PK2000 Diaphragm Sealing System

The core component of a pressure transmitter - diaphragm

It's the first point of contact with the medium, serving as the primary barrier for pressure sensing and protecting the transmitter's internal precision components. Its performance directly determines the transmitter's accuracy, stability, service life, and applicable scenarios. Below, we will introduce the structure, materials, and filling oil of t diaphragm sealing system.

1

Core Functions and Product Structure of the Diaphragm

The diaphragm is a system that transmits process pressure to the internal sensor. Its core functions include

❶ Pressure sensing

❷ Medium isolation

❸ Pressure transmission

The advantages of the diaphragm system are as follows:

- Process connection forms such as flanges are widely applicable to various working conditions
- It can measure various high and low temperature media, with a temperature range of -100~700℃
- Configurable capillary for remote measurement

According to different applications, its structure can be divided into the following categories

Differential pressure diaphragm system

Dual Diaphragm System:
This structure employs isolation diaphragms (e.g., flange-mounted) on both the high-pressure (HP) side and low-pressure (LP) side, connected to the differential pressure transmitter body via a capillary filling system. The dual diaphragm system is particularly suited for measuring liquid level in sealed containers or differential pressure, effectively handling corrosive, viscous, or high-temperature media.

Single Diaphragm System:
This design features a diaphragm (e.g., flange-mounted) on one side, while the other side is either directly exposed to process pressure or vented to atmospheric pressure. It is particularly suitable for liquid level measurement in open containers.

Absolute pressure and gauge pressure diaphragm system

Pressure transmitters with metal diaphragm seals are primarily used in process industries and hygienic/sanitary applications, designed to measure the pressure or liquid level of both liquids and gases.

2

Diaphragm Materials

The choice of material is critical to a diaphragm system's ability to withstand demanding operating conditions. Different materials are suited for different media environments.

316L Stainless Steel
Appearance: Metallic silver
Properties: Balanced corrosion resistance and cost-effectiveness
Applications: Non-aggressive media (water, steam, air, oils)

Hastelloy Alloy
Appearance: Dull gray metallic (darker than 316L)
Properties: Superior resistance to chlorides and reducing agents
Applications: Harsh chemical environments (sulfuric/hydrochloric acid)

PFA Coating
Appearance: Black/white rubber-like smooth surface
Properties: Chemically inert, non-stick, FDA-compliant
Applications: Viscous/crystallizing media, sanitary industries (food/pharma)

Tantalum
Appearance: Dark gray, dense texture
Properties: Unmatched hydrochloric acid resistance (especially hot concentrated)
Applications: Extreme corrosion scenarios

Inconel Alloy
Appearance: Similar to Hastelloy (nickel-chromium metallic)
Properties: High-temperature/oxidation resistance
Applications: Aerospace, superheated steam systems

Gold Plating
Appearance: Golden-yellow layer
Properties: Hydrogen embrittlement prevention, ultra-purity compatibility
Applications: Hydrogen measurement, semiconductor processes

3

The cavity between the diaphragm and transmitter is filled with hydraulic fluid, which:

Incompressibly and uniformly transmits pressure from the diaphragm to the internal sensor.
Ensures high-fidelity signal transmission while protecting sensitive components.

Code	Description	Temperature range	Typical applications
A	Silicone oil	-40 to 300° C	Wide temp range, stable for water/ steam/mild chemicals
B	High temperature silicone oil	-25 to 400° C	Extreme high temperature applications. Measurement of ultra-high temperature media such as steam and high t emperature oil.
C	Low temperature silicone oil	-60 to 150° C	Low viscosity, low-temperature fluidity, suitable for measuring cryogenic media such as LNG, liquid nitrogen, and liquid oxygen, to prevent solidification
D	Food grade	-20 to 230° C	It is non-toxic and harmless, and even if the membrane ruptures, it will not cause contamination. It is suitable for use in food, beverage, pharmaceutical , and biotechnology industries.
E	Fluoro oil	-20 to 175° C	High compatibility and safety. It is extremely chemically inert and compatible with strong oxidizing media (such as oxygen and chlorine), without Reaction occurs
F	Special silicone fluid	-100 to 200° C	Ultra-low temperature application, measuring cryogenic liquid nitrogen

