



Technology Solutions

# TEK-BAR 3110B

Smart Differential Pressure Transmitter



PRESSURE

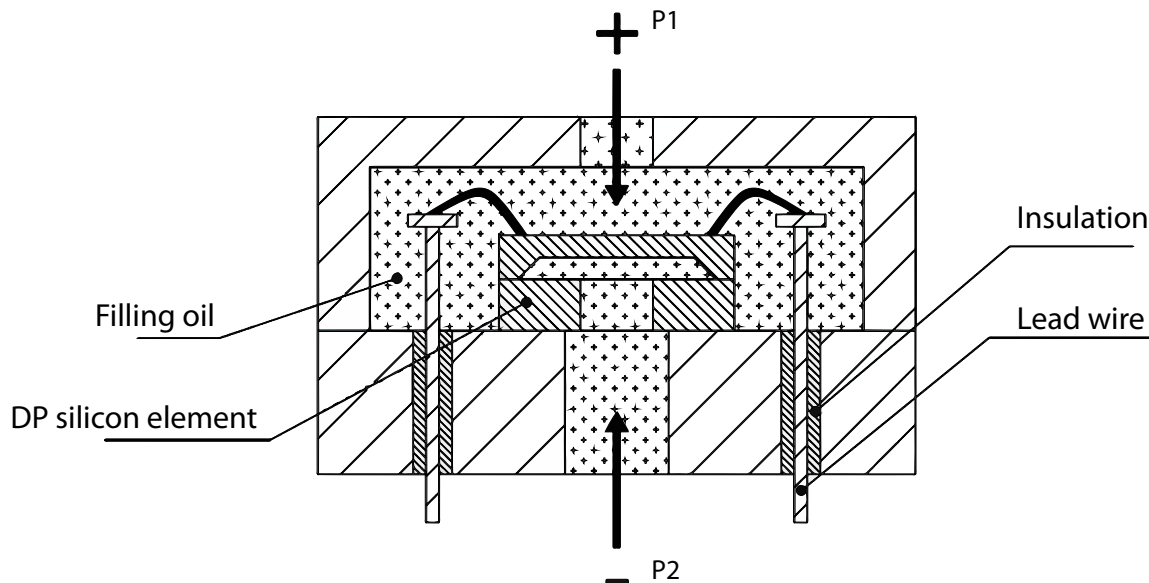


## Introduction

Tek-Bar 3110B Smart Differential Pressure Transmitter uses the world's advance single crystal silicon pressure sensor technology and state-of-the-art encapsulation technology. This is high performance pressure transmitter with HART communication protocol. It is used to measure liquid, gas, or steam flow, as well as liquid level, density, and pressure. It has accuracy up to 0.075% of URL and IP66 water-proof protection.

## Measuring Principle

The Tek-Bar 3110B works on the principle of mono silicon technology. The pressure sensor of the transmitter is located on the top of the metal body, away from the service fluid. This enables mechanical and thermal isolation of the sensor from the fluid in service. When pressure is applied on the diaphragm and the two pairs of piezo-resistors, they become stressed and undergo a change in voltage resistance. This change in resistance is directly proportional to the applied pressure, which is transferred to the transmitter body using lead wires. Built on semiconductor technology, the resistance change (piezoelectric effect) is notably higher than exhibited in standard strain gauges. Therefore, the sensitivity of mono-crystalline sensors is higher than the sensitivity of most other types.



