

*Your Pressure & Temperature
Switch Source*

F-SERIES

*Compact adjustable
pressure and temperature
switches for hazardous
locations*



ISO 9001
REGISTERED FIRM

DRESSER INSTRUMENT

A Halliburton Company



LISTED

F-SERIES PRODUCT INFORMATION

The Dresser Control Instrument Operation supplies highly reliable Ashcroft® switches and controls for industrial and process applications. We begin with rock-solid designs, matching the most appropriate technology with the safety and reliability requirements of the applications. The materials of construction are specified to Dresser's exacting standards, and product is built to last in the toughest applications. Our modern, responsive manufacturing facility in Milford, Connecticut is supported by an extensive network of stocking distributors and factory sales offices located in virtually every part of the world. Special application assistance is always just a telephone call away.

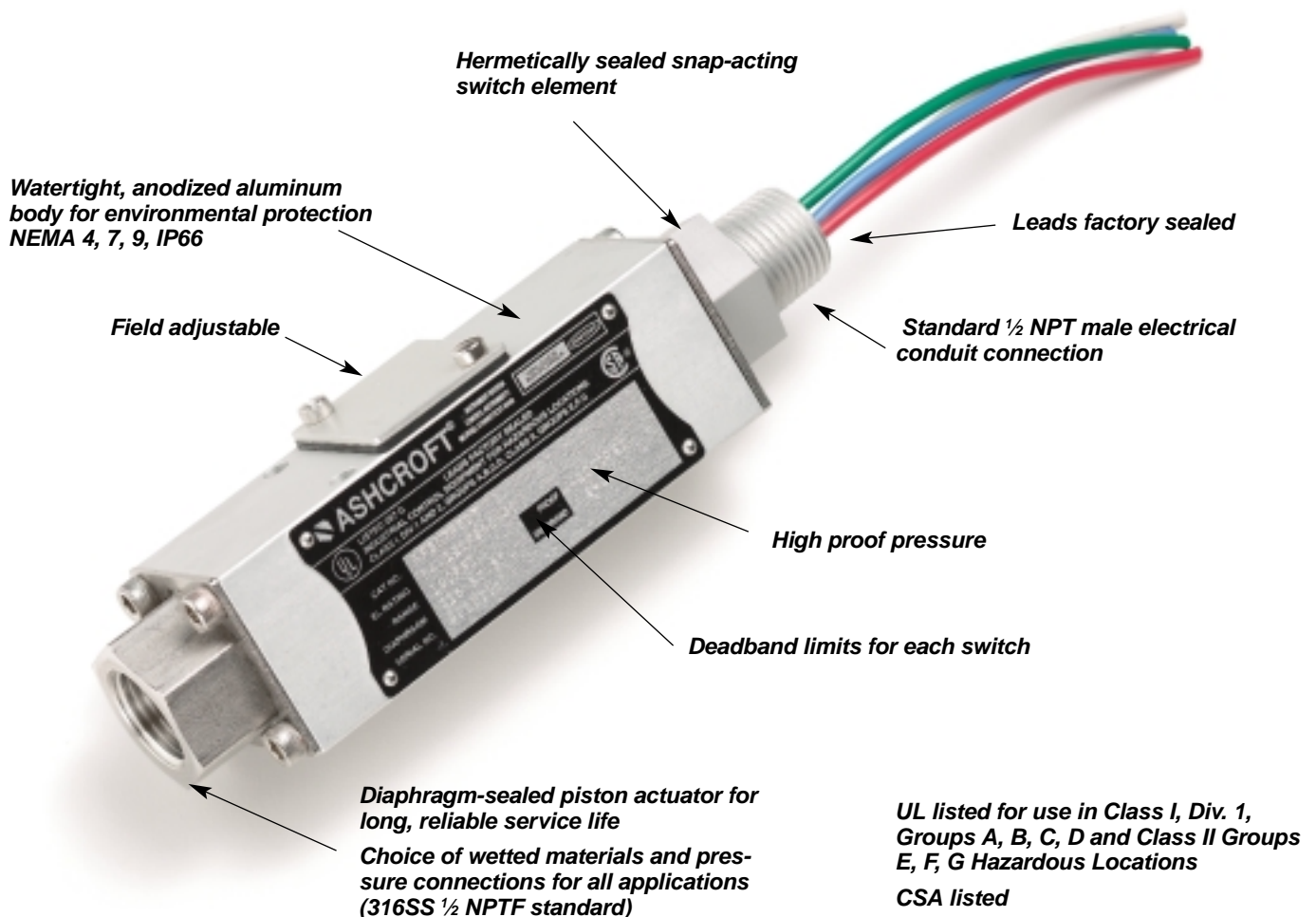
The Ashcroft F-Series switch line of compact, adjustable pressure and temperature switches is designed to satisfy most requirements for alarm, shutdown, control and interlock on a wide variety of process and equipment applications.

