

B-Series Switches- Pressure, Differential Pressure & Hydraulic

FEATURES

- Adjustable setpoints 15-100% of range
- Fixed or limited adjustable deadband
- Wide selection of switch elements
- Explosion proof enclosure provides uncompromising protection
- Special designs for NACE & fire applications

TYPICAL USES

- Offshore oil rigs
- Chemical and petrochemical plants
- Pulp and papermills
- Steel mills
- Power plants
- Water and sewage-treatment plants
- Other corrosive environments



SPECIFICATIONS

Setpoint:	Factory set or field adjustable
Setpoint Repeatability:	±1% of full range (Additional setpoint shift of ±1% of range per 10 °C from initial setpoint set at 20 °C typical)
Enclosure Rating:	B4/Hydraulic: NEMA 4X, IP66 B7: NEMA 7/9, IP66
Enclosure Material:	Epoxy coated aluminum (standard) Optional: 316 stainless steel (NEMA 7/9 only)
Diaphragm Material:	Buna N, Viton, Teflon, SS, Monel
Pressure Connection:	¼ NPT female (standard) Optional: ½ NPT female, ¼ NPT female & ½ NPT male Combo
Electrical Output:	SPDT or DPDT
Electrical Termination:	¾ NPT female (standard) Optional: ½ NPT female
Ambient Temperature Range:	-19 °C to 65 °C (-20 °F to 150 °F) All units calibrated at 20 °C
Process Temperature:	-18 °C to 65 °C (Buna n or Teflon diaphragm) -6 °C to 148 °C (Viton diaphragm) -18 °C to 148 °C (SS or Monel diaphragm)
Pressure Ranges:	Pressure: Vac-3000 psi, Differential: 0-600 psi Hydraulic: 1000-7500 psi
Approvals:	UL, CSA, FM, CE, RoHS (NEMA 4) ATEX, CSA, FM, IECEx, UL, RoHS (NEMA 7) UL: E38812, E34743 CSA: 55541 ATEX: Sira 02ATEX1391X IECEx SIR 14.007X FM: Limit Control and Steam Limit Control

- Highly reliable
- Designed for use in wide range of applications
- Pressure ranges from vacuum to 7500psi

