



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.	0 ... 500 µS/cm ≤ 1.5 % 0 ... 1 / 0 ... 500 mS/cm ≤ 1.0 % 0 ... 1000 mS/cm ≤ 1.5 %
	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 µS/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 µS/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 µS/cm		Pure water
10 µS/cm		Process water
600 µS/cm		Drinking water
	Food	Beer
1 mS/cm		Milk
		Orange juice
		Apple juice
10 mS/cm	Process	Phosphoric acid
100 mS/cm		Hydrochloric acid
		Sodium hydroxide
1000 mS/cm		



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 FDA	10/2011, 1935/2004, 2023/2006 PEEK : CFR 21.177.2415
Approvals		3-A approval 74-06 EHEDG cULus listed, E491206 IEC 61010-1:2010 IEC 61010-2-201:2013

Product marking

The marking on the product is made by laser engraving.
See below example:



AFI4-Matr.: 12345678
S/N.: 010000
Date.: 2016-06-15
Tag.:

Range: 0...1000mS
In U.: 16...30Vdc / 150mA
Out Con.: 4...20 mA HART®
Out Temp.: 4...20 mA

Temp.: -20...+85°C
Tprocess: -20...+140°C
Max. Torque 30 Nm



Display

Input

Input from AFIx transmitter	Digital, 2-way for communication between transmitter and display
Accuracy	≤ ± 0.1% of input from AFIx ambient -10 ... 70°C ≤ ± 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	µS/cm, mS/cm % °C, °F
User defined unit	8 × 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	≤ 0.0001%/K inside optimal range -10 ... 70°C ≤ 0.00015%/K outside optimal range -30 ... -10 / 70...80°C

