Technical Information
Proline Promag 10H
Electromagnetic flowmeter

The flowmeter for smallest flow rates with a highly cost-effective transmitter

Application

- The measuring principle is virtually independent of pressure, density, temperature and viscosity
- For the smallest flow quantities and demanding hygienic applications

Device properties

- Liner made of PFA
- Sensor housing made of stainless steel (3-A, EHEDG)
- Wetted materials CIP, SIP cleanable
- 2-line display with push buttons
- Device in compact or remote version
- HART

Your benefits

- Flexible installation concept – numerous hygienic process connections
- Energy-saving flow measurement – no pressure loss due to cross-section constriction
- Maintenance-free – no moving parts
- Cost-effective – designed for easy applications and direct integration
- Safe operation – display provides easy readable process information
- Fully industry compliant – IEC/EN/NAMUR

Endress+Hauser
People for Process Automation

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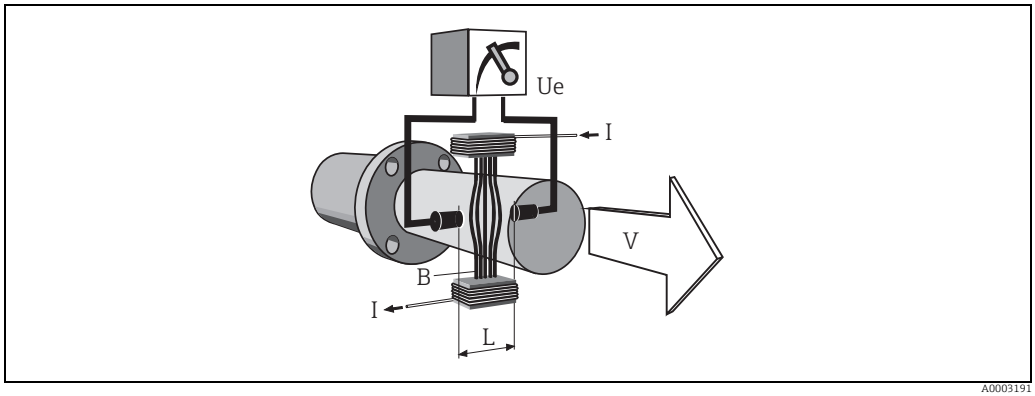
Function and system design

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 by means of the pipe cross-sectional area. The DC magnetic field is created through a switched direct current of alternating polarity.



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$Ue = B \cdot L \cdot v$
$Q = A \cdot v$

Ue	*Induced voltage*
B	*Magnetic induction (magnetic field)*
L	*Electrode spacing*
v	*Flow velocity*
Q	*Volume flow*
A	*Pipe cross-section*
I	*Current strength*

Measuring system

The measuring system consists of a transmitter and a sensor.
Two versions are available:
- Compact version: Transmitter and sensor form a mechanical unit.
- Remote version: Sensor is mounted separate from the transmitter.

Transmitter:
- Promag 10 (key operation, two-line, unilluminated display)

Sensor:
- Promag H (DN 2 to 150 / 1/12 to 6")

Input

Measured variable

Flow velocity (proportional to induced voltage)

Measuring ranges

Measuring ranges for liquids
Typically v = 0.01 to 10 m/s (0.03 to 33 ft/s) with the specified accuracy

Flow characteristic values (SI units)					
Nominal diameter		Recommended flow rate	Factory settings		
[mm]	[inch]	Min./max. full scale value (v ~ 0.3 or 10 m/s)	Full scale value, current output (v ~ 2.5 m/s)	Pulse value (~ 2 pulses/s)	Low flow cut off (v ~ 0.04 m/s)
2	1/12"	0.06 to 1.8 dm³/min	0.5 dm³/min	0.005 dm³	0.01 dm³/min
4	1/8"	0.25 to 7 dm³/min	2 dm³/min	0.025 dm³	0.05 dm³/min
8	3/8"	1 to 30 dm³/min	8 dm³/min	0.1 dm³	0.1 dm³/min
15	1/2"	4 to 100 dm³/min	25 dm³/min	0.2 dm³	0.5 dm³/min
25	1"	9 to 300 dm³/min	75 dm³/min	0.5 dm³	1 dm³/min
40	1 1/2"	25 to 700 dm³/min	200 dm³/min	1.5 dm³	3 dm³/min
50	2"	35 to 1100 dm³/min	300 dm³/min	2.5 dm³	5 dm³/min
65	–	60 to 2000 dm³/min	500 dm³/min	5 dm³	8 dm³/min
80	3"	90 to 3000 dm³/min	750 dm³/min	5 dm³	12 dm³/min
100	4"	145 to 4700 dm³/min	1200 dm³/min	10 dm³	20 dm³/min
125	–	220 to 7500 dm³/min	1850 dm³/min	15 dm³	30 dm³/min
150	6"	20 to 600 m³/h	150 m³/h	0.03 m³	2.5 m³/h

Flow characteristic values (US units)					
Nominal diameter		Recommended flow rate	Factory settings		
[inch]	[mm]	Min./max. full scale value (v ~ 0.3 or 10 m/s)	Full scale value, current output (v ~ 2.5 m/s)	Pulse value (~ 2 pulses/s)	Low flow cut off (v ~ 0.04 m/s)
1/12"	2	0.015 to 0.5 gal/min	0.1 gal/min	0.001 gal	0.002 gal/min
1/8"	4	0.07 to 2 gal/min	0.5 gal/min	0.005 gal	0.008 gal/min
3/8"	8	0.25 to 8 gal/min	2 gal/min	0.02 gal	0.025 gal/min
1/2"	15	1.0 to 27 gal/min	6 gal/min	0.05 gal	0.10 gal/min
1"	25	2.5 to 80 gal/min	18 gal/min	0.2 gal	0.25 gal/min
1 1/2"	40	7 to 190 gal/min	50 gal/min	0.5 gal	0.75 gal/min
2"	50	10 to 300 gal/min	75 gal/min	0.5 gal	1.25 gal/min
3"	80	24 to 800 gal/min	200 gal/min	2 gal	2.5 gal/min
4"	100	40 to 1250 gal/min	300 gal/min	2 gal	4 gal/min
–	125	60 to 1950 gal/min	450 gal/min	5 gal	7 gal/min
6"	150	90 to 2650 gal/min	600 gal/min	5 gal	12 gal/min

Operable flow range

Over 1000 : 1

Output

Output signal

Current output

- Galvanically isolated
- Active: 4 to 20 mA, R_L < 700 Ω (for HART: R_L ≥ 250 Ω)
- Full scale value adjustable
- Temperature coefficient: typ. 2 µA/°C, resolution: 1.5 µA

Pulse/status output

- Galvanically isolated
- Passive: 30 V DC/250 mA
- Open collector
- Can be configured as:
  - Pulse output: Pulse value and pulse polarity can be selected, max. pulse width adjustable (5 to 2000 ms), pulse frequency max. 100 Hz
  - Status output: for example, can be configured for error messages, empty pipe detection, flow recognition, limit value

Signal on alarm

- Current output → Failsafe mode can be selected
- Pulse output → Failsafe mode can be selected
- Status output → "Not conductive" in the event of fault or power supply failure

Load

See "output signal"

Low flow cutoff

Switch points for low flow cutoff are selectable.

Galvanic isolation

All circuits for inputs, outputs and power supply are galvanically isolated from each other.

Power supply

Terminal assignment

Order code for "Input / Output"	Terminal No.					
	24 (+)	25 (–)	26 (+)	27 (–)	1 (L1/L+)	2 (N/L–)
A	Pulse/status output		HART current output		Power supply	
Functional values	→ Section "Output signal"				→ Section "Supply voltage"	

Supply voltage

- 85 to 250 V AC, 45 to 65 Hz
- 20 to 28 V AC, 45 to 65 Hz
- 11 to 40 V DC

Power consumption

- 85 to 250 V AC: < 12 VA (incl. sensor)
- 20 to 28 V AC: < 8 VA (incl. sensor)
- 11 to 40 V DC: < 6 W (incl. sensor)

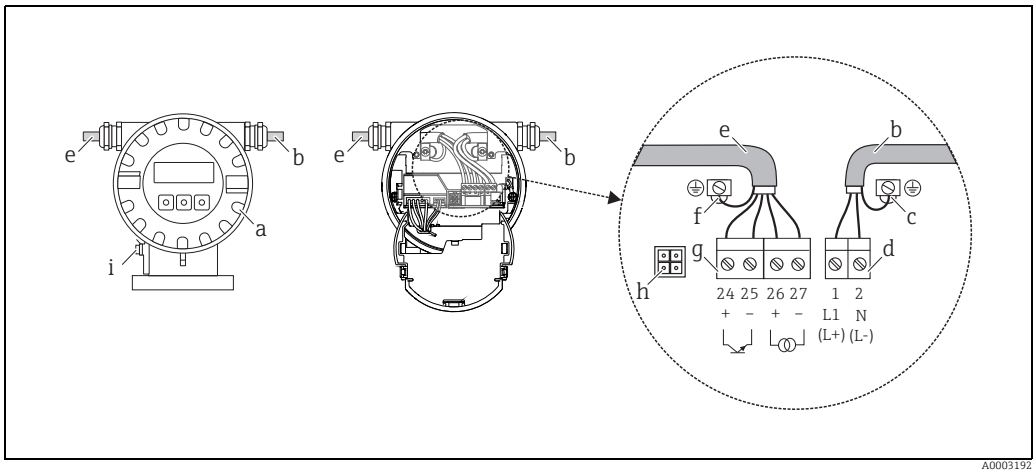
Switch-on current:

- Max. 16 A (< 5 ms) for 250 V AC
- Max. 5.5 A (< 5 ms) for 28 V AC
- Max. 3.3 A (< 5 ms) for 24 V DC

Power supply failure

Lasting min. ½ cycle frequency: EEPROM saves measuring system data

Electrical connection



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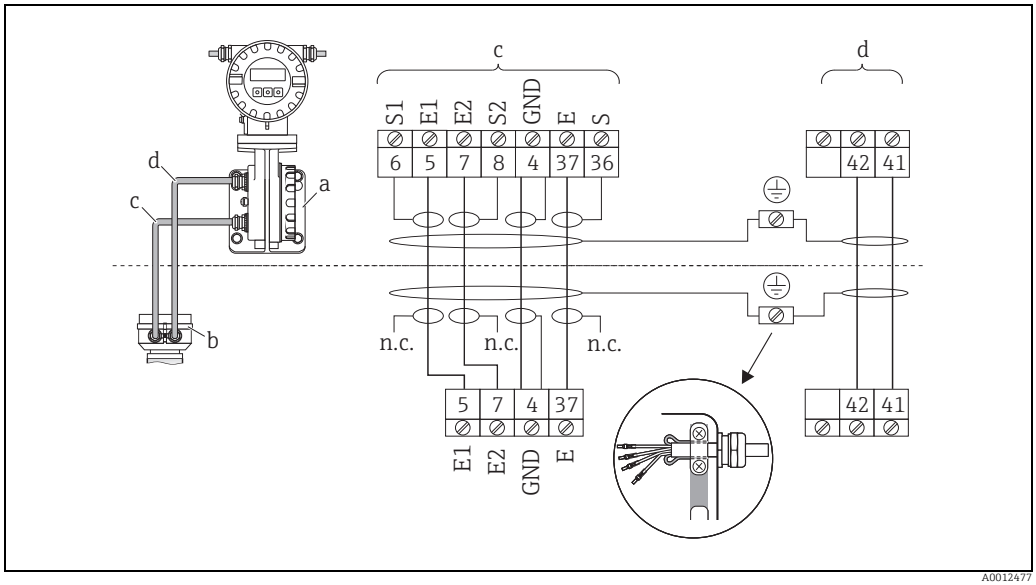
Connecting the transmitter (aluminum field housing), cable cross-section max. 2.5 mm² (14 AWG)

a Electronics compartment cover
b Power supply cable
c Ground terminal for power supply cable
d Terminal connector for power supply cable
e Electrode cable
f Ground terminal for electrode cable
g Terminal connector for electrode cable
h Service connector
i Ground terminal for potential equalization

Electrical connection, remote version



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Connecting the remote version

a Wall-mount housing connection compartment
b Sensor connection housing cover
c Electrode cable
d Coil current cable
n.c. Not connected, insulated cable shields

Terminal numbers and cable colours:
5/6 = brown, 7/8 = white, 4 = green, 37/36 = yellow

Note!
Grounding the cable shielding in the sensor takes place by means of the strain relief terminal.

Potential equalization

To guarantee perfect measurement, the sensor and the fluid have to be on the same electric potential. Potential equalization can take place by means of the metal, process connections in contact with the medium which are mounted directly on the sensors. As a result, further measures for potential equalization are generally not required.

Cable entries

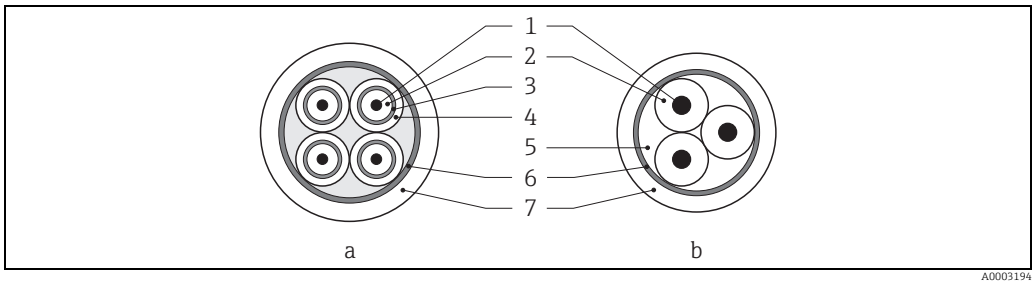
Power supply and electrode cables (inputs/outputs):
- Cable entry M20 × 1.5 (8 to 12 mm / 0.31 to 0.47")
- Thread for cable entries, ½" NPT, G ½"

Connecting cable for remote version:
- Cable entry M20 × 1.5 (8 to 12 mm / 0.31 to 0.47")
- Thread for cable entries, ½" NPT, G ½"

Remote version cable specifications

Coil current cable
- 3 × 0.75 mm^2 (18 AWG) PVC cable with common, braided copper shield (ø ~ 9 mm / 0.35")
- Conductor resistance: ≤ 37 Ω/km (≤ 0.011 Ω/ft)
- Capacitance core/core, shield grounded: ≤ 120 pF/m (≤ 37 pF/ft)
- Operating temperature: –20 to +80 °C (–68 to +176 °F)
- Cable cross-section: max. 2.5 mm^2 (14 AWG)
- Test voltage for cable insulation: ≤ 1433 AC r.m.s 50/60 Hz or ≥ 2026 V DC

Electrode cable
- 3 × 0.38 mm^2 (20 AWG) PVC cable with common, braided copper shield (ø ~ 9.5 mm / 0.37") and individual shielded cores
- With empty pipe detection (EPD): 4 × 0.38 mm^2 (20 AWG) PVC cable with common, braided copper shield (ø ~ 9.5 mm / 0.37") and individual shielded cores
- Conductor resistance: ≤ 50 Ω/km (≤ 0.015 Ω/ft)
- Capacitance core/shield: ≤ 420 pF/m (≤ 128 pF/ft)
- Operating temperature: –20 to +80 °C (–68 to +176 °F)
- Cable cross-section: max. 2.5 mm^2 (14 AWG)



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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

Operation in zones of severe electrical interference
The measuring device complies with the general safety requirements in accordance with EN 61010 and the EMC requirements of IEC/EN 61326.

Note!
Grounding is by means of the ground terminals provided for the purpose inside the connection housing. Ensure that the stripped and twisted lengths of cable shield to the ground terminal are as short as possible.

