

ABB MEASUREMENT & ANALYTICS | DATA SHEET

# AquaMaster4 FEW4 and FET4

## Electromagnetic flowmeter



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## **Measurement made easy**

The ideal flowmeter for potable water distribution networks, revenue metering and irrigation applications

### **Multiple measurement parameters**

- flow rate, flow velocity, volume flow (forward, reverse and net) and pressure (option)

### **Multiple power options**

- battery (with up to 10 years life), solar / wind renewable and AC mains

### **Wide range of sensor styles and size**

- reduced bore DN40 to 600, octagonal bore DN40 to 200, full bore DN250 to 2400 and probe 300 to 1000 mm

### **Ideal for arduous applications**

- IP68 for submersion and up to 5m buriable

### **Verification**

- in-situ diagnostics and self checking capabilities

### **Flexible communications**

- pulse, Modbus and Sensus with wireless interface to mobile smart phone / tablet

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## Applications

- Water supply in district / zonal metering area
- Revenue metering
- Leak monitoring in district / zonal metering area
- Survey and flow investigation
- Irrigation and abstraction

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## Additional product features

- In-situ diagnostics and self-checking capabilities
- High and low flowrate alarms
- Backward compatible with legacy AquaMaster sensors
- Drinking water certifications: WRAS, NSF, ACS, AS/NZS 4020
- Metrology certifications: OIML R49, MID MI-001, NMI R49 (pending)

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## Values to you

- Solution from the masters of flow measurement – in 1988, ABB invented and designed the world's first battery-powered electromagnetic flowmeter for DMA (District Metered Area)
- Invest smartly through 'single box' DMA solution – combining flow, pressure and data-logging
- Have greatest confidence in your billing based on highest accuracy with widest flow range revenue meter
- Get early warnings for leaks or bursts and reduce NRW (Non-Revenue Water) – highest confidence in night line performance
- Have highest confidence in the wet calibration – our flow rigs are certified by various national independent accredited bodies / laboratories all linked by the 'International Laboratory Accreditation Cooperation' (ILAC)
- Fit and flow with factory default settings. Use the ABB Velox mobile smart phone / tablet app to easily change configuration / settings to your preference
- Lowest total cost of ownership (TOTEX) over complete product lifecycle
- Maximum confidence in the health of the flow meter through the use of ABB's SRV500 in-situ verification tool

## Overview

### Multiple power options



2 x internal batteries (up to 10 years life)



Solar



Wind



AC mains

### Interactive phone / tablet app – simple and easy



Secured and easy



Contactless



Chart and retrieve data



Offline configuration



Easy firmware update

### Configurable features



In-built logger



Pressure measurement



Verification



### Communications options



Pulse output

MODBUS

Sensu protocol

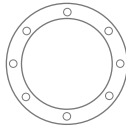
### Multiple sensor options



Reduced bore  
DN40 to 600



Octagonal bore  
DN40 to 200



Full bore  
DN250 to 2400



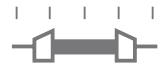
Probe  
300 to 1000 mm



### Measurement performance



Accuracy up to  $\pm 0.2\%$   
 $\pm 0.5$  mm/s whichever is greater



Range (R) up to R1000

### Drinking water approvals

NSF | WRAS | AS/NZS 4020 | DVGW | ACS

### Wide environmental conditions



IP68 to 10 m and up to 5 m buriable



-20 to 60 °C

Comparable to DIN ISO 12944  
Corrosion resistance









### Product type approvals (pending)

OIML R49 for accuracy class 1 and 2, MID MI-001, NMI R49 and NMI 10 and PAC for China

### Calibration rig approvals

ISO 17025 | UKAS | NATA | SIMT | NIST traceable

**Why is AquaMaster4 your first choice for distribution networks and revenue metering applications?**

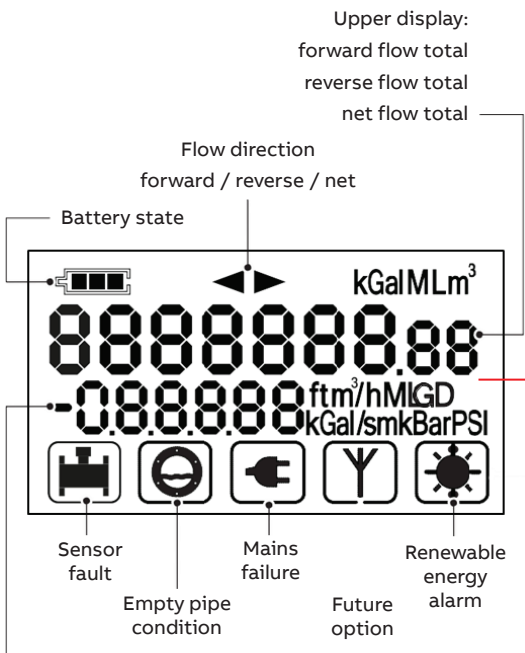
Your challenge	Our offering	Advantages for you
<p>Do you have confidence in your revenue meter and therefore in your water balance table?</p> 	<p>AquaMaster4 offers highest accuracy with a wide flow range. Our 0D upstream and downstream reduced bore sensor is virtually insensitive to hydraulic disturbances as it conditions the upstream fluid flow profile within the sensor’s central measuring zone giving superior performance; especially during the night when the flow rate is low.</p> <hr/> <p>The AquaMaster4’s in-built Data Logger runs at high speed, logging at a fast rate giving the user total flexibility to download (typically 15 minutes) logged data; then investigate, in precise detail, flow and pressure activity during a period of interest at even higher time resolution.</p> <hr/> <p>Such high resolution data facilitates step testing, leakage detection and water network analysis. The in-built logger delivers accuracies which are not possible when using an external data logger.</p>	<p>Increase in revenue for authorized water consumption and early warnings on leaks (non-revenue water)</p> 
<p>Do you want to reduce the cost for commissioning and interacting with the product?</p> 	<p>A free app (Velox) is available for use with Android and Windows smartphones and tablets. This supports simple configuration changes to made on your touchscreen color phone / tablet. Just touch to upload, then configure offline, touch again to update the AquaMaster4 configuration.</p> <hr/> <p>The logger contents can be downloaded as a file in industry-standard CSV format in the same manner. To ensure the product remains up-to-date with the latest features and enhancements, the firmware is updated using the Velox app.</p> <hr/> <p>‘Fit-and-Flow’ data storage inside AquaMaster4 eliminates the need to match a remote sensor with a transmitter in the field. On initial installation, the self-configuration sequence replicates all calibration factors, meter size and serial numbers, together with customer site-specific settings, into the transmitter automatically, eliminating the opportunity for error.</p>	<p>Increase productivity of your staff / contractor and eliminate poor quality through human error</p> 
<p>Do you want to have the lowest operational expenditure throughout the lifecycle of the product?</p> 	<p>Using 2 standard off-the-shelf ‘D’ lithium cells, the AquaMaster4 can be operated for up to 10 years.</p> <hr/> <p>Using a simple DC (6 to 22 V) connection from sources as small as a 5 W solar panel / wind generator, AquaMaster4 can be operated with green energy sources.</p> <hr/> <p>There is no longer any need for bespoke cables and laptops to connect to each transmitter.</p>	<p>Lower cost of ownership</p> 
	<p>In-situ self checking of flowmeter health enables the user to meet regulatory / technical requirements. In 1995 ABB invented and designed the world’s first in-situ verification system for electromagnetic flowmeters. Building on ABB’s fingerprint philosophy, each flow meter is verification tested before shipping from the factory. SRV500 enables the operator to choose whether to either use the factory fingerprint or, after product commissioning, to create a new fingerprint based on real site conditions.</p>	<p>Simplifies compliance to ISO 9001 traceability without any additional effort</p> 

### ...Overview

**Protective cover with wire to the contactless coupler**  
 The removable cover protects the transmitter display from accidental impact damage



**Wall-mount contactless coupler**  
 The wall mount coupler allows users to communicate easily using a mobile phone / tablet when the transmitter is located in inaccessible places (for example, a pit)



**Contactless communication**  
 Interacting with the transmitter is easily achieved with an Android / Microsoft smart phone / tablet over NFC



**IP68 connectors**  
 IP68 rated as standard, the transmitter can be fully-submerged for up to 2 meters

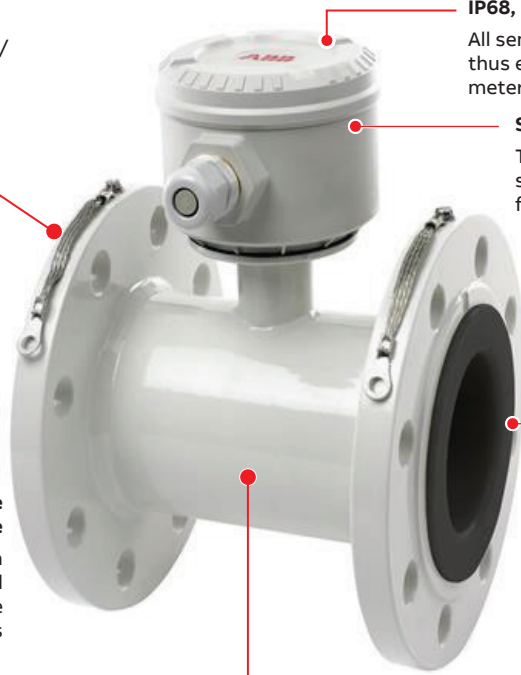
**Anti-tamper seal**  
 Secured against any tampering, meeting MID MI-001 regulations

**NFC tag for back-up**  
 All calibration settings are stored for easy access during in-field service. The remote mount version's settings are stored in the sensor

**Battery enclosure**  
 Enclosure for 2 off-the-shelf standard lithium batteries

**Range of flange options**

ISO 7005, DIN, EN 1092-1 PN10 / PN16 / PN25 / PN40  
 ANSI / ASME B16.5 / 16.47 series B Class 150 / Class 300  
 AWWA C207 Class B / D / E  
 AS 4087 PN16  
 AS2129 Table E  
 JIS 7.5K / 10K / 5K



**IP68, NEMA 6P**

All sensor types are, as standard, inherently submersible thus ensuring suitability for installation in chambers and metering pits that are prone to flooding

**Sensor memory**

The sensor stores all calibration factors, site settings and serial numbers enabling users to fit-and-flow

**Drinking water approvals**

NSF | WRAS | AS/NZS 4020 | DVGW | ACS

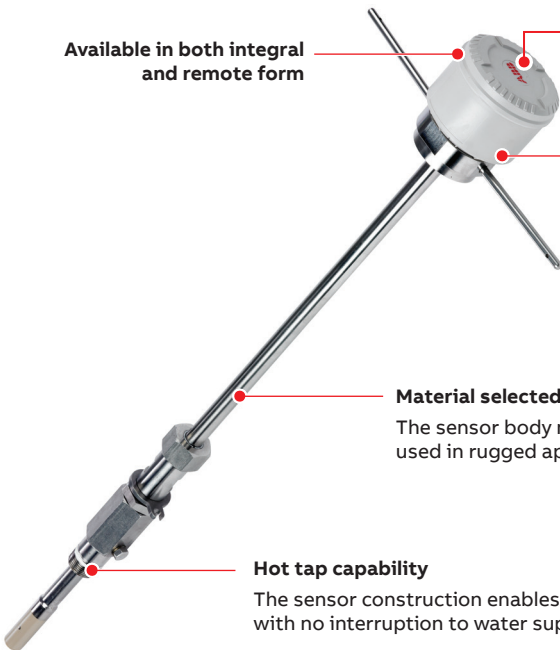
**EN ISO 12944 C4 grade comparable corrosion resistance**

Zinc-based primed with =70 µm (optional 300 µm) thick paint coat will give long lasting corrosion resistance even in arduous applications

**Upstream and downstream pipe length**

Reduced bore DN40 to 600 requires 0D upstream and downstream  
 Octagonal bore DN40 to 200 requires 5D upstream and 0D downstream  
 Full bore DN250 to 2400 requires 5D upstream and 2D downstream

Available in both integral and remote form



**IP68, NEMA 6P**

All sensor types are, as standard, inherently submersible thus ensuring suitability for installation in chambers and metering pits that are prone to flooding

**Sensor memory**

The sensor stores all calibration factors, site settings and serial numbers enabling users to fit-and-flow

**Material selected to last**

The sensor body material enables it to be used in rugged applications

**Hot tap capability**

The sensor construction enables installation with no interruption to water supply

## Calibration in ABB flow laboratory



Figure 1 ABB calibration rig – certificated by ISO, UKAS, NATA, SIMT and NIST traceable

ABB's flow calibration facilities are certified by various national independent accredited bodies / laboratories and these are all linked by the 'International Laboratory Accreditation Cooperation' (ILAC7).

Flowmeters in ABB's facilities can be calibrated by one of the following methods:

- gravimetric (using weigh scales)
- volumetric (using the meter prover)
- comparison (using reference meters)

Additionally, ABB's laboratories are checked against each other and against external accredited laboratories using transfer standard meters.

### Gravimetric

In this method, the flowmeter is calibrated in a pipeline, with water being pumped through it from a sump. A diverter valve situated downstream directs the flow from the meter either back to the sump or to a tank of sufficient capacity attached to a highly accurate weighing system.

### Volumetric

There are two main methods of volumetric calibration:

- Fixed volume volumetric tank method
  - This method works in a similar way to the gravimetric method, except that the flow from the meter is diverted into a tank of known volumetric capacity. This eliminates the need for a weighing system or to calculate the volume of water from its weight.

- Fixed volume ball meter prover
  - In this method, the diverter valve directs the flow from the meter into a meter prover. The prover is a precisely manufactured section of pipe containing a sphere that is three percent larger in diameter than the pipe. Two detector switches are situated in the pipe at a fixed distance apart. The volume of water that is contained in the pipe between the switches is known as the calibrated volume.

### Comparison

In this method, the flowmeter under calibration is installed in a pipeline in series with a reference, or master, flowmeter with a known calibration. Once the flow of water through both meters is stable, a timer is started and the outputs of both meters are simultaneously monitored. After a set period, the timer is stopped. Using the data from the calibration run enables the average flowrate of the meter under test to be compared with the master meter, with the difference being the error.

### Advantages of ABB's calibration rig

ABB has one of the largest calibration facilities in the world, capable of pumping 2.5 m<sup>3</sup>/s, enabling larger meters to be calibrated at high flowrates.

All of ABB calibration facilities are continuously pumped enabling a flowmeter to be calibrated at a steady flowrate (for example, over 300 or 600 seconds; or longer if required), to reduce a meter's random uncertainty errors during calibration.

ABB's high turndown flowmeters (those with a high R number) can be calibrated over an extended flow range, guaranteeing accurate flowmeter performance over its full operating range.



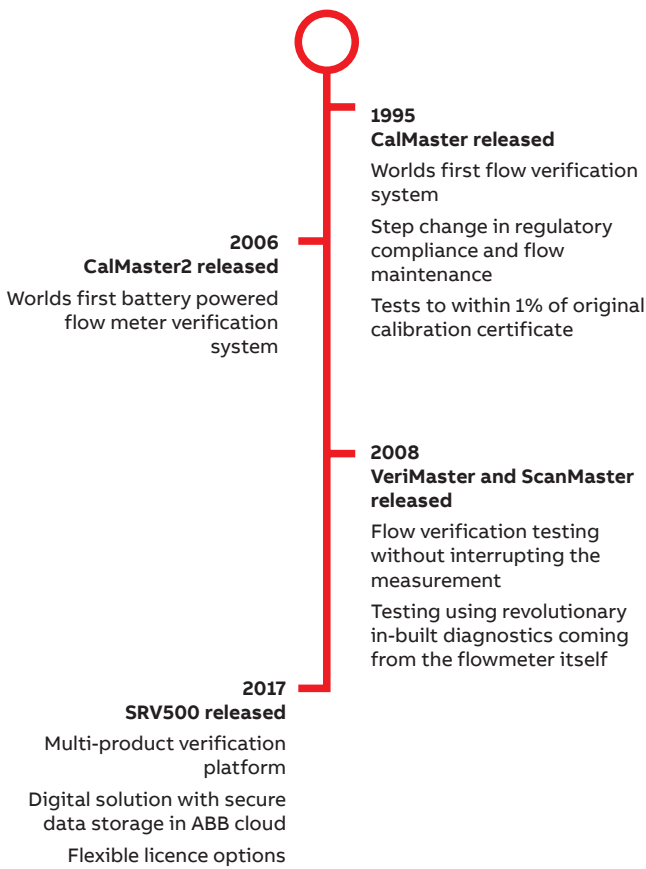
## Verification

### What is verification?

Verification is the inspection and testing of a product to establish that it meets regulatory / technical requirements. Industrial instrumentation is robust, very reliable and designed to operate for many years with minimal maintenance. In today's competitive environment customers are looking for ways to maximize their profitability, regular product verifications is one way to ensure processes continuously operate at their peak.

### The ABB verification story

Customers in the water and process industries have been able to save large sums of money thanks to ABB's innovations in product verification over the last two decades.



### Introducing SRV500

The next generation verification tool suite for use with ABB's complete range of active electronic flow meters. Download the software for free and use the instrument-specific test routine to provide the best possible check of product health, without stopping your process.

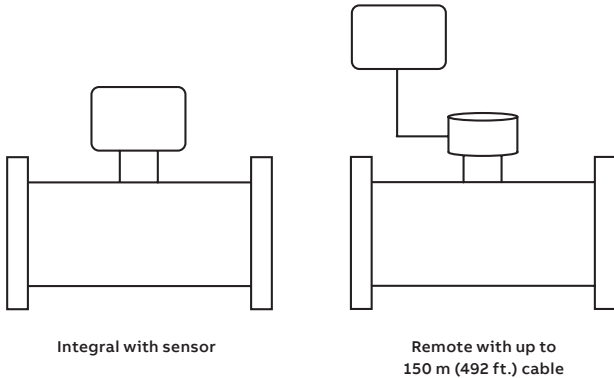
SRV500 verifies the condition and performance of the flow meter under test. With the licensed software version, test reports can be generated and stored locally for further analysis. SRV500 also analyzes the product internal diagnostics and compares the results with historical measurements.

