



Level



Pressure



Flow



Temperature



Liquid Analysis



Registration



Systems Components



Services



Solutions

Technical Information

Cerabar S PMP72

Process pressure measurement at high process temperatures

Pressure transmitter with metal sensors

Overload-resistant and function-monitored; Communication via HART, PROFIBUS PA or FOUNDATION Fieldbus



Application

The Cerabar S pressure transmitter is used for the following measuring tasks:

- Absolute pressure 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 without diaphragm seals (up to 280 °C (536 °F))
- International usage thanks to a wide range of approvals



Your benefits

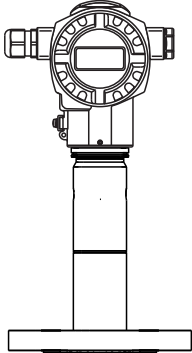
- Very good reproducibility and long-term stability
- High reference accuracy: up to $\pm 0.075\%$
- Turn down 10:1, higher on request
- Used for process pressure monitoring up to SIL3, certified according to IEC 61508 by TÜV SÜD
- HistoROM®/M-DAT memory module
- Function-monitored from the measuring cell to the electronics
- Rapid commissioning using the Quick Setup menu
- Easy and safe menu-guided operation onsite, via 4 to 20 mA with HART, via PROFIBUS PA or via FOUNDATION Fieldbus
- Extensive diagnostic functions

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Function and system design

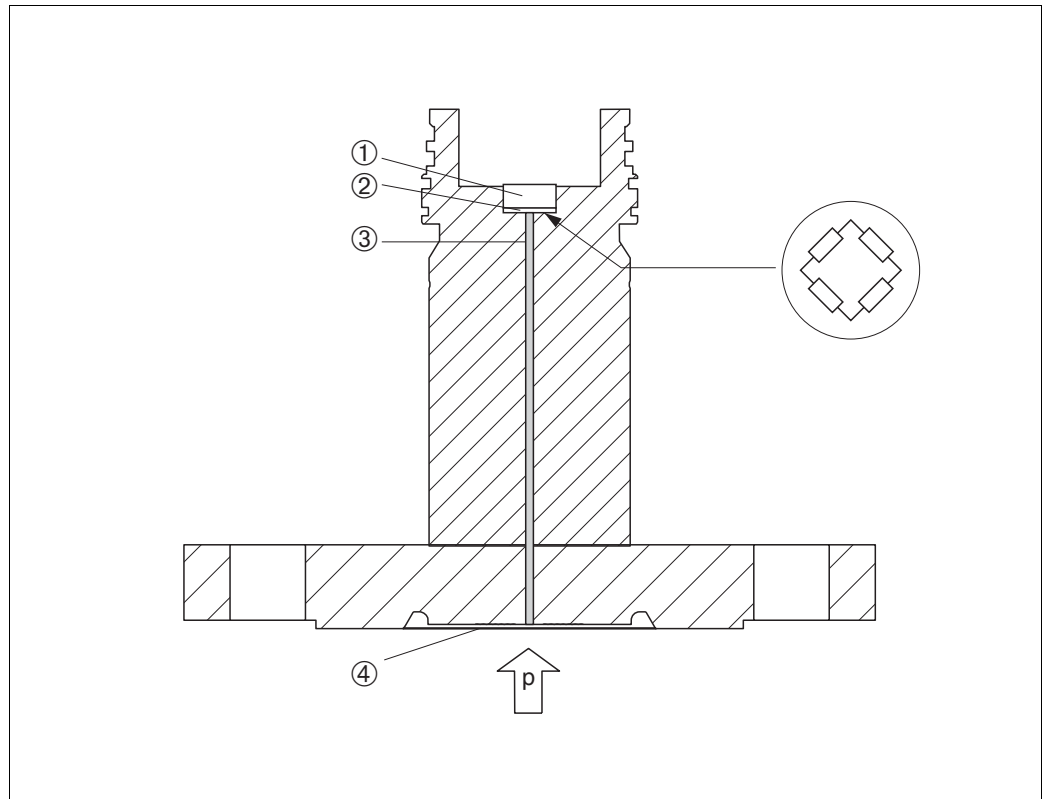
Device selection

Cerabar S	<p data-bbox="810 286 884 313">PMP72</p>  <p data-bbox="1369 837 1532 853">P01-PMP72xxx-16-xx-xx-xx-003</p> <p data-bbox="810 878 1474 929">With piezoresistive measuring cell and metal welded process isolating diaphragm</p>
Field of application	<ul style="list-style-type: none"> – Absolute pressure – Level
Process connections	<ul style="list-style-type: none"> – DN 25 – DN 80 flanges – ANSI 2" – 3" flanges
Measuring ranges	<ul style="list-style-type: none"> – 0 to 0.4 bar (0 to 6 psi) – 0 to 1 bar (0 to 15 psi)
OPL ¹	Max. 10 bar (150 psi)
Process temperature range	–10 to +280 °C (–14 to +536 °F)
Ambient temperature range	Depends on the process pressure –10 to +50 °C (–14 to +122 °F)
Reference accuracy	– Up to ±0.075% of the set span
Supply voltage	<ul style="list-style-type: none"> – Version for non-hazardous areas: 10.5 to 45 V DC – EEx ia: 10.5 to 30 V DC
Output	<ul style="list-style-type: none"> – 4 to 20 mA with superimposed HART protocol – PROFIBUS PA – FOUNDATION Fieldbus
Options	<ul style="list-style-type: none"> – NACE-compliant materials – Inspection certificate 3.1 – HistoROM®/M-DAT memory chip
Specialties	<ul style="list-style-type: none"> – High-precision process pressure measurement at high process temperatures – Process connections with minimum oil volume – Gas-tight, elastomer-free

1) OPL: over pressure limit; depends on the lowest-rated element, with regard to pressure, of the selected components

Measuring principle

Metal process isolating diaphragm



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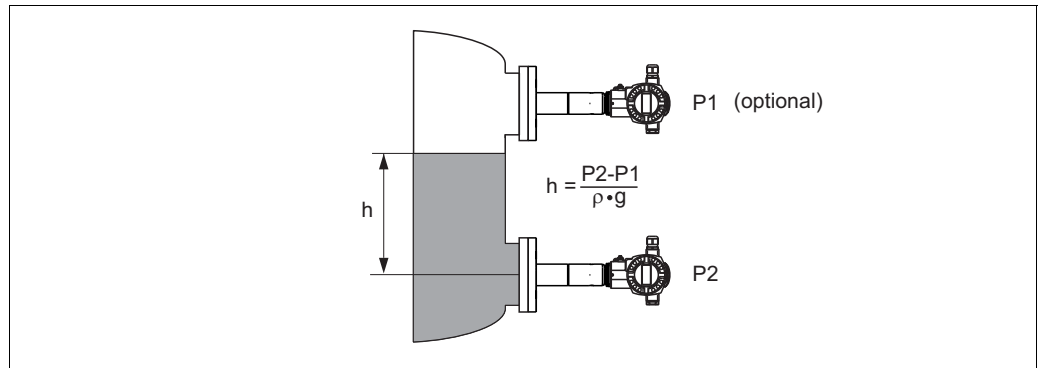
Metal sensor

- 1 Silicon measuring element, substrate
- 2 Wheatstone bridge
- 3 Channel with fill fluid
- 4 Metal process isolating diaphragm

The operating pressure deflects the process isolating diaphragm and a fill fluid transfers the pressure to a resistance bridge (semiconductor technology). The pressure-dependent change in the bridge output voltage is measured and evaluated.

Advantages:

- Can be used for process pressures up to 1 bar (15 psi) absolute pressure
- High long-term stability
- Guaranteed overload resistance up to 10 times the nominal pressure
- Second process barrier (secondary containment) for enhanced integrity
- Measurement far more accurate compared to diaphragm seal systems

Level measurement (level, volume and mass)**Function and design***Level measurement*

<i>h</i>	<i>Height (level)</i>
<i>p</i>	<i>Pressure</i>
ρ	<i>Density of the medium</i>
<i>g</i>	<i>Gravitation constant</i>

Your benefits

- Choice of three different level measuring modes in the device software
- Volume and mass measurements in any tank shapes by means of a freely programmable characteristic curve
- Choice of diverse level units with automatic unit conversion
- Customer-specific unit can be specified
- Has a wide range of uses, even in the following cases:
 - in the event of foam formation
 - in tanks with agitators or screen fittings
 - in the event of liquid gases

Communication protocol

- 4 to 20 mA with HART communication protocol
- PROFIBUS PA
 - Endress+Hauser devices meet the requirements of the FISCO model.
 - Due to the low current consumption of $13 \text{ mA} \pm 1 \text{ mA}$, the following number of devices can be operated on one bus segment if installing as per FISCO:
 - Up to 7 Cerabar S devices for Ex ia, CSA IS and FM IS applications
 - Up to 27 Cerabar S devices for all other applications, e.g. in non-hazardous areas, Ex nA etc.
 More information on PROFIBUS PA can be found in the Operating Instructions BA034S "PROFIBUS-DP/-PA: Guidelines for planning and commissioning" and in the PNO Guidelines.
- FOUNDATION Fieldbus
 - Endress+Hauser devices meet the requirements of the FISCO model.
 - Due to the low current consumption of $15 \text{ mA} \pm 1 \text{ mA}$, the following number of devices can be operated on one bus segment if installing as per FISCO:
 - Up to 6 Cerabar S devices for Ex ia, CSA IS and FM IS applications
 - Up to 24 Cerabar S devices for all other applications, e.g. in non-hazardous areas, Ex nA etc.
 More information on FOUNDATION Fieldbus, such as the bus system component requirements, can be found in the Operating Instructions BA013S "FOUNDATION Fieldbus Overview".