Electromechanical pressure and temperature switches are usually more cost effective than transmitters for these applications. Materials of construction have been selected for long life. A wide variety of precision switch elements are available to meet every application requirement, including standard hermetically sealed contacts with added reliability and safety. The actuators we use have been proven in more than 20 years of service in the world's plants and mills. Simplicity and ease of use are stressed to improve reliability of the installation. F-Series is designed to easily retrofit many similar models and are readily available.

F-Series switches have proven reliable in such harsh environments as:

- Offshore oil rigs
- Chemical and petrochemical plants
- Pulp and paper mills
- Engines, turbines and compressors

F-SERIES PRESSURE SWITCH



- Pipelines
- Water and wastewater treatment plants
- Machinery and equipment where compact size is important

Applications include: pumps, compressors, washers, filters, degreasers, evaporators, recovery systems, food processing, ground support equipment, reverse osmosis systems, heat exchangers, hydraulic systems, lubrication systems, marine equipment, textile machinery, heating and air conditioning equipment.

Hermetically Sealed Switch

All Ashcroft F-Series models feature standard hermetically sealed switch contacts. We recommend hermetically sealed switch elements for improved reliability in harsh and corrosive environments. The Ashcroft F-Series is also approved for installation in Division I and II hazardous locations.



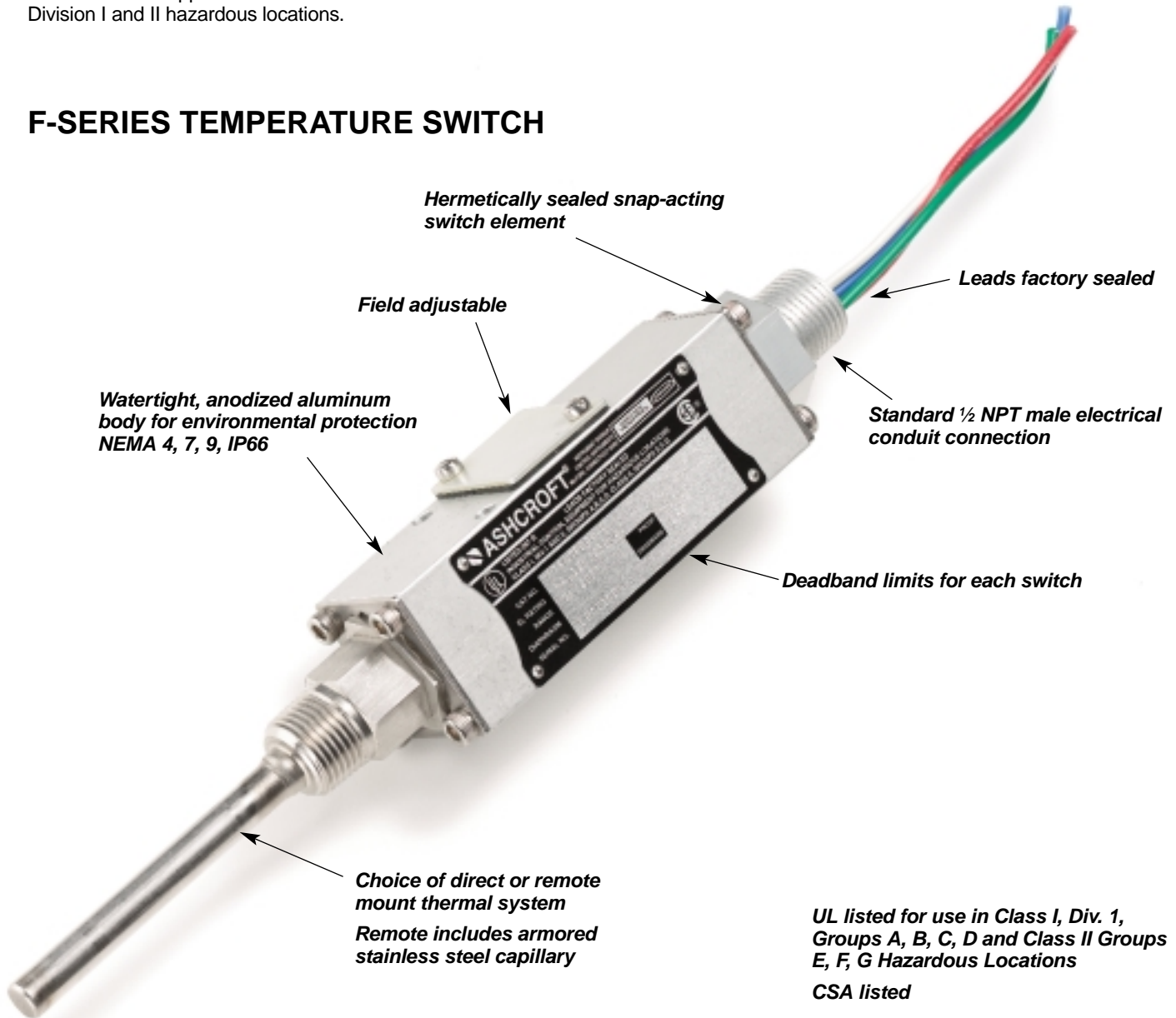
RECOMMENDED PRACTICE:

