Switch to Generation 3000

NEW IO-Link Option

One Series for

- Pressure
- Temperature
- Level

Barksdale®
CONTROL PRODUCTS
CRANE
Barksdale, Inc./Barksdale GmbH
A Subsidiary of Crane Co.

Generation 3000

MEASURE | MONITOR | CONTROL

Pressure, Temperature, Level

BPS3000, BTS3000, BLS3000 & BDS3000

The **Generation 3000 Series** combines all features of a modern electronic switch, with its **flexibility**, **operational convenience**, **analog** or **digital feedback** and **compact elegant design.**

Wide range of performance

Simple configuration allows customers to standardize on one series of switch for multiple functions. The BPS3000 operates from vacuum to 9000 psi, while the BTS3000 is designed for -22° F to 284° F. The BLS3000 offers various process connections and sensor lengths from 9.8 to 39.4 inches. The BDS3000 is pressure differential switch that offers ranges from 0-500 psi. Generation 3000 units are compatible with hydraulic fluid, varied chemicals, water, and gas media.

Compact and modern design

The compact BPS3000 electronic pressure switch, BTS3000 electronic temperature switch, and the BLS3000 electronic level switch enable simple installation in confined spaces. The angled top displays of these units are aesthetically pleasing and functional, and their simple setup logic is a true functional benefit.

Flexible by design

Designed to meet your application needs

Flexible display

The 4-digit 14-segment LED display ensures perfect readability independent of the positioning: even when mounting upside down the indication can be viewed correctly as the software allows inversion of the display.

Switch to **Barksdale**

High protection with Nema 6, IP67 and EMI resistance

Harsh environmental circumstances with dust or water being present are not a problem for the new Generation 3000 units. The sophisticated housing and sealed keypad provides simple programming and operation.

The high EMI protection of these units allows for installation where high power equipment or where walkie-talkies are in use, like in the steel and power industries.

Performance

With 0.5% accuracy and 0.1% repeatability across both pressure and temperature ranges and 1/5" (5 mm) resolution on the level switch, the new Generation 3000 units will meet most challenging application demands. The dual switch option with 0-10 VDC or 4-20 mA analog outputs will enable precise measurement and sensing every time. IO-Link option offers universal, smart and easy digital communication.

Easy operation

Our simple menu allows for easy navigation through the programming options, ascending and descending through the standardized menu with easy response push-buttons. The tamper proof settings can also help to prevent operational mistakes.

Rotatable 320° display and electrical connection

The rotatable 320° display and electrical connection on the Generation 3000 units makes the mounting and installation very versatile, accommodating a multitude of applications.

Switch to

Generation 3000

BLS3000

Direct Measurement

Reed relays

Various applications

The new BLS3000 is part of the Barksdale Generation 3000 family. Due to its wide range of process connections and UL approval, the level switch can be used in various applications for level measurement like industrial cooling and lubrication systems, test benches, and high performance power packs.

Compact and robust design

With a float smaller than our competition and a panel height of 4.5 inches and diameter of 1.6 inches, the required space of a BLS3000 is compact. This makes the BLS3000 suitable for installation in tight and compact spaces.

Accurate level measurement

Integrated reed relays enable continuous level measurement and customized set point adjustment ensures accurate feedback for level measurement. Unlike capacitance technology, our float design is not at risk of false measurement with changes in viscosity or contaminants in the media due to environmental conditions.

Wide range of media compatibility

The BLS3000 is suitable for a wide range of media such as water, coolants, hydraulic oil, media with dirty contaminants, and fluids with foam, where capacitance, guided wave, and ultrasonic technology may fall short.

Reduced-sticking float technology

Compared to other level float products, our float design reduces the float from sticking on the stem caused by sticky media or adhesion.

3-Products in 1-compact package

The BLS3000 is three devices: level gauge, level switch, and level transmitter packaged into one, eliminating the need for multiple instruments. This provides the flexibility of 0-10 VDC or 4-20 mA output options with up to two switch points.

Technical data

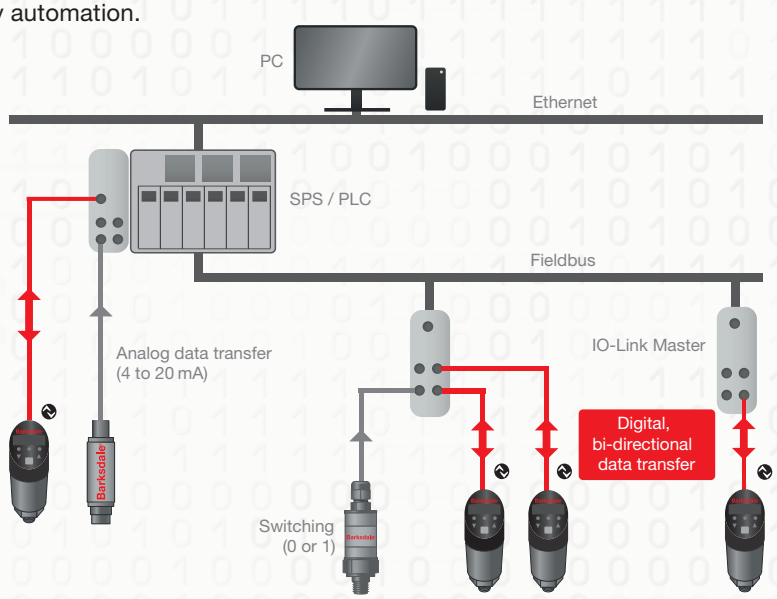
- Measuring element: Reed switch
- Total length (L0) = max. 39.4" (1000 mm)
- Measuring length (LM) = max. 36.6" (930 mm)
- Process connections:
  - 1/2" NPT, 3/4" NPT, 1" NPT, & 1-1/4" NPT
  - SAE 10 & SAE 12
  - G1/2", G3/4", G1", & M20x1.5
- Enclosure rating: IP65/IP67
- cULus approved

Generation 3000 *with* IO-Link

A new standard for digital communication

IO-Link is the final step that bridges digital communication down to the sensor level, and is integral to Industry 4.0. This allows bi-directional communication for sensors and actuators on all common fieldbus networks.

