

# Sensors & Switches

## Sensors & Switches for Wind Turbines



- ▶ High quality and reliability
- ▶ Global presence
- ▶ Local support

Control  
Control  
every move

## Barksdale

CONTROL PRODUCTS

**CRANE** Barksdale, Inc./Barksdale GmbH  
A Subsidiary of Crane Co.

# First hand competence

The efficiency of a wind energy plant is dependent on the quality of components used to measure and control its systems. Gear mechanisms, pitch control, braking systems – all of these must be monitored and controlled by components that offer consistent, reliable performance year after year. Barksdale supplies that performance in our pressure transducers, electronic and electromechanical pressure and temperature switches and level control products. Our instruments measure and control hydraulic and lubrication systems throughout the wind energy industry.

## Mechanical Pressure Control

- ▶ Rugged construction
- ▶ Narrow hysteresis
- ▶ High functional safety to -40°C
- ▶ UL approvals



Barksdale's 60 years of experience and reputation for quality gives you the confidence to rely on our control products for the consistent, reliable performance you expect.

Barksdale products are distributed throughout the world to international customers, with plants in Germany and the United States and distribution and service centers in the United States, China, Europe and India.

As a part of the Crane Co family, Barksdale is backed by a 150 year-old company with a relentless focus on Operational Excellence and continuous process improvement. On-time delivery, quality and safety are measured every day to ensure we are providing our customers with problem-free products that consistently meet the highest standards.

# Sensors & Switches for Wind Turbines

## Electronic Control

- ▶ High functional safety to -40°C
- ▶ UL approvals



## Mechanical Level Control

- ▶ High functional safety to -40°C
- ▶ UL approvals
- ▶ Rugged construction
- ▶ Highly customizable
- ▶ Integrated temperature control



## Mechanical Pressure Switches

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Microtorque™ Valve, Series 518, 526	26
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## Compact Pressure Switch

Series 9000

### Features

- ▶ High-quality materials
- ▶ Compact design
- ▶ Long pressure spring (precisely adjustable)
- ▶ Captive set screw

### Applications

- ▶ OEM applications
- ▶ Hydraulic power units
- ▶ Test equipment
- ▶ Heavy industry
- ▶ Ship building
- ▶ Mobile and stationary hydraulics



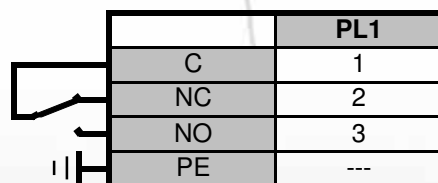
### General Specifications\*

<b>Repeatability:</b>	±2% (typically)
<b>Micro switch:</b>	(SPDT) silver contacts
<b>Switching frequency:</b>	Max. 60/min.
<b>Wetted parts:</b>	
Dynamic seal:	Teflon (PTFE) / Viton (FKM)
Fitting:	Aluminum (AlMg4.5Mn)
Piston:	Steel (100Cr6)
<b>Adjustment ranges:</b>	145 to 5800 psi (10 to 400 bar)
<b>Temperature range:</b>	
Storage:	-40 °F ... +176 °F (-40 °C ... +80 °C)
Piston switch:	-4 °F ... +176 °F (-20 °C ... +80 °C)

<b>Enclosure rating:</b>	IP65
<b>Material:</b>	
Housing:	Aluminum (AlMg4.5Mn)
Electrical plug:	Polyamid (PA)
Adjustment screw:	Stainless Steel (1.4305)
<b>Process connection:</b>	1/4" NPT G1/4" female thread (DIN ISO 228-1) option L
<b>Weight:</b>	0.39 lbs (175 g)
<b>Electrical connection:</b>	DIN 43650 (EN 175301-8013-A plug)

\* See Product Configurator for additional options.

### Wiring and Connection Diagram



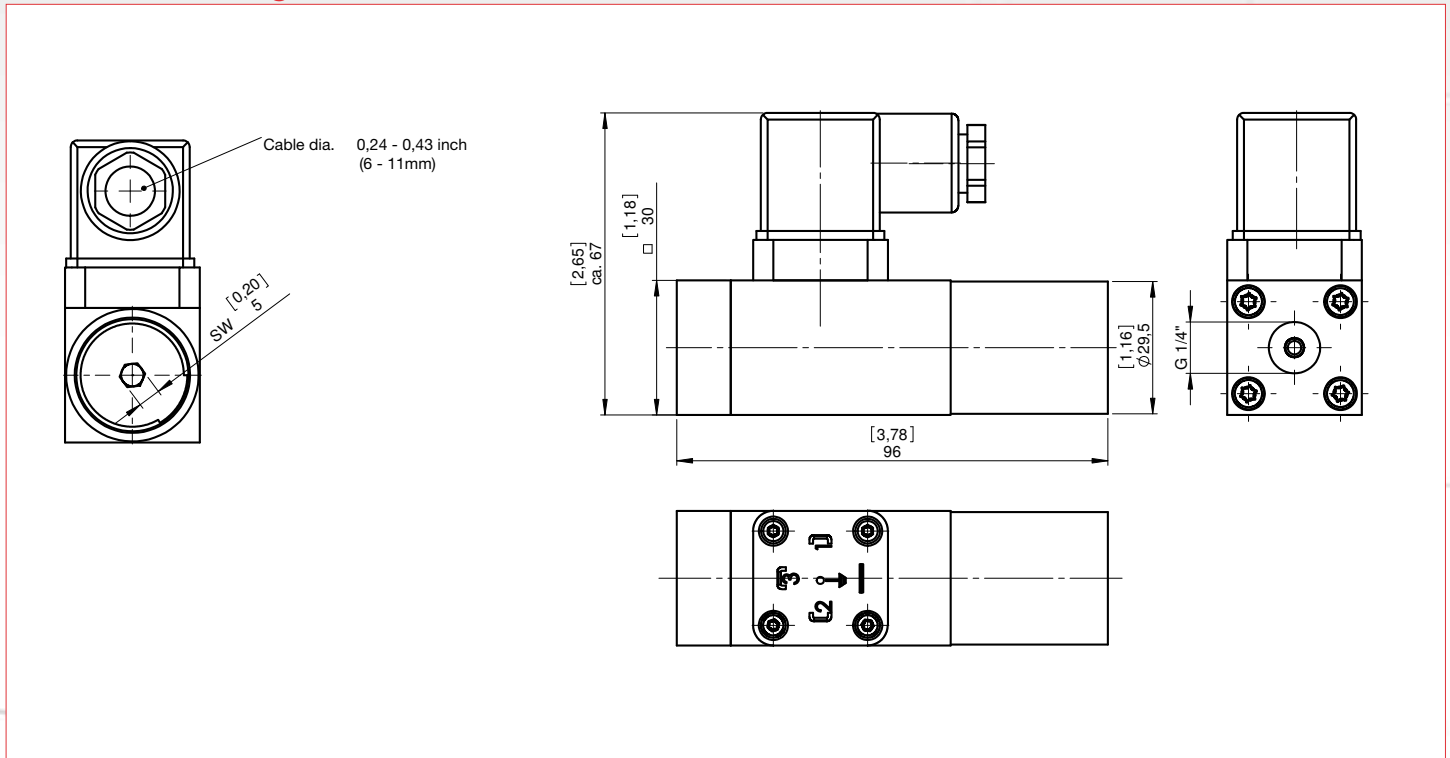
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## Technical Drawing



## Product Configurator

Example	9	A	A	-1	-PL1	-V	
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Series 9000

Process Conn.

2	G1/4" female
A	1/4" NPT female (standard)
E	7/16-20 UNF SAE-4

Pressure Range

Range	Adjustable Range		Max. Hysteresis at full range max %	Max. Operating Pressure psi (bar)	Proof Pressure psi (bar)
	Decreasing Press. psi (bar)	Increasing Press. psi (bar)			
A	85 - 638 (6 - 44)	145 - 725 (10 - 50)	10%	3620 (250)	4350 (300)
B	218 - 2680 (15-185)	290 - 2900 (20 - 200)		3620 (250)	4350 (300)
C	508 - 5220 (35 - 360)	580 - 5800 (40 - 400)		7250 (500)	8700 (600)

SPDT Contact

1	Silver
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Options

Seals

B	BUNA
V	Viton
E	EPDM

Electrical Conn.

PL1	DIN 43650
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## Compact Pressure Switch

Series 8000

### Features

- ▶ Proven design in stationary and mobile hydraulic applications
- ▶ Wide setpoint pressure range
- ▶ Available in wide range of configurations
- ▶ Precise setpoint adjustment
- ▶ Factory preset or field adjustable
- ▶ UL Type 4, IP65, IP68
- ▶ Modular concept

### Applications

- ▶ Hydraulic power packs
- ▶ Machine tools
- ▶ Overload controls
- ▶ Railways
- ▶ Factory automation
- ▶ Balers and compactors
- ▶ Marine applications



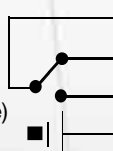
### General Specifications\*

<b>Repeatability:</b>	±1% typical, piston models ±2% typical, diaphragm models	<b>Approvals:</b> Standard:	UL / cULus (CSA) IP65 (DIN-plug), IP68 (cable) GOST R Intrinsically safe
<b>Microswitch:</b> Type:	SPDT contact	Ex Option:	DIN plug version Cable version DIN plug and cable version
Rating:	Silver contacts: 3A @ 250 VAC 5A @ 120 VAC 0.4A @ 120 VDC Gold contacts: 0.1A @ 125 VAC 0.1A @ 30 VDC	<ul style="list-style-type: none"> <li> II1G Ex ia IIB T6</li> <li> II1G Ex ia IIC T6</li> <li> II1GD Ex ia D20 T100</li> </ul>	
<b>Switching Frequency:</b>	max. 60 /min piston switch max. 30/ min diaphragm switch	<b>Ambient Temperature Range:</b>	Piston Switch: -40°F to +176°F (-40°C to +80°C) Diaphragm Switch: -4°F to +176°F (-20°C to +80°C)
<b>Wetted Parts:</b> Process Fitting:	304 stainless steel	<b>Adjustment Instructions:</b> Setpoint Adjustment:	Turn adjustment screw clockwise to increase pressure; counterclockwise to decrease pressure.
Housing:	Aluminum die-cast 230	<b>Shipping Weight:</b>	
Seals & Diaphragms:	Buna-N (NBR), Viton® (FKM), EPDM, Neoprene (CR)	CETOP Flange Model:	0.77 lbs. (350 g)
Adjustment Screw:	300 stainless steel (HEX 5)	Adaptor Version Straight:	1.36 lbs. (620 g)
<b>Electrical Connection:</b>	See options on next page	Adaptor Version 90° Angle:	1.48 lbs. (675 g)
<b>Enclosure Ratings:</b>	UL Listed, Type 4 for indoor and outdoor use.		
<b>Pressure Connection:</b>	Standard CETOP (multiple pressure connections available)		

\* See product configurator for additional options.