All controls should be selected considering the media and ambient operating conditions. Improper application can be detrimental to the switch, cause failure and possibly personal injury or property damage.

The information in this catalog is offered as a guide to assist in making the proper selection of Ashcroft controls.

Additional information is available from Dresser Control Instrument Operations. Sales Offices are listed on the back cover.

F-SERIES TEMPERATURE SWITCH



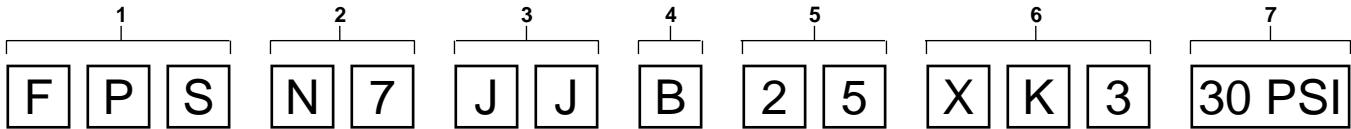
UL listed for use in Class I, Div. 1, Groups A, B, C, D and Class II Groups E, F, G Hazardous Locations

CSA listed

ORDER INFORMATION

F-SERIES PRESSURE SWITCH MODEL NUMBER:

To specify the exact switch desired select entries from appropriate tables as shown in example below.



| 1 – FUNCTION |
|--|
| FPS – Pressure switch, single setpoint, fixed deadband |

| 2 – ENCLOSURE |
|--|
| N7-NEMA 3, 4, 7 & 9, IP66 Anodized aluminum for hazardous locations |

| 3 – SWITCH ELEMENTS FOR FPS CONTROLS | | |
|--------------------------------------|--|--------------------------------|
| CODE | S.P.D.T. Switch Elements UL/CSA Listed | |
| P | Hermetically Sealed, Narrow Deadband | 5A, 125/250 Vac |
| J | Hermetically Sealed, General Purpose | 11A, 125/250 Va 5A, 30 Vdc |
| L | Hermetically Sealed, Gold Contacts | 1A, 125 Vac |
| CODE Dual | D.P.D.T. (2-S.P.D.T.) Switch Elements UL/CSA Listed | |
| JJ | Hermetically Sealed Dual General Purpose | 11A, 125/250 Vac 5A, 30 Vdc |
| LL | Hermetically Sealed Dual Gold Contacts | 1A, 125 Vac |

| 4 – ACTUATOR SEAL | | |
|-------------------|--|---------------------------------|
| Code | Material | Process Temperature Limits* °F) |
| B | Buna N | 0-150 |
| V | Viton | 20-200 |
| T | Teflon | 0-150 |
| R | Stainless Steel Diaphragm/ Viton O-ring | 0-150 |
| S | 316 Stainless Steel Welded | 0-200 |
| H | Stainless Steel Piston/ Viton O-ring | 20-200 |

| 5 – PRESSURE CONNECTION | |
|-------------------------|---|
| Code | Description |
| 25 | ¼ NPT Female |
| 06 | ¼ NPT Female <i>and</i> ½ NPT Male Combination |
| 07 | ½ NPT Female (Standard) |

