**APPLICATIONS**

- Water and wastewater engineering
- Oil and gas industry
- Chemical industry
- Energy production/industry
- Paper and pulp industry
- Metal industry
- Mechanical engineering

**SPECIAL FEATURES**

- High degree of accuracy
- Extremely simple operation
- State-of-the-art diagnosis for empty pipe detection
- Simpler and quicker fault rectification thanks to diagnosis-based help texts
- Digital communication via HART protocol (standard) or PROFIBUS-PA (option)
- Nominal pressure: PN 10, 16, 40,CL150, CL300
- Process connection: flange according to DIN/EN, ASME
- Lining: hard rubber, PTFE,PFA
- Medium temperature: up to 150 °C

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## Description

General information
The FTI flow FB100 was developed with particular consideration for the growing requirements that are placed on modern flowmeters. The modular device concept offers flexibility, cost-effective operation, and excellent reliability with a long operating life and minimal maintenance costs.

Sensor
Self-cleaning, double-sealing polished measuring electrodes increase the reliability and measurement performance of the device.
The high excitation frequency of the sensor means that the FTI flow FB100 has a fast response time as a flow metering system. State-of-the-art filter methods that separate the measurement signal from the interference signal enable precise measurement with outstanding accuracy even under difficult conditions (max. measurement deviation 0.25 % of the measured value).

Diagnostics functions
State-of-the-art diagnostics functions such as "empty pipe detection" and "sensor measurement" monitor the functional capability of the device and the process.
The limit values for the diagnosis parameters can be adjusted on-site. If these limit values are exceeded, an alarm is issued.
The diagnosis data can be extracted via a state-of-the-art Device Type Manager (DTM) for further analysis. Critical states can therefore be detected at an early stage and countermeasures can be taken.
This enables higher productivity and avoids down times.
In the event of a fault, a diagnosis-based help text is displayed which makes it significantly easier and quicker to rectify the fault. This provides maximum process reliability.

Telephone: +1 302 300 1919 • Fax: +1 302 300 1619
mail:sales@ftisensors.com FTI .Inc
1013 Centre Road, Suite 403S Wilmington, DE 19805
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Operation
The parameters pre-set in the plant are changed via the user-friendly display and noncontact operating buttons – quickly and easily without the need to open the housing. The easy setup function also guides inexperienced users smoothly through the configuration, step by step.

Device version
The FTI flow FB100 is available in a compact and remote mount design type.
Compact: sensor and transmitter form one mechanical unit.
Remote mount: sensor and transmitter are placed in separate housings.
The housings are available as single-compartment or dual-compartment housings, depending on the requirements concerning the Exprotection type.

Transmitter
The back-lit display can be turned without additional tools. The contrast is adjustable and the display is fully configurable. The size of the characters, the number of lines, and the resolution of the display (decimal points) are variable.
In multiplex mode, several display appearances can be flexibly preconfigured and called up in succession.
The intelligent module design of the transmitter slot enables simple dismantling without unscrewing cables or removing connectors.
Whether it is for counting pulses (active or passive), 20 mA (active or passive), status output (active or passive) – the universal transmitter always offers the right signal. The HART protocol is standard here.
Alternatively to the HART® protocol

# Technical data

## Design

### FTI flow FB100 series– compact design

| **FB100** | **FB100** |
|---|---|
| **Transmitter:** single-compartment housing<br>**sensor:**<br>Steel housing<br> | Aluminum housing<br> |
| | |



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mail:sales@ftisensors.com FTI .Inc
1013 Centre Road, Suite 403S Wilmington, DE 19805
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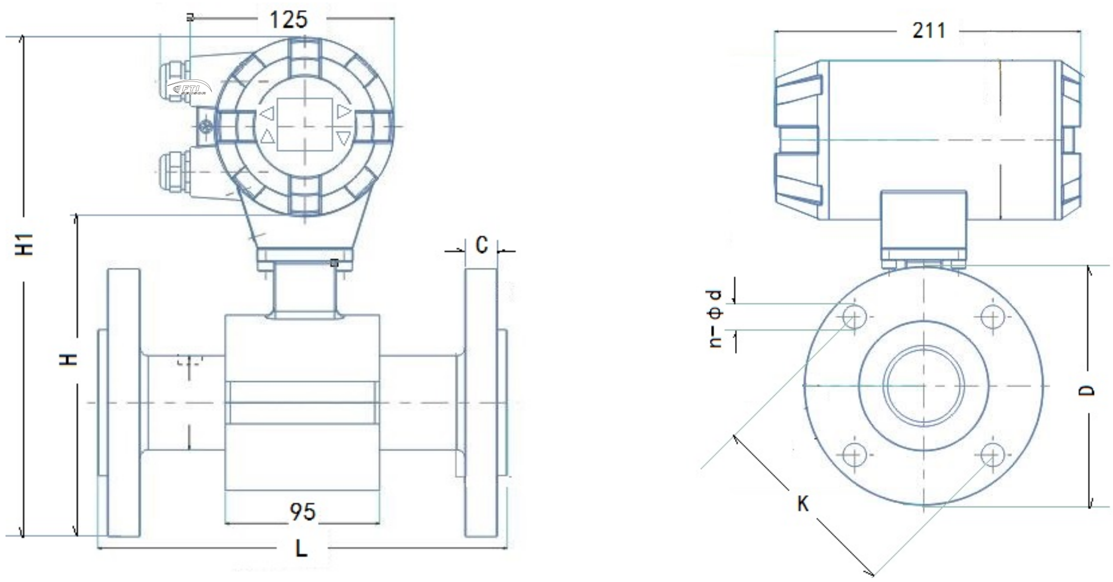
## Dimension Drawing




