



EGS 2000 Handbook

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

All rights reserved. It is prohibited to reproduce this documentation, or any part thereof, without the prior written authorisation of TOKYO KEISO CO., LTD.

Subject to change without notice.

Copyright 2016 by TOKYO KEISO CO., LTD.

1 Safety instructions	4
1.1 Intended use	4
1.2 Certification	4
1.3 Safety instructions from the manufacturer	5
1.3.1 Copyright and data protection	5
1.3.2 Disclaimer	5
1.3.3 Product liability and warranty	6
1.3.4 Information concerning the documentation	6
1.3.5 Warnings and symbols used	7
1.4 Safety instructions for the operator	7
2 Device description	8
2.1 Scope of delivery	8
2.2 Device description	9
2.3 Nameplate	9
3 Installation	10
3.1 General notes on installation	10
3.2 Storage	10
3.3 Transport	10
3.4 Pre-installation requirements	11
3.5 General requirements	11
3.5.1 Vibration	11
3.5.2 Magnetic field	11
3.6 Installation conditions	12
3.6.1 Inlet and outlet	12
3.6.2 Bends in 2 or 3 dimensions	12
3.6.3 T-section	12
3.6.4 Bends	13
3.6.5 Open feed or discharge	13
3.6.6 Flange deviation	14
3.6.7 Control valve	14
3.6.8 Pump	14
3.6.9 Air venting and vacuum forces	15
3.6.10 Mounting position	16
3.6.11 Mounting	16
3.6.12 Torques and pressures	16
3.6.13 Temperatures	19
4 Electrical connections	20
4.1 Safety instructions	20
4.2 Grounding	20
4.3 Virtual reference for EGC 300 (C, W and F version)	22
4.4 Connection diagrams	22

1.1 Intended use

**CAUTION!**

Responsibility for the use of the measuring devices with regard to suitability, intended use and corrosion resistance of the used materials against the measured fluid lies solely with the operator.

**INFORMATION!**

The manufacturer is not liable for any damage resulting from improper use or use for other than the intended purpose.

**WARNING!**

If the device is not used according to the operating conditions, the intended protection could be affected.

1.2 Certification

CE marking



The manufacturer certifies successful testing of the product by applying the CE marking.

This device fulfils the statutory requirements of the relevant EU directives.

For full information of the EU directives and standards and the approved certifications, please refer to the CE declaration or the website of the manufacturer.

1.3 Safety instructions from the manufacturer

1.3.1 Copyright and data protection

The contents of this document have been created with great care. Nevertheless, we provide no guarantee that the contents are correct, complete or up-to-date.

The contents and works in this document are subject to copyright. Contributions from third parties are identified as such. Reproduction, processing, dissemination and any type of use beyond what is permitted under copyright requires written authorisation from the respective author and/or the manufacturer.

The manufacturer tries always to observe the copyrights of others, and to draw on works created in-house or works in the public domain.

The collection of personal data (such as names, street addresses or e-mail addresses) in the manufacturer's documents is always on a voluntary basis whenever possible. Whenever feasible, it is always possible to make use of the offerings and services without providing any personal data.

We draw your attention to the fact that data transmission over the Internet (e.g. when communicating by e-mail) may involve gaps in security. It is not possible to protect such data completely against access by third parties.

We hereby expressly prohibit the use of the contact data published as part of our duty to publish an imprint for the purpose of sending us any advertising or informational materials that we have not expressly requested.

1.3.2 Disclaimer

The manufacturer will not be liable for any damage of any kind by using its product, including, but not limited to direct, indirect or incidental and consequential damages.

This disclaimer does not apply in case the manufacturer has acted on purpose or with gross negligence. In the event any applicable law does not allow such limitations on implied warranties or the exclusion of limitation of certain damages, you may, if such law applies to you, not be subject to some or all of the above disclaimer, exclusions or limitations.

Any product purchased from the manufacturer is warranted in accordance with the relevant product documentation and our Terms and Conditions of Sale.

The manufacturer reserves the right to alter the content of its documents, including this disclaimer in any way, at any time, for any reason, without prior notification, and will not be liable in any way for possible consequences of such changes.

1.3.3 Product liability and warranty

The operator shall bear responsibility for the suitability of the device for the specific purpose. The manufacturer accepts no liability for the consequences of misuse by the operator. Improper installation or operation of the devices (systems) will cause the warranty to be void. The respective "Standard Terms and Conditions" which form the basis for the sales contract shall also apply.

1.3.4 Information concerning the documentation

To prevent any injury to the user or damage to the device it is essential that you read the information in this document and observe applicable national standards, safety requirements and accident prevention regulations.

