



Technology Solutions

# TEK-BAR 3110B

Smart Differential Pressure Transmitter



PRESSURE

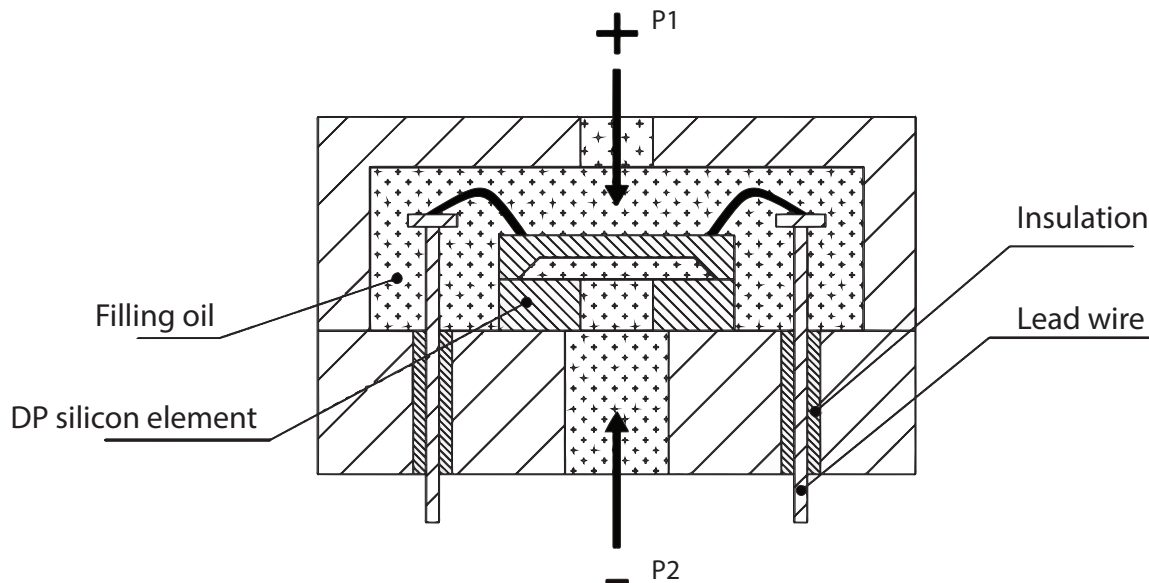


## Introduction

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

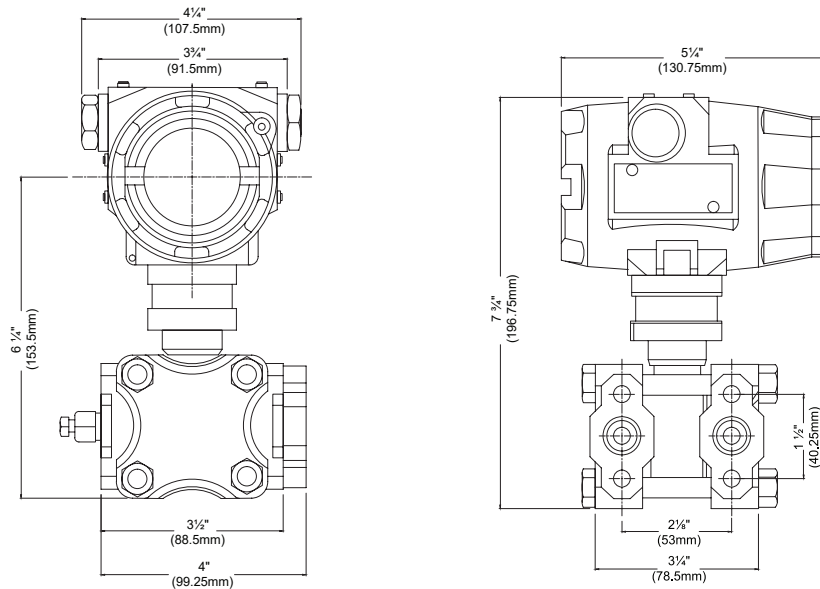
- Digital communication HART protocol
- High performance
- High accuracy up to  $\pm 0.075\%$
- It can be used to measure liquid, gas, and steam flow as well as liquid level, density, and pressure
- Various Output: 4-20 mA, digital signals with HART<sup>®</sup> Communication (Optional Modbus RS485 and 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	25" W.C. to 1500psid
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 limit	Low pressure side limit
25" w.c.	0.8" w.c.	-25" w.c.	25" w.c.	3600psid	3600psid	2300psid
200" w.c.	2" w.c.	-200" w.c.	200" w.c.	5800psid	3600psid	2300psid
1000" w.c.	10" w.c.	-1000" w.c.	1000" w.c.	5800psid	3600psid	2300psid
150psid	1.5psid	-72psid	150psid	5800psid	3600psid	2300psid
450psid	4.5psid	-72psid	450psid	5800psid	3600psid	2300psid
1500psid	15psid	-72psid	1500psid	5800psid	3600psid	2300psid

