OPTIFLUX 2000 Quick Start

Electromagnetic flow sensor

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

KROHNE

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

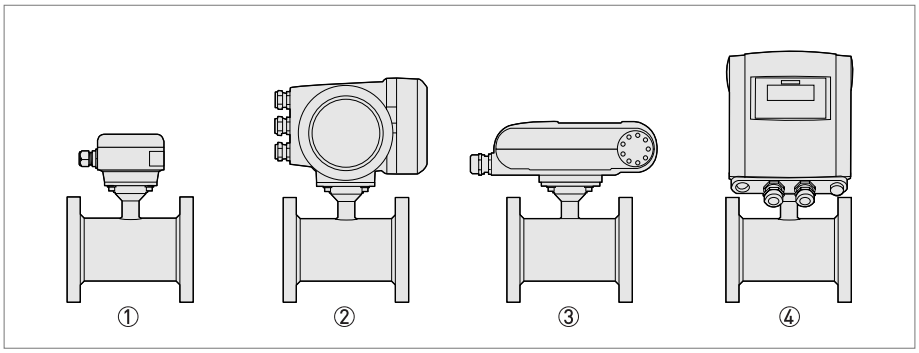
CAUTION!
Installation, assembly, start-up and maintenance may only be performed by appropriately trained personnel. The regional occupational health and safety directives must always be observed.

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. They appear on the back of the invoice and 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



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

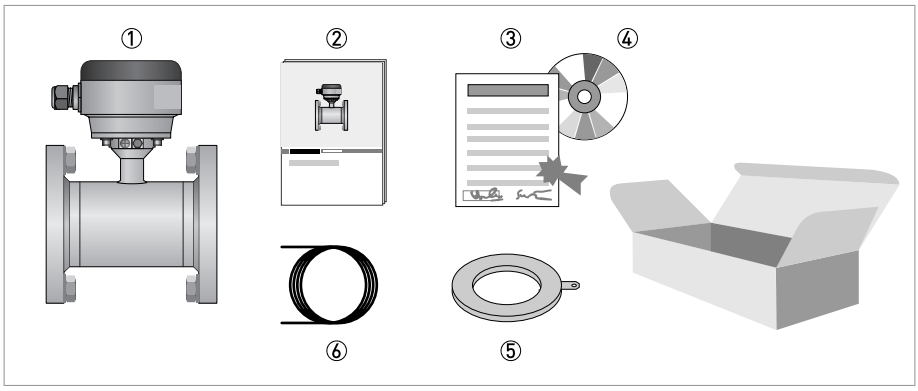


Figure 2-1: Scope of delivery

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)

2.2 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.

2.3 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.