If this document is not in your native language and if you have any problems understanding the text, we advise you to contact your local office for assistance. The manufacturer can not accept responsibility for any damage or injury caused by misunderstanding of the information in this document.

This document is provided to help you establish operating conditions, which will permit safe and efficient use of this device. Special considerations and precautions are also described in the document, which appear in the form of icons as shown below.

1.3.5 Warnings and symbols used

Safety warnings are indicated by the following symbols.



DANGER!

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



DANGER!

This warning refers to the immediate danger of burns caused by heat or hot surfaces.



DANGER!

This warning refers to the immediate danger when using this device in a hazardous atmosphere.



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.



LEGAL NOTICE!

This note contains information on statutory directives and standards.



• **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.

1.4 Safety instructions for the operator



WARNING!

*In general, devices from the manufacturer may only be installed, commissioned, operated and maintained by properly trained and authorized personnel.
This document is provided to help you establish operating conditions, which will permit safe and efficient use of this device.*

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

**INFORMATION!**

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

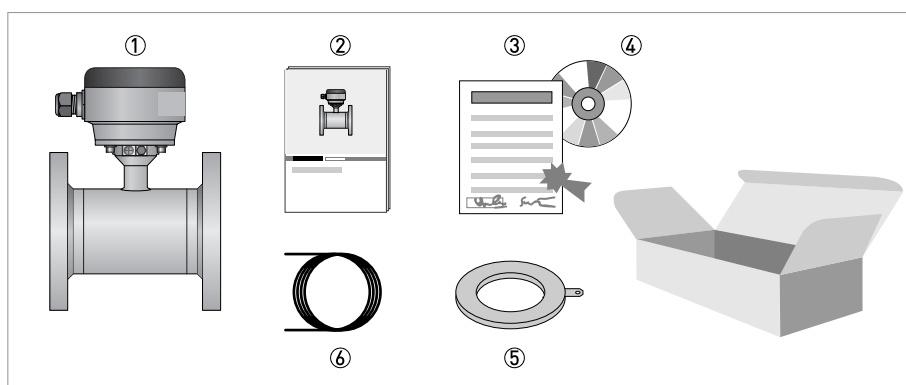


Figure 2-1: Scope of delivery

- ① Ordered flowmeter
- ② Product documentation
- ③ Factory calibration report
- ④ Grounding rings (optional)
- ⑤ Signal 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 flow sensor)
- Remote version (a measuring sensor with connection box and a separate signal converter)

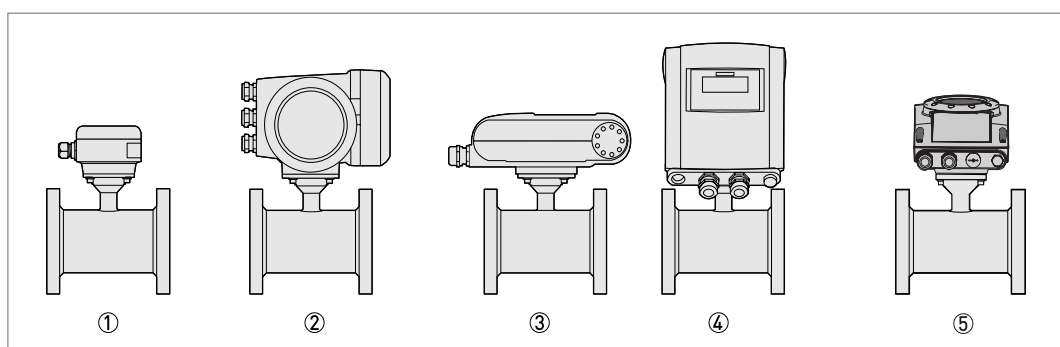


Figure 2-2: Device versions

- ① Remote version
- ② Compact version with signal converter EGC 300
- ③ Compact version with signal converter EGC 100 (0°)
- ④ Compact version with signal converter EGC 100 (45°)
- ⑤ Compact version with signal converter EGC 050 (10°)

2.3 Nameplate



INFORMATION!

Check the device nameplate to ensure that the device is delivered according to your order. Additional information (a.o correct supply voltage), can be found in the documentation of the signal converter.

3.1 General notes on installation

**INFORMATION!**

Inspect the packaging 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.

**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 Storage

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

3.3 Transport

Signal converter

- No special requirements.

Compact version

- Do not lift the device by the signal converter housing.
- Do not use lifting chains.
- To transport flange devices, use lifting straps. Wrap these around both process connections.

