



OPTIFLUX 5000 Quick Start

Electromagnetic flowmeter in flanged version

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!

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


INFORMATION!

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


INFORMATION!

The device will arrive in two cartons. One carton contains the converter and one carton contains the sensor.

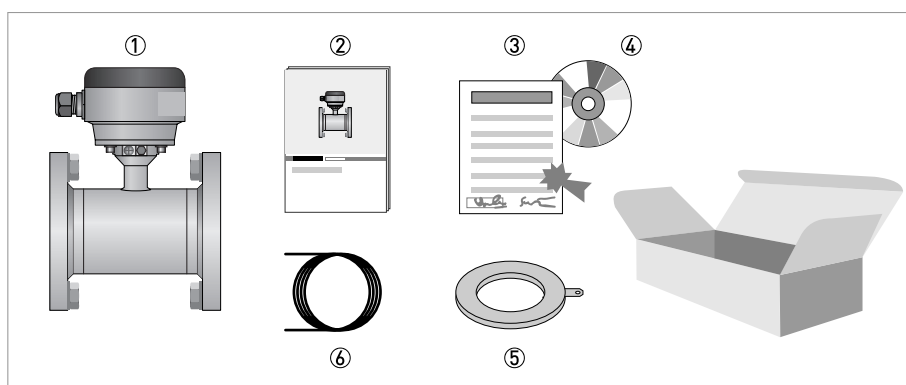


Figure 2-1: Scope of delivery

- ① Ordered flowmeter
- ② Product documentation
- ③ Factory calibration report
- ④ CD-ROM with product documentation
- ⑤ Grounding rings (optionally)
- ⑥ Cable (remote versions only)


INFORMATION!

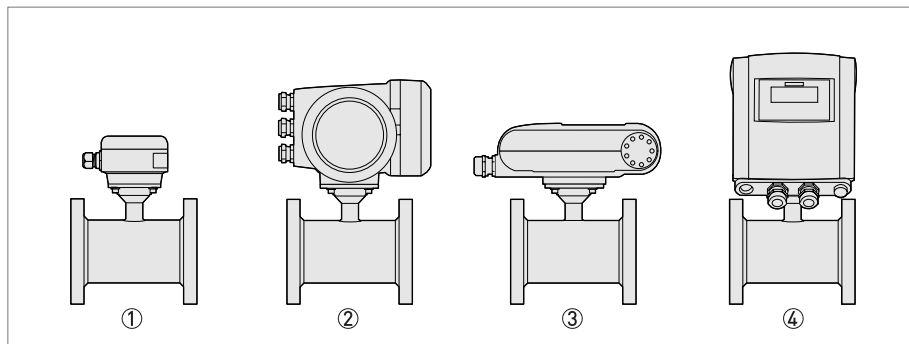
Assembly materials and tools are not part of the delivery. Use the assembly materials and tools in compliance with the applicable occupational health and safety directives.

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)



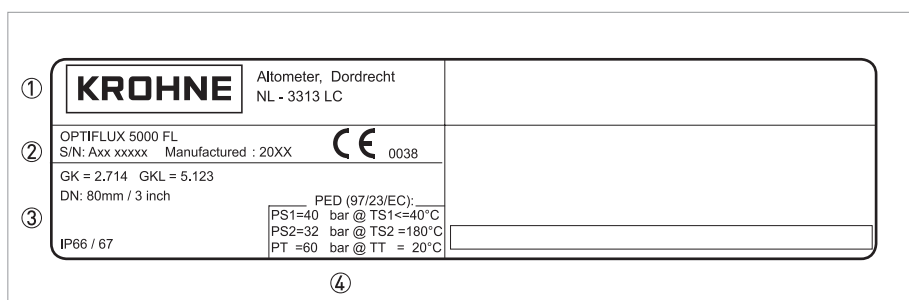
- ① Remote version
 ② Compact version with IFC 300 signal converter
 ③ Compact version with IFC 100 [0°] signal converter
 ④ Compact version with IFC 100 [45°] signal converter

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.