Input

Measured variable Absolute pressure, from which level (level, volume or mass) is derived

Measuring range Metal process isolating diaphragm for absolute pressure

Nominal value	Range limit		Smallest calibratable span ⁴	MWP ¹	OPL ²	Version in the order code ³
	lower (LRL) [bar _{abs}]	upper (URL) [bar _{abs} (psi _{abs})]				
0.4 bar (6 psi)	0	+0.4 (+6)	0.040 (0,6)	4 (60)	6 (90)	2F
1 bar (15 psi)	0	+1 (+15)	0.100 (1.5)	6.7 (100.5)	10 (150)	2H

- 1) The MWP (maximum working pressure) for the measuring device depends on the lowest-rated element, with regard to pressure, of the selected components, i.e. the process connection (→ 22 ff) has to be taken into consideration in addition to the measuring cell (→ see Table above). Pay attention to the pressure-temperature dependence also. For the appropriate standards and other information, see → 21, "Pressure specifications" section.
- 2) OPL: over pressure limit (= sensor overload limit)
- 3) Version in the order code → 31 ff, feature 40 "Sensor range; Sensor over pressure limit (OPL)"
- 4) Turn down > 10:1 can be configured at the device or on request

Explanation of terms

Explanation of terms: turn down (TD), set span and span based on zero point

- $|\text{Lower range value (LRV)}| \leq |\text{Upper range value (URV)}|$

Example:

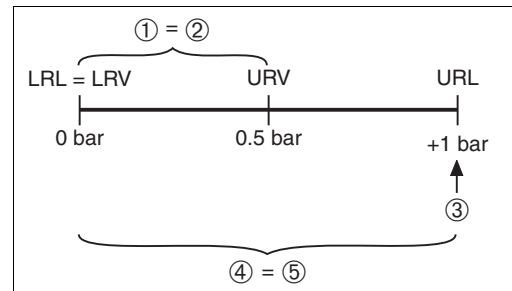
- Lower range value (LRV) = 0 bar
- Upper range value (URV) = 0.5 bar (7.5 psi)
- Nominal value (URL) = 1 bar (15 psi)

Turn down:

- $\text{TD} = \text{URL} / |\text{URV}| = 2:1$

Set span:

- $\text{URV} - \text{LRV} = 0.5 \text{ bar (7.5 psi)}$
This span is based on the zero point.



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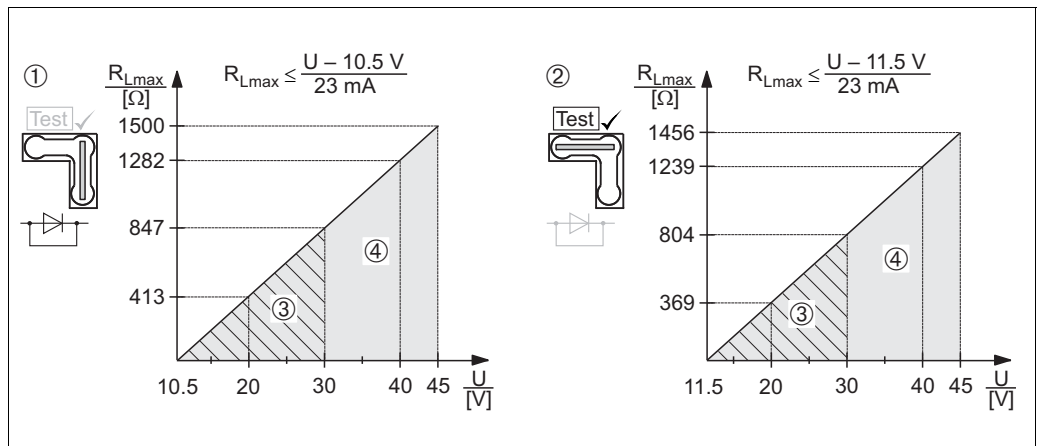
Example: 1 bar (15 psi) measuring cell

- 1 Set span
 - 2 Zero based span
 - 3 Nominal value \cong Upper range limit (URL)
 - 4 Nominal measuring range
 - 5 Sensor measuring range
- LRL Lower range limit
 URL Upper range limit
 LRV Lower range value
 URV Upper range value

Output

Output signal	<ul style="list-style-type: none"> ■ 4 to 20 mA with superimposed digital communication protocol HART 5.0, 2-wire ■ Digital communication signal PROFIBUS PA (Profile 3.0), 2-wire <ul style="list-style-type: none"> – Signal encoding: Manchester Bus Powered (MBP): Manchester II – Transmission rate: 31.25 kBit/s voltage mode ■ Digital communication signal FOUNDATION Fieldbus, 2-wire <ul style="list-style-type: none"> – Signal encoding: Manchester Bus Powered (MBP): Manchester II – Transmission rate: 31.25 kBit/s voltage mode
Signal range – 4 to 20 mA HART	3.8 to 20.5 mA
Signal on alarm	<p>As per NAMUR NE43</p> <ul style="list-style-type: none"> ■ 4 to 20 mA HART <ul style="list-style-type: none"> Options: <ul style="list-style-type: none"> – Max. alarm*: can be set from 21 to 23 mA – Hold measured value: last measured value is held – Min. alarm: 3.6 mA * Factory setting: 22 mA ■ PROFIBUS PA: can be set in the Analog Input Block, <ul style="list-style-type: none"> Options: Last Valid Out Value, Fsafe Value (factory setting), Status bad ■ FOUNDATION Fieldbus: can be set in the Analog Input Block, <ul style="list-style-type: none"> Options: Last Good Value, Fail Safe Value (factory setting), Wrong Value

Load – 4 to 20 mA HART



Load diagram, observe the position of the jumper and the explosion protection. (→ See also Page 14, "Taking 4 to 20 mA test signal" section.)

- 1 Jumper for 4 to 20 mA test signal inserted in "Non-test" position
- 2 Jumper for 4 to 20 mA test signal inserted in "Test" position
- 3 Voltage supply 10.5 (11.5) to 30 V DC for 1 GD, 1/2 GD, FM IS, CSA IS, IECEx ia, NEPSI Ex ia
- 4 Voltage supply 10.5 (11.5) to 45 V DC for devices for non-hazardous locations, 1/2 D, 1/3 D, 3 G Ex nA, FM DIP, FM NI, CSA dust ignition proof

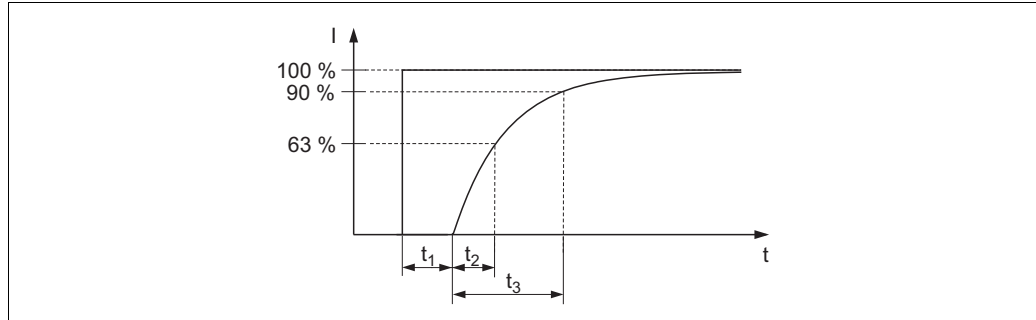
R_{Lmax} Maximum load resistance
 U Supply voltage

Note!

When operating via a handheld terminal or via a PC with an operating program, a minimum communication resistance of 250 Ω must be taken into account.

Resolution	<ul style="list-style-type: none"> ■ Current output: 1 μA ■ Display: can be set (factory setting: presentation of the maximum accuracy of the transmitter)
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Dead time, time constant



P01-xxxxxxx-05-xx-xx-xx-030

Presentation of the dead time and the time constant

**Dynamic behavior:
current output**

Dead time, time constant (T63)

Dead time t_1	Time constant (T63), t_2	Time constant (T90), t_3
60 ms	160 ms	250 ms

Dynamic behavior: HART

Dead time, time constant (T63)

A typical configuration for the PLC of 3 to 4 values per second results in the following total dead time:

Dead time t_1	Time constant (T63), t_2	Time constant (T90), t_3
310 ms	160 ms	250 ms

Reading cycle

- HART commands: 3 to 4 per second on average.
The Cerabar S commands the BURST MODE function for cyclic value transmission via the HART communication protocol.

Response time

≤ 250 ms

Cycle time (update time)

On average 250 to 330 ms.

**Dynamic behavior:
PROFIBUS PA****Dead time, time constant (T63)**

A typical cyclic configuration for the PLC of 20 values per second results in the following total dead time:

Dead time t_1	Time constant (T63), t_2	Time constant (T90), t_3
310 ms	160 ms	250 ms

Response time

- Cyclic: approx. 10 ms per request
- Acyclic: < 50 ms

All values are typical values.

Cycle time (update time)

The cycle time in a bus segment during cyclic data communication depends on the number of devices, the segment coupler used and the internal PLC cycle time.

**Dynamic behavior:
FOUNDATION Fieldbus****Dead time, time constant (T63)**

A typical configuration for the macro cycle time (host system) of 250 ms results in the following total dead time:

Dead time t_1	Time constant (T63), t_2	Time constant (T90), t_3
310 ms	160 ms	250 ms

Reading cycle

- Cyclic: up to 5/s, depends on the number and type of the function blocks used in a closed-control loop
- Acyclic: 10/s

Response time

- Cyclic: < 80 ms
- Acyclic: < 40 ms

All values are typical values.

Cycle time (update time)

250 ms

Damping

A damping affects all outputs (output signal, display).

- Via local display, handheld terminal or PC with operating program, continuous from 0 to 999 s
- In addition with HART and PROFIBUS PA: via DIP switches on the electronic insert, switch position "on" = set value and "off"
- Factory setting: 2 s

**Data on the FOUNDATION
Fieldbus interface**
Basic data

Device Type	1007F (hex)
Device Revision	06 (hex)
DD Revision	01 (hex)
CFF Revision	01 (hex)
ITK Version	5.0
ITK Certification Driver No.	IT054600
Link Master-enabled (LAS)	Yes
Link Master / Basic Device can be selected	Yes; factory setting: Basic Device
Number of VCRs	44
Number of Link objects in VFD	50

Virtual communication references (VCRs)

Permanent entries	44
Client VCRs	0
Server VCRs	5
Source VCRs	8
Sink VCRs	0
Subscriber VCRs	12
Publisher VCRs	19

Link settings

Slot time	4
Min. Inter PDU delay	12
Max. response delay	10

Transducer Blocks

Block	Content	Output values
TRD1 Block	Contains all the parameters relevant for measuring	<ul style="list-style-type: none"> ■ Pressure or level (channel 1) ■ Process temperature (channel 2)
Service Block	Contains service information	<ul style="list-style-type: none"> ■ Pressure after damping (channel 3) ■ Pressure maximum indicator (channel 4) ■ Counter for max. pressure overshoot (channel 5)
Diagnostic Block	Contains diagnostic information	Error number via DI channels (channel 0 to 16)
Display Block	Contains parameters for configuring the local display	No output values