B-Series Switches- Pressure, Differential Pressure & Hydraulic

PRESSURE, DIFFERENTIAL PRESSURE & HYDRAULIC RANGES

PRESSURE/VACUUM RANGES			Overpressure Ratings		Approximate Deadband Switch Element				
Nominal Pressure			Proof psi	Burst psi	20, 26, 27	21, 24, 31	50	22	32, 42
Vacuum									
-30" Hg	-760mm Hg	-100 kPa	250	400	0,3-0,7	1,5-3,0	0,5-2,2	0,4-1,5	2,1-4,2
Compound									
-15" H ₂ O/ 15" H ₂ O	-375mm H ₂ O/ 375mm H ₂ O	-3,7 kPa/ 3,7 kPa	20	35	0,15-0,75/ 0,15-0,75	1,5-2,5/ 1,5-2,5	0,45-2,0/ 0,45-2,0	0,5-1,2/ 0,5-1,2	2,1-3,5/ 2,1-3,5
-30" H ₂ O/ 30" H ₂ O	-760mm H ₂ O/ 760mm H ₂ O	-7,5 kPa/ 7,5 kPa	20	35	0,30-0,60/ 0,30-0,60	1,5-2,5/ 1,5-2,5	0,45-2,0/ 0,45-2,0	0,5-1,5/ 0,5-1,5	2,1-3,5/ 2,1-3,5
-30" Hg/ 15 psi	-760mm Hg/ 1,0 kg/cm ²	-100 kPa/ 100 kPa	250	400	0,5-1,0/ 0,3-0,7	2,0-3,0/ 0,5-1,5	0,75-2,5/ 0,5-1,0	0,7-1,8/ 0,7-1,4	2,8-4,2/ 0,7-2,1
-30" Hg/ 30 psi	-760mm Hg/ 2,0 kg/cm ²	-100 kPa/ 200 kPa	250	400	1,0-1,5/ 0,3-0,8	3,0-6,0/ 1,0-2,0	1,2-4,5/ 0,7-1,5	1,4-2,4 0,4-1,3	4,2-8,4/ 1,4-2,8
-30" Hg/ 60 psi	-760mm Hg/ 4,0 kg/cm ²	-100 kPa/ 400 kPa	250	400	2,0-3,0/ 0,7-1,5	5,0-9,0/ 3,0-5,0	2,5-7,0/ 1,1-4,0	2,8-4,5 1,0-2,3	7,0-12,0/ 4,2-7,0
Pressure									
10" H ₂ O	250mm H ₂ O	2,5 kPa	20	35	0,2-0,5	1,0-2,0	0,35-1,5	0,4-1,0	1,4-2,8
30" H ₂ O	750mm H ₂ O	7,5 kPa	20	35	0,3-0,6	1,5-2,5	0,45-2,0	0,5-2,0	2,1-3,5
60" H ₂ O	1500mm H ₂ O	15 kPa	20	35	0,5-1,3	1,5-3,5	0,9-2,5	0,7-3,0	2,1-5,0
100" H ₂ O	2500mm H ₂ O	25 kPa	20	35	0,6-1,6	2,5-5,5	1,1-4,0	1,0-4,0	3,5-7,7
150" H ₂ O	3750mm H ₂ O	37 kPa	20	35	1,0-2,5	4,5-8,5	1,7-6,5	2,0-6,0	6,0-12,0
15 psi	1,0 kg/cm ²	100 kPa	500	1500	0,1-0,35	0,5-1,5	0,2-1,0	0,4-1,0	0,7-2,1
30 psi	2,0 kg/cm ²	200 kPa	500	1500	0,1-0,50	0,5-1,5	0,3-1,0	0,4-1,0	0,7-2,1
60 psi	4,0 kg/cm ²	400 kPa	500	1500	0,3-1,0	1,0-3,5	0,7-2,5	0,6-2,0	1,4-5,0
100 psi	7,0 kg/cm ²	700 kPa	1000	3000	0,5-1,7	1,5-5,0	1,1-3,5	1,0-4,5	2,1-7,0
200 psi	14 kg/cm ²	1400 kPa	1000	3000	1-3	5-13	2-9	3,0-7,5	7,0-18,2
400 psi	28 kg/cm ²	2800 kPa	2400	3000	4-7,5	5-24	5,5-15	4,0-11,0	7,0-33,6
600 psi	42 kg/cm ²	4200 kPa	2400	3000	4-11	9-30	7-20	5,0-23,0	12,6-42
1000 psi	70 kg/cm ²	7000 kPa	12000	18000	7-30	30-110	18-70	15-80	42-154
3000 psi	210 kg/cm ²	2100 kPa	12000	18000	15-60	80-235	37-160	30,0-230	112-329

DIFFERENTIAL PRESSURE RANGES			Pressure Ratings		Approximate Deadband Switch Element				
Nominal Pressure			Static Working Pressure	Proof psi	20, 26, 27	21, 24, 31	50	22	32, 42
30" H ₂ O	750mm H ₂ O	7,5 kPa	5,4	21,6	0,3-0,6	1,5-2,5	0,45-2,0	0,5-2,0	2,1-3,5
60" H ₂ O	1500mm H ₂ O	15 kPa	5,4	21,6	0,5-1,3	1,5-3,5	0,9-2,5	0,7-3,0	2,1-5,0
100" H ₂ O	2500mm H ₂ O	25 kPa	5,4	21,6	0,6-1,6	2,5-5,5	1,1-4,0	1,0-4,0	3,5-7,7
150" H ₂ O	3750mm H ₂ O	37 kPa	5,4	21,6	1,0-2,5	4,5-8,5	1,8-6,5	2,0-6,0	6,3-12,0
15 psid	1,0 kg/cm ²	100 kPa	500	2000	0,5-1,0	2,0-5,0	0,7-3,5	0,7-1,4	2,8-7,0
30 psid	2,0 kg/cm ²	200 kPa	500	2000	1,0-2,0	2,0-5,0	1,5-3,5	1,4-2,8	2,8-7,0
60 psid	4,0 kg/cm ²	400 kPa	500	2000	2,0-4,0	3,0-6,0	3,0-4,5	2,8-5,6	4,2-8,5
100 psid	7,0 kg/cm ²	700 kPa	1000	4000	4,0-10,0	11,0-20,0	7,0-15,0	6,0-14,0	16,0-28,0
200 psid	14,0 kg/cm ²	1400 kPa	1000	4000	5,0-15,0	12,0-40,0	10,0-26,0	7,0-21,0	17,0-56,0
400 psid	28,0 kg/cm ²	2800 kPa	1000	8000	10,0-20,0	20,0-60,0	15,0-40,0	14,0-28,0	28,0-84,0
600 psid	42,0 kg/cm ²	4200 kPa	1000	8000	20,0-40,0	80,0-150,0	30,0-115,0	30,0-56,0	12,0-210,0