2.4 Transport

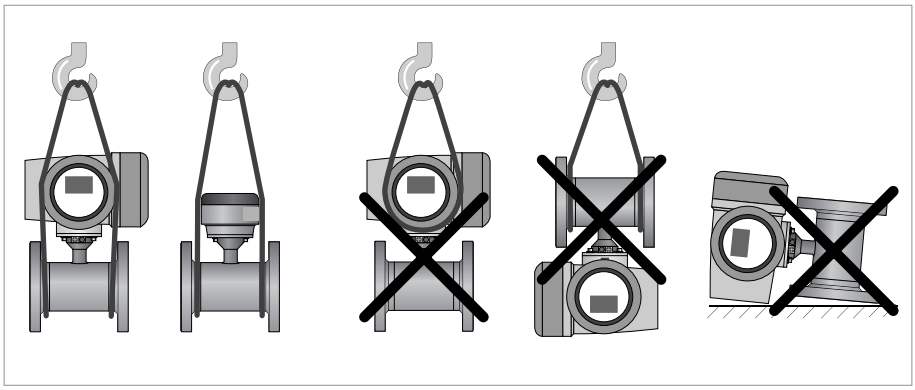


Figure 2-2: Transport

2.5 Installation conditions

2.5.1 Inlet and outlet

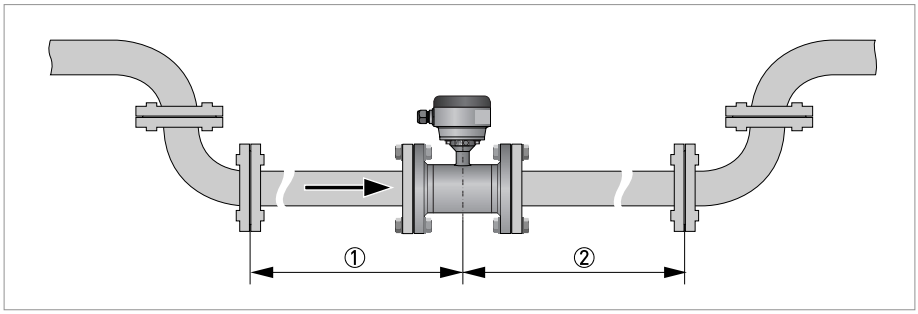


Figure 2-3: Recommended inlet and outlet sections

① ≥ 5 DN
② ≥ 2 DN

2.5.2 Mounting position

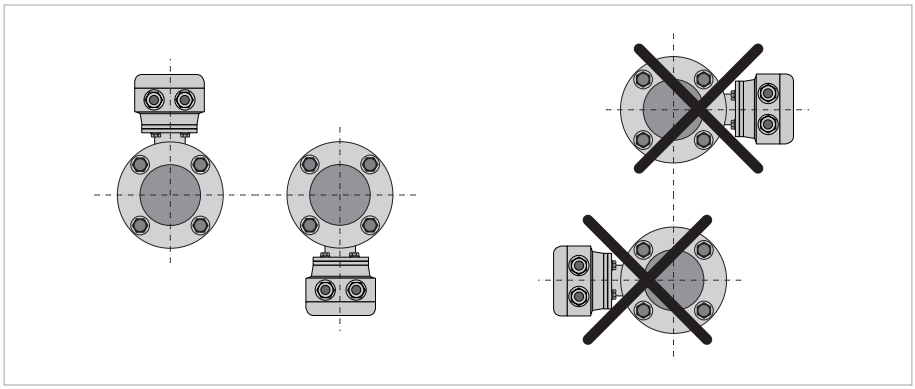


Figure 2-4: Mounting position

2.5.3 Flange deviation

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

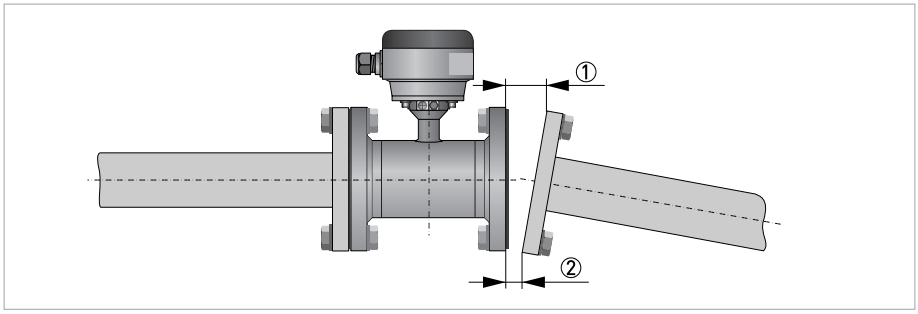


Figure 2-5: Flange deviation

① L_{max}
② L_{min}

2.5.4 T-section

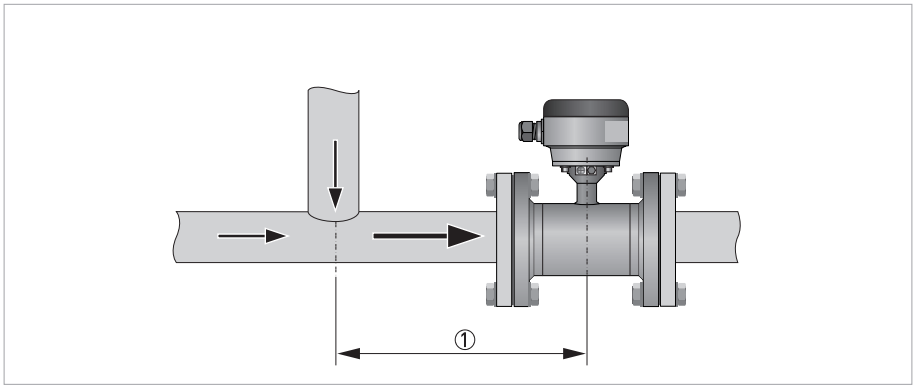


Figure 2-6: Distance after T-sections

