

Installation and Maintenance Instructions for B700, D700 & T700 ASHCROFT® Snap Action Pressure, Differential, & Temperature Switches ATEX Directive 2014/34/EU

CE II 2GD Sira 02ATEX1391X
0518 IECEx SIR 14.0077X

Ex db IIC T6 Gb Ta-20°C to +60°C / Ex tb IICT85°C Db



This product complies with the following standards:	
IECEX	ATEX
IEC 60079-0:2011 Ed 6	EN 60079-0:2012
IEC 60079-1:2014 Ed 7	EN 60079-1:2014
IEC 60079-31:2013	IEC 60079-31:2013

1. Installation Requirements

- The equipment may be used with flammable gases and vapors with apparatus groups IIC and with temperature class T6 in the ambient temperature range -20°C to +60°C.
- B7 and D7 Switches, Process Temperature: -20 to 60°C Other temperature limits are possible with different diaphragm materials
- Installation shall be carried out by suitably-trained personnel in accordance with the applicable code of practice e.g. IEC/EN 60079-14.
- Refer to appropriate datasheet for materials of construction and technical information.
- These switches are precision instruments and should never be left with internal components exposed. During installation insure that covers are in place and conduit openings are closed except when actually working on the switches.
- To minimize the risk of injury, the switches must be installed according to the required safety and electrical codes.
- To attain the degree of protection listed on the switch it may be necessary to add required conduit fittings.
- The switch must be protected from moisture, shock and/or extreme vibration.
- Mounting position: Switch can be mounted in any position. It is recommended that unit be set in intended operating position.
- Refer to tag on product to for product catalog number, electrical rating, pressure/temperature range, wetted materials, proof pressure/proof temperature rating and switch deadband.

2. Cautions

- The certification of this equipment relies upon the following materials used in its construction: aluminum and stainless steel. If the equipment is likely to come into contact with aggressive substances, then it is the responsibility of the user to take suitable precautions that prevent it from being adversely affected, thus ensuring that the type of protection provided by the equipment is not compromised. For compatibility questions contact Ashcroft.
- Always install the cover after wiring the switch and before power is supplied.
- Before removing the cover in hazardous areas be sure there is no explosive atmosphere present and the power supply is turned off.
- For ATEX/IEC approved switches all safety locking devices and electrical earthing must be installed or connected before operating.
- Never carry a temperature switch by holding only the stem, bulb or capillary.
- Do not push any foreign objects (ex. Screwdrivers) against the diaphragm.
- Do not exceed ranges, current and/or voltage limits.

3. Mounting

- Three holes external to the enclosure for surface mounting. Location of these holes is shown in the general dimension drawing.
- Units may also be mounted directly on the pressure line using the pressure connection. When tightening control to pressure line, always use the wrench flats or hex on the lower housing.

4. Electrical Connections

- Before operating the switch all conduit entries and/or junction

boxes need to be closed according to the required safety and electrical codes.

- Standard product has two ¾ NPT conduit holes one of which is fitted with a suitably certified blanking device. ¾ NPT conduit holes can be adapted with suitably certified reducers.
 - ATEX/IEC approved cable glands can be used.
- It is recommended that Teflon tape or other sealant be used on conduit, bushing, gland or plug threads to ensure integrity of the enclosure.
 - Only trained and skilled personnel are allowed to install the wires to the electrical terminals of the switch.
 - Cable couplers, glands and conduit connectors must have the correct electrical approvals.
 - Always follow safety and electrical regulations when connecting these devices.
 - The system ground of the device is marked with a green colored screw and/or by the ground symbol.
 - ATEX approved switches have an external ground screw that must be connected.
 - Micro switch terminals and wire color codes:
 - NO (Normally Open) Blue
 - NC (Normally Closed) Red
 - C (Common) White
 - SPDT – Wire directly to the switch according to circuit requirements.
 - 2 SPDT – Wire to front switch terminal block (left) and rear switch terminal block (right) as marked. Strip insulation ¼", insert in proper terminal connector and tighten clamping screw to secure.

