Level | Pressure | Flow | Temperature | Liquid Analysis | Registration | Systems Components | Services | Solutions

Technical Information

Proline Promag 50H, 53H

Electromagnetic Flow Measuring System
Flow measurement of liquids in hygienic, food or process applications

Application
Electromagnetic flowmeter for bidirectional measurement of liquids with a minimum conductivity of ≥ 5 µS/cm:

- Beverages, e.g. fruit juice, beer, wine
- Dairy products, fruit juice mixes
- Saline solutions
- Acid, alkalis etc.

- Flow measurement up to 4700 dm^3/min (1250 gal/min)
- Fluid temperature up to +150 °C (+302 °F)
- Process pressures up to 40 bar (580 psi)
- CIP-/SIP cleaning
- Stainless steel housing

Approvals in food sector/hygiene sector:
- 3A approval, EHEDG-tested, conform to FDA, USP Class VI

Application-specific lining material:
- PFA

Approvals for hazardous area:
- ATEX, FM, CSA, TIIS

Connection to process control system:
- HART, PROFIBUS DP/PA, FOUNDATION Fieldbus, MODBUS RS485

Your benefits
Promag measuring devices offer you cost-effective flow measurement with a high degree of accuracy for a wide range of process conditions.

The uniform Proline transmitter concept comprises:
- Modular device and operating concept resulting in a higher degree of efficiency
- Software options for batching, electrode cleaning and pulsating flow
- Uniform operating concept

The tried-and-tested Promag sensors offer:
- No pressure loss
- Not sensitive to vibrations
- Simple installation and commissioning

TI048D/06/en/05.10
71114592

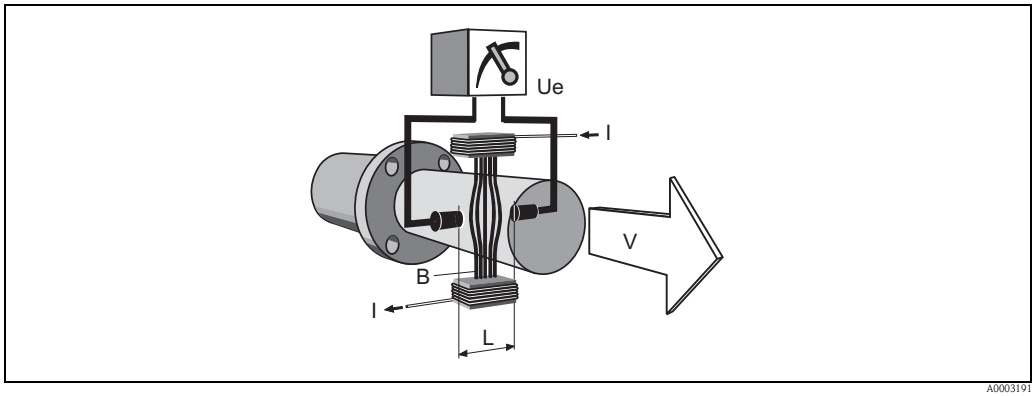
Endress+Hauser
People for Process Automation

Table of contents

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.



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

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 50 (user interface with push buttons for operation, two-line display, illuminated)
- Promag 53 ("Touch Control" without opening the housing, four-line display, unilluminated)

Sensor:
- Promag H (DN 2 to 100 / 1/12 to 4")

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

Operable flow range

Over 1000 : 1

Input signal

Status input (auxiliary input)
- U = 3 to 30 V DC, R_i = 5 kΩ, galvanically isolated
- Configurable for: totalizer(s) reset, measured value suppression, error-message reset

Status input (auxiliary input) with PROFIBUS DP and MODBUS RS485
- U = 3 to 30 V DC, R_i = 3 kΩ, galvanically isolated
- Switching level: 3 to 30 V DC, independent of polarity
- Configurable for: totalizer(s) reset (MODBUS RS485 only), measured value suppression, error-message reset, batching start/stop (optional), batch totalizer reset (optional)

Current input (only Promag 53)
- active/passive selectable, galvanically isolated, full scale value selectable, resolution: 3 µA, temperature coefficient: typ. 0.005% o.r./°C (o.r. = of reading)
- active: 4 to 20 mA, $R_i \leq 150$ Ω, max. 24 V DC, short-circuit-proof
- passive: 0/4 to 20 mA, $R_i < 150$ Ω, max. 30 V DC

Output

Output signal

Promag 50

Current output
active/passive selectable, galvanically isolated, time constant selectable (0.01 to 100 s), full scale value selectable, temperature coefficient: typ. 0.005% o.r./°C (o.r. = of reading), resolution: 0.5 µA
- active: 0/4 to 20 mA, $R_L < 700$ Ω (HART: $R_L \geq 250$ Ω)
- passive: 4 to 20 mA, operating voltage V_S: 18 to 30 V DC, $R_i \geq 150$ Ω

Pulse/frequency output
passive, open collector, 30 V DC, 250 mA, galvanically isolated
- Frequency output: full scale frequency 2 to 1000 Hz (f_{max} = 1250 Hz), on/off ratio 1:1, pulse width max. 10s
- Pulse output: pulse value and pulse polarity selectable, max. pulse width configurable (0.5 to 2000 ms)

PROFIBUS DP interface
- Transmission technology (Physical Layer): RS485 in accordance with ANSI/TIA/EIA-485-A: 1998, galvanically isolated
- Profil version 3.0
- Data transmission rate: 9,6 kBaud to 12 MBaud
- Automatic data transmission rate recognition
- Function blocks: 1 × analog Input, 1 × totalizer
- Output data: volume flow, totalizer
- Input data: positive zero return (ON/OFF), totalizer control, value for local display
- Cyclic data transmission compatible with previous model Promag 33
- Bus address adjustable via miniature switches or local display (optional) at the measuring device

PROFIBUS PA interface
- Transmission technology (Physical Layer): IEC 61158-2 (MBP), galvanically isolated
- Profil version 3.0
- Current consumption: 11 mA
- Permissible supply voltage: 9 to 32 V
- Bus connection with integrated reverse polarity protection
- Error current FDE (Fault Disconnection Electronic): 0 mA
- Function blocks: 1 × analog input, 2 × totalizer
- Output data: volume flow, totalizer
- Input data: positive zero return (ON/OFF), control totalizer, value for local display
- Cyclic data transmission compatible with previous model Promag 33
- Bus address adjustable via miniature switches or local display (optional) at the measuring device

Promag 53

Current output
active/passive selectable, galvanically isolated, time constant selectable (0.01 to 100 s),
full scale value selectable, temperature coefficient: typ. 0.005% o.r./°C (o.r. = of reading), resolution: 0.5 µA
- active: 0/4 to 20 mA, R_L < 700 Ω (HART: $R_L \geq 250$ Ω)
- passive: 4 to 20 mA, operating voltage V_S: 18 to 30 V DC, $R_i \geq 150$ Ω

Pulse/frequency output
active/passive selectable, galvanically isolated (Ex i version: only passive)
- active: 24 V DC, 25 mA (max. 250 mA during 20 ms), $R_L > 100$ Ω
- passive: open collector, 30 V DC, 250 mA
- Frequency output: full scale frequency 2 to 10000 Hz (f_{max} = 12500 Hz), EEx-ia: 2 to 5000 Hz; on/off ratio 1:1, pulse width max. 10 s
- Pulse output: pulse value and pulse polarity selectable, max. pulse width configurable (0.05 to 2000 ms)

PROFIBUS DP interface
- Transmission technology (Physical Layer): RS485 in accordance with ANSI/TIA/EIA-485-A: 1998, galvanically isolated
- Profil version 3.0
- Data transmission rate: 9,6 kBaud to 12 MBaud
- Automatic data transmission rate recognition
- Function blocks: 2 × analog Input, 3 × totalizer
- Output data: volume flow, calculated mass flow, totalizer 1 to 3
- Input data: positive zero return (ON/OFF), totalizer control, value for local display
- Cyclic data transmission compatible with previous model Promag 33
- Bus address adjustable via miniature switches or local display (optional) at the measuring device
- Available output combination → 📄 8

PROFIBUS PA interface
- Transmission technology (Physical Layer): IEC 61158-2 (MBP), galvanically isolated
- Profil version 3.0
- Current consumption: 11 mA
- Permissible supply voltage: 9 to 32 V
- Bus connection with integrated reverse polarity protection
- Error current FDE (Fault Disconnection Electronic): 0 mA
- Function blocks: 2 × analog input, 3 × totalizer
- Output data: volume flow, calculated mass flow, totalizer 1 to 3
- Input data: positive zero return (ON/OFF), totalizer control, value for local display
- Cyclic data transmission compatible with previous model Promag 33
- Bus address adjustable via miniature switches or local display (optional) at the measuring device

MODBUS RS485 interface
- Transmission technology (Physical Layer): RS485 in accordance with ANSI/TIA/EIA-485-A: 1998, galvanically isolated
- MODBUS device type: Slave
- Adress range: 1 to 247
- Bus address adjustable via miniature switches or local display (optional) at the measuring device
- Supported MODBUS function codes: 03, 04, 06, 08, 16, 23
- Broadcast: supported with the function codes 06, 16, 23
- Übertragungsmodus: RTU oder ASCII
- Supported baudrate: 1200, 2400, 4800, 9600, 19200, 38400, 57600, 115200 Baud
- Response time:
  - Direct data access = typically 25 to 50 ms
  - Auto-scan buffer (data range) = typically 3 to 5 ms
- Available output combination → 📄 8

FOUNDATION Fieldbus interface
- FOUNDATION Fieldbus H1
- Transmission technology (Physical Layer): IEC 61158-2 (MBP), galvanically isolated
- ITK version 5.01
- Current consumption: 12 mA
- Error current FDE (Fault Disconnection Electronic): 0 mA
- Bus connection with integrated reverse polarity protection
- Function blocks:
  - 5 × Analog Input (execution time: 18 ms each)
  - 1 × PID (25 ms)
  - 1 × Digital Output (18 ms)
  - 1 × Signal Characterizer (20 ms)
  - 1 × Input Selector (20 ms)
  - 1 × Arithmetic (20 ms)
  - 1 × Integrator (18 ms)
- Output data: volume flow, calculated mass flow, temperature, totalizer 1 to 3
- Input data: positive zero return (ON/OFF), reset totalizer
- Link Master (LM) functionality is supported

Signal on alarm
- Current output → failure response selectable (e.g. in accordance with NAMUR recommendation NE 43)
- Pulse/frequency output → failure response selectable
- Status output (Promag 50) → non-conductive by fault or power supply failure
- Relay output (Promag 53) → de-energized by 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.

