

# Process transmitter

## Model UPT-20, with pressure port

## Model UPT-21, with flush diaphragm

WIKA data sheet PE 86.05



### 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
- Approvals for hazardous areas



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 or remotely via a process control system.

### Turndown

An adjustable turndown 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	0 ... 1.6	0 ... 6	0 ... 16	0 ... 40	0 ... 100
	0 ... 250	0 ... 600	0 ... 1,000			
psi	0 ... 10	0 ... 15	0 ... 30	0 ... 100	0 ... 300	0 ... 500
	0 ... 1,500	0 ... 5,000	0 ... 10,000			

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 ... 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 resistance 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 specifications

### Accuracy at reference conditions

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

Selectable versions	
Standard	0.15 % of span
Option 1	0.10 % of span
Option 2	0.20 % of span

### Mounting correction

-20 ... +20 %

### Non-repeatability

$\leq$  0.15 % of span

### Behaviour with turndown

for measuring spans  $\geq$  1.6 bar

- TD  $\leq$  5:1 No influence on the accuracy
- TD  $>$  5:1 ...  $\leq$  100:1 GES = GG + 0.03 % x FS x (TD - 5)

For measuring spans  $<$  1.6 bar

- TD  $\leq$  1:1 No influence on the accuracy
- TD  $>$  1:1 ...  $\leq$  100:1 GES = GG + 0.03 % x FS x (TD - 1)

### Long-term stability

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

Measuring range  $<$  1 bar: 0.35 %/year

Measuring range  $\geq$  1 bar: 0.15 %/year

Measuring range  $\geq$  1.6 bar: 0.1 %/year

Measuring range  $\geq$  40 bar: 0.05 %/year

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

In compensated range 10 ... 70 °C:

No additional temperature error

Outside compensated range:

Typical  $<$  0.1 %/10 K

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

$<$  18 °C and  $>$  28 °C

0.1 %/10 K (max. 0.15 %)

GES: Overall accuracy via turndown

GG: Accuracy (e.g. 0.15 %)

FS: Full scale (end of measuring range - start of measuring range)

TD: Turndown factor (e.g. 4:1 corresponds to TD factor 4)

## Operating conditions

### Range of applications

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

### Humidity

≤ 93 % r. h.

### Permissible temperature ranges (for non-Ex)

- Ambient temperature  
Instrument with display: -20 ... +60 °C  
Instrument without display: -40 ... +80 °C <sup>1)</sup>  
1) 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

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

### Permissible temperature ranges (for Ex)

Temperature class / surface temperatures for all variants **without** cooling element):

Temperature class / surface temperature	Ambient and medium temperature (°C)
T5, T6	-40 ≤ Ta ≤ +60
T4	-40 ≤ Ta ≤ +80
T135 °C	-40 ≤ Ta ≤ +40 for Pi = 750 mW -40 ≤ Ta ≤ +70 for Pi = 650 mW -40 ≤ Ta ≤ +80 for Pi = 550 mW

Temperature class / surface temperatures for all variants **with** cooling element:

Temperature class	Max. medium temperature (°C)	Ambient temperature (°C)
T4	120	-40 ≤ Ta ≤ +50
T3	150	-40 ≤ Ta ≤ +40

## Restrictions to medium temperature due to sealing

Selectable versions		
	Material	Max. medium temperature
<b>Standard</b>	<b>NBR</b>	<b>-20 ... +105 °C</b>
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>

1) EPDM only with hygienic process connection

2) Process connection with cooling element

### Ignition protection types

II 1/2G Ex ia IIC T4/T5/T6 Ga/Gb  
II 2G Ex ia IIC T4/T5/T6 Gb  
II 3G Ex ic IIC T4/T5/T6 Gc  
II 1/2D Ex ia IIIC T135°C Da/Db  
II 2D Ex ia IIIC T135°C Db

### 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  $\leq 40$  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 surface per EN 60079-0:2012  
Colour: night blue RAL5022

## Display and operating unit, model DI-PT-U (option)

### Display type

LC display

For the process transmitter only this display may be used. For order number, see accessories.

