How to Order Mercoid Series D Pressure Switches

Operating Requirements
D is the generic designation for the pressure switch series. The next letter following the D designates the function of the switch with regard to the type of deadband and operation. DΔ, for example, means a D series pressure switch that has an adjustable deadband with double adjustments and is fully automatic. See page 10 for more information.

Enclosures
A general purpose NEMA 1 enclosure is furnished as standard on all Series D pressure switches. Weatherproof and explosion-proof housings are optionally available and designated by adding a third character to the model number. DAW, for example, indicates a DA pressure switch with a weatherproof enclosure. See page 13 for more information.

Wetted Material
The D Series is available with Bourdon tubes constructed of brass, Type 403 stainless steel, and Type 316 stainless steel. Material is designated as part of the series type number with 3 corresponding to brass, 2 to 403 stainless steel, and 4 to 316 stainless steel. For example, DA-31, DA-7031, DS-7231, and DA-531 all have brass bourdon tubes. Shown in the left hand column of the sample model number charts on pages 11 and 12.

Switch Type and Action
Mercoid Series D pressure switches are available with mercury or snap-action contacts. Snap-action switch models always start with the series type number of 7. For example, DA-7031 and DS-7231 are both snap switch models. Snap switches are available in SPDT and DPDT while the mercury switches are available in SPST, SPDT, DPDT, and DPST. The switch code designates the type of contact and follows the series type number in the overall model number. For example, DA-7031-15-3 is a SPDT mercury switch. Contact rating should also be considered when choosing the contact type. Shown across the top of the columns of the sample model number charts on pages 11 and 12.

Operating Range
The last part of the Series D model number is the operating range number. Operation of the switch is adjustable within the limits of the shown operating range. The upper limit of the adjustable operating range is also the maximum pressure for the switch and should not be exceeded. For example, DAW-33-3-2 has range number 2, which is 0 to 30" Hg vacuum. Shown in the second column of the sample model number charts on pages 11 and 12.

A complete model number chart is included on pages 16 and 17.
Series D Bourdon Tube Pressure Switches

**Type DA**
Adjustable Deadband, Fully Automatic, Double Adjustments

Equipped with two external adjustments, one for setting high pressure operating point, the other for setting low pressure operating point. Deadband, or the difference between high and low setpoints, is adjustable over full scale. Mercoid's most popular operating mode, available on most Series D pressure and temperature controls.

**Type DS**
Fixed Deadband, Fully Automatic, Single Adjustment

Equipped with single adjustment for setting operating point only. A single pointer on scale sets pressure point at which switch action occurs. Fixed deadband is factory set and cannot be altered in the field. Available on series D-200, D-7200 and D-9200 only.

**Type DR**
Semi-Automatic, Manual Reset, Single Adjustment

Equipped with a single adjustment for setting operating point to operate the circuit automatically upon a pressure increase or decrease. Pushbutton reset must be operated manually to restore the circuit to original position after automatic operation. Suffix “L,” i.e. DR-31-153L denotes control will operate automatically on increase; suffix “U” denotes control will operate automatically on decrease.

**Type DL**
Semi-Automatic, Manual Lock Reset, Single Adjustment

Equipped with a single adjustment for setting operating point. Control will operate at setpoint only upon a decrease in pressure. Manual lock feature permits circuit to be reset and locked in position. Lock remains in effect until pressure rises above control setting. Lock then releases and circuit is held in reset position until further automatic operation upon pressure decrease.

**Type D-400, DA-7400**
Two-Stage, Fully Automatic, 2 Set Pts.

Provides two stage control by actuating one circuit upon a rise or fall in pressure and a second circuit on a further rise or fall. Each setpoint has a fixed deadband.
### STOcked Models

