

# Bristol® 2808-15B

## Low Power Pressure Transmitter

Emerson Process Management offers the best solution to your process measurement and control needs. The low power Bristol® Series 2808 Transmitter provides the ease of installation, use, and external field calibration adjustments. Model 2808-15B is a reliable, compact pressure transmitter designed to accurately measure and provide a fast response to gauge pressure. Many applications include high speed control of compressors, pneumatic control systems and pressure sensor calibration system control as well as many traditional industrial and process control systems.

The low power 15B is user-configurable for a 1-5V or 4-20mA output proportional to input pressure. For battery and solar powered systems, the 15B produces a 1-5V output drawing only 2.2 mA with an operating voltage as low as 6 Vdc. In the current mode, a 4-20mA output will drive a 250 ohm load with only a 12Vdc power source. This low power feature is especially ideal for low power RTUs such as the 3530 Solar Power TeleRTU. For other applications, the output signal can be supplied to the input of a recorder, indicator or similar device.

The 15B is an adjustable range transmitter that is calibrated at the factory to a specific measurement range. Input ranges covering 17 inH<sub>2</sub>O through 5000 psig are available. Fine offset and gain pots can be found on the outside housing of the transmitter to make calibration/verification a breeze. The uniquely designed circuitry makes field calibrations simpler than the competition. Internal coarse settings allow the user to determine the coarse span and zero elevation/suppression range capability. This modular design concept makes the 15B a truly low cost transmitter for all applications.

Because of its compact size and lightweight, the 2808-15B transmitter is installed directly on, and supported by, the process piping. For installations that require other mounting arrangements, the transmitter may be specified with a universal mounting bracket. The 15B is the best answer for the need of a low power pressure transmitter for all process measurement and control applications.



### Operation

The sensor module provides a ½ inch NPT bottom entry process connection. This connection exposes one side of the process diaphragm to line pressure. The 15B contains a micromachined transduction element, fabricated using integrated circuit technology, to sense input pressure. This sensing technology combines the mechanical aspects of silicon, which is literally as strong as steel and hysteresis free, with the inherent semiconductor and electronic properties of an integrated circuit. The sensor consists of an internal silicon diaphragm into which piezoresistive strain gauge resistors are implanted, then interconnected to form a pressure sensitive Wheatstone Bridge. The outer process diaphragm is hydraulically connected to the silicon diaphragm using a suitable fill fluid. When the sensor is energized, by applying pressure to the outer diaphragm, the silicon diaphragm deflects, resulting in an electrical output change proportional to the input pressure. Because of the single crystal nature of the silicon diaphragm, linearity is excellent and pressure hysteresis is essentially unmeasurable.

Features

- Low cost of ownership
- Excellent accuracy
- Direct process mounting
- Low power consumption
- Explosion-proof electronic housing
- Local indicator option, linear or in engineering units
- Fast response

Functional Specifications

Input Ranges

Min. - Max.Span	Max. Working Pressure
0-17 to 0-100 inH <sub>2</sub> O	300 inH <sub>2</sub> O
0-50 to 0-300 inH <sub>2</sub> O	900 inH <sub>2</sub> O
0-67 to 0-400 inH <sub>2</sub> O	1200 inH <sub>2</sub> O
0-4 to 0-25 psi	75 psi
0-8 to 0-50 psi	150 psi
0-17 to 0-100 psi	300 psi
0-50 to 0-300 psi	900 psi
0-83 to 0-500 psi	1500 psi
0-167 to 0-1000 psi	3000 psi
0-500 to 0-3000 psi	4500 psi
0-833 to 0-5000 psi	7500 psi

Current Loop Mode

- Supply Voltage:  
24 Vdc nominal  
6.0 Vdc minimum at transmitter  
8 Vdc minimum with Local Digital Indicator option  
42.5 V dc maximum at transmitter  
Reverse polarity protected

- Output:  
Two wire analog, 4-20 mA proportional to pressure or level  
Current limited: 24 mA maximum  
Minimum current: 2 mA

The maximum loop resistance can be determined as follows:

$$R\text{-loop maximum} = \frac{V_{\text{supply}} - 6}{0.02} \text{ ohms}$$

The maximum load capacitance is at least 0.1uF

Voltage Mode

- Supply Voltage:  
6-42.5 Vdc  
Reverse polarity protected to 90 Vdc
- Supply Current:  
2.2 mA nominal
- Output into resistive load. (maximum cap. load 5 nf):
- 1-5 Vdc (3-wire)

Calibration Adjustments

- Span Adjustment:  
Adj. range is 16 to 100% URL (6:1 turndown)  
Coarse Span set by Rotary switch package  
Fine Span set by 15-turn potentiometer.
- Zero Adjustment:  
Adj. range is -600 to 600% LRL for elevation and suppression.  
Coarse Zero provided by DIP switch selections.  
Fine Zero set via 15-turn potentiometer.

