



## OPTIFLUX 6000 **Technical Datasheet**

Electromagnetic flow sensor  
for hygienic and sanitary applications

- Robust stainless steel housing for hygienic and aseptic operation
- Fully suitable for CIP and SIP
- Typical food & beverage and pharmaceutical process connections and insertion lengths



The documentation is only complete when used in combination with the relevant documentation for the signal converter.

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## 1.1 Sanitary and hygienic solution

The **OPTIFLUX 6000** electromagnetic flow sensor is specifically designed to stay clean and sterile in compliance with the most stringent demands prevailing in the food & beverages and pharmaceutical industries. There are no crevices, gaps or blind spots and the flow sensor offers full CIP/SIP possibilities. The flow sensor is conform FDA regulations for all wetted materials and is certified in accordance with EHEDG and 3A.

The OPTIFLUX 6000 provides simple engineering, installation and commissioning. The flowmeter is available as a separate or compact version. Therefore the flow sensor can be installed in places difficult to access due to for example high temperatures or vibrations. The converter is also available in a stainless steel housing for applications when for example regular cleaning procedures with aggressive cleaning agents, may attack a standard polyurethane coating.

In addition to weld-end connections, the OPTIFLUX 6000 offers a large number of other hygienic connections, including DIN 11851, DIN 11864, clamp and SMS.

Because of its high accuracy, a precise measurement of the medium is possible enabling an accurate calculation of flows whether it is required for blending, dosing or batching. Furthermore, losses can be reduced to a minimum. It remains its accuracy in case of pulsating flows. And also when a medium has a low conductivity for example in case of glucose or fruit concentrates, the OPTIFLUX 6000 delivers an optimal performance.

Due to its reinforced liner the OPTIFLUX 6000 is an optimal solution for applications where high temperatures or vacuum impacts can occur. The OPTIFLUX 6000 hygienic construction is also available for larger diameters up to DN150 as volumes are increasing, and larger pipe sizes are needed with fast increase in the industrial production of beer, wine, milk and other beverages.



### Highlights

- Robust stainless steel housing for hygienic and aseptic operation
- PFA liner reinforced with embedded stainless steel grid
- Vacuum resistance
- High form stability for good accuracy even with high pressures
- Unique L-shaped gasket prevents expansion of gasket into measurement tube
- Wide choice of electrode materials
- Simple and effective CIP / SIP
- Typical food and beverages and pharmaceutical process connections and insertion lengths
- Large diameter range up to DN150
- All wetted materials FDA conform
- EHEDG and 3A certified
- Conductivity  $\geq 1 \mu\text{S}/\text{cm}$  (for demi-water  $\geq 20 \mu\text{S}/\text{cm}$ )
- Process temperature up to 140°C

### Industries

- Food & Beverages
- Pharmaceutical
- Cosmetics

### Applications

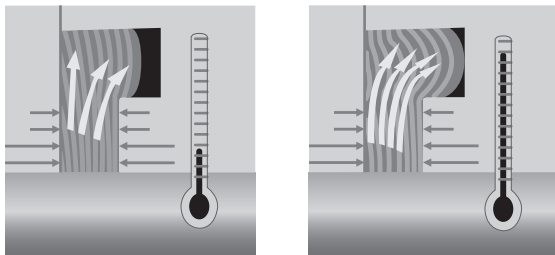
- Exact blending, dosing and batching
- Beverages including soft drinks, beer, wine and fruits juices
- Milk and other dairy products
- Beverages containing solids (for example yoghurt containing cereals)
- Drugs, caustic sodas, acids, proteins, antibiotics
- CIP media including acids and caustic solutions
- For large-scale production plants with diameter up to DN150

## 1.2 Options



### Reinforced PFA liner

The OPTIFLUX 6000 has an FDA conform PFA liner with an integrated stainless steel reinforcement that ensures vacuum resistance and long-term dimensional stability. The reinforced PFA liner makes sure that the OPTIFLUX 6000 keeps its form stability even at high temperatures and very low pressure or vacuum. Therefore the OPTIFLUX 6000 remains its accuracy over time.



### Unique gasket adapter concept

A special sealing concept for stainless steel adapters has been designed with support of TNO, a member of the European EHEDG organization. The sealing concept provides for a smooth and dimensionally stable measuring section between the two process connections. It prevents the gasket from expanding into the measuring tube because during CIP / SIP cleaning procedures, the gasket expands into an expansion chamber. This leads to a sharp sealing at the edge of the pipeline and a perfect transition into the measuring section. In addition, the gasket experiences less stress which results in a longer life time and reduced maintenance.

### 1.3 Measuring principle

An electrically conductive fluid flows inside an electrically insulated pipe through a magnetic field. This magnetic field is generated by a current, flowing through a pair of field coils. Inside of the fluid, a voltage  $U$  is generated:

$$U = v * k * B * D$$

in which:

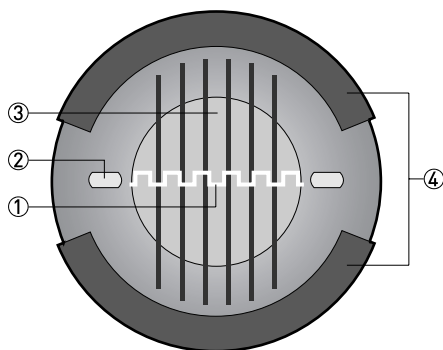
$v$  = mean flow velocity

$k$  = factor correcting for geometry

$B$  = magnetic field strength

$D$  = inner diameter of flow meter

The signal voltage  $U$  is picked off by electrodes and is proportional to the mean flow velocity  $v$  and thus the flow rate  $q$ . A signal converter is used to amplify the signal voltage, filter it and convert it into signals for totalising, recording and output processing.



- ① Induced voltage (proportional to flow velocity)
- ② Electrodes
- ③ Magnetic field
- ④ Field coils

## 2.1 Technical data

- *The following data is provided for general applications. If you require data that is more relevant to your specific application, please contact us or your local representative.*
- *Additional information (certificates, special tools, software,...) and complete product documentation can be downloaded free of charge from the website (Download Center).*

### Measuring system

Measuring principle	Faraday's law of induction
Application range	Electrically conductive fluids
<b>Measured value</b>	
Primary measured value	Flow velocity
Secondary measured value	Volume flow

### Design

Features	Hygienic design
	Stainless steel housing
	Food & beverage and pharmaceutical process connections
Modular construction	The measurement system consists of a flow sensor and a signal converter. It is available as compact and as separate version.
Compact version	With IFC 100 converter: OPTIFLUX 6100 C
	With IFC 300 converter: OPTIFLUX 6300 C
Remote version	In wall (W) mount version with the IFC 100 converter: OPTIFLUX 6100 W
	In field (F), wall (W) or rack (R) mount version with IFC 300 converter: OPTIFLUX 6300 F, W or R
Nominal diameter	DN2.5...150 / 1/10" ...6"
Measurement range	-12...+12 m/s / -40...+40 ft/s

**Measuring accuracy**

Reference conditions	Flow conditions similar to EN 29104
	Medium: Water
	Electrical conductivity: $\geq 300 \mu\text{S/cm}$
	Temperature: $+10\dots+30^\circ\text{C}$ / $+50\dots+86^\circ\text{F}$
	Operating pressure: 1 bar / 14.5 psig
	Wet calibrated on EN 17025 accredited calibration rig by direct volume comparison.
Accuracy curves	Related to volume flow (MV = Measured Value)
	These values are related to the pulse / frequency output.
	The additional typical measuring deviation for the current output is $\pm 10 \mu\text{A}$ .
	For detailed information refer to <i>Measuring accuracy</i> on page 20.
Repeatability	$\pm 0.1\%$ of MV, minimum 1 mm/s
Long term stability	$\pm 0.1\%$ of MV
Special calibration	On request

