



Technical specifications

Housing material	FlexHousing, Ø80 mm Stainless steel, AISI 304	
Cable (AFI5)	2.5 / 5.0 / 10.0 meter	
	Material	PUR
	Temperature	-40...80°C
Process connection	G1A hygienic, rotating (for other connections see adapters page 4)	
Insertion length	Standard	37 mm / hygienic version 41 mm
	Medium	60 mm / hygienic version 64 mm
	Long	83 mm / hygienic version 87 mm
Material	Not wetted	Stainless steel AISI 304
	Wetted parts	PEEK natura, unfilled
Surface	Wetted parts	Ra < 0.8 µm
Measuring range	Conductivity	0 ... 500 µS/cm ... 0 ... 1000 mS/cm 14 selectable ranges
	Concentration	4 factory set media/ranges 1 customer defined media/range
	Temperature	-30 ... 150°C Free programmable range
	Accuracy (sensor incl. transmitter @ 25°C ambient)	Cond./conc.
	Temperature	≤ 0.4°C
Temperature compensation	0.0 ... 5.0% / K, free adjustable	
Compensation range	-20 ... 150°C	
Reference temperature	25°C (adjustable)	
Sampling time	< 0.3 second	
Response time	Cond./conc.	t ₉₀ < 2.0 seconds
	Temperature	t ₉₀ < 15 seconds
Start up time without display	≤ 10 seconds	
Start up time with display	≤ 15 seconds	

Main features

- Range from 500 µS/cm to 1000 mS/cm
- All hygienic design
- Built in graphical display CombiView DFON
- Very fast temperature compensation
- Easy and full programmable with FlexProgrammer 9701
- AFI5 split version with remote sensor
- Separate 4...20 mA output for conductivity / concentration and 4...20 mA output for temperature
- FDT software
- 3-A approved
- EHEDG
- Touch screen

Applications

- Controlling CIP procedure
- Controlling filling machines
- Detection of specific medias
- Water systems with >50 µS/cm

Electrical specifications

Power supply	15 ... 35 VDC	
Output	Cond./conc.	4 ... 20 mA 4 ... 20 mA + HART®
	Temperature	4 ... 20 mA
	Relays	2 relays included in the display
Display (for more information please see page 3)	Without display	
	With DFON display, 2 relay-output galvanic separated	
Temperature drift	Conductivity	≤ 0.1%/K ^{1) 2)}
	Temperature	≤ 0.5%/K ¹⁾ AFI5: ≤ 0.5%/K + 0.005%/K pr. m sensor cable
El. connection	Left side	M12, 4-pin M16 or M20 cable gland
	Right side	M12, 4-pin (4 ... 20 mA output only) M12, 8-pin (4 ... 20 mA + relay output) M16 or M20 cable gland
Material	Plastic (PA) Stainless steel	

General specifications

Media temperature	-20 ... 140°C 150°C up to 1 hour	
Media pressure	< 25 bar (helium tested)	
Ambient temperature	Without display	-40 ... 85°C
	With display	-30 ... 80°C
Isolation voltage	500 VAC	
Protection class	EN60529/A2:2013	IP67 / IP69K
Humidity	IEC 68.2.38	98% condensing
Vibrations	IEC 60068.2.6 - test Fc 1.0 mm (2-13.2 Hz) 0.7g (13.2-100 Hz)	

¹⁾ Factor of change in process temperature from 25°C

²⁾ Range 0...500 µS/cm ≤ 0.3%/K

Conductivity ranges (selectable)

0 ... 500 $\mu\text{S/cm}$				
0 ... 1 mS/cm	0 ... 10 mS/cm	0 ... 100 mS/cm	1000 mS/cm	
0 ... 2 mS/cm	0 ... 20 mS/cm	0 ... 200 mS/cm		
0 ... 3 mS/cm	0 ... 30 mS/cm	0 ... 300 mS/cm		
0 ... 5 mS/cm	0 ... 50 mS/cm	0 ... 500 mS/cm		

Definition:

1000 $\mu\text{S/cm}$ = 1 mS/cm

1000 mS/cm = 1 S/cm

Conductivity in different media:

Conductivity	Media group	Media
55 nS/cm	Water	Ultra-pure water
1 $\mu\text{S/cm}$		Pure water
10 $\mu\text{S/cm}$		Process water
600 $\mu\text{S/cm}$	Food	Drinking water
		Beer
1 mS/cm		Milk
10 mS/cm	Process	Orange juice
100 mS/cm		Apple juice
		Phosphoric acid
		Hydrochloric acid
1000 mS/cm		Sodium hydroxide



