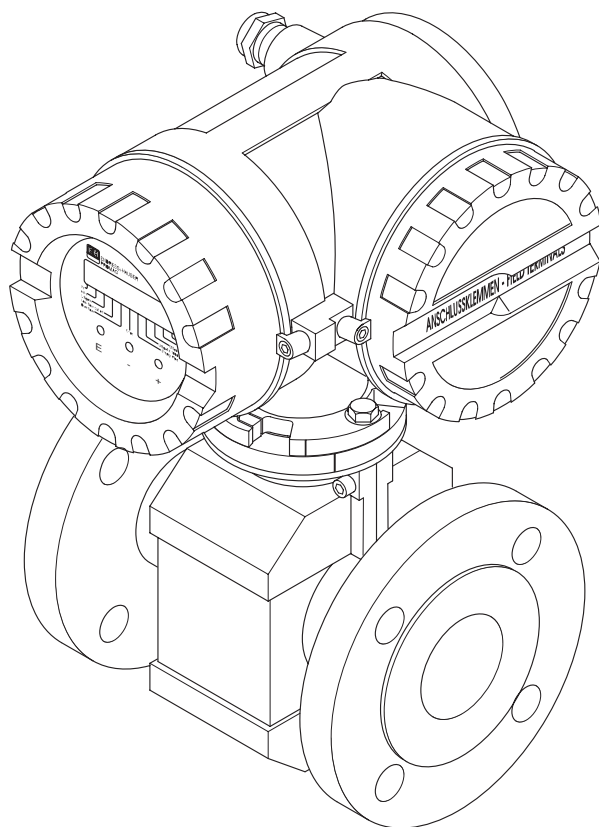
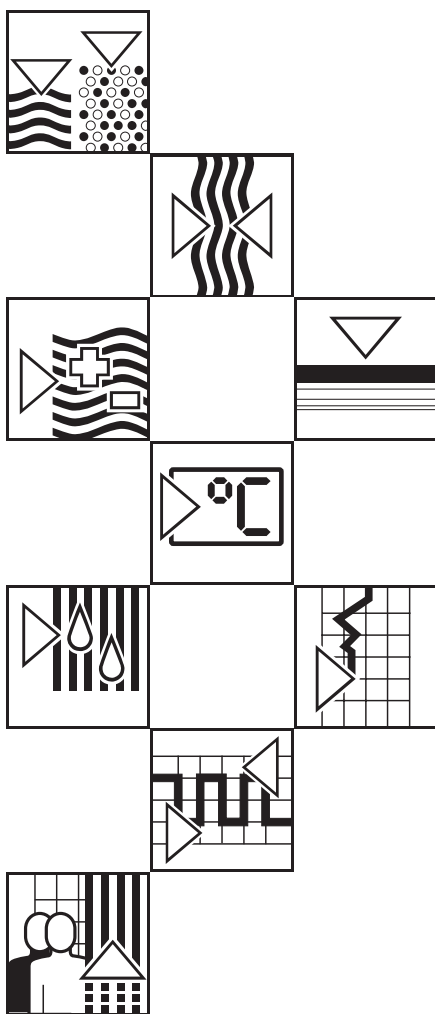


BA 039D/06/en/01.99
No. 50093119
CV 5.0

Valid as of software version
V 4.00.XX (amplifier)

