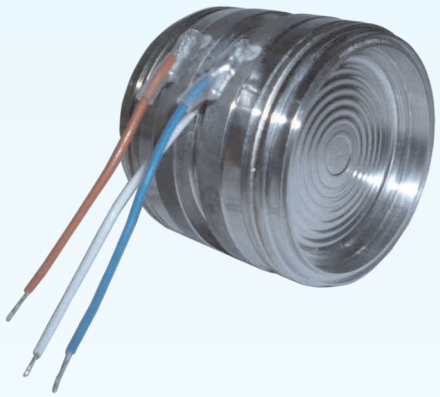
Model 115C
Metal Capacitive Differential Pressure Sensors

Description

The model 115C is a capacitive differential pressure sensor, based on the BCM metal capacitor technology. The sensing element is composed of two stationary capacitor plates and one movable sensing diaphragm. The sensing diaphragm is located between the two capacitor plates, and it forms two separated chambers together with each capacitor plate. The whole sensing element is packaged in a 316L SS (stainless steel) housing which is filled with silicone oil. Through the filling oil, measured pressures can be transferred from two 316L SS isolating diaphragms to the sensing element. If these two pressures are different, the sensing plate will be forced to move closer to one of the capacitor plates. As a result, the electrical output signal can be created by means of the capacitance change between the sensing plate and the two capacitor plates.

For different applications, there are different types of fill fluid available for this model. The sensor can be filled with the standard type-A fluid for common industry of general purpose, with the type-B fluid suitable for oxygen industry, or with the type-C fluid suitable for tobacco industry.

The 115C is designed to have a wide variety of pressure ranges from 0~16 mbar differential (D) pressure to 0~410 bar gauge (G) pressure. Owing to the large diameter diaphragm, the sensor is enabled to measure viscous fluids or fluids with particles, and it is also compatible with corrosive media. Tantalum, Hastelloy-C, or Monel diaphragms are available on request for stronger corrosive media applications. The 115C which can be sealed by O-rings features wetted parts with a diameter of 41.4mm.



Features

- pressure ranges & types:
  - D: 0~16 mbar, ... , ~100 bar
  - G: 0~16 mbar, ... , ~410 bar
  - A: 0~2 bar, ... , ~200 bar
- static pressure: up to 320 bar for diff. pressure applications
- overload pressure: up to 520 bar for gauge pressure applications
- 100% stainless steel construction
- material of diaphragm: 316L stainless steel (SS)
  option: Hastelloy-C, Tantalum, or Monel

Applications

- process control systems
- hydraulic systems
- liquid level control
- biomedical instruments
- flow measurement
- OEM equipment

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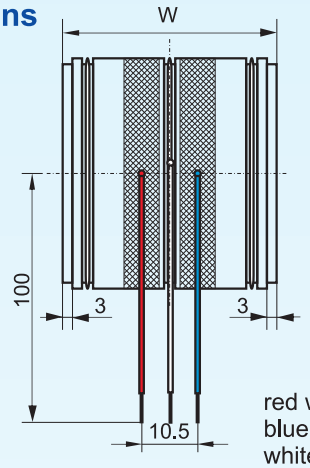
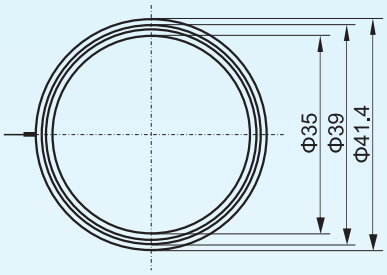
Dimensions



Pressure Range (bar)	W (mm)
0~0.016, ..., ~2	35.6
0~10	37
0~25	37.4
0~100	39
0~200	40.1, 39(#)
0~410	39



(#): Applicable for 520bar static pressure.

red wire: high pressure side
blue wire: low pressure side
white wire: sensor housing

Note: All dimensions are in mm.

