

# Process transmitter

## Model UPT-20, with pressure port

## Model UPT-21, with flush diaphragm

WIKA data sheet PE 86.05



for further approvals  
see page 10



### Applications

- Control and process technology
- Machine building and plant construction
- Pharmaceutical and hygienic industries
- Food industry
- Chemical, petrochemical industry

### Special features

- Multi-functional display
- Simple menu navigation
- Conductive plastic case or stainless steel case (optionally with electropolished surface)
- Large LC display, rotatable
- Approvals for hazardous areas



Process transmitter, model UPT-20

Fig. left: Plastic case

Fig. right: Stainless steel case with electropolished surface

### 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	0 ... 15,000		

1) 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	-1 ... 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

## Output signals

Selectable versions	
Standard	4 ... 20 mA
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 with HART®

### Refresh rate

20 ms without HART®

50 ms with 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

## 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

≤ 0.1 % of span

### Behaviour with turndown

For measuring spans ≥ 1.6 bar

- TD ≤ 5:1                      No influence on the accuracy
- TD > 5:1 ... ≤ 100:1      GES = GG x TD / 5

For measuring spans < 1.6 bar

- TD = 1:1                      No influence on the accuracy
- TD > 1:1 ... ≤ 100:1      GES = GG x (TD + 4) / 5

### Long-term stability

Measuring range < 1 bar: 0.35 %/year

Measuring range ≥ 1 bar: 0.15 %/year

Measuring range ≥ 1.6 bar: 0.1 %/year

Measuring range ≥ 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 %)

#### Legend

GES: Overall accuracy via turndown

GG: Accuracy (e.g. 0.15 %)

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

## 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

## Operating conditions

### Range of applications

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

### Permissible humidity

≤ 93 % r. h.

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

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

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

Storage temperature	
Instrument with display and operating unit	-40 ... +80 °C
Instrument without display and operating unit	-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	$-40 \leq T_a \leq +60$
T4	$-40 \leq T_a \leq +80$
T135 °C	$-40 \leq T_a \leq +40$ for $P_i = 750$ mW $-40 \leq T_a \leq +70$ for $P_i = 650$ mW $-40 \leq T_a \leq +80$ for $P_i = 550$ mW

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

Temperature class	Max. medium temperature (°C)	Ambient temperature (°C)
T4	120	$-40 \leq T_a \leq +50$
T3	150	$-40 \leq T_a \leq +40$

## Restrictions to medium temperature due to sealing (only for model UPT-21)

Selectable versions		
	Material	Max. 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>

1) EPDM only with hygienic process connection

2) 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

IP66/67

IP65 for versions with circular connector, angular connector or overvoltage protection

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

### Explosion protection

see approvals

## 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

## Process connections

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

Selectable versions		
Per standard	Thread size	Possible measuring ranges
EN 837	G 3/8 B	≤ 0 ... 1,000 bar ≤ 0 ... 15,000 psi
	G 1/2 B	≤ 0 ... 1,000 bar ≤ 0 ... 15,000 psi
	M20 x 1.5	≤ 0 ... 1,000 bar ≤ 0 ... 15,000 psi
ANSI / ASME B1.20.1	1/2 NPT	≤ 0 ... 1,000 bar ≤ 0 ... 15,000 psi
	1/2 NPT, female	≤ 0 ... 1,000 bar ≤ 0 ... 15,000 psi
	1/4 NPT	≤ 0 ... 1,000 bar ≤ 0 ... 15,000 psi