#### D SERIES Pressure Switch with Snap Action Switch and General Purpose Enclosure

<table>
<thead>
<tr>
<th>Bourdon Tube Material</th>
<th>Adjustable Operating Range (psig)</th>
<th>Minimum Deadband (psig)</th>
<th>SPDT @ 120 V AC/DC</th>
<th>SPST Open on Increase 10A @ 120 V AC/DC</th>
<th>SPST Close on Increase 5A @ 120 V AC/DC</th>
<th>Hermetically Sealed, Fixed Deadband SPDT 5A @ 120 VAC, 5A res. @ 30 VDC</th>
</tr>
</thead>
<tbody>
<tr>
<td>30˝ Hg Vac – 75</td>
<td>0 – 75</td>
<td>6</td>
<td>DA-21-153-2S</td>
<td>2A @ 240 VAC</td>
<td>DA-21-153-2S</td>
<td>10 A @ 120 VAC, 5 A @ 120 VAC Res. @ 30 VDC</td>
</tr>
<tr>
<td>10 – 200</td>
<td>10</td>
<td>4</td>
<td>DA-21-153-2S</td>
<td>2A @ 240 VAC</td>
<td>DA-21-153-2S</td>
<td>10 A @ 120 VAC, 5 A @ 120 VAC Res. @ 30 VDC</td>
</tr>
<tr>
<td>316 Stainless Steel</td>
<td>5 – 150</td>
<td>5</td>
<td>DA-21-153-2S</td>
<td>2A @ 240 VAC</td>
<td>DA-21-153-2S</td>
<td>10 A @ 120 VAC, 5 A @ 120 VAC Res. @ 30 VDC</td>
</tr>
<tr>
<td></td>
<td>10 – 200</td>
<td>6</td>
<td>DA-21-153-2S</td>
<td>2A @ 240 VAC</td>
<td>DA-21-153-2S</td>
<td>10 A @ 120 VAC, 5 A @ 120 VAC Res. @ 30 VDC</td>
</tr>
</tbody>
</table>

### D Series Pressure Switch with Snap Action Switch and General Purpose Enclosure

<table>
<thead>
<tr>
<th>Bourdon Tube Material</th>
<th>Adjustable Operating Range (psig)</th>
<th>Minimum Deadband (psig)</th>
<th>Model Number</th>
<th>Fixed Deadband (psig)</th>
<th>Model Number</th>
<th>Fixed Deadband (psig)</th>
<th>Model Number</th>
</tr>
</thead>
<tbody>
<tr>
<td>30˝ Hg Vac – 75</td>
<td>0 – 75</td>
<td>6</td>
<td>DA-21-153-2S</td>
<td>2A @ 240 VAC</td>
<td>DA-21-153-2S</td>
<td>10 A @ 120 VAC, 5 A @ 120 VAC Res. @ 30 VDC</td>
<td></td>
</tr>
<tr>
<td>10 – 200</td>
<td>10</td>
<td>4</td>
<td>DA-21-153-2S</td>
<td>2A @ 240 VAC</td>
<td>DA-21-153-2S</td>
<td>10 A @ 120 VAC, 5 A @ 120 VAC Res. @ 30 VDC</td>
<td></td>
</tr>
<tr>
<td>316 Stainless Steel</td>
<td>5 – 150</td>
<td>5</td>
<td>DA-21-153-2S</td>
<td>2A @ 240 VAC</td>
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<td>10 A @ 120 VAC, 5 A @ 120 VAC Res. @ 30 VDC</td>
<td></td>
</tr>
</tbody>
</table>
### D Series Pressure Switch with Mercury Switch and Weatherproof Enclosure

<table>
<thead>
<tr>
<th>Bourdon Tube Material</th>
<th>Adjustable Operating Range (psig)</th>
<th>Minimum SPDT on Increase</th>
<th>SPST Open on Increase</th>
<th>SPST Close on Increase</th>
<th>Adjustable Deadband</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Stainless Steel</strong></td>
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<td></td>
<td></td>
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</tr>
<tr>
<td>0-30 Hg Vac</td>
<td>0 - 30</td>
<td>DAW-33-153-2</td>
<td>DAW-33-2-2</td>
<td>DAW-33-3-2</td>
<td>1&quot; Hg</td>
</tr>
<tr>
<td>Brass</td>
<td>5 - 150</td>
<td>DAW-33-153-3</td>
<td>DAW-33-3-3</td>
<td>DAW-33-3-3</td>
<td>0.5</td>
</tr>
<tr>
<td></td>
<td>10 – 150</td>
<td>DAW-33-153-4</td>
<td>DAW-33-3-3</td>
<td>DAW-33-3-3</td>
<td>0.5</td>
</tr>
<tr>
<td></td>
<td>75 – 250</td>
<td>10 DAW-7023-153-6S</td>
<td>3.5 DSW-7223-153-6S</td>
<td>5.25 DSW-7323-153-6S</td>
<td></td>
</tr>
<tr>
<td></td>
<td>100 – 150</td>
<td>15 DAW-7023-153-8S</td>
<td>4 DSW-7223-153-8S</td>
<td>7.125 DSW-7323-153-8S</td>
<td></td>
</tr>
<tr>
<td></td>
<td>150 – 300</td>
<td>13 DAW-7023-153-10S</td>
<td>5 DSW-7223-153-10S</td>
<td>3.75 DSW-7323-153-10S</td>
<td></td>
</tr>
</tbody>
</table>

