



OPTIFLUX 6000 Quick Start

Electromagnetic flow sensor
for hygienic and sanitary applications

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

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Warnings and symbols used

**DANGER!**

This information refers to the immediate danger when working with electricity.

**DANGER!**

These warnings must be observed without fail. Even partial disregard of this warning can lead to serious health problems and even death. There is also the risk of seriously damaging the device or parts of the operator's plant.

**WARNING!**

Disregarding this safety warning, even if only in part, poses the risk of serious health problems. There is also the risk of damaging the device or parts of the operator's plant.

**CAUTION!**

Disregarding these instructions can result in damage to the device or to parts of the operator's plant.

**INFORMATION!**

These instructions contain important information for the handling of the device.

**HANDLING**

- This symbol designates all instructions for actions to be carried out by the operator in the specified sequence.

 RESULT

This symbol refers to all important consequences of the previous actions.

Safety instructions for the operator

**CAUTION!**

Installation, assembly, start-up and maintenance may only be performed by appropriately trained personnel. The regional occupational health and safety directives must always be observed.

**LEGAL NOTICE!**

The responsibility as to the suitability and intended use of this device rests solely with the user. The supplier assumes no responsibility in the event of improper use by the customer. Improper installation and operation may lead to loss of warranty. In addition, the "Terms and Conditions of Sale" apply which form the basis of the purchase contract.

**INFORMATION!**

- Further information can be found on the supplied CD-ROM in the manual, on the data sheet, in special manuals, certificates and on the manufacturer's website.
- If you need to return the device to the manufacturer or supplier, please fill out the form contained on the CD-ROM and send it with the device. Unfortunately, the manufacturer cannot repair or inspect the device without the completed form.

2.1 Scope of delivery

**INFORMATION!**

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

**INFORMATION!**

Do a check of the packing list to make sure that you have all the elements given in the order.

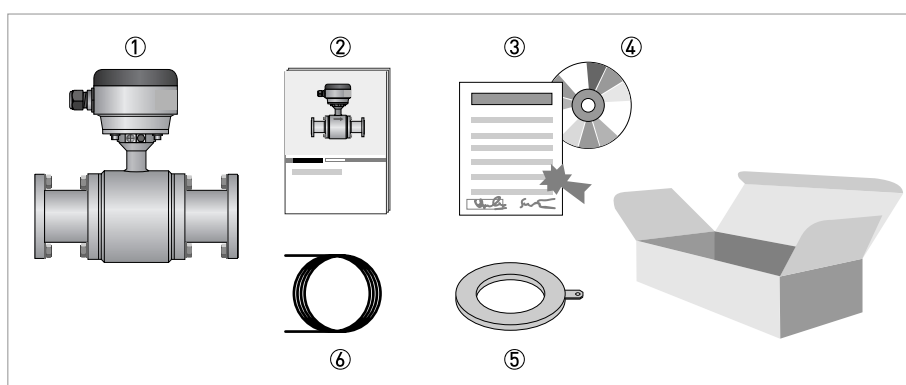


Figure 2-1: Scope of delivery

- ① Ordered flowmeter
- ② Product documentation
- ③ Factory calibration report
- ④ CD-ROM with product documentation
- ⑤ Grounding rings (optional)
- ⑥ Signal cable (remote version only)

2.2 Device description

Your measuring device is supplied ready for operation. The factory settings for the operating data have been made in accordance with your order specifications.

The following versions are available:

- Compact version (the signal converter is mounted directly on the measuring sensor)
- Remote version (electrical connection to the measuring sensor via field current and signal cable)



INFORMATION!

This flow sensor can be used as a remote version or as a compact version. All versions are covered by this document, although you will see the remote version in most pictures.

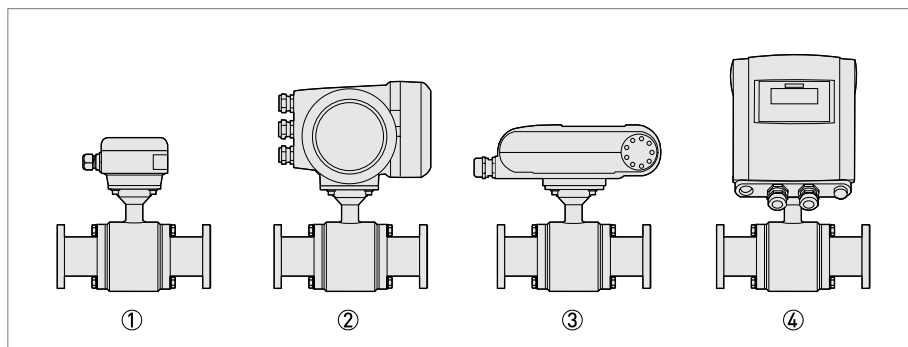


Figure 2-2: Available versions

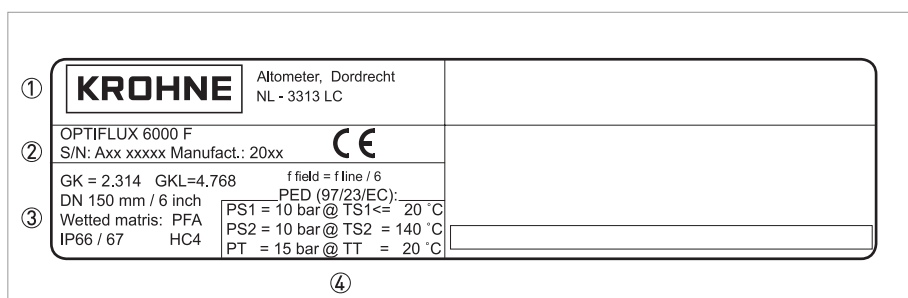
- ① Remote version
- ② Compact version with IFC 300 signal converter
- ③ Compact version with IFC 100 (0°) signal converter
- ④ Compact version with IFC 100 (45°) signal converter

2.3 Nameplates



INFORMATION!

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.