Building on ABB's fingerprint philosophy, each flow meter is verification tested before shipping from the factory. SRV500 enables the operator to choose whether to use either the factory fingerprint or to create a new fingerprint based on real site conditions after product commissioning. All verifications performed in the field can then be compared with the fingerprint data and previous tests to ensure flow meter performance has not degraded.



## Specification – transmitter

### Mounting on flow sensor



### Power supply



Battery



AC mains



Solar



Wind

### Battery power

2 lithium thionyl chloride ‘D’ batteries

**Note.** The following batteries work with the product:

- SAFT LS33600 \*
- Eve ER34615 \*
- GB Cell ER34615
- cT-energy ER34615
- OmniCel ER34615
- GEBC ER34615
- LiYa ER34615
- Fanzo ER34615H

\* Preferred

### Nominal battery life

Reduced bore	DN40 to 80	10 years	7 years
	DN100 to 300	7 years	5 years
	DN350 to 600	4 years	3 years
Octagonal bore	DN40 to 200	10 years	7 years
Full bore	DN250 to 600	4 years	3 years
	DN700 to 2400	2 years	2 years
Probe	300 to 1000 mm	10 years	7 years

Test conditions:

- acquisition = 15 seconds
- pulse output = 2 Hz @ 2 ms
- alarm output on = 25 %
- logger rate = 1 minute
- no pressure
- integral verification self check = 15 minutes
- ambient temperature = 20 °C

Battery capacity and life are significantly shortened:

- when the operating environment temperature ranges between -20 and 0 °C or 50 and 70 °C (-4° and 32 °F or 122 and 158 °F)
- when data acquisition is less than 15 seconds
- when pulse output width > 2 ms and output frequency is set high
- with extended NFC interface use

### Mains supply (option – remote only)

- 85 to 240 V AC, 50 / 60 Hz @ <3 VA
- Mains connection cable: approx. 3 m (9.8 ft.)

### Internal backup power time for:

- DN40 to 200: 16 days
- DN250 to 600: 6 days
- DN700 to 2400: 3 days

### Renewable power (option)

- Solar or wind
- Input voltage: 6 to 22 V DC @ <5 W
- Max. current: 200 mA

### Internal backup time for:

- DN40 to 200: 48 days
- DN250 to 600: 18 days
- DN700 to 2400: 9 days

**Note.** Renewable energy generators do not operate at maximum capacity. For example, low wind speeds, dirty solar panels and shorter daylight periods all reduce capacity. Consequently, some installations may require generators with a capacity greater than the specified 5 W minimum.

### Inputs

- IP68 connectors, mains cable (remote only)
- Sensor cable (remote only). ABB sensor cable supplied as standard. SWA cable available (via adapter box) on application
- Pressure transducer connection (option)

### Configuration / User interface

ABB Velox app on a compatible tablet or smartphone. Operating systems of smartphone or tablet are Android (Kit Kat or newer) and Windows (10 mobile or newer). Functions of Velox app include configuration, diagnostics, logger data retrieval and transmitter flash update.

## Outputs

- Pulse / Alarm
- Modbus
- Sensus protocol

### Pulse outputs (option)

- Output 1: forward pulses
- Output 2: reverse pulses
- +35 V @ 20 mA solid state, unipolar
- Isolated with one common, shared with alarm output max. ±50 V to earth
- 50 Hz max., programmable pulse width, default 2 ms \*

\* Increasing pulse width beyond 2 ms at frequencies greater than 10 Hz reduces battery life

### Alarm outputs (option)

- Indicates any problem with measurement, power supply or flowrate alarm
- Bi-directional, solid state
- +35 V @ 50 mA
- Isolated with one common, shared with pulse outputs

### Automatic meter reading (AMR)

3-wire Sensus compatible

## Logger

Logger function	Flow and pressure	Forward, reverse, and net flow totals
No. of records	45871	3120
Logging interval *	15 seconds 30 seconds 1 minute 5 minutes 15 minutes (selectable)	24 hours (fixed)
Logger capacity	31 days @ 1 minute 477 days @ 15 minutes	8 years

\* Based on a default 15 second measurement rate when operating on battery or renewable power

Retrieval of logger data file via smartphone / tablet – see **Configuration / User interface** on page 10

### Logger data file format

- .csv for easy import into databases / spreadsheets
- Time-stamped records with flow, pressure and totalizers in user-configured units of measurement

### Response time (programmable)

- >0.1 second (mains-powered)
- 15 seconds (battery-powered + external renewable energy)

## Environmental and operating conditions

### Ingress rating

IP68 (NEMA 6P), <2m (6 ft.)

### Submerged

9 months accrued time

### Humidity

0 to 100 %

### Temperature ranges

Storage: -20 to 60 °C (-4 to 140 °F)

Ambient: -20 to 60 °C (-4 to 140 °F)

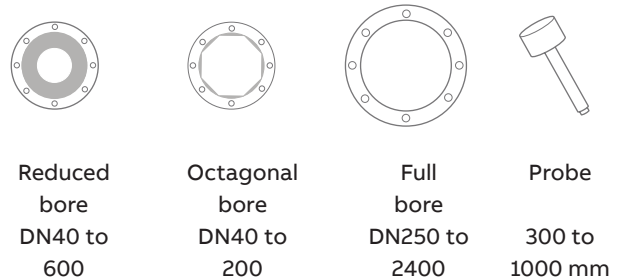
## Transmitter vibration

### IEC 60068-2-6 (2007)

Vibration level 2g

## Options and certifications

### Compatible sensor styles



### External pressure transducer (option)

10, 16, 20 and 40 bar absolute

### Backward compatibility (option)

- Full compatibility with legacy AquaMaster remote sensors. Plugs directly into AquaMaster 4 with no specific configuration required.

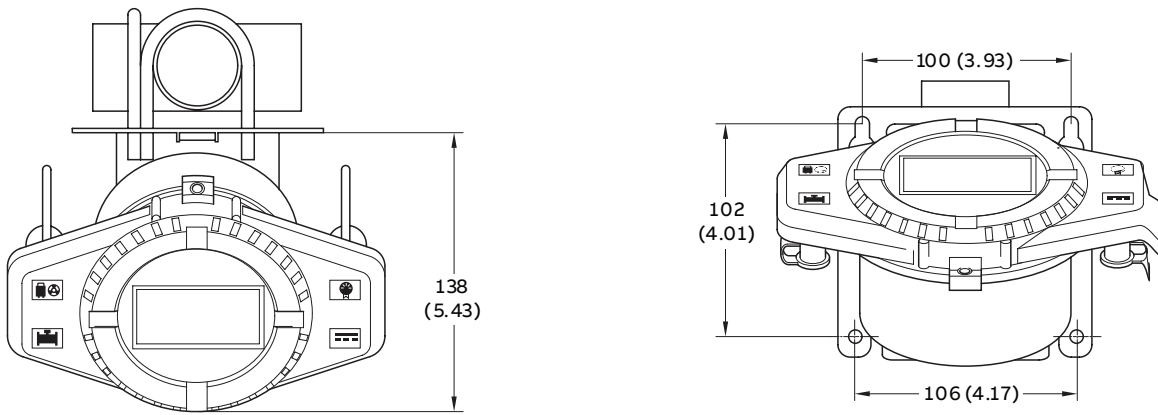
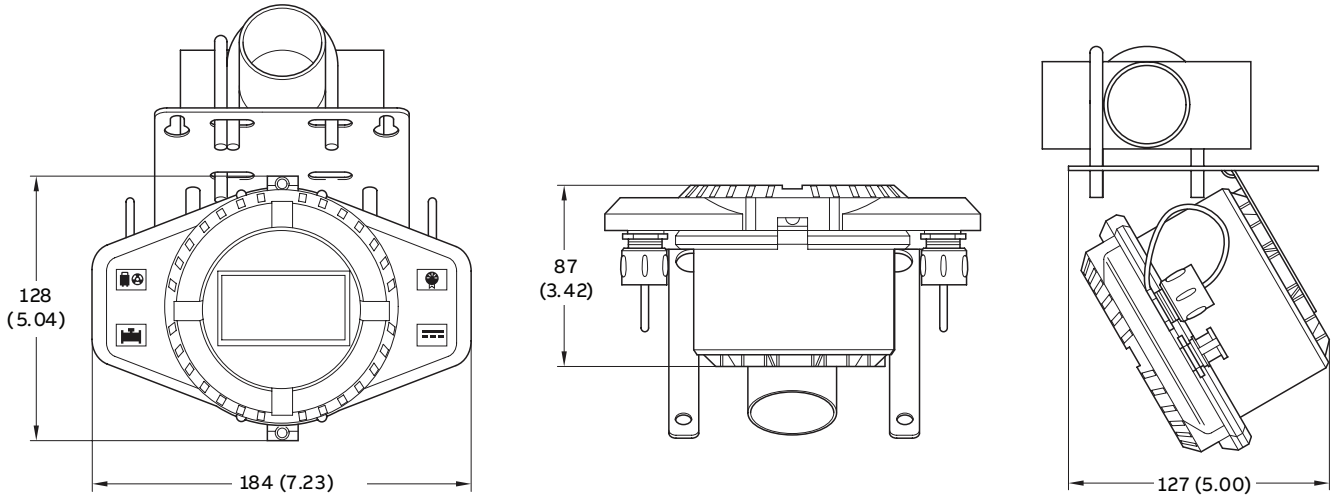
### MID / Tamper detection (option) (approval pending)

- Switch selectable inside the tamper-evident, seal-protected enclosure
- Prevents changes to meter configuration that affect the meter / output accuracy

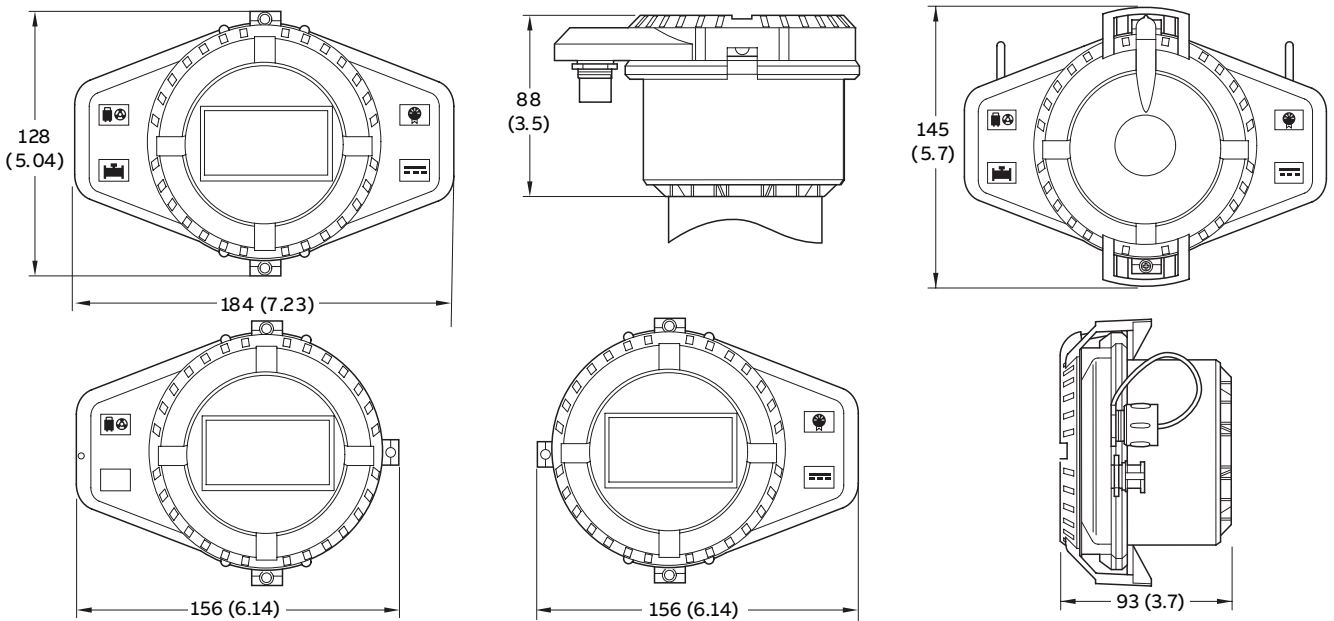
## ...Specification – transmitter

### Dimensions

Dimensions in mm (in.)



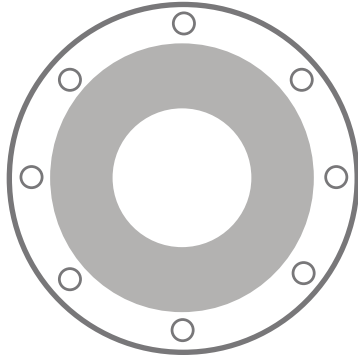
Wall- / Pipe-mount remote transmitter



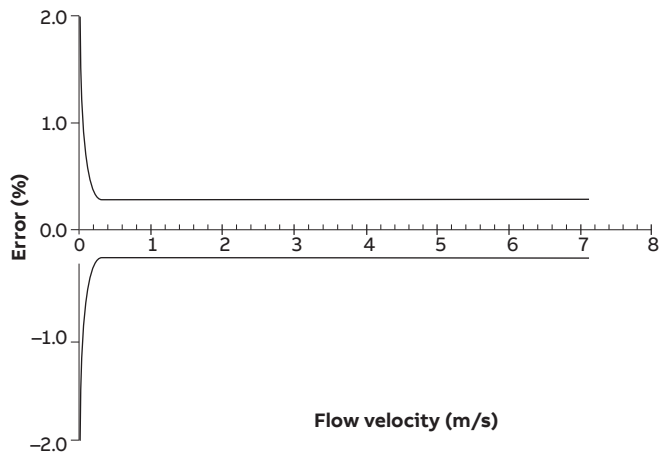
Integral transmitter

Transmitter with NFC aerial cover

## Specification – reduced bore sensor



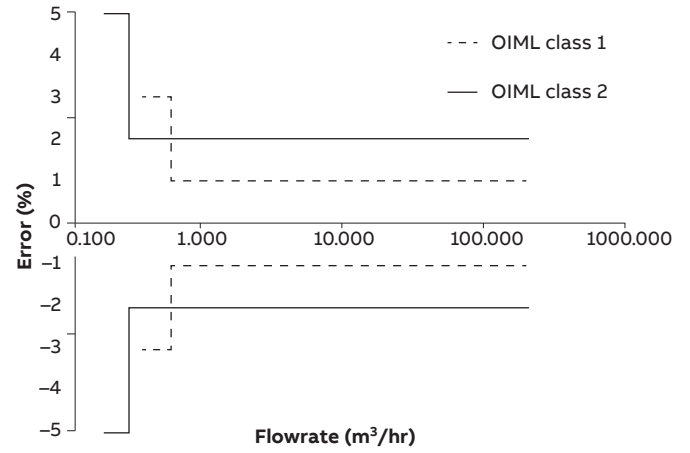
### Measurement accuracy



DN	Mains powered		Battery / Renewable energy powered	
	Class 2	Class 1	Class 2	Class 1
40 to 600	±0.5 or ±0.4 %	±0.2 %	±0.5 or ±0.4 %	±0.2 %
	±1 mm/s *	±0.5 mm/s *	±2 mm/s *	±1 mm/s *

\* Whichever is the greater

### Metrological performance to OIML R49 (pending)



DN	in.	Q3 (m3/h)	Mains powered		Battery / Renewable energy powered	
			Class 2 (R = 1000)	Class 1 (R = 500)	Class 2 (R = 400)	Class 1 (R = 160)
			Q1 (m3/h)	Q1 (m3/h)	Q1 (m3/h)	Q1 (m3/h)
40	1½	25	0.025	0.05	0.063	0.16
50	2	40	0.04	0.08	0.1	0.25
65	2½	63	0.063	0.126	0.158	0.39
80	3	100	0.1	0.2	0.25	0.63
100	4	160	0.16	0.32	0.4	1
125	5	160	0.16	0.32	0.4	1
150	6	400	0.4	0.8	1	2.5
200	8	630	0.63	1.26	1.58	3.94
250	10	1000	1	2	2.5	6.25
300	12	1600	1.6	3.2	4	10
350	14	1600	1.6	3.2	4	10
400	16	2500	2.5	5	6.3	15.6
450	18	2500	2.5	5	6.3	15.6
500	20	4000	4	8	10	25
600	24	6300	6.3	12.6	15.8	39.4

Q2 = 1.6 \* Q1

Q4 = 1.25 \* Q3

## ...Specification – reduced bore sensor

### Bore sizes and flange types

Bore size range  
DN40 to 600

### Flanges to standards

ASME  
AWWA  
ISO 7005 EN1092-1  
DIN  
AS4087  
AS2129  
JIS

### Pressure limitations for flanges

As per flange rating

### Pressure equipment directive 97/23/EC

This product is applicable in networks for the supply, distribution and discharge of water and associated equipment and is therefore exempt.