| 6 – F-SERIES OPTIONS | |
|----------------------|---------------------------|
| CODE | DESCRIPTION |
| XFP | Fungus Proofing |
| XFS | Factory Adjusted Setpoint |
| XK3 | Terminal Blocks |
| XNH | Tagging Stainless Steel |
| XEC | Epoxy Coating |
| X6B | Clean for Oxygen Service |

| 7A – NOMINAL RANGE AND PERFORMANCE TABLE – BUNA (CODE B) | | | | | | |
|--|-----|---------------------|------------------------------|-----------|-------------|--|
| Nominal Range | | Proof Press. psi | Deadband (by Switch Element) | | | |
| psi | bar | | Code J | Code P, L | Code JJ, LL | |
| 30 [†] Hg Vac. † | -1 | 1000 | 1.8-8.0 | 0.4-5.0 | 1.0-10.0 | |
| 30 | 2 | 1000 | 0.2-1.5 | 0.1-1.3 | 0.4-3.0 | |
| 60 | 4 | 1000 | 0.2-2.5 | 0.3-1.5 | 0.4-5.0 | |
| 100 | 7 | 1000 | 0.5-4.0 | 0.5-2.5 | 1.0-8.0 | |
| 200 | 14 | 1000 | 1.5-8.0 | 0.5-5.0 | 3.0-16.0 | |
| 400 | 28 | 1600 | 3.0-15.0 | 1.5-9.0 | 6.0-30.0 | |
| 600 | 40 | 2400 | 4.0-28.0 | 2.0-15.0 | 16.0-54.0 | |
| 1000 | 70 | 4000 | 6.0-50.0 | 3.0-30.0 | 24.0-100.0 | |

| 7B – NOMINAL RANGE AND PERFORMANCE TABLE – HIGH PRESSURE (CODE H) | | | | | | |
|---|-----|---------------------|------------------------------|-----------|-------------|--|
| Nominal Range | | Proof Press. psi | Deadband (by Switch Element) | | | |
| psi | bar | | Code J | Code P, L | Code JJ, LL | |
| 1000 | 70 | 12,000 | 50-100 | n/a | 100-200 | |
| 2000 | 140 | 12,000 | 100-200 | n/a | 200-400 | |
| 3000 | 210 | 12,000 | 150-300 | n/a | 300-600 | |
| 4000 | 280 | 16,000 | 150-350 | n/a | 300-700 | |

| 7C – NOMINAL RANGE AND PERFORMANCE TABLE – WELDED SS (CODE S) | | | | | | |
|---|-----|---------------------|------------------------------|-----------|-------------|--|
| Nominal Range | | Proof Press. psi | Deadband (by Switch Element) | | | |
| psi | bar | | Code J | Code P, L | Code JJ, LL | |
| 30 [†] Hg Vac. † | -1 | 1000 | N/A | N/A | N/A | |
| 30 | 2 | 1000 | 1.0-4.5 | 0.5-3.5 | 2.0-9.0 | |
| 60 | 4 | 1000 | 1.0-5.0 | 0.5-4.0 | 2.0-10.0 | |
| 100 | 7 | 1000 | 1.5-10.0 | 1.0-6.0 | 3.0-20.0 | |
| 200 | 14 | 1000 | 2.0-18.0 | 1.0-12.0 | 4.0-36.0 | |
| 400 | 28 | 1600 | 5.0-32.0 | 2.0-20.0 | 10.0-64.0 | |
| 600 | 40 | 2400 | 9.0-50.0 | 4.0-30.0 | 18.0-100.0 | |
| 1000 | 70 | 4000 | 15.0-80.0 | 7.0-50.0 | 50.0-160.0 | |