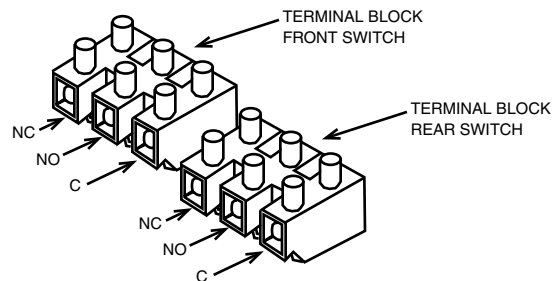


TABLE 1: MICRO SWITCH ELECTRICAL RATINGS

MICRO SWITCH CODE		ELECTRICAL RATING	
Single	Dual	Vac	Vdc
20	61	15A, 250V	0.4A, 120V
21	65	5A, 250V	
22	67	5A, 250V	2.5A, 28V
23	N/A	22A, 250V	
24	64	15A, 480V	0.25A, 250V
25	N/A	10A, 250V	10A, 250V
26	62	15A, 250V	0.4A, 120V
27	63	15A, 250V	
28	N/A	15A, 250V	
29	N/A	15A, 250V	
31	70	1A, 250V	50mA, 60V
32	68	11A, 250V	5A, 30V
42	71	1A, 125V	
50	N/A	15A, 250V	
35	N/A	10A, 250V	0.3A, 250V

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5. Adjustment of Setpoint *Note – As indicated below, adjustment of setpoint is made by use of 7/8" nut. Precision switch element mounting screws and bracket adjusting screw are factory sealed and should not be tampered with.*

B700 Series – A single setpoint adjustment nut (7/8") is located centrally at the bottom on the inside of the enclosure.

For accurate setpoint calibration, mount the switch on a calibration stand, a pump or catalog No. 1305 deadweight gauge tester. A suitable reference standard such as an ASHCROFT Duragauge or Test Gauge is necessary to observe convenient changes in pressure.

As received, the pressure switch will normally be set to approximately 90% of the indicated range. Pressurize the system to required setpoint and turn the adjustment nut until switch changes mode. Direction of turning is indicated on a label affixed to the inside of the switch enclosure. When setpoint has been achieved raise and lower pressure to insure that setpoint is correct.

After installation of the switch replace cover to insure electrical safety and to protect internal parts from the environment.

Note – Since vacuum models are already above setpoint at atmosphere, the Normally Open (NO) circuit will be closed as received.

D700 Series – A single setpoint adjustment nut (7/8") is located centrally at the bottom on the inside of the enclosure.

The direction of turning is indicated on a label affixed to the inside of the switch enclosure.

A typical calibration procedure would be as follows:

- Static Working Pressure - 600 psig
- Adjustable Differential Range - 5/200 psid
- Differential Setpoint - 150 psi above static working pressure.

Simultaneously raise the high and low side pressure to 600 psig. Maintain the low side pressure at 600 psig. Raise the high side pressure to 750 psig to obtain 150 psi differential.

Turn the adjustment nut until the switch changes mode at 150 psi differential. When the setpoint has been achieved, raise and lower the high side pressure to ensure that the differential setpoint is correct.

D700 Series (low range differential) – A single setpoint adjustment nut (7/8") is located centrally at the bottom on the inside of the enclosure.

The direction of turning is indicated on a label affixed to the inside of the switch enclosure. XG5 switches have a setpoint indication scale adjacent to the adjustment nut. To adjust the switch, align the top of the adjustment nut hex with the indicator line on the scale. Do not force adjustment or attempt to exceed the maximum setting shown on the scale or nameplate.

For accurate setpoint calibration or for switches without a scale mount the switch on a calibration stand so that the HIGH and LOW pressures expected under operating conditions may be obtained. Suitable reference standards are necessary for each pressure.

Note – During calibration an approximate setpoint under operating conditions can be obtained by setting the operating point with the low side open to atmosphere. A final setpoint adjustment can be made after installation.

Apply LOW pressure. Then apply HIGH pressure to the required setpoint and turn the adjustment nut until the switch operates. When the setpoint has been achieved, raise and lower HIGH pressure to ensure that the differential pressure between the HIGH and LOW pressures is correct.

After installation of the switch, replace the cover to ensure electrical safety and to protect the internal parts from the environment.

T700 Series – A single setpoint adjustment nut (7/8") is located centrally at the bottom on the inside of the enclosure.

The bulb of the switch should be immersed in a bath at the desired setpoint temperature. Optimum performance will be obtained if the bulb is fully immersed. Allow five minutes for initial stabilization.

As received, the temperature switch will normally be set to approx-

imately 90% of the indicated range. After stabilization, turn the adjustment nut until switch changes mode. Direction of turning is indicated on a label affixed to the inside of the switch enclosure. When setpoint has been achieved raise and lower temperature to insure that the setpoint is correct.

After installation of the switch replace cover to insure electrical safety and to protect internal parts from the environment.

B750, D750 and T750 Variable Deadband Switches – Deadband is varied by rotating the wheel on the precision switch. When viewed from the front of the enclosure, rotation to the left increases deadband – rotation to the right decreases deadband. Letters on the wheel may be used as a reference. Deadbands obtainable will vary from 0.5% to 9% of pressure or temperature range depending on range segment and type of diaphragm.