B-Series Switches- Pressure & Differential Pressure

Example:

**B4 20 B XPK 600
psi**

Enclosure

- B4** - Pressure switch, Type 400, watertight enclosure meets NEMA 3, 4, 4X, 13 and IP66 requirements.
- B7⁽¹⁾** - Pressure switch, Type 700, explosion-proof enclosure meets Div. 1 & 2, NEMA 7, 9 and IP66 requirements.
- D4** - Differential pressure switch, Type 400, water-tight enclosure meets NEMA 3, 4, 4X, 13 and IP66 requirements.
- D7⁽¹⁾** - Differential pressure switch, Type 700, explosion-proof enclosure meets Div. 1 & 2, NEMA 7, 9 and IP66 requirements.

Switch Element Selection - UL/CSA Listed SPDT

- 20⁽⁸⁾** - Narrow deadband ac, 15A - 125/250 Vac
 - 21** - Ammonia service, 5A - 125/250 Vac
 - 22⁽⁷⁾** - Hermetically sealed switch, narrow deadband, 5A - 125/250 Vac
 - 23** - Heavy duty ac, 22A - 125/250 Vac
 - 24⁽²⁾** - General purpose, 15A - 125/250/480 Vac, ½A - 125 Vdc, ¼A - 250 Vdc; 6A, 30 Vdc
 - 25⁽³⁾** - Heavy duty dc, 10A - 125 Vac or dc, 1/8 HP - 125 Vac or dc
 - 26⁽⁸⁾** - Sealed environment proof, 15A - 125/250 Vac
 - 27** - High temperature 148 °C, 15A - 125/250 Vac
 - 28⁽⁶⁾** - Manual reset trip on, increasing 15A - 125/250 Vac
 - 29⁽⁶⁾** - Manual reset trip on decreasing, 15A - 125/250 Vac
 - 31** - Low level (gold) contacts, 1A - 125 Vac
 - 32** - Hermetically sealed switch, general purpose, 11A - 125/250 Vac, 5A - 30 Vdc
 - 42** - Hermetically sealed switch, gold contacts, 1A - 125 Vac
 - 50** - Variable deadband, 15A - 125/250 Vac
- ### Switch Element Selection - UL/CSA Listed Dual (2 SPDT) ⁽⁴⁾
- 61⁽⁸⁾** - Dual narrow deadband, 15A - 125/250 Vac
 - 62⁽⁸⁾** - Dual sealed environment proof, 15A - 125/250 Vac
 - 63** - Dual high temp. 148°F, 15A - 125/250 Vac
 - 64** - Dual general purpose, 15A - 125/250/480 Vac, ½A - 125 Vdc, ¼A - 250 Vdc
 - 65** - Dual ammonia service, 5A - 125/250 Vac
 - 67^{(6) (7)}** - Dual hermetically sealed switch, narrow deadband, 5A - 125/250 Vac
 - 68⁽⁵⁾** - Dual hermetically sealed switch, general purpose, 11A - 125/250 Vac 5A, 30 Vdc
 - 70** - Dual low level gold contacts, 1A - 125 Vac
 - 71⁽⁶⁾** - Dual hermetically sealed switch, gold contacts, 1A - 125 Vac

Actuator Seal

Material	Process Temp. Limits °C ⁽¹⁰⁾	Range			
		Vac. °H ₂ O	0-600 psi	0-1000 psi	0-3000 psi
B - Buna-N	-18 to 65	•	•	•	•
V - Viton	20 to 148	•	•	•	•
T - Teflon	-18 to 65	•	•	•	•
S - 316L ⁽⁹⁾	-18 to 148		•	•	
P - Monel ⁽⁹⁾	-18 to 148		•	•	