Performance characteristics

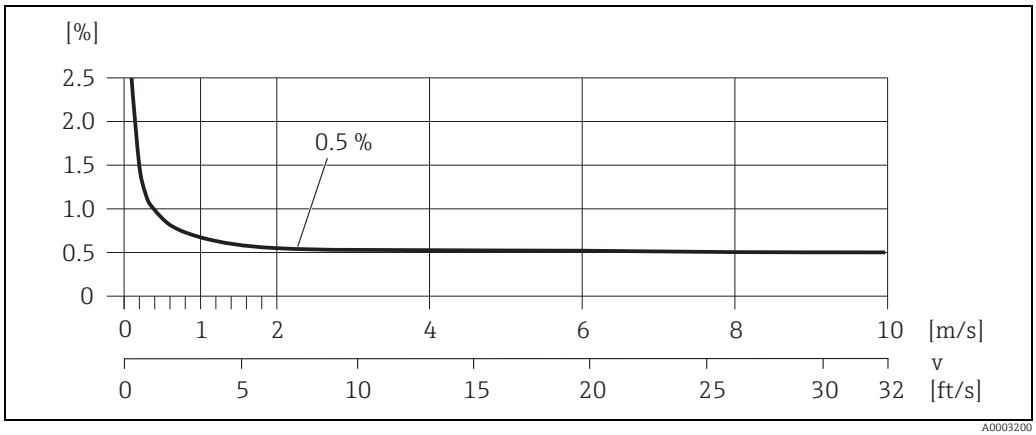
Reference operating conditions

- Error limits following DIN EN 29104, future ISO 20456
- Water, typically +15 to +45°C (+59 to +113 °F); 0.5 to 7 bar (73 to 101 psi)
- Specification as per calibration protocol
- Data on the measured error based on accredited calibration rigs traced back to ISO 17025

Maximum measured error

- Pulse output: ±0.5% o.r. ± 2 mm/s (o.r. = of reading)
- Current output: also typically ± 5 µA

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



Max. measured error in % of reading

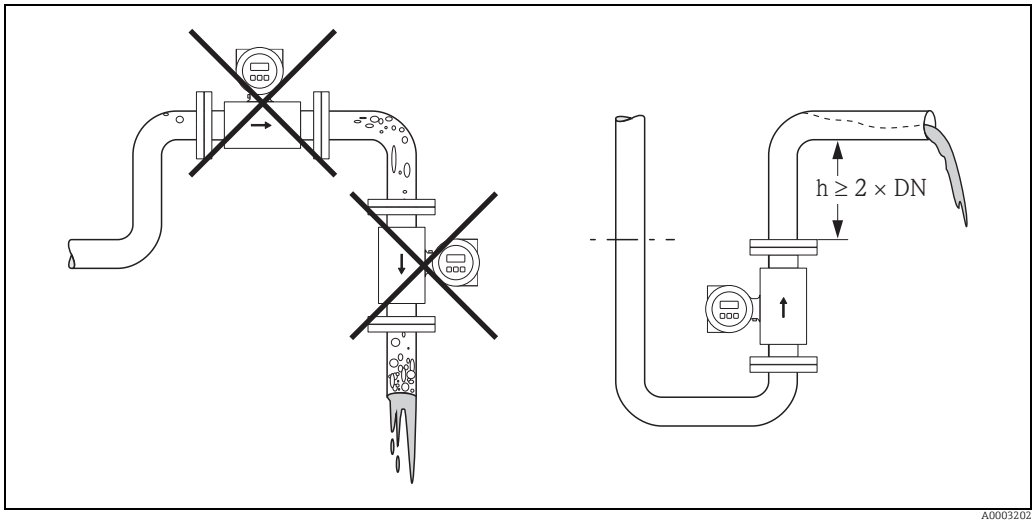
Repeatability

Max. ±0.2% o.r. ± 2 mm/s (o.r. = of reading)

Installation

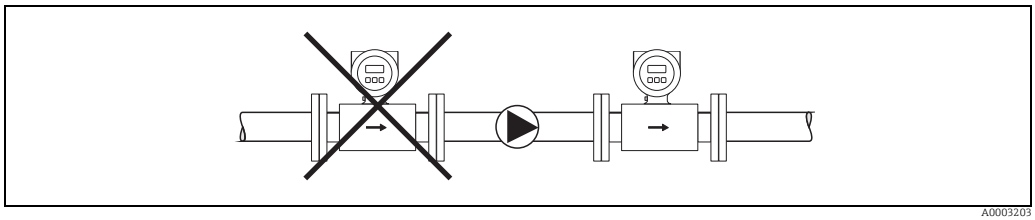
Mounting location

Entrained air or gas bubble formation in the measuring tube can result in an increase in measuring errors.
Avoid the following installation locations in the pipe:
- Highest point of a pipeline. Risk of air accumulating!
- Directly upstream from a free pipe outlet in a vertical pipeline.



Mounting location

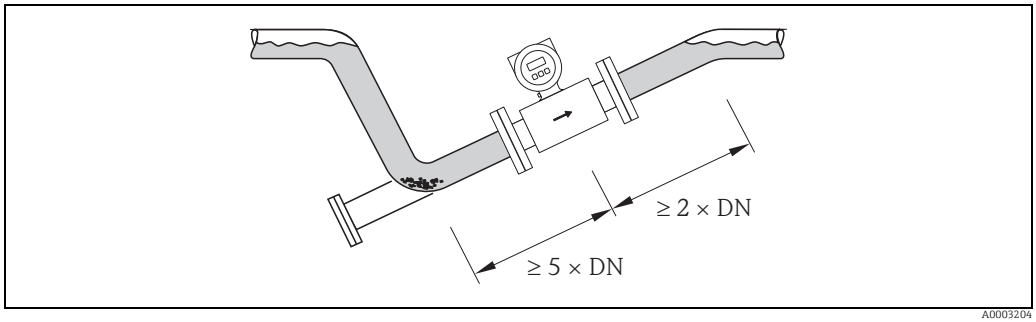
Installation of pumps
Sensors may not be installed on the pump suction side. This precaution is to avoid low pressure and the consequent risk of damage to the lining of the measuring tube. Information on the pressure tightness of the measuring tube lining → 20, Section "Pressure tightness".
It might be necessary to install pulse dampers in systems incorporating reciprocating, diaphragm or peristaltic pumps. Information on the shock and vibration resistance of the measuring system → 14, Section "Shock and vibration resistance".



Installation of pumps

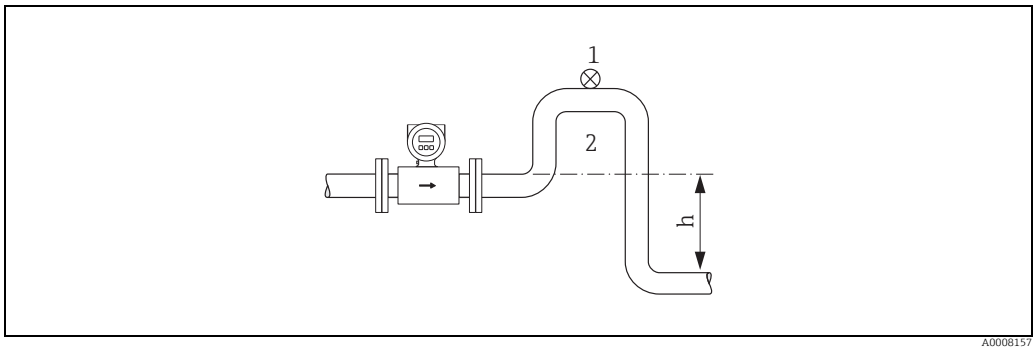
Partially filled pipes
Partially filled pipes with gradients necessitate a drain-type configuration.
The empty pipe detection function (EPD) provides additional security in detecting empty or partially filled pipes.

Note!
Risk of solids accumulating. Do not install the sensor at the lowest point in the drain. It is advisable to install a cleaning valve.



Installation with partially filled pipes

Down pipes
Install a siphon or a vent valve downstream of the sensor in down pipes h ≥ 5 m (16.4 ft). This precaution is to avoid low pressure and the consequent risk of damage to the lining of the measuring tube. This measure also prevents the liquid current stopping in the pipe which could cause air locks. Information on the pressure tightness of the measuring tube lining → 20, Section "Pressure tightness".



Installation measures for vertical pipes

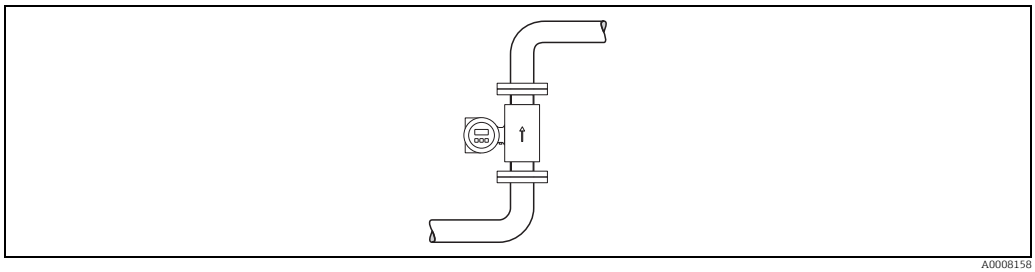
1 Vent valve
2 Pipe siphon
h Length of the down pipe

Orientation

An optimum orientation position helps avoid gas and air accumulations and deposits in the measuring tube. The measuring device also offers the additional empty pipe detection function (EPD) for the detection of partially filled measuring tubes, e.g. in the case of degassing fluids or varying process pressures.

Vertical orientation

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



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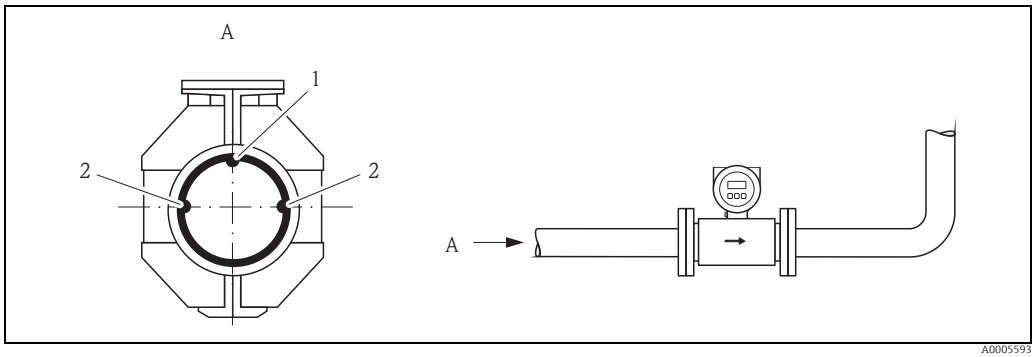
Vertical orientation

Horizontal orientation

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

Note!
Empty pipe detection only works correctly with horizontal orientation if the transmitter housing is facing upwards. Otherwise there is no guarantee that empty pipe detection will respond if the measuring tube is only partially filled or empty.



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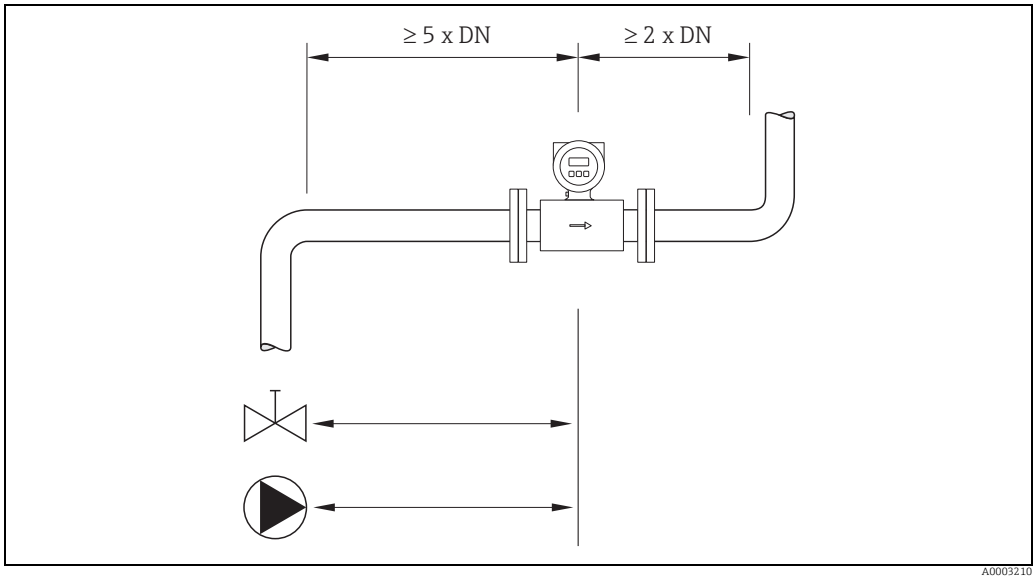
Horizontal orientation

1 EPD electrode for empty pipe detection (not for DN 2 to 8/ 1/12 to 5/16")
2 Measuring electrodes for signal detection

Inlet and outlet runs

If possible, install the sensor well clear of assemblies such as valves, T-pieces, elbows etc.

Note the following inlet and outlet runs to comply with measuring accuracy specifications:
- Inlet run: ≥ 5 × DN
- Outlet run: ≥ 2 × DN



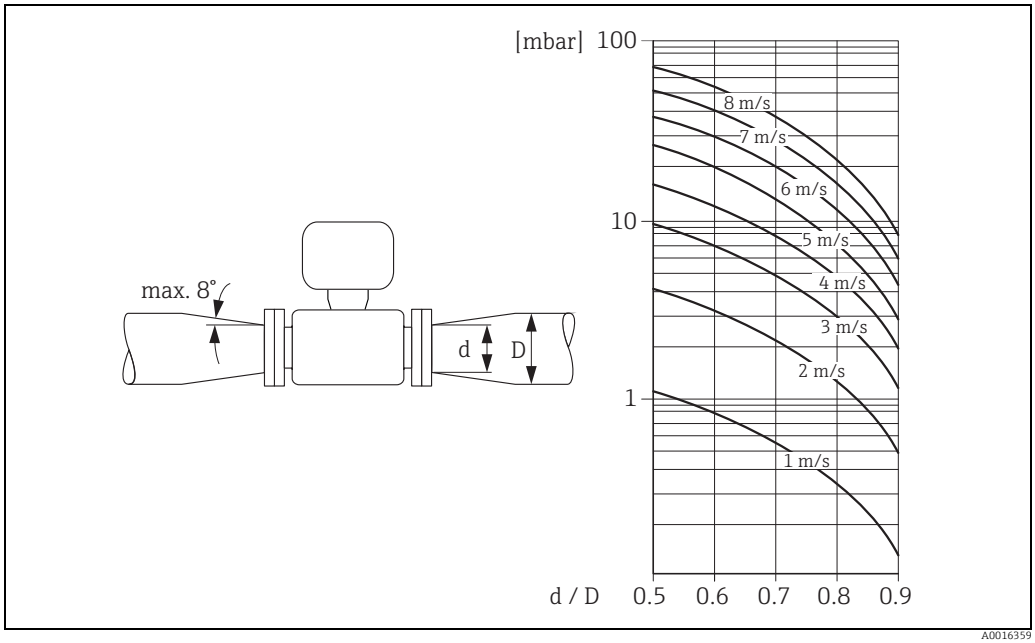
Inlet and outlet runs

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.

Note!
- The nomogram only applies to liquids of viscosity similar to that of water.
- For high viscosities of the fluid the selection of a pipe with larger diameter may be considered to reduce the pressure loss.