### Bore and flange material

- DN40 to 300: SG iron
- DN350 to 600: carbon steel
- All sizes coated with light gray 2-pack epoxy (RAL9002)
- Primer: Interpon PZ660 zinc-based system, 70 microns thick
- Top coat: Interpon 610 light gray polyester powder coating (RAL 9002), up to 150 microns thick, comparable to EN ISO 12944 grade C4
- As a special requirements: 2-pack epoxy primer / finish @ 300  $\mu\text{m}$  DFT

### Terminal box for remote sensors

Polycarbonate

### Environmental and process conditions

#### Ingress rating

- IP68 (NEMA 6P) to 10 m (33 ft.)
- For buriable applications: 1 m < sensor depth  $\leq$  5 m

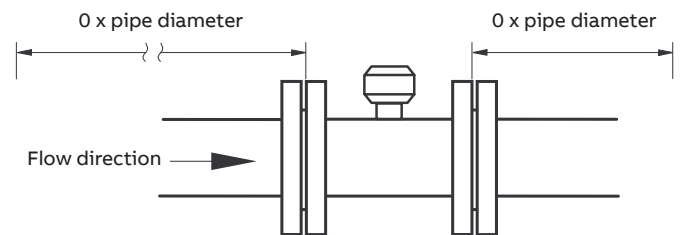
#### Temperature ranges

Ambient:  $-20$  to  $70$  °C ( $-4$  to  $158$  °F)  
Process:  $-6$  to  $70$  °C ( $21$  to  $158$  °F)

#### Conductivity

$>20$   $\mu\text{S}/\text{cm}$

#### Upstream and downstream pipe conditions



#### Pressure loss

Flow rate	Pressure loss in bar (psi)
$Q_3$	$<0.63$ (9.1)
$Q_3 / 2$	$<0.16$ (2.3)

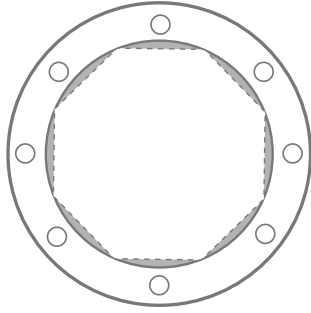
#### Potable water approvals for wetted parts

WRAS  
ACS  
DVGW W270  
NSF – 61  
AZ/NZ 4020

#### Metrological certifications (pending)

- OIML R49 for accuracy class 1 and 2 and environmental class T50  $0.1$  to  $50$  °C ( $32.18$  to  $122$  °F)
- MID MI-001
- NMI R49 and NMI 10 for Australia
- PAC for China

## Specification – full bore sensor



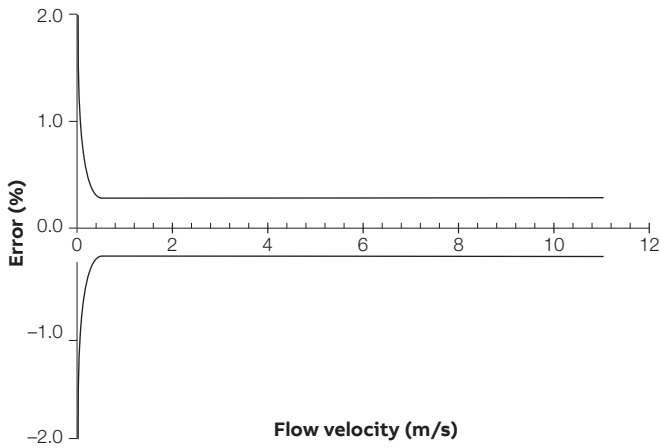
DN40 to 200

Octagonal bore, polypropylene liner

DN250 to 600

Full bore, elastomer or hard rubber liner

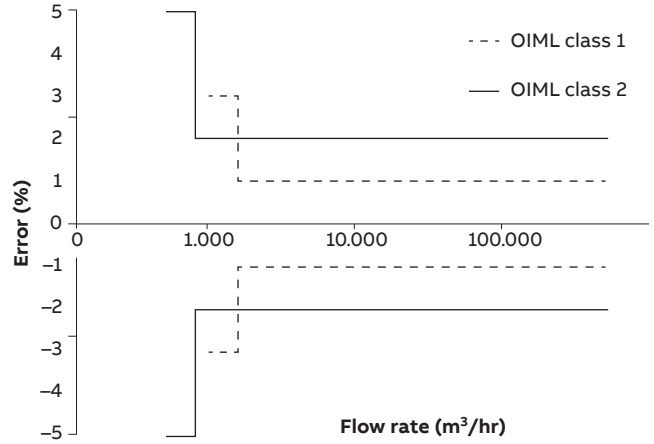
## Measurement accuracy



DN	Mains powered		Battery / Renewable energy powered	
	Class 2 ±0.5 or ±0.4 %	Class 1 ±0.2 %	Class 2 ±0.5 or ±0.4 %	Class 1 ±0.2 %
40 to 600	±2 mm/s *	±1 mm/s *	±4 mm/s *	±2 mm/s *
700 to 2400	±4 mm/s *	±2 mm/s *	±6 mm/s *	±3 mm/s *

\* whichever is the greater

## Metrological performance to OIML R49 (pending)



DN	in.	Q3 (m3/h)	Mains powered		Battery / Renewable energy powered	
			Class 2 (R = 500)	Class 1 (R = 250)	Class 2 (R = 250)	Class 1 (R = 125)
			Q1 (m3/h)	Q1 (m3/h)	Q1 (m3/h)	Q1 (m3/h)
40	1½	40	0.08	0.2	0.16	0.32
50	2	63	0.13	0.25	0.25	0.5
65	2½	100	0.2	0.4	0.4	0.8
80	3	160	0.32	0.6	0.64	1.28
100	4	250	0.5	1	1	2
125	5	250	0.5	1	1	2
150	6	630	1.26	2.5	2.5	5
200	8	1000	2	4	4	8
250	10	1600	3.2	6	6.4	12.8
300	12	2500	5	10	10	20
350	14	4000	8	16	16	32
400	16	4000	8	16	16	32
450	18	6300	12.6	25.2	25.2	50
500	20	6300	12.6	25.2	25.2	50
600	24	10000	20	40	40	80

DN	in.	Q3 (m3/h)	Class 2 (R = 315)	Class 1 (R = 160)	Class 2 (R = 160)	Class 1 (R = 80)
			700	28	16000	50.8
760	30	16000	50.8	100	100	200
800	32	16000	50.8	100	100	200
900	36	25000	79	156	156	312
1000	40	25000	79	156	156	312
1050	42	25000	79	156	156	312
1200	44	40000	127	250	250	500
1400	48	63000	200	394	394	787
1500	54	63000	200	394	394	787
1600	56	63000	200	394	394	787
1800	60	100000	317	625	625	1250
2000	64	100000	317	625	625	1250
2200	66	160000	508	1000	1000	2000
2400	72	160000	508	1000	1000	2000
2600	78	160000	508	1000	1000	2000

Q2 = 1.6 \* Q1

Q4 = 1.25 \* Q3

## ...Specification – full bore sensor

### Bore sizes and flange types

Bore size range  
DN40 to 2400

#### Flanges to standards

- ASME
- AWWA
- ISO 7005 EN1092-1
- DIN
- AS4087
- AS2129
- JIS

#### Pressure limitations for flanges

- As per flange rating
- PN25 max. process temperature 50 °C (122 °F)
- PN40 max. process temperature 40 °C (104 °F)

#### Pressure equipment directive 97/23/EC

This product is applicable in networks for the supply, distribution and discharge of water and associated equipment and is therefore exempt.

#### Bore and flange material

- DN40 to 300: SG iron
- DN350 to 2400: carbon steel
- All sizes coated with light gray 2-pack epoxy (RAL9002)
- Primer: Interpon PZ660 zinc-based system, 70 microns thick
- Top coat: Interpon 610 light gray polyester powder coating (RAL 9002), up to 150 microns thick, comparable to EN ISO 12944 grade C4
- As a special requirements: 2-pack epoxy primer / finish @ 300 µm DFT

#### Terminal box for remote sensors

Polycarbonate

### Environmental and process conditions

#### Ingress rating

- IP68 (NEMA 6P) to 10 m (33 ft.)
- For buriable applications (DN40 to 200, octagonal bore, polypropylene liner): 1 m < sensor depth ≤ 5 m

#### Temperature ranges

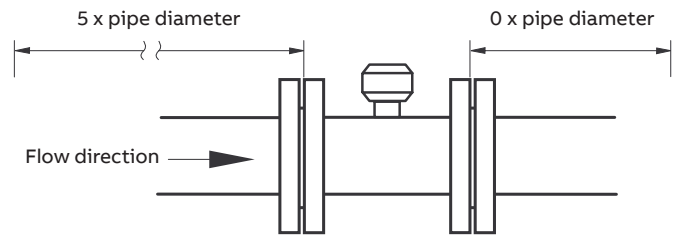
Ambient: -20 to 70 °C (-4 to 158°F)

Liner material	Bore size	Process temperature	
		Minimum	Maximum
Polypropylene	DN40 to 200	-6 °C (21 °F)	70 °C (158 °F)
Elastomer	DN250 to 600	-5 °C (23 °F)	50 °C (122 °F)
Hard rubber	DN250 to 2400	-10 °C (14 °F)	80 °C (176 °F)

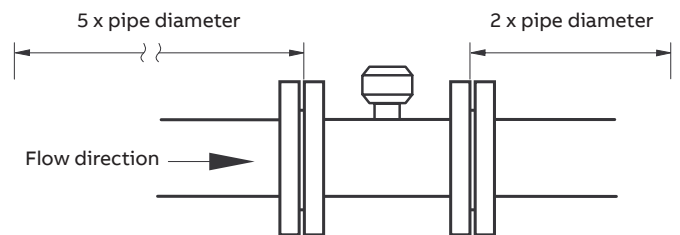
#### Conductivity

>20 µS/cm

#### Upstream and downstream pipe conditions (octagonal bore DN40 to 200)



#### Upstream and downstream pipe conditions (full bore DN250 to 2400)



#### Pressure loss

Flow rate	Pressure loss in bar (psi)
Q <sub>3</sub>	<0.25 bar (3.6 psi) for octagonal bore sensors
Q <sub>3</sub>	Negligible for full bore sensors



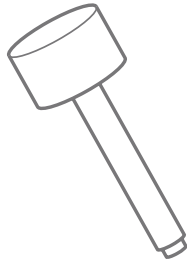
**Potable water approvals for wetted parts**

WRAS  
ACS  
DVGW W270  
NSF – 61  
AZ/NZ 4020

**Metrological certifications (pending)**

- OIML R49 for accuracy class 1 and 2 and environmental class T50 0.1 to 50 °C (32.18 to 122 °F)
- MID MI-001
- NMI R49 and NMI 10 for Australia
- PAC for China

## Specification – insertion flowmeter



### Mounting

- Integral transmitter
  - On probe sensor
- Remote transmitter
  - Off probe sensor

### Insertion details

- Size range
  - 300 to 1000 mm (12 to 40 in.)
- Pipe sizes
  - 200 to 8000 mm (8 to 320 in.) nominal bore
- Pressure limitations
  - 20 bar (295 psi) absolute
- Pressure equipment directive 97/23/EC
  - This product is applicable in networks for the supply, distribution and discharge of water and associated equipment and is therefore exempt.
- Sensor body material
  - 316L stainless steel
- Sensor tip material
  - PEEK
- Terminal box material for remote sensors
  - Polycarbonate
- Threaded connection
  - 1 in. BSP
  - 1 in. NPT
  - 1½ in. BSP
- Pressure tapping provision
  - ½ in. BSP

### Environmental and process conditions

- Ingress rating
  - IP68 (NEMA 6P) to 10 m (33 ft.)
- Temperature ranges
  - Ambient: -20 to 60 °C (-4 to 140°F)
  - Process: 0 to 60 °C (32 to 140 °F)

- Conductivity
  - >50 µS/cm

### Metrological performance and certifications

- Accuracy
  - ±2 % of rate or ±2 mm/s (±0.08 in./s) whichever is the greater

- Volume
  - Refer to ISO 7145-1982 (BS 1042 section 2.2) for details

- Flow condition
  - Fully developed profile in accordance with ISO 7145-1982 (BS1042 section 2.2.)

- Maximum flow
  - The maximum velocity depends upon the actual insertion length. Typical insertion lengths are 0.125 and 0.5 x pipe diameter. Figure 2 is a guide\* to the maximum allowable velocity for different insertion lengths.

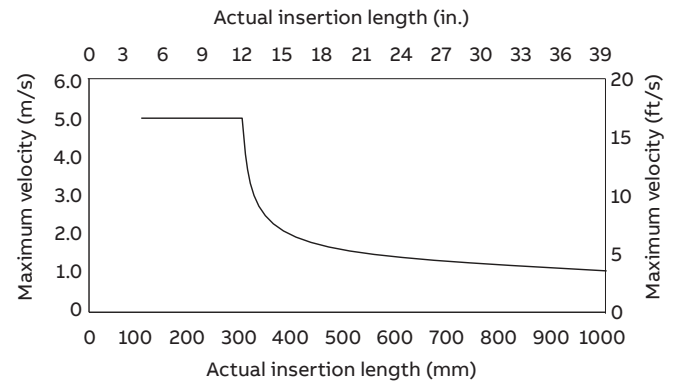


Figure 2 Maximum allowable velocity for different insertion lengths

- Potable water approvals for wetted parts
  - WRAS

\* Figure 2 is intended as a guide only. Factors that influence the maximum insertion length into the pipe include: flow sensor mounting components (for example, standoffs, bushes and valves) pipeline vibration, fluid vibration and pump noise.

## Specification – pressure transducer (option)



### Process connection

M12 male thread plus quick-release fitting

### Ingress protection

IP68 to 100 m (330 ft.)

### Wetted parts

303 stainless steel, nitrile and 96 % aluminum oxide

### Process temperature range

0 to 40 °C (32 to 104 °F) (protect transducer from frost)

### Pressure range (specify when ordering)

10, 16, 20 and 40 bar absolute

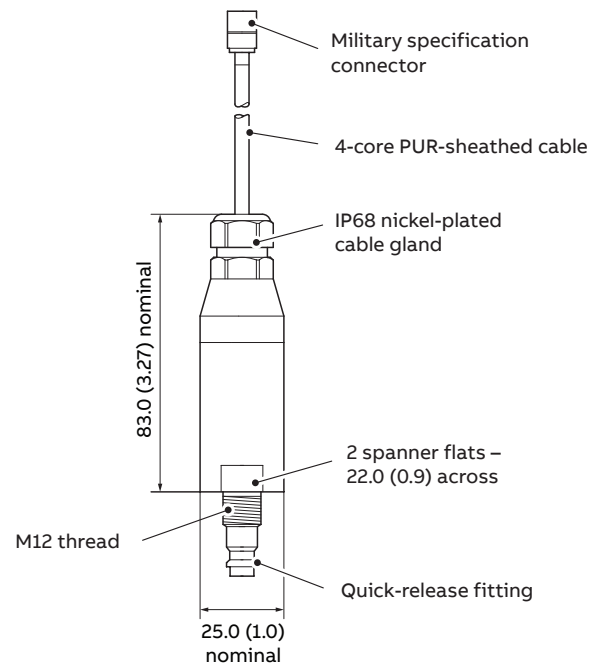
### Output span

10 mV / V

### Accuracy

< ±0.25 % of span

Dimensions in mm (in.)



## Dimensions – sensors

### R-style sensor – DN40 to 300 (1½ to 12 in.)

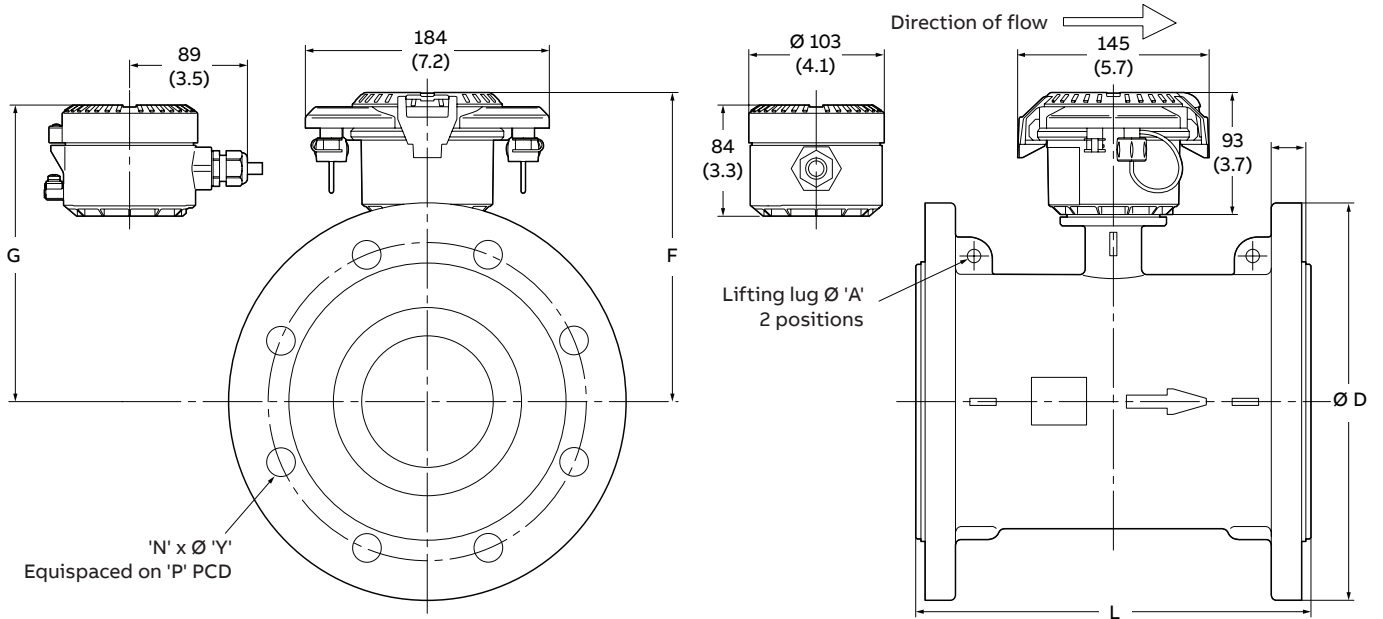


Figure 3 R-style sensor – DN40 to 300 (1½ to 12 in.)