- ① Name and address of the manufacturer
- ② Type designation of the flowmeter and CE sign with number(s) of notified body / bodies
- ③ Calibration data
- ④ PED data

2.4 Storage

- Store the device in a dry and dust-free location.
- Avoid lasting direct exposure to the sun.
- Store the device in its original packing.
- Storage temperature: -50 ...+70°C / -58...+158°F

2.5 Transport

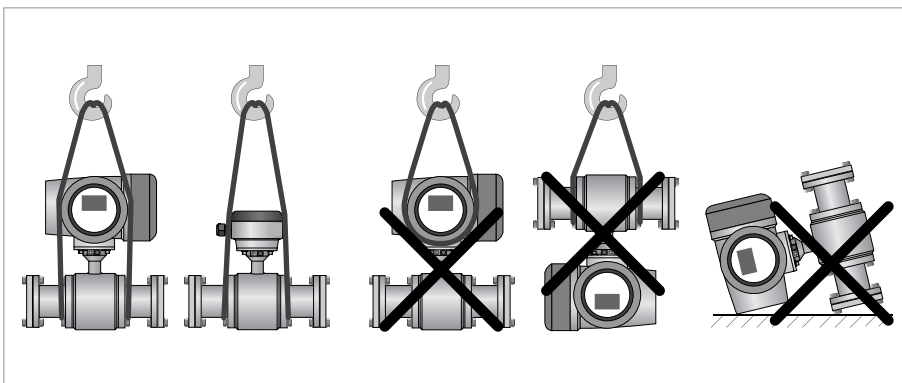


Figure 2-3: Transport

2.6 Installation conditions

2.6.1 Inlet and outlet

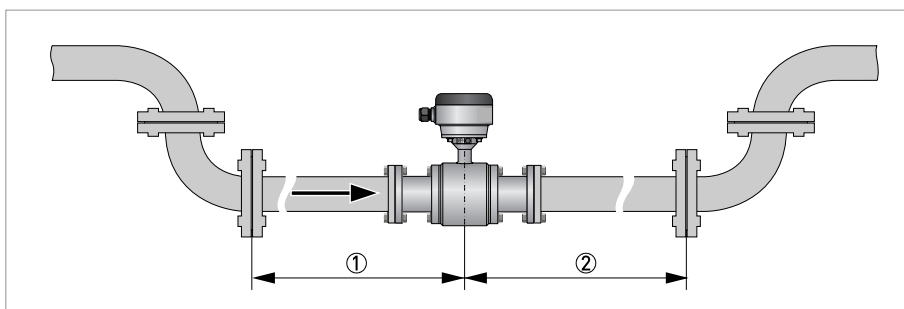


Figure 2-4: Recommended inlet and outlet

- ① ≥ 5 DN
② ≥ 2 DN

2.6.2 Mounting position

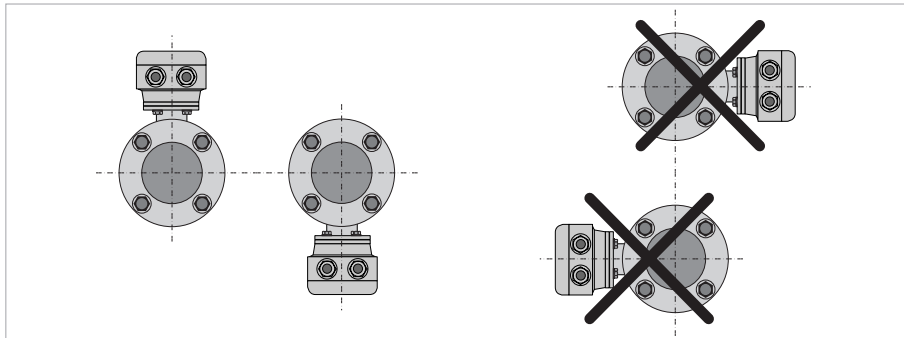


Figure 2-5: Mounting position

2.6.3 Flange deviation



CAUTION!

Max. permissible deviation of pipe flange faces:

$$L_{max} - L_{min} \leq 0.5 \text{ mm} / 0.02''$$

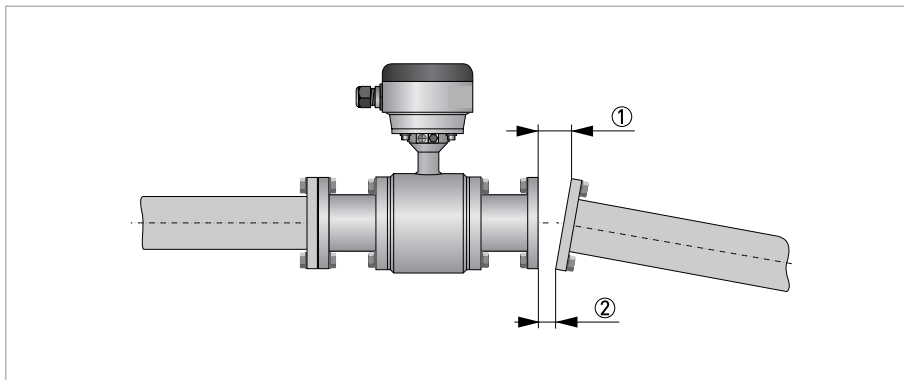


Figure 2-6: Flange deviation

- ① L_{max}
- ② L_{min}

2.6.4 T-section

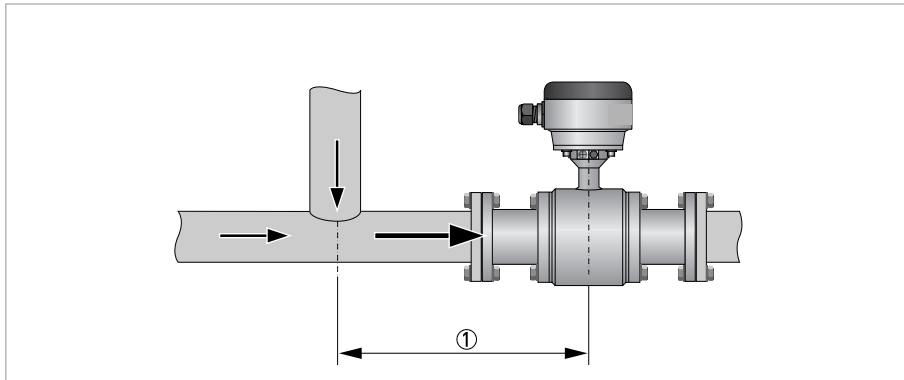


Figure 2-7: Distance after T-sections

① ≥ 10 DN

2.6.5 Vibration

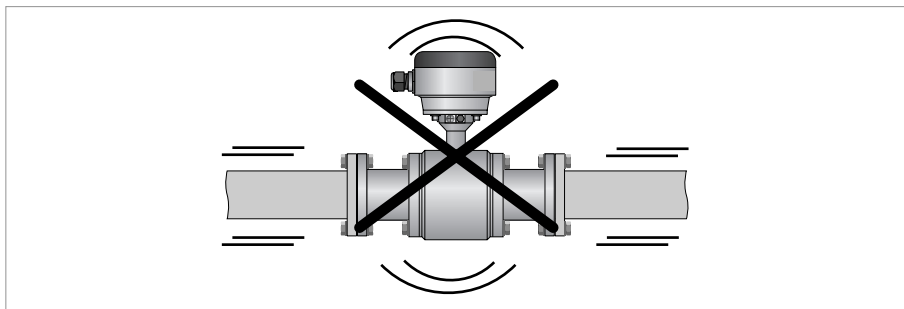


Figure 2-8: Avoid vibrations

2.6.6 Magnetic field

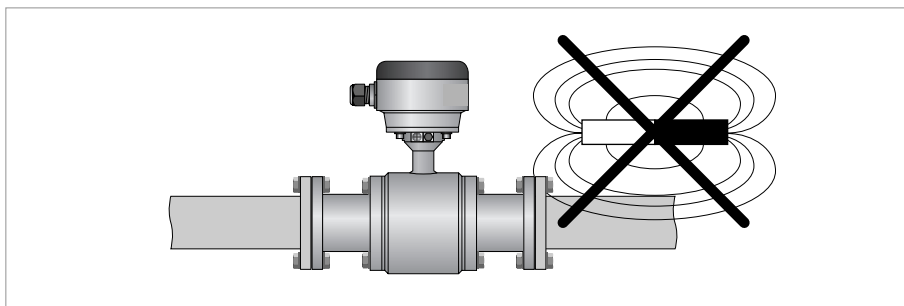


Figure 2-9: Avoid magnetic fields

2.6.7 Mounting requirements for self-draining


INFORMATION!