By providing user-friendly capabilities, such as remote parameterization and plug & playability into existing fieldbus networks, IO-Link opens up new possibilities in factory automation.



Cost reduction made easy

IO-link is essentially the USB interface for automated processes and operations. There are three main areas that help to reduce costs:

- wiring
- identification and parameterization
- diagnostic capability

The process values for IO-link have relatively low transmission speeds, but still have optimum refresh rates. This set up allows standard M12 cabling to be used while simultaneously reducing the likelihood of signal failure. Expensive shielded cables are not required for IO-link data transmission.

IO-link allows for sensors to be programmed and commissioned directly from the PLC and control room. This helps speed up commissioning and improves safety. Manual setting and corrections at the sensor are no longer required. Because important sensor settings are automatically saved in multiple locations, quality, repeatability, and efficiency is improved. Direct transmission of vital sensor data helps to reduce machine down time and eliminate the possibility of faulty system operation.

IO-link provides important service data and real-time diagnostic information. This enables users to implement preventative maintenance strategies, helping avoid costly machine break-downs. Sensor data can now be used to permanently optimize machine processes.

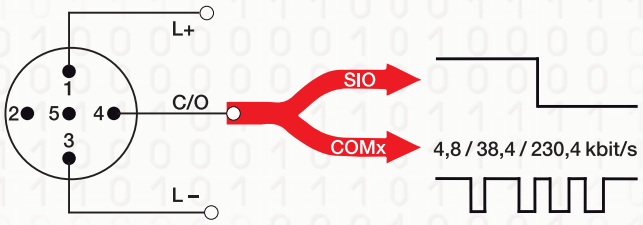
3/5 core unshielded cable is used for IO-link sensors and actuators. Because IO-link is a digital signal, it is nearly immune to EMI and RFI disturbance.

Use IO-Link
Universal · Smart · Easy

Reliable · Accurate · Low Maintenance · Intelligent · Remote Calibration

Backwards compatibility

IO-Link-capable sensors automatically detect the absence of a master and switch independently into the Standard Input Output mode – the device behaves like a classic electronic switch. Likewise, non IO-link switches can use binary data to transmit switching functions to the field bus network.

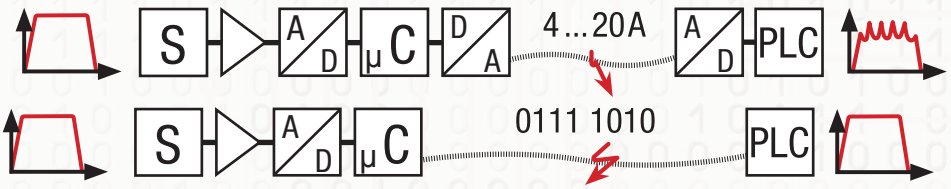


Serial, bi-directional, point-to-point connection for signal transmission and 24 V power supply.

Reliable data transfer

The digital transmission from the sensor to the PLC prevents the loss of accuracy by multiple AD/DA conversions and corrupted signals from EMI / RFI disturbance.

Analog Data Transfer



IODD files provide effective configuration and parameterization

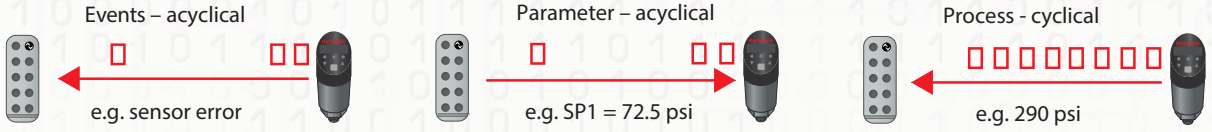
The use of the Input / Output Device Description (IODD) files allows for easy setup of devices in the IO-Link system. The availability of IODD files for each device is guaranteed globally.

All Barksdale IODD files are available in these two locations:

1) **https://ioddfinder.io-link.com/#/**
2) **https://www.barksdale.de/en/download/iolink/**

Data types

Different types of data can be sent to and from the master and sensor using the digital interface or PLC. This includes cyclical process data and acyclical parameters and events.



Electronic Dual Pressure Switch

BPS3000

Features

- Measuring range: gauge: 0 - 9000 psig, absolute: 0 - 150 psia
- One or two switch points
- Analog output 4 - 20 mA or 0 - 10 V
- Enclosure Rating: Type 4X (IP65) / Type 6 (IP67)
- Superior EMI protection
- Simple navigation menu
- Suitable for rapid cycling applications
- Display & electronic connection: rotatable by 320°
- IO-Link communication interface
- 0.50% accuracy

General Specifications**

Sensor element:	Ceramic sensor (standard) Optional: piezoresistive sensor (For proper sensor selection see product configurator for more details.)
Materials: Wetted parts: Enclosure: Seals:	 304 Stainless steel; brass (if surge dampener is required) 304 Stainless steel, PBT FKM fluoroelastomer (standard) EPDM (optional)
Operating elements:	3 easy-response push-buttons
Enclosure rating:	Type 4X (IP65) / Type 6 (IP67)
Protection class:	III
Electrical connection:	Plug M12 x 1, 4-pin / 5-pin / 8-pin (see product configurator)
Process connection:	1/4" NPT, 1/2" NPT flush diaphragm, 7/16-20 (SAE), 7/16-20 (JIC 37°), G1/4" M, G1/2" flush diaphragm (only piezoresistive)
Dimensions:	1.6 Ø x 4.4 inches (without plug connector)
Weight:	Approx. 0.4 lb (200 g)
Proof pressure:	1.5X rated pressure
A/D-Converter: Resolution: Scanning rate:	 12 bit (4,096 steps per measure span) 1000/s
Linearity error:	< ±0.5 % f. s. at +25 °C
Temperature influence:	TC zero < ±0.2 % FSO / 10K TC span < ±0.3 % FSO / 10K
Compensation range:	14°F to 158°F (-10°C to +70°C)
Repeatability:	±0.1% f. s.
Temperature range: Media: Electronics[1]: Storage:	 -13°F to 212°F (-25°C to +100°C) 14°F to 158°F (-10°C to +70°C) -22°F to 176°F (-30°C to +80°C)
Power supply[1]:	15 to 32 V DC, reversed polarity protected (SELV, PELV), Class 2
Power consumption:	Approx. 50 mA (without load) Approx. 80 mA (Output Code 6)
Digital display: Display rate:	4-digit 14-segment LED red display, digit height .35 inches (9 mm) 20/s
Error display:	LED RED and alphanumeric display

