SPECIFICATION SUMMARY

B225-23a
10/00

2808-35A

Low Power Differential Pressure Transmitter

Bristol Babcock offers the best solution to your process measurement and control needs. The low power *Series 2808 Transmitter* provides the ease of installation, use, and external field calibration adjustments. Model 2808-35A is a reliable, compact pressure transmitter designed to accurately measure and provide a fast response to differential pressure. In addition, the 35A has better common mode pressure rejection than most smart sensors. 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 35A is user-configurable for a 1-5V or 4-20mA output proportional to input pressure. For battery and solar powered systems, the 35A produces a 1-5V output drawing only 1.5mA 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 Bristol Babcock 3530 Solar Power TeleRTU. For other applications, the output signal can be supplied to the input of a recorder, indicator or similar device.

The 35A has an adjustable range that is calibrated at the factory to a specific measurement range. Input ranges covering 17 inH_20 through 300 PSID are available. Field adjustments can be performed via external fine gain and fine offset adjustments. Internal coarse settings allow the user to determine the coarse span and zero elevation/suppression range capability. An optional mounting bracket can be specified for vertical and horizontal pipe mounting.

Operation

The sensor module provides the process connections. These connections expose one side of the process diaphragms to the high and low pressure respectively. The 35A 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 diaphragms are hydraulically connected to the silicon diaphragm using a suitable fill fluid. When the sensor is energized, by applying pressure to the process diaphragms, the silicon diaphragm deflects proportionally to the differential pressure, resulting in an electrical output change proportional to the input differential pressure. Because of the single crystal nature of the silicon diaphragm, linearity is excellent and pressure hysteresis is essentially immeasurable.

Features

- Adjustable ranges
- $\pm$ 0.1 accuracy
- Two year warranty
- Explosion-proof electronic housing
- Local indicator option, linear or in engineering units

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Functional Specifications

- **Service**
  Liquid, gas or vapor

- **Input ranges:**

Min.	-	Max. Span	Max. Working Press. (PSI)
0-17	to	0-100 inH_20	2000
0-50	to	0-300 inH_20	2000
0-4.2	to	0-25 PSID	2000
0-17	to	0-100 PSID	2000
0-50	to	0-300 PSID	2000

- **Current Loop Mode**
  Supply Voltage:
  24V dc nominal
  7.0V dc minimum at transmitter
  10V dc minimum with Local Digital Indicator option
  37V dc maximum at transmitter
  42V dc with external load specified
  Reverse polarity protected

  Output:
  Two wire analog, 4-20 mA proportional to pressure or level
  Current limited: 28 mA maximum
  Minimum current: 2 mA

The maximum loop resistance can be determined as follows:

$$R\text{-loop maximum} = \frac{Vsupply-7}{0.02} \text{ ohms}$$

The maximum load capacitance is at least 50uF

- **Voltage Mode**
  Supply Voltage:
  6-42 Vdc
  Reverse polarity protected to 90 Vdc

  Supply Current:
  1.5mA nominal

  Output into resistive load (maximum cap. load 5nF):
  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
  Fine Span set by 25-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 25-turn potentiometer.

- **Response Time & Damping**

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

Damping Out	Damping In
1 ms	50 ms

  Recovery:
  Time to steady output after application of 24 volt supply with constant pressure is 100 ms maximum (With No Damping):
  5 ms

  Damping:
  User selectable by jumper circuit
  Damping OFF = approx.1 ms
  Damping ON = .05 sec ±25% time constant

- **Linearity:**
  On low-range models, full reverse pressure can represent an appreciable percentage of URL. If on those models, calibration contains 50% of zero elevation, nonlinearity errors can be as high as ±1%.

- **Overpressure Effect**
  ±0.1% URL at maximum operating pressure

- **Static Pressure Effect**
  ± 1% of URL/1000 PSI for range 22 and 23
  ±.05% of URl/1000 PSI typical ranges 13, 14 and 20
  ±0.1% maximum

Performance Specifications

- **Accuracy**
  ±0.1% of calibrated span
  Includes the combined effects of independent linearity, hysteresis, and repeatability

- **Stability**
  At constant conditions. ±0.25% of URL/yr

- **Temperature Effect – Total (Includes Zero and Span)**
  ±0.010% of URL per °F from –25 to 75°F
  ±0.015% of URL per °F from 75 to 185°F
  ±0.020% of URL per °F on 100 in H_20 only

- **Power Supply Effect**
  ±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**
  ±1.5 in H_20 which can be corrected by calibration

Environmental Specifications

- **Temperature Limits**
  Wet End:
  -40° to 220°F (-40° to 104°C) – DC 200 fill *
  0° to 220°F (-17.8° to 104°C) – Fluorolube fill *
  Fluorolube fill can be obtained via special orders only. Contact Watertown.
  Amplifier:
  -25° to 185°F (-32° to 85°C) – Standard
  Storage:
  -40° to 212°F (-40° to 100°C) – Standard