promag 30 (Model '99) Electromagnetic Flow Measuring System

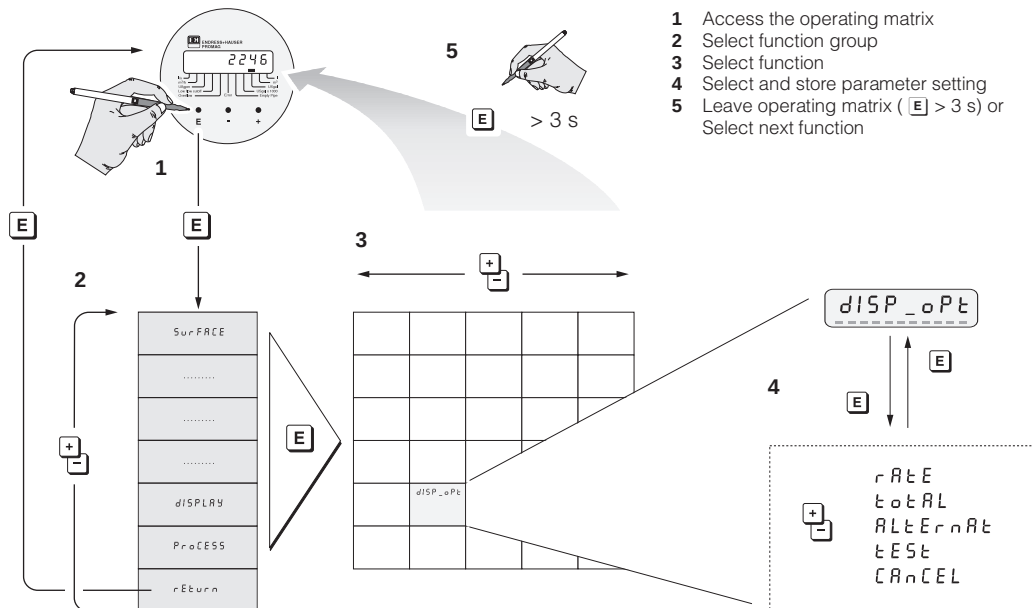
Operating Manual



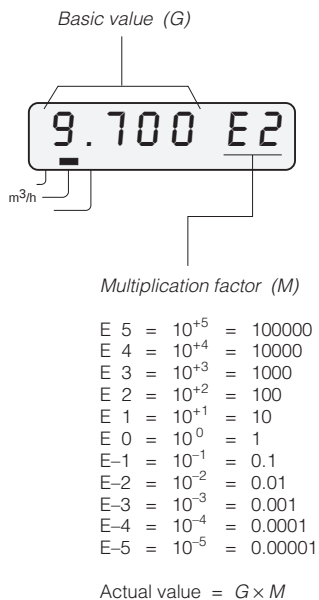
Endress + Hauser
Nothing beats know-how



Operating overview / Operating matrix



Display of numerical values



Example:

$$9.700 \text{ E } 2 = 9.700 \times 10^{+2} = 970.0 \text{ [m}^3/\text{h]}$$

$$9.700 \text{ E } -2 = 9.700 \times 10^{-2} = 0.097 \text{ [m}^3/\text{h]}$$

Function group "Gr00 / SurFACE"		
Fu01 / PRGECode	Function code	ALPHA = Text code nbr = Number code
Fu02 / u_RAtE	Flow rate unit	unit_1 = l/s; unit_2 = m ³ /h; unit_3 = USgpm
Fu03 / u_totAL	Totalizer unit	unit_4 = USgal x 1000; unit_5 = USgal; unit_6 = m ³ ; unit_7 = l (Litre)
Function group "Gr10 / Curr_out"		
Fu11 / F_SCALE	Full scale current value	Numeric entry: x.xxx E ± x
Fu12 / t_ConSt	Time constant	Numeric entry: xx.x (in steps of 0.5 seconds)
Fu13 / I_RAnGE	Current range	0-20 (mA); 4-20 (mA)
Function group "Gr20 / Puls_out"		
Fu21 / P_FACtor	Pulse value	Numeric entry: x.xxx E ± x
Function group "Gr30 / StAt_out"		
Fu31 / StAt_FcE	Status output function	Error = System and process error indication Flo_dir = Flow direction indication
Function group "Gr40 / InPut"		
Fu41 / InP_FcE	Auxiliary input function	SUPPRESS = Positive zero return RES_tot = Totalizer reset to "zero"
Function group "Gr50 / dISPLAy"		
Fu51 / rES_tot	Totalizer reset	CANCEL RES_YES = Totalizer reset activated
Fu52 / dISP_oPt	Display mode	rAtE = Flow rate display; totAL = Totalizer display; ALtErnAt = Alternating display of flow rate and totalizer tESt = Display test function
Fu53 / dISP_dR	Display damping	Numeric entry: xx.x (in steps of 0.5 seconds)
Fu54 / tot_oFL	Totalizer overflows	Display of totalizer overflows
Function group "Gr60 / PRoCESS"		
Fu61 / LFC	Creep suppression	LFC_oFF = Suppression off LFC_on = Suppression on
Fu62 / EPD	Empty Pipe Detection (EPD)	EPD_oFF = off; EPD_on = on; EPD_Ad_E = Empty pipe adjustment EPD_Ad_F = Full pipe adjustment
Fu63 / ECC	Electrode cleaning (ECC), optional	ECC_oFF = ECC off ECC_on = ECC on
rEturN	E → Return to the Function group (or HOME Position)	

