

## Additional Pressure and Temperature Switch Application Information

### DIFFICULT PROCESS MEDIA

When specifying pressure or temperature switches, the material in contact with media must be compatible with it. Otherwise, failure could occur, resulting in leakage, injury, loss of life, property or production. The user should review prior experience with materials of construction in the process for guidance in material selection. If this is not appropriate, contact Dresser's Control Instrument Operation for assistance. Relevant information such as process media, concentration of each constituent, temperature, pressure, the presence of contaminants, particulate, vibration or pulsation is necessary to make the best recommendation. Refer also to Product Information Page ASH-PI-14C "Corrosion Data Guide."

Some applications are best handled by adding an Ashcroft Diaphragm Seal to isolate the Fluid Media from the pressure or Differential Pressure Switch.

Diaphragm seals are recommended where:

- The process media being sensed could clog the pressure element.
- The process media temperature is above or below the ratings of the actuator seal materials.
- The application calls for a sanitary process connection.

**Note:** The addition of a diaphragm seal may increase the deadband and response time of the pressure switch to process pressure changes. Please consult the Control Instruments Operation for details.

Refer also to Ashcroft Product Bulletin DS-1 and Product Information Page SW/PI-30B, "Switch, Diaphragm Seal Combination."

### OXIDIZING MEDIA

When specifying a pressure switch for use in oxidizing media, such as chlorine, oxygen and several other chemical compounds, the wetted materials must be compatible with the media, and the switch should be cleaned for oxygen service. This is necessary to remove any residue that might react violently with the oxidizing media. Specify option X6B (clean for oxygen service). Refer also to Product Information Page SW/PI-6B, "Oxygen Cleaning for Ashcroft Switches."

### STEAM SERVICE

In order to prevent live steam from coming into contact with the switch actuator, a siphon filled with water should be installed between the switch and the process line. We recommend the optional stainless steel welded process connection and diaphragm even though

viton is rated for use with steam. Experience has shown that in many steam applications, the 300°F high temperature limit of viton is exceeded by steam under pressure.

In some boiler applications, a special U.L. listing, "MBPR," which requires unique features is needed. Dresser offers these features with option XG8. Refer also to Product Information Page SW/PI-27A, "Steam Limit Control Switch."

### NACE

NACE is the acronym for the National Association of Corrosion Engineers. Their standard MR0175-93 titled "Sulfide Stress Cracking Resistant Metallic Materials for Oilfield Equipment," is cited when ordering instruments for oilfield applications involving sour oil or gas with traces of hydrogen sulfide. It is a legal requirement in many states. NACE instruments are also suitable for use in sewage treatment plants and other applications with traces of hydrogen sulfide in the process.

For high concentrations of hydrogen sulfide in a diaphragm seal should be used; a Tantalum diaphragm and Hastelloy C (C276) lower housing are recommended. For over 3% or 30,000ppm, a seal is essential. Refer also to Product Information page DU/PI-63D.

### HIGH TEMPERATURE PROCESS

Refer to the actuator seal table for process temperature limits for pressure switch actuators. Pressure switches mounted directly to the process can withstand up to 300°F when equipped with optional viton, stainless steel or monel wetted parts. If process temperature exceeds 300°F, four feet of 1/2" tubing between the process and the switch will generally protect the switch from damage.

Alternatively, an Ashcroft diaphragm seal, can be used to isolate the switch from the hot process.

### VIBRATION

Generally, vibration will not harm Ashcroft Pressure Switches. However, premature tripping may occur under severe conditions. This tends to be annoying, but repeatable for a given situation and might be in the order of 5% to 10% of switch range from the setpoint, i.e. a 100 psi switch set at 50 psi on increasing pressure might trip somewhere between 40 and 45 psi on increasing pressure. This would not reduce the life of the pressure switch. The best approach in this type of application is to mount the switch remotely, connecting the switch to the process or equipment with flexible tubing. If this is not possible, consider the use of the Belleville actuator, option XG3. Refer

also to Product Information Page SW/PI-58, "Belleville Actuator."

