

## **F-SERIES**

*Compact adjustable  
pressure and temperature  
switches for hazardous  
locations*



LOOK FOR THESE MARKS ON  
OUR PRODUCTS

**ISO 9001**  
REGISTERED FIRM



**Instruments**

## F-SERIES PRODUCT INFORMATION

Dresser Instruments 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 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.

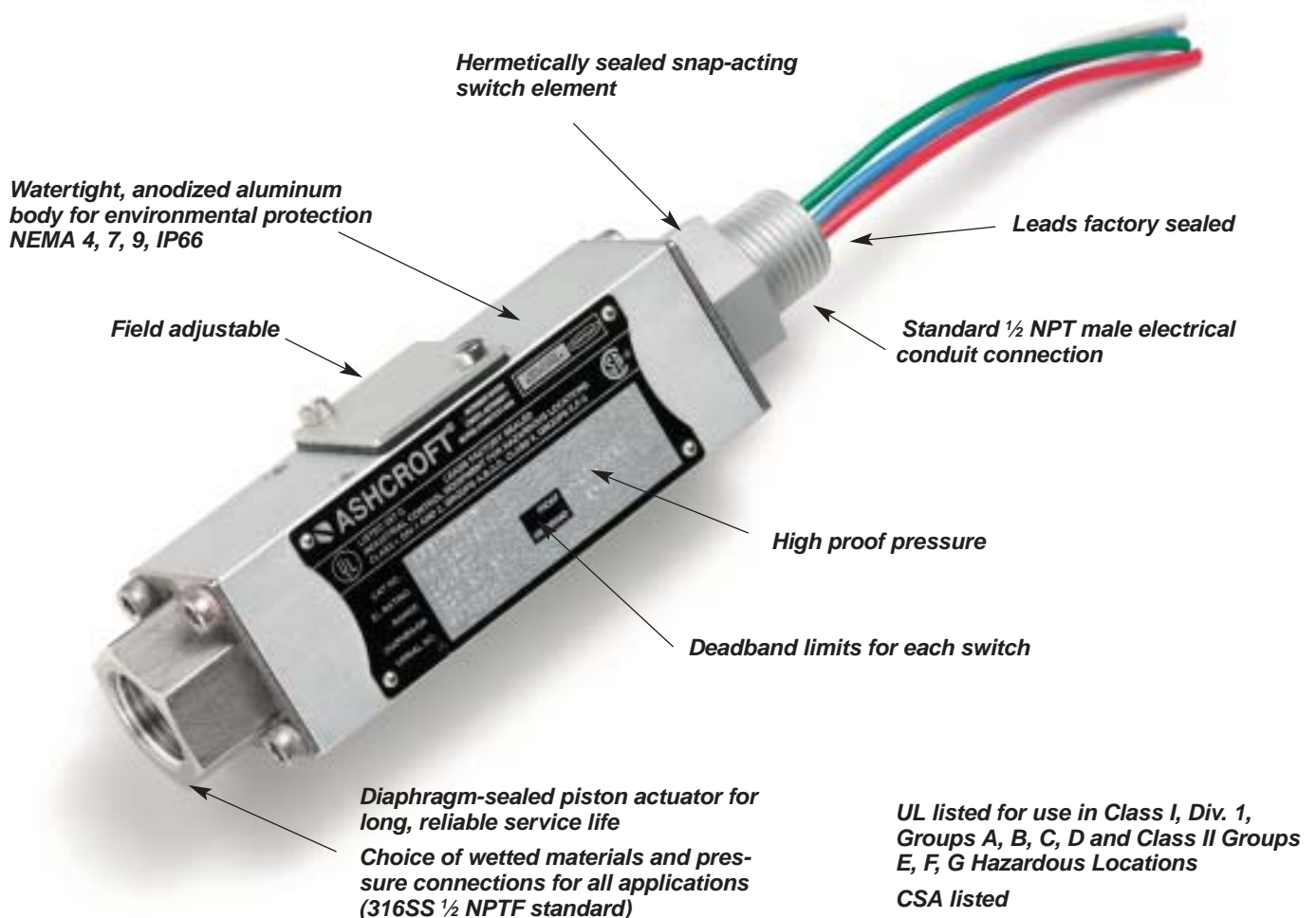
The Ashcroft® F-Series switch line of compact, adjustable pressure and temperature switches is designed to satisfy most requirements for alarm, shutdown, control and interlock on a wide variety of process and equipment applications. Electromechanical pressure and tempera-