Function blocks

Block	Content	Number of blocks	Execution time	Functionality
Resource Block	This block contains all the data that uniquely identify the device. It is an electronic version of the nameplate of the device.	1		Enhanced
Analog Input Block 1 Analog Input Block 2	This block receives the measuring data provided by the Sensor Block (can be selected using a channel number) and makes them available to other blocks at the output. Enhancement: digital outputs for process alarms, failsafe mode	2	45 ms	Enhanced
Digital Input Block	This block receives discrete data from the Diagnostics Block (can be selected using a channel number 0-16) and makes them available to other blocks at the output.	1	40 ms	Standard
Digital Output Block	This block converts the discrete input, thereby triggering an action (can be selected via a channel number) in the DP Flow Block or in the Service Block. Channel 1 resets the max. pressure overshoot counter.	1	60 ms	Standard
PID Block	This block acts as the proportional integral differential controller and is used universally for control in the field. It enables cascade and feedforward control. The IN input can be shown on the display. Selection is performed in the Display Block (DISPLAY_MAIN_LINE_CONTENT).	1	120 ms	Standard
Arithmetic Block	This block enables the easy use of mathematic functions common in measuring technology. The user does not have to know how to write the equations. The algorithm required for the function is chosen by selecting the name of the algorithm.	1	50 ms	Standard
Input Selector Block	This block allows users to select up to four inputs and generates an output value according to the action configured. The block normally receives its input from AI Blocks. It makes it possible to select the maximum, minimum and average values and the first valid value. Inputs IN1 to IN4 can be shown on the display. Selection is performed in the Display Block (DISPLAY_MAIN_LINE_CONTENT).	1	35 ms	Standard
Signal Characterizer Block	This block consists of two parts, each with an output value that represents a non-linear function of the input value. The non-linear function is generated via a simple with 21 user-defined value pairs.	1	30 ms	Standard
Integrator Block	This block integrates a measured variable over time or totalizes the pulses from a pulse input block. The block can be used as a totalizer that totalizes until it is reset, or as a batch totalizer in which the integrated value is compared to a set value generated before or during the control sequence and a binary signal is generated when the set value is reached.	1	35 ms	Standard
Analog Alarm Block	This block contains all the process alarm conditions (works like a comparator) and presents them at the output.	1	35 ms	Standard

Additional function block information:

Instantiate function block	YES
Number of instantiate blocks	15

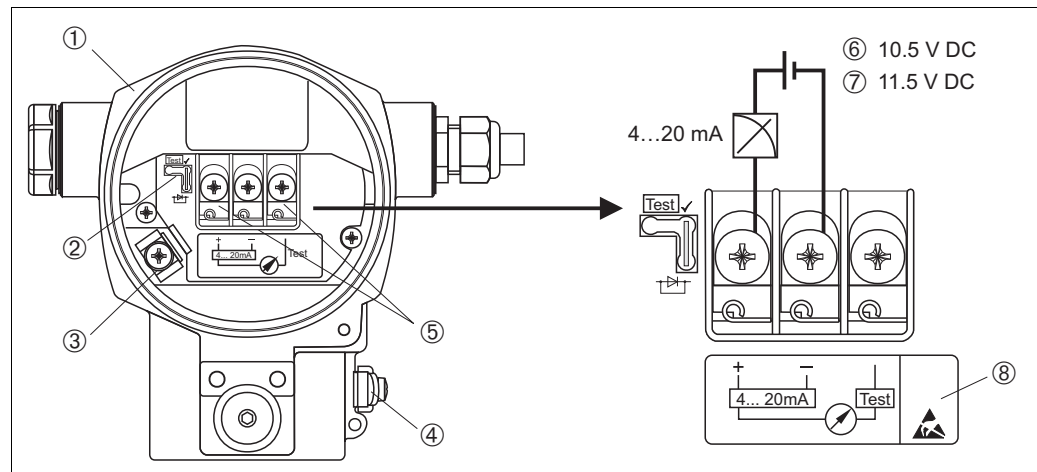
Power supply

Electrical connection

Note!

- When using the measuring device in hazardous areas, installation must comply with the corresponding national standards and regulations and the Safety Instructions or Installation or Control Drawings.
→ 33 ff, "Safety Instructions" and "Installation/Control Drawings" sections.
- Devices with integrated overvoltage protection must be grounded. → 20.
- Protective circuits against reverse polarity, HF influences and overvoltage peaks are installed.

4 to 20 mA HART



Electrical connection 4 to 20 mA HART

- 1 Housing
- 2 Jumper for 4 to 20 mA test signal
→ 14, "Taking 4 to 20 mA test signal" section.
- 3 Internal ground terminal
- 4 External ground terminal
- 5 4 to 20 mA test signal between plus and test terminal
- 6 Minimum supply voltage = 10.5 V DC, jumper is inserted as illustrated in the diagram.
- 7 Minimum supply voltage = 11.5 V DC, jumper is inserted in the "Test" position
- 8 Devices with integrated overvoltage protection are labeled OVP (overvoltage protection) here (→ 20).

PROFIBUS PA

The digital communication signal is transmitted to the bus via a twin-core connecting cable. The bus cable also carries the power supply. For further information on the network structure and grounding and for further bus system components such as bus cables, see the relevant documentation, e.g. Operating Instructions BA034S "PROFIBUS DP/PA: Guidelines for planning and commissioning" and in the PNO Guidelines.

Cable specification:

- Use a twisted, shielded twin-core cable, preferably cable type A.

Note!

For further information on the cable specification, see Operating Instructions BA034S "PROFIBUS DP/PA: Guidelines for planning and commissioning", PNO Guideline 2.092 "PROFIBUS PA User and Installation Guideline" and IEC 61158-2 (MBP).

FOUNDATION Fieldbus

The digital communication signal is transmitted to the bus via a twin-core connecting cable. The bus cable also carries the power supply. For further information on the network structure and grounding and for further bus system components such as bus cables, see the relevant documentation, e.g. Operating Instructions BA013S "FOUNDATION Fieldbus Overview" and the FOUNDATION Fieldbus Guideline.

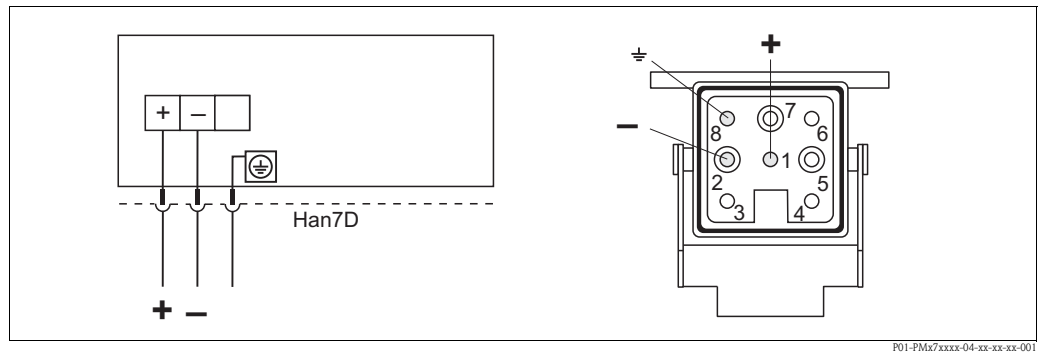
Cable specification:

- Use a twisted, shielded twin-core cable, preferably cable type A.

Note!

For further information on the cable specification, see Operating Instructions BA013S "FOUNDATION Fieldbus Overview", the FOUNDATION Fieldbus Guideline and IEC 61158-2 (MBP).

Devices with Harting connector Han7D

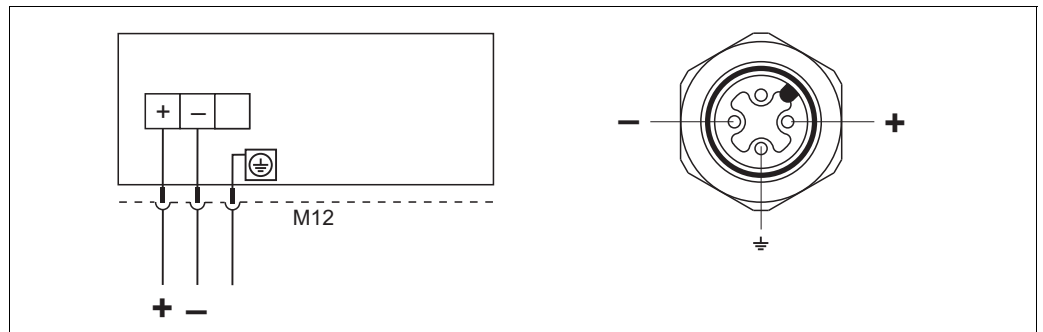


Left: electrical connection for devices with a Harting connector Han7D

Right: view of the connector at the device

P01-PMz7xxxx-04-xx-xx-xx-001

Devices with M12 connector



Left: electrical connection for devices with an M12 connector

Right: view of the connector at the device

P01-PMz7xxxx-04-xx-xx-xx-001

Endress+Hauser offers the following accessories for devices with an M12 connector:

Plug-in jack M 12x1, straight

- Material: body PA; coupling nut CuZn, nickel-plated
- Degree of protection (fully locked): IP67
- Order number: 52006263

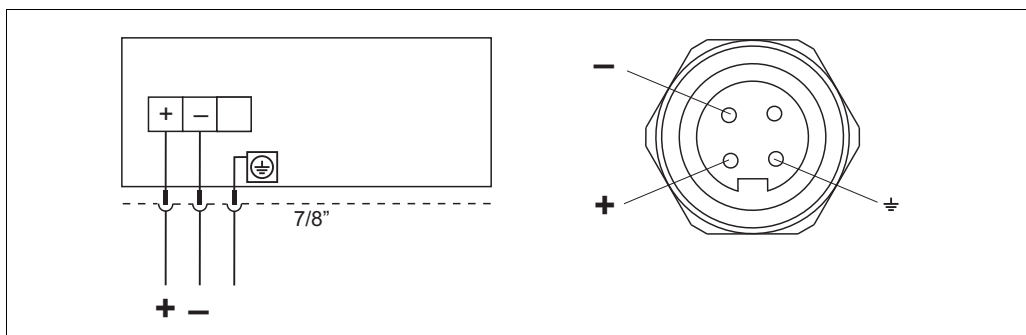
Plug-in jack M 12x1, elbowed

- Material: body PBT/PA; coupling nut GD-Zn, nickel-plated
- Degree of protection (fully locked): IP67
- Order number: 51006327

Cable 4x0.34 mm² with M12 socket, elbowed, screw plug, 5 m length (16 ft)

- Material: body PUR; coupling nut CuSn/Ni; cable PVC
- Degree of protection (fully locked): IP67
- Order number: 52010285

Devices with 7/8" connector



P01-xxx/xxxx-04-xx-xx-xx-003

Left: electrical connection for devices with a 7/8" connector

Right: view of the connector at the device

Cable gland

Approval	Type	Clamping area
Standard, II1/2G Exia, IS	Plastic M20x1.5	5 to 10 mm (0.2 to 0.39 in)
ATEX II1/2D, II1/3D, II1/2GD Exia, II1GD Exia II3G Ex nA	Metal M20x1.5 (Ex e)	7 to 10.5 mm (0.28 to 0.41 in)

Terminals

For wire cross-sections of 0.5 to 2.5 mm² (20 to 14 AWG)

Taking 4 to 20 mA test signal

A 4 to 20 mA test signal may be measured via the plus and test terminal without interrupting the measurement. You can reduce the minimum supply voltage of the measuring device by simply changing the position of the jumper. In this way, operation is also possible with lower voltage sources. Pay attention to the position of the jumper in the following table.