Sensor size	Flange		Dimensions in mm (in)								Approx weight				
	Standard	Class	Flange OD D	No. holes N	Bolt hole dia		Bolt hole PCD P	Sensor length L	Trans. height F	T. Box height G	Lifting lug A	kg (lbs)			
					Y	P						INT	REM		
DN40 (1½ in.)	EN 1092	PN 10, 16, 25	150	4	19 (.75)	110 (4.3)	200 (7.9)	158 (6.2)	149 (5.9)	N/A	13	12			
	ASME B16.5	CL150	(5.9)		15.7 (.62)	98					(29)	(27)			
	AS 2129	Table E	135 (5.3)		14 (.55)	95 (3.7)					11	8			
	JIS B2220	5K	120 (4.7)		15 (.59)	105 (4.2)					(24)	(18)			
		10K	140 (5.5)	19 (.75)	105 (4.2)										
DN50 (2 in.)	EN 1092	PN 10, 16, 25	165	4	19	125 (4.9)	200 (7.9)	162 (6.4)	152 (6.0)	N/A	15	14			
	ASME B16.5	CL150	(6.5)		(.75)	121 (4.8)					(32)	(30)			
	AS 2129	Table E	150		18	114					12	9			
	AS 4087	PN 16	(5.9)		(.71)	105 (4.1)					(26)	(20)			
		5K	130 (5.1)	15 (.59)	105 (4.1)										
		10K	155 (6.1)	19 (.75)	120 (4.7)										
DN65 (2½ in.)	EN 1092	PN 10, 16	185	4	19	145	200 (7.9)	176 (6.9)	167 (6.6)	N/A	19	18			
		PN 25	(7.3)	8	(.75)	(5.7)					(42)	(40)			
	ASME B16.5	CL150			20 (.79)	140 (5.5)									
	AS 2129	Table E	165	4	18	127					168 (6.6)	158 (6.2)	N/A	14	11
AS 4087	PN 16	(6.5)	(.71)		(5.0)	(31)	(24)								
	5K	155 (6.1)	15 (.59)		130 (5.1)										
JIS B2220	10K	175 (6.9)	19 (.75)		140 (5.5)										
DN80 (3 in.)	EN 1092	PN 10, 16, 25	200	8	19 (.75)	160 (6.3)	200 (7.9)	181 (7.1)	172 (6.8)	N/A	21	20			
	ASME B16.5	CL150	(7.9)		20 (.79)	152 (6.0)					(47)	(44)			
	AS 2129	Table E	185	4	18	146					174 (6.9)	165 (6.5)	N/A	17	14
	AS 4087	PN 16	(7.3)		(.71)	(5.8)								(37)	(31)
	5K	180 (7.1)	19		145 (5.7)										
JIS B2220	10K	185 (7.3)	8		(.75)	150 (5.9)									

Table 1 R-style sensor – DN40 to 80 (1½ to 3 in.)

Sensor size	Flange		Dimensions in mm (in)									Approx weight	
	Standard	Class	Flange OD	No. holes	Bolt hole dia	Bolt hole PCD	Sensor length	Trans. height	T. Box height	Lifting lug	kg (lbs)		
											D	N	Y
DN100 (4 in.)	EN 1092	PN 10, 16	235 (9.3)	8	19 (.75)	180 (7.1)	250 (9.9)	202 (8.0)	193 (7.6)	N/A	27 (60)	26 (58)	
		PN 25			23 (.91)	190 (7.5)							
	ASME B16.5	CL150	215 (8.5)	4	19 (.75)	191 (7.5)	250 (9.9)	212 (8.3)	203 (8.0)	N/A	23 (51)	20 (44)	
		Table E			18 (.71)	178 (7.0)							
	AS 4087	PN 16	200 (7.9)	8	19 (.75)	165 (6.5)	250 (9.9)	212 (8.3)	203 (8.0)	N/A	23 (51)	20 (44)	
	JIS B2220	5K			19 (.75)	178 (7.0)							
		7.5K	4	19 (.75)	195 (7.7)	250 (9.9)	212 (8.3)	203 (8.0)	N/A	23 (51)	20 (44)		
		10K	8	19 (.75)	175 (6.9)								
DN125 (5 in.)	EN 1092	PN 10, 16	270 (10.6)	8	18 (.71)	210 (8.3)	250 (9.9)	221 (8.7)	212 (8.3)	N/A	30 (66)	29 (64)	
		PN 25			28 (1.10)	220 (8.7)							
	ASME B16.5	CL150	255 (10.0)	8	22 (.87)	216 (8.5)	250 (9.9)	212 (8.3)	203 (8.0)	N/A	26 (57)	23 (51)	
		Table E			18 (.71)	210 (8.3)							
	AS 2129	5K	235 (9.3)	6	19 (.75)	200 (7.9)	250 (9.9)	212 (8.3)	203 (8.0)	N/A	26 (57)	23 (51)	
	JIS B2220	7.5K			19 (.75)	200 (7.9)							
		10K	8	23 (.91)	210 (8.3)	250 (9.9)	212 (8.3)	203 (8.0)	N/A	26 (57)	23 (51)		
		250 (9.8)	8	23 (.91)	210 (8.3)								
DN150 (6 in.)	EN 1092	PN 10, 16	300 (11.8)	8	23 (.91)	240 (9.5)	300 (11.8)	224 (8.8)	223 (8.8)	10,2 (40)	35 (77)	34 (75)	
		PN 25			22 (.87)	242 (9.5)							
	ASME B16.5	CL150	280 (11.0)	8	26 (1.02)	250 (9.8)	300 (11.8)	233 (9.2)	223 (8.8)	10,2 (40)	33 (73)	31 (68)	
		Table E			22 (.87)	235 (9.3)							
	AS 4087	PN 16	265 (10.4)	6	18 (.71)	230 (9.1)	300 (11.8)	233 (9.2)	223 (8.8)	10,2 (40)	33 (73)	31 (68)	
	JIS B2220	5K			19 (.75)	230 (9.1)							
		7.5K	8	19 (.75)	247 (9.7)	300 (11.8)	233 (9.2)	223 (8.8)	10,2 (40)	33 (73)	31 (68)		
		10K	8	23 (.91)	240 (9.5)								
DN200 (8 in.)	EN 1092	PN 10	343 (13.5)	8	23 (.91)	295 (11.6)	350 (13.8)	259 (10.2)	258 (10.2)	10,2 (40)	68 (150)	67 (147)	
		PN 16		12	28 (1.10)	310 (12.2)							
	ASME B16.5	CL150	335 (13.2)	8	22 (.87)	292 (11.5)	350 (13.8)	258 (10.2)	258 (10.2)	10,2 (40)	51 (112)	48 (106)	
		Table E			22 (.87)	292 (11.5)							
	AS 4087	PN 16	320 (12.6)	8	18 (.71)	280 (11.0)	350 (13.8)	258 (10.2)	258 (10.2)	10,2 (40)	51 (112)	48 (106)	
	JIS B2220	5K			19 (.75)	280 (11.0)							
		7.5K	12	19 (.75)	299 (11.8)	350 (13.8)	258 (10.2)	258 (10.2)	10,2 (40)	51 (112)	48 (106)		
		10K	12	23 (.91)	290 (11.4)								
DN250 (10 in.)	EN 1092	PN10	395 (15.6)	12	22 (.87)	350 (.87)	450 (17.7)	285 (11.2)	276 (10.9)	10,2 (40)	78 (172)	75 (165)	
		PN16			26 (1.02)	355 (14.0)							
	ASME B16.5	PN25	405 (15.9)	8	30 (1.18)	370 (14.6)	450 (17.7)	285 (11.2)	276 (10.9)	10,2 (40)	78 (172)	75 (165)	
		Table E			22 (.87)	356 (14.0)							
	AS 4087	PN 16	385 (15.2)	12	23 (.91)	345 (13.6)	450 (17.7)	285 (11.2)	276 (10.9)	10,2 (40)	78 (172)	75 (165)	
	JIS B2220	5K			23 (.91)	345 (13.6)							
		7.5K	8	23 (.91)	360 (14.2)	450 (17.7)	285 (11.2)	276 (10.9)	10,2 (40)	78 (172)	75 (165)		
		10K	12	25 (.98)	355 (14.0)								
	ASME B16.5	CL150	406 (16.0)	12	22 (.87)	362 (14.3)	450 (17.7)	285 (11.2)	276 (10.9)	10,2 (40)	78 (172)	75 (165)	
		406 (16.0)	12	22 (.87)	362 (14.3)								
DN300 (12 in.)	EN 1092	PN10	445 (17.5)	12	22 (.87)	400 (15.8)	500 (19.7)	310 (12.2)	301 (11.9)	10,2 (40)	115 (253)	112 (247)	
		PN16			26 (1.02)	410 (16.1)							
	ASME B16.5	PN25	455 (17.9)	12	30 (1.18)	430 (16.9)	500 (19.7)	310 (12.2)	301 (11.9)	10,2 (40)	115 (253)	112 (247)	
		Table E			26 (1.02)	406 (16.0)							
	AS 4087	PN 16	430 (16.9)	12	22 (.87)	406 (16.0)	500 (19.7)	310 (12.2)	301 (11.9)	10,2 (40)	115 (253)	112 (247)	
	JIS B2220	5K			23 (.91)	390 (15.4)							
		7.5K	10	23 (.91)	414 (16.3)	500 (19.7)	310 (12.2)	301 (11.9)	10,2 (40)	115 (253)	112 (247)		
		10K	16	25 (.98)	400 (15.8)								
	ASME B16.5	CL150	483 (19.0)	12	22 (.87)	432 (17.0)	500 (19.7)	310 (12.2)	301 (11.9)	10,2 (40)	115 (253)	112 (247)	
		483 (19.0)	12	22 (.87)	432 (17.0)								

Table 2 R-style sensor – DN100 to 300 (4 to 12 in.)

### ...Dimensions – sensors

R-style sensor – DN350 to 600 (14 to 24 in.)

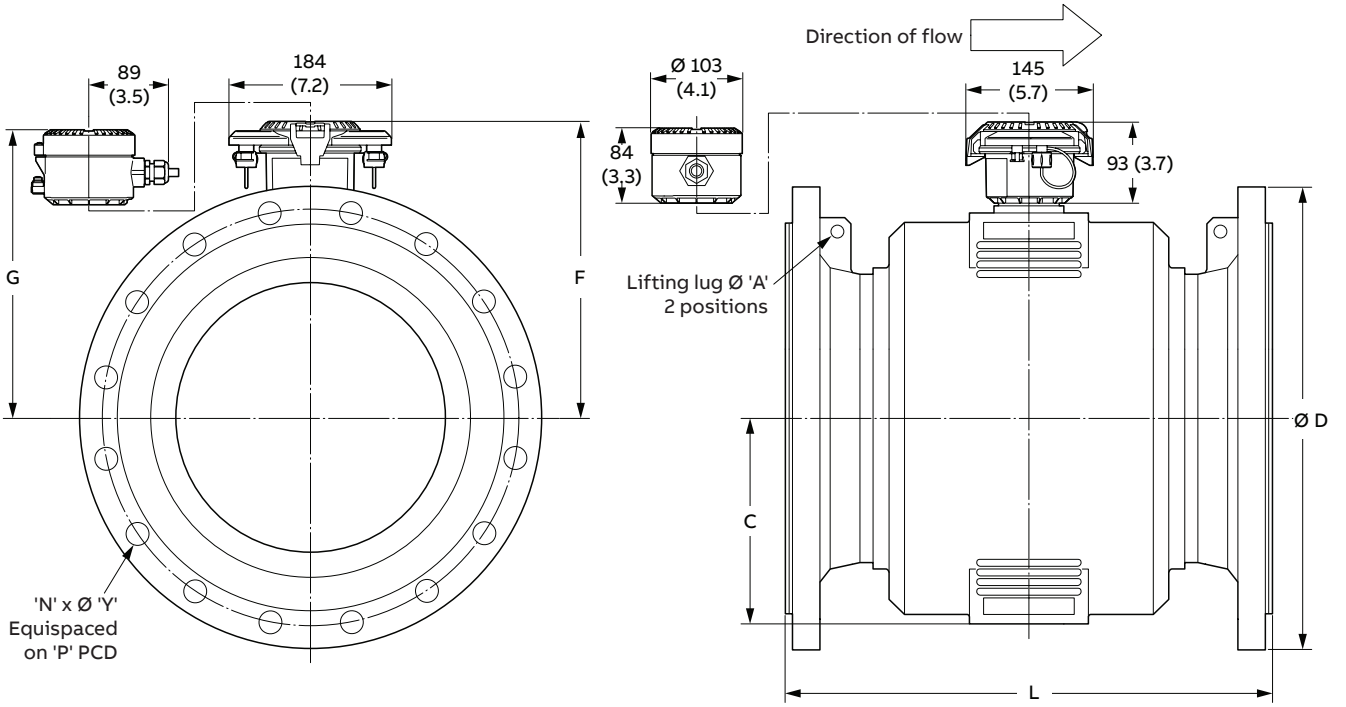


Figure 4 R-style sensor – DN350 to 600 (14 to 24 in.)

Sensor size	Flange		Flange OD	No. Holes	Bolt hole dia	Dimensions in mm (in)						Approx weight	
	Standard	Class				Bolt hole PCD	Sensor length	Trans height	T. Box height	Lifting lug	Cover flat	INT	REM
DN350 (14 in.)	EN 1092	PN 10	505 (19.9)	16	22 (.87)	460 (18.1)	550 (21.7)	334 (13.2)	324 (12.8)	14,5 (.57)	231 (9.1)	102 (225)	100 (220)
		PN 16	520 (20.5)		26 (1.02)	470 (18.5)							
		PN 25	555 (21.9)		33 (1.30)	490 (19.3)							
	ASME B16.5	CL150	535 (21.1)	29,5 (1.16)	476 (18.8)								
	AS 2129	Table E	525	26	470								
	AS 4087	PN 16	(20.7)	(1.02)	(18.5)								
	JIS B2220	5K	480 (18.9)	25	435 (17.1)								
	7.5K	530 (20.7)	(.98)	472 (18.6)									
	10K	490 (19.3)	16	445 (17.5)									
DN400 (16 in.)	EN 1092	PN 10	565 (22.3)	16	26 (1.02)	515 (20.3)	600 (23.6)	360 (14.2)	354 (13.9)	14,5 (.57)	257 (10.1)	117 (258)	115 (254)
		PN 16	580 (22.8)		30 (1.18)	525 (20.7)							
		PN 25	620 (24.4)		36 (1.42)	550 (21.7)							
	ASME B16.5	CL150	600 (23.6)	29,5 (1.16)	540 (21.3)								
	AS 2129	Table E	580	26	521								
	AS 4087	PN 16	(22.8)	(1.02)	(20.5)								
	JIS B2220	5K	540 (21.3)	16	25	495 (19.5)							
	7.5K	582 (22.9)	12	(.98)	524 (20.6)								
	10K	560 (22.1)	16	27 (1.06)	510 (20.1)								
DN450 (18 in.)	EN 1092	PN 10	615 (24.2)	20	26 (1.02)	565 (22.3)	700 (27.6)	388 (15.3)	379 (14.9)	14,5 (.57)	285 (11.2)	162 (357)	160 (353)
		PN 16	640 (25.2)		30 (1.18)	585 (23.0)							
		PN 25	670 (26.4)		36 (1.42)	600 (23.6)							
	ASME B16.5	CL150	635 (25.0)	32,5 (1.28)	578 (22.8)								
	AS 2129	Table E	640	26	584								
	AS 4087	PN 16	(25.2)	(1.02)	(23.0)								
	JIS B2220	5K	605 (23.8)	16	25 (.98)	555 (21.9)							
	7.5K	652 (25.7)	12	27 (1.06)	585 (23.0)								
	10K	620 (24.4)	20	27 (1.06)	565 (22.3)								
DN500 (20 in.)	EN 1092	PN 10	670 (26.4)	20	26 (1.02)	620 (24.4)	770 (30.3)	419 (16.5)	410 (16.2)	14,5 (.57)	316 (12.5)	219 (483)	217 (477)
		PN 16	715 (28.2)		33 (1.30)	650 (25.6)							
		PN 25	730 (28.7)		36 (1.42)	660 (26.0)							
	ASME B16.5	CL150	700 (27.6)	32,5 (1.28)	635 (25.0)								
	AS 2129	Table E	705	26	641								
	AS 4087	PN 16	(27.8)	(1.02)	(25.2)								
	JIS B2220	5K	655 (25.8)	20	25 (.98)	605 (23.8)							
	7.5K	706 (27.8)	12	27	639 (25.2)								
	10K	675 (26.6)	20	(1.06)	620 (24.4)								
DN600 (24 in.)	EN 1092	PN 10	780 (30.7)	20	30 (1.18)	725 (28.6)	920 (36.2)	446 (17.6)	437 (17.2)	14,5 (.57)	343 (13.5)	317 (699)	315 (695)
		PN 16	840 (33.1)		36 (1.42)	770							
		PN 25	845 (33.3)		39 (1.54)	(30.3)							
	ASME B16.5	CL150	815 (32.1)	35,5 (1.40)	749,5 (29.5)								
	AS 2129	Table E	825	33 (1.30)	756								
	AS 4087	PN 16	(32.5)	30 (1.18)	(29.7)								
	JIS B2220	5K	770 (30.3)	20	27	715 (28.2)							
	7.5K	810 (31.9)	16	(1.06)	743 (29.3)								
	10K	795 (31.3)	24	33 (1.30)	730 (28.7)								

Table 3 R-style sensor – DN350 to 600 (14 to 24 in.)

### ...Dimensions – sensors

V-style sensor – DN40 to 200 (1½ to 8 in.)

