

Technical Information

UC1 / CT-30

Customer-specific pressure transducer



Ceramic sensor with compensated sensor output signal

Application

- The customer-specific pressure transducers UC1 and CT-30 are available for gauge pressure measuring ranges from 0 to 50 mbar to 0 to 70 bar and for absolute pressure measuring ranges from 0 to 100 mbar to 0 to 70 bar. Measuring ranges outside of this are available as special measuring ranges.
- The pressure transducers are widely used, particularly in the areas of process measurement technology, medical technology, laboratory-specific technology and industrial measurement technology. They are suitable for use in hazardous areas. Endress+Hauser has the expertise to provide solutions for the most diverse applications, adapting both the electrical and the structural aspects of the pressure transducer to your specific application.

Your benefits

- Measuring ranges from 0 to 50 mbar to 0 to 70 bar
- Special measuring ranges available on request
- UCS2 pressure sensor element
- Customer-specific design
- Housing possible in various materials
- Output signal 0.5 to 4.5 V or 4 to 20 mA
- Ready for ATEX certificate transfer
- Guaranteed overload resistance up to 40 times the nominal pressure
- Process isolating diaphragm made from 99.9 % ultrapure ceramic
- Vacuum-resistant

Table of contents

About this document	3
Document function	3
Symbols used	3
Function and system design	4
Measuring principle	4
Examples for customer-specific solutions	4
Technical data	5
Measured variable	5
Measuring range	5
Output signal	5
Supply voltage	5
Reference operating conditions	5
Performance characteristics	6
Operating conditions	6
Safety notes	6
Ordering information	7
Disposal	7
Contact addresses	7



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

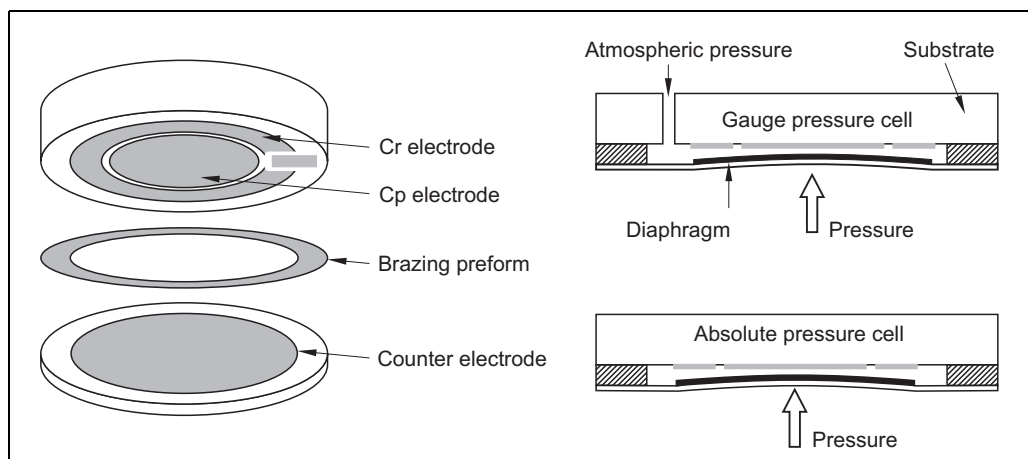
Symbols in graphics

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

Function and system design





Measuring principle

The capacitive ceramic pressure sensor element UCS2 is at the core of the transducer. Its special features include high overload resistance, corrosion resistance and long-term stability. In the pressure sensor element, two cylindrical ceramic components (diaphragm and meter body) are linked by means of a brazing preform. In absolute pressure sensors, there is a reference vacuum of $<3 \times 10^{-6}$ mbar between the process isolating diaphragm and the meter body. This allows measurement relative to the vacuum. In gauge pressure sensors, the back of the sensor is ventilated through a small hole in the meter body. An ASIC is located directly on the back of the meter body. It contains a temperature sensor for the active compensation of the temperature error as well as further correction functions for setting the zero point and span and for compensation of the non-linearity error. These ensure the excellent technical specifications of the pressure transducers. The components of the transducer housing that are in contact with the media can consist of various materials. The usual materials are available for process sealing, e.g. Viton, EPDM, NBR etc. The applied pressure is recorded in the transducers and converted into a proportional output signal of 0.5 to 4.5 V by the sensor element. If necessary, additional electronics can be integrated in the housing to convert the voltage output signal into a current output signal of 4 to 20 mA. The electrical connection and the process connection can be defined in accordance with the application. Pressure transducers with a wide range of protection classes – up to IP68 – provided by the housing are possible.