Position of jumper for test signal	Description
	<ul style="list-style-type: none"> - Measuring 4 to 20 mA test signal via the plus and test terminal: possible. (The output current can be measured continuously via the diode.) - Order configuration - Minimum supply voltage: 11.5 V DC
	<ul style="list-style-type: none"> - Measuring 4 to 20 mA test signal via the plus and test terminal: not possible. - Minimum supply voltage: 10.5 V DC

Supply voltage	<p>Note!</p> <ul style="list-style-type: none">■ When using the measuring device in hazardous areas, installation must comply with the corresponding national standards and regulations and the Safety Instructions or Installation or Control Drawings.■ All explosion protection data are given in separate documentation which is available upon request. The Ex documentation is supplied as standard with all devices approved for use in explosion hazardous areas. → 33 ff, "Safety Instructions" and "Installation/Control Drawings" sections. <p>4 to 20 mA HART</p> <ul style="list-style-type: none">■ Version for non-hazardous area, jumper for 4 to 20 mA test signal inserted in "Test" position (order configuration): 11.5 to 45 V DC■ Version for non-hazardous area, jumper for 4 to 20 mA test signal inserted in "Non-test" position: 10.5 to 45 V DC <p>PROFIBUS PA</p> <ul style="list-style-type: none">■ Version for non-hazardous areas: 9 to 32 V DC <p>FOUNDATION Fieldbus</p> <ul style="list-style-type: none">■ Version for non-hazardous areas: 9 to 32 V DC
Current consumption	<ul style="list-style-type: none">■ PROFIBUS PA: 13 mA ± 1 mA, switch-on current corresponds to IEC 61158-2, Clause 21.■ FOUNDATION Fieldbus: 15 mA ± 1 mA, switch-on current corresponds to IEC 61158-2, Clause 21.
Cable entry	→ 31 ff, feature 30 "Housing; Cable entry; Degree of protection".
Cable specification	<ul style="list-style-type: none">■ If only the analog signal is to be used, a normal instrument cable suffices. If the superimposed digital communication signal is to be used, use a shielded cable.■ Terminals for core cross-sections 0.5 to 2.5 mm² (20 to 14 AWG)■ Cable outer diameter: 5 to 9 mm (0.2 to 0.35 in)
Residual ripple	No influence on 4 to 20 mA signal up to ± 5 % residual ripple within the permitted voltage range [according to HART hardware specification HCF_SPEC-54 (DIN IEC 60381-1)]
Influence of power supply	≤ 0.0006% of URL/1 V

Performance characteristics

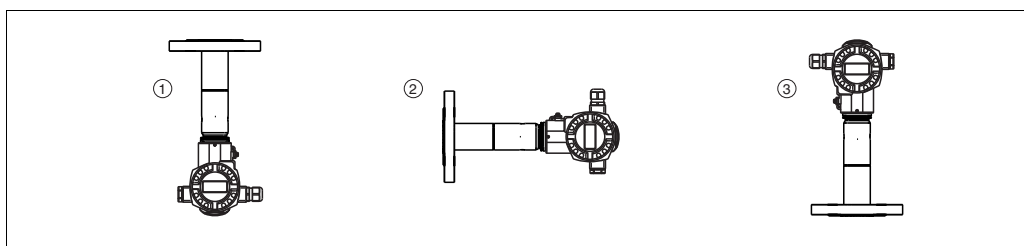
Reference operating conditions

- As per IEC 60770
- Ambient temperature T_A = constant, in the range of: +21 to +33 °C (+70 to 91 °F)
- Humidity φ = constant, in the range of: 5 to 80 % rH.
- Ambient pressure p_A = constant, in the range of: 860 to 1060 mbar (12.47 to 15.37 psi)
- Position of the measuring cell: constant, in range: horizontally $\pm 1^\circ$
- Input of LOW SENSOR TRIM and HIGH SENSOR TRIM for lower range value and upper range value
- Span based on zero point
- Material of the process isolating diaphragm: AISI 316L/1.4435
- Filling oil: Silicone oil
- Supply voltage: 24 V DC \pm 3 V DC
- Load with HART: 250 Ω

Long-term stability

- For measuring range 0.4 bar_{abs} (6 psi_{abs}): ± 0.44 % of the URL/year
- For measuring range 1 bar_{abs} (15 psi_{abs}): ± 0.175 % of the URL/year

Influence of orientation



Orientation: ① Suspended; ② Horizontal ③ Vertical

Suspended: ≤ 40 mbar (0.6 psi)

Horizontal: ≤ 20 mbar (0.3 psi)

Vertical: ≤ 1 mbar (0.015 psi)

Note!

Position-dependent zero point shift can be corrected. → 18, "General installation instructions" section.

Reference accuracy

The reference accuracy comprises the non-linearity according to limit point setting, hysteresis and non-reproducibility as per IEC 60770.

Measuring cell	% of the set span
0.4 bar _{abs} (6 psi _{abs})	<ul style="list-style-type: none"> ■ TD 1:1 = ± 0.15 ■ TD > 1:1 = $\pm 0.15 \times \text{TD}$
1 bar _{abs} (15 psi _{abs})	<ul style="list-style-type: none"> ■ TD 1:1 to TD 2.5:1 = ± 0.075 ■ TD > 2.5:1 = $\pm 0.03 \times \text{TD}$

Total performance

The "Total performance" specification comprises the non-linearity including hysteresis, non-reproducibility as well as the thermal change in the zero point.

Measuring cell	% of URL
0.4 bar _{abs} (6 psi _{abs})	± 0.375
1 bar _{abs} (15 psi _{abs})	± 0.225
All specifications apply to the temperature range -10 to $+60$ °C (14 to 140 °F) (process temperature = ambient temperature).	

Total error

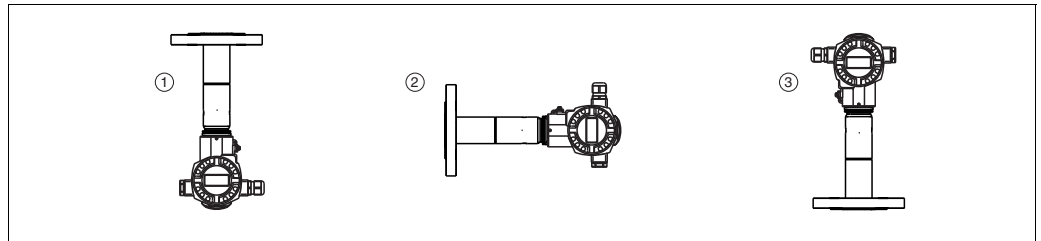
The total error comprises the long-term stability and the total performance:

Measuring cell	% of URL/year
0.4 bar _{abs} (6 psi _{abs})	■ ±0.82
1 bar _{abs} (15 psi _{abs})	■ ±0.4

Warm-up period

- 4 to 20 mA HART: <10 s
- PROFIBUS PA: 6 s
- FOUNDATION Fieldbus: 50 s

Thermal change in the zero output and the output span



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Orientation: ① Suspended; ② Horizontal ③ Vertical

Thermal change mbar (psi) with "Suspended" orientation:

T ambient °C (°F)	Process temperature °C (°F)				
	-10 ≤ T <100 (14 ≤ T <212)	100 ≤ T <150 (212 ≤ T <302)	150 ≤ T <200 (302 ≤ T <392)	200 ≤ T <250 (392 ≤ T <482)	250 ≤ T ≤280 (482 ≤ T ≤536)
-10 (14)	3.4 (0.051)	5.2 (0.078)	7.0 (0.105)	8.8 (0.132)	9.9 (0.1485)
0	3.5 (0.0525)	5.4 (0.081)	7.1 (0.1065)	9.8 (0.147)	11.9 (0.1785)
25 (77)	3.6 (0.054)	5.9 (0.0885)	9.4 (0.141)	13.4 (0.201)	16.5 (0.2475)
50 (122)	3.6 (0.054)	7.2 (0.108)	12.0 (0.18)	17.5 (0.2625)	21.6 (0.324)

Thermal change mbar (psi) with "Horizontal" orientation:

T ambient °C (°F)	Process temperature °C (°F)				
	-10 ≤ T <100 (14 ≤ T <212)	100 ≤ T <150 (212 ≤ T <302)	150 ≤ T <200 (302 ≤ T <392)	200 ≤ T <250 (392 ≤ T <482)	250 ≤ T ≤280 (482 ≤ T ≤536)
-10 (14)	3.7 (0.0555)	5.9 (0.0885)	8 (0.12)	10.3 (0.1545)	11.8 (0.177)
0	3.8 (0.057)	6.1 (0.0915)	8.1 (0.1215)	11.3 (0.1695)	13.8 (0.207)
25 (77)	3.9 (0.0585)	6.6 (0.099)	10.4 (0.156)	14.9 (0.2235)	18.4 (0.276)
50 (122)	3.9 (0.0585)	7.9 (0.1185)	13 (0.195)	19 (0.285)	23.5 (0.3525)

Thermal change mbar (psi) with "Vertical" orientation:

T ambient °C (°F)	Process temperature °C (°F)				
	-10 ≤ T <100 (14 ≤ T <212)	100 ≤ T <150 (212 ≤ T <302)	150 ≤ T <200 (302 ≤ T <392)	200 ≤ T <250 (392 ≤ T <482)	250 ≤ T ≤280 (482 ≤ T ≤536)
-10 (14)	4.2 (0.063)	7.0 (0.105)	9.7 (0.1455)	12.9 (0.1935)	14.9 (0.2235)
0	4.3 (0.0645)	7.2 (0.108)	9.8 (0.147)	13.9 (0.2085)	16.9 (0.2535)
25 (77)	4.4 (0.066)	7.7 (0.1155)	12.1 (0.1815)	17.5 (0.2625)	21.5 (0.3225)
50 (122)	4.4 (0.066)	9.0 (0.135)	14.7 (0.2205)	21.6 (0.324)	26.6 (0.399)

Operating conditions (installation)

General installation instructions

- The position-dependent zero point shift can be corrected directly at the device via operating keys, and also in hazardous locations in the case of devices with external operation.
- The housing of the Cerabar S can be rotated 380°. → [19](#), "Rotating the housing" section.

Measuring arrangement

Cerabar S transmitters are mounted as per the norms for a manometer (DIN EN 837-2). Endress+Hauser recommends the use of shutoff devices. The orientation depends on the measuring application.

Pressure measurement in gases

Mount Cerabar S with shutoff device above the tapping point so that any condensate can flow into the process.

Pressure measurement in steams

The Cerabar S can be operated in hot media within the permitted temperature and pressure limits.