Selection Table

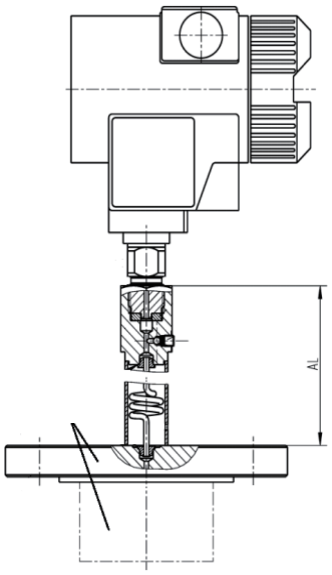
Key Parameters:

Viscosity (cSt)
- Impacts pressure transmission response speed
- Low-viscosity fluids enable faster signal response

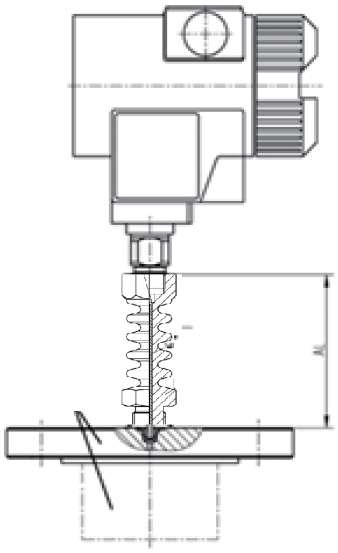
Specific Gravity
- Affects static pressure difference when installation height differs from transmitter
- Requires compensation for high-precision measurements

Transmitter Mounting:		
	1	Direct
	2	Cooling tower Direct
	3	..... m capillary 316L
	4	..... m capillary PVC>316L
Process Connection:		
	FA	DN25 PN10-40 B1, 316L flange EN1092-1 (DIN2527 D)
	FB	DN32 PN10-40 B1, 316L flange EN1092-1 (DIN2527 D)
	FC	DN50 PN10-40 B1, 316L flange EN1092-1 (DIN2527 D)
	FD	DN80 PN10-40 B1, 316L flange EN1092-1 (DIN2527 D)
	FE	DN100 PN10-16 B1, 316L flange EN1092-1 (DIN2527 C)
	FF	DN100 PN25-40 B1, 316L flange EN1092-1 (DIN2527 D)
	FG	NPS 1" Cl.150 RF, 316/316L flange ASME B16.5
	FH	NPS 1-1/2" Cl.150 RF, 316/316L flange ASME B16.5
	FI	NPS 1-1/2" Cl.300 RF, 316/316L flange ASME B16.5
	FJ	NPS 2" Cl.150 RF, 316/316L flange ASME B16.5
	FK	NPS 2" Cl.300 RF, 316/316L flange ASME B16.5
	FL	NPS 3" Cl.150 RF, 316/316L flange ASME B16.5
	FM	NPS 3" Cl.300 RF, 316/316L flange ASME B16.5
	FN	NPS 4" Cl.150 RF, 316/316L flange ASME B16.5
	FO	NPS 4" Cl.300 RF, 316/316L flange ASME B16.5
	FP	10K 50A RF, 316L flange JIS B2220
	FQ	10K 80A RF, 316L flange JIS B2220
	FR	10K 100A RF, 316L flange JIS B2220
	SA	DIN11851 DN32 PN40 slotted-nut, 316L,EHEDG, 3A
	SB	DIN11851 DN50 PN25 slotted-nut, 316L,EHEDG, 3A
	SC	DIN11851 DN65 PN25 slotted-nut, 316L,EHEDG, 3A
	SD	DIN11851 DN80 PN25 slotted-nut, 316L,EHEDG, 3A
	SE	DIN11851 DN40 PN40 slotted-nut, 316L,EHEDG, 3A
	TA	Tri-Clamp ISO2852 DN25 (1"), 316L,DIN32676 DN25, EHEDG, 3A
	TB	Tri-Clamp ISO2852 DN38 (1-1/2"), 316L,DIN32676 DN40, EHEDG, 3A
	TC	Tri-Clamp ISO2852 DN51 (2"), 316L,EHEDG, 3A
	TD	Tri-Clamp ISO2852 DN63.5 (2-1/2"), 316L EHEDG, 3A, ASME-BPE
	TE	Tri-Clamp ISO2852 DN76.1 (3"), 316L EHEDG, 3A
	UF	SMS 1-1/2" PN25, 316L, EHEDG, 3A
	UG	SMS 2" PN25, 316L, EHEDG, 3A
	UH	DRD 65mm PN25, 316L
	UK	Varivent F tube DN25-32 PN40, 316L,EHEDG, 3A
	UL	Pancake DN50 PN16-400, 316L
	UM	Pancake DN80 PN16-400, 316L
	UN	Pancake DN100 PN16-400, 316L
	UP	Pancake 2" 150-2500lbs, 316L
	UR	Pancake 3" 150-2500lbs, 316L
	US	Pancake 4" 150-2500lbs, 316L
	UT	Universal adapter 44mm 316L, 3A, incl. silicone shape sealEHEDG,
Membrane Material:		
	1	316L
	2	AlloyC
	3	Monel
	5	Tantalum
	6	Gold>316L
	8	0.25mm PFA>316L
Fill Fluid:		
	A	Silicone oil
	B	High temperature silicone oil
	C	Low Temperature Silicone Oil
	D	Food grade
	E	Fluoro oil
	F	Special Silicone fluid

