Instruction

MI 021-521 - en

FEBRUARY 2020

Model 9600A Magnetic Flow Tube for hygienic and sanitary applications

Master Instruction

Schneider Electric

IMPRINT

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.

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

The 9600A is designed to measure the volumetric flowrate of electrically conductive fluids in hygienic applications.

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 EU Declaration of Conformity or the website of the manufacturer.

DANGER!
For devices used in hazardous areas, additional safety notes apply. Please refer to the Ex documentation.

1.3 Safety instructions from the manufacturer

1.3.1 Copyright and data protection

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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.*
	***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.*
	***NOTICE!*** *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

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

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

NOTICE!
The remote version will arrive in two cartons. One carton contains the signal transmitter and one carton contains the flow tube.

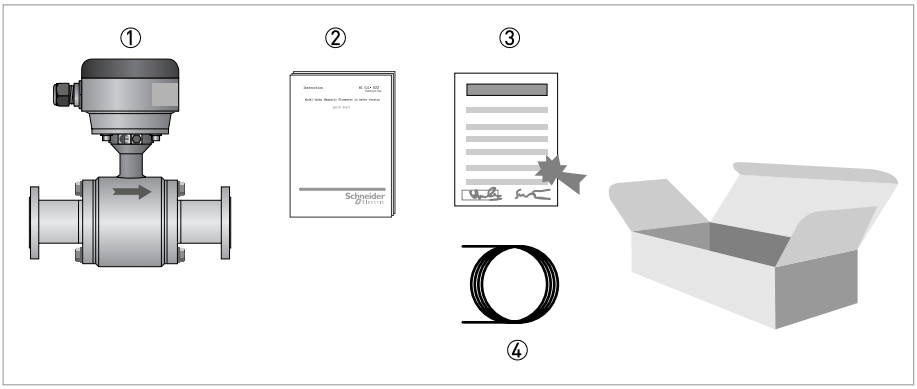


Figure 2-1: Scope of delivery

① Ordered flowmeter
② Product documentation
③ Factory calibration report
④ Signal cable (remote version only)

NOTICE!
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.

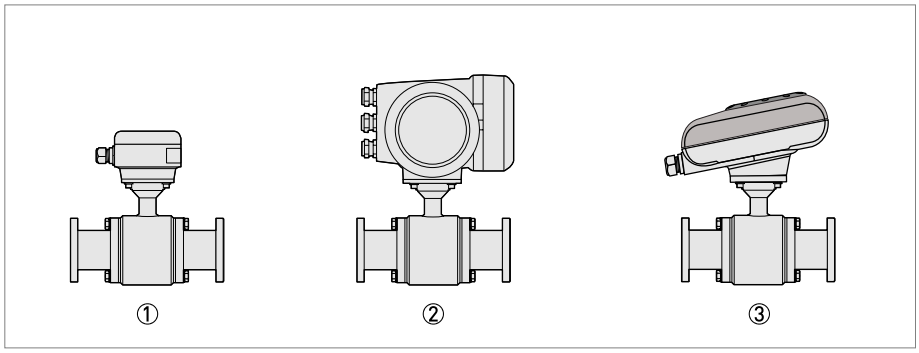
2.2 Device description

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 transmitteris installed directly on the measuring sensor)
- Remote version (electrical connection to the signal transmitter via field current and signal cable)

NOTICE!
This flow tube 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.



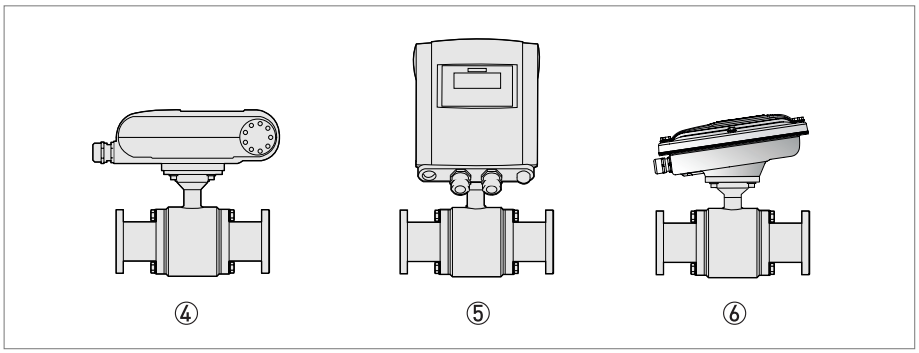


Figure 2-2: Available versions

① Remote version
② Compact version with IMT33 A signal transmitter
③ Compact version with IMT30 A (10°) signal transmitter
④ Compact version with IMT31 A (0°) signal transmitter
⑤ Compact version with IMT31 A (45°) signal transmitter
⑥ Compact version with IMT31 A stainless steel signal transmitter (10°)

2.3 Nameplates (examples)

NOTICE!
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.

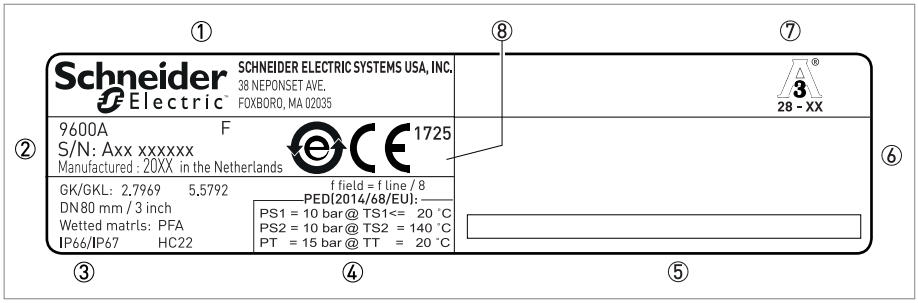


Figure 2-3: Example of a nameplate on a sensor

① Name and address of the manufacturer
② Type designation of the flowmeter, serial number & manufacturing date
③ Calibration data
④ PED data
⑤ Tag number
⑥ Additional information
⑦ A3 product certification marking
⑧ CE sign with number(s) of notified body / bodies and disposal logo

3.1 General notes on installation

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

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

NOTICE!
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 transmitter

- No special requirements.

Compact version

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

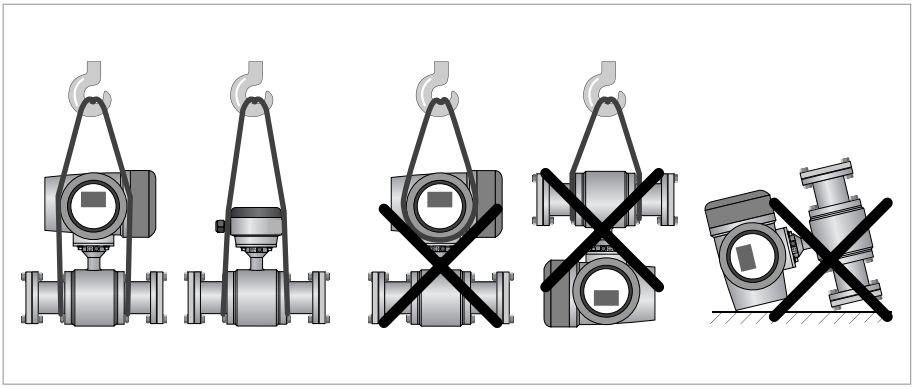


Figure 3-1: Transport

3.4 Pre-installation requirements

Make sure that you have all necessary tools (user supplied) 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

NOTICE!

The following precautions must be taken to ensure reliable installation.

- *Make sure that there is adequate space to the sides.*
- *Protect the transmitter from direct sunlight and install a sun shade if necessary.*
- *Transmitters installed in control cabinets require adequate cooling, e.g. by fan or heat exchanger.*
- *Do not expose the transmitter to intense vibration. The flowmeters are tested for a vibration level in accordance with IEC 60068-2-64.*
- *Avoid magnetic field! Keep at least 5 DN distance between electromagnetic flow tubes.*