Pressure measurement in liquids

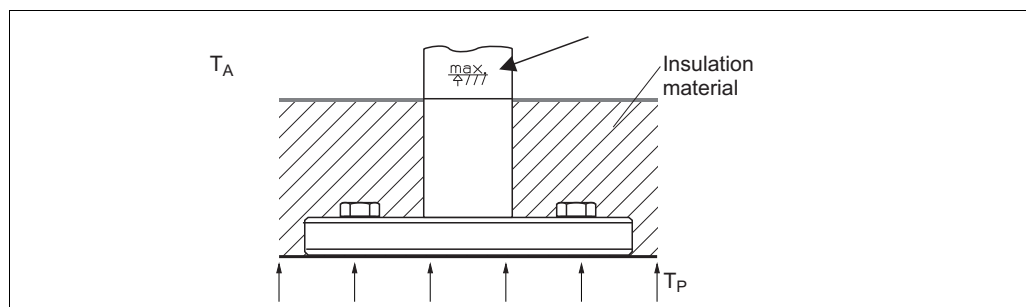
Mount Cerabar S with shutoff device below or at the same level as the tapping point.

Level measurement

- Mount Cerabar S below the lowest measuring point.
- Do not mount the device at the following positions:
In the filling curtain, in the tank outlet or at a point in the container which could be affected by pressure pulses from an agitator or a pump.
- The calibration and functional test can be carried out more easily if you mount the device downstream of a shutoff device.

High-temperature version heat insulation

The PMP72 may only be insulated up to a certain height. The maximum permitted insulation height is indicated on the devices and applies to an insulation material with a heat conductivity $\leq 0.04 \text{ W}/(\text{m} \times \text{K})$ at $100 \text{ }^\circ\text{C}$ ($212 \text{ }^\circ\text{F}$) with a linear increase to $0.07 \text{ W}/(\text{m} \times \text{K})$ at $300 \text{ }^\circ\text{C}$ ($572 \text{ }^\circ\text{F}$) and to the maximum ambient temperature → [20](#) and process temperatures → [21](#) permitted. The data were determined under the most critical application "quiescent air".



P01-PMP72xxx-11-xx-xx-en-000

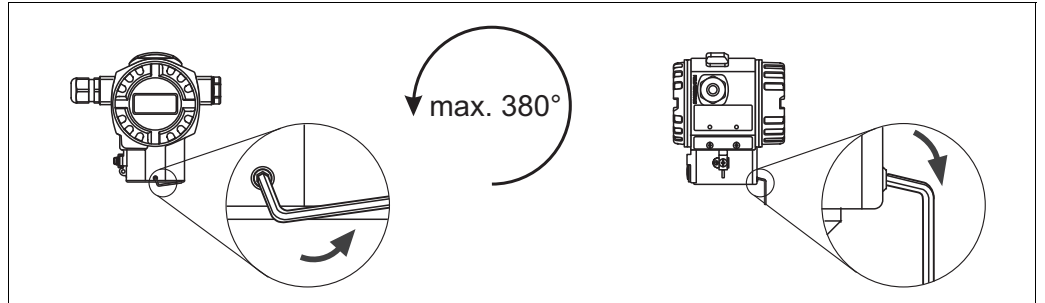
Maximum permitted insulation height

Rotating the housing

The housing can be rotated 380° by loosening the Allen screw.

Your benefits

- Easy mounting thanks to optimum alignment of the housing
- Device operation is easy to access
- Optimum visibility of the local display (optional).



*Aligning the housing by releasing the setscrew
T14 housing: 2 mm (0.08 in) Allen screw*

Operating conditions (environment)

Ambient temperature limits	<p>–10 to +50 °C (–14 to +122 °F)</p> <p>Note:</p> <p>Observe the minimum process pressure (see table in the "Process pressure limits" section → 21)!</p> <p>For devices for use in hazardous areas, see Safety Instructions, Installation or Control Drawing. (→ 33 ff, "Safety Instructions" and "Installation/Control Drawings" sections)</p>
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Storage temperature range	<ul style="list-style-type: none"> ■ –20 to +100 °C (–4 to +212 °F) ■ Local display: –40 to +85 °C (–40 to +185 °F)
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Degree of protection	<ul style="list-style-type: none"> ■ → See Page 31 ff, feature 30 "Housing; Cable entry; Degree of protection".
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Climate class	<p>Class 3K5 (air temperature: –5 to 45 °C (+23 to 113 °F), relative humidity: 4 to 95 %) satisfied as per IEC 721-3-3 (condensation possible)</p>
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Vibration resistance	Vibration resistance	
	Test standard	Aluminium housing
	IEC 61298-3	<p>guaranteed for</p> <p>10 to 60 Hz: ±0.15 mm (0.059 in);</p> <p>60 to 500 Hz: 2 g</p> <p>in all 3 planes</p>
	Stainless steel housing	<p>The vibration resistance for stainless steel housing ist reduced.</p>

Electromagnetic compatibility	<ul style="list-style-type: none"> ■ Electromagnetic compatibility as per EN 61326 and NAMUR Recommendation EMC (NE21). Details can be found in the Declaration of Conformity. ■ With increased interference immunity to electromagnetic fields as per EN 61000-4-3: 30 V/m with the cover closed ■ Maximum deviation: < 0.5 % of the span ■ The values indicated apply to a turn down (TD) = 1:1.
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Overvoltage protection (optional)	<ul style="list-style-type: none"> ■ Overvoltage protection: <ul style="list-style-type: none"> – Nominal functioning DC voltage: 600 V – Nominal discharge current: 10 kA ■ Surge current check $\hat{i} = 20$ kA as per DIN EN 60079-14: 8/20 μs satisfied ■ Arrester AC current check $I = 10$ A satisfied <p>→ 31 ff, feature 100 "Additional fittings 1" and feature 110 "Additional fittings 2", version "M overvoltage protection".</p> <p>Note!</p> <p>Devices with integrated overvoltage protection must be grounded.</p>
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Operating conditions (process)

Process temperature limits

-10 to +280 °C (-14 to +536 °F)

Note:

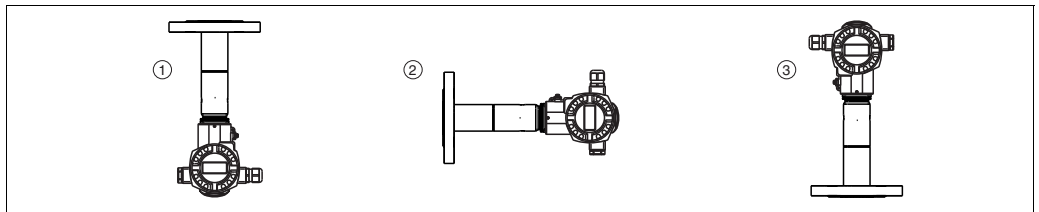
Observe the minimum process pressure (see table in the "Process pressure limits" section → 21)!

Pressure specifications

- The maximum pressure for the measuring device depends on the lowest-rated element with regard to pressure. See the following sections:
 - → 6 ff, "Measuring range" section
 - "Mechanical construction" section.
 The MWP (maximum working pressure) is specified on the nameplate. This value refers to a reference temperature of +20°C (68°F) or 100°F (38 °C) for ANSI flanges and may be applied to the device for an unlimited time. Observe the temperature dependency of the MWP.
- The pressure values permitted at higher temperatures can be found in the following standards:
 - EN 1092-1: 2001 Tab. 18 ¹
 - ASME B 16.5a – 2006 Tab. 2-2.2 F316
- The test pressure corresponds to the over pressure limit of the device (OPL = 1.5 x MWP) and may be applied for only a limited time period in order to avoid permanent damage.
- The Pressure Equipment Directive (EC Directive 97/23/EC) uses the abbreviation "PS". The abbreviation "PS" corresponds to the MWP (maximum working pressure) of the measuring device.

1) With regard to their stability-temperature property, the materials 1.4435 and 1.4404 are grouped together under 13EO in EN 1092-1 Tab. 18. The chemical composition of the two materials can be identical.

Process pressure limits



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Orientation: ① Suspended; ② Horizontal ③ Vertical

Use the following table to determine the minimum, absolute process pressures depending on the orientation.

		T ambient °C (°F)		
		-10 ≤ T <30 (14 ≤ T <86)	30 ≤ T <40 (86 ≤ T <104)	40 ≤ T ≤50 (104 ≤ T ≤122)
Orientation	T process °C (°F)	Minimum process pressure mbar _{abs} (psi _{abs})		
Suspended	-10 to 200 (14 to 392)	15 (0.23)	30 (0.45)	50 (0.75)
	201 to 240 (394 to 464)	30 (0.45)	40 (0.6)	55 (0.83)
	241 to 280 (466 to 536)	50 (0.75)	55 (0.83)	60 (0.9)
Horizontal	-10 to 200 (14 to 392)	35 (0.53)	55 (0.83)	75 (1.13)
	201 to 240 (394 to 464)	55 (0.83)	65 (0.98)	80 (1.2)
	241 to 280 (466 to 536)	75 (1.13)	80 (1.2)	85 (1.28)
Vertical	-10 to 200 (14 to 392)	60 (0.9)	80 (1.2)	100 (1.5)
	201 to 240 (394 to 464)	80 (1.2)	90 (1.35)	105 (1.58)
	241 to 280 (466 to 536)	100 (1.5)	105 (1.58)	110 (1.65)

The maximum measuring range, or the information regarding the MWP and OPL, applies for the maximum process pressure.

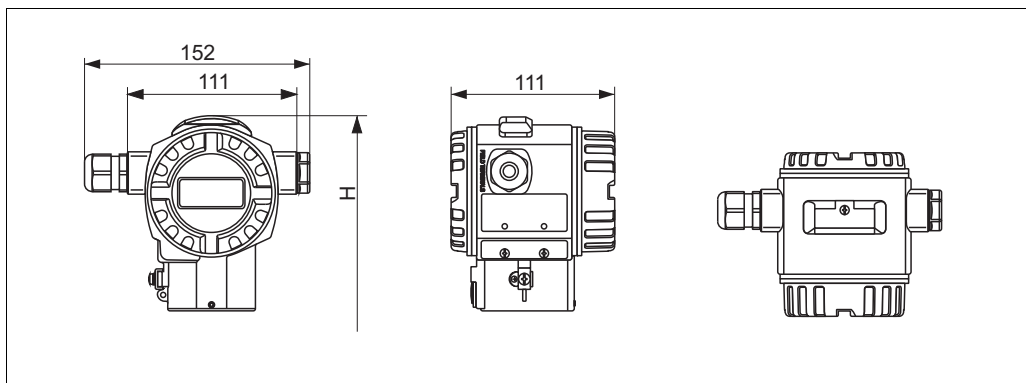
Calculation example:

Horizontal orientation, process temperature is 230 °C (446 °F), ambient temperature is max. 35 °C (95 °F).

Result: Minimum process pressure 65 mbar_{abs} (0.98 psi_{abs}).

