

# AFI5 (2 x 4...20 mA)

AFI5-####.#0#2.0###

## Overview

- Separated sensor
- Ideal for cramped spaces and strong vibrations
- All wetted parts in PEEK
- Compact, food-safe, hygienic design
- 3-A sanitary standards, FDA-compliant, EHEDG-certified



## Technical data

### Performance characteristics conductivity

Conductivity	14 selectable ranges
Min. measurable conductivity	50 µS/cm
Measuring ranges (selectable)	0 ... 500 µS/cm 0 ... 1 mS/cm 0 ... 2 mS/cm 0 ... 3 mS/cm 0 ... 5 mS/cm 0 ... 10 mS/cm 0 ... 20 mS/cm 0 ... 30 mS/cm 0 ... 50 mS/cm 0 ... 100 mS/cm 0 ... 200 mS/cm 0 ... 300 mS/cm 0 ... 500 mS/cm 0 ... 1000 mS/cm
Max. measuring span	1000 mS/cm
Min. measuring span	500 µS/cm
Max. measuring error	± 1.0 % FSR , 0 ... 1 mS/cm to 0 ... 500 mS/cm ± 1.5 % FSR , 0 ... 1000 mS/cm ± 1.5 % FSR , 0 ... 500 µS/cm
Reference conditions for max. measuring error	Sensor incl. transmitter @ 25°C ambient temperature
Reference temperature	25 °C , adjustable
Repeatability	< 0.5 % FSR , > 1 mS/cm
Compensated temperature range	-20 ... 150 °C
Temperature compensation	0.0 ... 5.0 % FSR/K , adjustable
Step response time	≤ 2.0 s
Sample time	≤ 0.4 s

### Performance characteristics conductivity

Temperature drift (Factor of change in process temperature from 25°C)	≤ 0.1 % FSR/K
Temperature drift (Factor of change in process temperature from 25°C) (0 ... 500 µS / cm)	≤ 0.3 % FSR/K
<b>Performance characteristics concentration</b>	
Concentration	Programmable with FlexProgram
Factory set media (available from FlexProgram)	0 ... 25 % by weight , HNO3 (nitric acid) 36 ... 82 % by weight , HNO3 (nitric acid) 0 ... 12 % by weight , NaOH (caustic soda) 25 ... 50 % by weight , NaOH (caustic soda)
Customer defined media	Customer defined (30 point lookup table)
<b>Performance characteristics temperature</b>	
Temperature	Free programmable range
Measuring range	-20 ... 150 °C
Thermal response time, T90	≤ 15 s
Max. measuring error	± 0.4 K
Reference conditions for max. measuring error	Sensor incl. transmitter @ 25°C ambient temperature
Temperature coefficient (Factor of change in process temperature from 25°C)	≤ 0.0625 % FSR/K , AFI5 with sensor cable 2.5 m ≤ 0.075 % FSR/K , AFI5 with sensor cable 5 m ≤ 0.1 % FSR/K , AFI5 with sensor cable 10 m
<b>Process conditions</b>	
Process temperature	-20 ... 140 °C , permanent 140 ... 150 °C , max. t < 1 h
Process pressure	≤ 25 bar

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## Technical data

### Process conditions

SIP/CIP compatibility &lt; 60 min, @ medium temperature up to 150 °C

### Process connection

 Connection variants G 1 A hygienic  
 Immersion length Refer to section "Dimensional drawings"  
 Wetted parts material PEEK Natura  
 Surface roughness wetted parts Ra ≤ 0.8 µm

### Ambient conditions

 Operating temperature range -30 ... 80 °C, with DFON touch screen  
 -40 ... 85 °C, without DFON touch screen  
 Degree of protection (EN 60529) IP67  
 IP69K, with appropriate cable  
 Humidity < 98 % RH, condensing  
 Insulation voltage 500 V AC  
 Vibration (sinusoidal) (EN 60068-2-6) 1.0 mm p-p (2 ... 13.2 Hz), 0.7 g (13.2 ... 100 Hz), 1 octave / min.