① ≥ 10 DN

2.5.5 Vibration

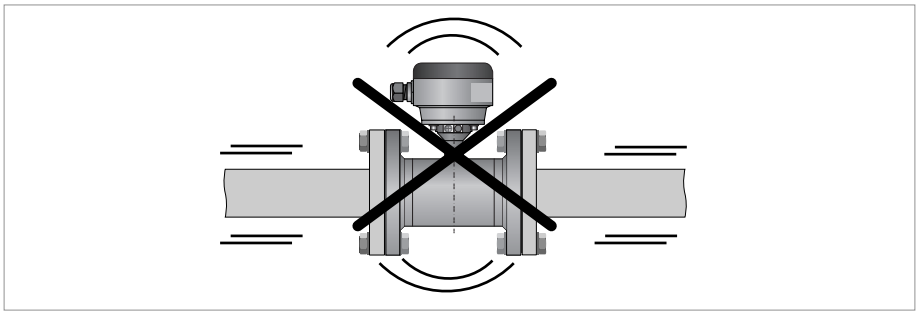


Figure 2-7: Avoid vibrations

2.5.6 Magnetic field

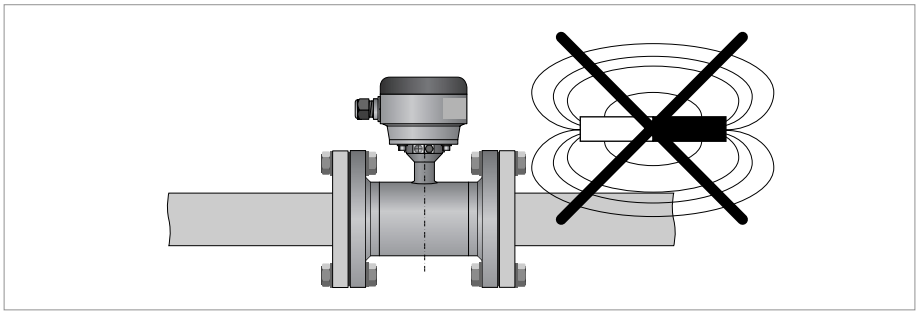


Figure 2-8: Avoid magnetic fields

2.5.7 Bends

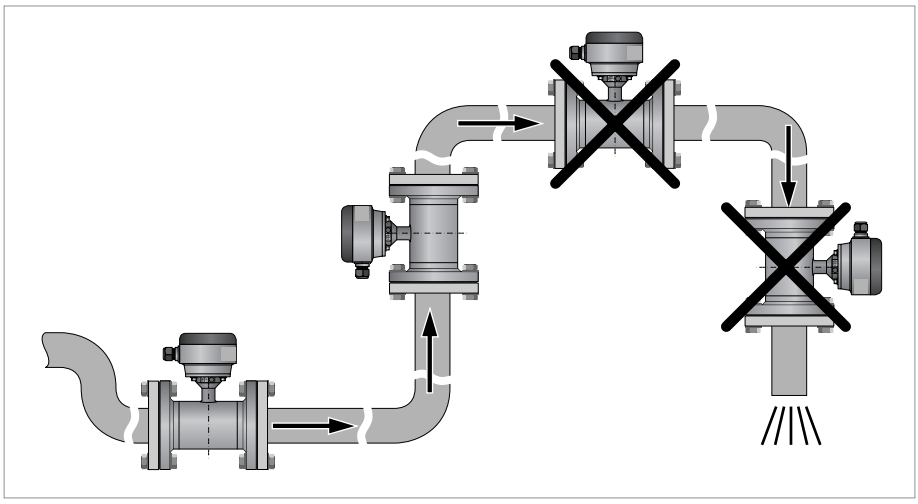


Figure 2-9: Installation in bending pipes

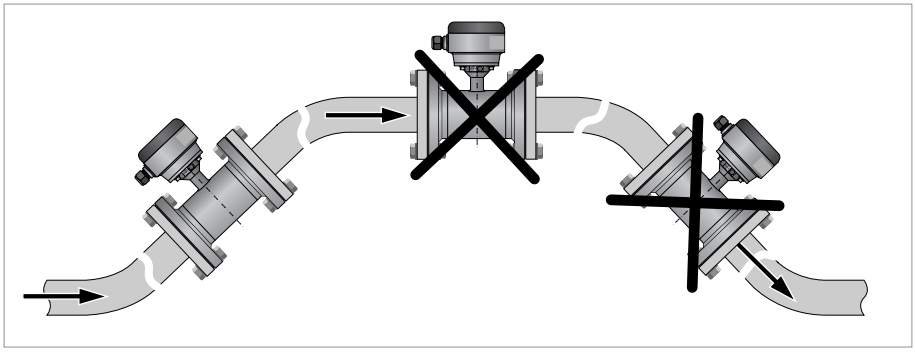


Figure 2-10: Installation in bending pipes

2.5.8 Open discharge

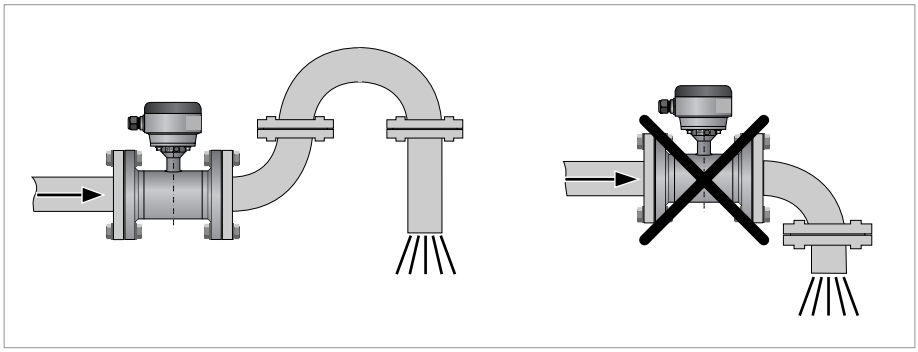


Figure 2-11: Installation before an open discharge

2.5.9 Control valve

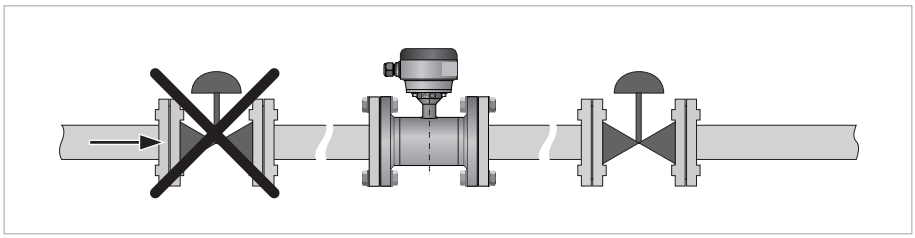


Figure 2-12: Installation before control valve