**Operating conditions**

<b>Temperature</b>	
Process temperature	Separate flow sensor: $-40\dots+140^\circ\text{C}$ / $-40\dots+284^\circ\text{F}$
	Compact with IFC 300 converter: $-40\dots+140^\circ\text{C}$ / $-40\dots+284^\circ\text{F}$
	Compact with IFC 100 converter: $-40\dots+120^\circ\text{C}$ / $-40\dots+248^\circ\text{F}$
	For detailed information refer to <i>Temperatures</i> on page 26. For Ex versions different temperatures are valid. Please check the relevant Ex documentation for details.
Ambient temperature	$-40\dots+65^\circ\text{C}$ / $-40\dots+149^\circ\text{F}$
Storage temperature	$-50\dots+70^\circ\text{C}$ / $-58\dots+158^\circ\text{F}$
<b>Pressure</b>	
Ambient pressure	Atmospheric
Nominal flange pressure	For detailed information refer to <i>Dimensions and weights</i> on page 11.
Vacuum load	0 mbar / 0 psi
<b>Chemical properties</b>	
Physical condition	Conductive liquids
Electrical conductivity	$\geq 1 \mu\text{S/cm}$
	Demi-water: $\geq 20 \mu\text{S/cm}$

**Installation conditions**

Installation	Take care that the flow sensor is always fully filled.
	For detailed information refer to <i>Installation</i> on page 21.
Flow direction	Forward and reverse
	Arrow on flow sensor indicates positive flow direction.
Inlet run	$\geq 5 \text{ DN}$
Outlet run	$\geq 2 \text{ DN}$
Dimensions and weights	For detailed information refer to <i>Dimensions and weights</i> on page 11.



## Materials

Sensor housing	DN2.5...15: Stainless steel Duplex (1.4462)
	DN25...150: Stainless steel AISI 304 (1.4301)
Measuring tube	Stainless steel AISI 304 (1.4301)
Adapters	Stainless steel AISI 316 L (1.4404)
	Other materials on request.
Liner	PFA
Connection box (F-version only)	<b>Standard:</b> Aluminum, Polyurethane coated
	<b>Option:</b> Stainless steel AISI (1.4408)
Electrodes	<b>Standard:</b> Hastelloy® C
	<b>Option:</b> Hastelloy® B2, platinum, stainless steel, tantalum, titanium
Gaskets	<b>Standard:</b> EPDM
	FDA recommends EPDM gaskets only if medium ≤ 8% fat.
	<b>Option:</b> Silicone (non-Ex only)

## Process connections

DIN 11850 row 2 / 11866 row A	DN2.5...150
DIN 11851	DN2.5...150
DIN 11864-2A flange with notch	DN25...150
DIN 32676	DN25...100
ISO 2037	DN2.5...150
ISO 2852	DN2.5...150
SMS 1145	DN25...100
Tri Clamp	½...4"
	Note: DN2.5...6 (1/10...1/4") have DN10 (3/8") connections.

## Electrical connections

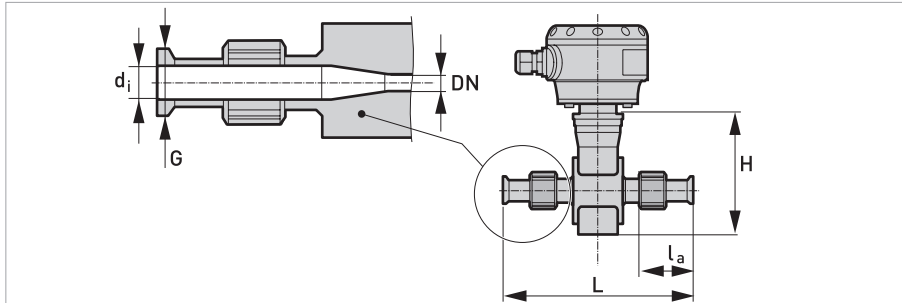
<b>Signal cable</b>	
Type A (DS)	Standard cable, double shielded. Max. length: 600 m / 1950 ft (dep. on electrical conductivity and measuring sensor). See documentation of the converter for more information.
Type B (BTS)	Optional cable, triple shielded. Max. length: 600 m / 1950 ft. (dep. on electrical conductivity and measuring sensor). See documentation of the converter for more information.

## Approvals en Certificates

<b>CE</b>	
	This device fulfills the statutory requirements of the EC directives. The manufacturer certifies successful testing of the product by applying the CE mark.
Electromagnetic compatibility	Directive: 2004/108/EC
	Harmonized standard: EN 61326-1: 2006
Low voltage directive	Directive: 2006/95/CE
	Harmonized standard: EN 61010: 2001
Pressure equipment directive	Directive: 97/23/EC
	Category I, II or SEP
	Fluid group 1
	Production module H
<b>Hazardous areas</b>	
ATEX	Please check the relevant Ex documentation for details.
	<b>Compact version with IFC 300 C converter:</b>
	II 2 GD or II 2 (1) GD
	<b>Remote version:</b>
	II 2 GD
FM	<b>In combination with IFC 300 C or F converter:</b>
	Class I, Div. 2, Groups A, B, C and D
	Class II, Div. 2, Groups F and G
	Class III, Div. 2, Groups F and G
	Only available for DN2.5...15
CSA	<b>In combination with IFC 300 C or F converter:</b>
	Class I, Div. 2, Groups A, B, C and D
	Class II, Div. 2, Groups F and G
	Class III, Div. 2, Groups F and G
	Only available for DN2.5...15
<b>Other approvals and standards</b>	
Protection category acc. to IEC 529/ EN 60529	<b>Standard</b>
	IP 66/67 (NEMA 4/4X/6)
	<b>Option (F version only)</b>
	IP 68 field (NEMA 6P)
	IP 68 factory (NEMA 6P)
	IP 68 is only available for separate design and with a stainless steel connection box.
Hygienic	3A approved
	EHEDG
	Conform FDA regulations

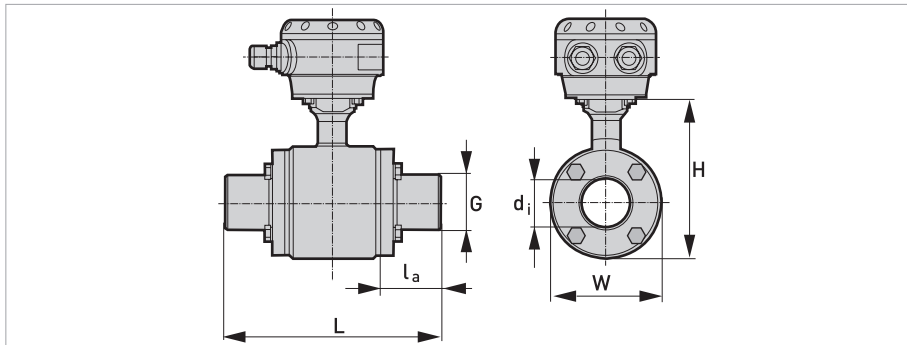
## 2.2 Dimensions and weights

DIN 11850 (row 2 or DIN 11866 row A)