### Wiring Code

(contact status at atmospheric pressure)



	DIN 43650 Plug (PL1)	M12 Plug (PL2/5)	Cable Gland (CA)	1/2" NPT Conduit w/ Free Leads (CD1)
<b>Common</b>	1	1	Brown	Purple
<b>Normally Closed</b>	2	2	Black	Blue
<b>Normally Open</b>	3	4	Gray	Red
<b>Ground</b>	GRD	3*	Green/Yellow	Green/Yellow

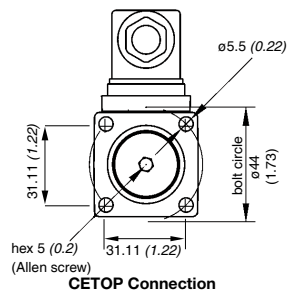
\* PL5 is without ground

# Compact Pressure Switch

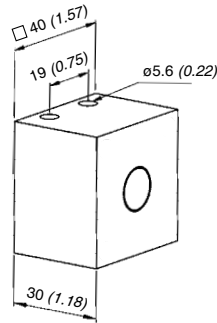
# Series 8000

## Technical Drawings

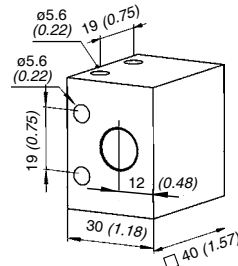
### Process Connections



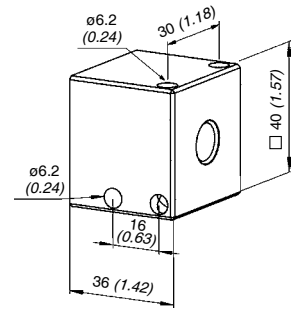
**CETOP Connection**



**Standard Straight**

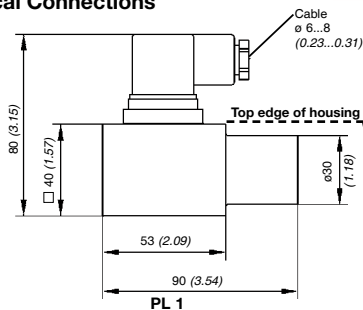


**90° Side Entry**

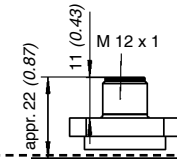


**Retrofit Connection For 96100 & X1T**

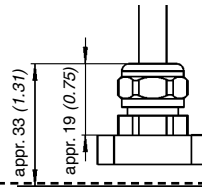
### Electrical Connections



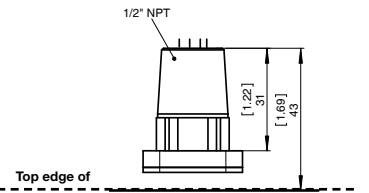
**PL 1**



**PL2 & PL5**



**CA3**



**CD 1**

Dimensions in mm (inch)

## Product Configurator

Example: 8 A A 1 - PL1 - B -UL<sup>5</sup>

Series 8000

### Process Connections<sup>7</sup>

1 <sup>1</sup>	Cetop connection flange 40 x 40
2	G1/4" female
A	1/4" NPT female
C	1/8" NPT female
D	1/4" NPT female, 90° side entry
E	7/16 SAE-4 20 UNF

### SPDT Contacts

1	Silver
2	Gold-plated

### Electrical Connectors

- PL1	Plug DIN 43650 A, IP65 (UR only)
- PL2	Plug M12, 4-pol. without female plug, IP67 (UR only)
- PL5	Plug M12, 5-pol. without female plug. (UR only)
- CA3	Cable gland, 27.5" (0.7 m) cable, neoprene jacketed, IP68
- CD1 <sup>2</sup>	1/2" NPTM AWG 20 with 24" (60 cm) leads (3 leads + ground)

### Options<sup>3</sup>

- EXI	Intrinsically safe EXia (not UL)
- LH	Small hysteresis <sup>6</sup>
- VA	300 series stainless steel housing

### Seals

- B	Buna -N (NBR)
- V	Viton® (FKM)
- E	EPDM
- N	Neoprene (CR)

### Adjustable Range

	Adjustable Ranges				Max. Hysteresis <sup>4</sup> (Dead-band)	Proof Pressure psi (bar)
	(decreasing pressure) psi (bar)		(increasing pressure) psi (bar)			
Diaphragm						
A	5.8 - 82	(0.4 - 5.7)	8.7 - 87	(0.6 - 6.0)	≤15% of max adjustable range	1200 (80) <sup>(†)</sup>
B	29 - 246	(2.0 - 17)	4.3 - 250	(3.0 - 20)		1200 (80) <sup>(†)</sup>
C	43 - 600	(3.0 - 41)	60 - 650	(4.0 - 45)		1200 (80) <sup>(†)</sup>
Piston						
D	43 - 2320	(3.0 - 160)	75 - 2600	(5.0 - 180)	≤15% of max adjustable range	8700 (600)
E	430 - 4300	(30 - 300)	750 - 5000	(50 - 350)		8700 (600)
F	800 - 7550	(55 - 520)	1200 - 8700	(80 - 600)		15000 (900)

Notes:

<sup>1</sup> Model 81XX- at pressure ranges is (A to E) delivered with 2 spring clips and 2 mounting screws 5 x 60 mm, steel 10.9, galvanized (hex 4). Pressure range (F) is delivered with 4 mounting screws.

<sup>2</sup> Contact rating for silver contact is 3A @ 125 VAC.

<sup>3</sup> Consult factory for additional options.

<sup>4</sup> Consult sale drawing for dead-band chart

<sup>5</sup> Not applicable with -EXI options

<sup>6</sup> Only for piston version.

<sup>7</sup> Consult factory for other process connections. Minimum quantities may apply.

(†) Proof pressure 2900 psi (200 bar) on request (May shorten the lifetime of the switch).

## Compact Pressure Switch

Series 7000

### Features

- ▶ Compact size
- ▶ Multiple electrical connections
- ▶ True SPDT snap action micro-switch
- ▶ NEMA 1 or 4X
- ▶ Factory preset or field adjustable
- ▶ Available in corrosion-resistant thermoplastic, stainless steel or brass

### Applications

- ▶ Pool & spa heaters
- ▶ Beverage dispensers
- ▶ Air proving in HVAC systems
- ▶ Engine monitoring
- ▶ Hydraulic power units
- ▶ Mobile hydraulics
- ▶ Pump or compressor control
- ▶ Hydraulic and pneumatic braking systems



### General Specifications\*

<b>Electrical Characteristics:</b>	All models incorporate Underwriters' Laboratories, Inc. and CSA Listed single pole double throw snap-action switching elements.
<b>Accuracy:</b>	±0.5 psi for range "0" ±1 psi for range "1" ±8% typical for ranges "2" to "7"
<b>Switch:</b>	SPDT snap action; single circuit
<b>Wetted Parts:</b> Diaphragm type: (range 0, 1, 2, 3)  Piston type: (ranges 4, 5, 6, 7)	NORYL® plastic fitting with NORYL® plastic housing, or 300 series stainless steel fitting, or brass fitting and Buna-N diaphragm.  300 series stainless steel or brass fitting.
<b>Electrical Connection:</b>	See product configurator for electrical connection options.
<b>Enclosure Ratings:</b>	NEMA 1, NEMA 4
<b>Pressure Connection:</b>	1/4" NPT (standard)

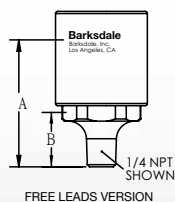
\* See product configurator for additional options.

### SS Fitting Dimension

FITTING	DIMENSION 'A'	DIMENSION 'B'
1/4 NPT	2.25 [57.15]	.75 [19.05]
1/8 NPT	2.62 [66.55]	1.10 [27.94]
* 7/16 NPT	2.25 [57.15]	.75 [19.05]
* G 1/4	2.25 [57.15]	.75 [19.05]

FOR (+6 AND -7) PRESSURE RANGE BRASS FITTINGS, ADD .51 LENGTH TO ABOVE DIMENSIONS 'A' AND 'B'

\* Available in stainless steel only



<b>Approvals:</b> UL:	Recognized components per UL 508 standard, industrial control equipment.
CSA:	Listed per CSA Guide 380-W1.16 class 3231
FDA/NSF:	Certified per NSF 18
PED (European):	Compliant to PED 97/23/EC standard
<b>Temperature Range:</b> Operating:	-40° to +180°F - piston type 0° to 180°F - diaphragm type
Storage:	-40° to +200°F
<b>EMI/RFI:</b> Vibration:	10 g's per MIL-STD 202, method 204, condition A
Shock:	50 g's per MIL-STD 202, method 213, condition A
<b>Adjustment Instructions:</b> Pressure Setpoint:	Turn adjustment screw clockwise to increase pressure; counterclockwise to decrease pressure.
<b>Shipping Weight:</b>	Plastic: approximate .10 lbs. Stainless steel: approximate .25 lbs.

### Wiring Code

CONTACT	FREE LEADS	PVC GRAY CABLE	TYPE 'SJO' CABLE	DIN 43650 TYPE CONNECTOR
COMMON	PURPLE	WHITE	WHITE	POSITION 1
NORMALLY OPEN	RED	RED	GREEN	POSITION 3
NORMALLY CLOSED	BLUE	BLACK	BLACK	POSITION 2

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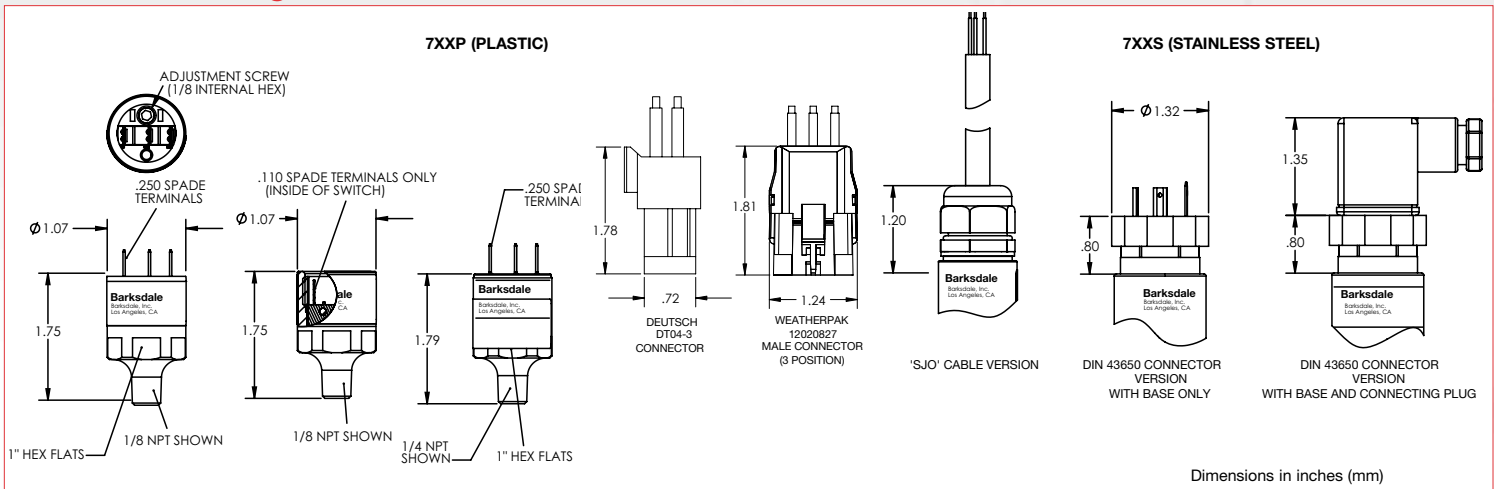




# Compact Pressure Switch

# Series 7000

## Technical Drawing



## Product Configurator

Example **72 4 S -2 4 -1 B**

### Basic Configuration

71	Factory set & permanently locked
72	Field adjustable
73	Field adjustable with factory pre-set

### Pressure Range

Range	Adjustable Range				Approx. Deadband (Actuation Value)	*Operating Pressure (Max)	Max. Proof Pressure
	Decreasing - psi		Increasing - psi				
	Min	Max	Min	Max			
0 <sup>1</sup>	1.25	3	2	4	1.5 (MAX)	20	20
1	2	7	3	10	.5 - 4	20	50
2	6	35	8	50	2 - 15	80	100
3 <sup>2</sup>	30	90	40	120	5 - 30	130	140
4 <sup>3</sup>	150	700	250	1000	30 - 300	4000	6000
5 <sup>3</sup>	500	2300	600	3000	100 - 800	4000	6000
6 <sup>4</sup>	20	150	30	200	10 - 100	700	2000
7 <sup>4</sup>	80	400	150	500	20 - 150	700	2000

\* Operating pressure is defined as the maximum pressure at which the pressure switch can maintain set point accuracy.

