

Technical Information

Cerabar S

PMC71, PMP71, PMP75

Process pressure measurement

Pressure transmitter with ceramic and metallic measuring cells



Applications

The device is used for the following measuring tasks:

- Absolute pressure and gauge pressure measurement in gases, steams or liquids in all areas of process engineering and process measurement technology
- Level, volume or mass measurements in liquids
- High process temperatures
 - up to 150 °C (302 °F) without diaphragm seal
 - up to 400 °C (752 °F) with typical diaphragm seals
- High pressures up to 700 bar (10 500 psi)
- Low-energy version with voltage output (1-5V DC), e.g. for operation on solar-operated control units (Remote Terminal Unit (RTU))

Your benefits

- Very good reproducibility and long-term stability
- High reference accuracy up to $\pm 0.025\%$
- Turn down up to 100:1, higher on request
- Used for process pressure monitoring up to SIL 3, certified to IEC 61508 by TÜV SÜD
- High level of safety during operation thanks to function monitoring from the measuring cell to the electronics
- Easy electronics replacement guaranteed with HistoROM®/M-DAT

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About this document



Document function	The document contains all the technical data on the device and provides an overview of the accessories and other products that can be ordered for the device.
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Symbols used









Safety symbols

Symbol	Meaning
	DANGER! This symbol alerts you to a dangerous situation. Failure to avoid this situation will result in serious or fatal injury.
	WARNING! This symbol alerts you to a dangerous situation. Failure to avoid this situation may result in serious or fatal injury.
	CAUTION! This symbol alerts you to a dangerous situation. Failure to avoid this situation may result in minor or moderate injury.
	NOTE! This symbol contains information on procedures and other circumstances that do not result in personal injury.

Electrical symbols

Symbol	Meaning	Symbol	Meaning
	Protective ground connection A terminal that must be connected to ground prior to establishing any other connections.		Ground connection A grounded terminal which, as far as the operator is concerned, is grounded via a grounding system.

Symbols for certain types of Information

Symbol	Meaning
	Permitted Procedures, processes or actions that are permitted.
	Preferred Procedures, processes or actions that are preferred.
	Forbidden Procedures, processes or actions that are forbidden.
	Tip Indicates additional information.
	Reference to documentation
	Reference to page
	Reference to graphic
	Visual inspection

Symbols in graphics

Symbol	Meaning
1, 2, 3 ...	Item numbers
1., 2., 3. ...	Series of steps
A, B, C, ...	Views
A-A, B-B, C-C, ...	Sections

Documentation


See the "Supplementary documentation" section →  135



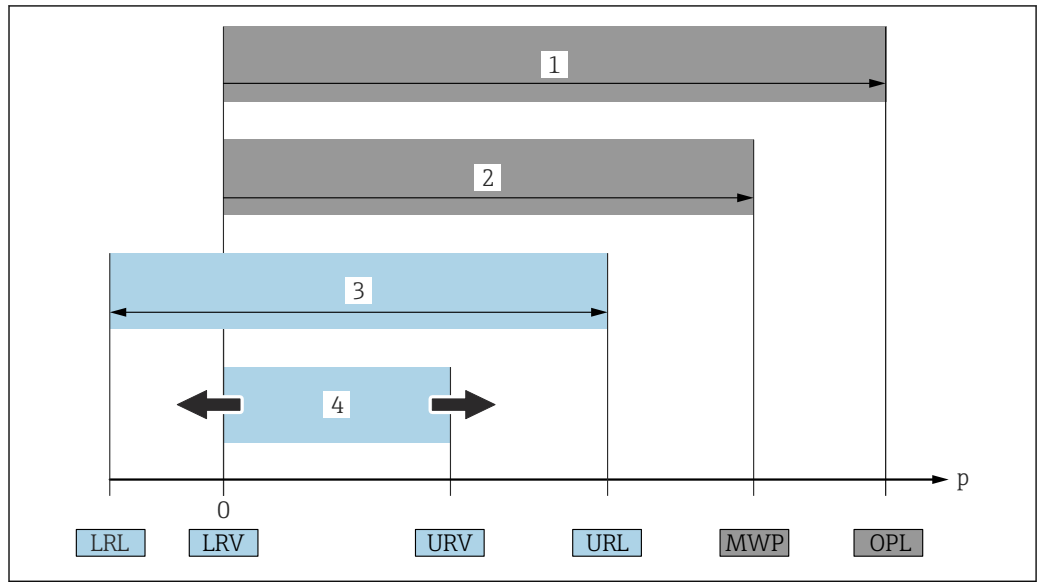
The document types listed are available:

In the Download Area of the Endress+Hauser Internet site: www.endress.com → Download

Safety Instructions (XA)