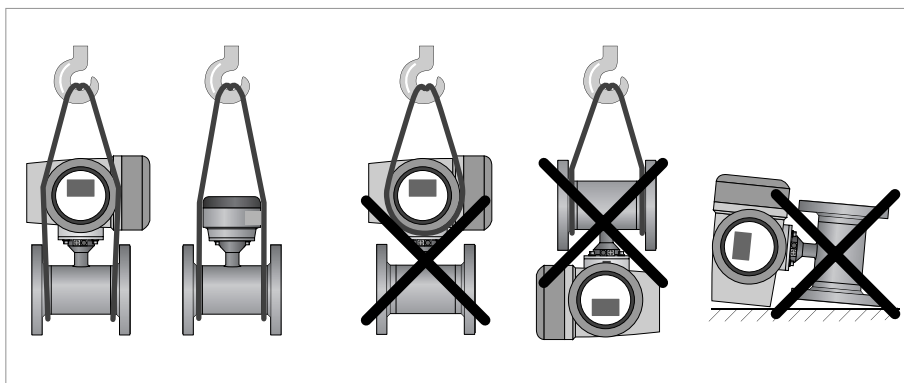


Figure 3-1: Transport

3.4 Pre-installation requirements

Make sure that you have all necessary tools available:

- Allen key (4 mm)
- Small screwdriver
- Wrench for cable glands
- Wrench for wall mounting bracket (remote version only)
- Torque wrench for installing flowmeter in pipeline

3.5 General requirements



INFORMATION!

The following precautions must be taken to ensure reliable installation.

- *Make sure that there is adequate space to the sides.*
- *Protect the signal converter from direct sunlight and install a sun shade if necessary.*
- *Signal converters installed in control cabinets require adequate cooling, e.g. by fan or heat exchanger.*
- *Do not expose the signal converter to intense vibration. The flowmeters are tested for a vibration level in accordance with IEC 68-2-64.*