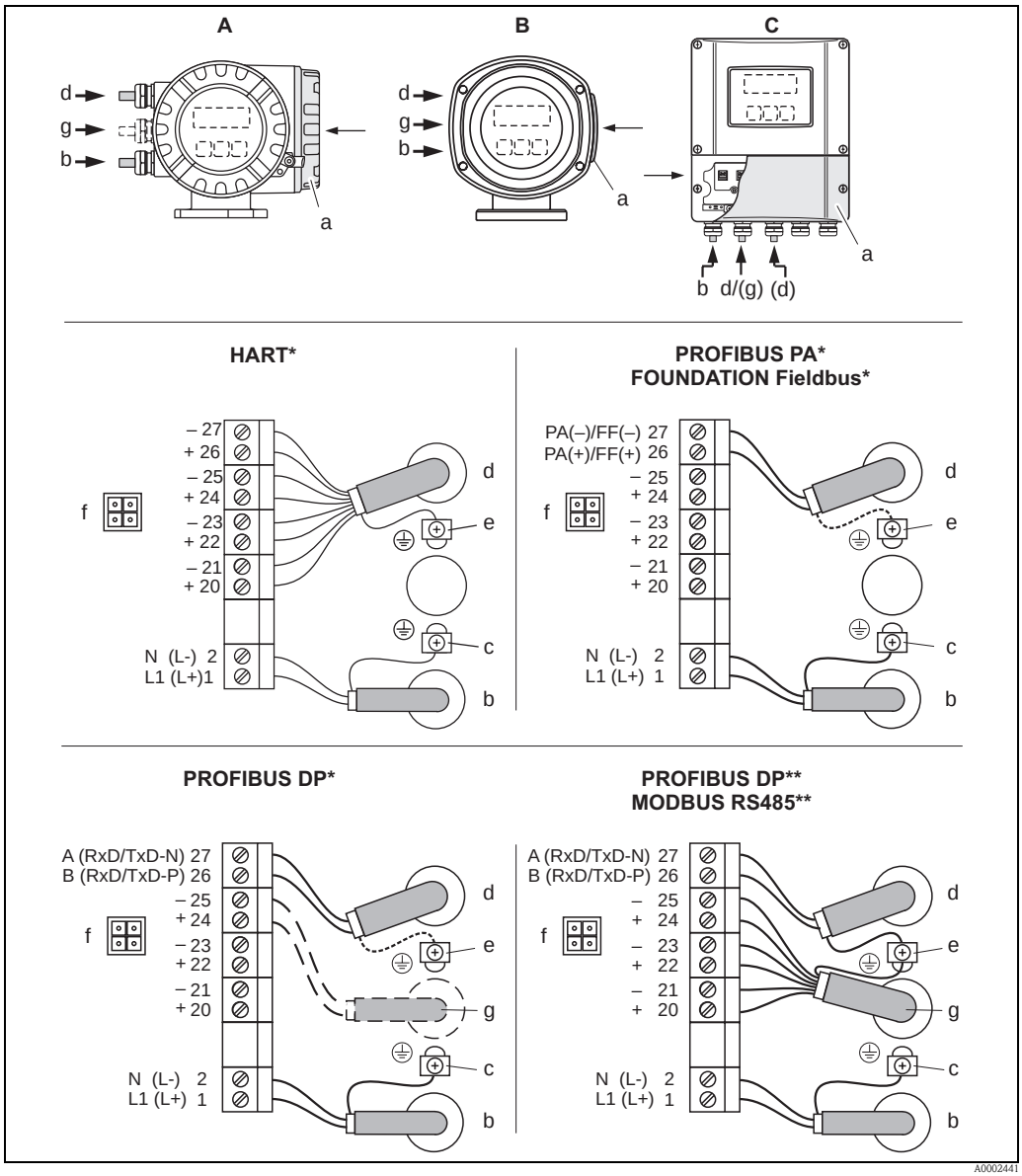
Switching output

Status output (Promag 50, Promag 53)
Open collector, max. 30 V DC / 250 mA, galvanically isolated.
Configurable for: error messages, Empty Pipe Detection (EPD), flow direction, limit values.

Relay outputs (Promag 53)
Normally closed (NC or break) or normally open (NO or make) contacts available
(default: relay 1 = NO, relay 2 = NC), max. 30 V / 0,5 A AC ; 60 V / 0,1 A DC, galvanically isolated.
Configurable for: error messages, Empty Pipe Detection (EPD), flow direction, limit values, batching contacts.

Power supply

Electrical connection, measuring unit



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

A View A (field housing)
B View B (stainless steel field housing)
C View C (wall-mount housing)

**)* fixed communication boards
***)* flexible communication boards
a Connection compartment cover
b Cable for power supply: 85 to 260 V AC / 20 to 55 V AC / 16 to 62 V DC
- Terminal No. 1: L1 for AC, L+ for DC
- Terminal No. 2: N for AC, L– for DC

c Ground terminal for protective conductor
d Signal cable: see "Electrical connection, terminal assignment" → 🖹 8
Fieldbus cable:
- Terminal No. 26: DP (B) / PA + / FF + / MODBUS RS485 (B) / (PA, FF: with polarity protection)
- Terminal No. 27: DP (A) / PA – / FF – / MODBUS RS485 (A) / (PA, FF: with polarity protection)

e Ground terminal for signal cable shield / Fieldbus cable / RS485 line
f Service adapter for connecting service interface FXA193 (Fieldcheck, FieldCare)
g Signal cable: see "Electrical connection, terminal assignment" → 🖹 8
Cable for external termination (only for PROFIBUS DP with fixed assignment communication board):
- Terminal No. 24: +5 V
- Terminal No. 25: DGND

Electrical connection, terminal assignment

Terminal assignment, Promag 50

Order variant	Terminal No. (inputs/outputs)			
	20 (+) / 21 (–)	22 (+) / 23 (–)	24 (+) / 25 (–)	26 (+) / 27 (–)
50***-**********W	–	–	–	Current output HART
50***-**********A	–	–	Frequency output	Current output HART
50***-**********D	Status input	Status output	Frequency output	Current output HART
50***-**********H	–	–	–	PROFIBUS PA
50***-**********J	–	–	+5 V (external termination)	PROFIBUS DP
50***-**********S	–	–	Frequency output, Ex i, passive	Current output, Ex i, passive, HART
50***-**********T	–	–	Frequency output, Ex i, passive	Current output, Ex i, passive, HART

Ground terminal → 🖹 7

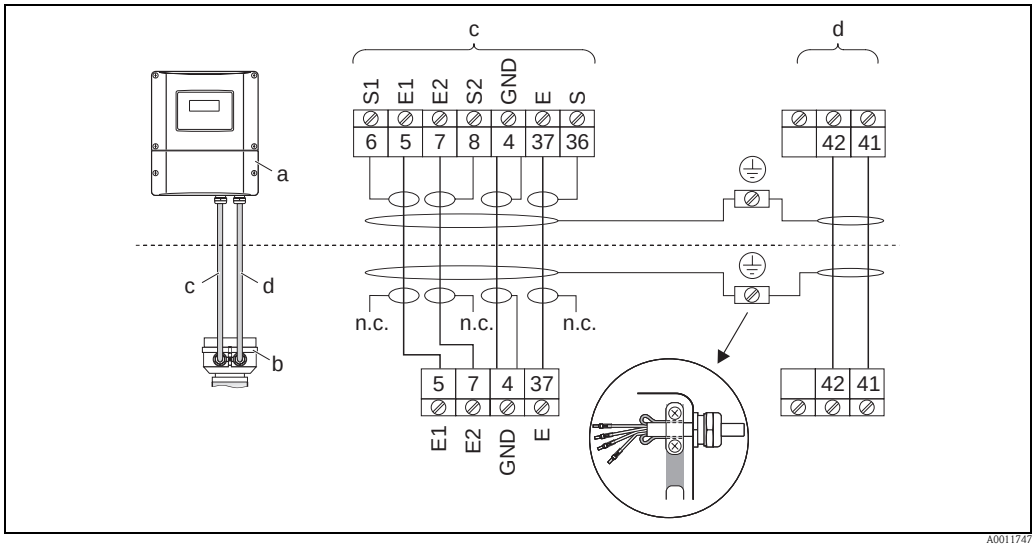
Terminal assignment, Promag 53

The inputs and outputs on the communication board can be either permanently assigned or variable, depending on the version ordered (see table). Replacements for modules which are defective or which have to be replaced can be ordered as accessories.