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

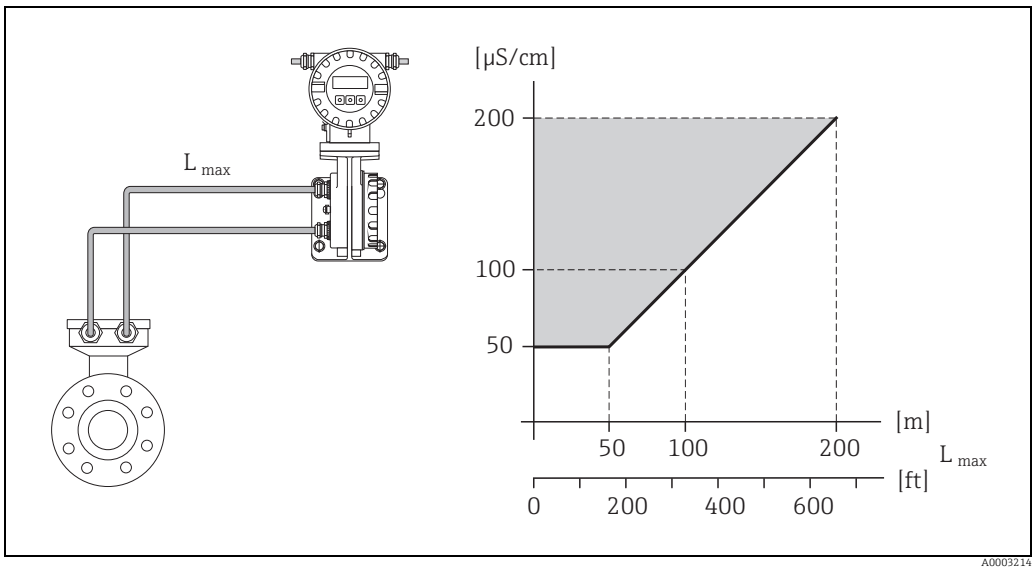


Pressure loss due to adapters

Length of connecting cable

When mounting the remote version, please note the following to achieve correct measuring results:

- Fix cable run or lay in armored conduit. Cable movements can falsify the measuring signal especially in the case of low fluid conductivities.
- Route the cable well clear of electrical machines and switching elements.
- If necessary, ensure potential equalization between sensor and transmitter.
- The permitted cable length L_{max} is determined by the fluid conductivity.
  A minimum conductivity of 50 µS/cm is needed for all fluids.
- When the empty pipe detection function is switched on (EPD), the maximum connecting cable length is 10 m (33 ft).



Permitted length of connecting cable for remote version
Area marked in gray = permitted range; L_{max} = length of connecting cable in [m] ([ft]); fluid conductivity in [µS/cm]

Environment

Ambient temperature range

- Transmitter: −20 to +60 °C (−4 to +140 °F)

  Note!
  At ambient temperatures below −20 °C (−4 °F), the readability of the display may be impaired.
- Sensor: −40 to +60 °C (−40 to +140 °F)

Note!
- The permitted temperature range of the measuring tube lining may not be undershot or overshot (→ 14, Section "Medium temperature range").
- Install the device at a shady location. Avoid direct sunlight, particularly in warm climatic regions.
- The transmitter must be mounted separate from the sensor if both the ambient and fluid temperatures are high.

Storage temperature

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

Note!
- The measuring device must be protected against direct sunlight during storage in order to avoid unacceptably high surface temperatures.
- A storage location must be selected where moisture does not collect in the measuring device. This will help prevent fungus and bacteria infestation which can damage the liner.
- If protecting caps or protective covers are mounted, these must not be removed before mounting the device.

Degree of protection

- Standard: IP 67 (NEMA 4X) for transmitter and sensor.

Shock and vibration resistance

Acceleration up to 2 g following IEC 68-2-6

Interior cleaning

- CIP cleaning
- SIP cleaning

Electromagnetic compatibility (EMC)

- As per IEC/EN 61326 and NAMUR recommendation NE 21
- Emission: to limit value for industry EN 55011

Process

Medium temperature range

Sensor:
- DN 2 to 150 (1/12 to 6"): −20 to +150 °C (−4 to +302 °F)

Seals:
- EPDM: −20 to +150 °C (−4 to 302 °F)
- Viton (FKM): −20 to +150 °C (−4 to 302 °F)
- Kalrez: −20 to +150 °C (−4 to 302 °F)

Conductivity

The minimum conductivity is: ≥ 50 µS/cm

Note!
In the remote version, the necessary minimum conductivity also depends on the cable length (→ 13, Section "Length of connecting cable").

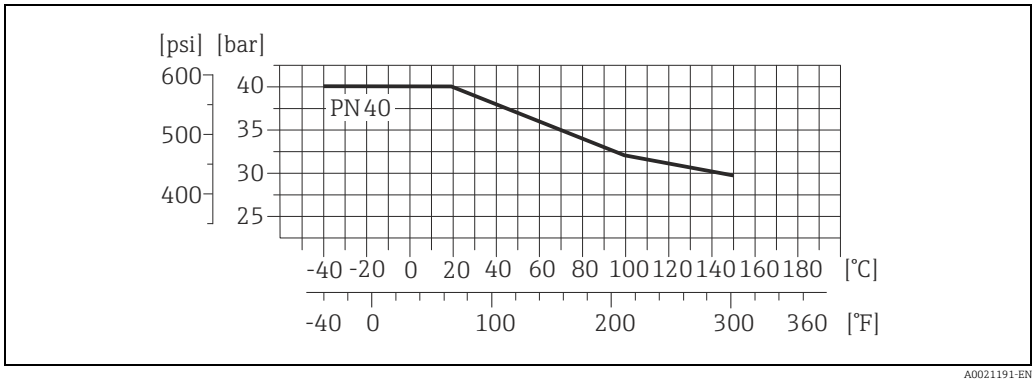
Pressure-temperature ratings

The following diagrams contain pressure-temperature ratings (reference curves) for flange materials with regard to the medium temperature.

Process connections with O-ring seal, 2 to 25 (1/12 to 1")

Process connection: coupling according to ISO 228 (DIN 2999), NPT; flange according to EN 1092-1 (DIN 2501)

Process connection material: stainless steel, 1.4404 (316L)



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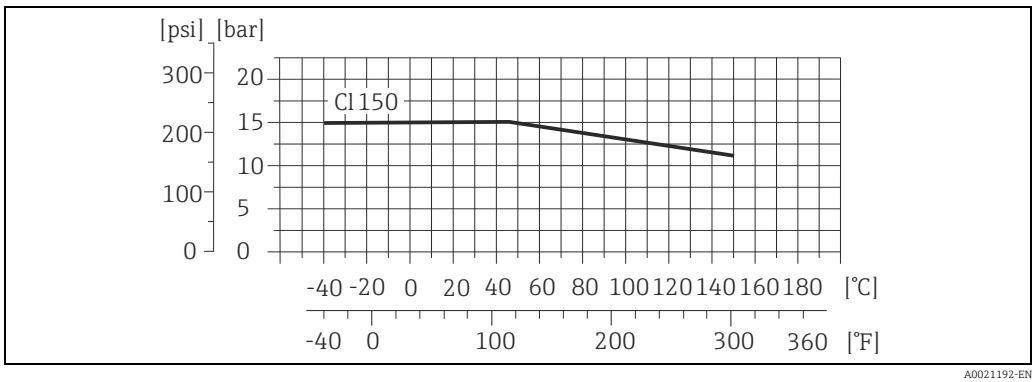
Process connection: flange according to ASME B16.5

Process connection material: stainless steel, 1.4404 (316L)



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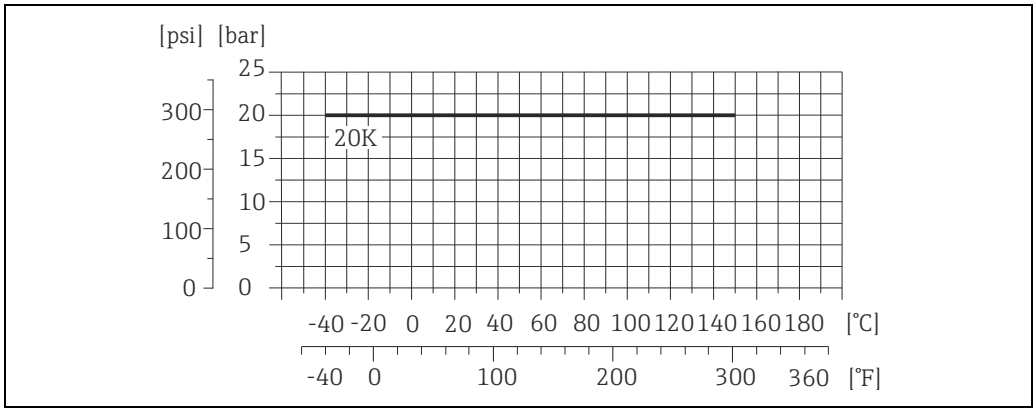
Process connection: flange according to JIS B2220

Process connection material: stainless steel, 1.4404 (316L)



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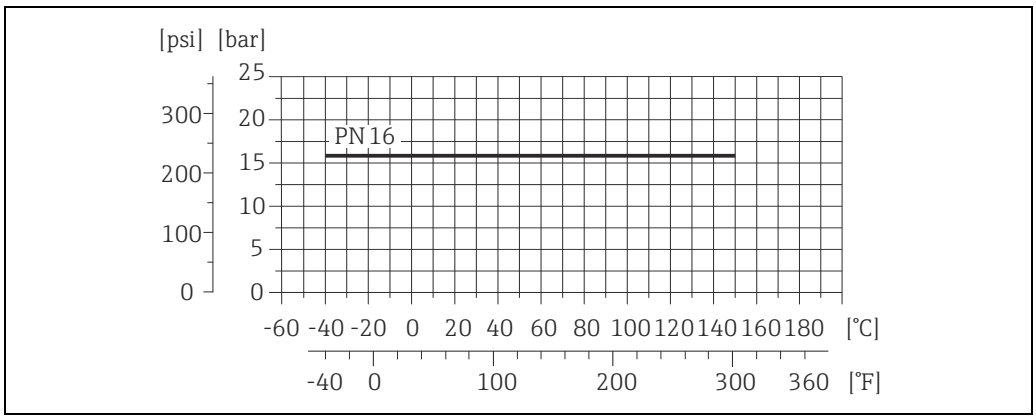
Process connections with aseptic gasket seal, 2 to 25 (1/12 to 1")

Process connection: welding nipple according to EN 10357 (DIN 11850), ODT/SMS;
clamp according to ISO 2852, DIN 32676, L14 AM7;
coupling according to SC DIN 11851, DIN 11864-1, SMS 1145;
flange according to DIN 11864-2

Process connection material: stainless steel, 1.4404 (316L)



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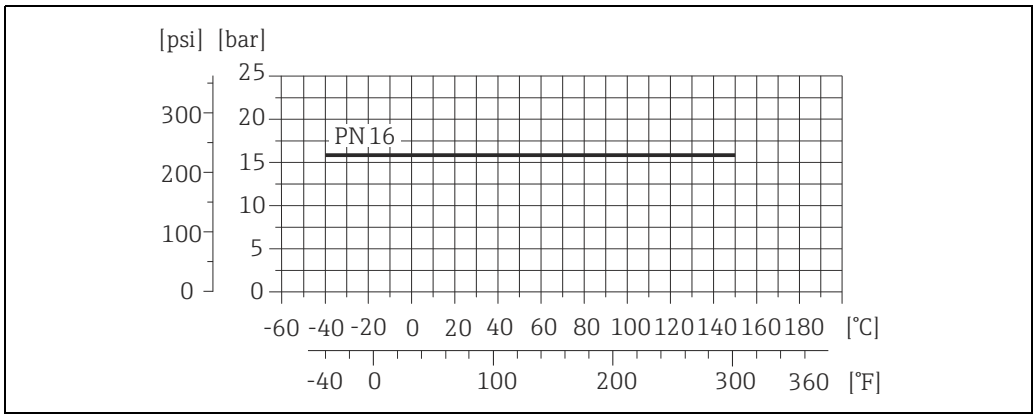
Process connections with aseptic gasket seal, 40 to 150 (1½ to 6")

Process connection: welding nipple according to ODT/SMS;
coupling according to SMS 1145,

Process connection material: stainless steel, 1.4404 (F316L)



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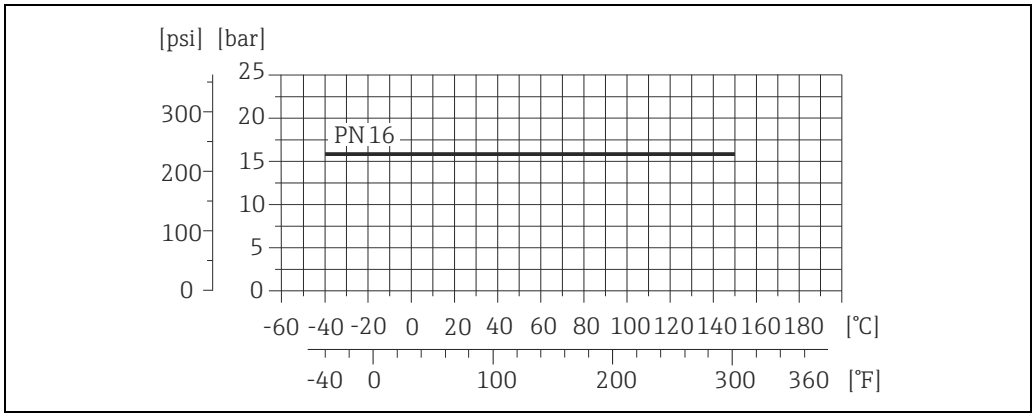
Process connection: welding nipple according to EN 10357 (DIN 11850); coupling according to SC DIN 11851

Process connection material: stainless steel, 1.4404 (F316L)



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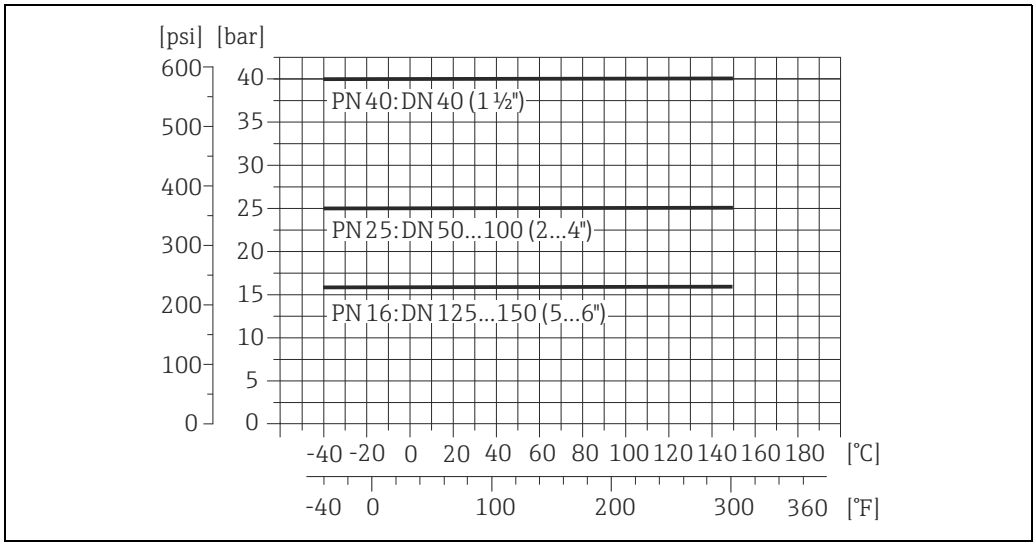
For order codes with suffixes +CA/+CB:



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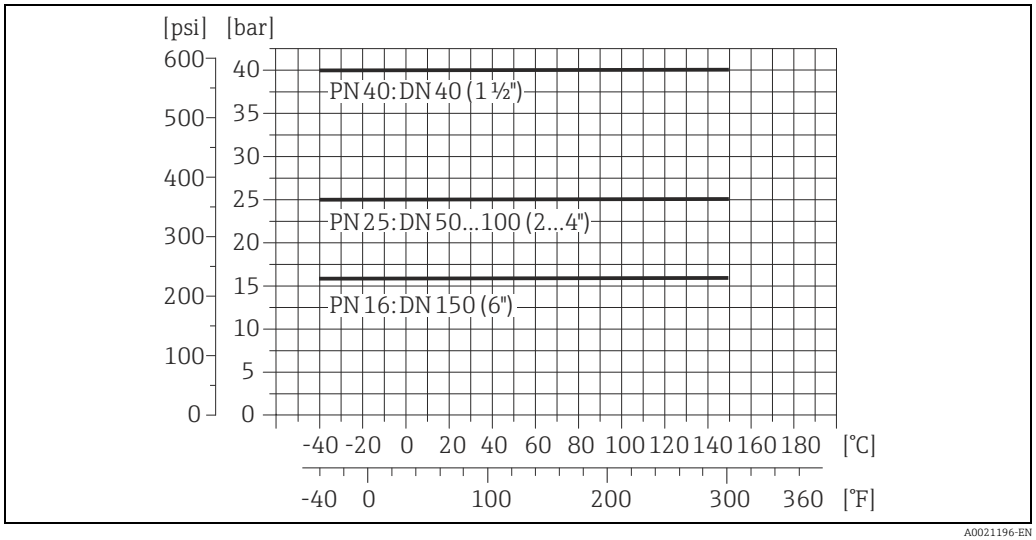
Process connection: welding nipple according to ASME BPE

Process connection material: stainless steel, 1.4404 (F316L)



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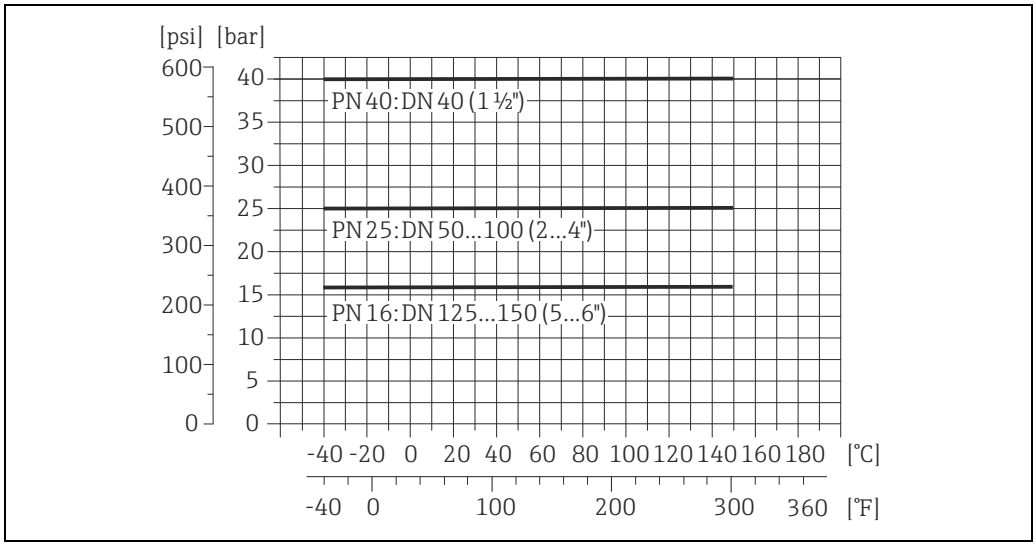
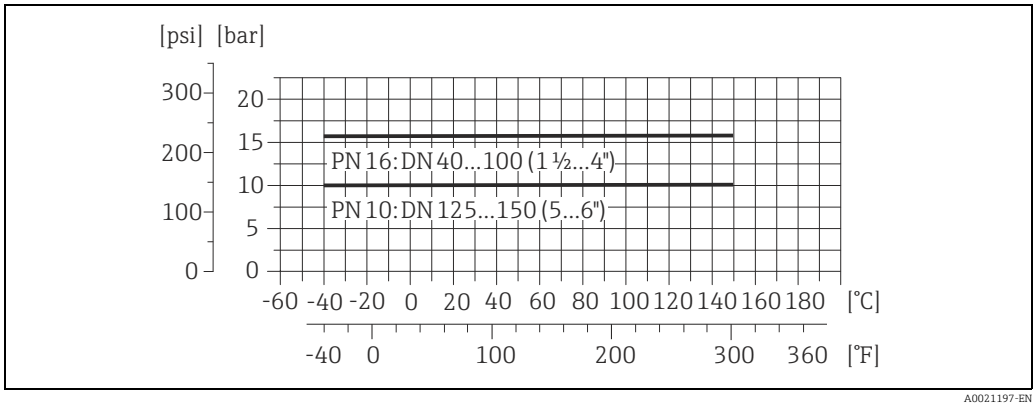
Process connection: welding nipple according to ISO 2037

Process connection material: stainless steel, 1.4404 (F316L)



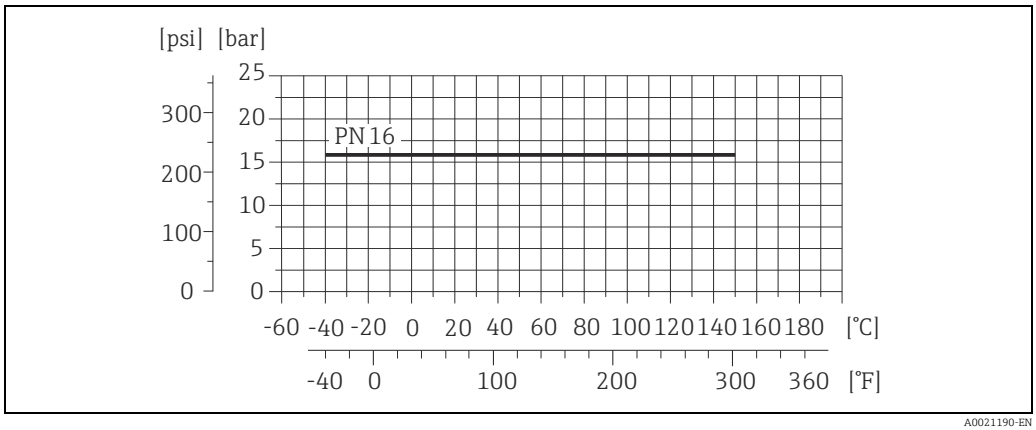
Process connection: clamp according to L14 AM7

Process connection material: stainless steel, 1.4404 (F316L)

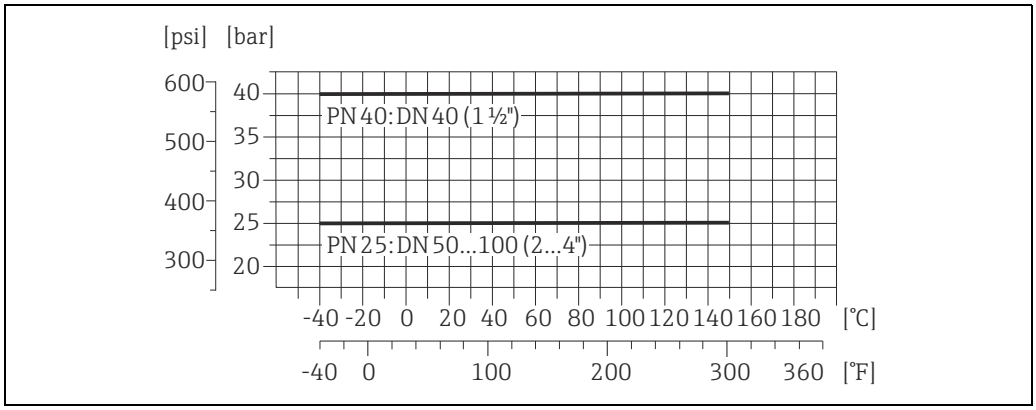


Process connection: coupling according to DIN 11864-1

Process connection material: stainless steel, 1.4404 (F316L)



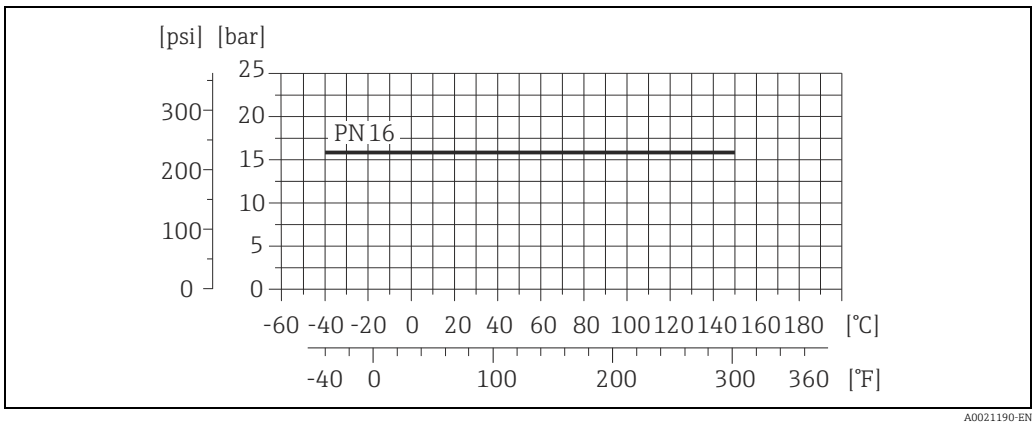
For order codes with suffixes +CA/+CB:



A0021194-EN

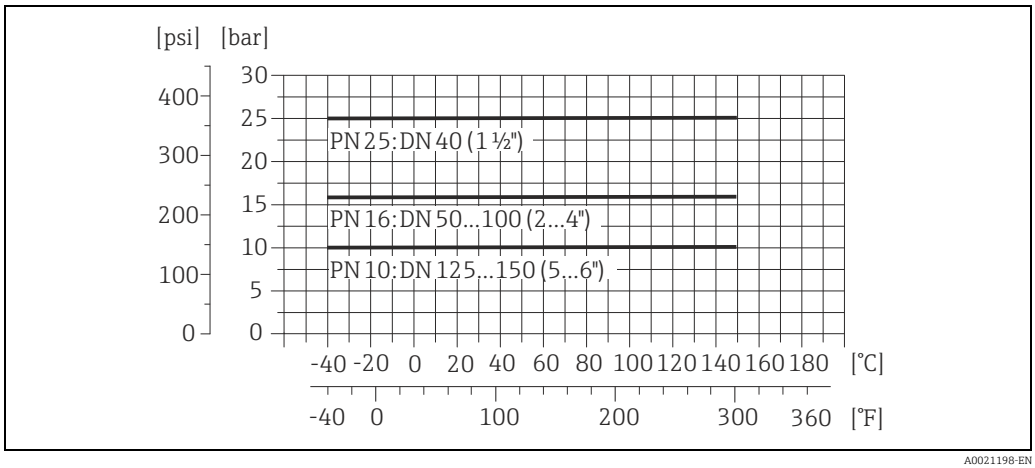
Process connection: flange according to DIN 11864-2

Process connection material: stainless steel, 1.4404 (F316L)



A0021190-EN

For order codes with suffixes +CA/+CB:



A0021198-EN

Medium pressure range (nominal pressure)

The permitted nominal pressure depends on the process connection, the seal and the nominal diameter.

Process connections DN 2 to 25 (1/12 to 1") with O-ring seal

Nominal diameter	[mm]	2	4	8	15	25
	[inch]	1/12"	1/8"	3/8"	1/2"	1"
Couplings: ISO 228/DIN 2999, NPT		1.4404 (316L): PN 40 (580 psi)				
Flange: EN 1092-1 (DIN 2501)						
Flange: ASME B16.5		1.4404 (316L): Class 150				
Flange: JIS B2220		1.4404 (316L): 20 K				

Process connections DN 2 to 25 (1/12 to 1") with aseptic gasket seal

Nominal diameter	[mm]	2	4	8	15	25
	[inch]	1/12"	1/8"	3/8"	1/2"	1"
Welding nipple: EN 10357 (DIN 11850), ODT/SMS		1.4404 (316L): PN 16 (232 psi)				
Couplings: SC DIN 11851, DIN 11864-1, SMS 1145						
Clamp: L14 AM7						
Flange: DIN 11864-2						

Process connections DN 40 to 150 (1½ to 6") with aseptic gasket seal 1.4404 (F316L)

Nominal diameter	[mm]	40	50	65	80	100	125	150
	[inch]	1½"	2"	-	3"	4"	-	6"
Welding nipple: ODT/SMS		PN 16 (232 psi)						
Welding nipple: EN 10357 (DIN 11850)		PN 16 (232 psi)						
– For order codes with suffixes +CA/+CB		PN 40 (580 psi)	PN 25 (362.5 psi)				PN 16 (232 psi)	
Welding nipple: ISO 2037		PN 40 (580 psi)	PN 25 (362.5 psi)				PN16 (232 psi)	
Welding nipple: ASME BPE		PN 40 (580 psi)	PN 25 (362.5 psi)				-	PN 16 (232 psi)
Clamp: L14 AM7		PN 16 (232 psi)					PN 10 (145 psi)	
Coupling: SC DIN 11851		PN 16 (232 psi)						
– For order codes with suffixes +CA/+CB		PN 40 (580 psi)	PN 25 (362.5 psi)				PN 16 (232 psi)	
Coupling: SMS 1145		PN 16 (232 psi)						
Coupling: DIN 11864-1		PN 16 (232 psi)						
– For order codes with suffixes +CA/+CB		PN 40 (580 psi)	PN 25 (362.5 psi)				-	
Flange: DIN 11864-2		PN 16 (232 psi)						
– For order codes with suffixes +CA/+CB		PN 25 (362.5 psi)	PN 16 (232 psi)				PN 10 (145 psi)	

Pressure tightness

Measuring tube lining: PFA

Nominal diameter		Limit values for abs. pressure [mbar] ([psi]) at fluid temperatures:				
[mm]	[inch]	25 °C (77 °F)	80 °C (176 °F)	100 °C (212 °F)	130 °C (266 °F)	150 °C (302 °F)
2 to 150	1/12 to 6"	0	0	0	0	0

Limiting flow

The diameter of the pipe and the flow rate determine the nominal diameter of the sensor.
The optimum flow velocity is between 2 and 3 m/s (6.5 to 9.8 ft/s). Also match the velocity of flow (v) to the physical properties of the fluid:

- v < 2 m/s (6.5 ft/s): For low conductivity values
- v > 2 m/s (6.5 ft/s): For media that produce buildup (e.g. milk with high fat content)

Note!
- A necessary increase in the flow velocity can be achieved by reducing the sensor nominal diameter (→ 12, Section "Adapters").
- For fluids with high levels of solids, the selection of a pipe with nominal diameter > DN 8 (3/8") may be considered, to improve the stability of the signal and cleanability due to larger electrodes.

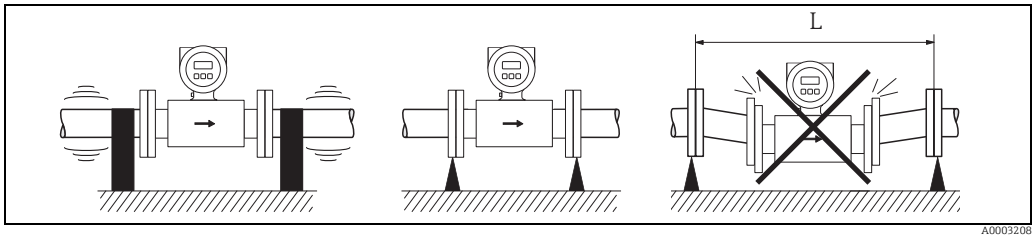
Pressure loss

- No pressure loss if the sensor is installed in a pipe with the same nominal diameter.
- Pressure losses for configurations incorporating adapters according to DIN EN 545 (→ 12, Section "Adapters").

Vibrations

Secure the piping and the sensor if vibration is severe.

Note!
If vibrations are too severe, we recommend the sensor and transmitter be mounted separately. Information on the permitted shock and vibration resistance → 14, Section "Shock and vibration resistance".