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

Selectable versions		
Per standard	Thread size	Possible measuring ranges
-	G 1/2 B	0 ... 6 to 0 ... 600 bar 0 ... 50 to 0 ... 5,000 psi
	G 1 B	≤ 0 ... 1.6 bar ≤ 0 ... 100 psi
	G 1 1/2 B	≤ 0 ... 16 bar ≤ 0 ... 100 psi
	G 1 hygienic <sup>1) 2)</sup>	≤ 0 ... 16 bar ≤ 0 ... 100 psi
	G 1 hygienic with cooling element	≤ 0 ... 40 bar ≤ 0 ... 500 psi
	M44 x 1.25 with union nut	≤ 0 ... 40 bar ≤ 0 ... 500 psi
Tri-clamp	DN 1 1/2	≤ 0 ... 40 bar ≤ 0 ... 500 psi
	DN 2	≤ 0 ... 40 bar ≤ 0 ... 500 psi
Clamp DIN 32676	DN 40	≤ 0 ... 40 bar ≤ 0 ... 500 psi
Grooved union nut DIN 11851 with conical coupling <sup>3)</sup>	DN 25	≤ 0 ... 40 bar ≤ 0 ... 500 psi
	DN 50	≤ 0 ... 40 bar ≤ 0 ... 500 psi
NEUMO BioConnect®	DN 40 form V	≤ 0 ... 40 bar ≤ 0 ... 500 psi
VARIVENT®	Form N	≤ 0 ... 40 bar ≤ 0 ... 500 psi
	Form F	≤ 0 ... 40 bar ≤ 0 ... 500 psi

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VARIVENT® is a registered trademark of GEA Tuchenhausen GmbH.

1) Also available as a high-temperature version up to 150 °C.

2) Suitable for WIKA adapter system model 910.61, see data sheet AC 09.20

3) For a 3-A conform connection of process connections with milk thread fittings per DIN 11851, profile sealings from SKS Komponenten BV or Kieselmann GmbH have to be used.

## 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 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.

## Materials

### Wetted parts

Selectable versions				
Model	Measuring ranges	Process connections	Materials	
UPT-20	≤ 40 bar	All	Standard	Process connection: Stainless steel 1.4404 Sensor: Stainless steel 1.4404
	> 40 bar	All	Standard	Process connection: Stainless steel 1.4404 Sensor: Elgiloy® 2.4711
			Option	Process connection: Hastelloy® HC276 Sensor: Elgiloy® 2.4711
UPT-21	All	All	Standard	Process connection: Stainless steel 1.4435 Diaphragm: Stainless steel 1.4435
		G ½ G 1	Option 1	Process connection: Hastelloy® HC276 Diaphragm: Hastelloy® HC276
		G ½ G 1	Option 2	Process connection: Gold-plated Diaphragm: Gold-plated

### Sealing material

see table under Operating conditions, medium temperature

### Case

Selectable versions	
Option 1	Plastic (PBT) with conductive surface per EN 60079-0:2012 Colour: Night blue RAL5022
Option 2	Stainless steel case, precision-cast (suitable for chemical, petrochemical industries)
Option 3	Stainless steel case with electropolished surface (suitable for pharmaceutical, food and hygienic industries)

## Electrical connections

Selectable versions		
Connection	Ingress protection	Wire cross-section
Plastic cable gland	IP66/67	max. 2.5 mm <sup>2</sup> (AWG 14)
Nickel-plated brass cable gland	IP66/67	max. 2.5 mm <sup>2</sup> (AWG 14)
Stainless steel cable gland	IP66/67	max. 2.5 mm <sup>2</sup> (AWG 14)
Stainless steel cable gland in hygienic design	IP66/67	max. 2.5 mm <sup>2</sup> (AWG 14)
Angular connector DIN 175301-803A with mating connector	IP65	max. 1.5 mm <sup>2</sup>
Circular connector M12 x 1 (4-pin) without mating connector	IP65	-

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

### Electrical safety

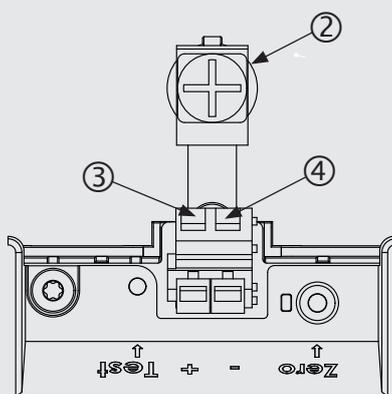
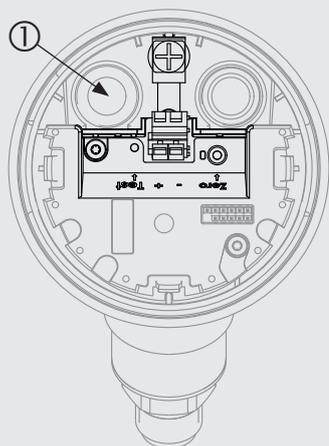
Reverse polarity protection