### Refresh rate

200 ms

### Main display

4 ½-digit

### Additional display

Selectable via menu, three-line scale range

### Bar graph display

20 segments, radial, pressure gauge simulation

### Colours

Background: light grey  
Digits: black

### Operating state

Display via symbols

## Output signals

### Selectable versions

<b>Standard</b>	<b>4 ... 20 mA</b>
Option	4 ... 20 mA with HART® signal

### Load in $\Omega$

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

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

$U_{\min}$  = 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 without HART®

### Refresh rate

20 ms without HART®

50 ms mit HART®

## Voltage supply (for non-Ex)

### Power supply $U_+$

DC 12 ... 36 V

## Voltage supply (for Ex)

Power supply  $U_+$ : DC 12 ... 30 V

Maximum voltage  $U_i$ : DC 30 V

Maximum current  $I_i$ : 100 mA

Maximum power  $P_i$  (gas): 1,000 mW

Maximum power  $P_i$  (dust,

depending on the max.

ambient temperature): 750/650/550 mW

Effective internal capacitance: 11 nF

Effective internal inductance: 100  $\mu$ H

## Reference conditions (per IEC 61298-1)

### Temperature

23 °C ± 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)

Selectable versions		
Per standard	Thread size	Possible measuring ranges
EN 837	G ¾ B	≤ 0 ... 1,000 bar ≤ 0 ... 14,500 psi
	G ½ B	≤ 0 ... 1,000 bar ≤ 0 ... 14,500 psi
	M20 x 1.5	≤ 0 ... 1,000 bar ≤ 0 ... 14,500 psi
ANSI / ASME B1.20.1	½ NPT	≤ 0 ... 1,000 bar ≤ 0 ... 14,500 psi
	½ NPT, female	≤ 0 ... 1,000 bar ≤ 0 ... 14,500 psi
	¼ NPT	≤ 0 ... 1,000 bar ≤ 0 ... 14,500 psi

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

Selectable versions		
Per standard	Thread size	Possible measuring ranges
-	G ½ B, flush	0 ... 6 to 0 ... 600 bar 0 ... 50 to 0 ... 6,000 psi
	G 1 B, flush	≤ 0 ... 1.6 bar ≤ 0 ... 30 psi
	G 1 ½ B, flush	≤ 0 ... 16 bar ≤ 0 ... 30 psi
	G 1 hygienic, flush	≤ 0 ... 16 bar ≤ 0 ... 30 psi

## Pressure transmission medium

Model	Medium
Model UPT-20	Measuring range < 40 bar/500 psi: Synthetic oil, halocarbon oil
	Measuring range ≥ 40 bar/500 psi: 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

Selectable versions		
Connection	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.

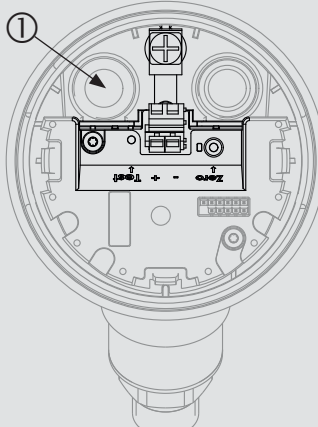
## Electrical safety

Reverse polarity protection

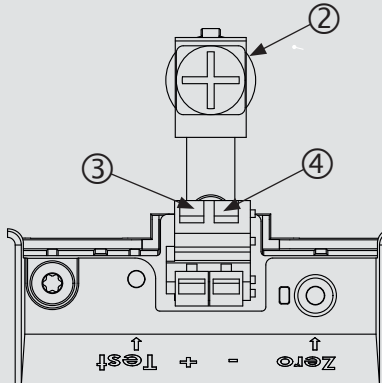
## Connection diagrams

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

Outlet for connection cable

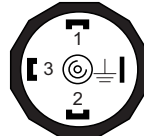


Pin assignment




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

**Angular connector DIN 175301-803 A**

	<b>U<sub>+</sub></b>	1
	<b>U<sub>-</sub></b>	2
	<b>Shield</b>	GND

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

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

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

## 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

During interference, increased measuring deviations of up to 0.15 % of the set measuring range can occur.