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

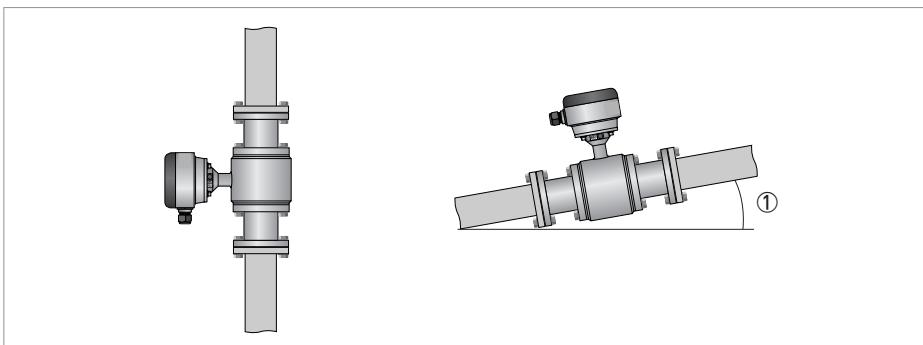


Figure 2-10: Installation note for 3A marked installations

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°	-	-

2.6.8 Bends

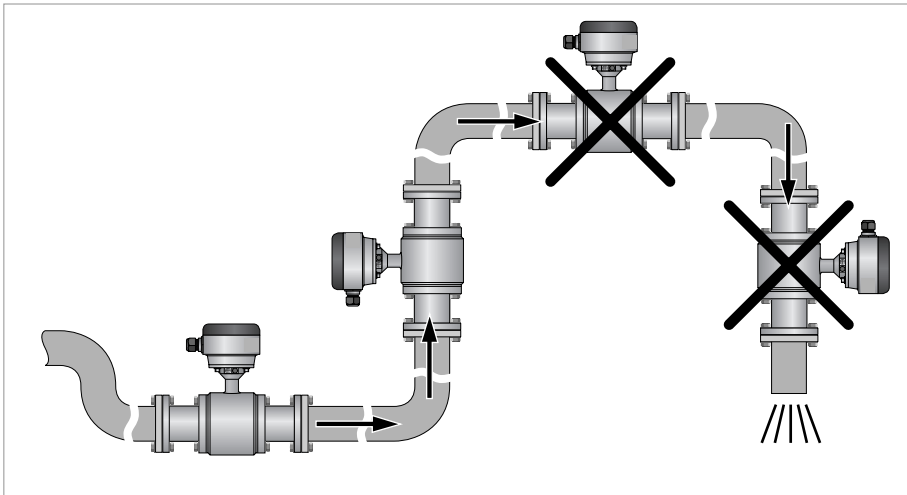


Figure 2-11: Installation in bending pipes

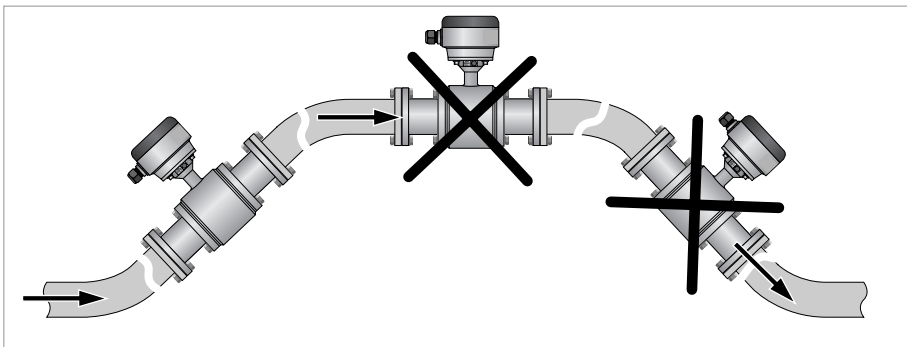


Figure 2-12: Installation in bending pipes

2.6.9 Open discharge

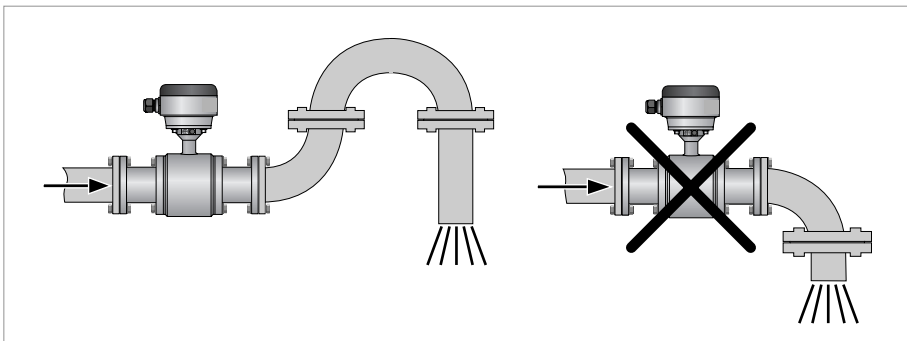


Figure 2-13: Installation before an open discharge

2.6.10 Control valve

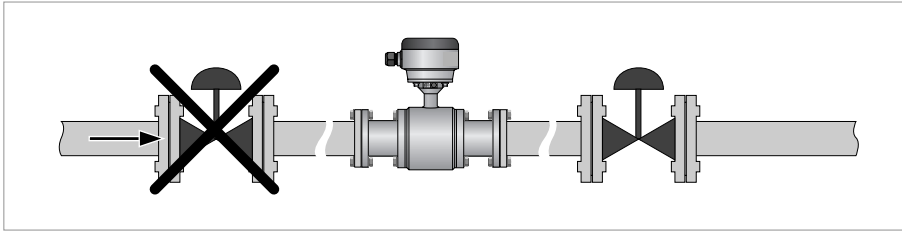


Figure 2-14: Installation before control valve

2.6.11 Air venting

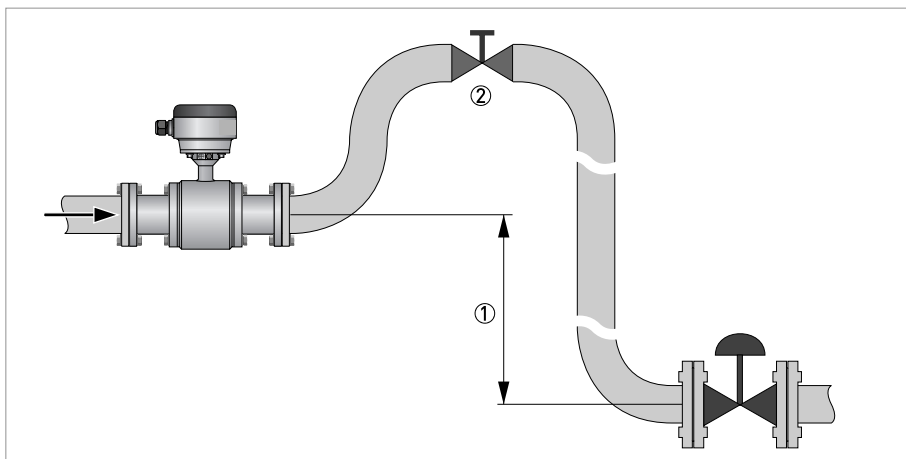


Figure 2-15: Air venting

- ① ≥ 5 m
- ② Air ventilation point

2.6.12 Pump

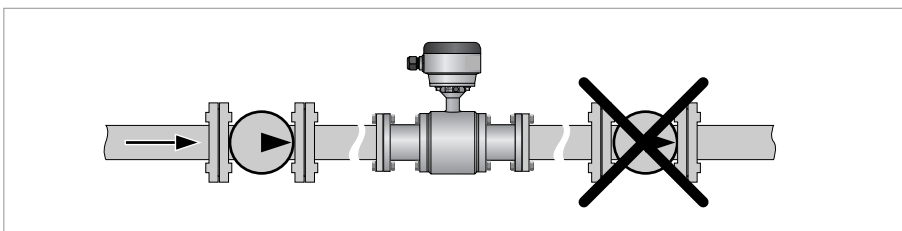


Figure 2-16: Installation after pump

2.6.13 Temperatures

**CAUTION!**

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

2.7 Mounting

2.7.1 Torques and pressures

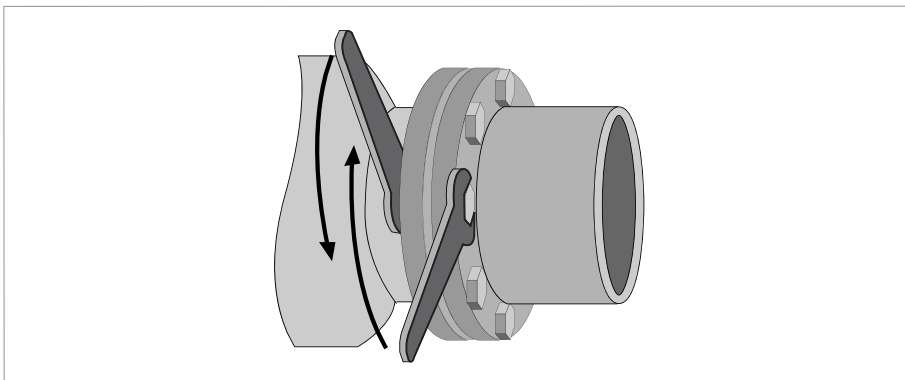


Figure 2-17: Tightening of bolts



CAUTION!