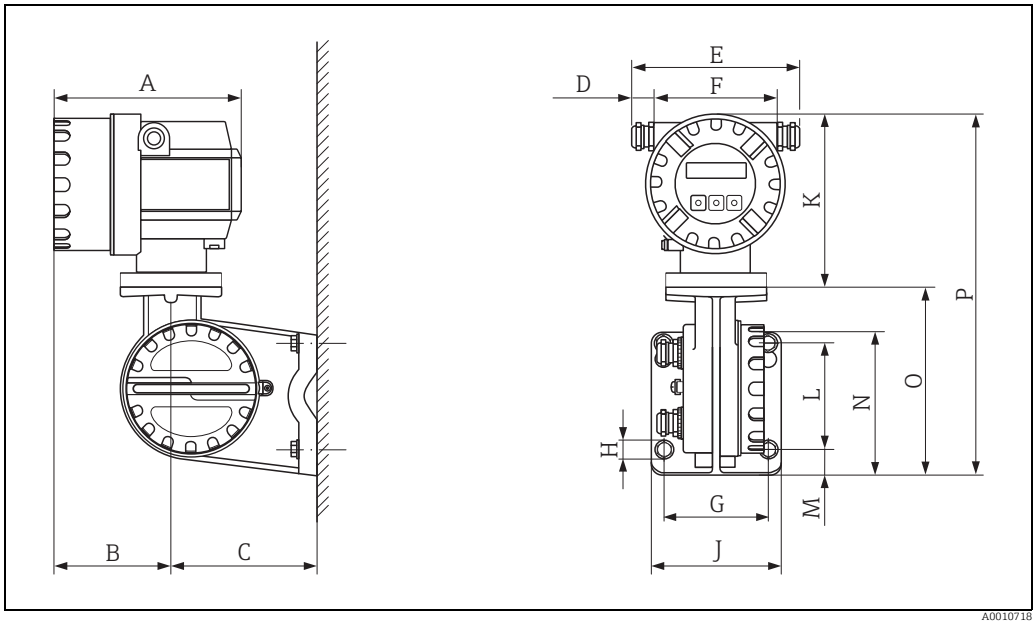
Measures to prevent vibration of the measuring device

L > 10 m (33 ft)

Mechanical construction

Design, dimensions

Transmitter, remote version



Transmitter dimensions, remote version

Dimensions in SI units

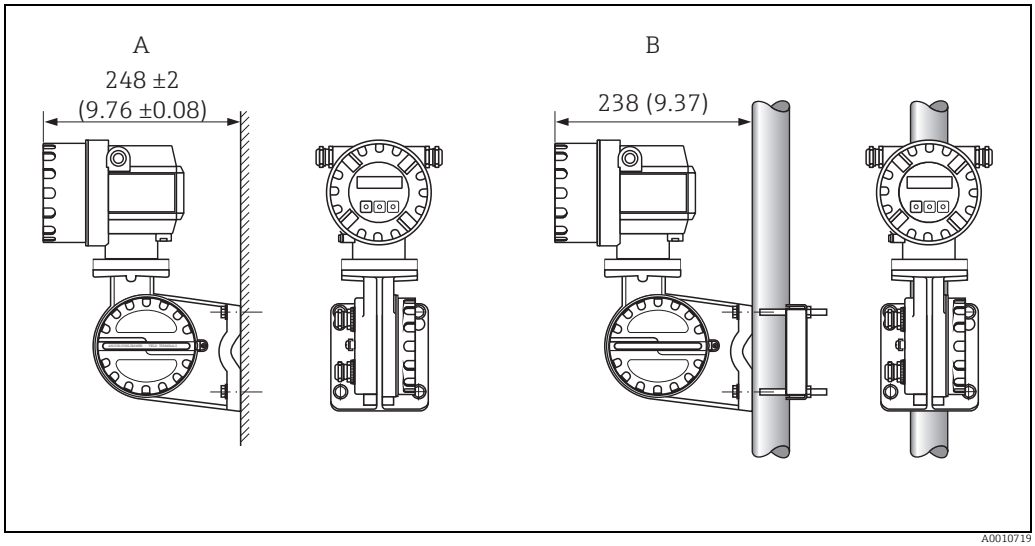
A	B	C	D	E	F	G	Ø H
178	113	135	20 to 30	161 to 181	121	100	8.6 (M8)
J	K	L	M	N	O	P	
123	150	100	25	133	177.5	327.5	

All dimensions in [mm]

Dimensions in US units

A	B	C	D	E	F	G	Ø H
7.00	4.45	5.31	0.79 to 1.81	6.34 to 7.13	4.76	3.94	0.34 (M8)
J	K	L	M	N	O	P	
4.84	5.90	3.94	0.98	5.24	6.99	12.89	

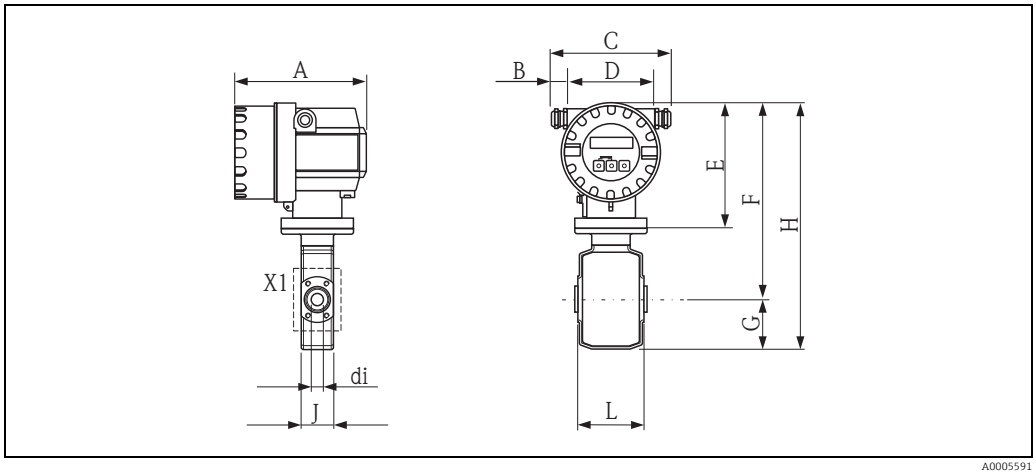
All dimensions in [inch]



Transmitter mounting, remote version

A Direct wall mounting
B Pipe mounting

Compact version DN 2 to 25 (1/12 to 1")



A0005591

Dimensions in SI units

DN	L	A	B	C	D	E	F	G	H	J	X1	di
2	86	178	20 to 30	161 to 181	113	150	235	48	283	43	M6 × 4	2.25
4										43		4.5
8										43		9.0
15										43		16.0
1"							239	52	291	53		22.6
25							239	52	291	53		26.0

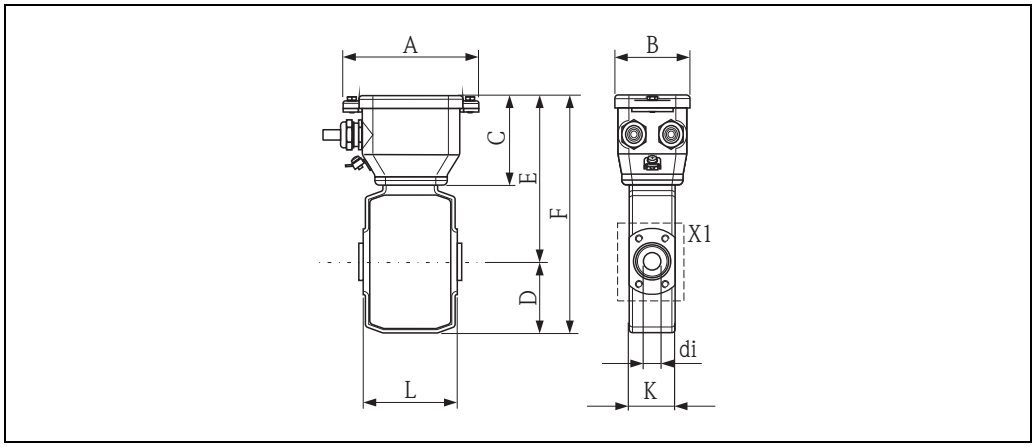
Total length depends on the process connections.
All dimensions in [mm]

Dimensions in US units

DN	L	A	B	C	D	E	F	G	H	J	X1	di
1/12"	3.39	7.01	0.79 to 1.81	6.34 to 7.13	4.45	5.91	9.21	1.88	11.09	1.69	M6 × 4	0.09
1/8"										1.69		0.18
3/8"										1.69		0.35
1/2"										1.69		0.63
1"							7.33	2.04	3.37	2.07		0.89
DN 25							7.33	2.04	3.37	2.07		1.02

Total length depends on the process connections.
All dimensions in [inch]

Sensor, remote version DN 2 to 25 (1/12 to 1")



A0005536

Dimensions in SI units

DN	L	A	B	C	D	E	F	K	X1	di
2	86	127	70	75	48	129	177	43	M6 × 4	2.25
4								43		4.5
8								43		9.0
15								43		16.0
1"					52	133	185	53		22.6
25					52	133	185	53		26.0

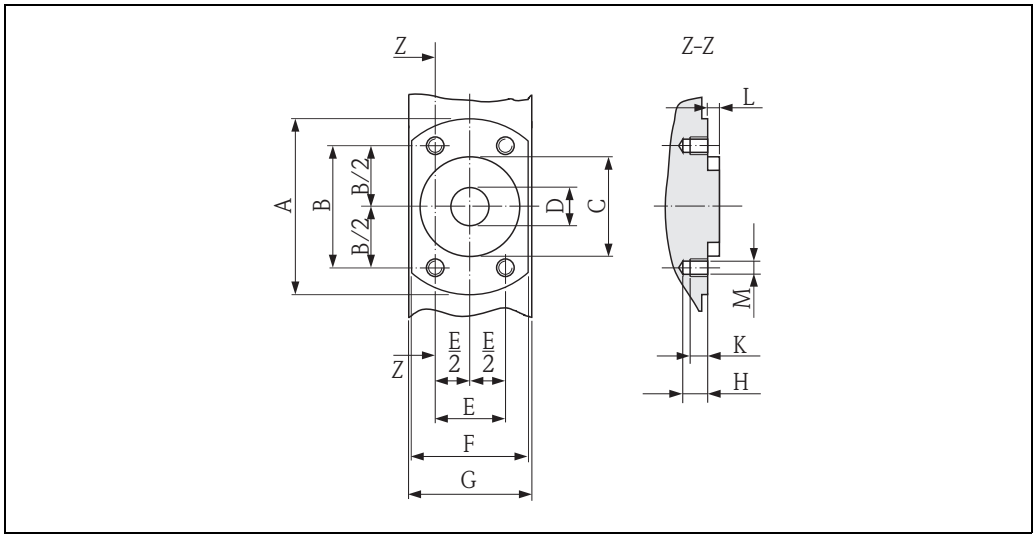
Total length depends on the process connections.
All dimensions in [mm]

Dimensions in US units

DN	L	A	B	C	D	E	F	K	X1	di
1/12"	3.39	5.00	2.76	2.95	1.88	5.06	6.94	1.69	M6 × 4	0.09
1/8"								1.69		0.18
3/8"								1.69		0.35
1/2"								1.69		0.63
1"					2.04	5.21	7.25	2.07		0.89
DN 25					2.04	5.21	7.25	2.07		1.02

Total length depends on the process connections.
All dimensions in [inch]

Sensor, front view (without process connections) DN 2 to 25 (1/12 to 1")



A0008190

Dimensions in SI units

DN	A	B	C	D	E	F	G	H	K	L	M
2	62	41.6	34	9	24	42	43	8.5	6	4	M6
4				9							
8				9							
15				16							
1"	72	50.2	44	22.6	29	55	56				
25	72	50.2	44	26.0	29	55	56				

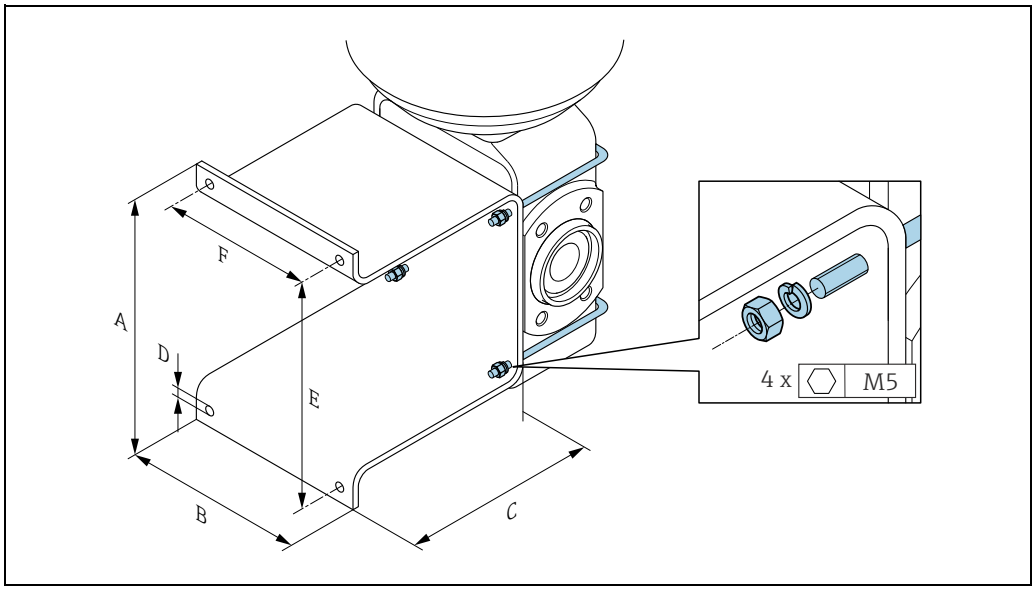
All dimensions in [mm]

Dimensions in US units

DN	A	B	C	D	E	F	G	H	K	L	M
1/12"	2.44	1.64	1.34	0.35	0.94	1.65	1.69	0.33	0.24	0.16	M6
1/8"				0.35							
3/8"				0.35							
1/2"				0.63							
1"	2.83	1.98	1.73	0.89	1.14	2.17	2.20				
DN 25	2.83	1.98	1.73	1.02	1.14	2.17	2.20				

All dimensions in [inch]

Sensor, wall mounting kit DN 2 to 25 (1/12 to 1")

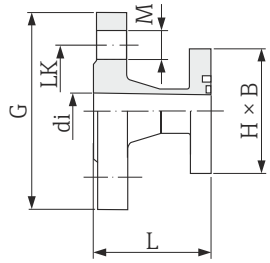


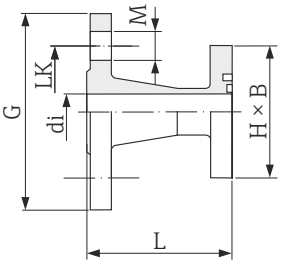
A0005537

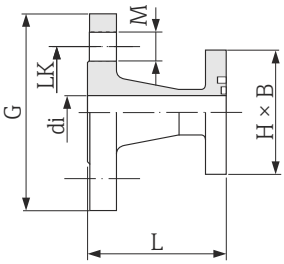
Dimensions in mm (inch)

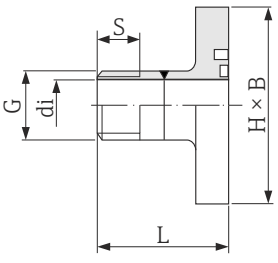
A	B	C	Ø D	E	F
140 (5.51")	110 (4.33")	120 (4.72")	7 (0.28")	125 (4.92")	88 (3.46")

Process connections with O-ring seal, DN 2 to 25 (1/12 to 1")

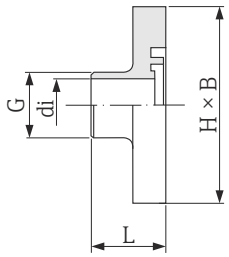
Flange according to EN 1092-1 (DIN 2501), Form B: PN 40 1.4404 (316L)	Sensor DN	Fits to flange [1]	di	G	L	LK	M	H × B
10H**-D**********	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]
	2 to 8	DN 15	17.3	95	56.2	65	14	62 × 42
	15	DN 15	17.3	95	56.2	65	14	62 × 42
	25 (DIN)	DN 25	28.5	115	56.2	85	14	72 × 55
	[1] EN 1092-1 (DIN 2501) ▪ Fitting length = (2 × L) + 86 mm ▪ Fitting length to DVGW (200 mm) ▪ Surface roughness: R_a ≤ 1.6 µm							