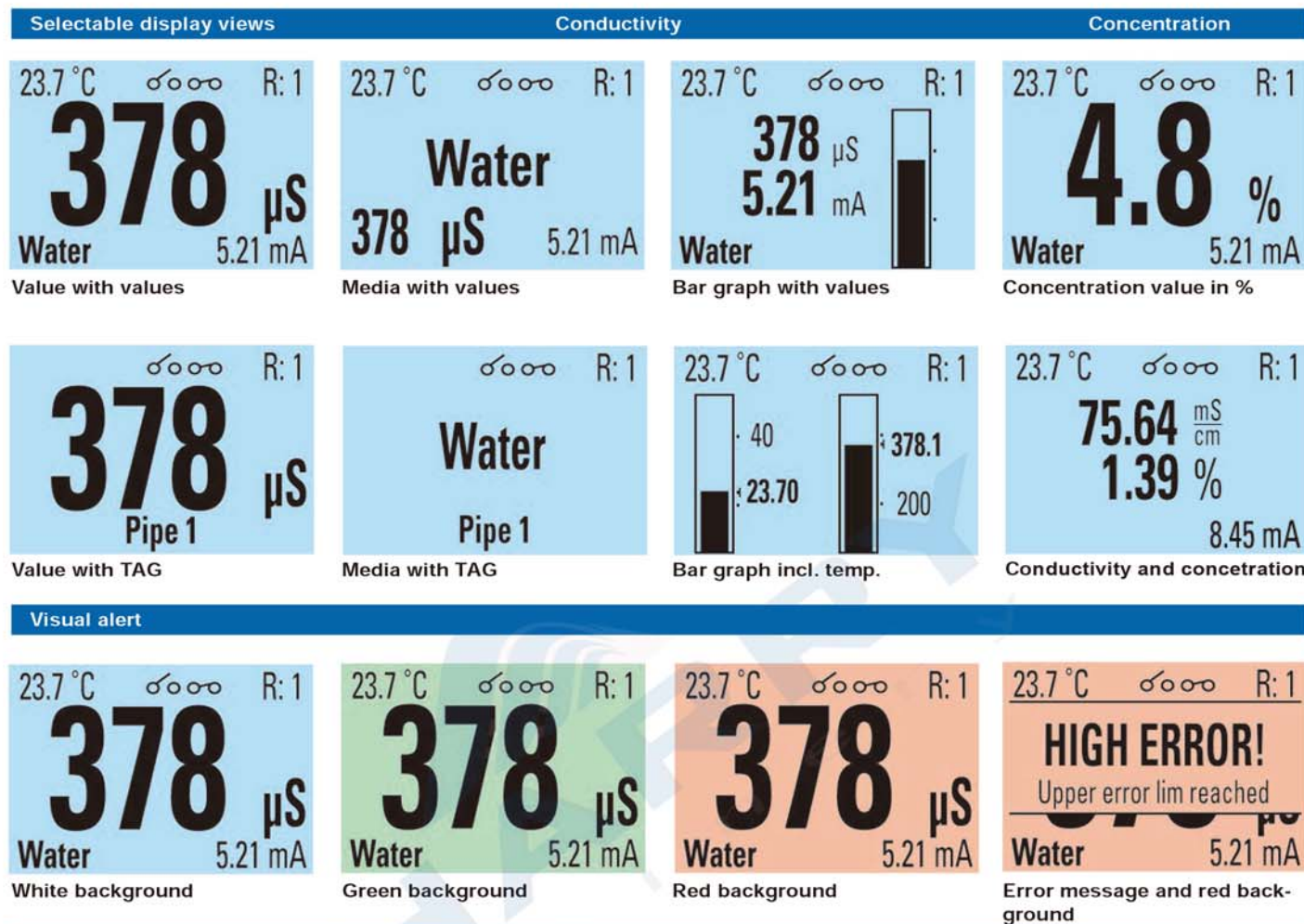
Environmental conditions

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

Mechanical data

Material	Polycarbonate
Protection class	IP67/IP69K

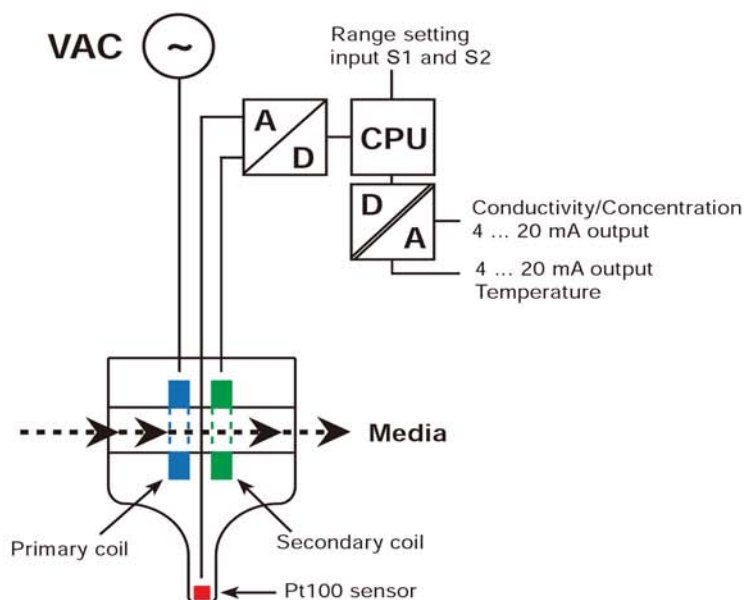




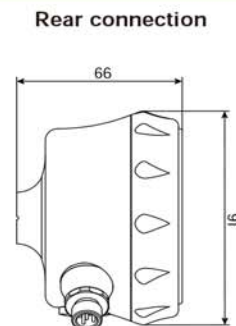
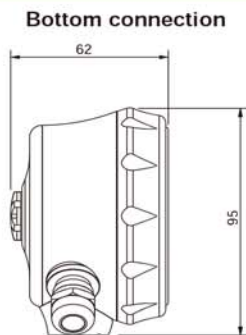
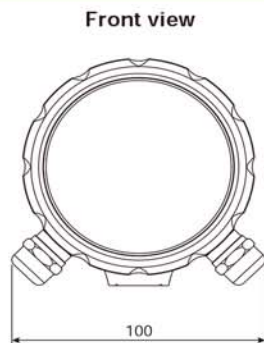
Working principle

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.

