

# BSW Series

## Solid state pressure switch with analog output

### FEATURES

- 0...70 mbar to 0...10 bar
- Differential, gage and absolute pressure options
- Adjustable threshold point
- Adjustable hysteresis
- 1 - 5 V analog output
- Low side and high side switching output
- LED status indicator
- Long term stability 0.1 % / year



### SERVICE

Pressure inlet: Non-corrosive, non-ionic pressure media, such as dry air and dry gases.

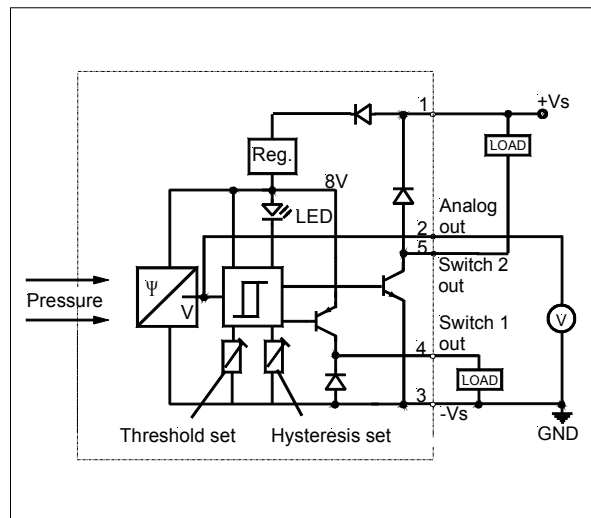
Scale: 1 cm  
1 inch

### SPECIFICATIONS

#### Maximum ratings

|                             |                    |
|-----------------------------|--------------------|
| Supply voltage              | 11 to 30 V         |
| Output current              |                    |
| Analog output               | 20 mA              |
| Switching output 1 (pnp)    | 100 mA             |
| Switching output 2 (npn)    | 300 mA             |
| Temperature limits          |                    |
| Storage                     | -55 to 100°C       |
| Operating                   | -40 to 85°C        |
| Compensated                 | 0 to 70°C          |
| Proof pressure <sup>1</sup> |                    |
| BSWM...                     | 1.4 bar            |
| BSW001... to BSW005...      | 2 x rated press.   |
| BSW010...                   | 1.5 x rated press. |

### ELECTRICAL BLOCK DIAGRAM



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### PERFORMANCE CHARACTERISTICS (unless otherwise noted $V_s = 15\text{ V}$ , $t_{amb} = 25^\circ\text{C}$ )

| Characteristics                                     | Min.        | Typ. | Max. | Unit |
|---|-------------|------|------|------|
| Operating pressure (differential/gage) <sup>2</sup> | BSWM070D... | 0    | 70   | mbar |
|   | BSWM350D... | 0    | 350  |      |
|   | BSW001D...  | 0    | 1    |      |
|   | BSW002D...  | 0    | 2    |      |
|   | BSW005D...  | 0    | 5    |      |
| Operating pressure (absolute) <sup>3</sup>          | BSW010D...  | 0    | 10   | bar  |
|   | BSW001A...  | 0    | 1    |      |
|   | BSW002A...  | 0    | 2    |      |
|   | BSW005A...  | 0    | 5    |      |

### ANALOG OUTPUT

|   |                          |             |       |       |         |
|---|--------------------------|-------------|-------|-------|---------|
| Zero pressure offset                            | 0.8                      | 1.0         | 1.2   | V     |         |
| Full scale output                               | 4.8                      | 5.0         | 5.2   |       |         |
| Full scale span <sup>4</sup>                    |                          | 4.0         |       |       |         |
| Non-linearity and hysteresis (BSL) <sup>5</sup> |                          | 0.2         | 1.0   | %FSO  |         |
| Thermal effects (0 - 70°C) <sup>6</sup>         | Combined offset and span | BSWM070D... | ±0.04 | ±0.20 | %FSO/°C |
|   |                          | BSWM350D... | ±0.03 | ±0.15 |         |
|   |                          | all others  | ±0.02 | ±0.10 |         |
|   |                          |             |       |       |         |
| Long term stability <sup>7</sup>                |                          | 0.1         |       | %FSO  |         |