3.5.1 Vibration

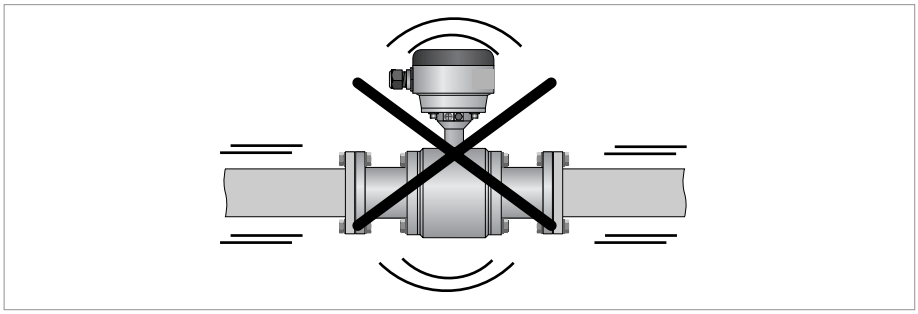


Figure 3-2: Avoid vibrations

3.5.2 Magnetic field

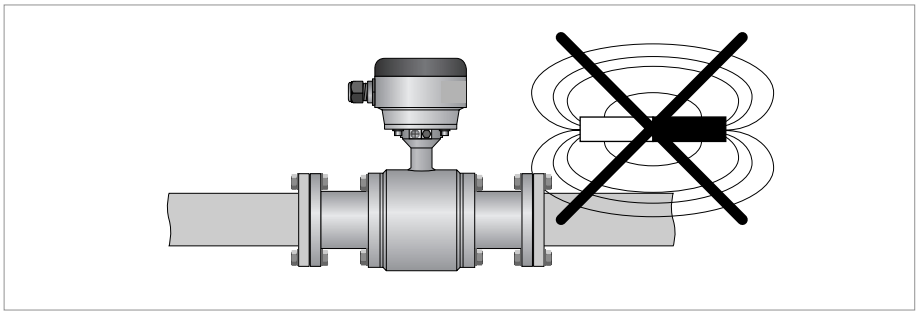


Figure 3-3: Avoid magnetic fields

3.6 Installation conditions

3.6.1 Inlet and outlet

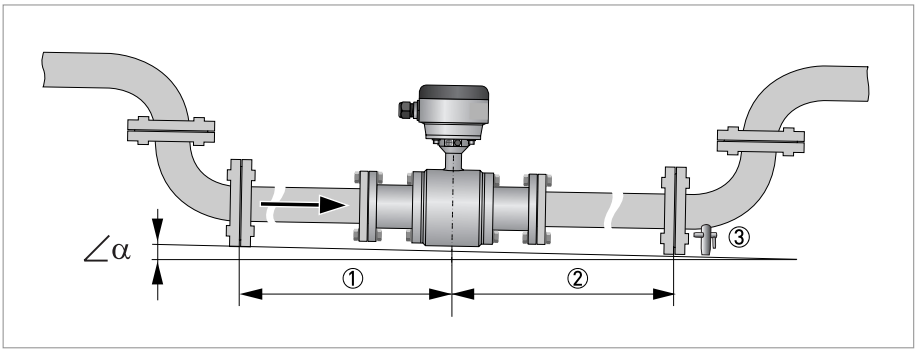


Figure 3-4: Recommended inlet and outlet

① Refer to chapter "Bends in 2 or 3 dimensions"
② ≥ 2 DN
③ Drain valve (to empty pipeline)
∠α ; >2°

3.6.2 Bends in 2 or 3 dimensions

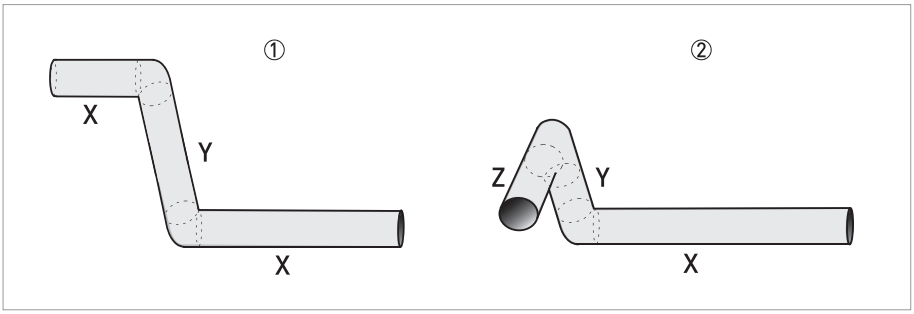


Figure 3-5: 2 and/or 3 dimensional bends upstream of the flowmeter

① 2 dimensions = X/Y
② 3 dimensions = X/Y/Z
Inlet length: using bends in 2 dimensions: ≥ 5 DN; when having bends in 3 dimensions: ≥ 10 DN

NOTICE!
*2 dimensional bends occur in a vertical **or** horizontal plane (X/Y) only, while 3 dimensional bends occur in both vertical **and** horizontal plane (X/Y/Z).*

3.6.3 T-section

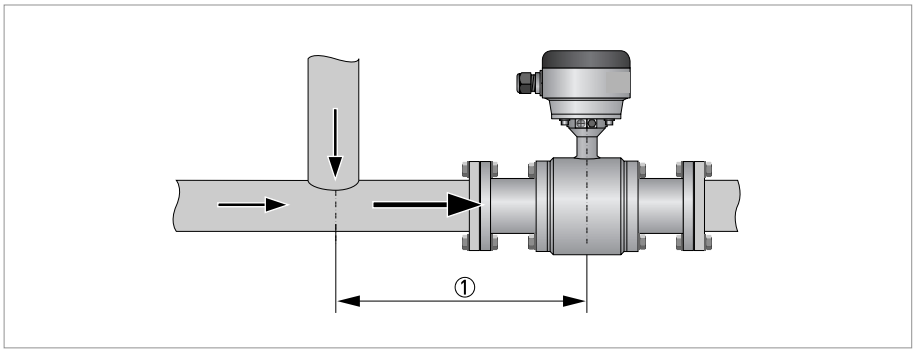


Figure 3-6: Distance behind a T-section

① ≥ 10 DN

3.6.4 Bends

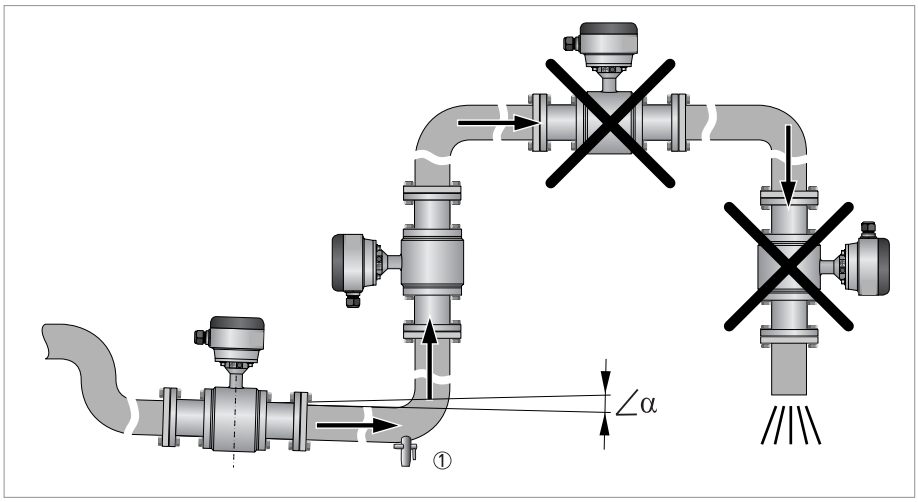


Figure 3-7: Installation in bending pipes (90°)

∠α ; >2°

① Drain valve (to empty pipeline)

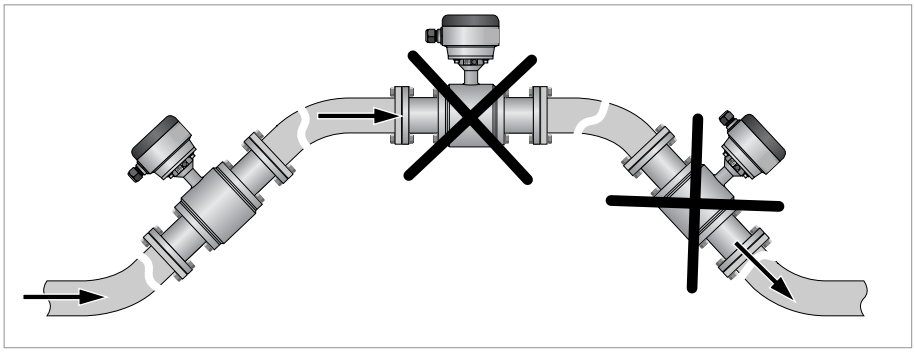


Figure 3-8: Installation in bending pipes (45°)

3.6.5 Open discharge

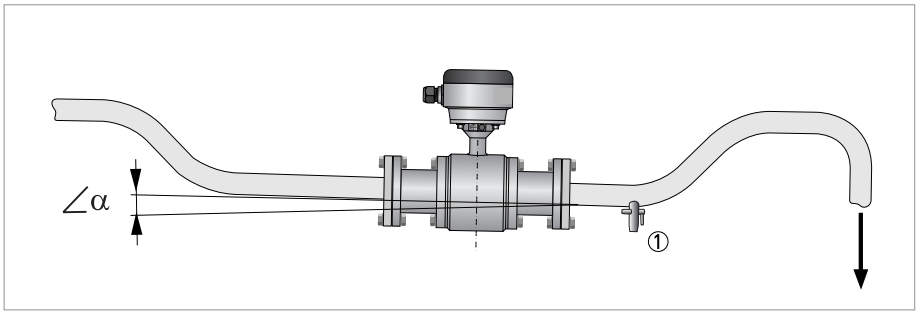


Figure 3-9: Installation in front of an open discharge

∠α ; >2°
① Drain valve (to empty pipeline)

3.6.6 Control valve

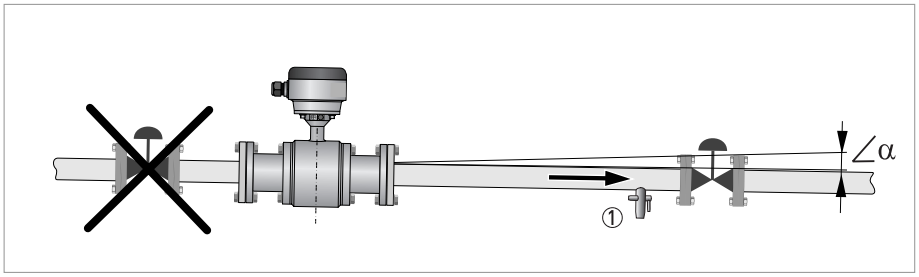


Figure 3-10: Installation in front of a control valve

∠α ; >2°
① Drain valve (to empty pipeline)