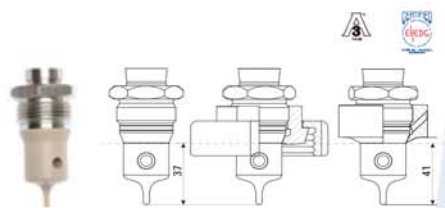


Dimensions in mm AFI4



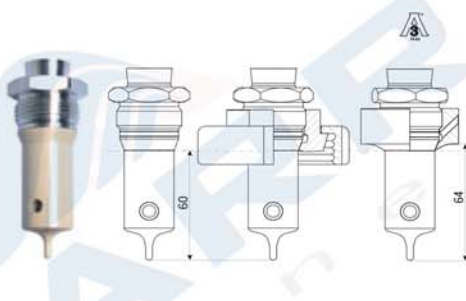
Short version 37 mm

Standard Hygienic Hygienic 3-A/EHEDG



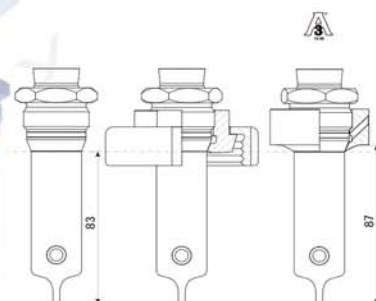
Medium version 60 mm

Standard Hygienic Hygienic 3-A

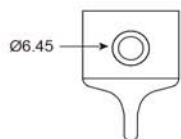


Long version 83 mm

Standard Hygienic Hygienic 3-A



Hole diameter



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

The short 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

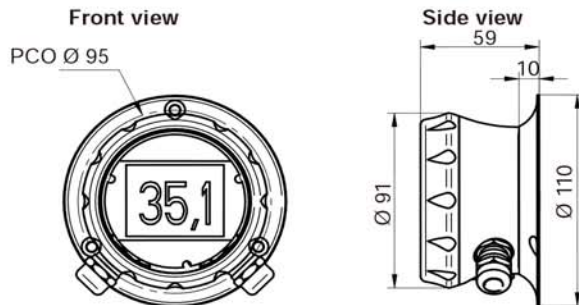


ZPX4-xx0

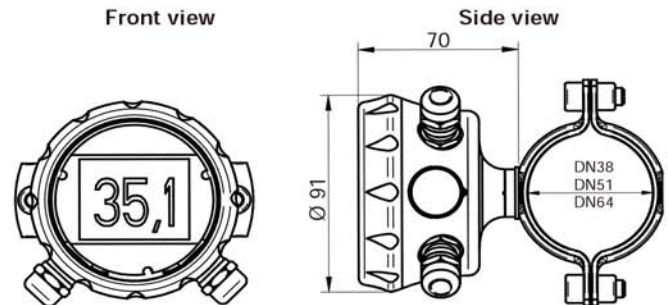


Dimensions AFI5

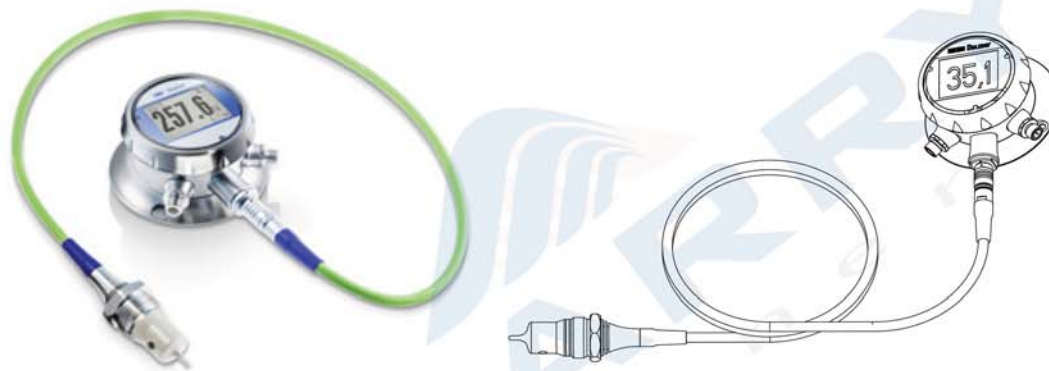
Wall mounted version



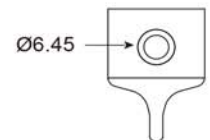
Pipe mounted version



AFI5 cable sensor

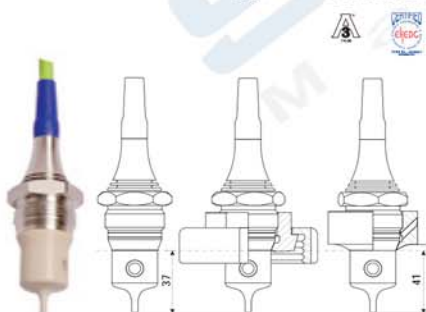


Hole diameter



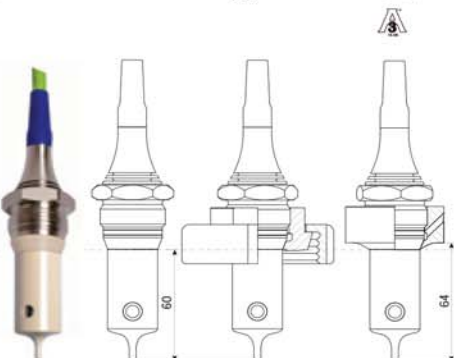
Short version 37 mm

Standard Hygienic 3-A/EHEDG



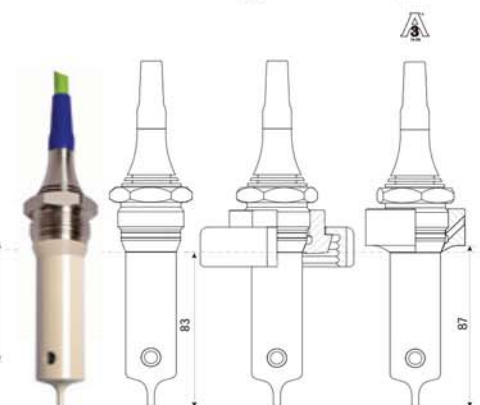
Medium version 60 mm

Standard Hygienic 3-A



Long version 83 mm