DN2.5...10 screwed adapter with DN10 process connections / DN15 screwed adapter

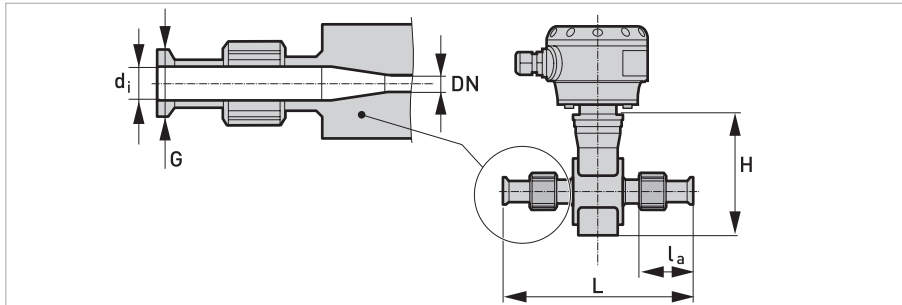
Nominal size		Dimensions [mm]						Approx. weight
		Adapter			Flowmeter			
DN	PN	$d_i$	G	$l_a$	L	H	W	[kg]
2.5...10	40	10	13	32	180	120	44	1.5
15	40	16	19	32	180	120	44	1.5



DN25...150 bolted adapter

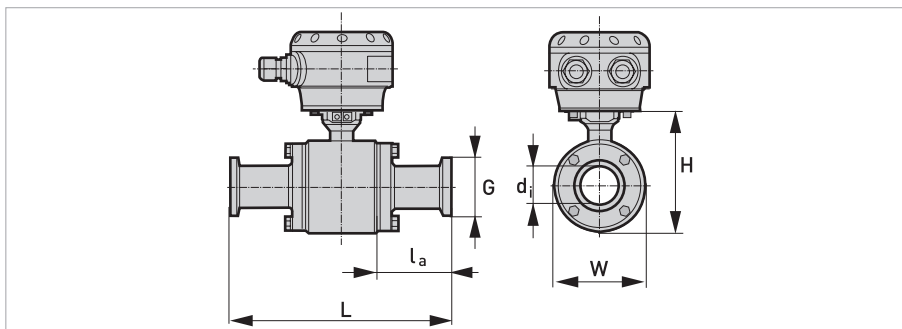
Nominal size		Dimensions [mm]						Approx. weight [kg]
		Adapter			Flowmeter			
DN	PN	d <sub>i</sub>	G	l <sub>a</sub>	L	H	W	
25	40	26	29	20.6	132.6	128	89	3
40	40	38	41	61.3	220	153	114	5.3
50	25	50	53	61.3	220	153	114	6.8
65	25	66	70	41.8	220	180	141	10.9
80	25	81	85	66.8	280	191	152	11.2
100	16	100	104	59.3	280	242	203	18.4
125	10	125	129	66.3	319	258	219	29.5
150	10	150	154	64.3	325	293	254	44.3

## DIN 11851



DN2.5...10 screwed adapter with DN10 process connections / DN15 screwed adapter

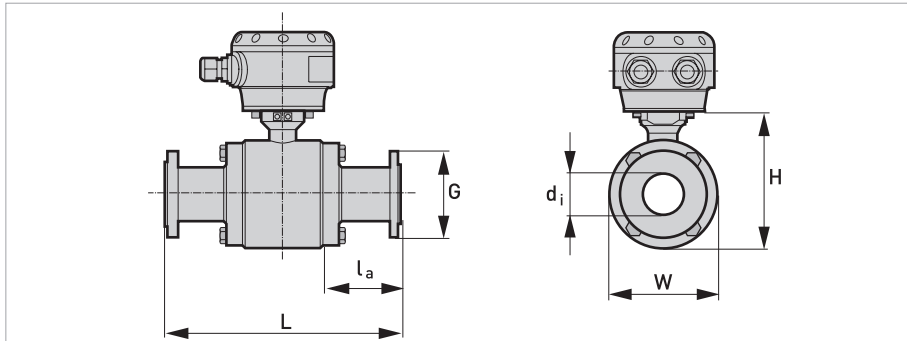
Nominal size		Dimensions [mm]						Approx. weight
DN	PN	Adapter		Flowmeter				
DN	PN	d <sub>i</sub>	G	l <sub>a</sub>	L	H	W	[kg]
2.5...10	40	10	Rd 28 x 1/8"	53.1	214	142	44	1.5
15	40	16	Rd 34 x 1/8"	53.1	214	142	44	1.5



DN25...150 bolted adapter

Nominal size		Dimensions [mm]						Approx. weight
DN	PN	Adapter		Flowmeter				
DN	PN	d <sub>i</sub>	G	l <sub>a</sub>	L	H	W	[kg]
25	40	26	Rd 52 x 1/6"	49.3	190	128	89	3.2
40	40	38	Rd 65 x 1/6"	91.3	280	153	114	5.5
50	25	50	Rd 78 x 1/6"	93.3	284	153	114	5.3
65	25	66	Rd 95 x 1/6"	77.8	292	180	141	10
80	25	81	Rd 110 x 1/4"	107.8	362	191	152	12.5
100	16	100	Rd 130 x 1/4"	109.3	380	242	203	21.8
125	10	On request						
150	10	On request						

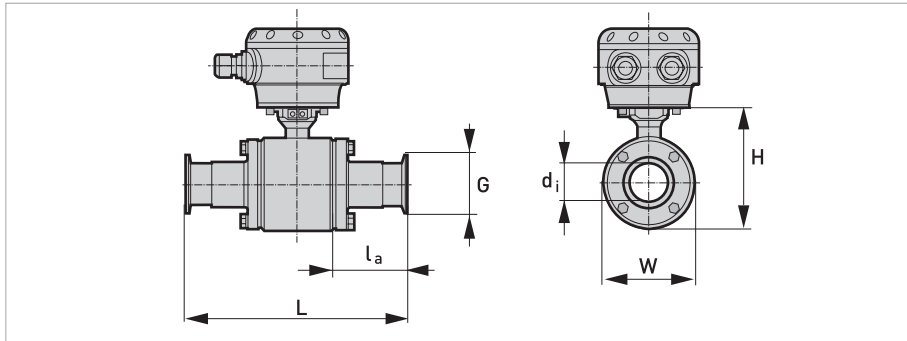
DIN 11864-2A



DN25...150 bolted adapter

Nominal size		Dimensions [mm]						Approx. weight
		Adapter			Flowmeter			
DN	PN	d <sub>i</sub>	G	l <sub>a</sub>	L	H	W	[kg]
25	40	26	70	45.8	183	128	89	4.4
40	40	38	82	83.3	264	153	114	7.5
50	25	50	94	83.3	264	153	114	9
65	25	66	113	63.8	264	180	141	14.5
80	25	81	133	122.8	392	191	152	18.6
100	16	100	159	115.3	392	242	203	28.2
125	10	On request						
150	10	On request						