Analog output: Current output: Scanning rate: Voltage output: Rating: Adjustment range:	 4-20 mA 2 ms 0 to 10 V DC max. 10 mA 25% to 100% f. s.	
Transistor switching outputs:		
Switching function	Normally open / normally closed, standard /window mode and diagnosis function adjustable	
Switching output:	PNP / NPN (field-selectable on IO-Link units)	
Adjustment range for switching point and hysteresis:	0% to 125% f. s.	
Switching frequency:	Max. 100 Hz	
Load:	Max. 500mA, short-circuit-proof IO-Link: Max. 250mA	
Delay:	0.0 s to 50.0 s adjustable	
Status display(s):	LED(s) red	
IO-Link Communication Interface		
Transmission type:	COM2 (38.4 kBaud)	
IO-Link revision:	1.1	
SDCI standard:	IEC 61131-9	
Profiles:	Smart Sensor, Process Data Variable, Device Identification, Device Diagnosis	
SIO modules:	Yes	
Required master port type:	A	
SIO output:	1 analog / 2 binary (switch points) [see product configurator]	
Min. process cycle time [ms]:	2.5	
Device ID:	0x011...	
Approvals[1]:	cULus[1] E42816, BV-50018/A0[2]	
EMI	EN 61000-4-2 ESD	4 kV CD / 8 kV AD
	EN 61000-4-3 HF radiated	10 V/m
	EN 61000-4-4 Burst	2 kV
	EN 61000-4-5-Surge	1/2 kV
	EN 61000-4-6 HF conducted	10 V
Shock resistance	DIN EN 60028-2-27	50 g (11 ms)
Vibration resistance	DIN EN 60028-2-26	20 g (10 to 2000 Hz)

** See product configurator for additional options.

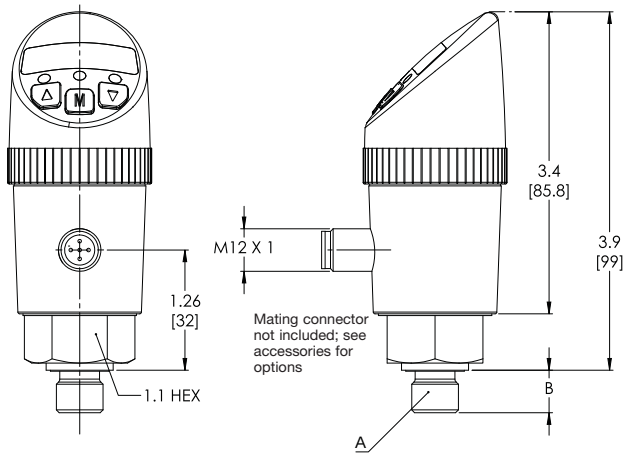
[1] Condition of use with cULus: 140°F max. ambient; power supply: max. 28 V DC

[2] BV approval only with output code 1-5; for more details please see BV certification.

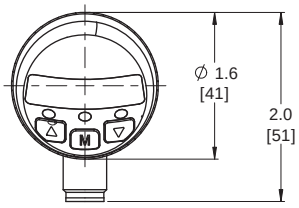
Electronic Dual Pressure Switch

BPS3000

Technical Drawings



Process Connections "A"	Dimension "B"
1/4" NPT	.66" [16.9 mm]
1/2" NPT flush diaphragm seal	.83" [21 mm]
7/16-20 UNF (SAE 4)	.36" [9.1 mm]
7/16-20 UNF (JIC 37°)	.55" [14 mm]
G 1/4"	.47" [12 mm]
G 1/2"	.55" [14 mm]



Electrical Connection Chart

Pin	Signal Output Code 1 & 7	Signal Output Code 2 & 3	Signal Output Code 4 &5 & 8	Signal Output Code 6	
1	+Ub	+Ub	+Ub	+Ub	
2	SP2	Signal	Signal	SP1a	NC
3	0V	0V	0V	SP1b	
4	SP1/ IO-Link *	SP1	SP1/ IO-Link *	0V	
5	-	-	SP2	SP2a	NO
6	-	-	-	SP2b	
7	-	-	-	-	
8	-	-	-	Housing	

* IO-LINK ONLY FOR SIGNAL OUTPUT CODES 7 & 8

c UL us

Dimensions in inches [mm]

Product Configurator

Example	BPS3	8	N	V	M	9000P	P

Series:

BPS3	Series BPS3000, electronic dual pressure switch

Output:

1	Dual switch point
2	Single switch point plus 4-20mA (0-10V field selectable)
3	Single switch point plus 0-10V (4-20mA field selectable)
4	Dual switch point plus 4-20mA (0-10V field selectable)
5	Dual switch plus 0-10V (4-20mA field selectable)
6	Dual switch points (1 x NO SPST / 1 x NC SPST), requires piezo. sensor, not UL approved
7	IO-Link / Dual switch point
8	IO-Link / Dual switch point plus 4-20mA (0-10V field selectable)

Process Connections*:

N	1/4" NPT male thread
3[1]	1/2" NPT flush diaphragm seal
E	7/16-20 UNF (SAE 4)
P	7/16-20 UNF male thread (JIC 37°)
G	G1/4" male thread
2[1]	G1/2" flush diaphragm seal

*Contact factory for a 40x40 Cetop/Manifold or G1/2 with Large Bore Diameter connection.