### 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+	1
	U-	2
	Shield	GND

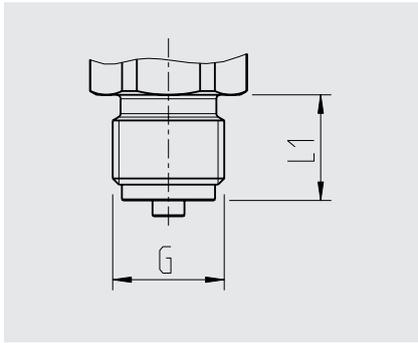
Circular connector M12 x 1 (4-pin)		
	U+	1
	U-	3
	Shield	4

#### Legend

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

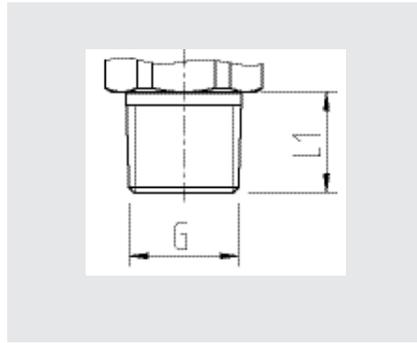
## Dimensions in mm

### Process connections for model UPT-20



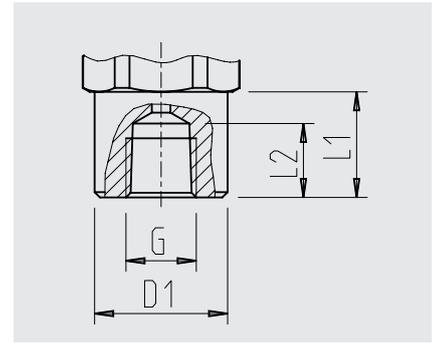
G	L1
G 3/8 B	16
G 1/2 B	20
M20 x 1.5	20

Hexagon dimension: 12 mm  
Spanner width: 27



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

Hexagon dimension: 12 mm  
Spanner width: 27

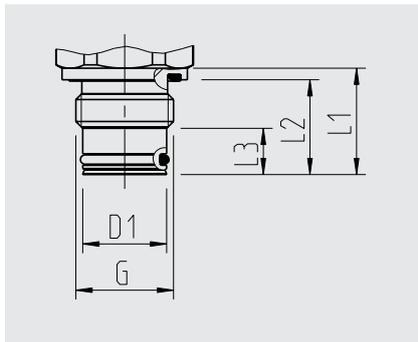


G	L1	L2	D1
Measuring ranges ≤ 40 bar			
1/2 NPT, female	20	19	26.5
Measuring ranges > 40 bar			
1/2 NPT, female	20	19	40.5

Measuring ranges ≤ 40 bar  
Hexagon dimension: 10 mm  
Spanner width: 27

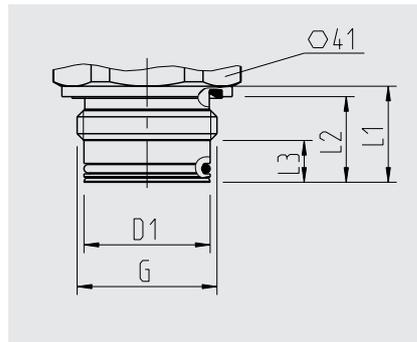
Measuring ranges > 40 bar  
Hexagon dimension: 12 mm  
Spanner width: 41

