

# OPTIFLUX 1000 Quick Start

Electromagnetic flow sensor in sandwich 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!

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



#### 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!

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

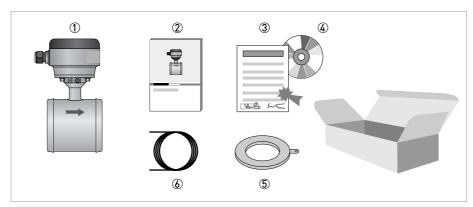


Figure 2-1: Scope of delivery

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



#### INFORMATION!

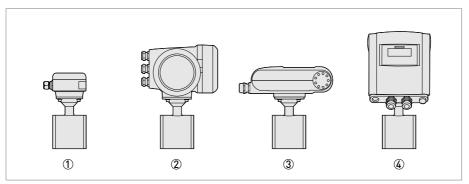
Assembly materials and tools are not part of the delivery. Use the assembly materials and tools in compliance with the applicable occupational health and safety directives.

# 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)



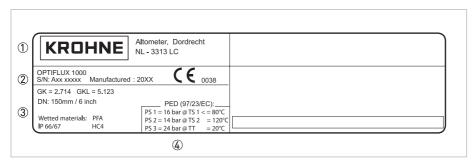
- Remote version
- ② Compact version with IFC 300 signal converter
- 3 Compact version with IFC 100 (0°) signal converter
- 4 Compact version with IFC 100 (45°) signal converter