Order variant	Terminal No. (inputs/outputs)			
	20 (+) / 21 (–)	22 (+) / 23 (–)	24 (+) / 25 (–)	26 (+) / 27 (–)
Fixed communication boards (fixed assignment)				
53***-**********A	–	–	Frequency output	Current output HART
53***-**********B	Relay output 2	Relay output 1	Frequency output	Current output HART
53***-**********F	–	–	–	PROFIBUS PA, Ex i
53***-**********G	–	–	–	FOUNDATION Fieldbus, Ex i
53***-**********H	–	–	–	PROFIBUS PA
53***-**********J	–	–	–	PROFIBUS DP
53***-**********K	–	–	–	FOUNDATION Fieldbus
53***-**********Q	–	–	Status input	MODBUS RS485
53***-**********S	–	–	Frequency output, Ex i	Current output, Ex i, passive, HART
53***-**********T	–	–	Frequency output, Ex i	Current output, Ex i, passive, HART
Flexible communication boards				
53***-**********C	Relay output 2	Relay output 1	Frequency output	Current output HART
53***-**********D	Status input	Relay output	Frequency output	Current output HART
53***-**********L	Status input	Relay output 2	Relay output 1	Current output HART
53***-**********M	Status input	Frequency output	Frequency output	Current output HART
53***-**********N	Current output	Frequency output	Status input	MODBUS RS485
53***-**********P	Current output	Frequency output	Status input	PROFIBUS DP
53***-**********V	Relay output 2	Relay output 1	Status input	PROFIBUS DP
53***-**********2	Relay output	Current output	Frequency output	Current output HART
53***-**********4	Current input	Relay output	Frequency output	Current output HART
53***-**********7	Relay output 2	Relay output 1	Status input	MODBUS RS485

Ground terminal → 🖹 7

Electrical connection, remote version



Connecting the remote version

a Wall-mount housing connection compartment
b Sensor connection housing cover
c Signal 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 (power supply)

- 85 to 260 V AC, 45 to 65 Hz
- 20 to 55 V AC, 45 to 65 Hz
- 16 to 62 V DC

PROFIBUS PA and FOUNDATION Fieldbus
- Non-Ex: 9 to 32 V DC
- Ex i: 9 to 24 V DC
- Ex d: 9 to 32 V DC

Cable entry

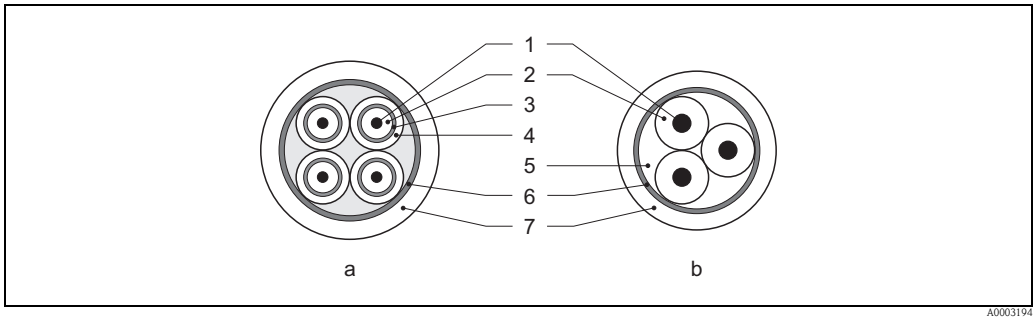
Power supply and signal cables (inputs/ outputs):
- Cable entry M20 × 1.5 (8 to 12 mm / 0.31 to 0.47")
- Sensor cable entry for armoured cables M20 × 1.5 (9.5 to 16 mm / 0.37 to 0.63")
- Thread for cable entries, ½" NPT, G ½"

Connecting cable for remote version:
- Cable entry M20 × 1.5 (8 to 12 mm / 0.31 to 0.47")
- Sensor cable entry for armoured cables M20 × 1.5 (9.5 to 16 mm / 0.37 to 0.63")
- Thread for cable entries, ½" NPT, G ½"

Remote version cable specifications

Coil cable
- 2 × 0.75 mm² (18 AWG) PVC cable with common, braided copper shield (∅ ~ 7 mm / 0.28")
- 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 mm² (14 AWG)
- Test voltage for cable insulation: ≤ 1433 AC r.m.s. 50/60 Hz or ≥ 2026 V DC

Signal cable
- 3 × 0.38 mm² (20 AWG) PVC cable with common, braided copper shield (∅ ~ 7 mm / 0.28") and individual shielded cores
- With empty pipe detection (EPD): 4 × 0.38 mm² (20 AWG) PVC cable with common, braided copper shield (∅ ~ 7 mm / 0.28") 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 mm² (14 AWG)



a *Signal 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 and NAMUR recommendation NE 21.

Caution!
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.

Power consumption

- AC: < 15 VA (incl. sensor)
- DC: < 15 W (incl. sensor)

Switch-on current:
- Max. 3 A (< 5 ms) for 260 V AC
- Max. 13.5 A (< 50 ms) for 24 V DC

Power supply failure

Lasting min. ½ cycle frequency: EEPROM saves measuring system data
- EEPROM or T-DAT (Promag 53 only) retain the measuring system data in the event of a power supply failure
- S-DAT: exchangeable data storage chip which stores the data of the sensor (nominal diameter, serial number, calibration factor, zero point etc.)

Potential equalization

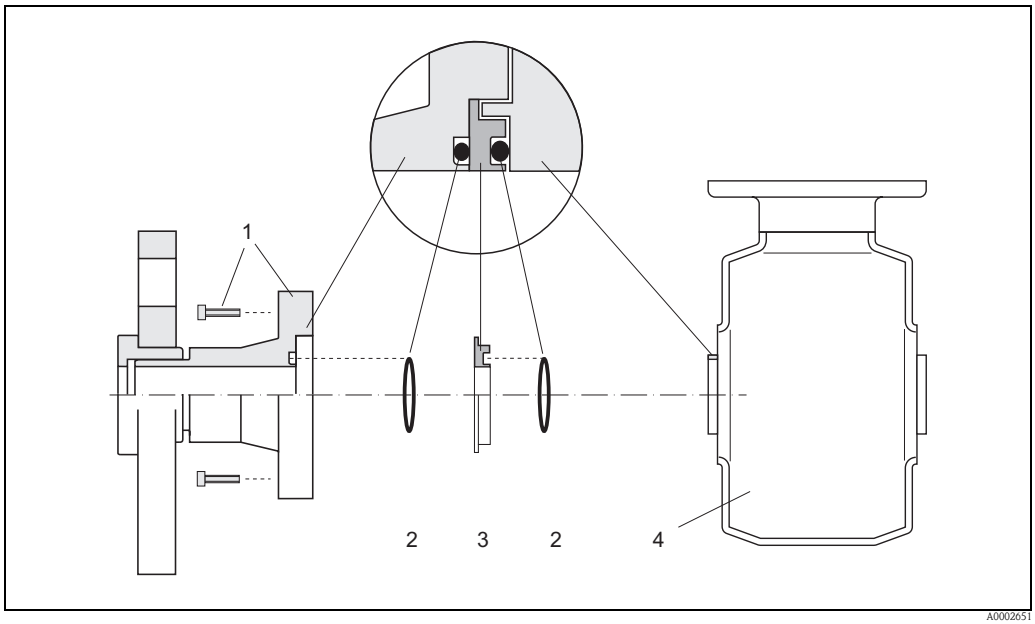
Perfect measurement is only ensured when the medium and the sensor have the same electrical potential.

Metal process connections

Potential matching usually takes place over the metallic process connection in contact with medium process connections which are directly mounted on the measuring transmitter. This usually means that additional potential matching measures are unnecessary.

Plastic process connections

For plastic process connections, potential matching must be ensured between sensor and medium using additional ground rings. If these ground rings are missing, this can influence accuracy or destroy the measuring transmitter through the electrochemical decomposition of electrodes.



1 Allen screw (process connection)
2 O-ring seals
3 Plastic washer (spacer) or ground ring
4 Sensor

When using ground rings, note the following points:

- Depending on the option ordered, plastic washers may be installed at the process connections instead of ground rings. These plastic washers serve only as spacers and have no potential equalization function. In addition, they provide a sealing function at the interface between the sensor and process connection.
  For this reason, with process connections without ground rings, these plastic washers/seals must not be removed, or must always be installed.
- Ground rings can be ordered separately from Endress+Hauser as an accessory.
  Also make sure that the ground rings are compatible with the electrode material. Otherwise the danger exists that the electrodes could be destroyed by electrochemical corrosion.
  You can find material data on → 📄 44.
- Ground rings, incl. seals, are mounted inside the process connection. This has no influence on the installation length. You can find the dimensions of ground rings on → 📄 35.

Performance characteristics

Reference operating conditions

As per DIN EN 29104 and VDI/VDE 2641:
- Fluid temperature: +28 °C ± 2 K (+82 °F ± 2 K)
- Ambient temperature: +22 °C ±2 K (+72 °F ± 2 K)
- Warm-up period: 30 minutes

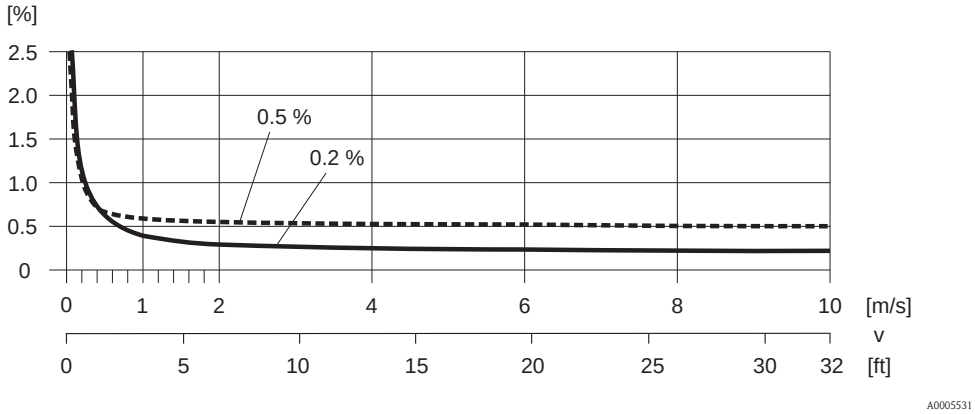
Installation conditions:
- Inlet run > 10 × DN
- Outlet run > 5 × DN
- Sensor and transmitter grounded.
- The sensor is centered in the pipe.