### SWITCHING OUTPUT

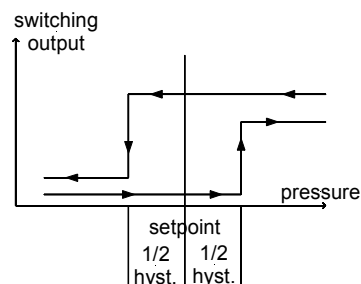
|  |  |     |     |      |
|--|--|-----|-----|------|
| Switching output 1                       | pnp, open collector, load switched to ground |     |     |      |
| Switching output 2                       | npn, open collector, load switched to +Vs    |     |     |      |
| Output voltage (high) Switching output 1 | 7  | 7.5 |     | V    |
| Output voltage (low) Switching output 2  |  | 0.5 | 1.2 |      |
| Status indication                        | red LED                                      |     |     |      |
| Threshold point setting <sup>8</sup>     | 20   |     | 100 | %    |
| Hysteresis setting <sup>8</sup>          | 1  |     | 10  |      |
| Switching frequency                      |  |     | 1   | kHz  |
| Switch point repeatability               |  | 0.2 |     | %FSO |

#### Specification notes:

- Proof pressure is the maximum pressure which may be applied without causing damage to the sensing element.
- The output signal of all BSW...D-PCB is proportional to the pressure applied to port P2, relative to port P1, e.g. the output signal increases when vacuum is applied to port P1 relative to port P2.
- The output signal of all BSW...A-PCB is proportional to the absolute pressure applied to port P1.
- Span is the algebraic difference between the output at full scale pressure and offset.
- Non-linearity refers to the **Best Straight Line** fit measured for offset, full scale and 1/2 full scale pressure.
- Temperature shift tested and guaranteed at 70°C relative to 25°C. All specs are shown relative to 25°C.
- Difference in output/switch point at any pressure within the operating pressure range and temperature within 0 - 70°C after:
  - 1000 temperature cycles, 0 - 70°C
  - 1 million pressure cycles 0 bar to full scale pressure
- Hysteresis setting has a direct influence on the switching points when the pressure increases or decreases.  
The switching points can be calculated as follows:

Output going active (LED on)  
when pressure exceeds SET POINT + hysteresis/2

Output going inactive (LED off)  
when pressure falls below SET POINT - hysteresis/2