Sealing:

V	FKM fluoroelastomer (standard)
E	EPDM (EPR) (optional)

Electrical Connection:

M[2]	M12

Sensor:

Blank	Standard ceramic sensor
P	Piezoresistive sensor

Pressure Ranges[3]

0015PA[4, 5, 7]	0 - 15 psia (absolute)
0075PA[4, 5, 7]	0 - 75 psia (absolute)
0150PA[4, 5, 7]	0 - 150 psia (absolute)
0003P[4, 5, 7]	0 - 3 psig
0015P[4, 5, 7]	0 - 15 psig
0050P[4, 5, 7]	0 - 50 psig
0075P[4, 5, 7]	0 - 75 psig
0150P[8]	0 - 150 psig
0750P[8]	0 - 750 psig
1500P[8]	0 - 1500 psig
3000P[8]	0 - 3000 psig
6000P[8]	0 - 6000 psig
9000P[4, 8]	0 - 9000 psig

Accessories

Order Number	Description
239535-1M-R-S[6]	4 Pin M12 Female Right Angle Plug Molded Cable, 3.28 Feet (1 Meter), Shielded
239535-1M-S[6]	4 Pin M12 Female Straight Plug Molded Cable, 3.28 Feet (1 Meter), Shielded
239537	4 Pin M12 Female Straight Connector
239236	4 Pin M12 Female Right Angle Connector
239546-1M-R-S[6]	5 Pin M12 Female Right Angle Plug Molded Cable, 3.28 Feet (1 Meter), Shielded
239546-1M-S[6]	5 Pin M12, Female Straight Plug Molded Cable, 3.28 Feet (1 Meter), Shielded
239548-S	5 Pin M12 Female Straight Connector
239548-R	5 Pin M12 Female Right Angle Connector

Note:
1. Only available from (0-150 psig) range up to (0-9000 psig) range. Piezoresistive sensor only.
2. Mating connector not included with unit; mating connectors are available and can be ordered as an accessory.
3. Contact factory for ranges not listed including BAR.
4. Pressure range requires piezoresistive sensor.
5. Units are rated at IP65 only.
6. See Cable Connectors & Accessories for more options.
7. Not available with process connections 3 & 2
8. Includes .2 mm Ø removable brass orifice

Electronic Dual Temperature Switch

BTS3000

Features

- Measuring range: -22° to +284°F (-30° to +140°C)
- One or two switch points
- Analog output 4 - 20 mA
- Display & electronic connection: rotatable by 320°
- Simple navigation menu
- Superior EMI protection
- 0.50% accuracy
- IO-Link communication interface
- Enclosure Rating: Type 4X (IP65) / Type 6 (IP67)

Applications

- Machine tool industry
- Hydraulic & pneumatic systems
- Injection molding machines
- Cooling monitoring / circuits
- Lubrication systems
- Construction machinery
- Automobile industry

General Specifications*

Sensor element:	PT100 Class A DIN/IEC 60751
Materials: Wetted parts: Enclosure: Seals:	 304 Stainless steel 304 Stainless steel / PBT, PA6.6 GF30 FKM fluoroelastomer (standard) EPDM (optional)
Operating elements:	3 easy-response push-buttons
Enclosure rating:	Type 4X (IP65) / Type 6 (IP67)
Protection class:	III
Electrical connection:	Plug M12 x 1, 4-pin / 5-pin / 8-pin
Process connection:	1/4" NPT Male, 1/2" NPT Male, 7/16-20 UNF (SAE-4) Male, G1/4" Male
Dimensions Enclosure:	1.6 Ø x 4.4 inches (without plug connector and sensor)
Weight:	Approx. 0.4 lb (200 g)
Measuring ranges:	-22°F to +284°F (-30°C to +140°C)
Max. pressure:	2,900 psi (200 bar)
A/D-Converter: Resolution: Scanning rate:	 12 bit (4,096 steps per measure span) 1000/s
Time Constant:	Approx. 40 s
Accuracy:	< ±0.5 % f. s. at +25 °C
Repeatability:	±0.1% f. s.
Temperature range: Electronics: Storage:	 14°F to 140°F (-10°C to +60°C) -22°F to 176°F (-30°C to +80°C)
Power supply:	15 to 28 V DC, reversed polarity protected (SELV, PELV) Class 2
Digital display: Display rate:	4-digit 14-segment LED red display, digit height .35 inches (9 mm) 20/s
Error display:	LED RED and alphanumeric display
Power consumption:	Approx. 50 mA (without load) Approx. 80 mA (Output Code 6)
Relay output (option 6):	Relay 1 NC Relay 2 NO Load: max. 1A, max. 60V, max. 30VA

Analog output: Current output: Scanning rate: Adjustment range:	 4-20 mA 2 ms 25% to 100% f. s.	
Transistor switching outputs:		
Switching function:	Normally open / normally closed, standard /window mode and diagnosis function adjustable	
Switching output:	PNP / (NPN field-selectable on IO-Link units)	
Adjustment range for switching point and hysteresis:	0% to 125% f. s.	
Switching frequency:	Max. 100 Hz	
Load:	Max. 500mA, short-circuit-proof IO-Link: Max. 250mA	
Delay:	0.0 s to 50.0 s adjustable	
Status display(s):	LED(s) red	
IO-Link Communication Interface:		
Transmission type:	COM2 (38.4 kBaud)	
IO-Link revision:	1.1	
SDCI standard:	IEC 61131-9	
Profiles:	Smart Sensor, Process Data Variable, Device Identification, Device Diagnosis	
SIO modules:	Yes	
Required master port type:	A	
SIO output:	1 analog / 2 binary (switch points) [see product configurator]	
Min. process cycle time [ms]:	2.5	
Device ID:	0x011...	
Approvals:	cULus*** - E302981	
EMI	EN 61000-4-2 ESD	4 kV CD / 8 kV AD
	EN 61000-4-3 HF radiated	10 V/m
	EN 61000-4-4 Burst	2 kV
	EN 61000-4-5-Surge	1/2 kV
	EN 61000-4-6 HF conducted	10 V
Shock resistance**	DIN EN 60028-2-27	50 g (11 ms)
Vibration resistance**	DIN EN 60028-2-26	20 g (10 to 2000 Hz)