2.5.10 Air venting

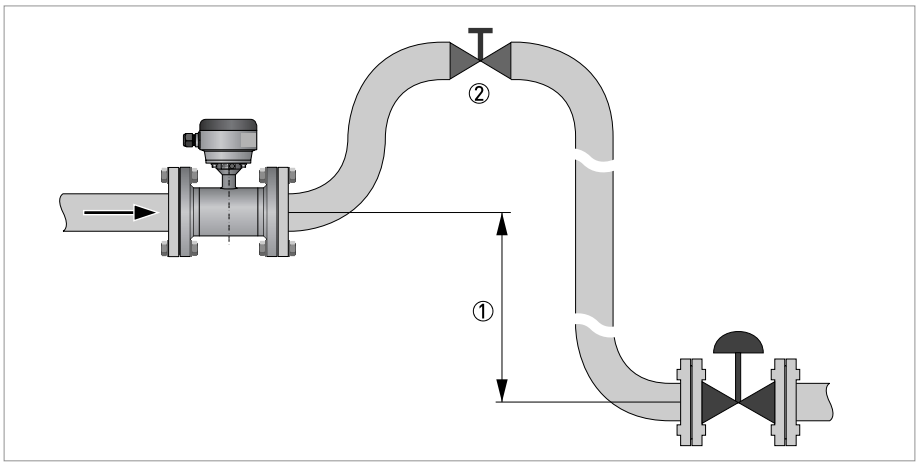


Figure 2-13: Air venting

① ≥ 5 m
② Air ventilation point

2.5.11 Pump

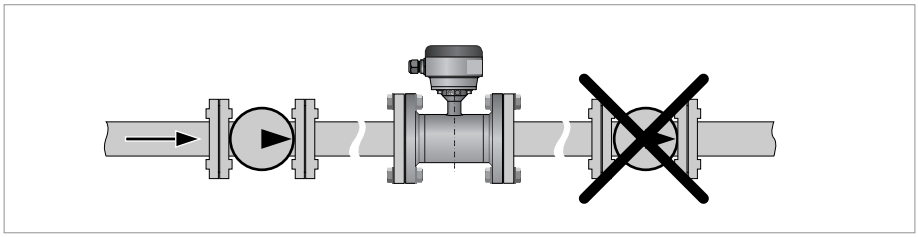


Figure 2-14: Installation after pump

2.5.12 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.
Hardrubber								
Separate flow sensor	-5	80	-40	65	23	176	-40	149
Compact with IFC 300	-5	80	-40	65	23	176	-40	149
Compact with IFC 100	-5	80	-40	65	23	176	-40	149
Polypropylene ①								
Separate flow sensor	-5	90	-40	65	23	194	-40	149
Compact with IFC 300	-5	90	-40	65	23	194	-40	149
Compact with IFC 100	-5	90	-40	65	23	194	-40	149

