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 0~75 mbar differential (D) pressure to 0~413.7 bar gauge (G) pressure with an accuracy up to 0.2%fs (full scale). 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 40.8mm.

Features

- pressure ranges & types:
  - D: 0~75 mbar, ... , 0~68.9 bar
  - G: 0~75 mbar, ... , 0~413.7 bar
  - A: 0~374 mbar, ... , 0~68.9 bar
- static pressure: up to 320 bar for diff. pressure applications
- overload pressure: up to 520 bar for gauge pressure applications
- accuracy up to 0.2%fs
- 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

![Dimensions Diagram]

W < 35.1 (for ranges II, III)
W ≥ 35.1 (for ranges IV, ..., IX)

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

Technical Data

<table>
<thead>
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<th>Parameters</th>
<th>Units</th>
<th>Specifications</th>
<th>Notes</th>
</tr>
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<tbody>
<tr>
<td>pressure medium</td>
<td></td>
<td>gas, dilute liquid, paste, viscous fluid or fluid with grains, as long as compatible with the diaphragm material of 115C</td>
<td></td>
</tr>
<tr>
<td>differential pressure (D) ranges</td>
<td>bar, D</td>
<td>0<del>0.075, 0</del>0.374, 0<del>1.868, 0</del>6.9, 0<del>20.68, 0</del>68.9</td>
<td></td>
</tr>
<tr>
<td>static pressure</td>
<td>bar</td>
<td>69, 138, 320</td>
<td></td>
</tr>
<tr>
<td>differential overload pressure</td>
<td>bar</td>
<td>69, 138, 320</td>
<td></td>
</tr>
<tr>
<td>gauge pressure (G) ranges</td>
<td>bar, G</td>
<td>0<del>0.075, 0</del>0.374, 0<del>1.868, 0</del>6.9, 0<del>20.68, 0</del>68.9</td>
<td>0<del>206.8, 0</del>413.7</td>
</tr>
<tr>
<td>absolute pressure (A) ranges</td>
<td>bar, A</td>
<td>- 0<del>0.374, 0</del>1.868, 0<del>6.9, 0</del>20.68, 0~68.9</td>
<td>-</td>
</tr>
<tr>
<td>overload pressure for G &amp; A pressures</td>
<td>bar</td>
<td>69, 138, 320</td>
<td></td>
</tr>
<tr>
<td>full scale output</td>
<td>pF</td>
<td>90±40 measured from high pressure side, i.e., between red and white wires. 280±40 measured from low pressure side, i.e., between blue and white wires.</td>
<td></td>
</tr>
<tr>
<td>zero offset</td>
<td>pF</td>
<td>120±20 in case of pressure range of 1.868bar; 140±40 in case of the other ranges</td>
<td></td>
</tr>
<tr>
<td>accuracy</td>
<td>%fs</td>
<td>±0.2 in case of pressure ranges of 0.374bar, 1.868bar, 6.9bar, 20.68bar; ±0.25 in case of pressure ranges of 0.075bar, 68.9bar, 206.8bar, 413.7bar; ±0.5 (standard)</td>
<td>1 &amp; 2</td>
</tr>
<tr>
<td>long-terms stability</td>
<td>%/fs/year</td>
<td>≤ ±0.25</td>
<td></td>
</tr>
<tr>
<td>zero variation caused by static pressure</td>
<td>%/fso</td>
<td>≤ ±0.5</td>
<td>3</td>
</tr>
<tr>
<td>span variation caused by static pressure</td>
<td>%/fso</td>
<td>≤ ±0.5</td>
<td>3</td>
</tr>
<tr>
<td>operating temperature range</td>
<td>°C</td>
<td>-20 ~ +93 (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.</td>
<td></td>
</tr>
<tr>
<td>storage temperature range</td>
<td>°C</td>
<td>-40 ~ +105</td>
<td></td>
</tr>
<tr>
<td>temperature coefficient of zero</td>
<td>%/fso/°C</td>
<td>≤ ±0.025</td>
<td></td>
</tr>
<tr>
<td>temperature coefficient of span</td>
<td>%/fso/°C</td>
<td>≤ ±0.025</td>
<td></td>
</tr>
<tr>
<td>insulation resistance</td>
<td>MΩ</td>
<td>&gt; 500 @100Vdc</td>
<td></td>
</tr>
<tr>
<td>response time</td>
<td>ms</td>
<td>≤ 100 in case of ranges &gt; 0.075bar; ≤ 400 in case of 0~0.075bar range</td>
<td></td>
</tr>
<tr>
<td>electrical interface</td>
<td></td>
<td>3 colored flying wires with FEP (Teflon) insulation, length = 50mm</td>
<td></td>
</tr>
<tr>
<td>diaphragm material</td>
<td></td>
<td>316L SS (standard); option: Hastelloy-C, Tantalum, or Monel</td>
<td></td>
</tr>
<tr>
<td>housing material</td>
<td></td>
<td>3.53 alloy steel</td>
<td></td>
</tr>
<tr>
<td>weight</td>
<td>g</td>
<td>~280</td>
<td></td>
</tr>
</tbody>
</table>

Notes:
1. "fs" refers to full scale pressure.
2. Accuracy = sqrt (non-linearity + hysteresis + repeatability).
3. 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.
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Ordering Information

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

- **pressure ranges & types vs static (overload) pressure**
  - II = 0~75mbarD or G vs 69bar, 138bar, or 320bar
  - III = 0~374mbarD, G, or A vs 138bar or 320bar
  - IV = 0~1.868barD, G, or A vs 138bar or 320bar
  - V = 0~6.9barD, G, or A vs 138bar or 320bar
  - VI = 0~20.68barD, G, or A vs 138bar or 320bar
  - VII = 0~68.9barD, G, or A vs 138bar or 320bar
  - VIII = 0~206.8barG vs 520bar
  - IX = 0~413.7barG vs 520bar

- **static (overload) pressure**
  - 69 = 69bar in case of DP ranges II, ..., VII
  - 138 = 138bar in case of ranges II, ..., VII
  - 320 = 320bar in case of ranges II, ..., VII
  - 520 = 520bar in case of G ranges VIII or IX

- **output signal**
  - S = differential capacitive signal

- **accuracy**
  - 0.2%fs in case of ranges III, IV, VI
  - 0.25%fs in case of ranges II, VII, VIII, IX
  - 0.5%fs (standard)

- **operating temperature range**
  - TA = -20 ~ +93°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

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

**Examples of Ordering Code**

- **standard sensor:**
  
  115C(DP)-V-138-S-0.5%fs-TA-12

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