### Output signal

 Conductivity/Concentration 4 ... 20 mA  
 Temperature 4 ... 20 mA  
 Relays 2 relays included in the display  
 Current rating 100 mA, max.  
 Interface With FlexProgrammer 9701

### Housing

 Style FlexHousing, Ø80 mm  
 Wall mounted split version  
 Pipe mounted split version  
 Overall size Refer to section "Dimensional drawings"  
 Material AISI 304 (1.4301)

### Cable (AFI5)

 Cable lengths 10.0 m  
 5.0 m  
 2.5 m  
 Material PUR  
 Temperature -40 ... 80 °C  
 Minimum bending radius 40 mm

### Electrical connection

 Connector (available for left side) M12-A, 4-pin, stainless steel  
 M16x1.5, plastic  
 M16x1.5, stainless steel  
 M20x1.5, plastic  
 M20x1.5, stainless steel  
 Connector (available for right side) M16x1.5, plastic  
 M16x1.5, stainless steel  
 M20x1.5, plastic  
 M20x1.5, stainless steel  
 M12-A, 4-pin, stainless steel, 4 ... 20 mA output  
 M12-A, 8-pin, stainless steel, 4 ... 20 mA + relay output

### Power supply

 Voltage supply range 15 ... 35 V DC  
 Current consumption (no load) 150 mA, max.  
 Power-up time ≤ 10 s, without DFON touch screen  
 ≤ 16 s, with DFON touch screen

### Factory settings

 Output mode Conductivity  
 Conductivity Range 1 0 ... 200 mS/cm  
 Conductivity Range 2 0 ... 20 mS/cm  
 Conductivity Range 3 0 ... 2 mS/cm  
 Conductivity Range 4 0 ... 500 µS/cm  
 Temperature output 0 ... 150 °C  
 Output damping 0.00 s  
 Temperature compensation Range 1-4 2.00 % FSR/K  
 Output lower limit 3.70 mA  
 Output upper limit 21.00 mA

### Compliance and approvals

 EMC EN 61326-1  
 Hygiene 3-A (74-07)  
 EHEDG EL Class I  
 FDA (21 CFR 177.2415)  
 Safety cULus listed, E491206

## Operating conditions

Measuring range	Max. measuring error	Conductivity	Media group	Media
0 ... 500 µS/cm	1,5 % FSR	7,5 µS/cm	Water	Ultra-pure water
0 ... 1 mS/cm	1,0 % FSR	10 µS/cm		Pure water
0 ... 2 mS/cm	1,0 % FSR	20 µS/cm		Process water
0 ... 3 mS/cm	1,0 % FSR	30 µS/cm	Food & Beverage	Drinking water
0 ... 5 mS/cm	1,0 % FSR	50 µS/cm		Beer
0 ... 10 mS/cm	1,0 % FSR	100 µS/cm		Milk
0 ... 20 mS/cm	1,0 % FSR	200 µS/cm		Orange juice
0 ... 30 mS/cm	1,0 % FSR	300 µS/cm		Apple juice
0 ... 50 mS/cm	1,0 % FSR	500 µS/cm	Process	Phosphoric acid
0 ... 100 mS/cm	1,0 % FSR	1 mS/cm		Hydrochloric acid
0 ... 200 mS/cm	1,0 % FSR	2 mS/cm		Sodium hydroxide
0 ... 300 mS/cm	1,0 % FSR	3 mS/cm		
0 ... 500 mS/cm	1,0 % FSR	5 mS/cm		
0 ... 1000 mS/cm	1,5 % FSR	15 mS/cm		



# AFI5 (2 x 4...20 mA)

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## Display

### General information

Panel type	FSTN Graphical LCD
Display range	-9999 ... 99999
Max. digit height	22 mm
Material	Polycarbonate

### Ambient conditions

Operating temperature range	-30 ... 80 °C
Optimal readability temperature range	-10 ... 70 °C
Degree of protection (EN 60529)	IP 67 IP 69 K

### Input signal

Input signal from transmitter	Digital, 2-way for communication between transmitter and display
Update time	≤ 1 s , max. 0.3 s , typ.