### Process connections for model UPT-21



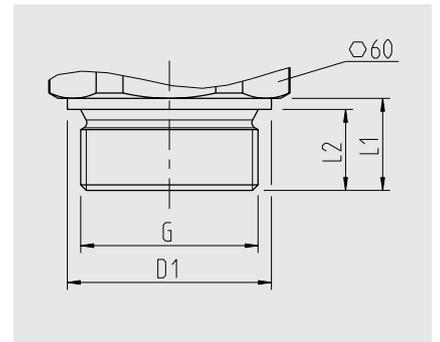
G	L1	L2	L3	D1
G 1/2 B	23	20.5	10	18

Hexagon dimension: 12 mm  
Spanner width: 27



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

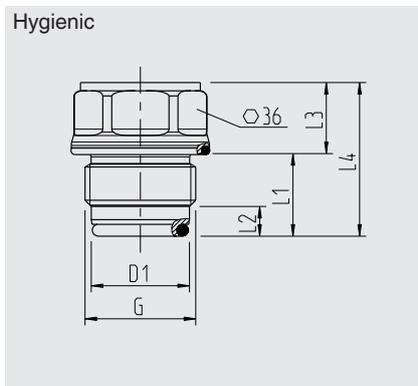
Hexagon dimension: 13 mm



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

Hexagon dimension: 14 mm

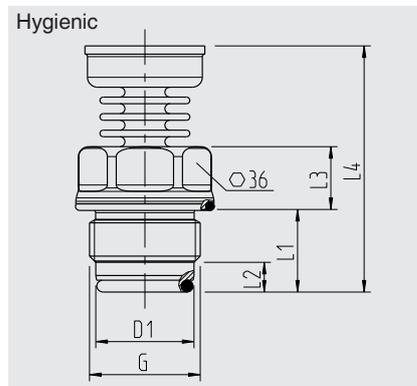
### Hygienic



G	L1	L2	L3	L4	D1
G 1 B	25	9	19	46.5	29.5

Hexagon dimension: 13 mm

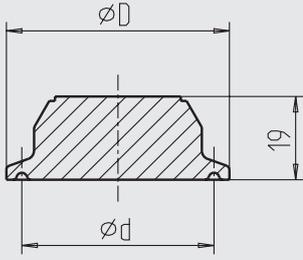
### Hygienic



G	L1	L2	L3	L4	D1
G 1 B	25	9	19	74.5	29.5

Hexagon dimension: 13 mm

**Clamp connection  
(clamp)**

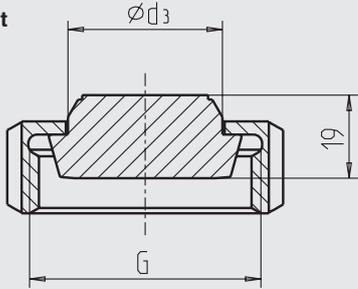


		ØD	Ød
Tri-clamp 1)	DN 1 1/2	50.5	43.5
	DN 2	64	56.6
DIN 32676	DN 40	50.5	43.5

1) Process connections per ASME BPE

**Grooved union nut  
DIN 11851**

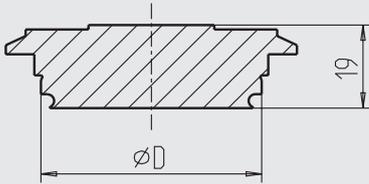
with conical coupling  
for pipes per  
DIN 11850



		G	Ød <sub>3</sub>
DIN 11851	DN 25	Rd 52 x 1/6	44
	DN 50	Rd 78 x 1/6	61

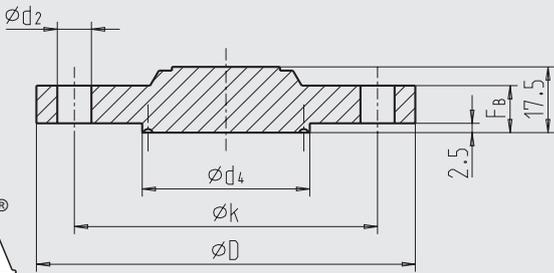
For a 3-A conform connection of process connections with milk thread fittings per DIN 11851, profile sealings from SKS Komponenten BV or Kieselmann GmbH have to be used.