Contents

1	Safety Instructions	5	8	Dimensions	57
1.1	Correct usage	5	8.1	Dimensions Promag 30 A	57
1.2	Dangers and notes	5	8.2	Dimensions Promag 30 H	60
1.3	Personnel for installation, start-up and operation	6	8.3	Dimensions Promag 30 F (DN 15...300)	62
1.4	Repairs and dangerous substances	6	8.4	Dimensions Promag 30 F (DN 350...2000)	63
1.5	Technical improvements	6			
2	Instrument Identification	7	9	Technical Data	65
3	Mounting and Installation	9	Index		75
3.1	Transport instructions (DN > 350/14")	9			
3.2	Mounting location	10			
3.3	Mounting position	12			
3.4	Nominal diameter and flow rate	13			
3.5	Adapters	13			
3.6	Mounting Promag A	14			
3.7	Mounting Promag H	15			
3.8	Mounting Promag F	16			
3.9	Turning the transmitter housing and local display	18			
3.10	Mounting the transmitter (remote version)	19			
4	Electrical Connection	21			
4.1	Degree of protection	21			
4.2	Connecting the transmitter	22			
4.3	Connecting the cable of the remote version	26			
4.4	Cable specifications	28			
4.5	Potential equalisation	29			
4.6	Commissioning	31			
5	Display and Operation	33			
5.1	Display and operating elements	33			
5.2	Operation (operating matrix)	34			
5.3	Operating example	36			
6	Description of Functions	37			
7	Trouble-shooting, Maintenance and Repairs	49			
7.1	Response of the measuring system on faults or alarm	49			
7.2	Trouble-shooting and remedy	50			
7.3	Replacing the measuring electrodes	52			
7.4	Replacing the transmitter electronics	54			
7.5	Replacing the fuse	55			
7.6	Repairs	55			
7.7	Spare parts	55			
7.8	Maintenance	55			

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Registered trademark of E.I. Du Pont de Nemours & Co., Wilmington, USA

TRI-CLAMP[®], HASTELLOY[®]
Registered trademark of Ladish & Co., Inc., Kenosha, USA

1 Safety Instructions

1.1 Correct usage

- The Promag 30 is only to be used for measuring the flow of conductive fluids. Most liquids can be measured provided they have a minimum conductivity of $\geq 5 \mu\text{S/cm}$, e.g.
 - acids, alkalis, pastes, pulps,
 - drinking water, waste water, sewage sludge,
 - milk, beer, wine, mineral water, yoghurt, molasses, etc.
 A minimum conductivity of $\geq 20 \mu\text{S/cm}$ is required for measuring demineralised water.
- The manufacturer assumes no liability for damage caused by incorrect use of the instrument.
- Instruments which are used in the explosion hazardous area are supplied with a separate "Ex documentation", which is an integral part of this Operating Manual. The instructions and connected loads provided in this supplement must absolutely be observed. An appropriate icon is shown on the front of this document according to the approval given and the test center.



1.2 Dangers and notes

All instruments are designed to meet state-of-the-art safety requirements, have been tested, and have left the factory in an operational perfectly safe condition. The devices were developed according to EN 61010 "Protection Measures for Electronic Equipment for Measurement, Control, Regulation and Laboratory Procedures".

A hazardous situation may occur if the flowmeter is not used for the purpose it was designed for or is used incorrectly.

Please carefully note the information provided in this Operating Manual indicated by the following pictograms:

Warning!

A "warning" indicates actions or procedures which, if not performed correctly, may lead to personal injury or a safety hazard.

Please strictly observe the instructions supplied and proceed carefully.



Warning!

Caution!

A "caution" indicates actions or procedures which, if not performed correctly, may lead to faulty operations or the destruction of the instrument.

Please strictly observe the respective instructions.



Caution!

Note!

A "note" indicates actions or procedures which, if not performed correctly, may indirectly affect operations or lead to an unexpected instrument response.



Note!