### D Series Pressure Switch with Snap Action Switch and Weatherproof Enclosure

<table>
<thead>
<tr>
<th>Bourdon Tube Material</th>
<th>Adjustable Operating Range (psig)</th>
<th>Model Number (SPST)</th>
<th>Model Number (Fixed)</th>
<th>Model Number (Hermetically Sealed)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Stainless Steel</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>75 – 250</td>
<td>10 DAW-7023-153-6S</td>
<td>3.5 DSW-7223-153-6S</td>
<td>5.25 DSW-7323-153-6S</td>
</tr>
<tr>
<td></td>
<td>100 – 150</td>
<td>15 DAW-7023-153-8S</td>
<td>4 DSW-7223-153-8S</td>
<td>7.125 DSW-7323-153-8S</td>
</tr>
<tr>
<td></td>
<td>150 – 300</td>
<td>13 DAW-7023-153-10S</td>
<td>5 DSW-7223-153-10S</td>
<td>3.75 DSW-7323-153-10S</td>
</tr>
</tbody>
</table>

### Stocked Models

D Series Pressure Switch with Mercury Switch and Weatherproof Enclosure

- **Stainless Steel**
- **Brass**

### Hermetically Sealed, Fixed Deadband

- **SPST**
- **SPDT**

### Adjustable Deadband

- **SPST**
- **SPDT**

### Adjustable Operating Range

- **Stainless Steel**
- **Brass**

### Minimum SPDT on Increase

- **Stainless Steel**
- **Brass**

### SPST Open on Increase

- **Stainless Steel**
- **Brass**

### SPST Close on Increase

- **Stainless Steel**
- **Brass**

### Adjustable Deadband (psig)

- **Stainless Steel**
- **Brass**

### Model Number

- **Dwyer Instruments, Inc.**
- **PO Box 373/Michigan City, Indiana 46361**
- **Phone 219 879-8000/Fax 219 872-9057 • U.K. Phone (+44) (0)1494-461707 • Australia Phone 61 2 4272-2055**
Bourdon Tube Pressure Switches — Control Dimensions & Enclosures

**Series D**

**General Purpose**
Types DA, DS, DR, DL
Drawing No. 1000B

**Weatherproof**
Types DAW, DSW, DRW
Drawing No. 1062

**Explosion-Proof**
Types DAH, DRH, DSH
Drawing No. 1350

**Diaphragm Seal**
Types MSAG
Drawing No. 2305

**Flange for Surface Mounting**
Drawing No. 1000F
PN 17-20(2)

**Explosion-Proof**
Types DAE, DRE, DSE
Drawing No. 98D

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**General Purpose**
**NEMA 1 Enclosure**
For indoor use and other general purpose applications under normal atmospheric conditions. Provides protection against dust and light splashing. Heavy gauge plain steel case. Flanged case available. Transparent cover for visible on-off operation. Locking device prevents tampering. Pressure connection, 1/4” NPT. Electrical connection back of case for 1/2” conduit or BX. Shipping wt. 4 lbs. See above for dimensions. Furnished as standard unless otherwise specified.

**NEMA 3S, 4, & 4X Enclosure**
For outdoor or indoor applications. Complies with hose test and requirements for watertight, dust-tight, drip-tight weatherproof, weather-resistant, splash-proof, shee-proof, and moisture-resistant. Flanged, heavy gauge steel case with transparent cover for visible on-off operation. External adjustments protected by cover. Bottom pressure connection, 1/4” NPT. Electrical connection back of case for 1/2” conduit, removable 1/2” hub. Shipping wt. 6 lbs. See above for dimensions. Optional, add “W” to prefix, i.e. DAW, DSW, DSW.

**Weatherproof Type W**
NEMA 3S, 4, & 4X Enclosure
For outdoor or indoor applications. Complies with hose test and requirements for watertight, dust-tight, drip-tight weatherproof, weather-resistant, splash-proof, sheet-proof, and moisture-resistant. Flanged, heavy gauge steel case with transparent cover for visible on-off operation. External adjustments protected by cover. Bottom pressure connection, 1/2” male NPT x 1/4” female NPT. External adjustments. Available with breather and drain. Shipping wt. 8 lbs. (3.6 kg.). See above for dimensions. Optional housing, to order add “H” to prefix. Example: DAH, DRH, or DSH. Not available on D80 Series.