2.5 Transport

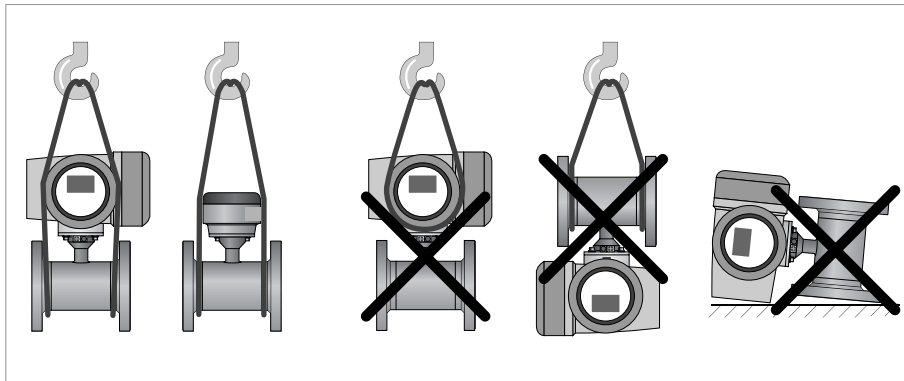


Figure 2-2: Transport

2.6 Installation conditions

2.6.1 Inlet and outlet

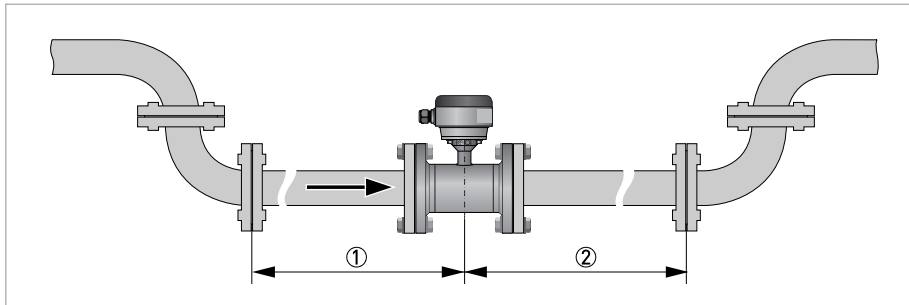


Figure 2-3: Recommended inlet and outlet sections

- ① ≥ 5 DN
- ② ≥ 2 DN

2.6.2 Mounting position

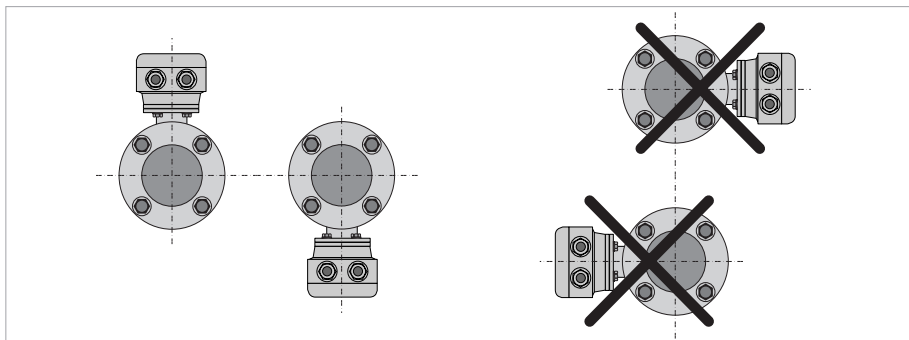


Figure 2-4: Mounting position

2.6.3 Flange deviation

**CAUTION!**

Max. permissible deviation of pipe flange faces:

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

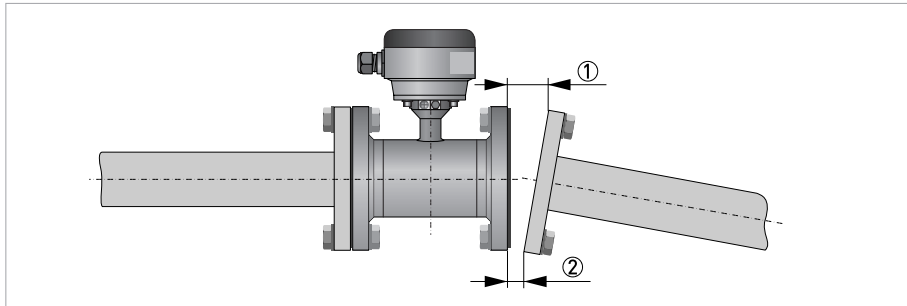


Figure 2-5: Flange deviation

① L_{max}

② L_{min}

2.6.4 T-section

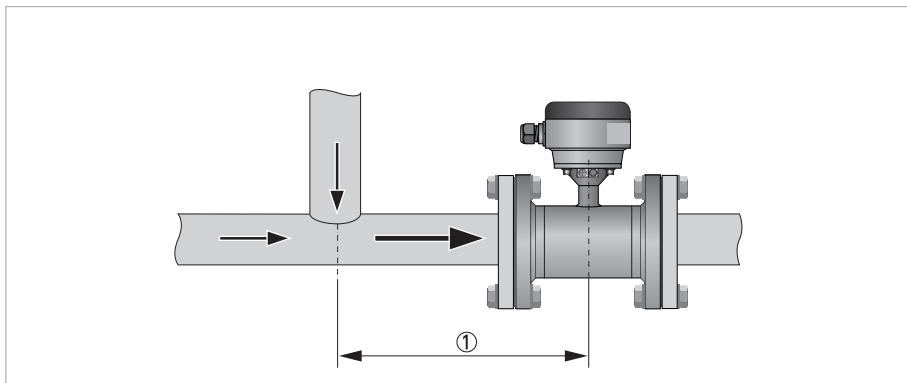


Figure 2-6: Distance after T-sections

① $\geq 10 \text{ DN}$

2.6.5 Vibration

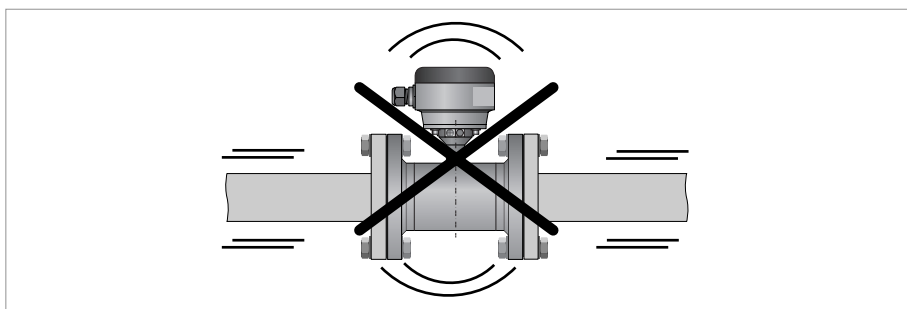


Figure 2-7: Avoid vibrations

2.6.6 Magnetic field

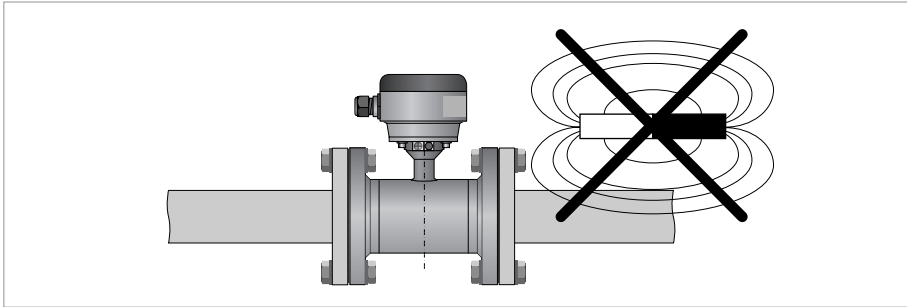


Figure 2-8: Avoid magnetic fields

2.6.7 Bends

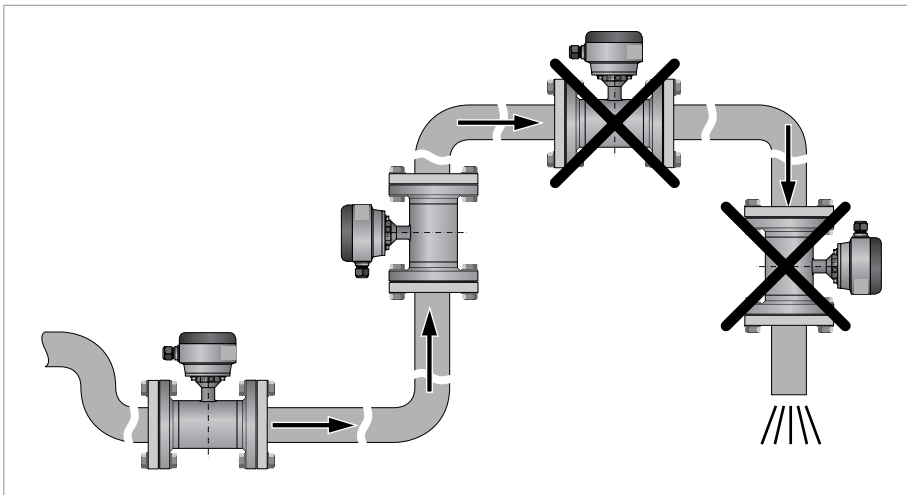


Figure 2-9: Installation in bending pipes

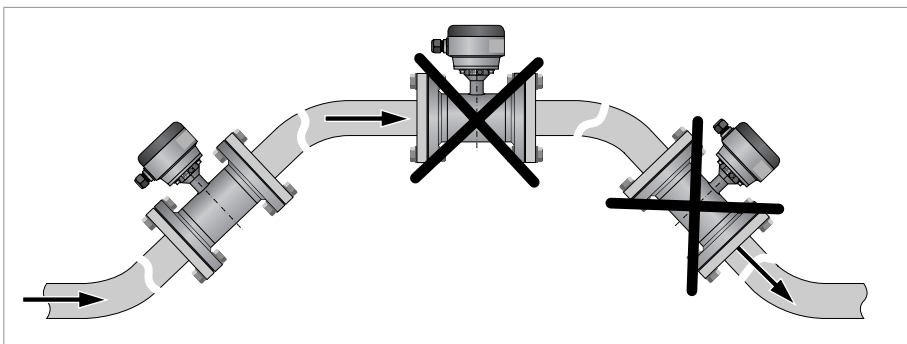


Figure 2-10: Installation in bending pipes

2.6.8 Open discharge

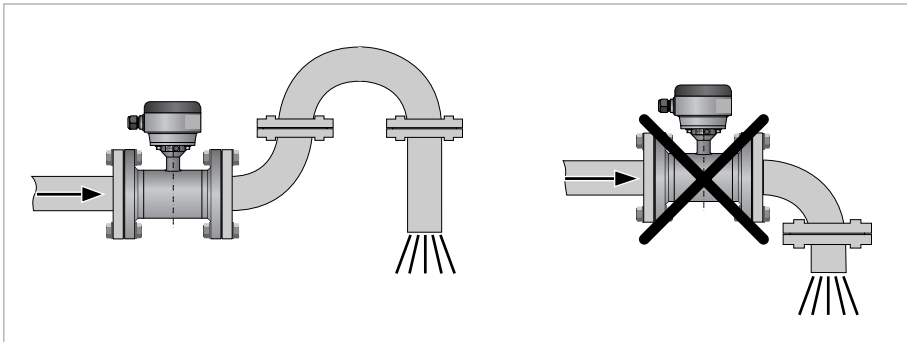


Figure 2-11: Installation before an open discharge

2.6.9 Control valve