The max. allowable torque depends on the gasket material, see datasheet for detailed information.

Bolts to be used from material SS, class 70-A2.



Tightening of bolts

- Step 1: Apply approx. 50% of max. torque given in table.
- Step 2: Apply approx. 80% of max. torque given in table.
- Step 3: Apply 100% of max. torque given in table.

Maximum torque for 11864-2A flange version

Nominal diameter [mm]	Pressure rating	Bolts	Max. torque [Nm]
25	PN 40	4x M6	7
40	PN 40	4x M8	16
50	PN 25	4x M8	16
80	PN 25	6x M8	16
100	PN 25	6x M8	16
125	PN 10	6x M10	32
150	PN 10	6x M10	32

Type of connection	Size of connection		Max. operating pressure	
	mm	inch	bar	psig
Aseptic weld on for pipes to DIN 11850	DN10...40	-	40	580
	DN50...80	-	25	360
	DN100	-	16	230
	DN125...150	-	10	145
Aseptic weld on for pipes to ISO 2037	12...38	-	40	580
	51...76.1	-	25	360
	101.6	-	16	230
	114.3...139.7	-	10	145
Dairy screw to DIN 11851 ①	DN10...40	-	40	580
	DN50...80	-	25	360
	DN100	-	16	230
	DN125...150	-	10	145
Screwed to SMS 1145 ①	25...100	-	6	90
Flanges to DIN 11864-2A	DN25...40	-	40	580
	DN50...80	-	25	360
	DN100	-	16	230
	DN125...150	-	10	145
Clamp joint to ISO 2852	12...51	-	16	230
	63.5...76.1	-	10	145
	100	-	8	115
	114.3...139.7	-	5	72
Clamp joint to DIN 32676	DN25...50	-	16	230
	DN65...100	-	10	145
Clamp joint to Tri Clamp	-	1/2...3	20.5	295
	-	4	13.8	200
Vacuum load	all versions and sizes		0 mbar abs.	0 psia

① Without 3A mark

2.7.2 Installation of weld-on versions

For mounting sensors with weld-on connections, please follow the procedure as follows:



- Mount the sensor completely in the pipeline and spot the weld-on connections to the pipe. This is necessary to align the mounting bores of the flange.
- Remove the sensor body and the gaskets from the adapters by loosen the screws.
- Weld the adapters completely to the pipe.
- When the pipe is cold again, reinstall the gasket and mount the sensor.

3.1 Safety instructions

**DANGER!**

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

**DANGER!**

Observe the national regulations for electrical installations!

**WARNING!**

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.

**INFORMATION!**

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.

3.2 Grounding

**DANGER!**

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

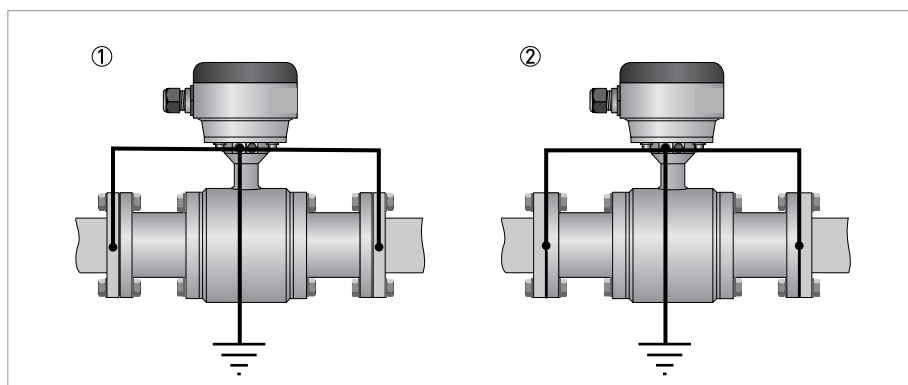


Figure 3-1: Grounding options

1. Grounding option without grounding rings
2. Grounding option with grounding rings

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

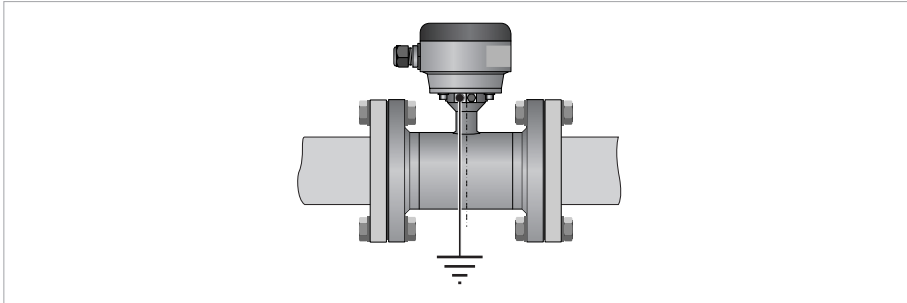


Figure 3-2: Virtual reference

Possible if:

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

3.4 Connection diagrams



INFORMATION!

For the connection diagrams please refer to the documentation of the applicable converter.