ture 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
- Pipelines

### F-Series Pressure Switch



- 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.

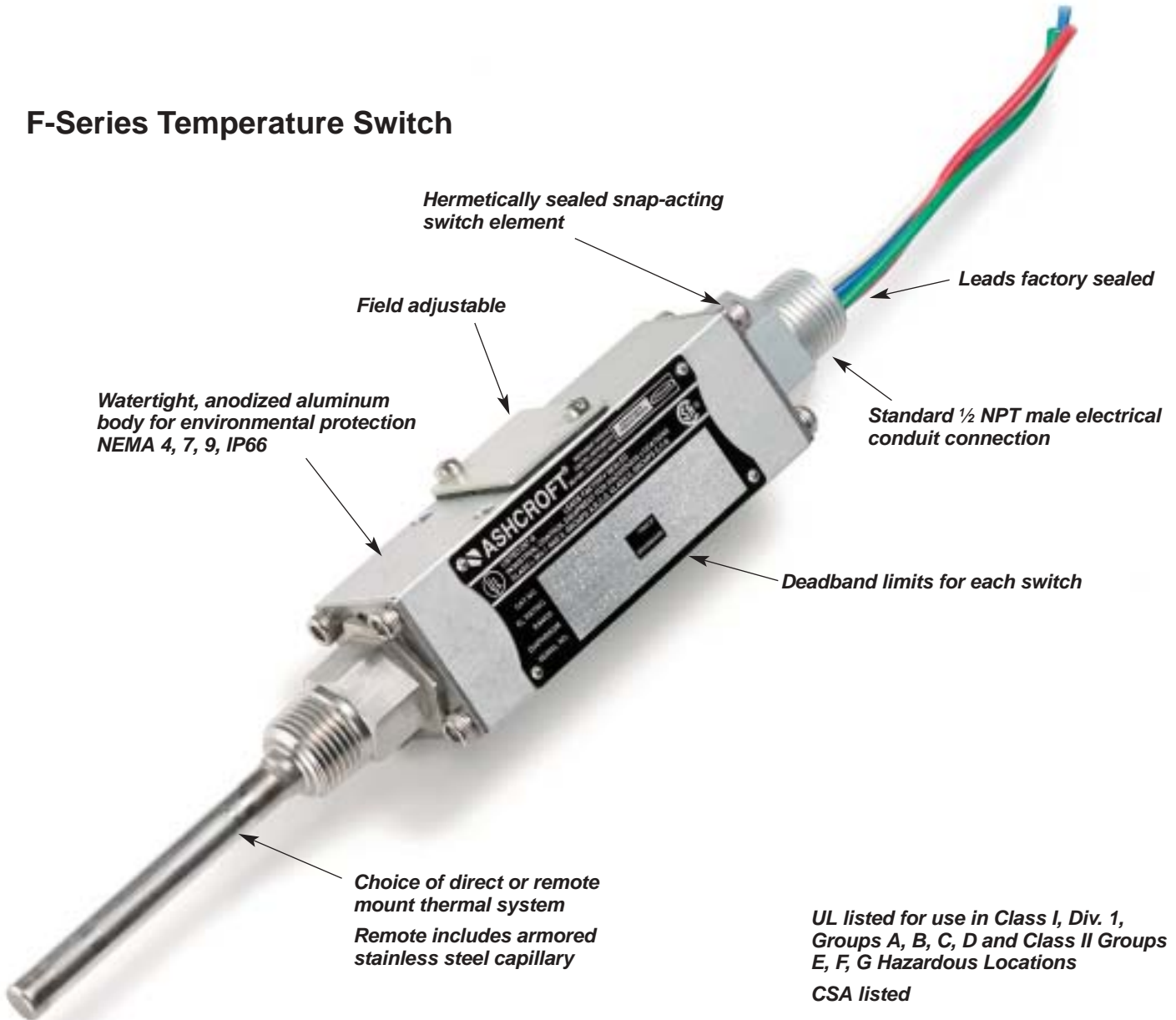


**RECOMMENDED PRACTICE:**

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 switches.

**F-Series Temperature Switch**



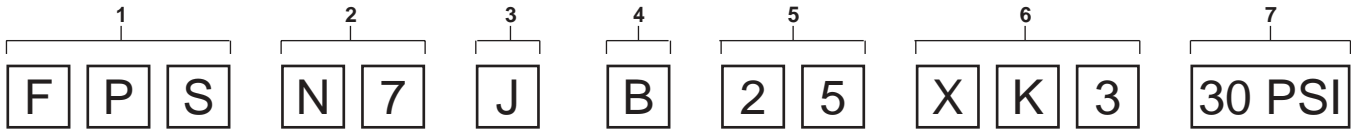
UL listed for use in Class I, Div. 1, Groups A, B, C, D and Class II Groups E, F, G Hazardous Locations

CSA listed

# ORDERING 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

### 4 – ACTUATOR SEAL

Code	Material	Process Temperature Limits °F <sup>(1)</sup>
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
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
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
30 <sup>†</sup> Hg Vac.†	-1	1000	1.8-8.0	0.4-5.0
30	2	1000	0.2-1.5	0.1-1.3
60	4	1000	0.2-2.5	0.3-1.5
100	7	1000	0.5-4.0	0.5-2.5
200	14	1000	1.5-8.0	0.5-5.0
400	28	1600	3.0-15.0	1.5-9.0
600	40	2400	4.0-28.0	2.0-15.0
1000	70	4000	6.0-50.0	3.0-30.0