### Fitting Material

P	Noryl® plastic (available with pressure ranges 0 - 3 only)
F	Noryl® plastic with NSF/FDA compliance (available with pressure ranges 0 - 3 only)
S	300 series stainless steel
B <sup>7</sup>	Brass (only available with pressure ranges 6 and 7, and 1/8" NPT process connection)

### Limit Switch

-1 <sup>1</sup>	SPDT, snap-action switch, 5 Amps @ 125/250 VAC (silver contacts)
-2	SPDT, snap-action switch, 0.1 Amps @ 125/250 VAC (gold contacts)
-4 <sup>1</sup>	SPST, N.O., snap-action switch, 5 Amps @ 125/250 VAC (silver contacts)
-5 <sup>1</sup>	SPST, N.C., snap-action switch, 5 Amps @ 125/250 VAC (silver contacts)
-6	SPST, N.O., snap-action switch, 0.1 Amps @ 125/250 VAC (gold contacts)
-7	SPST, N.C., snap-action switch, 0.1 Amps @ 125/250 VAC (gold contacts)

### NOTES:

- Only 3 amps available @ 125/250VAC with silver contact limit switches for range '0'
- Not UL/CSA certified
- Piston models - only available in stainless steel
- Available only in brass fittings (use Viton diaphragms as standard - no price adder)
- Available only with stainless steel or brass, factory set & locked models
- Minimum quantities may be required.
- Brass fitting only available in 1/8" NPT, pressure ranges 6 or 7, electrical connections 3 or 4.

### Options

-Wxxx Extra wire length (XXX = inches)

### Set Point

-XXX	Set point (not required for field adjustable models)
R	Rising pressure
F	Falling pressure

### Wetted Material

B	Buna-N
N	Neoprene (not available with "F" fitting material)
V	Viton® Diaphragm (not available with "F" fitting material)
D	Disigrin O-ring (available in stainless steel & piston models only)
F	FDA approved - Buna-N (available in stainless steel & piston models only)

### Process Connection <sup>6</sup>

-1	1/8" NPTM
-2	1/4" NPTM
-3	7/16-20 with O-ring seal (available only with stainless steel models)
-4	G1/4 (available only with stainless steel models)

### Electrical Connection

1	.250 x .032 male spade quick disconnects (NEMA 1), not available with brass
2	.110 x .020 male spade quick disconnects (NEMA 1), not available with brass
3	Free leads. 18 gauge, 18" long (available only with stainless steel models - NEMA 1)
4	Unshielded PVC jacketed cable, 18 AWG, 18" long, (available only with stainless steel models - NEMA 4)
5 <sup>5</sup>	DIN 43650-type connector - base only (available only with stainless steel & factory set models - NEMA 4)
6 <sup>5</sup>	DIN 43650-type connector - with base & plug (available only with stainless steel & factory set models - NEMA 4)
7 <sup>5</sup>	SJO type cable, 3 wire, 18 AWG, 18" long (available only with stainless steel & factory set models - NEMA 4)
8 <sup>6</sup>	Weatherpak connector, female, 2-position, two 18" free wires, for normally closed circuits
9 <sup>6</sup>	Weatherpak connector, female, 2-position, two 18" free wires, for normally open circuits
10 <sup>6</sup>	Weatherpak, connector, male, 3-position, three 18" free wires, used only with SPDT limit switches
11 <sup>6</sup>	Deutsch connector, female, 3-position, three 18" free wires, used only with SPDT limit switches

# Pressure

## Compact Switch

## Series 96201, 96211, 96221

### Features

- ▶ Compact size
- ▶ Low & high pressures including vacuum
- ▶ Extremely versatile
- ▶ Optional DIN and conduit connectors
- ▶ NEMA 1 & 4; IP65
- ▶ Single pole double throw snap action switching
- ▶ Factory preset or field adjustable

### Applications

- ▶ Pump & compressor monitoring
- ▶ Air proving in HVAC systems
- ▶ Engine monitoring
- ▶ Machine tools
- ▶ Hydraulic power units
- ▶ Mobile hydraulics
- ▶ Medical equipment
- ▶ Irrigation systems
- ▶ General industrial applications



### General Specifications\*

<b>Accuracy:</b>	± 2% of full range
<b>Switch:</b> Type:	SPDT snap action; single circuit
Rating:	5 Amp @ 125/250 VAC (Class BB microswitch - standard) 10 Amp @ 125/250 VAC (Class CC microswitch) 5 Amp @ 30 VDC (Class BB and CC microswitches)
<b>Wetted Parts:</b> Process Fitting:	Brass (standard); 416 stainless steel (optional)
O-Ring Seals & Diaphragms:	Buna-N (standard)
Piston (96201 models):	Stainless steel; Teflon back-up ring
<b>Electrical Connection:</b>	12" free leads, #18 AWG
<b>Enclosure Ratings:</b>	NEMA 1 (plastic - standard) NEMA 4 (when ordered with -T4 or -T5 options) IP65 (when ordered with T2 DIN connection option)
<b>Pressure Connection:</b>	1/4" NPT male (standard)
<b>Approvals:</b> UL:	UL recognized component (UR); With optional conduit connector (-T4 or -T5 option) becomes UL listed. UL File No. E42816.
CSA:	CSA #LR22354

<b>Temperature Range:</b> Series 96201:	-40° to +165°F (-40° to +74°C)
Series 96211:	-20° to +165°F (-29° to +74°C)
Series 96221:	0° to +165°F (-18° to +74°C)
<b>Adjustment Capability:</b>	Models L96201, L96211 and L96221 are factory set and permanently locked. Models 96201, 96211, and 96221 are field adjustable via an external adjustment sleeve.
<b>Pressure Setpoint Adjustment:</b>	Secure hex body with open-end wrench; hand turn adjustment sleeve:  Clockwise (counterclockwise for vacuum models) to increase.  Counterclockwise (clockwise for vacuum models) to decrease set point.
<b>Shipping Weight:</b>	Approximate 0.95 lbs.

### Wiring Code

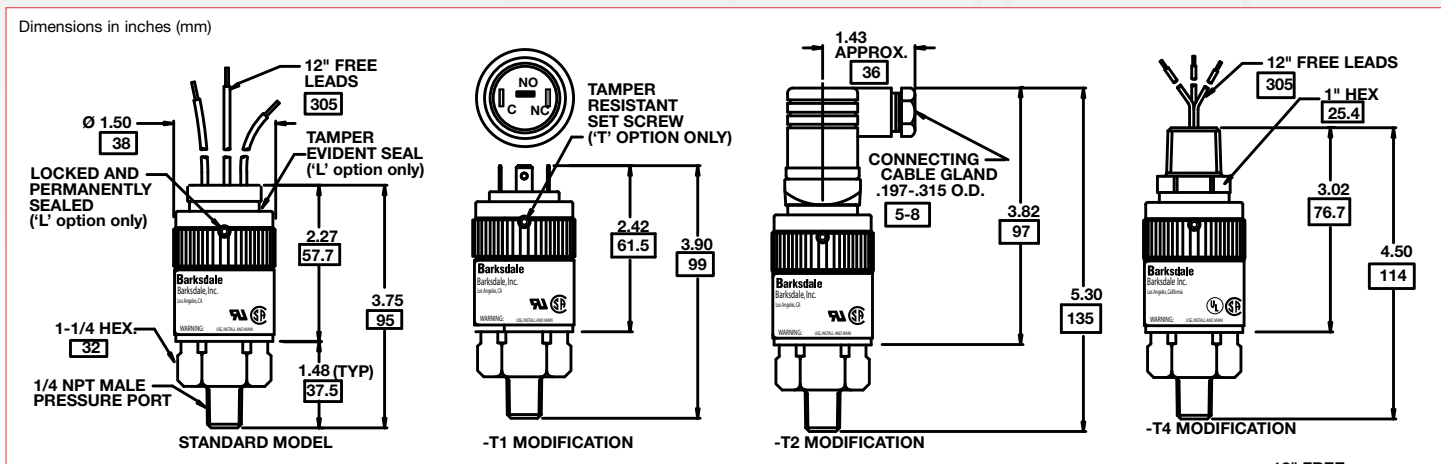
LEAD	PRESSURE		VACUUM	
	COLOR	PIN	COLOR	PIN
NORMALLY CLOSED	BLUE	2	RED	3
COMMON	PURPLE	1	PURPLE	1
NORMALLY OPEN	RED	3	BLUE	2

\* See product configurator for additional options.

# Compact Switch

# Series 96201, 96211, 96221

## Technical Drawings



## Product Configurator

Example: **96211-BB3 SS -T5 -V**

### Prefix

- L Factory set and permanently locked (optional)
- T Tamper resistant setscrew (optional)

### Base Model

	Adjustable Range				Approx. Deadband (Actuation Value) psi (bar)	Proof Pressure psi (bar)	
	Decreasing - psi (bar)		Increasing - psi (bar)				
	Min.	Max.	Min.	Max.			
96221-BB1	1" Hg	28" Hg	6" Hg	30" Hg	.5 - 8" Hg	30 (2)" Hg	Vacuum
96211-BB1	2.5 (.2)	12.8 (.9)	3 (.2)	15 (1)	.3 - 3 (.02 - .21)	1000 (68)	Low Pressure Diaphragms
96211-BB2	5 (.3)	31 (2)	6 (.4)	35 (2.4)	.5 - 6 (.03 - .41)	1000 (68)	
96211-BB3	8.5 (.6)	44 (3)	10 (.6)	50 (3.4)	.5 - 8 (.03 - .55)	1000 (68)	
96211-BB4	22.5 (1.5)	112 (8)	25 (1.8)	125 (8.5)	1 - 15 (.07 - 1.03)	1000 (68)	
96211-BB5	70 (5)	220 (15)	80 (5.5)	250 (17)	5 - 40 (.34 - 2.76)	1000 (68)	
96211-BB6	110 (7)	440 (30)	130 (9)	500 (34)	10 - 75 (.69 - 5.17)	1000 (68)	
96201-BB1	190 (13)	450 (31)	250 (17)	600 (41)	30-150 (2.07 - 10.35)	7000 (476)	High Pressure Piston
96201-BB2	360 (24)	1450 (105)	430 (29)	1700 (116)	40-400 (2.76 - 27.59)	7000 (476)	
96201-BB3	1450 (105)	3900 (265)	1650 (112)	4400 (300)	100-750 (6.90 - 51.72)	7000 (476)	
96201-BB4	3650 (248)	6700 (456)	4000 (272)	7500 (510)	200-1000 (13.79-68.96)	12000 (816)	
96201-BB5	300 (20)	2500 (170)	380 (26)	3000 (200)	80-500 (5.52-34.48)	7000 (476)	
-CC	10A @ 125/250VAC Limit Switch (replace -BB with -CC)						

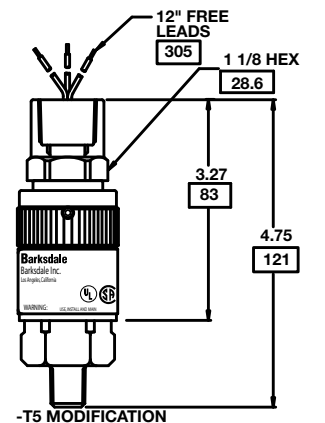
### Fitting Option

Blank	Brass (Standard)
SS	Stainless steel (not available with vacuum models)

### Electrical Connectors

Blank	12" free leads (standard)
-T1	1/4" male spade terminals
-T2	DIN Connector, 43650 type
-T4	1/2" NPT male conduit connector with free leads
-T5	1/2" NPT female conduit connector with free leads

NOTES:  
<sup>1</sup> Not available with DIN connector (-T2 option)  
<sup>2</sup> Minimum quantities may apply  
<sup>3</sup> Only available with -T5 electrical connection



### Options

-Z1	Cleaned for oxygen service
-Z12	Gold contact limit switch, 1 A, 125 VAC
-Z17	DIN 43650 base only (no mating plug)
-Z24	Unshielded cable, #18 AWG PVC
-P1	7/16-20 SAE pressure Fitting with O-ring
-JXXX <sup>3</sup>	SJO cable, #18 AWG (XXX = inches) (available only with T5 connector)
-WXXX <sup>1</sup>	Extra wire length (XXX = inches)
-SXXX	Factory preset (consult factory)

### Diaphragm/O-ring Material<sup>2</sup>

Blank	Buna-N (standard)
-E	Ethylene propylene (EPR)
-N	Neoprene
-V	Viton®

# Pressure

## Explosion Proof Compact Switch

Series 9671X, 9681X, 9692X

### Features

- ▶ ATEX approved
- ▶ NEMA 4X, 7 & 9
- ▶ NACE compliant
- ▶ SPDT and DPDT switch
- ▶ Safe to adjust during operation
- ▶ Dia-seal/piston sensor
- ▶ Dual sealed for DIV 1 & DIV 2 applications

