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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 % Al_2O_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

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Table of contents

About this document

Document function

This document contains all the technical data for the device and provides an overview of the device versions and accessories that can be ordered.

Symbols used

Safety symbols

Symbol	Meaning
WARNING	**WARNING!** This symbol alerts you to a dangerous situation. Failure to avoid this situation can result in serious or fatal injury.
NOTICE	**NOTICE!** This symbol contains information on procedures and other facts which do not result in personal injury.

Symbols for certain types of information

Symbol	Meaning
	**Tip** Indicates additional information.
	Reference to documentation
	Reference to page

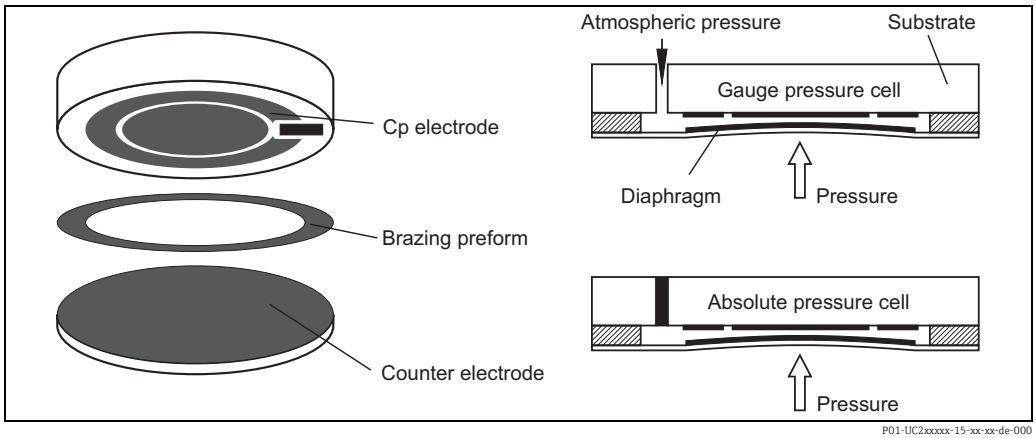
Symbols in graphics

Symbol	Meaning
1, 2, 3, ...	Item numbers
A, B, C, ...	Views

Function and system design

Measuring principle

The Ceracore UCS2 basic material is Al_2O_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 3.0×10^{-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 Al_2O_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

Measured variable

Choice of gauge pressure or absolute pressure

Measuring range

Gauge pressure measurement 0.1 to 70 bar and absolute pressure measurement 0.1 to 70 bar

Output

Values dependent on installation

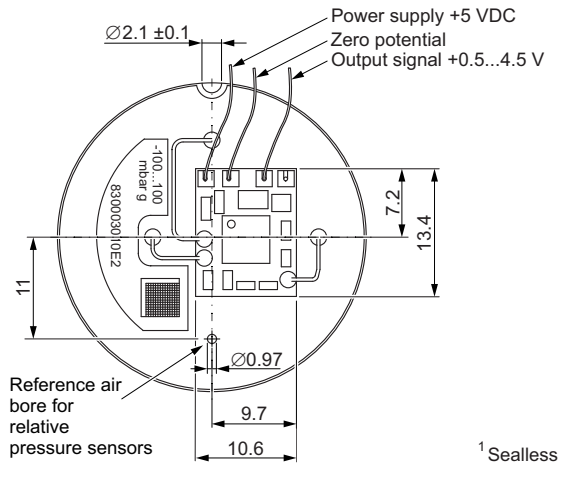
Zero point	0.50 V ± 0.05 V; applies to the respective lower range-value of the measuring range
Span	4.00 V ± 0.05 V
Characteristic curve	linear; max. non-linearity ≤0.2 % of span
Load	≥10 kΩ or ≤300 pF (with signal deviation <0.1 % of span)
Rise time	approx. 1 ms
Switch-on time	max. 10 ms
Output signal	0.5 to 4.5 V

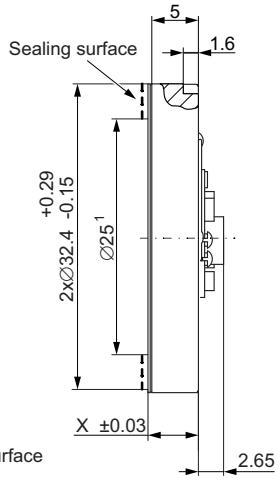
Power supply

Supply voltage	▪ 5 V DC stabilized, minimum 4.5 V / maximum 5.5 V ▪ Influence of supply voltage: no influence on linearity / proportional on lower range-value / proportional on span, no influence on temperature compensation
Current consumption	Maximum 2 mA at a supply voltage of 5 V

Operating conditions: Installation

Orientation	Arbitrary. Operate the sensor system with the diaphragm pointing downwards. Otherwise observe the position-dependent zero point shift for small pressure ranges (≤ 400 mbar).
Weight	approx. 17 to 23 g, depending on measuring range
Dimensions	**Electrical connection**





Dimension X	Pressure/ thickness
7.14	70 bar / 2.11
6.78	40 bar / 1.75
6.42	20 bar / 1.39
6.13	10 bar / 1.10
5.84	4 bar / 0.81
5.68	2 bar / 0.65
5.54	1 bar / 0.51
5.41	400 mbar / 0.38
5.33	200 mbar / 0.30
5.27	100 mbar / 0.24

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Operating conditions: Environment

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

Operating conditions: Process

Reference operating conditions	▪ As per DIN EN IEC 62828 ▪ Ambient temperature T_A = constant, in range: +23 to +27 °C (+73 to +81 °F) ▪ Relative humidity φ = constant, in range: 5 to 80 % RH. ▪ Ambient pressure p_A = constant, in range: 860 to 1 060 mbar (12.47 to 15.37 psi) ▪ Position of measuring cell = constant, in range: process isolating diaphragm pointing downwards (see also the "Orientation" section → 5) ▪ Analog output supply voltage: 4.5 to 5.5 V DC stabilized
Long-term stability	max. 0.1 % of span per year
Media	Gases and liquids
Material	Diaphragm: aluminum oxide ceramic Al_2O_3 (99.9 %)
Process temperature limits	-40 °C to +125 °C, compensation temperature -20 °C to +80 °C
Thermal change	Thermal change of the lower range-value in the compensation temperature range: max. ±0.75 % of span, with extended specification ±1 % of span Thermal change of output span in the compensation temperature range: max. ±0.5 % of span. With measuring ranges ≤0.4 bar ±0.8 % of span, with extended specification ±1 % of span
Limiting medium pressure range	Overload limit: see "Ordering information" section, Overload influence: negligible
Vacuum resistance	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)
Safety notes	For work on and with the device: **NOTICE** **Danger of damaging the device** Static sensitive devices. ▸ Handle only at static safe work stations!

Ordering information

Detailed ordering information is available from the following sources:
In the Product Configurator on the Endress+Hauser website:
www.sensors-components.endress.com

Product Configurator - the tool for individual product configuration
- Product-specific configuration data
- Depending on the device: direct input of information specific to measuring point, such as measuring range
- Automatic verification of exclusion criteria

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	

Disposal

According to the Directive 2012/19/EU on waste electrical and electronic equipment (WEEE), our products are marked with the depicted symbol in order to minimize the disposal of WEEE as unsorted municipal waste. Such products may not be disposed of as unsorted municipal waste and can be returned to Endress+Hauser for disposal at conditions stipulated in our General Terms and Conditions or as individually agreed.

Contact addresses

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