Options

Use table from page 6

Range

Select from table page 4

ORDERING CODE NOTES:

- 1 Standard housing epoxy coated aluminum. Use variation code YW for 316SS housing.
- 2 Standard switch
- 3 Not available with psid ranges.
- 4 Dual switches are 2 SPDT snap-action switches, not independently adjustable.
- 5 Wires cannot be terminated inside B400 switch enclosure.
- 6 Not available with type 700 enclosure.
- 7 Estimated dc. rating, 2.5A, 28 Vdc (not UL listed).
- 8 Estimated dc rating, 0.4A, 120 Vdc (not UL listed).
- 9 Available on pressure only.
- 10 Ambient operating temperature limits -28 to 65 °C, all styles, setpoint shift of ±1% of range per 10 °C temperature change is normal. Switches are calibrated at 20 °C reference.

B-Series Switches- Hydraulic

ORDERING CODE

Example:

**H4 24 V XPK 3000
psi**

Enclosure

H4 - Hydraulic pressure switch, Type 400, watertight enclosure meets NEMA 3, 4, 4X, 13 and IP66 requirements.

Switch Element Selection - UL/CSA Listed SPDT

20⁽³⁾ - Narrow deadband ac, 15A - 125/250 Vac

22⁽⁴⁾ - Hermetically sealed switch, narrow deadband, 5A - 125/250 Vac

23 - Heavy duty ac, 22A - 125/250 Vac

24⁽¹⁾ - General purpose, 15A - 125/250/480 Vac, ½A - 125 Vdc, ¼A - 250 Vdc; 6A, 30 Vdc

25 - Heavy duty dc, 10A - 125 Vac or dc, 1/8 HP - 125 Vac or dc

26⁽³⁾ - Sealed environment proof, 15A - 125/250 Vac

27 - High temperature 148 °C, 15A - 125/250 Vac

28 - Manual reset trip on increasing, 15A - 125/250

29 - Manual reset trip on decreasing, 15A - 125/250 Vac

32 - Hermetically sealed switch, general purpose, 11A - 125/250 Vac, 5A - 30 Vdc

Switch Element Selection - UL/CSA Listed Dual (2 SPDT)⁽²⁾

61⁽³⁾ - Dual narrow deadband, 15A - 125/250 Vac

62⁽³⁾ - Dual sealed environment proof, 15A - 125/250 Vac

63 - Dual high temp. 148 °C, 15A - 125/250 Vac

64 - Dual general purpose, 15A - 125/250/480 Vac, ½A - 125 Vdc, ¼A - 250 Vdc

65 - Dual ammonia service, 5A - 125/250 Vac

70 - Dual low level gold contacts, 1A - 125 Vac

Actuator Seal

Material	Process Temp. Limits °C ⁽⁵⁾	
V - Viton	-6 to 148	Viton O-ring, stainless steel pressure connection

Options

Use table from page 6

Range

Range psi	Adjustable Setpoint Limits psi	Proof Pressure psi
1000	150 – 1000	12.000
2000	300 – 2000	12.000
3000	450 – 3000	12.000
5000	750 – 5000	10.000
7500	1125 – 7500	100.000

NOTES:

- Standard switch.
- Dual switches are 2 SPDT snap-action switches, not independently adjustable.
- Estimated dc rating, 0.4A, 120 Vdc (not UL listed)
- Estimated dc rating, 2.5A, 28 Vdc (not UL listed)
- Ambient operating temperature limits -28 to 65 °C, all styles, setpoint shift of ±1% of range per 10 °C temperature change is normal. Switches are calibrated at 20 °C reference.