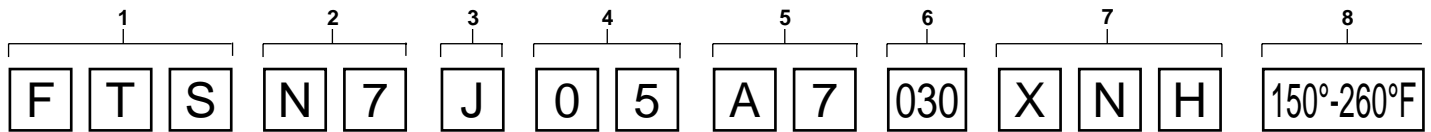
| 7D – NOMINAL RANGE AND PERFORMANCE TABLE – VITON, TEFLON, SS w/VITON O-RING (CODES V, T & R) | | | | | | |
|--|-----|---------------------|------------------------------|-----------|-------------|--|
| Nominal Range | | Proof Press. psi | Deadband (by Switch Element) | | | |
| psi | bar | | Code J | Code P, L | Code JJ, LL | |
| 30 [†] Hg Vac. † | -1 | 1000 | 1.5-10.0 | 0.5-7.0 | N/A | |
| 30 | 2 | 1000 | 0.5-3.5 | 0.2-2.5 | 1.0-7.0 | |
| 60 | 4 | 1000 | 0.5-4.0 | 0.5-3.0 | 1.0-8.0 | |
| 100 | 7 | 1000 | 1.0-7.0 | 1.0-4.5 | 2.0-14.0 | |
| 200 | 14 | 1000 | 2.5-12.0 | 1.0-8.5 | 5.0-24.0 | |
| 400 | 28 | 1600 | 5.0-30.0 | 2.0-17.0 | 10.0-60.0 | |
| 600 | 40 | 2400 | 8.0-48.0 | 4.0-34.0 | 16.0-96.0 | |
| 1000 | 70 | 4000 | 10.0-80.0 | 5.0-55.0 | 50.0-160.0 | |

Setpoints are field adjustable between 15% and 100% of nominal range listed in Table.
Exception: Stainless Steel welded(s), limits are 20% and 100%.
†Vacuum range not available with stainless steel.

ORDER INFORMATION

F-SERIES TEMPERATURE SWITCH MODEL NUMBER:

To specify the exact switch desired select entries from appropriate tables as shown in example below.



| 1 – FUNCTION |
|---|
| FTS – Temperature switch, single setpoint, fixed deadband |

| 2 – ENCLOSURE |
|--|
| N7-NEMA 3, 4, 7 & 9, IP66 Anodized aluminum for hazardous locations |

| 3 – SWITCH ELEMENTS FOR FTS CONTROLS | | |
|--------------------------------------|--|--------------------------------|
| CODE | S.P.D.T. Switch Elements UL/CSA Listed | |
| P | Hermetically Sealed, Narrow Deadband | 5A, 125/250 Vac |
| J | Hermetically Sealed, General Purpose | 11A, 125/250 Va 5A, 30 Vdc |
| L | Hermetically Sealed, Gold Contacts | 1A, 125 Vac |
| CODE Dual | D.P.D.T. (2-S.P.D.T.) Switch Elements UL/CSA Listed | |
| JJ | Hermetically Sealed Dual General Purpose | 11A, 125/250 Vac 5A, 30 Vdc |
| LL | Hermetically Sealed Dual Gold Contacts | 1A, 125 Vac |

| 4 – LINE LENGTH ⁽²⁾ | | |
|--------------------------------|----------------|--------------------------------------|
| Direct Mount | | |
| ORDER CODE | Line Length | Style |
| 00 | Not Applicable | Rigid |
| Remote Mount | | |
| 05 | 5´ | Capillary with Armor (Std.) |
| 10 | 10´ | |
| 15 | 15´ | |
| 20 | 20´ | |
| 25 | 25´ | |

| 5 – THERMAL SYSTEM SELECTION ⁽¹⁾ | |
|---|------------------------------------|
| LINE MATERIAL | |
| Direct Mount | |
| ORDER CODE | DESCRIPTION |
| | No Entry Required for Direct Mount |
| Remote Mount | |
| A7 | SS Armor (Std.) |

| 6 – BULB LENGTH SELECTION ⁽³⁾ | | |
|--|----------|---|
| Direct Mount | | |
| ORDER CODE | “S” DIM. | MIN. ⁽⁶⁾ THERMOWELL “U” DIM. |
| 027 ⁽¹⁰⁾ | 2¾” | – |
| 040 | 4” | 2½” |
| 060 | 6” | 4½” |
| 090 | 9” | 7½” |
| 120 | 12” | 10½” |
| Remote Mount | | |
| 030 | 3” | 2½” |