## Benefits

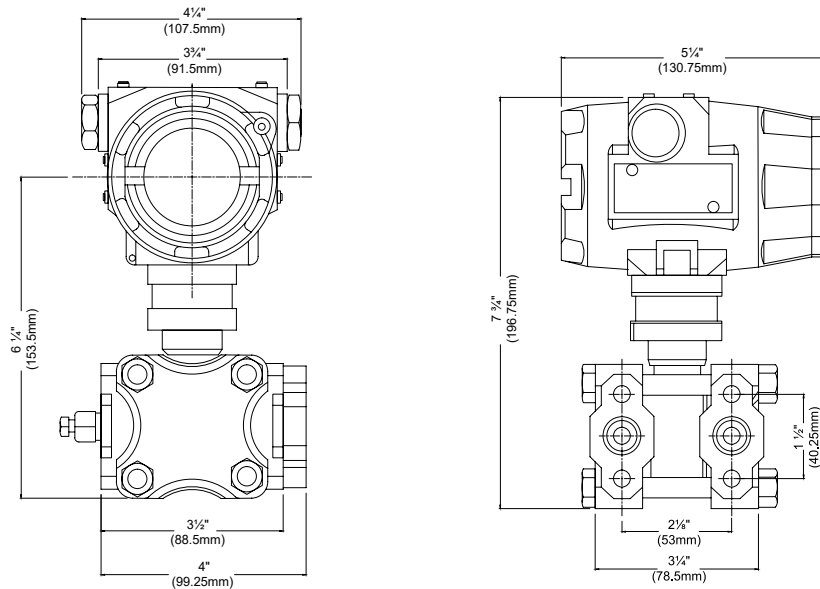
- Digital communication HART protocol
- High performance
- High accuracy up to  $\pm 0.075\%$
- It can be used to measure liquid, gas, and steam flow as well as liquid level, density, and pressure
- Various Output: 4-20 mA, digital signals with HART<sup>®</sup> Communication (Optional Modbus RS485 and 1 to 5VDC)
- Multiple temperature and linearity compensation to improve accuracy
- Fully-sealed and fully isolated silicon pressure sensor
- Superior stainless steel process flange
- Dual diaphragm overload protection, it can easily cope with overload tests
- CSA Class I Div I Approved

## Applications

- It is used in various industries like food and beverages, chemical, water and waste water industries.
- It is used to measure liquid, Gas or steam flow as well as liquid level, density and pressure.
- Measurement of Differential pressure across Flue gas duct.

## Dimensional Drawing

### Drawing and Dimension with Display



## Specifications

Pressure Type	Differential
Reference Accuracy	±0.075% F.S.
Wetted Materials	Hastelloy C and 316 LSS
Measuring Range	24" W.C. to 1450psid
Stability	±0.2% URL/5 year
Process Connection	1/4" NPT Female
Working Humidity	5 to 100% RH at 104°F
Output Signal	4 mA to 20 mA with HART® Communication (Optional Modbus RS485 and 1 to 5VDC)
Electrical Connection	1/2" NPT female
HART Loop Resistance	250 to 550ohm
Approvals	CE, CSA Class I Div I
Weight (Excluding Option Items)	8.81lb (without mounting bracket and process connection adapter)
Testing Standard	IEC60770

## Damping Time

Damping time of amplifier	0-100 s adjustable
Diaphragm capsule (isolated diaphragm and silicon oil filling) damping time	≤0.2 s
Start-up after power off	≤6 s
Normal services after data recovery	≤3 s

## Environmental Conditions

Working Temperature	-40 °F to 185 °F (-40 °C to 85 °C)
	Integrated LCD display: -4 °F to 158 °F (-20 °C to 70 °C)
Storage Temperature	-40 °F to 230 °F (-40 °C to 110 °C)
	Integrated LCD display: -40 °F to 185 °F (-40 °C to 85 °C)
Media Temperature	Silicon oil filling: -40 °F to 248 °F (-40 °C to 120 °C)
Working Humidity	5-100% RH at 104°F

## Power Supply

Standard	10.5 to 55VDC
HART Protocol	16.5 to 55VDC, communication load resistance 250 Ω
Load Resistance	0 to 2119Ω for working condition, 250 to 600Ω for HART protocol
Transmission Distance	<3281ft
Power Consumption	≤500 mW at 24 VDC, 20.8 mA

## Measuring Range and Limit

Nominal value	Smallest calibrated span	Lower range limit(LRL)	Upper range limit(URL)	Static pressure limit	High pressure side overload limit	Low pressure side overload limit
24" w.c.	0.80" w.c.	-24" w.c.	24.11" w.c.	3625psid	3625psid	2320psid
160" w.c.	1.60" w.c.	-160.74" w.c.	160.74" w.c.	5800psid	3625psid	2320psid
1000" w.c.	10" w.c.	1000" w.c.	1000" w.c.	5800psid	3625psid	2320psid
145psid	40" w.c.	-2000" w.c.	145psid	5800psid	3625psid	2320psid
435psid	120" w.c.	-2000" w.c.	435psid	5800psid	3625psid	2320psid
1450psid	40" w.c.	-2000" w.c.	1450psid	5800psid	3625psid	2320psid