3.6.7 Pump

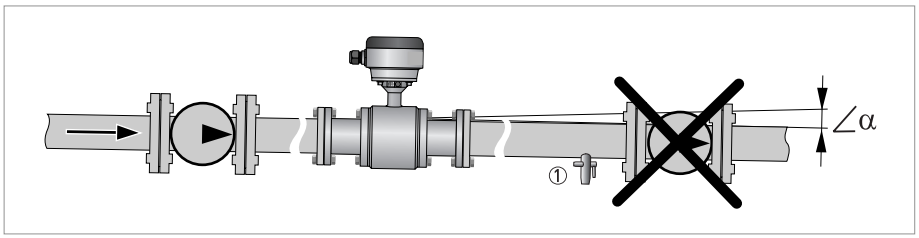


Figure 3-11: Installation behind a pump

3.6.8 Air venting and vacuum forces

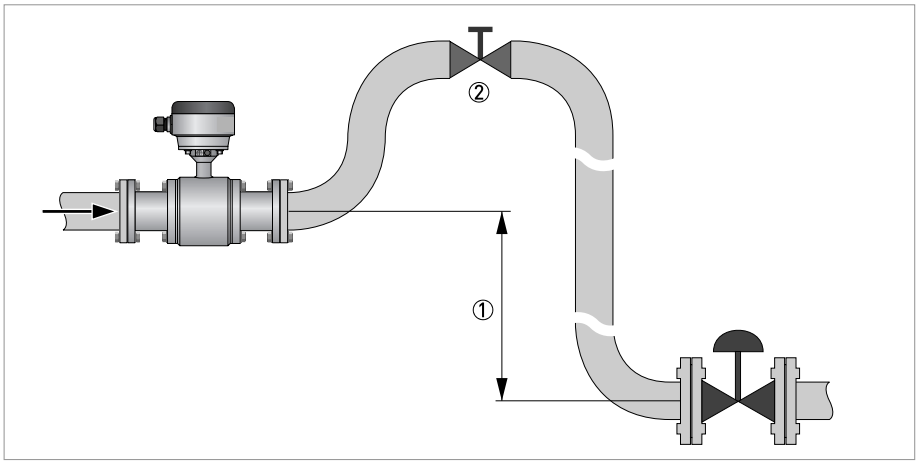


Figure 3-12: Air venting

① ≥ 5 m
② Air ventilation point

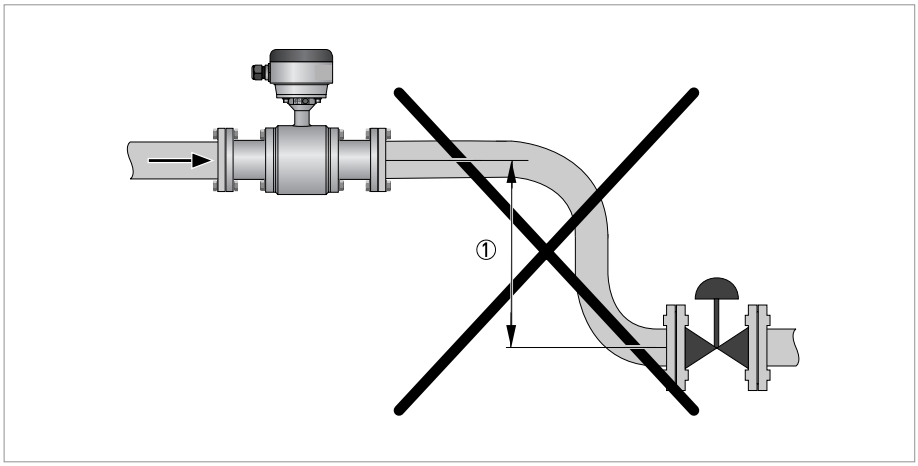


Figure 3-13: Vacuum

① ≥ 5 m

3.6.9 Mounting requirements for self-draining

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

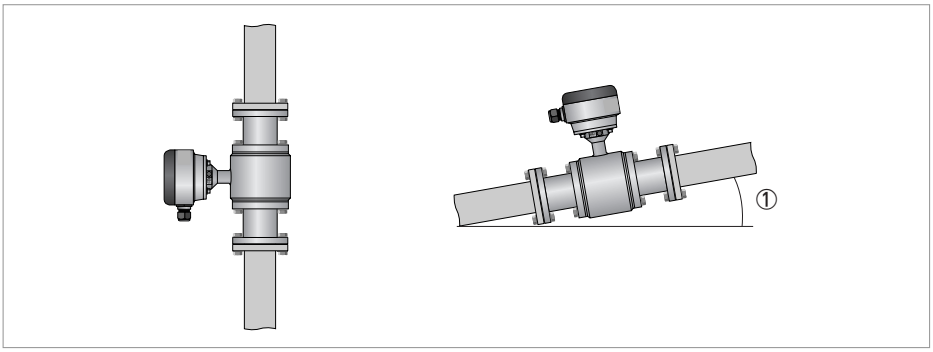


Figure 3-14: Installation note for 3A marked installations

① Minimum slope

Minimum slope

Nominal diameter	DIN EN 10357 / DIN 11850	ISO 2037	DIN 11864 2A	ISO 2852	DIN 32676	Tri Clamp
2.5...6	10°	10°	-	-	-	-
10	3°	3°	-	-	-	-
15	10°	10°	-	①	-	-
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°	①	①

① consult factory

3.6.10 Flange deviation

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

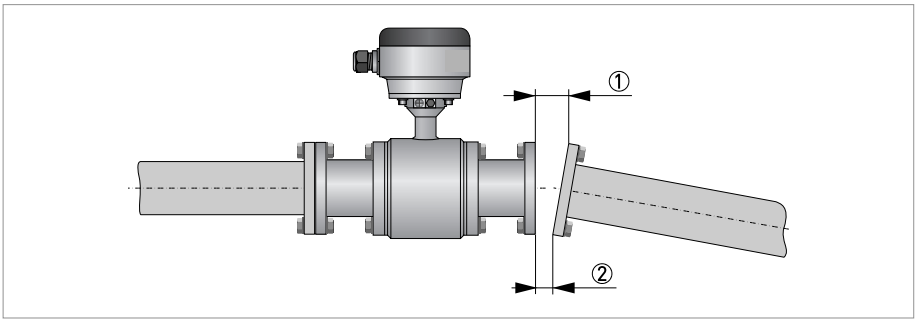


Figure 3-15: Flange deviation

① L_{max}
② L_{min}

3.6.11 Mounting position

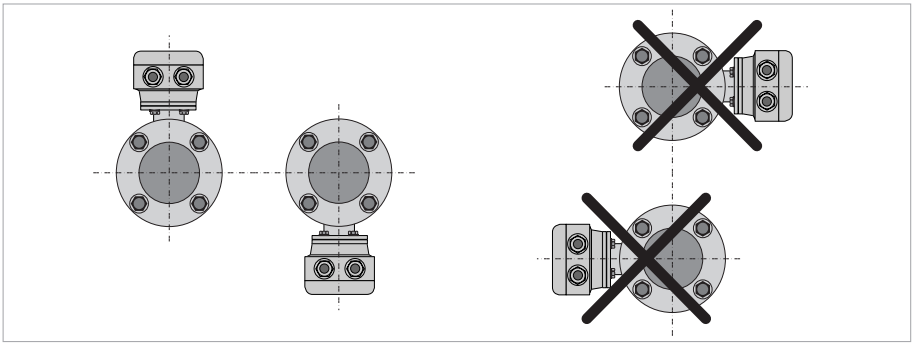


Figure 3-16: Mounting position

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

3.7 Mounting

CAUTION!
Please take care to use the proper gasket to prevent damaging the liner of the flowmeter. In general, the use of spiral wound gaskets is not advised, as it could severely damage the liner of the flowmeter.

3.7.1 Torques and pressures

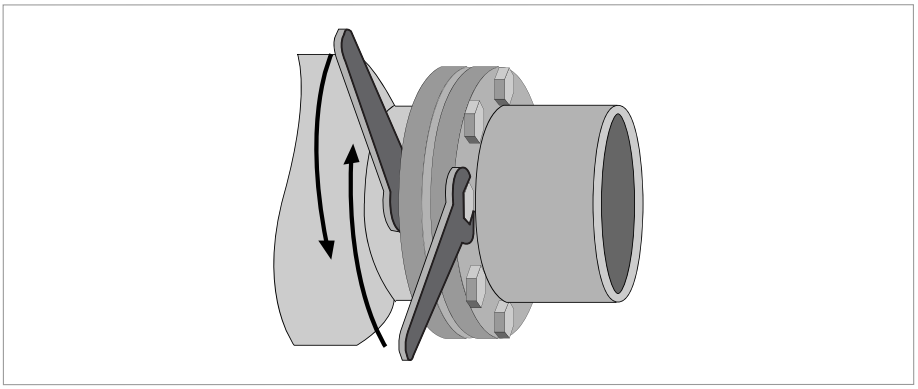


Figure 3-17: Tightening of bolts

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

- 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.

