



Level



Pressure



Flow



Temperature



Liquid  
Analysis



Registration



Systems  
Components



Services



Solutions

Technical Information

## Ceracore UCS2

Pressure sensor element

Ceramic sensor with compensated sensor output signal



### Application

- The pressure sensor element Ceracore UCS2 delivers a pressure-proportional voltage signal
- Endress+Hauser offers support for the integration of the Ceracore UCS2 into the customized application

### Your benefits

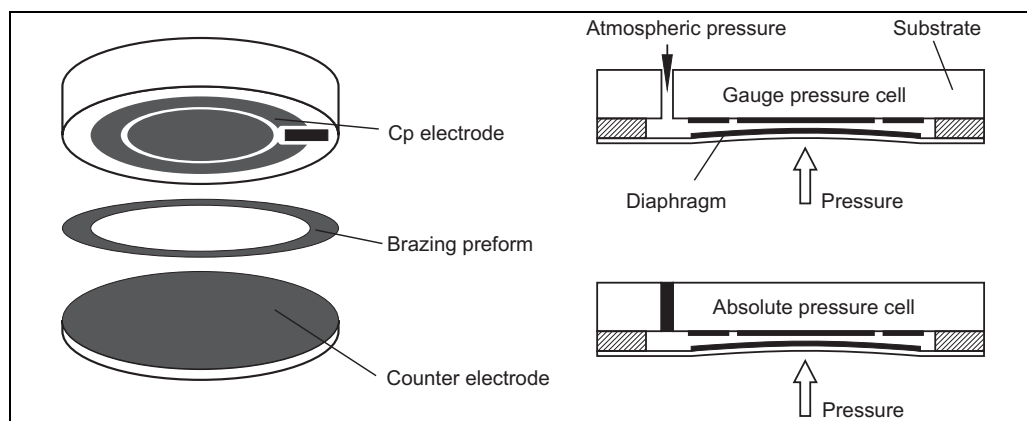
- Dry capacitive ceramic sensor
- Basic ceramic material (99.9 %  $\text{Al}_2\text{O}_3$ )
  - extremely high overload limit
  - absolutely resistant to wear
  - high temperature stability
  - high long-term stability
  - no hysteresis
  - corrosion-resistant
- Active electronics
  - sensor-specific signal conditioning
  - high-accuracy pressure measurement with temperature stability

## Function and system design

### Measuring principle

The Ceracore UCS2 basic material is  $\text{Al}_2\text{O}_3$  (99.9 %), a highly resistant ceramic material for many aggressive gases and liquids. Cylindrical ceramic components (diaphragm, meter body) are bonded to form a high-strength, hermetically sealed pressure sensor element. With absolute pressure sensors, the vacuum of  $3.0 \times 10^{-6}$  mbar created in the production process between the diaphragm and the meter body remains permanently. This permits pressure measurements related to the vacuum. With gauge pressure sensors, the back of the diaphragm is vented, i.e. this sensor measures the gauge pressure relative to the atmospheric pressure. Electrically, the sensor element represents a plate capacitor whose capacitance change is the dimension for the pressure change. The capacitive measuring process satisfies the highest requirements concerning resolution and reproducibility. Together with the hysteresis-free behavior of the material  $\text{Al}_2\text{O}_3$ , it is the basis for the excellent specifications of the sensor. In addition, the Ceracore UCS2 is a dry measuring cell, i.e. there is no separating diaphragm or filling fluid which could influence the measurement.

A further advantage of the capacitive ceramic sensor is its high overload resistance. After removal of the overload, it returns to the initial position without any damage or hysteresis.



## Input

<b>Measured variable</b>	Choice of gauge pressure or absolute pressure
<b>Measuring range</b>	Gauge pressure measurement 0.1 to 70 bar, absolute pressure measurement 0.2 to 70 bar

## Output

Values dependent on installation

<b>Zero point</b>	$0.50 \text{ V} \pm 0.05 \text{ V}$ ; applies to the respective lower range-value of the measuring range
<b>Span</b>	$4.00 \text{ V} \pm 0.05 \text{ V}$
<b>Characteristic curve</b>	linear; max. non-linearity $\leq 0.2 \%$ of span
<b>Load</b>	$\geq 10 \text{ k}\Omega$ or $\leq 300 \text{ pF}$ (with signal deviation $< 0.1 \%$ of span)
<b>Rise time</b>	approx. 1 ms
<b>Switch-on time</b>	max. 10 ms
<b>Long-term stability</b>	max. 0.1 % of span per year
<b>Output signal</b>	0.5 to 4.5 V

