Bourdon Tube Switch

Series B1S, B2S, B1T, B2T

Features
- High accuracy
- High pressure up to 18,000 psi
- Tamper-proof external adjustment
- Single and dual switching capability
- Water tight housing versions available (NEMA 4)

Applications
- Oil & gas
- Medical applications
- Mining
- Compressors
- Power plants
- Water pumps
- Hydraulic power units
- Pneumatic devices
- General industrial applications

General Specifications*

<table>
<thead>
<tr>
<th>Electrical Characteristics</th>
<th>Details</th>
</tr>
</thead>
<tbody>
<tr>
<td>All models incorporate Underwriters Laboratories, Inc. and CSA Listed single pole double throw snap-action switching elements.</td>
<td></td>
</tr>
<tr>
<td><strong>Accuracy</strong>¹</td>
<td>± 1% of the adjustable range</td>
</tr>
<tr>
<td><strong>Switch</strong> Type:</td>
<td>Single pole double throw (SPDT) snap action; single or dual circuit</td>
</tr>
<tr>
<td>Rating:</td>
<td>10 amp @ 125/250 VAC, 3 amp @ 480 VAC, 0.5 amp @ 24 VDC</td>
</tr>
<tr>
<td><strong>Wetted Parts</strong> Process Fitting &amp; Bourdon Tube:</td>
<td>316 series stainless steel</td>
</tr>
<tr>
<td>Enclosure:</td>
<td>Anodized aluminum</td>
</tr>
<tr>
<td><strong>Electrical Connection</strong> Stripped Model:</td>
<td>21” Free Leads</td>
</tr>
<tr>
<td>Housed Model:</td>
<td>Internal terminal strip via conduit connection</td>
</tr>
<tr>
<td><strong>Enclosure Ratings</strong> Housed Model:</td>
<td>NEMA 4</td>
</tr>
<tr>
<td><strong>Pressure Connection</strong></td>
<td>Housed models with proof pressure up to 7,200 psi and stripped models with proof pressure up to 6,000 psi; 1/4” NPT female; All higher pressure ranges: superpressure fitting for 1/4” O.D. tube.</td>
</tr>
</tbody>
</table>

**Approvals:**
- UL/CSA (optional): UL File E42816, CSA: Class 3231 02; File No. 022355-0.000

**Temperature Range:**
- Operating: -40° to +165°F (-40° to +74 °C)

**Adjustment Instructions:**
- Remove protective hex cap to remove adjustment screw.
- Turn main unit adjustment screw clockwise to lower setpoint, counterclockwise to raise setpoint.
- For optional adjustable actuation value (deadband) models, set the desired DECREASING setpoint first and then turn microswitch adjustment wheel counterclockwise to increase the amount of deadband until the desired INCREASING setpoint is achieved.

**Options:**
- UL/CSA approval (max rating 300 VAC)
- NEMA 4X
- Temperature stabilization and pre-cycle
- Cleaned for oxygen service

**Shipping Weight:**
- Stripped Model: 1.5 lbs. approximate
- Housed Model: 2.5 lbs. approximate

**Wiring Code**

<table>
<thead>
<tr>
<th>Lead</th>
<th>Circuit #1</th>
<th>Circuit #2</th>
</tr>
</thead>
<tbody>
<tr>
<td>Normally Closed</td>
<td>Blue</td>
<td>Orange</td>
</tr>
<tr>
<td>Common</td>
<td>Purple</td>
<td>Brown</td>
</tr>
<tr>
<td>Normally Open</td>
<td>Red</td>
<td>Yellow</td>
</tr>
</tbody>
</table>

* See product configurator for additional options.

¹ ±1% for 32-110°F, ±2% for > 110°F, -2/+3°F for <32°F

B1T/B2T (housed)

B1S/B2S (stripped)

Wiring Diagram
Technical Drawing

Product Configurator

<table>
<thead>
<tr>
<th>H</th>
<th>B1T</th>
<th>-AA</th>
<th>180</th>
<th>SS</th>
</tr>
</thead>
<tbody>
<tr>
<td>H</td>
<td>Hermetically sealed limit switch option (requires AA, CC, GH or HH limit switch)</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Series

- **B1T**: Single Setpoint Housed
- **B2T**: Dual Setpoint Housed
- **B1S**: Single Setpoint Stripped
- **B2S**: Dual Setpoint Stripped

Limit Switch

<table>
<thead>
<tr>
<th>Option</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>-A</td>
<td>10 amps @ 125/250 VAC; 3 amps @ 480 VAC; (standard for pressure range 12, 32, 65, 120 and 180)</td>
</tr>
<tr>
<td>-B</td>
<td>10 amps @ 125/250/480 VAC; 0.05 amps @ 125 VDC; 0.03 amps @ 250 VDC (standard for pressure range 32)</td>
</tr>
<tr>
<td>-H</td>
<td>10 amps @ 125/250/480 VAC; 0.1 amps @ 125 VDC; 0.05 amps @ 250 VDC (standard for pressure range 32)</td>
</tr>
<tr>
<td>-M</td>
<td>10 amps @ 125/250/480 VAC; 3 amps @ 480 VAC; 0.5 amps @ 125 VDC; 0.25 amps @ 250 VDC (adjustable differentials)</td>
</tr>
<tr>
<td>-S</td>
<td>3 무료</td>
</tr>
</tbody>
</table>