### 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
1000	70	12,000	50-100	n/a
2000	140	12,000	100-200	n/a
3000	210	12,000	150-300	n/a
4000	280	16,000	150-350	n/a

### 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
30	2	1000	1.0-4.5	0.5-3.5
60	4	1000	1.0-5.0	0.5-4.0
100	7	1000	1.5-10.0	1.0-6.0
200	14	1000	2.0-18.0	1.0-12.0
400	28	1600	5.0-32.0	2.0-20.0
600	40	2400	9.0-50.0	4.0-30.0
1000	70	4000	15.0-80.0	7.0-50.0

### 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
30 <sup>†</sup> Hg Vac.†	-1	1000	1.5-10.0	0.5-7.0
30	2	1000	0.5-3.5	0.2-2.5
60	4	1000	0.5-4.0	0.5-3.0
100	7	1000	1.0-7.0	1.0-4.5
200	14	1000	2.5-12.0	1.0-8.5
400	28	1600	5.0-30.0	2.0-17.0
600	40	2400	8.0-48.0	4.0-34.0
1000	70	4000	10.0-80.0	5.0-55.0

All models feature ±1 percent of range setpoint repeatability and a minimum of 400 percent of range proof pressures. 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.

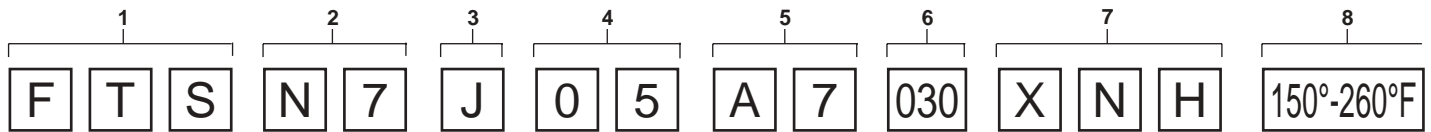
(1) Ambient operating temperature limits -20 to 150°F, all styles, setpoint shift of 1% of range per 50°F temperature change is normal.