Mechanical construction

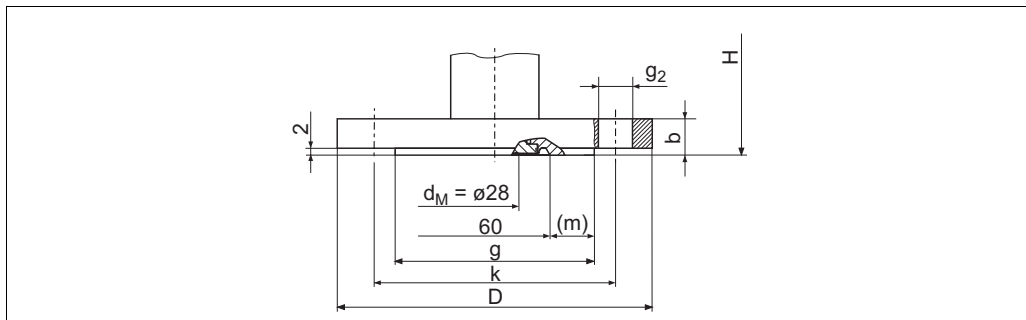
T14 housing dimensions



Front view, left-hand side view, top view
 → Installation height H , see process connection in question. Housing weight → 23.

Process connections

EN/DIN flanges, connection dimensions as per EN 1092-1/DIN 2527

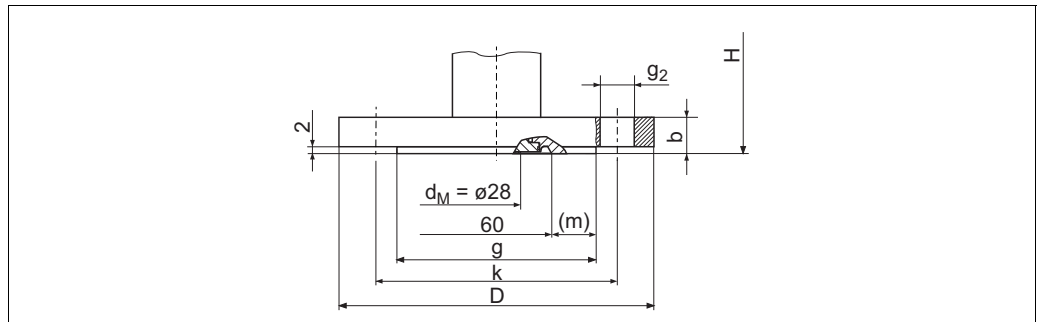


EN/DIN flange with raised face, material AISI 316L
 H : device height = 311 mm (12.2 in)

Version	Flange							Boltholes			
	Nominal diameter	Nominal pressure	Shape ¹	Dia-meter	Thick-ness	Raised face	Width of the raised face	Quantity	Diameter	Hole circle	Flange weight ²
				D [mm]	b [mm]	g [mm]	(m) [mm]		g ₂ [mm]	k [mm]	[kg]
CN	DN 25	PN 10-40	B1 (D)	115	18	66 ³	4	4	14	85	2.3
B3	DN 50	PN 10-40	B1 (D)	165	20	102	21	4	18	125	4.1
B4	DN 80	PN 10-40	B1 (D)	200	24	138	39	8	18	160	6.5

- 1) Designation as per DIN 2527 in brackets
- 2) Housing weight → 23
- 3) With these process connections the raised face is smaller than described in the standard. Due to a smaller raised face a special seal must be used. Contact a seal manufacturer or your Endress+Hauser sales office.

ANSI flanges, connection dimensions as per ANSI B 16.5, raised face RF



P01-PMP72xxx-06-09-xx-xx-002

ANSI flange with raised face RF (see table below)

H: device height = 311 mm (12.2 in)

Ver- sion	Flange							Boltholes			
	Material	Nomi- nal dia- meter	Class/ Nominal pressure	Diameter	Thickness	Diameter of raised face	Width of the raised face	Quan- tity	Diameter	Hole circle	Flange weight ¹ [kg]
				D [in] / [mm]	b [in] / [mm]	g [in] / [mm]	(m) [in] / [mm]		g ₂ [in] / [mm]	k [in] / [mm]	
ANSI flanges											
AF	AISI 316/316L ²	2 in	150 lb./sq.in	6 / 152.4	0.75 / 19.1	3.62 / 91.9	0.63 / 16	4	0.75 / 19.1	4.75 / 120.7	3.5
AG	AISI 316/316L ²	3 in	150 lb./sq.in	7.5 / 190.5	0.94 / 23.9	5 / 127	1.34 / 34	4	0.75 / 19.1	6 / 152.4	6

1) Housing weight → 23

2) Combination of AISI 316 for required pressure resistance and AISI 316L for required chemical resistance (dual rated)

Weight

Housing

	Aluminium	AISI 316L
With electronic insert and on-site display	1.2 kg (2.65 lbs)	2.1 kg (4.63 lbs)

With electronic insert and local display: 1.2 kg (2.65 lbs)

Process connections

→ 22 ff

Material**Housing:**

- Selectable:
 - Housing: die-cast aluminum with protective powder-coating on polyester base: RAL 5012 (blue), cover: RAL 7035 (gray)
 - Precision cast stainless steel AISI 316L (1.4435)
- External operation (keys and key cover): polycarbonate PC-FR, RAL 7035 (gray)
- Sight glass: mineral glass
- Cable gland: polyamide (PA)
- Pressure compensation filter: PA6 GF10
- Plug: PBT-GF30 FR, for dust ignition-proof, Ex d, FM XP and CSA XP: AISI 316L (1.4435)
- Seals:
 - Cable gland and blind plug: silicone (VMQ)
 - Pressure compensation filter O-ring: silicone (VMQ)
 - Cover: EPDM
 - Sight glass: silicone (VMQ)
- Nameplates: AISI 304 (1.4301)

Process connections

- ANSI and DIN/EN flanges (see also "Ordering information" section): stainless steel 316L with material number 1.4435 (316L) or 1.4404 (316L)
(With regard to their stability-temperature property, the materials 1.4435 and 1.4404 are grouped together under 13E0 in EN 1092-1 Tab. 18. The chemical composition of the two materials can be identical.)

Miscellaneous:

For process connections, process isolating diaphragms, seals and filling oils see ordering information,
→  31 ff.

Human interface

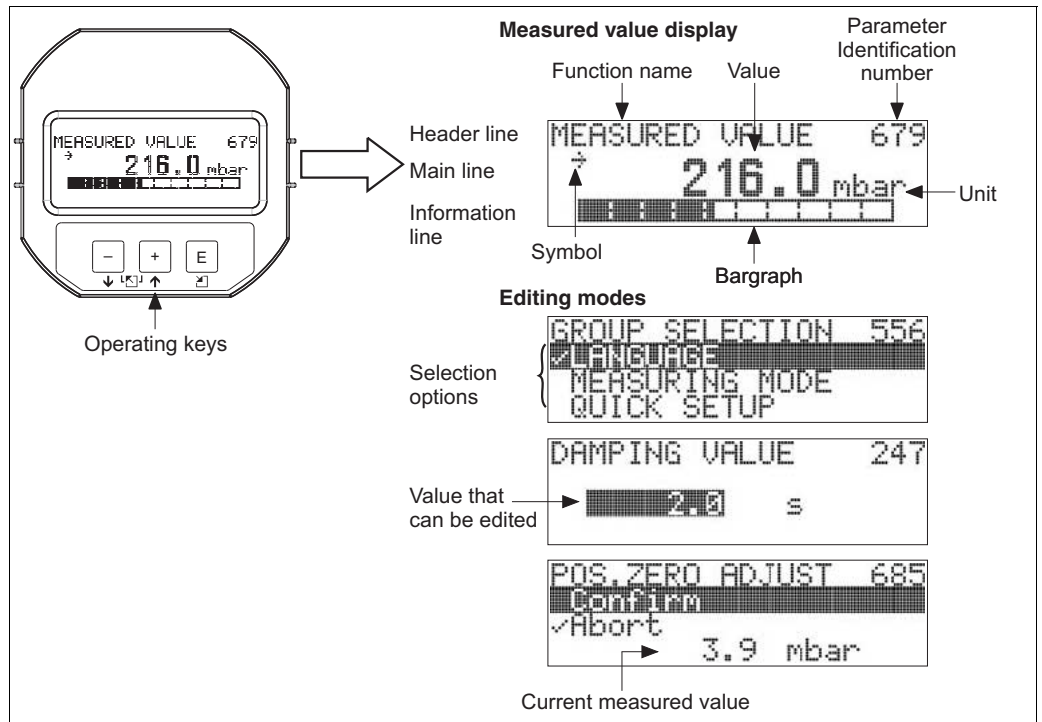
Operating elements

Local display (optional)

A 4-line liquid crystal display (LCD) is used for display and operation. The local display shows measured values, dialog texts as well as fault and notice messages in plain text, thereby supporting the user at every stage of operation. The liquid crystal display of the device can be turned in 90° stages. Depending on the orientation of the device, this makes it easy to operate the device and read the measured values.

Functions:

- 8-digit measured value display including sign and decimal point, bar graph for 4 to 20 mA HART as current display; or for PROFIBUS PA as graphic display of the standardized value of the AI Block; for FOUNDATION Fieldbus as graphic display of the transducer output.
- Simple and complete menu guidance as parameters are split into several levels and groups
- Each parameter is given a 3-digit ID number for easy navigation
- Possibility of configuring the display to suit individual requirements and preferences, such as language, alternating display, contrast setting, display of other measured values such as sensor temperature etc.
- Comprehensive diagnostic functions (fault and warning message, maximum indicator etc.)
- Rapid and safe commissioning using Quick Setup menus

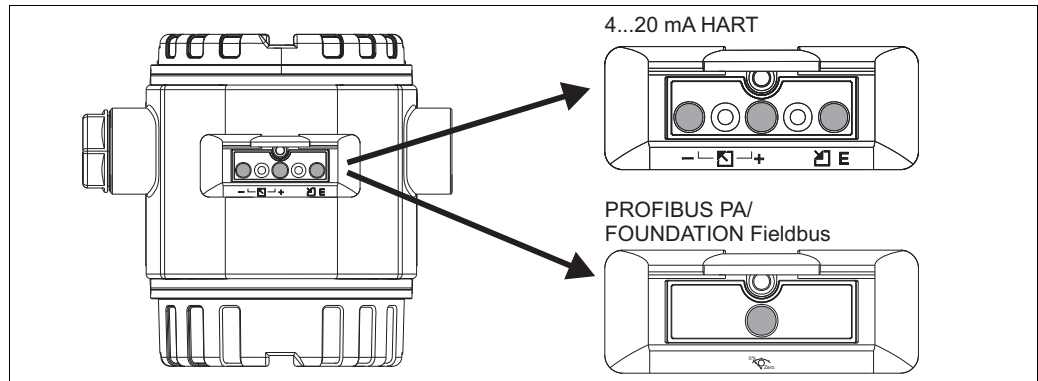


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Operating elements

Operating keys on the outside of the device

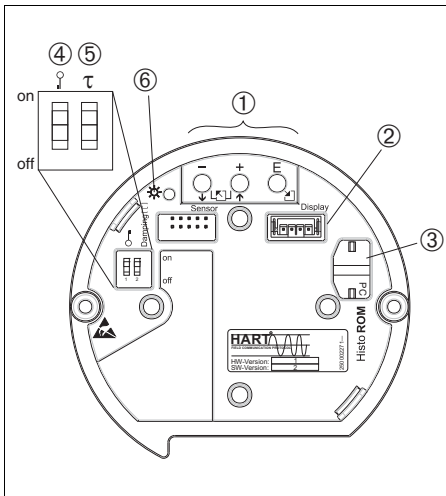
On the aluminum or stainless steel T14 housing, the operating keys are located either under the protective flap on the exterior of the device or inside on the electronic insert.