### Applications

- ▶ BOP closing units
- ▶ Safety panels
- ▶ Pipelines
- ▶ Chemical and petrochemical plants
- ▶ Pulp and paper mills
- ▶ Pump and gas compressors
- ▶ Turbines
- ▶ Oil & gas applications



### General Specifications\*

<b>Accuracy:</b>	±2% of full scale
<b>Typical Life:</b>	2.5 million cycles
<b>Switch:</b>	SPDT, snap action, Class CC simulated DPDT (optional)
<b>Wetted Parts:</b>	316 stainless steel
Process Fitting:	
Seals:	
Piston:	
Enclosure:	316 stainless steel or aluminum
<b>Electrical Connection:</b>	1/2" NPT male conduit connection, 18 AWG, 18" (300 mm) free leads
<b>Electrical Rating:</b>	11 amps @ 125/250VAC 5 amps @ 30 VDC (CC Class)
<b>Enclosure Ratings:</b>	NEMA 4X, 7 & 9 (SS) NEMA 4, 7, & 9 (AL)

<b>Pressure Connection:</b>	1/4" NPT female
<b>Approvals:</b>	CE 0081, LCIE 08 ATEX 6074X II 2 G, Ex d IIC T6  UL # E37043 CSA # LR22354  UL&CSA Approved for use in hazardous locations Class I, Groups A,B,C,& D; Class II, Groups E,F,& G (Group A, UL Only)
<b>Ambient Temperature:</b>	-4° to +104°F (-20° to +40°C)
<b>EMI/RFI:</b>	EN55011
<b>Vibration:</b>	10g's 10-500 Hz, MIL-STD202F
<b>Shock:</b>	50g's, 11 mS, MIL-S-901C
<b>Adjustment:</b>	Internal adjustment wheel with built in set-screws (#6) <sup>1</sup>
<b>Shipping Weight:</b>	Approximately 1.85 lbs.

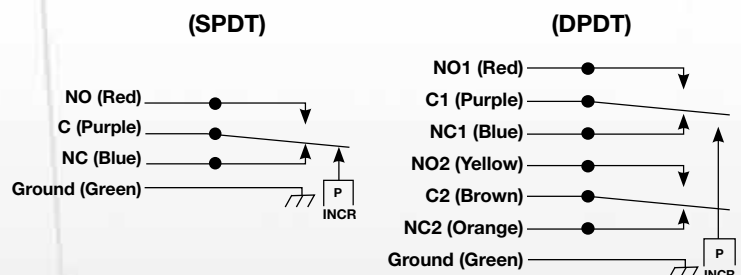
<sup>1</sup> Need to loosen set screw (#6) at all times when resetting adjustment.

\* See product configurator for additional options.

### Wiring Code

Lead	9692X/9681X (Pressure)		9671X (Vacuum)	
	Circuit #1	Circuit #2	Circuit #1	Circuit #2
Normally Open	Red	Yellow	Blue	Orange
Common	Purple	Brown	Purple	Brown
Normally Closed	Blue	Orange	Red	Yellow
Ground	Green		Green	

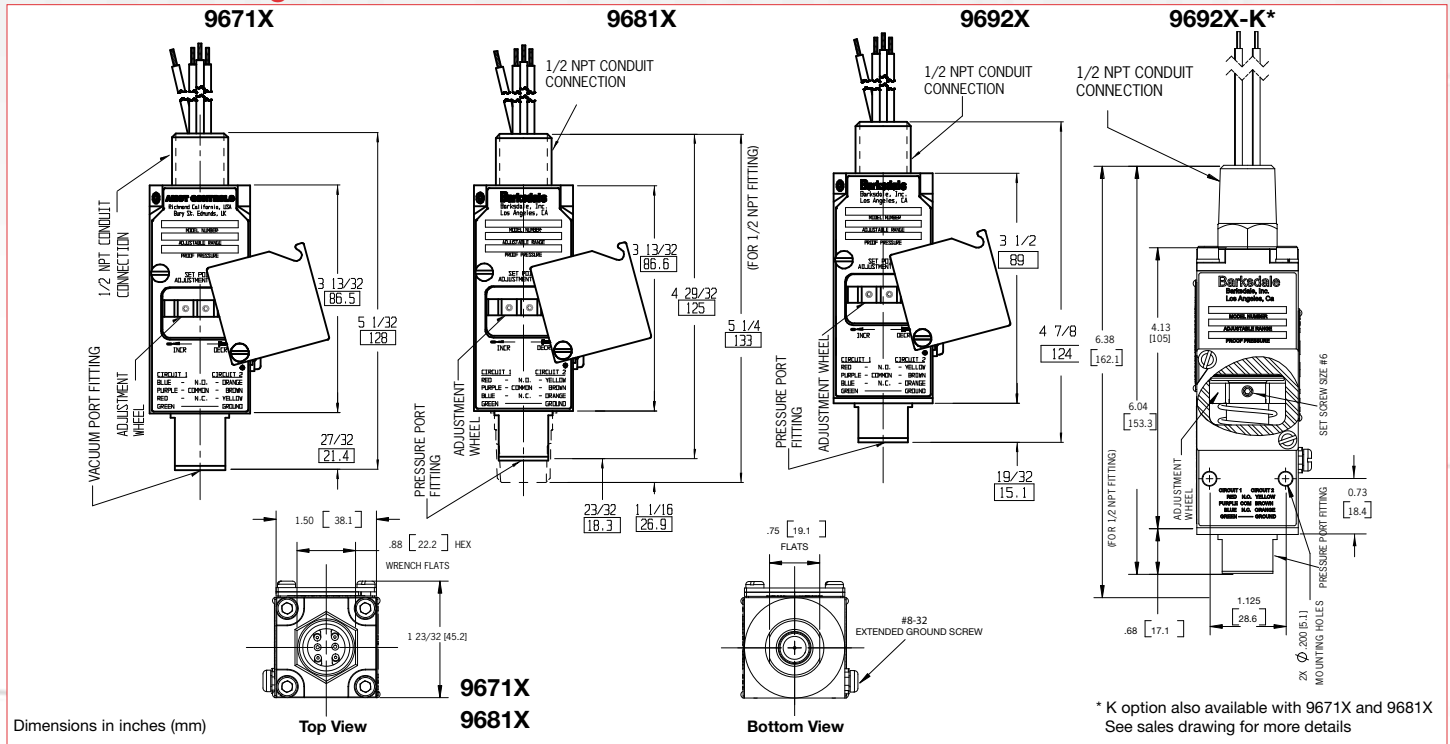
### Wiring Diagram



# Explosion Proof Compact Switch

# Series 9671X, 9681X, 9692X

## Technical Drawings



## Product Configurator

Example: **9681X -1CC -2 -AL -K -W036**

### Base Model

9671X	Vacuum switch, 1 - 30 in. Hg.
9681X	Pressure switch, 2 - 500 psi
9692X	Pressure switch, 100 - 10000 psi

### Limit Switch

-1CC	SPDT Switch, 11 amps @ 125/250 VAC; 5 amps @ 30 VDC
-2CC	DPDT Switch, 11 amps @ 125/250 VAC; 5 amps @ 30 VDC
-1GH	SPDT gold contact switch, 1 amp @ 125 VAC
-2GH	DPDT gold contact switch, 1 amp @ 125 VAC

### Pressure Ranges for 9681X & Vacuum Ranges for 9671X

		Adjustable Range				Approx. Deadband <sup>1</sup> (Actuation Value)	Proof Pressure
		Decreasing - psi (bar)		Increasing - psi (bar)			
		Min	Max	Min	Max		
9671X	Blank	1" Hg	21" Hg	5" Hg	30" Hg	4 - 9" Hg	30" Hg
9681X	-1	2 (.1)	12 (.8)	3 (.2)	15 (1)	1 - 3 (.07 - .2)	1000 (69)
	-2	5 (.3)	125 (8.6)	7 (.5)	150 (10.3)	2 - 25 (.1 - 1.7)	1000 (69)
	-3	25 (1.7)	260 (17.9)	32 (2.2)	300 (20.6)	7 - 40 (.5 - 2.8)	1000 (69)
	-4	50 (3.4)	440 (30.3)	65 (4.5)	500 (34.4)	15 - 60 (1 - 4.1)	1000 (69)

### Pressure Range for 9692X

9692X		Adjustable Range				Approx. Deadband <sup>1</sup> (Actuation Value)	Proof Pressure
		Decreasing - psi (bar)		Increasing - psi (bar)			
		Min	Max	Min	Max		
-1	100 (6.9)	600 (41.4)	150 (10.3)	750 (51.7)	50 - 150 (3.4 - 10.3)	15000 (1034)	
-2	150 (10.3)	800 (55.2)	220 (15.2)	1000 (69)	70 - 200 (4.7 - 13.8)	15000 (1034)	
-3	400 (27.6)	2600 (179)	500 (34.5)	3000 (207)	100 - 400 (6.7 - 27.6)	15000 (1034)	
-4	700 (48.2)	4400 (303)	840 (57.9)	5000 (345)	140-600 (9.6 - 41.4)	15000 (1034)	
-5	1000 (69)	6700 (462)	1200 (82.8)	7500 (517)	140-800 (9.6 - 55.2)	15000 (1034)	
-6	150 (10.3)	800 (55.2)	220 (15.2)	3000 (207)	50-1000 (3.4-68.9)	15000 (1034)	
-7	5000 (344.8)	8800 (606.9)	5200 (358.6)	10000 (689.7)	200-2000 (13.8-137.9)	15000 (1034)	

### Options

- Wxxx Extra wire length (XXX = inches)
- Sxxx Factory preset (consult factory)

-K Mounting holes and conduit wrench flats

### Housing Option

- Blank 316 stainless steel housing
- AL Aluminum housing (-K only)

### Process Connection<sup>2</sup>

- Blank 1/4" NPT Female (standard)
- P1 7/16-20 SAE female process connection

### Wetted Material

- Blank Viton® diaphragm/O-rings (standard)
- B Buna-N diaphragm/O-rings
- E EPR diaphragm/O-rings (UL, CSA, and ATEX not available for this option)

### NOTES:

- Deadband values indicated when used with the "CC" limit switch
- Contact factory for other possible connection options

## Electronic Pressure Switch

SW2000

### Features

- ▶ Pressure control with internal stainless steel diaphragm
- ▶ High accuracy with fully adjustable deadband
- ▶ 2 solid state contacts or 1 solid state contact plus 1 4-20 mA analog output
- ▶ Built-in digital display readout
- ▶ Fully configurable via keypad
- ▶ Suitable for rapid cycling (100 times per second)
- ▶ UL/CSA approved

### Applications

- ▶ OEM-applications in hydraulics and pneumatics
- ▶ Lubrication monitoring
- ▶ Machine tool industry
- ▶ Injection molding machines
- ▶ Compressor
- ▶ Apparatus engineering equipment



### General Specifications\*

<b>Accuracy:</b>	0.5% FS					
<b>Linearity Error:</b>	±0.5% f. s. at 77°F(25°C)					
<b>Repeatability:</b>	±0.1% f. s.					
<b>Sensor Element:</b>	Piezoresistive silicone measuring sensor					
<b>Material:</b>	304 stainless steel					
Wetted Parts:	304 stainless steel					
Seals:	Viton® (FKM fluorelastomer)					
<b>Measuring Ranges (psi):</b>	150	750	1500	3000	6000	9000
<b>Proof Pressure (psi):</b>	220	1100	2175	4400	9000	11,600
<b>Process Connection:</b>	1/4-18 NPT, 7/16-20 SAE, G1/4 M					
<b>Electrical Connection:</b>	Plug M 12 x 1, 4-pin					
<b>Power Supply:</b>	15 to 28 VDC reverse polarity protected					
<b>Power Consumption:</b>	approx. 50 mA (without load)					
<b>A/D-Converter:</b>	10 bit (1,024 steps per measure. span)					
Resolution:	10 bit (1,024 steps per measure. span)					
Scanning Rate:	100/s (for peak value memory)					
<b>Time Constant:</b>	approx. 40s					
<b>Analog Output:</b>	4-20 mA					
Current Output:	4-20 mA					
Load:	max. RI = (Ub-12 V) / 20 mA RI = 600 ohm at 24 VDC					
Load Influence:	0.3% / 100 ohm					
Scanning Rate:	5 ms					
Voltage Output:	0 to 10 VDC (optional)					
Rating:	max. 10 mA, short circuit-protection					
Adjustment Range	25% to 100% f. s.					
<b>Switching Output(s):</b>	Normally open / normally closed, standard-/window-mode					
Switching Function (adjustable):	Normally open / normally closed, standard-/window-mode					

\* See product configurator for additional options.