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

NOTICE!
Maximum torque for sizes smaller than DN25: 6 Nm

3.7.2 Installation of weld-on versions

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

- Mount the flow tube 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 flow tube 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 flow tube.

3.7.3 Temperatures

CAUTION!
Protect the device from direct sunlight.

Ambient temperature

	°C		°F	
	min.	max.	min.	max.
Separate flow tube Compact version with; IMT30A, IMT31A & IMT33A	-40	65	-40	149
Separate flow tube Compact version with; IMT31A stainless steel	-40	60	-40	140

Maximum process temperature

Type of connection	Separate flow tube		Compact + IMT30A & IMT31A		Compact + IMT33A	
	°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 1146 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

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!*

	***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.*

	***NOTICE!*** *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.*

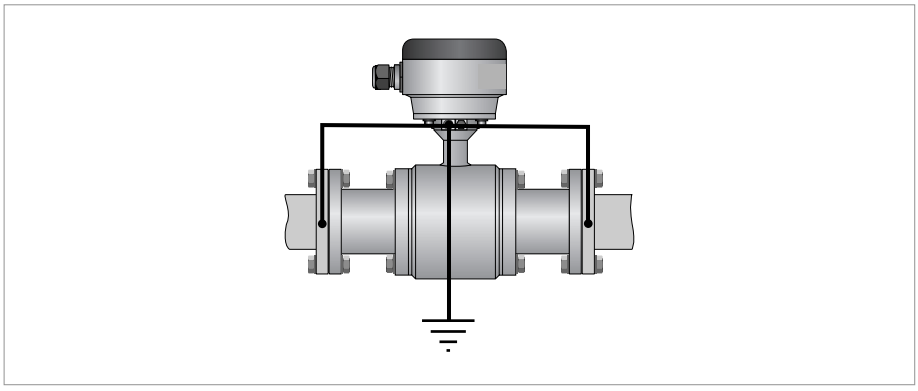


Figure 4-1: Grounding

4.3 Virtual reference for IMT33A (4, N and H version)

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.

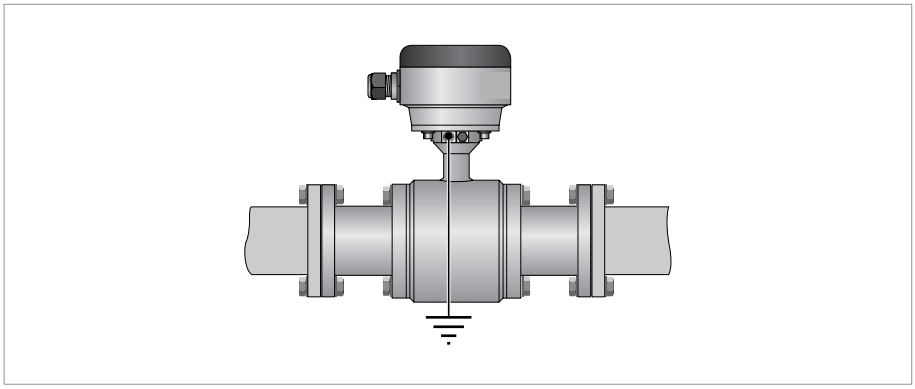


Figure 4-2: Virtual reference

Minimum requirements:

- Size: ≥ DN10 / 3/8"
- Electrical conductivity: ≥ 200 µS/cm
- Electrode cable: max. 50 m / 164 ft, type DS

4.4 Connection diagrams

	NOTICE! *For the connection diagrams the documentation of the applicable transmitter.*

5.1 Cleaning

CAUTION!
In principle, no special maintenance is needed. However, make sure that the used cleaning product doesn't affect the outer surface and the gaskets.

5.2 Spare parts availability

The manufacturer adheres to the basic principle that functionally adequate spare parts for each device or each important accessory part will be kept available for a period of 3 years after delivery of the last production run for the device.

This regulation only applies to spare parts which are subject to wear and tear under normal operating conditions.

5.3 Availability of services

The manufacturer offers a range of services to support the customer after expiration of the warranty. These include repair, maintenance, technical support and training.

NOTICE!
For more precise information, please contact your local sales office.

5.4 Returning the device to the manufacturer

5.4.1 General information

This device has been carefully manufactured and tested. If installed and operated in accordance with these operating instructions, it will rarely present any problems.

WARNING!
Should you nevertheless need to return a device for inspection or repair, please pay strict attention to the following points:

- *Due to statutory regulations on environmental protection and safeguarding the health and safety of the personnel, the manufacturer may only handle, test and repair returned devices that have been in contact with products without risk to personnel and environment.*
- *This means that the manufacturer can only service this device if it is accompanied by the following certificate (see next section) confirming that the device is safe to handle.*

WARNING!
If the device has been operated with toxic, caustic, radioactive, flammable or water-endangering products, you are kindly requested:

- *to check and ensure, if necessary by rinsing or neutralising, that all cavities are free from such dangerous substances,*
- *to enclose a certificate with the device confirming that it is safe to handle and stating the product used.*

5.4.2 Preapproval form - Customer returned process-wetted products

§	***LEGAL NOTICE!*** *In compliance with **U.S. Federal OSHA Standard 29CFR1910.1200** process information must be reviewed previous to receiving authorization to return material to Schneider Electric Systems USA, Inc.*

NO PRODUCT EXPOSED TO HYDROFLUORIC ACID OR MERCURY WILL BE ACCEPTED!

Date: _____

Customer information

Customer's name:

Address:

Phone no:

Fax no.:

Contact's name:

Rep information

Rep's name:

Address:

Phone no:

Fax no.:

Contacts' name:

Product being returned:

Model No.:

Serial no.:

Under warranty? YES NO

Copies of MSDS sheets for all processes including cleaning solutions may be required.

Type of process (what chemicals/materials were processed through the unit):

Explain what steps were taken to decontaminate the unit: (was unit steam cleaned, rinsed out with water, chemically cleaned etc.)

Form completed by: _____ _____

Print name Signature

Date: _____

CLEANING STATEMENT
(Note: Your item will not be serviced unless the following cleaning statement has been signed):

I certify that the above referenced item has been properly purged and cleaned, complies with U.S. Department of Transportation shipping requirements and DOES NOT present a health and/or safety hazard (as defined by OSHA) to our Customer Repair personnel.

Print name: _____ Signature: _____

Print title: _____ Date: _____

Please fax the completed form to the Customer Satisfaction Center +1-508-549-4999

5.5 Disposal

§	***LEGAL NOTICE!*** *Disposal must be carried out in accordance with legislation applicable in your country.*

Separate collection of WEEE (Waste Electrical and Electronic Equipment) in the European Union:

According to the directive 2012/19/EU, the monitoring and control instruments marked with the WEEE symbol and reaching their end-of-life **must not be disposed of with other waste**.
The user must dispose of the WEEE to a designated collection point for the recycling of WEEE or send them back to our local organisation or authorised representative.

6.1 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 flowmeter

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 transmitter is used to amplify the signal voltage, filter it and convert it into signals for totalizing, recording and output processing.

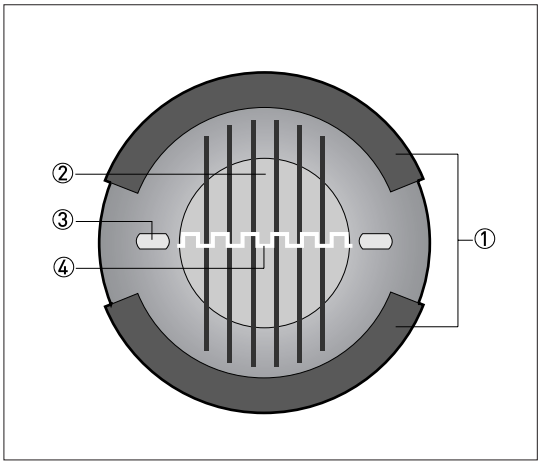


Figure 6-1: Measuring principle

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

6.2 Technical data

NOTICE!