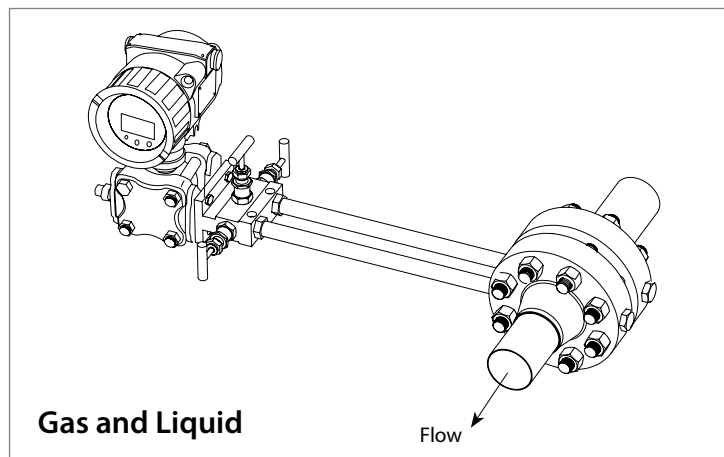
Nominal value	Smallest calibrated span	Lower range limit(LRL)	Upper range limit(URL)	Static pressure limit	High pressure side overload limit	Low pressure side overload limit
6kPa	0.2kPa	-6kPa	6kPa	25MPa	25MPa	16MPa
40kPa	0.4kPa	-40kPa	40kPa	40MPa	25MPa	16MPa
250kPa	2.5kPa	-250kPa	250kPa	40MPa	25MPa	16MPa
1MPa	10kPa	-500kPa	1MPa	40MPa	25MPa	16MPa
3MPa	30kPa	-500kPa	3MPa	40MPa	25MPa	16MPa
10MPa	100kPa	-500kPa	10MPa	40MPa	25MPa	16MPa

Nominal value	Smallest calibrated span	Lower range limit(LRL)	Upper range limit(URL)	Static pressure limit	High pressure side overload limit	Low pressure side overload limit
0.06bar	0.002bar	-0.06bar	0.06bar	250bar	250bar	160bar
0.4bar	0.004bar	-0.4bar	0.4bar	400bar	250bar	160bar
2.5bar	0.025bar	-2.5bar	2.5bar	400bar	250bar	160bar
10bar	0.1bar	-5bar	10bar	400bar	250bar	160bar
30bar	0.3bar	-5bar	30bar	400bar	250bar	160bar
100bar	1bar	-5bar	100bar	400bar	250bar	160bar

## Applications

### Liquid Flow Measurement

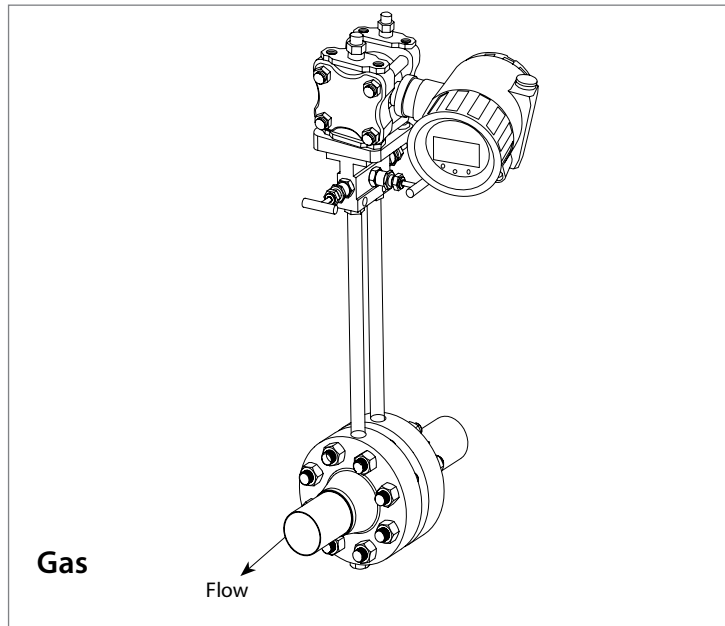
- Place taps to the side of the line to prevent sediment deposits on the transmitters process isolators
- Mount the transmitter beside or below the taps so gases can vent into the process line
- Mount drain/vent valve upward to allow gases to vent