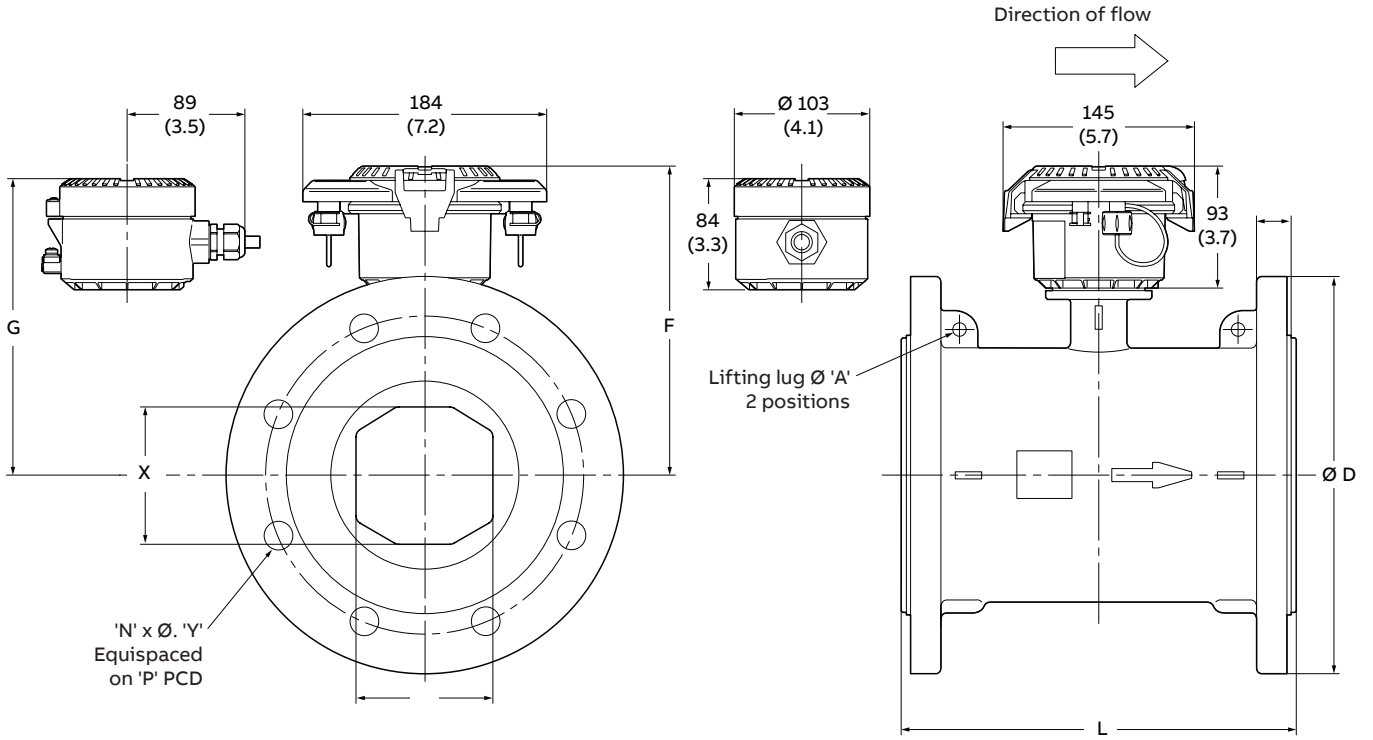


Figure 5 V-style sensor – DN40 to 200 (1½ to 8 in.)



Sensor size	Flange		Dimensions in mm (in)								Approx weight kg (lbs)			
	Standard	Class	Flange OD D	No. holes N	Bolt hole dia. Y	Bolt hole PCD P	Sensor length L	Trans height F	T. box height G	Lifting lug A	INT	REM		
DN40 (1½ in.)	EN 1092	PN 10, 16, 25	150	4	19 (.75)	110 (4.3)	200 (7.9)	158	149	N/A	13	12		
	ASME B16.5	CL150	(5.9)		15.7 (.62)	98		(6.2)	(5.9)		(29)	(27)		
	AS 2129	Table E	135 (5.3)		14 (.55)	(3.9)		154	144		10	7		
	JIS B2220	10K	140 (5.5)		19 (.75)	105 (4.2)		(6.1)	(5.7)		(22)	(15)		
DN50 (2 in.)	EN 1092	PN 10, 16, 25	165	4	19	125 (4.9)	200 (7.9)	162 (6.4)	153 (6.0)	N/A	14	13		
	ASME B16.5	CL150	(6.5)		(.75)	121 (4.8)					(31)	(29)		
	AS 2129	Table E	150		18	114					11	8		
	AS 4087	PN 16	(5.9)		(.71)	(4.5)					(24)	(18)		
DN65 (2½ in.)	EN 1092	PN 10, 16	185 (7.3)	4	19	145	200 (7.9)	176 (6.9)	167 (6.6)	N/A	16	15		
	ASME B16.5	PN 25		8	(.75)	(5.7)							(35)	(33)
	AS 2129	Table E	165	4	18	127					13	10		
	AS 4087	PN 16	(6.5)		(.71)	(5.0)					(29)	(22)		
DN80 (3 in.)	EN 1092	PN 10, 16, 25	200	8	19 (.75)	160 (6.3)	200 (7.9)	181 (7.1)	172 (6.8)	N/A	17	16		
	ASME B16.5	CL150	(7.9)		20 (.79)	152 (6.0)					(38)	(36)		
	AS 2129	Table E	185	4	18	146					16	13		
	AS 4087	PN 16	(7.3)		(.71)	(5.8)					(36)	(28)		
DN100 (4 in.)	EN 1092	PN 10, 16	235 (9.3)	8	19 (.75)	180 (.71)	250 (9.9)	202 (8.0)	193 (7.6)	N/A	19	18		
	ASME B16.5	PN 25			23 (.91)	190 (7.5)							(42)	(40)
	AS 2129	Table E	215 (8.5)	4	18	178					212	203		
	AS 4087	PN 16	(7.1)		(7.0)	(8.3)					(8.0)			
DN125 (5 in.)	EN 1092	PN 10, 16	270 (10.6)	8	18 (.71)	210 (8.3)	250 (9.9)	221 (8.7)	212 (8.3)	N/A	30	29		
	ASME B16.5	PN 25			22 (1.10)	220 (8.7)					(66)	(64)		
	AS 2129	Table E	255 (10.0)	4	18 (.71)	210 (8.3)					212	203		
	AS 4087	PN 16	(10.6)		(.71)	(8.3)					(8.0)	(53)	(46)	
DN150 (6 in.)	EN 1092	PN10, 16	300 (11.8)	8	23 (.91)	240 (9.5)	300 (11.8)	233 (9.2)	224 (8.8)	10,2 (.40)	35	34		
	ASME B16.5	CL150			22 (.87)	242 (9.5)					(77)	(75)		
	AS 2129	Table E	280	6	26 (1.02)	250 (9.8)					235 (9.3)	225 (8.9)	34 (75)	31 (68)
	AS 4087	PN 16	(11.0)		18 (.71)	235 (9.3)								
DN200 (8 in.)	EN 1092	PN10	375 (11.8)	8	23	295	350 (13.8)	259 (10.2)	249 (9.8)	10,2 (.40)	67	66		
	ASME B16.5	PN16			23 (.91)	295 (11.6)					(147)	(145)		
	AS 2129	Table E	360 (14.2)	8	28 (1.10)	310 (12.2)					258 (10.2)	249 (9.8)	53 (116)	50 (110)
	AS 4087	PN 16	(13.2)		22 (.87)	292								
JIS B2220	7.5K	342 (8.7)	12	19 (.75)	299 (11.8)									
	10K	330 (13.0)		23 (.91)	290 (11.4)									

Table 4 V-style sensor – DN40 to 200 (1½ to 8 in.)

### ...Dimensions – sensors

F-style sensor – DN250 to 400 (10 to 16 in.)

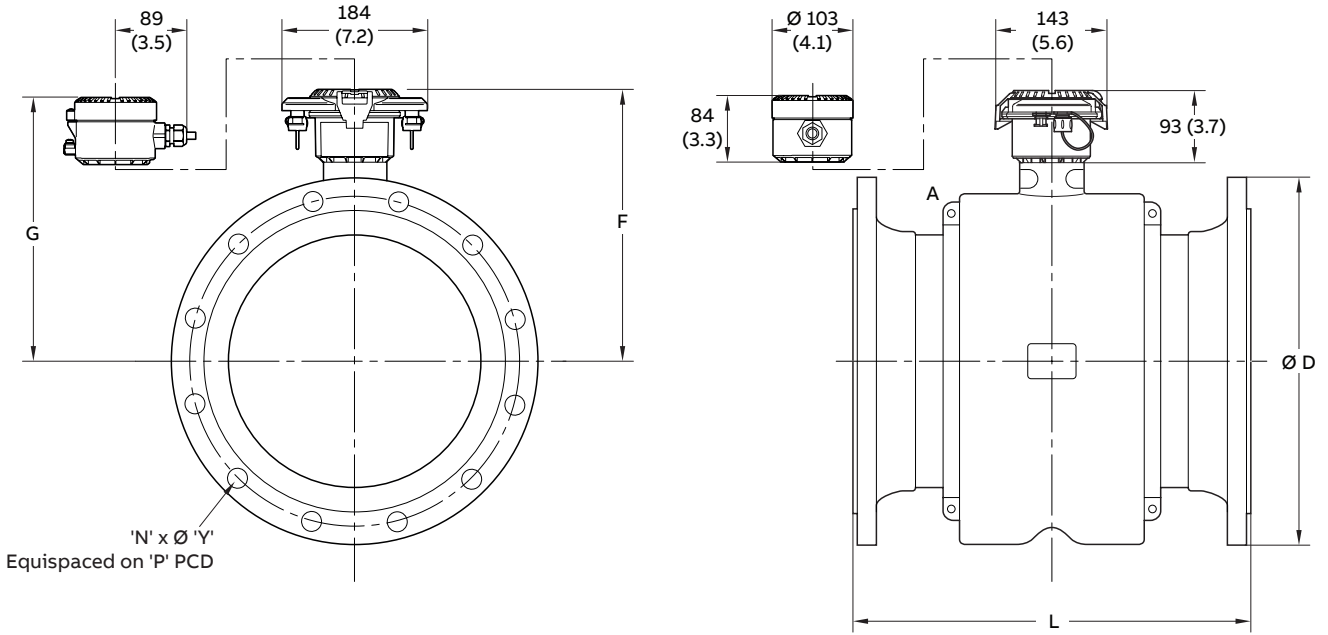


Figure 6 F-style sensor – DN250 to 400 (10 to 16 in.)

Sensor size	Flange		Dimensional in mm [in]								Approx. weight kg (lbs)	
	Standard	Class	Flange OD	No. holes	Bolt hole dia.	Bolt hole PCD	Sensor length	Trans height	Tx box height	Lifting lug	INT	REM
DN250 (10 in.)	EN 1092 or DIN	PN10	395 (15.55)	12	22	350	450	319	310	N/A	61	59
		PN16	405 (15.94)	12	26	355					65	63
		PN25	425 (16.73)	12	30	370					84	82
		PN40	450 (17.72)	12	33	385					95	93
	AS4087	PN16	405 (15.94)	8	22	356	450	319	310	N/A	65	63
		PN35	430 (16.93)	12	26	381					95	93
	JIS B2220	5K	385 (15.16)	12	23	345	450	319	310	N/A	65	63
		10K	400 (15.75)	12	25	355					65	63
	ASME B16.5	CL300	445 (17.52)	16	28.6	387.4	450	319	310	N/A	105	103
		CL150	405 (15.94)	12	26	362					70	68
DN300 (12 in.)	EN 1092 or DIN	PN10	445 (17.52)	12	22	400	500	342	333	N/A	74	72
		PN16	460 (18.11)	12	26	410					80	78
		PN25	485 (19.09)	16	30	430					100	98
		PN40	515 (20.28)	16	33	450					130	128
	JIS B2220	5K	430 (16.93)	12	23	390	500	342	333	N/A	80	78
		10K	445 (17.52)	16	25	400					80	78
	AS4087	PN16	455 (17.91)	12	22	406	500	342	333	N/A	130	128
		PN35	490 (19.29)	26	26	438					130	128
	ASME B16.5	CL300	520 (20.47)	16	31.8	450.8	500	342	333	N/A	150	148
		CL150	485 (19.09)	12	26	431.8					105	103
DN350 (14 in.)	EN 1092 or DIN	PN10	505 (19.88)	16	22	460	550	357	348	N/A	95	93
		PN16	520 (20.47)	16	26	470					110	108
		PN25	555 (21.85)	16	33	490					145	143
		PN40	580 (22.83)	16	36	510					195	193
	JIS B2220	5K	480 (18.90)	12	22	435	550	357	348	N/A	95	93
		10K	490 (19.29)	16	25	445					95	93
	AS4087	PN16	525 (20.67)	12	26	470	550	357	348	N/A	130	128
		PN35	550 (21.65)	16	30	495					185	183
	ASME B16.5	CL300	585 (23.03)	20	31.8	514.4	550	357	348	N/A	140	138
		CL150	535 (21.06)	12	29	476.3					105	103
DN400 (16 in.)	EN 1092 or DIN	PN10	565 (22.24)	16	26	515	600	399	390	N/A	103	101
		PN16	580 (22.83)	16	30	525					126	124
		PN25	620 (24.41)	16	36	550					170	168
		PN40	660 (25.98)	16	39	585					258	256
	JIS B2220	5K	540 (21.26)	12	25	495	600	399	390	N/A	103	101
		10K	560 (22.05)	16	27	510					116	114
	AS4087	PN16	580 (22.83)	12	26	521	600	399	390	N/A	154	152
		PN35	610 (24.02)	20	30	552					302	300
	ASME B16.5	CL300	650 (25.59)	24	35	571.5	600	399	390	N/A	265	263
		CL150	600 (23.62)	12	29	539.8					175	173

Table 5 F-style sensor – DN250 to 400 (10 to 16 in.)

### ...Dimensions – sensors

F-style sensor – DN450 to 600 (18 to 24 in.)

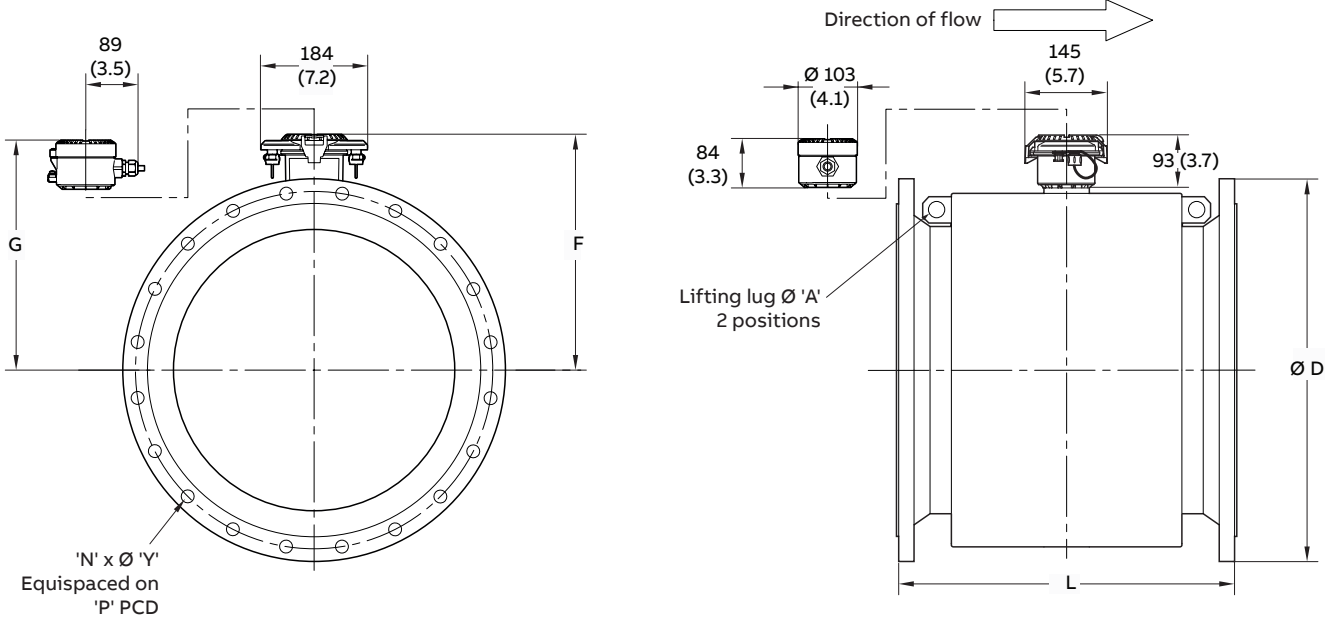


Figure 7 F-style sensor – DN450 to 600 (18 to 24 in.)

Sensor size	Flange		Dimensional in mm [in]								Approx weight	
	Standard	Class	Flange OD	No. holes	Bolt hole dia.	Bolt hole PCD	Sensor length	Trans height	Tx box height	Lifting lug	kg (lbs)	
											D	N
DN450 (18 in.)	EN 1092 or DIN	PN10	615 (24.21)	20	26	565	600	407	398	30	173	171
		PN16	640 (25.20)	20	30	585					188	186
		PN25	670 (26.38)	20	36	600	245				243	
		PN40	685 (26.97)	20	39	610	315				313	
	JIS B2220	5K	605 (23.82)	16	25	555	600	407	398	30	165	163
		10K	620 (24.41)	20	27	565					177	175
	AS4087	PN16	640 (25.20)	12	26	584	600	407	398	30	232	230
		PN35	675 (26.57)	20	33	610					328	326
	ASME B16.5	CL300	710 (27.95)	24	35	628.6	600	407	398	30	368	366
		CL150	635 (25.00)	16	32	577.9					250	248
DN500 (20 in.)	EN 1092 or DIN	PN10	670 (26.38)	20	26	620	600	407	398	30	190	188
		PN16	715 (28.15)	20	33	650					240	238
		PN25	730 (28.74)	20	36	660	300				298	
		PN40	755 (29.72)	20	42	670	392				390	
	JIS B2220	5K	655 (25.79)	20	25	605	600	407	398	30	190	188
		10K	675 (26.57)	20	27	620					290	288
	AS4087	PN16	705 (27.76)	16	26	641	600	407	398	30	435	433
		PN35	735 (28.94)	24	33	673					300	298
	ASME B16.5	CL150	700 (27.56)	20	32	635	600	407	398	30	490	488
		CL300	775 (30.51)	24	35	658.8					490	488
DN600 (24 in.)	EN 1092 or DIN	PN10	780 (30.71)	20	30	725	800	458	449	30	284	282
		PN16	840 (33.07)	20	36	770					318	316
		PN25	845 (33.27)	20	39	770	460				458	
		PN40	890 (35.04)	20	26	705	600				598	
	JIS B2220	5K	770 (30.31)	20	27	715	800	458	449	30	275	273
		10K	795 (31.30)	24	33	730					306	304
	AS4087	PN16	825 (32.48)	16	30	756	800	458	449	30	382	380
		PN35	850 (33.46)	24	36	781					452	450
	ASME B16.5	CL300	915 (36.02)	24	41	812.8	800	458	449	30	550	548
		CL150	815 (32.09)	20	35	749.3					425	423

Table 6 F-style sensor – DN450 to 600 (18 to 24 in.)