- *The following data is provided for general applications. If you require data that is more relevant to your specific application, please contact us or your local sales office.*
- *Additional information (certificates, special tools, software,...) and complete product documentation can be downloaded free of charge from the website.*

Measuring system

Measuring principle	Faraday's law of induction
Application range	Electrically conductive fluids
Measured value	
Primary measured value	Flow velocity
Secondary measured value	Volume flow

Design

Features	Hygienic design
	Stainless steel housing
	Food & beverage and pharmaceutical process connections
Modular construction	The measurement system consists of a flow tube and a signal transmitter. It is available as compact and as separate version.
Compact version	With signal transmitter: IMT30A
	With signal transmitter: IMT31A
	With signal transmitter: IMT33A
Remote version	In wall (W) mount version with signal transmitter: IMT30A
	In wall (W) mount version with signal transmitter: IMT31A
	In field (H) or wall (N) version with signal transmitter: IMT33A H or N
Nominal diameter	DN2.5...150 / 1/10"...6"
Measuring range	-12...+12 m/s / -40...+40 ft/s

Measuring accuracy

Maximum measuring error	Depending on signal transmitter and DN size.
	IMT30A: down to 0.5% of the measured value ± 1 mm/s.
	IMT31A: down to 0.3% of the measured value ± 1 mm/s for DN10...150 (³/8...6"). down to 0.4% of the measured value ± 1 mm/s for DN2.5...6 (¹/10...¼").
	IMT33A: down to 0.2% of the measured value ± 1 mm/s for DN10...150 (³/8...6"). down to 0.3% of the measured value ± 2 mm/s for DN2.5...6 (¹/10...¼").
	Optional:
	Optimised accuracy for IMT30A and IMT31A. For more details on optimised accuracy, see the concerning signal transmitter documentation.
	The additional typical measuring deviation for the current output is ± 10 µA.
	The maximum measuring error depends on the installation conditions.
	For detailed information refer to *Measuring accuracy* on page 48.
Repeatability	± 0.1% of MV, minimum 1 mm/s
Long term stability	± 0.1% of MV

Operating conditions

Temperature	
Process temperature	Separate flow tube: -40...+140°C / -40...+284°F
	Compact with IMT33A signal transmitter: -40...+140°C / -40...+284°F
	Compact with IMT30A and IMT31A signal transmitter: -40...+120°C / -40...+248°F at an ambient temperature ≤ 40 °C / 104 °F
	For ISO 2852 and Tri-clamp versions: -40...+120°C / -40...+248°F
	For Ex versions different temperatures are valid. Please check the relevant Ex documentation for details.
Ambient temperature	-40...+65°C / -40...+149°F
	IMT31A stainless steel version: -40...+60°C / -40...+140°F
Storage temperature	-50...+70°C / -58...+158°F
Pressure	
Ambient pressure	Atmospheric
Nominal flange pressure	For detailed information refer to *Dimensions and weights* on page 34.
Vacuum load	0 mbar / 0 psi

Chemical properties	
Physical condition	Electrical conductive liquids
Electrical conductivity	Standard: ≥ 1 µS/cm
	Water: ≥ 20 µS/cm
Permissible gas content (volume)	IMT30A: ≤ 3%
	IMT31A: ≤ 3%
	IMT33A: ≤ 5%
Permissible solid content (volume)	IMT30A: ≤ 10%
	IMT31A: ≤ 10%
	IMT33A: ≤ 70%

Installation conditions

Installation	Assure that the flow tube is always fully filled.
Flow direction	Forward and reverse
	Arrow on flow tube indicates positive flow direction.
Inlet run	≥ 5 DN
Outlet run	≥ 2 DN
Dimensions and weights	For detailed information refer to *Dimensions and weights* on page 34.

Materials

Flow tube housing	DN2.5...15: stainless steel Duplex (1.4462)
	DN25...150: stainless steel AISI 304 (1.4301)
Measuring tube	Stainless steel AISI 304 (1.4301)
Adapters	Stainless steel AISI 316 L (1.4404)
Liner	PFA
Connection box (F-version only)	**Standard:**
	Aluminum with a standard coating
	Option:
	Stainless steel AISI (1.4408)
Electrodes	**Standard:**
	Hastelloy® C
	Option:
	Hastelloy® B2, platinum, stainless steel, tantalum, titanium
Gaskets	**Standard:**
	EPDM
	FDA recommends EPDM gaskets only if medium ≤ 8% fat.
	Option:
	Silicone (non-Ex only)

Process connections

DIN EN 10357 / DIN 11850 row 2 / 11866 row A	DN2.5...150
DIN 11851	DN2.5...150
DIN 11864-2A flange with notch	DN25...150
DIN 32676	DN25...150
ISO 2037	DN2.5...150
ISO 2852	DN2.5...150
SMS 1146	DN2.5...100
Tri Clamp	1/10"...6"
Note: flow tube diameters < DN10 have DN10 connections, which means the flow tube diameter is smaller.	

Electrical connections

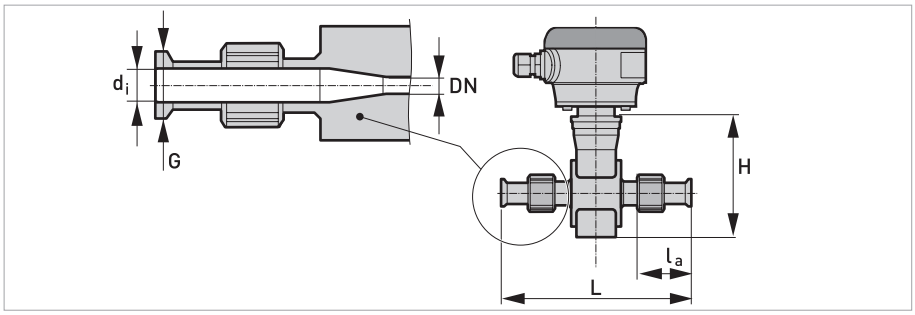
Signal cable	
Type A (DS)	Standard cable, double shielded. Max. length: 600 m / 1950 ft (dep. on electrical conductivity and the flow tube). See the documentation of the signal transmitter for more information.
Type B (BTS)	Optional cable, triple shielded. Max. length: 600 m / 1950 ft (dep. on electrical conductivity and the flow tube). See the documentation of the signal transmitter for more information.

Approvals and certificates

CE	
This device fulfills the statutory requirements of the EU directives. The manufacturer certifies successful testing of the product by applying the CE mark.	
	For full information of the EU directives & standards and the approved certifications, please refer to the EU Declaration of Conformity or the manufacturer website.
Hazardous areas	
ATEX	Please check the relevant Ex documentation for details.
	Compact version with IMT33A 4 signal transmitter:
	II 2 G, II D, II 2 (1) G
	Remote (F) version:
	II 2 G, II 2 D
FM	**In combination with IMT33A 4 or H signal transmitter:**
	Class I, Div. 2, Groups A, B, C and D
	Class II, Div. 2, Groups F and G
	Class III, Div. 2, Groups F and G
	Only available for DN2.5...15
CSA	**In combination with IMT33A 4 or H signal transmitter:**
	Class I, Div. 2, Groups A, B, C and D
	Class II, Div. 2, Groups F and G
	Class III, Div. 2, Groups F and G
	Only available for DN2.5...15
Other approvals and standards	
Protection category acc. to IEC 60529	**Standard**
	IP66/67, NEMA 4/4X/6
	Option (F version only)
	IP68 field, NEMA 6P
	IP68 factory, NEMA 6P
	IP68 is only available for separate design and with a stainless steel connection box.
	Option IP69 IP 67/69 is available for connection box and stainless steel IMT31A signal transmitter.
Hygienic	3A approved
	EHEDG
Shock test	IEC 60068-2-27
	30 g for 18 ms
Vibration test	IEC 60068-2-64
	f = 20...2000 Hz, rms = 4.5 g, t = 30 min.

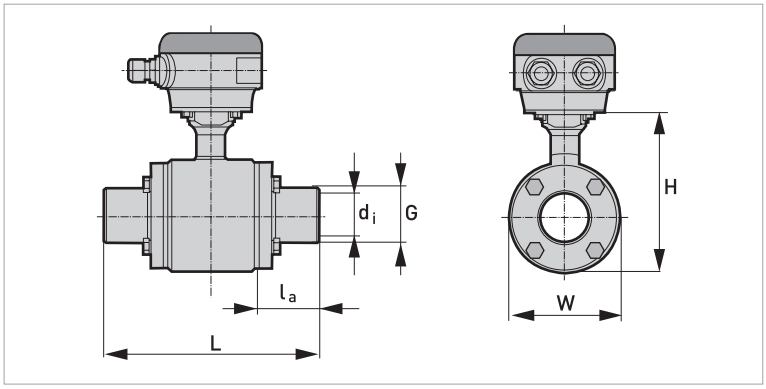
6.3 Dimensions and weights

DIN EN 10357/ DIN 11850 (row 2 or DIN 11866 row A)



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

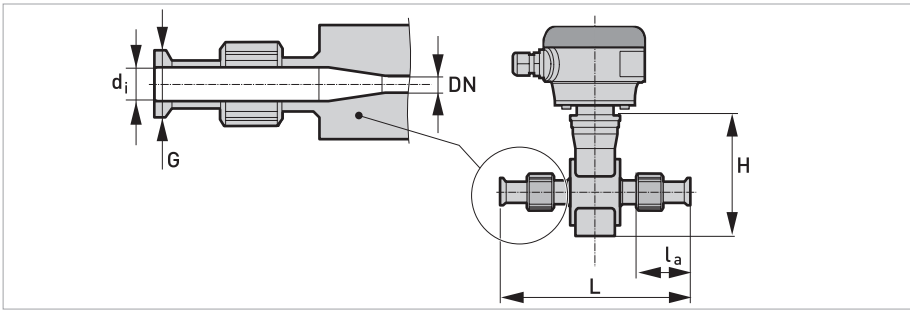
Nominal size		Dimensions [mm]						Approx. weight
		Adapter			Flowmeter			
DN	PN	d_i	G	l_a	L	H	W	[kg]
2.5...10	40	10	13	32	180	120	44	1.5
15	40	16	19	32	180	120	44	1.5