| DN | L (mm) | H | H1 | H2 | D | K | n-Φd | C | （Mpa） | (kg) |
|---|---|---|---|---|---|---|---|---|---|---|
| 10 | 160 | 120 | 260 | 202 | 90 | 60 | 4-Φ14 | 14 | 4.0 | 4.6 |
| 15 | 160 | 125 | 265 | 207 | 95 | 65 | 4-Φ14 | 14 | | 4.8 |
| 20 | 160 | 135 | 275 | 217 | 105 | 75 | 4-Φ14 | 16 | | 5.4 |
| 25 | 160 | 145 | 285 | 227 | 115 | 85 | 4-Φ14 | 16 | | 6.2 |
| 32 | 160 | 165 | 305 | 247 | 140 | 100 | 4-Φ18 | 18 | | 7.2 |
| 40 | 200 | 175 | 315 | 257 | 150 | 110 | 4-Φ18 | 18 | | 8.3 |
| 50 | 200 | 190 | 330 | 272 | 165 | 125 | 4-Φ18 | 20 | | 10 |
| 65 | 200 | 210 | 350 | 292 | 185 | 145 | 4-Φ18 | 20 | 1.6 | 10.5 |
| 80 | 200 | 225 | 365 | 307 | 200 | 160 | 8-Φ18 | 20 | | 11.4 |
| 100 | 250 | 252 | 392 | 334 | 235 | 180 | 8-Φ18 | 22 | | 14.5 |
| 125 | 250 | 275 | 415 | 357 | 250 | 210 | 8-Φ18 | 22 | | 17.5 |
| 150 | 300 | 310 | 450 | 392 | 285 | 240 | 8-Φ22 | 24 | | 23 |
| 200 | 350 | 362 | 502 | 444 | 340 | 295 | 12-Φ22 | 26 | | 32 |
| 250 | 400 | 420 | 560 | 502 | 395 | 350 | 12-Φ22 | 26 | 1.0 | 44 |
| 300 | 500 | 470 | 610 | 552 | 445 | 400 | 12-Φ22 | 28 | | 56 |
| 350 | 500 | 525 | 665 | 607 | 500 | 460 | 16-Φ22 | 30 | | 71 |
| 400 | 600 | 590 | 730 | 672 | 565 | 515 | 16-Φ26 | 32 | | 94 |
| 450 | 600 | 635 | 775 | 717 | 615 | 565 | 20-Φ26 | 35 | | 106 |
| 500 | 600 | 690 | 830 | 772 | 670 | 620 | 20-Φ26 | 38 | | 129 |
| 600 | 600 | 717 | 937 | 879 | 780 | 725 | 20-Φ30 | 42 | | 203 |
| 700 | 700 | 912 | 962 | 994 | 895 | 840 | 24-Φ30 | 30 | | 320 |
| 800 | 800 | 995 | 1045 | 1077 | 1010 | 950 | 24-Φ34 | 32 | | 450 |
| 900 | 900 | 1125 | 1175 | 1207 | 1110 | 1050 | 28-Φ34 | 34 | | 580 |
| 1000 | 1000 | 1135 | 1185 | 1217 | 1220 | 1160 | 28-Φ36 | 34 | | 700 |
| 1200 | 1200 | 1417 | 1467 | 1499 | 1405 | 1340 | 32-Φ33 | 60 | 0.6 | 900 |
| 1400 | 1400 | 1640 | 1690 | 1722 | 1630 | 1560 | 36-Φ36 | 68 | | 1150 |
| 1600 | 1600 | 1840 | 1890 | 1922 | 1830 | 1760 | 40-Φ36 | 76 | | 1450 |
| 1800 | 1800 | 2055 | 2105 | 2137 | 2045 | 1970 | 44-Φ39 | 84 | | 1780 |

