

## P-Series Multifunction Pressure Switches



P-Series

### FEATURES

- *Explosion Proof and Watertight Enclosure – N7 Models*
- *Easy-to-read scale for approximate setpoint indication ( $\pm 5\%$  accuracy)*
- *Stainless steel internal parts*
- *Easy setpoint adjustment(s) capability*
- *Diaphragm-sealed piston actuator for long life is standard for most ranges*



P-Series Differential



P-Series Dual Point

Ashcroft® switches and controls are highly reliable for your industrial and process applications. We begin with rock-solid designs, matching the most appropriate technology with the safety and reliability requirements of the applications. The materials of construction are specified to exacting standards, and product is built to last in the toughest applications. Our modern, responsive manufacturing facility is supported by an extensive network of stocking distributors and factory sales offices located in virtually every part of the world. Special application assistance is always just a telephone call away. The Ashcroft P-Series switch line is designed for uncompromising end user reliability and safety.

Die cast aluminum enclosure is available in NEMA 7/9 (explosion-proof enclosure Class I, Div. 1 & 2, Groups B, C, & D and Class II, Div. 1 & 2, Groups E, F and G). Dual chamber design allows setpoint changes to be made safely even with power connected. Materials of construction have been selected for long life. A wide variety of precision switch elements are available to meet every application requirement, including hermetically sealed contacts for added reliability and safety. The actuators we use have been proven in more than twenty years of service in plants and mills through-out the world. Multiple features such as dual setpoints and adjustable deadbands are offered. Special designs are available for fire safety, limit control and other more stringent requirements. Ease of use is stressed to improve the reliability of the installation.

P-Series switches are currently being successfully used in refineries, chemical and petrochemical plants, water and sewage treatment plants, steel mills and other tough applications. Typical applications are on blowers, compressors, boilers, burners, turbines and reverse osmosis systems.

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# P-Series Multifunction Pressure Switches

## Pressure & Differential Pressure Switches

P-Series pressure, differential pressure and vacuum switches use two different actuators depending on setpoint requirements. For setpoints between 2 and 3000 psi, the simple, rugged diaphragm- sealed piston actuator is used. This design features high reliability and a choice of actuator seal materials for virtually every application. An optional welded design is also available for setpoints up to 1000 psi for

maximum reliability. This design is available in 316 SS or Monel. Differential pressure models use a unique dual-diaphragm- sealed piston design that features very high static operating pressures and small size.

For setpoints between 4.5 and 150 inches of H<sub>2</sub>O, a large diaphragm is used for increased sensitivity in both pressure and differential pressure designs with good choice of materials of

construction.

All standard models feature  $\pm 1$  percent of range setpoint repeatability and a minimum of 400 percent of range proof pressures.

These standard designs perform well in applications where shock and vibration could be a problem and may be used with Ashcroft® diaphragm seals in extreme services such as slurries or abrasive process fluids.