<b>Switching Output(s) Cont.:</b>	Adjustment Range: 0% to 125% f. s. Hysteresis: 0% to 125% f. s. Switching Frequency: max. 100 Hz Contact Rating: max. 500 mA, short circuit-protection Delay: 0.0 to 9.9 s adjustable Status Display(s): Green LED(s)
<b>Digital Display:</b>	3-digit 7-segment LED display, height 10 mm, (0.39 inches), red Display Range: -1 to 999 Display Rate: 20/s
<b>Error Display:</b>	Orange LED display (AL).
<b>Operating Elements:</b>	3 easy response push buttons
<b>Temperature Range:</b>	Media: -13°F to 212°F (-25°C to +100°C) Electronics: 14°F to 158°F (-10°C to +70°C) Storage: -22°F to 176°F (-30°C to +80°C)
<b>Temperature Influence:</b>	±0.2% f.s. /10K
<b>Compensation Range:</b>	14°F to 158°F (-10°C to +70°C)
<b>Protection Class:</b>	IP65
<b>Dimensions (Housing):</b>	1-7/16" X 5-1/8" (36 mm x 130 mm) (without electrical plug)
<b>Additional Features:</b>	7-segment LED display, microprocessor, self monitoring with error display, all parameters are configured by keypad. Tamper proof, keypad lock, rugged construction, vibration- and shockproof, long term stability, controlled
<b>Weight:</b>	approx. 0.4 lb (200 g)
<b>Approvals:</b>	c/ULus: file No. E42816

# Electronic Pressure Switch

# SW2000

## Technical Drawings

Shown with G 1/4 Connection

Plug M 12 X 1 4 pin	Model with 1 switching output	Model with 2 switching outputs	Model with 1 switching output and 1 analog output
Pin 1 brown	+Ub (15 - 28 V DC)	+Ub (15 - 28 V DC)	+Ub (15 - 28 V DC)
Pin 2 white	-	SP2 (0.5 A max.) (0.4 A)*	Analog
Pin 3 blue	0 V	0 V	0 V
Pin 4 black	SP1 (0.4 A max.)	SP1 (0.4 A max.)	SP1 (0.4 A max.)

### Connection Chart

Plug M 12 X 1 4 pin	Version with switching output	Version with 1 switching output and 1 analog output
Pin 1	(15 to 28 VDC)	(15 to 28 VDC)
Pin 2	SP2 (0.4 A max.)	analog (4-20 mA)
Pin 3	0 V	0 V
Pin 4	SP1 (0.4 A max.)	SP1 (0.4 A max.)

### Dimensions (in inches)

Process Connections "A"	"B"
1/4-18 NPT	2"
G 1/4	1-1/8"
7/16-20-SAE	2"

## Product Configurator

**Example** SW2000 -11 -N -1

### Base Model

SW2000 Solid State Pressure switch

### Pressure Ranges

-01-A	0 - 15 PSIA (absolute)
-30-A	0 - 75 PSIA (absolute)
-05-A	0 - 150 PSIA (absolute)
-05	0 - 150 PSIG (gauge)
-31	0 - 750 PSIG (gauge)
-11	0 - 1500 PSIG (gauge)
-13	0 - 3000 PSIG (gauge)
-16	0 - 6000 PSIG (gauge)
-32	0 - 9000 PSIG (gauge)

### Connection

-N	1/4" NPT
-P3	7/16-20 SAE
-G	G 1/4

### Options

-1	Single switch plus 4-20 mA output
-2	Dual switch capability (No analog output)
-6	Single switch plus 0-10 volt output

## Accessory

Order #	Description
239236	- 4 Pin, M12 Electrical mating connector

## Electronic Pressure Switch

UDS1V2

### Features

- ▶ Teach & Go
- ▶ Compact construction
- ▶ Housing 320° rotatable
- ▶ 1 or 2 outputs
- ▶ Adjustable hysteresis

### Applications

- ▶ OEM applications in hydraulic and pneumatic systems
- ▶ Press construction
- ▶ Lubricant monitoring, apparatus engineering
- ▶ Machine/machine tool industry
- ▶ Automobile industry
- ▶ Injection molding machines



### General Specifications\*

<b>Sensor element:</b>	Piezoresistive silicon or ceramic measuring cell
<b>Materials:</b> Wetted parts: Electronics housing: Seals:	Steel, pass., Al2O3 PA 6.6 Vitor (FKM)
<b>Operating elements:</b>	2 easy response push buttons
<b>System of protection:</b>	IP65
<b>Protection class:</b>	III
<b>Process connection:</b>	1/4" NPT Others on request
<b>Dimensions:</b>	Approx. Ø 28 x 100 mm (without plug connector)
<b>Measuring ranges:</b>	0 to 150 to 0 to 9000 PSI 0 to 10 bar to 0 to 600 bar
<b>Electrical connection:</b>	Plug M12x1, 4-pin

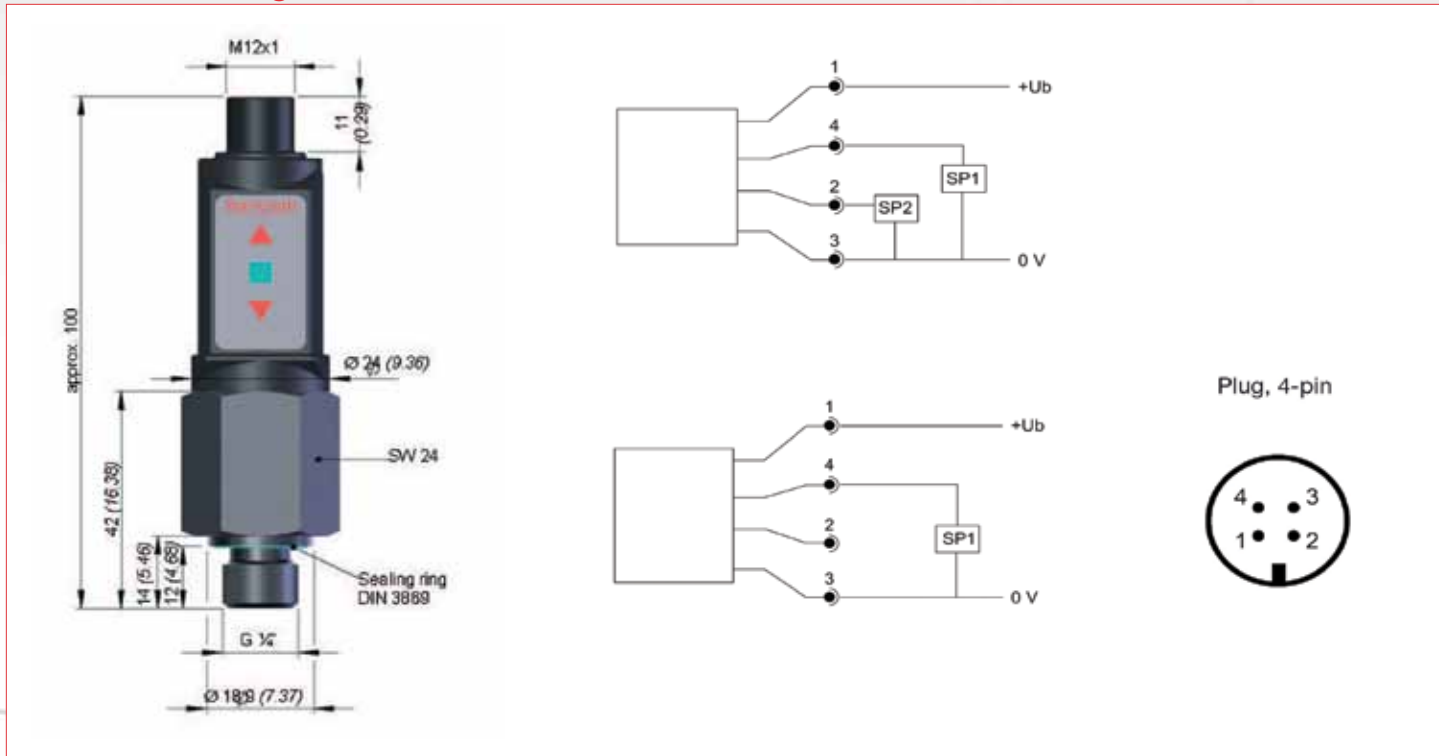
<b>Temperature influence:</b>	± 0.2 % f.s./10K
<b>Compensation range:</b>	14°F to 158°F (-10 °C to +70 °C)
<b>Repeatability:</b>	+/- 1 % f.s.
<b>Temperature range:</b> Medium: Electronics: Storage:	-13°F to 212°F (-25 °C to +100 °C) -13°F to 212°F (-25 °C to +80 °C) -22°F to 176°F (-30 °C to +80 °C)
<b>Power supply:</b>	15 to 32 V DC, reversed polarity protected (SELV, PELV)
<b>Transistor switching outputs PNP:</b> Adjustment range for switching point- and hysteresis <sup>1</sup>	0 % to 100 % f.s. Max. 100 Hz Max. 200 mA, short-circuit proof
<b>Vibration:</b>	10 g/20 to 2000 Hz
<b>Shock:</b>	100 g/11 ms

Note 1: Only 1SP version (2SP version 15% hysteresis)

\* See Product Configurator for additional options.



## Technical Drawing



## Product Configurator

Example	UDS1V2	-05	-N	-2
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### Process Range

-05	0-150 psi
-11	0-1500 psi
-16	0-6000 psi
-32	0-9000 psi

### SPDT Contact

-N	1/4" NPT
-G	G1/4
-P3	7/16 - 20 SAE

### Options

-1	Single switch w/ adjustable hysteresis
-2	Dual switch w/ ~15% hysteresis

# Transducers

## General Industrial Transducer (Amplified)

**Series 423, 425, 426**

### Features

- ▶ General purpose, industrial grade transducer
- ▶ Diffused silicon sensor for high accuracy and reliability
- ▶ Rugged stainless steel enclosure
- ▶ Superior surge voltage protection and EMI/RFI immunity
- ▶ Built-in high pressure snubber (2000 psi and above)
- ▶ Current and voltage signals
- ▶ UL and cUL approved

### Applications

- ▶ Industrial hydraulic equipment
- ▶ Cranes
- ▶ Compressors
- ▶ Gas metering
- ▶ Vacuum machinery packaging

### General Specifications\*

<b>Accuracy (LH &amp; R):</b>	±0.25% BSL
<b>Long Term Stability:</b>	±0.5% FSO of calibration curve
<b>Typical Life Cycle:</b>	100 million cycles
<b>Proof Pressure:</b>	2 times rated pressure or 13,000 psi max. (884 bar), whichever is less
<b>Input:</b>	
423:	Excitation voltage: 9 to 30 VDC
426:	Excitation voltage: 14 to 30 VDC
425:	Excitation voltage: 12 to 32 VDC
<b>Supply Current:</b>	15 mA maximum (no load)
<b>Min. Load Resistance:</b>	2K ohms (voltage series only)
<b>Output:</b>	
423:	Output: 0.5 to 5.5 VDC Full scale output: 5.0 VDC ± 0.8% Zero output: 0.5 VDC ± 0.4%
426:	Output: 1 to 11 VDC Full scale output: 10 VDC ± 1% Zero output: 1.0 VDC ± 2%
425:	Output: 4 to 20 mA Full scale output: 20 mA ± 1% Zero output: 4 mA ± 2% Span: 16mA
<b>Wetted Parts:</b>	17-4 PH & 300 series stainless steel
<b>Enclosure:</b>	NEMA 4, 300 series stainless steel

\* See product configurator for additional options.