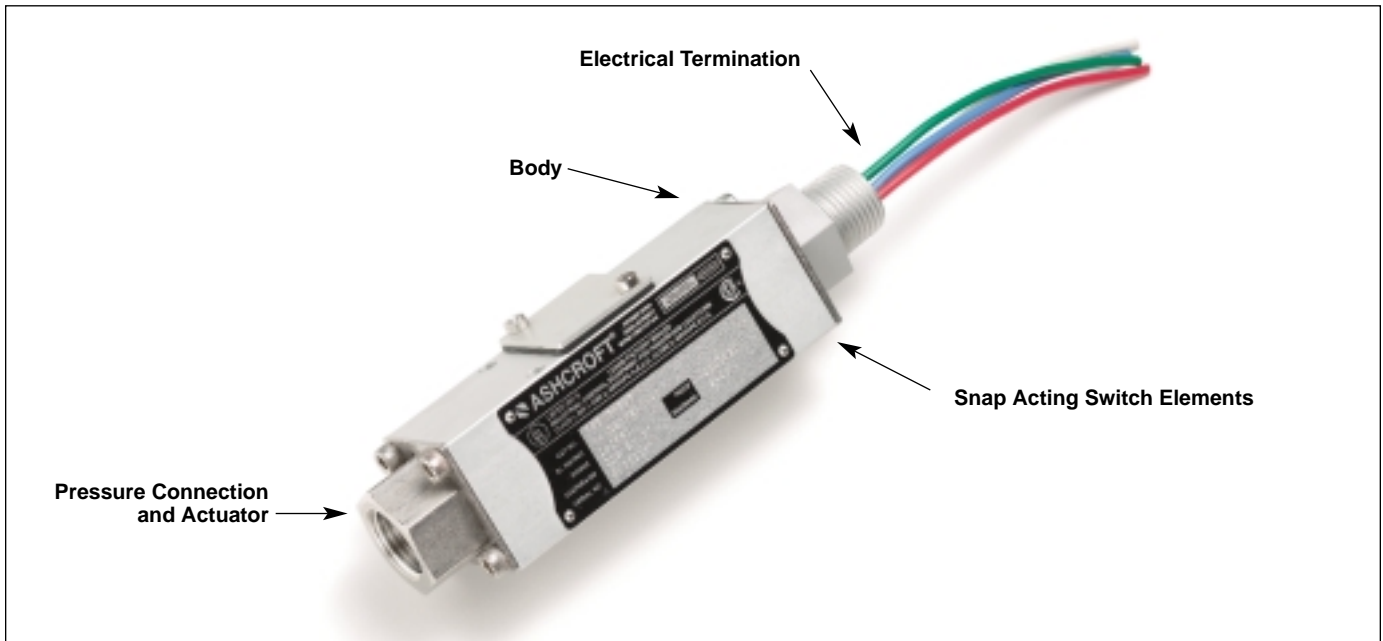
| 7 – F-SERIES OPTIONS | |
|----------------------|---|
| CODE | DESCRIPTION |
| XFP | Fungus Proof |
| XFS | Factory Adjusted Setpoint |
| XK3 | Terminal Blocks |
| XNH | Tagging Stainless Steel |
| XBX | 69 Series Bushing for Thermowell System |
| XEC | Epoxy Coating |

| 8 – NOMINAL RANGE AND PERFORMANCE TABLE | | | | | | |
|---|------------|------------------|------------------------------|-----------|---------|--|
| Nominal Range | | Max. Temp. °F | Deadband (by Switch Element) | | | |
| °F | °C | | Code J | Code P, L | Code JJ | |
| -40 to 60 | -40 to 16 | 400 | 5-10 | 1.4-6.0 | 9-20 | |
| 0 to 100 | -20 to 40 | 400 | 5-15 | 1.5-7.5 | 10-25 | |
| 75 to 205 | 20 to 95 | 400 | 5-18 | 2.0-9.0 | 12-30 | |
| 150 to 260 | 65 to 125 | 400 | 5-18 | 2.0-9.0 | 7-20 | |
| 235 to 375 | 110 to 190 | 500 | 5-18 | 2.0-9.0 | 10-24 | |
| 350 to 525 | 175 to 275 | 700 | 10-25 | 2.5-10.0 | 15-30 | |
| 500 to 720 | 260 to 400 | 900 | 10-30 | 5.0-23.0 | 15-40 | |

NOTES

- (1) Additional bulb lengths available – consult factory.
- (2) Additional line lengths available – consult factory.

SWITCH SELECTION INFORMATION



SELECTION

Before making your selection, consider the following:

1. Actuator

The actuator responds to changes in pressure or temperature and operates the switch element in response to these changes.

The actuator is normally exposed to process fluid and must therefore be chemically compatible with it. The following may be used to help select actuator type:

For nominal pressure ranges 0-15 psi through 0-1000 psi, and vacuum, Dresser's standard actuator is a diaphragm-sealed piston. In this actuator, process pressure acting on the piston area causes it to overcome the adjustable spring force and actuate a snap-action switch. A diaphragm and O-ring seal the process media from this mechanism. These are available in: Buna N, Teflon and Viton. The standard process connection is stainless steel. An optional all welded Stainless Steel pressure connection is also available. For hydraulic applications and 2000, 3000 and 4000 psi ranges, a piston actuator is offered. This actuator features a stainless steel piston moving in a smooth bore, sealed by a Viton O-ring. This design is more reliable than the diaphragm sealed piston when subjected to frequent large pressure excursions, pressure surges and spikes associated with hydraulic applications.