Gas and Liquid

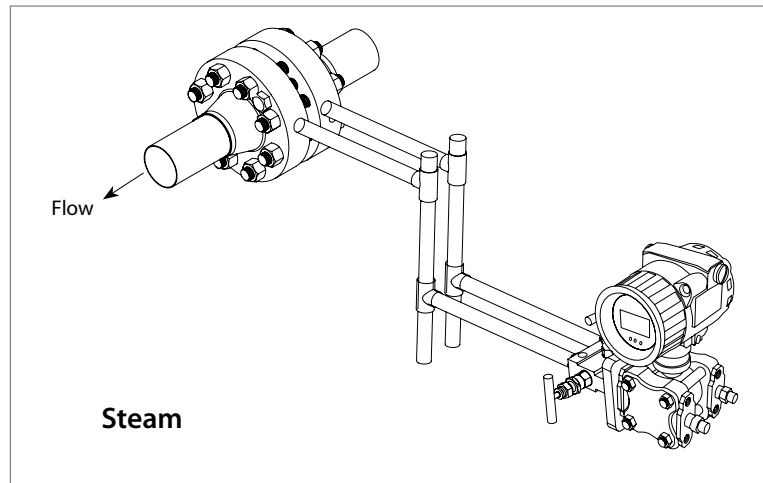
## Gas Flow Measurement

- Place taps in the top or side of the line
- Mount the transmitter beside or above the taps so liquid will drain into the process line



## Steam Flow Measurement

- Place taps to the side of the line
- Mount the transmitter below the taps to ensure that the impulse piping will stay filled with condensate
- In steam service above 250 °F (121 °C), fill impulse lines with water to prevent the steam from contacting the transmitter directly and to ensure accurate measurement at start-up



**Note:** For steam or other elevated temperature services, it is important that temperatures at the process connection do not exceed the transmitters process temperature limits.

## Model Chart

Example	Tek-Bar 3110B-D	3	WP	1	HC	1	#	Tek-Bar 3110B-D-3-WP-1-HC-1
<b>Series</b>	Tek-Bar 3110B-D							Smart Differential Pressure Transmitter
<b>Range Options</b>		1 2 3 4 5 6						0 to 24" w.c. 0 to 160" w.c. 0 to 1000" w.c. 0 to 145 psid 0 to 435 psid 0 to 1450 psid
<b>Approval Rating</b>			WP CSA					General Purpose NEMA 4X/IP66 CSA Class I Div I Explosion-Proof
<b>Process Connections</b>				1 X				¼" NPT Female Diaphragm Seal
<b>Diaphragm Material</b>					HC			Hastelloy C
<b>Electrical Connections</b>						1		½" NPT Female
<b>Options</b>							MOD CC FC BA 3WF 5WF BF TAG O VDC IP68	Modbus RS485 Communication Custom Calibration with 5 point Calibration Certificate Factory Configuration, No Certificate Stainless Steel Bracket (Angle type) with SST Bolts 3-Way Manifold Valve 5-Way Manifold Valve Stainless Steel Bracket (Flat type) with SST Bolts Stainless Steel Hang Tag 1/2"-14 NPTF, Oval Flange Process Connection Adapter (Includes 2 O-rings, adapters, and bolts) 1 to 5VDC Output Submersible Rated

## Popular Models

Model Number	Description
3110B-D-1-CSA-1-HC-1	EXP DP Pressure Transmitter, 0-24" w.c., LCD
3110B-D-2-CSA-1-HC-1	EXP DP Pressure Transmitter, 0-160" w.c., LCD
3110B-D-3-CSA-1-HC-1	EXP DP Pressure Transmitter, 0-1000" w.c., LCD
3110B-D-4-CSA-1-HC-1	EXP DP Pressure Transmitter, 0-145 psid, LCD
3110B-D-5-CSA-1-HC-1	EXP DP Pressure Transmitter, 0-435 psid, LCD

3110B-D-6-CSA-1-HC-1	EXP DP Pressure Transmitter, 0-1450 psid, LCD
3110B-D-1-WP-1-HC-1	DP Pressure Transmitter, 0-24" w.c., LCD
3110B-D-2-WP-1-HC-1	DP Pressure Transmitter, 0-160" w.c., LCD
3110B-D-3-WP-1-HC-1	DP Pressure Transmitter, 0-1000" w.c., LCD
3110B-D-4-WP-1-HC-1	DP Pressure Transmitter, 0-145 psid, LCD
3110B-D-5-WP-1-HC-1	DP Pressure Transmitter, 0-435 psid, LCD



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DOC # TEK/PO/CAT/211115/21108/01.4  
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