**Explosion-Proof Type H**
Hazardous Area Enclosure suitable for Class I, Groups C & D, Class II, Groups E, F & G; NEMA 7 & 9 applications. Control mechanism is an integral part of enclosure and cannot be replaced in the field. For surface, panel or pipe mounting. Aluminum case with glass window in cover for visible on-off operation. Bottom pressure connection, 1/2” conduit connection for ranges 15S, 16S. Use PN 17-31 for ranges 15S, 16S.

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**NOTE:** Standard general purpose NEMA 1 and NEMA 4 enclosures are suitable for Class I, Division 2 applications with addition of conduit hub (mercury switch models only).

Dwyer Instruments, Inc. P.O. Box 373/Michigan City, Indiana 46361/Phone 219 879-8000/Fax 219-872-9057 • U.K. Phone (+44) 1494-461707 • Australia Phone 61 2 4272-2055
Mounting Flange
For Surface Mounting
(Field Installation)
For DA, DAF, DS, DSF, DR, DRF and DL controls only. May be ordered separately for field installation.
Part No. 17-26
(except on 15S, 16S)
Part No. 17-31
(for range 15S, 16S only)
Mounting Bracket
For use with standard
NEMA 1 enclosure general
purpose controls only: Series
DA, DAF, DS, DSF, DR, DRF, DL. Note: not adaptable
for Range 15S and 16S.
Part No. 33-25
Conduit Hub
For 1/2" rigid conduit. Mercury switch type controls
with standard general pur-
pose NEMA-1 or optional
weather-resistant NEMA-3 or
NEMA-4 enclosures are suit-
able for Class I, Div. 2
applications when ordered
with this hub. Available for
DA Series.
Part No. 42-413
Remote Connections
Part No. 49-62HP – 6 ft.
copper remote connec-
tion, 2500 psig max.
Part No. 49-210 – 12 ft.
316 s.s. connection with
303 s.s. fittings, 3000
psig max.
Breathers & Drains
For Class I, Groups C, D and
Class II, Groups E, F, G
(water only). Mercoid S.S.
drains are flame-tight, but not
watertight which permits
water to escape continuously.
Mercoid S.S. breathers in-
clude a water shedding cap
and provide effective case
ventilation.
For Series DAH, DAHF,
DRH, DRHF, DSH, DSHF.
Part No. 42-274 –
Standard drain.
Part No. 42-276 –
Standard breather.
For Series DAE, DRE.
Part No. 42-275 – Drain
with 1/4" connection.
*Part No. 42-276 –
Standard breather with
1/2" connection.
*Part No. 42-279 –
Reducer (3/4" to 1/2") for
breather.
*Breather and reducer
must be ordered togeth-
er.
Pigtail Siphon
Recommended for steam ap-
clications 35 psig or higher.
For Series D-30, D-530,
D-230, D-7030, D-7230 pres-
sure controls. Please specify.
Part No. 42-58 2000 psig
max.
Miscellaneous
Oxygen & Acetylene Service
Spec. 23444
Fungus Proof
Spec. 23720
FM Approval –
DAF, DRF, DSF
Factory Mutual
Approved Series D
Pressure Switches
*Registered Trademark of E.I. DuPont de Nemours & Co.
DELIRI® Bushed Movement “B”
Provides longer service life for Series
D pressure and temperature con-
trols. Vibration and pulsation are the
prime causes of control wear. Almost
all types of vibration will have some
effect on the life and continued ac-
curacy of controls.
To offset the wearing of metal sur-
faces found in bearings and pivot
points, the control mechanism is de-
signed to incorporate Delrin bushed
movements at each possible wear
point. Also for environments where
corrosion may be a factor.
Add Letter B After Type
and Suffix Nos. Example:
DS-221-2B, DA-31-3B,
DAH-41-3B.
Bourdon Tube Pressure Switches — Over-Pressure Diaphragm Controls

FEATURES
- Protects to 2,500 psig
- Available to 5,000 psig
- External adjustment
- Adjustable or fixed deadband
- Integral over-pressure seal
- 316 Stainless Steel protects to 2,500 psig
- Available to 5,000 psig
- External adjustment
- Adjustable or fixed deadband

APPLICATION
For low pressure setpoints in a system where normal pressures may rise to 5,000 psig. An over-pressure seal protects the control beyond a predetermined pressure. When that pressure is exceeded, the diaphragm seats and no further motion is transmitted.

