



Level



Pressure



Flow



Temperature

Liquid  
Analysis

Registration

Systems  
Components

Services



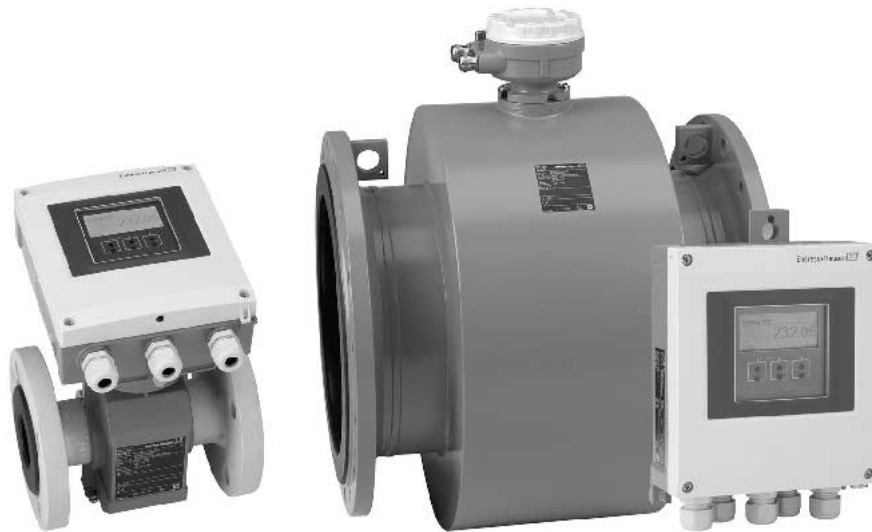
Solutions

## Technical Information

# Proline Promag W 400

Electromagnetic flow measuring system

The specialist for all water and wastewater applications



### Application

- Accurate bidirectional measurement of liquids with a minimum conductivity of  $\geq 5 \mu\text{S}/\text{cm}$  in water/wastewater applications.
- The electromagnetic measuring principle is unaffected by pressure and temperature. Additionally the flow profile has a minimal effect on the measurement results.

#### Device properties

- Nominal diameter: DN 25 to 2000 (1 to 78")
- Liner (HG, PU) with worldwide drinking water approvals: KTW, WRAS, NSF, ACS
- Process pressure: max. 40 bar (580 psi)
- Durable polycarbonate transmitter housing
- Graphical local display with operation from the outside (Touch Control)
- Up to 3 outputs and 1 input including 4-20 mA HART communication

### Your benefits

The specialist for very demanding water and wastewater applications

#### Sizing – correct product selection

*Applicator* – the reliable, easy-to-use tool for selecting and sizing measuring devices for every application

#### Installation – simple and efficient

- Compact design
- Certified corrosion protection (EN ISO 12944) needed for submerged or direct burial installations
- Compact and remote version perfectly suited to meet the requirements of the water/wastewater industry

#### Commissioning – reliable and intuitive

- Guided parameterization – "Make-it-run" wizards
- Integrated web server for fast commissioning

#### Operation – increased measurement availability

- Simultaneous measurement: volume flow and conductivity
- Immune to process influences
- Diagnostics; automatic data restore by HistorOM

Cost-effective life cycle management by W@M







## Table of contents

<b>Document information</b> . . . . .	<b>3</b>	<b>Process</b> . . . . .	<b>27</b>
Symbols used . . . . .	3	Medium temperature range . . . . .	27
<b>Function and system design</b> . . . . .	<b>4</b>	Conductivity . . . . .	27
Measuring principle . . . . .	4	Pressure-temperature ratings . . . . .	27
Measuring system . . . . .	5	Pressure tightness . . . . .	29
<b>Input</b> . . . . .	<b>5</b>	Flow limit . . . . .	29
Measured variable . . . . .	5	Pressure loss . . . . .	30
Measuring range . . . . .	6	System pressure . . . . .	30
Operable flow range . . . . .	8	Vibrations . . . . .	30
Input signal . . . . .	8	<b>Mechanical construction</b> . . . . .	<b>31</b>
<b>Output</b> . . . . .	<b>8</b>	Design, dimensions . . . . .	31
Output signal . . . . .	8	Weight . . . . .	41
Signal on alarm . . . . .	9	Measuring tube specification . . . . .	46
Low flow cut off . . . . .	10	Materials . . . . .	46
Galvanic isolation . . . . .	10	Fitted electrodes . . . . .	48
Protocol-specific data . . . . .	10	Process connections . . . . .	48
<b>Power supply</b> . . . . .	<b>11</b>	Surface roughness . . . . .	48
Terminal assignment . . . . .	11	<b>Operability</b> . . . . .	<b>49</b>
Supply voltage . . . . .	12	Operating concept . . . . .	49
Power consumption . . . . .	12	Local operation . . . . .	49
Current consumption . . . . .	12	Remote operation . . . . .	50
Power supply failure . . . . .	12	<b>Certificates and approvals</b> . . . . .	<b>50</b>
Electrical connection . . . . .	13	CE mark . . . . .	50
Potential equalization . . . . .	15	C-Tick symbol . . . . .	51
Terminals . . . . .	17	Ex approval . . . . .	51
Cable entries . . . . .	17	Drinking water approval . . . . .	51
Cable specification . . . . .	18	Other standards and guidelines . . . . .	51
<b>Performance characteristics</b> . . . . .	<b>19</b>	<b>Ordering information</b> . . . . .	<b>51</b>
Reference operating conditions . . . . .	19	<b>Application packages</b> . . . . .	<b>52</b>
Maximum measured error . . . . .	19	Cleaning . . . . .	52
Repeatability . . . . .	21	Diagnostics functions . . . . .	52
Influence of ambient temperature . . . . .	21	<b>Accessories</b> . . . . .	<b>52</b>
<b>Installation</b> . . . . .	<b>21</b>	Device-specific accessories . . . . .	52
Mounting location . . . . .	21	Communication-specific accessories . . . . .	53
Orientation . . . . .	22	Service-specific accessories . . . . .	53
Inlet and outlet runs . . . . .	23	System components . . . . .	54
Adapters . . . . .	23	<b>Documentation</b> . . . . .	<b>54</b>
Length of connecting cable . . . . .	24	Standard documentation . . . . .	54
Installing the wall-mount housing . . . . .	25	Supplementary device-dependent documentation . . . . .	54
Special mounting instructions . . . . .	25	<b>Registered trademarks</b> . . . . .	<b>54</b>
<b>Environment</b> . . . . .	<b>26</b>		
Ambient temperature range . . . . .	26		
Storage temperature . . . . .	26		
Atmosphere . . . . .	26		
Degree of protection . . . . .	26		
Shock resistance . . . . .	26		
Vibration resistance . . . . .	26		
Mechanical load . . . . .	26		
Electromagnetic compatibility (EMC) . . . . .	26		








## Document information

### Symbols used


#### Electrical symbols



Symbol	Meaning
 A0011197	<b>Direct current</b> A terminal to which DC voltage is applied or through which direct current flows.
 A0011198	<b>Alternating current</b> A terminal to which alternating voltage is applied or through which alternating current flows.
 A0017381	<b>Direct current and alternating current</b> <ul style="list-style-type: none"> <li>■ A terminal to which alternating voltage or DC voltage is applied.</li> <li>■ A terminal through which alternating current or direct current flows.</li> </ul>
 A0011200	<b>Ground connection</b> A grounded terminal which, as far as the operator is concerned, is grounded via a grounding system.
 A0011199	<b>Protective ground connection</b> A terminal which must be connected to ground prior to establishing any other connections.
 A0011201	<b>Equipotential connection</b> A connection that has to be connected to the plant grounding system: This may be a potential equalization line or a star grounding system depending on national or company codes of practice.

#### Symbols for certain types of information

Symbol	Meaning
 A0011182	<b>Allowed</b> Indicates procedures, processes or actions that are allowed.
 A0011183	<b>Preferred</b> Indicates procedures, processes or actions that are preferred.
 A0011184	<b>Forbidden</b> Indicates procedures, processes or actions that are forbidden.
 A0011193	<b>Tip</b> Indicates additional information.
 A0011194	<b>Reference to documentation</b> Refers to the corresponding device documentation.
 A0011195	<b>Reference to page</b> Refers to the corresponding page number.
 A0011196	<b>Reference to graphic</b> Refers to the corresponding graphic number and page number.

#### Symbols in graphics

Symbol	Meaning
1, 2, 3,...	Item numbers
1., 2., 3. ...	Series of steps
A, B, C, ...	Views
A-A, B-B, C-C, ...	Sections
 A0013441	Flow direction

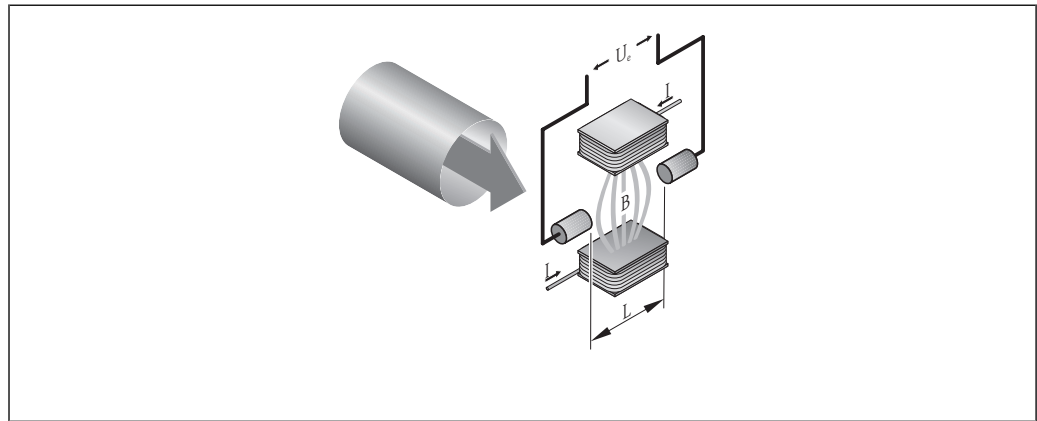
Symbol	Meaning
 A0011187	<b>Hazardous area</b> Indicates a hazardous area.
 A0011188	<b>Safe area (non-hazardous area)</b> Indicates a non-hazardous area.

## Function and system design

### Measuring principle

Following *Faraday's law of magnetic induction*, a voltage is induced in a conductor moving through a magnetic field.

In the electromagnetic measuring principle, the flowing medium is the moving conductor. The voltage induced is proportional to the flow velocity and is supplied to the amplifier by means of two measuring electrodes. The flow volume is calculated via the pipe cross-sectional area. The DC magnetic field is created through a switched direct current of alternating polarity.



$$I \quad U_e = B \cdot L \cdot v \quad ; \quad Q = A \cdot v$$

- $U_e$  Induced voltage
- $B$  Magnetic induction (magnetic field)
- $L$  Electrode spacing
- $v$  Flow velocity
- $Q$  Volume flow
- $A$  Piping cross-section
- $I$  Current

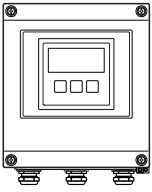
**Measuring system**

The device consists of a transmitter and a sensor.

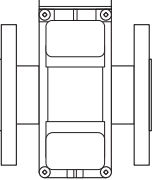
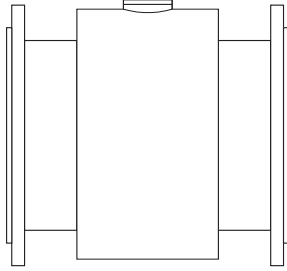
Two device versions are available:

- Compact version – the transmitter and sensor form a mechanical unit.
- Remote version – the transmitter and sensor are mounted separately from one another.

**Transmitter**

<p><b>Promag 400</b></p>  <p style="text-align: right; font-size: small;">A0017117</p>	<p>Device versions and materials:</p> <ul style="list-style-type: none"> <li>■ Compact housing: polycarbonate plastic</li> <li>■ Wall-mount housing: polycarbonate plastic</li> </ul> <p>Configuration:</p> <ul style="list-style-type: none"> <li>■ External operation via four-line, illuminated local display with touch control and guided menus ("Make-it-run" wizards) for applications</li> <li>■ Via operating tools (e.g. FieldCare)</li> <li>■ Via Web browser (e.g. Microsoft Internet Explorer)</li> </ul>
---	--

**Sensor**

<p><b>Promag W</b></p> <p><i>Fixed flange: DN 25 to 300 (1 to 12")</i></p>  <p style="text-align: right; font-size: small;">A0017040</p>	<p>Nominal diameter range: DN 25 to 2000 (1 to 78")</p> <p>Materials:</p> <ul style="list-style-type: none"> <li>■ Sensor housing: aluminum coated AlSi10Mg, carbon steel with protective varnish</li> <li>■ Sensor connection housing: aluminum coated AlSi10Mg, polycarbonate</li> <li>■ Measuring tube: stainless steel 1.4301/304, 1.4306/304L; for flanges made of carbon steel with Al/Zn protective coating or protective varnish</li> <li>■ Liner: hard rubber, polyurethane</li> <li>■ Seals: as per DIN EN 1514-1</li> <li>■ Electrodes: 1.4435/304L, Alloy C-22, tantalum</li> <li>■ Ground disks: 1.4435/316L, Alloy C-22, tantalum</li> </ul>
<p><i>Fixed flange: DN 350 to 2000 (14 to 78")</i></p>  <p style="text-align: right; font-size: small;">A0017041</p>	

**Input**

**Measured variable**

**Direct measured variables**

- Volume flow (proportional to induced voltage)
- Electrical conductivity

**Calculated measured variables**



Mass flow

**Measuring range**Typically  $v = 0.01$  to  $10$  m/s ( $0.03$  to  $33$  ft/s) with the specified accuracy*Flow characteristic values in SI units*

Nominal diameter		Recommended flow min./max. full scale value ( $v \sim 0.3/10$ m/s)	Factory settings		
[mm]	[in]		Full scale value current output ( $v \sim 2.5$ m/s)	Pulse value ( $\sim 2$ pulse/s)	Low flow cut off ( $v \sim 0.04$ m/s)
		[m <sup>3</sup> /h]	[m <sup>3</sup> /h]	[m <sup>3</sup> ]	[m <sup>3</sup> /h]
25	1	9 to 300 dm <sup>3</sup> /min	75 dm <sup>3</sup> /min	0.5 dm <sup>3</sup>	1 dm <sup>3</sup> /min
32	–	15 to 500 dm <sup>3</sup> /min	125 dm <sup>3</sup> /min	1 dm <sup>3</sup>	2 dm <sup>3</sup> /min
40	1 ½	25 to 700 dm <sup>3</sup> /min	200 dm <sup>3</sup> /min	1.5 dm <sup>3</sup>	3 dm <sup>3</sup> /min
50	2	35 to 1 100 dm <sup>3</sup> /min	300 dm <sup>3</sup> /min	2.5 dm <sup>3</sup>	5 dm <sup>3</sup> /min
65	–	60 to 2 000 dm <sup>3</sup> /min	500 dm <sup>3</sup> /min	5 dm <sup>3</sup>	8 dm <sup>3</sup> /min
80	3	90 to 3 000 dm <sup>3</sup> /min	750 dm <sup>3</sup> /min	5 dm <sup>3</sup>	12 dm <sup>3</sup> /min
100	4	145 to 4 700 dm <sup>3</sup> /min	1 200 dm <sup>3</sup> /min	10 dm <sup>3</sup>	20 dm <sup>3</sup> /min
125	–	220 to 7 500 dm <sup>3</sup> /min	1 850 dm <sup>3</sup> /min	15 dm <sup>3</sup>	30 dm <sup>3</sup> /min
150	6	20 to 600	150	0.025	2.5
200	8	35 to 1 100	300	0.05	5
250	10	55 to 1 700	500	0.05	7.5
300	12	80 to 2 400	750	0.1	10
350	14	110 to 3 300	1 000	0.1	15
375	15	140 to 4 200	1 200	0.15	20
400	16	140 to 4 200	1 200	0.15	20
450	18	180 to 5 400	1 500	0.25	25
500	20	220 to 6 600	2 000	0.25	30
600	24	310 to 9 600	2 500	0.3	40
700	28	420 to 13 500	3 500	0.5	50
750	30	480 to 15 000	4 000	0.5	60
800	32	550 to 18 000	4 500	0.75	75
900	36	690 to 22 500	6 000	0.75	100
1 000	40	850 to 28 000	7 000	1	125
–	42	950 to 30 000	8 000	1	125
1 200	48	1 250 to 40 000	10 000	1.5	150
–	54	1 550 to 50 000	13 000	1.5	200
1 400	–	1 700 to 55 000	14 000	2	225
–	60	1 950 to 60 000	16 000	2	250
1 600	–	2 200 to 70 000	18 000	2.5	300
–	66	2 500 to 80 000	20 500	2.5	325
1 800	72	2 800 to 90 000	23 000	3	350
–	78	3 300 to 100 000	28 500	3.5	450
2 000	–	3 400 to 110 000	28 500	3.5	450

## Flow characteristic values in US units

Nominal diameter		Recommended flow min./max. full scale value (v ~ 0.3/10 m/s)	Factory settings		
[in]	[mm]		Full scale value current output (v ~ 2.5 m/s)	Pulse value (~ 2 pulse/s)	Low flow cut off (v ~ 0.04 m/s)
		[gal/min]	[gal/min]	[gal]	[gal/min]
1	25	2.5 to 80	18	0.2	0.25
–	32	4 to 130	30	0.2	0.5
1 ½	40	7 to 190	50	0.5	0.75
2	50	10 to 300	75	0.5	1.25
–	65	16 to 500	130	1	2
3	80	24 to 800	200	2	2.5
4	100	40 to 1 250	300	2	4
–	125	60 to 1 950	450	5	7
6	150	90 to 2 650	600	5	12
8	200	155 to 4 850	1 200	10	15
10	250	250 to 7 500	1 500	15	30
12	300	350 to 10 600	2 400	25	45
14	350	500 to 15 000	3 600	30	60
15	375	600 to 19 000	4 800	50	60
16	400	600 to 19 000	4 800	50	60
18	450	800 to 24 000	6 000	50	90
20	500	1 000 to 30 000	7 500	75	120
24	600	1 400 to 44 000	10 500	100	180
28	700	1 900 to 60 000	13 500	125	210
30	750	2 150 to 67 000	16 500	150	270
32	800	2 450 to 80 000	19 500	200	300
36	900	3 100 to 100 000	24 000	225	360
40	1 000	3 800 to 125 000	30 000	250	480
42	–	4 200 to 135 000	33 000	250	600
48	1 200	5 500 to 175 000	42 000	400	600
54	–	9 to 300 Mgal/day	75 Mgal/day	0.0005 Mgal	1.3 Mgal/day
–	1 400	10 to 340 Mgal/day	85 Mgal/day	0.0005 Mgal	1.3 Mgal/day
60	–	12 to 380 Mgal/day	95 Mgal/day	0.0005 Mgal	1.3 Mgal/day
–	1 600	13 to 450 Mgal/day	110 Mgal/day	0.0008 Mgal	1.7 Mgal/day
66	–	14 to 500 Mgal/day	120 Mgal/day	0.0008 Mgal	2.2 Mgal/day
72	1 800	16 to 570 Mgal/day	140 Mgal/day	0.0008 Mgal	2.6 Mgal/day
78	–	18 to 650 Mgal/day	175 Mgal/day	0.0010 Mgal	3.0 Mgal/day
–	2 000	20 to 700 Mgal/day	175 Mgal/day	0.0010 Mgal	2.9 Mgal/day

 To calculate the measuring range, use the *Applicator* sizing tool (→  53)

**Recommended measuring range**

"Flow limit" section (→  29)

**Operable flow range** Over 1000 : 1

**Input signal**

**Status input**

<b>Maximum input values</b>	<ul style="list-style-type: none"> <li>■ DC 30 V</li> <li>■ 6 mA</li> </ul>
<b>Response time</b>	Adjustable: 5 to 200 ms
<b>Input signal level</b>	<ul style="list-style-type: none"> <li>■ Low signal: DC -3 to +5 V</li> <li>■ High signal: DC 12 to 30 V</li> </ul>
<b>Assignable functions</b>	<ul style="list-style-type: none"> <li>■ Off</li> <li>■ Reset totalizers 1-3 separately</li> <li>■ Reset all totalizers</li> <li>■ Flow override</li> </ul>

## Output

**Output signal**

**Current output**

<b>Current output</b>	Can be set as: <ul style="list-style-type: none"> <li>■ 4-20 mA HART (active)</li> <li>■ 0-20 mA (active)</li> </ul>
<b>Maximum output values</b>	<ul style="list-style-type: none"> <li>■ DC 24 V (when idle)</li> <li>■ 22.5 mA</li> </ul>
<b>Load</b>	0 to 700 $\Omega$
<b>Resolution</b>	0.5 $\mu$ A
<b>Damping</b>	Adjustable: 0 to 999 s
<b>Assignable measured variables</b>	<ul style="list-style-type: none"> <li>■ Volume flow</li> <li>■ Conductivity</li> <li>■ Mass flow</li> </ul>