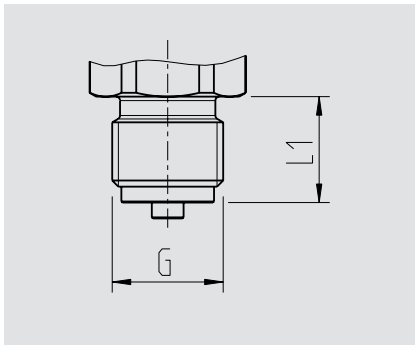
**ATEX directive**  
 94/9/EC

## Manufacturer's declarations

**NAMUR**  
 NE 21:2011

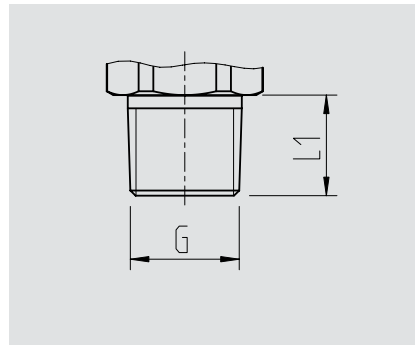
## Dimensions in mm

### Process connections for model UPT-20



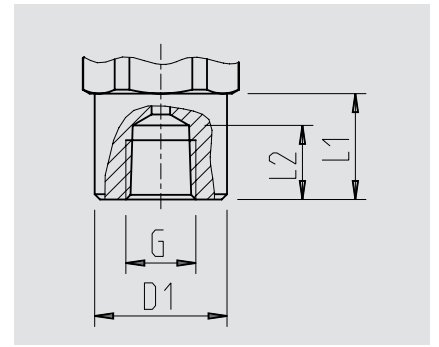
G	L1
G 3/8 B	16
G 1/2 B	20
M20 x 1.5	20

Hexagon dimension: 12 mm  
Spanner width: 27



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

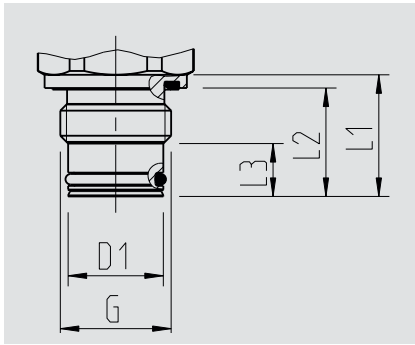
Hexagon dimension: 12 mm  
Spanner width: 27



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

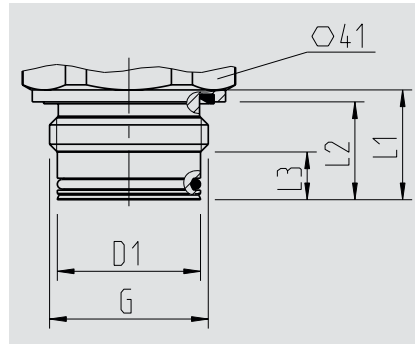
Hexagon dimension: 12 mm  
Spanner width: 27