### ...Dimensions – sensors

#### F-style sensor – DN700 to 2400 (28 to 96 in.)

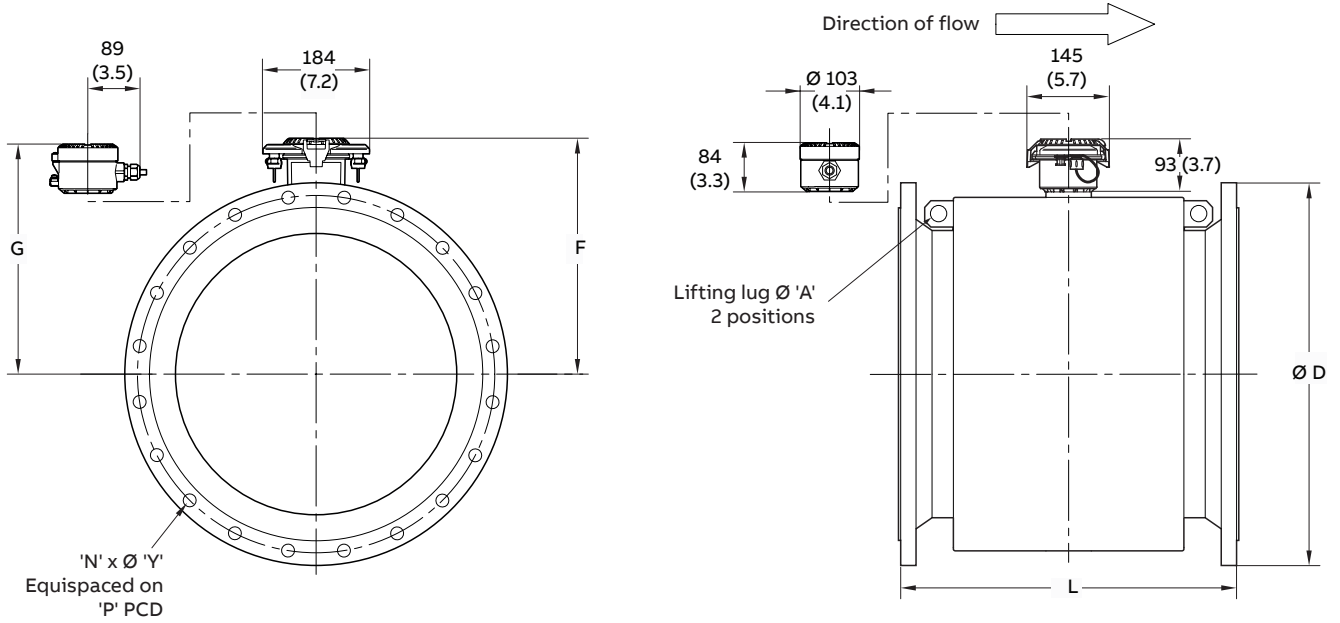


Figure 8 F-style sensor – DN700 to 2400 (28 to 96 in.)

Sensor size	Flange		Dimensional in mm (in)								Approx weight kg (lbs)		
	Standard	Class	Flange OD	No. holes	Bolt hole dia.			Sensor length	Trans height	Tx box height	Lifting lug	Approx weight kg (lbs)	
					D	N	Y					P	L
DN700 (28 in.)	JIS	5K	875	24	27	820	700	497	492	30	216	214	
		10K	905	24	33	840					282	280	
		PN6	860	24	26	810					225	223	
		PN10	895	24	30	840					303	301	
	EN 1092 or DIN	PN16	910	24	36	840	337	335					
		PN25	960	24	42	875	471	469					
		PN40	995	24	48	900	586	584					
	AWWA C207	CLASS B	927	28	32 (1.25)	864 (34)	249	247					
		CLASS D	927				280	278					
		CLASS E	927				700	472	470				
		CLASS F	1035				28	44 (1.75)	940 (37)	715	713		
	AS 4087	PN16	910	20	30	845	359	357					
		PN35	935	24	36	857	539	537					
	AS 2129	TABLE D	910	20	30	845	700	263	261				
		TABLE E	910	20	33	845	700	337	335				
	ASME B16.5	CL150 SERIES A	925	28	35 (1.375)	863.6	790	503	501				
CL150 SERIES B		835	40	22 (0.875)	795.3	910	323	321					
ASME B16.5	CL300 SERIES A	1035	28	44.5 (1.75)	939.8	940	811	809					
	CL300 SERIES B	920	36	35 (1.375)	857.2	910	631	629					

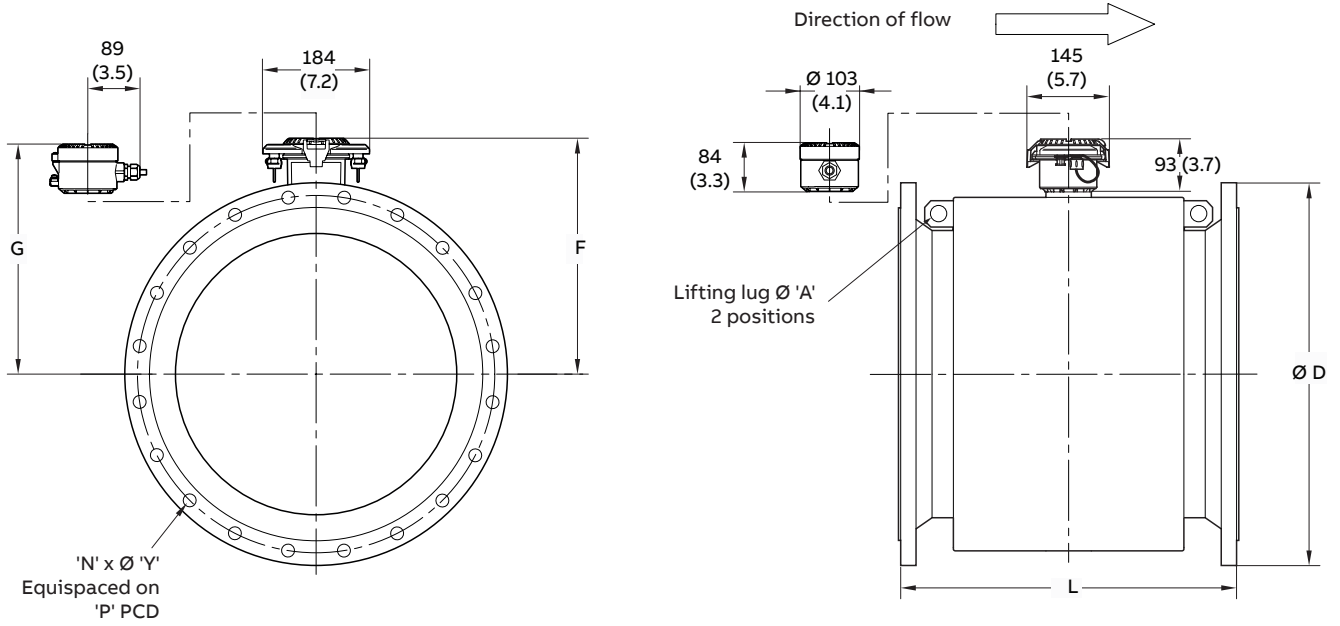
Table 7 F-style sensor – DN700 (28 in.)

Sensor size	Flange		Dimensional in mm (in)								Approx weight kg (lbs)		
	Standard	Class	Flange OD	No. holes	Bolt hole dia.		Bolt hole PCD	Sensor length	Trans height	Tx box height	Lifting lug	INT	REM
					D	N							
DN750 (30 in.)	JIS	JIS5K	945	24	33	880						251	249
		JIS10K	970	24	33	900						327	325
	AWWA C207	CLASS B	984									273	271
		CLASS D	984	28	32 (1.25)	914 (36)	762					344	342
		CLASS E	984	28	32 (1.25)	914 (36)						496	494
		CLASS F	1092	28	44 (1.75)	997 (39.25)						790	788
	AS 4087	PN16	995	20	33	927						467	465
		PN35	1015	28	36	940	990		523	518	30	663	661
	AS 2129	TABLE D	995	20	33	927						340	338
		TABLE E	995	20	36	927	762					454	452
	ASME B16.5	CL150 SERIES A	985	28	35 (1.375)	914.4	820					544	542
		CL150 SERIES B	885	44	22 (0.875)	846.1	990					320	318
	ASME B16.5	CL300 SERIES A	1090	28	47.6 (1.875)	997	975					972	970
		CL300 SERIES B	990	36	38.1 (1.5)	920.8	990					748	746
DN800 (32 in.)	JIS	JIS5K	995	24	33	930						280	278
		JIS10K	1020	28	33	950						364	362
	EN 1092 or DIN	PN6	975	24	30	920	800					294	292
		PN10	1015	34	33	950						406	404
		PN16	1025	24	39	950	870					469	467
		PN25	1085	24	48	990	950					615	613
	AWWA C207	PN40	1140	24	56	1030	1040					866	864
		CLASS B	1060									328	326
		CLASS D	1060	28	38 (1.5)	978 (38.5)						408	406
		CLASS E	1060	28	38 (1.5)	978 (38.5)	800		547	542	30	634	632
	AS 4087	CLASS F	1150	28	44 (1.75)	1054 (41.5)						897	895
		PN16	1060	20	36	984						530	528
	AS2129	PN35	1060	28	36	984	1040					751	749
		TABLE D	1060	20	36	984						386	384
	ASME B16.5	TABLE E	1060	20	36	984	800					519	517
		CL150 SERIES A	1060	28	41.3 (1.625)	977.9	940					700	698
	ASME B16.5	CL150 SERIES B	940	48	22 (0.875)	900.1	1040					406	404
		CL300 SERIES A	1150	28	51 (2)	1054.1	1120					1227	1225
CL300 SERIES B		1055	32	41.3 (1.625)	977.9	1040					933	931	
DN900 (36 in.)	JIS	JIS5K	1095	24	33	1030						369	367
		JIS10K	1120	28	33	1050						445	443
	EN 1092 or DIN	PN6	1075	24	30	1020	900					390	388
		PN10	1115	28	33	1050						502	500
		PN16	1125	28	39	1050						589	587
		PN25	1185	28	48	1090	1040					819	817
	AWWA C207	PN40	1250	28	56	1140	1170					1158	1156
		CLASS B	1168									417	415
		CLASS D	1168	32	38 (1.5)	1086 (42.75)						493	491
		CLASS E	1168	32	38 (1.5)	1086 (42.75)	900		598	593	30	827	825
	AS 4087	CLASS F	1270	32	51 (2)	1168 (46)						1150	1148
		PN16	1175	24	36	1092						706	704
	AS 2129	PN35	1185	32	39	1105	1170					1044	1042
		TABLE D	1175	24	36	1092						514	512
	ASME B16.5	TABLE E	1175	24	36	1092	900					694	692
		CL150 SERIES A	1170	32	41.3 (1.625)	1085.8	1010					961	959
	ASME B16.5	CL150 SERIES B	1055	44	25.4 (1)	1009.6	1170					595	593
		CL300 SERIES A	1270	32	54 (2.125)	1168.4	1080					1513	1511
CL300 SERIES B		1170	32	44.5 (1.75)	1089	1170					1147	1145	

Table 8 F-style sensor – DN750 to 900 (30 to 36 in.)

### ...Dimensions – sensors

...F-style sensor – DN700 to 2400 (28 to 96 in.)



...Figure 88 F-style sensor – DN700 to 2400 (28 to 96 in.)

Sensor size	Flange		Dimensional in mm (in)								Approx weight kg (lbs)				
	Standard	Class	Flange OD	No. holes	Bolt hole dia.	Bolt hole PCD	Sensor length	Trans height	Tx box height	Lifting lug	INT	REM			
													D	N	Y
DN1000 (40 in.)	JIS	JIS5K	1195	28	33	1130	1000	648	643	30	441	439			
		JIS10K	1235	28	39	1160					572	570			
		PN6	1175	28	30	1120					466	464			
		PN10	1230	28	36	1160					674	672			
	EN 1092 or DIN	PN16	1255	28	42	1170	879	877							
		PN25	1320	28	56	1210	1207	1205							
		PN40	1360	28	56	1250	1300	1413	1411						
	AWWA C207	CLASS B	1289	36	38 (1.5)	1200 (47.25)	503	501							
		CLASS D	1289				659	657							
		CLASS E	1289				36	38 (1.5)	1200 (47.25)	1000	648	643	30	1028	1026
		CLASS F	1378				36	51 (2)	1276 (50.25)	1367	1365				
	AS 4087	PN16	1255	24	36	1175	831	829							
		PN35	1275	36	39	1194	1300	1244	1242						
	AS 2129	TABLE D	1255	24	36	1175	610	608							
		TABLE E	1255	24	39	1175	1000	833	831						
	ASME B16.5	CL150 SERIES A	1290	36	41.3 (1.625)	1200.2	1080	1149	1147						
CL150 SERIES B		1175	44	28.6 (1.125)	1120.8	1300	738	736							
ASME B16.5	CL300 SERIES A	1240	32	44.5 (1.75)	1155.7	1150	1349	1347							
	CL300 SERIES B	1275	40	44.5 (1.75)	1190.6	1300	1487	1485							

Table 9 F-style sensor – DN1000 (40 in.)

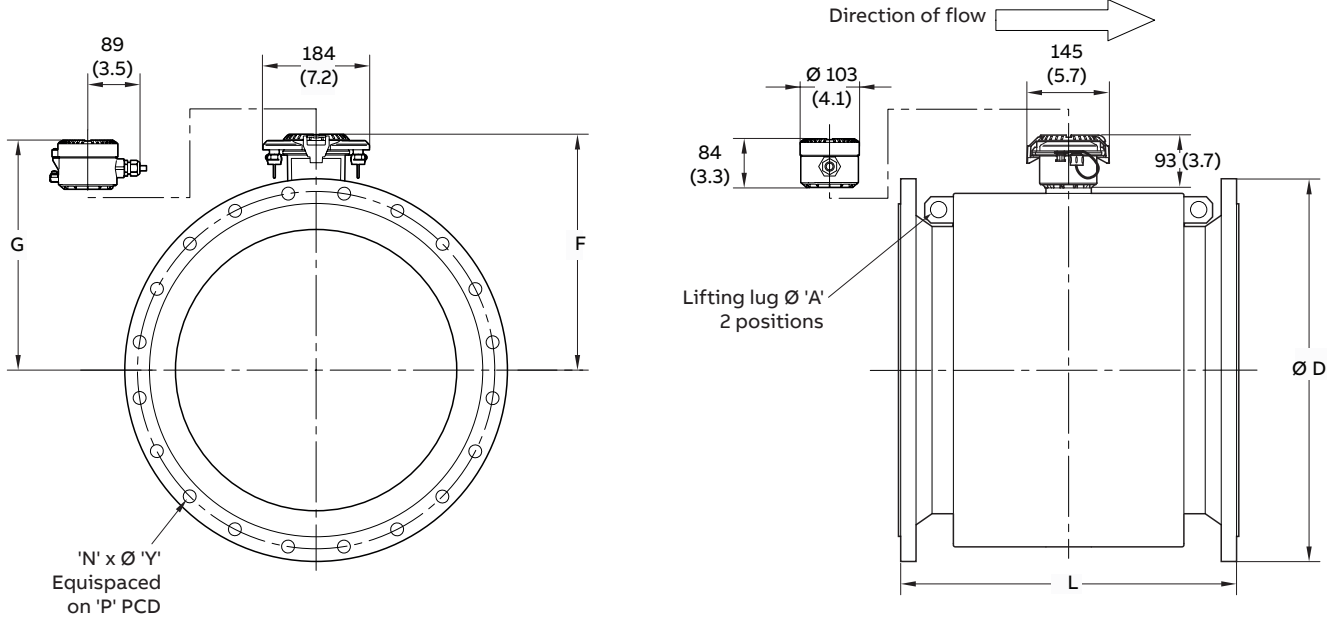


Sensor size	Flange		Dimensional in mm (in)							Trans height	Tx box height	Lifting lug	Approx weight kg (lbs)	
	Standard	Class	Flange OD	No. holes	Bolt hole dia.	Bolt hole PCD	Sensor length	INT					REM	
								D	N				Y	P
DN1050 (42 in.)	AWWA C207	CLASS B	1346	36	38 (1.5)	1257 (49.5)	1067	701	697	30	564	562		
		CLASS D	1346								669	667		
		CLASS E	1346								1143	1141		
		CLASS F	1448								1568	1566		
	ASME B16.5	CL150 SERIES A	1345	36	41.3 (1.625)	1257.3					1289	1287		
		CL150 SERIES B	1225	48	28.6 (1.125)	1171.6					809	807		
	ASME B16.5	CL300 SERIES A	1290	32	44.5 (1.75)	1206.5					1170	1527	1525	
CL300 SERIES B		1335	36	47.6 (1.875)	1244.6	1365	1704	1702						
DN1100 (44 in.)	JIS	JIS5K	1305	28	33	1240	1118	701	697	30	510	508		
		JIS10K	1345	28	39	1270					689	687		
	AWWA C207	CLASS B	1403	40	38 (1.5)	1315 (51.75)					615	613		
		CLASS D	1403								807	805		
		CLASS E	1404								1205	1203		
		CLASS F	1505								1719	1717		
DN1200 (48 in.)	JIS	5K	1420	32	33	1350	1200				651	649		
		10K	1465	32	39	1380					967	965		
		PN6	1405	32	33	1340					710	708		
	EN 1092 or DIN	PN10	1455	32	39	1380	1560					1107	1105	
		PN16	1485	32	48	1390						1363	1361	
		PN25	1530	32	56	1420						1559	1557	
		PN40	1575	32	62	1460						2133	2131	
		CLASS B	1511	44	38 (1.5)	1422 (56)						772	770	
	CLASS D	1511	999				997							
	CLASS E	1511	1458				1456							
	CLASS F	1651	40				51 (2)	1543 (60.76)	1200	753	748	30	2400	2398
	AS 4087	PN16	1490	32	36	1410						1253	1251	
	AS 2129	TABLE-D	1490	32	36	1410						1023	1021	
		TABLE-E	1490	32	39	1410						1272	1270	
	AS 4087	PN35	1530	40	42	1441						1560	2115	2113
	ASME CL150	SERIES A	1510	44	41.3 (1.625)	1422.4	1310	1707	1705					
		SERIES B	1390	44	31.8 (1.25)	1335.1	1200	1085	1083					
	ASME CL300	SERIES A	1465	32	51 (2)	1371.6	1400	2163	2161					
		SERIES B	1510	40	51 (2)	1416	1560	2352	2350					
	DN1350 (54 in.)	AWWA C207	CLASS B	1683	44	44 (1.75)	1594 (62.75)	1350	848	843	45	981	979	
CLASS D			1683	1213								1211		
CLASS E			1683	1942								1940		
DN1400 (56 in.)	EN 1092 or DIN	PN6	1630	36	36	1560	1400					1085	1083	
		PN10	1675	36	42	1590						1731	1729	
		PN16	1685	36	48	1590						1770	1768	
		PN25	1755	36	62	1640						1820	2368	2366
		PN40	1795	36	62	1680							848	843
	ASME CL150	SERIES A	1745	48	47.6 (1.875)	1651	1490	2566	2554					
		SERIES B	1600	60	31.8 (1.25)	1543	1400	1593	1591					
	ASME CL300	SERIES A	1710	28	60.3 (2.375)	1600.2	1600	3376	3374					
		SERIES B	1765	36	60.3 (2.375)	1651	1820	3758	3756					

Table 10 F-style sensor – DN1050 to 1400 (42 to 56 in.)