# 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 2-2: Transport

# 2.6 Installation conditions

### 2.6.1 Inlet and outlet

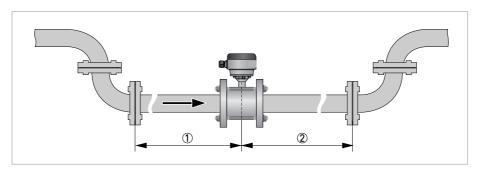


Figure 2-3: Recommended inlet and outlet

- ①  $\geq 5 DN$ ②  $\geq 2 DN$

# 2.6.2 Mounting position

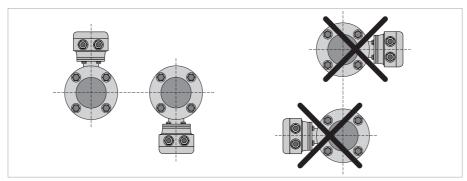


Figure 2-4: Mounting position

# 2.6.3 Flange deviation



### **CAUTION!**

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

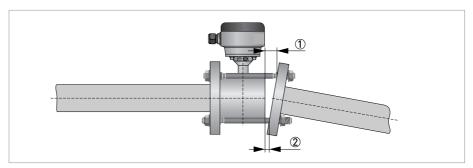


Figure 2-5: Flange deviation

- ① L<sub>max</sub>
- ② L<sub>min</sub>

### 2.6.4 T-section

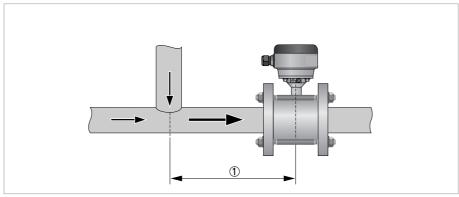


Figure 2-6: Distance after T-sections

① ≥ 10 DN

### 2.6.5 Vibration

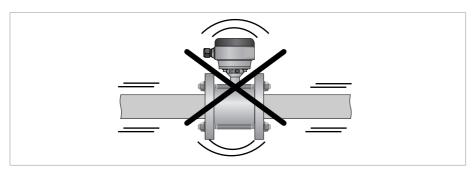


Figure 2-7: Avoid vibrations

# 2.6.6 Magnetic field

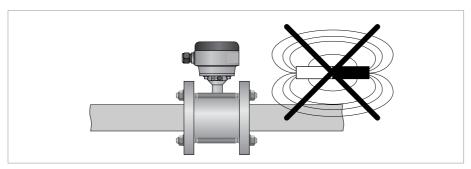


Figure 2-8: Avoid magnetic fields

### 2.6.7 Bends

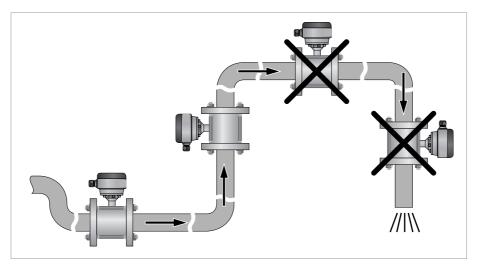


Figure 2-9: Installation in bending pipes

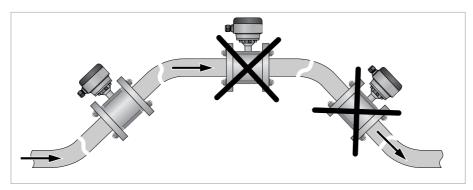


Figure 2-10: Installation in bending pipes

# 2.6.8 Open discharge

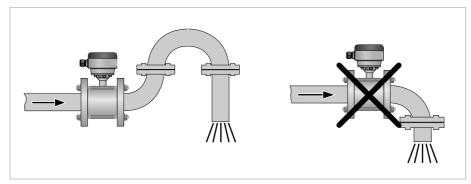


Figure 2-11: Installation before an open discharge

# 2.6.9 Control valve

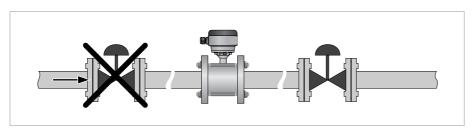


Figure 2-12: Installation before control valve

# 2.6.10 Air venting

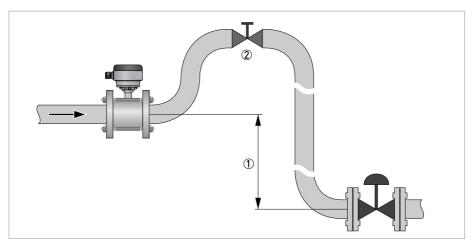


Figure 2-13: Air venting

- $\bigcirc$  25 m
- ② Air ventilation point

# 2.6.11 Pump

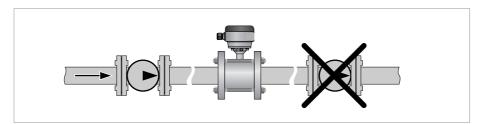


Figure 2-14: Installation after pump

# 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	-25	120	-25	65	-13	248	-13	149
Compact + IFC 300 C	-25	120	-25	65	-13	248	-13	149
Compact + IFC 100 C	-25	120	-25	65	-13	248	-13	149

# 2.7 Torques and pressures

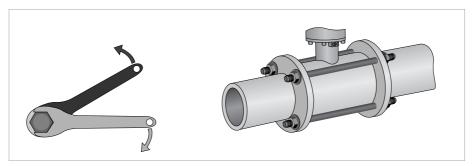


Figure 2-15: Tightening of bolts



### 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.

### EN 1092-1

Nominal size	Pipe f	langes	Pressure rating	Max. torque
	Flange size	Pressure rating	[bar]	[Nm]
DN10	DN15	PN 16/40	16	16
DN15	DN15	PN 16/40	16	16
DN25	DN25	PN 16/40	16	16
DN40	DN40	PN 16/40	16	25
DN50	DN50	PN 16/40	16	45
DN80	DN80	PN 16/40	16	25
DN100	DN100	PN 16/40	16	33
DN150	DN150	PN 16/40	16	82

### **ASME B 16.5**

Nominal size	Pipe f	langes	Pressure rating	Max. torque
	Flange size	Pressure rating	[psig]	[Nm]
3/8"	1/2"	150/300 lb	230	16
1/2"	1/2"	150/300 lb	230	16
1"	1"	150/300 lb	230	15
1 1/2"	1 1/2"	150/300 lb	230	25
2"	2"	150/300 lb	230	45
3"	3"	150 lb	230	56
3"	3"	300 lb	230	28
4"	4"	150/300 lb	230	36
6"	6"	150 lb	230	100
6"	6"	300 lb	230	66