- **GH**: 1 amp @ 125 VAC with Gold Contacts
- **AA**: Hermetically sealed; 4 amps @ 125/250 VAC
- **CC**: Hermetically sealed; 10 amps @ 125/250 VAC
- **GH**: Hermetically sealed; 1 amp @ 125 VAC with Gold Contacts
- **HH**: Hermetically sealed; 5 amps @ 125/250 VAC (adjustable differentials)

Options

- **-CS** - UL & CSA Approval (only available with B1T & B2T)
- **-FX** - NEMA 4X enclosure (only available with B1T & B2T)
- **-Z1** - Cleaned for oxygen service
- **-Wxxx** - Extra wire length (XXX = inches)
- **-Sxxx** - Factory preset (consult factory)

Process Connection

Blank

1/4" NPT Female (available on 65, 120, and 180 ranges only)

Pressure Range

<table>
<thead>
<tr>
<th>Adjustable Range</th>
<th>Approx. Deadband</th>
<th>Proof</th>
<th>Proof</th>
</tr>
</thead>
<tbody>
<tr>
<td>Decreasing - psi (bar)</td>
<td>Increasing - psi (bar)</td>
<td>(Actuation Value)</td>
<td>B1T/B2T</td>
</tr>
<tr>
<td>Min</td>
<td>Max</td>
<td>Min</td>
<td>Max</td>
</tr>
<tr>
<td>12</td>
<td>50 (3.4)</td>
<td>1180 (80.3)</td>
<td>70 (4.8)</td>
</tr>
<tr>
<td>32</td>
<td>160 (11)</td>
<td>3161 (211)</td>
<td>199 (13.5)</td>
</tr>
<tr>
<td>48</td>
<td>240 (16)</td>
<td>4715 (321)</td>
<td>325 (21.7)</td>
</tr>
<tr>
<td>65</td>
<td>325 (22)</td>
<td>6385 (434)</td>
<td>440 (29.9)</td>
</tr>
<tr>
<td>120</td>
<td>600 (41)</td>
<td>11450 (779)</td>
<td>1150 (78)</td>
</tr>
<tr>
<td>180</td>
<td>600 (41)</td>
<td>17450 (1187)</td>
<td>1150 (78)</td>
</tr>
</tbody>
</table>

1 Consult sales drawings for specific deadband values
2 Deadband values indicated when used with the “standard” limit switch
3 This range is not available with any agency approval (no -CS)
4 Limited to 300VAC (-CS: CSA only on B1S/B2S models and no UL)
5 Subject to change

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**Explosion Proof Bourdon Tube**

**Series B1X, B2X**

**Features**
- High accuracy, high proof
- Explosion-proof housing for hazardous location
- Hermetically sealed
- Tamper-proof setpoint adjustment
- Dual set point capability
- UL, CSA, ATEX approved
- NEMA 4, 7, 9 & IP66

**Applications**
- Power plants
- Water pumps
- Blow out preventers (BOP)
- Pneumatic devices
- General industrial applications
- Oil and gas

**General Specifications**

<table>
<thead>
<tr>
<th><strong>Electrical Characteristics</strong></th>
<th>All models incorporate Underwriters Laboratories, Inc. and CSA Listed single pole double throw snap-action switching elements.</th>
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</thead>
<tbody>
<tr>
<td><strong>Accuracy</strong>:&lt;sup&gt;1&lt;/sup&gt;</td>
<td>± 1% of the adjustable range</td>
</tr>
<tr>
<td><strong>Switch:</strong></td>
<td>Single pole double throw (SPDT) snap action; single or dual circuit</td>
</tr>
<tr>
<td><strong>Rating:</strong></td>
<td>3 amps @ 480 VAC (standard)</td>
</tr>
<tr>
<td><strong>Wetted Parts:</strong></td>
<td>316 series stainless steel</td>
</tr>
<tr>
<td><strong>Enclosure:</strong></td>
<td>Die-cast aluminum</td>
</tr>
<tr>
<td><strong>Electrical Connection:</strong></td>
<td>Internal terminal strip via conduit connection (1/2&quot; NPT on B1X models, 3/4&quot; NPT on B2X models)</td>
</tr>
<tr>
<td><strong>Enclosure Ratings:</strong></td>
<td>NEMA 4, 7, 9</td>
</tr>
<tr>
<td><strong>Pressure Connection:</strong></td>
<td>Models with proof pressures up to 7,200 psi: 1/4&quot; NPT Female; Models with higher pressure ranges: Superpressure Fitting for 1/4&quot; O.D. tube</td>
</tr>
</tbody>
</table>