Concentration ranges (selectable)

NaOH (caustic soda)	0 ... 15% by weight (0 ... 90°C)
	25 ... 50% by weight (0 ... 90°C)
HNO ₃ (nitric acid)	0 ... 25% by weight (0 ... 80°C)
	36 ... 82% by weight (0 ... 80°C)
	1 x customer defined (30 point linearization)

Compliance and approvals

Apply to	EU directives	10/2011, 1935/2004, 2023/2006
	FDA	PEEK : CFR 21.177.2415
Approvals		3-A
		EHEDG
		cULus listed, E491206
		IEC 61010-1:2010
		IEC 61010-2-201:2013

Display

Input

Input from AFIx transmitter	Digital, 2-way for communication between transmitter and display
Accuracy	$\leq \pm 0.1\%$ of input from AFIx ambient -10 ... 70°C $\leq \pm 0.2\%$ of input span ambient -30...10 / 70...80°C
Update time	≤ 1 second. Typical 0.3 second

User-configurable data

Error/warning indication	Individually configurable display and backlight indication in white, green or red colour, steady or flashing light. Configurable limits over the range.
Media description	Customer programmable e.g. " MILK " " Water " " NaOH "
Measuring unit	$\mu\text{S/cm}$, mS/cm % °C, °F
User defined unit	8 x 20 pixel matrix

Relay

Contacts	2 x solid state relays
Load current	Max. 75 mA
Voltage	Max. 60 V _p

Display

Type	FSTN Graphical LCD
Display range	-9999...99999
Digit height	Max. 22 mm
Temperature drift	$\leq 0.0001\%/K$ inside optimal range -10 ... 70°C $\leq 0.00015\%/K$ outside optimal range -30 ... -10 / 70...80°C

Environmental conditions

Optimal readability	-10 ... 70°C
Operating temperature	-30 ... 80°C

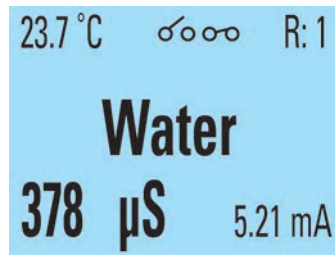
Mechanical data

Material	Polycarbonate
Protection class	IP67/IP69K

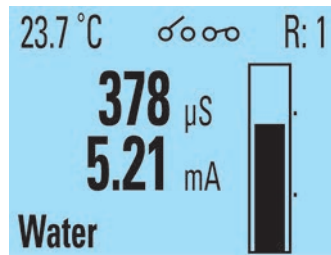
Selectable display views Conductivity Concentration



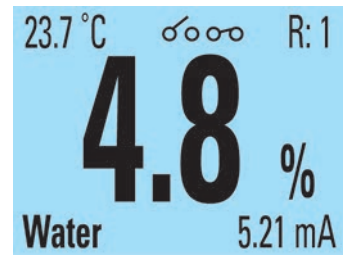
Value with values



Media with values



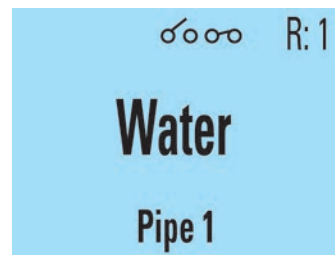
Bar graph with values



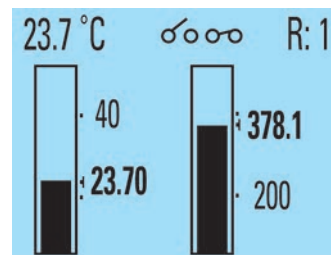
Concentration value in %



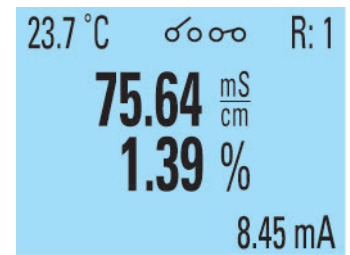
Value with TAG



Media with TAG



Bar graph incl. temp.