B-Series Switches- Pressure & Differential Pressure


OPTIONAL FEATURES AND ACCESSORIES

B-SERIES SWITCH OPTIONS						
Code	Description	Applicable Switch Series				
		Pressure		Differential Pressure		H
		(psi)	(in. H ₂ O)	(psi)	(in. H ₂ O)	Notes
BP	Wall Mounting Bracket in. H ₂ O		•	•		
BX	½" Male NPT Bushing					•
CH	Chained Cover	•	•	•	•	•
C8	CSA Approval	•	•	•	•	10
CN	ATEX Directive 94/9/EC/IECEx Rating	•	•	•	•	15
CEN3	Cable gland M20 for execution Ex d	•	•	•	•	15
CEN6	Standard connection ¾ NPT innen Ex ia	•	•	•	•	15
CEN7	Cable gland M20 for execution Ex ia	•	•	•	•	15
D2	Dual Seal Rating (700 Series only)	•		•		
FM	FM Approval – Single Element	•	•	•	•	14
	FM Approval – Dual Element	•	•	•	•	14
FP	Fungus Proofing	•	•	•	•	•
FS	Factory Adjusted Setpoint	•	•	•	•	•
G3	Belleville Actuator	•				13,14
G5	UL Limit Control to 150" H ₂ O				•	1, 14
G6	UL Limit Control to 600 psi	•				1, 14
G7	Secondary Chamber with Vent	•				11
G8	Steam Limit Control to 300 psi	•				
G9	Fire Safe Welded Actuator	•				7
HS	High Static Differential Pressure			•		12
HX	High Pressure, 40 psi, (static) d/p only 160 psi (proof) d/p only 100 psi (proof) pressure only (" H ₂ O)		•		•	
JK	Left Conduit Connection	•	•	•	•	•
JL	¾" to ½" Reducing Bushing	•	•	•	•	•
JM	Metric Electrical Conduit Conn. M20 x 1.5	•	•	•	•	•
K3	Terminal Block (700 Series only)	•	•	•	•	6
LE	6 foot Leads on the Micro Switch	•	•	•	•	•
NH	Tagging Stainless Steel	•	•	•	•	•
NN	Paper Tag	•	•	•	•	•
PK	Pilot Light(s) Top Mounted	•	•	•	•	•
PM	¾" Sealed Conduit Connection with 16" Lead Wires	•	•	•	•	•
TA	316 Stainless Steel Pressure Connection for in. H ₂ O Range		•		•	
TM	2" Pipe Mounting Bracket	•	•	•	•	
UD	316 Stainless Steel Pressure Conn. Pressure Connection:			•		
06	½ NPT Male, ¼ NPT Female 316 Stainless Steel (Combination)	•	•	•	•	5
07	½ NPTF Press. Conn., 316 SS	•	•	•	•	9
6B	Cleaned for Oxygen Service Diaphragm Seal	•	•	•	•	3
9F	Inches of Water Housing for Outdoor Use		•			
YW	316SS Housing	•	•	•	•	•

OPTION NOTES:

- 1 Buna N and Viton diaphragm.
- 2 Advise static or working pressure for differential pressure switches.
- 3 Buna N cannot be cleaned for oxygen service.
- 4 N/A on 700 Series.
- 5 Standard with 1000 and 3000 psi ranges. Bottom connection only on DP in H₂O ranges.
- 6 Terminal Blocks standard with 700 dual switches.
- 7 Stainless steel diaphragm only.
- 8 Standard on 700 Series. N/A with DPDT element on 400 Series.
- 9 N/A with Monel diaphragm.
- 10 Standard on 400 Series.
- 11 SS diaphragm required. Teflon diaphragm is the backup.
NEMA 7 only.
- 12 Buna N and Viton diaphragm – 15#D & 30#D only.
- 13 24, 32, 64 or 68 element only.
- 14 N/A on all combinations.
- 15 700 Series only.

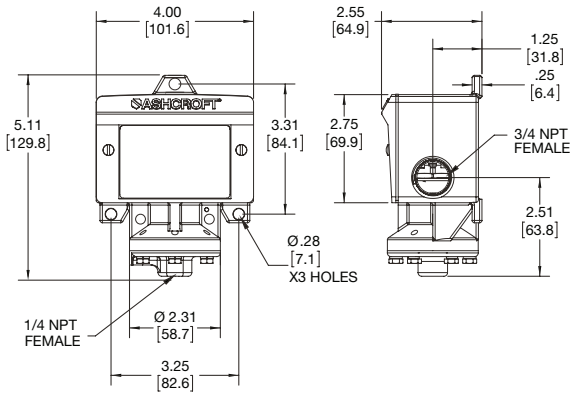
 II 1GD
Ex ia IIC T4 Ga
Ex ia IIIC T135°C Da IP6X
(Ta = -20°C bis +60°C)