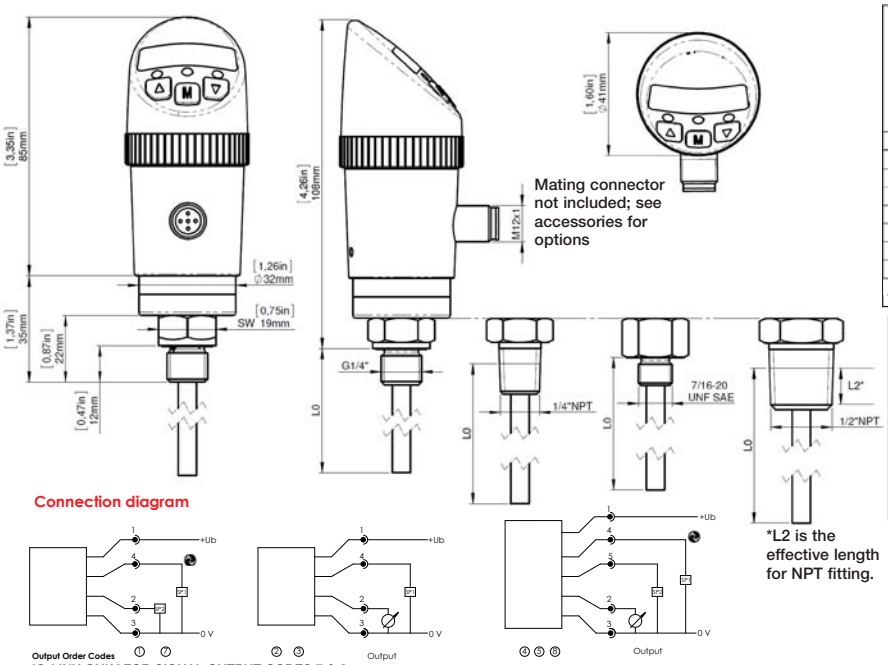
** At probe length over 100mm shock & vibration resistance can be influenced by the application
*** 1 - 5 output options only
* See product configurator for additional options.

Electronic Dual Temperature Switch

BTS3000

Bulletin #T0032-F

Technical Drawings



Connection diagram

IO-LINK ONLY FOR SIGNAL OUTPUT CODES 7 & 8

Electrical Connection Chart

Pin	Signal Output Code 1 & 7	Signal Output Code 2 & 3	Signal Output Code 4 &5 & 8	Signal Output Code 6	
1	+Ub	+Ub	+Ub	+Ub	
2	SP2	Signal	Signal	SP1a	NC
3	0V	0V	0V	SP1b	
4	SP1/ IO-Link *	SP1	SP1/ IO-Link *	0V	
5	-	-	SP2	SP2a	NO
6	-	-	-	SP2b	
7	-	-	-	-	
8	-	-	-	Housing	

* IO-LINK ONLY FOR SIGNAL OUTPUT CODES 7 & 8

Length	1/4" NPT / 1/2" NPT / 7/16-20 UNF (SAE-4)	G1/4"
L0	.7" [17.78 mm]	0.67" [17 mm]
	2" [50.8 mm]	0.98" [25 mm]
	4" [101.6 mm]	1.97" [50 mm]
	6" [152.4 mm]	3.94" [100 mm]
	12" [304.8 mm]	11.80" [300 mm]
		25.59" [650 mm]

c UL us

Dimensions inches [mm]

Product Configurator

Example	BTS3	8	E	V	M	2.00Z	1

Series:

BTS3	Series BTS3000, electronic dual temperature switch

Output:

1	Dual switch point
2	Single switch point plus 4-20mA (0-10V field selectable)
3	Single switch point plus 0-10V (4-20mA field selectable)
4	Dual switch point plus 4-20mA (0-10V field selectable)
5	Dual switch point plus 0-10V (4-20mA field selectable)
6	Dual switch points (1 x NO SPST / 1 x NC SPST), not UL approved
7	IO-Link / Dual switch point, no UL
8	IO-Link / Dual switch point plus 4-20mA (0-10V field selectable), no UL

Process Connections:

N[9]	1/4" NPT male thread
3[1,9]	1/2" NPT male thread (Consult factory)
E	7/16-20 UNF (SAE 4)
G	G1/4" male thread
2	G1/2" male thread (Consult factory)

Electrical Connection:

M[3]	M12

Sealing:

V[2]	FKM fluoroelastomer (standard)
E[2]	EPDM (EPR) (optional)
X	No seal (Required for units with NPT thread)
F	FFKM (optional) (Consult factory)

Temperature Ranges:

1	0 to 100°C
2	-30 to 140°C
3	32 to 210°F
4	-22 to 280°F

Sensor Length[4]:

0017M[5]	17 mm probe
0025M[5]	25 mm probe
0050M[5]	50 mm probe
0100M[5]	100 mm probe
0300M[5]	300 mm probe
0650M[5,6]	650 mm probe
0.70Z[1,7]	0.7" probe
2.00Z[1,7]	2" probe
4.00Z[1,7]	4" probe
6.00Z[1,7]	6" probe
12.0Z[6,7]	12" probe

Accessories

Order Number	Description
239535-1M-R-S[8]	4 Pin M12 Female Right Angle Plug Molded Cable, 3.28 Feet (1 Meter), Shielded
239535-1M-S[8]	4 Pin M12 Female Straight Plug Molded Cable, 3.28 Feet (1 Meter), Shielded
239537	4 Pin M12 Female Straight Connector
239236	4 Pin M12 Female Right Angle Connector
239546-1M-R-S[8]	5 Pin M12 Female Right Angle Molded Cable, 3.28 Feet (1 Meter), Shielded
239546-1M-S[8]	5 Pin M12, Female Straight Plug Molded Cable, 3.28 Feet (1 Meter), Shielded
239548-S	5 Pin M12 Female Straight Connector
239548-R	5 Pin M12 Female Right Angle Connector
208779[1]	2" Probe - Brass Thermowell
208779-SS[1]	2" Probe - 316 Stainless Steel Thermowell
208780[1]	4" Probe - Brass Thermowell
208780-SS[1]	4" Probe - 316 Stainless Steel Thermowell
208781[1]	6" Probe - Brass Thermowell
208781-SS[1]	6" Probe - 316 Stainless Steel Thermowell