Conductivity and concentration

Visual alert



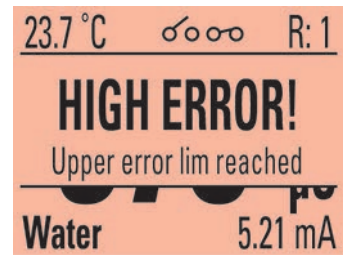
White background



Green background



Red background

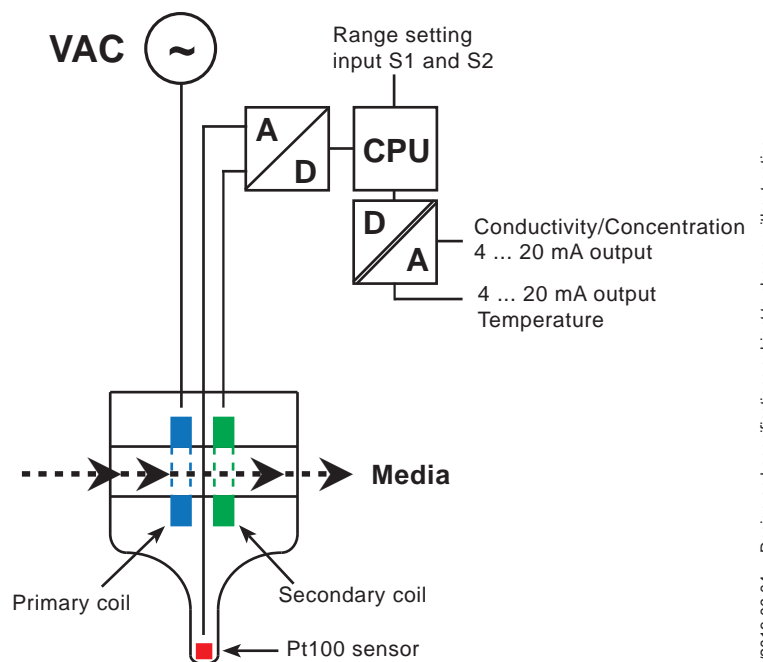


Error message and red background

Working principle

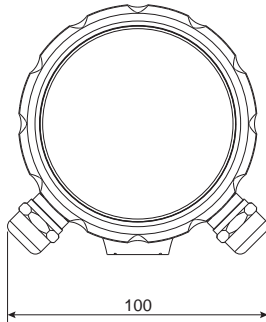
The measuring cell is a homogeneous sealed body all in PEEK. Through the body is a hole, through which the media flows. Built-in around the hole are two coils; a primary coil supplied with an AC voltage and a secondary coil, which picks up a small signal through the media induced voltage. The size of this voltage is dependent on the conductivity of the media. This signal is amplified and handled in the electronics to a linear analogue 4...20 mA output signal. Also built into the body is a Pt100 sensor placed in the tip of the sensor. This is measuring the media temperature to enable temperature compensation of the conductivity signal, which is very temperature dependent. The Pt100 sensor signal is also available as an analogue 4...20 mA output signal.

The coils and sensor are encapsulated in the PEEK sensor body, with surface roughness (Ra) <0,8 μm. It is therefore well suited for use in hygienic processes or direct in concentrated acids or alkalis.