Adjustment of Setpoint – As received, the switch will normally be set to approximately 90% of range. Rotate the wheel on the MICRO SWITCH all the way to the right; this will provide smallest deadband. Pressurize, or increase bath temperature, to the required setpoint and turn the adjustment nut until the switch changes mode. Lower the pressure to reset the switch. Rotate the wheel on the MICRO SWITCH until the desired deadband is obtained. The upper setpoint will be changing upward with this adjustment. Lower the pressure to reset the switch. Then increase the pressure to the desired setpoint and turn the adjusting nut until the switch changes mode. Lower the pressure and check reset-point and deadband.

6. Specific Conditions of Use

- Prior to use, the equipment shall be subjected to a pressure test, which shall be based on the process pressure of the associated system. If available, the test shall be conducted in accordance with the requirements of an applicable industry standard. The pressure shall be applied from the system side of the diaphragm. It must be proven that there is no leakage of the test medium into the flameproof enclosure and that the flameproof enclosure does not become pressurized above ambient atmospheric pressure.
- Epoxy coated enclosures are non-conducting and may generate an ignition-capable level of electrostatic charges under certain extreme conditions. The user should ensure that the equipment is not installed in a location where it may be subjected to external conditions (such as high-pressure steam) which might cause a build-up of electrostatic charges on non-conducting surfaces. Additionally, cleaning of the equipment should be done only with a damp cloth.
- Switch vent must not be used nor blocked.
- In accordance with clause 5.1 of IEC/EN 60079-1 the critical dimensions of the flamepaths are:

Flamepath	Maximum Gap (mm)	Minimum L (mm)
The cylindrical joint between the pushrod & spring guide	0.09	25

7. Cleaning

- Never use aggressive solvents.
- Do not use high-pressure water to clean the switch.

8. Maintenance/Troubleshooting

- All ASHCROFT switches require little or no maintenance.
- Inspection and maintenance of this equipment shall be carried out by suitably trained personnel in accordance with the applicable code of practice e.g. IEC/EN 60079-17.
- Be sure that the case is closed at all times.
- When the switch is exposed to process media that may harden and/or build up in the pressure port, the switch should be removed and cleaned as needed.
- If the switch does not function, only trained and skilled personnel should check on the wiring, power supply and/or mounting.
- If the problem cannot be solved, do not attempt to repair, please contact Ashcroft or Ashcroft distributor.

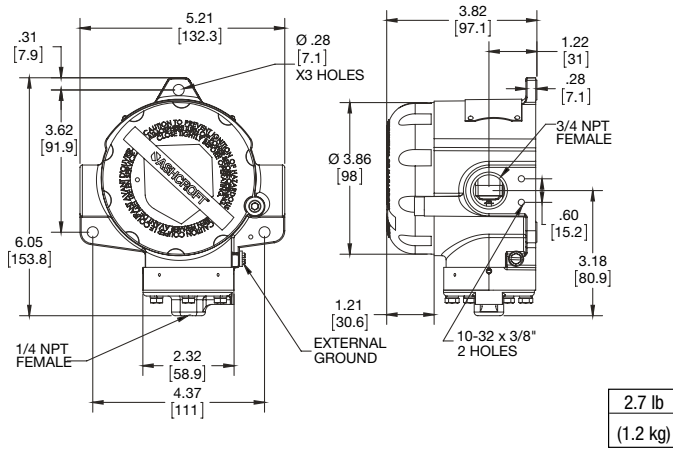
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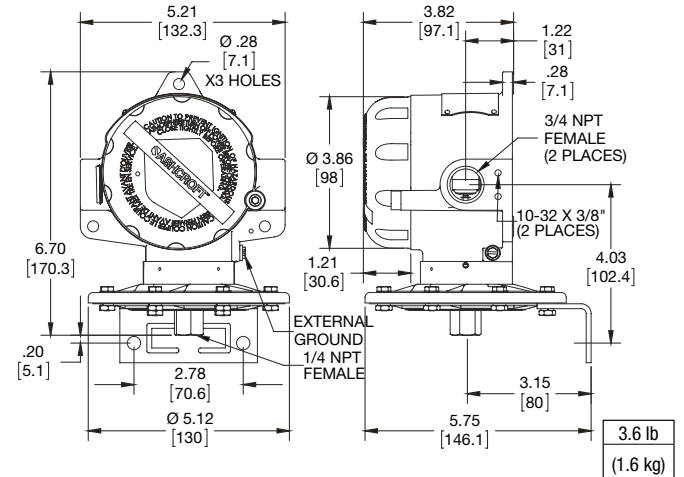
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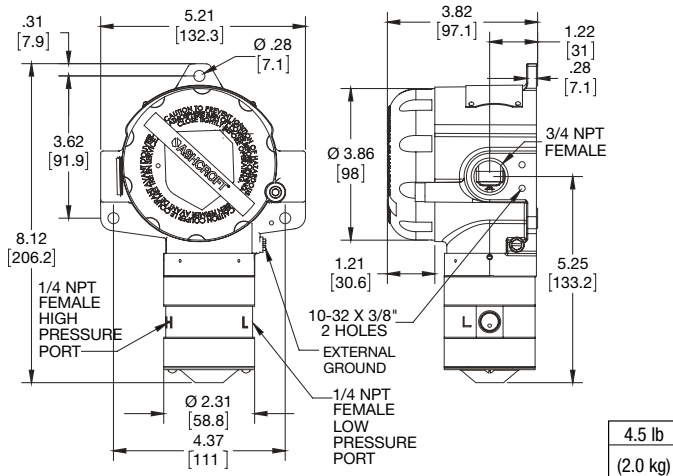
Pressure switch – psi ranges