Maximum measured error

Promag 50:
- Pulse output: ±0.5% o.r. ± 1 mm/s
  optional: ±0.2% o.r. ± 2 mm/s
  (o.r. = of reading)
- Current output: also typically ± 5 µA

Promag 53:
- Pulse output: ±0.2% 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

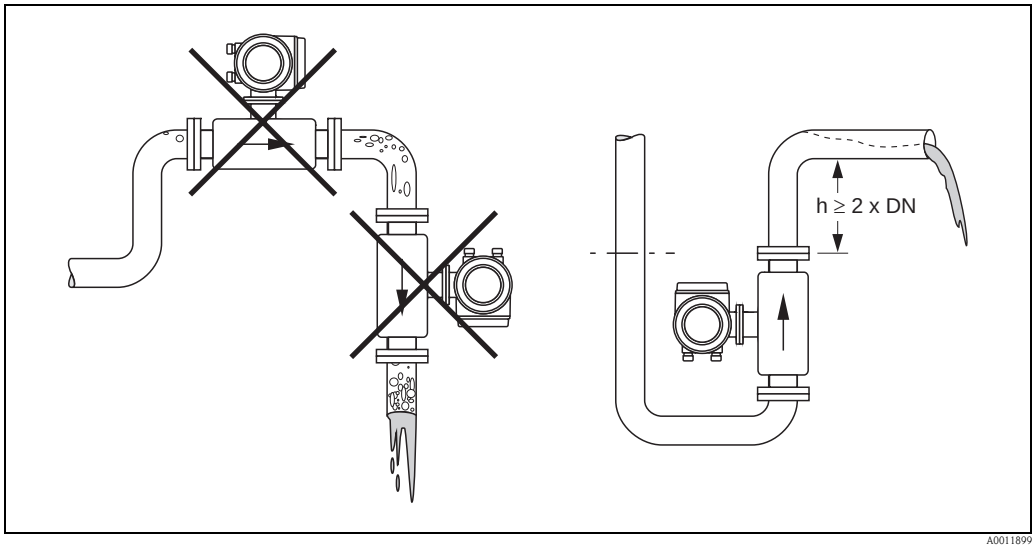
Max. ±0.1% o.r. ± 0.5 mm/s (o.r. = of reading)

Operating conditions: Installations

Installation instructions

Mounting location

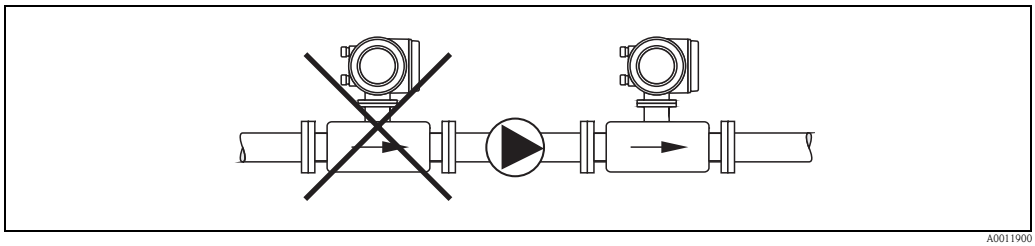
Entrained air or gas bubble formation in the measuring tube can result in an increase in measuring errors.
Avoid the following installation locations in the pipe:
- Highest point of a pipeline. Risk of air accumulating!
- Directly upstream from a free pipe outlet in a vertical pipeline.



Mounting location

Installation of pumps

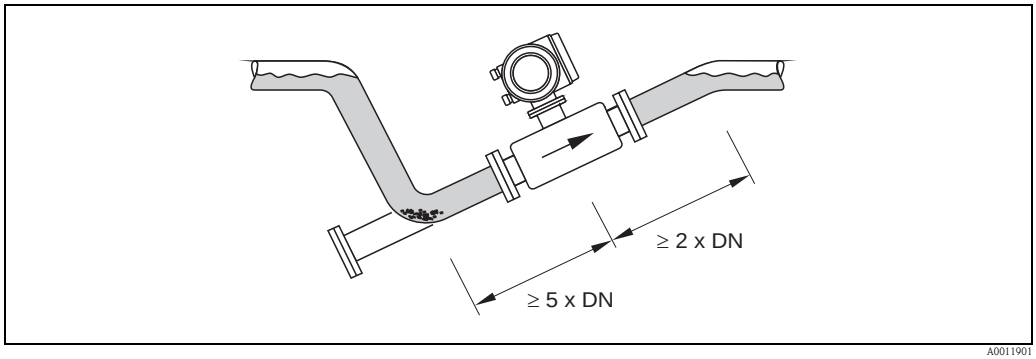
Sensors may not be installed on the pump suction side. This precaution is to avoid low pressure and the consequent risk of damage to the lining of the measuring tube. Information on the pressure tightness of the measuring tube lining → 19, Section "Pressure tightness".
Pulsation dampers may be needed when using piston pumps, piston diaphragm pumps or hose pumps. Information on the shock and vibration resistance of the measuring system → 18, Section "Shock and vibration resistance".



Installation of pumps

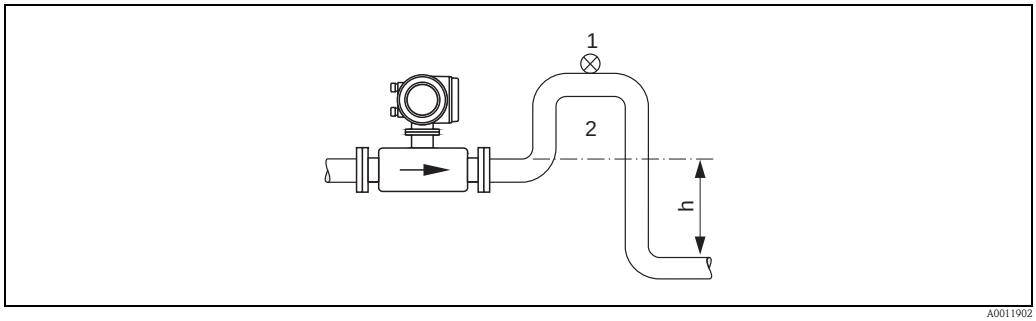
Partially filled pipes
Partially filled pipes with gradients necessitate a drain-type configuration.
The empty pipe detection function (EPD) provides additional security in detecting empty or partially filled pipes.

Caution!
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 → 19, Section "Pressure tightness".

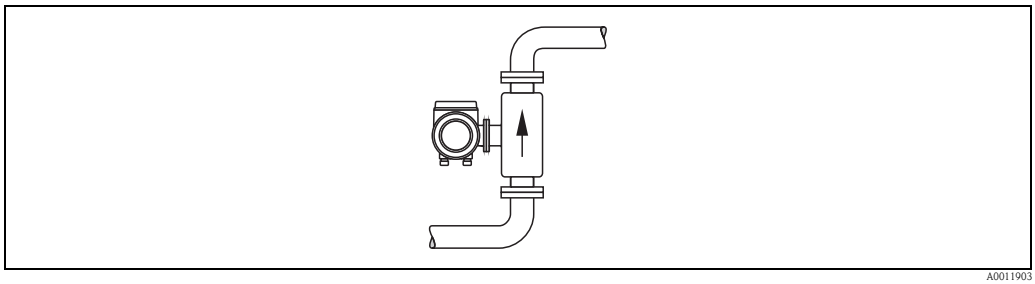


Installation measures for vertical pipes

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

Orientation
An optimum orientation helps avoid gas and air accumulations and deposits in the measuring tube. However, the measuring device also offers the additional function of empty pipe detection (EPD) for detecting partially filled measuring tubes or if outgassing fluids or fluctuating operating pressures are present.

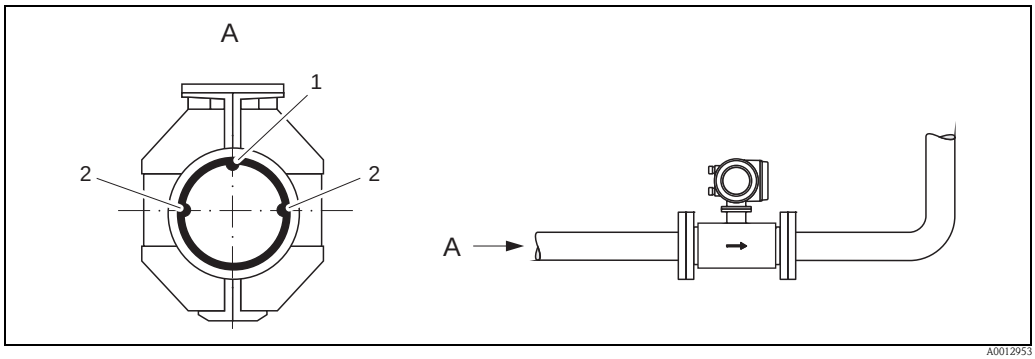
Vertical orientation
This is the ideal orientation for self-emptying piping systems and for use in conjunction with empty pipe detection.



Vertical orientation

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

Caution!
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.

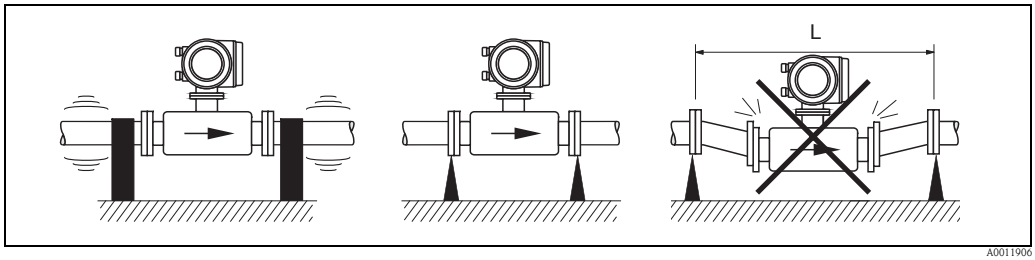


Horizontal orientation

1 EPD electrode for empty pipe detection (not for DN 2 to 15 / 1/12 to ½")
2 Measuring electrodes for signal detection

Vibrations
Secure the piping and the sensor if vibration is severe.

Caution!
If vibrations are too severe, we recommend the sensor and transmitter be mounted separately. Information on the permitted shock and vibration resistance → 🖹 18, Section "Shock and vibration resistance".