### ...Dimensions – sensors

...F-style sensor – DN700 to 2400 (28 to 96 in.)

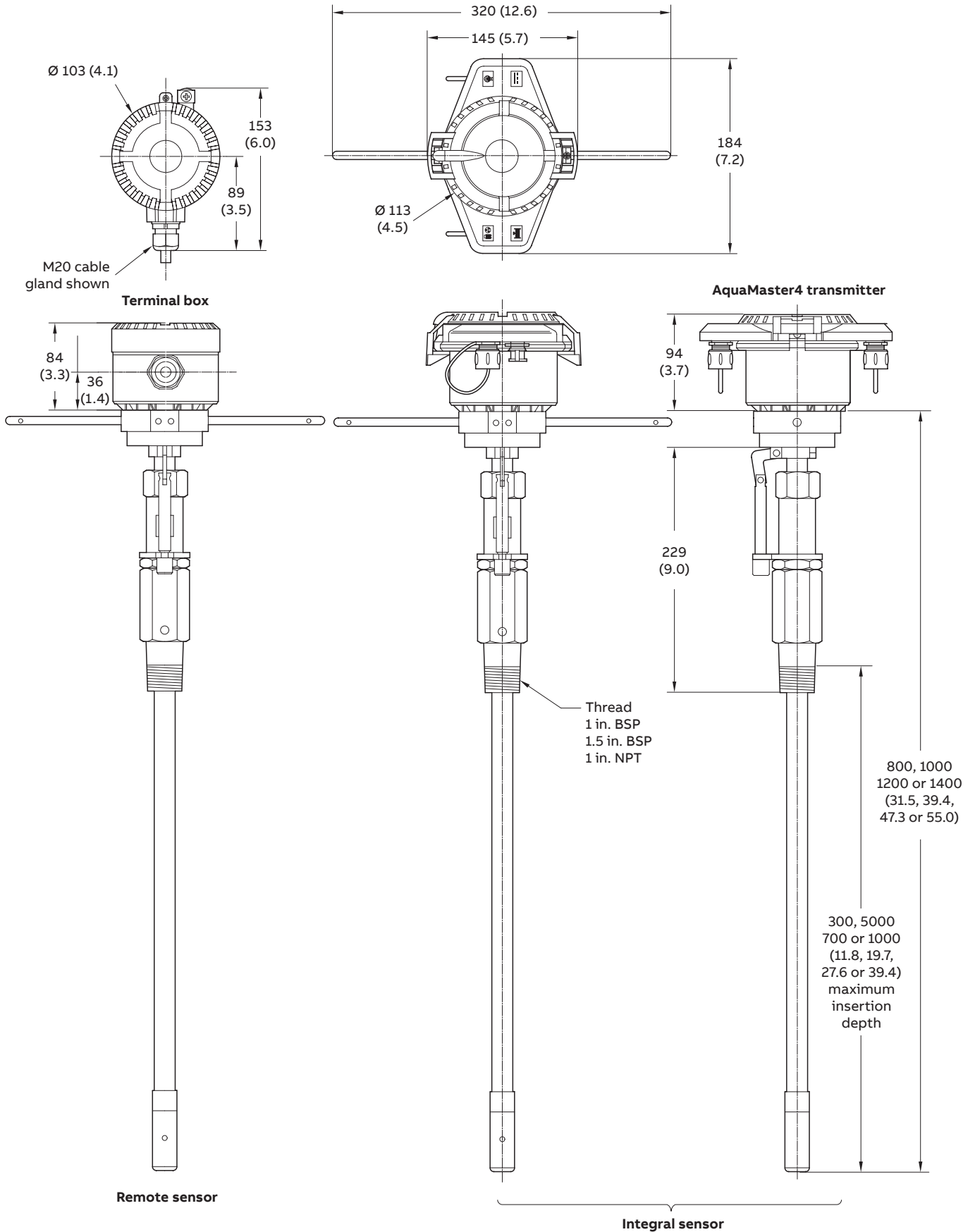


...Figure 8 F-style sensor – DN700 to 2400 (28 to 96 in.)

Sensor size	Flange		Dimensional in mm (in)								Approx weight in kg(lbs)		
	Standard	Class	Flange OD	No. Holes	Bolt Hole Dia	Bolt Hole PCD	Sensor Length	Trans Height	Tx box Height	Lifting Lug	INT	REM	
													D
DN1500 (60 in.)	JIS	5K	1730	36	33	1660					1029	1027	
		10K	1795	40	45	1700					1504	1502	
	AWWA C207	CLASS B	1854									1229	1227
		CLASS D	1854	52	44(1.75)	1759(69.25)	1524					1514	1512
		CLASS E	1854	52	44(1.75)	1759(69.25)		958	953	45	2544	2542	
	ASME CL150	SERIES A	1855	52	47.6(1.875)	1759						3084	3082
		SERIES B	1725	52	35(1.375)	1662.1						2031	2029
	ASME CL300	SERIES A	1810	32	60.3(2.375)	1701.8	1640					3875	3873
SERIES B		1880	40	60.3(2.375)	1763.7	1950					4181	4179	
DN1600 (64 in.)	EN 1092 or DIN	PN6	1830	40	36	1760					1434	1432	
		PN10	1915	40	48	1820	1600				2525	2523	
		PN16	1975	40	56	1820		959	954	45	2768	2766	
		PN25	1930	40	62	1860					3201	3199	
		PN40	2025	40	70	1900	2080				4375	4373	
DN1650 (66 in.)	AWWA C207	CLASS B	2032	52	44(1.75)	1930(76)	1650	1009	1004	45	1504	1502	
		CLASS D	2032								2025	2023	
DN1800 (72 in.)	EN 1092 or DIN	PN6	2045	44	39	1970					1853	1851	
		PN10	2115	44	48	2020	1800				3180	3178	
		PN16	2130	44	56	2020		1074	1069	45	3657	3655	
		PN25	2195	44	70	2070	2380				4422	4420	
	AWWA C207	CLASS B	2197									1773	1771
		CLASS D	2197	60	44(1.75)	2096(82.5)	1800				2387	2385	
DN1950 (78 in.)	AWWA C207	CLASS B	2362	64	51(2)	2261(89)	1950	1184	1179	45	2309	2307	
		CLASS D	2362								3037	3035	
DN2000 (80 in.)	EN 1092 or DIN	PN6	2265	48	42	2180					2581	2579	
		PN10	2325	48	48	2230	2000				4254	4252	
		PN16	2345	48	62	2230		1184	1179	45	4556	4554	
		PN25	2425	48	70	2300	2600				5896	5894	
DN2100 (84 in.)	AWWA C207	CLASS B	2534	64	51(2)	2426(95.5)	2100	1288	1283	45	2641	2639	
		CLASS D	2534								3487	3485	
DN2200 (88 in.)	EN 1092 or DIN	PN6	2475	52	42	2390					3363	3361	
		PN10	2550	52	56	2440	2200	1288	1283	45	5795	5793	
DN2400 (96 in.)	EN 1092 or DIN	PN6	2685	56	42	2600					4100	4098	
		PN10	2760	56	56	2650	2400	1388	1283	45	6968	6966	

Table 11 F-style sensor – DN1500 to 2400 (42 to 96 in.)

**Dimensions – insertion flowmeter**

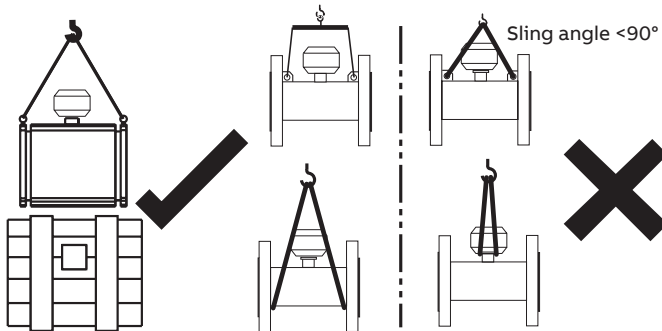


## Installation requirements – sensor

This section is intended to give an overview of installation of a flowmeter. For Installation requirements, technical information and Health and Safety precautions refer to User Guide OI/FER100/FER200-EN.

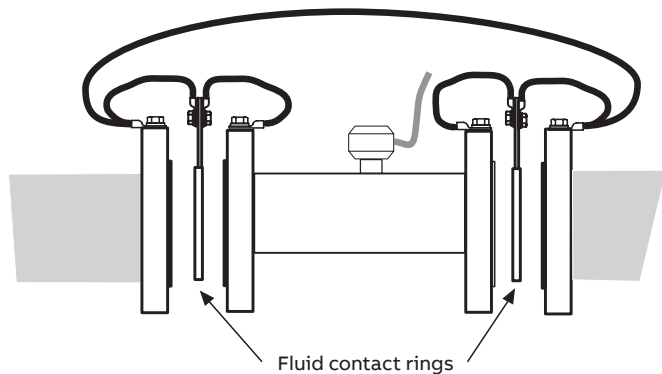
### Unpacking the flowmeter

Care must be taken when lifting the flowmeter to use the lifting hooks provided or sling under the body of the meter. Never lift the flowmeter using the terminal connection box of the sensor cable as this causes damage and invalidates the warranty.

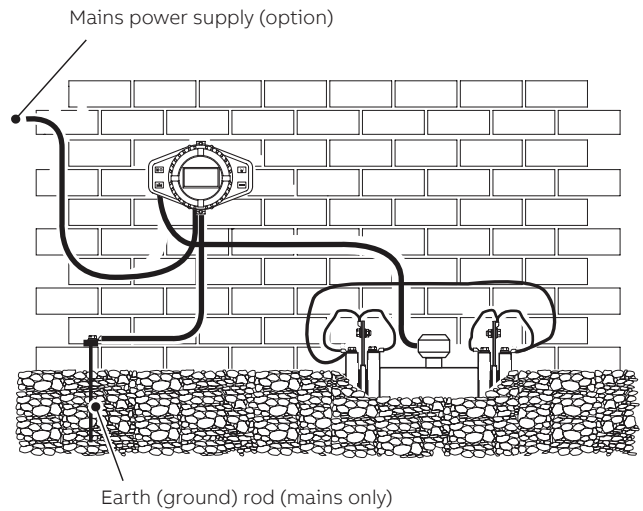


### Grounding

The flowmeter sensor must be cross-bonded to the upstream and downstream pipes. For technical reasons, this potential must be identical to the potential of the metering fluid. The fluid connection is made by installing 2 fluid contact rings (for grounding).

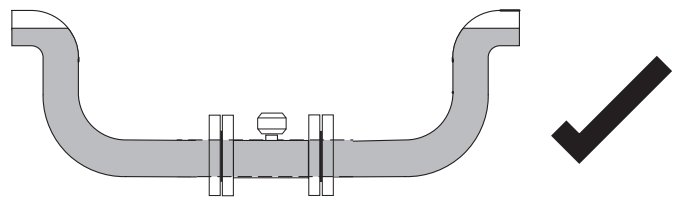


**Note.** The grounding arrangements shown below are applicable to both cathodic and non-cathodic protected installations.



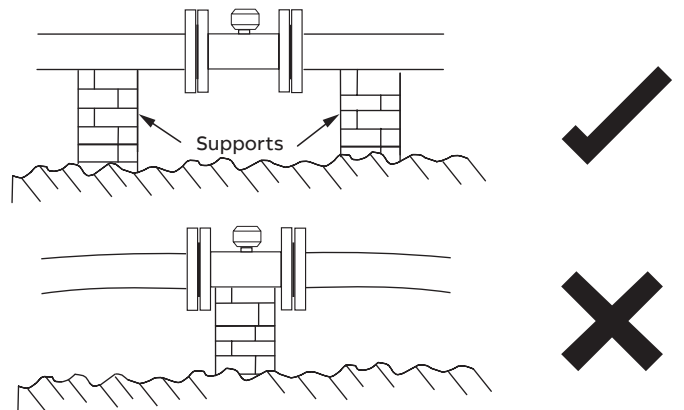
### Mounting

The installation conditions shown below must be observed to achieve the best operational results. The sensor tube must always be completely full.



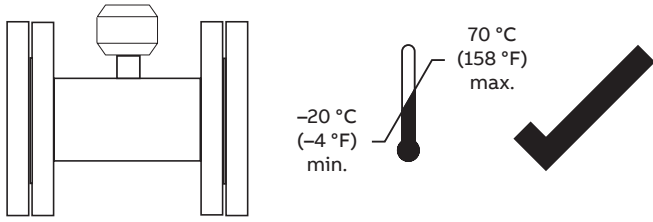
The flow direction must correspond to the identification plate. The flowmeter measures the flowrate in both directions. Forward flow is the factory setting.

The flowmeter must be installed without mechanical tension (torsion, bending). If necessary, support the pipeline.

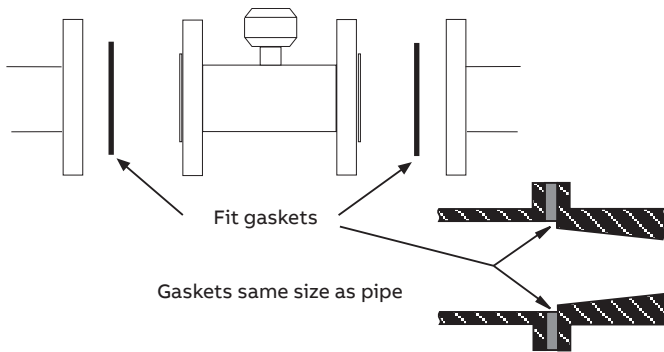


### ...Installation requirements – sensor

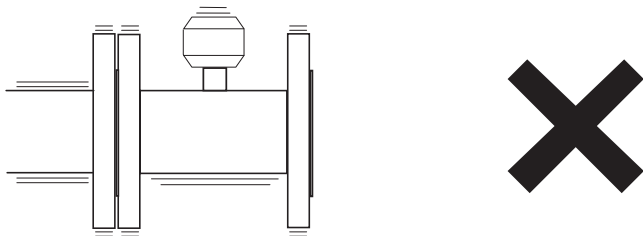
The flange seal material must be compatible with the fluid and fluid temperatures.



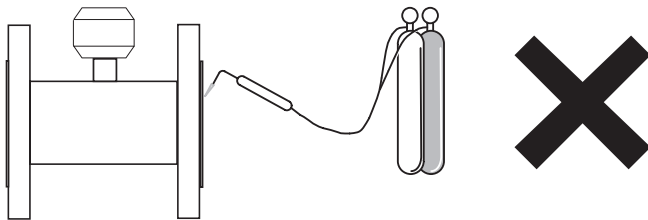
Seals must not extend into the flow area as this causes turbulence that adversely influences flowmeter accuracy.



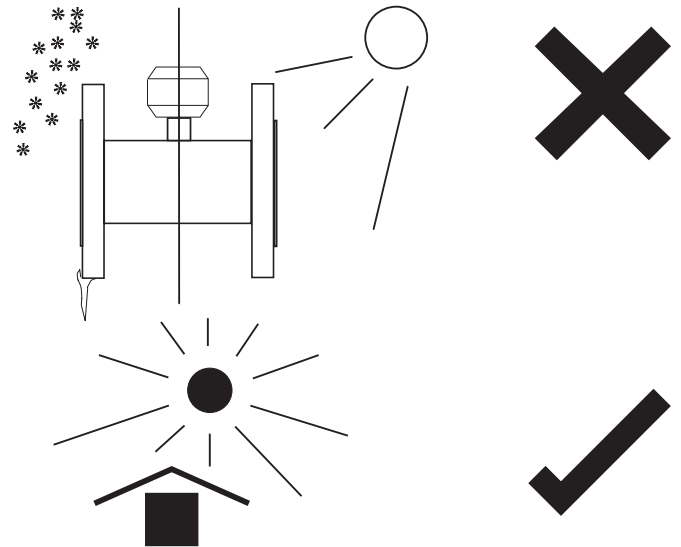
The pipeline must not exert any forces and torques on the flowmeter (for example, vibration).