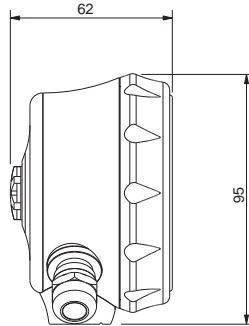


Dimensions in mm AFI4

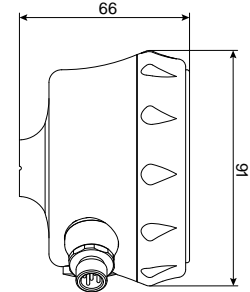
Front view



Bottom connection



Rear connection



Short version 37 mm

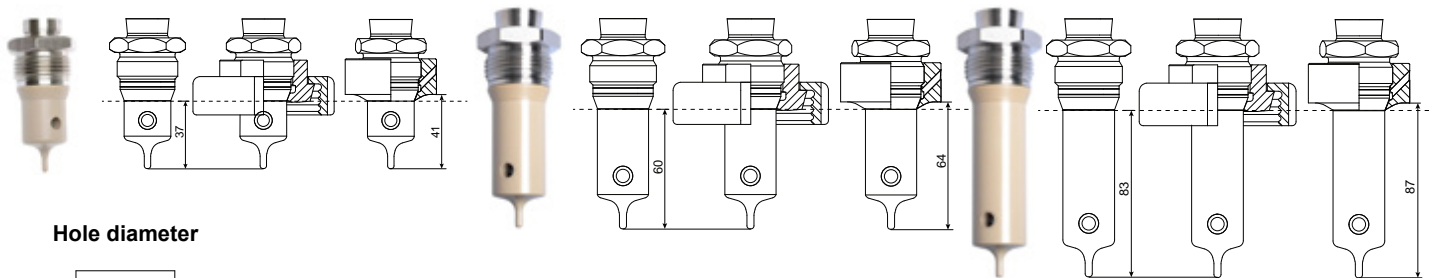
Standard Hygienic Hygienic

Medium version 60 mm

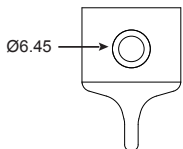
Standard Hygienic Hygienic

Long version 83 mm

Standard Hygienic Hygienic



Hole diameter



The sensor is 3-A approved when mounted in one of the 3-A approved G1A mounting adapters below.

The sensor is EHEDG approved when mounted in one of the EHEDG approved G1A mounting adapters below.