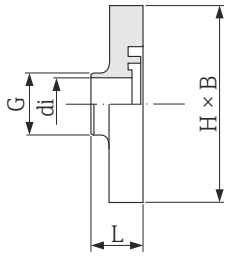
Flange according to ASME B16.5: Class 150 1.4404 (316L)	Sensor DN	Fits to flange≠	di	G	L	LK	M	H × B
10H**-E**********	[mm]	[inch]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]
	2 to 8	½"	15.7	89	66.0	60.5	15.7	62 × 42
	15	½"	16.0	89	66.0	60.5	15.7	62 × 42
	25 (1" ANSI)	1"	26.7	108	71.8	79.2	15.7	72 × 55
	[1] ASME B16.5 ▪ Fitting length = (2 × L) + 86 mm ▪ Surface roughness: R_a ≤ 1.6 µm							

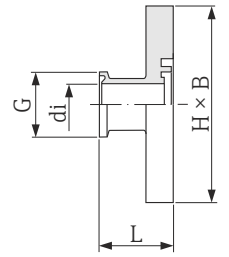
Flange according to JIS B2220: 20K 1.4404 (316L)	Sensor DN	Fits to flange	di	G	L	LK	M	H × B
10H**-F**********	[mm]	B2220	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]
	2 to 8	ND 15	15	95	67	70	15	62 × 42
	15	ND 15	16	95	67	70	15	62 × 42
	25 (DIN)	ND 25	26	125	67	90	19	72 × 55
	▪ Fitting length = (2 × L) + 86 mm ▪ Surface roughness: R_a ≤ 1.6 µm							

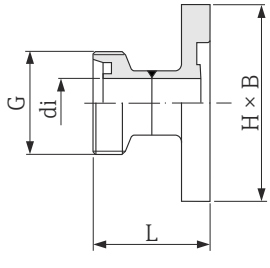
External thread according to ISO 228/DIN 2999 1.4404 (316L)	Sensor DN	Fits to internal thread	di	G	L	S	H × B
10H**-K**********	[mm]	[inch]	[mm]	[inch]	[mm]	[mm]	[mm]
	2 to 8	R 3/8"	10	3/8"	40	10.1	62 × 42
	15	R ½"	16	½"	40	13.2	62 × 42
	25 (1" ANSI)	R 1"	25	1"	42	16.5	72 × 55
	▪ Fitting length = (2 × L) + 86 mm ▪ Surface roughness: R_a ≤ 1.6 µm						

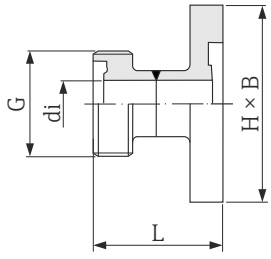
Process connections with aseptic gasket seal, DN 2 to 25 (1/12 to 1")

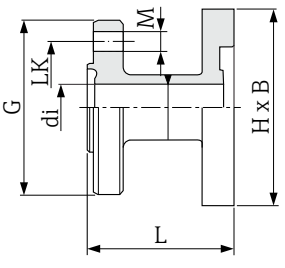
Welding nipple according to EN 10357 (DIN 11850) 1.4404 (316L)	Sensor DN	Fits to piping	di	G	L	H × B
10H**-U**********	[mm]	EN 10357 (DIN 11850)	[mm]	[mm]	[mm]	[mm]
 A0003870	2 to 8	13 × 1.5	10	14	23.3	62 × 42
	15	19 × 1.5	16	20	23.3	62 × 42
	25 (DIN)	29 × 1.5	26	30	23.3	72 × 55
	▪ Fitting length = (2 × L) + 86 mm ▪ Surface roughness: R_a ≤ 0.8 µm ▪ If pigs are used for cleaning, it is essential to take the inside diameters of measuring tube and process connection (di) into account!					

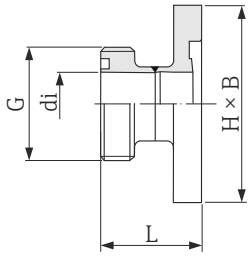
Welding nipple according to ODT/SMS 1.4404 (316L)	Sensor DN	Fits to piping	di	G	L	H × B
10H**-V**********	[mm]	ODT/SMS	[mm]	[mm]	[mm]	[mm]
 A0003871	2 to 8	12.7 × 1.65	9.0	12.7	16.1	62 × 42
	15	19.1 × 1.65	16.0	19.1	16.1	62 × 42
	25 (1" ANSI)	25.4 × 1.65	22.6	25.4	16.1	72 × 55
	▪ Fitting length = (2 × L) + 86 mm ▪ Surface roughness: R_a ≤ 0.8 µm ▪ If pigs are used for cleaning, it is essential to take the inside diameters of measuring tube and process connection (di) into account!					

Tri-Clamp for L14 AM7 1.4404 (316L)	Sensor DN	Fits to piping	di	G	L	H × B
10H**-1**********	[mm]	OD	[mm]	[mm]	[mm]	[mm]
 A0003872	2 to 8	Tube 12.7 × 1.65 (OD ½")	9.4	25.0	28.5	62 × 42
	15	Tube 19.1 × 1.65 (ODT ¾")	15.8	25.0	28.5	62 × 42
	25 (1" ANSI)	Tube 25.4 × 1.65 (ODT 1")	22.1	50.4	28.5	72 × 55
	▪ Fitting length = (2 × L) + 86 mm ▪ Surface roughness: R_a ≤ 0.8 µm ▪ If pigs are used for cleaning, it is essential to take the inside diameters of measuring tube and process connection (di) into account!					

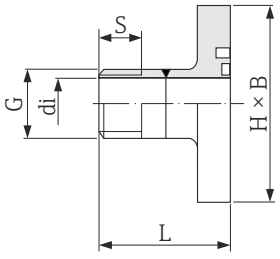
Coupling SC DIN 11851, threaded adapter 1.4404 (316L)	Sensor DN	Fits to piping	di	G	L	H × B
10H**-2**********	[mm]	EN 10357 (DIN 11850)	[mm]	[mm]	[mm]	[mm]
	2 to 8	Tube 12 × 1 (DN 10)	10	Rd 28 × ⅛"	44	62 × 42
	15	Tube 18 × 1.5 (DN 15)	16	Rd 34 × ⅛"	44	62 × 42
	25 (DIN)	Tube 28 × 1 or 28 × 1.5 (DN 25)	26	Rd 52 × 1/6"	52	72 × 55
	▪ Fitting length = (2 × L) + 86 mm ▪ Surface roughness: $R_a \leq 0.8$ µm ▪ If pigs are used for cleaning, it is essential to take the inside diameters of measuring tube and process connection (di) into account!					

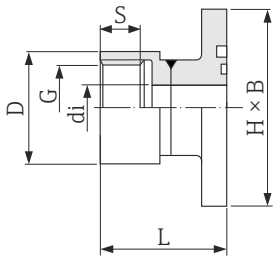
Coupling DIN 11864-1, aseptic threaded adapter, Form A 1.4404 (316L)	Sensor DN	Fits to piping	di	G	L	H × B
10H**-3**********	[mm]	EN 10357 (DIN 11850)	[mm]	[mm]	[mm]	[mm]
	2 to 8	Tube 13 × 1.5 (DN 10)	10	Rd 28 × ⅛"	42	62 × 42
	15	Tube 19 × 1.5 (DN 15)	16	Rd 34 × ⅛"	42	62 × 42
	25 (DIN)	Tube 29 × 1.5 (DN 25)	26	Rd 52 × 1/6"	49	72 × 55
	▪ Fitting length = (2 × L) + 86 mm ▪ Surface roughness: $R_a \leq 0.8$ µm ▪ If pigs are used for cleaning, it is essential to take the inside diameters of measuring tube and process connection (di) into account!					

Flange according to DIN 11864-2, aseptic grooved flange, Form A 1.4404 (316L)	Sensor DN	Fits to piping	di	G	L	LK	M	H × B
10H**-4**********	[mm]	EN 10357 (DIN 11850)	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]
	2 to 8	Tube 13 × 1.5 (DN 10)	10	54	48.5	37	9	62 × 42
	15	Tube 19 × 1.5 (DN 15)	16	59	48.5	42	9	62 × 42
	25 (DIN)	Tube 29 × 1.5 (DN 25)	26	70	48.5	53	9	72 × 55
	▪ Fitting length = (2 × L) + 86 mm ▪ Surface roughness: $R_a \leq 0.8$ µm ▪ If pigs are used for cleaning, it is essential to take the inside diameters of measuring tube and process connection (di) into account!							

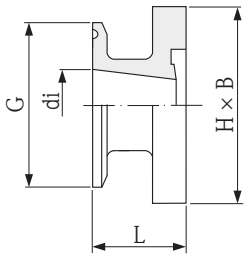
Coupling SMS 1145, threaded adapter 1.4404 (316L)	Sensor DN	Fits to piping	SMS 1145 DN	di	G	L	H × B
10H10H**-5**********	[mm]	OD	[mm]	[mm]	[mm]	[mm]	[mm]
	25 (1" ANSI)	1"	25	22.6	Rd 40 × 1/6"	30.8	72 × 55
	▪ Fitting length = (2 × L) + 86 mm ▪ Surface roughness: R_a ≤ 0.8 µm ▪ If pigs are used for cleaning, it is essential to take the inside diameters of measuring tube and process connection (di) into account!						

Process connections orderable only as accessories with O-ring seal, DN 2 to 25 (1/12 to 1")

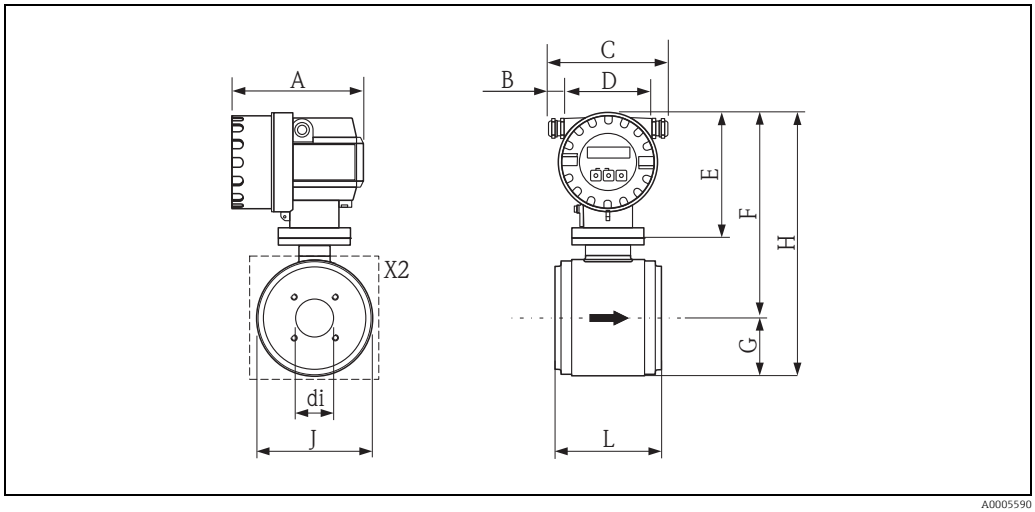
External pipe thread 1.4404 (316L)	Sensor DN	Fits to internal thread	di	G	L	S	H × B
DKH**-GD**	[mm]	Internal pipe thread	[mm]	[inch]	[mm]	[mm]	[mm]
	2 to 8	NPT 3/8"	10	3/8"	50	15.5	62 × 42
	15	NPT 1/2"	16	1/2"	50	20.0	62 × 42
	25 (1" ANSI)	NPT 1"	25	1"	55	25.0	72 × 55
	▪ Fitting length = (2 × L) + 86 mm ▪ Surface roughness: R_a ≤ 1.6 µm						

Internal thread 1.4404 (316L)	Sensor DN	Fits to external thread	di	G	D	L	S	H × B
DKH**-GC**	DN [mm]	NP External pipe thread	[mm]	[inch]	[mm]	[mm]	[mm]	[mm]
	2 to 8	NPT 3/8"	8.9	3/8"	22	45	13	62 × 42
	15	NPT 1/2"	16.0	1/2"	27	45	14	62 × 42
	25 (1" ANSI)	NPT 1"	27.2	1"	40	51	17	72 × 55
	▪ Fitting length = (2 × L) + 86 mm ▪ Surface roughness: R_a ≤ 1.6 µm							

Process connections orderable only as accessories with aseptic gasket seal, DN 15

Tri-Clamp for L14 AM17 1.4404 (316L)	Sensor DN	Fits to piping	di	G	L	H × B
DKH**-HF**	[mm]	OD	[mm]	[mm]	[mm]	[mm]
	15	Tube 25.4 × 1.65 (ODT 1")	22.1	50.4	28.5	62 × 42
	▪ Fitting length = (2 × L) + 86 mm ▪ Surface roughness: $R_a \leq 0.8$ µm ▪ If pigs are used for cleaning, it is essential to take the inside diameters of measuring tube and process connection (di) into account!					

Compact version DN 40 to 150 (1½ to 6")



A0005590

Dimensions in SI units

DN	L	A	B	C	D	E	F	G	H	J	X2	di
40	140	178	20 to 30	161 to 181	113	150	242	53.5	295.5	107	M8 × 4	34.8
50	140						248.5	60	308.5	120	M8 × 4	47.5
65	140						256	67.5	323.5	135	M8 × 6	60.2
80	140						262.5	74	336.5	148	M8 × 6	72.9
100	140						275.5	87	362.5	174	M8 × 6	97.4
125	200						291.5	103	394.5	206	M10 × 6	120.0
150	200						305.5	117	422.5	234	M10 × 6	146.9

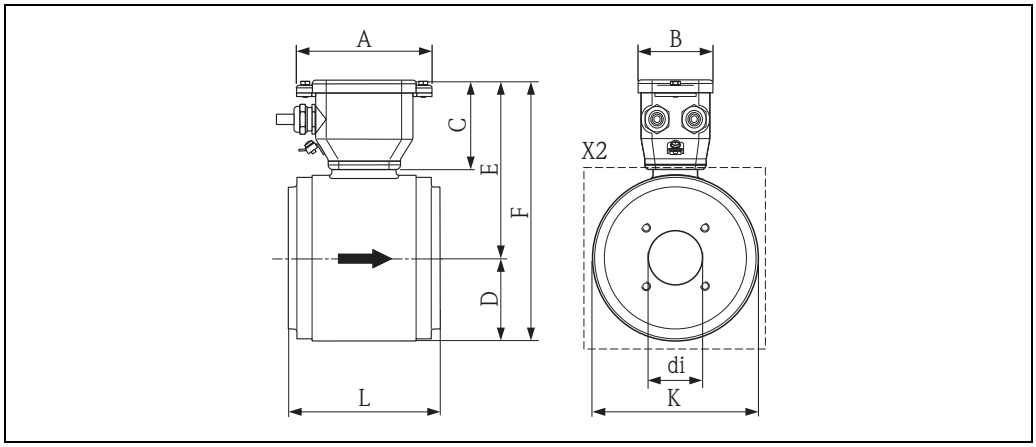
Total length depends on the process connections.
All dimensions in [mm]

Dimensions in US units

DN	L	A	B	C	D	E	F	G	H	J	X2	di
1½"	5.51	7.01	0.79 to 1.81	6.34 to 7.13	4.45	5.91	9.53	2.11	11.63	4.21	M8 × 4	1.37
2"	5.51						9.78	2.36	12.15	4.72	M8 × 4	1.87
3"	5.51						10.33	2.91	13.25	5.83	M8 × 6	2.87
4"	5.51						10.85	3.43	14.27	6.85	M8 × 6	3.83
6"	7.87						12.03	4.61	16.63	9.21	M10 × 6	5.78