### Wiring Code

423, 425 & 426			
T5/H5/T4/H4	T2	H3	
1	A	Red	+ Excitation
3	B	Black	+ Output
2	C	Green	Common
4	D	White	Case Ground
-	-	Bare	Shield

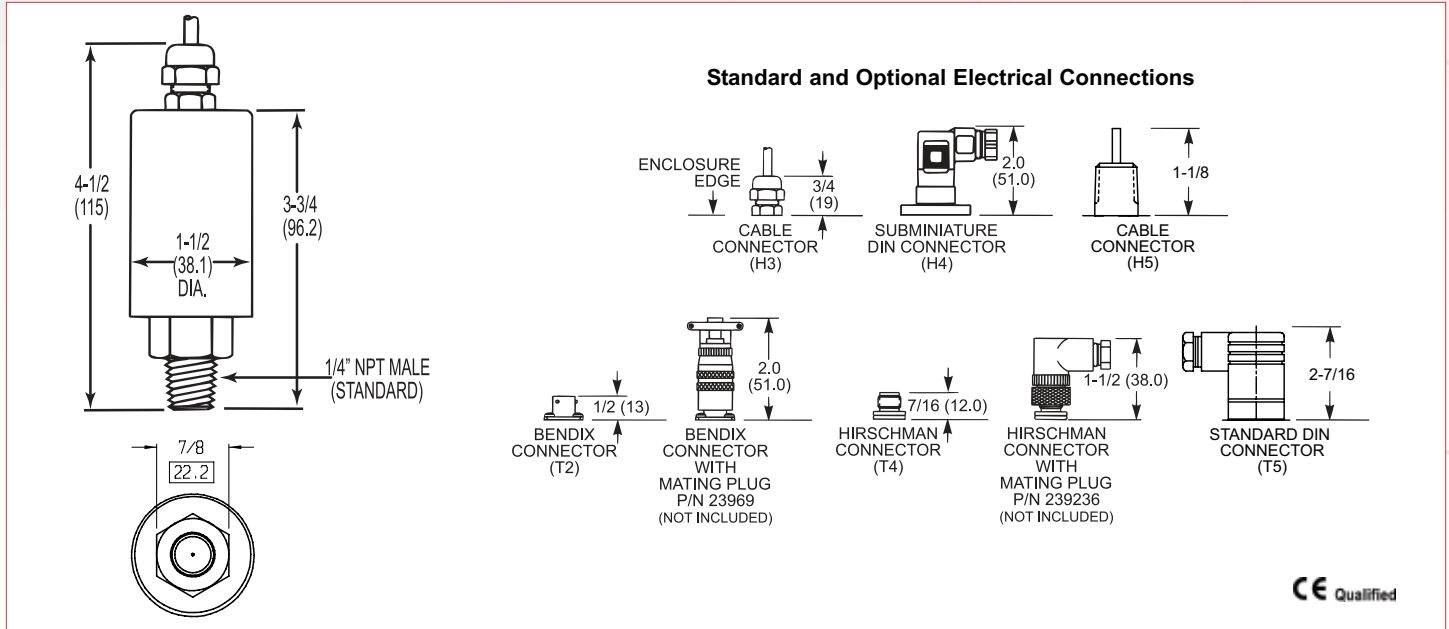


<b>Pressure Connection:</b>	1/4"-18 NPT male (STD)
<b>Response Time:</b>	1 kHz (typ)
<b>Electrical Connection:</b>	3 conductor for voltage series and 2 conductor for current series, 24 awg, PVC jacketed, shielded cable, 3 ft. (1 m) long with integral strain relief and case ground.
<b>Temperature Ranges:</b>	
Operating:	-40° to 185°F (-40° to 85)°C
Compensated:	30° to 160°F (-1° to 71)°C
Storage:	-40° to 185°F (-40° to 85)°C
<b>Temperature Shift:</b>	
Zero & Span:	0.0125% per °F over compensated range, 75°F reference (±1% of FSO over temp. range)
<b>Vibration:</b>	15 g's, 10-2000 Hz, MIL-STD 202
<b>Shock:</b>	50 g's, 11 ms, MIL-STD 202 Method 213, Cond. G.
<b>Built-in Protection:</b>	Conducted & radiated RF emissions/interference to EN 55011  IEC 801-2, -3, -4, -5, and -6  EN/IEC 6100-4-2, -3, -4, -5, -6  Refer to engineering drawing for details.
<b>Weight:</b>	
423 & 426:	7.4 oz. (221 grams) to 1000 psi 9.9 oz. (281 grams) 2,000 psi and higher
425:	7.4 oz. (210 grams) to 1000 psi 9.4 oz. (266 grams) 2,000 psi and higher
<b>Warranty:</b>	1 year warranty

# General Industrial Transducer (Amplified)

# Series 423, 425, 426

## Technical Drawings



## Product Configurator

Example	425	H3	-19		P1
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### Base Model

423	0.5 - 5.5 VDC analog output
425	4 - 20 mA analog output
426	1 - 11 VDC analog output

### Electrical Connection

H3	Shielded & jacketed #22 AWB cable (1 meter) (standard)
H4	Subminiature DIN connector (43650 type) - mating connector included
H5	Shielded & jacketed cable with 1/2" male conduit
T2 <sup>1</sup>	Bendix connector (PT02A-8-4P) - 4 pin
T4 <sup>2</sup>	M12 Hirschman connector (ELST 412 PG9)
T5	Standard DIN connector (43650) - mating connector included

### Pressure Range

-23	0 - 29.9" of Hg
-25	0 - 5 psi (0 - 0.35 bar)
-01	0 - 15 psi (0 - 1 bar) <sup>4</sup>
-21	0 - 30 psi (0 - 2 bar) <sup>4</sup>
-03	0 - 50 psi (0 - 3.5 bar) <sup>4</sup>
-22	0 - 60 psi (0 - 4 bar) <sup>4</sup>
-04	0 - 100 psi (0 - 6.9 bar) <sup>4</sup>
-05	0 - 150 psi (0 - 10.3 bar) <sup>4</sup>
-06	0 - 200 psi (0 - 12.8 bar) <sup>4</sup>
-07	0 - 300 psi (0 - 20.7 bar) <sup>4</sup>
-08	0 - 500 psi (0 - 34.5 bar)
-19	0 - 600 psi (0 - 41 bar)
-10	0 - 1,000 psi (0 - 69 bar)
-11	0 - 1,500 psi (0 - 104 bar)
-12	0 - 2,000 psi (0 - 138 bar) <sup>5</sup>
-13	0 - 3,000 psi (0 - 207 bar) <sup>5</sup>
-14	0 - 4,000 psi (0 - 276 bar) <sup>5</sup>
-15	0 - 5,000 psi (0 - 345 bar) <sup>5</sup>
-16	0 - 6,000 psi (0 - 414 bar) <sup>5</sup>
-17	0 - 7,500 psi (0 - 517 bar) <sup>5</sup>
-18	0 - 10,000 psi (0 - 689 bar) <sup>5</sup>

### Options

-N4X	Nema 4X enclosure (H3 Option only)
-E <sup>6</sup>	External zero span adjustment
-Z15	Calibrated in bars
-Z10	1 to 5V output (available only on 423 models)
-Z11	1 to 6V output (available only on 423 models)
-Z12	0.5 to 4.5V output (available only on 423 models)
-Z16	2 to 10V output (available only on 426 models)
-WXXX	Additional length of free leads (in inches) (H3/H5 connection)
-ZXXY	Special pressure ranges (see note 3)
-U	UL & cUL approved <sup>7</sup>

## Accessories

Order #	Description
23969	Bendix mating connector (T2 electrical option)
239236	Hirschman mating connector (T4 electrical option)
208360	Pressure snubber (1/4-18 NPT female/male)

### Process Connection

Blank	1/4-18 NPT male (standard)
-P1	7/16-20 UNF-2B female
-P3	7/16-20 UNF-2A male

Blank	Gauge pressure
-A	Absolute pressure range (<300psi)

<sup>1</sup> Mating connector: Bendix # PT06E-8-4S or equivalent (not included). Order number: 23969

<sup>2</sup> Mating connector: Hirschman # ELWIK4 4021 PG7 or equivalent (not included). Order number: 239236

<sup>3</sup> Add suffix ZXXY for special pressure ranges. XX = significant digits. Y = number of trailing zeros. Example: for 230psi calibration, add Z231

<sup>4</sup> Available in absolute ranges

<sup>5</sup> Built-in surge protector

<sup>6</sup> Available with connector options H3 and T4 only

<sup>7</sup> Refer engineering drawing for detail

## OEM Transducer

## Series 623, 625, 626, 627

### Features

- ▶ cULus approved
- ▶ Compact size
- ▶ Stainless steel construction
- ▶ Ceramic sensor technology
- ▶ Current and voltage outputs


### Applications

- ▶ Water irrigation systems
- ▶ Medical gas systems
- ▶ HVAC systems
- ▶ Pumps and compressors
- ▶ Machine tools
- ▶ Hydraulic and pneumatic applications
- ▶ Mobile hydraulics
- ▶ General industrial applications



### General Specifications\*

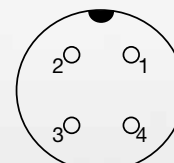
<b>Accuracy (LH &amp; R):</b>	±0.5% FSO Typical
<b>Typical Life Cycle:</b>	100 million cycles
<b>Proof Pressure:</b>	2 times rated pressure, or 9000 psi max, whichever is less.
<b>Input/Excitation Voltage:</b>	
625 (2-wire):	9 to 28 VDC
623 (3-wire):	9 to 30 VDC
626 (3-wire):	14 to 30 VDC
627 (3-wire):	14 to 30 VDC
<b>Output:</b>	
625 (2-wire):	4-20 mA
623 (3-wire):	0.5-5.5 VDC
626 (3-wire):	1-11 VDC
627 (3-wire):	0-10 VDC
<b>Zero and Span:</b>	15 mA maximum (no load)
<b>Wetted Parts:</b>	316 Stainless steel, ceramic and Viton® O-ring (Typical)
<b>Enclosure**:</b>	NEMA 4X IP65 (H4 connection) IP67 (H3/T4 connection)
<b>Pressure Connection:</b>	1/4" NPT standard. Other options available.
<b>Electrical Connection:</b>	PVC jacketed cable standard. Other options available.