Switches are calibrated at 70°F ambient reference.

# ORDERING 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

4 – LINE LENGTH <sup>(2)</sup>		
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 <sup>(1)</sup>	
LINE MATERIAL	
Direct Mount	
ORDER CODE	DESCRIPTION
	No Entry Required for Direct Mount
Remote Mount	
A7	SS Armor (Std.)

6 – BULB LENGTH SELECTION <sup>(3)</sup>		
Direct Mount		
ORDER CODE	“S” DIM.	MIN. <sup>(6)</sup> THERMOWELL “U” DIM.
027 <sup>(3)</sup>	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

8 – NOMINAL RANGE AND PERFORMANCE TABLE					
ORDER CODE	Nominal Range		Proof Press. °F	Deadband (by Switch Element)	
	°F	°C		Code J	Code P, L
00	-40 to 60	-40 to 16	400	5-10	1.4-6.0
	0 to 100	-20 to 40	400	5-15	1.5-7.5
05	75 to 205	20 to 95	400	5-18	2.0-9.0
	150 to 260	65 to 125	400	5-18	2.0-9.0
10	235 to 375	110 to 190	500	5-18	2.0-9.0
	350 to 525	175 to 275	700	10-25	2.5-10.0
15	500 to 720 <sup>(4)</sup>	260 to 400	900	10-30	5.0-23.0

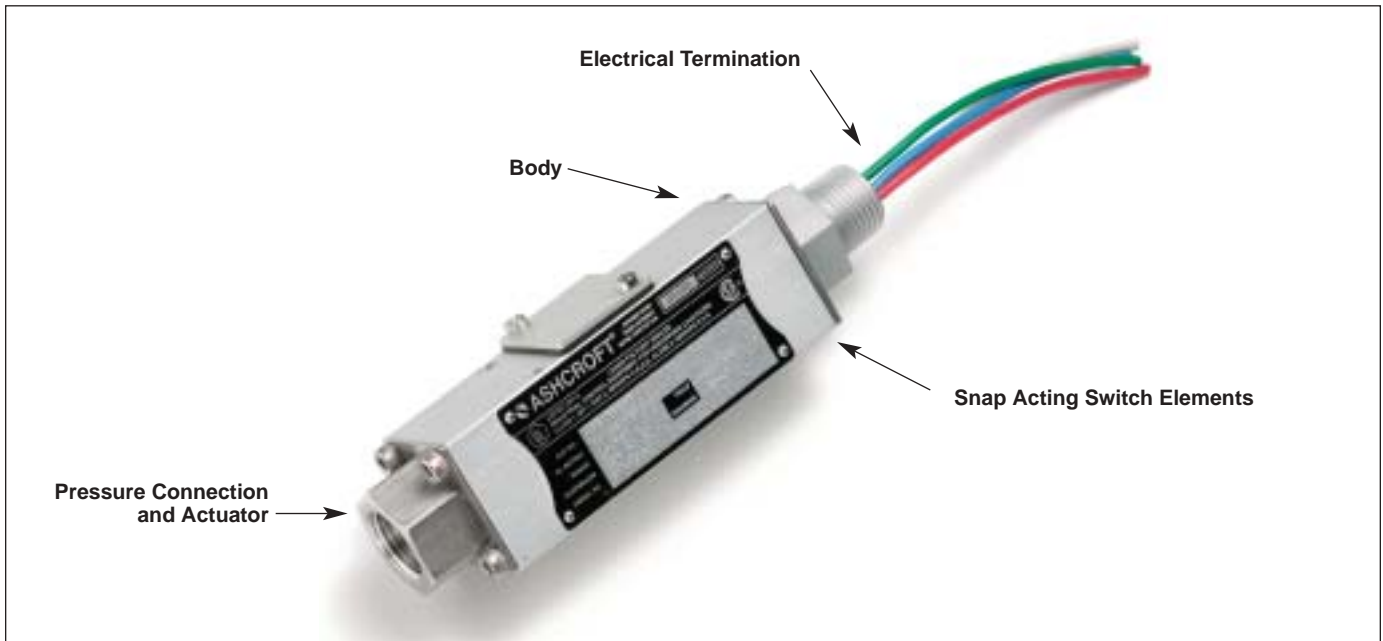
All models feature ±1 percent of range span setpoint repeatability with very high overtemperature ratings.