Total length depends on the process connections.
All dimensions in [inch]

Sensor, remote version DN 40 to 150 (1½ to 6")



A0005535

Dimensions in SI units

DN	L	A	B	C	D	E	F	K	X2	di
40	140	125	70	75	53.5	138.5	191.8	107	M8 × 4	34.8
50	140				60	145.0	204.8	120	M8 × 4	47.5
65	140				67.5	152.5	219.8	135	M8 × 6	60.2
80	140				74	159.0	232.8	148	M8 × 6	72.9
100	140				87	172.0	258.8	174	M8 × 6	97.4
125	200				103	188.0	290.8	206	M10 × 6	120.0
150	200				117	202.0	318.8	234	M10 × 6	146.9

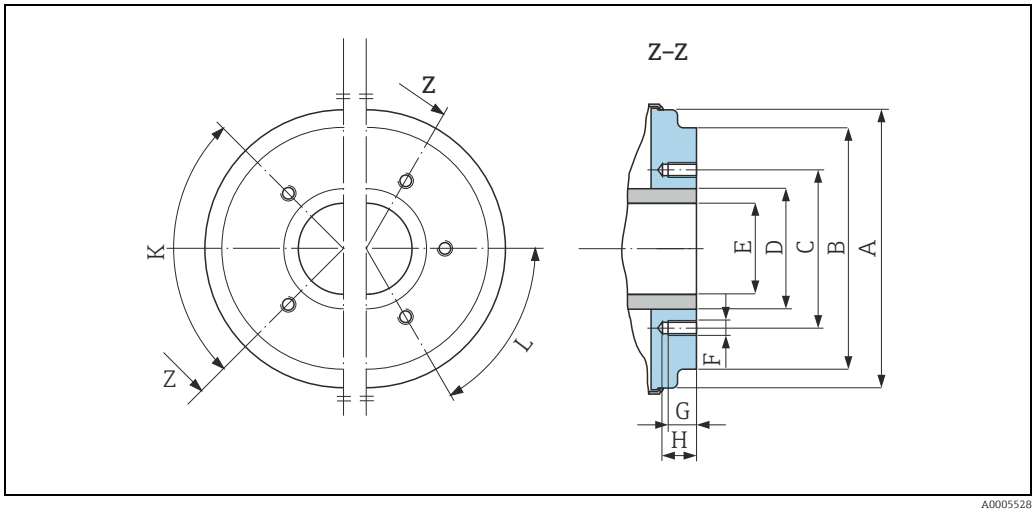
Total length depends on the process connections.
All dimensions in [mm]

Dimensions in US units

DN	L	A	B	C	D	E	F	K	X2	di
1½"	5.51	4.92	2.76	2.95	2.11	5.45	7.55	4.21	M8 × 4	1.37
2"	5.51				2.36	5.71	8.06	4.72	M8 × 4	1.87
3"	5.51				2.91	6.26	9.17	5.83	M8 × 6	2.87
4"	5.51				3.43	6.77	10.19	6.85	M8 × 6	3.83
6"	7.87				4.61	7.95	12.55	9.21	M10 × 6	5.78

Total length depends on the process connections.
All dimensions in [inch]

Sensor, front view (without process connections) DN 40 to 150 (1½ to 6")



A0005528

Dimensions in SI units

DN	A	B	C	D	E	F	G	H	K 90° ±0.5°	L 60° ±0.5°
									Threaded holes	
40	99.7	85.8	71.0	48.3	34.8	M 8	12	17	4	–
50	112.7	98.8	83.5	60.3	47.5	M 8	12	17	4	–
65	127.7	114.8	100.0	76.1	60.2	M 8	12	17	–	6
80	140.7	133.5	114.0	88.9	72.9	M 8	12	17	–	6
100	166.7	159.5	141.0	114.3	97.4	M 8	12	17	–	6
125	198.7	191.5	171.0	139.7	120.0	M 10	15	20	–	6
150	226.7	219.5	200.0	168.3	146.9	M 10	15	20	–	6

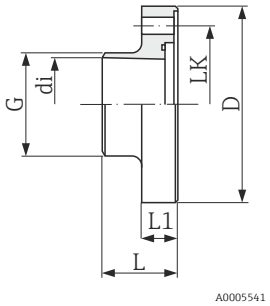
All dimensions in [mm]

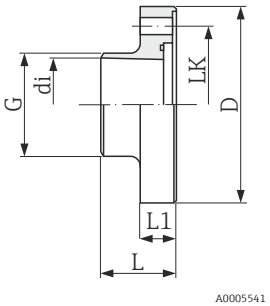
Dimensions in US units

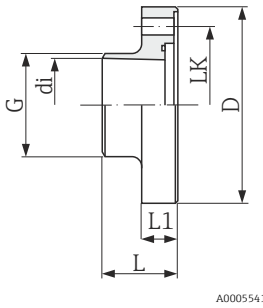
DN	A	B	C	D	E	F	G	H	K 90° ±0.5°	L 60° ±0.5°
									Threaded holes	
1½"	3.93	3.38	2.80	1.90	1.37	M 8	0.47	0.67	4	–
2"	4.44	3.89	3.29	2.37	1.87	M 8	0.47	0.67	4	–
3"	5.54	5.26	4.49	3.50	2.87	M 8	0.47	0.67	–	6
4"	6.56	6.28	5.55	4.50	3.83	M 8	0.47	0.67	–	6
6"	8.93	8.64	7.87	6.63	5.78	M 10	0.59	0.79	–	6

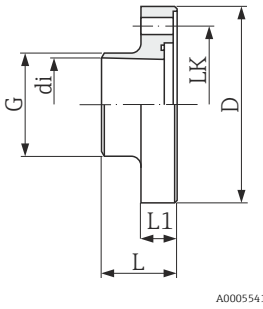
All dimensions in [inch]

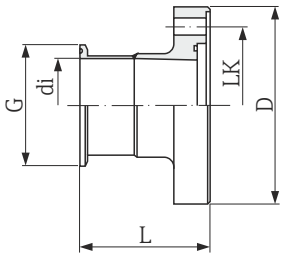
Process connections with aseptic gasket seal, DN 40 to 150 (1½ to 6")

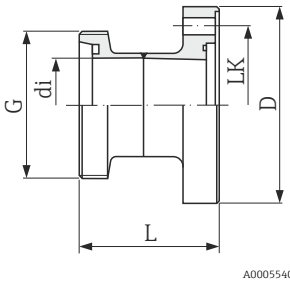
Welding nipple according to EN 10357 (DIN 11850) 1.4404 (F316L)	Sensor DN	Fits to piping	di	G	D	L	L1	LK	L_{tot} [1]
	[mm]	EN 10357 (DIN 11850)	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]
	Order codes: 10H**-U**********, DKH**-HR** Surface roughness: $R_a \leq 0.8$ µm								
	40	41 × 1.5	38	43	92.0	42	19	71.0	220
	50	53 × 1.5	50	55	105.0	42	19	83.5	220
	65	70 × 2	66	72	121.0	42	21	100.0	220
	80	85 × 2	81	87	140.7	73	18	114.0	280
	100	104 × 2	100	106	166.7	73	18	141.0	280
	125	129 × 2	125	129	198.7	53	25	171.0	300
	150	154 × 2	150	154	226.7	53	25	200.0	300
	Order codes: 10H**-U**********+CA/+CB, DKH**-HR**+CA/+CB Surface roughness +CA: $R_a \leq 0.8$ µm Surface roughness +CB: $R_a \leq 0.38$ µm								
	40	41 × 1.5	38.0	41	99.7	43	18	71.0	220
	50	53 × 1.5	50.0	53	112.7	43	18	83.5	220
	65	70 × 2	66.0	70	127.7	43	18	100.0	220
	80	85 × 2	81.0	85	140.7	43	18	114.0	220
	100	104 × 2	100.0	104	166.7	43	18	141.0	220
	[1] L_{tot} = fitting length If pigs are used for cleaning, it is essential to take the inside diameters of measuring tube and process connection (di) into account!								

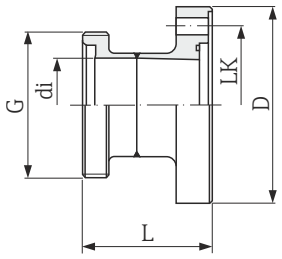
Welding nipple according to ODT/SMS 1.4404 (F316L)	Sensor DN	Fits to Piping	di	G	D	L	L1	LK	L_{tot} [1]
	[mm]	OD/SMS	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]
	Order codes: 10H**-V**********, DKH**-HB**								
	40	38.1 × 1.65	35.3	40	92	42	19	71.0	220
	50	50.8 × 1.65	48.1	55	105	42	19	83.5	220
	65	63.5 × 1.65	59.9	66	121	42	21	100.0	220
	80	76.2 × 1.65	72.6	79	140.7	73	18	114.0	280
	100	101.6 × 1.65	97.5	104	166.7	73	18	141.0	280
	[1] L_{tot} = fitting length Surface roughness: $R_a \leq 0.8$ µm If pigs are used for cleaning, it is essential to take the inside diameters of measuring tube and process connection (di) into account!								

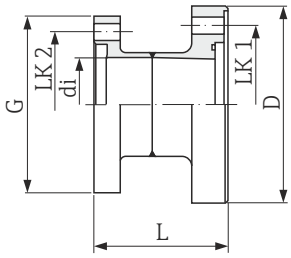
Welding nipple according to ASME BPE 1.4404 (F316L)	Sensor DN		Fits to Piping	di	G	D	L	L1	LK	L_{tot} [1]
	[mm]	[inch]	ASME BPE	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]
	Order codes: 10H**-Q**********, DKH**-HN**									
	40	1½"	38.1 × 1.65	34.8	38.1	99.7	43	18	71.0	220
	50	2"	50.8 × 1.65	47.5	50.8	112.7	43	18	83.5	220
	65	–	63.5 × 1.65	60.2	63.5	127.7	43	18	100.0	220
	80	3"	76.2 × 1.65	72.9	76.2	140.7	43	18	114.0	220
	100	4"	101.6 × 2.11	97.4	101.6	166.7	43	18	141.0	220
	150	6"	152.4 × 2.77	149.9	152.4	226.7	53	25	200.0	300
	[1] L_{tot} = fitting length Surface roughness: $R_a \leq 0.8$ µm If pigs are used for cleaning, it is essential to take the inside diameters of measuring tube and process connection (di) into account!									

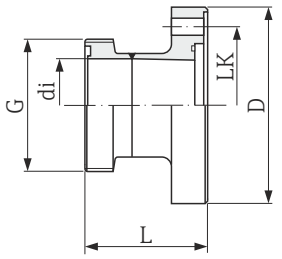
Welding nipple according to ISO 2037 1.4404 (F316L)	Sensor DN	Fits to Piping	di	G	D	L	L1	LK	L_{tot} [1]
	[mm]	ISO 2037	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]
	Order codes: 10H**-T**********, DKH**-HP**								
	40	38 × 1.2	35.6	38	99.7	43	18	71.0	220
	50	51 × 1.2	48.6	51	112.7	43	18	83.5	220
	65	63.5 × 1.6	60.3	63.5	127.7	43	18	100.0	220
	80	76.1 × 1.6	72.9	76.1	140.7	43	18	114.0	220
	100	101.6 × 2	97.6	101.6	166.7	43	18	141.0	220
	125	139.7 × 2	135.7	139.7	198.7	93	25	171.0	380
	150	168.3 × 2.6	163.1	168.3	226.7	93	25	200.0	380
	[1] L_{tot} = fitting length Surface roughness: $R_a \leq 0.8$ µm If pigs are used for cleaning, it is essential to take the inside diameters of measuring tube and process connection (di) into account!								

Tri-Clamp for L14 AM7 1.4404 (F316L)	Sensor DN		Fits to piping	di	G	D	L	LK	L_{tot} [1]
	[mm]	[inch]	ASME BPE	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]
	Order codes: 10H**-1**********, DKH**-HE** Surface roughness: $R_a \leq 0.8$ µm								
	40	1½"	38.1 × 1.65	34.8	50.4	92.0	68.6	71.0	273.2
	50	2"	50.8 × 1.65	47.5	63.9	105.0	68.6	83.5	273.2
	65	–	63.5 × 1.65	60.2	77.4	121.0	68.6	100.0	273.2
	80	3"	76.2 × 1.65	72.9	90.9	140.7	99.6	114.0	333.2
	100	4"	101.6 × 2.11	97.4	118.9	166.7	99.6	141.0	333.2
	150	6"	152.4 × 2.77	146.9	166.9	226.7	53	200.0	300
	Order codes: 10H**-1**********+CA/+CB, DKH**-HE**+CA/+CB Surface roughness +CA: $R_a \leq 0.8$ µm Surface roughness +CB: $R_a \leq 0.38$ µm								
	40	1½"	38.1 × 1.65	34.8	50.4	99.7	43	71.0	220
	50	2"	50.8 × 1.65	47.5	63.9	112.7	43	83.5	220
	65	–	63.5 × 1.65	60.2	77.4	127.7	43	100.0	220
	80	3"	76.2 × 1.65	72.9	90.9	140.7	43	114.0	220
	100	4"	101.6 × 1.65	97.4	118.9	166.7	43	141.0	220
	[1] L_{tot} = fitting length If pigs are used for cleaning, it is essential to take the inside diameters of measuring tube and process connection (di) into account!								

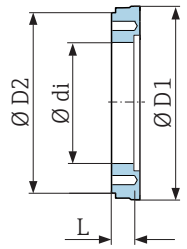
Coupling SC DIN 11851 1.4404 (F316L)	Sensor DN	Fits to piping	di	G	D	L	LK	L_{tot} [1]
	[mm]	DN 11850	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]
	Order codes: 10H**-2**********, DKH**-HG** Surface roughness: $R_a \leq 0.8$ µm							
	40	42 × 1.5	38	Rd 65 × 1/6"	92.0	72	71.0	280
	50	54 × 1.5	50	Rd 78 × 1/6"	105.0	74	83.5	284
	65	70 × 2	66	Rd 95 × 1/6"	121.0	78	100.0	292
	80	85 × 2	81	Rd 110 × ¼"	140.7	114	114.0	362
	100	104 × 2	100	Rd 130 × ¼"	166.7	123	141.0	380
	125	129 × 2	125	Rd 160 × ¼"	198.7	93	171.0	380
	150	154 × 2	150	Rd 160 × ¼"	226.7	98	200.0	390
	Order codes: 10H**-2**********+CA/+CB, DKH**-HG**+CA/+CB Surface roughness +CA: $R_a \leq 0.8$ µm Surface roughness +CB: $R_a \leq 0.38$ µm							
	40	42 × 1.5	38	Rd 65 × 1/6"	99.7	63	71.0	260
	50	54 × 1.5	50	Rd 78 × 1/6"	112.7	63	83.5	260
	65	70 × 2	66	Rd 95 × 1/6"	127.7	68	100.0	270
	80	85 × 2	81	Rd 110 × ¼"	140.7	73	114.0	280
	100	104 × 2	100	Rd 130 × ¼"	166.7	78	141.0	290
	[1] L_{tot} = fitting length If pigs are used for cleaning, it is essential to take the inside diameters of measuring tube and process connection (di) into account!							