3.5.1 Vibration

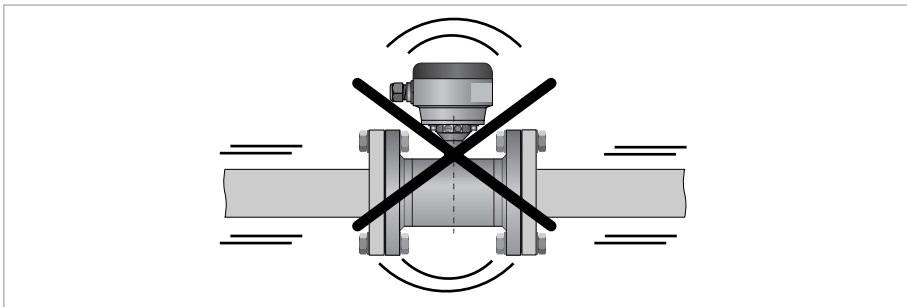


Figure 3-2: Avoid vibrations

3.5.2 Magnetic field

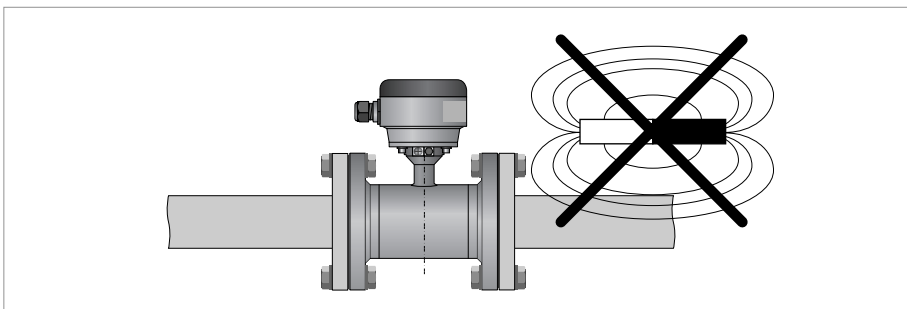


Figure 3-3: Avoid magnetic fields

3.6 Installation conditions

3.6.1 Inlet and outlet

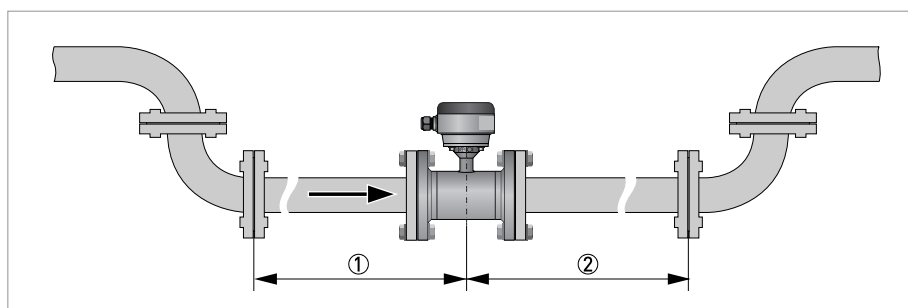


Figure 3-4: Recommended inlet and outlet

- ① Refer to chapter "Bends in 2 or 3 dimensions"
- ② $\geq 2 \text{ DN}$

3.6.2 Bends in 2 or 3 dimensions

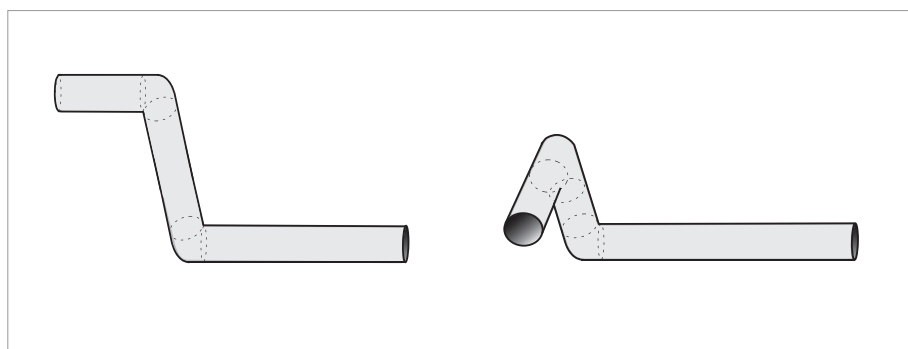


Figure 3-5: Inlet when using 2 and/or 3 dimensional bends in front of the flowmeter

Inlet length: using bends in 2 dimensions: $\geq 5 \text{ DN}$; when having bends in 3 dimensions: $\geq 10 \text{ DN}$