### NOTES

- (1) Additional bulb lengths available – consult factory.
- (2) Additional line lengths available – consult factory.
- (3) Not available on 350 to 525°F.
- (4) Available with remote mount thermal system only.

Switches are calibrated at 70°F ambient reference.

# 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 1000, 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. 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 elec-

trical conduit connection for ease of installation. Pressure switches may also be mounted 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 ensure safety.

### 3. The Switching Function

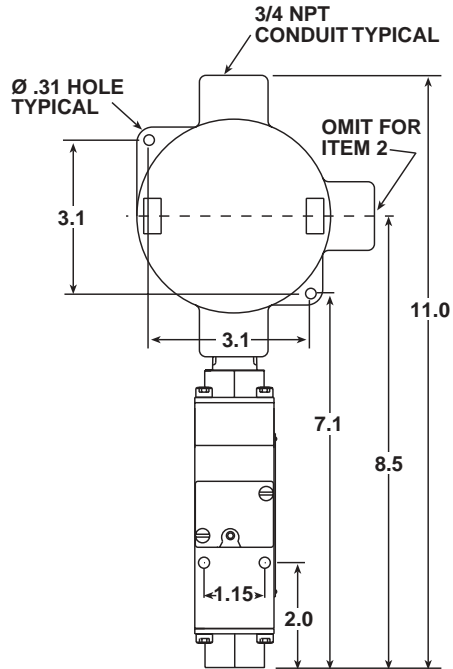
Next, consider the switching function. Most applications for alarm and shutdown and interlock are satisfied by single setpoint, fixed deadband models. For pump, compressor, and other control applications, special deadbands are often required. Consult your Ashcroft representative or the Dresser website,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

### 4. The Switch Element

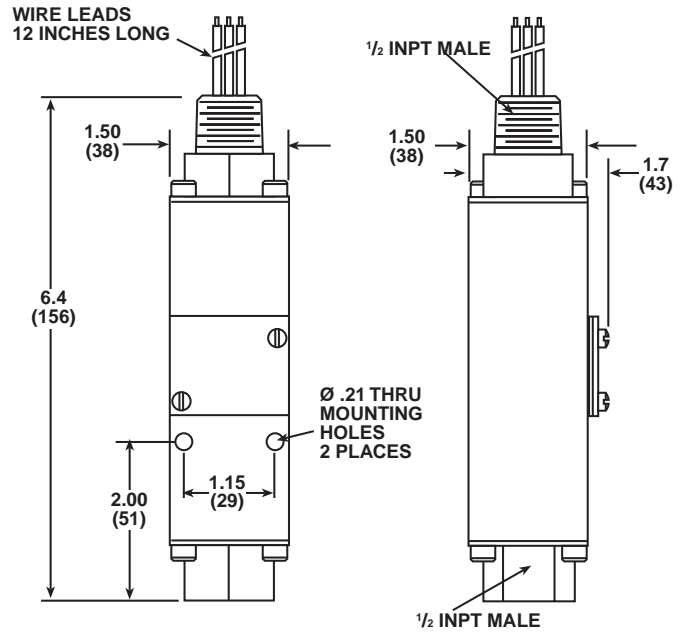
Finally, the electrical switching element must be compatible with the electrical load being switched. For ease of selection, all electrical switching elements are snap acting, SPDT (single pole-double throw). Refer to catalog pages for switch element choices. Select a switch element with electrical rating 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