**VARIVENT®**



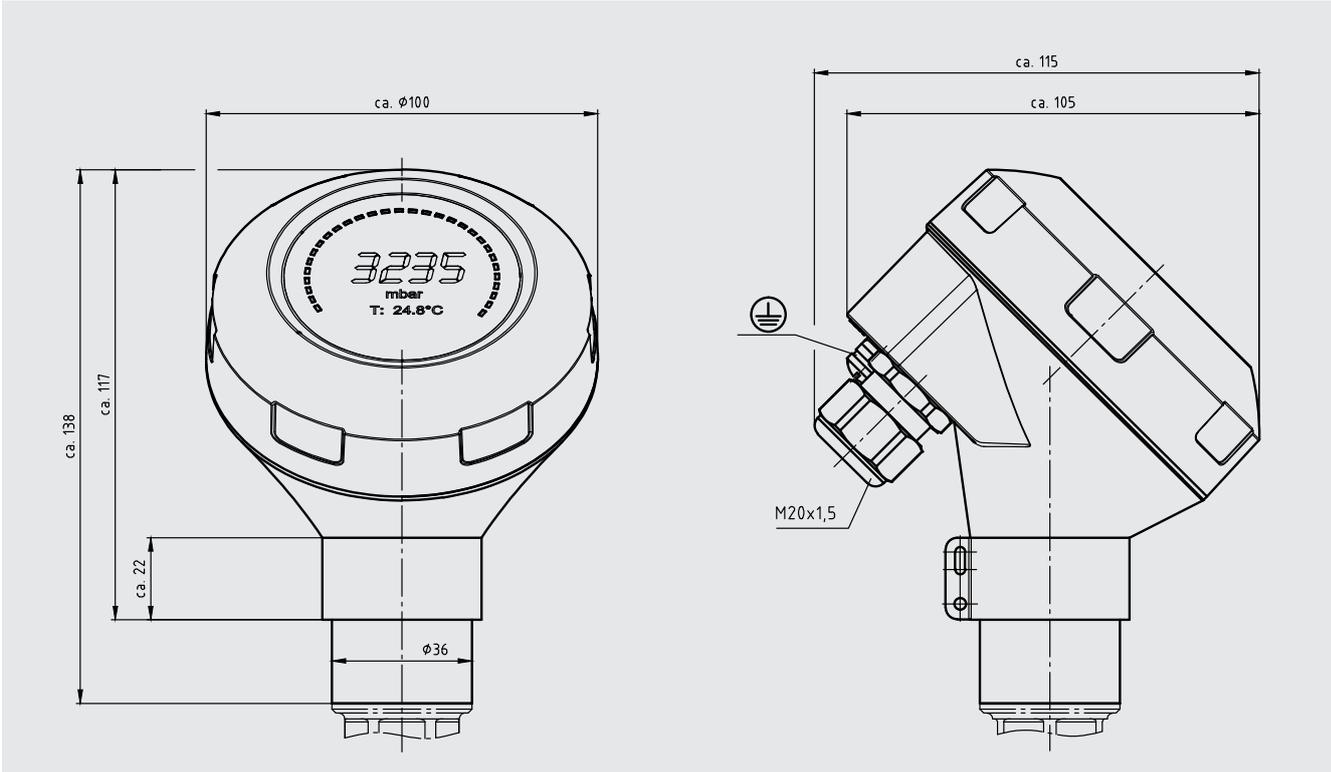
		ØD
VARIVENT®	Form F	50
	Form N	68

**NEUMO  
BioConnect® Flange form V**

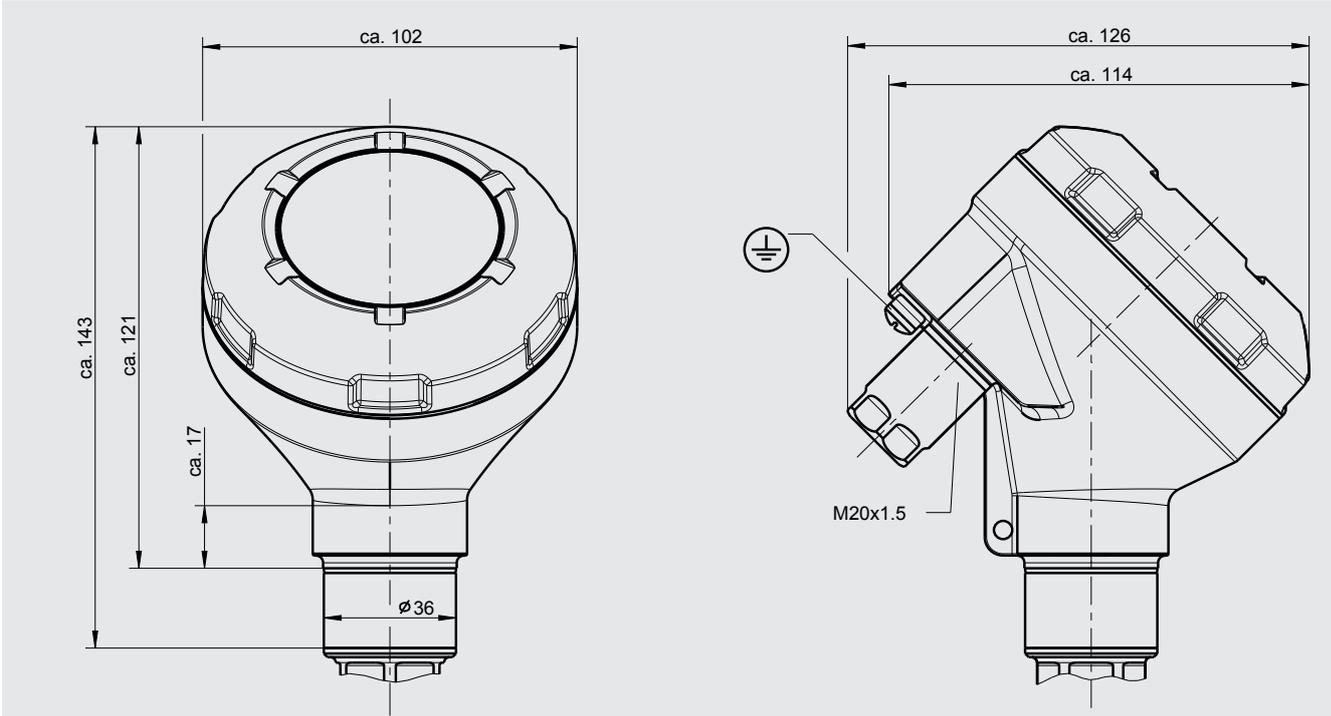


		Ød <sub>2</sub>	Ød <sub>4</sub>	ØD	Øk	F <sub>B</sub>
BioConnect®	DN 40	4 x 9	44.2	100	80	10

Process transmitter with plastic case, models UPT-20 and UPT-21



Process transmitter with stainless steel case, models UPT-20 and UPT-21



## Accessories

	Description	Order no.
	<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	on request
	<b>HART® modem</b> USB interface, model 010031 RS-232 interface, model 010001 Bluetooth® interface [EEx ia] IIC, model 010041	11025166 7957522 11364254
	<b>HART® modem, PowerXpress</b> USB interface 2.0 Voltage supply via USB or AC 100/250 V, 50/60 Hz power supply unit Requires Windows 98, 2000, XP (32-bit), VISTA (32-bit), Windows 7(32/64-bit)	14133234
	<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)	14025585
	<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)	14025730
	<b>Hand-held, model MFC5150X</b> HART® protocol, universal voltage supply, cable set with 250 Ω resistance, with DOF upgrade, ATEX and cULus	14104078
	<b>Welding socket</b> for process connection G ½ flush for process connection G 1 flush for process connection G 1 ½ flush for process connection G 1 hygienic flush	1192299 1192264 2158982 2166011
	<b>Instrument mounting bracket</b> for wall or pipe mounting, stainless steel	14058660
	<b>Overvoltage protection</b> for transmitters, 4 ... 20 mA, M12 x 1.5, series connection	14002489
	<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.	14090181
	Barstock valve, model 910.81 See data sheet AC 09.18	
	Hygienic cable gland M20 x 1.5	11348691