 II 2GD
Ex d IIC T6 Gb
Ex t IIIC T85°C Db IP 6X
(Ta = -20°C to +60°C)

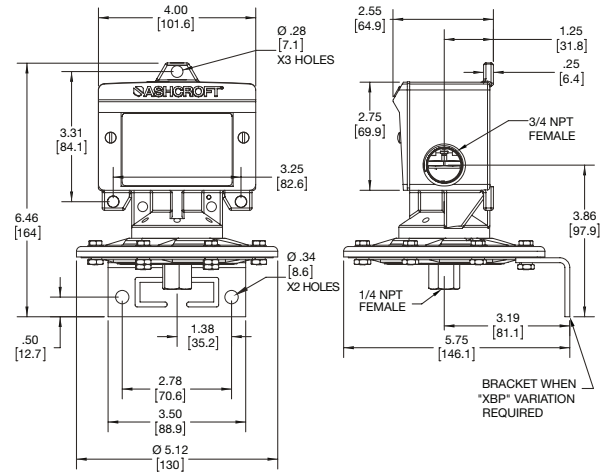
**B-Series Switches-
Pressure, Differential Pressure & Hydraulic**

B 400 & H400 DIMENSIONS

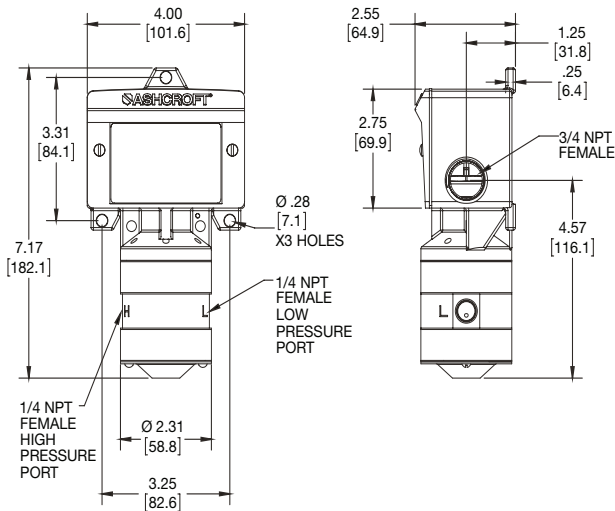
Pressure switch & Hydraulic – psi ranges



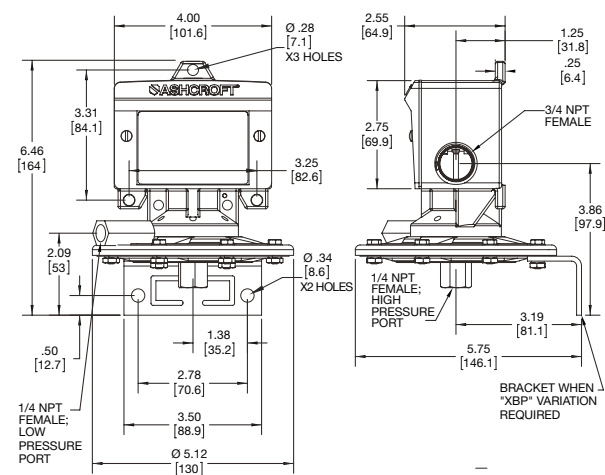
Pressure switch & Hydraulic – inches of water ranges



Differential pressure switch – psi differential ranges



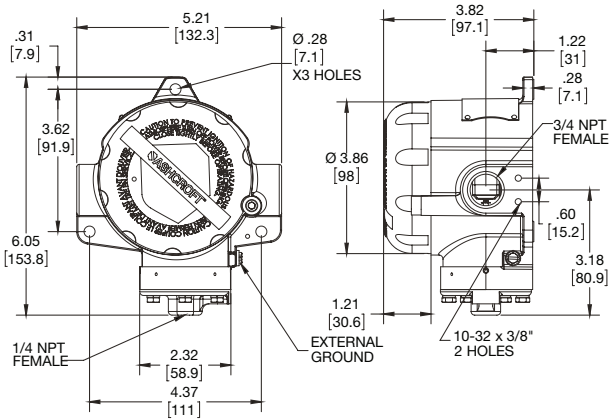
Differential pressure switch – inches of water ranges