Response Time & Damping

- Time Constant:  
(Time required for 63% change in output with a 100% input change)

<u>Damping Out</u>	<u>Damping In</u>
10 ms	50 ms

- Recovery:  
Time to steady output after application of 24 volt supply with constant pressure is 100 ms maximum (With No Damping):  
10 ms
- Damping:  
User selectable by jumper circuit  
Damping OFF = 10 ms max  
Damping ON = .05 sec  $\pm$ 25% time constant

**Reverse Pressure**

- On low-range models, full vacuum can represent an appreciable percentage of URL. If on those models, calibration contains 50% of zero elevation, non-linearity errors can be as high as  $\pm$ 1%.

**Overpressure Effect**

- $\pm$ 0.2% URL at maximum operating pressure

**Performance Specifications**

- Accuracy  
 $\pm$ 0.15% of calibrated span.  
Includes the combined effects of independent linearity, hysteresis, and repeatability.
- Stability  
At constant conditions.  $\pm$ 0.1% of URL/yr typical;  
 $\pm$ 0.25% of URL/yr max
- Temperature Effect – Total (Includes Zero and Span)  
 $\pm$ 0.015% of URL per °F from -25 to 75°F  
 $\pm$ 0.010% of URL per °F from 75 to 185°F  
 $\pm$ 0.020% of URL per °F on 100 inH<sub>2</sub>O only
- Power Supply Effect  
 $\pm$ 0.005% of upper range limit per volt change
- Ripple and Noise  
In accordance with ISA 50.1, Section 4.6
- Mounting Position Effect on Transmitter Accuracy  
 $\pm$ 2 in H<sub>2</sub>O which can be corrected by calibration

**Environmental Specifications**

**Temperature Limits**

- Wet End:  
-40° to 220°F (-40° to 104°C)
- Amplifier:  
-25° to 185°F (-32° to 85°C)
- Storage:  
-40° to 212°F (-40° to 100°C)

\*The maximum permissible temperature inside the enclosure (irrespective of sensor temperature) is 185°F (85°C) for the amplifier board.

- Optional Local Indication:  
Operating: -30°C to +80°C  
Storage: -40°C to +80°C
- Humidity Limits (cover in place)  
15 to 95% RH @ 185°F (85°C)

**EMI Effect**

$\pm$ 0.1% of upper range limit @ 3V/M from 20 to 1000 MHz

Meets /SAMA PMC-33-1C with transmitter cover in place and all wiring contained in grounded conduit.

**Surge Protection**

Bipolar, differential surge

1000 watts for 1 ms – without local indicator

May be used with purchased surge protector for additional protection (for non-hazardous, non-approved installations only).

**Vibration Effect**

Less than  $\pm$ 0.1% of URL for 10 to 500 Hz at 1 g on any axis.

**Hazardous Locations:**

- Class 1, Division 1, Groups C & D, Explosion-Proof without conduit seals
- Class 1, Division 2 non-incendive

**Physical Specifications**

- Diaphragm and Connection Materials  
316 Stainless Steel or Hastelloy C
- Process Connection  
1/2 inch NPT male
- Electrical Connection  
½ inch NPT conduit connection with internal field wiring terminals
- Fill Medium  
DC 200 Silicone
- Electronics Housing Material and Rating  
Low copper aluminum, epoxy finish. NEMA 4X
- Optional Local Indication  
4-1/2 Digit User-Configurable LCD Meter: Linear (0 to 100%), or in engineering units  
Zero: Can be adjusted approx. 20% of span  
Polarity: Automatic (-) displayed
- Weight  
Standard: 2.4 lbs.  
With meter option: 2.5 lbs.