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

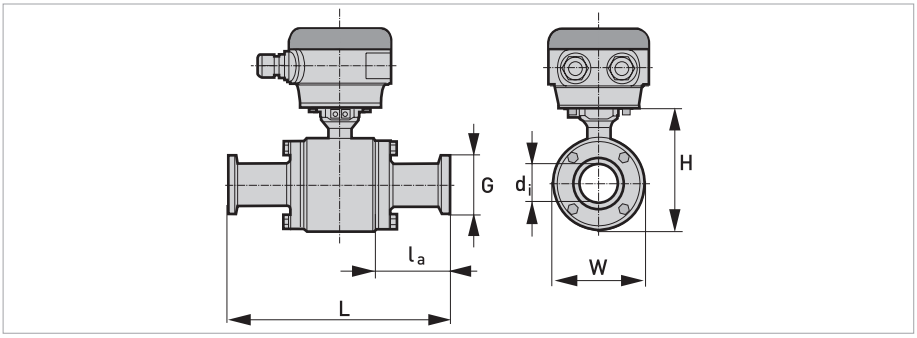
DIN 11851



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

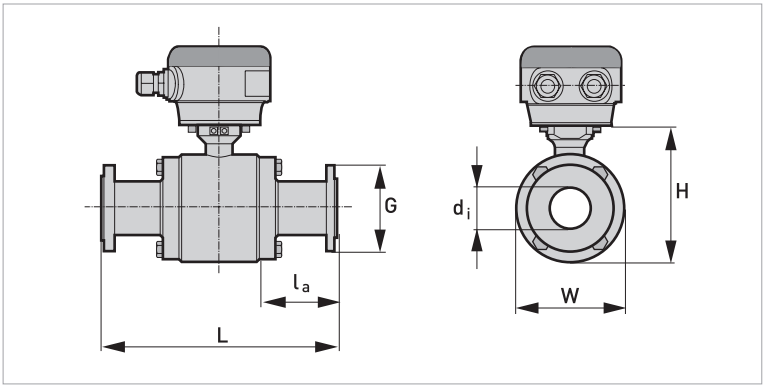
DIN 11851



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							

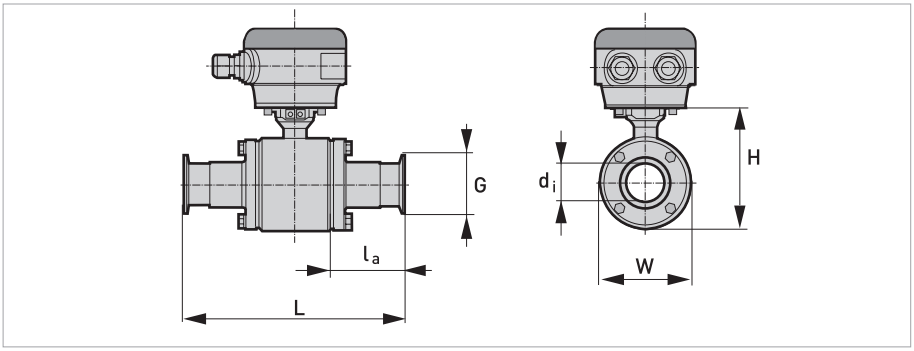
DIN 11864-2A



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	25	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	125	183	121	429	259	219	35
150	10	150	213	127	450	294	254	52

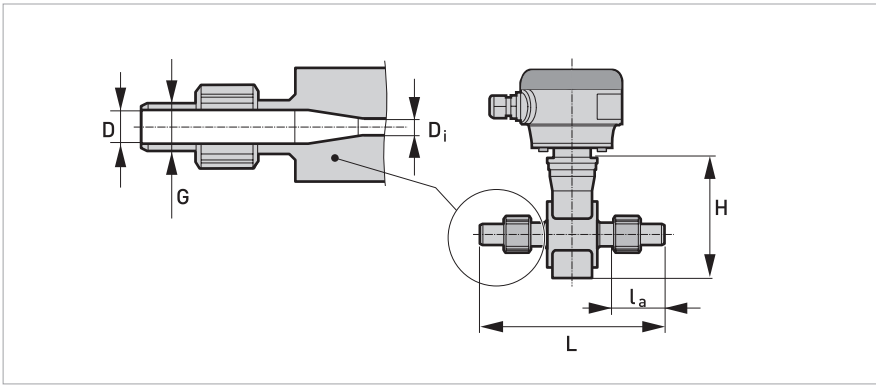
DIN 32676



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	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
125	16	125	155	90	366	259	219	30
150	16	150	213	127	450	294	254	45

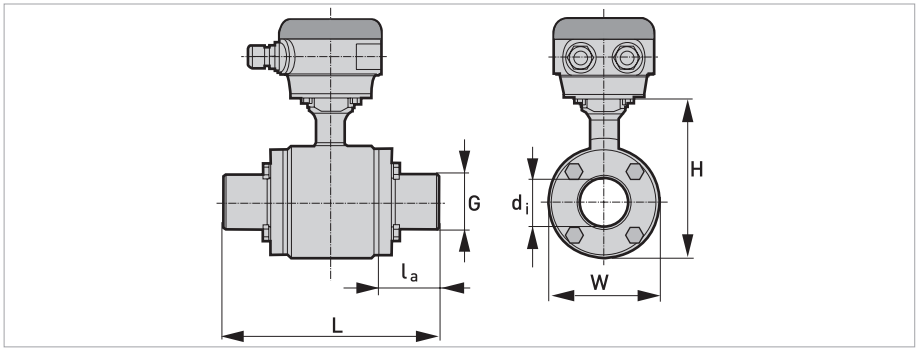
ISO 2037



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

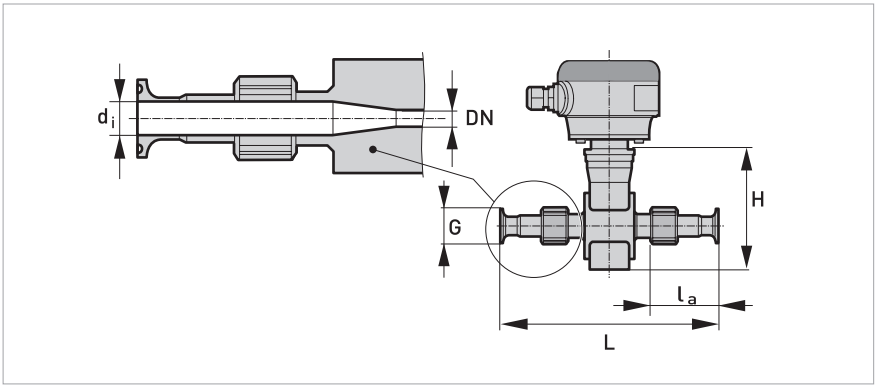
ISO 2037



DN25...150 bolted adapter

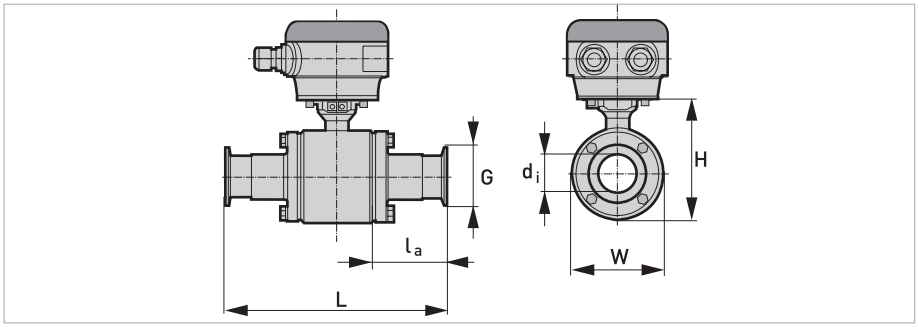
Nominal size		Dimensions [mm]						Approx. weights
		Adapter			Flowmeter			
DN	PN	d_i	G	l_a	L	H	W	[kg]
25	40	22.6	31	20.6	132.6	128	89	3
38	40	38	43	61.3	220	153	114	5.3
51	25	49	55	61.3	220	153	114	5
63.5	25	60.3	71	41.8	220	180	141	9
76.1	25	72.9	86	66.8	280	191	152	10.8
101.6	16	97.6	105	59.3	280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

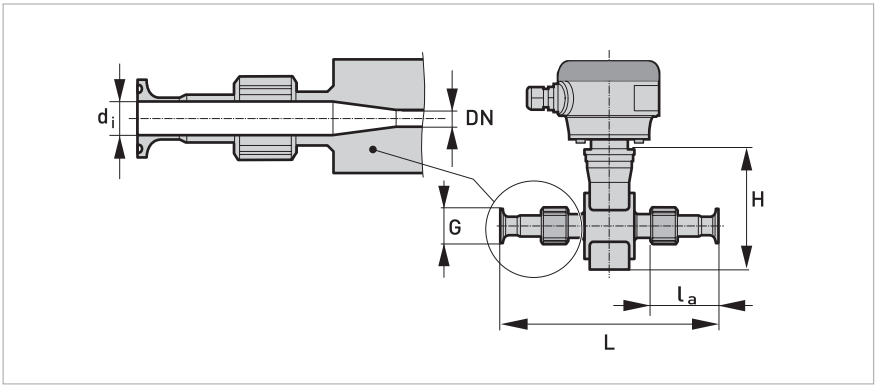
Nominal size			Dimensions [mm]						Approx. weight
			Adapter			Flowmeter			
DN	[Inch]	PN	d_i	G	l_a	L	H	W	[kg]
2.5...10	1/10"...3/8"	16	10	34	51.6	219	142	44	1.8
17.2	1/2"	16	16	34	51.6	219	142	44	1.8