1.3 Personnel for installation, start-up and operation

- Mounting, electrical installation, start-up and maintenance of the instrument may only be carried out by trained personnel authorized by the operator of the facility. Personnel must absolutely and without fail read and understand this Operating Manual before carrying out its instructions.
- The instrument may only be operated by personnel who are authorized and trained by the operator of the facility. All instructions in this manual are to be observed without fail.
- With special fluids, incl. those used for cleaning, E+H will be pleased to supply information concerning the chemical resistance properties of wetted parts.
- When welding the piping, the welding machinery must not be grounded through the Promag.
- The installer has to make sure that the measuring system is correctly wired up according to the wiring diagrams. The measuring system is to be grounded.
- Please observe all provisions valid for your country and pertaining to the opening and repairing of electrical devices.



Danger of electrical shock!

With the housing cover removed, protection against accidental contact is no longer present. Components with high voltages are exposed below the local display. When programming according to section 5.1–5.3, avoid any contact with the electronic components which lie below the local display, and do not use any electrically conductive object to depress the operating keys.

1.4 Repairs and dangerous substances

The following procedures must be carried out before a Promag 30 is sent to Endress+Hauser for repair:

- A note must always be enclosed with the instrument, containing a description of the fault, the application, and the chemical and physical properties of the product being measured.
- Remove all residue which may be present. Pay special attention to the gasket grooves and crevices where fluid may be present. This is especially important if the fluid is dangerous to health, e.g. corrosive, carcinogenic, radioactive, etc.
- No instrument should be returned without all dangerous material being removed first (e.g. in scratches or diffused through plastic).

Incomplete cleaning of the instrument may result in waste disposal or cause harm to personnel (burns, etc). Any costs arising from this will be charged to the owner of the instrument.

1.5 Technical improvements

The manufacturer reserves the right to modify technical data without prior notice. Your local E+H Sales Office will supply you with all current information and any updates to this Operating Manual.

2 Instrument Identification

An overview of the complete Promag 30 measuring system is shown below.
The technical specifications are stamped on the nameplate and contain the following information:

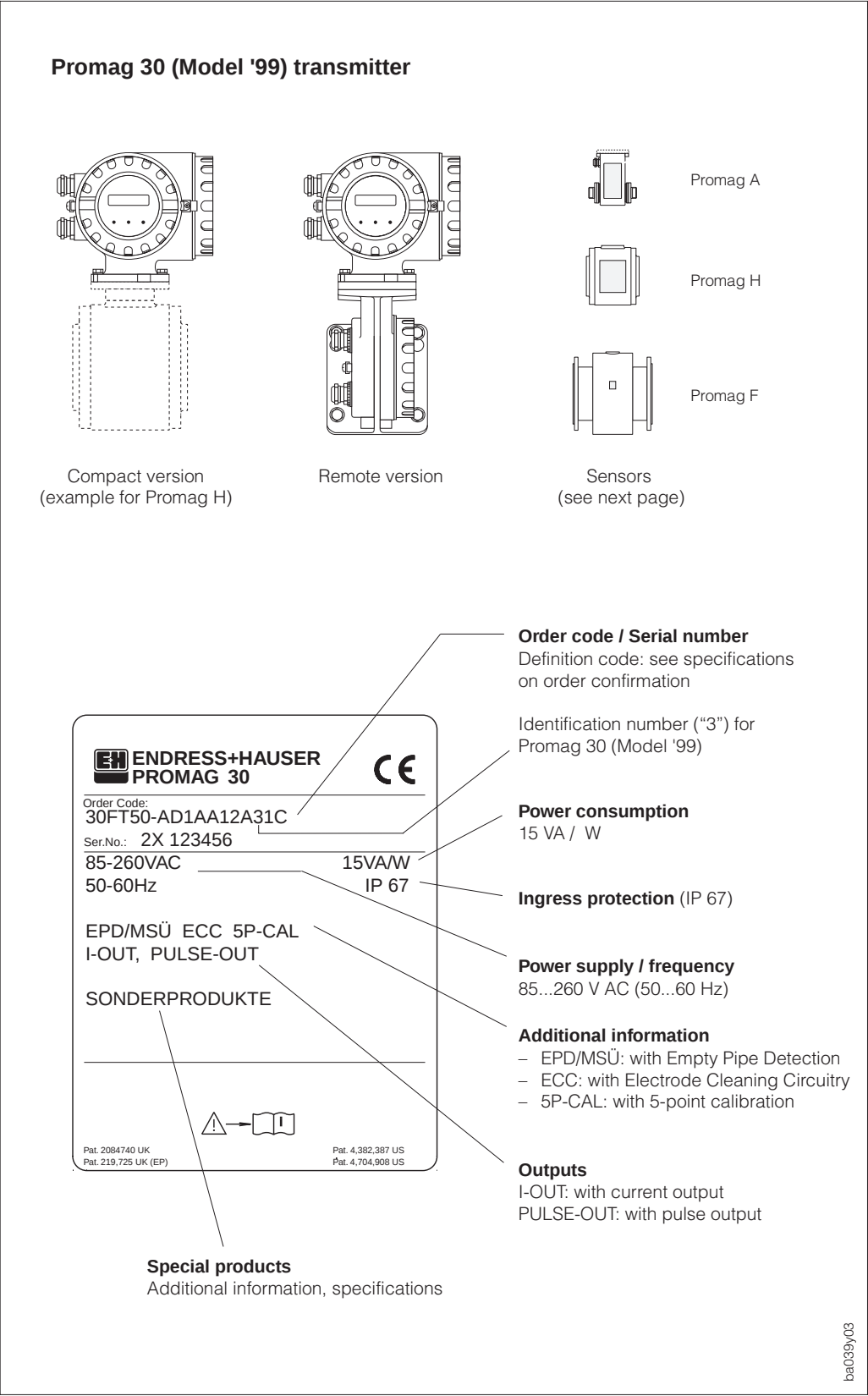
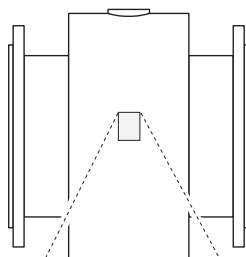