3.6.3 T-section

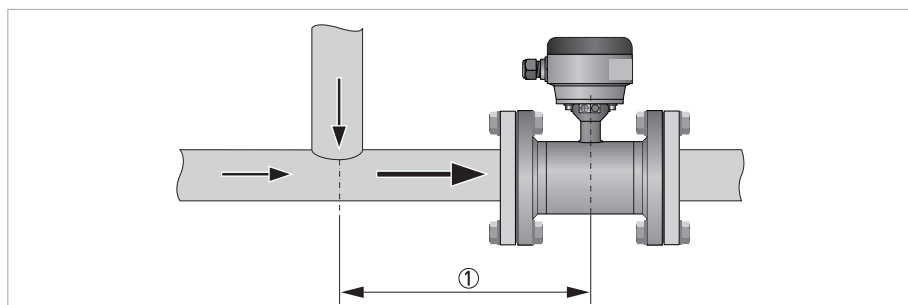


Figure 3-6: Distance behind a T-section

- ① $\geq 10 \text{ DN}$

3.6.4 Bends

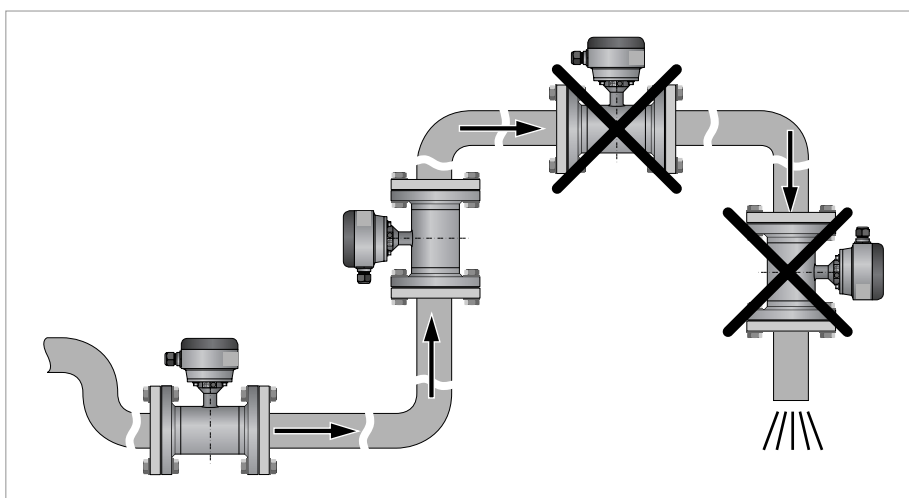


Figure 3-7: Installation in bending pipes

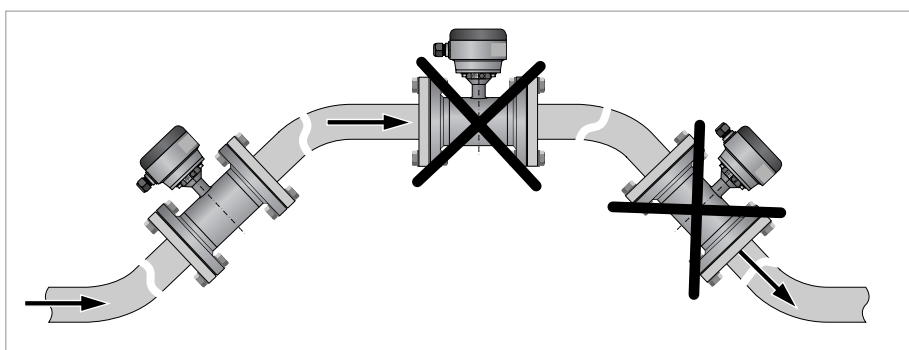


Figure 3-8: Installation in bending pipes



CAUTION!

Avoid draining or partial filling of the flow sensor

3.6.5 Open feed or discharge

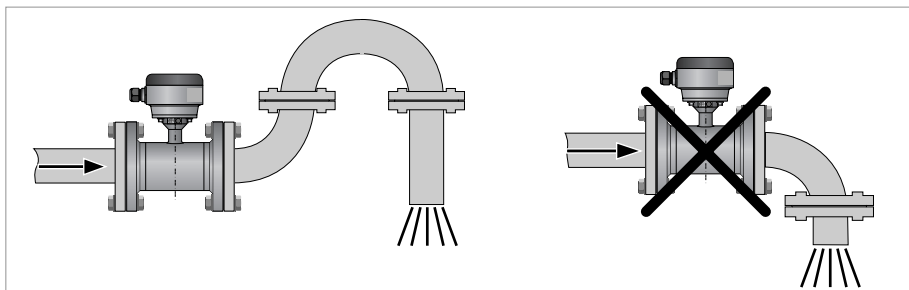


Figure 3-9: Installation in front of an open discharge

3.6.6 Flange deviation



CAUTION!

Max. permissible deviation of pipe flange faces:

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

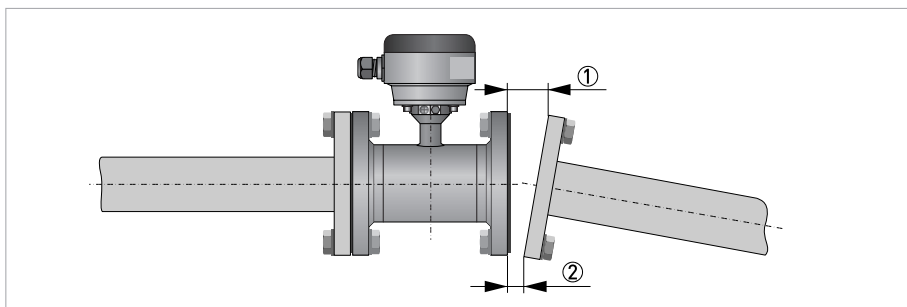


Figure 3-10: Flange deviation

① L_{max}

② L_{min}

3.6.7 Control valve

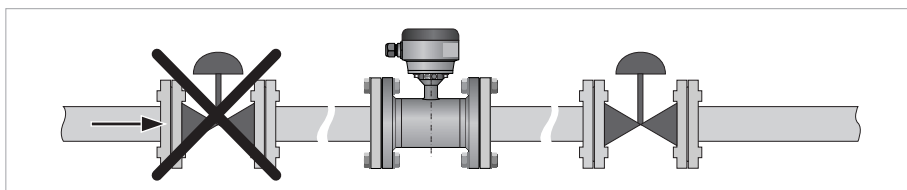


Figure 3-11: Installation in front of a control valve

3.6.8 Pump

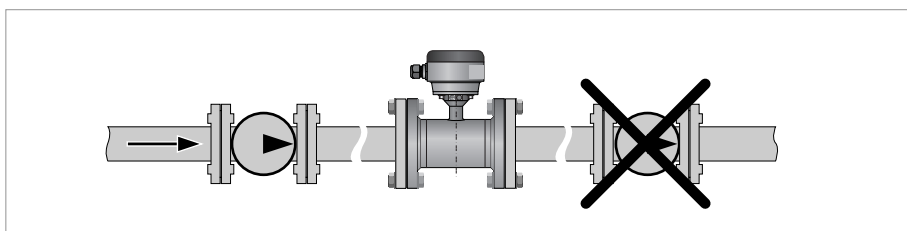


Figure 3-12: Installation behind a pump

3.6.9 Air venting and vacuum forces

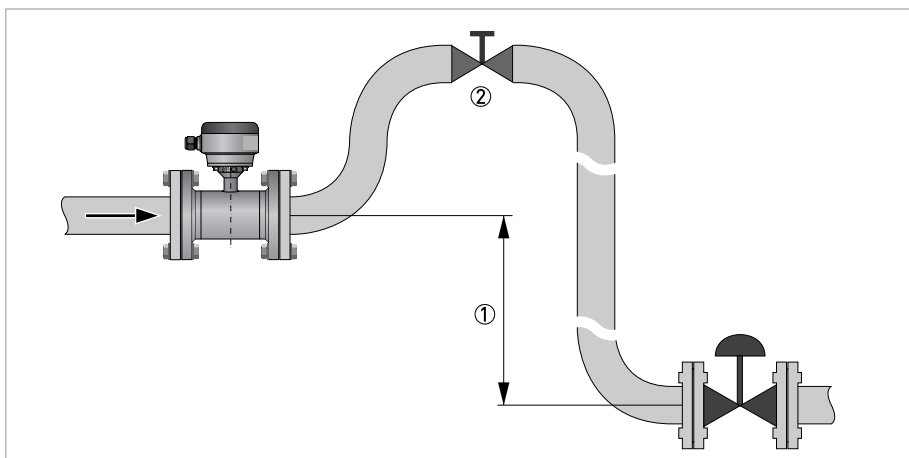


Figure 3-13: Air venting

① ≥ 5 m

② Air ventilation point

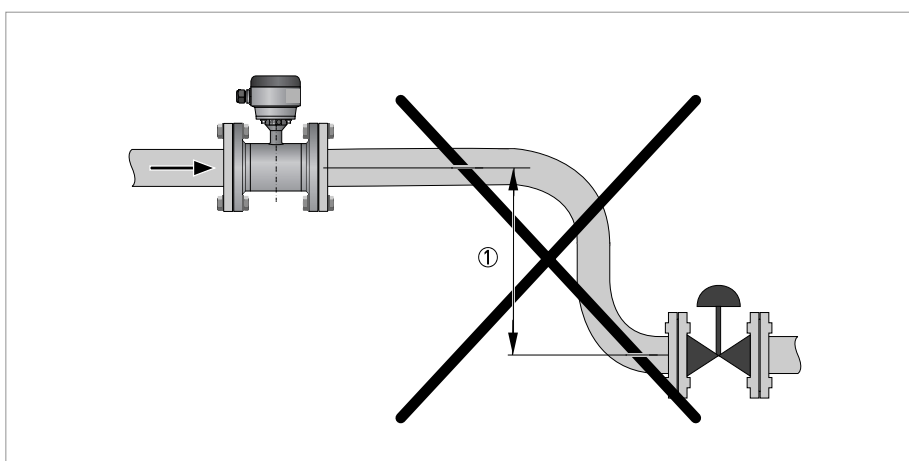


Figure 3-14: Vacuum

① ≥ 5 m

3.6.10 Mounting position

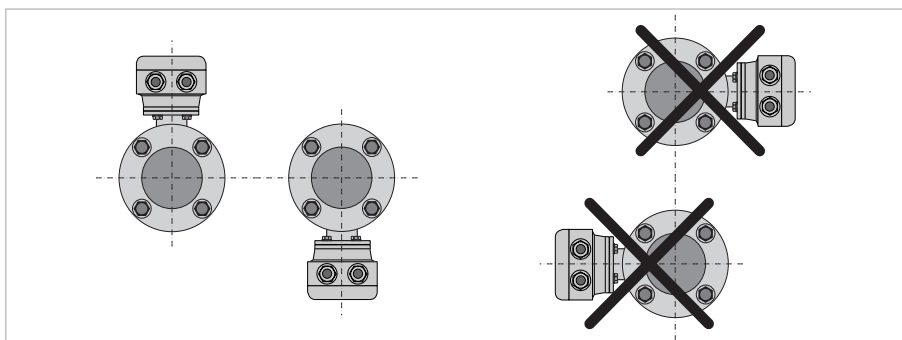


Figure 3-15: Mounting position

- Install flow sensor in line with the pipe axis.
- Pipe flange faces must be parallel to each other.

3.6.11 Mounting

3.6.12 Torques and pressures

The maximum pressure and torques values for the flowmeter are theoretical and calculated for optimum conditions and use with carbon steel flanges.