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mail:sales@ftisensors.com FTI .Inc
1013 Centre Road, Suite 403S Wilmington, DE 19805
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| Model number | FB100 |
|---|---|
| Measured value deviation | Standard: 0.5 % of the measured value<br>Option: 0.25 % of the measured value |
| Nominal width range | DN 10 to 300 (3/8 to 12″) - Aluminium housing<br>DN 25 to 300 (1 to 12“) - Steel housing |
| Process connection | Flange according to DIN 2501/EN 1092-1, ASME B16.5 |
| Nominal pressure | PN 10, PN 16, PN 40, ASME CL150, ASME CL300 |
| Lining | Hard rubber: DN 15 to 300 (1/2 to12″) - Aluminium housing<br>Hard rubber: DN 40 to 300 (1 1/2 to12″) - Steel housing<br>PTFE: DN 10 to 300 (3/8 to 12″) - Aluminium housing<br>PTFE: DN 25 to 300 (1 to 12″) - Steel housing |
| Conductivity | > 5 μS/cm, (20 μS/cm for demineralized water) |
| Electrodes | Stainless steel, Hastelloy C, platinum-iridium, tantalum, titanium |
| Process connection material | Steel, stainless steel |
| Protection type | IP65, IP67 |
| Medium temperature | Hard rubber: -15 to +90 °C (-5 to +194 °F)<br>PTFE: -25 to +130 °C (-13 to +266 °F)<br>PFA: -15 to+180℃ (-13 to +356 °F) |
| **Approvals** | |
| Electromagnetic compatibility | 2004/108/EC – EMC 2014/30/EU – EMC |
| Communication | HART protocol (standard), PROFIBUS PA |
| **Transmitter** | |
| Voltage supply | AC 220 to 230 V (-15/+10 %), DC 24 V (-10/+10 %) |
| Current output | 4 to 20 mA active or passive |
| Pulse output | Active or passive can be set using software on-site |
| Switching output | Optocoupler, programmable function |
| Switching input | Optocoupler, programmable function |
| Display | Graphical display, adjustable |
| Housing | Compact design, available as single-compartment or dual-compartment housing, depending on the requirements concerning the Ex-protection |
| Communication | HART protocol (standard), PROFIBUS-PA (option) |
| Electrical safety | According to DIN EN 61010-1 |
| Electromagnetic compatibility | According to DIN EN 61326-1, DIN EN 61326-2-3 |

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mail:sales@ftisensors.com FTI .Inc
1013 Centre Road, Suite 403S Wilmington, DE 19805
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## Specification - general

### Reference conditions

**According to EN 29104**

| | |
|---|---|
| **Fluid temperature** | 20 °C (68 °F) ± 2 K |
| **Ambient temperature** | 20 °C (68 °F) ± 2 K |
| **Supply power** | Nominal voltage acc. to name plate<br>$U_n$ ± 1 %, frequency f ± 1 % |
| **Installation conditions** | - Upstream >10 x DN, straight section<br>- Downstream >5 x DN, straight section |
| **Warm-up phase** | 30 min. |

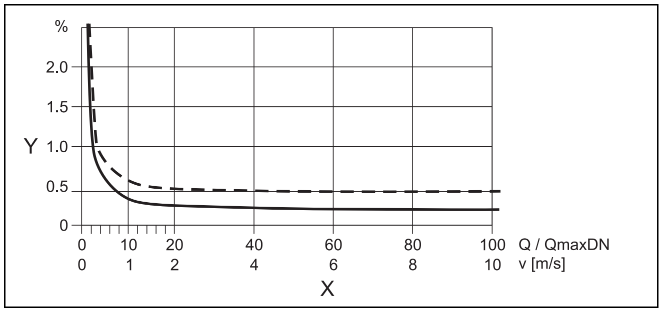

Fig. 1

Y Accuracy ± of measured value in [%]
X Flow velocity v in [m/s], Q / $Qmax_{DN}$ [%]

### Maximum measuring error

**Impulse output**

- Standard calibration:
  ± 0.4 % of measured value,
  ± 0.02 % $Qmax_{DN}$ (DN 3 … 2000)
- Optional calibration:
  ± 0.2 % of measured value,
  ± 0.02 % $Qmax_{DN}$ (DN 10 … 600, 800)

### Nominal width and measuring range

The measuring range end value can be configured between 0.02x$Q_{max}$DN and 2x$Q_{max}$DN.