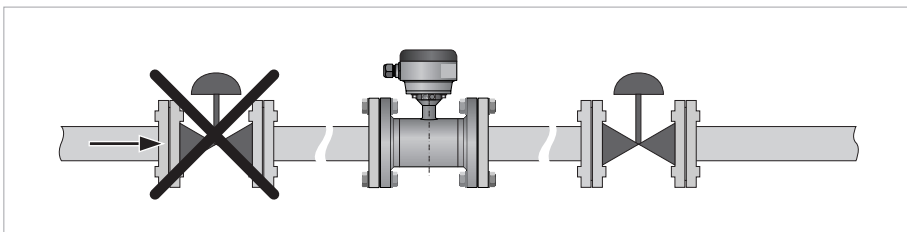


Figure 2-12: Installation before control valve

2.6.10 Air venting

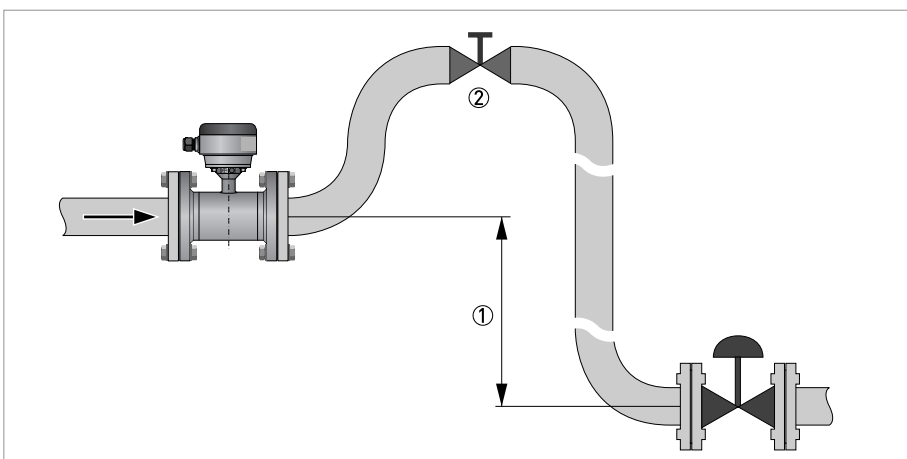


Figure 2-13: Air venting

① ≥ 5 m

② Air ventilation point

2.6.11 Pump

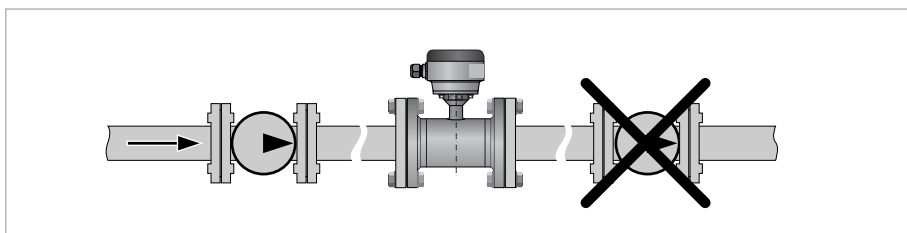


Figure 2-14: Installation after pump

2.6.12 Temperatures



CAUTION!

Protect the device from direct sunlight.

Temperature range	Process [°C]		Ambient [°C]		Process [°F]		Ambient [°F]	
	min.	max.	min.	max.	min.	max.	min.	max.
Separate flow sensor	-60	180	-40	65	-76	356	-40	149
Compact + IFC 300	-60	140	-40	65	-76	284	-40	149
Compact + IFC 100	-60	140	-40	65	-76	284	-40	149

2.7 Mounting

2.7.1 Torques and pressures

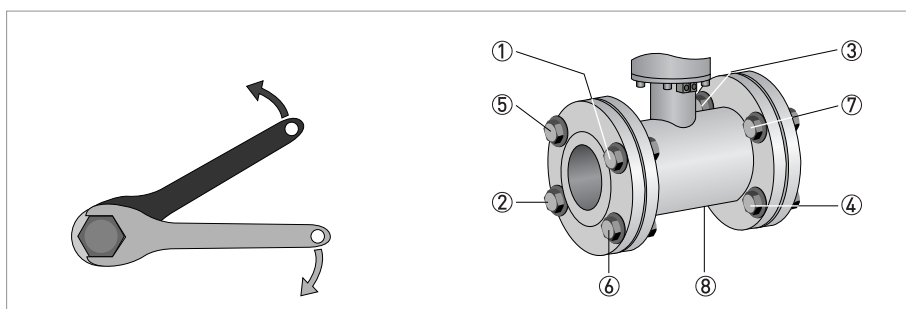

WARNING!