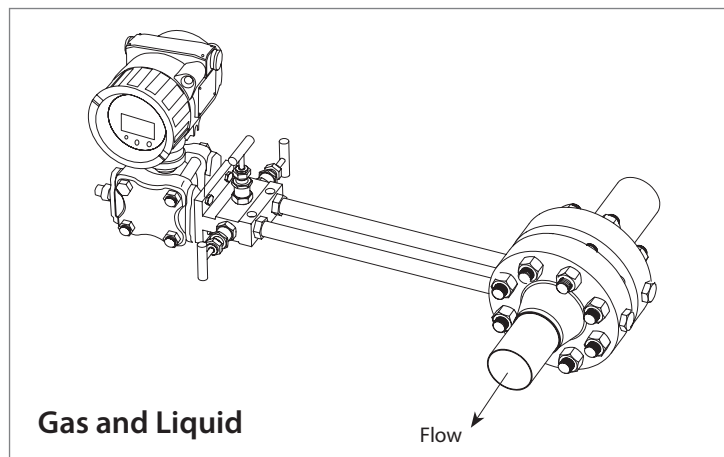
Nominal value	Smallest calibrated span	Lower range limit(LRL)	Upper range limit(URL)	Static pressure limit	High pressure side limit	Low pressure side limit
6kPa	0kPa	-6kPa	6kPa	25MPa	25MPa	16MPa
50kPa	0kPa	-6kPa	50kPa	40MPa	25MPa	16MPa
249kPa	2kPa	-6kPa	249kPa	40MPa	25MPa	16MPa
1MPa	10kPa	-496kPa	1MPa	40MPa	25MPa	16MPa
3MPa	31kPa	-496kPa	3MPa	40MPa	25MPa	16MPa
10MPa	103kPa	-496kPa	10MPa	40MPa	25MPa	16MPa

Nominal value	Smallest calibrated span	Lower range limit(LRL)	Upper range limit(URL)	Static pressure limit	High pressure side limit	Low pressure side limit
0.1bar	0.002bar	-0.01bar	0.1bar	248bar	248bar	159bar
0.5bar	0.005bar	-0.5bar	0.5bar	400bar	248bar	159bar
2.5bar	0.025bar	-2.5bar	2.5bar	400bar	248bar	159bar
10.3bar	0.1bar	-5bar	10.3bar	400bar	248bar	159bar
31.0bar	0.3bar	-5bar	31.0bar	400bar	248bar	159bar
103.4bar	1bar	-5bar	103.4bar	400bar	248bar	159bar