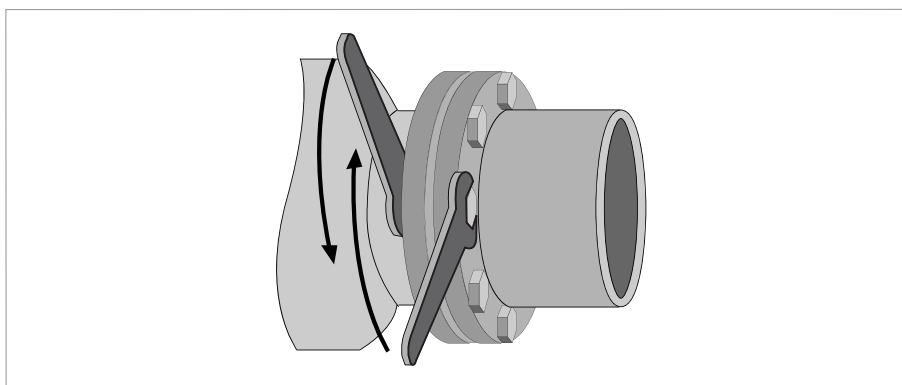


Figure 3-16: Tightening of bolts



- Always tighten the bolts uniformly and in diagonally opposite sequence.
- Do not exceed the maximum torque value.
- 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.

Nominal size DN [mm]	Pressure rating	Bolts	Max. torque [Nm] ^①		
			Polyolefin	Polypropylene	Hard rubber
25	PN 40	4 x M 12	-	22	11
32	PN 40	4 x M 16	-	37	19
40	PN 40	4 x M 16	-	43	25
50	PN 40	4 x M 16	-	55	31
65	PN 16	② x M 16	-	51	42
65	PN 40	8 x M 16	-	38	21
80	PN 40	8 x M 16	-	47	25
100	PN 16	8 x M 16	-	39	30
125	PN 16	8 x M 16	-	53	40
150	PN 16	8 x M 20	-	68	47
200	PN 10	8 x M 20	68	-	68
200	PN 16	12 x M 20	45	-	45
250	PN 10	12 x M 20	65	-	65
250	PN 16	12 x M 24	78	-	78
300	PN 10	12 x M 20	76	-	76
300	PN 16	12 x M 24	105	-	105
350	PN 10	16 x M 20	75	-	75
400	PN 10	16 x M 24	104	-	104
450	PN 10	20 x M 24	93	-	93
500	PN 10	20 x M 24	107	-	107
600	PN 10	20 x M 27	138	-	138
700	PN 10	24 x M 27	163	-	163
800	PN 10	24 x M 30	219	-	219
900	PN 10	28 x M 30	205	-	205
1000	PN 10	28 x M 33	261	-	261

① The specified torque values are dependent on variables (temperature, bolt material, gasket material, lubricants, etc.) which are not within the control of the manufacturer. Therefore the values should be regarded as indicative only.

② DN65 / PN16 is available with standard 8 bolt holes.

Nominal size [inch]	Flange class [lb]	Bolts	Max. torque [lb.ft] ①		
			Polyolefin	Polypropylene	Hard rubber
1	150	4 x 1/2"	-	6.7	3.2
1 1/2	150	4 x 1/2"	-	13	9
2	150	4 x 5/8"	-	24	17
3	150	4 x 5/8"	-	43	29
4	150	8 x 5/8"	-	34	23
6	150	8 x 3/4"	-	61	38
8	150	8 x 3/4"	51	-	51
10	150	12 x 7/8"	58	-	58
12	150	12 x 7/8"	77	-	77
14	150	12 x 1"	69	-	69
16	150	16 x 1"	67	-	67
18	150	16 x 1 1/8"	105	-	105
20	150	20 x 1 1/8"	94	-	94
24	150	20 x 1 1/4"	133	-	133
28	150	28 x 1 1/4"	119	-	119
32	150	28 x 1 1/2"	191	-	191
36	150	32 x 1 1/2"	198	-	198
40	150	36 x 1 1/2"	198	-	198

① The specified torque values are dependent on variables (temperature, bolt material, gasket material, lubricants, etc.) which are not within the control of the manufacturer. Therefore the values should be regarded as indicative only.

Nominal size [inch]	Flange class [lb]	Bolts	Max. torque [lb.ft] ①		
			Polyolefin	Polypropylene	Hard rubber
1	300	4 x 5/8"	-	11	5
1 1/2	300	4 x 3/4"	-	29	20
2	300	8 x 5/8"	-	18	13
3	300	8 x 3/4"	-	44	30
4	300	8 x 3/4"	-	69	47
6	300	12 x 3/4"	-	62	38
8	300	12 x 7/8"	60	-	60
10	300	16 x 1"	75	-	75
12	300	16 x 1 1/8"	113	-	113
14	300	20 x 1 1/4"	71	-	71
16	300	20 x 1 1/4"	92	-	92
18	300	24 x 1 1/4"	108	-	108
20	300	24 x 1 1/4"	121	-	121
24	300	24 x 1 1/2"	189	-	189

① The specified torque values are dependent on variables (temperature, bolt material, gasket material, lubricants, etc.) which are not within the control of the manufacturer. Therefore the values should be regarded as indicative only.