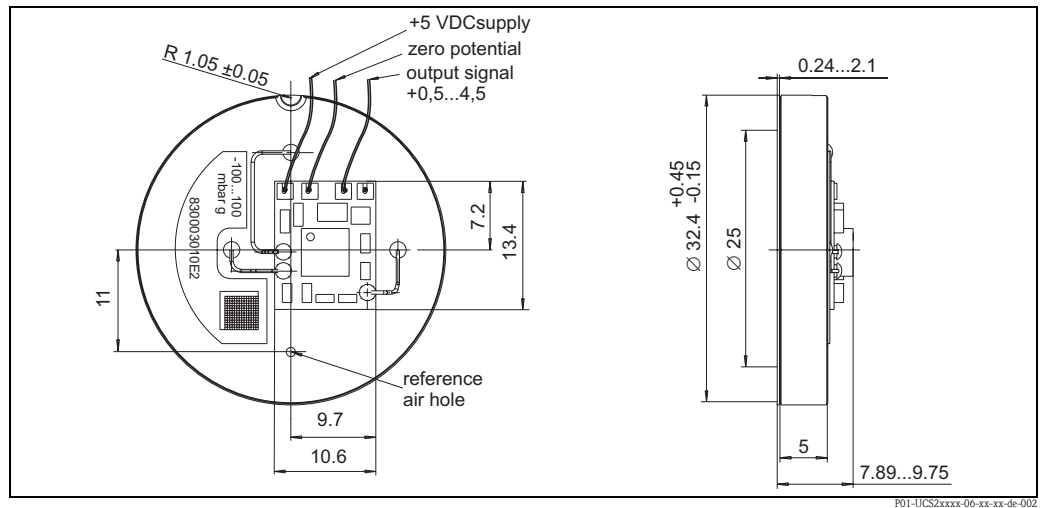
## Power supply

<b>Supply voltage</b>	<ul style="list-style-type: none"> <li>■ 5 V DC stabilized, minimum 4.5 V / maximum 5.5 V</li> <li>■ Influence of supply voltage: no influence on linearity / proportional on lower range-value / proportional on span, no influence on temperature compensation</li> </ul>
<b>Current consumption</b>	Maximum 2 mA at a supply voltage of 5 V

## Operating conditions: Installation

<b>Orientation</b>	Arbitrary. Operate the sensor system with the diaphragm pointing downwards. Otherwise observe the position-dependent zero point shift for small pressure ranges ( $\leq 400$ mbar).
<b>Weight</b>	approx. 17 to 23 g, depending on measuring range

**Dimensions**  
**Electrical connection**



## Operating conditions: Environment

<b>Ambient temperature range</b>	-40 °C to +125 °C (also applies to storage temperature)
<b>Degree of protection</b>	IP 00 as per DIN 60529 (IEC529); Climate class 3K3 DIN EN 60721-3-3

## Operating conditions: Process

<b>Reference operating conditions</b>	As per DIN IEC 60770, T = 25 °C
<b>Media</b>	Gases and liquids
<b>Material</b>	Diaphragm: aluminum oxide ceramic $Al_2O_3$ (99.9 %)
<b>Process temperature limits</b>	-40 °C to +125 °C, compensation temperature -20 °C to +80 °C

<b>Thermal change</b>	Thermal change of the lower range-value in the compensation temperature range: max. $\pm 0.75$ % of span, with extended specification $\pm 1$ % of span Thermal change of output span in the compensation temperature range: max. $\pm 0.5$ % of span. With measuring ranges $\leq 0.4$ bar $\pm 0.8$ % of span, with extended specification $\pm 1$ % of span
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<b>Limiting medium pressure range</b>	Overload limit: see "Ordering information" section, Overload influence: negligible
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<b>Vacuum resistance</b>	UCS2 with nominal value 400 mbar up to 70 bar: 0 mbar abs UCS2 with nominal value 200 mbar: 500 mbar abs (Version M in Ordering information) UCS2 with nominal value 100 mbar: 700 mbar abs (Version L in Ordering information)
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## Ordering information

### Ceracore UCS2

10	Sensor range; Overload (other measuring ranges and special versions on request)	
A	0...100 mbar / 10 kPa/1.5 psi absolute; 4 bar/400 kPa/60 psi	
B	0 to 200 mbar /20 kPa/3 psi absolute; 6 bar/600 kPa/ 90 psi	
C	0 to 400 mbar /40 kPa/6 psi absolute; 6 bar/600 kPa/ 90 psi	
D	0 to 1 bar /100 kPa/15 psi absolute; 10 bar/1 MPa/ 150 psi	
E	0 to 2 bar /200 kPa/30 psi absolute; 18 bar/1.8 MPa/ 270 psi	
F	0 to 4 bar /400 kPa/60 psi absolute; 25 bar/2.5 MPa/ 375 psi	
G	0 to 10 bar /1 MPa/150 psi absolute; 40 bar/4 MPa/ 600 psi	
H	0 to 20 bar /2 MPa/300 psi absolute; 40 bar/4 MPa/ 600 psi	
I	0 to 40 bar /4 MPa/600 psi absolute; 60 bar/6 MPa/ 900 psi	
J	0 to 70 bar /7 MPa/1050 psi absolute; 105 bar/10.5 MPa/ 1575 psi	
L	0 to 100 mbar /10 kPa/1.5 psi relative; 4 bar/400 kPa/ 60 psi	
M	0 to 200 mbar /20 kPa/3 psi relative; 6 bar/600 kPa/ 90 psi	
N	0 to 400 mbar /40 kPa/6 psi relative; 6 bar/600 kPa/ 90 psi	
O	0 to 1 bar /100 kPa/15 psi relative; 10 bar/1 MPa/ 150 psi	
P	0 to 2 bar /200 kPa/30 psi relative; 18 bar/1.8 MPa/ 270 psi	
R	0 to 4 bar /400 kPa/60 psi relative; 25 bar/5 MPa/ 375 psi	
S	0 to 10 bar /1 MPa/150 psi relative; 40 bar/4 MPa/ 600 psi	
T	0 to 20 bar /2 MPa/300 psi relative; 40 bar/4 MPa/ 600 psi	
U	0 to 40 bar /4 MPa/600 psi relative; 60 bar/6 MPa/ 900 psi	
V	0 to 70 bar /7 MPa/1050 psi relative; 105 bar/10.5 MPa/ 1575 psi	
20	Calibration; Unit	
A	see additional specification (special measuring ranges with extended specifications)	
1	Sensor range; mbar/bar	
2	Sensor range; kPa/MPa	
3	Sensor range; psi	

UCS2 -			A	1	A	1	AAA	
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