

## Process transmitter Model UPT-20, with pressure port Model UPT-21, with flush diaphragm



### Applications

- Process technology
- Machine building and plant construction
- Control technology
- Pharmaceutical industry
- Food industry

### Special features

- Multi-functional display
- Simple menu navigation
- Conductive plastic case
- Large LC display, rotatable



Process transmitter, model UPT-20

## Description

### Instrument construction

The model UPT-2x process transmitter has been developed for applications which require an intelligent sensor. Particularly the integrated temperature compensation makes the process transmitter interesting for a wide range of applications.

The measuring cell is made of stainless steel 316L or of a combination with high-quality Elgiloy®.

The case is rotatable by 330° and the LC display can be mounted in different positions, displaceable in 90° steps. The LC display is easy to read in any mounting position, even from a distance of up to 5 m.

### HART® protocol

The process transmitter can be installed both in applications using analogue technique and modern systems communicating via the HART® protocol.

Via the display and operating module or the HART® interface this process transmitter can be configured directly on site.

### Turndown

An adjustable turndown (20:1) allows to register exact process values with optimised limits of the measuring values and without major restrictions of the accuracy.

## Measuring ranges

| Gauge pressure |                         |                         |                          |           |           |           |
|----------------|-------------------------|-------------------------|--------------------------|-----------|-----------|-----------|
| bar            | 0 ... 0.4<br>0 ... 250  | 0 ... 1.6<br>0 ... 600  | 0 ... 6<br>0 ... 1,000   | 0 ... 16  | 0 ... 40  | 0 ... 100 |
| psi            | 0 ... 10<br>0 ... 1,500 | 0 ... 15<br>0 ... 5,000 | 0 ... 30<br>0 ... 10,000 | 0 ... 100 | 0 ... 300 | 0 ... 500 |

1) For model UPT-20: The value specified in the table applies only when sealing is made using a sealing ring below the hexagon. Otherwise max. 1,600 bar applies.

| Absolute pressure |           |           |           |           |          |
|-------------------|-----------|-----------|-----------|-----------|----------|
| bar               | 0 ... 0.4 | 0 ... 1.6 | 0 ... 6   | 0 ... 16  | 0 ... 40 |
| psi               | 0 ... 30  | 0 ... 100 | 0 ... 300 | 0 ... 500 |          |

| Vacuum and +/- measuring ranges |             |               |                |                |                |            |
|---------------------------------|-------------|---------------|----------------|----------------|----------------|------------|
| bar                             | -0.4 ... 0  | -0.2 ... +0.2 | -1 ... +0.6    | -1 ... +5      | -1 ... +15     | -1 ... +40 |
| psi                             | -14.5 ... 0 | -14.5 ... +15 | -14.5 ... +100 | -14.5 ... +300 | -14.5 ... +600 |            |

Other measuring ranges can be set via turndown.

For measuring ranges above 600 bar only the model UPT-20 is available.

### Vacuum tightness

Vacuum tightness is provided, except for instruments for oxygen applications.

### Overpressure limit

Measuring range  $\leq$  16 bar/ 300 psi: 3 times

Measuring range  $>$  16 bar/ 300 psi: 2 times

## Accuracy data

### Accuracy at reference conditions

Including non-linearity, hysteresis, zero offset and end value deviation (corresponds to measured error per IEC 61298-2).

| Accuracy        |                       |
|-----------------|-----------------------|
| <b>Standard</b> | <b>0.15 % of span</b> |
| Option 1        | 0.10 % of span        |
| Option 2        | 0.20 % of span        |

### Mounting correction

-20 ... +20 %

### Non-repeatability

$\leq$  0.1 % of span

### Behaviour with turndown (with accuracy 0.15 %)

■ 1:1 ... 5:1 No change in accuracy

■  $>$  5:1  $<$  0.03 % x turndown

### Long-term stability

$\leq$  (0.1 % x turndown)/year

### Thermal change zero point / span (reference temperature 20 °C)

In compensated range 10 ... 70 °C:

$<$  0.05 % / 10 K x turndown

Outside compensated range:

Typical  $<$  0.1 % / 10 K x turndown

### Thermal change of the current output (reference temperature 20 °C)

$<$  0.05 % / 10 K, max. 0.15 %

## Operating conditions

The process pressure transmitter is suitable for internal and external operation. Direct exposure to sunlight is permitted.

### Humidity

≤ 93 % r. h.