CAUTION!

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

3.6.13 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.
Hard rubber								
Separate flow sensor	-5	80	-40	65	23	176	-40	149
Compact with EGC 300	-5	80	-40	65	23	176	-40	149
Compact with EGC 100	-5	80	-40	65	23	176	-40	149
Compact with EGC 050	-5	80	-40	65	23	176	-40	149
Polypropylene ①								
Separate flow sensor	-5	90	-40	65	23	194	-40	149
Compact with EGC 300	-5	90	-40	65	23	194	-40	149
Compact with EGC 100	-5	90	-40	65	23	194	-40	149
Compact with EGC 050	-5	90	-40	65	23	194	-40	149

① Polypropylene is only available for DN25...150

4.1 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.

4.2 Grounding

**DANGER!**

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

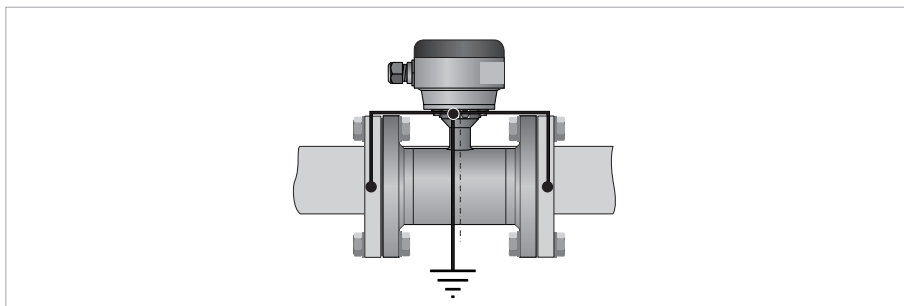


Figure 4-1: Grounding

- ① Metal pipelines, not internally coated. Grounding without grounding rings.

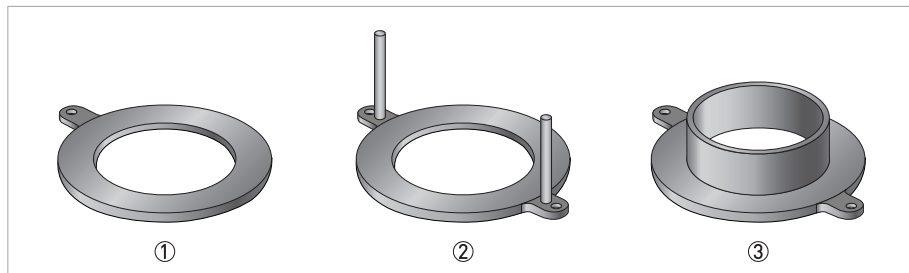


Figure 4-2: Different types of grounding rings

- 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 / 0.02")

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

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

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

Benefits of virtual reference:

- Grounding rings or grounding electrodes can be omitted.
- Safety increases by reducing the number of potential leakage points.
- The installation of the flowmeters is much easier.

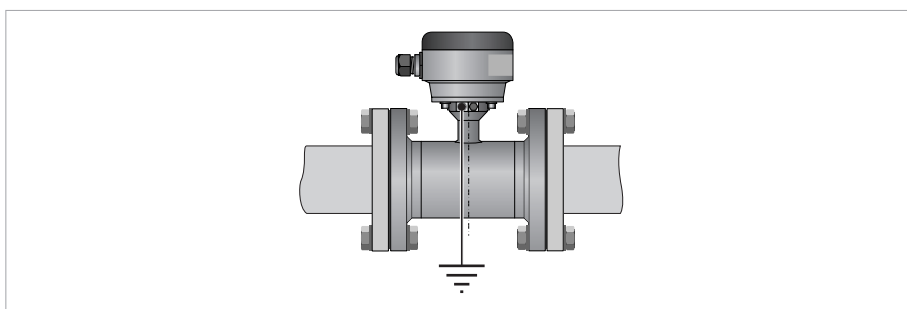


Figure 4-3: Virtual reference

Minimum requirements:

- Size: $\geq$ DN10
- Electrical conductivity: $\geq 200 \mu\text{S/cm}$
- Signal cable: max. 50 m / 164 ft, type DS

4.4 Connection diagrams



INFORMATION!

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





Head Office : Shiba Toto Building, 1 - 7 - 24 Shibakoen, Minato-ku, Tokyo 105 - 8558
Tel : 03 - 3431 - 1625 (KEY) ; Fax : 03 - 3433 - 4922
e-mail : overseas.sales@tokyokeiso.co.jp ; URL : <http://www.tokyokeiso.co.jp>