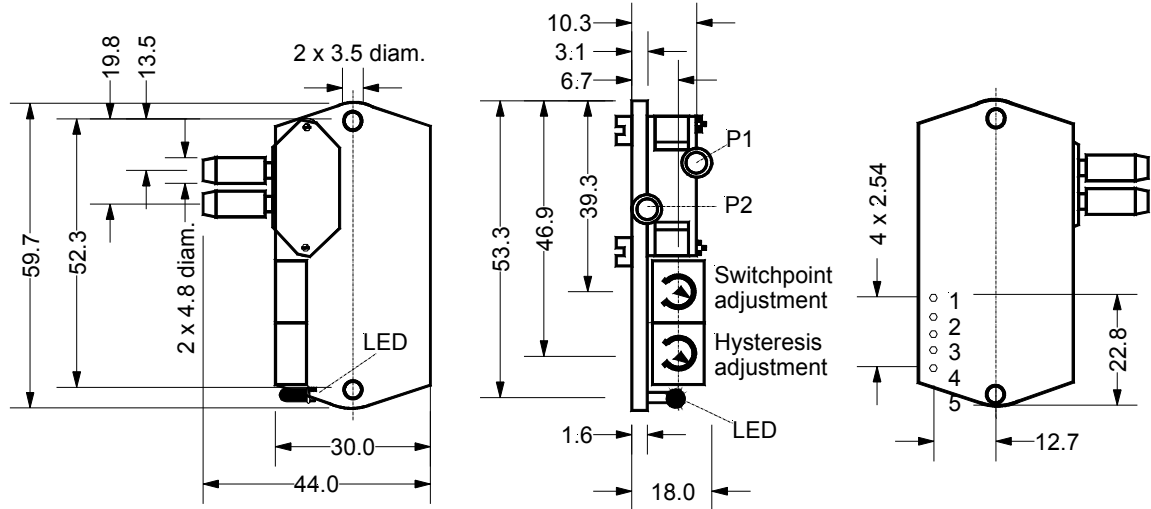


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### PHYSICAL DIMENSIONS

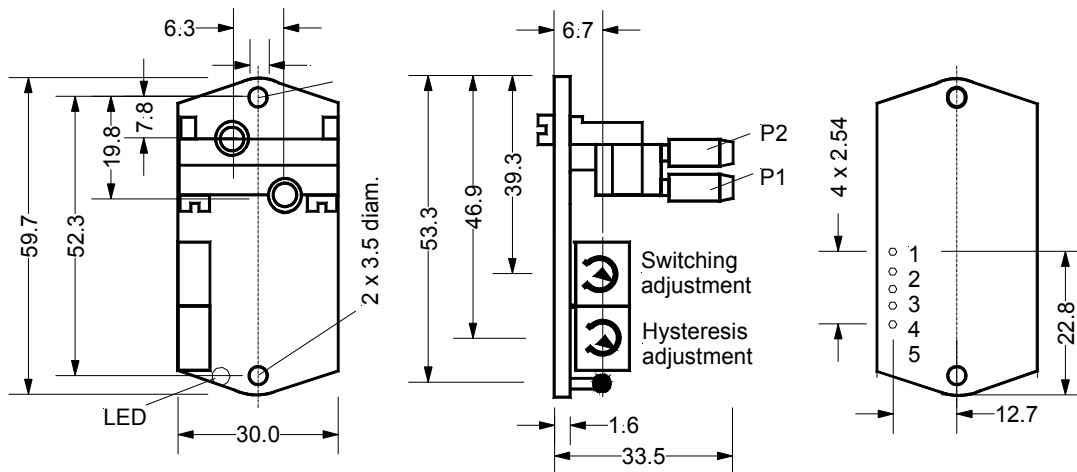
#### BSW...V-PCB



mass: 18 g

dimensions in mm

#### BSW...H-PCB



mass: 21 g

dimensions in mm

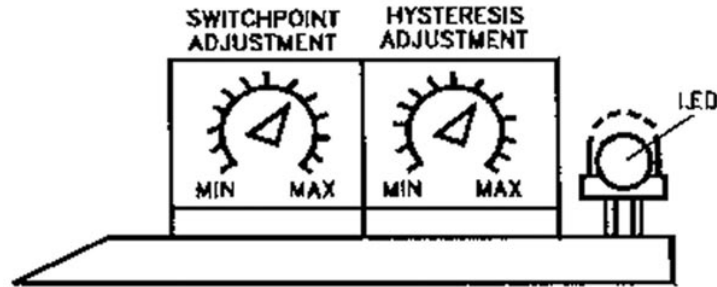
#### Pin connection

| Pin | Connection     |
|-----|----------------|
| 1   | +Vs            |
| 2   | Vout (analog)  |
| 3   | -Vs (GND)      |
| 4   | Switch 1 (out) |
| 5   | Switch 2 (out) |

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### HYSTERESIS AND SWITCH POINT SETTING



| Function        | Change per scale unit |
|-----------------|-----------------------|
| Hysteresis      | ≈ 0.9 %FS             |
| Switching point | ≈ 7.3 %FS             |

### ORDERING INFORMATION

| Pressure range   | Part number<br>Package version   |  |
|--|--|--|
|  | Side facing ports  | Top facing ports   |
| <b>Differential/Gage devices</b><br>0 - 70 mbar<br>0 - 350 mbar<br>0 - 1 bar<br>0 - 2 bar<br>0 - 5 bar<br>0 - 10 bar | BSWM070DV-PCB<br>BSWM350DV-PCB<br>BSW001DV-PCB<br>BSW002DV-PCB<br>BSW005DV-PCB<br>BSW010DV-PCB | BSWM070DH-PCB<br>BSWM350DH-PCB<br>BSW001DH-PCB<br>BSW002DH-PCB<br>BSW005DH-PCB<br>BSW010DH-PCB |
| <b>Absolute devices</b><br>0 - 1 bar<br>0 - 2 bar<br>0 - 5 bar   | BSW001AV-PCB<br>BSW002AV-PCB<br>BSW005AV-PCB   | BSW001AH-PCB<br>BSW002AH-PCB<br>BSW005AH-PCB   |

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