See the "Safety instructions" section →  135

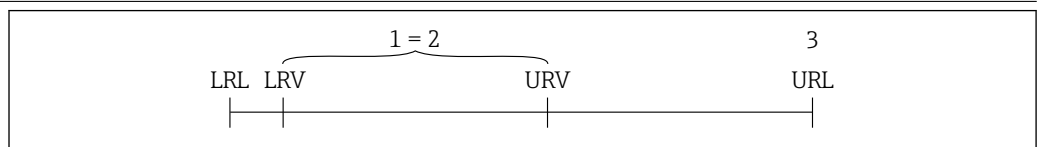
Terms and abbreviations



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Item	Term/abbreviation	Explanation
1	OPL	The OPL (overpressure limit) for the measuring device depends on the lowest-rated element, with regard to pressure, of the selected components, i.e. the process connection has to be taken into consideration in addition to the measuring cell. Also observe pressure-temperature dependency. For the relevant standards and additional information, see the "Pressure specifications" section → 51. The OPL may only be applied for a limited period of time.
2	MWP	The MWP (maximum working pressure) for the sensors depends on the lowest-rated element, with regard to pressure, of the selected components, i.e. the process connection has to be taken into consideration in addition to the measuring cell. Also observe pressure-temperature dependency. For the relevant standards and additional information, see the "Pressure specifications" section → 51. The maximum working pressure may be applied at the device for an unlimited period. The maximum working pressure can also be found on the nameplate.
3	Maximum sensor measuring range	Span between LRL and URL This sensor measuring range is equivalent to the maximum calibratable/adjustable span.
4	Calibrated/adjusted span	Span between LRV and URV Factory setting: 0 to URL Other calibrated spans can be ordered as customized spans.
p	-	Pressure
-	LRL	Lower range limit
-	URL	Upper range limit
-	LRV	Lower range value
-	URV	Upper range value
-	TD (turn down)	Turn down Example - see the following section.

Turn down calculation



A0029545

- 1 Calibrated/adjusted span
- 2 Zero point-based span
- 3 URL sensor

Example

- Sensor: 10 bar (150 psi)
- Upper range value (URL) = 10 bar (150 psi)
- Calibrated/adjusted span: 0 to 5 bar (0 to 75 psi)
- Lower range value (LRV) = 0 bar (0 psi)
- Upper range value (URV) = 5 bar (75 psi)

Turn down (TD):

$$TD = \frac{URL}{|URV - LRV|}$$

$$TD = \frac{10 \text{ bar (150 psi)}}{|5 \text{ bar (75 psi)} - 0 \text{ bar (0 psi)}|} = 2$$

In this example, the TD is 2:1.
This span is based on the zero point.

Registered trademarks

HART®

Registered trademark of the FieldComm Group, Austin, USA

PROFIBUS®

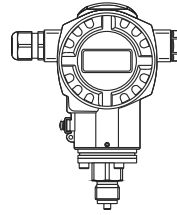
Registered trademark of the PROFIBUS User Organization, Karlsruhe, Germany

FOUNDATION™Fieldbus

Registered trademark of the FieldComm Group, Austin, Texas, USA

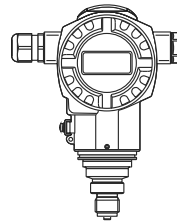
Function and system design

Device features



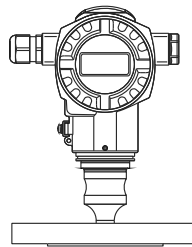
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PMC71 with capacitive measuring cell and ceramic process isolating diaphragm (Ceraphire®)



A0020463

PMP71 with piezoresistive measuring cell and metallic welded process isolating diaphragm



A0020464

PMP75 with diaphragm seal

Field of application

- Gauge pressure and absolute pressure
- Level

Process connections

PMC71:

- Thread
- EN flanges DN 25 – DN 80
- ANSI flanges 1" – 4"
- JIS flanges 50 A – 100 A

PMP71:

- Thread
- DN 25 – DN 80
- ASME 1 ½" – 4"
- JIS 25 A – 100 A
- Oval flange adapters
- Prepared for diaphragm seal mount

PMP75:

Wide range of diaphragm seals

Measuring ranges

- PMC71: From –100/0 to 100 mbar (–1.5/0 to 1.5 psi) to –1/0 to 40 bar (–15/0 to 600 psi)
- PMP71: From –400/0 to 400 mbar (–6/0 to 6 psi) to –1/0 to 700 bar (–15/0 to 10500 psi)
- PMP75: From –400/0 to 400 mbar (–6/0 to 6 psi) to –1/0 to 400 bar (–15/0 to 6000 psi)