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

- **Optional Local Indication**
  Operating: -25°C to +55°C
  Storage: -40°C to +85°C

- **Humidity Limits (cover in place)**
  15 to 95% RH @ 140°F (60°C)
  15 to 50% RH @ 185°F (85°C)

- **EMI Effect**
  ±1% of upper range limit @ 10V/M from 20 to 500 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 ±0.1% of URL for 10 to 500 Hz at 1 g on any axis.
  Meets SAMA PMC-31-1

- **Hazardous Locations:**
  Explosion-proof for Class 1, Division 1, Groups C & D

Physical Specifications

- **Diaphragm material**
  316 Stainless Steel, Hastelloy C

- **Process flange**
  316 Stainless Steel, Hastelloy C

- **Flange bolt material**
  316 Stainless Steel

- **Manifold**
  Stainless Steel, Hastelloy C

- **Fill fluids**
  DC 200 Silicone oil
  Fluorolube fill can be obtained via special orders only. Contact Watertown.

- **Process connections**
  ¼" NPT conduit connection
  ½" NPT with connection blocks

- **Electrical connections**
  ½" NPT conduit connection with internal field wiring terminals

- **Housing material and rating**
  Low copper aluminum, epoxy finish, NEMA 4X

- **Optional Local Indication**
  4-1/2 Digit User-Connfigurable LCD Meter:
  Linear (0 to 100%), or in engineering units
  Polarity: Automatic (-) displayed

- **Weight**
  Standard: 6.36 lbs.
  With meter option: 6.5 lbs.

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Model Number Specifications

DIFFERENTIAL TRANSMITTER
2808-35A-AB-C-D-E-F-G-H-J-K-L-M

AB INPUT RANGES

Min. - Max. Span	
0-17" to 0-100" H_20	13
0-50" to 0-300" H_20	14
0-4.2 to 0-25 PSID	20
0-17 to 0-100 PSID	22
0-50 to 0-300 PSID	23

C OUTPUT SIGNAL

Linear	1

D DIAPHRAGM & CONNECTION

316 SS	1
Hastelloy C	2

E FILLING MEDIA

DC 200 Silicone Fluid	1
Fluorolube - Contact Watertown	

F FLANGE MATERIAL
(Must match diaphragm and connection material)

316 SS	1
Hastelloy C	2
316 SS	5
(for Remote Seals only)	

G MANIFOLD ADAPTERS (FOOTBALLS)
(Must match Flange material)

None	0
316 SS	1
Hastelloy C	2

H LOCAL INDICATION

None	0
Local Indication*	1

J FLANGE ORIENTATION

Standard	1
90 Degrees Down	2

K MOUNTING BRACKET

None	0
Flange Mounted Bracket (Option J = 1)	1
Neck Mounted Bracket	2

L CERTIFICATION

UL/CUL Explosion-proof for Class 1, Div. 1, Groups C & D	1
CENELEC*	2

M WARNING PLATE

Not Applicable	0
Russian	1

* Check with Watertown for availability

Accessories & Options:	**Part Number**
Manifold only	391142-01-1
Manifold with pipe mount	391142-02-0
Transient Protector	388630-01-9