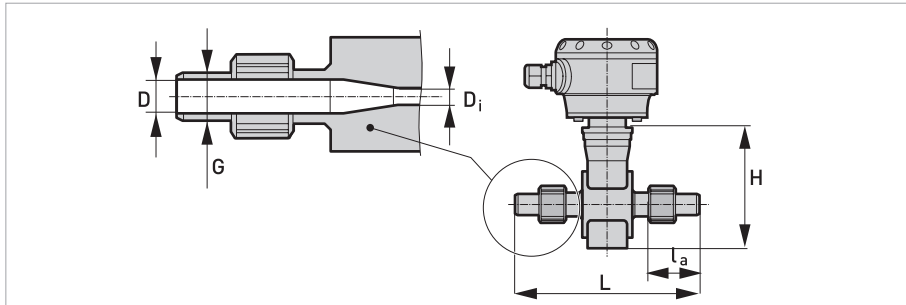
## DIN 32676



DN25...100 bolted adapter

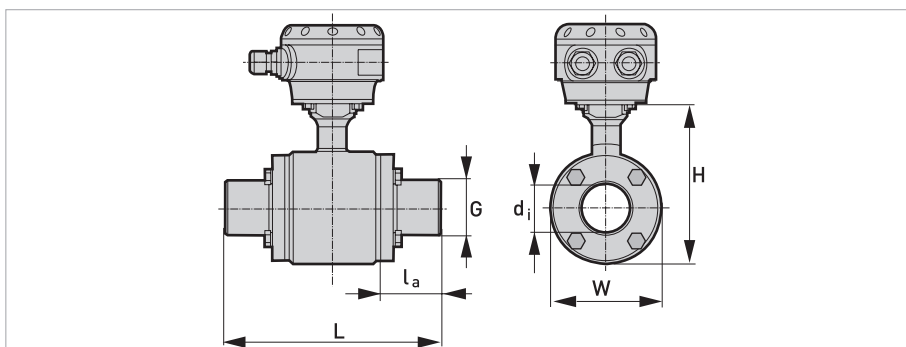
Nominal size		Dimensions [mm]						Approx. weight
		Adapter			Flowmeter			
DN	PN	$d_i$	G	$l_a$	L	H	W	[kg]
25	16	26	50.5	41.8	175	128	89	3.2
40	16	38	50.5	80.8	259	153	114	5.5
50	16	50	64	80.8	259	153	114	5.3
65	16	66	91	67.8	272	180	141	10
80	16	81	106	92.8	332	191	152	12.5
100	16	100	119	85.3	332	242	203	21.8

ISO 2037



DN2.5...10 screwed adapter with DN10 process connections / DN17.2 screwed adapter

Nominal size		Dimensions [mm]						Approx. weights
DN	PN	Adapter		Flowmeter				
DN	PN	d <sub>i</sub>	G	l <sub>a</sub>	L	H	W	[kg]
2.5...12	40	10	15	32	180	142	44	1.5
17.2	40	16	21	32	180	142	44	1.5

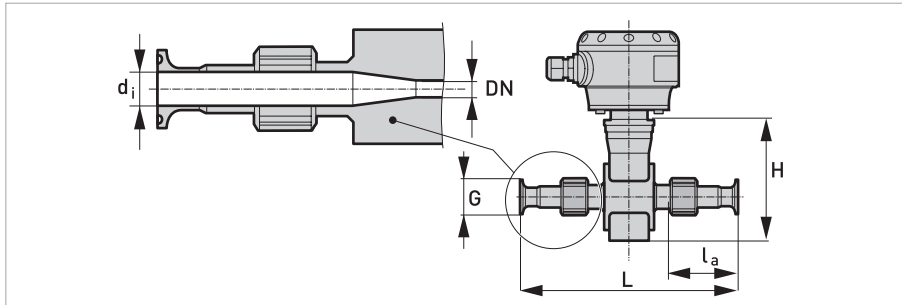


DN25...150 bolted adapter

Nominal size		Dimensions [mm]						Approx. weights
DN	PN	Adapter		Flowmeter				
DN	PN	d <sub>i</sub>	G	l <sub>a</sub>	L	H	W	[kg]
25	40	22.6	31	20.6	132.6	128	89	3
38	40	38	43	61.3	220	153	114	5.3
51	25	49	55	61.3	220	153	114	5
63.5	25	60.3	71	41.8	220	180	141	9
76.1	25	72.9	86	66.8	280	191	152	10.8
101.6	16	97.6	105	59.3	280	242	203	18.4
114.3	10	110.3	130	66.3	319	258	219	29.5
139.7	10	135.7	156	64.3	325	293	254	44.3

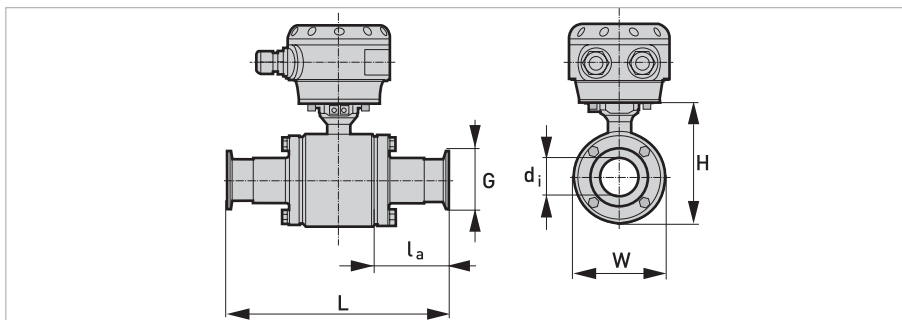


## ISO 2852



DN2.5...10 screwed adapter with DN10 process connections / DN17.2 screwed adapter

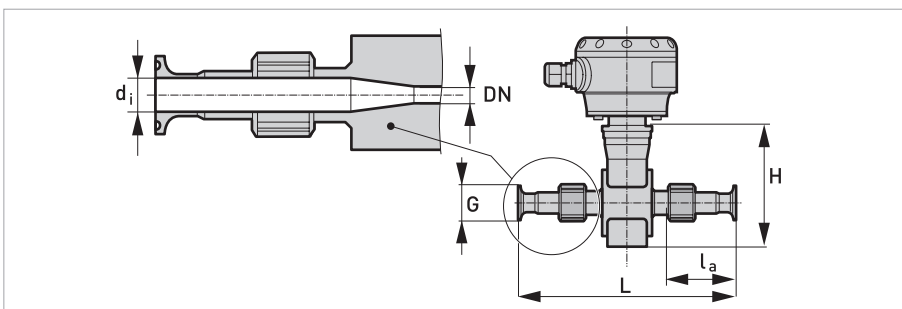
Nominal size		Dimensions [mm]						Approx. weight
DN	PN	Adapter			Flowmeter			
DN	PN	d <sub>i</sub>	G	l <sub>a</sub>	L	H	W	[kg]
2.5...10	16	10	34	51.6	219	142	44	1.8
17.2	16	16	34	51.6	219	142	44	1.8



DN25...150 bolted adapter

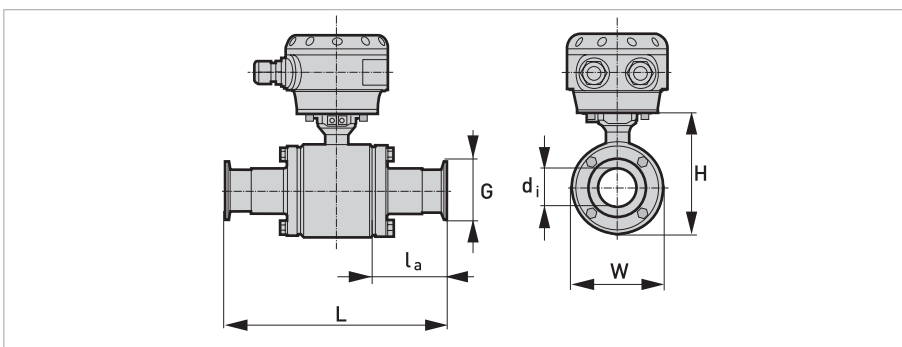
Nominal size		Dimensions [mm]						Approx. weight
DN	PN	Adapter			Flowmeter			
DN	PN	d <sub>i</sub>	G	l <sub>a</sub>	L	H	W	[kg]
25	16	22.6	50,5	41.8	175	128	89	3.3
38	16	35.6	50,5	87.8	273	153	114	5.4
50	16	48.6	64	87.8	273	153	114	5.2
63.5	10	60.3	77.5	68.3	273	180	141	9.5
76.1	10	72.9	91	93.3	333	191	152	11.2
101.6	8	97.6	119	85.8	333	242	203	19.1
114.3	5	On request						
139.7	5	On request						