① Polypropylene available for DN25...150

Diameter	Minimum operating pressure absolute in mbar (abs) at process temperature			
[mm]	20°C	40°C	60°C	80°C
Liner in Polypropylene				
DN25...150	250	250	400	400
Liner in Hard rubber				
DN200...300	250	250	400	400
DN350...1000	500	500	600	600
DN1200...3000	600	600	750	750

Diameter	Minimum operating pressure absolute in psia at process temperature			
[inches]	68°F	104°F	140°F	176°F
Liner in Polypropylene				
1...6"	3.6	3.6	5.8	5.8
Liner in Hard rubber				
8...12"	3.6	3.6	5.8	5.8
14...40"	7.3	7.3	8.7	8.7
48...120"	8.7	8.7	10.9	10.9

2.5.13 Vacuum load

Diameter	Minimum operating pressure absolute in mbar (abs) at process temperature			
[mm]	20°C	40°C	60°C	80°C
Liner in Polypropylene				
DN25...150	250	250	400	400
Liner in Hard rubber				
DN200...300	250	250	400	400
DN350...1000	500	500	600	600
DN1200...3000	600	600	750	750

Diameter	Minimum operating pressure absolute in psia at process temperature			
[inches]	68°F	104°F	140°F	176°F
Liner in Polypropylene				
1...6"	3.6	3.6	5.8	5.8
Liner in Hard rubber				
8...12"	3.6	3.6	5.8	5.8
14...40"	7.3	7.3	8.7	8.7
48...120"	8.7	8.7	10.9	10.9

2.6 Mounting

2.6.1 Torques and pressures

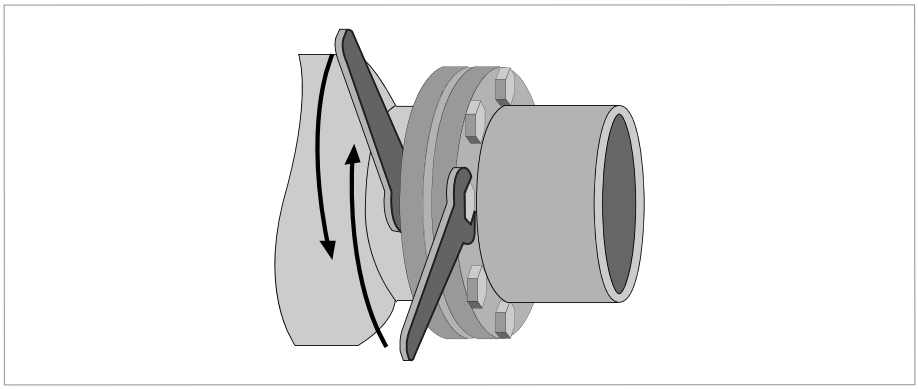


Figure 2-15: Tightening of bolts

Tightening of bolts

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

Nominal DN [mm]	Pressure rating	Bolts	Max. torque [Nm]	
			Polypropylene	Hardrubber
25	PN 40	4 × M 12	22	11
32	PN 40	4 × M 16	37	19
40	PN 40	4 × M 16	43	25
50	PN 40	4 × M 16	55	31
65	PN 16	4 × M 16	51	42
65	PN 40	8 × M 16	38	21
80	PN 40	8 × M 16	47	25
100	PN 16	8 × M 16	39	30
125	PN 16	8 × M 16	53	40
150	PN 16	8 × M 20	68	47
200	PN 10	8 × M 20	-	68
200	PN 16	12 × M 20	-	45
250	PN 10	12 × M 20	-	65
250	PN 16	12 × M 24	-	78
300	PN 10	12 × M 20	-	76
300	PN 16	12 × M 24	-	105
350	PN 10	16 × M 20	-	75
400	PN 10	16 × M 24	-	104
450	PN 10	20 × M 24	-	93
500	PN 10	20 × M 24	-	107
600	PN 10	20 × M 27	-	138
700	PN 10	20 × M 27	-	163
800	PN 10	24 × M 30	-	219
900	PN 10	28 × M 30	-	205
1000	PN 10	28 × M 35	-	261