| Nominal width | | Minimum measuring range end value | $Q_{max}$DN | Maximum measuring range end value |
|---|---|---|---|---|
| **DN** | **Inch "** | **0.02x$Q_{max}$DN (≈ 0.2 m/s)** | **0 to ≈ 10 m/s** | **2x$Q_{max}$DN (≈ 20 m/s)** |
| 10 | 3/8 | 0.9 l/min (0.24 US gal/min) | 45 l/min (11.9 US gal/min) | 90 l/min (23.78 US gal/min) |
| 15 | 1/2 | 2 l/min (0.53 US gal/min) | 100 l/min (26.4 US gal/min) | 200 l/min (52.8 US gal/min) |
| 20 | 3/4 | 3 l/min (0.79 US gal/min) | 150 l/min (39.6 US gal/min) | 300 l/min (79.3 US gal/min) |
| 25 | 1 | 4 l/min (1.06 US gal/min) | 200 l/min (52.8 US gal/min) | 400 l/min (106 US gal/min) |
| 32 | 1 1/4 | 8 l/min (2.11 US gal/min) | 400 l/min (106 US gal/min) | 800 l/min (211 US gal/min) |
| 40 | 1 1/2 | 12 l/min (3.17 US gal/min) | 600 l/min (159 US gal/min) | 1200 l/min (317 US gal/min) |
| 50 | 2 | 1.2 $m^3$/h (5.28 US gal/min) | 60 $m^3$/h (264 US gal/min) | 120 $m^3$/h (528 US gal/min) |
| 65 | 2 1/2 | 2.4 $m^3$/h (10.57 US gal/min) | 120 $m^3$/h (528 US gal/min) | 240 $m^3$/h (1057 US gal/min) |
| 80 | 3 | 3.6 $m^3$/h (15.9 US gal/min) | 180 $m^3$/h (793 US gal/min) | 360 $m^3$/h (1585 US gal/min) |
| 100 | 4 | 4.8 $m^3$/h (21.1 US gal/min) | 240 $m^3$/h (1057 US gal/min) | 480 $m^3$/h (2113 US gal/min) |
| 125 | 5 | 8.4 $m^3$/h (37 US gal/min) | 420 $m^3$/h (1849 US gal/min) | 840 $m^3$/h (3698 US gal/min) |
| 150 | 6 | 12 $m^3$/h (52.8 US gal/min) | 600 $m^3$/h (2642 US gal/min) | 1200 $m^3$/h (5283 US gal/min) |
| 200 | 8 | 21.6 $m^3$/h (95.1 US gal/min) | 1080 $m^3$/h (4755 US gal/min) | 2160 $m^3$/h (9510 US gal/min) |
| 250 | 10 | 36 $m^3$/h (159 US gal/min) | 1800 $m^3$/h (7925 US gal/min) | 3600 $m^3$/h (15850 US gal/min) |
| 300 | 12 | 48 $m^3$/h (211 US gal/min) | 2400 $m^3$/h (10567 US gal/min) | 4800 $m^3$/h (21134 US gal/min) |



Telephone: +1 302 300 1919 • Fax: +1 302 300 1619
mail:sales@ftisensors.com FTI .Inc
1013 Centre Road, Suite 403S Wilmington, DE 19805
www.ftisensors.com

# Sensor

## Temperatures

The temperature range of the device depends on various factors. These factors include the medium temperature, the ambient temperature, the operating pressure, the lining material, and the approvals for the Ex-protection.

## Storage temperature

-40 to +70 °C (-40 to +158 °F)

## Minimum admissible pressure depending on the medium temperature

**Sensor housing made of aluminum (shell housing)**

| Lining | Nominal width | $p_{operating}$abs | at $T_{operating}$ [a] |
|---|---|---|---|
| Hard rubber | DN 15 to 300 (1/2 to 12″) | 0 mbar | < 90 °C (194 °F) |
| PTFE | DN 10 to 300 (3/8 to 12″) | 270 mbar | < 20 °C (68 °F) |
| | | 400 mbar | < 100 °C (212 °F) |
| | | 500 mbar | < 130 °C (266 °F) |

[a] Higher temperatures are admissible for CIP/SIP cleaning for a limited time (see table „Maximum admissible cleaning temperature “, page 9).

**Sensor housing made of steel**

| Lining | Nominal width | $p_{operating}$abs | at $T_{operating}$ [a] |
|---|---|---|---|
| Hard rubber | DN 40 to 300 (1 1/2 to 12″) | 600 mbar | < 80 °C (176 °F) |
| PTFE | DN 25 to 300 (1 to 12″) | 270 mbar | < 20 °C (68 °F) |
| | | 400 mbar | < 100 °C (212 °F) |
| | | 500 mbar | < 130 °C (266 °F) |

[a] Higher temperatures are admissible for CIP/SIP cleaning for a limited time (see table „Maximum admissible cleaning temperature “, page 9).

## Maximum admissible cleaning temperature

| CIP cleaning | Lining Sensor | $T_{max}$ | $T_{max}$ minutes | $T_{Amb}$ |
|---|---|---|---|---|
| Steam cleaning | PTFE | 150 °C (302 °F) | 60 | 25 °C (77 °F) |
| Liquids | PTFE | 140 °C (284 °F) | 60 | 25 °C (77 °F) |

If the ambient temperature is > 25 °C, the difference must be subtracted from the max. cleaning temperature. $T_{max}$ - Δ °C.