G1" mounting adapters

Welding connection

For tank



ZPW2-521

Clamp connection



ISO 2852 DN38 **ZPH1-5213**
ISO 2852 DN51 **ZPH1-5216**

Threaded connections



DIN 11851 DN32 **ZPH3-5222**
DIN 11851 DN40 **ZPH3-5224**
DIN 11851 DN50 **ZPH3-5225**
DIN 11851 DN65 **ZPH3-5227**



DIN 11864-1-A DN40 **ZPH3-5254**
DIN 11864-1-A DN50 **ZPH3-5255**

For pipe



DN 40...50 **ZPW2-526**
DN 60...150 **ZPW2-527**



Variline, type N **ZPH1-524E**



SMS 1145 DN 38 **ZPH1-5233**
SMS 1145 DN 51 **ZPH1-5236**

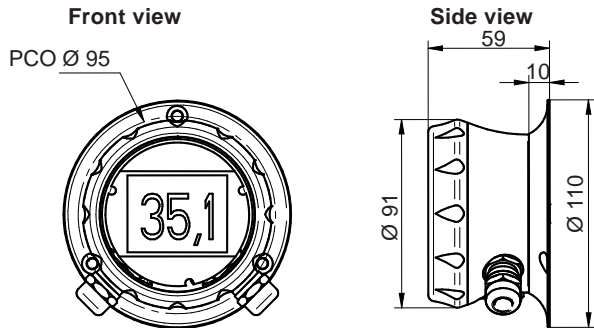
Union nut



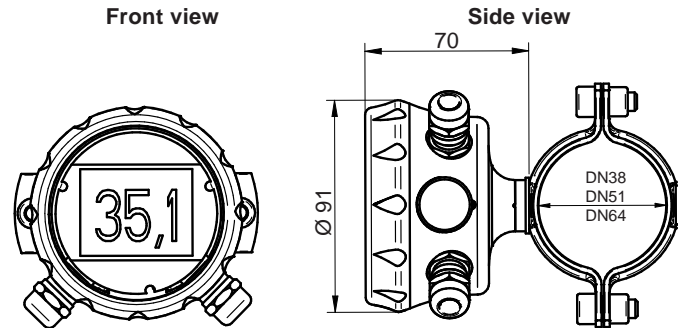
ZPX4-xx0

Dimensions AFI5

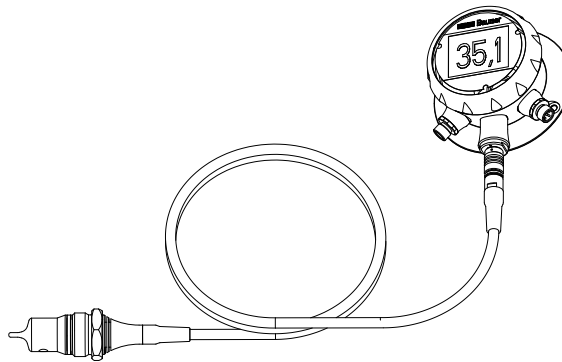
Wall mounted version



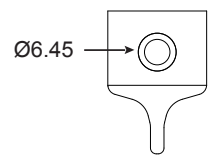
Pipe mounted version



AFI5 cable sensor



Hole diameter



Short version 37 mm

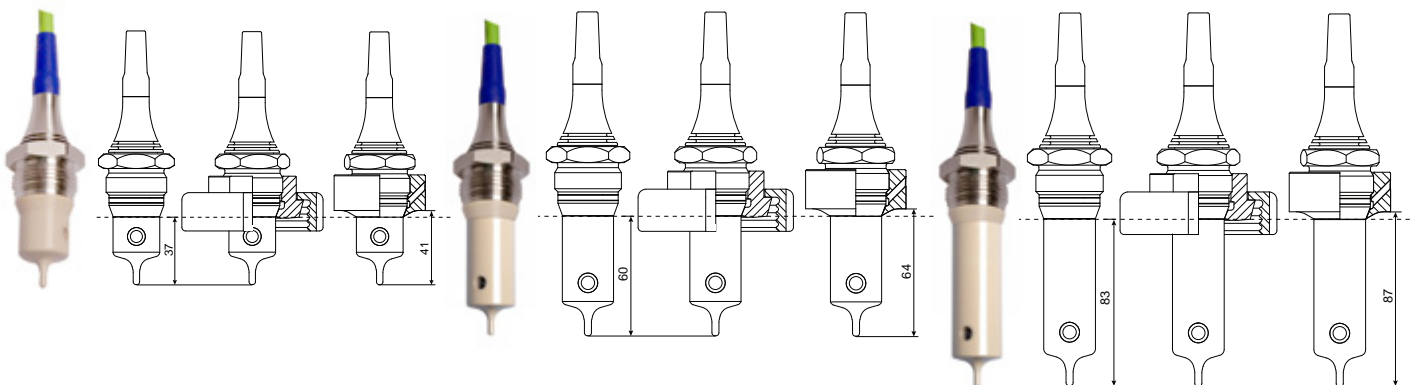
Medium version 60 mm

Long version 83 mm

Standard Hygienic Hygienic

Standard Hygienic Hygienic

Standard Hygienic Hygienic

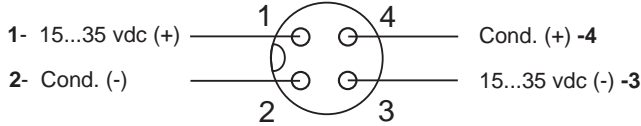


The sensor is 3-A approved when mounted in one of the 3-A approved G1A mounting adapters, shown on page 4.

The sensor is EHEDG approved when mounted in one of the EHEDG approved G1A mounting adapters, shown on page 4.

Electrical connection

Left side electrical connection (Front view)



Left side M12, 4 pin connector

1. Brown	Supply (+)	(15...35 vdc)
2. White	Cond. (-)	(4...20 mA)
3. Blue	Supply (-)	(15...35 vdc)
4. Black	Cond. (+)	(4...20 mA)

Note :

If a M12 4-pin connector for left and right side is selected the AFI4 is directly compatible with the previous Baumer ISL conductivity transmitter.

To connect the FlexProgrammer to the transmitter

- Com 1** Red clip
- Com 2** Black clip

The data entered to the transmitter will automatically be displayed on the DFON display via the ribbon cable (UnitCom)

To connect the FlexProgrammer to the DFON display

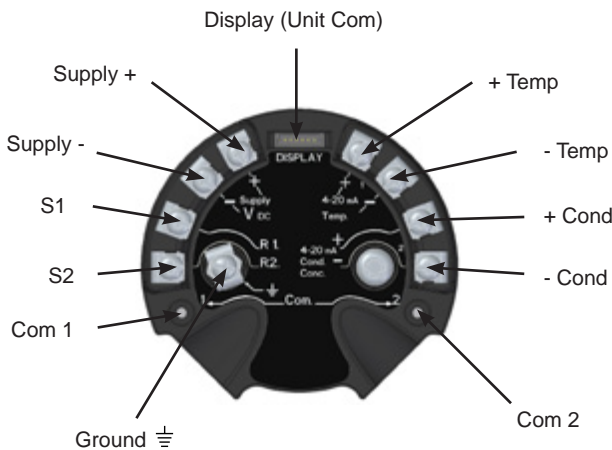
- Com 1** Red clip
- Com 2** Black clip

Colour change, relay set-points and error messages etc. can be setup be set in the DFON display.

To set the external input for range selection

Range	S1	S2	Range	S1	S2
1	N.C.	N.C.	3	N.C.	24 VDC
2	24 VDC	N.C.	4	24 VDC	24 VDC

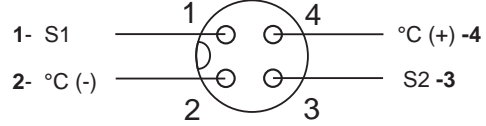
Electrical connection on the AFIX transmitter



Note:

The ground connection (⏏) is to be connected with the cable shield if using cable gland and shielded cable.