Coupling DIN 11864-1, Aseptic threaded adapter, Form A 1.4404 (F316L)	Sensor DN	Fits to piping	di	G	D	L	LK	L_{tot} [1]
 A0005545	[mm]	DN 11850	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]
	Order codes: 10H**-3**********, DKH**-HH** Surface roughness: $R_a \leq 0.8$ µm							
	40	42 × 1.5	38	Rd 65 × 1/6"	92.0	71	71.0	278
	50	54 × 1.5	50	Rd 78 × 1/6"	105.0	71	83.5	278
	65	70 × 2	66	Rd 95 × 1/6"	121.0	76	100.0	288
	80	85 × 2	81	Rd 110 × ¼"	140.7	113	114.0	360
	100	104 × 2	100	Rd 130 × ¼"	166.7	121	141.0	376
	Order codes: 10H**-3**********+CA/+CB, DKH**-HH**+CA/+CB Surface roughness +CA: $R_a \leq 0.8$ µm Surface roughness +CB: $R_a \leq 0.38$ µm							
	40	42 × 1.5	38	Rd 65 × 1/6"	99.7	61	71.0	256
	50	54 × 1.5	50	Rd 78 × 1/6"	112.7	61	83.5	256
	65	70 × 2	66	Rd 95 × 1/6"	127.7	66	100.0	266
	80	85 × 2	81	Rd 110 × ¼"	140.7	71	114.0	276
	100	104 × 2	100	Rd 130 × ¼"	166.7	76	141.0	286
	[1] L_{tot} = fitting length If pigs are used for cleaning, it is essential to take the inside diameters of measuring tube and process connection (di) into account!							

Flange according to DIN 11864-2, Aseptic flat flange, Form A 1.4404 (F316L)	Sensor DN	Fits to piping	di	G	D	L	LK 1	LK 2	L_{tot} [1]
 A0005546	[mm]	DN 11850	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]
	Order codes: 10H**-4**********, DKH**-HJ** Surface roughness: $R_a \leq 0.8$ µm								
	40	42 × 1.5	38	82	92.0	64	71.0	65	264
	50	54 × 1.5	50	94	105.0	64	83.5	77	264
	65	70 × 2	66	113	121.0	64	100.0	95	264
	80	85 × 2	81	133	140.7	129	114.0	112	392
	100	104 × 2	100	159	166.7	129	141.0	137	392
	125	129 × 2	125	190	198.7	84	171.0	161	362
	150	154 × 2	150	220	226.7	84	200.0	188	362
	Order codes: 10H**-4**********+CA/+CB, DKH**-HJ**+CA/+CB Surface roughness +CA: $R_a \leq 0.8$ µm Surface roughness +CB: $R_a \leq 0.38$ µm								
	40	42 × 1.5	38	82	99.7	56	71.0	65	246
	50	54 × 1.5	50	94	112.7	56	83.5	77	246
	65	70 × 2	66	113	127.7	56	100.0	95	246
	80	85 × 2	81	133	140.7	68	114.0	112	270
	100	104 × 2	100	159	166.7	72	141.0	137	278
	[1] L_{tot} = fitting length If pigs are used for cleaning, it is essential to take the inside diameters of measuring tube and process connection (di) into account!								

Coupling SMS 1145, threaded adapter 1.4404 (F316L)	Sensor DN	Fits to piping	SMS 1145 DN	di	G	D	L	LK	L_{tot} [1]
 A0005538	[mm]	OD	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]
	Order codes: 10H**-5**********, DKH**-HK** Surface roughness: $R_a \leq 0.8$ µm								
	40	38.1 × 1.65	38.0	35.5	Rd 60 × 1/6"	92.0	63	71.0	262
	50	50.8 × 1.65	51.0	48.5	Rd 70 × 1/6"	105.0	65	83.5	266
	65	63.5 × 1.65	63.5	60.5	Rd 85 × 1/6"	121.0	70	100.0	276
	80	76.2 × 1.65	76.0	72.6	Rd 98 × 1/6"	140.7	106	114.0	346
	100	101.6 × 1.65	101.6	97.5	Rd 132 × 1/6"	166.7	101	141.0	336
	Order codes: 10H**-5**********+CA/+CB, DKH**-HK**+CA/+CB Surface roughness +CA: $R_a \leq 0.8$ µm Surface roughness +CB: $R_a \leq 0.38$ µm								
	40	38.1 × 1.65	38.0	34.8	Rd 60 × 1/6"	99.7	61	71.0	256
	50	50.8 × 1.65	51.0	47.5	Rd 70 × 1/6"	112.7	61	83.5	256
	65	63.5 × 1.65	63.5	60.2	Rd 85 × 1/6"	127.7	66	100.0	266
	80	76.2 × 1.65	76.0	72.6	Rd 98 × 1/6"	140.7	71	114.0	276
	100	101.6 × 1.65	101.6	97.4	Rd 132 × 1/6"	166.7	76	141.0	286
	[1] L_{tot} = fitting length If pigs are used for cleaning, it is essential to take the inside diameters of measuring tube and process connection (di) into account!								

Spacer (accessory for DN 80 to 100/3 to 4")

Spacer 1.4435 (316L)	Sensor DN		di	D1	D2	L
DK5HB - ****	[mm]	[inch]	[mm]	[mm]	[mm]	[mm]
 A0017294	80	3"	72.9	140.7	141	30
	100	4"	97.4	166.7	162	30

Weight

Nominal diameter		Compact version (DIN)		Remote version (without cable; DIN)			
				Sensor		Transmitter (wall-mount housing)	
[mm]	[inch]	[kg]	[lbs]	[kg]	[lbs]	[kg]	[lbs]
2	1/12"	3.6	8.0	2.0	4.0	3.1	7.0
4	1/8"	3.6	8.0	2.0	4.0	3.1	7.0
8	3/8"	3.6	8.0	2.0	4.0	3.1	7.0
15	½"	3.7	8.0	1.9	4.0	3.1	7.0
25	1"	3.9	9.0	2.8	6.0	3.1	7.0
40	1½"	5.5	12.1	4.1	4.1	3.1	7.0
50	2"	6.0	13.2	4.6	4.1	3.1	7.0
65	–	6.8	15.0	5.4	4.6	3.1	7.0
80	3"	7.4	16.3	6.0	6.0	3.1	7.0
100	4"	8.7	19.2	7.3	7.3	3.1	7.0
125	–	14.1	31.1	12.7	12.7	3.1	7.0
150	6"	16.5	36.4	15.1	15.1	3.1	7.0

- Transmitter (compact version): 1.8 kg (3.97 lbs)
- Weight data valid for standard pressure ratings and without packaging material.

Measuring tube specifications

Nominal diameter		Pressure rating[1]	Internal diameter[2]	
		EN (DIN)	PFA	
[mm]	[inch]	[bar]	[mm]	[inch]
2	1/12"	PN 16 / PN 40	2.25	0.09
4	1/8"	PN 16 / PN 40	4.5	0.18
8	3/8"	PN 16 / PN 40	9.0	0.35
15	½"	PN 16 / PN 40	16.0	0.63
–	1"	PN 16 / PN 40	22.6	0.89
25	–	PN 16 / PN 40	26.0	1.02
40	1½"	PN 16 / PN 25 / PN 40	35.3	1.39
50	2"	PN 16 / PN 25 / PN 40	48.1	1.89
65	–	PN 16 / PN 25 / PN 40	59.9	2.36
80	3"	PN 16 / PN 25 / PN 40	72.6	2.86
100	4"	PN 16 / PN 25 / PN 40	97.5	3.84
125	–	PN 10 / PN 16	120.0	4.72
150	6"	PN 10 / PN 16	146.5	5.77

[1] Pressure rating depends on the process connection and the seals used.
[2] Internal diameter of process connections.

Material

- Transmitter housing: powder-coated die-cast aluminum
- Window material: glass
- Sensor housing: 1.4301 (304)
- Wall mounting kit: 1.4301 (304)
- Measuring tube: 1.4301 (304)
- Lining material: PFA (USP Class VI; FDA 21 CFR 177.1550; 3A)
- Ground rings: 1.4435 (316L) (optional: Alloy C-22)
- Electrodes: 1.4435 (316L) (optional: Alloy C-22)
- Seals:
  – DN 2 to 25 (1/12 to 1"): O-Ring (EPDM, Viton, Kalrez), gasket seal (EPDM*, Viton)
  – DN 40 to 150 (1½ to 6"): gasket seal (EPDM*)

  * = USP Class VI; FDA 21 CFR 177.2600; 3A

Fitted electrodes

Measuring electrodes and empty pipe detection electrodes
- Available as standard with: 1.4435 (316L), Alloy C-22
- DN 2 to 8 (1/12 to 5/16"): without empty pipe detection electrode

Process connections

With O-ring:
- Flange EN (DIN), ASME, JIS
- Coupling: ISO 228/DIN 2999, NPT

With gasket seals:
- Welding nipples (EN 10357 (DIN 11850), ODT/SMS, ASME BPE, ISO 2037)
- Tri-Clamp (L14 AM7)
- Coupling (SC DIN 11851, DIN 11864-1, SMS 1145)
- Flange (DIN 11864-2)

Surface roughness

Stainless steel electrodes, 1.4435 (316L); Alloy C22, 2.4602 (UNS N06022); platinum; tantalum:
≤ 0.3 to 0.5 µm (11.8 to 19.7 µin)
(All data relate to parts in contact with fluid)

Liner with PFA:
≤ 0.4 µm (15.7 µin)
(All data relate to parts in contact with fluid)

Stainless steel process connections:
- With O-ring seal: ≤ 1.6 µm (63 µin)
- With aseptic seal: ≤ 0.8 µm (31.5 µin)
  Optional: ≤ 0.38 µm (15 µin)
  (All data relate to parts in contact with fluid)

Operability

Local operation

Display elements

- Liquid crystal display: unilluminated, two-line, 16 characters per line
- Display (operating mode) preconfigured: volume flow and totalizer status
- 1 totalizer

Operating elements

Local operation via three keys (⊖, ⊕, Ⓔ)

Remote operation

Operation via HART protocol and FieldCare

Certificates and approvals

CE mark

The measuring system is in conformity with the statutory requirements of the EC Directives. Endress+Hauser confirms successful testing of the device by affixing to it the CE mark.

C-tick symbol

The measuring system meets the EMC requirements of the "Australian Communications and Media Authority (ACMA)".

Ex approval

Information about currently available Ex versions (ATEX, FM, CSA) can be supplied by your Endress +Hauser Sales Center on request. All explosion protection data are given in a separate documentation which is available upon request.

Sanitary compatibility

- 3A approval and EHEDG-certified
- Seals → conform to FDA (apart from Kalrez seals)

Pressure equipment directive

The measuring devices can be ordered with or without PED (Pressure Equipment Directive). If a device with PED is required, this must be ordered explicitly. For devices with nominal diameters less than or equal to DN 25 (1"), this is neither possible nor necessary.

- With the identification PED/G1/III on the sensor nameplate, Endress+Hauser confirms conformity with the "Basic safety requirements" of Appendix I of the Pressure Equipment Directive 97/23/EC.
- Devices with this identification (with PED) are suitable for the following types of fluid:
  - Fluids of Group 1 and 2 with a steam pressure of greater than, or smaller and equal to 0.5 bar (7.3 psi)
  - Unstable gases
- Devices without this identification (without PED) are designed and manufactured according to good engineering practice. They correspond to the requirements of Art. 3, Section 3 of the Pressure Equipment Directive 97/23/EC. Their application is illustrated in Diagrams 6 to 9 in Appendix II of the Pressure Equipment Directive 97/23/EC.

Other standards and guidelines

- EN 60529
  Degrees of protection by housing (IP code)
- EN 61010
  Safety requirements for electrical equipment for measurement, control and laboratory use.
- IEC/EN 61326
  "Emission in accordance with requirements for Class A".
  Electromagnetic compatibility (EMC requirements)
- ANSI/ISA-S82.01
  Safety Standard for Electrical and Electronic Test, Measuring, Controlling and related Equipment - General Requirements Pollution degree 2, Installation Category II.
- 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

Ordering information

Detailed ordering information is available from the following sources:
- In the Product Configurator on the Endress+Hauser website: www.endress.com → Select country → Instruments → Select device → Product page function: Configure this product
- From your Endress+Hauser Sales Center: 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
  Output format
- Ability to order directly in the Endress+Hauser Online Shop

Accessories

Various accessories, which can be ordered separately from Endress+Hauser, are available for the transmitter and the sensor. Your Endress+Hauser service organization can provide detailed information on the order codes in question.

Device-specific accessories

For the transmitter

Accessory	Description
Transmitter	Transmitter for replacement or for stock. Use the order code to define the following specifications: ▪ Approvals ▪ Degree of protection / version ▪ Cable for remote version ▪ Cable entries ▪ Display / power supply / operation ▪ Software ▪ Outputs / inputs
Mounting kit for transmitter	Mounting kit for aluminum field housing (remote version). Suitable for pipe mounting.
Wall mounting kit	Wall mounting kit for transmitter.
Cable for remote version	Coil and electrode cables, various lengths.
Process display RIA45	Multifunctional 1-channel display unit with: ▪ Universal input ▪ Transmitter power supply ▪ Limit relay ▪ Analog output
Process display RIA251	Digital display unit for integration into 4 to 20 mA current loop.
Field display unit RIA16	Digital field display unit for integration into 4 to 20 mA current loop.
Application Manager RMM621	Electronic recording, display, balancing, control, saving and event and alarm monitoring of analog and digital input signals. Values and status output via analog and digital output signals. Remote transmission of alarms, input values and calculated values using a PSTN or GSM modem.

For the sensor

Accessory	Description
Mounting kit	Mounting kit for Promag H, comprising: ▪ 2 Process connections ▪ Screws ▪ Seals
Adapter connection	Adapter connections for installing a Promag H instead of a Promag 30/33 A or Promag 30/33 H DN 25.
Set of seals	For regular replacement of the seals of the sensor.
Welding jig	Welding nipples as process connection: Welding jig for installation in pipes.
Spacer	A spacer is required if a sensor of DN 80 to 100 is replaced in an existing installation and the new sensor is shorter.

Communication-specific accessories

Accessory	Description
HART handheld terminal Field Xpert SFX 100	Handheld terminal for remote configuration and for obtaining measured values via the HART current output (4 to 20 mA). Contact your Endress+Hauser representative for more information.
Fieldgate FXA320	Gateway for remote interrogation of HART sensors and actuators via web browser: ▪ 2-channel analog input (4 to 20 mA) ▪ 4 binary inputs with event counter function and frequency measurement ▪ Communication via modem, Ethernet or GSM ▪ Visualization via Internet/Intranet in the web browser and/or WAP cellular phone ▪ Limit value monitoring with alarm signaling by e-mail or SMS ▪ Synchronized time stamping of all measured values.
Fieldgate FXA520	Gateway for remote interrogation of HART sensors and actuators via web browser: ▪ Web server for remote monitoring of up to 30 measuring points ▪ Intrinsically safe version [EEx ia]IIC for applications in hazardous areas ▪ Communication via modem, Ethernet or GSM ▪ Visualization via Internet/Intranet in the web browser and/or WAP cellular phone ▪ Limit value monitoring with alarm signaling by e-mail or SMS ▪ Synchronized time stamping of all measured values ▪ Remote diagnostics and remote configuration of connected HART devices
FXA195	The Commubox FXA195 connects intrinsically safe smart transmitters using the HART protocol to the USB port of a personal computer. This enables remote operation of the transmitter with operating software (e.g. FieldCare). Power is supplied to the Commubox via the USB port.

Service-specific accessories

Accessory	Description
Applicator	Software for selecting and configuring flowmeters. Applicator can be downloaded from the Internet or ordered on CD-ROM for installation on a local PC. Contact your Endress+Hauser representative for more information.
Fieldcheck	Tester/simulator for testing flowmeters in the field. When used in conjunction with the "FieldCare" software package, test results can be imported into a database, printed and used for official certification. Contact your Endress+Hauser representative for more information.
FieldCare	FieldCare is Endress+Hauser's FDT-based plant asset management tool. 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.

Accessory	Description
Memograph M graphic display recorder	The Memograph M graphic display recorder provides information on all the relevant process 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 DSD card or USB stick. Memograph M boasts a modular design, intuitive operation and a comprehensive security concept. The ReadWin® 2000 PC software is part of the standard package and is used for configuring, visualizing and archiving the data captured. The mathematics channels which are optionally available enable continuous monitoring of specific power consumption, boiler efficiency and other parameters which are important for efficient energy management.
FXA193	Service interface connects the device to the PC for operation via FieldCare.

Documentation

- System Information Promag 10 (SI00042D/06)
- Operating Instructions Promag 10 (BA00082D/06)

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