Note:
1. Thermowell option available for 1/2" NPTF only with 2", 4" and 6" probes only; consult factory for details.
2. Available only for G and UNF thread.
3. Mating connector not included with unit; mating connectors are available and can be ordered as an accessory.
4. Custom probe length available; minimum quantities may apply.
5. Available only for G1/4" or G1/2" thread.
6. At probe length over 11.8" (300 mm), the probe must be kept out of the direct path of the flowing media.
7. Available only for NPT and UNF thread.
8. See Cable Connectors & Accessories for more options.
9. Requires sealing code X

Electronic Dual Level Switch

BLS3000

Features

- Signal resolution: 1/5" (5 mm)
- Redundant measurement system ensures reliable output
- Total length (L0): 9.8"-39.4" (250 mm-1000 mm)
- One or two switch points
- Analog output: 4 - 20 mA or 0 - 10 V
- Rotatable 320° display & electrical connection
- Easy menu navigation

Applications

- Level control for:
  - Hydraulics
  - Lubrication system
  - Cooling

General Specifications*

Sensor element:	Reed switch
Materials: Wetted parts: Stem (Fitting, Tube): Float: Seals: Electronic housing:	 Stainless steel 316Ti NBR (BUNA-N) foam FKM, EPDM or NBR (BUNA-N) Stainless steel 316Ti, PBT, elastomer
Operating elements:	3 easy-response push-buttons
Enclosure rating:	Type 1 / Type 4X (IP65) / Type 6 (IP67)
Protection class:	III
Electrical connection:	Plug M12 x 1, 4-pin / 5-pin / 8-pin (depending on Output selection)
Process connection:	See Product Configurator for process connection options (page 2)
Float BN17: Density medium: Depth of immersion:	 min. 0.02 lb/in³ (0.60 g/cm³) 0.59” ± 0.07” (15 ± 2 mm) (water) 0.74” ± 0.07” (19 ± 2 mm) (oil 0.75) Ø0.70”, height 0.98” (Ø17.8 mm, height 25 mm)
Dimensions enclosure:	1.6 Ø x 4.5 inches (41 x 110 mm) For 1/2" NPT (without M12 connector or probe). Contact factory for other sizes.
Weight:	Approx. 0.77 lb (350 g) (for G1/2” size and 250 mm L0, for exact weight, contact factory)
Total lenght (L0):	9.8" (250 mm), 14.6" (370 mm), 16.1" (410 mm), others on request up to 39.4” (1000 mm)
Accuracy:	± 1 digit (without turbulence) including temperature influence and repeatability
Resolution:	1/5" (5 mm)
Max. pressure:	43.5 psi (3 bar)
Temperature range: Medium: Ambient/Operating: Storage:	 -13 °F to +176 °F (-25 °C... +80 °C) -4 °F to +158 °F (-20 °C… + 70 °C) -22 °F to +176 °F (-30 °C… + 80 °C)
Power supply:	15 to 28 V DC, reversed polarity protected (SELV, PELV)
Power consumption:	Approx. 50 mA (without load) Approx. 80 mA (Output Code 6)

Digital display:	4-digit 14-segment LED display, red, digit height 0.35 inches (9 mm)	
Error display:	LED RED and alphanumeric display	
Analog output: Current output: Load: Scanning rate: Voltage output: Rating: Adjustment range:	 4-20 mA max. RI = (Ub-12V) / 20 mA RI = 600 Ohm at Ub = 24 V DC 2 ms 0 to 10 V DC max. 10 mA 25% to 100% f. s.	
Units: Distance: Volume:	 %, mm, cm, m, inch, feet, liter, m³, gallon	
Transistor switchting outputs:		
Switching function:	Normally open/normally closed, standard / window mode and adjustable functions	
Switching output:	PNP	
Adjustment range for switching point and hysteresis:	0 % to 125 % f. s.	
Switching frequency:	Max. 100 Hz	
Load	Max. 500 mA, short-circuit proof	
Delay	0.0 s to 50 s adjustable	
Status display(s):	LED(s) red	
EMI:	EN 61000-4-2 ESD	4 kV CD / 8 kV AD
	EN 61000-4-3 HF radiated	10 V/m
	EN 61000-4-4 Burst	2 kV
	EN 61000-4-5-Surge	1/2 kV
	EN 61000-4-6 HF conducted	10 V
Shock resistance	DIN EN 60028-2-27	50 g (11 ms)
Vibrations resistance	DIN EN 60028-2-26	20 g (10...2000 Hz)
Approvals:	cULus[1]	

1) Conditions of use: 140 °F (60 °C) max. ambient, power supply max. 28 V DC

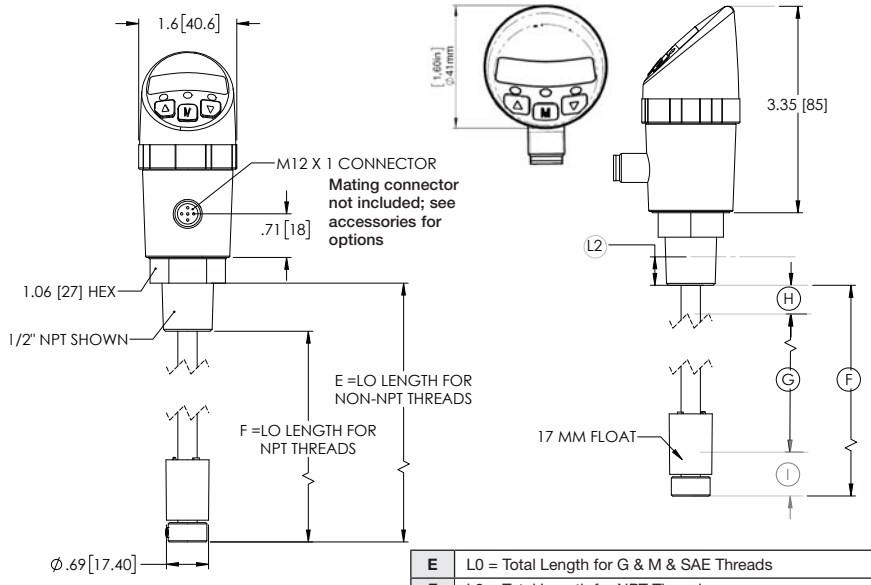
* See product configurator for additional options.