4.1 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:

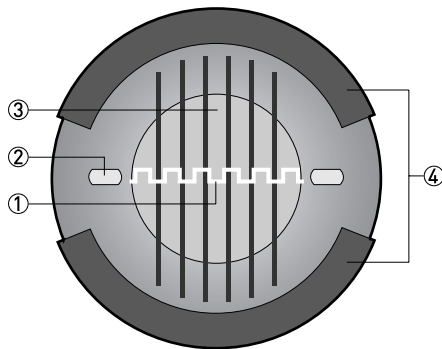
v = mean flow velocity

k = factor correcting for geometry

B = magnetic field strength

D = inner diameter of flow meter

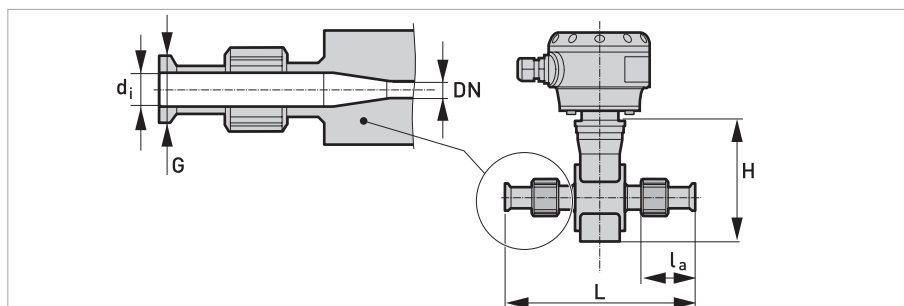
The signal voltage U is picked off by electrodes and is proportional to the mean flow velocity v and thus the flow rate q . A signal converter is used to amplify the signal voltage, filter it and convert it into signals for totalising, recording and output processing.



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

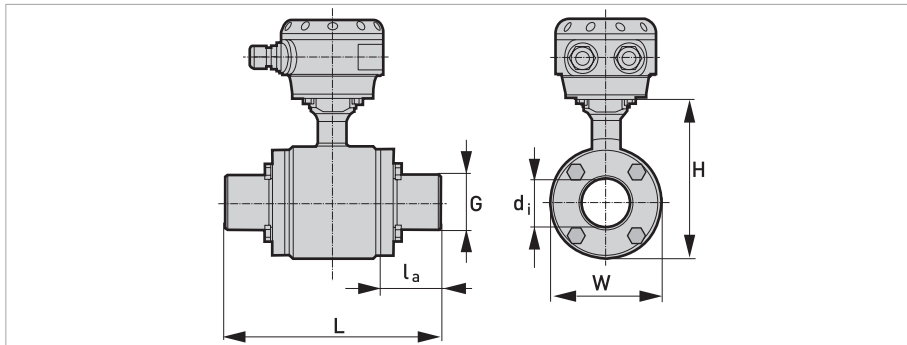
4.2 Dimensions and weights

DIN 11850 (row 2 or DIN 11866 row A)



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

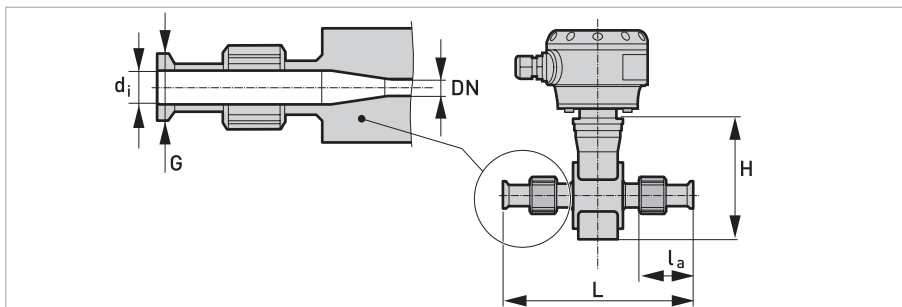
Nominal size		Dimensions [mm]						Approx. weight
		Adapter			Flowmeter			
DN	PN	d _i	G	l _a	L	H	W	[kg]
2.5...10	40	10	13	32	180	120	44	1.5
15	40	16	19	32	180	120	44	1.5



DN25...150 bolted adapter

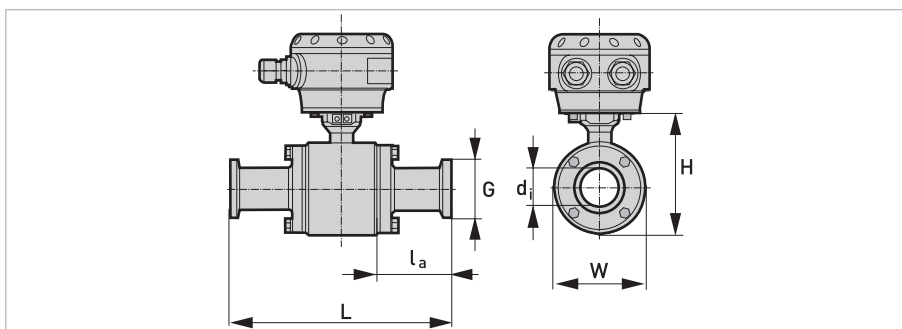
Nominal size		Dimensions [mm]						Approx. weight
		Adapter			Flowmeter			
DN	PN	d _i	G	l _a	L	H	W	[kg]
25	40	26	29	20.6	132.6	128	89	3
40	40	38	41	61.3	220	153	114	5.3
50	25	50	53	61.3	220	153	114	6.8
65	25	66	70	41.8	220	180	141	10.9
80	25	81	85	66.8	280	191	152	11.2
100	16	100	104	59.3	280	242	203	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

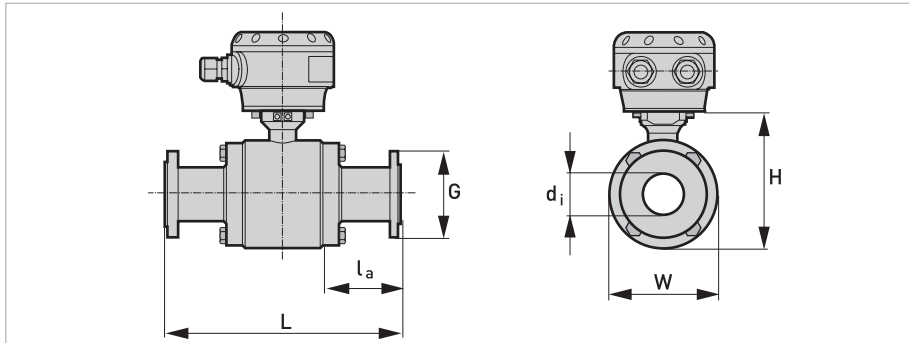
Nominal size		Dimensions [mm]						Approx. weight
		Adapter			Flowmeter			
DN	PN	d _i	G	l _a	L	H	W	[kg]
2.5...10	40	10	Rd 28 x 1/8"	53.1	214	142	44	1.5
15	40	16	Rd 34 x 1/8"	53.1	214	142	44	1.5



