

AFI5

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 $\mu\text{S/cm}$ |
| Measuring ranges (selectable) | 0... 500 $\mu\text{S/cm}$ 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 $\mu\text{S/cm}$ |
| Max. measuring error | $\pm 1.0\%$ FSR, 0 ... 1 mS/cm to 0 ... 500 mS/cm $\pm 1.5\%$ FSR, 0 ... 1000 mS/cm $\pm 1.5\%$ FSR, 0 ... 500 $\mu\text{S/cm}$ |
| 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, T90 | ≤ 2.0 s |
| Sample time | ≤ 0.3 s |

Performance characteristics conductivity

| | |
|---|---|
| Temperature coefficient (Factor of change in process temperature from 25°C) | $\leq 0.1\%$ FSR/K |
| Temperature coefficient (Factor of change in process temperature from 25°C) (0 ... 500 $\mu\text{S/cm}$) | $\leq 0.3\%$ FSR/K |
| Performance characteristics concentration | |
| Concentration | 4 factory set media |
| HNO ₃ (nitric acid) | 0... 25 % by weight, 0 ... 80 °C 36 ... 82 % by weight, 0 ... 80 °C |
| NaOH (caustic soda) | 0... 15 % by weight, 0 ... 90 °C 25 ... 50 % by weight, 0 ... 90 °C |
| Customer defined media | Customer defined (30 point lookup table) |
| Performance characteristics temperature | |
| Temperature | Free programmable range |
| Measuring range | -20 ... 150 °C |
| Step response time, T90 | ≤ 15 s |
| Max. measuring error | $\pm 0.4\%$ |
| Reference conditions for max. measuring error | Sensor incl. transmitter @ 25°C ambient temperature |
| Temperature coefficient (Factor of change in process temperature from 25°C) | $\leq 0.5125\%$ FSR/K, AFI5 with sensor cable 2.5 m $\leq 0.525\%$ FSR/K, AFI5 with sensor cable 5 m $\leq 0.55\%$ FSR/K, AFI5 with sensor cable 10 m |
| Process conditions | |
| Process temperature | -20 ... 140 °C, permanent 140 ... 150 °C, max. t < 1 h |
| Process pressure | ≤ 25 bar |
| SIP/CIP compatibility | < 60 min, @ medium temperature up to 150 °C |

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Technical data

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) | IP 67 IP 69K , 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 current limit | 3.70 mA |
| Output upper current limit | 21.00 mA |

Compliance and approvals

| | |
|---------|--|
| EMC | EN 61326-1:2013 |
| Hygiene | 3-A (74-07) EHEDG EL Class I FDA (21 CFR 177.2415) |

Operating conditions

| Measuring range | Max. measuring error | Conductivity | Media group | Media |
|------------------|----------------------|--------------|-----------------|-------------------|
| 0 ... 500 µS/cm | 1,5 % FSR | 55 nS/cm | Water | Ultra-pure water |
| 0 ... 1 mS/cm | 1,0 % FSR | 1 µS/cm | | Pure water |
| 0 ... 2 mS/cm | 1,0 % FSR | 10 µS/cm | | Process water |
| 0 ... 3 mS/cm | 1,0 % FSR | 600 µS/cm | Food & Beverage | Drinking water |
| 0 ... 5 mS/cm | 1,0 % FSR | | | Beer |
| 0 ... 10 mS/cm | 1,0 % FSR | | | Milk |
| 0 ... 20 mS/cm | 1,0 % FSR | Orange juice | | |
| 0 ... 30 mS/cm | 1,0 % FSR | Apple juice | | |
| 0 ... 50 mS/cm | 1,0 % FSR | 10 mS/cm | Process | Phosphoric acid |
| 0 ... 100 mS/cm | 1,0 % FSR | 100 mS/cm | | Hydrochloric acid |
| 0 ... 200 mS/cm | 1,0 % FSR | 1000 mS/cm | | Sodium hydroxide |
| 0 ... 300 mS/cm | 1,0 % FSR | | | |
| 0 ... 500 mS/cm | 1,0 % FSR | | | |
| 0 ... 1000 mS/cm | 1,5 % FSR | | | |



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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 |