**Pulse/frequency/switch output**

<b>Function</b>	<ul style="list-style-type: none"> <li>■ With the order code for "Output; Input", option <b>H</b>: output 2 can be set as a pulse or frequency output</li> <li>■ With the order code for "Output; Input", option <b>I</b>: output 2 and 3 can be set as a pulse, frequency or switch output</li> </ul>
<b>Version</b>	Passive, open collector
<b>Maximum input values</b>	<ul style="list-style-type: none"> <li>■ DC 30 V</li> <li>■ 250 mA</li> </ul>
<b>Voltage drop</b>	For 25 mA: $\leq$ DC 2 V
<b>Pulse output</b>	
<b>Pulse width</b>	Adjustable: 0.05 to 2000 ms
<b>Maximum pulse rate</b>	10000 Impulse/s
<b>Pulse value</b>	Adjustable
<b>Assignable measured variables</b>	<ul style="list-style-type: none"> <li>■ Volume flow</li> <li>■ Mass flow</li> </ul>
<b>Frequency output</b>	
<b>Output frequency</b>	Adjustable: 0 to 10000 Hz
<b>Damping</b>	Adjustable: 0 to 999 s
<b>Pulse/pause ratio</b>	1:1



<b>Assignable measured variables</b>	<ul style="list-style-type: none"> <li>■ Volume flow</li> <li>■ Conductivity</li> <li>■ Mass flow</li> </ul>
<b>Switch output</b>	
<b>Switching behavior</b>	Binary, conductive or non-conductive
<b>Switching delay</b>	Adjustable: 0 to 100 s
<b>Number of switching cycles</b>	Unlimited
<b>Assignable functions</b>	<ul style="list-style-type: none"> <li>■ Off</li> <li>■ On</li> <li>■ Diagnostic behavior</li> <li>■ Limit value:                             <ul style="list-style-type: none"> <li>- Volume flow</li> <li>- Conductivity</li> <li>- Mass flow</li> <li>- Totalizer 1-3</li> </ul> </li> <li>■ Flow direction monitoring</li> <li>■ Status                             <ul style="list-style-type: none"> <li>- Empty pipe detection</li> <li>- Low flow cut off</li> </ul> </li> </ul>

**Signal on alarm**

Depending on the interface, failure information is displayed as follows:

**Current output**

*4-20 mA*

<b>Failure mode</b>	Selectable (as per NAMUR recommendation NE 43): <ul style="list-style-type: none"> <li>■ Minimum alarm: 3.6 mA</li> <li>■ Maximum alarm: 22 mA</li> <li>■ Adjustable value: 3.59 to 22.5 mA</li> </ul>
---------------------	--

*0-20 mA*

<b>Failure mode</b>	Choose from: <ul style="list-style-type: none"> <li>■ Maximum alarm: 22 mA</li> <li>■ Adjustable value: 0 to 22.5 mA</li> </ul>
---------------------	---

**HART**

<b>Device diagnostics</b>	Device condition can be read out via HART Command 48
---------------------------	--

**Pulse/frequency/switch output**

<b>Pulse output</b>	
<b>Failure mode</b>	Choose from: <ul style="list-style-type: none"> <li>■ Actual value</li> <li>■ No pulses</li> </ul>
<b>Frequency output</b>	
<b>Failure mode</b>	Choose from: <ul style="list-style-type: none"> <li>■ Actual value</li> <li>■ Defined value: 0 to 12 500 Hz</li> <li>■ 0 Hz</li> </ul>
<b>Switch output</b>	
<b>Failure mode</b>	Choose from: <ul style="list-style-type: none"> <li>■ Current status</li> <li>■ Open</li> <li>■ Closed</li> </ul>

**Local display**

<b>Plain text display</b>	With information on cause and remedial measures
<b>Backlight</b>	Red backlighting indicates a device error.



Status signal as per NAMUR recommendation NE 107

**Operating tool**

- Via digital communication: HART protocol
- Via service interface

<b>Plain text display</b>	With information on cause and remedial measures
---------------------------	---



Additional information on remote operation (→ 50)

**Web browser**

<b>Plain text display</b>	With information on cause and remedial measures
---------------------------	---

**Low flow cut off**

The switch points for low flow cut off are user-selectable.

**Galvanic isolation**

The following connections are galvanically isolated from each other:

- Inputs
- Outputs
- Voltage supply

**Protocol-specific data****HART**

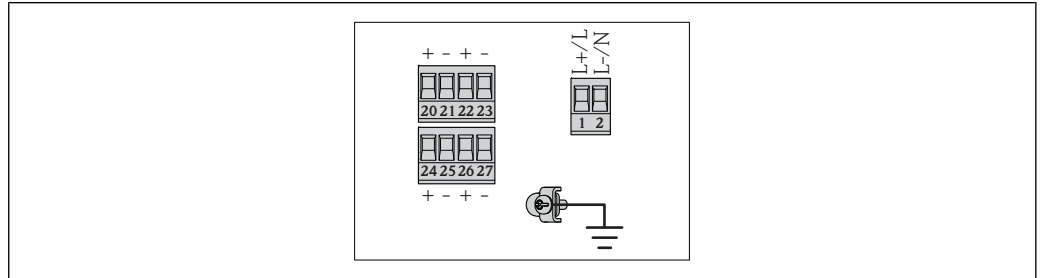
Manufacturer ID	0x11
Device type ID	0x47
HART protocol revision	6.0
Device description files (DTM, DD)	Information and files under: <a href="http://www.endress.com">www.endress.com</a>
HART load	Min. 250 Ω
Dynamic variables	<p>The measured variables can be freely assigned to the dynamic variables.</p> <p><b>Measured variables for PV (primary dynamic variable)</b></p> <ul style="list-style-type: none"> <li>■ Volume flow</li> <li>■ Conductivity</li> <li>■ Mass flow</li> </ul> <p><b>Measured variables for SV, TV, QV (secondary, tertiary and quaternary dynamic variable)</b></p> <ul style="list-style-type: none"> <li>■ Volume flow</li> <li>■ Conductivity</li> <li>■ Mass flow</li> <li>■ Totalizer 1</li> <li>■ Totalizer 2</li> <li>■ Totalizer 3</li> </ul>

## Power supply

### Terminal assignment

### Transmitter

0-20 mA/4-20 mA HART connection version with additional outputs and inputs



A0017112

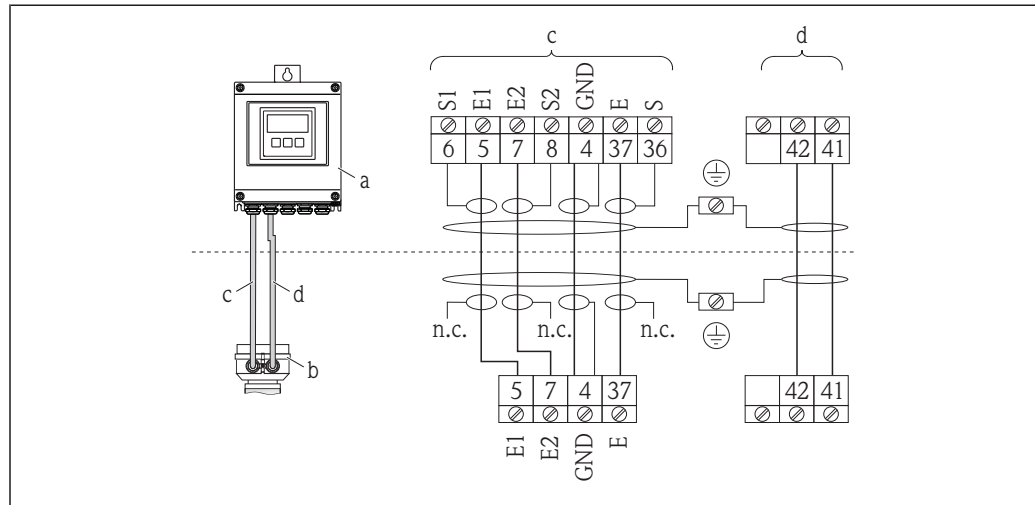
### Supply voltage

Order code for "Power supply"	Terminal numbers	
	1 (L+/L)	2 (L-/N)
Option A	AC 100 to 230 V	
Option B	AC/DC 24 V	

### Signal transmission

Order code for "Output; input"	Terminal numbers							
	Output 1		Output 2		Output 3		Input 4	
	26 (+)	27 (-)	24 (+)	25 (-)	22 (+)	23 (-)	20 (+)	21 (-)
Option H	<ul style="list-style-type: none"> <li>4-20 mA HART (active)</li> <li>0-20 mA (active)</li> </ul>		Pulse/frequency output (passive)		switch output (passive)		-	
Option I	<ul style="list-style-type: none"> <li>4-20 mA HART (active)</li> <li>0-20 mA (active)</li> </ul>		Pulse/frequency/switch output (passive)		Pulse/frequency/switch output (passive)		Status input	

**Remote version**



A0017275

2 Connecting the remote version

- a Transmitter: main electronics module with terminals
- b Sensor: connection module
- c Electrode cable
- d Coil current cable
- n.c. Not connected, insulated cable shields

Terminal No. and cable colors: 6/5 = brown; 7/8 = white; 4 = green; 36/37 = yellow

**Supply voltage**

Order code for "Power supply"	Terminal voltage	Frequency range
Option A: AC 100 to 230 V	AC 85 to 260 V	47 to 63 Hz
Option B: AC/DC 24 V	AC/DC 18 to 30 V	44 to 66 Hz/-

**Power consumption**

Transmitter

Order code for "Power supply"	Maximum power consumption
Option A: AC 100 to 230 V	30 VA
Option B: AC/DC 24 V	30 VA/8 W

**Current consumption**

Transmitter

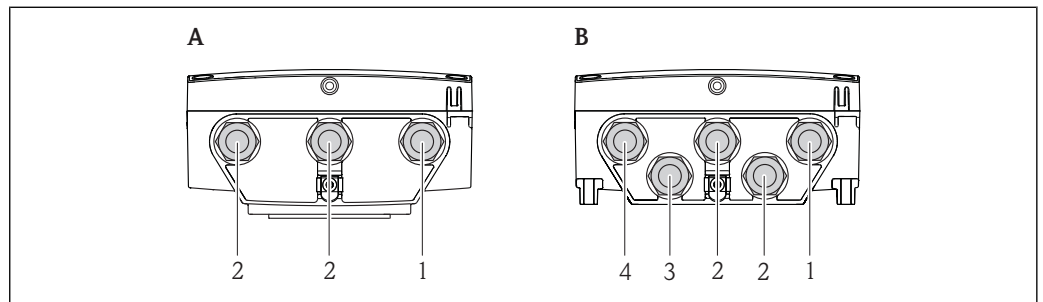
Order code for "Power supply"	Maximum current consumption	Maximum switch-on current
Option A: AC 100 to 230 V	145 mA	25 A (< 5 ms)
Option B: AC/DC 24 V	350 mA	27 A (< 5 ms)

**Power supply failure**

- Totalizers stop at the last value measured.
- Configuration is retained in the plug-in memory (HistoROM DAT).
- Error messages (incl. total operated hours) are stored.

Electrical connection

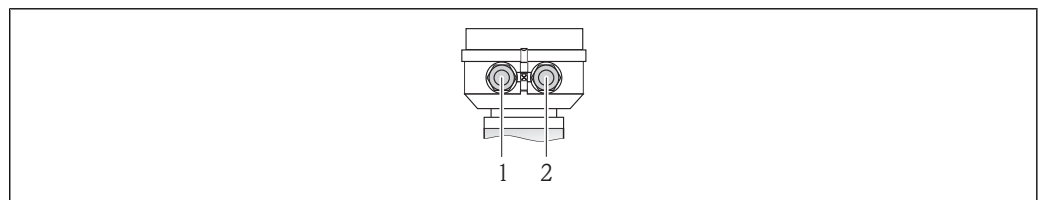
Connecting the transmitter



A0017113

- A Compact version
- B Remote version
- 1 Cable entry for supply voltage
- 2 Cable entry for signal transmission
- 3 Cable entry for coil current cable
- 4 Cable entry for electrode cable

Remote version connection

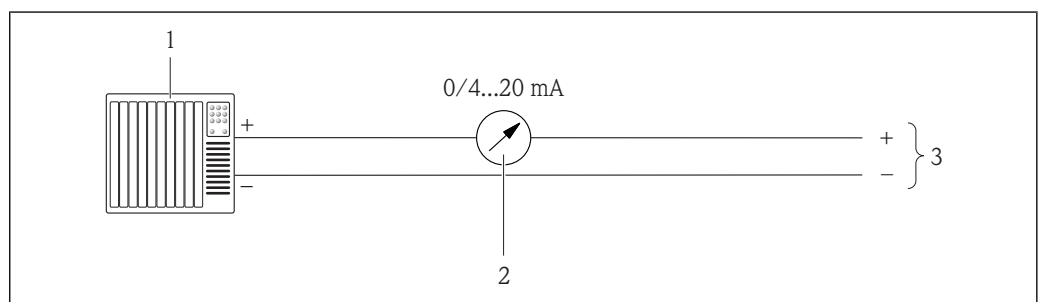


A0017267

- 1 Electrode cable
- 2 Coil current cable

- Fix the cable run or route it in an armored conduit.  
Cable movements can influence the measuring signal especially in the case of low fluid conductivities.
- Route the cable well clear of electrical machines and switching elements.
- Ensure potential equalization between sensor and transmitter (→ 15).

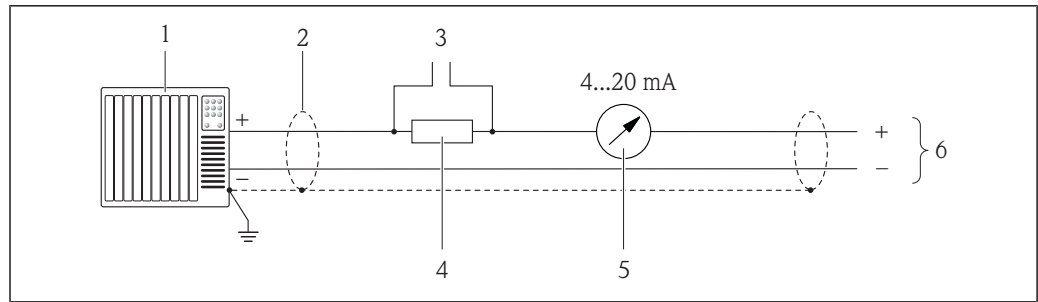
Connection examples



A0017162

3 Connection example for 0-20 mA current output (active) and 4-20 mA current output (active)

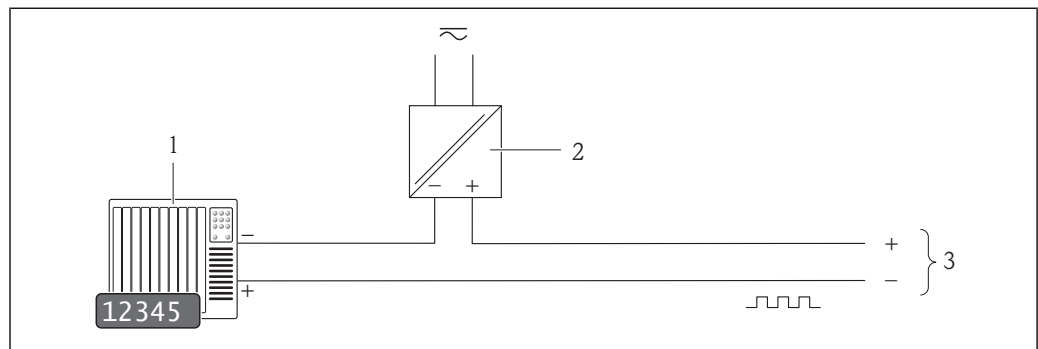
- 1 Automation system with current input (e.g. PLC)
- 2 Analog display unit: observe maximum load (→ 8)
- 3 Transmitter



A0016800

4 Connection example for 4-20 mA HART current output (active)

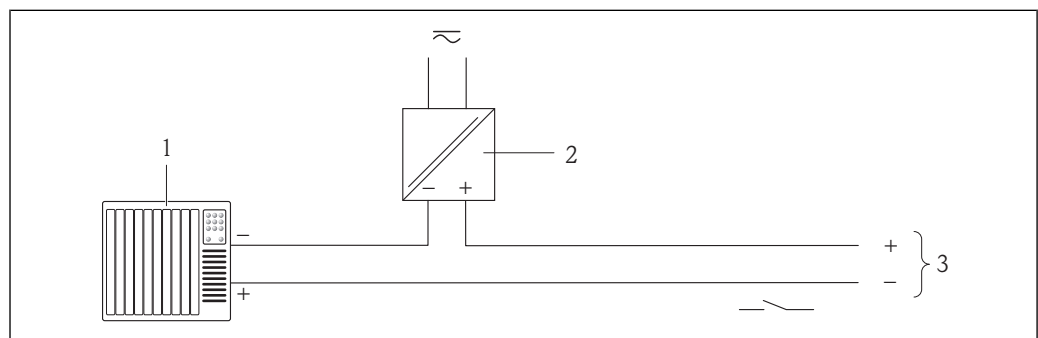
- 1 Automation system with current input (e.g. PLC)
- 2 Observe cable specification (→ 18)
- 3 Connection for HART operating devices (→ 50)
- 4 Resistor for HART communication ( $\geq 250 \Omega$ ): observe maximum load (→ 8)
- 5 Analog display unit: observe maximum load (→ 8)
- 6 Transmitter



A0016801

5 Connection example for pulse/frequency output (passive)

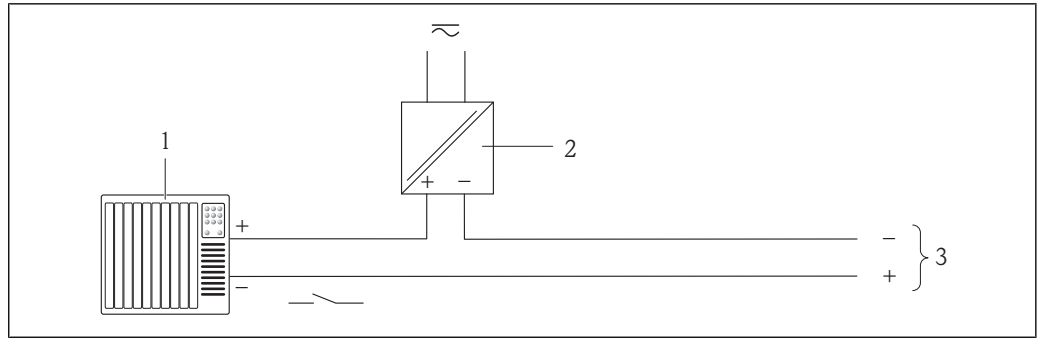
- 1 Automation system with pulse/frequency input (e.g. PLC)
- 2 Voltage supply
- 3 Transmitter: observe input values (→ 8)



A0016802

6 Connection example for switch output (passive)

- 1 Automation system with switch input (e.g. PLC)
- 2 Voltage supply
- 3 Transmitter: observe input values (→ 8)



7 Connection example for status input

- 1 Automation system with status output (e.g. PLC)
- 2 Voltage supply
- 3 Transmitter: observe input values (→ 8)

A0017163

**Potential equalization**

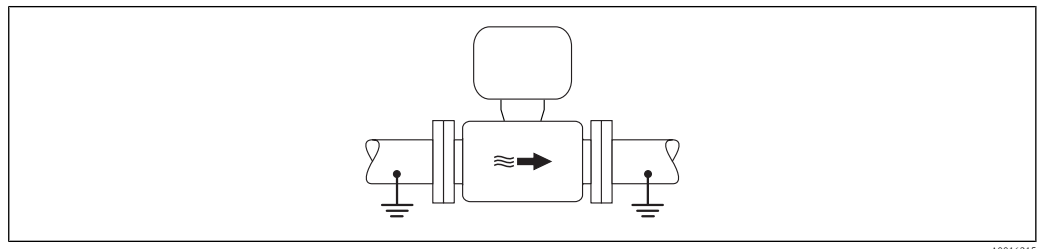
**Requirements**

Please consider the following to ensure correct measurement:

- Same electrical potential for the fluid and sensor
- Company-internal grounding concepts
- Pipe material and grounding

**Connection examples for standard situations**

*Metal, grounded pipe*



8 Potential equalization via measuring tube

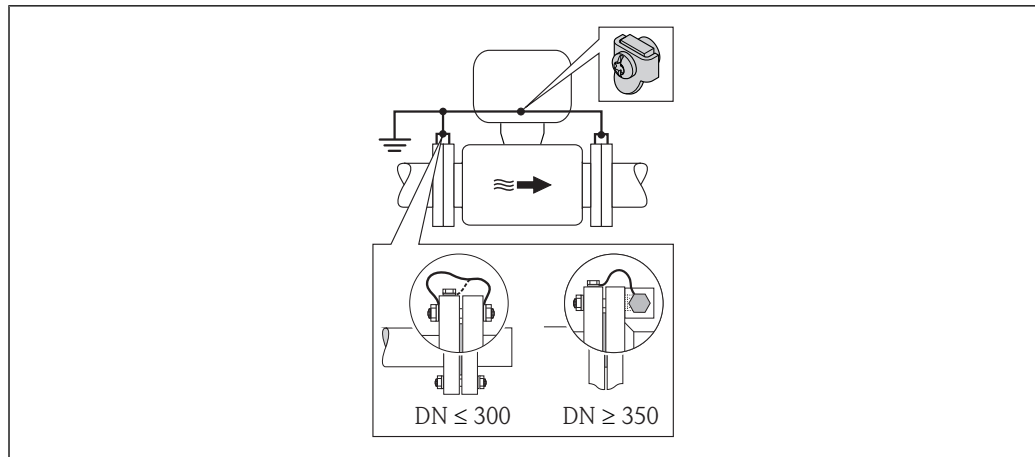
A0016315

**Connection example in special situations**

*Unlined and ungrounded metal pipe*

This connection method also applies in situations where:

- The customary potential equalization is not used
- Equalizing currents are present



A0016317

9 Potential equalization via ground terminal and pipe flanges

Note the following when installing:

- Connect both sensor flanges to the pipe flange via a ground cable and ground them.
- Connect the connection housing of the transmitter or sensor to ground potential by means of the ground terminal provided for the purpose. To mount the ground cable:
  - If  $DN \leq 300$  (12"): Mount the ground cable directly on the conductive flange coating of the sensor with the flange screws.
  - If  $DN \geq 350$  (14"): Mount the ground cable directly on the metal transport bracket.