Technical Data

Parameters		Units	Specifications							Notes
pressure medium			gas, dilute liquid, paste, viscous fluid or fluid with grains, as long as it is compatible with the materials of 115C wetted parts							
differential pressure (D) ranges		bar, D	0~0.016	~0.06	~0.4, ~2, ~10	~25	~100			
static pressure		bar	20	40	100 (STD), 250, 320	125	200			1
differential overload pressure		bar	20	40	100 (STD), 250, 320	125	200			
gauge pressure (G) ranges		bar, G	0~0.016	~0.06	~0.4, ~2, ~10	~25	~100	~200	~410	
absolute pressure (A) ranges		bar, A	-	-	0~2, ~10	~25	~100	~200	-	
overload for G & A pressures		bar	20	40	100 (STD), 250, 320	125	200	250 (STD), 520	520	
capacitance at full scale	CH	pF	⩽ 100, 120 in case of 0.016barD/G							2 & 3
	CL	pF	⩾ 200							2 & 3
zero offset	CH & CL	pF	140±30; 110±30 in case of 2barD/G/A; 120±30 in case of 200barG/A; 140±40 in case of 520bar static pressure							
accuracy		%fs	±0.8							4 & 5
long-terms stability		%fs/year	⩽ ±0.25; ⩽ ±0.5 in case of 0.016barD/G, or 200barG/A							
zero variation caused by static pressure		%fso	⩽ ±0.5							6 & 7
span variation caused by static pressure		%fso	⩽ ±0.5							6 & 7
operating temperature range		°C	-40 ~ +120 (standard), fill fluid type-A for common industry. -40 ~ +130, fill fluid type-B suitable for oxygen industry. -40 ~ +130, fill fluid type-C suitable for tobacco industry.							
storage temperature range		°C	-40 ~ +120							
temperature coefficient of zero		%fso/°C	⩽ ±0.04							7
temperature coefficient of span		%fso/°C	⩽ ±0.08							7
insulation resistance		MΩ	⩾ 500 @100Vdc							
response time		ms	⩽ 100 in case of ranges > 0.06bar; ⩽ 400 in case of 0~0.06bar range							
electrical interface			3 colored flying wires with FEP (one kind of Teflon) insulation, length = 100mm							
diaphragm material			316L SS (standard); option: Hastelloy-C, Tantalum, or Monel							
housing material			3J53 alloy steel							
weight		g	~280							

General conditions for measurements: media temperature = 25°C, ambient temperature = 25°C, humidity = 60%RH.

Notes:
1. "STD" refers to standard.
2. CH is the capacitance measured between the red and white wires, while CL is the capacitance measured between the blue and white wires.
3. The listed capacitances are typical values. For batch production, CH has deviation of ⩽ ±30pF while CL has deviation of ⩽ ±40pF.
4. "fs" refers to full scale pressure.
5. Accuracy = sqrt (non-linearity^2 + hysteresis^2 + repeatability^2).
   The non-linearity, hysteresis, and repeatability are calculated by K values which are defined as K = (CL - CH) / (CL + CH).
6. The variations of zero and span can be eliminated when the 115C DPS is associated with an electronics circuit which is adjusted to the given static pressure.
7. Calculated by K values which are defined in Note 5 above.

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Ordering Information

example: 115C(DP)-2-100-S-0.8%fs-TA-12-FW-(*)

pressure types
115C(DP) 115C for DP applications
115C(hDP) refers to DP of high static pressure of 250bar or 320bar
115C(AP) 115C for absolute pressure applications
115C(GP) 115C for gauge (relative) pressure applications

pressure ranges & types vs static (overload) pressure	
0.016 = 0~16mbarD(^), or G	vs 20bar
0.06 = 0~60mbarD(^), or G	vs 40bar
0.4 = 0~400mbarD(^), or G	vs 100bar (standard), 250bar, or 320bar
2 = 0~2barD(^), G, or A	vs 100bar (standard), 250bar, or 320bar
10 = 0~10barD(^), G, or A	vs 100bar (standard), 250bar, or 320bar
25 = 0~25barD(^), G, or A	vs 125bar
100 = 0~100barD(^), G, or A	vs 200bar
200 = 0~200barG, or A	vs 250bar (standard), or 520bar
410 = 0~410barG	vs 520bar
(^): DP sensors can work with both DP≤0 and DP≥0, e.g., 0~2barD = measuring range of both -2~0bar and 0~+2bar.	

static (overload) pressure
20 = 20bar in case of 16mbarD/G
40 = 40bar in case of 60mbarD/G
100 = 100bar in case of 400mbarD/G, 2barD/G/A, or 10barD/G/A
125 = 125bar in case of 25barD/G/A
200 = 200bar in case of 100barD/G/A
250 = 250bar in case of 400mbarD/G, 2barD/G/A, 10barD/G/A, or 200barG/A
320 = 320bar in case of 400mbarD/G, 2barD/G/A, or 10barD/G/A
520 = 520bar in case of 200barG/A, or 413.7barG

output signal
S = differential capacitive signal

accuracy
0.8%fs

operating temperature range
TA = -40 ~ +120°C (standard, fill fluid type-A for common industry)
TB = -40 ~ +130°C (fill fluid type-B for oxygen industry)
TC = -40 ~ +130°C (fill fluid type-C for tobacco industry)

diaphragm material
12 = 316L SS (standard)
13 = Hastelloy-C
14 = Tantalum
15 = Monel

electrical interface
FW = flying wires, length = 100mm. Wire length can be customized, e.g, FW(50mm).

"(*)" is necessary only if any customized parameter is required, otherwise it is neglectable.

Examples of Ordering Code

- standard sensor:

  115C(hDP)-2-250-S-0.8%fs-TA-12-FW

The listed dimensions, specifications, and ordering information are subject to change without prior notice.

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