### Ambient temperature

Instrument with display: -20 ... +60 °C

Instrument without display: -40 ... +80 °C <sup>1)</sup>

<sup>1)</sup> Instrument with angular connector or circular connector: -30 ... +80 °C

### Storage temperature

-40 ... +80 °C

### Medium temperature

Oxygen application: -20 ... +60 °C

Model UPT-20:

-40 ... +85 °C

-40 ... +105 °C at max. 40 °C ambient temperature

-40 ... +120 °C at max. 30 °C ambient temperature

Model UPT-21:

Depending on sealing, cooling element and ambient temperature

UPT-21 without cooling element:

85 °C at max. 80 °C ambient temperature

105 °C at max. 40 °C ambient temperature

120 °C at max. 30 °C ambient temperature

UPT-21 with cooling element:

85 °C at max. 80 °C ambient temperature

120 °C at max. 50 °C ambient temperature

150 °C at max. 40 °C ambient temperature

| Sealing  | Material           | Medium temperature            |
|----------|--------------------|-------------------------------|
| Standard | NBR                | -20 ... +105 °C               |
| Option 1 | FKM                | -20 ... +105 °C               |
| Option 2 | FKM                | -20 ... +150 °C <sup>2)</sup> |
| Option 3 | EPDM <sup>1)</sup> | -40 ... +105 °C               |
| Option 4 | EPDM <sup>1)</sup> | -40 ... +150 °C <sup>2)</sup> |

<sup>1)</sup> EPDM only with hygienic process connection

<sup>2)</sup> Process connection with cooling element

### Vibration resistance

4 g (5 ... 100 Hz) per GL characteristic curve 2

### Shock resistance

150 g (3.2 ms) per IEC 60068-2-27

### Ingress protection

IP 66/67

IP 65 for versions with circular connector, angular connector or overvoltage protection

Ingress protection only applies with closed case head and closed cable glands.

## Materials

### Wetted parts

■ Model UPT-20, measuring range ≤ 40 bar:  
Stainless steel 1.4404

■ Model UPT-20, measuring range > 40 bar:  
Stainless steel 1.4404 and stainless steel 2.4711

■ Model UPT-21:  
Stainless steel 1.4435

### Sealing material

See table under Operating conditions, medium temperature

### Case

Plastic (PBT) with conductive surfaces to EN 60079-0:2012

Colour: night blue RAL5022

## Display and operating unit (option)

### Display type

LC display

### Refresh rate

200 ms

### Main display

4 ½-digit

### Additional display

Selectable via menu, three-line scale range

### Bargraph display

20-segment, radial, pressure gauge simulation

### Colours

Background: light grey

Digits: black

### Operating state

Display via symbols

## Output signals

| Signal   |                               |
|----------|-------------------------------|
| Standard | 4 ... 20 mA                   |
| Option   | 4 ... 20 mA with HART® signal |

### Load in $\Omega$

$$\leq (U_+ - U_{Bmin}) / 0.023 \text{ A}$$

$U_+$  = applied power supply (see "Power supply")

$U_{Bmin}$  = minimum power supply (see "Power supply")

### Damping

0 ... 99.9 s, adjustable

After the set damping time the instrument outputs 63 % of the applied pressure as output signal.

### Settling time $t_{90}$

60 ms without HART®

80 ms with HART®

### Refresh rate

20 ms without HART®

50 ms with HART®

## Voltage supply

### Power supply $U_+$

DC 12 ... 36 V

## Reference conditions (per IEC 61298-1)

### Temperature

23 °C  $\pm$  2 °C

### Power supply

DC 23 ... 25 V

### Atmospheric pressure

860 ... 1,060 mbar (86 ... 106 kPa, 12.5 ... 15.4 psig)

### Humidity

35 ... 95 % r. h.