DN25...150 bolted adapter

Nominal size		Dimensions [mm]						Approx. weight
		Adapter			Flowmeter			
DN	PN	d _i	G	l _a	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							

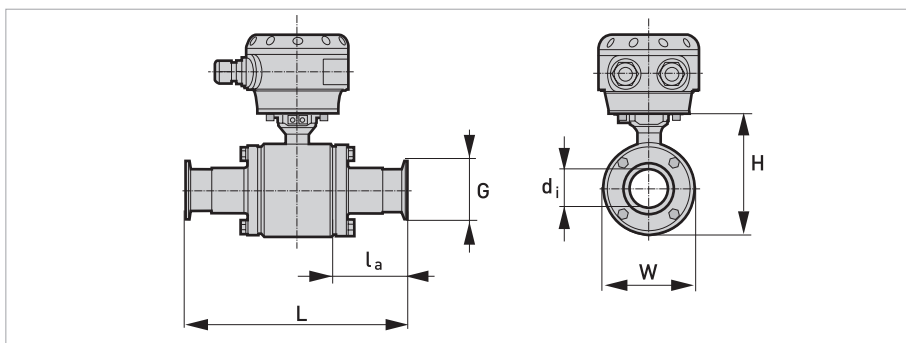
DIN 11864-2A



DN25...150 bolted adapter

Nominal size		Dimensions [mm]						Approx. weight
		Adapter			Flowmeter			
DN	PN	d _i	G	l _a	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							

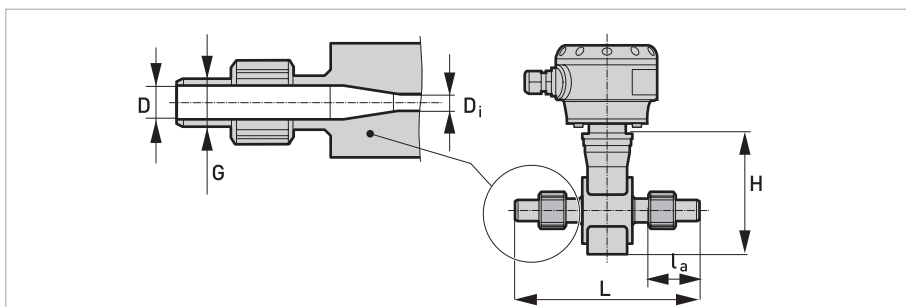
DIN 32676



DN25...100 bolted adapter

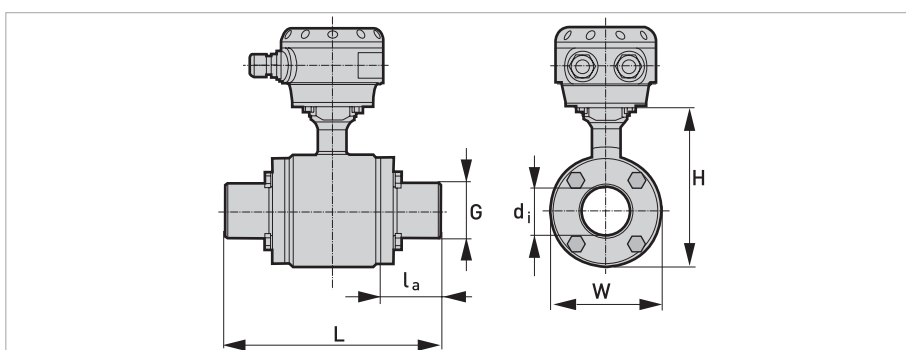
Nominal size		Dimensions [mm]						Approx. weight
		Adapter			Flowmeter			
DN	PN	d _i	G	l _a	L	H	W	[kg]
25	16	26	50.5	41.8	175	128	89	3.2
40	16	38	50.5	80.8	259	153	114	5.5
50	16	50	64	80.8	259	153	114	5.3
65	16	66	91	67.8	272	180	141	10
80	16	81	106	92.8	332	191	152	12.5
100	16	100	119	85.3	332	242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

ISO 2037



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

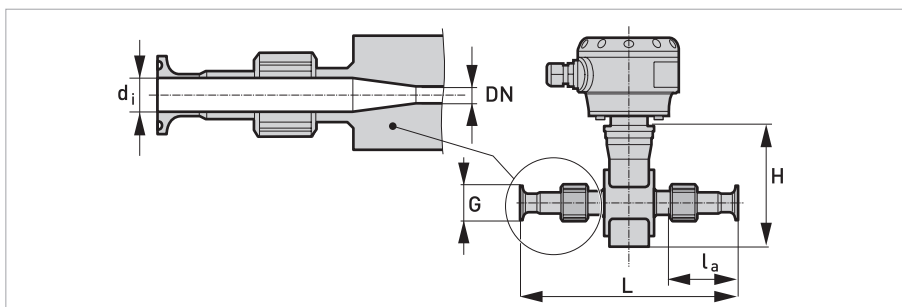
Nominal size		Dimensions [mm]						Approx. weights
		Adapter			Flowmeter			
DN	PN	d _i	G	l _a	L	H	W	[kg]
2.5...12	40	10	15	32	180	142	44	1.5
17.2	40	16	21	32	180	142	44	1.5