Please use "not lubricated" Stainless steel A2 / 6.9 class bolts.

DN15...100

Tighten the bolts in fixed order, see picture:

- Step 1: by hand
- Step 2: approx. 25% of max. torque
- Step 3: approx. 50% of max. torque
- Step 4: approx. 80% of max. torque
- Step 5: 100% of max. torque given in table


INFORMATION!

Diameters DN80 and DN100 have 8 holes per flange, please continue in the same way to tighten the other bolts.


CAUTION!

With the instrument, 4 PTFE gaskets are delivered (2 to be used with installation, 2 as spare). No other gaskets are required.

EN 1092-1

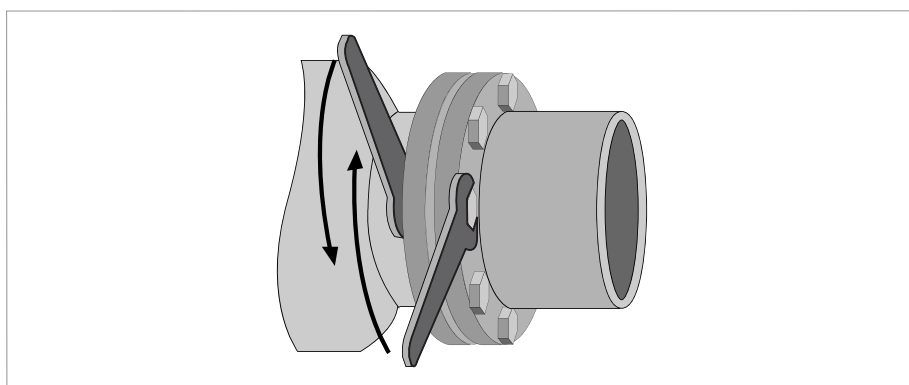
Nominal size DN [mm]	Pressure rating	Bolts	Max. torque [Nm]
15	PN 40	4 × M 12	73.5
25	PN 40	4 × M 12	73.5
40	PN 40	4 × M 16	178
50	PN 40	4 × M 16	178
80	PN 40	8 × M 16	178
100	PN 16	8 × M 16	178