### Characteristic curve determination

Terminal method per IEC 61298-2

### Curve characteristics

Linear

### Reference mounting position

Vertical, diaphragm points downward

## Process connections

### With pressure port (for model UPT-20)

| In accordance with standard | Thread size     | Possible measuring ranges                                             |
|-----------------------------|-----------------|-----------------------------------------------------------------------|
| EN 837                      | G 3/8 B         | $\leq 0 \dots 1,000 \text{ bar}$<br>$\leq 0 \dots 14,500 \text{ psi}$ |
|                             | G 1/2 B         | $\leq 0 \dots 1,000 \text{ bar}$<br>$\leq 0 \dots 14,500 \text{ psi}$ |
|                             | M20 x 1.5       | $\leq 0 \dots 1,000 \text{ bar}$<br>$\leq 0 \dots 14,500 \text{ psi}$ |
| ANSI / ASME B1.20.1         | 1/2 NPT         | $\leq 0 \dots 1,000 \text{ bar}$<br>$\leq 0 \dots 14,500 \text{ psi}$ |
|                             | 1/2 NPT, female | $\leq 0 \dots 1,000 \text{ bar}$<br>$\leq 0 \dots 14,500 \text{ psi}$ |
|                             | 1/4 NPT         | $\leq 0 \dots 1,000 \text{ bar}$<br>$\leq 0 \dots 14,500 \text{ psi}$ |

### With flush diaphragm (for model UPT-21)

| In accordance with standard | Thread size         | Possible measuring ranges                                       |
|-----------------------------|---------------------|-----------------------------------------------------------------|
| -                           | G 1/2 B, flush      | 0 ... 6 up to 0 ... 600 bar<br>0 ... 50 up to 0 ... 6,000 psi   |
|                             | G 1 B, flush        | $\leq 0 \dots 1.6 \text{ bar}$<br>$\leq 0 \dots 30 \text{ psi}$ |
|                             | G 1 1/2 B, flush    | $\leq 0 \dots 16 \text{ bar}$<br>$\leq 0 \dots 30 \text{ psi}$  |
|                             | G 1 hygienic, flush | $\leq 0 \dots 16 \text{ bar}$<br>$\leq 0 \dots 30 \text{ psi}$  |

### Pressure transmission medium

| Model        | Medium                                                             |
|--------------|--------------------------------------------------------------------|
| Model UPT-20 | Measuring range > 40 bar/500 psi:<br>Synthetic oil, halocarbon oil |
|              | Measuring range $\leq$ 40 bar/500 psi:<br>Dry measuring cell       |
| Model UPT-21 | Synthetic oil, halocarbon oil                                      |

In general, halocarbon oil for oxygen applications.  
Optionally FDA-listed media for the food industry are available.

### Diaphragm seals

The model UPT-20 process transmitter can be adapted to the harshest conditions in the process industry by using diaphragm or in-line diaphragm seals. Thus, the transmitter can be used at extreme temperatures and with aggressive, corrosive, heterogeneous, abrasive, highly viscous or toxic media. As a result of the wide variety of aseptic connections (such as clamp, threaded pipe or DIN 11864 aseptic connections) measuring assemblies meet the high demands of sterile process engineering.



## Electrical connections

| Available connections                                       | Ingress protection | Wire cross-section                |
|-------------------------------------------------------------|--------------------|-----------------------------------|
| Cable gland M20 x 1.5 and spring-loaded terminals           | IP 66/67           | max. 2.5 mm <sup>2</sup> (AWG 14) |
| Angular connector DIN 175301-803A with mating connector     | IP 65              | max. 1.5 mm <sup>2</sup>          |
| Circular connector M12 x 1 (4-pin) without mating connector | IP 65              | -                                 |

The stated ingress protection only applies when plugged in using mating connectors that have the appropriate ingress protection.

### Electrical safety

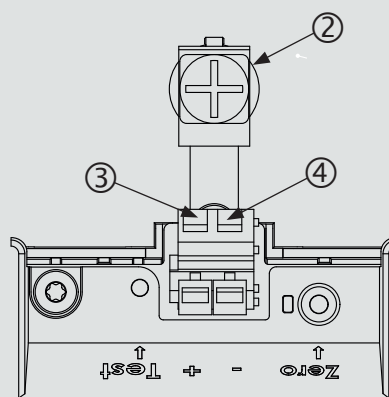
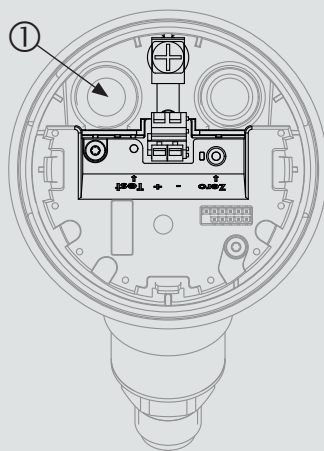
Reverse polarity protection

### Connection diagrams

#### Cable gland M20 x 1.5 and spring-loaded terminals

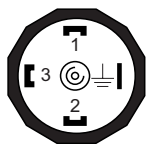
Outlet for connection cable

Pin assignment



- ① Cable gland
- ② Shield
- ③ Positive power supply terminal
- ④ Negative power supply terminal