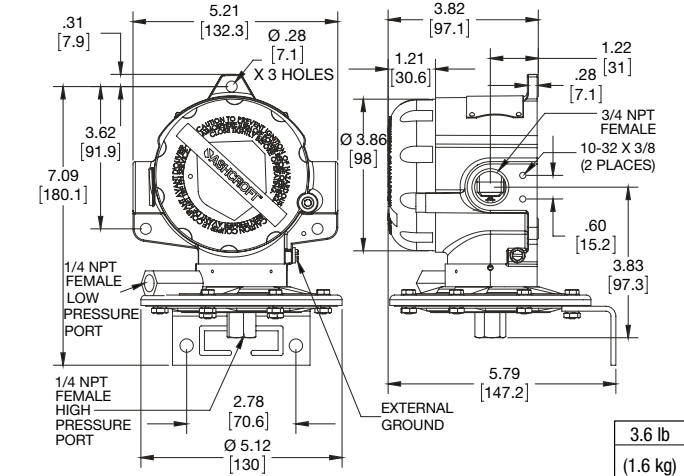
Pressure switch – inches of water ranges



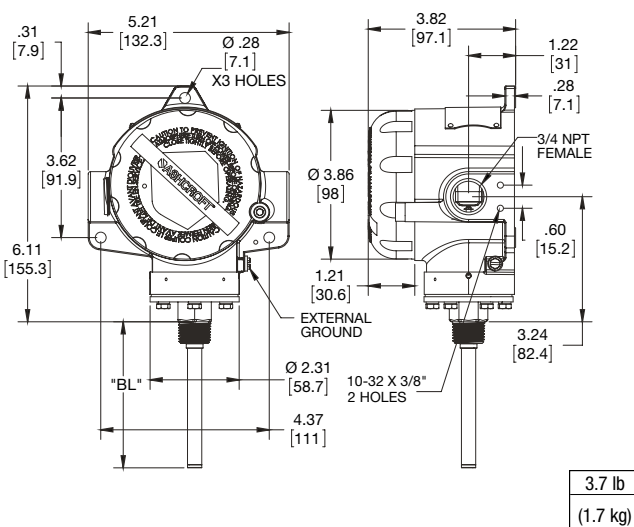
Differential pressure switch – psi differential ranges



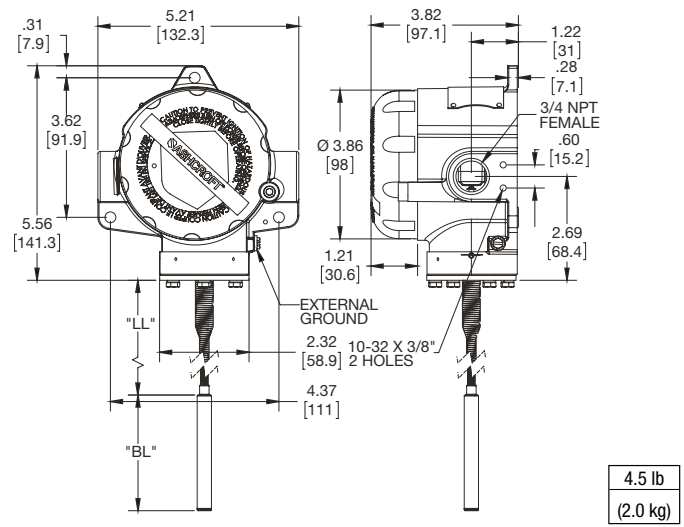
Differential pressure switch – inches of water ranges



Temperature switch – direct mount



Temperature switch – remote mount



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