For all temperature ranges the standard Ashcroft® temperature actuator operates on the vapor pressure principal: the vapor pressure in a sealed thermal system is applied to a sensing element, which in turn actuates a switch. This is known as a SAMA Class II system. Various filling materials are used including Propane, Butane, Methyl Actuator, N Propyl Alcohol and Xylene. High over temperature capability is possible with this type of system. The interface between liquid and vapor is the point at which sensing occurs. This is the "sensitive" portion of the bulb. Bulb extensions and capillary are normally filled with vapor, and have little effect on the setpoint, regardless of ambient temperature variations; therefore, no ambient compensation is required. For best results, they should be mounted within 60 degrees of vertical to assure the liquid remains in the bulb.

2. Enclosure (Body)

The body protects the switch element and mechanism from the environment and has provisions for mounting and wiring. The standard F Series body is anodized aluminum, and an optional epoxy-coated aluminum body is available for maximum corrosion resistance. The standard body is explosion-proof NEMA 7/9, and IP 66 for most process applications.

F Series includes a watertight cover gasket, external mounting holes and a 1/2 NPT electrical conduit connection for ease of installation. Pressure switches may also be mount-

ed directly to the process by means of the pressure connection.

Note: When installing Ashcroft switches, refer to instruction sheets included with each switch, the National Electrical Code, and any other local codes or requirements to assure safety.

3. The Switching Function

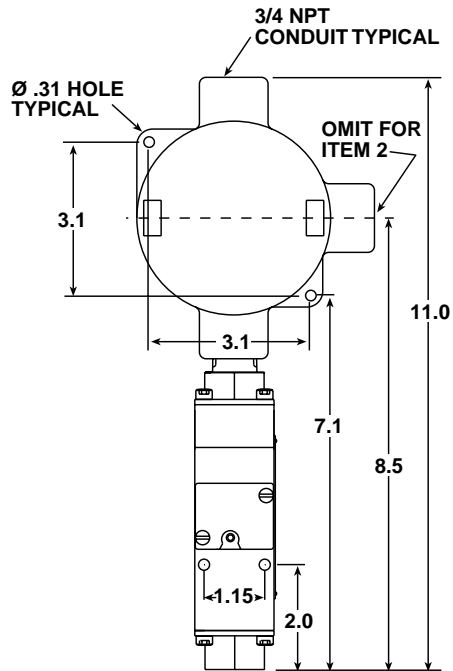
Next, consider the switching function. Most applications for alarm and shutdown and interlock are satisfied by single setpoint, fixed deadband models. For pump, compressor, and other control applications, special deadbands are often required. Consult your Ashcroft representative or the Dresser website, www.dresser.com/instruments for application assistance.

4. The Switch Element

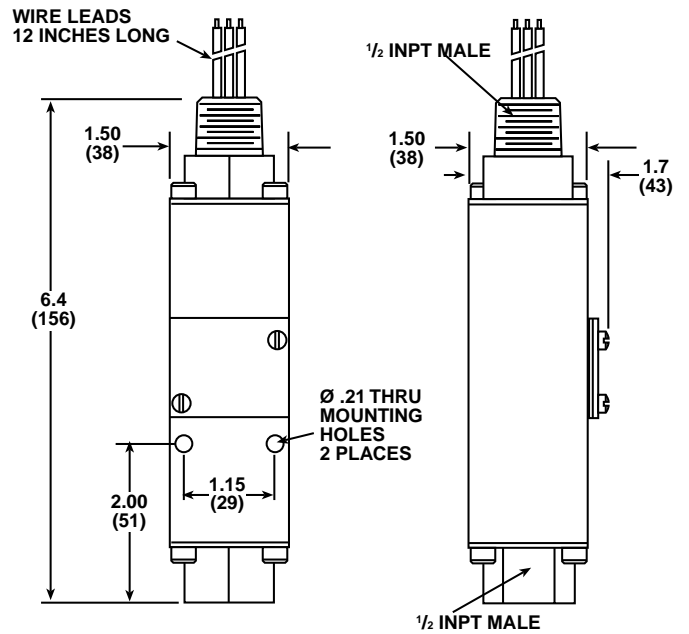
Finally, the electrical switching element must be compatible with the electrical load being switched. For ease of selection, all electrical switching elements are snap acting, SPDT (single pole-double throw), or 2 (SPDT). Refer to catalog pages for switch element choices. Select a switch element with electrical rating that exceeds the electrical rating of the device being controlled by the switch. For better reliability and safety, Hermetically Sealed switching elements are standard on all F Series Models.