Nominal size [inch]	Flange class [lbs]	Bolts	Max. torque [Nm]	
			Polypropylene	Hardrubber
1	150	4 × 1/2"	6.7	4.4
1 1/2	150	4 × 1/2"	13	12
2	150	4 × 5/8"	24	23
3	150	4 × 5/8"	43	39
4	150	8 × 5/8"	34	31
6	150	8 × 3/4"	61	51
8	150	8 × 3/4"	-	69
10	150	12 × 7/8"	-	79
12	150	12 × 7/8"	-	104
14	150	12 × 1"	-	93
16	150	16 × 1"	-	91
18	150	16 × 1 1/8"	-	143
20	150	20 × 1 1/8"	-	127
24	150	20 × 1 1/4"	-	180
28	150	28 × 1 1/4"	-	161
32	150	28 × 1 1/2"	-	259
36	150	32 × 1 1/2"	-	269
40	150	36 × 1 1/2"	-	269

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.

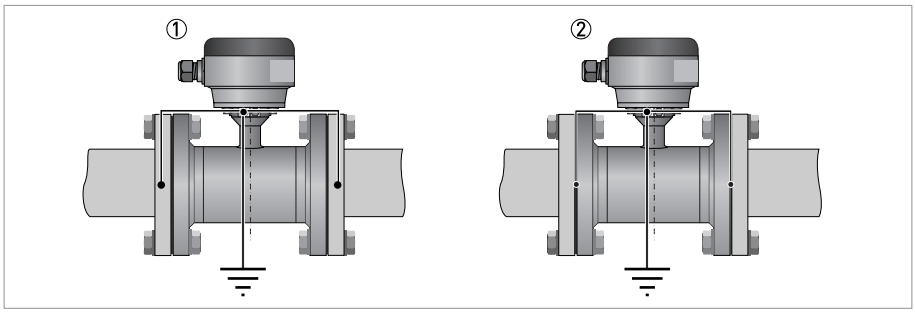


Figure 3-1: Grounding

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

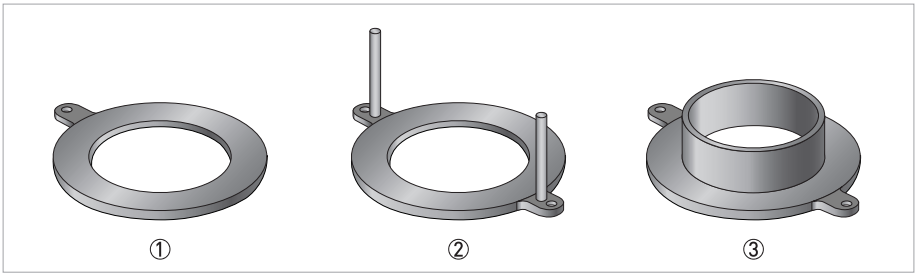


Figure 3-2: Different types of grounding rings

① Grounding ring number 1
② Grounding ring number 2
③ Grounding ring number 3

Grounding ring number 1:

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

Grounding ring number 2:

- 3 mm / 0.1" thick
- Prevents damage to the flanges during transport and installation
- Especially for flow sensors with PTFE liner

Grounding ring number 3:

- 3 mm / 0.1" thick
- With cylindrical neck (length 30 mm / 1.25" for DN10...150 / 3/8...6")
- Prevents damage to the liner when abrasive liquids are used

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

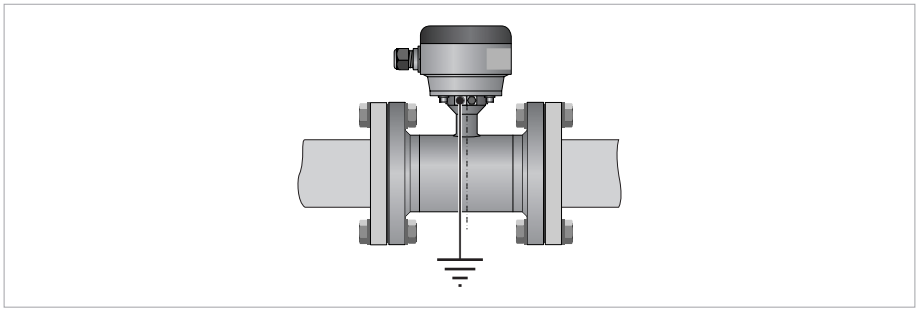


Figure 3-3: Virtual reference

Possible if:

- ≥ DN10
- Electrical conductivity ≥ 200 µS/cm
- Electrode cable max. 50m.

3.4 Connection diagram for measuring sensor, field housing

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

- If a shielded field current cable is used, the shield must **NOT** be connected.
- The outer shield of signal cable A or B in the signal converter housing is connected via the strain relief terminal.
- Bending radius of signal and field current cable: ≥ 50 mm / 2"
- The following illustration is schematic. The positions of the electrical connection terminals may vary depending on the housing version.