## PRESSURE/VACUUM SWITCHES

| NOMINAL RANGE <sup>(1)</sup>     |                                     |                     | Overpressure Ratings |              | PPA <sup>(3)</sup> | PPS <sup>(4)</sup> |                |              |                  |            | PPD <sup>(4)</sup> |              |                  |
|----------------------------------|-------------------------------------|---------------------|----------------------|--------------|--------------------|--------------------|----------------|--------------|------------------|------------|--------------------|--------------|------------------|
|                                  |                                     |                     | Proof<br>psi         | Burst<br>psi | SWITCH ELEMENT     |                    |                |              |                  |            |                    |              |                  |
|                                  |                                     |                     |                      |              | J,H                | G                  | J,H            | K,F          | P                | GG         | JJ,HH              | KK,FF        | PP               |
| VACUUM<br>−30″ Hg                | −760mm Hg                           | −100 Kpa            | 250                  | 400          | 7-26               | 3-5                | 3-6.5          | 1-2          | 1-2.5            | 3-5        | 3-6.5              | 1-2          | 1-2.5            |
| COMPOUND<br>30″ Hg/<br>15 psi    | 760mm Hg/<br>1.0 Kg/cm <sup>2</sup> | −100 Kpa<br>100 Kpa | 250                  | 400          | 10-25<br>4-13      | 3-5<br>1-2         | 2.5-3.5<br>1-3 | 1-2<br>0.5-1 | 1-2.5<br>0.5-1.2 | 3-5<br>2-4 | 2.5-4.5<br>1-3     | 1-2<br>0.5-1 | 1-2.5<br>0.5-1.2 |
| PRESSURE<br>30″ H <sub>2</sub> O | 750mm H <sub>2</sub> O              | 7.5 Kpa             | 20                   | 35           | 4-27               | 1.5-3.5            | 2-5            | 0.5-1        | 0.5-2            | 1.5-3.5    | 2-5                | 0.5-1        | 0.5-2            |
| 60″ H <sub>2</sub> O             | 1500mm H <sub>2</sub> O             | 15 Kpa              | 20                   | 35           | 5-54               | 1.5-3.5            | 2.5-5          | 0.5-1.3      | 1-2              | 1.5-3.5    | 2.5-5              | 0.5-1.3      | 1-2              |
| 100″ H <sub>2</sub> O            | 2500mm H <sub>2</sub> O             | 25 Kpa              | 20                   | 35           | 8.5-90             | 4-6                | 4-8.5          | 1-2          | 1-3              | 4-7        | 4-8.5              | 1-2          | 1-3              |
| 150″H <sub>2</sub> O             | 3750mm H <sub>2</sub> O             | 37 Kpa              | 20                   | 35           | 18-135             | 5-11               | 10-18          | 1.5-3        | 2-6              | 8-14       | 10-18              | 1.5-3        | 2-6              |
| 15 psi                           | 1.0 kg/cm <sup>2</sup>              | 100 Kpa             | 500                  | 1000         | 2.5-13             | 1-2                | 1-3            | 0.5-1        | 0.5-1.2          | 1-2        | 1-3                | 0.5-1        | 0.5-1.2          |
| 30 psi                           | 2.0 kg/cm <sup>2</sup>              | 200 Kpa             | 500                  | 1500         | 3-26               | 1-2.5              | 2-4.5          | 0.5-1.5      | 0.5-1.5          | 1-2.5      | 2-4.5              | 0.5-1.5      | 0.5-1.5          |
| 60 psi                           | 4.0 kg/cm <sup>2</sup>              | 400 Kpa             | 500                  | 1500         | 5-54               | 2-4                | 4-7            | 1-2          | 1-2.5            | 2-4        | 4-7                | 1-2          | 1-2.5            |
| 100 psi                          | 7.0 kg/cm <sup>2</sup>              | 700 Kpa             | 1000                 | 3000         | 10-90              | 5-7                | 5-10           | 1-2.5        | 2-4              | 5-7        | 5-10               | 1-2.5        | 2-4              |
| 200 psi                          | 14 kg/cm <sup>2</sup>               | 1400 Kpa            | 1000                 | 3000         | 20-180             | 10-15              | 10-18          | 1-4          | 5-8              | 10-20      | 15-35              | 3-6          | 5-8              |
| 400 psi                          | 28 kg/cm <sup>2</sup>               | 2800 Kpa            | 2400                 | 3000         | 45-360             | 16-30              | 16-45          | 4-8          | 5-15             | 16-30      | 16-45              | 4-8          | 5-15             |
| 600 psi                          | 42 kg/cm <sup>2</sup>               | 4200 Kpa            | 2400                 | 3000         | 75-540             | 16-50              | 20-75          | 5-15         | 6-25             | 16-50      | 20-75              | 5-15         | 6-25             |
| 1000 psi <sup>(5)</sup>          | 70 kg/cm <sup>2</sup>               | 7000 Kpa            | 12000                | 14000        | 160-900            | 75-130             | 50-160         | 7-30         | 10-85            | 75-130     | 50-160             | 7-30         | 10-85            |
| 2000 psi                         | 140 kg/cm <sup>2</sup>              | 14000 Kpa           | 12000                | 14000        | 350-1800           | 150-200            | 150-350        | 20-50        | 25-110           | 150-200    | 150-350            | 20-50        | 25-110           |
| 3000 psi                         | 210 kg/cm <sup>2</sup>              | 21000 Kpa           | 12000                | 14000        | 400-2600           | 180-250            | 180-400        | 30-70        | 50-250           | 180-250    | 180-400            | 30-70        | 50-250           |