Fig. 1
Promag 30 transmitter.
Typical nameplate specifications
(example)

Promag F (15...2000)



Definition code: see specifications
on order confirmation

0.5328 / -5

Materials

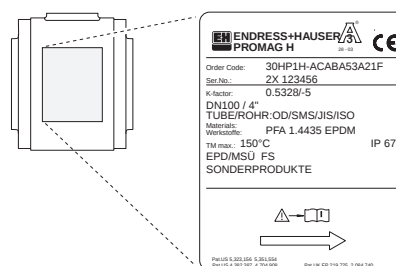
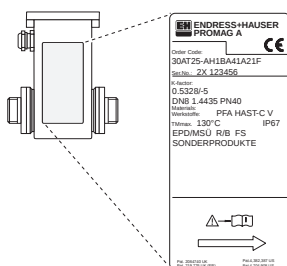
- Lining: soft rubber (WG)
- Measuring electrodes: stainless steel 1.4435

Ingress protection (IP 67)
Max. fluid temperature (120 °C)

- EPD/MSÜ: with Empty Pipe Detection
- R/B: with reference electrode
- FS: remote version (see page 19)
- EME/AWE: with interchangeable measuring electrodes

Additional information, specifications

Promag H (DN 25...100)



ba039y04

3 Mounting and Installation

Warning!

- The instructions given in this section are to be observed at all times in order to ensure safe and reliable operation of the measuring system.
- For explosion protected instruments the mounting regulations and the technical data may differ from those stated here. Please refer to the Ex supplement of this Operating Manual for additional information.



3.1 Transport instructions (DN ≥ 350/14")

The pipe lining on the flanges is protected by disks to prevent damage when transporting to the measuring point. These are to be removed when installing. Instruments are to be transported in the containers they are delivered in.

Transporting to the measuring point

- The sensor must not be lifted by the transmitter housing!
- Use only the grips on the flange for lifting out and mounting the sensor in the piping (from DN 350 or 14").

Caution!

The sensor must not be lifted by the metal casing using a fork lift truck! This can buckle the casing and so damage the internal magnetic coils.

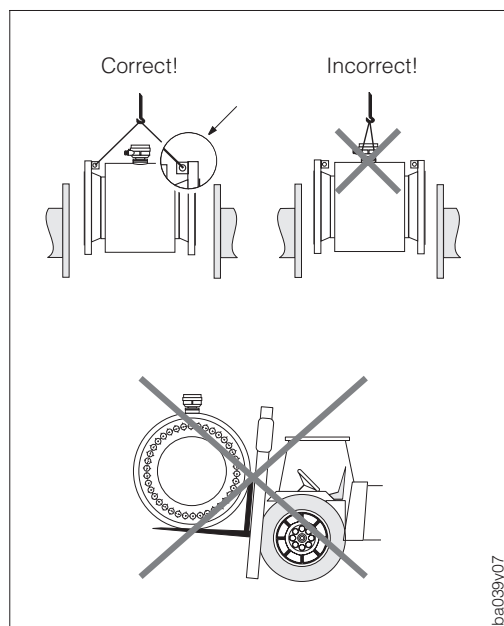


Fig. 3
Transport instructions for large
diameter sensors (DN ≥ 350)

Base and supports

The sensor is to be mounted on a base which is sufficiently strong enough to withstand its weight.