**Approvals:**
- UL/CSA (standard): UL File No.#E37043; CSA File No. #LR22354 Hazardous Locations, Class I Division I, Groups B, C, & D; Class II Groups E, F, & G
- ATEX (optional): Ex models are ATEX marked as follows: Ex II 2G D, Ex d IIIC T6Gb Ex tb IIIC T80°C Db IP66 -40°C ≤ Tamb ≤ +75°C

**Temperature Range:**
- Operating: -40° to +165°F (-40° to +74°C)

**Adjustment Instructions:**
- Remove protective hex cap to remove adjustment screw.
- Turn main unit adjustment screw clockwise to lower setpoint, counterclockwise to raise setpoint.
- For optional adjustable actuation value (deadband) models, set the desired DECREASING setpoint first and then turn microswitch adjustment wheel counterclockwise to increase the amount of deadband until the desired INCREASING setpoint is achieved.

**Options:**
- Gold contact Limit switch; 1 A @ 125 VAC
- 1/2" NPT female process connection
- Cleared for oxygen service – consult factory for details
- Adjustable deadband
- Temperature compensation and pre-cycle
- Hermetically sealed limit switch

**Shipping Weight:**
- Single - approximate 6.0 lbs.
- Double - approximate 6.5 lbs.

**Wiring Diagram**

*See product configurator for additional options.*

<sup>1</sup> ±1% for 32-110°F; ±2% for > 110°F; -2/+3°F for <32°F
**Explosion Proof Bourdon Tube**

**Series B1X, B2X**

### Technical Drawing

![B1X Diagram](image1)

![B2X Diagram](image2)

**Product Configurator**

<table>
<thead>
<tr>
<th>Example</th>
<th>B1X</th>
<th>-H</th>
<th>32</th>
<th>SS</th>
<th>-P2</th>
<th>-UL</th>
</tr>
</thead>
</table>

**Prefix**

- **H**: Hermetically sealed limit switch option - Class I, Division II (requires AA, CC or HH limit switch)

**Series**

- **B1X**: Single setpoint
- **B2X**: Dual setpoint

**Limit Switch**

- **A**: 10 amps @ 125/250 VAC; 3 amps @ 480 VAC; (standard for pressure range 12, 32, 48 and 72)
- **B**: 10 amps @ 125/250/480 VAC; 0.05 amps @ 125 VDC; 0.03 amps @ 250 VDC
- **C**: 10 amps @ 125/250/480 VAC; 0.1 amps @ 125VDC; 0.05 amps @ 250 VDC
- **H**: 10 amps @ 125/250 VAC; 3 amps @ 480 VAC; (standard with pressure range 20)
- **M**: 15 amps @ 125/250/480 VAC; 0.05 amps @ 125 VDC; 0.25 amps @ 250 VDC
- **S**: 25 amps @ 125 VAC with gold contacts
- **GH**: Hermetically sealed; 4 amps @ 125/250 VAC
- **AA**: Hermetically sealed; 4 amps @ 125/250 VAC
- **CC**: Hermetically sealed; 10 amps @ 125/250 VAC
- **HH**: Hermetically sealed; 5 amps @ 125/250 VAC

**Process Connection**

- **Blank**: Blank
- **-P2**: 1/2" NPT female pressure fitting

**Pressure Range**

<table>
<thead>
<tr>
<th>Adjustable Range</th>
<th>Decreasing - psi (bar)</th>
<th>Increasing - psi (bar)</th>
<th>Approx. Deadband^3 (Actuation Value)</th>
<th>Proof Pressure</th>
</tr>
</thead>
<tbody>
<tr>
<td>Min</td>
<td>Max</td>
<td>Min</td>
<td>Max</td>
<td>psi (bar)</td>
</tr>
<tr>
<td>12</td>
<td>50 (3.3)</td>
<td>1173 (78)</td>
<td>1200 (80)</td>
<td>11 - 27 (0.7 - 1.8)</td>
</tr>
<tr>
<td>20</td>
<td>160 (10.6)</td>
<td>1961 (131)</td>
<td>2000 (133)</td>
<td>16 - 39 (1.1 - 2.6)</td>
</tr>
<tr>
<td>32</td>
<td>240 (16)</td>
<td>3115 (208)</td>
<td>3200 (213)</td>
<td>40 - 85 (2.7 - 5.7)</td>
</tr>
<tr>
<td>48</td>
<td>325 (22.4)</td>
<td>4715 (321)</td>
<td>4800 (327)</td>
<td>40 - 85 (2.7 - 5.7)</td>
</tr>
<tr>
<td>72</td>
<td>600 (40)</td>
<td>6650 (443)</td>
<td>7200 (480)</td>
<td>275 - 550 (18 - 37)</td>
</tr>
</tbody>
</table>

^1 Consult sales drawings for specific deadband values
^2 Pressure range subject to change
^3 Deadband values indicated when used with the "standard" limit switch
^4 Consult sales drawings for dimensions

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