## DIFFERENTIAL PRESSURE SWITCHES

| NOMINAL RANGE <sup>(1)</sup> |                         | Overpressure Ratings    |           | PDA <sup>(3)</sup> | PDS <sup>(4)</sup> |         |         |         |       |       |         |         | PDD <sup>(4)</sup> |  |
|------------------------------|-------------------------|-------------------------|-----------|--------------------|--------------------|---------|---------|---------|-------|-------|---------|---------|--------------------|--|
|                              |                         | Static Working Pressure | Proof psi | SWITCH ELEMENT     |                    |         |         |         |       |       |         |         |                    |  |
|                              |                         |                         |           | J,H                | G                  | J,H     | K,F     | P       | GG    | JJ,HH | KK,FF   | PP      |                    |  |
| 30" H <sub>2</sub> O Diff.   | 750mm H <sub>2</sub> O  | 5.4                     | 21.6      | 5.5-27             | 3-5                | 4-6.5   | 0.5-1   | 0.5-2   | 3-5   | 4-6.5 | 0.5-1   | 0.5-2   |                    |  |
| 60" H <sub>2</sub> O Diff.   | 1500mm H <sub>2</sub> O | 5.4                     | 21.6      | 5.5-54             | 3-5                | 4.5-6.5 | 0.5-1.3 | 1-2     | 3-5   | 4-6.5 | 0.5-1.3 | 1-2     |                    |  |
| 100" H <sub>2</sub> O Diff.  | 2500mm H <sub>2</sub> O | 5.4                     | 21.6      | 8.5-90             | 4-6                | 4.5-8.5 | 1-2     | 1-3     | 4-7   | 4-8.5 | 1-2     | 1-3     |                    |  |
| 150" H <sub>2</sub> O Diff.  | 3750mm H <sub>2</sub> O | 5.4                     | 21.6      | 18-135             | 5-11               | 10-18   | 1.5-3   | 2-6     | 8-12  | 10-18 | 1.5-3   | 2-6     |                    |  |
| 15 psid                      | 1.0 kg/cm <sup>2</sup>  | 500                     | 2000      | 2.5-13             | 1-2                | 1-3     | 0.5-1   | 0.5-1.2 | 1-2   | 1-3   | 0.5-1   | 0.5-1.2 |                    |  |
| 30 psid                      | 2.0 kg/cm <sup>2</sup>  | 500                     | 2000      | 3.5-27             | 1-2.5              | 2-4.5   | 1-1.5   | 1-1.5   | 1-2.5 | 2-4.5 | 0.5-1.5 | 0.5-1.5 |                    |  |
| 60 psid                      | 4.0 kg/cm <sup>2</sup>  | 500                     | 2000      | 6.5-54             | 2-4                | 4-7     | 1-2     | 1-2.5   | 2-4   | 4-7   | 1-2     | 1-2.5   |                    |  |
| 100 psid                     | 7.0 kg/cm <sup>2</sup>  | 1000                    | 4000      | 10-90              | 5-7                | 5-10    | 1-2.5   | 2-4     | 5-7   | 5-10  | 1-2.5   | 2-4     |                    |  |
| 200 psid                     | 14 kg/cm <sup>2</sup>   | 1000                    | 4000      | 20-180             | 10-15              | 10-18   | 1-4     | 5-8     | 10-20 | 10-18 | 3-6     | 5-8     |                    |  |
| 400 psid                     | 28 kg/cm <sup>2</sup>   | 1000                    | 8000      | 45-360             | 16-30              | 16-45   | 4-8     | 5-15    | 16-30 | 16-45 | 4-8     | 5-15    |                    |  |

Values shown are for 0 static working pressure

## NOTES:

- Switches may generally be set between 15% and 100% of nominal range on in-creasing pressure. Consult factory for applications where set points must be lower.
- All deadbands are given in English units as shown in the nominal range column.