<b>Ground cable</b>	Copper wire, at least $6 \text{ mm}^2$ (0.0093 in <sup>2</sup> )
---------------------	--

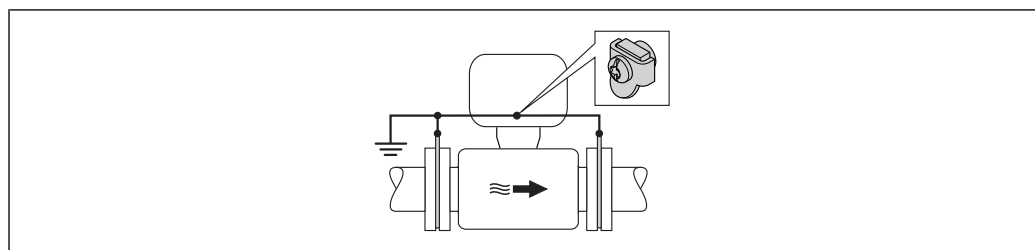
**i** For remote device versions, the ground terminal in the example always refers to the sensor and **not** to the transmitter.

**i** The necessary ground cable can be ordered from Endress+Hauser (→ 52).

#### Plastic pipe or pipe with insulating liner

This connection method also applies in situations where:

- The customary potential equalization is not used
- Equalizing currents are present



A0016318

10 Potential equalization via ground terminal and ground disks

Note the following when installing:

The ground disks must be connected to the ground terminal via the ground cable and be connected to ground potential.

<b>Ground cable</b>	Copper wire, at least $6 \text{ mm}^2$ (0.0093 in <sup>2</sup> )
---------------------	--

**i** For remote device versions, the ground terminal in the example always refers to the sensor and **not** to the transmitter.

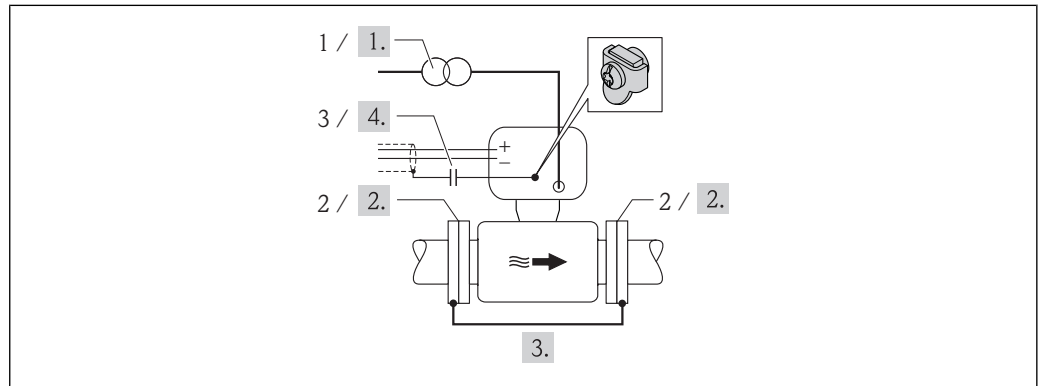


**i** The ground cable and ground disks can be ordered from Endress+Hauser (→ 52).

*Pipe with a cathodic protection unit*

This connection method is only used if the following two conditions are met:

- Metal pipe without liner or pipe with electrically conductive liner
- Cathodic protection is integrated in the personal protection equipment



11 Potential equalization and cathodic protection

- 1 Isolation transformer power supply
- 2 Electrically isolated from the pipe
- 3 Capacitor

<b>Ground cable</b>	Copper wire, at least 6 mm <sup>2</sup> (0.0093 in <sup>2</sup> )
---------------------	---

1. Connect the measuring device to the power supply such that it is floating in relation to the protective ground.
2. Install the sensor in the pipe in a way that provides electrical insulation.
3. Connect the two flanges of the pipe to one another via a ground cable.
4. Guide the shield of the signal lines through a capacitor.

**i** For remote device versions, the ground terminal in the example always refers to the sensor and **not** to the transmitter.

**i** The necessary ground cable can be ordered from Endress+Hauser (→ 52).

**Terminals**

**Transmitter**

- Supply voltage cable: plug-in screw terminals for wire cross-sections 0.5 to 2.5 mm<sup>2</sup> (20 to 14 AWG)
- Signal cable: plug-in screw terminals for wire cross-sections 0.5 to 2.5 mm<sup>2</sup> (20 to 14 AWG)
- Electrode cable: plug-in screw terminals for wire cross-sections 0.5 to 2.5 mm<sup>2</sup> (20 to 14 AWG)
- Coil current cable: screw terminals for wire cross-sections 0.5 to 2.5 mm<sup>2</sup> (20 to 14 AWG)

**Sensor**

Screw terminals for wire cross-sections 0.5 to 2.5 mm<sup>2</sup> (20 to 14 AWG)

**Cable entries**

**Transmitter and sensor**

- Cable gland:
  - For standard cable: M20 × 1.5 with cable Ø 6 to 12 mm (0.24 to 0.47 in)
  - For reinforced cable: M20 × 1.5 with cable Ø 9.5 to 16 mm (0.37 to 0.63 in)
- Thread for cable entry:
  - NPT ½"
  - G ½"
  - M20

**i** If metal cable entries are used, use a grounding plate.

**Cable specification****Permitted temperature range**

- $-40\text{ °C}$  ( $-40\text{ °F}$ )... $\geq 80\text{ °C}$  ( $176\text{ °F}$ )
- Minimum requirement: cable temperature range  $\geq$  ambient temperature + 20 K

**Power supply cable**

Standard installation cable is sufficient.

**Signal cable***Current output*

- For 0-20 mA and 4-20 mA: standard installation cable is sufficient.
- For 4-20 mA HART: Shielded cable recommended. Observe grounding concept of the plant.

*Pulse/frequency/switch output*

Standard installation cable is sufficient.

*Status input*

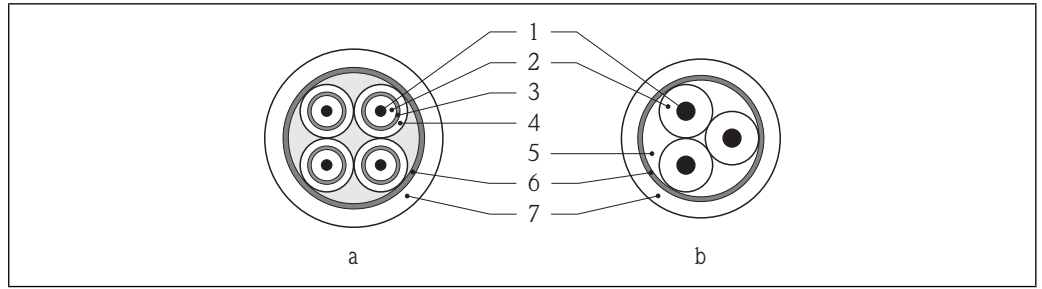
Standard installation cable is sufficient.

**Connecting cable for remote version***Electrode cable*

<b>Standard cable</b>	$3 \times 0.38\text{ mm}^2$ (20 AWG) with common, braided copper shield ( $\varnothing \sim 7\text{ mm}$ (0.28")) and individually shielded cores
<b>Cable for empty pipe detection (EPD)</b>	$4 \times 0.38\text{ mm}^2$ (20 AWG) with common, braided copper shield ( $\varnothing \sim 7\text{ mm}$ (0.28")) and individually shielded cores
<b>Conductor resistance</b>	$\leq 50\ \Omega/\text{km}$ (0.015 $\Omega/\text{ft}$ )
<b>Capacitance: core/shield</b>	$\leq 420\text{ pF/m}$ (128 pF/ft)
<b>Operating temperature</b>	$-20\text{ to }+80\text{ °C}$ ( $-68\text{ to }+176\text{ °F}$ )

*Coil current cable*

<b>Standard cable</b>	$2 \times 0.75\text{ mm}^2$ (18 AWG) with common, braided copper shield ( $\varnothing \sim 7\text{ mm}$ (0.28")) and individually shielded cores
<b>Conductor resistance</b>	$\leq 37\ \Omega/\text{km}$ (0.011 $\Omega/\text{ft}$ )
<b>Capacitance: core/core, shield grounded</b>	$\leq 120\text{ pF/m}$ (37 pF/ft)
<b>Operating temperature</b>	$-20\text{ to }+80\text{ °C}$ ( $-68\text{ to }+176\text{ °F}$ )
<b>Test voltage for cable insulation</b>	$\leq \text{AC } 1433\text{ V r.m.s. } 50/60\text{ Hz}$ or $\geq \text{DC } 2026\text{ V}$



A0003194

12 Cable cross-section

- a Electrode cable
- b Coil current cable
- 1 Core
- 2 Core insulation
- 3 Core shield
- 4 Core jacket
- 5 Core reinforcement
- 6 Cable shield
- 7 Outer jacket

- i** A connecting cable can be ordered from Endress+Hauser for IP68:
  - Pre-terminated cables that are already connected to the sensor.
  - Pre-terminated cables, where the cables are connected by the customer onsite (incl. tools for sealing the connection compartment)

*Reinforced connecting cable*

Use in the following situations:

- When laying the cable directly in the ground
- Where there is a risk of damage from rodents
- If using the device below IP68 degree of protection

- i** The reinforced connecting cable with an additional, reinforcing metal braid can be ordered from Endress +Hauser (→ 52).

*Operation in zones of severe electrical interference*

The measuring system meets the general safety requirements (→ 51) and EMC specifications (→ 26).

Grounding is by means of the ground terminal provided for the purpose inside the connection housing. The stripped and twisted lengths of cable shield to the ground terminal must be as short as possible.

## Performance characteristics

**Reference operating conditions**

**To DIN EN 29104**

- Fluid temperature:  $+28 \pm 2 \text{ }^\circ\text{C}$  ( $+82 \pm 4 \text{ }^\circ\text{F}$ )
- Ambient temperature range:  $+22 \pm 2 \text{ }^\circ\text{C}$  ( $+72 \pm 4 \text{ }^\circ\text{F}$ )
- Warm-up period: 30 min

**Installation**

- Inlet run  $> 10 \times \text{DN}$
- Outlet run  $> 5 \times \text{DN}$
- Sensor and transmitter grounded.
- The sensor is centered in the pipe.

- i** To calculate the measuring range, use the *Applicator* sizing tool (→ 53)

**Maximum measured error**

**Accuracy of outputs**

o.r. = of reading; o.f.s. = of full scale value

The outputs have the following base accuracy specifications.

Current output

<b>Accuracy</b>	Max. $\pm 0.05\%$ o.f.s. or $\pm 5 \mu\text{A}$
-----------------	---

Pulse/frequency output


<b>Accuracy</b>	Max. $\pm 50$ ppm o.r.
-----------------	------------------------

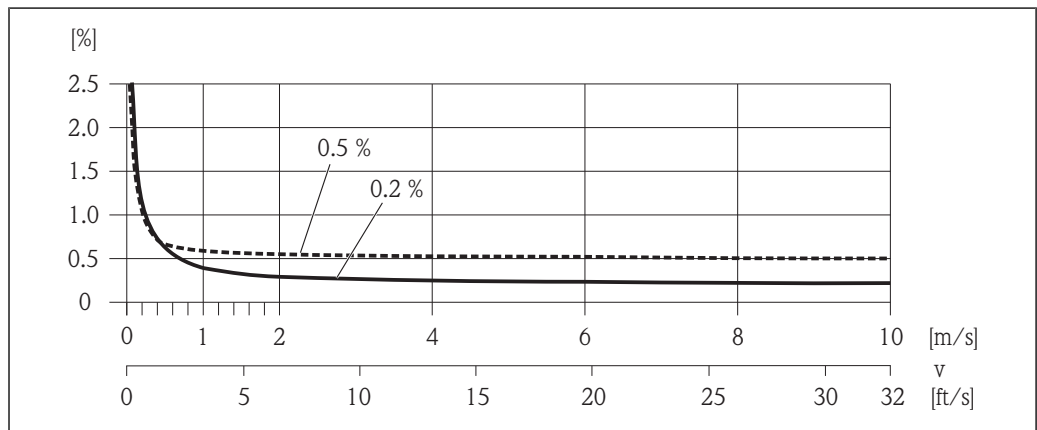
**Error limits under reference operating conditions**

o.r. = of reading

Pulse output

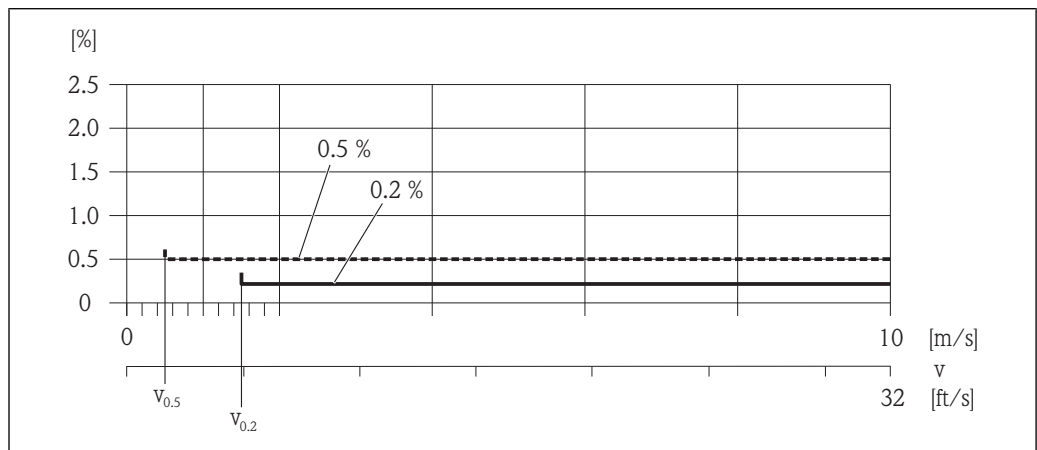
- $\pm 0.5\%$  o.r.  $\pm 1$  mm/s (0.04 in/s)
- Optional:  $\pm 0.2\%$  o.r.  $\pm 2$  mm/s (0.08 in/s)

 Fluctuations in the supply voltage do not have any effect within the specified range.



A0005531

 13 Maximum measured error in % o.r.



A0017051

 14 Flat Spec in % o.r.

Flat Spec flow values 0.5 %

Nominal diameter		$v_{0.5}$	
[mm]	[in]	[m/s]	[ft/s]
25 to 600	1 to 24	0.5	1.64

Flat Spec flow values 0.2 %

Nominal diameter		v <sub>0.2</sub>	
[mm]	[in]	[m/s]	[ft/s]
25 to 600	1 to 24	1.5	4.92

**Repeatability** o.r. = of reading  
max. ±0.1 % o.r. ± 0.5 mm/s (0.02 in/s)

**Influence of ambient temperature** o.r. = of reading; o.f.s. = of full scale value

**Current output**

<b>Temperature coefficient</b>	Typically ±50 ppm/°C o.r. or ±1 µA/°C
--------------------------------	---------------------------------------

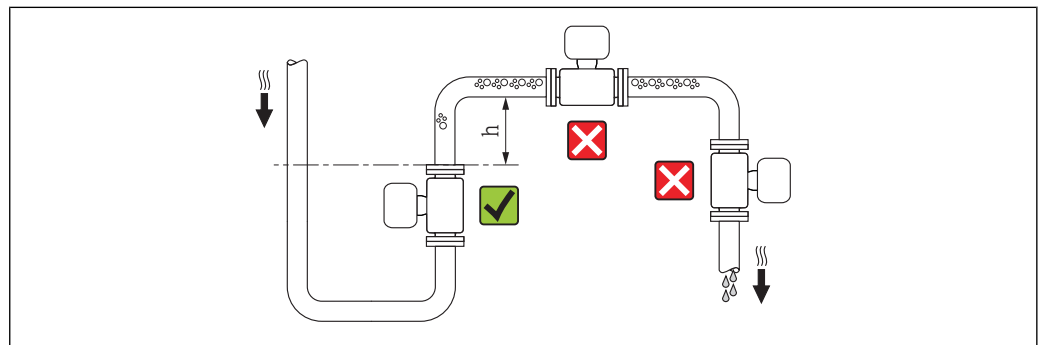
**Pulse/frequency output**

<b>Temperature coefficient</b>	Max.±50 ppm/°C
--------------------------------	----------------

## Installation

No special measures such as supports are necessary. External forces are absorbed by the construction of the device.

**Mounting location** Preferably install the sensor in an ascending pipe, and ensure a sufficient distance to the next pipe elbow:  $h \geq 2 \times DN$





A0017061

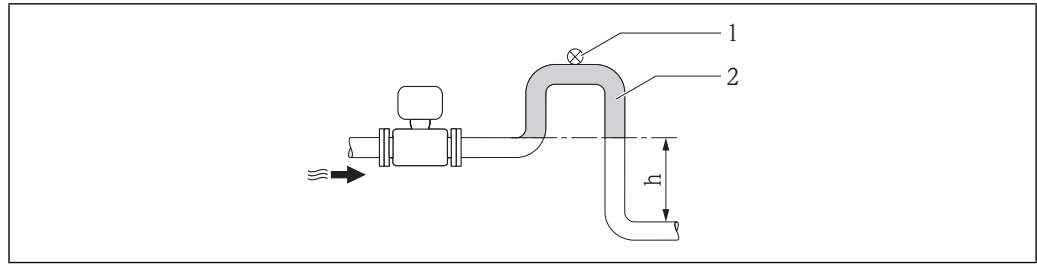
To prevent measuring errors arising from accumulation of gas bubbles in the measuring tube, avoid the following mounting locations in the pipe:

- Highest point of a pipeline.
- Directly upstream of a free pipe outlet in a down pipe.

**Installation in down pipes**

Install a siphon or a vent valve downstream of the sensor in down pipes whose length  $h \geq 5 \text{ m}$  (16.4 ft). This precaution is to avoid low pressure and the consequent risk of damage to the measuring tube. This measure also prevents the system losing prime, which could cause air pockets.

 For information on the liner's resistance to partial vacuum (→  29)



A0017064

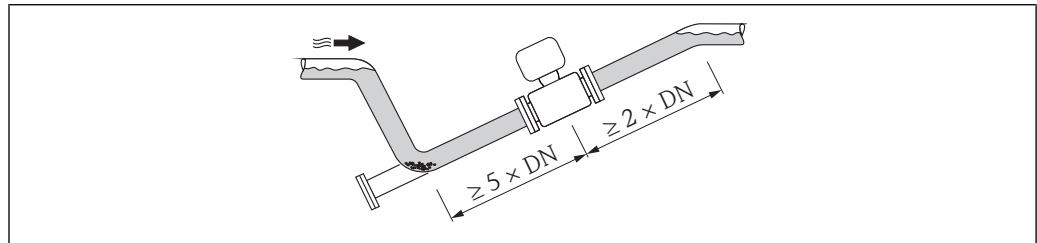
15 Installation in a down pipe

- 1 Vent valve  
2 Pipe siphon  
h Length of down pipe

### Installation in partially filled pipes

A partially filled pipe with a gradient necessitates a drain-type configuration. The empty pipe detection (EPD) function offers additional protection by detecting empty or partially filled pipes.

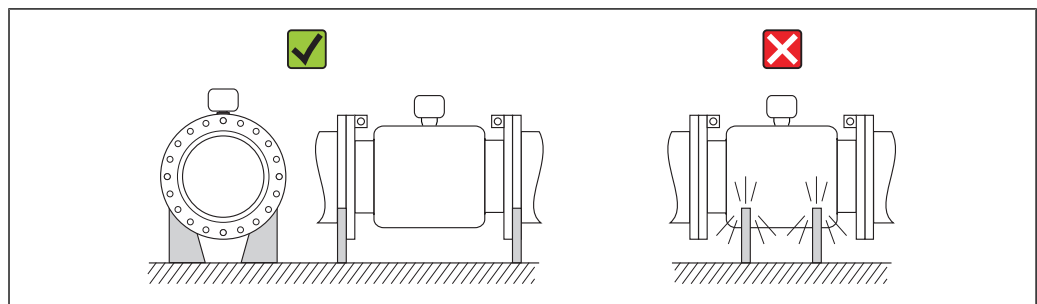
- Do not install the sensor at the lowest point in the drain: risk of solids accumulating.
- It is advisable to install a cleaning valve.