Bristol Babcock

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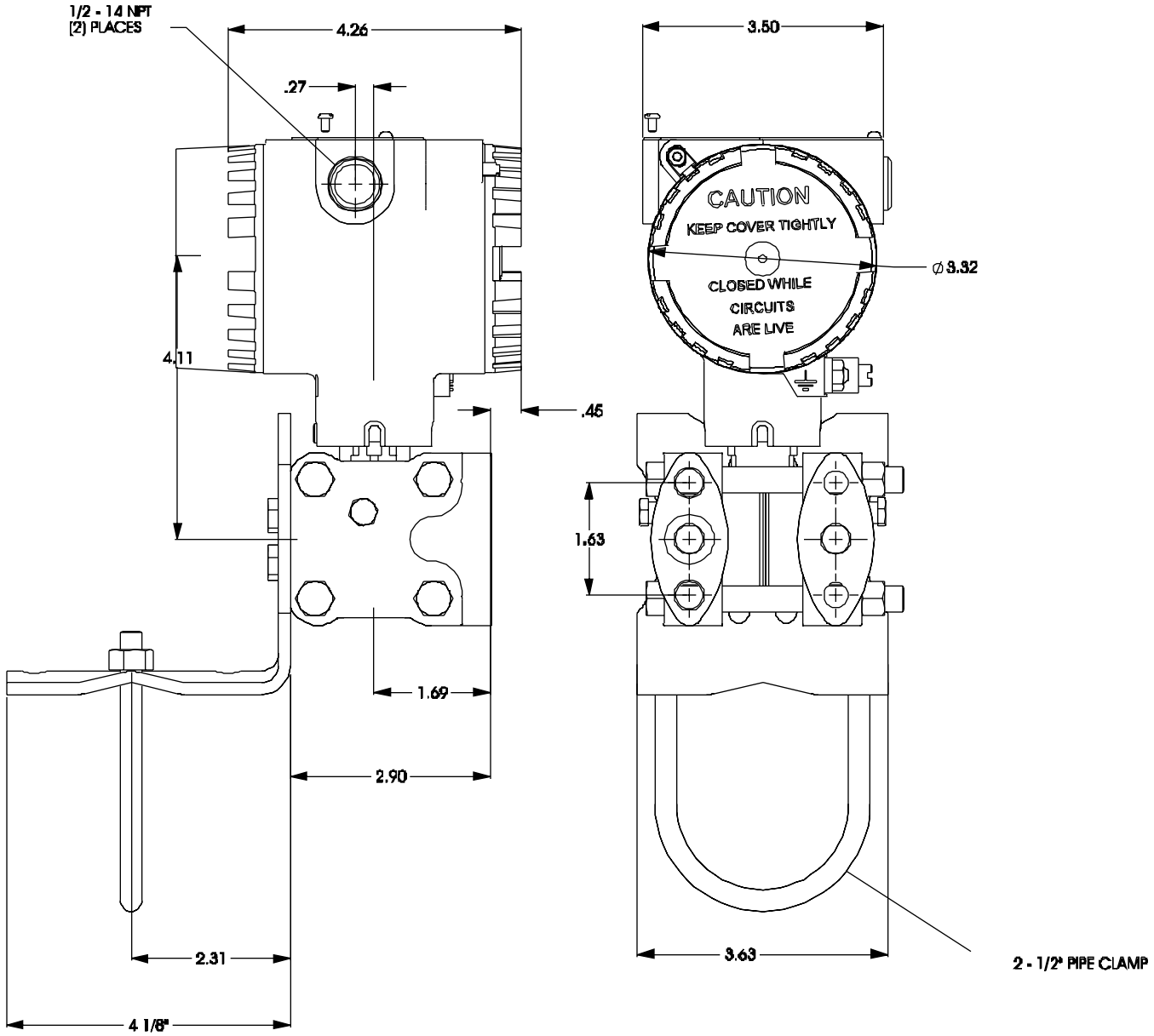
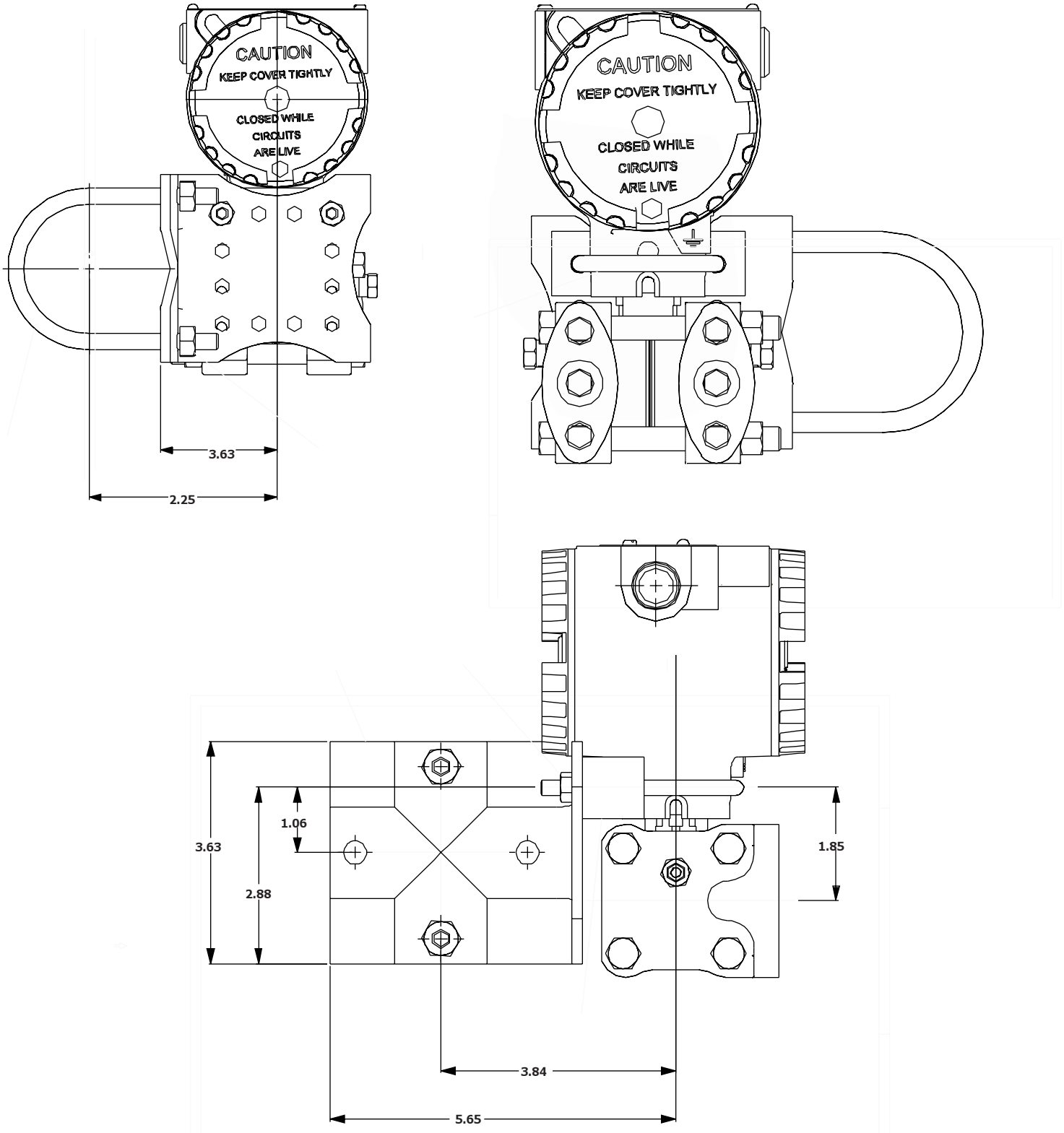
Printed in the U.S.