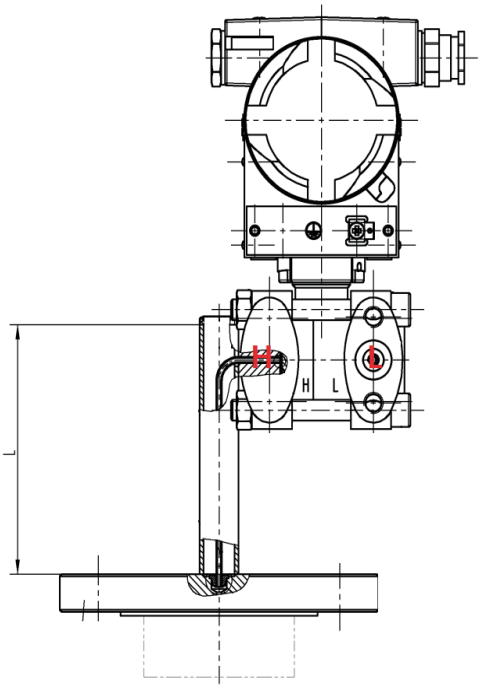
Product Appearance Diagram



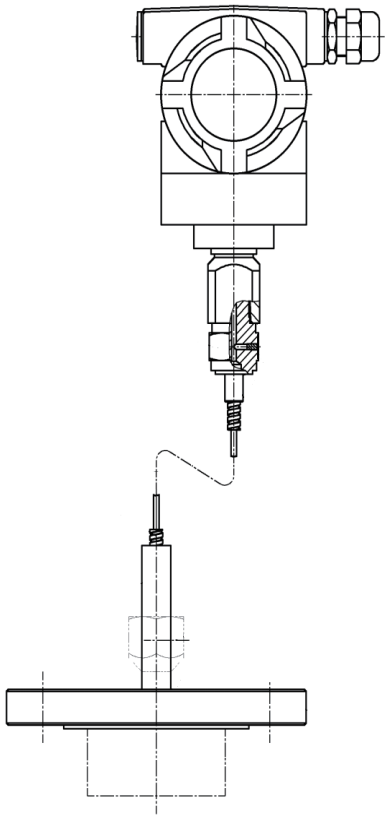
Direct Mounting



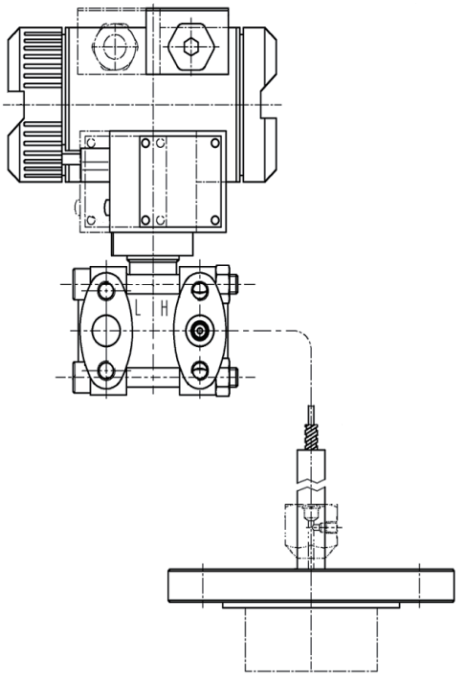
Direct Mounting with Cooling Tower



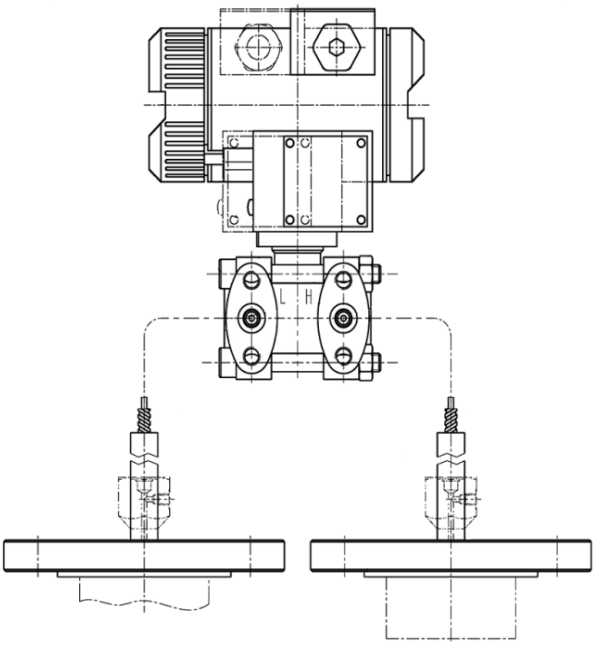
Direct Mounting



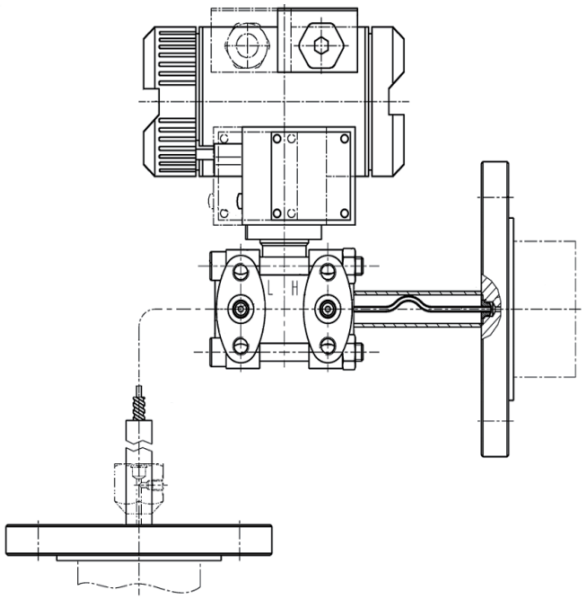
Remote Seal with Capillary



Remote Seal with Capillary



Two Side Remote Seal



Direct Mounting + One Side Remote Seal

BICCNS®

Tel ：+8613260630831

E-mail ：globalmarket@baiconsensor.com

Website ：en.baiconsensor.com

Address： Plant 402, Building 1, 3E Industrial Park, Xiangcheng District, Suzhou 215127, Jiangsu, China