P01-UC2xxxx-15-xx-xx-xx-000

Examples for customer-specific solutions

Measurement of minimal pressure	Vacuum measurement	Gas pressure measurement	Hydrostatic measurement
 <p data-bbox="252 1765 395 1787">P01-PMCS1xxx-16-xx-xx-xx-00</p>	 <p data-bbox="603 1738 746 1760">P01-PMCS1xxx-16-xx-xx-xx-00</p>	 <p data-bbox="954 1738 1098 1760">P01-PMCS1xxx-16-xx-xx-xx-00</p>	 <p data-bbox="1294 1765 1437 1787">P01-PMCS1xxx-16-xx-xx-xx-00</p>
<p>The UC1 capsule is the smallest module of the customer-specific pressure transducers and forms the basis of the pressure transmitter for measuring minimal measuring ranges.</p>	<p>Transducers can be supplied with the small flange connections which are common in vacuum measurement. The transducers have a dry measuring cell, which means that outgassing of the transfer medium is impossible.</p>	<p>The sensors deliver accurate results in gas pressure measurement applications, thanks to the good long-term stability, thermal behavior and minimal conformity error. In addition, a large selection of different sealing materials can be used which guarantees optimum adaptation to the medium in question.</p>	<p>Transducers based on the UCS2 are a highly attractive and frequently used measuring system for hydrostatic level measurement. This is primarily due to their long-term stability and the possibility to manufacture very low pressure ranges.</p>

Technical data

Measured variable Absolute pressure and gauge pressure

Measuring range

Gauge pressure (also available in psi measuring ranges)		
Nominal value	OPL [bar] ¹⁾	Vacuum resistance [bar _{abs}]
0 to 50 mbar ²⁾	4	0.3
0 to 100 mbar	4	0.3
0 to 200 mbar	6	Vacuum-resistant
0 to 400 mbar	6	Vacuum-resistant
0 to 1 bar	10	Vacuum-resistant
0 to 2 bar	18	Vacuum-resistant
0 to 4 bar	25	Vacuum-resistant
0 to 10 bar	40	Vacuum-resistant
0 to 20 bar	40	Vacuum-resistant
0 to 40 bar	60	Vacuum-resistant
0 to 70 bar	105	Vacuum-resistant

Absolute pressure (also available in psi measuring ranges)		
Nominal value	OPL [bar] ¹⁾	Vacuum resistance [bar _{abs}]
-	-	-
0 to 100 mbar ²⁾	4	Vacuum-resistant
0 to 200 mbar	6	Vacuum-resistant
0 to 400 mbar	6	Vacuum-resistant
0 to 1 bar	10	Vacuum-resistant
0 to 2 bar	18	Vacuum-resistant
0 to 4 bar	25	Vacuum-resistant
0 to 10 bar	40	Vacuum-resistant
0 to 20 bar	40	Vacuum-resistant
0 to 40 bar	60	Vacuum-resistant
0 to 70 bar	105	Vacuum-resistant

1) OPL: Over Pressure Limit (= overload limit)

2) See extended specifications (on request)

Special measuring ranges on request.

Output signal

UC1 / CT-30
0.5 to 4.5 V (ratiometric) or 4 to 20 mA

Supply voltage

UC1 / CT-30 (0.5 to 4.5 V)	UC1 / CT-30 (4 to 20 mA)
4.5 to 5.5 V (stabilized)	12 to 30 V

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)
- Analog output supply voltage: 4.5 to 5.5 V DC stabilized

Performance characteristics

	UC1 / CT-30 (0.5 to 4.5 V)	UC1 / CT-30 (4 to 20 mA)
Zero point deviation	max. $\pm 1.25\%$	max. $\pm 0.2\%$
Span deviation	max. $\pm 1.25\%$	max. $\pm 1.25\%$
Conformity error (sum of non-linearity, hysteresis and repeatability)	max. $\pm 0.2\%$	max. $\pm 0.2\%$
Compensated temperature range	-20°C to $+80^{\circ}\text{C}$	-20°C to $+80^{\circ}\text{C}$
Temperature effect on lower range value (within the compensated temperature range)	max. $\pm 0.75\%$	max. $\pm 0.75\%$
Temperature effect on the span	max. $\pm 0.3\%$ within the compensated temperature range for measuring ranges ≥ 0.4 bar For measuring ranges < 0.4 bar: $\pm 0.5\%$	max. $\pm 0.5\%$ within the compensated temperature range for measuring ranges ≥ 0.4 bar For measuring ranges < 0.4 bar: $\pm 0.7\%$
Long-term stability	max. 0.1% per year under reference operating conditions	

Operating conditions

	UC1 / CT-30 (0.5 to 4.5 V)	UC1 / CT-30 (4 to 20 mA)
Ambient temperature range	-40°C to $+125^{\circ}\text{C}$	-20°C to $+80^{\circ}\text{C}$
Storage temperature range	-40°C to $+125^{\circ}\text{C}$	-40°C to $+80^{\circ}\text{C}$
Degree of protection	Depends on housing (IP68 as per DIN VDE 0470 possible)	
Process temperature limits	-20°C to $+80^{\circ}\text{C}$	-20°C to $+80^{\circ}\text{C}$

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

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

Internet: www.sensors-components.endress.com
E-mail: sensors-components.pcm@endress.com



71541313