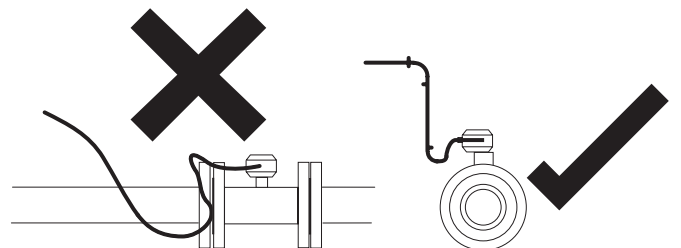
The flowmeter must not be submitted to localized heating during installation; take care to remember this is a measuring instrument.



The flowmeter must not be exposed to direct sunlight. Provide appropriate sun protection where necessary.

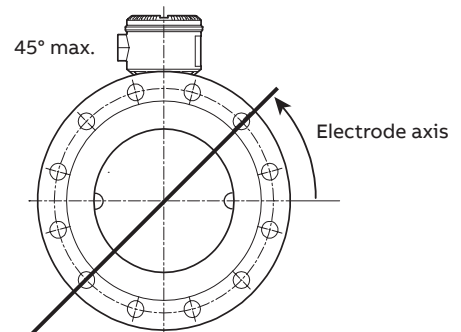


The cable to the flowmeter must be installed neatly or within a conduit. Both loose or conduit installations must have a u-bend below terminal connection box height to enable any water to run off thus avoiding any capillary action into the flowmeter sensor.



#### Electrode axis

The electrode axis must be horizontal wherever possible or no more than 45° from horizontal.



**Installation requirements – transmitter**

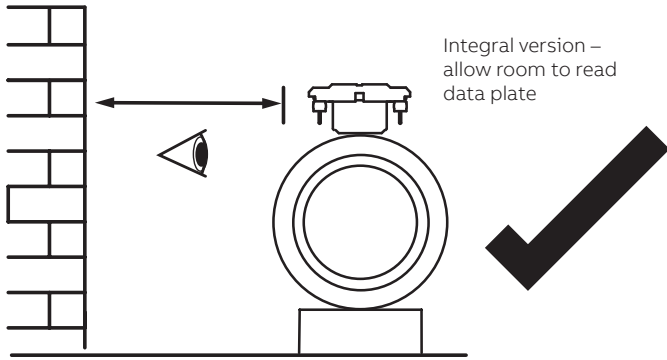


Figure 9 Siting

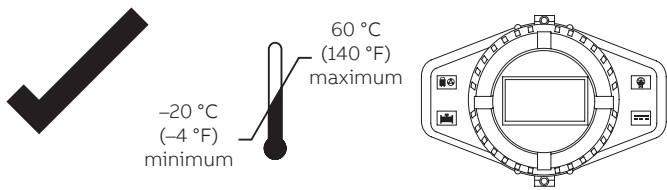


Figure 10 Within temperature limits

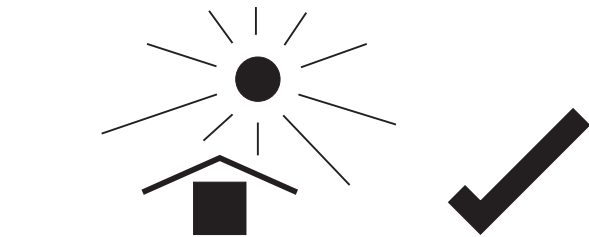


Figure 11 Shade

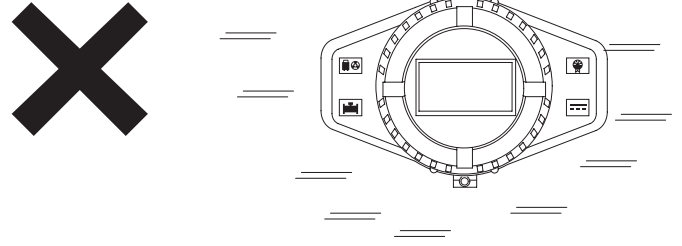


Figure 12 Vibration

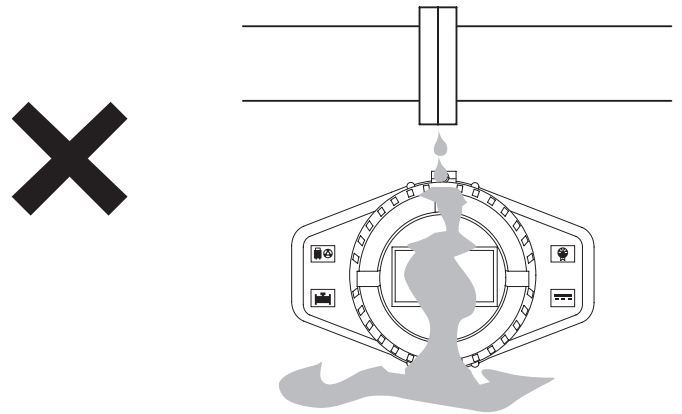


Figure 13 Spillage

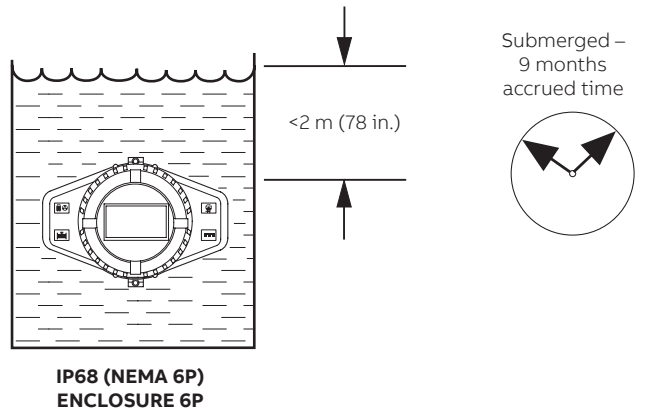
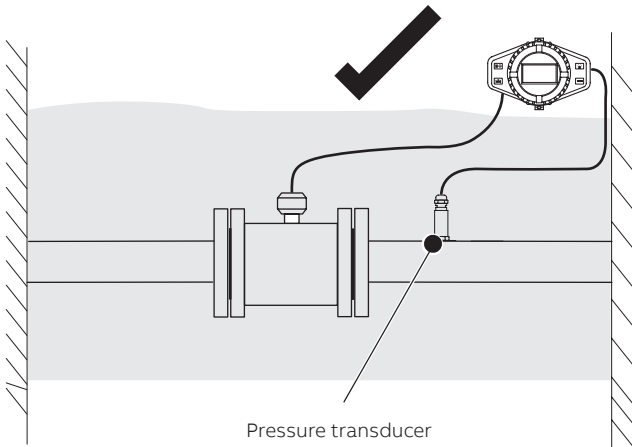


Figure 14 Within environmental rating

...Installation requirements – transmitter



For access to display and communication

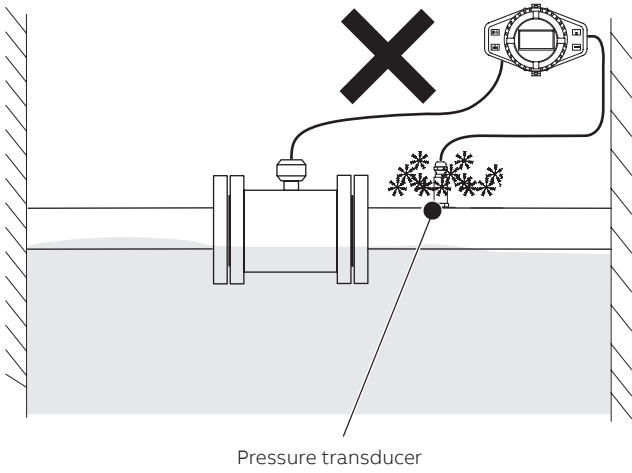
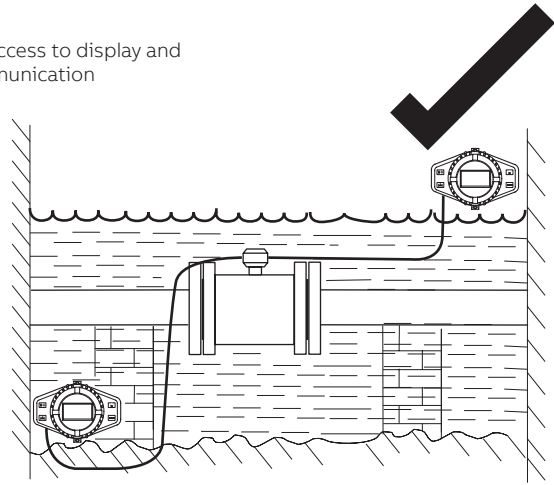


Figure 16 Access to transmitter

Figure 15 Pressure transducer – protect from frost



## AquaMaster 4 series differences

	Features	AquaMaster 4	
		41X (standard)	43X (advanced)
<b>Mounting</b>	Integral	✓	✓
	Remote	✓	✓
<b>Sensors</b>	Full bore flanged rubber DN40 to DN2400	✓	✓
	Octagonal bore flanged polypropylene DN40 to DN200	✓	✓
	Reduced bore flanged rubber DN40 to DN600	✓	✓
	Probe 300 to 1000 mm	✓	✓
<b>Measurement</b>	Class 2 / 0.5 % calibration	✓	
	Class 2 / 0.4 % calibration		✓
	Class 1 and 2 / 0.2 % calibration		✓
	Extended range class 1 and 2 calibration to OIML R49 and NMI R49		✓
	Totalizer	✓	✓
	Pressure		✓
<b>Power</b>	Internal logger		✓
	AC (100 to 230 V, 50 or 60 Hz)		✓
	Battery	✓	✓
<b>Outputs</b>	Renewable (solar / wind)		✓
	Digital outputs	✓	✓
	Modbus		✓
<b>Special application needs</b>	Sensus compatible	✓	✓
	Sensor submerged (up to 10 m) or buried (up to 5 m) *	✓	✓
	Retrofit with legacy AquaMaster sensors		✓

\*DN40 to 600 reduced bore and DN40 to 200 octagonal bore sensors

## Ordering information

### Electromagnetic flowmeter

<b>Sensor and transmitter</b>									
Standard integral flowmeter	FEW411								
Standard remote flowmeter	FEW412								
Advanced integral flowmeter	FEW431								
Advanced remote flowmeter	FEW432								
<b>Sensor only</b>									
Standard remote sensor	FEW418								
Advanced remote sensor	FEW438								
<b>Sensor style / liner material</b>									
Full bore / rubber liner		F							
Octagonal bore / polypropylene liner		V							
Reduced bore / rubber liner		R							
Probe / PEEK		A							
<b>Meter size</b>									
DN40 (1½ in.)								0040	
DN50 (2 in.)								0050	
DN65 (2½ in.)								0065	
DN80 (3 in.)								0080	
DN100 (4 in.)								0100	
DN125 (5 in.)								0125	
DN150 (6 in.)								0150	
DN200 (8 in.)								0200	
DN250 (10 in.)								0250	
DN300 (12 in.)								0300	
300 mm (12 in.) insertion length – probe only								P030	
DN350 (14 in.)								0350	
DN400 (16 in.)								4000	
DN450 (18 in.)								0450	
DN500 (20 in.)								0500	
500 mm (20 in.) insertion length – probe only								P050	
DN600 (24 in.)								0600	
DN700 (28 in.)								0700	
700 mm (28 in.) Insertion length – probe only								P070	
DN750 (30 in.)								0750	
DN800 (32 in.)								0800	
DN900 (36 in.)								0900	
DN1000 (40 in.)								1000	
1000 mm (40 in.) Insertion length – probe only								P100	
DN1050 (42 in.)								1050	
DN1100(44 in.)								1100	
DN1200 (48 in.)								1200	
DN1350 (54 in.)								1350	
DN1400 (56 in.)								1400	
DN1500 (60 in.)								1500	
DN1600 (64 in.)								1600	
DN1650 (66 in.)								1650	
DN1800 (72 in.)								1800	
DN1950 (78 in.)								1950	
DN2000 (80 in.)								2000	
DN2100 (84 in.)								2100	
DN2200 (88 in.)								2200	
DN2400 (96 in.)								2400	
Others								9999	

Continued on next page ...



## ...Ordering information

### ...Electromagnetic flowmeter

#### Options – add to order code as required

<b>Logger and protocol</b>	
Internal logger option	LPN
<b>Calibration type</b>	
Class 2.5 calibration to NMI M10 – FEW411 and FEW412 only	RCS
Class 2 / 0.5 % factory calibration – FEW411 and FEW412 only	RCC
Class 2 / 0.4 % factory calibration – Standard with FEW431 and FEW432 only	RCD
Class 2 / 0.2 % factory calibration – Option with FEW431 and FEW432 only	RCB
Class 1 / 0.2 % factory calibration – Option with FEW431 and FEW432 only	RCF
Class 2 calibration to OIML R49 and NMI R49 – Option with FEW431 and FEW432 only	RCM
Class 1 calibration to OIML R49 and NMI R49 – Option with FEW431 and FEW432 only	RCN
2 % factory calibration (probe only)	RCW
<b>Number of test points</b>	
1	TV1
5	TV5
<b>Signal cable length and type</b>	
5 m (approx. 15 ft.)	SC1
10 m (approx. 30 ft.)	SC2
20 m (approx. 66 ft.)	SC4
30 m (approx. 98 ft.)	SC6
50 m (approx. 164 ft.)	SCA
100 m (approx. 328 ft.)	SCE
150 m (approx. 492 ft.)	SCG
<b>Additional cables</b>	
Sensus cable, 5 m	SR1
Sensus cable, 20 m	SR4
Renewable energy cable, 10 m	SP2
<b>Accessories</b>	
1½ in. ball valve	AB
RS485 lead with MIL connector for MODBUS	AT
<b>Display protective cover</b>	
Display protective cover without NFC	AD1
Display protective cover with NFC, 5 m cable	AD2
Display protective cover with NFC, 20 m cable	AD3
<b>Pressure span</b>	
1000 kPa / 10 bar / 145 psi	PS1
1600 kPa / 16 bar / 232 psi	PS2
2000 kPa / 20 bar / 300 psi	PS3
4000 kPa / 40 bar / 580 psi	PS4
<b>Pressure transducer</b>	
Remote, cable length 10 m (33 ft)	PT5
Remote, cable length 20 m (65 ft)	PT6
<b>Other usage certifications</b>	
UL Fire Service approval	CMF
<b>Potable water approvals</b>	
WRAS – cold water approval	CWA
NSF-61	CWC
DVGW	CWD
AZ / NZS 4020	CWE
ACS	CWF
WRAS – 60 °C water approval	CWK
<b>Sensor length</b>	
1D laylength – DN700 to 2400 (28 to 96 in.)	JH
1.3D laylength – DN700 to 2400 (28 to 96 in.)	JK
<b>Other options</b>	
With customer property label	KL
<b>Documentation language</b>	
German	M1
Spanish	M3
French	M4
English	M5
Chinese	M6
Polish	M9

**Transmitter**

	Product coding field number	1,2,3,4,5,6	7	8,9
<b>Transmitter only</b>				
Standard remote transmitter		FET412		
Advanced remote transmitter		FET432		
<b>Power supply</b>				
Battery powered – battery not fitted			B	
Battery powered – battery fitted			L	
AC + internal back-up			K	
External renewable energy + internal back-up			R	
<b>Outputs</b>				
MODBUS				M4
Pulse output				B1
Sensus communication protocol compatible				S1
Without (FEW411 and FEW412 only)				Y0
<b>Options – add to order code as required</b>				
<b>Logger and protocol</b>				
Internal logger option				LPN
<b>Additional cables</b>				
Sensus cable, 5 m				SR1
Sensus cable, 20 m				SR4
Renewable energy cable, 10 m				SP2
<b>Accessories</b>				
RS485 lead with MIL connector for MODBUS				AT
<b>Display protective cover</b>				
Display protective cover without NFC				AD1
Display protective cover with NFC, 5 m cable				AD2
Display protective cover with NFC, 20 m cable				AD3
<b>Pressure span</b>				
1000 kPa / 10 bar / 145 psi				PS1
1600 kPa / 16 bar / 232 psi				PS2
2000 kPa / 20 bar / 300 psi				PS3
4000 kPa / 40 bar / 580 psi				PS4
<b>Pressure transducer</b>				
Remote, cable length 10 m (33 ft)				PT5
Remote, cable length 20 m (65 ft)				PT6
<b>Other usage certifications</b>				
Measuring Instruments Directive (MID)				CM1
UL Fire Service approval				CMF
<b>Documentation language</b>				
German				M1
Spanish				M3
French				M4
English				M5
Chinese				M6
Polish				M9

## Accessories

Part No.	Description
3KXF0044 38U0100	Display protective cover without NFC
3KXF0044 55U0100	Display protective cover with NFC, 5 m cable (approx. 15 ft.)
3KXF004455U0200	Display protective cover with NFC, 20 m cable (approx. 66 ft.)
3KXF004482U0100	Sensus cable, 5 m (approx. 15 ft.)
3KXF004482U0300	Sensus cable, 20 m (approx. 66 ft.)
WABC2010/05	Sensor cable, 5 m (approx. 15 ft.)
WABC2010/10	Sensor cable, 10 m (approx. 30 ft.)
WABC2010/20	Sensor cable, 20 m (approx. 66 ft.)
WABC2010/30	Sensor cable, 30 m (approx. 98 ft.)
WABC2010/50	Sensor cable, 50 m (approx. 164 ft.)
WABC2010/100	Sensor cable, 100 m (approx. 328 ft.)
WABC2010/150	Sensor cable, 150 m (approx. 492 ft.)

Sales



Service



Software





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