<b>Temperature Ranges:</b>	
Operating:	-40°F to +185°F (-40°C to +85°C)
Compensated:	30°F to +130°F (-1°C to +54°C)
Storage:	-40°F to +185°F (-40°C to +85°C)
<b>Temperature Shift:</b>	
Zero and Span:	±0.06% FS/K over operating temperature range
<b>Vibration:</b>	15 g's, 10-2000 Hz, MIL-STD 202
<b>Approval<sup>1</sup>:</b>	 UL File E302981, to UL 508, as Industrial Control Equipment (NMTR, NMTR7), and to UL 61010-1, as Process Control Equipment (QUYX, QUYX7).
<b>Shock:</b>	50 g's, 11 ms, MIL-STD 202 Method 213, Cond. G.
<b>Weight:</b>	5.1 oz (145 grams) (typical)
<b>Warranty:</b>	1 year

### Wiring Code

Electrical Termination		Voltage Output	Current Output
H3	H4 / T4	Series 623/626/627	Series 625
Red	1	+ Excitation	+ Excitation
Black	2	Common	Common
White	3	+ Output	Not used
Drain	4	Case Ground	Case Ground

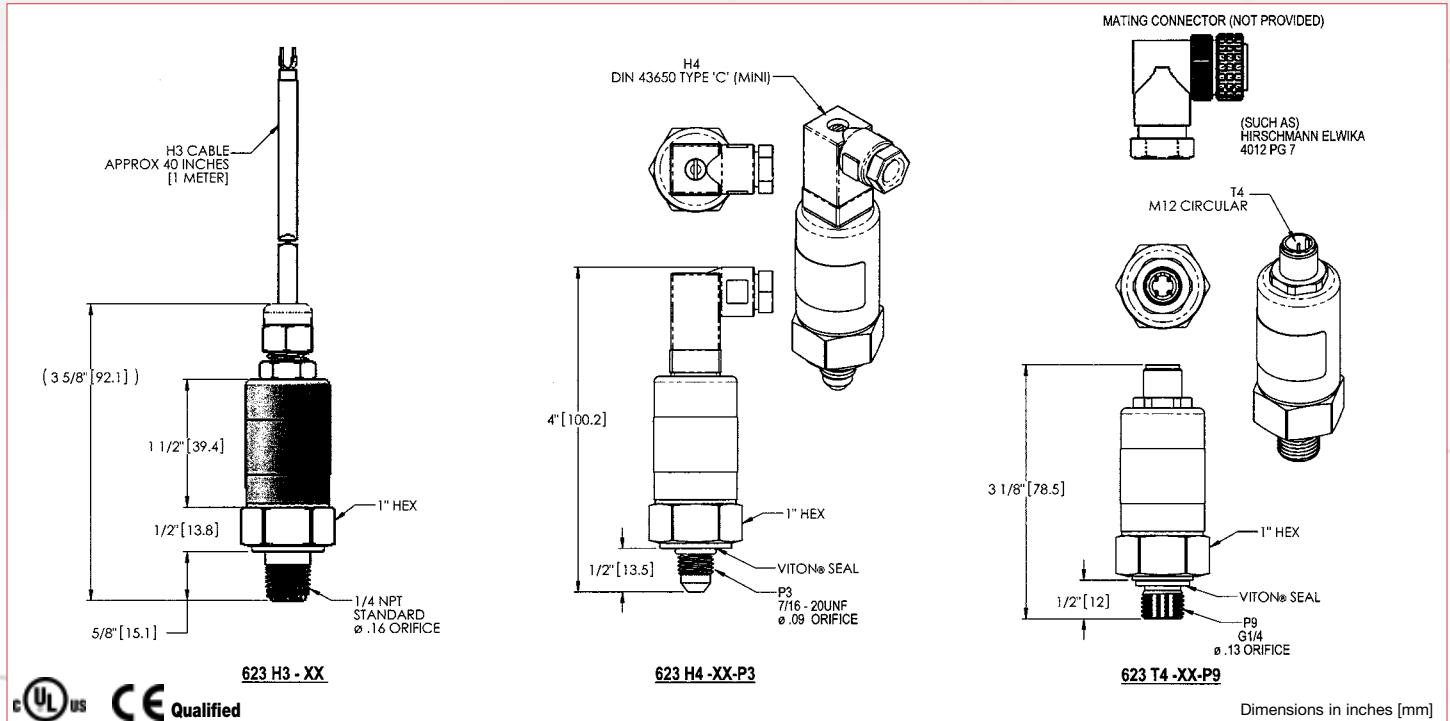
### T4 Pin Out Diagram



\* See product configurator for additional options.

\*\* Mating connector must be properly installed to preserve enclosure rating

## Technical Drawings



## Product Configurator

Example: **625 H3 -05**

### Base Model

625	4-20 mA analog output
623	0.5-5.5 VDC analog output
626	1-11 VDC analog output
627	0-10 VDC analog output

### Electrical Connection

H3	PVC jacketed cable (1 m)
H4	Mini-DIN 43650 Type "C"
T4	M12 circular connector

### Pressure Range<sup>3</sup>

-21	0-30 PSI (0-2 BAR)
-26	0-75 PSI (0-5 BAR)
-05	0-150 PSI (0-10 BAR)
-07	0-300 PSI (0-20 BAR)
-27	0-750 PSI (0-50 BAR)
-11	0-1500 PSI (0-100 BAR)
-13	0-3000 PSI (0-200 BAR)
-16	0-6000 PSI (0-400 BAR)

### Process Connection

Blank	1/4" NPT Male
-P3	7/16-20 UNF Male
-P9	G1/4 Male

### Options

Blank	Standard
-Z1	Cleaned for oxygen service
-Z15	Calibrated in BAR
-Z10	1 to 5 V output (only available on 623)
-Z11	1 to 6 V output (only available on 623)
-Z12	0.5 to 4.5 V output (only available on 623)
-Z16	0.2 to 10 V output (only available on 626)
-Z19	Built in pressure surge suppressor (0.031" orifice)
-Z20	Fluorosilicone O-Ring
-Z21	Built in pressure surge suppressor (0.011" orifice)
-Z22	Combination options: P9 + Z15 + Z19
-Z23	Combination options: P9 + Z15 + Z21
-ZXXY <sup>2</sup>	Special Pressure Ranges
-Wxxx	Specify cable length in inches (H3 longer than 40 inches)

Note 1. Conditions of Use: Class 2 power source, Type 4X indoor, 122°F (50°C) max. ambient.

2. Add suffix ZXXY for special pressure range calibration. XX = significant digits. Y = number of trailing zeros. Example: 130 psi calibration: add -Z131.

3. Other ranges available - consult factory.

## Electronic Temperature Switch

**TS2000**

### Features

- ▶ Temperature control digital display
- ▶ 2 solid state contacts or 1 solid state contact plus 1 analog output
- ▶ High accuracy with fully adjustable deadband
- ▶ Optional 4-20 mA analog output
- ▶ Built-In digital display readout
- ▶ Fully configurable via keypad
- ▶ UL/CSA approved

### Applications

- ▶ Hydraulic and pneumatic systems
- ▶ Lubrication monitoring
- ▶ Construction machinery
- ▶ Automobile industry
- ▶ Machine tools
- ▶ Injection molding machines
- ▶ Apparatus engineering equipment



### General Specifications\*

<b>Accuracy:</b>	0.5% f. s.
<b>Linearity Error:</b>	±0.5% f. s. at 77°F (25°C)
<b>Repeatability:</b>	±0.1% f. s.
<b>Sensor Element:</b>	PT100-element (Class B)
<b>Sensor Diameter:</b>	1/4 in. (6 mm)
<b>Sensor Length:</b>	0.67, 1.97, 11.82 in.
<b>Wetted Parts:</b> Seals:	Stainless steel 1.4435 (ST 316L) FKM (fluorelastomer)
<b>Measuring Ranges:</b>	32° to +212°F (0° to +100°C); -22° to +302°F (-30° to +150°C)
<b>Proof Pressure:</b>	8,700 psi (600 bar)
<b>Process Connection:</b>	1/4" NPT (standard), G1/4 male
<b>Electrical Connection:</b>	Plug M 12 x 1, 4-pin
<b>Power Supply:</b>	12 to 32 VDC reverse polarity protected
<b>Power Consumption:</b>	approx. 50 mA (without load)
<b>A/D-Converter:</b> Resolution: Scanning Rate:	10 bit (1024 steps per measure. span) 100/s (for peak value memory)
<b>Time Constant:</b>	approx. 40s
<b>Analog Output:</b> Current Output: Load:  Load Influence: Scanning Rate: Voltage Output: Rating: Adjustment Range	4-20 mA max. RI = (Ub-12 V) / 20 mA RI = 600 Ohm at Ub =24 VDC 0.3% / 100 Ohm 5 ms 0 to 10 VDC (optional) max. 10 mA, short circuit-protection 25% to 100% f. s.

\* See product configurator for additional options.

<b>Switching Output(s):</b> Switching Function (adjustable): Adjustment Range: Hysteresis: Diagnosis Function: Switching Frequency: Contact Rating: Delay: Status Display(s):	1 or 2 pnp open collector, standard-/window-mode 0% to 125% f. s. 0% to 125% f. s. SP2 max. 100 Hz max. 500 mA, short circuit-protection 0.0 to 9.9 s adjustable Green LED(s) for activated switching point
<b>Digital Display:</b>  Display Range: Display Rate: Display Unit:	3-digit LED display, 7-segment, height 10 mm (0.39 inch), red  -99 to 999 20/s °F (°C) - adjustable
<b>Error Display:</b>	Orange LED display (AL).
<b>Operating Elements:</b>	3 easy response push buttons
<b>Temperature Range:</b> Media: Electronics: Storage:	-22° to +302°F (-30° to +150°C) +14° to +158°F (-10° to +70°C) -22° to +176°F (-30° to +80°C)
<b>Protection Class:</b>	IP65
<b>Dimensions (Housing):</b>	1-7/16 x 5-1/8 inch (36 X 130 mm) (without electrical plug), housing rotates for switch adjustment after mounting
<b>Additional Features:</b>	7-segment LED display, microprocessor controlled, self monitoring with error display, display rotateable around 330°, all parameters are configured by keypad. Tamper proof, keypad lock, rugged construction, vibration- and shockproof, long term stability.
<b>Weight:</b>	approx. 200 g with 17 mm sensor length approx. 0.44 lb. with 0.67 inch sensor length
<b>Approvals:</b>	c/ULus: file No. E42816

# Electronic Temperature Switch

**TS2000**

## Technical Drawings

Plug M 12 X 1 4 pin	Model with 1 switching output	Model with 2 switching outputs	Model with 1 switching output and 1 analog output
Pin 1 brown	+Ub (15 - 28 V DC)	+Ub (15 - 28 V DC)	+Ub (15 - 28 V DC)
Pin 2 white	-	SP2 (0.5 A max.) (0.4 A)*	Analog
Pin 3 blue	0 V	0 V	0 V
Pin 4 black	SP1 (0.5 A max.)	SP1 (0.5 A max.)	SP1 (0.5 A max.)

## Product Configurator

Example **TS2000 -212 -A -N -2**

### Base Model

TS2000 Solid State temperature switch

### Temperature Ranges

-212	32° to 212° F
-302	-22° to 302° F

### Sensor Length

-A	0.67" length
-B	1.97" length
-C	11.82" length

### Options

-1	Single switch plus 4-20 mA output
-2	Dual switch capability (No analog output)

### Connection

-N	1/4" NPT
G	G1/4

## Accessory

Order #	Description
239236	- 4 Pin, M12 Electrical mating connector

# Multi Level Switch

**UNS1000-BN18**

## Features

- ▶ For bulkhead unions G1/2" and M 20 x 1.5
- ▶ Compact design
- ▶ Monitor level and temperature
- ▶ Multiple lengths for top mount

## Applications

- ▶ OEM applications
- ▶ Accessories for hydraulic reservoirs
- ▶ Mineral oil applications
- ▶ Power Packs



## General Specifications\*

<b>Materials:</b>	
Bulkhead union:	Brass
Contact tube:	Brass
Float stopper:	Bronze
Float:	Foamed NBR
<b>System of protection:</b>	IP65
<b>Housing:</b>	---
<b>Process connection:</b>	
Male thread:	G1/2" DIN ISO 228-1 = T1/2 M20 x 1.5 DIN 13 3/4" NPTM 1" NPTM
<b>Electrical connection:</b>	Plug M12 x 1, 4-pin, PA Plug DIN EN 175301-803-A (former DIN 43650), 4-pin, PA Cable gland, PA
<b>Electrical values:</b>	Max. 24 V AC / DC Max. 1 A Max. 20 VA / W
<b>Operating temperature:</b>	14 °F to 194 °F (-10 °C to +90 °C)

<b>Operating pressure:</b>	Max. 4 bar (400 kPa = 58 psi)
<b>Density:</b>	Min. 0.64 g/cm <sup>3</sup>
<b>Depth of immersion at density 1:</b>	0.59 ±0.08 inch (15 ±2 mm)
<b>Temperature switch:</b>	Bimetal
Temperature range:	10 K-steps 140 °F to 194 °F (+60 °C to +90 °C)
Indexing tolerance:	±5 K
Differential gap:	30 ±15 K
Contact:	NC (the contact is closed at room temperature)
<b>Dual switch:</b>	
Switching points:	Standard: 1 float for 1 switching point Dual: 1 float for 2 switching points
Distance L1 - L2:	min. 1.26 inch (32 mm)
Kind of contact, opt.:	acc. to ASAM (L1 = Pin 1+2 / L2 = Pin 1 + 4) only with M12 x 1
Approval:	---

\* See Product Configurator for additional options.