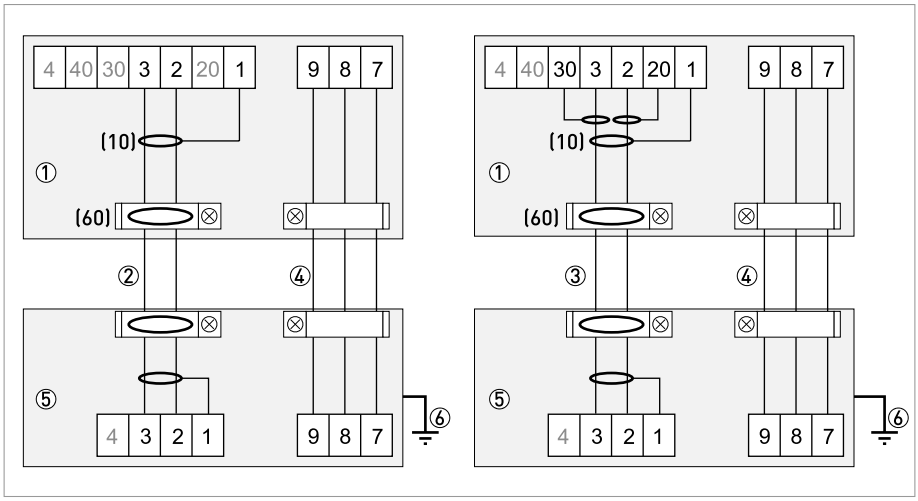
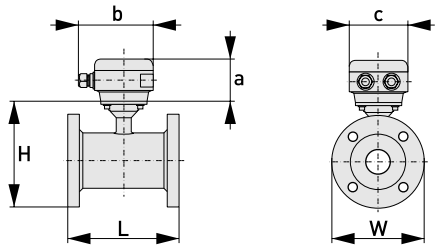
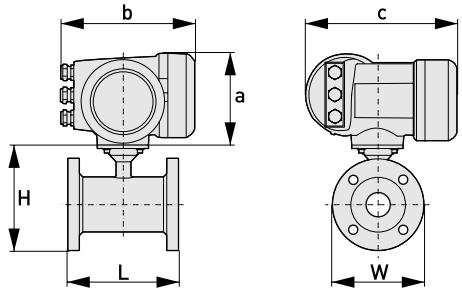
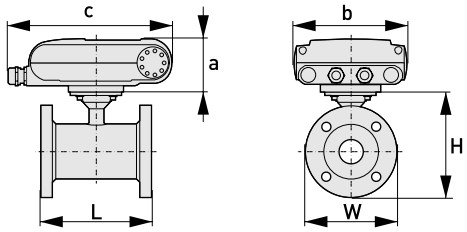
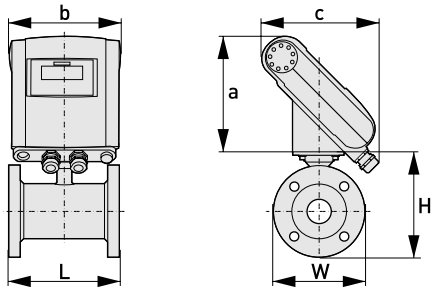


Figure 3-4: Connection diagram for measuring sensor, field housing

① Electrical terminal compartment in housing of the signal converter for signal and field current cable.
② Signal cable A
③ Signal cable B
④ Field current cable C
⑤ Connection box of measuring sensor
⑥ Functional ground FE

4.1 Dimensions and weight

Remote version		a = 77 mm / 3.1" b = 139 mm / 5.5" ① c = 106 mm / 4.2" Total height = H + a
Compact version with IFC 300		a = 155 mm / 6.1" b = 230 mm / 9.1" ① c = 260 mm / 10.2" Total height = H + a
Compact version with IFC 100 (0°)		a = 82 mm / 3.2" b = 161 mm / 6.3" c = 257 mm / 10.1" ① Total height = H + a
Compact version with IFC 100 (45°)		a = 186 mm / 7.3" b = 161 mm / 6.3" c = 184 mm / 2.7" ① Total height = H + a