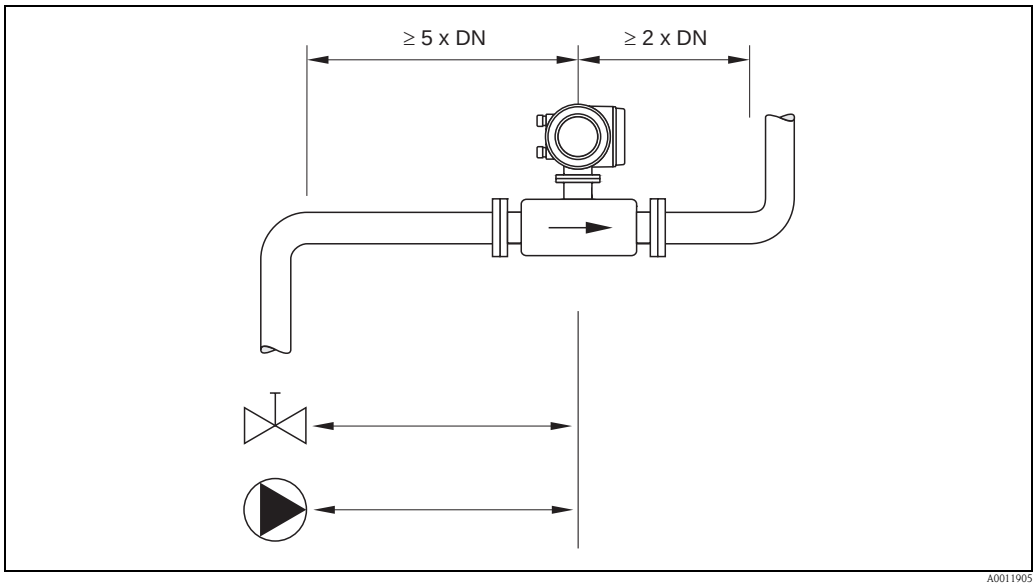
Measures to prevent vibration of the measuring device

L > 10 m (33 ft)

Inlet and outlet run

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



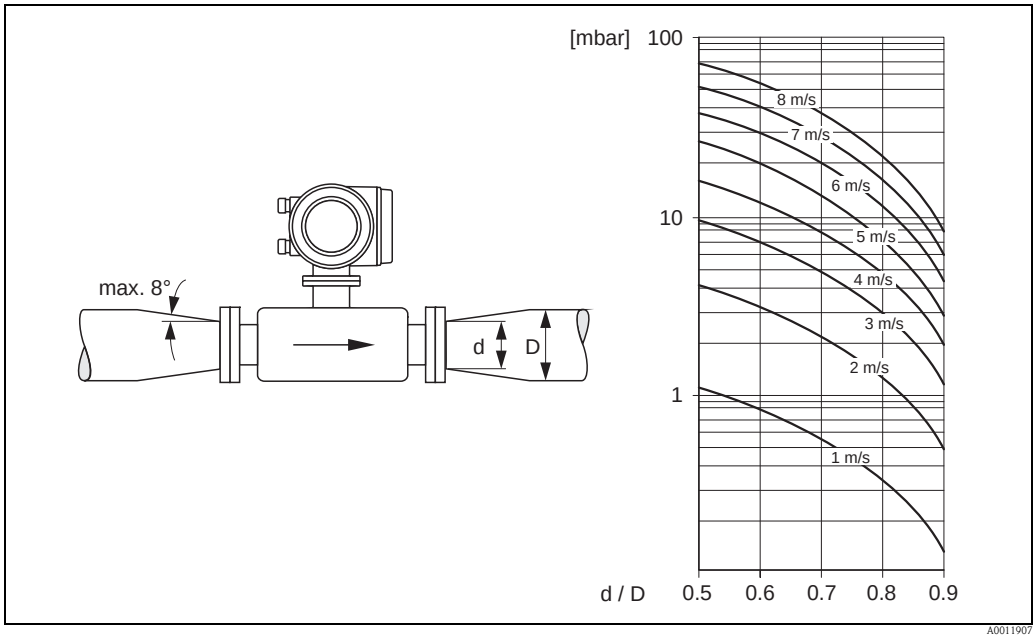
Inlet and outlet run

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 water.

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.

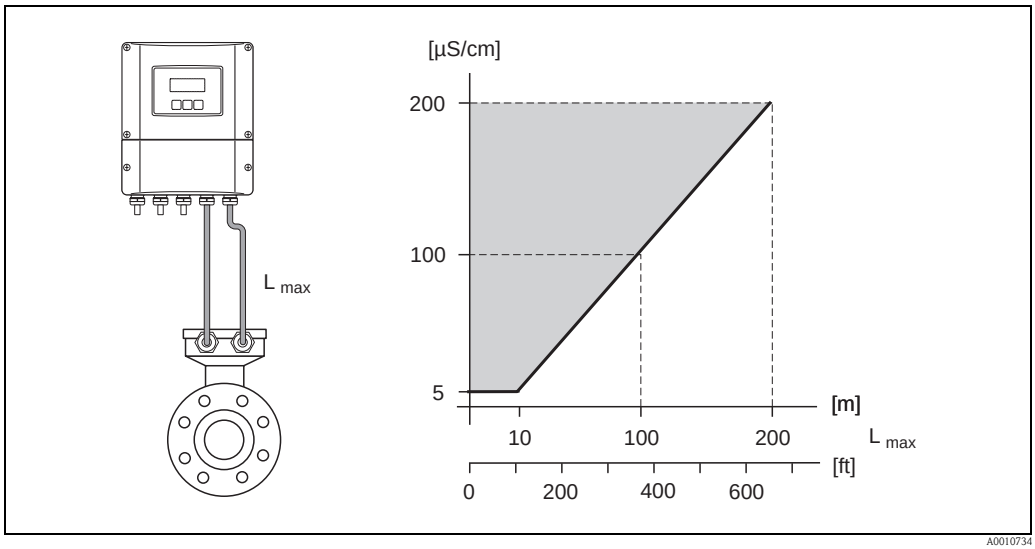


Pressure loss due to adapters

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 20 µS/cm is required for measuring demineralized water.
- 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]

Operating conditions: Environment

Ambient temperature range

Transmitter
- Standard: –20 to +60 °C (–4 to +140 °F)
- Optional: –40 to +60 °C (–40 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)

Caution!
The permitted temperature range of the measuring tube lining may not be undershot or overshot (→ 19, Section "Medium temperature range").

Please note the following points:
- Install the device in 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.

Caution!
- 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 600 68-2-6

CIP cleaning

possible

SIP cleaning

possible

Electromagnetic compatibility (EMC)

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

Operating conditions: Process

Medium temperature range

The permissible medium temperature depends on the sensor and the sealing material:

Sensor:
- DN 2 to 100 (1/12 to 4"): –20 to +150 °C (–4 to +302 °F)

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

Conductivity

The minimum conductivity is:
- ≥ 5 µS/cm for fluids generally
- ≥ 20 µS/cm for demineralized water

Note!
In the remote version, the necessary minimum conductivity also depends on the cable length (→ 17, Section "Length of connecting cable").

Medium pressure range (nominal pressure)

The permitted nominal pressure depends on the process connection and the seal:
- 40 bar (580 psi):
  - flange EN 1092-1 (DIN 2501)
  - weld socket for DIN EN ISO 1127 pipes and ODT (with O-ring seal)
- 16 bar (232 psi): all other process connections

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)	180 °C (356 °F)
2 to 100	1/12 to 4"	0	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 to 3 m/s (6.5 to 9.8 ft/s). The velocity of flow (v), moreover, has to be matched to the physical properties of the fluid:

- v < 2 m/s (6.5 ft/s): for small conductivities
- v > 2 m/s (6.5 ft/s): for fluids causing build-up such as high-fat milk etc.

Flow characteristic values (SI units)					
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	0.10 dm³	0.1 dm³/min
15	½"	4 to 100 dm³/min	25 dm³/min	0.20 dm³	0.5 dm³/min
25	1"	9 to 300 dm³/min	75 dm³/min	0.50 dm³	1.00 dm³/min
40	1½"	25 to 700 dm³/min	200 dm³/min	1.50 dm³	3.00 dm³/min
50	2"	35 to 1100 dm³/min	300 dm³/min	2.50 dm³	5.00 dm³/min
65	–	60 to 2000 dm³/min	500 dm³/min	5.00 dm³	8.00 dm³/min
80	3"	90 to 3000 dm³/min	750 dm³/min	5.00 dm³	12.0 dm³/min
100	4"	145 to 4700 dm³/min	1200 dm³/min	10.0 dm³	20.0 dm³/min

Flow characteristic values (US units)					
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
½"	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	0.20 gal	0.25 gal/min
1½"	40	7 to 190 gal/min	50 gal/min	0.50 gal	0.75 gal/min
2"	50	10 to 300 gal/min	75 gal/min	0.50 gal	1.25 gal/min
3"	80	24 to 800 gal/min	200 gal/min	2.00 gal	2.50 gal/min
4"	100	40 to 1250 gal/min	300 gal/min	2.00 gal	4.00 gal/min