OPERATING RANGES
Brass Bourdon Tube, with Mercury Switch

<table>
<thead>
<tr>
<th>RANGE NO.</th>
<th>Adjustable Operating Range (psig)</th>
<th>MIN. DEADBAND (psig)</th>
<th>FIXED DEADBAND</th>
</tr>
</thead>
<tbody>
<tr>
<td>3</td>
<td>10 Hg. Vac. 12 psig*</td>
<td>1.5</td>
<td>0.75</td>
</tr>
<tr>
<td>1</td>
<td>1-14</td>
<td>1.5</td>
<td>0.75</td>
</tr>
<tr>
<td>4</td>
<td>1-35</td>
<td>3.5</td>
<td>1.5</td>
</tr>
</tbody>
</table>

*Operation not recommended for processes that do not go below 0 PSIG.

Steel Bourdon Tube, with Mercury Switch

<table>
<thead>
<tr>
<th>RANGE NO.</th>
<th>Adjustable Operating Range (psig)</th>
<th>MIN. DEADBAND (psig)</th>
<th>FIXED DEADBAND</th>
</tr>
</thead>
<tbody>
<tr>
<td>5S</td>
<td>2-60</td>
<td>4</td>
<td>2</td>
</tr>
<tr>
<td>6S</td>
<td>5-100</td>
<td>6</td>
<td>3</td>
</tr>
<tr>
<td>8S</td>
<td>10-200</td>
<td>8</td>
<td>4</td>
</tr>
<tr>
<td>9S</td>
<td>20-300</td>
<td>14</td>
<td>7</td>
</tr>
<tr>
<td>10S</td>
<td>50-600</td>
<td>50</td>
<td>25</td>
</tr>
<tr>
<td>11S</td>
<td>75-1000</td>
<td>75</td>
<td>50</td>
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<tr>
<td>12S</td>
<td>100-1500</td>
<td>100</td>
<td>100</td>
</tr>
<tr>
<td>13S</td>
<td>300-2500</td>
<td>150</td>
<td>100</td>
</tr>
</tbody>
</table>

NOTES: Above controls must have seal attached DA-2i indicates slugged bourdon tube.

Bourdon Tube Pressure Switches — Pipe-Mounted Diaphragm Seals

FEATURES
- Maximum seal design pressure is 2500 psig for MSAG and MSAH, 100 psig XTBX. Seals can be filled after installation via Bleed Screw (7) in diagram at right. Thin, flexible diaphragm (2) is actuated by system pressure. Diaphragm transmits system pressure to seal’s liquid fill (3) to operate the Bourdon tube of the protected control which attaches at (1). Chemical corrosion or other damage to seal from system’s pressure medium can be prevented by proper selection of materials for the diaphragm, (2) bottom bowl (8) and other surfaces which the pressure medium will contact.

APPLICATION
Mercoid diaphragm seals prevent corrosive, viscous or other damaging pressure media (gas, liquid, etc.) from entering the pressure system and from damaging control. Chemical corrosion or other damage to seal from system’s pressure medium can be prevented by proper selection of materials for the diaphragm, (2) bottom bowl (8) and other surfaces which the pressure medium will contact.

Series D Bourdon Tube Pressure Switches — Pipe-Mounted Diaphragm Seals

FEATURES
- Maximum seal design pressure is 2500 psig for MSAG and MSAH, 100 psig XTBX. Seals can be filled after installation via Bleed Screw (7) in diagram at right. Thin, flexible diaphragm (2) is actuated by system pressure. Diaphragm transmits system pressure to seal’s liquid fill (3) to operate the Bourdon tube of the protected control which attaches at (1). Chemical corrosion or other damage to seal from system’s pressure medium can be prevented by proper selection of materials for the diaphragm, (2) bottom bowl (8) and other surfaces which the pressure medium will contact.

APPLICATION
Mercoid diaphragm seals prevent corrosive, viscous or other damaging pressure media (gas, liquid, etc.) from entering the pressure system and from damaging control. Chemical corrosion or other damage to seal from system’s pressure medium can be prevented by proper selection of materials for the diaphragm, (2) bottom bowl (8) and other surfaces which the pressure medium will contact.

NOTES: Controls and gauges with diaphragm seals can be affected by ambient and system temperature changes, particularly at low pressures. For these conditions, Mercoid Controls can be furnished with ambient temperature compensation (available only when control is mounted on seal). Write for details.

Mercoid diaphragm seals are not available for Range 15S & 16S Mercoid Pressure Controls.

NOTE: Controls and gauges with diaphragm seals can be furnished with ambient temperature compensation (available only when control is mounted on seal). Most seals can be furnished with a remote copper or S.S. tubing connection between seal and control. A mounting bracket (No. 33-25) may be used for remote mounted controls. Specify if remote connection is desired.