Physical Dimensions

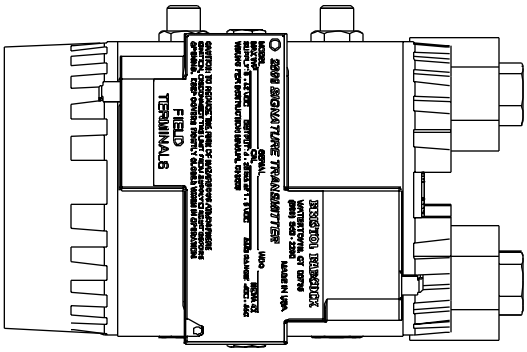


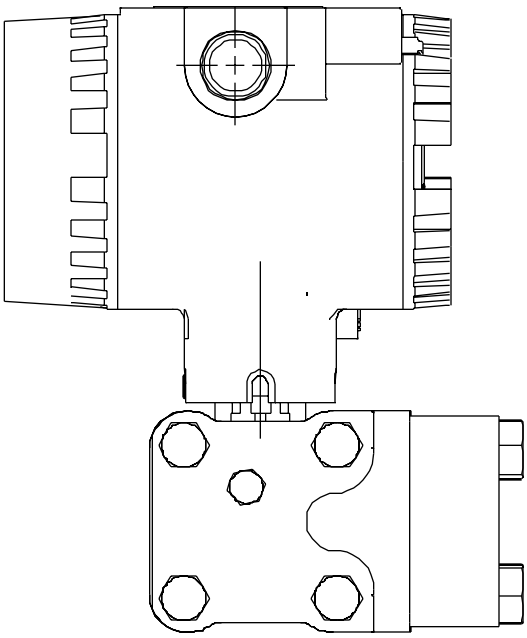
FLANGE TYPE MOUNTING BRACKET

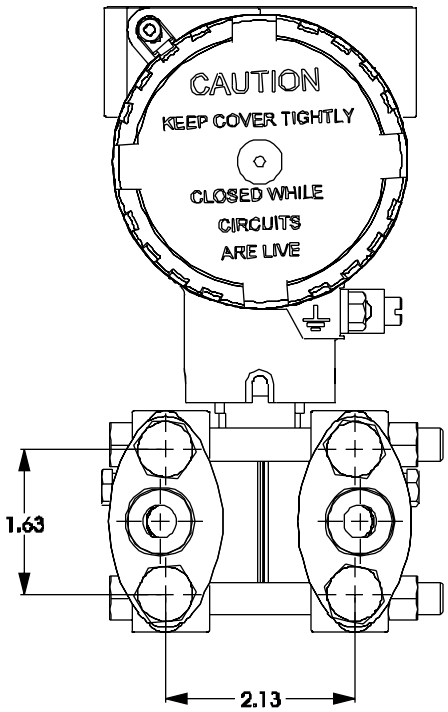


NECK TYPE MOUNTING BRACKET

Physical Dimensions







MANIFOLD ADAPTER OPTION