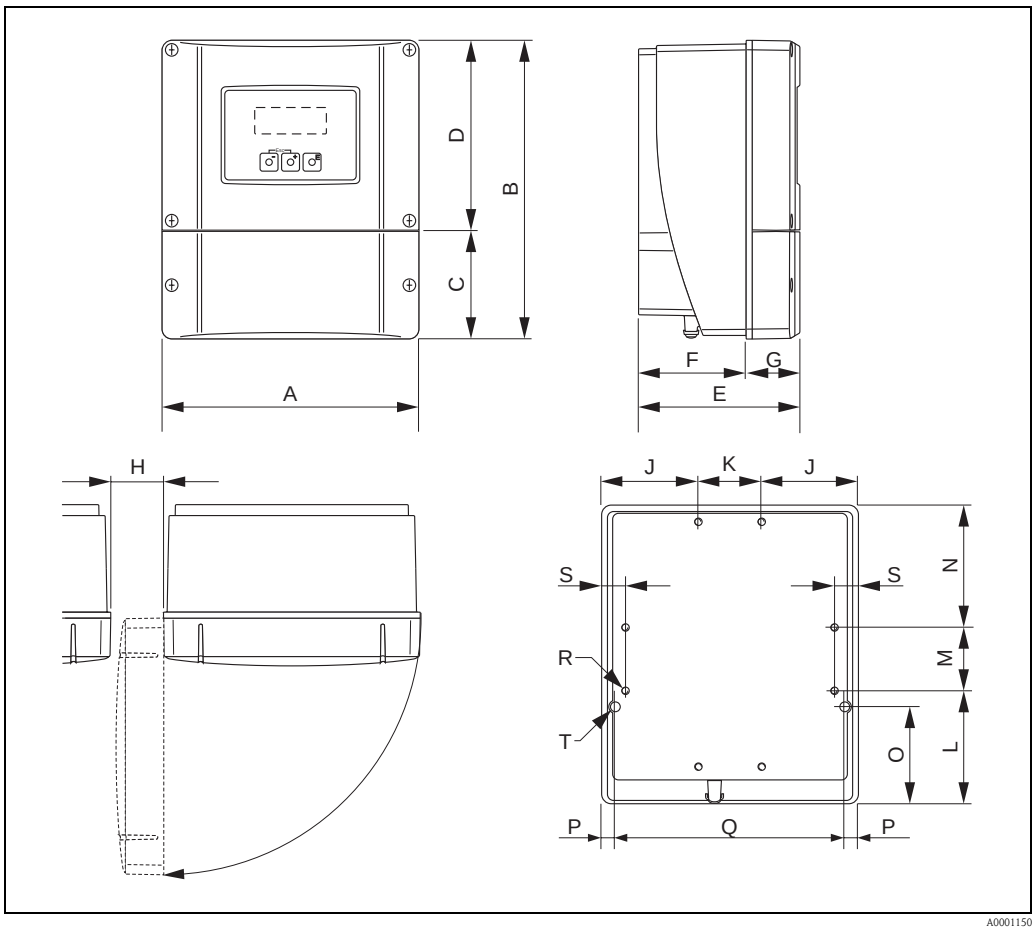
Pressure loss

- With DN 8 to 100 (3/8 to 4") 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 (→ 16, Section "Adapters").

Mechanical construction

Design, dimensions

Transmitter remote version, wall-mount housing (non Ex-zone and II3G/Zone 2)



Dimensions (SI units)

A	B	C	D	E	F	G	H	J
215	250	90.5	159.5	135	90	45	> 50	81
K	L	M	N	O	P	Q	R	S
53	95	53	102	81.5	11.5	192	8 × M5	20

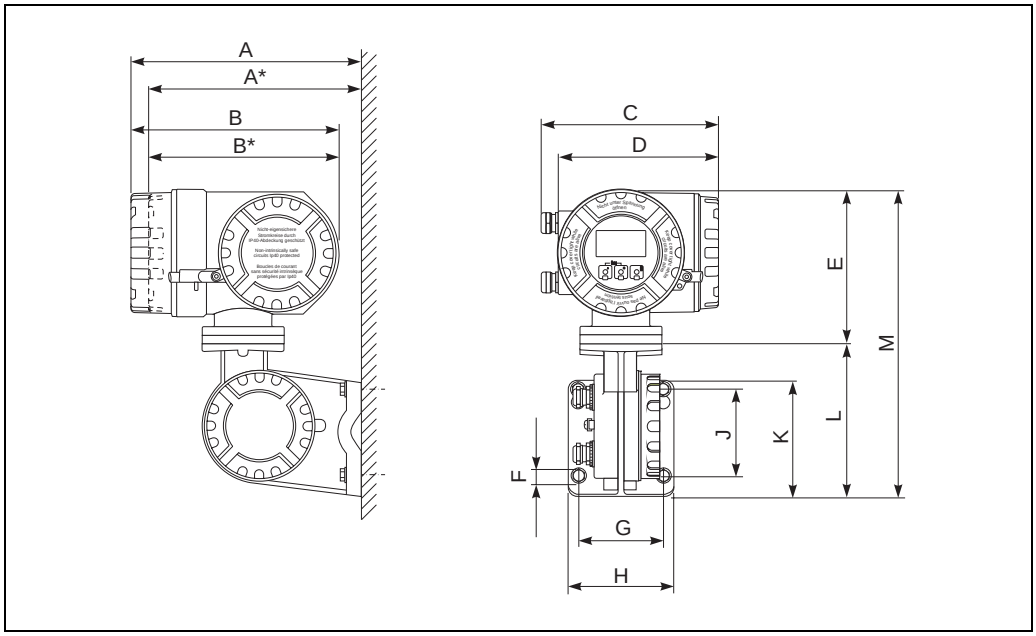
All dimensions in [mm]

Dimensions (US units)

A	B	C	D	E	F	G	H	J
8.46	9.84	3.56	6.27	5.31	3.54	1.77	> 1.97	3.18
K	L	M	N	O	P	Q	R	S
2.08	3.74	2.08	4.01	3.20	0.45	7.55	8 × M5	0.79

All dimensions in [inch]

Transmitter remote version, connection housing (II2GD/Zone 1)



Dimensions (SI units)

A	A*	B	B*	C	D	E	Ø F	G	H	J	K	L	M
265	242	240	217	206	186	178	8.6 (M8)	100	130	100	144	170	355

All dimensions in [mm]

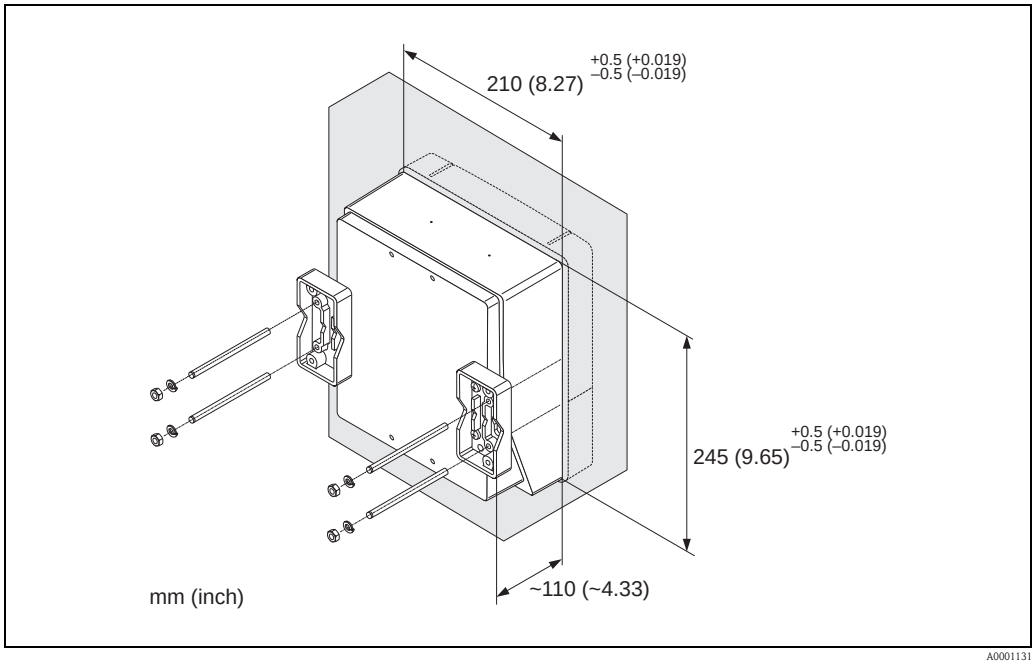
Dimensions (US units)

A	A*	B	B*	C	D	E	Ø F	G	H	J	K	L	M
10.4	9.53	9.45	8.54	8.11	7.32	7.01	0.34 (M8)	3.94	5.12	3.94	5.67	6.69	14.0

All dimensions in [inch]

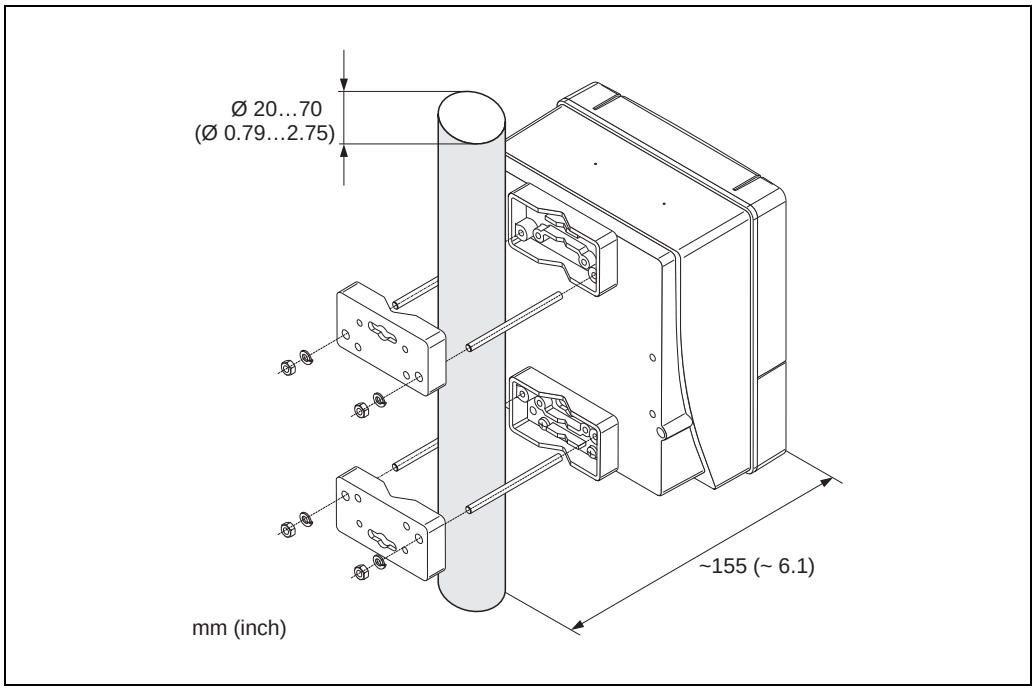
There is a separate mounting kit for the wall-mounted housing. It can be ordered from Endress+Hauser as an accessory. The following installation variants are possible:
- Panel-mounted installation
- Pipe mounting