**Product Data Document**

225DS-21c

July 25, 2007 - Page 5

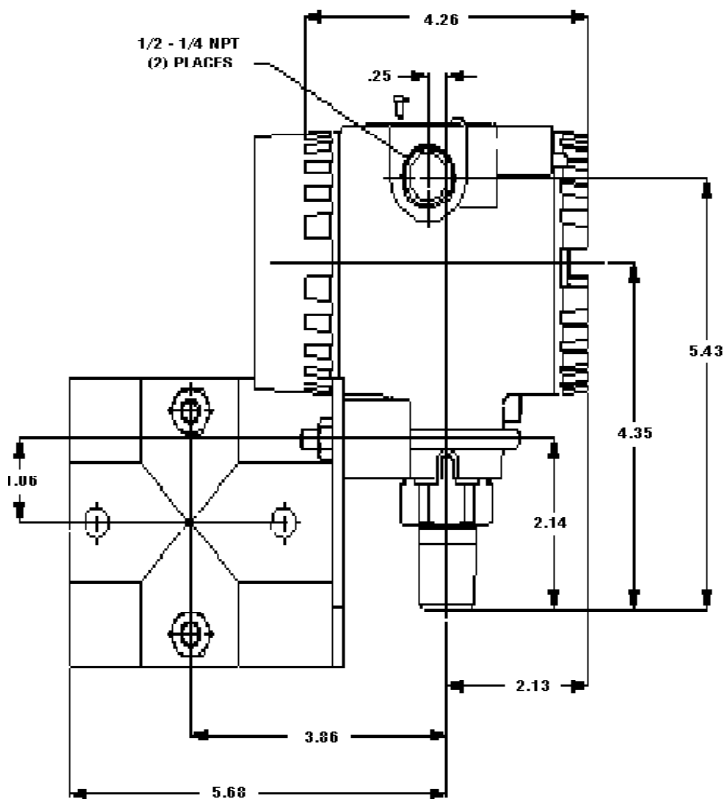
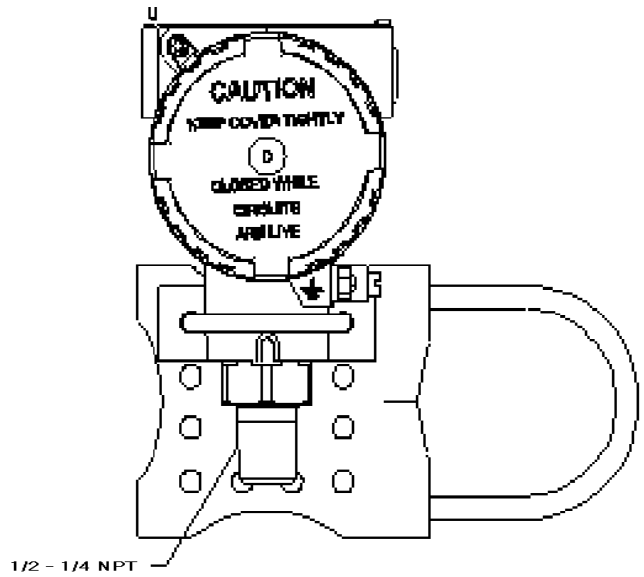
**Bristol® Low Power Pressure Transmitter**

**Model Number: 2808-15B - A B - C - D - E - F - G - H**

**2808-15B**

SELECT	DESCRIPTION	CODE
<b>INPUT PRESSURE RANGE</b>		<b>280815BASE</b>
<b>A B</b>	<b>Min. Span - Max. Span (URL)</b>	<b>A B</b>
(10)	0 - 17 to 0 - 100" H <sub>2</sub> O	13
	0 - 50 to 0 - 300" H <sub>2</sub> O	14
	0 - 67 to 0 - 400" H <sub>2</sub> O	15
	0 - 4.2 to 0 - 25 psi	20
	0 - 8.3 to 0 - 50 psi	21
	0 - 17 to 0 - 100 psi	22
	0 - 50 to 0 - 300 psi	23
	0 - 83 to 0 - 500 psi	24
	0 - 167 to 0 - 1000 psi	25
	0 - 500 to 0 - 3000 psi	26
	0 - 833 to 0 - 5000 psi	27
<b>DIAPHRAGM and CONNECTION MATERIAL</b>		<b>C</b>
(20)	316 Stainless Steel	X2808DIAPH
	Hastelloy C	2
<b>FILLING MEDIA</b>		<b>D</b>
(30)	DC 200 Silicone Fluid	XTRANSFILL
<b>INDICATION</b>		<b>E</b>
(40)	None	XTRANSIN
	Local Digital Indication (Linear)	1
<b>MOUNTING BRACKET</b>		<b>F</b>
(50)	Without Mounting Bracket	XTRANMTBKT
	With Neck Mounted Bracket	1
<b>CERTIFICATION</b>		<b>G</b>
(60)	UL/CUL	1
	Omega	3
	UL/CUL Class 1, Div 1 Intrinsically Safe	4
	For use with IS TeleFlow	Not Avail w/ Indicator 1- 5 V Output Only
<b>WARNING PLATE</b>		<b>H</b>
(70)	Not Applicable	0
	Russian	1
		Not Avail. w/ Indication