Tri Clamp



DN 1/2...3/4" screwed adapter

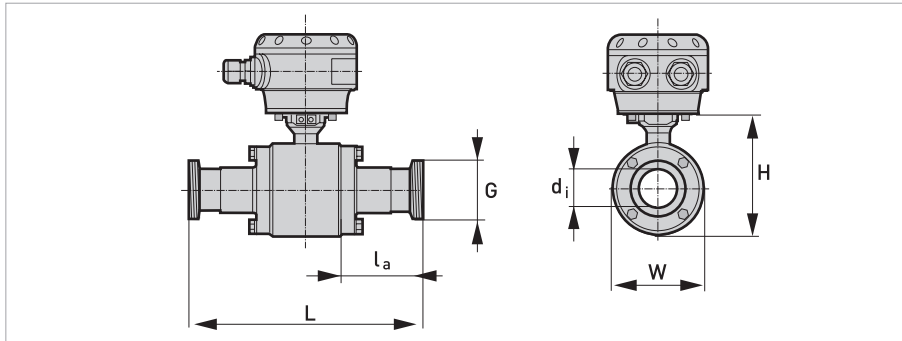
Nominal size		Dimensions [inch]						Approx. weight
		Adapter			Flowmeter			
DN	PN	d <sub>i</sub>	G	l <sub>a</sub>	L	H	W	[kg]
1/2"	20	0.37	0.98	1.97	8.5	5.59	1.73	1.5
3/4"	20	0.62	0.98	1.97	8.5	5.59	1.73	1.5



DN1...4" bolted adapter

Nominal size		Dimensions [inch]						Approx. weight
		Adapter			Flowmeter			
DN	PN	d <sub>i</sub>	G	l <sub>a</sub>	L	H	W	[kg]
1"	20	0.85	1.98	1.02	5.64	5.04	3.5	3.2
1 1/2"	20	1.35	1.98	3.46	10.75	6.02	4.49	5.5
2"	20	1.85	2.52	3.46	10.75	6.02	4.49	5.3
2 1/2"	20	2.35	3.05	2.69	11.5	7.09	5.55	10
3"	20	2.85	3.54	3.68	14.25	7.52	5.98	12.5
4"	12	3.83	4.68	3.38	14.96	9.53	7.99	21.8

## SMS 1145 Adapter



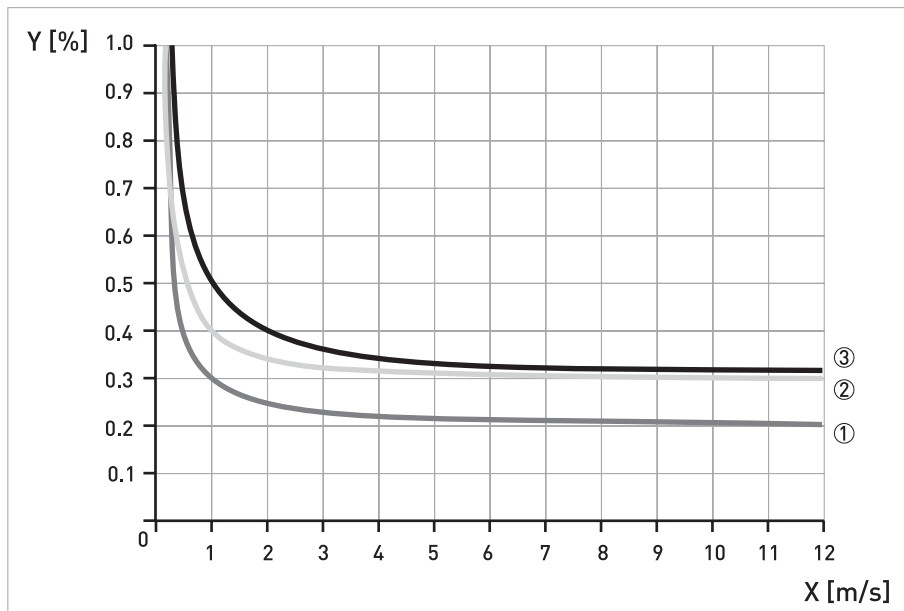
DN25...100 bolted adapter

Nominal size		Dimensions [mm]						Approx. weight
		Adapter			Flowmeter			
DN	PN	$d_i$	G	$l_a$	L	H	W	[kg]
25	6	22.6	Rd 40-6	28.1	147.6	128	89	3.2
38	6	35.5	Rd 60-6	54	262	153	114	5.7
51	6	48.6	Rd 70-6	84.3	266	153	114	5.4
63.5	6	60.3	Rd 85-6	69.8	276	180	141	9.9
76	6	72.9	Rd 98-6	99.8	346	191	152	12.1
100	6	97.6	Rd 132-6	44	336	242	203	21.9

### 2.3 Measuring accuracy

**Reference conditions**

- Medium: water
- Temperature: 20°C / 68°F
- Pressure: 1 bar / 14.5 psi



X [m/s]: flow velocity  
 Y [%]: deviation from the actual Measured Value (MV)

Compact with IFC 300	Accuracy	Curve
DN2.5...6 / 1/10...1/4"	0.3% of MV + 2 mm/s	③
DN10...150 / 3/8...6"	0.2% of MV + 1 mm/s	①

Compact with IFC 100	Accuracy	Curve
DN2.5...6 / 1/10...1/4"	0.4% of MV + 1 mm/s	as ② + 0.1%
DN10...150 / 3/8...6"	0.3% of MV + 1 mm/s	②

### 3.1 Intended use

The measurement of volumetric flowrate of electrically conductive fluids in hygienic applications.

### 3.2 Notes on installation

*Inspect the cartons carefully for damage or signs of rough handling. Report damage to the carrier and to the local office of the manufacturer.*

*Check the packing list to check if you received completely all that you ordered.*

*Look at the device nameplate to ensure that the device is delivered according to your order. Check for the correct supply voltage printed on the nameplate.*