A0017063

### For very heavy sensors

If the nominal diameter  $DN \geq 350$  (14 in), mount the sensor on a foundation of adequate load-bearing strength. Do not support the weight of the sensor on the metal casing as this could damage the metal casing and the internal magnetic coils.



A0016276

### Orientation

The direction of the arrow on the sensor nameplate helps you to install the sensor according to the flow direction (direction of medium flow through the piping).

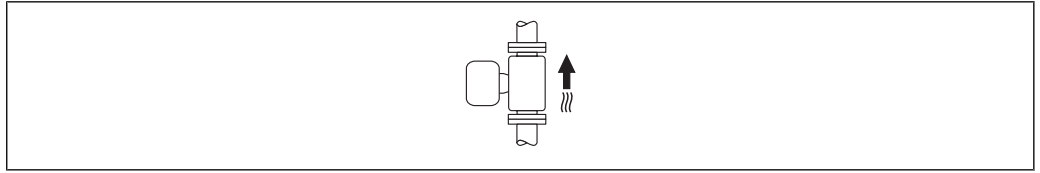
An optimum orientation position helps avoid gas and air accumulations and deposits in the measuring tube.

The measuring device also offers the empty pipe detection function to detect:

- Partially empty measuring pipes
- Outgassing fluids
- Applications with variable process pressures

### Vertical

This is the optimum orientation for self-emptying piping systems and for use in conjunction with empty pipe detection.

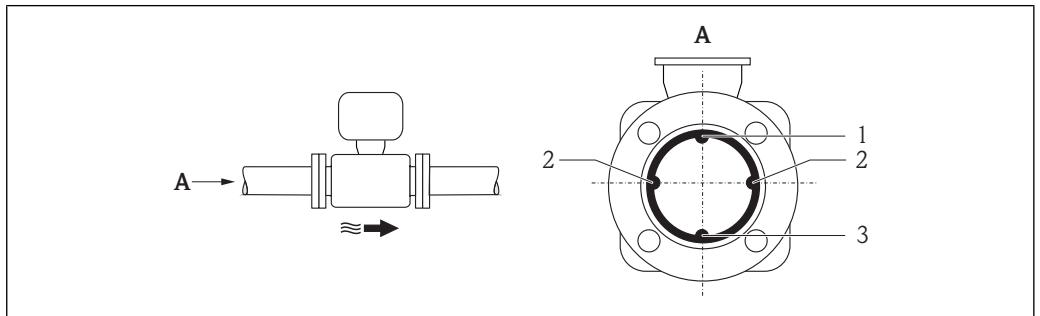


A0015591

**Horizontal**

The measuring electrode plane must be horizontal. This prevents brief insulation of the two measuring electrodes by entrained air bubbles.

**i** With horizontal orientation, empty pipe detection only works if the transmitter housing is pointing upwards as otherwise there is no guarantee that the empty pipe detection function will actually respond to a partially filled or empty measuring tube.



A0016260

16 Horizontal orientation

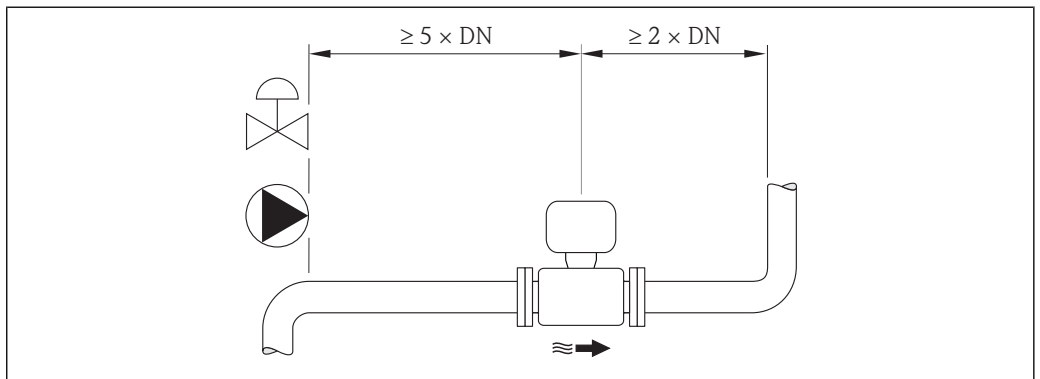
- 1 EPD electrode for empty pipe detection
- 2 Measuring electrodes for signal detection
- 3 Reference electrode for potential equalization

**Inlet and outlet runs**

If possible, install the sensor upstream from fittings such as valves, T-pieces or elbows.

Observe the following inlet and outlet runs to comply with accuracy specifications:

- Inlet run  $\geq 5 \times DN$
- Outlet run  $\geq 2 \times DN$



A0016275

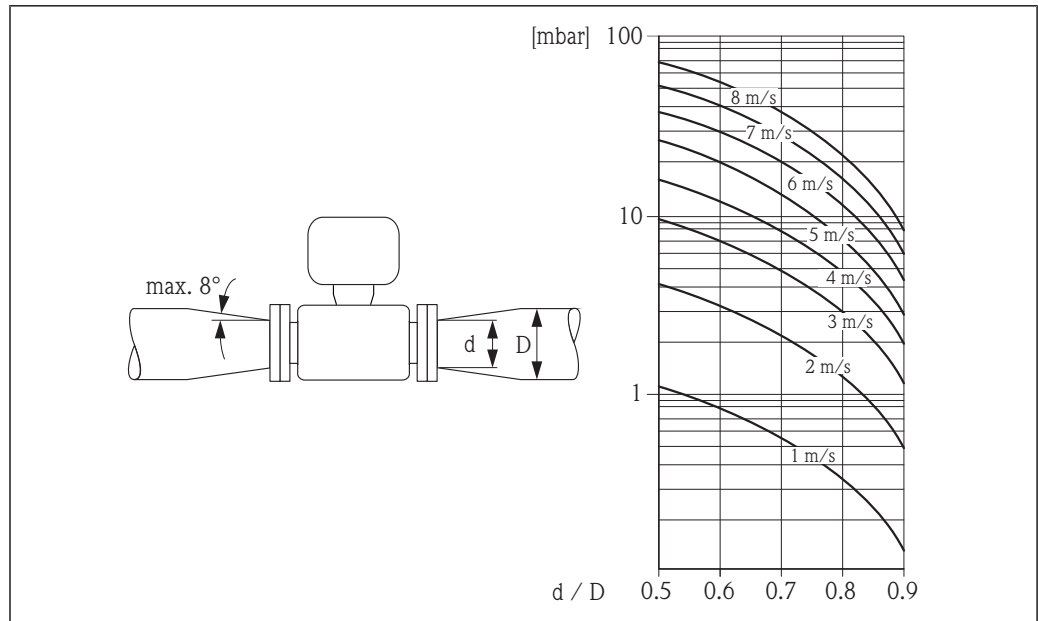
**Adapters**

Suitable adapters to DIN EN 545 (double-flange reducers) can be used to install the sensor in larger-diameter pipes. The resultant increase in the rate of flow improves measuring accuracy with very slow-moving fluids.

The nomogram shown here can be used to calculate the pressure loss caused by reducers and expanders:

- Calculate the ratio of the diameters  $d/D$ .
- From the nomogram read off the pressure loss as a function of flow velocity (downstream from the reduction) and the  $d/D$  ratio.

**i** The nomogram only applies to liquids with a viscosity similar to that of water.

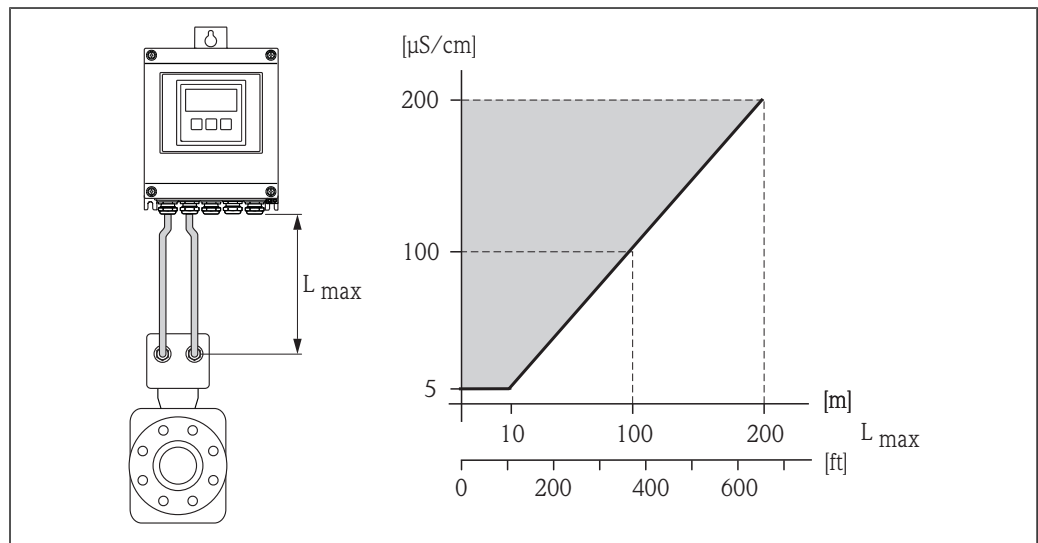


A0016359

**Length of connecting cable**

To ensure correct measuring results when using the remote version, observe the maximum permitted cable length  $L_{max}$ . This length is determined by the conductivity of the fluid.

- If measuring liquids in general: 5  $\mu\text{S}/\text{cm}$
- If measuring demineralized water: 20  $\mu\text{S}/\text{cm}$



A0016539

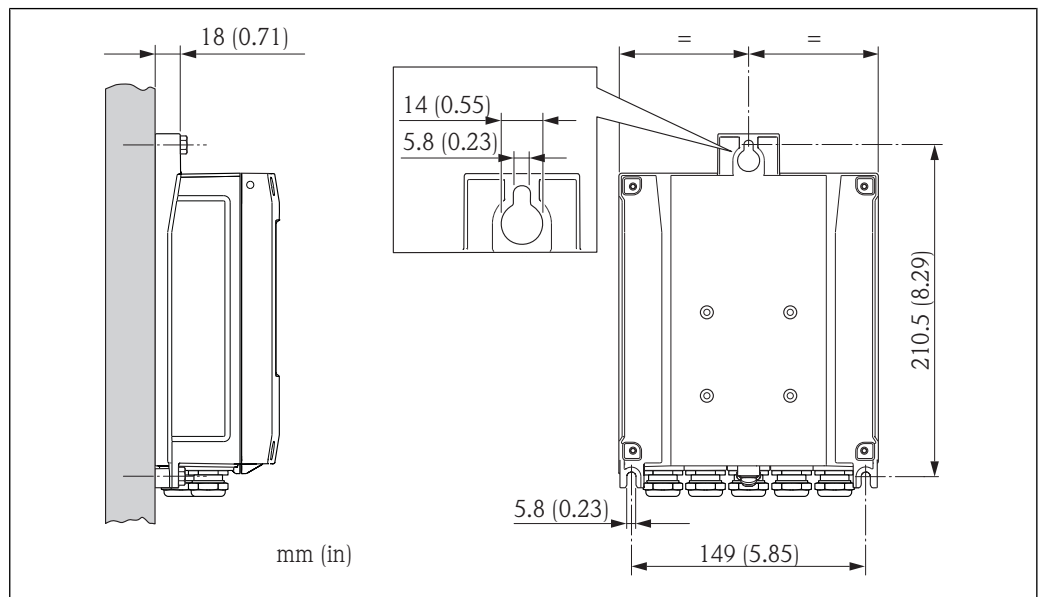
17 Permitted length of connecting cable for remote version

Area shaded gray = permitted range  
 $L_{max}$  = length of connecting cable in [m] ([ft])  
 $[\mu\text{S}/\text{cm}]$  = fluid conductivity



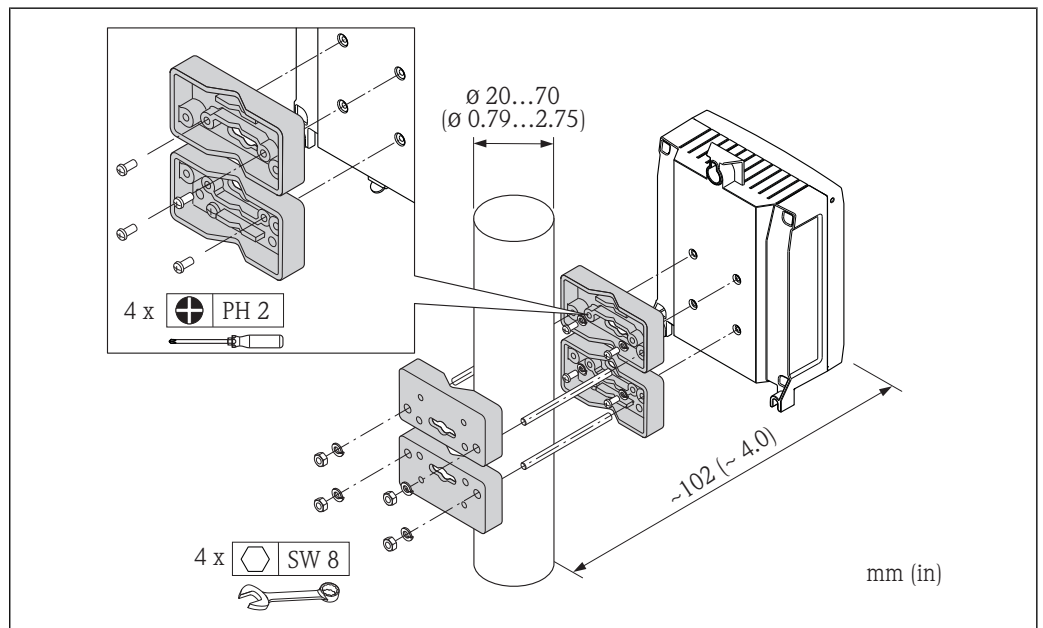
**Installing the wall-mount housing**

**Wall mounting**



A0017138

**Pipe mounting**



A0017135


**i** A separate mounting kit can be ordered from Endress+Hauser for pipe mounting (→ 52).

**Special mounting instructions**

**Weather protection cover**

To ensure that the optional weather protection cover can be easily opened, maintain the following minimum head clearance: 350 mm (13.8 in)

## Environment

<b>Ambient temperature range</b>	Transmitter	-20 to +50 °C (-4 to +122 °F)
	Local display	The readability of the display may be impaired at ambient temperatures below -20 °C (-4 °F).
	Sensor	<ul style="list-style-type: none"> <li>■ Flange material carbon steel: -10 to +60 °C (+14 to +140 °F)</li> <li>■ Flange material stainless steel: -40 to +60 °C (-40 to +140 °F)</li> </ul> Mount the transmitter separately from the sensor if both the ambient and fluid temperatures are high.
	Liner	Do not exceed or fall below the permitted temperature range of the liner (→  27).

If operating outdoors:

- Install the measuring device in a shady location.
- Avoid direct sunlight, particularly in warm climatic regions.
- Avoid direct exposure to weather conditions.



Weather protection covers can be ordered from Endress+Hauser: see "Accessories" section (→  52)

**Storage temperature** The storage temperature corresponds to the operating temperature range of the measuring transmitter and the appropriate measuring sensors.

- Protect the measuring device against direct sunlight during storage in order to avoid unacceptably high surface temperatures.
- Select a storage location where moisture cannot collect in the measuring device as fungus or bacteria infestation can damage the liner.
- If protection caps or protective covers are mounted these should never be removed before installing the measuring device.

**Atmosphere** If a plastic transmitter housing is permanently exposed to certain steam and air mixtures, this can damage the housing.



If you are unsure, please contact your Endress+Hauser Sales Center for clarification.

**Degree of protection**

**Transmitter**

- As standard: IP66/67, type 4X enclosure
- When housing is open: IP20, type 1 enclosure

**Sensor**

- As standard: IP66/67, type 4X enclosure
- Optionally available for remote version:
  - IP66/67, type 4X enclosure; fully welded, with protective varnish EN ISO 12944 C5-M. Suitable for use in corrosive atmospheres.
  - IP68, type 6P enclosure; fully welded, with protective varnish as per EN ISO 12944 C5-M. Suitable for permanent immersion in water ≤ 3 m (10 ft).
  - IP68, type 6P enclosure; fully welded, with protective varnish as per EN ISO 12944 Im2/Im3. Suitable for permanent immersion in saline water ≤ 3 m (10 ft) or in buried applications.

**Shock resistance** Acceleration up to 2 g following IEC 600 68-2-6

**Vibration resistance** Acceleration up to 2 g following IEC 600 68-2-6

**Mechanical load**

- Protect the transmitter housing against mechanical effects, such as shock or impact; the use of the remote version is sometimes preferable.
- Never use the transmitter housing as a ladder or climbing aid.

**Electromagnetic compatibility (EMC)**

- As per IEC/EN 61326 and NAMUR Recommendation 21 (NE 21)
- Complies with emission limits for industry as per EN 55011 (Class A)



Details are provided in the Declaration of Conformity.

## Process

### Medium temperature range

- 0 to +80 °C (+32 to +176 °F) for hard rubber, DN 50 to 2000 (2 to 78")
- -20 to +50 °C (-4 to +122 °F) for polyurethane, DN 25 to 1200 (1 to 48")

### Conductivity

- $\geq 5 \mu\text{S}/\text{cm}$  for liquids in general
- $\geq 20 \mu\text{S}/\text{cm}$  for demineralized water

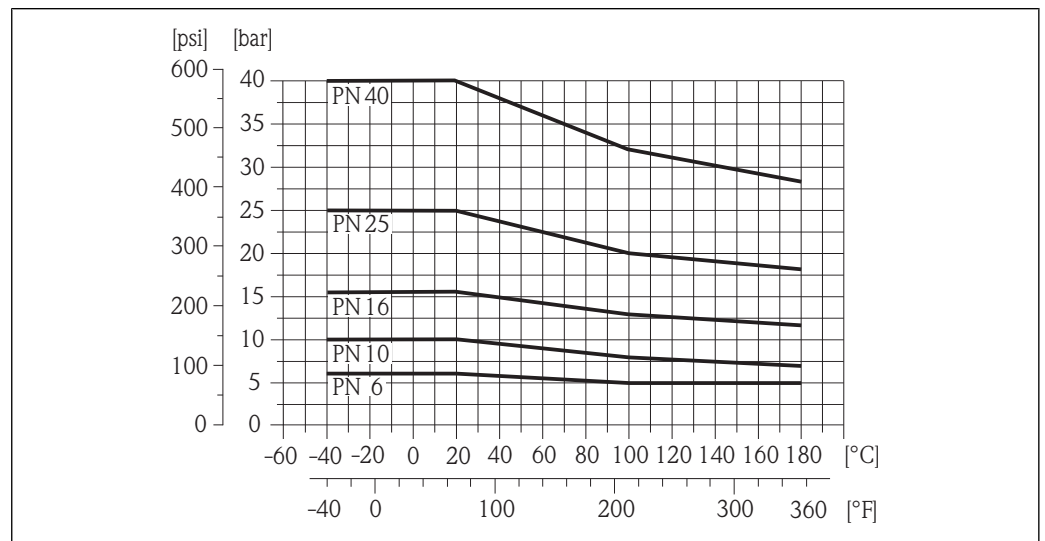


Note that in the case of the remote version, the requisite minimum conductivity also depends on the cable length (→ 24).

### Pressure-temperature ratings

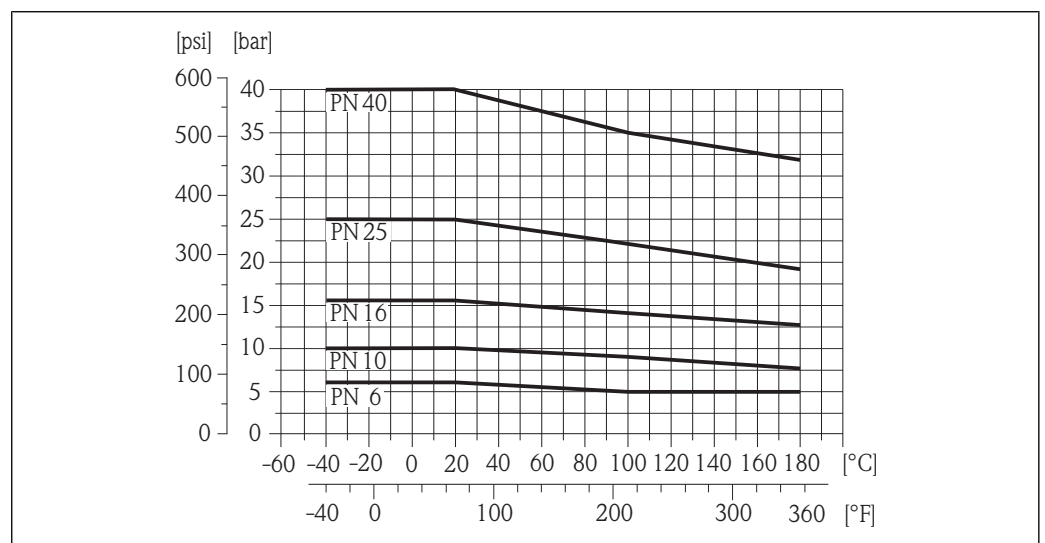
The following material load diagrams refer to the entire device and not just the process connection.