Deadbands shown are for switches with Buna N diaphragm. Approximate deadbands for optional diaphragms:

Viton:  
Teflon:  
Stainless Steel:  
Monel:

Multiply Buna N value by 1.4  
Multiply Buna N value by 1.2  
Multiply Buna N value by 1.7  
Multiply Buna N value by 1.7

- Deadbands for PPA and PDA models are adjustable between the values shown.

- Deadbands for PPS, PPD, PDS and PDD models are fixed within the range of values shown. Manufacturing and parts variances result in variation from one unit to another as shown.

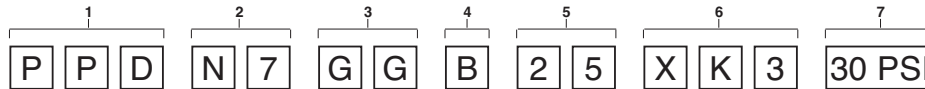
- Proof pressure is 4000 psi with SS and Monel welded diaphragms.

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# P-Series Multifunction Pressure Switches

## P-SERIES PRESSURE AND DIFFERENTIAL PRESSURE SWITCH MODEL NUMBER:

To specify the exact switch desired select entries from appropriate tables as shown in example below.



### 1 – FUNCTION

**PPA** – Pressure control, single setpoint, adjustable deadband  
**PPD** – Pressure control, two independently adjustable setpoints, fixed deadband  
**PPS** – Pressure control, single setpoint, fixed deadband  
**PDA** – Differential pressure control, single setpoint, adjustable deadband  
**PDD** – Differential pressure control, two independently adjustable setpoints, fixed deadband  
**PDS** – Differential Pressure control, single setpoint, fixed deadband

### 2 – ENCLOSURE

N7-NEMA 7&9, IP66  
 (explosion proof Div. 1 & 2)

### 3 – SWITCH ELEMENTS FOR PPA & PDA CONTROLS

| CODE                                                  | S.P.D.T. Switch Elements<br>UL/CSA Listed         |                                                    |                                                        |
|-------------------------------------------------------|---------------------------------------------------|----------------------------------------------------|--------------------------------------------------------|
| H                                                     | General Purpose                                   | 10A, 125/250 Vac<br>1/2A, 125 Vdc<br>1/4A, 250 Vdc |                                                        |
| J                                                     | Hermetically Sealed<br>Switch, General<br>Purpose | 11A, 125/250 Vac<br>5A, 30 Vdc                     |                                                        |
| SWITCH ELEMENTS FOR<br>PPD, PPS, PDD AND PDS CONTROLS |                                                   |                                                    |                                                        |
| CODE                                                  | Switch Elements<br>UL/CSA Listed                  |                                                    |                                                        |
| Single<br>(PS)                                        | Dual<br>(PD)                                      |                                                    |                                                        |
| C                                                     | CC                                                | Heavy Duty – AC                                    | 22A, 125/250 Vac                                       |
| E                                                     | EE                                                | Manual Reset, Actuates on Decreasing Pressure      | 15A, 125/250 Vac<br>5A, 30 Vdc                         |
| F <sup>(4)</sup>                                      | FF                                                | Sealed Environment Proof                           | 15A, 125/250 Vac                                       |
| G <sup>(5)</sup>                                      | GG                                                | General Purpose                                    | 15A, 125/250/480 Vac<br>1/2A, 125 Vdc<br>1/4A, 250 Vdc |
| H                                                     | HH                                                | General Purpose – AC-DC                            | 10A, 125/250 Vac<br>10A, Vdc                           |
| J                                                     | JJ                                                | Hermetically Sealed Switch, General Purpose        | 11A, 125/250 Vac<br>5A, 30 Vdc                         |
| K <sup>(4)</sup>                                      | KK                                                | Narrow Deadband                                    | 15A, 125/250 Vac                                       |
| L                                                     | LL                                                | Hermetically Sealed, Gold Contacts                 | 1A, 125 Vac                                            |
| M                                                     | MM                                                | Low Level Gold Contacts                            | 1A, 125 Vac                                            |
| P <sup>(3)</sup>                                      | PP                                                | Hermetically Sealed – AC                           | 5A, 125/250 Vac                                        |
| U                                                     | UU                                                | Manual Reset, Actuates on Increasing Pressure      | 15A, 125/250 Vac<br>6A, 130 Vdc                        |
| W                                                     | WW                                                | Ammonia Service                                    | 5A, 125/250 Vac<br>6A, 30 Vdc                          |
| Y                                                     | YY                                                | High Temperature 300°F Ambient                     | 15A, 125/250 Vac                                       |
| S                                                     | SS                                                | Heavy Duty – DC                                    | 10A, 125 Vac or Vdc<br>1/8 HP, 125 Vac or Vdc          |