DN25...150 bolted adapter

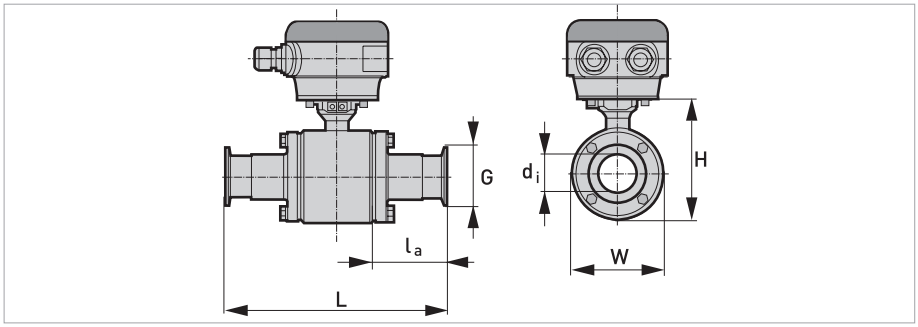
Nominal size			Dimensions [mm]						Approx. weight
			Adapter			Flowmeter			
DN	[Inch]	PN	d_i	G	l_a	L	H	W	[kg]
25	1"	16	22.6	50.5	41.8	175	128	89	3.3
38	1.5"	16	35.6	50.5	87.8	273	153	114	5.4
50	2"	16	48.6	64	87.8	273	153	114	5.2
63.5	2.5"	10	60.3	77.5	68.3	273	180	141	9.5
76.1	3"	10	72.9	91	93.3	333	191	152	11.2
101.6	4"	8	97.6	119	85.8	333	242	203	19.1
114.3	5"	5	110.3	211	90	366	259	219	30
139.7	6"	5	135.7	246	90	376	294	254	45

Tri Clamp



DN1/10...1/2" screwed adapter

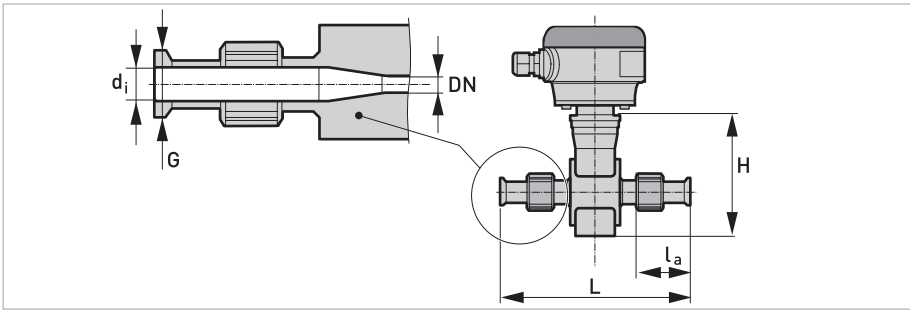
Nominal size		Dimensions [inch]						Approx. weight
		Adapter			Flowmeter			
DN	PN	d_i	G	l_a	L	H	W	[kg]
1/10"...3/8"	20	0.37	0.98	1.97	8.5	5.59	1.73	1.5
1/2"	20	0.62	0.98	1.97	8.5	5.59	1.73	1.5



DN1...6" bolted adapter

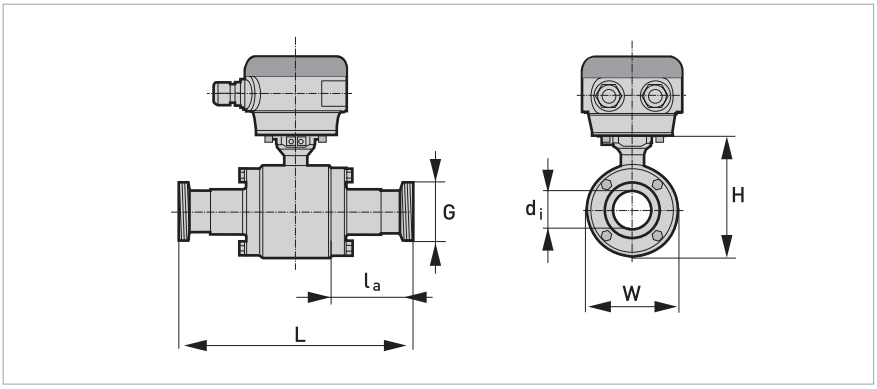
Nominal size		Dimensions [inch]						Approx. weight
		Adapter			Flowmeter			
DN	PN	d_i	G	l_a	L	H	W	[kg]
1"	20	0.85	1.98	1.02	5.64	5.04	3.5	3.2
1½"	20	1.35	1.98	3.46	10.75	6.02	4.49	5.5
2"	20	1.85	2.52	3.46	10.75	6.02	4.49	5.3
2½"	20	2.35	3.05	2.69	10.75	7.09	5.55	10
3"	20	2.85	3.54	3.68	13.11	7.52	5.98	12.5
4"	12	3.83	4.68	3.38	13.11	9.53	7.99	21.8
5"	-	4.78	5.69	3.54	14.43	10.20	8.62	30
6"	-	5.78	6.57	3.62	14.80	11.57	10.00	45

SMS 1146 Adapter



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	39	10	Rd 40-6	53	226	128	44	2
4	39	10	Rd 40-6	53	226	128	44	2
6	39	10	Rd 40-6	53	226	128	44	2
10	6	10	Rd 40-6	53	226	128	44	2
15	6	10	Rd 40-6	53	226	128	44	2



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

6.4 Measuring accuracy

Every electromagnetic flowmeter is calibrated by direct volume comparison. The wet calibration validates the performance of the flowmeter under reference conditions against accuracy limits.

The accuracy limits of electromagnetic flowmeters are typically the result of the combined effect of linearity, zero point stability and calibration uncertainty.

Reference conditions

- Medium: water
- Temperature: +5...+35°C / +41...+95°F
- Operating pressure: 0.1...5 barg / 1.5...72.5 psig
- Inlet section: ≥ 5 DN
- Outlet section: ≥ 2 DN

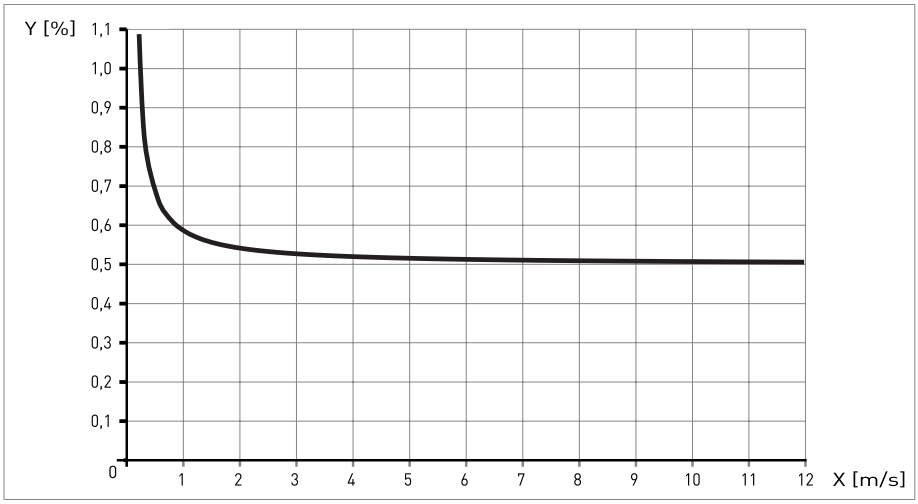


Figure 6-2: Flow velocity vs. accuracy
X [m/s] : flow velocity
Y [%]: deviation from the actual measured value (mv)

Compact with IMT30A	Accuracy	Curve
DN10...150 | 3/8...6"	0.5% of MV + 1 mm/s	

NOTICE!
Optionally for IMT30A; extended calibration at 2 points for optimised accuracy.
For more details on optimised accuracy, see the concerning signal transmitter documentation.