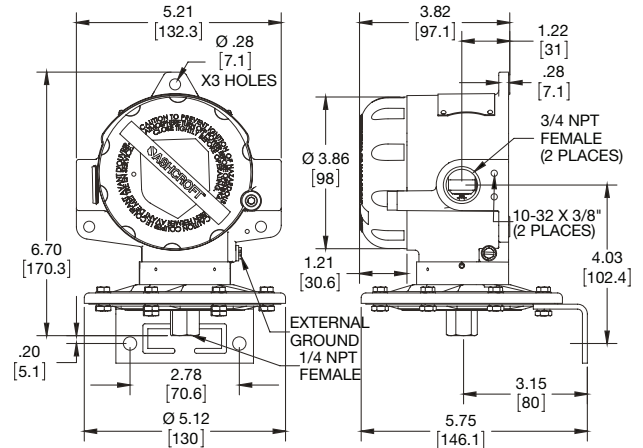
**B-Series Switches-
Pressure & Differential Pressure**

B 700 DIMENSIONS

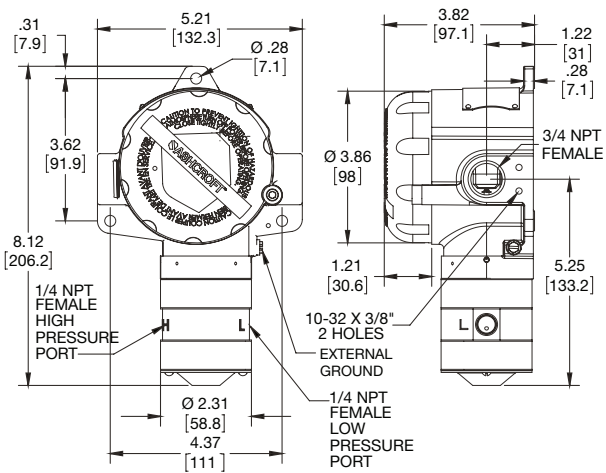
Pressure switch – psi ranges



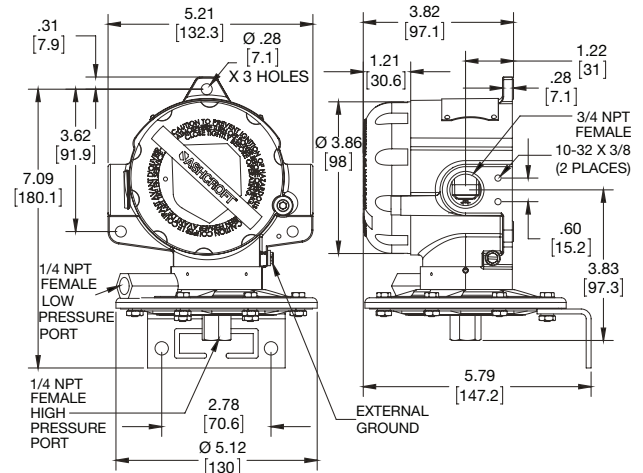
Pressure switch – inches of water ranges



Differential pressure switch – psi differential ranges



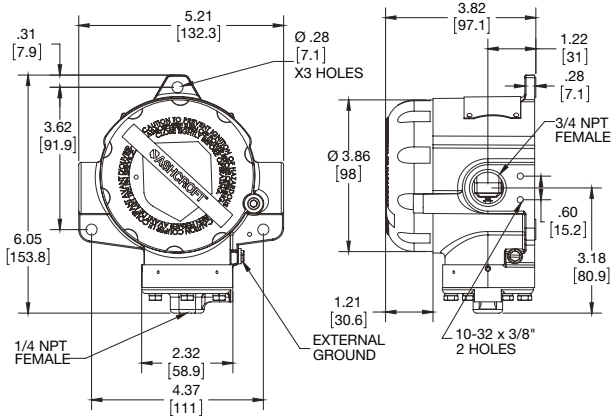
Differential pressure switch – inches of water ranges