#### Flange connection according to EN 1092-1 (DIN 2501)



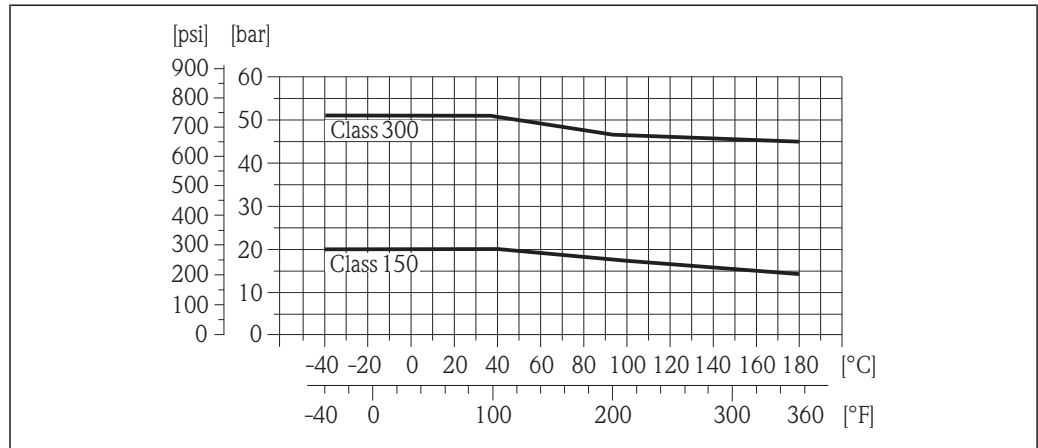
18 Fixed flange PN 6/10/16/25/40, materials C22, FE 410W B and S235JRG2, DN 25 to 2000 (1 to 78")

#### Flange connection according to EN 1092-1 (DIN 2501)



19 Fixed flange PN 6/10/16/25/40, material 1.4571/316L, DN 25 to 2000 (1 to 78")

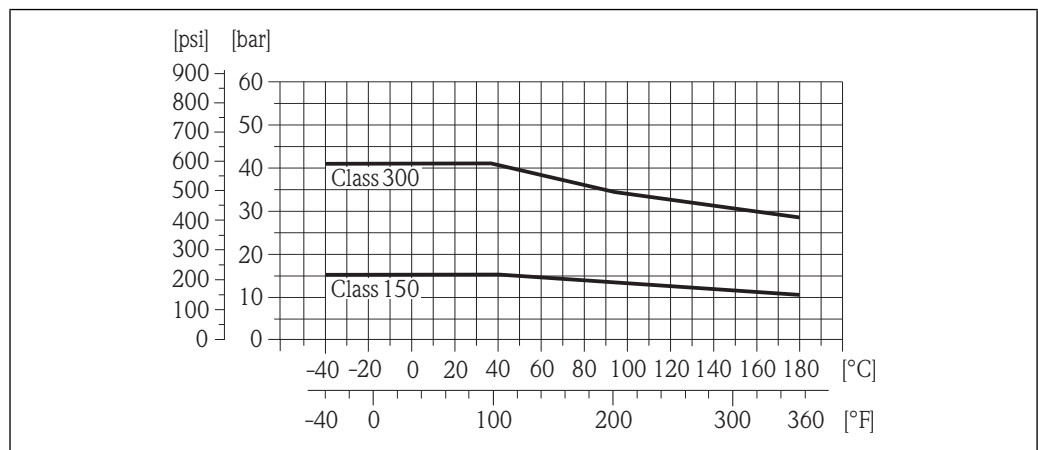
**Flange connection according to ASME B16.5**



A0003226

20 Fixed flange Class 150/300, material A105, DN 25 to 600 (1 to 24")

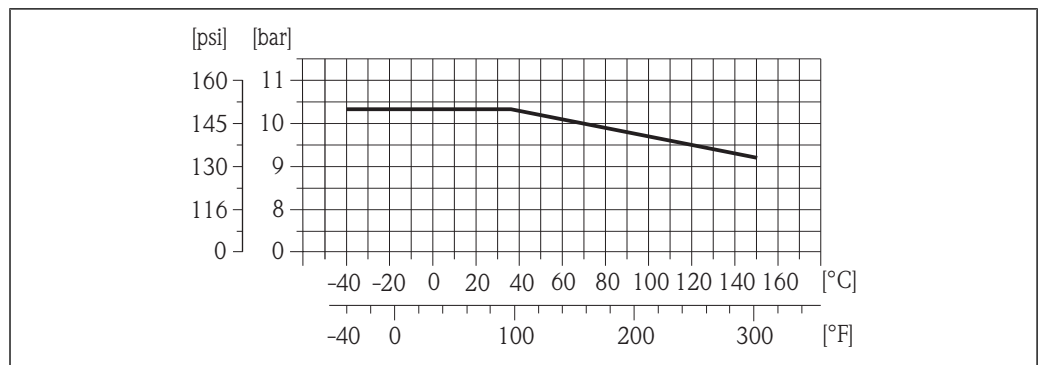
**Flange connection according to ASME B16.5**



A0005307

21 Fixed flange Class 150/300, material 316L, DN 25 to 600 (1 to 24")

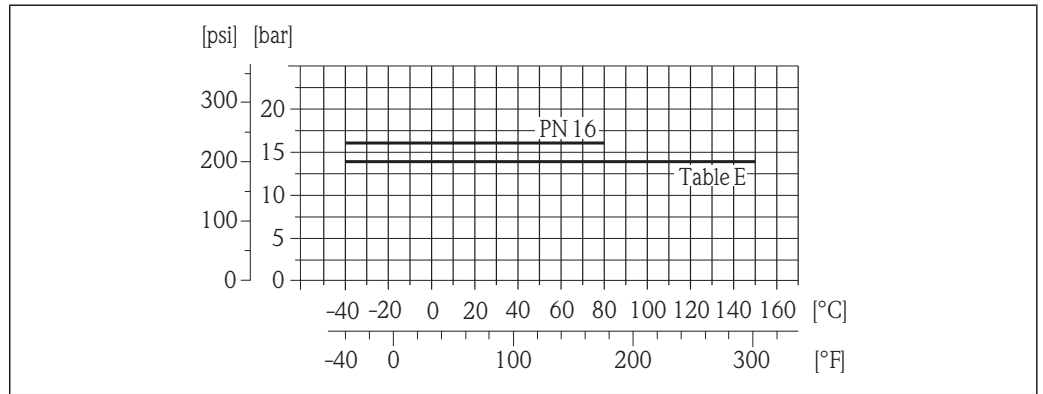
**Flange connection according to AWWA C207**



A0017116

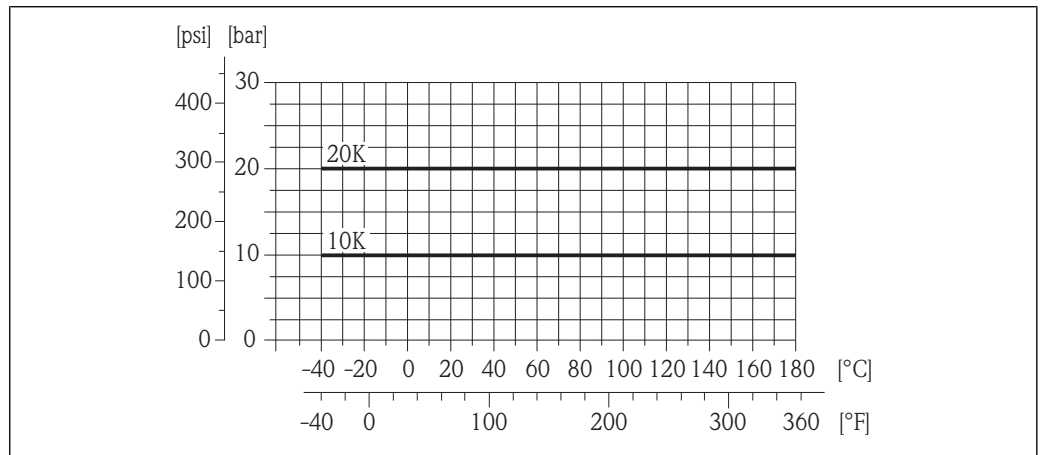
22 Fixed flange Class D, material 1.0425/316L (P265GH), DN 1200 to 1800 (48 to 72")

**Flange connection according to AS 2129 and AS 4087**



23 Fixed flange Table E, materials A105, S235JRG2 and S275JR, DN 50 to 1200 (2 to 48"); fixed flange PN 16, materials A105, S275JR, DN 50 to 1200 (2 to 48")

**Flange connection according to JIS B2220**



24 Fixed flange 10K/20K, materials H11, S235JRG2 and 1.0425/316L, DN 25 to 300 (1 to 12")

**Pressure tightness**

Liner: hard rubber

Nominal diameter		Limit values for absolute pressure in [mbar] ([psi]) for fluid temperatures:		
[mm]	[in]	+25 °C (+77 °F)	+50 °C (+122 °F)	+80 °C (+176 °F)
50...2000	2...78	0 (0)	0 (0)	0 (0)

Liner: polyurethane

Nominal diameter		Limit values for absolute pressure in [mbar] ([psi]) for fluid temperatures:	
[mm]	[in]	+25 °C (+77 °F)	+50 °C (+122 °F)
25...1200	1...48	0 (0)	0 (0)

**Flow limit**

The diameter of the pipe and the flow rate determine the nominal diameter of the sensor. The optimum velocity of flow is between 2 to 3 m/s (6.56 to 9.84 ft/s). Also match the velocity of flow (v) to the physical properties of the fluid:


- $v < 2$  m/s (6.56 ft/s): for abrasive fluids (e.g. potter's clay, lime milk, ore slurry)
- $v > 2$  m/s (6.56 ft/s): for fluids producing buildup (e.g. wastewater sludges)

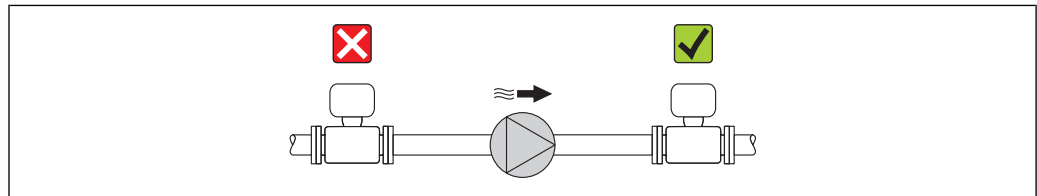
For an overview of the measuring range full scale values, see the "Measuring range" section (→ 6)

**Pressure loss**

- No pressure loss occurs if the sensor is installed in a pipe with the same nominal diameter.
- Pressure losses for configurations incorporating adapters according to DIN EN 545 (→ 23)

**System pressure**

- Never install the sensor on the pump suction side in order to avoid the risk of low pressure, and thus damage to the liner.
- Furthermore, install pulse dampers if reciprocating, diaphragm or peristaltic pumps are used.
-  For information on the liner's resistance to partial vacuum (→ 29)
- For information on the measuring system's resistance to vibration and shock (→ 26), (→ 26)

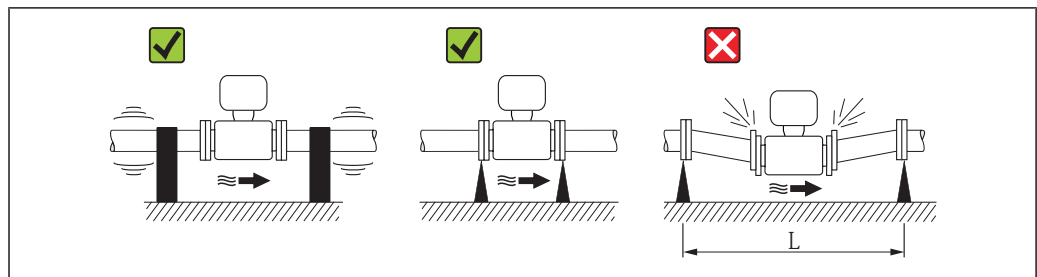


A0015594


**Vibrations**

In the event of very strong vibrations, the pipe and sensor must be supported and fixed. It is also advisable to mount the sensor and transmitter separately.

-  For information on the permitted resistance to vibration and shock (→ 26), (→ 26)



A0016266

 25 Measures to prevent vibration of the device

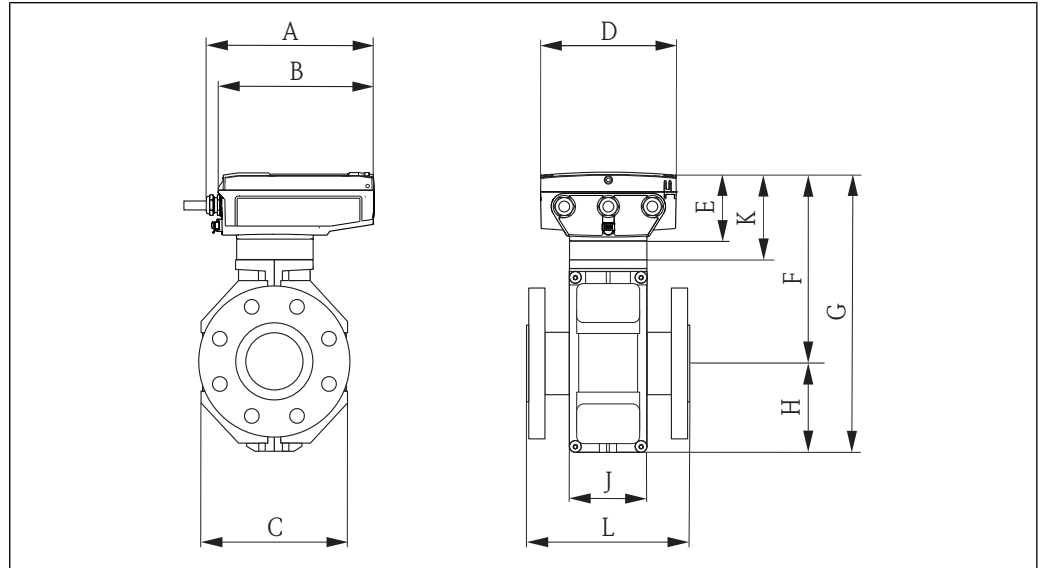
$L > 10 \text{ m (33 ft)}$

## Mechanical construction

### Design, dimensions

#### Compact version

Order code for "Housing", option M "Compact, polycarbonate" with DN 25 to 300 (1 to 12")



A0017150

#### Dimensions in SI units

DN <sup>1)</sup>	L <sup>2)</sup>	A	B	C	D	E	F	G	H	J	K
[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]
25	200	216	189	120	165	84	196	280	84	94	109
32	200	216	189	120	165	84	196	280	84	94	109
40	200	216	189	120	165	84	196	280	84	94	109
50	200	216	189	120	165	84	196	280	84	94	109
65	200	216	189	180	165	84	221	330	109	94	109
80	200	216	189	180	165	84	221	330	109	94	109
100	250	216	189	180	165	84	221	330	109	94	109
125	250	216	189	260	165	84	261	411	150	140	109
150	300	216	189	260	165	84	261	411	150	140	109
200	350	216	189	324	165	84	286	466	180	156	109
250	450	216	189	400	165	84	311	516	205	166	109
300	500	216	189	460	165	84	336	566	230	166	109

- 1) EN (DIN), AS, JIS; For flanges according to AS, only nominal diameters DN 80, 100 and 150 to 300 are available.  
 2) The length is independent of the selected pressure rating. Length in accordance with DVGW/ISO.

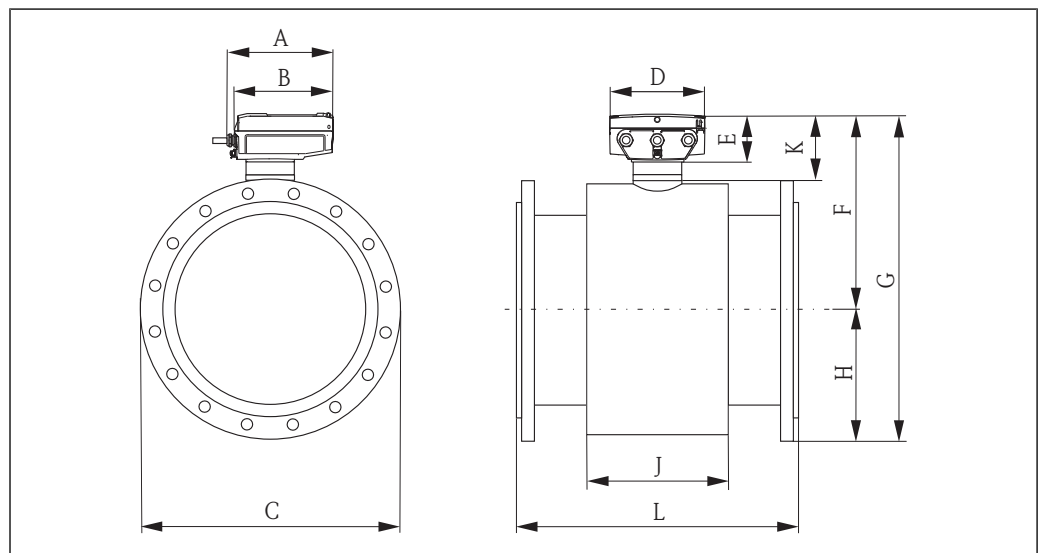
#### Dimensions in US units

DN <sup>1)</sup>	L <sup>2)</sup>	A	B	C	D	E	F	G	H	J	K
[in]	[in]	[in]	[in]	[in]	[in]	[in]	[in]	[in]	[in]	[in]	[in]
1	7.87	8.50	7.44	4.72	6.50	3.31	7.72	11.02	3.31	3.70	4.29
1 ½	7.87	8.50	7.44	4.72	6.50	3.31	7.72	11.02	3.31	3.70	4.29
2	7.87	8.50	7.44	4.72	6.50	3.31	7.72	11.02	3.31	3.70	4.29

DN <sup>1)</sup>	L <sup>2)</sup>	A	B	C	D	E	F	G	H	J	K
[in]	[in]	[in]	[in]	[in]	[in]	[in]	[in]	[in]	[in]	[in]	[in]
3	7.87	8.50	7.44	7.09	6.50	3.31	8.70	12.99	4.29	3.70	4.29
4	9.84	8.50	7.44	7.09	6.50	3.31	8.70	12.99	4.29	3.70	4.29
6	11.8	8.50	7.44	10.2	6.50	3.31	10.28	16.18	5.91	5.51	4.29
8	13.8	8.50	7.44	12.8	6.50	3.31	11.26	18.35	7.09	6.14	4.29
10	17.7	8.50	7.44	15.8	6.50	3.31	12.24	20.31	8.07	6.14	4.29
12	19.7	8.50	7.44	18.1	6.50	3.31	13.23	22.28	9.06	6.54	4.29

- 1) ASME  
 2) The length is independent of the selected pressure rating. Length in accordance with DVGW/ISO.

Order code for "Housing", option M "Compact, polycarbonate" with DN 350 to 2000 (14 to 78")



A0017154

Dimensions in SI units

DN <sup>1)</sup>	L <sup>2)</sup>	A	B	C	D	E	F	G	H	J	K
[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]
350	550	216	189	276	165	84	405.5	687.5	282	564	119
375	600	216	189	276	165	84	431.5	739.5	308	616	119
400	600	216	189	276	165	84	431.5	739.5	308	616	119
450	650	216	189	292	165	84	456.5	789.5	333	666	119
500	650	216	189	292	165	84	482	840.5	358.5	717	119
600	780	216	189	402	165	84	534	944.5	410.5	821	119
700	910	216	189	589	165	84	635.5	1147.5	512	1024	119
750	975	216	189	626	165	84	635.5	1147.5	512	1024	119
800	1040	216	189	647	165	84	657	1190.5	533.5	1067	119
900	1170	216	189	785	165	84	733.5	1343.5	610	1220	119
1000	1300	216	189	862	165	84	809.5	1495.5	686	1372	119
1050	1365	216	189	912	165	84	835.5	1547.5	712	1424	119
1200	1560	216	189	992	165	84	934.5	1745.5	811	1622	119
1350	1755	216	189	1252	165	84	1035.5	1947.5	912	1824	119



DN <sup>1)</sup>	L <sup>2)</sup>	A	B	C	D	E	F	G	H	J	K
[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]
1400	1820	216	189	1252	165	84	1110.5	2097.5	987	1974	119
1500	1950	216	189	1392	165	84	1134.5	2145.5	1011	2022	119
1600	2080	216	189	1482	165	84	1179.5	2235.5	1056	2112	119
1650	2145	216	189	1482	165	84	1216.5	2309.5	1093	2186	119
1800	2340	216	189	1632	165	84	1311.5	2499.5	1188	2376	119
2000	2600	216	189	1732	165	84	1361.5	2599.5	1238	2476	119

- 1) EN (DIN), AS; For flanges according to AS, only nominal diameters DN 350, 400, 500 and 600 are available.  
 2) The length is independent of the selected pressure rating. Length in accordance with DVGW/ISO.