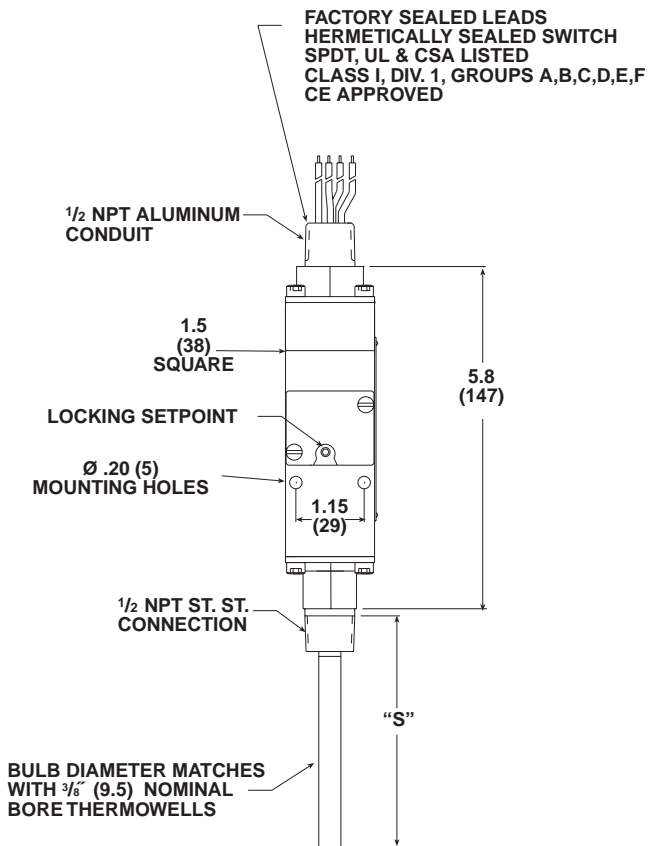
## Pressure Switch with XK3



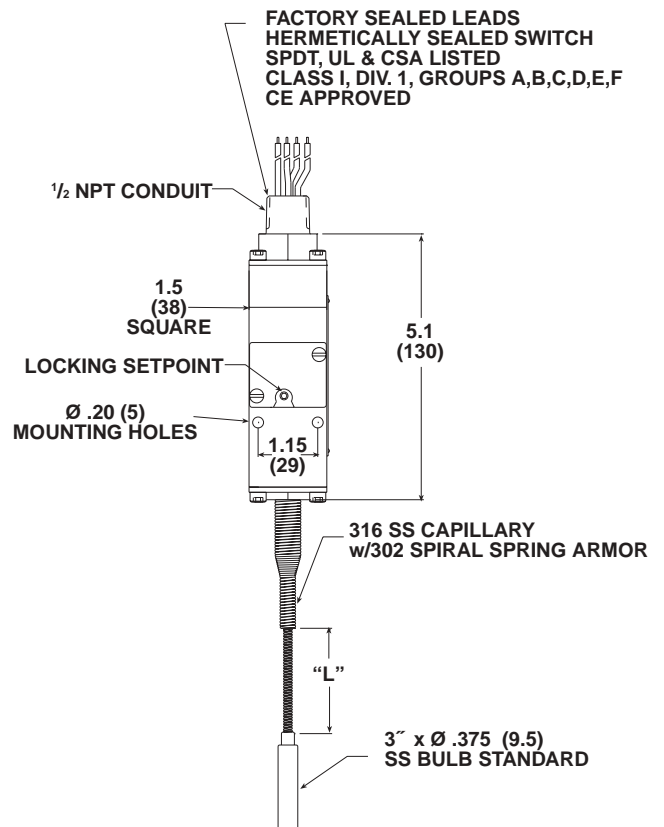
## Pressure Switch



## Temperature Direct Mount



## Temperature Remote Mount



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