# 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.

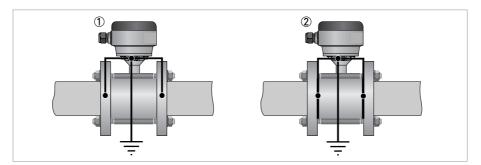


Figure 3-1: Grounding

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



Figure 3-2: Grounding ring number 1

### Grounding ring number 1 (Optional for DN25...100):

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

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

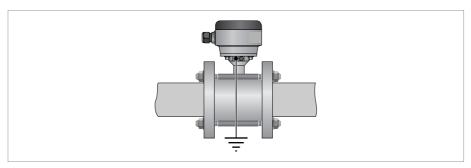


Figure 3-3: Virtual reference

### Possible if:

- ≥ DN10
- 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:

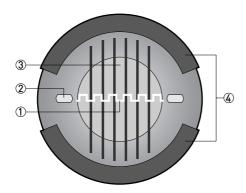
v = mean flow velocity

k = factor correcting for geometry

B = magnetic field strength

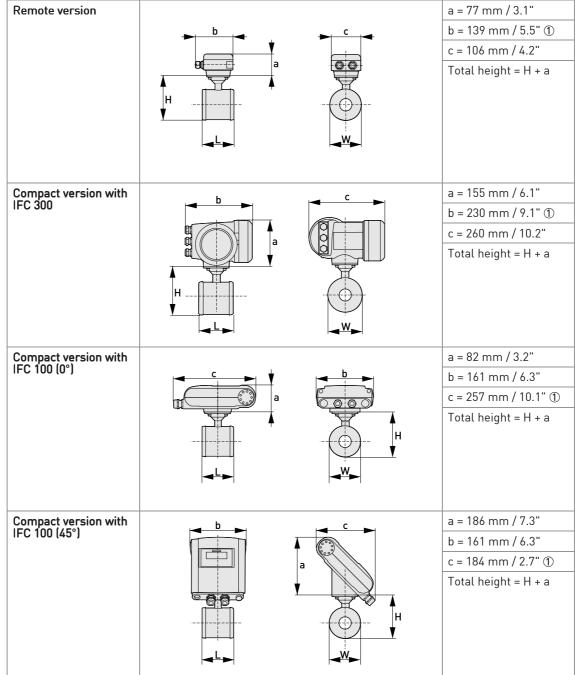
D = inner diameter of flow meter

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



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



### 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.

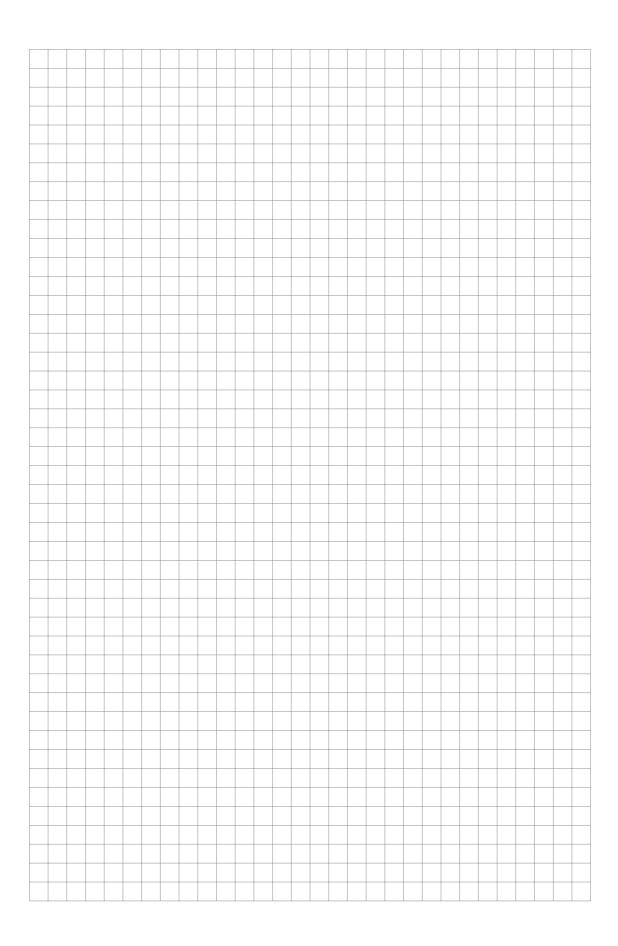
Nom	inal size	Dimensions [mm]			Approx. weight	
DN	PN [bar]	L	Н	W	[kg]	
10	40	68	137	47	1.7	
15	40	68	137	47	1.7	
25	40	54	147	66	1.7	
40	40	78	162	82	2.6	
50	40	100	151	101	4.2	
80	40	150	180	130	5.7	
100	16	200	207	156	10.5	
150	16	200	271	219	15.0	