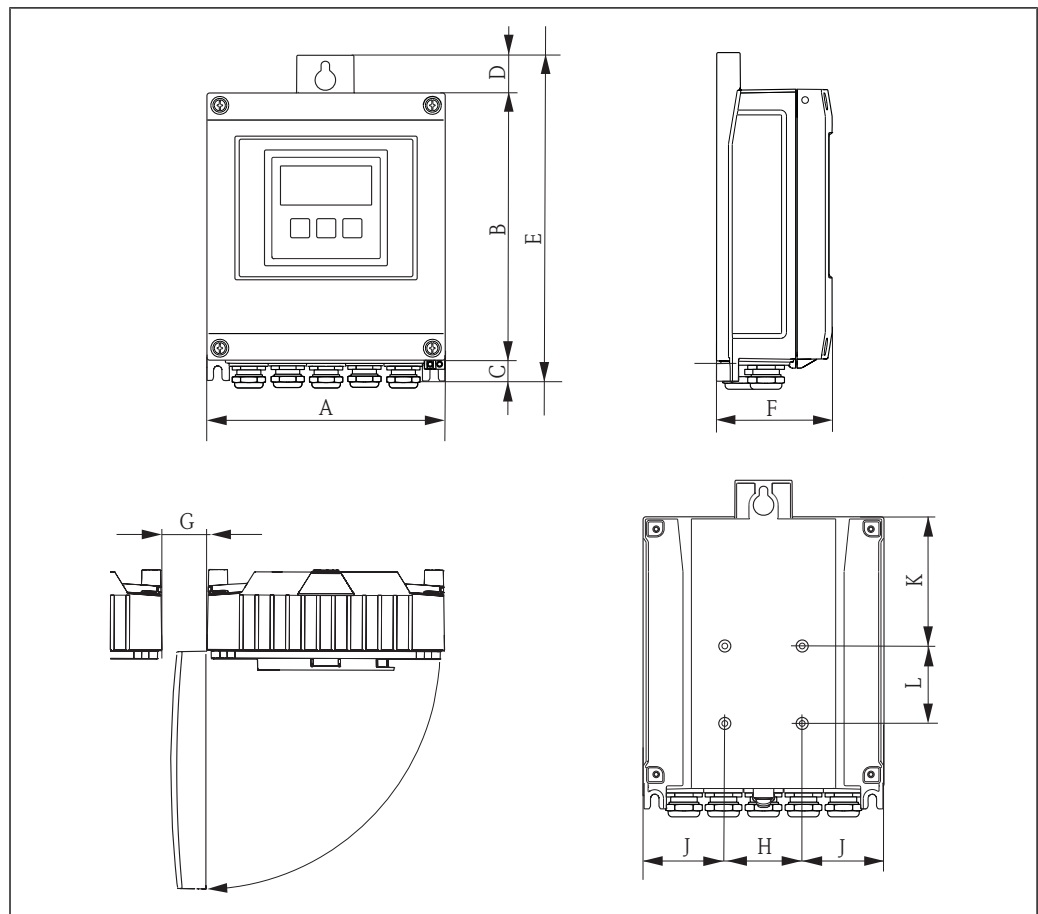
*Dimensions in US units*

DN <sup>1)</sup>	L <sup>2)</sup>	A	B	C	D	E	F	G	H	J	K
[in]	[in]	[in]	[in]	[in]	[in]	[in]	[in]	[in]	[in]	[in]	[in]
14	21.6	8.50	7.44	10.9	6.50	3.31	16.0	27.1	11.1	22.2	4.69
15	23.6	8.50	7.44	10.9	6.50	3.31	17.0	29.1	12.1	24.2	4.69
16	23.6	8.50	7.44	10.9	6.50	3.31	17.0	29.1	12.1	24.2	4.69
18	25.6	8.50	7.44	11.5	6.50	3.31	18.0	31.1	13.1	26.2	4.69
20	25.6	8.50	7.44	11.5	6.50	3.31	19.0	33.1	14.1	28.2	4.69
24	30.7	8.50	7.44	15.8	6.50	3.31	21.0	37.2	16.2	32.3	4.69
28	35.8	8.50	7.44	23.2	6.50	3.31	25.0	45.2	20.1	40.3	4.69
30	38.4	8.50	7.44	24.6	6.50	3.31	25.0	45.2	20.1	40.3	4.69
32	40.9	8.50	7.44	25.5	6.50	3.31	25.9	46.9	21.0	42.0	4.69
36	46.0	8.50	7.44	30.9	6.50	3.31	28.9	52.9	24.0	48.0	4.69
40	51.2	8.50	7.44	33.9	6.50	3.31	31.9	58.9	27.0	54.0	4.69
42	53.7	8.50	7.44	35.9	6.50	3.31	32.9	60.9	28.0	56.0	4.69
48	61.4	8.50	7.44	39.0	6.50	3.31	36.8	68.7	31.9	63.8	4.69
54	69.1	8.50	7.44	42.3	6.50	3.31	40.8	76.7	35.9	71.8	4.69
56	71.7	8.50	7.44	49.3	6.50	3.31	43.7	82.6	38.9	77.7	4.69
60	76.8	8.50	7.44	54.8	6.50	3.31	44.7	84.5	39.8	79.6	4.69
64	81.9	8.50	7.44	58.4	6.50	3.31	46.4	88.0	41.6	83.2	4.69
66	84.4	8.50	7.44	58.4	6.50	3.31	47.9	90.9	43.0	86.0	4.69
72	92.1	8.50	7.44	64.2	6.50	3.31	51.6	98.4	46.8	93.5	4.69
78	102.3	8.50	7.44	68.2	6.50	3.31	53.6	102	48.7	97.5	4.69

- 1) ASME, AWWA; flanges ≤ 24 in only available according to ASME, flanges ≥ 28 in only available according to AWWA.  
 2) The length is independent of the selected pressure rating. Length in accordance with DVGW/ISO.

**Transmitter remote version**

Order code for "Housing", option N "Remote, polycarbonate"



A0017148

*Dimensions in SI units*

A	B	C	D	E	F
[mm]	[mm]	[mm]	[mm]	[mm]	[mm]
165	185	15	25	225	80

G	H	J	K	L
[mm]	[mm]	[mm]	[mm]	[mm]
50	53	56	88.5	53

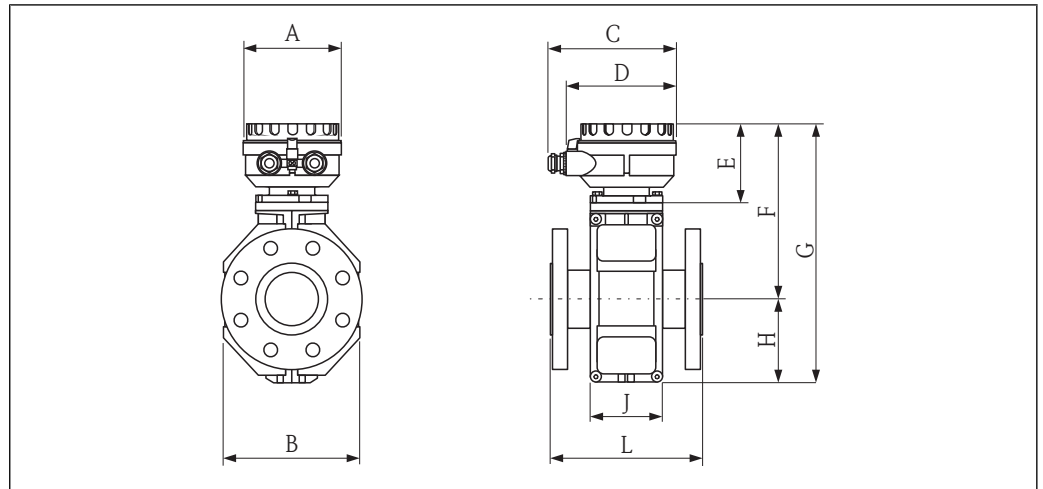
*Dimensions in US units*

A	B	C	D	E	F
[in]	[in]	[in]	[in]	[in]	[in]
6.5	7.28	0.59	0.98	8.86	3.15

G	H	J	K	L
[in]	[in]	[in]	[in]	[in]
1.97	2.09	2.2	3.48	2.09

**Sensor remote version**

DN 25 to 300 (1 to 12")



A0017282

*Dimensions in SI units*

DN <sup>1)</sup>	L <sup>2)</sup>	A	B	C	D	E	F	G	H	J
[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]
25	200	129	120	163	143	102	202	286	84	94
32	200	129	120	163	143	102	202	286	84	94
40	200	129	120	163	143	102	202	286	84	94
50	200	129	120	163	143	102	202	286	84	94
65	200	129	180	163	143	102	227	336	109	94
80	200	129	180	163	143	102	227	336	109	94
100	250	129	180	163	143	102	227	336	109	94
125	250	129	260	163	143	102	267	417	150	140
150	300	129	260	163	143	102	267	417	150	140
200	350	129	324	163	143	102	292	472	180	156
250	450	129	400	163	143	102	317	522	205	156
300	500	129	460	163	143	102	342	572	230	166

- 1) EN (DIN), AS, JIS; For flanges according to AS, only nominal diameters DN 80, 100 and 150 to 300 are available.
- 2) The length is independent of the selected pressure rating. Length in accordance with DVGW/ISO.

*Dimensions in US units*

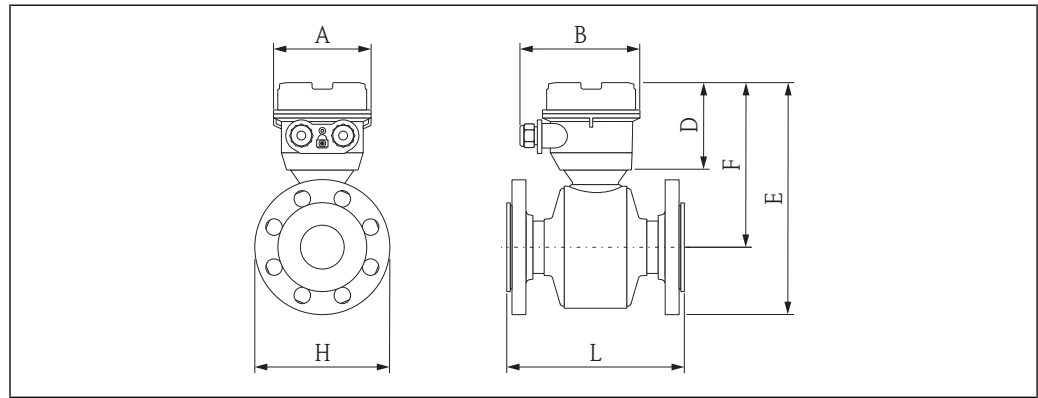
DN <sup>1)</sup>	L <sup>2)</sup>	A	B	C	D	E	F	G	H	J
[in]	[in]	[in]	[in]	[in]	[in]	[in]	[in]	[in]	[in]	[in]
1	7.87	5.08	4.72	6.42	5.63	4.02	7.95	11.3	3.32	3.70
1 ½	7.87	5.08	4.72	6.42	5.63	4.02	7.95	11.3	3.32	3.70
2	7.87	5.08	4.72	6.42	5.63	4.02	7.95	11.3	3.32	3.70
3	7.87	5.08	7.10	6.42	5.63	4.02	8.94	13.2	4.30	3.70
4	9.84	5.08	7.10	6.42	5.63	4.02	8.94	13.2	4.30	3.70
6	11.8	5.08	10.2	6.42	5.63	4.02	10.5	16.4	5.91	5.51
8	13.8	5.08	12.8	6.42	5.63	4.02	11.5	18.6	7.10	6.14

DN <sup>1)</sup>	L <sup>2)</sup>	A	B	C	D	E	F	G	H	J
[in]	[in]	[in]	[in]	[in]	[in]	[in]	[in]	[in]	[in]	[in]
10	17.7	5.08	15.8	6.42	5.63	4.02	12.5	20.6	8.08	6.14
12	19.7	5.08	18.1	6.42	5.63	4.02	13.5	22.5	9.06	6.54

1) ASME

2) The length is independent of the selected pressure rating. Length in accordance with DVGW/ISO.

DN 50 to 300 (2 to 12"), fully welded (IP68)



A0017200

Dimensions in SI units

DN	L	A	B	D	F
[mm]	[mm]	[mm]	[mm]	[mm]	[mm]
50	200	112	138	95.5	189
65	200	112	138	95.5	201.5
80	200	112	138	95.5	206.5
100	250	112	138	95.5	219
125	250	112	138	95.5	232
150	300	112	138	95.5	253.5
200	350	112	138	95.5	279
250	450	112	138	95.5	312.5
300	500	112	138	95.5	337.5

Dimension E										
DN	EN (DIN)				ASME		AS		JIS	
	PN 10	PN 16	PN 25	PN 40	Class 150	Class 300	Table E	PN 16	10K	20K
[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]
50	-	-	-	272	265	272	264	264	267	267
65	-	295	-	295	-	-	-	-	290	290
80	-	307	-	307	302	311	300	300	300	307
100	-	330	-	382	333	346	327	327	325	332
125	-	357	-	367	-	-	-	-	357	367
150	-	396	-	404	393	412	395	395	395	406

Dimension E										
DN	EN (DIN)				ASME		AS		JIS	
	PN 10	PN 16	PN 25	PN 40	Class 150	Class 300	Table E	PN 16	10K	20K
[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]
200	450	450	460	–	450	–	447	447	445	454
250	510	515	525	–	516	–	515	515	513	528
300	560	568	580	–	580	–	565	565	560	578

Dimension H										
DN	EN (DIN)				ASME		AS		JIS	
	PN 10	PN 16	PN 25	PN 40	Class 150	Class 300	Table E	PN 16	10K	20K
[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]
50	–	–	–	165	152.4	165	150	150	155	155
65	–	185	–	185	–	–	–	–	175	175
80	–	200	–	200	190.5	209.6	185	185	185	200
100	–	220	–	325	228.6	254	215	215	210	225
125	–	250	–	270	–	–	–	–	250	270
150	–	285	–	300	279.4	317.5	280	280	280	305
200	340	340	360	–	342.9	–	335	335	330	350
250	395	405	425	–	406.4	–	405	405	400	430
300	445	460	485	–	482.6	–	455	455	445	480

*Dimensions in US units*

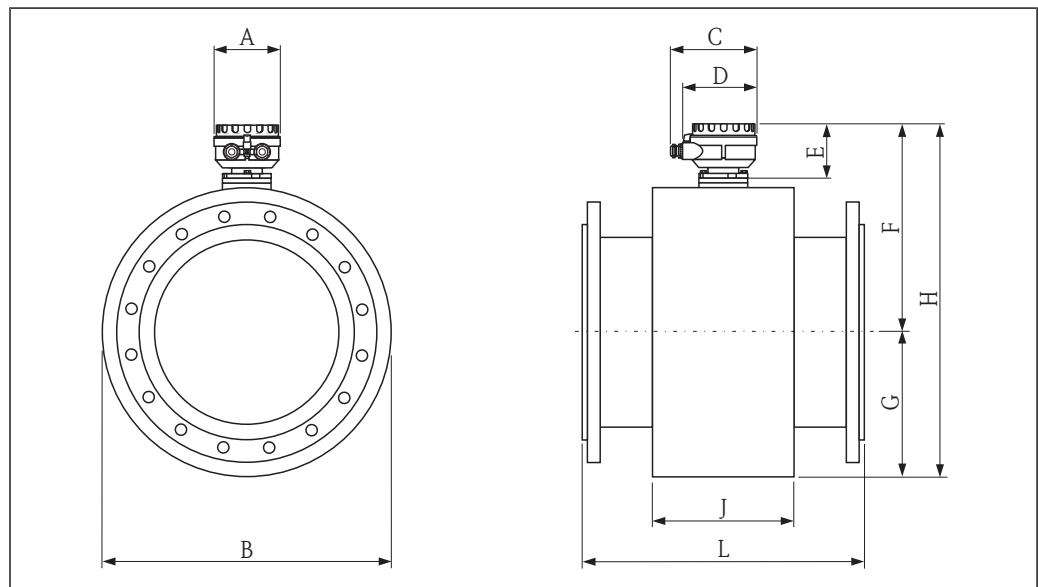
DN	L	A	B	D	F
[in]	[in]	[in]	[in]	[in]	[in]
2	7.87	4.41	5.43	3.76	7.44
3	7.87	4.41	5.43	3.76	8.13
4	9.84	4.41	5.43	3.76	8.62
6	11.8	4.41	5.43	3.76	9.98
8	13.8	4.41	5.43	3.76	11.0
10	17.7	4.41	5.43	3.76	12.3
12	19.7	4.41	5.43	3.76	13.3

Dimension E										
DN	EN (DIN)				ASME		AS		JIS	
	PN 10	PN 16	PN 25	PN 40	Class 150	Class 300	Table E	PN 16	10K	20K
[in]	[in]	[in]	[in]	[in]	[in]	[in]	[in]	[in]	[in]	[in]
2	–	–	–	10.7	10.4	10.7	10.4	10.4	10.5	10.5
3	–	12.1	–	12.1	11.9	12.2	11.8	11.8	11.8	12.1
4	–	13.0	–	15.0	13.1	13.6	12.9	12.9	12.8	13.1
6	–	15.6	–	15.9	15.5	16.2	15.6	15.6	15.6	16.0

Dimension E										
DN	EN (DIN)				ASME		AS		JIS	
	PN 10	PN 16	PN 25	PN 40	Class 150	Class 300	Table E	PN 16	10K	20K
[in]	[in]	[in]	[in]	[in]	[in]	[in]	[in]	[in]	[in]	[in]
8	17.7	17.7	18.1	–	17.7	–	17.6	17.6	17.5	17.9
10	20.1	20.3	20.7	–	20.3	–	20.3	20.3	20.2	20.8
12	22.0	22.4	22.8	–	22.8	–	22.2	22.2	22.0	22.8

Dimension H										
DN	EN (DIN)				ASME		AS		JIS	
	PN 10	PN 16	PN 25	PN 40	Class 150	Class 300	Table E	PN 16	10K	20K
[in]	[in]	[in]	[in]	[in]	[in]	[in]	[in]	[in]	[in]	[in]
2	–	–	–	6.50	6.00	6.50	5.91	5.91	6.10	6.10
3	–	7.87	–	7.87	7.5	8.25	7.28	7.28	7.28	7.87
4	–	8.66	–	12.8	9.00	10.0	8.46	8.46	8.27	8.86
6	–	11.2	–	11.8	11.0	12.5	11.0	11.0	11.0	12.0
8	13.4	13.4	14.2	–	13.5	–	13.2	13.2	13.0	13.8
10	15.6	15.9	16.7	–	16.0	–	15.9	15.9	15.8	16.9
12	17.5	18.1	19.1	–	19.0	–	17.9	17.9	17.5	18.9

DN 350 to 2000 (14 to 78")



A0017283

Dimensions in SI units

DN <sup>1)</sup>	L <sup>2)</sup>	A	B	C	D	E	F	G	H	J
[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]
350	550	129	564	163	143	102	401.5	282	683.5	276
375	600	129	616	163	143	102	427.5	308	735.5	276

DN <sup>1)</sup>	L <sup>2)</sup>	A	B	C	D	E	F	G	H	J
[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]
400	600	129	616	163	143	102	427.5	308	735.5	276
450	650	129	666	163	143	102	452.5	333	785.5	292
500	650	129	717	163	143	102	478	358.5	836.5	292
600	780	129	821	163	143	102	530	410.5	940.5	402
700	910	129	1024	163	143	102	631.5	512	1143.5	589
750	975	129	1024	163	143	102	631.5	512	1143.5	626
800	1040	129	1067	163	143	102	653	533.5	1186.5	647
900	1170	129	1220	163	143	102	729.5	610	1339.5	785
1000	1300	129	1372	163	143	102	805.5	686	1491.5	862
1050	1365	129	1424	163	143	102	831.5	712	1543.5	912
1200	1560	129	1622	163	143	102	930.5	811	1741.5	992
1350	1755	129	1824	163	143	102	1031.5	912	1943.5	1252
1400	1820	129	1974	163	143	102	1106.5	987	2093.5	1252
1500	1950	129	2022	163	143	102	1130.5	1011	2141.5	1392
1600	2080	129	2112	163	143	102	1175.5	1056	2231.5	1482
1650	2145	129	2186	163	143	102	1212.5	1093	2305.5	1482
1800	2340	129	2376	163	143	102	1307.5	1188	2495.5	1632
2000	2600	129	2476	163	143	102	1357.5	1238	2595.5	1732

- 1) EN (DIN), AS; For flanges according to AS, only nominal diameters DN 350, 400, 500 and 600 are available.
- 2) The length is independent of the selected pressure rating. Length in accordance with DVGW/ISO.