## Accessories

Order Number	Description
907-0013	ST1 socket acc. to DIN EN 175 301-803-A (former DIN 43650) with PG9 made from PA
907-0344	M12 x 1-socket (circular connector, straight) with PG9 made from PA



## Technical Drawing

Würfelseiter DIN EN 175 301-803-A (DNH3850), 4-polig, PA  
cube-plug DIN EN 178 301-803-A (DNH3850), 4-pin, PA

**Option ST1**  
Typenschild/nameplate  
SW 27 [hex. 1.06]  
#18 [ø.71]  
#6 [ø.315]

FLOAT POSITION  
BN18  
NO= MAGNET UNTEN / BOTTOM  
NC= MAGNET OBEN / TOP

B: ONLY LEVEL (L1) = MIN 25 MM  
LEVEL (L1) + TEMP. (TSxx/2) = MIN 40 MM

UNS1000-MS/\*\*-ST1-BN18-L1/1(2)-TSxx/2

...-BN18-L1/1(2)-TSxx/2

without ground connection

...-BN18-L1/1(2)

only for ST1 and M12x1  
without ground connection

...-BN18-L2/2.1-Dual\*\*\*

without ground connection

**PICTURE: TANK = EMPTY AND AMBIENT TEMP.**

## Product Configurator

**Example**    UNS1000 - MS / T1/2 - ST1 - BN18 - L1/1(2) - L0 = 475\*

\* L0 = 600mm max

**UNS1000**    UNS1000

**Float**    BN18    Standard

**Material Stem**    MS    Standard

### Switch Function

L1/1(2)	Standard
L1/1	Customized
L1/2	Customized

### Process Conn.

T1/2	Standard
M20x1.5	Standard
T3/4NPT	Customized
T1NPT	Customized

### Option

TS60/2	Customized
TS70/2	Standard
TS80/2	Customized
TS90/2	Customized
NT	Customized

### Electr. Conn.

ST1	Standard
M12x1	Customized
PG	Customized
KL6	Customized

## Microtorque™ Valve

518, 526 Series

### Features

- ▶ Original Shear-Seal® technology
- ▶ Compact design
- ▶ Non-interflow option
- ▶ Spring return option
- ▶ Multiple handle types
- ▶ 2 or 3 position detent

### Applications

- ▶ Work holding clamps and systems
- ▶ Hydraulic presses and lifting systems
- ▶ Hydraulic test equipment
- ▶ Grease injection equipment
- ▶ Hydraulic power units



### General Specifications\*

<b>Media:</b>	Hydraulic oil
<b>Working Pressure:</b>	6,000 psi (415 bar) **
<b>Flow Capacity, Cv:</b>	See table
<b>Back Pressure:</b>	Must not exceed 250 psi (17.2 bar)*** at return port for satisfactory operation
<b>Proof Pressure:</b>	1-1/2 times working pressure except at return port
<b>Burst Pressure:</b>	2-1/2 times working pressure except at return port
<b>Media Temperature Range:</b>	-40° to +250°F (-40° to +121°C)
<b>Porting:</b>	1/4" NPT, SAE for 1/4" tubing, or DO3 pattern for manifold mounting
<b>Mounting:</b>	Panel mountable with p/n 22357 mounting nut (-P option) DO3 Manifold mounting shipped with (4) #10-24 screws and O-Rings
<b>Handle Rotation:</b>	90°; 45° each side of center position

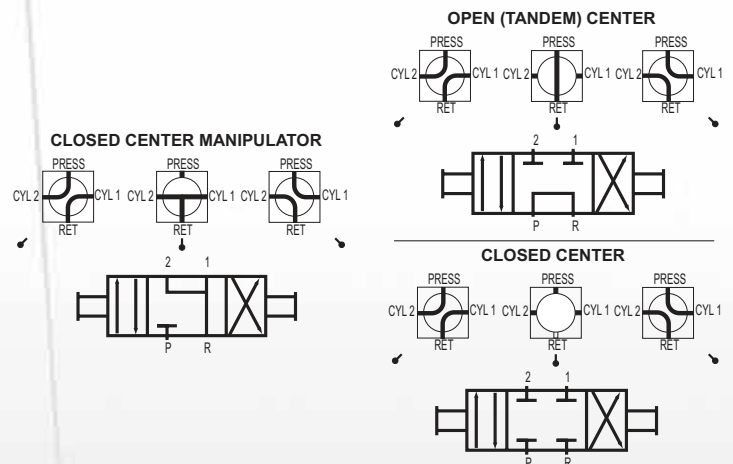
<b>Detent:</b>	
2-position:	Detent at 90° positions
3-position:	Detents at center and 2 extreme positions
<b>Optional Spring Return:</b>	Available to center or either shifted position 5,000 psi (345 bar) max working pressure on spring return option
<b>Body &amp; Housing:</b>	Anodized aluminum
<b>Shaft, Rotor, Pressure Seals:</b>	400 series stainless steel
<b>Standard O-Rings:</b>	Buna N, others available
<b>Back-up Rings:</b>	Teflon
<b>Bearings:</b>	Hardened steel
<b>Shipping Weight:</b>	.95 lbs

\* See product configurator for additional options.

\*\* Consult factory for pressure up to 10,000 psi (690 bar)

\*\*\* For requirements in excess of 250 psi (17.2 bar) at return port consult factory

	Flow Capacity (Approx.)		Min. Flow Passage Dia.	Cv Factor
	20 ft/sec (6.1 m/s) gpm (l/min)	40 ft/sec (12.2 m/s) gpm (l/min)		
<b>518 Series Interflow</b>	1.4 (5.6)	2.8 (11)	0.17"	0.40
<b>526 Series Non-Interflow</b>	0.36 (1.4)	0.72 (2.7)	0.086"	0.09



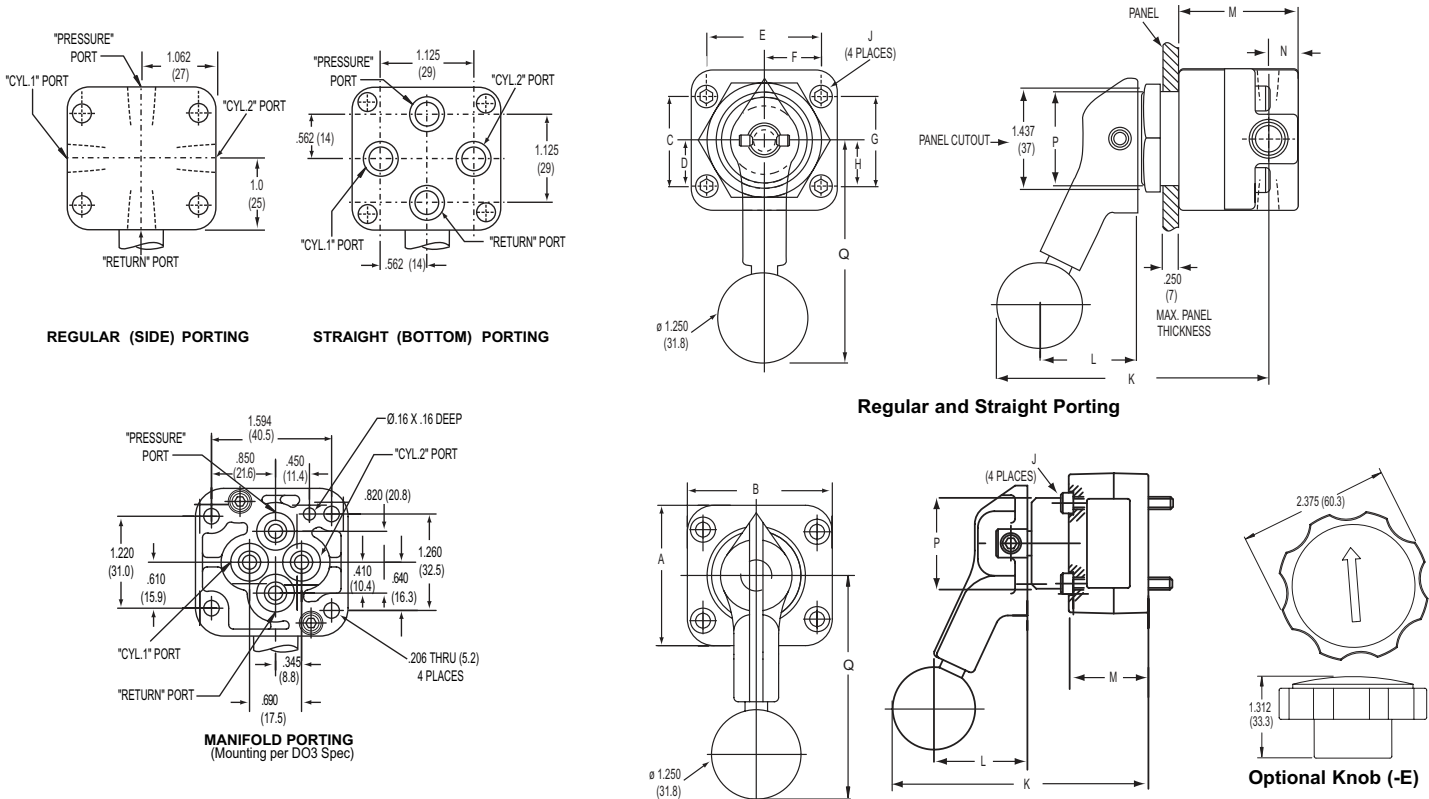
**Barksdale**  
CONTROL PRODUCTS

Barksdale, Inc./Barksdale GmbH  
A Subsidiary of Crane Co.

# Microtorque™ Valve

## 518, 526 Series

### Technical Drawings



Series	Porting	A	B	C	D	E	F	G	H	J	K	L	M	N	P	Q
518 or 526	21R, 61S Porting	1.968 (50.0)	2.031 (51.6)	1.281 (32.5)	.640 (16.3)	1.594 (40.5)	.850 (21.6)	1.219 (31.1)	.610 (15.5)	1/4-28 UNF	3.812 (96.8)	1.437 (36.5)	1.781 (45.2)	.437 (11.1)	1.375 (34.9)	3.125 (79.4)
	41M Manifold Porting	1.968 (50.0)	2.031 (51.6)							10-24 UNC	3.875 (98.4)	1.437 (36.5)	1.406 (29.0)		1.375 (34.9)	3.125 (79.4)
	Spring Return Option										5.562 (141.3)	2.500 (63.3)				5.437 (138.1)

### Product Configurator

Example: **518 41M 6 H C 3**

#### Series

- 518 Interflow
- 526 Non-interflow

#### Porting

- 21R Regular (side) porting
- 41M Manifold porting (DO3)
- 61S Straight (bottom) Porting

#### Pressure Range

- 6 6,000 psi

#### Working Media

- H Hydraulic oil

#### Flow Pattern

- C 4-way closed center
- O 4-way open center
- M 4-way manipulator Closed center

#### Detent Position

- 2 2-position 90° rotation
- 3 3-position

#### Position

- Zxx Optional O-ring material <sup>2</sup>

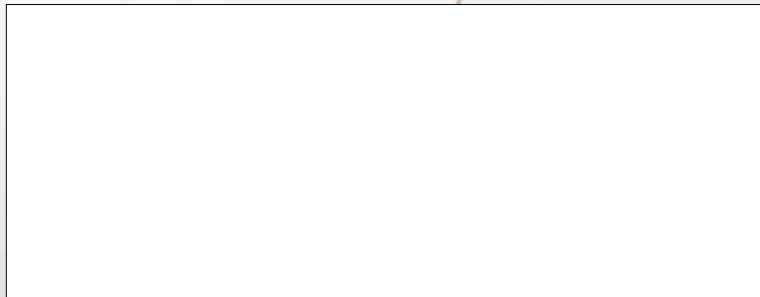
#### Options

- MC Spring return to center <sup>1</sup>
- MR Spring return to right (Pressure port to C1) <sup>1</sup>
- ML Spring return to left (Pressure port to C2) <sup>1</sup>
- MS SAE porting for 1/4" tubing
- E Black knob (not available with spring return)
- P Panel mounting nut p/n 22357

<sup>1</sup> 5,000psi max working pressure for spring return option  
<sup>2</sup> See supplemental guide for the appropriate "Z number"

# Global Presence

## Global Presence



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