## Applications

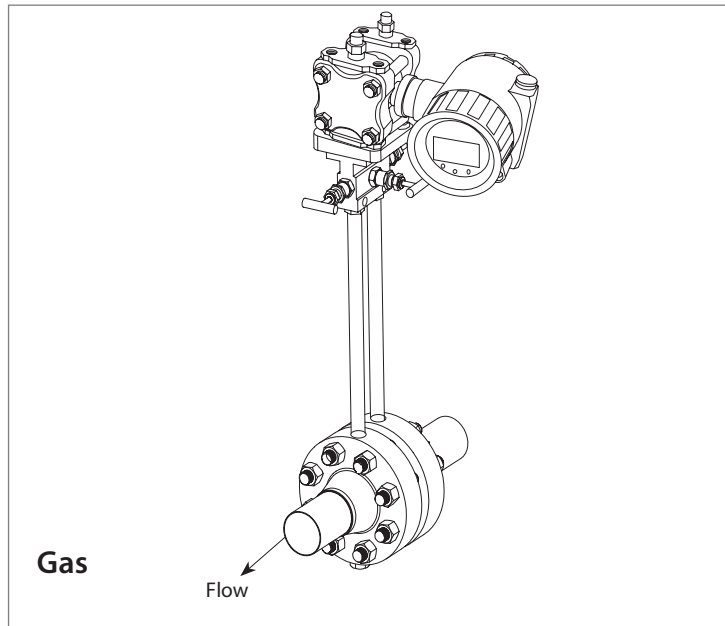
### Liquid Flow Measurement

- 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



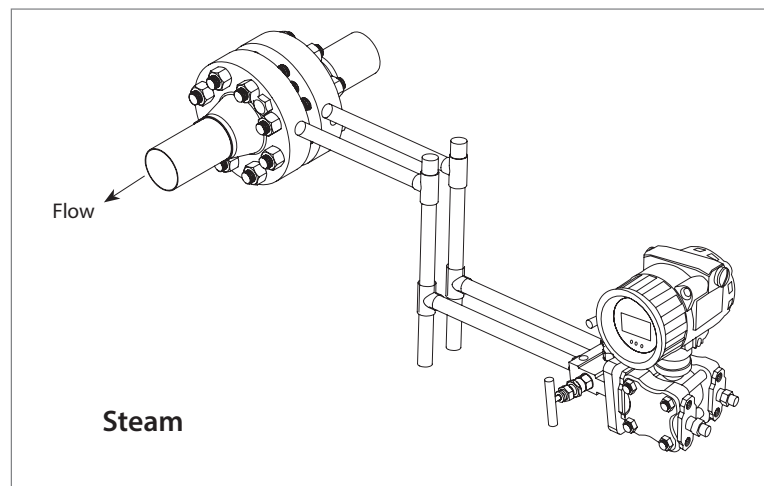
## Gas Flow Measurement

- 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
Series	Tek-Bar 3110B-D							Smart Differential Pressure Transmitter
Range Options		1						0 to 25" w.c. (100:1 Turndown, Adj. Range: -25 to 25 w.c.)
		2						0 to 200" w.c. (100:1 Turndown, Adj. Range: -200 to 200 w.c.)
		3						0 to 1000" w.c. (100:1 Turndown, Adj. Range: -1000 to 1000w.c.)
		4						0 to 150 psid (100:1 Turndown, Adj. Range: -72 to 150 psid)
		5						0 to 450 psid (100:1 Turndown, Adj. Range: -72 to 450 psid)
		6						0 to 1500 psid (100:1 Turndown, Adj. Range: -72 to 1500 psid)
Approval Rating			WP CSA					General Purpose NEMA 4X/IP66 CSA Class I Div I Explosion-Proof
Process Connections				1 X				¼" NPT Female Diaphragm Seal
Diaphragm Material					HC			Hastelloy C
Electrical Connections						1		½" NPT Female
Options							MOD	Modbus RS485 Communication
							CC	Custom Calibration with 5 point Calibration Certificate
							FC	Factory Configuration, No Certificate
							BA	Stainless Steel Bracket (Angle type) with SST Bolts
							3WF	3-Way Manifold Valve
							5WF	5-Way Manifold Valve
							BF	Stainless Steel Bracket (Flat type) with SST Bolts
							TAG	Stainless Steel Hang Tag
							O	1/2"-14 NPTF, Oval Flange Process Connection Adapter (Includes 2 O-rings, adapters, and bolts)
						VDC	1 to 5VDC Output	
						IP68	Submersible Rated	

## Popular Models

Model Number	Description
3110B-D-1-CSA-1-HC-1	EXP DP Pressure Transmitter, 0-25" w.c., LCD
3110B-D-2-CSA-1-HC-1	EXP DP Pressure Transmitter, 0-200" 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, 0-150 psid, LCD
3110B-D-5-CSA-1-HC-1	EXP DP Pressure Transmitter, 0-450 psid, LCD
3110B-D-6-CSA-1-HC-1	EXP DP Pressure Transmitter, 0-1500 psid, LCD

3110B-D-1-WP-1-HC-1	DP Pressure Transmitter, 0-25" w.c., LCD
3110B-D-2-WP-1-HC-1	DP Pressure Transmitter, 0-200" 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, 0-150 psid, LCD
3110B-D-5-WP-1-HC-1	DP Pressure Transmitter, 0-450 psid, LCD



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