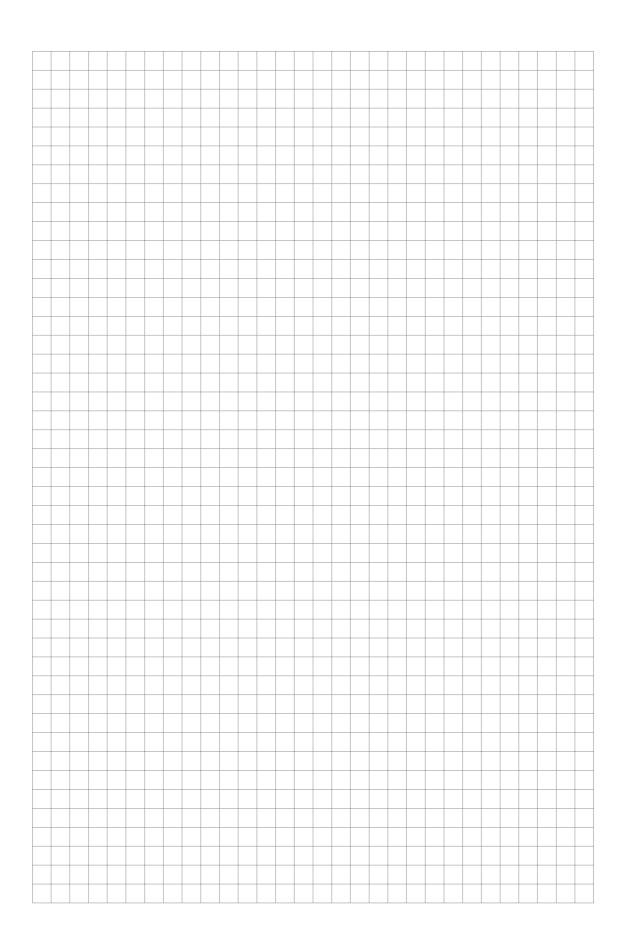
Nomi	nal size	Dimensions [inches]			Approx. weight	
ASME	PN [psi]	L	Н	W	[lb]	
3/8"	580	2.68	5.39	1.85	3.7	
1/2"	580	2.68	5.39	1.85	3.7	
1"	580	2.13	5.79	2.6	3.7	
1½"	580	3.07	6.38	3.23	5.7	
2"	580	3.94	5.94	3.98	9.3	
3"	580	5.91	7.08	5.12	12.6	
4"	232	7.87	8.15	6.14	23.1	
6"	232	7.87	10.67	8.62	33.1	



### CAUTION!

- Pressures are applicable at 20°C / 68°F.
- For higher temperatures, the pressure ratings are as per ASME B16.5 (up to 24").







### **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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