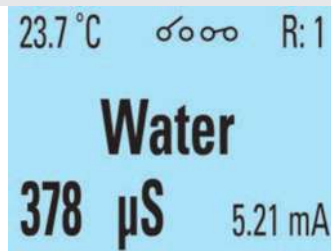
Relays

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

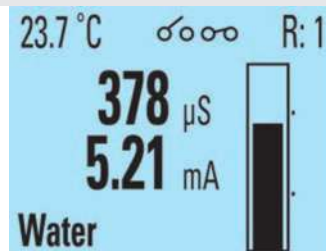
Selectable display views



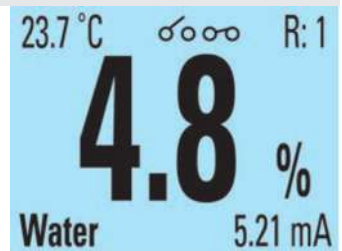
Conductivity value with medium and additional values



Medium with additional values



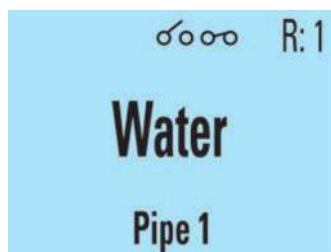
Bar chart with additional values and medium



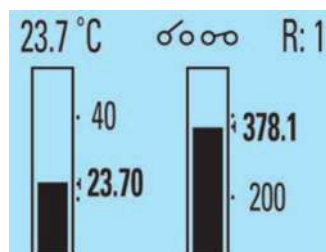
Concentration with additional values and medium



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

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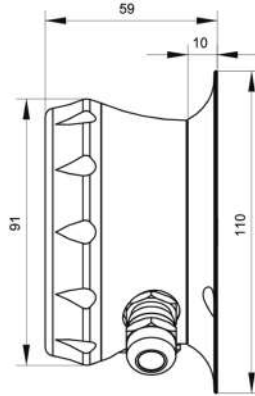
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Dimensional drawings

Housing



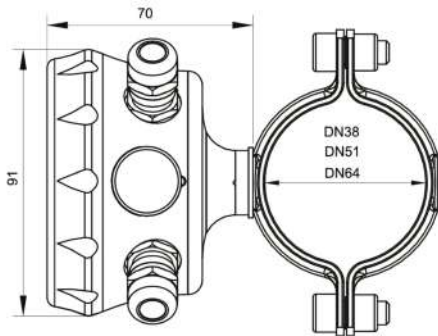
FlexHousing, wall mounting, front view



FlexHousing, wall mounting, side view



FlexHousing, pipe mounting, front view



FlexHousing, pipe mounting, side view

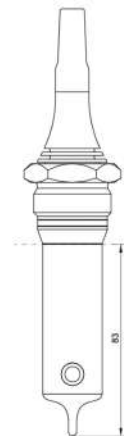
Process connection



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



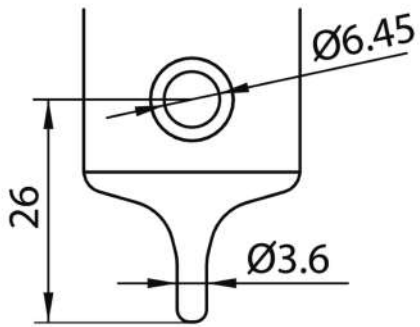
G 1 A hygienic (BCID: A04), PEEK, 60 mm



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

Dimensional drawings

Process connection



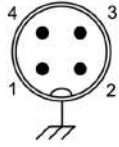
Sensor tip with integrated Pt100 sensor element