*Dimensions in US units*

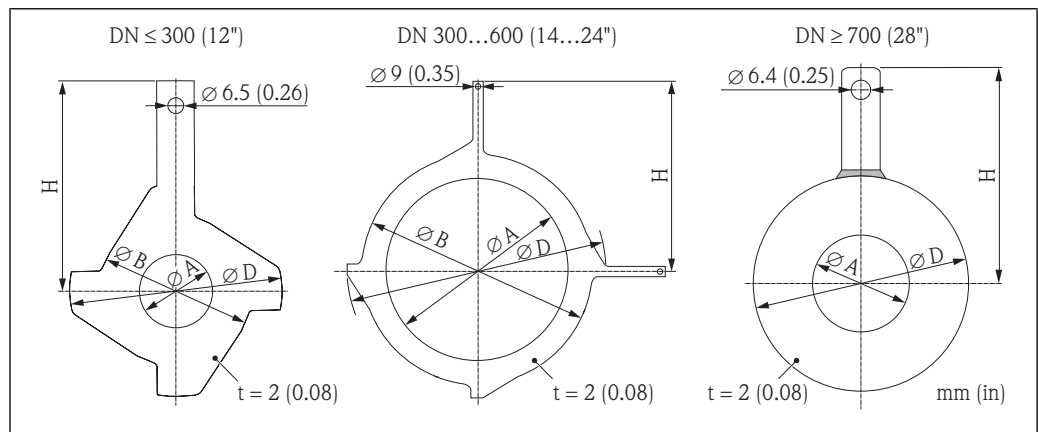
DN <sup>1)</sup>	L <sup>2)</sup>	A	B	C	D	E	F	G	H	J
[in]	[in]	[in]	[in]	[in]	[in]	[in]	[in]	[in]	[in]	[in]
14	21.6	5.08	22.2	6.42	5.63	4.02	15.8	11.1	29.1	10.9
15	23.6	5.08	24.2	6.42	5.63	4.02	16.8	12.1	31.1	10.9
16	23.6	5.08	24.2	6.42	5.63	4.02	16.8	12.1	31.1	10.9
18	25.6	5.08	26.2	6.42	5.63	4.02	17.8	13.1	33.1	11.5
20	25.6	5.08	28.2	6.42	5.63	4.02	18.8	14.1	35.1	11.5
24	30.7	5.08	32.3	6.42	5.63	4.02	20.9	16.2	39.2	15.8
28	35.8	5.08	40.3	6.42	5.63	4.02	24.9	20.1	45.0	23.2
30	38.4	5.08	40.3	6.42	5.63	4.02	24.9	20.1	45.0	24.6
32	40.9	5.08	42.0	6.42	5.63	4.02	25.7	21.0	46.7	25.5
36	46.0	5.08	48.0	6.42	5.63	4.02	28.7	24.0	52.7	30.9
40	51.2	5.08	54.0	6.42	5.63	4.02	31.7	27.0	58.7	33.9
42	53.7	5.08	56.0	6.42	5.63	4.02	32.7	28.0	60.7	35.9
48	61.4	5.08	63.8	6.42	5.63	4.02	36.6	31.9	68.5	39.0
54	69.1	5.08	71.8	6.42	5.63	4.02	40.6	35.9	76.5	42.3
56	71.7	5.08	77.7	6.42	5.63	4.02	43.6	38.9	82.4	49.3
60	76.8	5.08	79.6	6.42	5.63	4.02	44.5	39.8	84.3	54.8
64	81.9	5.08	83.2	6.42	5.63	4.02	46.3	41.6	87.9	58.4
66	84.4	5.08	86.0	6.42	5.63	4.02	47.7	43.0	90.8	58.4

DN <sup>1)</sup>	L <sup>2)</sup>	A	B	C	D	E	F	G	H	J
[in]	[in]	[in]	[in]	[in]	[in]	[in]	[in]	[in]	[in]	[in]
72	92.1	5.08	93.5	6.42	5.63	4.02	51.5	46.8	98.2	64.2
78	102.3	5.08	97.5	6.42	5.63	4.02	53.4	48.7	102.2	68.2

- 1) ASME, AWWA; flanges ≤ 24 in only available according to ASME, flanges ≥ 28 in only available according to AWWA.  
 2) The length is independent of the selected pressure rating. Length in accordance with DVGW/ISO.

**Accessories**

*Ground disks for flange connections*



A0015442

*Dimensions in SI and US units*

DN		Pressure rating	A		B		D		H	
[mm]	[in]		[mm]	[in]	[mm]	[in]	[mm]	[in]	[mm]	[in]
25	1	<sup>1)</sup>	26	1.02	62	2.44	77.5	3.05	87.5	3.44
32	1 ¼	<sup>1)</sup>	35	1.38	80	3.15	87.5	3.44	94.5	3.72
40	1 ½	<sup>1)</sup>	41	1.61	82	3.23	101	3.98	103	4.06
50	2	<sup>1)</sup>	52	2.05	101	3.98	115.5	4.55	108	4.25
65	2 ½	<sup>1)</sup>	68	2.68	121	4.76	131.5	5.18	118	4.65
80	3	<sup>1)</sup>	80	3.15	131	5.16	154.5	6.08	135	5.31
100	4	<sup>1)</sup>	104	4.09	156	6.14	186.5	7.34	153	6.02
125	5	<sup>1)</sup>	130	5.12	187	7.36	206.5	8.13	160	6.30
150	6	<sup>1)</sup>	158	6.22	217	8.54	256	10.08	184	7.24
200	8	<sup>1)</sup>	206	8.11	267	10.51	288	11.34	205	8.07
250	10	<sup>1)</sup>	260	10.24	328	12.91	359	14.13	240	9.45
300	12	<sup>1)</sup>	312	12.28	375	14.76	413	16.26	273	10.75
350	14	DIN, PN 6	343	13.50	433	16.54	479	18.86	365	14.37
350	14	DIN, PN 10	343	13.50	420	17.05	479	18.86	365	14.37
350	14	ASME, Class 150	343	13.50	420	17.05	479	18.86	365	14.37
400	16	DIN, PN 6	393	15.47	470	18.50	542	21.34	395	15.55
400	16	DIN, PN 10	393	15.47	480	18.90	542	21.34	395	15.55
400	16	ASME, Class 150	393	15.47	480	18.90	542	21.34	395	15.55
450	18	DIN, PN 6	439	17.28	525	20.67	583	22.95	417	16.42



DN		Pressure rating	A		B		D		H	
[mm]	[in]		[mm]	[in]	[mm]	[in]	[mm]	[in]	[mm]	[in]
450	18	DIN, PN 10	439	17.28	538	21.18	583	22.95	417	16.42
450	18	ASME, Class 150	439	17.28	538	21.18	583	22.95	417	16.42
500	20	DIN, PN 6	493	19.41	575	23.31	650	25.59	460	18.11
500	20	DIN, PN 10	493	19.41	592	22.64	650	25.59	460	18.11
500	20	ASME, Class 150	493	19.41	592	22.64	650	25.59	460	18.11
600	24	DIN, PN 6	593	23.35	676	27.28	766	30.16	522	20.55
600	24	DIN, PN 10	593	23.35	693	26.61	766	30.16	522	20.55
600	24	ASME, Class 150	593	23.35	693	26.61	766	30.16	522	20.55
700	28	DIN, PN 6	697	27.44	–	–	786	30.94	460	18.11
700	28	DIN, PN 10	693	27.28	–	–	813	32.01	480	18.9
700	28	AS, PN 16	687	27.05	–	–	807	31.77	490	19.29
700	28	AWWA, Class D	693	27.28	–	–	832	32.76	494	19.45
750	30	AWWA, Class D	743	29.25	–	–	833	32.8	523	20.59
800	32	DIN, PN 6	799	31.46	–	–	893	35.16	520	20.47
800	32	DIN, PN 10	795	31.30	–	–	920	36.22	540	21.26
800	32	AS, PN 16	789	31.06	–	–	914	35.98	550	21.65
800	32	AWWA, Class D	795	31.30	–	–	940	37.01	561	22.09
900	36	DIN, PN 6	897	35.31	–	–	993	39.09	570	22.44
900	36	DIN, PN 10	893	35.16	–	–	1020	40.16	590	23.23
900	36	AS, PN 16	886	34.88	–	–	1014	39.92	595	23.43
900	36	AWWA, Class D	893	35.16	–	–	1048	41.26	615	24.21
1000	40	DIN, PN 6	999	39.33	–	–	1093	43.03	620	24.41
1000	40	DIN, PN 10	995	39.17	–	–	1127	44.37	650	25.59
1000	40	AS, PN 16	988	38.90	–	–	1131	44.53	660	25.98
1000	40	AWWA, Class D	995	39.17	–	–	1163	45.79	675	26.57
1050	42	AWWA, Class D	1044	41.10	–	–	1220	48.03	704	27.72
1200	48	DIN, PN 6	1203	47.36	–	–	1310	51.57	733	28.86

1) Ground disks can be used for all the flange standards/pressure ratings which can be supplied in the standard version.

**Weight**

**Compact version**

Weight data:

- Including the transmitter (1.15 kg (2.54 lbs))
- Excluding packaging material

*Weight in SI units*

Nominal diameter		EN (DIN), AS <sup>1)</sup>		ASME, AWWA		JIS	
[mm]	[in]	Pressure rating	[kg]	Pressure rating	[kg]	Pressure rating	[kg]
25	1	PN 40	7.3	Class 150	7.3	10K	7.3
32	–	PN 40	8	Class 150	–	10K	7.3
40	1 ½	PN 40	9.4	Class 150	9.4	10K	8.3
50	2	PN 40	10.6	Class 150	10.6	10K	9.3
65	–	PN 16	12	Class 150	–	10K	11.1

Nominal diameter		EN (DIN), AS <sup>1)</sup>		ASME, AWWA		JIS	
[mm]	[in]	Pressure rating	[kg]	Pressure rating	[kg]	Pressure rating	[kg]
80	3	PN 16	14	Class 150	14	10K	112.5
100	4	PN 16	16	Class 150	16	10K	14.7
125	–	PN 16	21.5	Class 150	–	10K	21
150	6	PN 16	25.5	Class 150	25.5	10K	24.5
200	8	PN 10	45	Class 150	45	10K	41.9
250	10	PN 10	65	Class 150	75	10K	69.4
300	12	PN 10	70	Class 150	110	10K	72.3
350	14	PN 6	105	Class 150	175		
375	15	PN 6	120	Class 150	–		
400	16	PN 6	120	Class 150	205		
450	18	PN 6	161	Class 150	255		
500	20	PN 6	156	Class 150	285		
600	24	PN 6	208	Class 150	405		
700	28	PN 6	304	Class D	400		
–	30	PN 6	–	Class D	460		
800	32	PN 6	357	Class D	550		
900	36	PN 6	485	Class D	800		
1000	40	PN 6	589	Class D	900		
–	42	PN 6	–	Class D	1 100		
1200	48	PN 6	850	Class D	1 400		
–	54	PN 6	–	Class D	2 200		
1400	–	PN 6	1 300	Class D	–		
–	60	PN 6	–	Class D	2 700		
1600	–	PN 6	1 700	Class D	–		
–	66	PN 6	–	Class D	3 700		
1800	72	PN 6	2 200	Class D	4 100		
–	78	PN 6	–	Class D	4 600		
2000	–	PN 6	2 800	Class D	–		

1) Flanges according to AS are only available for DN 80, 100, 150 to 400, 500 and 600.

#### Weight in US units

Nominal diameter		ASME, AWWA	
[mm]	[in]	Pressure rating	[lbs]
25	1	Class 150	16.1
40	1 ½	Class 150	20.7
50	2	Class 150	23.4
80	3	Class 150	30.9
100	4	Class 150	35.3
150	6	Class 150	56.2
200	8	Class 150	99.2
250	10	Class 150	165.4

Nominal diameter		ASME, AWWA	
[mm]	[in]	Pressure rating	[lbs]
300	12	Class 150	242.6
350	14	Class 150	385.9
400	16	Class 150	452
450	18	Class 150	562.3
500	20	Class 150	628.4
600	24	Class 150	893
700	28	Class D	882
–	30	Class D	1 014.3
800	32	Class D	1 212.8
900	36	Class D	1 764
1 000	40	Class D	1 984.5
–	42	Class D	2 425.5
1 200	48	Class D	3 087
–	54	Class D	4 851
–	60	Class D	5 953.5
–	66	Class D	8 158.5
1 800	72	Class D	9 040.5
–	78	Class D	10 143

**Transmitter remote version**

1.15 kg (2.54 lb)

**Sensor remote version**

Weight data:

- Including the transmitter housing
- Excluding the connecting cable
- Excluding packaging material

*Weight in SI units*

Nominal diameter		EN (DIN), AS <sup>1)</sup>		ASME, AWWA		JIS	
[mm]	[in]	Pressure rating	[kg]	Pressure rating	[kg]	Pressure rating	[kg]
25	1	PN 40	5.3	Class 150	5.3	10K	5.3
32	–	PN 40	6	Class 150	–	10K	5.3
40	1 ½	PN 40	7.4	Class 150	7.4	10K	6.3
50	2	PN 40	8.6	Class 150	8.6	10K	7.3
65	–	PN 16	10	Class 150	–	10K	9.1
80	3	PN 16	12	Class 150	12	10K	10.5
100	4	PN 16	14	Class 150	14	10K	12.7
125	–	PN 16	19.5	Class 150	–	10K	19
150	6	PN 16	23.5	Class 150	23.5	10K	22.5
200	8	PN 10	43	Class 150	43	10K	39.9
250	10	PN 10	63	Class 150	73	10K	67.4
300	12	PN 10	68	Class 150	108	10K	70.3

Nominal diameter		EN (DIN), AS <sup>1)</sup>		ASME, AWWA		JIS	
[mm]	[in]	Pressure rating	[kg]	Pressure rating	[kg]	Pressure rating	[kg]
350	14	PN 6	103	Class 150	173		
375	15	PN 6	118	Class 150	–		
400	16	PN 6	118	Class 150	203		
450	18	PN 6	159	Class 150	253		
500	20	PN 6	154	Class 150	283		
600	24	PN 6	206	Class 150	403		
700	28	PN 6	302	Class D	398		
–	30	PN 6	–	Class D	458		
800	32	PN 6	355	Class D	548		
900	36	PN 6	483	Class D	798		
1 000	40	PN 6	587	Class D	898		
–	42	PN 6	–	Class D	1 098		
1 200	48	PN 6	848	Class D	1 398		
–	54	PN 6	–	Class D	2 198		
1 400	–	PN 6	1 298	Class D	–		
–	60	PN 6	–	Class D	2 698		
1 600	–	PN 6	1 698	Class D	–		
–	66	PN 6	–	Class D	3 698		
1 800	72	PN 6	2 198	Class D	4 098		
–	78	PN 6	–	Class D	4 598		
2 000	–	PN 6	2 798	Class D	–		

1) Flanges according to AS are only available for DN 80, 100, 150 to 400, 500 and 600.

#### Weight in US units

Nominal diameter		ASME, AWWA	
[mm]	[in]	Pressure rating	[lbs]
25	1	Class 150	11.7
40	1 ½	Class 150	16.3
50	2	Class 150	19.0
80	3	Class 150	26.5
100	4	Class 150	30.9
150	6	Class 150	51.8
200	8	Class 150	94.8
250	10	Class 150	161
300	12	Class 150	238.1
350	14	Class 150	381.5
400	16	Class 150	447.6
450	18	Class 150	557.9
500	20	Class 150	624
600	24	Class 150	888.6
700	28	Class D	877.6

Nominal diameter		ASME, AWWA	
[mm]	[in]	Pressure rating	[lbs]
–	30	Class D	1 009.9
800	32	Class D	1 208.3
900	36	Class D	1 759.6
1 000	40	Class D	1 980.1
–	42	Class D	2 421.1
1 200	48	Class D	3 082.6
–	54	Class D	4 846.6
–	60	Class D	5 949.1
–	66	Class D	8 154.1
1 800	72	Class D	9 036.1
–	78	Class D	10 138.6

**Sensor remote version, fully welded (IP68)**

Weight data:

- Including the transmitter housing
- Excluding the connecting cable
- Excluding packaging material

*Weight in SI units*

Nominal diameter		EN (DIN), AS <sup>1)</sup>		ASME		JIS	
[mm]	[in]	Pressure rating	[kg]	Pressure rating	[kg]	Pressure rating	[kg]
50	2	PN 40	10	Class 150	9	10K	9
65	–	PN 16	11	Class 150	–	10K	10
80	3	PN 16	13	Class 150	13	10K	11
100	4	PN 16	15	Class 150	17	10K	13
125	–	PN 16	20	Class 150	–	10K	18
150	6	PN 16	25	Class 150	26	10K	23
200	8	PN 10	36	Class 150	42	10K	32
250	10	PN 10	49	Class 150	59	10K	48
300	12	PN 10	58	Class 150	84	10K	55

1) For flanges according to AS, DN 65 and 125 are not available.

*Weight in US units*

Nominal diameter		ASME, AWWA	
[mm]	[in]	Pressure rating	[lbs]
50	2	Class 150	19.9
80	3	Class 150	28.7
100	4	Class 150	37.5
150	6	Class 150	57.3
200	8	Class 150	92.6
250	10	Class 150	130
300	12	Class 150	185

## Measuring tube specification

Nominal diameter		Pressure rating				Measuring tube internal diameter			
		EN (DIN)	ASME AWWA	AS 2129 AS 4087	JIS	Hard rubber		Polyurethane	
[mm]	[in]					[mm]	[in]	[mm]	[in]
25	1	PN 40	Class 150	–	20K	–	–	24	0.94
32	–	PN 40	–	–	20K	–	–	32	1.26
40	1 ½	PN 40	Class 150	–	20K	–	–	38	1.50
50	2	PN 40	Class 150	Table E, PN 16	10K	50	1.97	50	1.97
65	–	PN 16	–	–	10K	66	2.60	66	2.60
80	3	PN 16	Class 150	Table E, PN 16	10K	79	3.11	79	3.11
100	4	PN 16	Class 150	Table E, PN 16	10K	102	4.02	102	4.02
125	–	PN 16	–	–	10K	127	5.00	127	5.00
150	6	PN 16	Class 150	Table E, PN 16	10K	156	6.14	156	6.14
200	8	PN 10	Class 150	Table E, PN 16	10K	204	8.03	204	8.03
250	10	PN 10	Class 150	Table E, PN 16	10K	258	10.2	258	10.2
300	12	PN 10	Class 150	Table E, PN 16	10K	309	12.2	309	12.2
350	14	PN 6	Class 150	Table E, PN 16	–	342	13.5	342	13.5
375	15	–	–	PN 16	–	392	15.4	–	–
400	16	PN 6	Class 150	Table E, PN 16	–	392	15.4	392	15.4
450	18	PN 6	Class 150	–	–	437	17.2	437	17.2
500	20	PN 6	Class 150	Table E, PN 16	–	492	19.4	492	19.4
600	24	PN 6	Class 150	Table E, PN 16	–	594	23.4	594	23.4
700	28	PN 6	Class D	Table E, PN 16	–	692	27.2	692	27.2
750	30	–	Class D	Table E, PN 16	–	742	29.2	742	29.2
800	32	PN 6	Class D	Table E, PN 16	–	794	31.3	794	31.3
900	36	PN 6	Class D	Table E, PN 16	–	891	35.1	891	35.1
1 000	40	PN 6	Class D	Table E, PN 16	–	994	39.1	994	39.1
–	42	–	Class D	–	–	1 043	41.1	1 043	41.1
1 200	48	PN 6	Class D	Table E, PN 16	–	1 197	47.1	1 197	47.1
–	54	–	Class D	–	–	1 339	52.7	–	–
1 400	–	PN 6	–	–	–	1 402	55.2	–	–
–	60	–	Class D	–	–	1 492	58.7	–	–
1 600	–	PN 6	–	–	–	1 600	63.0	–	–
–	66	–	Class D	–	–	1 638	64.5	–	–
1 800	72	PN 6	Class D	–	–	1 786	70.3	–	–
2 000	78	PN 6	Class D	–	–	1 989	78.3	–	–

## Materials

## Transmitter housing

- Order code for "Housing", option **M**, **N**: polycarbonate plastic
- Window material: polycarbonate plastic

**Transmitter cable entries**

Order code for "Housing", option M "Compact, polycarbonate"; option N "Remote, polycarbonate"

The various cable entries are suitable for hazardous and non-hazardous areas.

Electrical connection	Material
Cable gland M20 × 1.5	Plastic
Thread G ½" via adapter	Nickel-plated brass
Thread NPT ½" via adapter	Nickel-plated brass

**Connecting cable for remote version**

- Electrode cable: PVC cable with copper shield
- Coil current cable: PVC cable with copper shield

**Sensor housing**

- DN 25 to 300 (1 to 12"): aluminum coated AlSi10Mg
- DN 50 to 300 (2 to 12"): carbon steel with protective varnish (IP68)
- DN 350 to 2000 (14 to 78"): carbon steel with protective varnish

**Sensor connection housing**

- Aluminum coated AlSi10Mg (IP66/67)
- DN 50 to 300 (2 to 12"): polycarbonate (IP68)

**Sensor cable entries**

Order code for "Housing", option N "Remote, polycarbonate"

The various cable entries are suitable for hazardous and non-hazardous areas.