The operating keys on the exterior of the device work on the basis of the Hall sensor principle. As a result, no additional openings are required in the device. This guarantees:

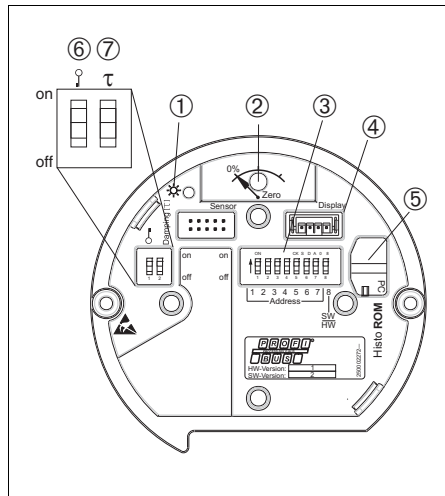
- Complete protection against environmental influences such as moisture or contamination
- Easy operation without extra tools
- No wear

Operating keys and elements located inside on the electronic insert



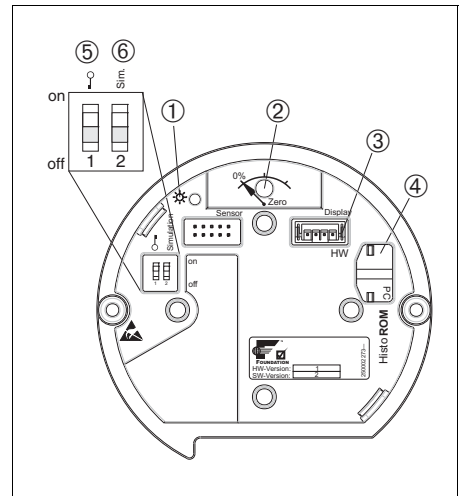
HART electronic insert

- 1 Operating keys
- 2 Slot for optional display
- 3 Slot for optional HistoROM®/M-DAT
- 4 DIP switch for locking/unlocking parameters relevant to the measured value
- 5 DIP switch for switching damping on/off
- 6 Green LED to indicate value is accepted



PROFIBUS PA electronic insert

- 1 Green LED to indicate value is accepted
- 2 Key for position adjustment and device reset
- 3 DIP switch for bus address
- 4 Slot for optional display
- 5 Slot for optional HistoROM®/M-DAT
- 6 DIP switch for locking/unlocking parameters relevant to the measured value
- 7 DIP switch for switching damping on/off



FOUNDATION Fieldbus electronic insert

- 1 Green LED to indicate value is accepted
- 2 Key for position adjustment and device reset
- 3 Slot for optional display
- 4 Slot for optional HistoROM®/M-DAT
- 5 DIP switch for locking/unlocking parameters relevant to the measured value
- 6 DIP switch for switching simulation mode on/off

Onsite operation

Function	Operation from outside (operating keys, optional)	Operation from inside (electronic insert)	Display (optional)
Position adjustment (zero point correction)	X	X	X
Setting lower range value and upper range value - reference pressure present at the device	X (only HART)	X (only HART)	X
Device reset	X	X	X
Locking and unlocking parameters relevant to the measured value	---	X	X
Value acceptance indicated by the green LED	X	X	X
Switching damping on and off	---	X (only HART and PA)	X
Setting the bus address of the device (PA)	---	X	X
Switching the simulation mode on and off (FOUNDATION Fieldbus)	---	X	X

Remote operation

All software parameters are accessible depending on the position of the write protection switch on the device.

HART

Remote operation via:

- Field Communicator 375 handheld terminal (see "Hardware and software for local and remote operation" section → 28)
- FieldCare (see "Hardware and software for local and remote operation" section → 28 ff) with
 - Commubox FXA191 (see "Hardware and software for local and remote operation" section → 28 ff)
 - Commubox FXA195 (see "Hardware and software for local and remote operation" section → 28 ff)
- Field Xpert:

Field Xpert is an industrial PDA with integrated 3.5" touchscreen from Endress+Hauser based on Windows Mobile. It communicates via wireless with the optional VIATOR Bluetooth modem connected to a HART device point-to-point or wireless via WiFi and Endress+Hauser's Fieldgate FXA520. Field Xpert also works as a stand-alone device for asset management applications. For details, refer to BA060S/04/EN.

PROFIBUS PA

Remote operation via:

- FieldCare (see "Hardware and software for local and remote operation" section → 28 ff)
 - Profiboard: For connecting a PC to PROFIBUS
 - Proficard: For connecting a laptop to PROFIBUS

FOUNDATION Fieldbus

Remote operation via:

- Field Communicator 375 handheld terminal (see "Hardware and software for local and remote operation" section → 28 ff)
- Use an FF configuration program, such as NI-FBUS Configurator, to:
 - Integrate devices with a "FOUNDATION Fieldbus signal" into an FF network
 - Configure FF-specific parameters

Operation with NI-FBUS Configurator:

The NI-FBUS Configurator is an easy-to-use graphical environment for creating linkages, loops, and a schedule based on the fieldbus concepts.

You can use the NI-FBUS Configurator to configure a fieldbus network as follows:

- Set block and device tags
- Set device addresses
- Create and edit function block control strategies (function block applications)
- Configure vendor-defined function and transducer blocks
- Create and edit schedules
- Read and write to function block control strategies (function block applications)
- Invoke Device Description (DD) methods
- Display DD menus

- Download a configuration
- Verify a configuration and compare it to a saved configuration
- Monitor a downloaded configuration
- Replace a virtual device by a real device
- Save and print a configuration



Note!

For further information please contact your Endress+Hauser Sales Center.

Hardware and software for local and remote operation

Commubox FXA191

For intrinsically safe HART communication with FieldCare via the RS232C interface. For details refer to TI237F700/EN.

Commubox FXA195

For intrinsically safe HART communication with FieldCare via the USB port. For details refer to TI404F/00/EN.

Commubox FXA291

The Commubox FXA291 connects Endress+Hauser field devices with a CDI interface (= Endress+Hauser Common Data Interface) and the USB port of a computer or laptop. For details refer to TI405C/07/EN.

Note!

For the PMP72, you also need the "ToF adapter FXA291" accessory.

ToF adapter FXA291

The ToF adapter FXA291 connects the Commubox FXA291 with devices of the ToF platform, pressure equipment and the GammapiLOT via the USB port of a computer or laptop. For details refer to KA271F.

Field Communicator 375

The handheld terminal can be used to set all the parameters via menu operation along the entire bus cable.

HistoROM®/M-DAT (optional)

The HistoROM®/M-DAT is a memory module that can be attached to every electronic insert. The HistoROM®/M-DAT can be retrofitted at any time (Order No.: 52027785).

Your benefits

- Ability to commission the same measuring points swiftly and reliably by copying configuration data from one transmitter to another transmitter
- Reliable process monitoring thanks to the cyclic recording of pressure and sensor temperature measured values
- Easy diagnosis by recording diverse events, such as alarms, configuration changes, counters for measuring range undershoot and overshoot for pressure and temperature, as well as overshooting and undershooting user limits for pressure and temperature, etc.
- Analysis and graphic evaluation of the events and process parameters via software (part of scope of supply).

You can order the HistoROM®/M-DAT via feature 100 "Additional fittings 1", feature 110 "Additional fittings 2" or as a spare part. → 31 ff. A CD with an Endress+Hauser operating program also forms part of the scope of supply.

When operating a FOUNDATION Fieldbus device using an FF configuration program, you can copy data from one transmitter to another. To access the data and events saved in the HistoROM®/M-DAT, you require the Endress+Hauser FieldCare operating program, the Commubox FXA291 service interface and the ToF adapter FXA291.

FieldCare

FieldCare is an Endress+Hauser asset management tool based on FDT technology. With FieldCare, you can configure all Endress+Hauser devices as well as devices from other manufacturers that support the FDT standard.

FieldCare supports the following functions:

- Configuration of transmitters in offline and online mode
- Loading and saving device data (upload/download)
- HistoROM®/M-DAT analysis
- Documentation of the measuring point

Connection options:

- HART via Commubox FXA191 and the RS 232 C serial interface of a computer
- HART via Commubox FXA195 and the USB port of a computer
- PROFIBUS PA via segment coupler and PROFIBUS interface card
- FOUNDATION Fieldbus via Commubox FXA193 and the RS 232 C serial interface of a computer
- Service interface with Commubox FXA291 and ToF adapter FXA291 (USB).

For further information → www.endress.com

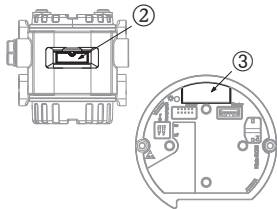
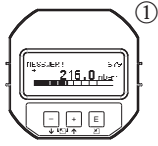
Certificates and approvals

CE mark	The device meets the legal requirements of the relevant EC directives. Endress+Hauser confirms that the device has been successfully tested by applying the CE mark.
Ex approvals	<ul style="list-style-type: none"> ■ ATEX ■ FM ■ CSA ■ NEPSI ■ IECEx ■ Also combinations of approvals <p>All explosion protection data are given in separate documentation which is available upon request. The Ex documentation is supplied as standard with all devices approved for use in explosion hazardous areas. → 33 ff, "Safety Instructions" and "Installation/Control Drawings" sections.</p>
Functional safety SIL/ IEC 61508 Declaration of Conformity (optional)	<p>The Cerabar S devices with a 4 to 20 mA output signal have been developed in accordance with the IEC 61508 standard. These devices can be used to monitor the process level and pressure up to SIL 3.</p> <p>For a detailed description of the safety functions with Cerabar S, settings and functional safety data, see the "Functional safety manual - Cerabar S" SD190P.</p> <p>For devices up to SIL 3 / IEC 61508 Declarations of Conformity, see → 31 ff, feature 100 "Additional fittings 1" and feature 110 "Additional fittings 2" version E "SIL / IEC 61508 Declaration of Conformity".</p>
Pressure Equipment Directive (PED)	The device corresponds to Article 3 (3) of the EC directive 97/23/EC (Pressure Equipment Directive) and has been designed and manufactured according to good engineering practice.
Standards and guidelines	<p>DIN EN 60770 (IEC 60770): Transmitters for use in industrial process control systems Part 1: Methods for inspection and routine testing</p> <p>DIN 16086: Electrical pressure measuring instruments, pressure sensors, pressure transmitters, pressure measuring instruments, concepts, specifications on data sheets</p> <p>EN 61326-X: EMC product family standard for electrical equipment for measurement, control and laboratory use.</p>

Ordering information

PMP72

This overview does not mark options which are mutually exclusive.