Installation in control panel



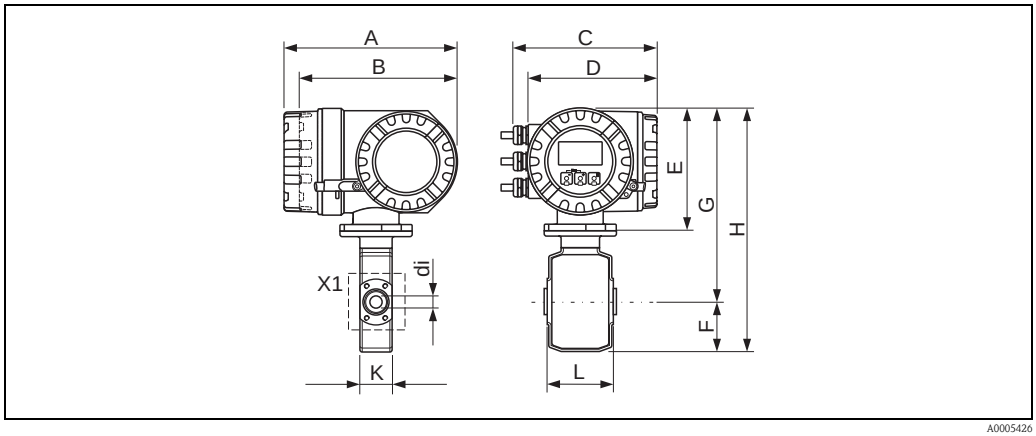
A0001131

Pipe mounting



A0001132

Compact version, aluminum field housing DN 2 to 25 (1/12 to 1")



Dimensions in SI units

DN	L	A	B	C	D	E	F	G	H	K	X1	di
2	86	227	207	187	168	160	55	252	307	43	M6 × 4	2.25
4										43		4.5
8										43		9
15										43		16
25										56		26

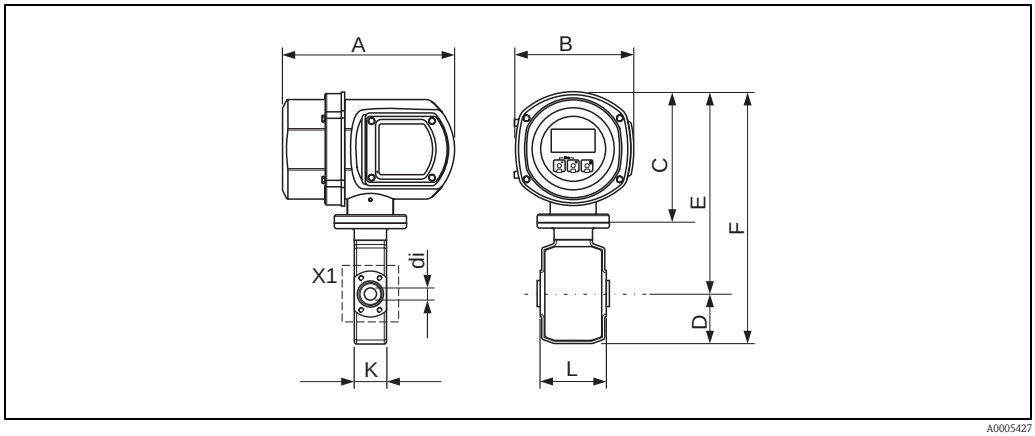
Total length depends on the process connections.
All dimensions in [mm]

Dimensions in US units

DN	L	A	B	C	D	E	F	G	H	K	X1	di
1/12"	3.39	8.94	8.15	7.36	6.61	6.30	2.17	9.92	12.1	1.69	M6 × 4	0.09
1/8"										1.69		0.18
3/8"										1.69		0.35
½"										1.69		0.63
1"										2.20		0.89

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

Compact version, stainless-steel field housing DN 2 to 25 (1/12 to 1")



A0005427

Dimensions in SI units

DN	L	A	B	C	D	E	F	K	X1	di
2	86	225	153	168	55	261	316	43	M6 × 4	2.25
4								43		4.5
8								43		9
15								43		16
25								56		26

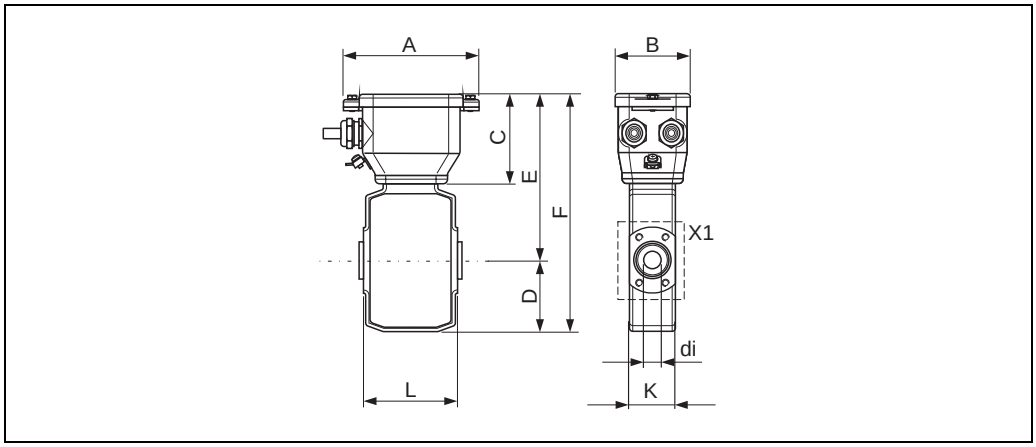
Total length depends on the process connections.
All dimensions in [mm]

Dimensions in US units

DN	L	A	B	C	D	E	F	K	X1	di
1/12"	3.39	8.86	6.02	6.61	2.17	10.3	12.4	1.69	M6 × 4	0.09
1/8"								1.69		0.18
3/8"								1.69		0.35
½"								1.69		0.63
1"								2.20		0.89

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	55	136	191	43	M6 × 4	2.25
4								43		4.5
8								43		9.0
15								43		16.0
25								56		26.0

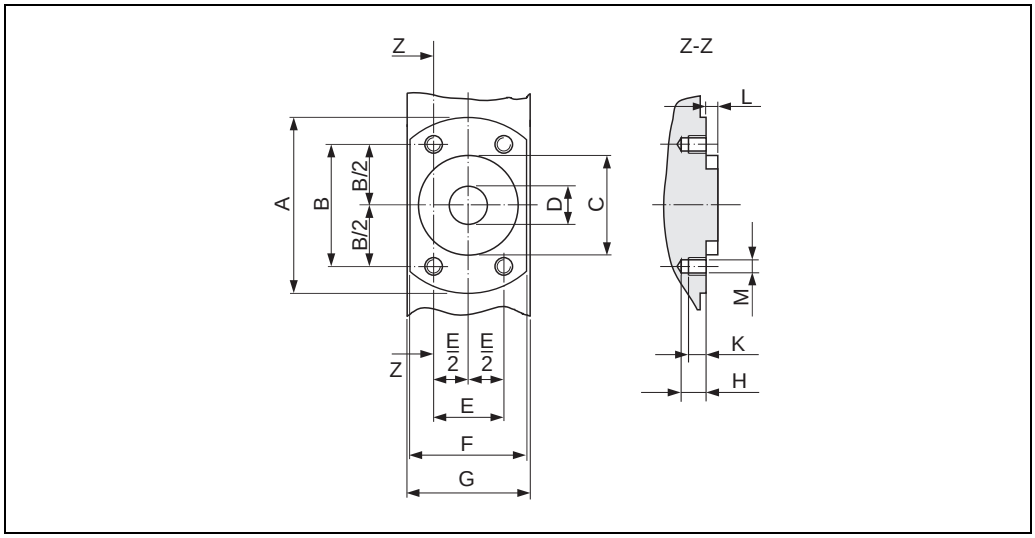
Total length depends on the process connections.
All dimensions in [mm]

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	2.17	5.35	7.52	1.69	M6 × 4	0.09
1/8"								1.69		0.18
3/8"								1.69		0.35
½"								1.69		0.63
1"								2.20		0.89

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							
25	72	50.2	44	26	29	55	56				

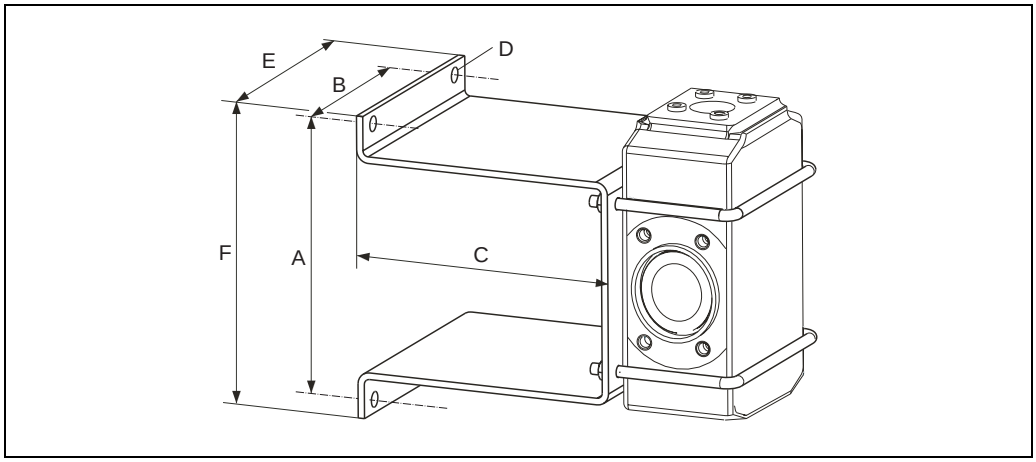
All dimensions in [mm]