#### Angular connector DIN 175301-803 A



|                |             |
|----------------|-------------|
| U <sub>+</sub> | 1           |
| U <sub>-</sub> | 2           |
| Shield         | GND $\perp$ |

#### Circular connector M12 x 1 (4-pin)



|                |   |
|----------------|---|
| U <sub>+</sub> | 1 |
| U <sub>-</sub> | 3 |
| Shield         | 4 |

U<sub>+</sub> Positive power supply terminal  
U<sub>-</sub> Negative power supply terminal

## CE conformity

### Pressure equipment directive

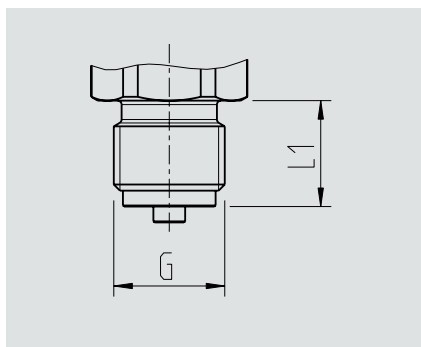
97/23/EC

### EMC directive

2004/108/EG interference emission (group 1, class B) and immunity per EN 61326-1:2013 (industrial application), EN 61326-2-3:2013 and per NAMUR NE 21:2011

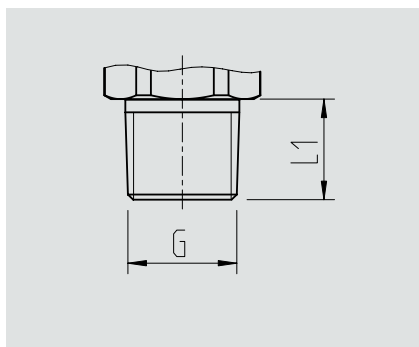
## Dimensions in mm

### Process connections for model UPT-20



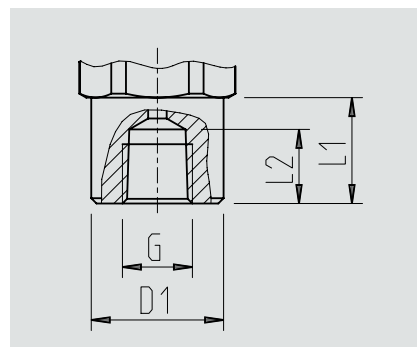
| G         | L1 |
|-----------|----|
| G 3/8 B   | 16 |
| G 1/2 B   | 20 |
| M20 x 1.5 | 20 |

Hexagon dimension: 12 mm



| G       | L1 |
|---------|----|
| 1/4 NPT | 13 |
| 1/2 NPT | 19 |

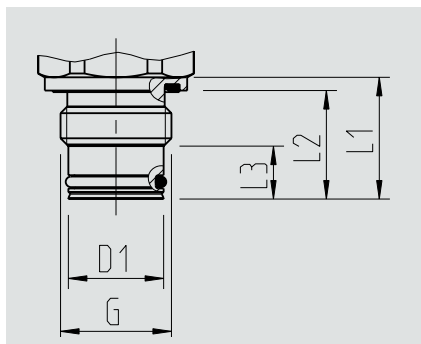
Hexagon dimension: 12 mm



| G               | L1 | L2 | D1   |
|-----------------|----|----|------|
| 1/2 NPT, female | 20 | 19 | 26.5 |

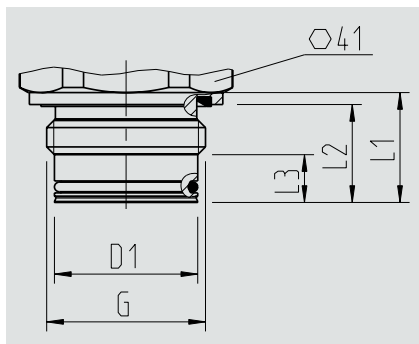
Hexagon dimension: 12 mm

### Process connections for model UPT-21



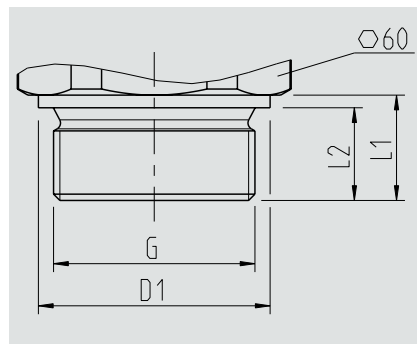
| G       | L1 | L2   | L3 | D1 |
|---------|----|------|----|----|
| G 1/2 B | 23 | 20.5 | 10 | 18 |