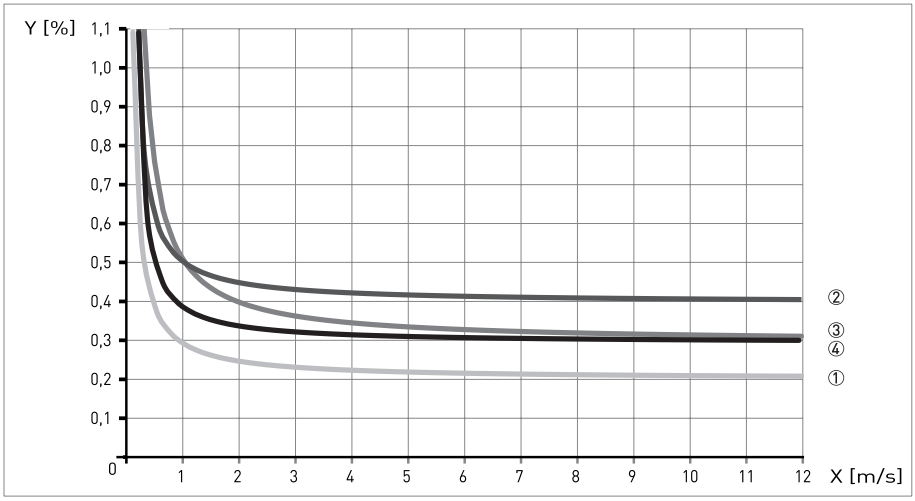
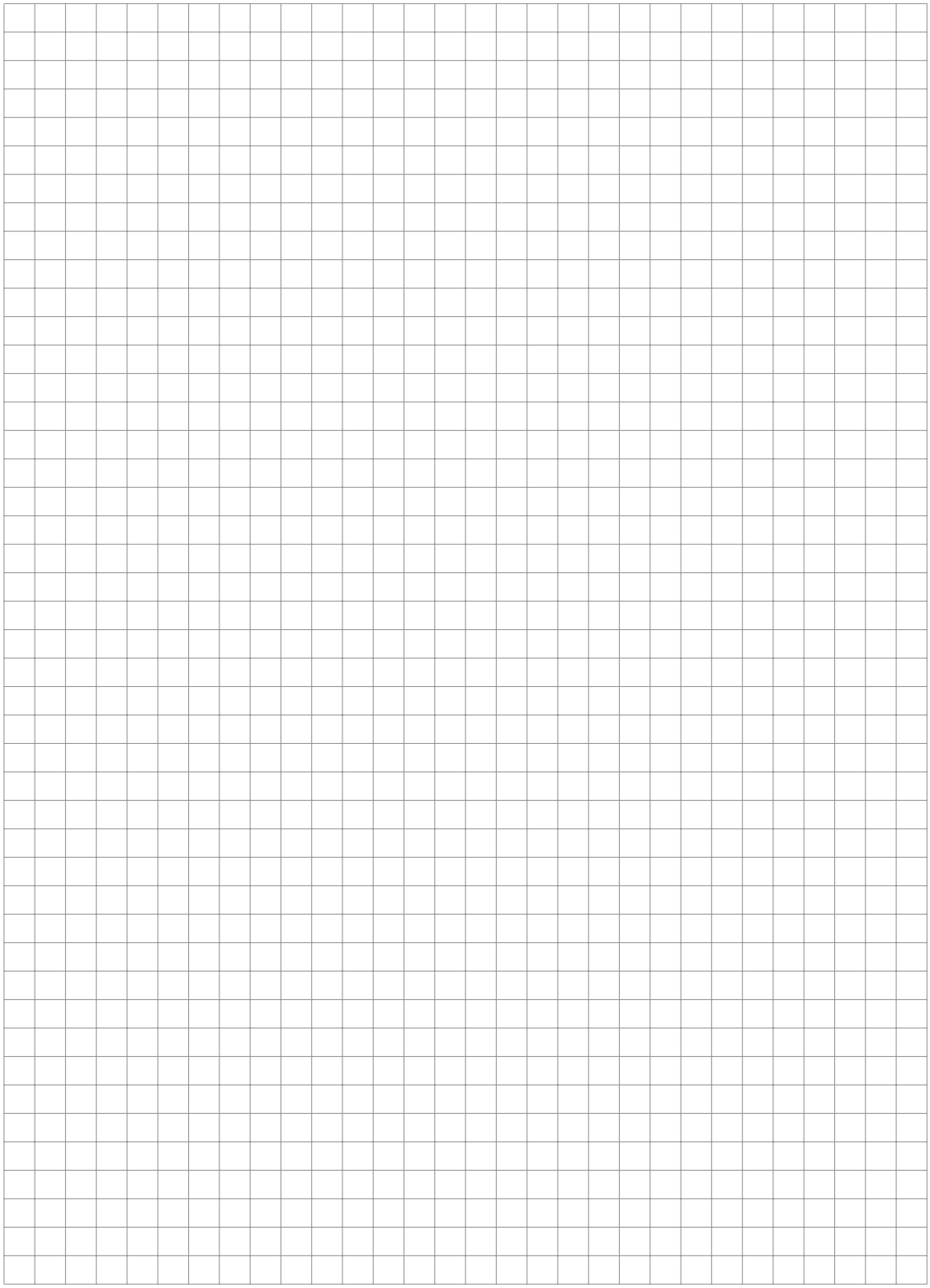


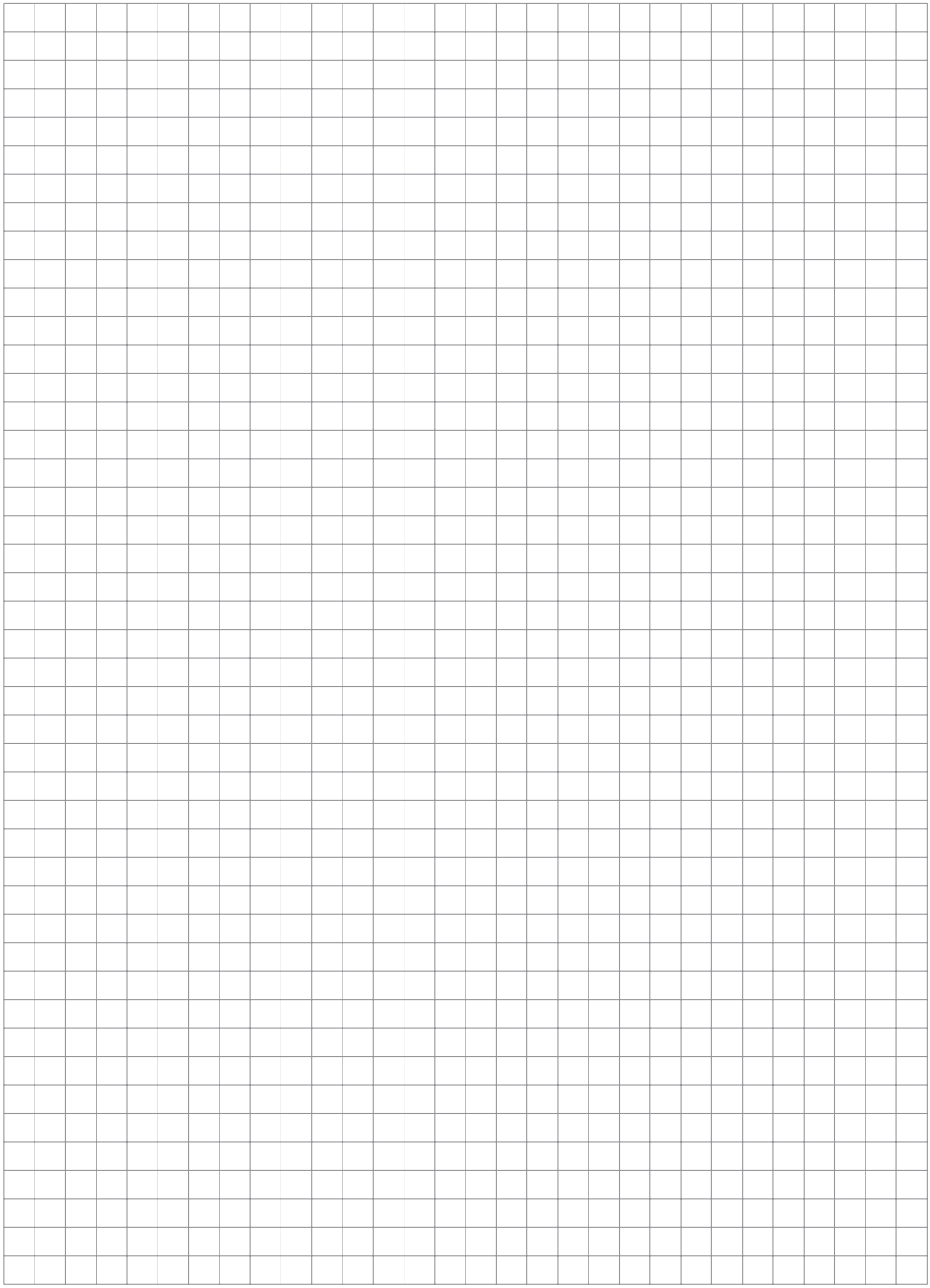
Figure 6-3: Flow velocity vs. accuracy
X [m/s] : flow velocity
Y [%]: deviation from the actual measured value (mv)

Compact with IMT33A	Accuracy	Curve
DN2.5...6 | 1/10...1/4"	0.3% of MV + 2 mm/s	③
DN10...150 | 3/8...6"	0.2% of MV + 1 mm/s	①

Compact with IMT31A	Accuracy	Curve
DN2.5...6 | 1/10...1/4"	0.4% of MV + 1 mm/s	②
DN10...150 | 3/8...6"	0.3% of MV + 1 mm/s	④

NOTICE!
Optionally for IMT31A; extended calibration at 2 points for optimised accuracy.
For more details on optimised accuracy, see the concerning signal transmitter documentation.





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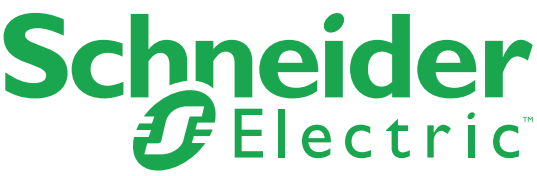

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