(Δ °C = $T_{Amb}$ - 25 °C)



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1013 Centre Road, Suite 403S Wilmington, DE 19805
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## Maximum ambient temperature depending on the medium temperature

| Compact design | | | | | |
|---|---|---|---|---|---|
| **Lining** | **Flange material** | **Ambient temperature** | | **Medium temperature** | |
| | | **Minimum** | **Maximum** | **Minimum** | **Maximum** |
| Hard rubber | Steel | -10 °C (14 °F) | 60 °C (140 °F) | -10 °C (14 °F) | 90 °C (194 °F) |
| Hard rubber | Stainless steel | -15 °C (5 °F) | 60 °C (140 °F) | -15 °C (5 °F) | 90 °C (194 °F) |
| PTFE | Steel | -10 °C (14 °F) | 60 °C (140 °F)<br>45 °C (113 °F) | -10 °C (14 °F) | 90 °C (194 °F)<br>130 °C (266 °F) |
| PTFE | Stainless steel | -20 °C (-4 °F) | 60 °C (140 °F)<br>45 °C (113 °F) | -25 °C (-13 °F) | 90 °C (194 °F)<br>130 °C (266 °F) |

| Remote mount design | | | | | |
|---|---|---|---|---|---|
| **Lining** | **Nominal width** | **Ambient temperature** | | **Medium temperature** | |
| | | **Minimum** | **Maximum** | **Minimum** | **Maximum** |
| Hard rubber | Steel | -10 °C (14 °F) | 60 °C (140 °F) | -10 °C (14 °F) | 90 °C (194 °F) |
| Hard rubber | Stainless steel | -15 °C (5 °F) | 60 °C (140 °F) | -15 °C (5 °F) | 90 °C (194 °F) |
| PTFE | Steel | -10 °C (14 °F) | 60 °C (140 °F) | -10 °C (14 °F) | 130 °C (266 °F) |
| PTFE | Stainless steel | -25 °C (-13 °F) | 60 °C (140 °F) | -25 °C (-13 °F) | 130 °C (266 °F) |

## Protection type according to EN 60529

| | |
|---|---|
| Compact design (internal transmitter) | IP65, IP67 |
| Remote mount design (external transmitter) | IP65, IP67 |

## Pipeline vibration according to EN 60068-2-6

Valid for:

| | |
|---|---|
| Compact design<br>(With aluminum transmitter housing) | In the range 10 to 58 Hz max. 0.15 mm (0.006″) amplitude<br>In the range 58 to 150 Hz max. 2 g acceleration |
| Remote mount design<br>(Sensor) | In the range 10 to 58 Hz max. 0.15 mm (0.006″) amplitude<br>In the range 58 to 150 Hz max. 2 g acceleration |

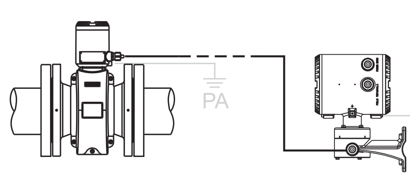
## Insertion length

The flanged devices comply with the insertion lengths specified according to VDI/VDE 2641, ISO 13359 or according to DVGW (work sheet W420, design WP, ISO 4064 short).

## Signal cable length and preamplifier

For devices in the remote mount design, the electrical connection between the transmitter and sensor is made via a signal cable.

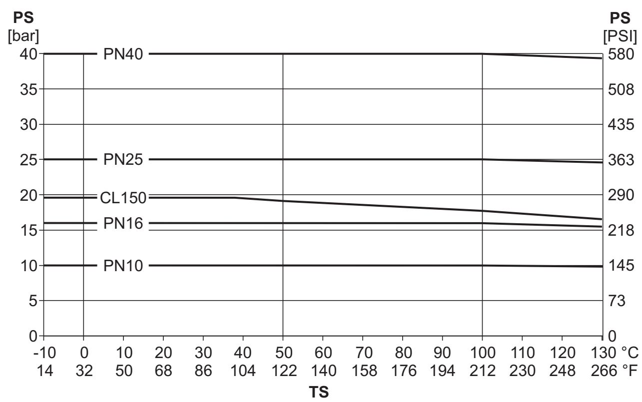
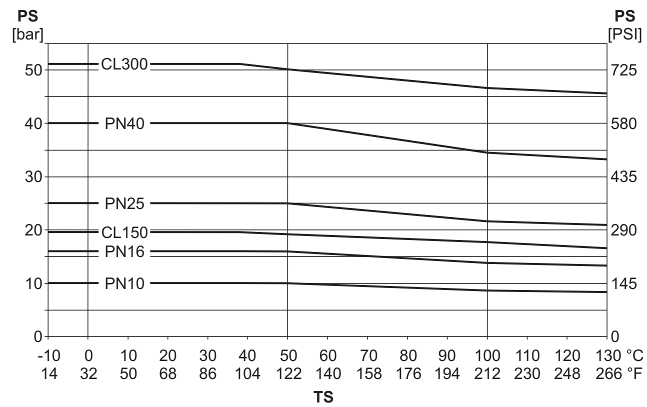
| | |
|---|---|
| **Transmitter housing design** | Dual-compartment housing |
| **Maximum signal cable length**<br>Without preamplifier<br>With preamplifier | <br>10 m (164 ft)<br>- |
| **Scope of delivery** | 10 m (32.8 ft) permanently installed |
| | |