### 4 – ACTUATOR SEAL™

| Code<br>and<br>Material  | Process<br>Temp.<br>Limits<br>°F <sup>(2)</sup> | Range                     |              |             |                      |
|--------------------------|-------------------------------------------------|---------------------------|--------------|-------------|----------------------|
|                          |                                                 | VAC<br>~ H <sub>2</sub> O | 0-600<br>psi | 1000<br>psi | 2000-<br>3000<br>psi |
| B – Buna-N               | 0 to 150                                        | •                         | •            | •           | •                    |
| V – Viton                | 20 to 300                                       | •                         | •            | •           |                      |
| T – Teflon               | 0 to 150                                        | •                         | •            | •           | •                    |
| S – SS <sup>(9)</sup>    | 0 to 300                                        |                           | •            | •           |                      |
| P – Monel <sup>(9)</sup> | 0 to 300                                        |                           | •            | •           |                      |

### 5 – PRESSURE PORT

| Code |                                                  |
|------|--------------------------------------------------|
| 25   | 1/4" NPT Female (Std. up to 1000#)               |
| 06   | 1/4" NPT Female and<br>1/2" NPT Male Combination |
| 07   | 1/2" NPT Female                                  |

### 6 – P-SERIES OPTIONS

| CODE                | DESCRIPTION                                      | Pressure |                    | Differential<br>Pressure |                    |
|---------------------|--------------------------------------------------|----------|--------------------|--------------------------|--------------------|
|                     |                                                  | psi      | ~ H <sub>2</sub> O | psi                      | ~ H <sub>2</sub> O |
| XCH                 | Chained Cover                                    | •        | •                  | •                        | •                  |
| XC8 <sup>(10)</sup> | CSA Approval, N7                                 | •        | •                  | •                        | •                  |
| XD2                 | Dual Seal Rating                                 | •        | N/A                | N/A                      | •                  |
| XFP                 | Fungus Proofing                                  | •        | •                  | •                        | •                  |
| XFS <sup>(6)</sup>  | Factory Adjusted Setpoints                       | •        | •                  | •                        | •                  |
| XG9 <sup>(7)</sup>  | Fire Safe Actuator                               | •        | N/A                | N/A                      | N/A                |
| HXH                 | 40 psi Static Press. (D/P Only)                  | N/A      | •                  | N/A                      | •                  |
|                     | 160 psi Proof Press. (D/P Only)                  |          |                    |                          |                    |
|                     | 100 psi Proof Press. (Press. Only)               |          |                    |                          |                    |
| XJL                 | 3/4" to 1/2" Reducing Bushing                    | •        | •                  | •                        | •                  |
| XK3                 | Terminal Blocks                                  | •        | •                  | •                        | •                  |
| XL9 <sup>(11)</sup> | Low Hardness SS Pressure Conn.                   | •        | N/A                | N/A                      | N/A                |
| XNH                 | Tagging Stainless Steel                          | •        | •                  | •                        | •                  |
| XPk <sup>(10)</sup> | Pilot Light(s)                                   | •        | •                  | •                        | •                  |
| XPM                 | 3/4" Sealed Conduit Conn. with 16" Lead Wires    | •        | •                  | •                        | •                  |
| XTA                 | 316 SS Press. Conn. for ~H <sub>2</sub> O Ranges | N/A      | •                  | N/A                      | •                  |
| XUD                 | 316 SS Press. Conn. for psid Ranges              | N/A      | N/A                | •                        | N/A                |
| X6B <sup>(8)</sup>  | Cleaned for Oxygen Service                       | •        | N/A                | •                        | N/A                |