DN25...150 bolted adapter

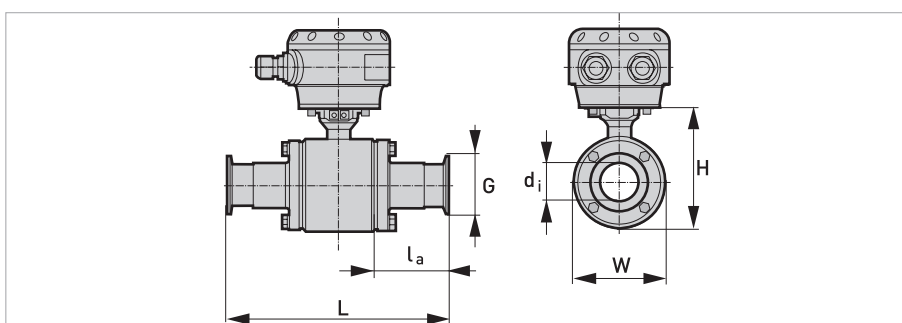
Nominal size		Dimensions [mm]						Approx. weights
		Adapter			Flowmeter			
DN	PN	d _i	G	l _a	L	H	W	[kg]
25	40	22.6	31	20.6	132.6	128	89	3
38	40	38	43	61.3	220	153	114	5.3
51	25	49	55	61.3	220	153	114	5
63.5	25	60.3	71	41.8	220	180	141	9
76.1	25	72.9	86	66.8	280	191	152	10.8
101.6	16	97.6	105	59.3	280	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

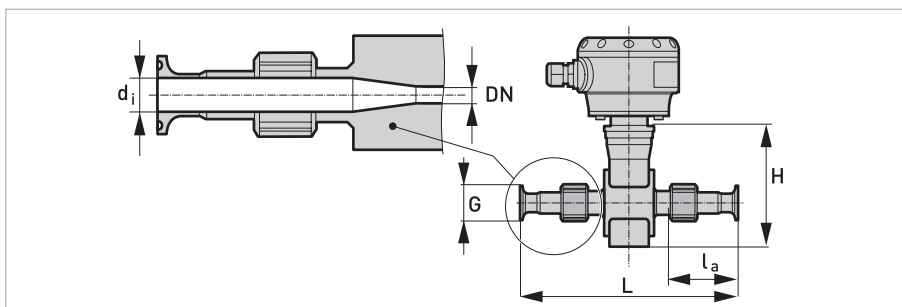
Nominal size		Dimensions [mm]						Approx. weight
		Adapter			Flowmeter			
DN	PN	d _i	G	l _a	L	H	W	[kg]
2.5...10	16	10	34	51.6	219	142	44	1.8
17.2	16	16	34	51.6	219	142	44	1.8



DN25...150 bolted adapter

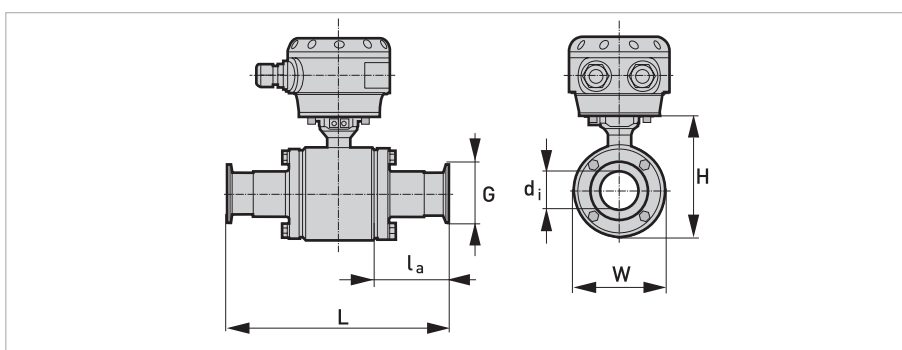
Nominal size		Dimensions [mm]						Approx. weight
		Adapter			Flowmeter			
DN	PN	d _i	G	l _a	L	H	W	[kg]
25	16	22.6	50,5	41.8	175	128	89	3.3
38	16	35.6	50,5	87.8	273	153	114	5.4
50	16	48.6	64	87.8	273	153	114	5.2
63.5	10	60.3	77.5	68.3	273	180	141	9.5
76.1	10	72.9	91	93.3	333	191	152	11.2
101.6	8	97.6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

Tri Clamp



DN½...¾ screwed adapter

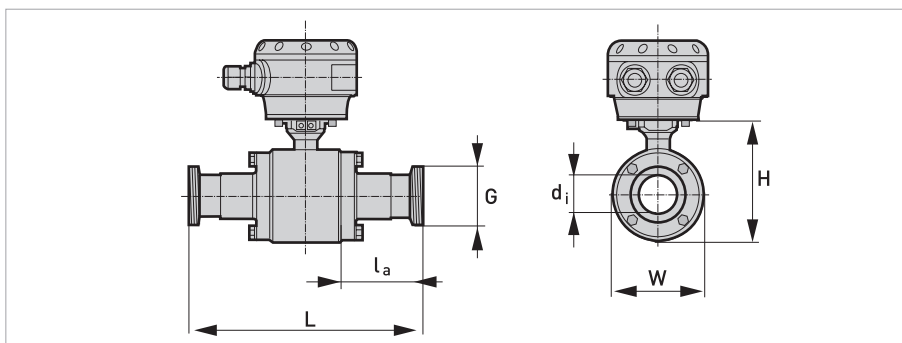
Nominal size		Dimensions [inch]						Approx. weight
		Adapter			Flowmeter			
DN	PN	d _i	G	l _a	L	H	W	[kg]
½"	20	0.37	0.98	1.97	8.5	5.59	1.73	1.5
¾"	20	0.62	0.98	1.97	8.5	5.59	1.73	1.5



DN1...4" bolted adapter

Nominal size		Dimensions [inch]						Approx. weight
		Adapter			Flowmeter			
DN	PN	d _i	G	l _a	L	H	W	[kg]
1"	20	0.85	1.98	1.02	5.64	5.04	3.5	3.2
1½"	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
2½"	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





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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