Caution!

Do not support the sensor by the sheet casing. The casing may be dented and so damage the magnetic coils inside the sensor.

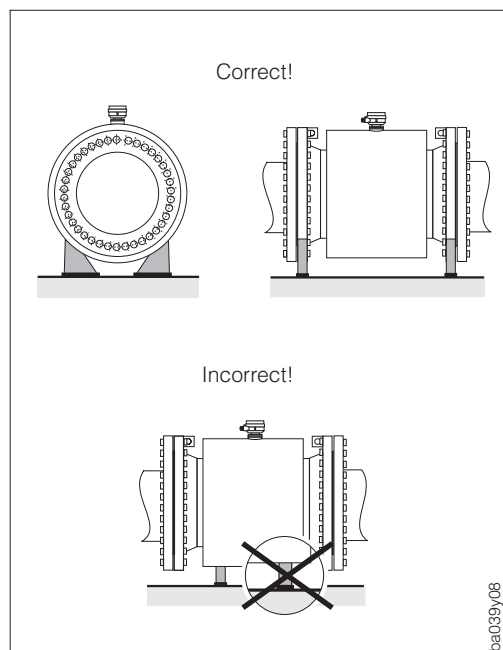


Fig. 4
The proper way to support large
diameter sensors (DN ≥ 350)

3.2 Mounting location

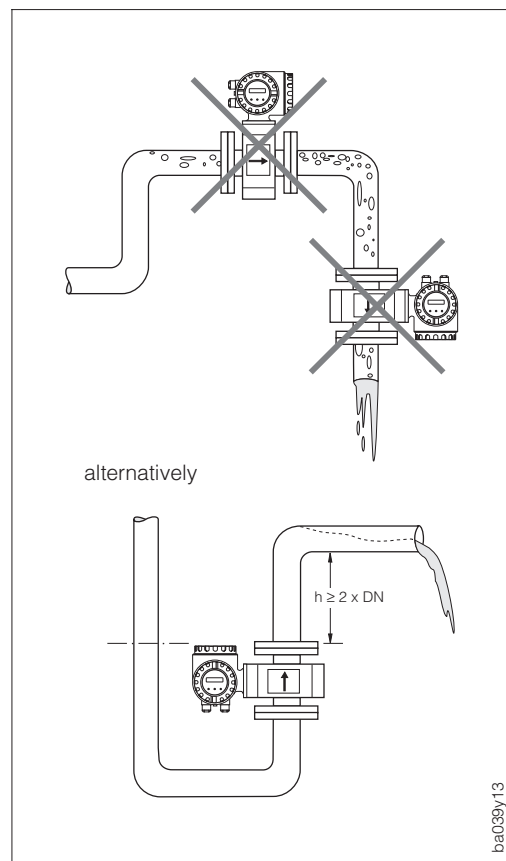


Fig. 5
Mounting location

Correct measurement is only possible when the pipe is full. The following locations should therefore be avoided:

- No installation at the highest point (air accumulation).
- No installation immediately before an open pipe outlet in a downward line.

The alternative installation, however, permits a correct measurement.

Partly filled pipes

For inclines a mounting similar to a drain should be adopted. Added security is offered by Empty Pipe Detection in order to detect empty or partly filled pipes (see page 46).

Note!
Danger of solids accumulation!
Do not mount the sensor at the lowest point of the drain. A cleaning valve should also be installed.



Note!