### 7 – RANGE

Select from Table on Page 2

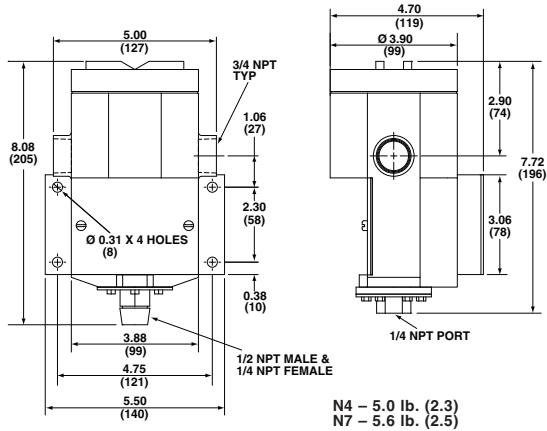
#### NOTES:

- These items are wetted by process fluid.
- Ambient operating temperature limits –20 to 150°F, all styles. Set point shift of range per 50°F temperature change is normal.
- Estimated dc rating, 2.5A, 28 Vdc (not UL listed).
- Estimated dc rating, .4A, 120 Vdc (not UL listed).
- Not UL listed at 480 Vac.
- Supply static pressure for D/P switches.
- St. diaphragm only.
- Not available with Buna-N diaphragm.
- Available on psi only.
- Not available on NEMA 7.
- Available with Teflon diaphragm only, to 600 psi only.

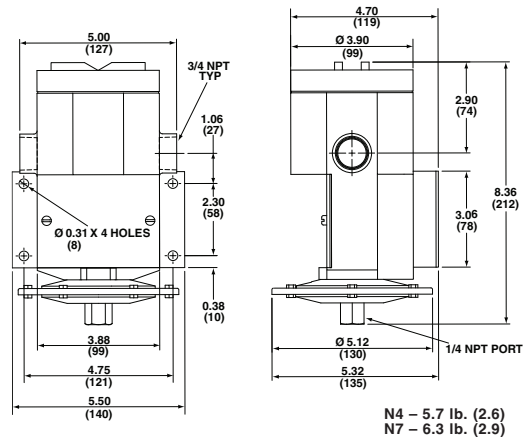
## P-Series Multifunction Pressure Switches

### Dimensions – P-Series

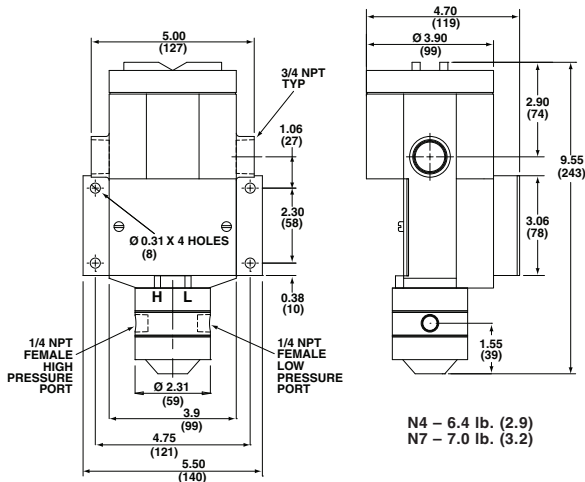
#### Pressure Switch – psi Ranges



#### Pressure Switch – in. H<sub>2</sub>O Ranges



#### Differential Pressure Switch – psid Ranges



#### Differential Pressure Switch – Diff. in. H<sub>2</sub>O Ranges