### PULSATION

Pressure Pulsation below the range of the pressure switch will not harm it. However, because the switch can react to pressure pulses less than one second duration, it might be desirable to include a dampening device. Several Ashcroft accessories, such as snubbers address this situation. Refer to the accessory section of Ashcroft Ordering Handbook (OH-1), or consult your Ashcroft Representative for more information.

### MOUNTING

All Ashcroft pressure, temperature and differential pressure switches with snap acting contacts may be mounted in any position. This includes the sensing bulbs of temperature switches. This is an important advantage of snap acting switch designs.

### SWITCH ELEMENT SELECTION

B-Series switches are available with a wide variety of snap acting switch elements to meet most electrical requirements. The standard contact arrangement is single pole, double throw (SPDT). This includes both normally open and normally closed contacts. Standard contact material is fine silver which generally is suitable for switching 8 volts or more, up to the rating in the Switch Element Selection Table. When switching less than 8 volts, optional Gold Alloy contacts are recommended.

Optional Dual, or 2 SPDT contacts may be supplied in B-Series enclosures for applications requiring two switch functions at the same setpoint. These contacts are technically not double pole, double throw (DPDT). They are synchronized at the factory to actuate within 1% of nominal range of each other. For simultaneous actuation of 2 SPDT contacts, option XG3 should be ordered. Refer also to SW/PI-58 "Belleville Actuator."

All product information pages referred to on these pages are available on the Dresser Instruments web site at:  
[www.ashcroft.com](http://www.ashcroft.com)

### INFORMATION & GUIDELINES FOR SETTING ASHCROFT PRESSURE, TEMPERATURE AND DIFFERENTIAL PRESSURE SWITCHES

All Ashcroft Pressure, Temperature and Differential Pressure switches can be set at any point between about 15% and 100% of the range as designated on the label or the nominal range table.

Ashcroft Pressure and Temperature Switches can be either set in the field or ordered from the factory preset to your requirements. When set at the factory, the specification is  $\pm 1\%$  of the nominal range.

Factory setting, or XFS, is a very popular option, and as a result, we often get orders that do not have enough information or have incorrect information.

### HOW TO ORDER

When "XFS" is desired:

1. Setpoint must be indicated.
2. Increasing or decreasing pressure must be indicated.  
Ex: B424B XFS 100#  
Set: 60# decreasing
3. For differential pressure switches, static operating pressure must be given also.

### HAZARDOUS LOCATIONS

#### a. Division I.

Ashcroft 700 series or other explosion proof enclosures are required to meet the requirements of Division I Hazardous Locations as defined by the National Electrical Code.

#### b. Division II.

These enclosures also meet the less stringent requirements for Division II Hazardous Locations. Alternatively, Ashcroft 400 series or other watertight enclosures, with hermetically sealed switch elements are approved for use in Division II hazardous locations.

#### c. Intrinsic Safety.

Any Ashcroft pressure or temperature switch may be used with an approved barrier in most intrinsically safe systems. These switches do not create or store energy and are therefore designated "simple devices" in these systems.

**Exception:** Ashcroft N series electronic pressure switches require power and may not be suitable for use in all intrinsically safe systems.

#### c. ATEX.

ATEX is a European designation that deals with standards for equipment and protective systems intended for use in potentially explosive atmospheres. This approval is required for switches intended for use in hazardous locations, especially important to OEMs who export to Europe and contractors specifying or purchasing products for European applications.

Dresser Instrument is the leader in providing pressure and temperature switches for alarm, shutdown and control in hazardous locations.

Models are available with single or dual set-points, fixed or adjustable deadbands.

Choose from standard, miniature or compact enclosures, construction of epoxy coated aluminum or stainless steel.

#### Ask for additional references:

*Product Information Page SW/PI-65*

Enclosure ratings for Ashcroft Pressure and Temperature Switches.

*Product Information Page SW/PI-66*

Intrinsic Safety and Ashcroft Switches.

*Product Information Page SW/PI-67*

ATEX approval for Ashcroft Pressure and Temperature Switches.

Contact your Ashcroft representative to discuss the many choices offered or check out the Dresser Instruments web site at:

[www.ashcroft.com](http://www.ashcroft.com)