### 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 measuring unit	8 × 20 pixel matrix

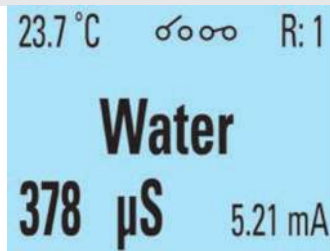
### Relays

Contacts	2 x solid state relays
Max. load current	75 mA
Max. switching voltage	60 V

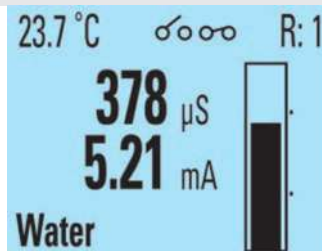
## Selectable display views



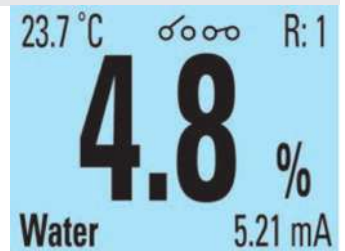
Conductivity value with medium and additional values



Medium with additional values



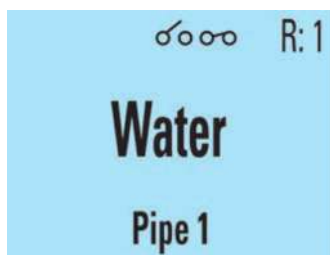
Bar chart with additional values and medium



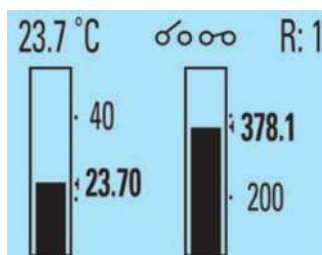
Concentration with additional values and medium



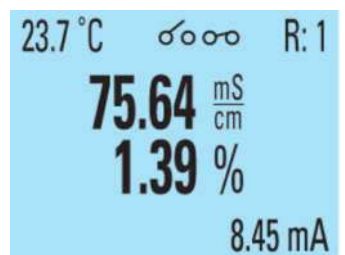
Conductivity value with measuring point (TAG)



Medium with measuring point (TAG)