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Electrical connection

M12-A, 4-pin

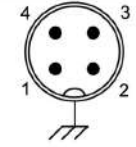


Left side connection

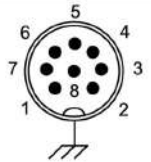


Right side connection

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 |

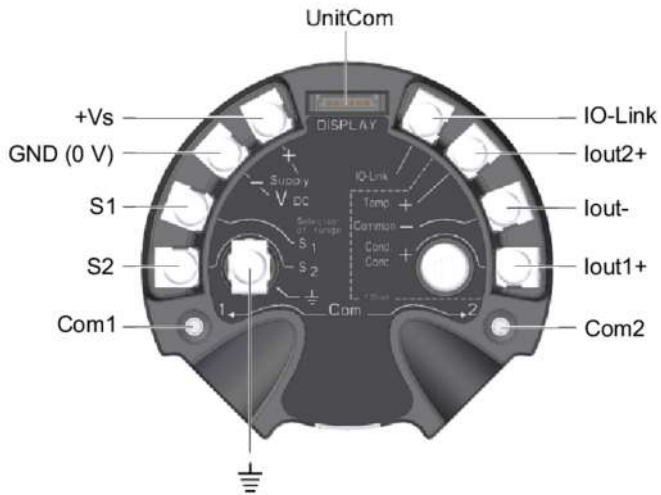
lout- is internally connected as common for both Conductivity/Concentration and Temperature output.

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Electrical connection

Terminal assignment transmitter

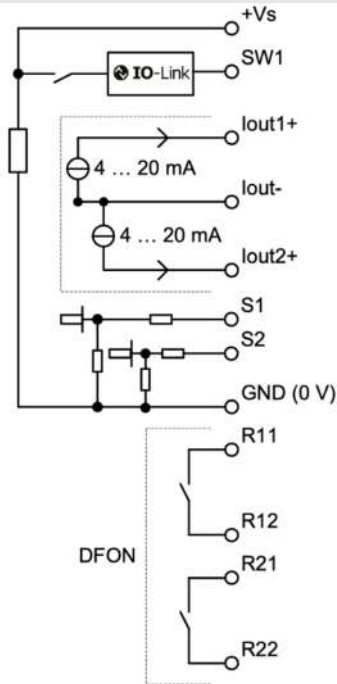


Terminal assignment DFON display



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

Replacement switching diagram



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Ordering information

Ordering key - Configuration possibilities see website

| | AFI | 5 | - | # | # | # | # | . | # | 0 | # | 2 | . | 0 | # | # | # |
|--|-----|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Product | AFI | | | | | | | | | | | | | | | | |
| Type | | | | | | | | | | | | | | | | | |
| Split version | | 5 | | | | | | | | | | | | | | | |
| Housing | | | | | | | | | | | | | | | | | |
| Wall mounting | | | | | | | | | | | | | | | | | A |
| Pipe mounting DN38 | | | | | | | | | | | | | | | | | C |
| Pipe mounting DN51 | | | | | | | | | | | | | | | | | D |
| Pipe mounting DN64 | | | | | | | | | | | | | | | | | E |
| Electrical connection | | | | | | | | | | | | | | | | | |
| 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 |
| Material of el. connection | | | | | | | | | | | | | | | | | |
| Plastic | | | | | | | | | | | | | | | | | 1 |
| Stainless steel, AISI 304 (1.4301) | | | | | | | | | | | | | | | | | 3 |
| Cable length (cm) | | | | | | | | | | | | | | | | | |
| Sensor cable 250 cm | | | | | | | | | | | | | | | | | 1 |
| Sensor cable 500 cm | | | | | | | | | | | | | | | | | 2 |
| Sensor cable 1000 cm | | | | | | | | | | | | | | | | | 3 |
| Display | | | | | | | | | | | | | | | | | |
| Without display | | | | | | | | | | | | | | | | | 1 |
| With display, with activated relays | | | | | | | | | | | | | | | | | 4 |
| Safety | | | | | | | | | | | | | | | | | |
| Standard | | | | | | | | | | | | | | | | | 0 |
| Configuration | | | | | | | | | | | | | | | | | |
| No configuration | | | | | | | | | | | | | | | | | 0 |
| Configuration of range | | | | | | | | | | | | | | | | | 1 |
| Configuration of range + display incl. 2 relays | | | | | | | | | | | | | | | | | 3 |
| Output | | | | | | | | | | | | | | | | | |
| 2 x 4...20 mA | | | | | | | | | | | | | | | | | 2 |
| Version | | | | | | | | | | | | | | | | | |
| Standard | | | | | | | | | | | | | | | | | 0 |
| Process connection | | | | | | | | | | | | | | | | | |
| 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 |
| Approvals | | | | | | | | | | | | | | | | | |
| Standard approvals | | | | | | | | | | | | | | | | | 0 |
| 3-A / EHEDG | | | | | | | | | | | | | | | | | 1 |
| 3-A | | | | | | | | | | | | | | | | | 2 |

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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 |