Hexagon dimension: 12 mm



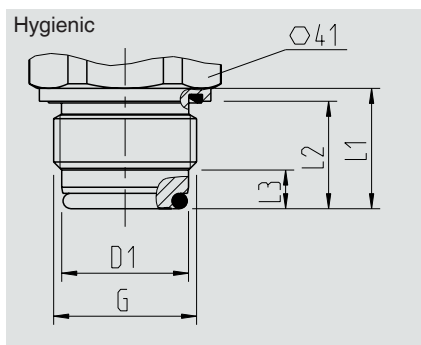
| G     | L1 | L2   | L3 | D1 |
|-------|----|------|----|----|
| G 1 B | 23 | 20.5 | 10 | 30 |

Hexagon dimension: 13 mm



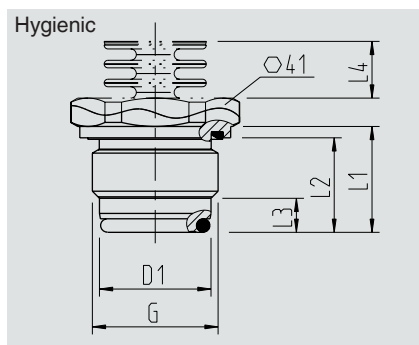
| G         | L1 | L2 | D1 |
|-----------|----|----|----|
| G 1 1/2 B | 25 | 22 | 55 |