### 3.3 Installation conditions

#### 3.3.1 Inlet and outlet

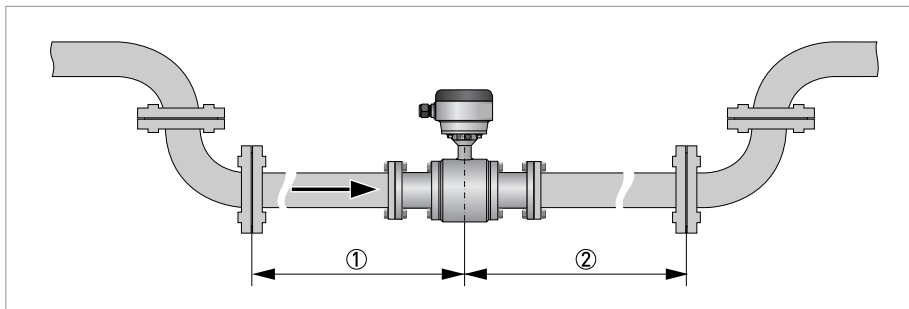


Figure 3-1: Recommended inlet and outlet

①  $\geq 5$  DN

②  $\geq 2$  DN

#### 3.3.2 Mounting position

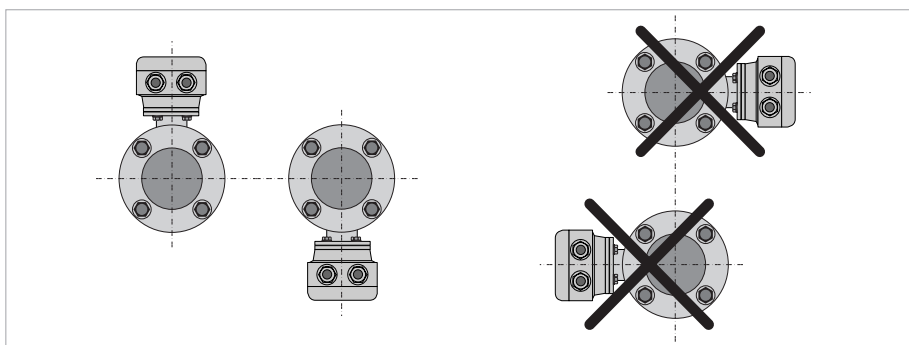


Figure 3-2: Mounting position

### 3.3.3 Flange deviation

Max. permissible deviation of pipe flange faces:  
 $L_{max} - L_{min} \leq 0.5 \text{ mm} / 0.02''$

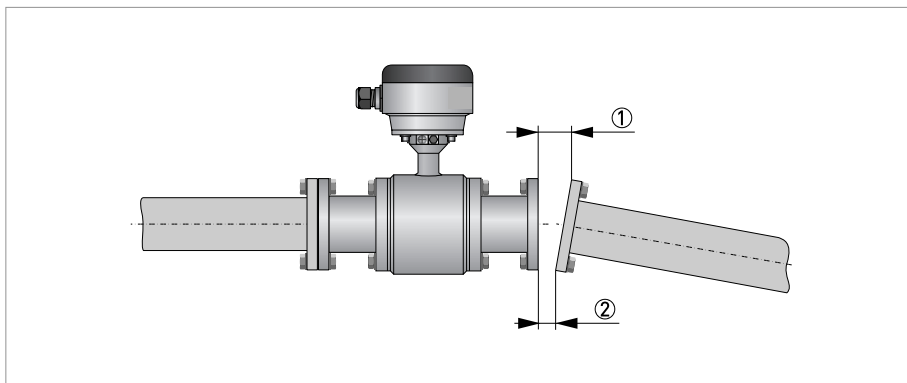


Figure 3-3: Flange deviation

- ①  $L_{max}$
- ②  $L_{min}$

### 3.3.4 T-section

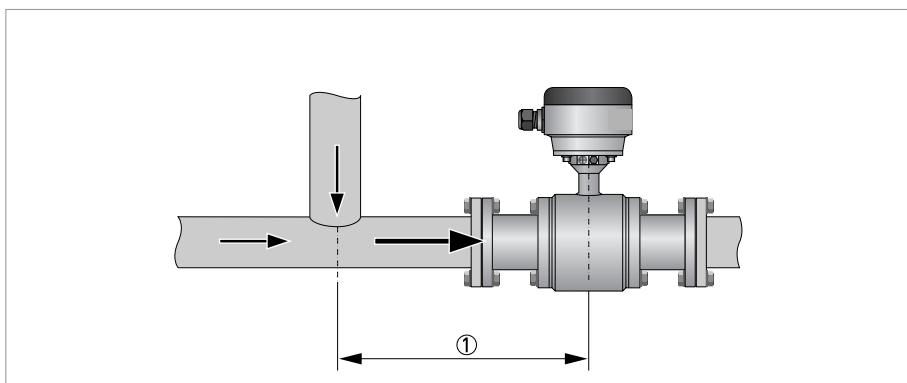


Figure 3-4: Distance after T-sections

- ①  $\geq 10 \text{ DN}$

### 3.3.5 Vibration

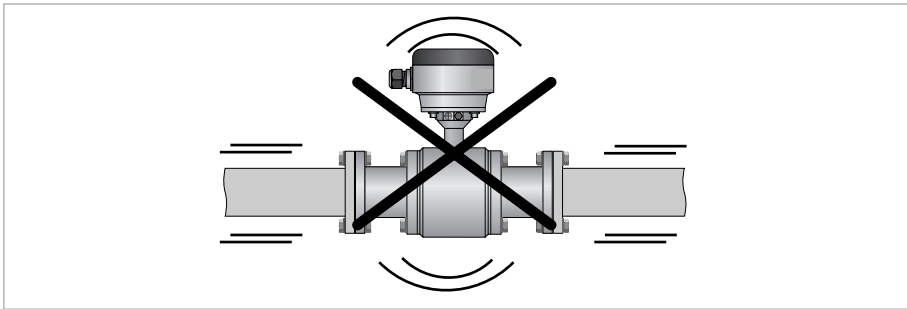


Figure 3-5: Avoid vibrations

### 3.3.6 Magnetic field

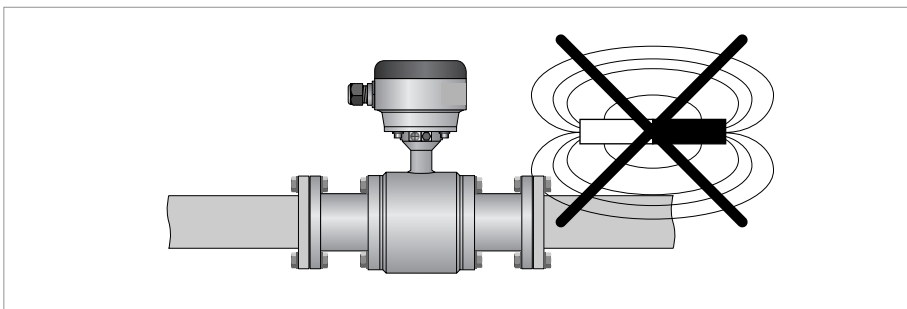


Figure 3-6: Avoid magnetic fields

### 3.3.7 Mounting requirements for self-draining

*Applicable for 3A marked installations: install flow sensor in vertical pipelines or in pipelines with a minimum slope as indicated!*

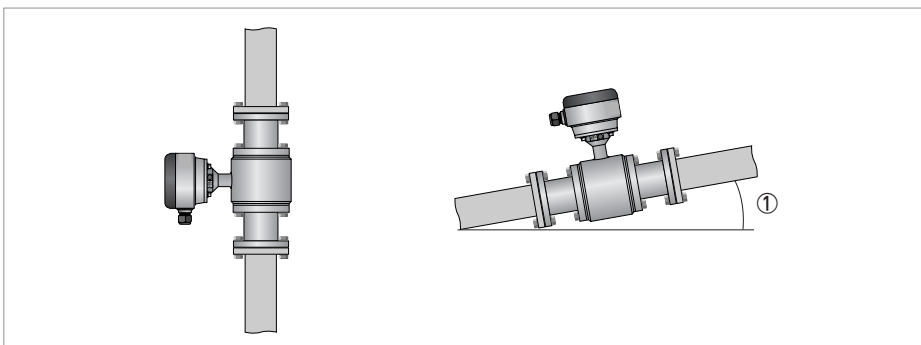


Figure 3-7: Installation note for 3A marked installations

① Minimum slope

Minimum slope

Nominal diameter	DIN 11850	ISO 2037	DIN 11864 2A	ISO 2852	DIN 32676	Tri Clamp
2.5...6	10°	10°	-	-	-	-
10	3°	3°	-	-	-	-
15	10°	10°	-	-	-	-
25	10°	3°	10°	3°	10°	3°
40...50	5°	3°	5°	3°	5°	3°
65...80	10°	3°	10°	3°	10°	3°
100	5°	3°	5°	3°	5°	3°
125...150	10°	3°	10°	3°	-	-