Electrical connection	Material
Cable gland M20 × 1.5	Nickel-plated brass
Thread G ½" via adapter	Nickel-plated brass
Thread NPT ½" via adapter	Nickel-plated brass

**Measuring tubes**

- DN 25 to 300 (1 to 12"): stainless steel 1.4301/304, 1.4306/304L; for carbon steel flanges with Al/Zn protective coating
- DN 50 to 300 (2 to 12"): for carbon steel flanges with protective varnish (IP68)
- DN 350 to 2000 (14 to 78"): stainless steel 1.4301/304, 1.4306/304L; for carbon steel flanges with protective varnish

*Liner*

- DN 25 to 1200 (1 to 48"): polyurethane
- DN 50 to 2000 (2 to 78"): hard rubber

**Electrodes**

1.4435/304L, Alloy C-22, tantalum

**Process connections**

EN 1092-1 (DIN 2501)

DN 25 to 2000 (1 to 78")<sup>1)</sup>: 1.4571/316L, C22, FE 410W B, S235JRG2

*ASME B16.5*DN 25 to 600 (1 to 24")<sup>1)</sup>: A105, 316L*AWWA C207*

DN 1200 to 1800 (48 to 72"): 1.0425/316L (P265GH)

*AS 2129*

DN 50 to 1200 (2 to 48"): A105, S235JRG2, S275JR

*AS 4087*

DN 50 to 1200 (2 to 48"): A105, S275JR

*JIS B2220*DN 25 to 300 (1 to 12")<sup>1)</sup>: H11, S235JRG2, 1.0425/316L**Seals**

In accordance with DIN EN 1514-1

**Accessories***Weather protection cover*

Stainless steel 1.4301

*Ground disks*

1.4435/316L, Alloy C-22, tantalum

**Fitted electrodes**

Measurement, reference and empty pipe detection electrodes available as standard with:

- 1.4435/304L
- Alloy C-22
- Tantalum

Optionally available with DN 350 to 2000 (14 to 78"):

Exchangeable measuring electrodes made from 1.4435/304L

**Process connections**

Flange connections:

- EN 1092-1 (DIN 2501)<sup>2)</sup>
  - DN ≤ 300 (12"), fixed flange (PN 10/16/25/40) = form A
  - DN ≥ 350 (14"), fixed flange (PN 6/10/16/25) = flat face
- ASME B16.5
  - DN 25 to 600 (1 to 24"), fixed flange (Class 150)
  - DN 25 to 150 (1 to 6"), fixed flange (Class 300)
- AWWA C207
  - DN 1200 to 1800 (48 to 72"), fixed flange (Class D)
- AS 2129
  - DN 50 to 1200 (2 to 48"), fixed flange (Table E)
- AS 4087
  - DN 50 to 1200 (2 to 48"), fixed flange (PN 16)
- JIS B2220
  - DN 50 to 300 (2 to 12"), fixed flange (10K)
  - DN 25 to 300 (1 to 12"), fixed flange (20K)



For information on the materials of the process connections (→ 47)

**Surface roughness**

Electrodes with 1.4435/304L, Alloy C-22, tantalum:

≤ 0.3 to 0.5 μm (11.8 to 19.7 μin)

(All data relate to parts in contact with fluid)

1) DN ≤ 300 (12") with Al/Zn protective coating, DN ≥ 350 (14") with protective varnish

2) Dimensions as per DIN 2501, DN 65 (2 1/2") PN 16 and DN 600 (24") PN 16 only as per EN 1092-1



## Operability

### Operating concept

#### Operator-oriented menu structure for user-specific tasks

- Commissioning
- Operation
- Diagnostics
- Expert level

#### Rapid and safe commissioning

- Guided menus ("Make-it-run" wizards) for applications
- Menu guidance with brief explanations of the individual parameter functions

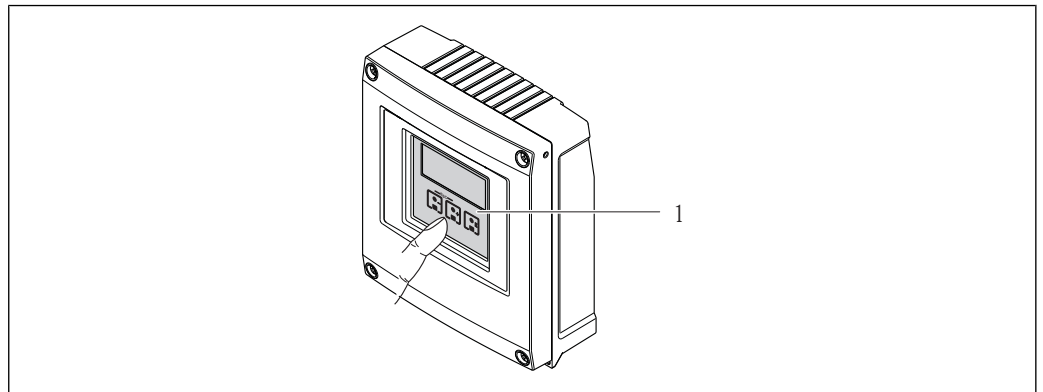
#### Reliable operation

- Operation in the following languages:
  - Via local display: English, German, French, Spanish, Italian, Dutch, Portuguese, Polish, Russian, Turkish, Chinese, Japanese, Bahasa (Indonesian), Vietnamese, Czech
  - Via "FieldCare" operating tool: English, German, French, Spanish, Italian, Dutch, Japanese
  - Via Web browser: English, German, French, Spanish, Italian, Dutch, Portuguese, Polish, Russian, Turkish, Chinese, Japanese, Bahasa (Indonesian), Vietnamese, Czech
- Uniform operating philosophy applied to device, operating tools and Web browser
- If replacing the electronic module, transfer the device configuration via the plug-in memory (HistoROM DAT) which contains the process and measuring device data and the event logbook. No need to reconfigure.

#### Efficient diagnostics increase measurement availability

- Troubleshooting measures can be called up via the device, operating tools and Web browser
- Diverse simulation options and optional line recorder functions

### Local operation



1 Operation with touch control

#### Display elements

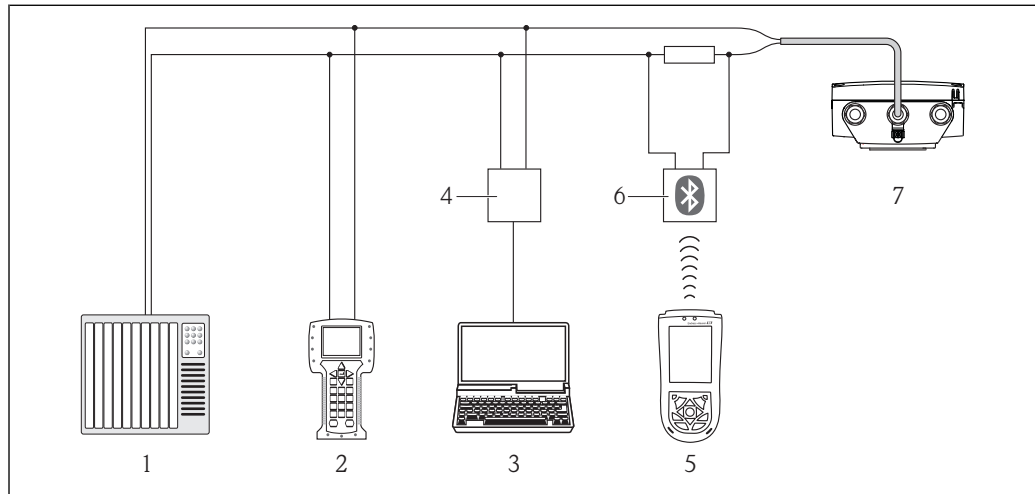
- 4-line display
- White background lighting; switches to red in event of device errors
- Format for displaying measured variables and status variables can be individually configured
- Permitted ambient temperature for the display:  $-20$  to  $+50$  °C ( $-4$  to  $+122$  °F)  
The readability of the display may be impaired at temperatures outside the temperature range.

#### Operating elements

External operation via touch control; 3 optical keys: ☐, ☐, ☐

## Remote operation

## Via HART protocol

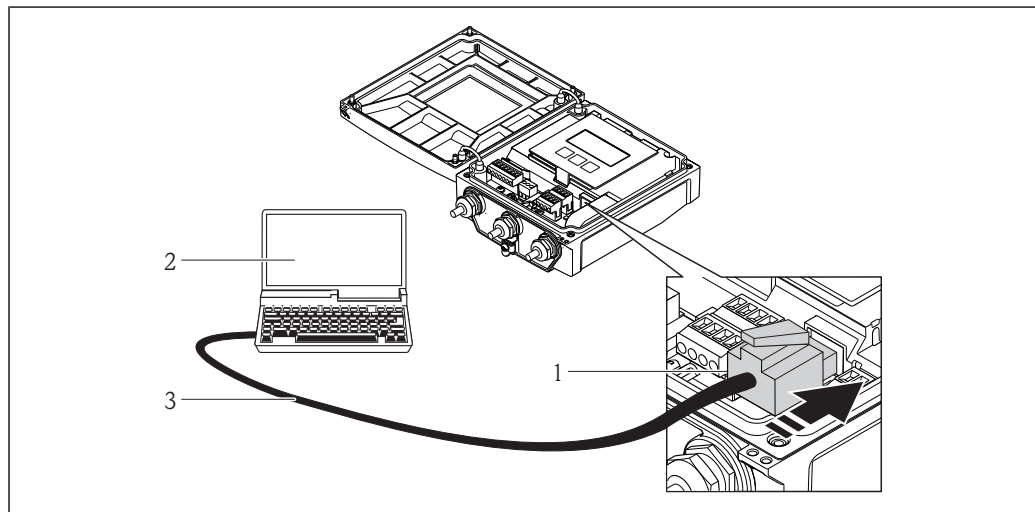


A0017124

26 Options for remote operation via HART protocol

- 1 Control system (e.g. PLC)
- 2 Field Communicator 475
- 3 Computer with operating tool (e.g. FieldCare, AMS Device Manager, SIMATIC PDM)
- 4 Commubox FXA195 (USB)
- 5 Field Xpert SFX100
- 6 VIATOR Bluetooth modem with connecting cable
- 7 Transmitter

## Via service interface (CDI-RJ45)



A0017119

- 1 Service interface (CDI-RJ45) of the measuring device with access to the integrated Web server
- 2 Computer with Web browser (e.g. Internet Explorer) for accessing the integrated device Web server or with "FieldCare" operating tool with COM DTM "CDI Communication TCP/IP"
- 3 Standard Ethernet connecting cable with RJ45 connector

## Certificates and approvals

### CE mark

The measuring system is in conformity with the statutory requirements of the applicable EC Directives. These are listed in the corresponding EC Declaration of Conformity along with the standards applied.

Endress+Hauser confirms successful testing of the device by affixing to it the CE mark.

<b>C-Tick symbol</b>	The measuring system meets the EMC requirements of the "Australian Communications and Media Authority (ACMA)".
<b>Ex approval</b>	<p><b>cCSAus</b></p> <p>Currently, the following versions for use in hazardous areas are available:</p> <p><i>NI (Ex nA, Ex nL)</i></p> <p>Class I Division 2 Groups ABCD; NIFW*</p> <p>*= NIFW parameter as per Control Drawings</p>
<b>Drinking water approval</b>	<ul style="list-style-type: none"> <li>■ ACS</li> <li>■ KTW/W270</li> <li>■ NSF 61</li> <li>■ WRAS BS 6920</li> </ul>
<b>Other standards and guidelines</b>	<ul style="list-style-type: none"> <li>■ EN 60529 Degrees of protection provided by enclosures (IP code)</li> <li>■ EN 61010-1 Protection Measures for Electrical Equipment for Measurement, Control, Regulation and Laboratory Procedures.</li> <li>■ IEC/EN 61326 Emission in accordance with Class A requirements. Electromagnetic compatibility (EMC requirements)</li> <li>■ ANSI/ISA-S82.01 Safety Standard for Electrical and Electronic Test, Measuring, Controlling and related Equipment - General Requirements. Pollution degree 2, Installation Category II</li> <li>■ CAN/CSA-C22.2 No. 1010.1-92 Safety requirements for Electrical Equipment for Measurement and Control and Laboratory Use. Pollution degree 2, Installation Category II</li> <li>■ NAMUR NE 21 Electromagnetic compatibility (EMC) of industrial process and laboratory control equipment.</li> <li>■ NAMUR NE 32 Data retention in the event of a power failure in field and control instruments with microprocessors</li> <li>■ NAMUR NE 43 Standardization of the signal level for the breakdown information of digital transmitters with analog output signal.</li> <li>■ NAMUR NE 53 Software of field devices and signal-processing devices with digital electronics</li> <li>■ NAMUR NE 105 Specifications for integrating fieldbus devices in engineering tools for field devices</li> <li>■ NAMUR NE 107 Status classification as per NE107</li> </ul>

## Ordering information

Detailed ordering information is available from the following sources:

- In the Product Configurator on the Endress+Hauser website: [www.endress.com](http://www.endress.com) → Select country → Instruments → Select device → Product page function: Configure this product
- From your Endress+Hauser Sales Center: [www.endress.com/worldwide](http://www.endress.com/worldwide)



### Product Configurator - the tool for individual product configuration

- Up-to-the-minute configuration data
- Depending on the device: Direct input of measuring point-specific information such as measuring range or operating language
- Automatic verification of exclusion criteria
- Automatic creation of the order code and its breakdown in PDF or Excel output format
- Ability to order directly in the Endress+Hauser Online Shop

## Application packages

Many different application packages are available to enhance the functionality of the device. Such packages might be needed to address safety aspects or specific application requirements.

The application packages can be ordered from Endress+Hauser either directly with the device or subsequently. Detailed information on the order code in question is available from your local Endress+Hauser sales center or on the product page of the Endress+Hauser website: [www.endress.com](http://www.endress.com).

Cleaning	Package	Description
	Electrode cleaning circuit (ECC)	The electrode cleaning circuit (ECC) function has been developed to have a solution for applications where magnetite ( $\text{Fe}_3\text{O}_4$ ) deposits frequently occur (e.g. hot water). Since magnetite is highly conductive this build up leads to measuring errors and ultimately to the loss of signal. The option is designed to AVOID build up of highly conductive matter and thin layers (typically magnetite).


Diagnostics functions	Package	Description
	HistoROM extended function	Comprises extended functions concerning the event log and the activation of the measured value memory (data logger). Event log: Memory volume is extended from 20 message entries (basic version) to up to 100 entries. Data logging (line recorder): <ul style="list-style-type: none"> <li>■ Memory capacity for up to 1000 measured values is activated.</li> <li>■ 250 measured values can be output via each of the 4 memory channels. The recording interval can be defined and configured by the user.</li> <li>■ Data logging is visualized via the local display or FieldCare.</li> </ul>

## Accessories









Various accessories, which can be ordered with the device or subsequently from Endress+Hauser, are available for the device. Detailed information on the order code in question is available from your local Endress+Hauser sales center or on the product page of the Endress+Hauser website: [www.endress.com](http://www.endress.com).

Device-specific accessories	For the transmitter	
	Accessories	Description
	Promag 400 transmitter	Transmitter for replacement or storage. Use the order code to define the following specifications: <ul style="list-style-type: none"> <li>■ Approvals</li> <li>■ Output / input</li> <li>■ Display / operation</li> <li>■ Housing</li> <li>■ Software</li> </ul>
	Weather protection cover	Is used to protect the measuring device from the effects of the weather: e.g. rainwater, excess heating from direct sunlight or extreme cold in winter.
	Connecting cable for remote version	Coil current and electrode cables, various lengths, reinforced cables available on request.
	Ground cable	Set, consisting of two ground cables for potential equalization.
	Pipe mounting set	Pipe mounting set for transmitter.
	Compact → remote conversion kit	For converting a compact device version to a remote device version.
	Promag 50/53 → Promag 400 conversion kit	For converting a Promag with transmitter 50/53 to a Promag 400.

**For the sensor**


Accessories	Description
Ground disks for flange connections	Are used to ground the fluid in lined measuring tubes to ensure proper measurement.  For details, see Installation Instructions EA00070D

**Communication-specific accessories**


Accessories	Description
Commubox FXA191 HART	For intrinsically safe HART communication with FieldCare via the RS232C interface.  For details, see "Technical Information" TI00237F
Commubox FXA195 HART	For intrinsically safe HART communication with FieldCare via the USB interface.  For details, see "Technical Information" TI00404F
Commubox FXA291	Connects Endress+Hauser field devices with a CDI interface (= Endress+Hauser Common Data Interface) and the USB port of a computer or laptop.  For details, see "Technical Information" TI00405C
HART Loop Converter HMX50	Is used to evaluate and convert dynamic HART process variables to analog current signals or limit values.  For details, see "Technical Information" TI00429F and Operating Instructions BA00371F
WirelessHART adapter	Is used for the wireless connection of field devices. The WirelessHART adapter can be easily integrated into field devices and existing infrastructures, offers data protection and transmission safety and can be operated in parallel with other wireless networks with minimum cabling complexity.  For details, see Operating Instructions BA00061S
Fieldgate FXA320	Gateway for the remote monitoring of connected 4-20 mA measuring devices via a Web browser.  For details, see "Technical Information" TI00025S and Operating Instructions BA00053S
Fieldgate FXA520	Gateway for the remote diagnostics and remote configuration of connected HART measuring devices via a Web browser.  For details, see "Technical Information" TI00025S and Operating Instructions BA00051S
Field Xpert SFX100	Compact, flexible and robust industry handheld terminal for remote configuration and for obtaining measured values via the HART current output (4-20 mA).  For details, see Operating Instructions BA00060S

**Service-specific accessories**


Accessories	Description
Applicator	Software for selecting and sizing Endress+Hauser measuring devices: <ul style="list-style-type: none"> <li>■ Calculation of all the necessary data for identifying the optimum flowmeter: e.g. nominal diameter, pressure loss, accuracy or process connections.</li> <li>■ Graphic illustration of the calculation results</li> </ul> Administration, documentation and access to all project-related data and parameters over the entire life cycle of a project. Applicator is available: <ul style="list-style-type: none"> <li>■ Via the Internet: <a href="https://wapps.endress.com/applicator">https://wapps.endress.com/applicator</a></li> <li>■ On CD-ROM for local PC installation.</li> </ul>

W@M	<p>Life cycle management for your plant</p> <p>W@M supports you with a wide range of software applications over the entire process: from planning and procurement, to the installation, commissioning and operation of the measuring devices. All the relevant device information, such as the device status, spare parts and device-specific documentation, is available for every device over the entire life cycle. The application already contains the data of your Endress+Hauser device. Endress+Hauser also takes care of maintaining and updating the data records.</p> <p>W@M is available:</p> <ul style="list-style-type: none"> <li>■ Via the Internet: <a href="http://www.endress.com/lifecyclemanagement">www.endress.com/lifecyclemanagement</a></li> <li>■ On CD-ROM for local PC installation.</li> </ul>
FieldCare	<p>FDT-based plant asset management tool from Endress+Hauser.</p> <p>It can configure all smart field units in your system and helps you manage them. By using the status information, it is also a simple but effective way of checking their status and condition.</p> <p> For details, see Operating Instructions BA00027S and BA00059S</p>

**System components**

Accessories	Description
Memograph M graphic display recorder	<p>The Memograph M graphic data manager provides information on all the relevant measured variables. Measured values are recorded correctly, limit values are monitored and measuring points analyzed. The data are stored in the 256 MB internal memory and also on a SD card or USB stick.</p> <p> For details, see "Technical Information" TI00133R and Operating Instructions BA00247R</p>

## Documentation

-  The following document types are available:
- On the CD-ROM supplied with the device
  - In the Download Area of the Endress+Hauser Internet site: [www.endress.com](http://www.endress.com) → Download

**Standard documentation**

Device type	Communication	Document type	Documentation code
5W4B**-	---	Brief Operating Instructions	KA01114D
	HART	Operating Instructions	BA01063D

**Supplementary device-dependent documentation**

Device type	Document type	Approval	Documentation code
5W4B**-	Installation Instructions		Specified for each individual accessory

## Registered trademarks

**HART®**

Registered trademark of the HART Communication Foundation, Austin, USA

**Microsoft®**

Registered trademark of the Microsoft Corporation, Redmond, Washington, USA

**Applicator®, FieldCare®, Field Xpert™, HistoROM®**

Registered or registration-pending trademarks of the Endress+Hauser Group

---

---

## Instruments International

Endress+Hauser  
Instruments International AG  
Kaegenstrasse 2  
4153 Reinach  
Switzerland

Tel.+41 61 715 81 00  
Fax+41 61 715 25 00  
[www.endress.com](http://www.endress.com)  
[info@ii.endress.com](mailto:info@ii.endress.com)

**Endress + Hauser**   
People for Process Automation