## Approvals (option)

Logo	Description	Country
	<b>EC declaration of conformity</b> <ul style="list-style-type: none"> <li>■ EMC directive, interference emission (group 1, class B) and immunity per EN 61326-1:2013 (industrial application), EN 61326-2-3:2013 <sup>1)</sup></li> <li>■ Pressure equipment directive</li> <li>■ ATEX directive</li> </ul> <ul style="list-style-type: none"> <li>- Ex i Zone 1 gas [II 2G Ex ia IIC T4/T5/T6 Gb] Zone 1 connection to zone 0 gas [II 1/2G Ex ia IIC T4/T5/T6 Ga/Gb]</li> <li>Zone 2 gas [II 3G Ex ic IIC T4/T5/T6 Gc]</li> <li>Zone 21 dust [II 2D Ex ia IIIC T135 °C Db]</li> <li>Zone 21 connection to zone 20 dust [II 1/2D Ex ia IIIC T135 °C Da/Db]</li> </ul>	European Community
	<b>IECEX</b> Hazardous areas <ul style="list-style-type: none"> <li>- Ex i Zone 1 gas [Ex ia IIC T6 ... T3 Gb] Zone 1 connection to zone 0 gas [Ex ia IIC T6 ... T3 Ga/Gb]</li> <li>Zone 2 gas [Ex ia IIC T6 ... T3 Gc]</li> <li>Zone 21 dust [Ex ia IIIC T135 °C Db]</li> <li>Zone 21 connection to zone 20 dust [Ex ia IIIC T135 °C Da/Db]</li> </ul>	IECEX member states
	<b>EAC</b> <ul style="list-style-type: none"> <li>■ Pressure equipment directive</li> <li>■ Electromagnetic compatibility</li> <li>■ Hazardous areas</li> </ul> <ul style="list-style-type: none"> <li>- Ex i Zone 0 gas [0ExiaIICT4/T5/T6 X]</li> <li>Zone 1 gas [1ExiaIICT4/T5/T6 X]</li> <li>Zone 2 gas [2ExiaIICT4/T5/T6 X]</li> <li>Zone 21 dust [Ex iaD 20 T135 °C X]</li> <li>Zone 20 dust [Ex iaD 21 T135 °C X]</li> </ul>	Eurasian Economic Community
	<b>MTSCHS</b> Permission for commissioning	Kazakhstan
	<b>BelGIM</b> Metrology, measurement technology	Belarus
	<b>DNOP_MakNII</b> <ul style="list-style-type: none"> <li>■ Mining</li> <li>■ Hazardous areas</li> </ul> <ul style="list-style-type: none"> <li>- Ex i Zone 1 connection to zone 0 gas [II 1/2G EEx ia IIC T4/T5/T6 Ga/Gb]</li> <li>Zone 21 connection to zone 20 dust [II 1/2D IP6X T130 °C/T95 °C/T80 °C]</li> </ul>	Ukraine
	<b>Uzstandard</b> Metrology, measurement technology	Uzbekistan
	<b>INMETRO</b> <ul style="list-style-type: none"> <li>■ Metrology, measurement technology</li> <li>■ Hazardous areas</li> </ul> <ul style="list-style-type: none"> <li>- Ex i Zone 1 gas [Ex ia IIC T6 ... T3 Gb] Zone 1 connection to zone 0 gas [Ex ia IIC T6 ... T3 Ga/Gb]</li> <li>Zone 2 gas [Ex ia IIC T6 ... T3 Gc]</li> <li>Zone 21 dust [Ex ia IIIC T135 °C Db]</li> <li>Zone 21 connection to zone 20 dust [Ex ia IIIC T135 °C Da/Db]</li> </ul>	Brazil
	<b>3-A</b> Food <p>This instrument is 3-A marked, based on a third party verification for conformance to the 3-A standard.</p>	International

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

## Manufacturer's information and certifications

- NAMUR NE21:2011
- NACE
- FDA conform filling and sealing

## Certificates (option)

- 2.2 test report
- 3.1 inspection certificate
- DKD/DAkkS calibration certificate
- Calibration
- 3.1 calibration certificate per DIN EN 10204

Approvals and certificates, see website

## Ordering information

Model / Explosion protection / Case version / Digital display / Window / Output signal / Electrical connection / Measuring range / Process connection / Sealing / Wetted parts / Accuracy / Certificates / Scaling

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