Telephone: +1 302 300 1919 • Fax: +1 302 300 1619
mail:sales@ftisensors.com FTI .Inc
1013 Centre Road, Suite 403S Wilmington, DE 19805
www.ftisensors.com

## Material load – sensor housing (steel)

Limits for the admissible fluid temperature (TS) and admissible pressure (PS) are determined by the used liner and flange materials of the device (see device nameplate).

| Cast steel housing DN 25 (1") to 300 (12") | Welded steel housing DN 25 (1") to 300 (12") |
|---|---|
|  |  |





# Transmitter

## Electrical properties

| | |
|---|---|
| Voltage supply | AC 100 to 230 V (-15 %/+10 %)<br>AC 24 V (-30 %/+10 %)<br>DC 24 V (-30 %/+30 %), harmonics < 5 % |
| Supply frequency | 47 to 64 Hz |
| Excitation frequency | 6.25 HZ, 7.5 Hz, 12.5 Hz, 15 Hz, 25 Hz, 30 Hz<br>(50/60 Hz voltage supply) |
| Power consumption | Sensor including transmitter<br>AC S ≤ 20 VA (switch-on current 8.8 A at AC 230 V)<br>DC P ≤ 12 W (switch-on current 5.6 A) |
| Electrical connection | Screw terminals (maximum 2.5 mm² – AWG 14) |

## Empty pipe detection

**Requirements for the function:**

- Conductivity of the medium to be measured of ≥ 20 μS/cm
- Signal cable length of ≤ 50 m (164 ft)
- Sensor without preamplifier
- Nominal width DN ≥ DN 10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mail:sales@ftisensors.com FTI .Inc
1013 Centre Road, Suite 403S Wilmington, DE 19805
www.ftisensors.com

### Mechanical features

| | |
|---|---|
| **Compact design** | |
| Housing | Aluminum casting, painted |
| Paint | Paint coat ≥ 80 µm thick |
| Cable fitting | Polyamide |
| **Remote mount design** | |
| Housing | Aluminum casting, painted |
| Paint | Paint coat ≥ 80 µm thick |
| Cable fitting | Polyamide |
| Weight | 4.5 kg (9.92 lb) |

### Temperatures

| | |
|---|---|
| Storage temperature | -40 to +70 °C (-40 to +158 °F) |
| Ambient temperature | -20 to +60 °C (-4 to +140 °F) |

### Protection type

| | |
|---|---|
| Transmitter housing | IP65, IP67 |

### Vibration according to EN 60068-2

Valid for:

| | |
|---|---|
| Remote mount design | In the range 10 to 58 Hz max. 0.15 mm (0.006″) amplitude[a] |
| (Transmitter) | In the range 58 to 150 Hz max. 2 g acceleration[a] |

[a] = Peak load

# Mounting

## Grounding

The grounding of the sensor is important both for safety reasons and for the electromagnetic flowmeter to function properly. The grounding screws of the sensor should be connected to protection conductor potential. For measurement reasons, this should be identical to the medium potential as far as possible.

For plastic lines or pipelines with insulating lining, the grounding is via a grounding plate or grounding electrode. If the pipe section is not free from external interference voltages, it is recommended that one grounding plate is fitted in front of the sensor and one is fitted behind the sensor.

## Installation

### General information

- The measuring pipe must always be full.
- The flow direction must match the identification marking
- The maximum torque for all flange screws must be observed. These must be selected according to factors including temperature, pressure, screw and seal material, and the relevant regulations in each case.
- Install the devices without any mechanical tension (torsion, bending).
- Fit flange devices with plane-parallel counterflanges only using the appropriate seals.
- Use a flange seal made from a material that is compatible with the medium and the medium temperature.
- Seals may not extend into the flow area, since any turbulence affects the device accuracy.
- The pipeline must not exert any inadmissible forces or torque on the device.
- Only remove the sealing plugs in the cable fittings when installing the electrical cables.
- Install remote mount transmitters at a location that is largely free of vibration.
- Do not expose the transmitter to direct sunlight; provide sun protection if necessary.



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mail:sales@ftisensors.com FTI .Inc
1013 Centre Road, Suite 403S Wilmington, DE 19805
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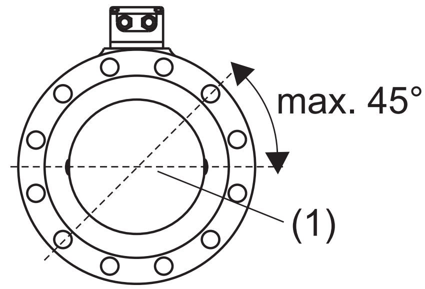
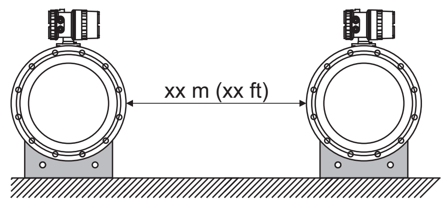
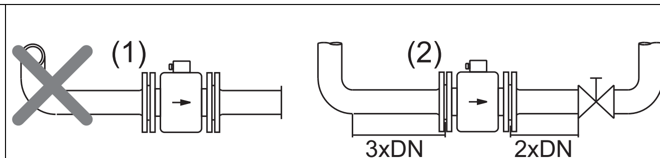
## Electrode axis

| | |
|---|---|
| • Electrode axis (1) horizontal if possible or rotated max. 45°. |  |