ASME B 16.5

Nominal size [inch]	Flange class [lb]	Bolts	Max. torque [ftlb]
1/2	300	4 × 1/2"	40
1	150 / 300	4 × 1/2"	40
1 1/2	150 / 300	4 × 1/2"	40
2	150 / 300	4 × 5/8"	97
3	150 / 300	4 × 5/8"	97
4	150	8 × 5/8"	97

DN150...300**Tighten the bolts:**

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

**EN 1092-1**

Nominal size DN [mm]	Pressure rating	Bolts	Max. torque [Nm]
150	PN 16	8 × M 20	①
200	PN 10	8 × M 20	①
250	PN 10	12 × M 20	①
300	PN 10	12 × M 20	①

① Max. torque depends on the gaskets used by the end-user.

ASME B 16.5

Nominal size [inch]	Flange class [lb]	Bolts	Max. torque [ftlb]
6	150	8 × 3/4"	①
8	150	8 × 3/4"	①
10	150	12 × 7/8"	①
12	150	12 × 7/8"	①

① Max. torque depends on the gaskets used by the end-user.

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!

**DANGER!**

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

**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.

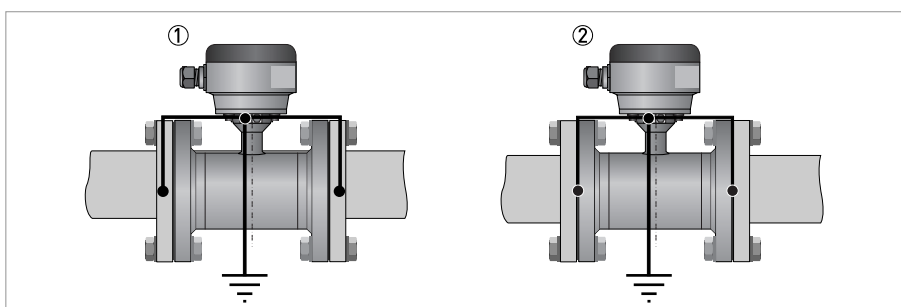


Figure 3-1: Grounding

- ① Metal pipelines, not internally coated. Grounding without grounding rings.
- ② Metal pipelines with internal coating and non-conductive pipelining. Grounding with grounding rings.



Figure 3-2: Grounding ring number 1

Grounding ring number 1 (for type VN20):

- 3 mm / 0.1" thick (tantalum: 0.5 mm / 0.1")

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

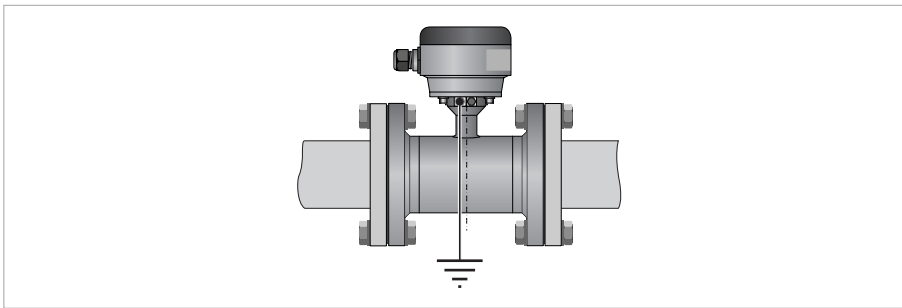


Figure 3-3: Virtual reference

Possible if:

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

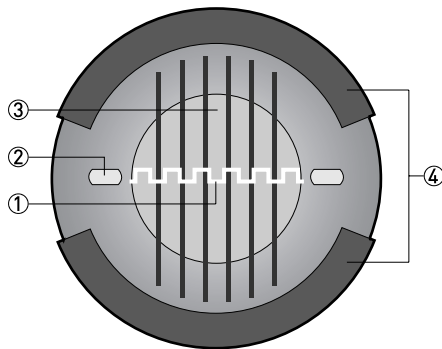
v = mean flow velocity

k = factor correcting for geometry

B = magnetic field strength

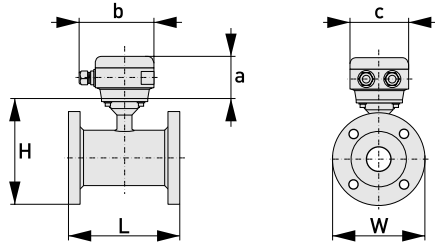
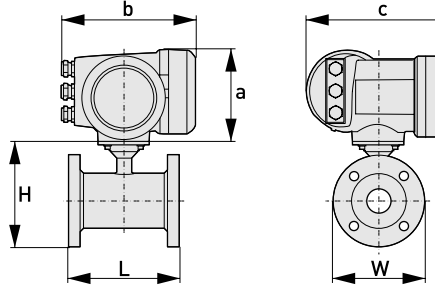
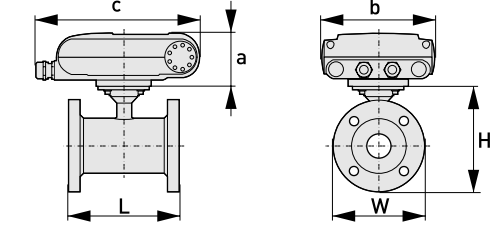
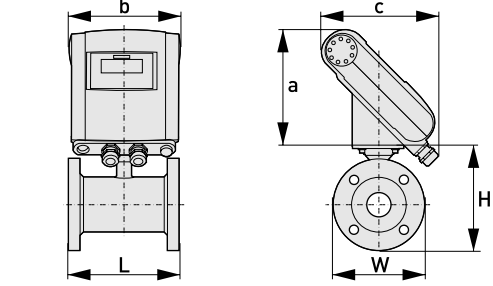
D = inner diameter of flow meter

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

Remote version		<p>a = 77 mm / 3.1"</p> <p>b = 139 mm / 5.5" ①</p> <p>c = 106 mm / 4.2"</p> <p>Total height = H + a</p>
Compact version with IFC 300		<p>a = 155 mm / 6.1"</p> <p>b = 230 mm / 9.1" ①</p> <p>c = 260 mm / 10.2"</p> <p>Total height = H + a</p>
Compact version with IFC 100 (0°)		<p>a = 82 mm / 3.2"</p> <p>b = 161 mm / 6.3"</p> <p>c = 257 mm / 10.1" ①</p> <p>Total height = H + a</p>
Compact version with IFC 100 (45°)		<p>a = 186 mm / 7.3"</p> <p>b = 161 mm / 6.3"</p> <p>c = 184 mm / 7.3" ①</p> <p>Total height = H + a</p>

① The value may vary depending on the used cable glands.