F-SERIES DIMENSIONS

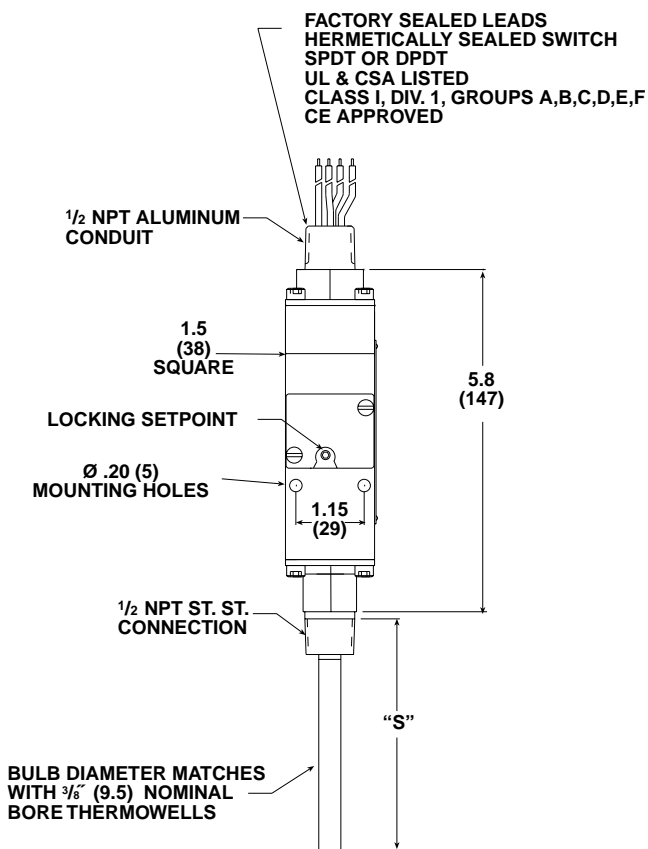
Pressure Switch with XK3



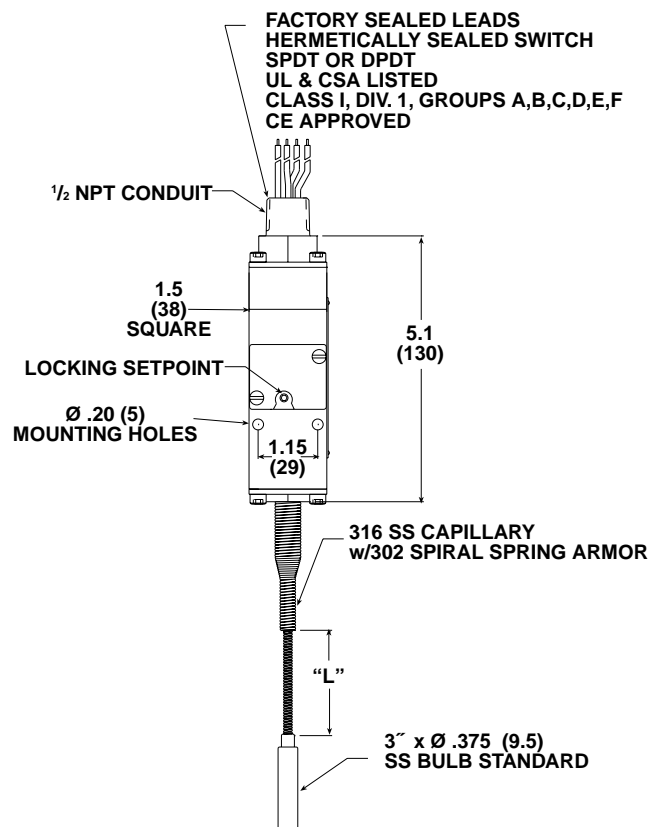
Pressure Switch



Temperature Direct Mount



Temperature Remote Mount



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information, drawings, tech-
nical information and other
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instrumentation visit our
web site . . .*

www.dresser.com/instruments