## Minimum clearance

| | |
|---|---|
| • Maintain a minimum clearance of 0.7 m (2.3 ft) between the devices to prevent any mutually interference. |  |

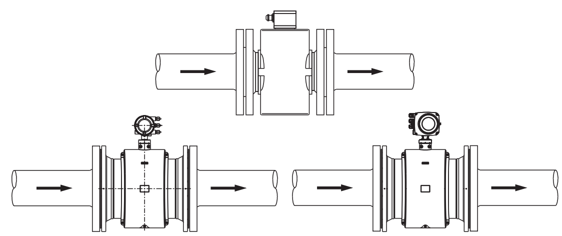
## Inlet section, outlet section

| | |
|---|---|
| The measuring principle is independent of the flow profile as long as turbulence does not extend into the measurement zone, e.g. downstream from double elbows (1), in case of tangential inflow or where gate valves are partially open upstream of the sensor.<br>In these cases, measures must be taken to normalize the flow profile.<br>• Do not install fittings, elbows or valves, etc. directly upstream of the sensor (1).<br>• Flaps must be installed so that the flap blade does not extend into the sensor.<br>• Valves or other shut-off devices should be mounted in the outlet section (2).<br>Experience has shown that a straight inlet section of 3 × DN and a straight outlet section of 2 × DN is sufficient in most cases (DN = nominal width of the transmitter – see the adjacent figure).<br>For test stands, the reference conditions of 10 × DN for the straight inlet and 5 × DN for the straight outlet must be provided according to EN 29104/ISO 9104. |  |

## Flow direction

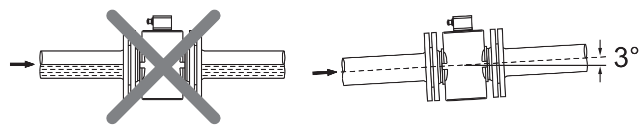
The device records the flow in both directions.
Default setting: forward flow direction
Identification marking:

- Arrow direction on the device
- Alignment of the sensor housing during initial startup (default setting) as displayed in the adjacent figures



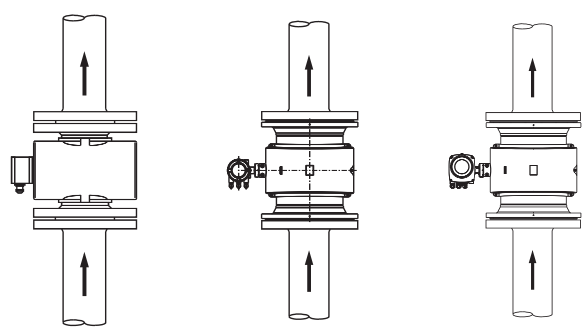
## Horizontal flow direction

- Measuring pipe must always be full.
- Ensure the line is slightly inclined for degassing.



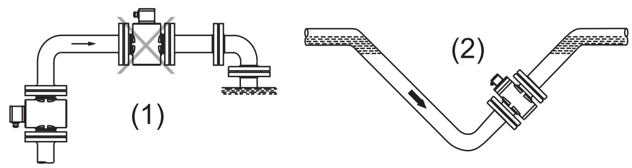

## Vertical flow direction

- Vertical installation for measuring abrasive substances, the preferred flow direction is from bottom to top.



## Free inlet, free outlet

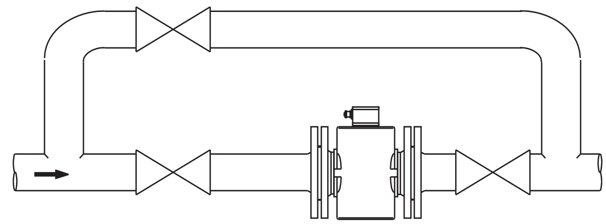
- For a free outlet, do not install the measuring device at the highest point or in the draining side of the pipeline, as the measuring pipe runs empty or air bubbles can form (1).
- For free inlets or outlets, provide a culvert (downward routing of the pipe) so that the pipeline is always full (2).