Hexagon dimension: 14 mm



| G     | L1 | L2 | L3 | D1   |
|-------|----|----|----|------|
| G 1 B | 28 | 25 | 9  | 29.5 |

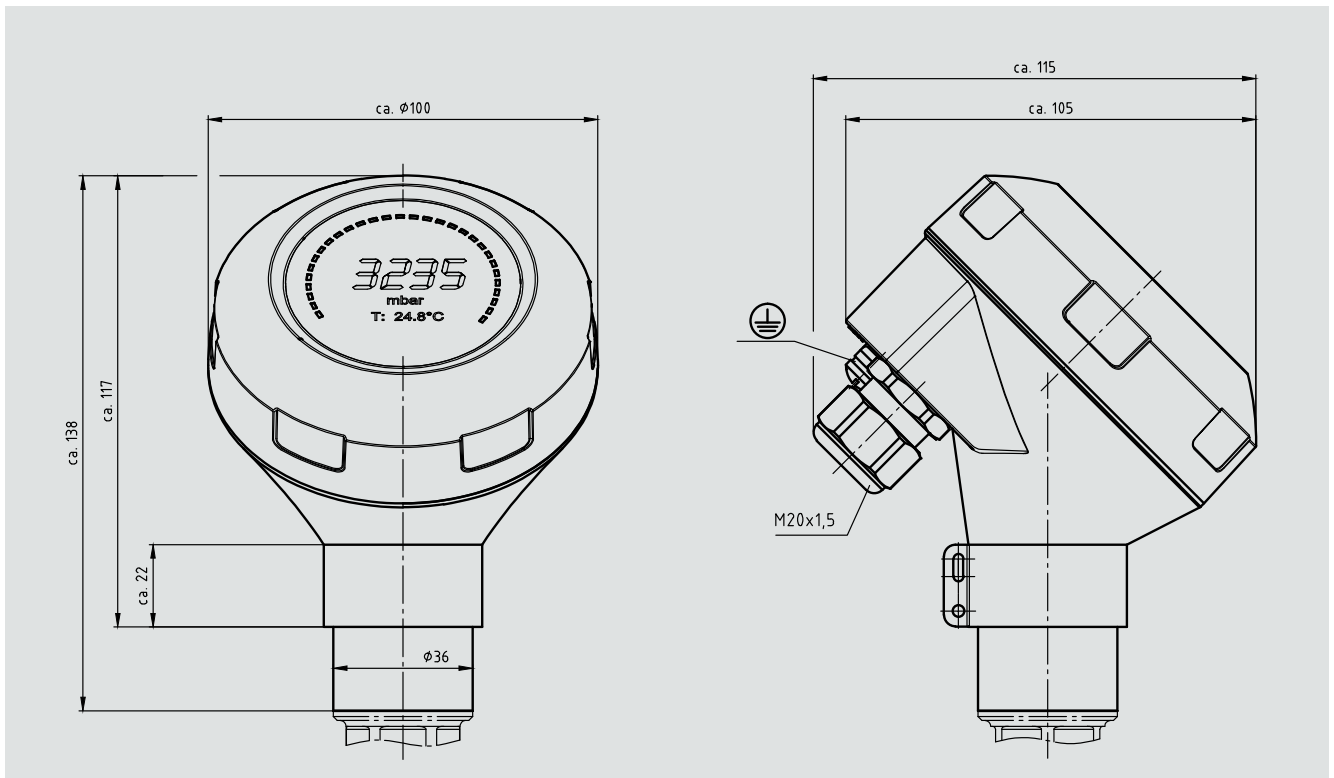
Hexagon dimension: 13 mm







| G     | L1 | L2 | L3 | L4   | D1   |
|-------|----|----|----|------|------|
| G 1 B | 28 | 25 | 9  | 15.5 | 29.5 |

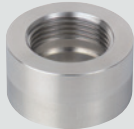




Hexagon dimension: 13 mm

## Process transmitter, models UPT-20 and UPT-21



## Accessories

|                                                                                     | Description                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | Order no.                                |
|-------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------|
|  | <p><b>Display module, model DIH52-F</b><br/>5-digit display, 20-segment bargraph, without separate power supply, with additional HART® functionality. Automatic adjustment of measuring range and span.<br/>Secondary-master functionality: Setting the measuring range and unit of the connected transmitter using HART® standard commands possible.<br/>Optionally: explosion protection per ATEX</p>                                                                                                          | on request                               |
|  | <p><b>HART® modem</b><br/>USB interface, model 010031<br/>RS-232 interface, model 010001<br/>Bluetooth® interface [Ex ia] IIC, model 010041</p>                                                                                                                                                                                                                                                                                                                                                                  | <p>11025166<br/>7957522<br/>11364254</p> |
|  | <p><b>Hand-held, model FC475HP1EKLUGMT</b><br/>HART® protocol, Li-Ion battery, voltage supply AC 100 ... 240 V, colour display with backlighting, Bluetooth® and infrared interface, ATEX, FM, CSA and IECEx(i) (including FISCO if available)</p> <p><b>Hand-held, model FC475FP1EKLUGMT</b><br/>HART® protocol and FF Bus, Li-Ion battery, voltage supply AC 100 ... 240 V, colour display with backlighting, Bluetooth® and infrared interface, ATEX, FM, CSA and IECEx(i) (including FISCO if available)</p> | <p>14025585<br/>14025730</p>             |
|  | <p><b>Hand-held, model MFC4150</b><br/>HART® protocol, universal voltage supply, cable set with 250 Ω resistance, with DOF upgrade, ATEX and cULus</p>                                                                                                                                                                                                                                                                                                                                                           | 11405333                                 |

|                                                                                   | Description                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | Order no.                                          |
|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------|
|  | <p><b>Welding socket</b></p> <ul style="list-style-type: none"> <li>■ for process connection G ½ flush</li> <li>■ for process connection G 1 flush</li> <li>■ for process connection G ½ flush</li> <li>■ for process connection G 1 hygienic flush</li> </ul>                                                                                                                                                                                                                    | <p>1192299<br/>1192264<br/>2158982<br/>2166011</p> |
|   | <p><b>Instrument mounting bracket</b><br/>for wall or pipe mounting, stainless steel</p>                                                                                                                                                                                                                                                                                                                                                                                          | <p>14058660</p>                                    |
|   | <p><b>Overvoltage protection</b><br/>for transmitters, 4 ... 20 mA, M12 x 1.5, series connection</p>                                                                                                                                                                                                                                                                                                                                                                              | <p>14002489</p>                                    |
|   | <p><b>Overvoltage protection, Ex d with flameproof enclosure</b><br/>for transmitters, 4 ... 20 mA, M20 x 1.5</p>                                                                                                                                                                                                                                                                                                                                                                 | <p>12140503</p>                                    |
|  | <p><b>Display and operating unit</b></p> <p>The display and operating unit can be attached in 90° steps. The display and operating unit features a main display and an additional display.</p> <p>The main display shows the output signal. The additional display shows different values, at the same time as the main display - these values can be selected by the user.</p> <p>The process pressure transmitter can be configured through the display and operating unit.</p> | <p>13315277</p>                                    |

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