3.3.8 Bends

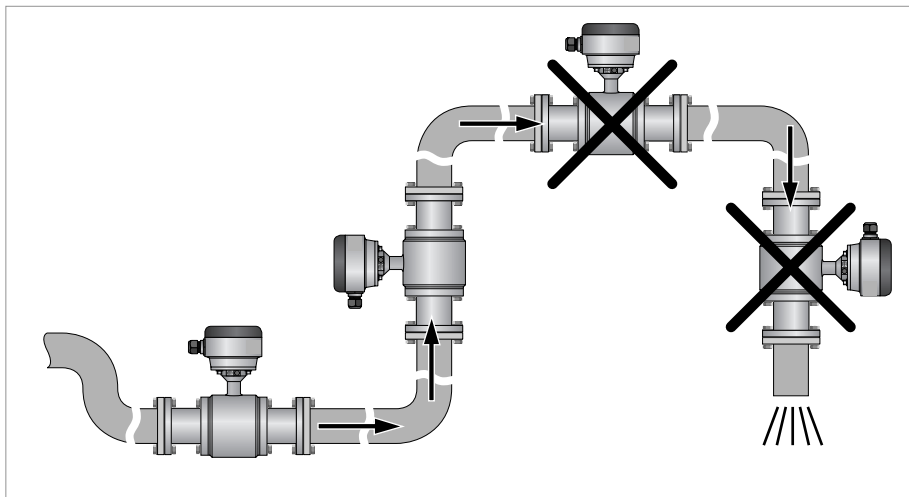


Figure 3-8: Installation in bending pipes

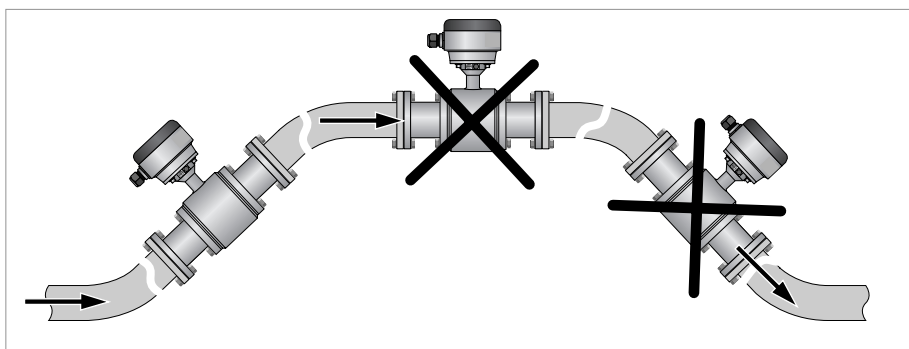


Figure 3-9: Installation in bending pipes



### 3.3.9 Open discharge

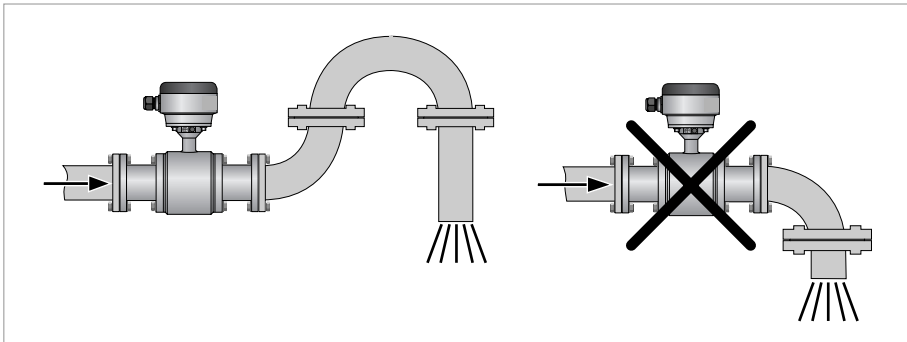


Figure 3-10: Installation before an open discharge

### 3.3.10 Control valve

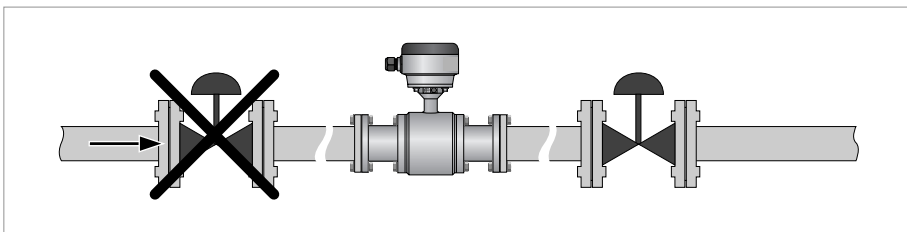


Figure 3-11: Installation before control valve

### 3.3.11 Air venting

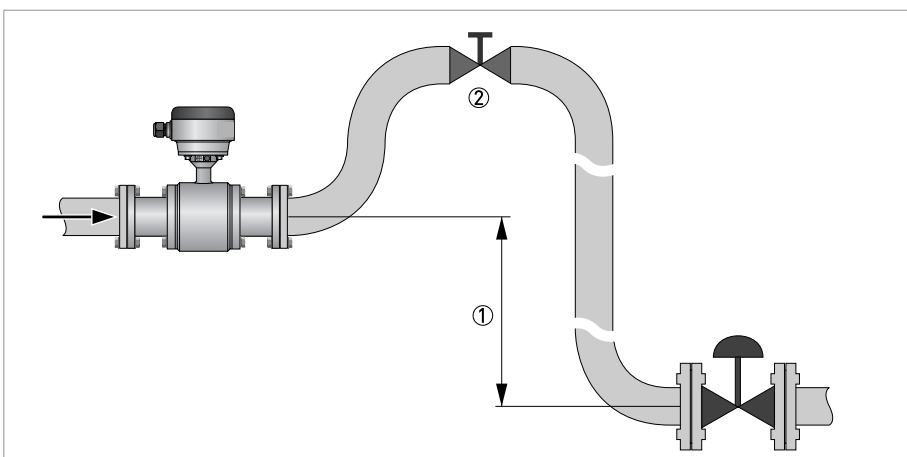


Figure 3-12: Air venting

①  $\geq 5$  m

② Air ventilation point

### 3.3.12 Pump

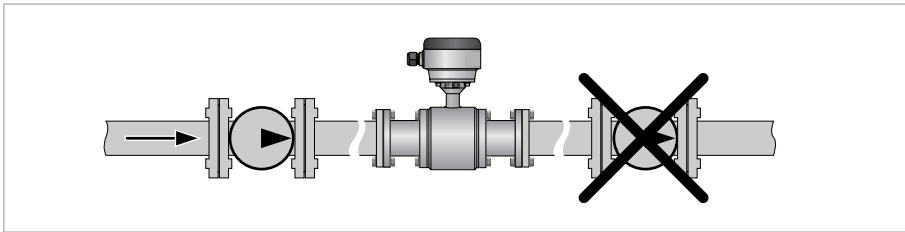


Figure 3-13: Installation after pump

### 3.3.13 Temperatures

*Protect the device from direct sunlight.*

#### Ambient temperature

	°C		°F	
	min.	max.	min.	max.
Separate flow sensor	-40	65	-40	149
Compact + IFC 300	-40	65	-40	149
Compact + IFC 100	-40	65	-40	149