Standard Hygienic 3-A



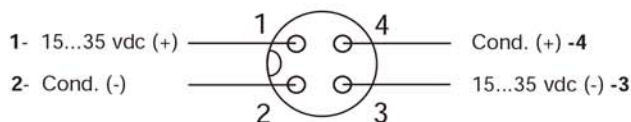
The sensors above is 3-A approved when mounted in one of the 3-A approved G1A mounting adapters, shown on page 4.

The short 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

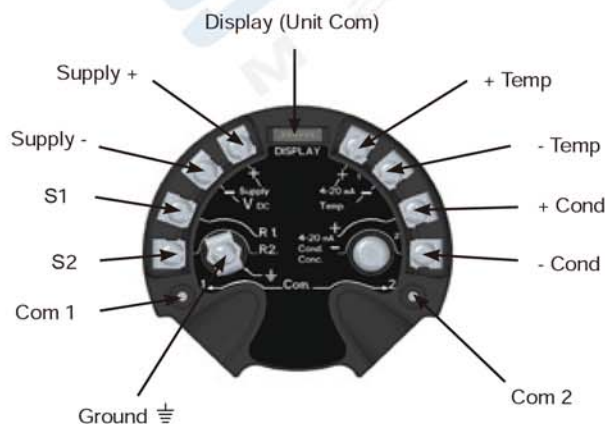
Com 1	Red clip
Com 2	Black clip

Colour change, relay set-points and error messages etc. can be set up 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

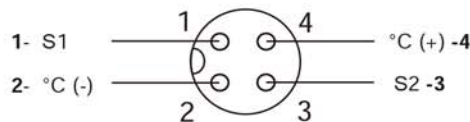
Electrical connection on the AFIx transmitter



Note:

The ground connection ($\equiv$) 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:

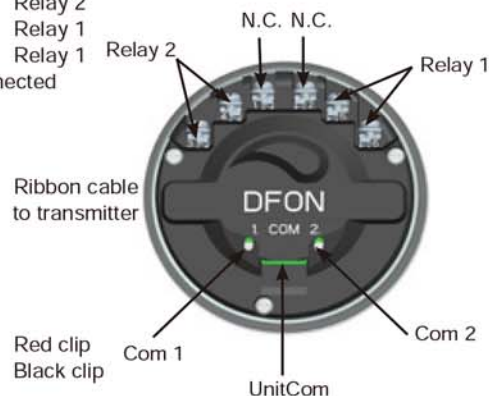
The pin 2 in left connection and pin 7 in right connection can be connected as common - for both Con. and Temp. 4...20 mA output.

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
(3 + 5 can be connected common)	

UnitCom

To connect the Flexprogrammer
Com 1
Com 2



Ordering details

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