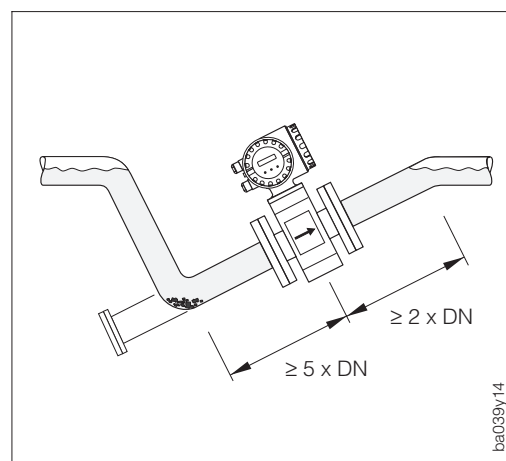


Fig. 6
Mounting with a partly filled pipe

Downward pipe

With the installation suggested opposite, partial vacuum is avoided even with a downward pipe > 5 m long (siphon, vent valve downstream of the sensor).

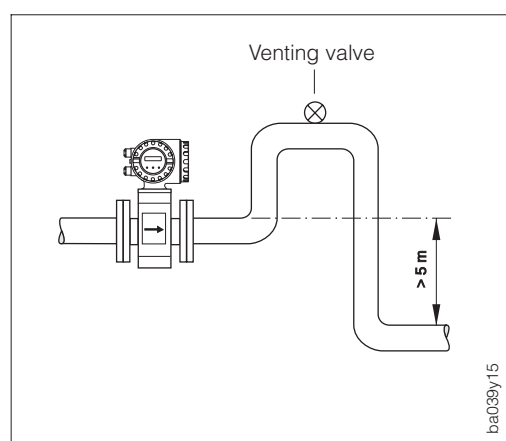


Fig. 7
Installation downward pipe

Installation of pumps

Do not mount the sensors on the suction side of pumps. This prevents low pressure and therefore possible damage to the lining of the measuring tube. Information on the resistance to vacuum of the flowmeter lining can be found on page 74.

Pulse dampers should be installed when using reciprocal, diaphragm or peristaltic pumps.

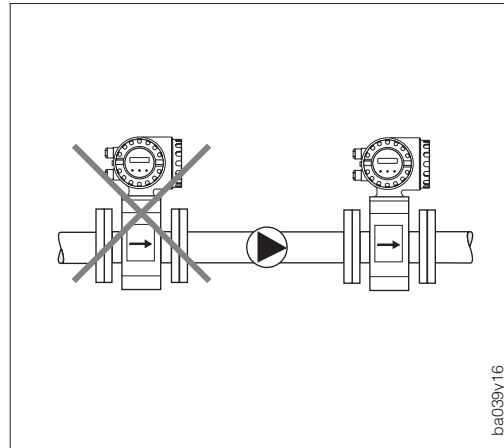


Fig. 8
Installation of pumps

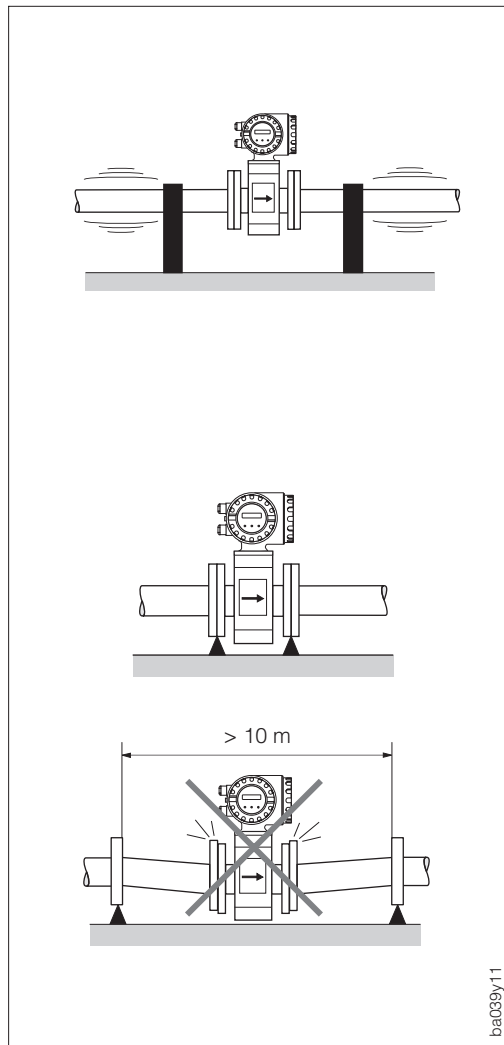
Vibration

The piping before and after the sensor should be securely fastened if there is excessive vibration. Information on shock and vibration resistance is found on page 67.