#### Maximum process temperature

Type of connection	Separate flow sensor		Compact + IFC 100		Compact + IFC 300	
	°C	°F	°C	°F	°C	°F
Aseptic weld on for pipes to DIN 11850	140	284	120 ①	248 ②	140	284
Aseptic weld on for pipes to ISO 2037	140	284	120 ①	248 ②	140	284
Dairy screw to DIN 11851 ③	140	284	120 ①	248 ②	140	284
Screwed to SMS 1145 ③	140	284	120 ①	248 ②	140	284
Flanges to DIN 11864-2A	140	284	120 ①	248 ②	140	284
Clamp joint to ISO 2852	120	248	120	248	120	248
Clamp joint to DIN 32676	140	284	120 ①	248 ②	140	284
Clamp joint to Tri Clamp	120	248	120	248	120	248

① 140°C if ambient temperature ≤ 40°C

② 284°F if ambient temperature ≤ 104°F

③ Without 3A mark

### 3.3.14 Cleaning

*In principle, no special maintenance is needed. However, make sure that the used cleaning product doesn't affect the outer surface and the gaskets.*

## 4.1 Safety instructions

*All work on the electrical connections may only be carried out with the power disconnected. Take note of the voltage data on the nameplate!*

*Observe the national regulations for electrical installations!*

*For devices used in hazardous areas, additional safety notes apply; please refer to the Ex documentation.*

*Observe without fail the local occupational health and safety regulations. Any work done on the electrical components of the measuring device may only be carried out by properly trained specialists.*

*Look at the device nameplate to ensure that the device is delivered according to your order. Check for the correct supply voltage printed on the nameplate.*

## 4.2 Grounding

*The device must be grounded in accordance with regulations in order to protect personnel against electric shocks.*

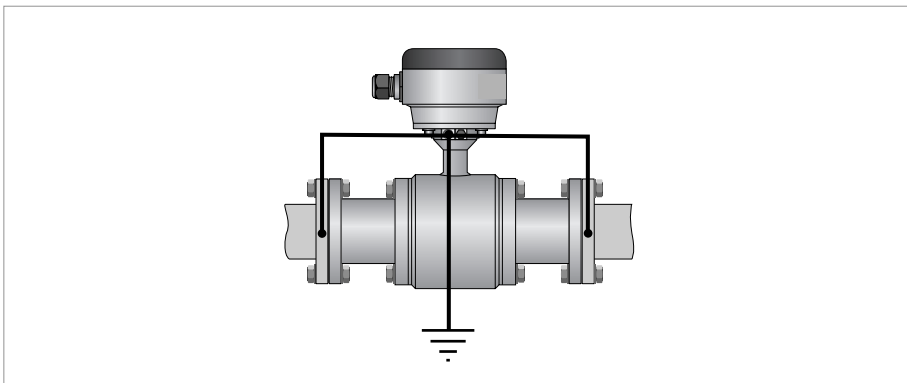


Figure 4-1: Grounding without grounding rings

### 4.3 Virtual reference for IFC 300 (C, W and F version)

The virtual reference option on the IFC 300 flow converter provides complete isolation of the measurement circuit.

The benefits of virtual reference are that grounding rings or grounding electrodes can be omitted, safety increases by reducing the number of potential leakage points and the installation of the flowmeters is much easier.

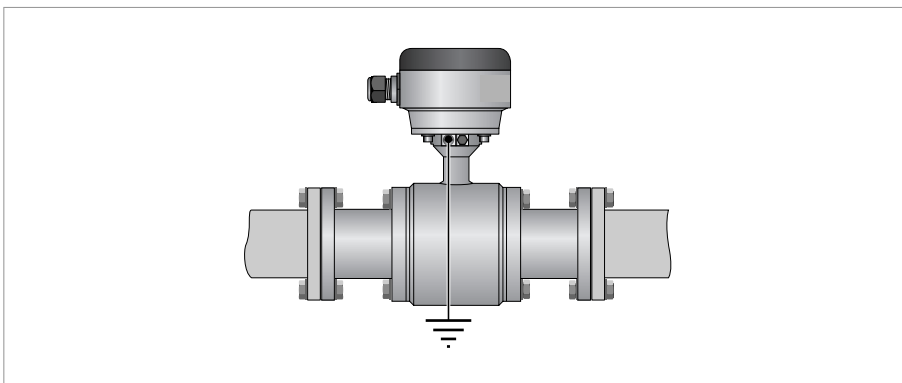


Figure 4-2: Virtual reference

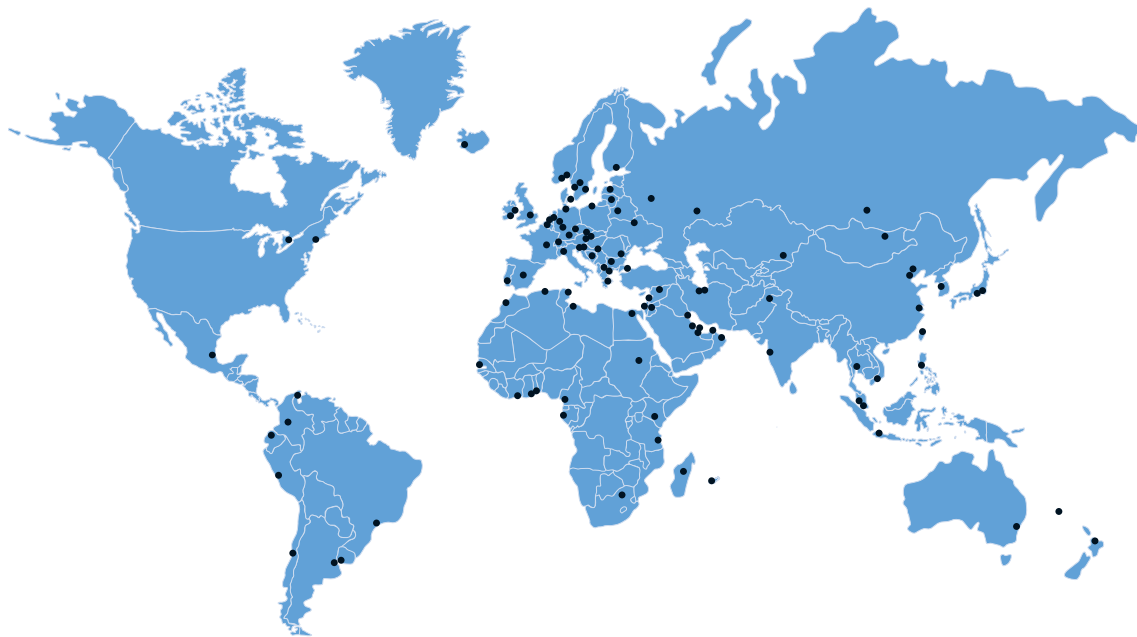
**Possible if:**

- $\geq \text{DN}10$
- Electrical conductivity  $\geq 200 \mu\text{S}/\text{cm}$
- Electrode cable max. 50 m / 164 ft, type DS









## KROHNE product overview

- Electromagnetic flowmeters
- Variable area flowmeters
- Ultrasonic flowmeters
- Mass flowmeters
- Vortex flowmeters
- Flow controllers
- Level meters
- Temperature meters
- Pressure meters
- Analysis products
- Measuring systems for the oil and gas industry
- Measuring systems for sea-going tankers

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