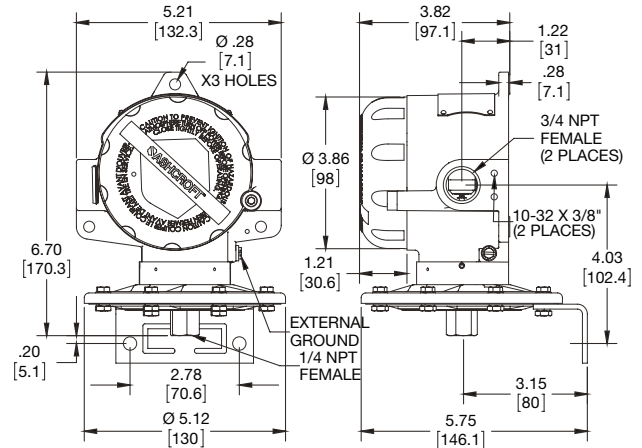
**B-Series Switches-
Pressure & Differential Pressure**

B 700 DIMENSIONS

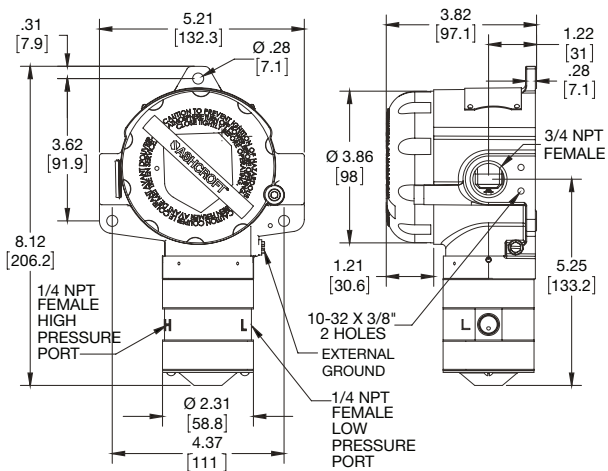
Pressure switch – psi ranges



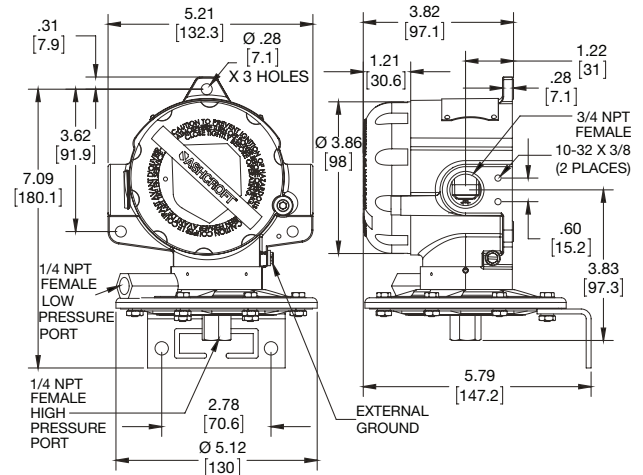
Pressure switch – inches of water ranges



Differential pressure switch – psi differential ranges



Differential pressure switch – inches of water ranges



B-Series Switches- Pressure & Differential Pressure

Ashcroft 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 Ashcroft's exacting standards, and product is built to last in the toughest applications. Our modern, responsive manufacturing facility 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 B-Series switch line is designed to satisfy most switch requirements. Materials of construction have been selected for long life. A wide variety of precision switch elements are available to meet every application requirement, including hermetically sealed contacts for 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. Special designs are available for fire safety, NACE, limit control and other more stringent requirements. Simplicity and ease of use are stressed to improve reliability of the installation.

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.

Pressure & Differential Pressure Switches

B-Series pressure, differential pressure and vacuum switches use two different actuators depending on setpoint requirements. For setpoints between 2 and 3000 psi, the simple, rugged diaphragm-sealed piston actuator is used. This design features high reliability and choice of actuator seal materials for virtually every application. An optional welded design is also available for setpoints up to 1000 psi for maximum reliability. This design is available in stainless steel 316 or Monel. Differential pressure models use a unique, dual diaphragm-sealed piston design that features very high static operating pressures and small size.

For setpoints between 4,5 and 150 inches of H₂O, a large diaphragm is used for increased sensitivity in both pressure and differential pressure designs with good choice of materials of construction.

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

These standard designs perform well in applications where shock and vibration could be a problem and may be used in conjunction with Ashcroft diaphragm seals in extreme services such as slurries or abrasive process fluids.