Physical Dimensions



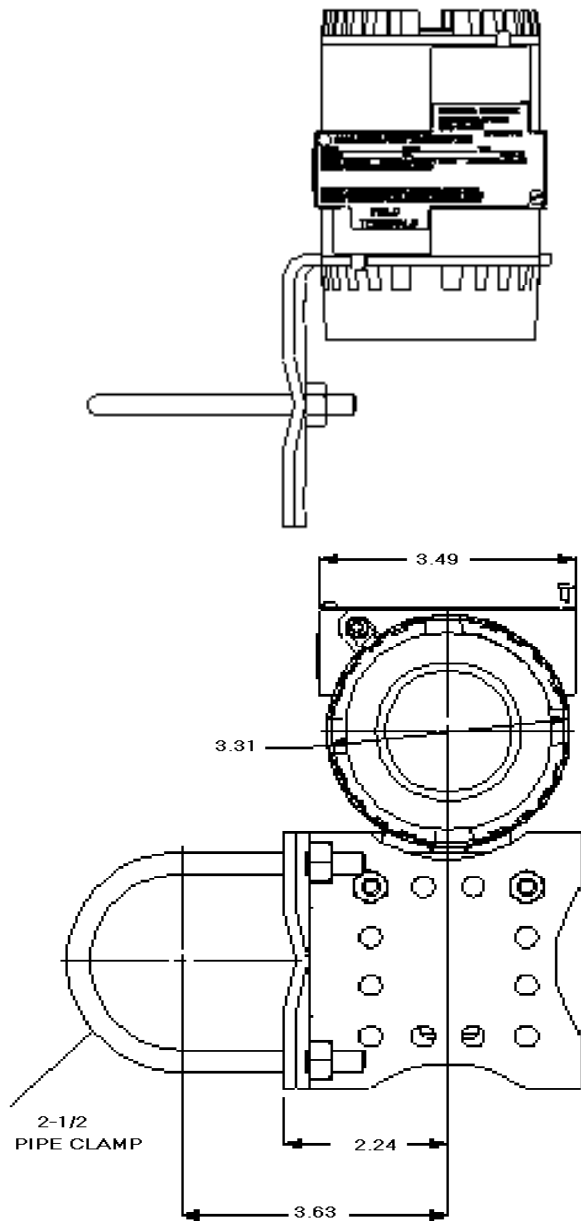
# Product Data Document

225DS-21c

July 25, 2007 - Page 7

# Bristol® Low Power Pressure Transmitter

## Physical Dimensions



© 2007 Remote Automation Solutions, division of Emerson Process Management. All rights reserved.

Bristol, Inc., Bristol Babcock Ltd, Bristol Canada, BBI SA de CV and the Flow Computer Division, are wholly owned subsidiaries of Emerson Electric Co. doing business as Remote Automation Solutions ("RAS"), a division of Emerson Process Management. FloBoss, ROCLINK, Bristol, Bristol Babcock, ControlWave, TeleFlow and Helicoid are trademarks of RAS. AMS, PlantWeb and the PlantWeb logo are marks of Emerson Electric Co. The Emerson logo is a trademark and service mark of the Emerson Electric Co. All other marks are property of their respective owners.

The contents of this publication are presented for informational purposes only. While every effort has been made to ensure informational accuracy, they are not to be construed as warranties or guarantees, express or implied, regarding the products or services described herein or their use or applicability. RAS reserves the right to modify or improve the designs or specifications of such products at any time without notice. All sales are governed by RAS' terms and conditions which are available upon request. RAS does not assume responsibility for the selection, use or maintenance of any product. Responsibility for proper selection, use and maintenance of any RAS product remains solely with the purchaser and end-user.

### Emerson Process Management Remote Automation Solutions

Watertown, CT 06795 USA  
Mississauga, ON 06795 Canada  
Worcester WR3 8YB UK

T 1 (860) 945-2200  
T 1 (905) 362-0880  
T 44 (1) 905-856950

Website: [www.EmersonProcess.com/Remote](http://www.EmersonProcess.com/Remote)