Electronic Dual Level Switch

BLS3000

Bulletin #L0043-C

Technical Drawings



E	L0 = Total Length for G & M & SAE Threads
F	L0 = Total Length for NPT Threads
G	LM = L0 - (To + Tu)
H	To = Top Dead Band
I	Tu = Bottom Dead Band
L2	The effective length of 1/2" NPT, 3/4" NPT, 1"NPT and 1-1/4" NPT thread

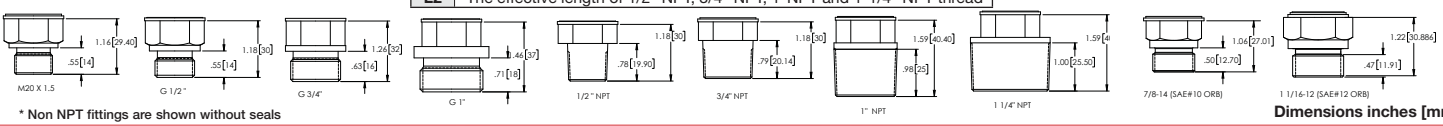
Electrical Connection Chart

Pin	Signal Output Code	Signal Output Code 2 & 3	Signal Output Code 4 & 5	Signal Output Code 6	
1	+Ub	+Ub	+Ub	+Ub	
2	SP2	Signal	Signal	SP1a	NC
3	0V	0V	0V	SP1b	
4	SP1	SP1	SP1	0V	
5	-	-	SP2	SP2a	NC
6	-	-	-	SP2b	
7	-	-	-	-	
8	-	-	-	Housing	

Length	1/2" NPT, 3/4" NPT, 1" NPT, 1 1/4" NPT, 7/8-SAE 10, 1-1/16-12 SAE 12	G1/2", G 3/4", G1", M20X1.5
L0	9.8"	250 mm
	14.6"	370 mm
	16.1"	410 mm

Process Connection	Dead band	
	To (Top)	Tu (Buttom)
G1/2"	1.06 ± 0.12 [27 ± 3]	1.06 ± 0.12 [27± 3]
G3/4"	1.14 ± 0.12 [29 ± 3]	
G1"	1.22 ± 0.12 [31 ± 3]	
M20 x 1.5 mm	1.06 ± 0.12 [27 ± 3]	
1/2" NPT	0.51 ± 0.12 [13 ± 3]	
3/4" NPT		
1" NPT		
1¼" NPT		
7/8-14 UNF (SAE 10)	1.01 ± 0.12 [25.7 ± 3]	
1 1/16-2 UN (SAE 12)	1.1 ± 0.12 [28 ± 3]	

Process Connections*



* Non NPT fittings are shown without seals

Dimensions inches [mm]

Product Configurator

Example	BLS3	1	6	X	M	14.6Z

Series:

BLS3	Series BLS3000, electronic dual level switch

Output:

1	Dual switch point
2	Single switch point plus 4-20mA
3	Single switch point plus 0-10V
4	Dual switch point plus 4-20mA
5	Dual switch point plus 0-10V
6	Dual switch point (1x NO SPST / 1x NC SPST), non UL

Process Connections:

2	G1/2" male, with seal (seal code V, E or B)
3	1/2" NPT male, without seal (seal code X)
5	G3/4" male, with seal (seal code V, E or B)
6	3/4" NPT male, without seal (seal code X)
A	G1" male, with seal (seal code V, E or B)
B	1" NPT male, without seal (seal code X)
C	1¼" NPT male, without seal (seal code X)
H	M20 x 1.5 mm male, with seal (seal code V, E or B)
I[1]	7/8-14 UNF (SAE 10) male, (seal code V, E or B)
J[1]	1 1/16 -12 UN (SAE 12) male, (seal code V, E or B)

Seal Material:

X	No seal is required for NPT thread
V	FKM (fluoroelastomer)
E	EPDM (EPR)
B	NBR (BUNA-N)

Total Sensor Length L0[3]:

0250M[4]	250 mm (process con. code 2, 5, A & H)
0370M[4]	370 mm (process con. code 2, 5, A & H)
0410M[4]	410 mm (process con. code 2, 5, A & H)
1000M[4]	1000 mm (process con. code 2, 5, A and H)
09.8Z[5]	9.8 inch (process con. code 3, 6, B, C, I, & J)
14.6Z[5]	14.6 inch (process con. code 3, 6, B, C, I, & J)
16.1Z[5]	16.1 inch (process con. code 3, 6, B, C, I, & J)
39.4Z[5]	39.4 inch (process con. code 3, 6, B and C)

Electrical Connection:

M[2]	M12 x 1 mm (4 or 5 pin)

Accessories

Order Number	Description
239535-1M-R-S[6]	4 Pin M12 Female Right Angle Plug Molded Cable, 3.28 Feet (1 Meter), Shielded
239535-1M-S[6]	4 Pin M12 Female Straight Plug Molded Cable, 3.28 Feet (1 Meter), Shielded
239537	4 Pin M12 Female Straight Connector
239236	4 Pin M12 Female Right Angle Connector
239546-1M-R-S[6]	5 Pin M12 Female Right Angle Molded Cable, 3.28 Feet (1 Meter), Shielded
239546-1M-S[6]	5 Pin M12, Female Straight Plug Molded Cable, 3.28 Feet (1 Meter), Shielded
239548-S	5 Pin M12 Female Straight Connector
239548-R	5 Pin M12 Female Right Angle Connector

Note: 1. Subject to minimum order quantity of 10 pieces; consult factory for lead time.
2. Mating connector not included with unit; mating connectors are available and can be ordered as an accessory.
3. Custom length available up to 39.4" (1000 mm); minimum quantities may apply.
4. Available only for G & M thread.
5. Available only for NPT, UNF & UN thread.
6. See Cable Connectors & Accessories for more options.