Bar chart including temperature



Conductivity and concentration value



White background



Green background



Red background



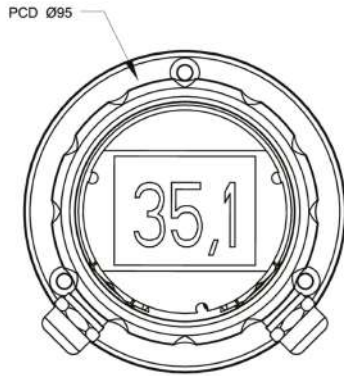
Exemplary error message

# AFI5 (2 x 4...20 mA)

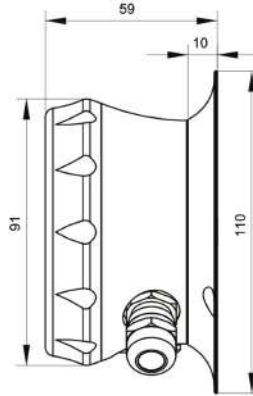
AFI5-####.#0#2.0###

## Dimensional drawings (mm)

### Housing



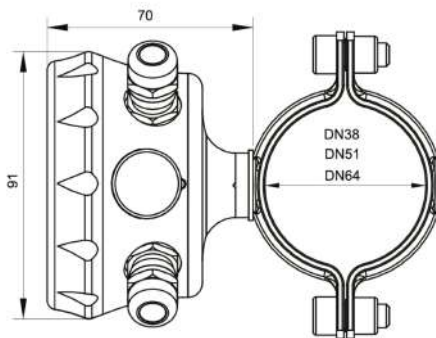
FlexHousing, wall mounting, front view



FlexHousing, wall mounting, side view



FlexHousing, pipe mounting, front view

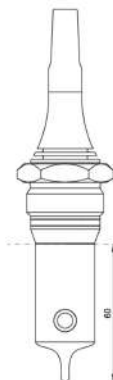


FlexHousing, pipe mounting, side view

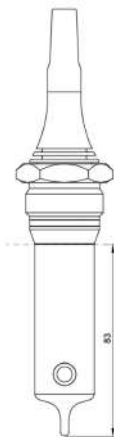
### Process connection



G 1 A hygienic (BCID: A04), PEEK, 37 mm



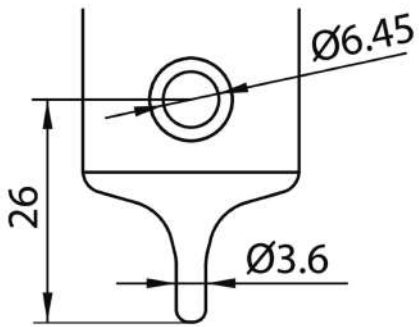
G 1 A hygienic (BCID: A04), PEEK, 60 mm



G 1 A hygienic (BCID: A04), PEEK, 83 mm

## Dimensional drawings (mm)

### Process connection



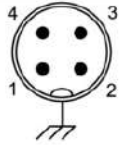
Sensor tip with integrated Pt100 sensor element

# AFI5 (2 x 4...20 mA)

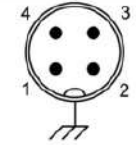
AFI5-####.#0#2.0###

## Electrical connection

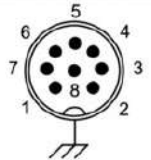
M12-A, 4-pin



M12-A, 4-pin



M12-A, 8-pin



Left side connection (front view): M12-A, 4-pin

Function			Pin assignment
+Vs	Power supply +	15 ... 35 V DC	1
GND (0 V)	Power supply -	15 ... 35 V DC	3
lout1+	Conductivity +	4 ... 20 mA	4
lout-	Conductivity -	4 ... 20 mA	2
IO-Link	IO-Link / SW		n.c.

lout- is internally connected as common for both Conductivity/Concentration and Temperature output.

Left side connection (front view): Cable gland

Function			Recommended wiring
+Vs	Power supply +	15 ... 35 V DC	BN
GND (0 V)	Power supply -	15 ... 35 V DC	BU
lout1+	Conductivity +	4 ... 20 mA	BK
lout-	Conductivity -	4 ... 20 mA	WH
IO-Link	IO-Link / SW		GY

lout- is internally connected as common for both Conductivity/Concentration and Temperature output.

Right side connection (front view): M12-A, 4-pin

Function			Pin assignment
lout2+	Temperature +	4 ... 20 mA	4
lout-	Temperature -	4 ... 20 mA	2
S1	External input	n.c. / 24 V DC	1
S2	External input	n.c. / 24 V DC	3

lout- is internally connected as common for both Conductivity/Concentration and Temperature output.

Right side connection (front view): M12-A, 8-pin

Function			Pin assignment
lout2+	Temperature +	4 ... 20 mA	2
lout-	Temperature -	4 ... 20 mA	7
S1	External input	n.c. / 24 V DC	1
S2	External input	n.c. / 24 V DC	8
R11	Relay 1		5
R12	Relay 1		6
R21	Relay 2		3
R22	Relay 2		4

lout- is internally connected as common for both Conductivity/Concentration and Temperature output.