Right side electrical connection (Front view)



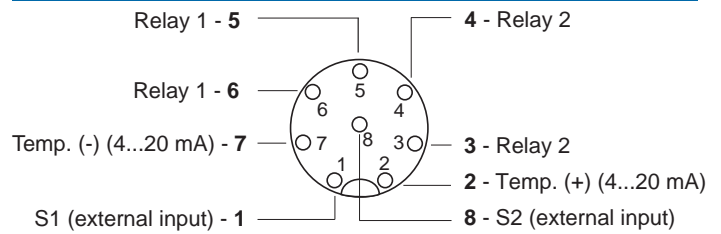
Right side M12, 4-pin connector

1. Brown	S1	(external input)
2. White	Temp. (-)	(4...20 mA)
3. Blue	S2	(external input)
4. Black	Temp. (+)	(4...20 mA)

Note :

The pin 2 in left connection and pin 2 in right connection can be connected as common - for both Con. and Temp. 4...20 mA output.

Right side electrical connection with relay output



Right side M12, 8 pin connector

1. White	S1	(external input)
2. Brown	Temp. (+)	(4...20 mA)
3. Green	Relay 2	
4. Yellow	Relay 2	
5. Grey	Relay 1	
6. Light red	Relay 1	
7. Blue	Temp. (-)	(4...20 mA)
8. Red	S2	(external input)

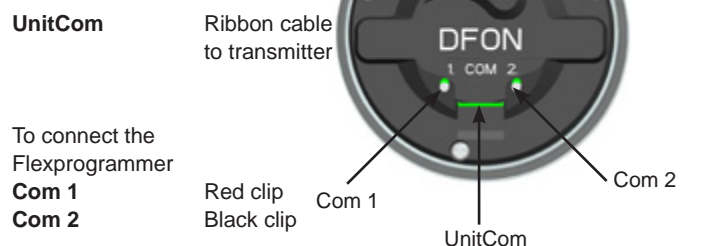
Note:

The pin 2 in left connection and pin 7 in right connection can be connected as common - for both Con. and Temp. 4...20 mA output.

Electrical connection on the display with relay output

- 1. Not connected
 - 2. Not connected
 - 3. Green Relay 2
 - 4. Yellow Relay 2
 - 5. Grey Relay 1
 - 6. Light red Relay 1
 - 7. Blue Temp. (-) (4...20 mA)
 - 8. Red S2 (external input)
- (3 + 5 can be connected common)

UnitCom



To connect the Flexprogrammer
Com 1 Red clip
Com 2 Black clip

Ordering details

	AFI	-	.	0	.	0			
Model	AFI								
Conductivity transmitter, CombiLyz									
Type									
Compact version	4								
Split version	5								
		-							
Housing									
Bottom connection		5							
Rear connection		6							
Wall mounted		A							
Pipe mounted, DN38		C							
Pipe mounted, DN51		D							
Pipe mounted, DN64		E							
Electrical connection									
M12 - 2x4-wire (w.o. relay output)		6							
M12 - 1x4-wire / 1x8-wire		7							
2 x M16 cable gland		8							
M16 (left) and M20 (right) cable gland		A							
2 x M20 cable gland		B							
Material of electrical connection									
Plastic (not available with M12)				1					
Stainless steel				3					
Cable length									
No cable				0					
Sensor cable, 2.5 meter				1					
Sensor cable, 5.0 meter				2					
Sensor cable, 10 meter				3					
					.				
Display									
Without				1					
DFON with 2 relay output				4					
Safety									
Standard					0				
Configuration									
No configuration					0				
Configuration without display or with display as slave					1				
Configuration with separate configuration of display and relays					3				
Output									
2 x 4...20 mA						2			
2 x 4...20 mA, HART						4			
							.		
Version									
Standard								0	
Process connection									
G1A hygienic, PEEK, 37 mm (A04)									1
G1A hygienic, PEEK, 83 mm (A04)									2
G1A hygienic, PEEK, 60 mm (A04)									3
Approvals									
Without									0
3-A approved / EHEDG									1
Calibration certificate									
No									0
Calibration certificate, conductivity (5 points)									1
Calibration certificate, temperature (3 points)									2
Calibration certificate, conductivity (5 points) and temperature (3 points)									3