Caution!

Excessive vibration necessitates separate mounting of the sensor and transmitter (see pages 19, 67).

Mechanical support of the sensor is recommended for free runs of piping over 10 m long.



Caution!

Fig. 9
Remedies to avoid vibrations

3.3 Mounting position

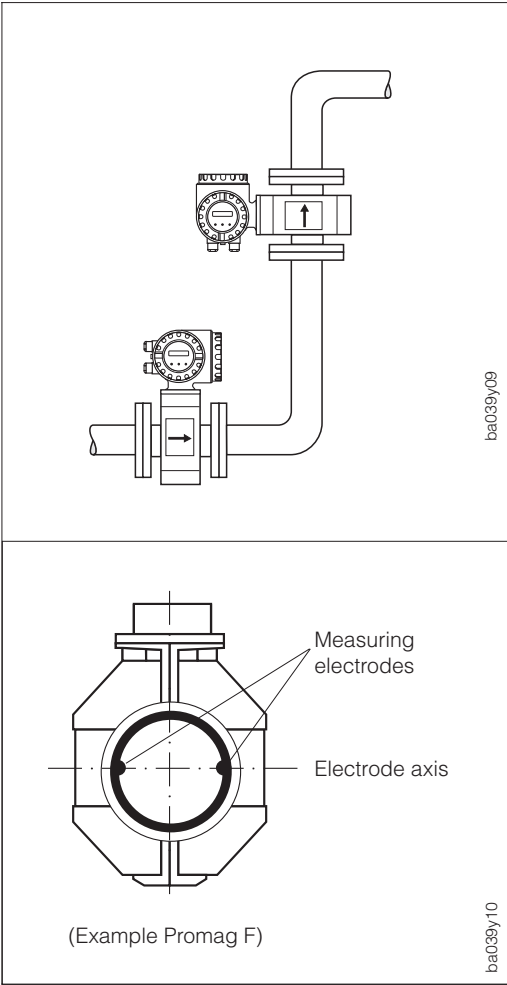


Fig. 10
Mounting position (horizontal,
vertical)

Vertical mounting:
This is the recommended position with the flow upwards. Entrained solid particles sink and fatty components in the stationary fluid rise away from the measuring electrodes. This is the optimal position in empty pipe system and when using Empty Pipe Detection (see page 46).

Horizontal mounting:
The axis of the electrodes must be horizontal, thus preventing brief insulation of the electrodes by entrained air bubbles.

Electrode axis:
The plane in which the electrode axis lies with regard to the transmitter is identical for the Promag A, H and F sensors.

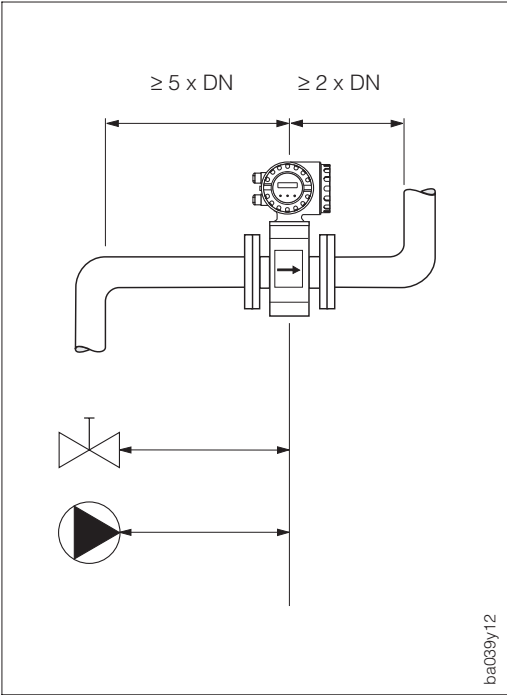


Fig. 11
Inlet and outlet sections

Inlet and outlet sections
The sensor should be mounted away from fittings such as valves, T-pieces, elbows, etc.

Inlet section: $\geq 5 \times \text{DN}$
Outlet section: $\geq 2 \times \text{DN}$

The inlet and outlet sections must be observed in order to maintain accuracy.

以上内容仅为本文档的试下载部分，为可阅读页数的一半内容。如要下载或阅读全文，请访问：<https://d.book118.com/066213133100010142>