Right side connection (front view): Cable gland

Function			Recommended wiring
lout2+	Temperature +	4 ... 20 mA	BN
lout-	Temperature -	4 ... 20 mA	BU
S1	External input	n.c. / 24 V DC	WH
S2	External input	n.c. / 24 V DC	RD
R11	Relay 1		GY
R12	Relay 1		PK
R21	Relay 2		GN
R22	Relay 2		YE

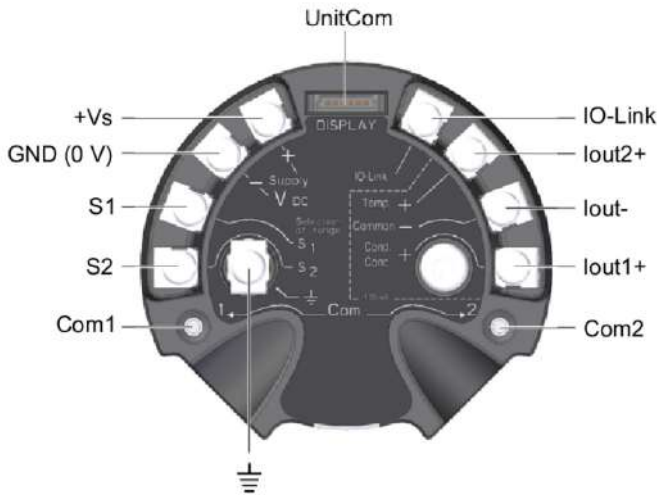
lout- is internally connected as common for both Conductivity/Concentration and Temperature output.

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AFI5-####.#0#2.0###

## Electrical connection

### Terminal assignment transmitter

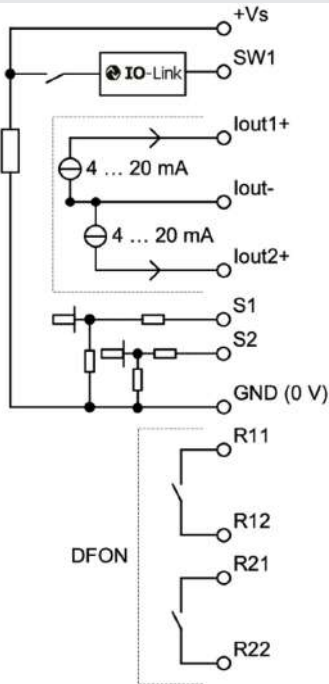


### Terminal assignment DFON display



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

### Replacement switching diagram



# AFI5 (2 x 4...20 mA)

AFI5-####.#0#2.0###

## Ordering information

Ordering key - Configuration possibilities see website

	AFI	5	-	#	#	#	#	.	#	0	#	2	.	0	#	#	#
<b>Product</b>	AFI																
<b>Type</b>																	
Split version		5															
<b>Housing</b>																	
Wall mounting																	A
Pipe mounting DN38																	C
Pipe mounting DN51																	D
Pipe mounting DN64																	E
<b>Electrical connection</b>																	
2 x M12-A, 4-pin																	6
1 x M12-A, 4-pin + 1 x M12-A, 8-pin																	7
2 x M16x1.5 cable gland																	8
1 x M16x1.5 + 1 x M20x1.5 cable gland																	A
2 x M20x1.5 cable gland																	B
<b>Material of el. connection</b>																	
Plastic																	1
Stainless steel, AISI 304 (1.4301)																	3
<b>Cable length (cm)</b>																	
Sensor cable 250 cm																	1
Sensor cable 500 cm																	2
Sensor cable 1000 cm																	3
<b>Display</b>																	
Without display																	1
With display, with activated relays																	4
<b>Safety</b>																	
Standard																	0
<b>Configuration</b>																	
No configuration																	0
Configuration of range																	1
Configuration of range + display incl. 2 relays																	3
<b>Output</b>																	
2 x 4...20 mA																	2
<b>Version</b>																	
Standard																	0
<b>Process connection</b>																	
G 1 A hygienic, PEEK, length: 37 mm. (A04)																	1
G 1 A hygienic, PEEK, length: 83 mm. (A04)																	2
G 1 A hygienic, PEEK, length: 60 mm. (A04)																	3
<b>Approvals</b>																	
Standard approvals																	0
3-A / EHEDG																	1



# AFI5 (2 x 4...20 mA)

AFI5-####.#0#2.0###

## Ordering information

Ordering key - Configuration possibilities see website

AFI 5 - # # # # . # 0 # 2 . 0 # # #

### 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