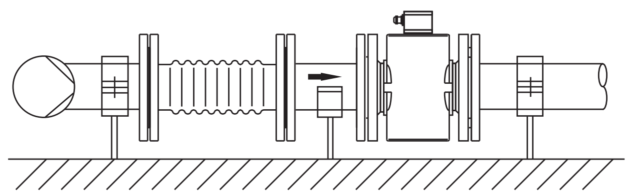



Telephone: +1 302 300 1919 • Fax: +1 302 300 1619
mail:sales@ftisensors.com FTI .Inc
1013 Centre Road, Suite 403S Wilmington, DE 19805
www.ftisensors.com

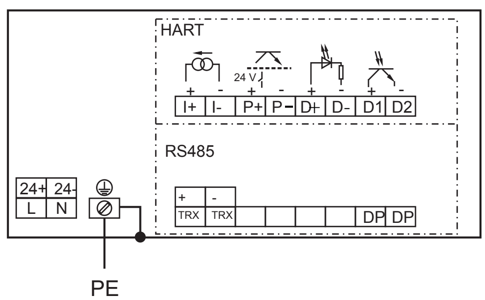
## Heavily contaminated measurement media

| | |
|---|---|
| • We recommend a bypass connection, according to the figure, for heavily contaminated media so that the system can continue operating without any interruptions during mechanical cleaning. |  |

## Installation near pumps

| | |
|---|---|
| • We recommend using mechanical vibration compensators for sensors that are installed near pumps or other equipment generating vibrations. |  |

# Electrical connection




**Voltage supply**

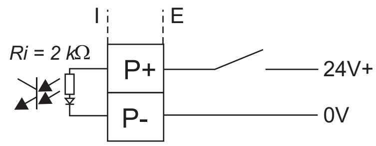
| Alternating voltage (AC) | | Direct voltage (DC) | |
|---|---|---|---|
| **Terminal** | **Function** | **Terminal** | **Function** |
| L<br>N | Phase<br>Neutral conductor | 24V+<br>24V- | +<br>- |
| PE | Protection conductor (PE) | PE | Protection conductor (PE) |

**Input and output connection**

| Terminal | Function |
|---|---|
| I+/I- | **Current/HART output** - The current output is available in "active" or "passive" mode. |
| TRX-/+ | RS485-/+ |
| P+/P- | **Digital output DO1 active/passive** - Function can be configured using software on-site as "Pulse output" or "Binary output". The default setting is "Pulse output". |
| D+/D- | Switch output |
| D1/D2 | **Digital output DO2 passive** - Function can be configured using software on-site as "Pulse output" or "Binary output". The default setting is "Binary output", flow direction signaling. |
| PE | **Functional ground** |

Telephone: +1 302 300 1919 • Fax: +1 302 300 1619
mail:sales@ftisensors.com FTI .Inc
1013 Centre Road, Suite 403S Wilmington, DE 19805
www.ftisensors.com

## Digital input DI1



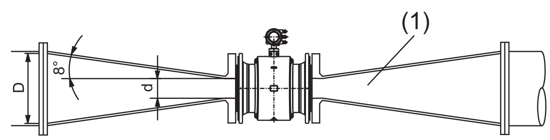

| | |
|---|---|
| Data of the optocoupler | 16 V ≤ U ≤ 30 V, $R_i$ = 2 kΩ |
| E.g. for external output switch-off or external totalizer reset | |

I = internal, E = external

## Installation in pipelines with larger nominal widths

Determine the resulting pressure loss when using reducers (1):

1. Determine the diameter ratio d/D
2. Refer to the flow nomograph for the flow velocity (adjacent figure).
3. Read the pressure loss on the Y-axis in the flow nomogram.



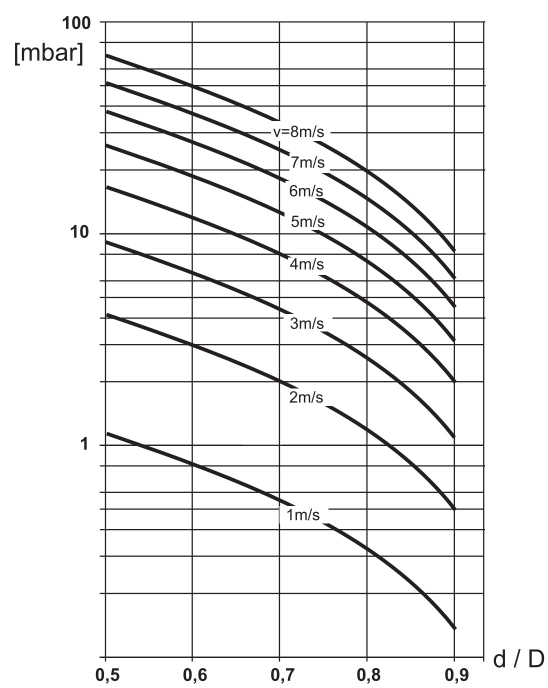

(1) Flange transition piece

(d) Inner diameter of the flowmeter

(D) Inner diameter of the pipeline

**Nomograph for pressure loss calculations**

For flange transition piece with α/2 = 8°




(V) Flow velocity [m/s]

(∆p) Pressure loss [mbar]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