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.*

EN 1092-1

Nominal size		Dimensions [mm]				Approx. weight [kg]
DN	PN [bar]	L		H	W	
		DIN	ISO			
25	40	150	200	140	115	5
32	40	150	200	157	140	6
40	40	150	200	166	150	7
50	40	200	200	186	165	11
65	16	200	200	200	185	9
80	40	200	200	209	200	14
100	16	250	250	237	220	15
125	16	250	250	266	250	19
150	16	300	300	300	285	27
200	10	350	350	361	340	34
250	10	400	450	408	395	48
300	10	500	500	458	445	58
350	10	500	550	510	505	78
400	10	600	600	568	565	101
450	10	600	-	618	615	111
500	10	600	-	671	670	130
600	10	600	-	781	780	165
700	10	700	-	898	895	248
800	10	800	-	1012	1015	331
900	10	900	-	1114	1115	430
1000	10	1000	-	1225	1230	507
1200	6	1200	-	1417	1405	555
1400	6	1400	-	1619	1630	765
1600	6	1600	-	1819	1830	1035
1800	6	1800	-	2027	2045	1470
2000	6	2000	-	2259	2265	1860

150 lbs flanges

Nominal size		Dimensions [mm]			Approx. weight [kg]
ASME	PN [psi]	L	H	W	
1"	284	150	137	108.0	8
1½"	284	150	155	127.0	10
2"	284	200	179	152.0	13
3"	284	200	204	190.5	17
4"	284	250	241	228.6	23
5"	284	250	268	254.0	27
6"	284	300	297	279.4	34
8"	284	350	362	342.9	43
10"	284	400	414	406.4	65
12"	284	500	477	482.6	94
14"	284	700	525	533.4	129
16"	284	800	583	596.9	165
18"	284	800	628	635	186
20"	284	800	685	698.5	223
24"	284	800	797	812.8	306

CAUTION!

- *Pressures at 20° C / 68° F.*
- *For higher temperatures, the pressure and temperature ratings are as per ASME B16.5 (up to 24") or ASME B16.47 (>24").*
- *Dimensions for other sizes on request.*

Nominal size		Dimensions [inches]			Approx. weight [lbs]
ASME	PN [psi]	L	H	W	
1"	284	5.91	5.39	4.25	18
1½"	284	5.91	6.10	5.00	22
2"	284	7.87	7.05	5.98	29
3"	284	7.87	8.03	7.50	37
4"	284	9.84	9.49	9.00	51
5"	284	9.84	10.55	10	60
6"	284	11.81	11.69	11	75
8"	284	13.78	14.25	13.5	95
10"	284	15.75	16.3	16.0	143
12"	284	19.69	18.78	19.0	207
14"	284	27.56	20.67	21.0	284
16"	284	31.50	22.95	23.5	364
18"	284	31.50	24.72	25.0	410
20"	284	31.50	26.97	27.5	492
24"	284	31.50	31.38	32.0	675

CAUTION!

- *Pressures at 20° C / 68° F.*
- *For higher temperatures, the pressure and temperature ratings are as per ASME B16.5 (up to 24") or ASME B16.47 (>24").*
- *Dimensions for other sizes on request.*

300 lbs flanges

Nominal size		Dimensions [mm]			Approx. weight [kg]
ASME	PN [psi]	L	H	W	
1"	741	150	145	123.8	8
1½"	741	200	169	155.6	9
2"	741	250	186	165.1	13
3"	741	250	214	209.6	17
4"	741	300	254	254.0	23
6"	741	320	316	317.5	36
8"	741	400	382	381.0	71
10"	741	500	433	444.5	112
12"	741	600	508	520.7	170
14"	741	700	550	584.2	215
16"	741	800	609	647.7	290
20"	741	800	723	774.7	425
24"	741	800	848	914.4	610

CAUTION!

- *Pressures at 20° C / 68° F.*
- *For higher temperatures, the pressure and temperature ratings are as per ASME B16.5 (up to 24") or ASME B16.47 (>24").*
- *Dimensions for other sizes on request.*

Nominal size		Dimensions [inches]			Approx. weight [lbs]
ASME	PN [psi]	L	H	W	
1"	741	5.91	5.71	4.87	18
1½"	741	7.87	6.65	6.13	20
2"	741	9.84	7.32	6.50	29
3"	741	9.84	8.43	8.25	37
4"	741	11.81	10.00	10.00	51
6"	741	12.60	12.44	12.50	79
8"	741	15.75	15.04	15.0	157
10"	741	19.69	17.05	17.5	247
12"	741	23.62	20.00	20.5	375
14"	741	27.56	21.65	23.0	474
16"	741	31.50	23.98	25.5	639
20"	741	31.50	28.46	30.5	937
24"	741	31.50	33.39	36.0	1345

CAUTION!

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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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