10	Approval:		
	A	For non-hazardous areas	
	1	ATEX II 1/2 G Ex ia IIC T6	
	2	ATEX II 1/2 D	
	4	ATEX II 1/3 D	
	8	ATEX II 1 GD Ex ia IIC T6	
	3	ATEX II 1/2 GD Ex ia IIC T6	
	7	ATEX II 3 G Ex nA II T6	
	S	FM IS, Class I, II, III Division 1, Groups A – G; NI Class I Division 2, Groups A – D; AEx ia; Zone 0,1,2,20,21,22	
	Q	FM DIP, Class II, III Division 1, Groups E – G; Zone 21,22	
	R	FM NI, Class I, Division 2, Groups A – D; Zone 2	
	U	CSA IS, Class I, II, III Division 1, Groups A – G; Class I Division 2, Groups A – D, Ex ia; Zone 0,1,2	
	W	CSA Class II, III Division 1, Groups E – G (dust ignition proof)	
	H	NEPSI Ex ia IIC T6	
	I	IECEx Zone 0/1 Ex ia IIC T6	
20	Output; Operation:		
	A	4 to 20 mA SIL HART, external operation, LCD (→ see Fig. ①, ②)	
	B	4 to 20 mA SIL HART, internal operation, LCD (→ see Fig. ①, ③)	
	C	4 to 20 mA SIL HART, internal operation, (→ see Fig. ③)	
	M	PROFIBUS PA, external operation, LCD (→ see Fig. ①, ②)	
	N	PROFIBUS PA, internal operation, LCD (→ see Fig. ①, ③)	
	O	PROFIBUS PA, internal operation (→ see Fig. ③)	
	P	FOUNDATION Fieldbus, external operation, LCD (→ see Fig. ①, ③)	
	Q	FOUNDATION Fieldbus, internal operation, LCD (→ see Fig. ①, ③)	
	R	FOUNDATION Fieldbus, internal operation (→ see Fig. ③)	
30	Housing; Cable entry; Degree of protection:		
	A	Aluminum T14 housing, optional lateral display, IP 66/67/NEMA 4X/ 6P, gland M 20x1.5,	
	B	Aluminum T14 housing, optional lateral display, IP 66/67/NEMA 4X/ 6P, thread G 1/2	
	C	Aluminum T14 housing, optional lateral display, IP 66/67/NEMA 4X/ 6P, thread 1/2 NPT	
	D	Aluminum T14 housing, optional lateral display, IP66/67/NEMA 4X/ 6P, M 12x1 PA connector,	
	E	Aluminum T14 housing, optional lateral display, IP 66/67/NEMA 4X/ 6P, 7/8" FF connector	
	F	Aluminum T14 housing, optional lateral display, IP 65/NEMA 4X, Han7D 90° connector	
	1	AISI 316L T14 housing, optional display on the side, IP 66/67/NEMA 4X/ 6P, Gland M 20x1.5	
	2	AISI 316L T14 housing, optional display on the side, IP 66/67/NEMA 4X/ 6P, Thread G 1/2	
	3	AISI 316L T14 housing, optional display on the side, IP 66/67/NEMA 4X/ 6P, Thread 1/2 NPT	
	4	AISI 316L T14 housing, optional display on the side, IP 66/67/NEMA 4X/ 6P, M 12x1 PA plug	
	5	AISI 316L T14 housing, optional display on the side, IP 66/67/NEMA 4X/ 6P, 7/8" FF plug	
	6	AISI 316L T14 housing, optional display on the side, IP 65/NEMA 4X, Hand 7D plug 90°	
40	Sensor range; Sensor over pressure limit (OPL):		
		Sensors for absolute pressure	
		Sensor nominal value (URL)	OPL (over pressure limit)
	2F	0.4 bar/40 kPa/6 psi abs	6 bar/600 kPa/90 psi abs
	2H	1 bar/100 kPa/15 psi abs	10 bar/1 MPa/150 psi abs
50	Calibration; Unit:		
	1	Sensor range; mbar/bar	
	2	Sensor range; kPa/MPa	
	3	Sensor range; mmH ₂ O/mH ₂ O	
	4	Sensor range; inH ₂ O/ftH ₂ O	
	6	Sensor range; psi	
	E	Customised pressure; see additional spec.	
	F	Customised level; see additional spec.	
	H	Customised pressure + 5-point works calib. certificate; see additional spec.	
	I	Customised level + 5-point works calib. certificate; see additional spec.	
60	Material of the process isolating diaphragm:		
	1	AISI 316L	

PMP72 (continued)

70																				Process connection; Material:			
																				CN	DN 25 PN 10-40 B1, AISI 316L		
																					B3	DN 50 PN 10-40 B1, AISI 316L	
																					B4	DN 80 PN10-40 B1, 316L, flush-mounted	
																					ANSI flanges, flush-mounted process diaphragms		
																					AF	2" 150 lbs RF, AISI 316/316L (CRN)	
																					AG	3" 150 lbs RF, AISI 316/316L (CRN)	
90																					Fill fluid:		
																					U	High-temperature oil, silicone	
100																					Additional fittings 1:		
																						A	Not selected
																						B	Material test certificate, wetted parts, inspection certificate as per EN 10204 3.1 in accordance with specification 52005759
																						C	NACE-compliant version (MR0175)
																						D	Material test certificate for wetted parts as per EN 10204 3.1 and NACE-compliant version (MR0175), inspection certificate as per EN 10204 in accordance with specification 52010806
																						E	SIL Declaration of Conformity
																						M	Overvoltage protection
																						N	HistoROM/M-DAT
3	Individual testing with test certificate, inspection certificate as per EN 10204 3.1																						
110																					Additional fittings 2:		
																						A	Not selected
																						E	SIL Declaration of Conformity
																						M	Overvoltage protection
																						N	HistoROM/M-DAT
																						3	Individual testing with test certificate, inspection certificate as per EN10204 3.1
5	Helium leak test EN 1528 with test certificate, inspection certificate as per EN 10204 3.1																						
995																					Identification:		
																						1	Measuring point TAG, see additional specification
																						2	Bus address, see additional specification
PMP72																							Order code

Documentation

Field of Activities	<ul style="list-style-type: none"> ■ Pressure measuring technology, high-performance measuring devices for process pressure, differential pressure, level and flow: FA004P/00/EN
Technical Information	<ul style="list-style-type: none"> ■ Cerabar S: TI383P/00/EN ■ Deltabar S: TI382P/00/EN ■ Deltapilot S: TI416P/00/EN ■ EMC test procedures TI241F/00/EN
Operating Instructions	<p>4 to 20 mA HART:</p> <ul style="list-style-type: none"> ■ Cerabar S: BA271P/00/EN ■ Description of Device Functions, Cerabar S/Deltabar S/Deltapilot S: BA274P/00/EN <p>PROFIBUS PA:</p> <ul style="list-style-type: none"> ■ Cerabar S: BA295P/00/EN ■ Description of Device Functions, Cerabar S/Deltabar S/Deltapilot S: BA296P/00/EN <p>FOUNDATION Fieldbus:</p> <ul style="list-style-type: none"> ■ Cerabar S: BA302P/00/EN ■ Description of Device Functions, Cerabar S/Deltabar S/Deltapilot S: BA303P/00/EN
Brief Operating Instructions	<ul style="list-style-type: none"> ■ 4 to 20 mA HART, Cerabar S: KA1019P/00/EN ■ PROFIBUS PA, Cerabar S: KA1022P/00/EN ■ FOUNDATION Fieldbus, Cerabar S: KA1025P/00/EN
Functional safety manual (SIL)	<ul style="list-style-type: none"> ■ Cerabar S (4 to 20 mA): SD190P/00/EN

Safety Instructions

Certificate/type of protection	Electronics	Documentation	Version in the order code
ATEX II 1/2 G Ex ia IIC T6	– 4 to 20 mA HART, PROFIBUS PA, FOUNDATION Fieldbus	– XA244P	1
ATEX II 1/2 D	– 4 to 20 mA HART – PROFIBUS PA, FOUNDATION Fieldbus	– XA246P – XA289P	2
ATEX II 1/2 D Ex ia IIC	– 4 to 20 mA HART – PROFIBUS PA, FOUNDATION Fieldbus	– XA247P – XA290P	2
ATEX II 1/3 D	– 4 to 20 mA HART – PROFIBUS PA, FOUNDATION Fieldbus	– XA248P – XA291P	4
ATEX II 3 G Ex nA II T6	– 4 to 20 mA HART, PROFIBUS PA, FOUNDATION Fieldbus	– XA251P	7
ATEX II 1/2 GD Ex ia IIC T6	– 4 to 20 mA HART, PROFIBUS PA, FOUNDATION Fieldbus	– XA253P	3
ATEX II 1 GD Ex ia IIC T6	– 4 to 20 mA HART, PROFIBUS PA, FOUNDATION Fieldbus	– XA276P	8

Certificate/type of protection	Electronic insert	Documentation	Version in the order code
IECEx Zone 0/1 Ex ia IIC T6	– 4 to 20 mA HART	– XB005P	I

Certificate/type of protection	Electronic insert	Documentation	Version in the order code
NEPSI Ex ia IIC T6	– 4 to 20 mA HART, PROFIBUS PA, FOUNDATION Fieldbus	– XC003P	H

Installation/Control Drawings

Certificate/type of protection	Electronics	Documentation	Version in the order code
FM IS Class I, II, III, Division 1, Groups A – G; NI, Class I Division 2, Groups A – D; AEx ia	– 4 to 20 mA HART – PROFIBUS PA, FOUNDATION Fieldbus	– ZD147P – ZD188P	S
CSA IS Class I, II, III, Division 1, Groups A – G; Class I Division 2, Groups A – G	– 4 to 20 mA HART – PROFIBUS PA, FOUNDATION Fieldbus	– ZD148P – ZD189P	U
CSA +XP Class I Division 1, Groups B - D, Class II Division 1, Groups E - G, Class III	– 4 to 20 mA HART – PROFIBUS PA, FOUNDATION Fieldbus	– Under development	V

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