCHES OF WATER			
C1	1" to 60" Pressure	0.75"	600	ABSOLUTE VACUUM
C4	1" to 60" Vacuum	0.75"	600	

Standard Construction Steel Surface, 316 Stainless Steel Diaphragm. Other Materials Available.

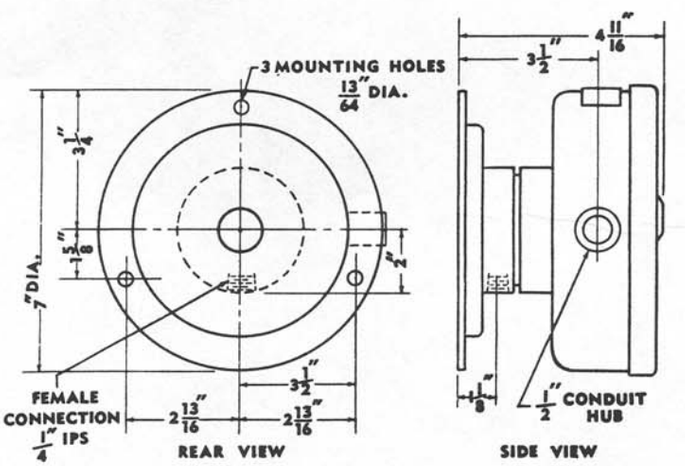
ELECTRICAL RATING

Each mercury switch has the following load capacity: AC 120V. 0.3A., 240V. 0.15A., (24V. 0.9A.) DC 120V. 0.15A., 240V. 0.07A. For higher electrical capacities use with Mercoid Type V Relay. (Not available for 440V. service). Available 1A. 120V. AC; 1/2A. 240V. AC.

TWO-STAGE TYPES

Available for stage operation incorporating two SP-ST Mercoid magnetic mercury switches for various operations. Operating ranges, and electrical rating same as for single circuit types—write for further details.

SERIES CP CONTROLS ARE BUILT ON ORDER TO MEET REQUIREMENTS OF EACH INSTALLATION AND CANNOT BE CARRIED IN STOCK . . . PRICES ON APPLICATION.



DIMENSIONS

INSTALLATION INSTRUCTIONS — See Opposite Page.

MERCOID CONTROL

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