OPL

- PMC71: max. 60 bar (900 psi)
- PMP71: max. 1 050 bar (15 750 psi)
- PMP75: max. 600 bar (9 000 psi)

Process temperature range (temperature at process connection)

- PMC71: -25 to +125 °C (-13 to +257 °F)
-20 to +150 °C (-4 to +302 °F) (High-temperature version, see Product Configurator "Additional option 1" or 110 "Additional option 2" section, option "T")
- PMP71: -40 to +125 °C (-40 to +257 °F)
- PMP75: -70 to +400 °C (-94 to +752 °F)
(depending on the filling oil)

Ambient temperature range

- Without LCD display: up to -60 to +85 °C (-76 to +185 °F)
- With LCD display: -20 to +70 °C (-4 to +158 °F)
(extended temperature application range -60 to +85 °C (-76 to +185 °F) with limitations in optical properties, such as display speed and contrast)
- Separate housing: -20 to +60 °C (-4 to +140 °F)
- PMP75: Diaphragm seal systems depending on the version

Reference accuracy

- PMC71: Up to ±0.05% of the set span
PLATINUM version: up to ±0.025 % of the set span
- PMP71: Up to ±0.05% of the set span
PLATINUM version: up to ±0.025 % of the set span
- PMP75: Up to ±0.075% of the set span

Supply voltage

Supply voltage non-Ex

- 4 to 20 mA HART: 10.5 to 45 V DC
- 1-5V DC: 9 to 35 V DC
- PROFIBUS PA and FOUNDATION Fieldbus: 9 to 32 V DC

Supply voltage Ex ia

10.5 to 30 V DC

Supply voltage Ex d (1-5V DC)

9 to 35 V DC

Output

- 4 to 20 mA with superimposed HART protocol
- 1-5V DC
- PROFIBUS PA
- FOUNDATION Fieldbus

Options

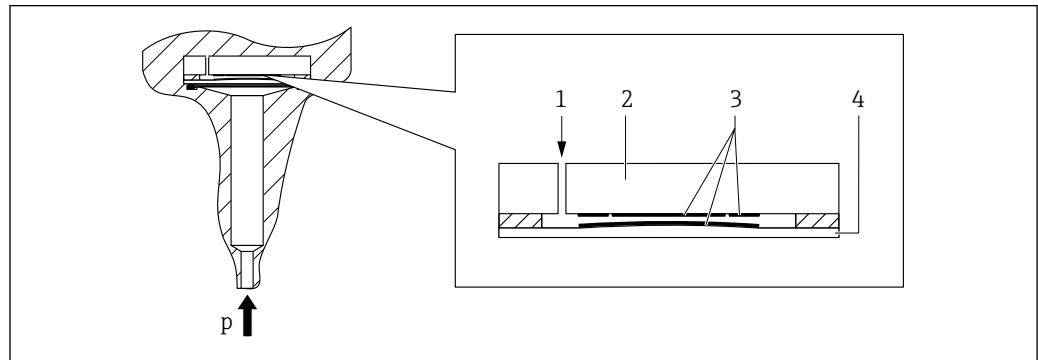
- Inspection certificate 3.1
- HistoROM®/M-DAT memory chip
- Separate housing
- PMP75: gold-coated process isolating diaphragm
- PMP71, PMP75: gold-rhodium coated process isolating diaphragm
- PMP71, PMP75: NACE-compliant materials

Specialties

- PMC71:
 - Metal-free measurement with PVDF connection
 - Special cleaning of the transmitter to remove paint-wetting substances, for use in paint shops
- PMP71:
 - Process connections with minimum oil volume
 - Gas-tight, elastomer-free
- PMP75:
 - Wide range of diaphragm seals
 - For high medium temperatures
 - Process connections with minimum oil volume
 - Completely welded versions

Measuring principle

Devices with ceramic process isolating diaphragm (Ceraphire®)



A0020465

- 1 Air pressure (gauge pressure sensors)
- 2 Ceramic substrate
- 3 Electrodes
- 4 Ceramic process isolating diaphragm

The ceramic sensor is an oil-free sensor, i.e. the process pressure acts directly on the robust ceramic process isolating diaphragm and causes it to deflect. A pressure-dependent change in capacitance is measured at the electrodes of the ceramic substrate and the process isolating diaphragm. The measuring range is determined by the thickness of the ceramic process isolating diaphragm.

Advantages:

- Guaranteed overload resistance up to 40 times the nominal pressure (see "OPL" column in table) → ☺ 13)
- The ultrapure 99.9% ceramic (Ceraphire®, see also "www.endress.com/ceraphire") ensures:
 - Extremely high chemical durability
 - High mechanical durability
- Suitable for vacuums
- Secondary containment for enhanced integrity
- Process temperatures up to 150 °C (302 °F)