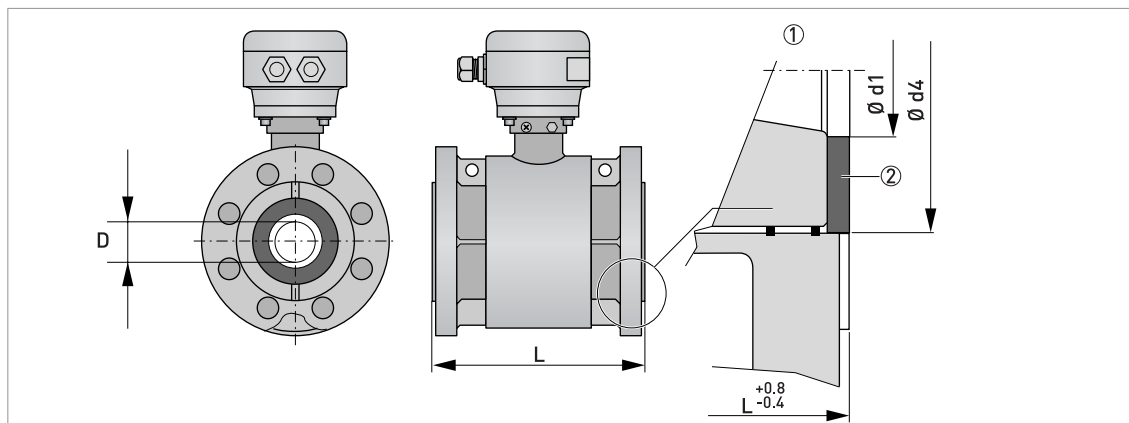


Figure 4-1: Construction details DN15...100

- ① Detail ceramics / flange / gaskets
- ② PTFE sealing ring

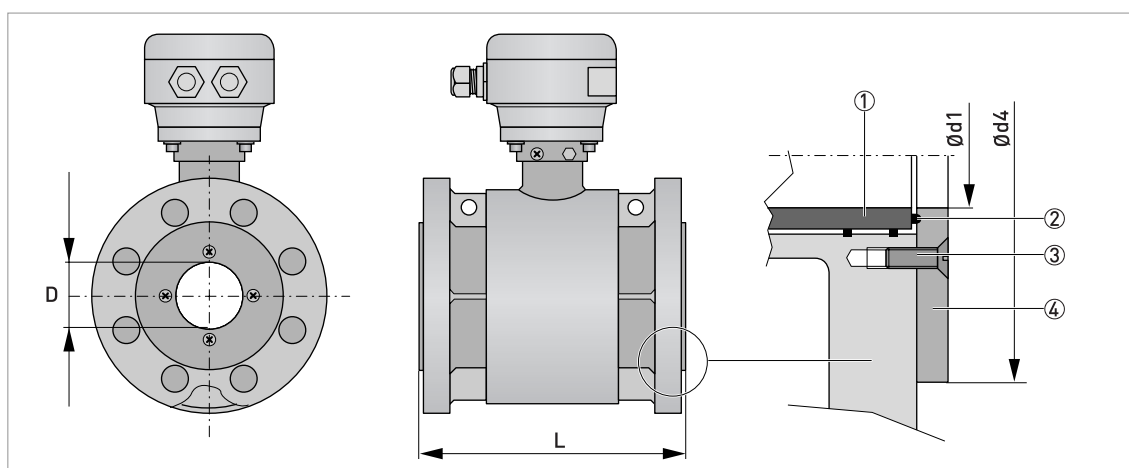


Figure 4-2: Construction details DN150...300

- ① Ceramic liner
- ② O-ring
- ③ Screw
- ④ Grounding ring

**INFORMATION!**

- All data given in the following tables are based on standard versions of the sensor only.
- Especially for smaller nominal sizes of the sensor, the converter can be bigger than the sensor.
- Note that for other pressure ratings than mentioned, the dimensions may be different.
- For full information on converter dimensions see relevant documentation.

EN 1092-1

Nominal size	Dimensions [mm]						Approx. weight [kg]
DN	L	H	W	D	Ød1	Ød4	
15	150	127	95	12	15	44	3
25	150	143	115	20	26	46	4
40	150	168	150	30	39	62	6
50	200	184	165	40	51	74	9
80	200	217	200	60	80	106	15
100	250	242	220	80	101	133	21
150	265	355	283	150	150	215	37
200	315	396	342	200	198	270	53
250	365	458	395	250	250	322	87
300	500	493	445	300	300	375	145

ASME B 16.5 150 lb

Nominal size	Dimensions [inches]						Approx. weight [lb]
inch	L	H	W	D	Ød1	Ød4	
1"	5.91	5.47	4.25	0.79	1.02	1.81	8.8
1½"	5.91	6.18	5	1.18	1.54	2.44	13.2
2"	7.87	6.89	6	1.57	2.01	2.91	19.8
3"	7.87	8.39	7.5	2.36	3.15	4.17	33.1
4"	9.84	9.65	9	3.15	3.98	5.24	46.3
6"	10.43	13.98	11	5.91	5.91	8.46	81.6
8"	12.4	15.59	13.5	7.80	7.80	10.63	116.8
10"	14.37	18.03	16	9.84	9.84	12.68	191.8
12"	19.69	19.41	19	11.81	11.81	14.76	366

ASME B 16.5 300 lb

Nominal size	Dimensions [inches]						Approx. weight [lb]
inch	L	H	W	D	Ød1	Ød4	
½"	5.91	5.0	3.74	0.47	0.59	-	6.8
1"	5.91	5.91	4.92	0.79	1.02	1.81	8.8
2"	7.87	7.20	6.50	1.57	2.01	2.91	22.9
3"	7.87	8.86	8.27	2.36	3.15	4.17	40.6
1½": not possible because of ASTM-NUT							

**CAUTION!**

- Pressures at 20°C / 68°F.
- For higher temperatures, the pressure and temperature ratings are as per ASME B16.5.



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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