### Process connections for model UPT-21



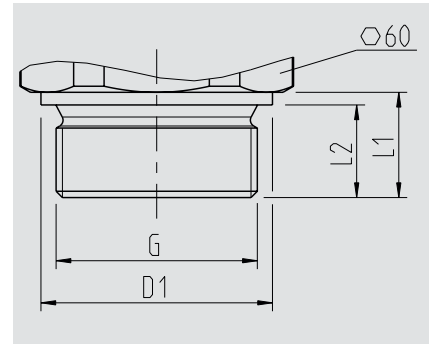
G	L1	L2	L3	D1
G 1/2 B	23	20.5	10	18

Hexagon dimension: 12 mm  
Spanner width: 27



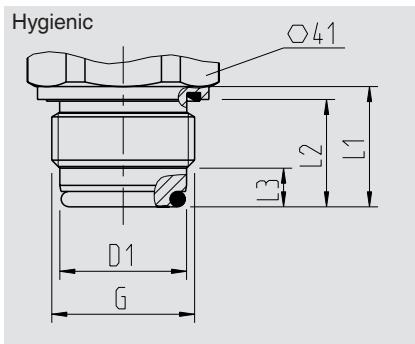
G	L1	L2	L3	D1
G 1 B	23	20.5	10	30

Hexagon dimension: 13 mm



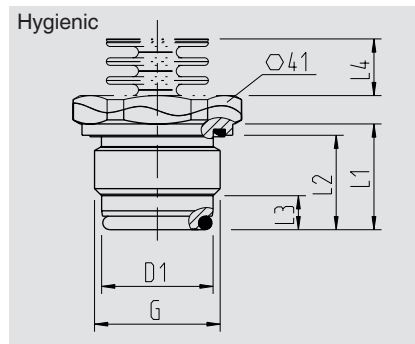
G	L1	L2	D1
G 1 1/2 B	25	22	55

Hexagon dimension: 14 mm



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

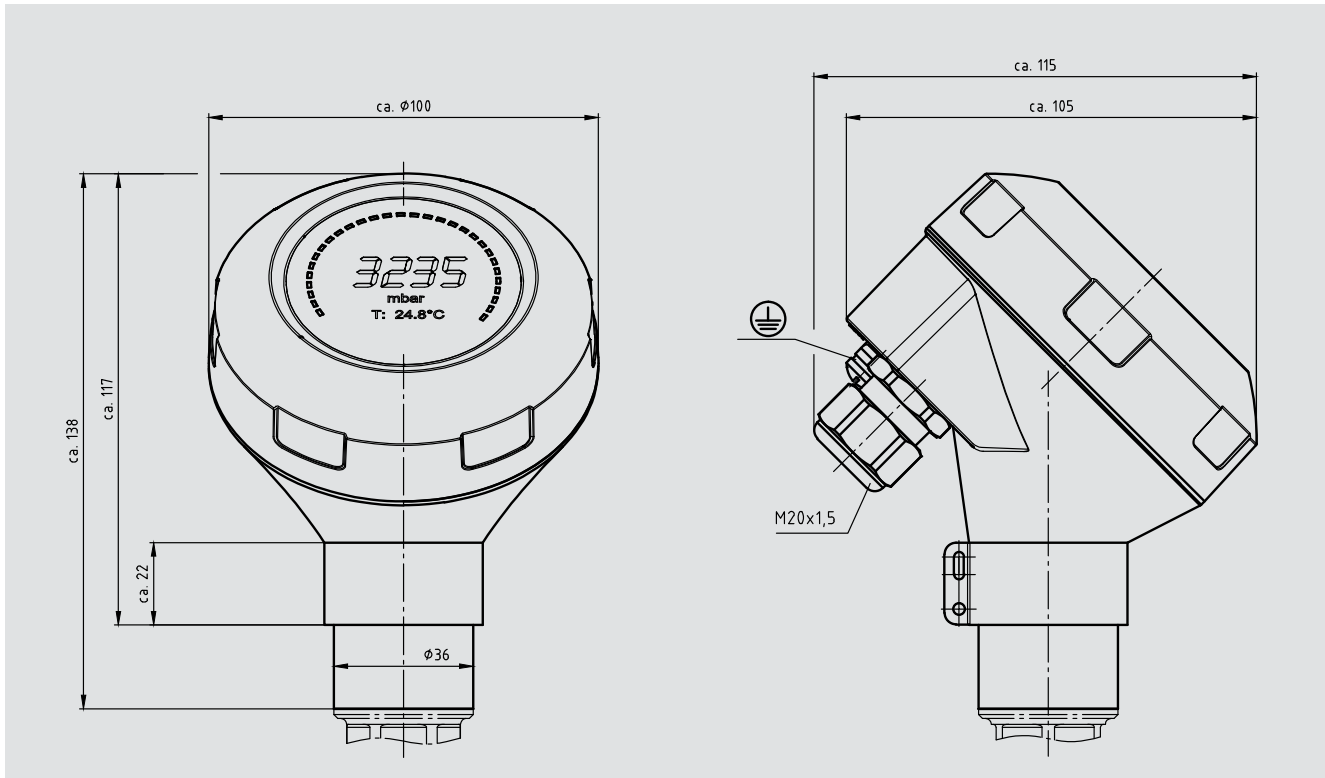
Hexagon dimension: 13 mm







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>                      5-digit display, 20-segment bar graph, without separate power supply, with additional HART® functionality. Automatic adjustment of measuring range and span.                      Secondary-master functionality: Setting the measuring range and unit of the connected transmitter using HART® standard commands possible.                      Optional: Explosion protection per ATEX</p>	<p>on request</p>
	<p><b>HART® modem</b>                      USB interface, model 010031                      RS-232 interface, model 010001                      Bluetooth® interface [EEx ia] IIC, model 010041</p>	<p>11025166                      7957522                      11364254</p>
	<p><b>Hand-held, model FC475HP1EKLUGMT</b>                      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>                      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                      14025730</p>
	<p><b>Hand-held, model MFC4150</b>                      HART® protocol, universal voltage supply, cable set with 250 Ω resistance, with DOF upgrade, ATEX and cULus</p>	<p>11405333</p>



	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 1 ½ flush</li> <li>■ for process connection G 1 hygienic flush</li> </ul>	<p>1192299 1192264 2158982 2166011</p>
	<p><b>Instrument mounting bracket</b> for wall or pipe mounting, stainless steel</p>	<p>14058660</p>
	<p><b>Overvoltage protection</b> 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> for transmitter, 4 ... 20 mA, M20 x 1.5</p>	<p>12140503</p>
	<p><b>Display and operating unit, model DI-PT-U</b> The display and operating unit can be attached in 90° steps. The display and operating unit features a main display and an additional display. 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. The process pressure transmitter can be configured through the display and operating unit. Only this display may be used for installation into the process transmitter.</p>	<p>14090181</p>

### Ordering information

Model / Measuring range / Output signal / Accuracy / Process connection / Sealing / Electrical connection / Digital display / Instrument holder / Overpressure protection / Approval / Certificates

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