Electronic Dual Differential Pressure Switch BDS3000

Features

- Measuring range: differential: 0 - 500 psid
- Enclosure Rating: Type 4X (IP65) / Type 6 (IP67)
- Two switch points
- 0.50% accuracy
- Analog output 4 - 20 mA or 0 - 10 V
- Superior EMI protection
- Display & electronic connection: rotatable by 320°
- Simple navigation menu
- IO-Link digital communication interface
- Hydraulic and pneumatic compatible

Applications

- Filtration
- Machine tool industry
- Factory Automation
- Lubrication monitoring
- Pumps and compressors

General Specifications

Sensor element:	Piezoresistive sensor
Materials: Wetted parts: Enclosure: Seals:	 Stainless steel fittings 316L Stainless steel sensors 304 Stainless steel, PBT FKM fluoroelastomer
Operating elements:	3 easy-response push-buttons
Enclosure rating:	Type 4X (IP65) / Type 6 (IP67)
Protection class:	III
Electrical connection:	Plug M12 x 1, 5-pin
Process connection:	1/4" NPT female (low and high sides)
Dimensions:	3.00 x 1.60 x 4.81 inches
Weight:	Approx. 1.5 lb
A/D-Converter: Resolution: Scanning rate:	 12 bit (4,096 steps per measure span) 1000/s
Linearity error:	< ±0.5 % f. s. at +25 °C
Temperature influence:	TC zero < ±0.2 % FSO / 10K TC span < ±0.3 % FSO / 10K
Compensation range:	32°F to 122°F (0°C to +50°C)
Repeatability:	±0.1% f. s.
Temperature range: Media: Electronics: Storage:	 -13°F to 212°F (-25°C to +100°C) 14°F to 158°F (-10°C to +70°C) -22°F to 176°F (-30°C to +80°C)
Power supply:	15 to 32 V DC, reversed polarity protected (SELV, PELV), Class 2
Power consumption:	Approx. 50 mA (without load)
Digital display: Display rate:	4-digit 14-segment LED red display, digit height .35 inches (9 mm) 20/s
Error display:	LED RED and alphanumeric display

Analog output:	
Current output:	4-20 mA
Scanning rate:	2 ms
Voltage output:	0 to 10 V DC
Rating:	max. 10 mA
Adjustment range:	25% to 100% f. s.
Transistor switching outputs:	
Switching function:	Normally open / normally closed, standard / window mode and diagnosis function adjustable
Switching output:	PNP / NPN (field selectable on IO-Link units)
Adjustment range for switching point and hysteresis:	0% to 125% f. s.
Switching frequency:	Max. 100 Hz
Load:	Max. 500 mA (250 mA IO-Link units), short-circuit-proof
Delay:	0.0 s to 50.0 s adjustable
Status display(s):	LED(s) red
IO-Link Communication Interface	
Transmission type:	COM2 (38.4 kBaud)
IO-Link revision:	1.1
SDCI standard:	IEC 61131-9
Profiles:	Smart Sensor, Process Data Variable, Device Identification, Device Diagnosis
SIO modules:	Yes
Required master port type:	A
SIO output:	1 analog / 2 binary (switch points) [see product configurator]
Min. process cycle time [ms]:	2.5
Device ID:	0x071...

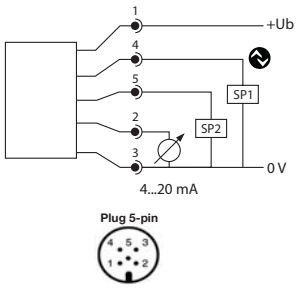
Pressure Ranges

Pressure Range Code	Differential Pressure	Proof Pressure	Proof Pressure	Common Pressure
	P1>P2 (PSID)	P1>P2 (PSID)	P2>P1 (PSID)	P1=P2 (PSI)
0015P	0-15	30	15	2500
0100P	0-100	200	100	2500
0500P	0-500	1000	150	2500

Electronic Dual Differential Pressure Switch — BDS3000

Technical Drawings

Connection diagram



Dimensions in inches [mm]

Product Configurator

Example	BDS3	4	F	V	M	0500P

Series:

BDS3	Series BDS3000, electronic dual differential pressure switch

Output:

4	Dual switch point plus 4-20mA (0-10V field selectable)
8	IO-Link / Dual switch point plus 4-20mA (0-10 field selectable)

Process Connections:

F	1/4" NPT female

Sealing:

V	FKM fluoroelastomer

Electrical Connection:

M[1]	M12

Pressure Ranges[2]

0015P	0 - 15 psid (differential)
0100P	0 - 100 psid (differential)
0500P	0 - 500 psid (differential)

Accessories

Order Number	Description
239546-1M-R-S[3]	5 Pin M12 Female Right Angle Plug Molded Cable, 3.28 Feet (1 Meter), Shielded
239546-1M-S[3]	5 Pin M12, Female Straight Plug Molded Cable, 3.28 Feet (1 Meter), Shielded
239548-S	5 Pin M12 Female Straight Connector
239548-R	5 Pin M12 Female Right Angle Connector

Note:
1. Mating connector not included with unit; mating connectors are available and can be ordered as an accessory.
2. Contact factory for ranges not listed including BAR.
3. See Cable Connectors & Accessories for more options.

Switch to Generation 3000

BPS3000

Pressure Switch
Vacuum & 0-9000 psi
Dual switch & analog output

BPS3000

Differential Switch
Ranges from 0-500 psi
Dual switch & analog output

BTS3000

Temperature Switch
32 - 212°F, -22 - 284°F
0 - 100°C, -30 - 140°C

BLS3000

Level Switch
Probe lengths from 9.8" to 39.4"
(250 mm to 1000 mm)

Switch to Generation 3000 for performance you can trust.

BPS3000, BTS3000 & BLS3000 Custom Solutions

Our standard offering of options can be configured to meet your application needs.
See our data sheet, or our eConfigurator, to select the product to meet your specific requirements.

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