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							
½"				0.63							
1"	2.83	1.98	1.73	0.89	1.14	2.17	2.20				

All dimensions in [inch]

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

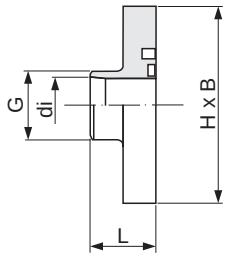


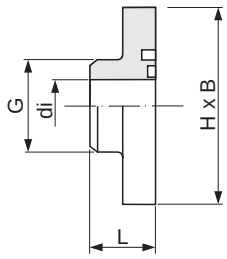
A0005537

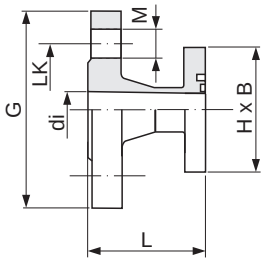
Dimensions in mm (inch)

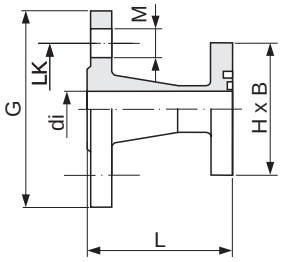
A	B	C	Ø D	E	F
125 (4.92")	88 (3.46")	120 (4.72")	7 (0.28")	110 (4.33")	140 (5.51")

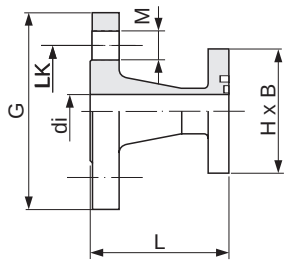
Process connections with O-ring seal (DN 2 to 25 / 1/12 to 1")

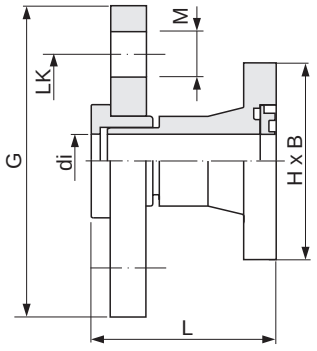
Weld socket for DIN	Sensor	Fits to	di	G	L	H × B
1.4404 / 316L 5*H**-B**********	DN [mm]	Piping DIN EN ISO 1127	[mm]	[mm]	[mm]	[mm]
 A0005547	2 to 8	13.5 × 1.6	10.3	13.5	20.3	62 × 42
	15	21.3 × 1.6	18.1	21.3	20.3	62 × 42
	25 (DIN)	33.7 × 2.0	29.7	33.7	20.3	62 × 52
	■ Fitting length = (2 × L) + 86 mm					

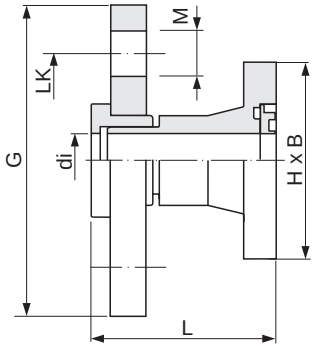
Weld socket for ODT/SMS	Sensor	Fits to	di	G	L	H × B
1.4404 / 316L 5*H**-C**********	DN [mm]	Piping ODT/SMS [mm]	[mm]	[mm]	[mm]	[mm]
 A0005548	2 to 8	13.5 × 2.3	17.3	13.5	20.3	62 × 42
	15	21.3 × 2.65	17.3	21.3	20.3	62 × 42
	25 (DIN)	33.7 × 3.25	28.5	33.7	20.3	72 × 55
	■ Fitting length = (2 × L) + 86 mm					

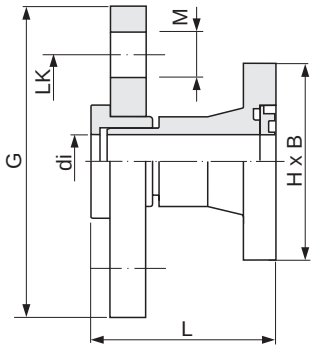
Flange	Sensor	Fits to	di	G	L	LK	M	H × B
PN 40/EN 1092-1 (DIN 2501), Form B 1.4404 / 316L 5*H**-D**********	DN [mm]	Flange[1)] [mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]
 A0005549	2 to 8	DN 15	17.3	95	56.2	65	14	62 × 42
	15	DN 15	17.3	95	56.2	65	14	62 × 42
	25 (DIN)	DN 25	28.5	115	56.2	85	14	72 × 55
	[1)] EN 1092-1 (DIN 2501) ■ Fitting length = (2 × L) + 86 mm ■ Fitting length to DVGW (200 mm)							

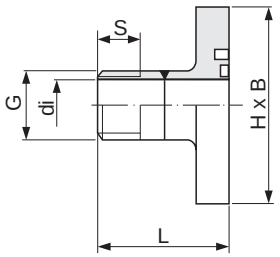
Flange	Sensor	Fits to	di	G	L	LK	M	H × B
Cl. 150/ ANSI B16.5 1.4404 / 316L 5*H**-E**********	DN [mm]	Flange ANSI B16.5 [inch]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]
 A0005550	2 to 8	½"	15.7	89	66.0	60.5	15.7	62 × 42
	15	½"	16.0	89	66.0	60.5	15.7	62 × 42
	25 (1" ANSI)	1"	26.7	108	71.8	79.2	15.7	72 × 55
	■ Fitting length = (2 × L) + 86 mm							

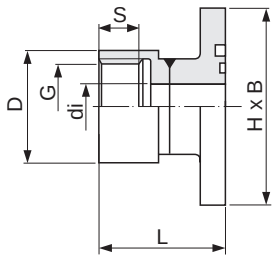
Flange	Sensor	Fits to	di	G	L	LK	M	H × B
20K / JIS B2220; 1.4404 / 316L 5*H**-F**********	DN [mm]	Flange B2220	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]
	2 to 8	ND 15	15	95	67	70	15	62 × 42
	15	ND 15	16	95	67	70	15	62 × 42
	25 (DIN)	ND 25	26	125	67	90	19	72 × 55
	▪ Fitting length = (2 × L) + 86 mm							

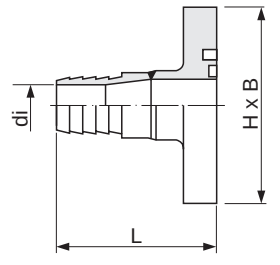
Flange	Sensor	Fits to	di	G	L	LK	M	H × B
PN 16 / EN 1092-1 (DIN 2501); PVDF 5*H**-G**********	DN [mm]	Flange EN 1092-1 (DIN 2501)	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]
	2 to 8	DN 15	16	95	57	65	14	62 × 42
	15	DN 15	16	95	57	65	14	62 × 42
	25 (DIN)	DN 25	27.2	115	57	85	14	72 × 55
	▪ Fitting length = (2 × L) + 86 mm ▪ Fitting length to DVGW (200 mm) ▪ The requisite ground rings can be ordered as accessories (Order No. DK5HR-****).							

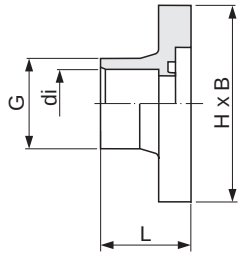
Flange	Sensor	Fits to	di	G	L	LK	M	H × B
Cl. 150 / ANSI B16.5; PVDF 5*H**-H**********	DN [mm]	Flange ANSI B16.5	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]
	2 to 8	½"	16	95	57	60	16	62 × 42
	15	½"	16	95	57	60	16	62 × 42
	25 (DIN)	1"	27.2	115	57	79	16	72 × 55
	▪ Fitting length = (2 × L) + 86 mm ▪ The requisite ground rings can be ordered as accessories (Order No. DK5HR-****).							

Flange	Sensor	Fits to	di	G	L	LK	M	H × B
10K / JIS B2220; PVDF 5*H**-J**********	DN [mm]	Flange B2220	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]
	2 to 8	ND 15	16	95	57	70	15	62 × 42
	15	ND 15	16	95	57	70	15	62 × 42
	25 (DIN)	ND 25	27.2	125	57	90	19	72 × 55
	■ Fitting length = (2 × L) + 86 mm ■ The requisite ground rings can be ordered as accessories (Order No. DK5HR-****).							

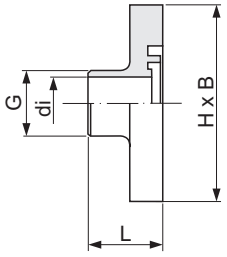
External pipe thread	Sensor	Fits to	di	G	L	S	H × B
ISO 228/ DIN 2999; 1.4404 / 316L 5*H**-K**********	DN [mm]	Internal thread [inch]	[mm]	[inch]	[mm]	[mm]	[mm]
	2 to 8	R 3/8"	10	3/8"	40	10.1	62 × 42
	15	R ½"	16	½"	40	13.2	62 × 42
	25 (1" ANSI)	R 1"	25	1"	42	16.5	72 × 55
	■ Fitting length = (2 × L) + 86 mm						

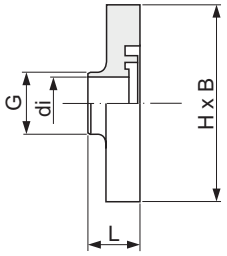
Internal pipe thread	Sensor	Fits to	di	G	D	L	S	H × B
ISO 228/ DIN 2999; 1.4404 / 316L 5*H**-L**********	DN [mm]	External thread [inch]	[mm]	[inch]	[mm]	[mm]	[mm]	[mm]
	2 to 8	Rp 3/8"	9	3/8"	22	45	13	62 × 42
	15	Rp ½"	16	½"	27	45	14	62 × 42
	25 (1" ANSI)	Rp 1"	27.2	1"	40	51	17	72 × 55
	■ Fitting length = (2 × L) + 86 mm							

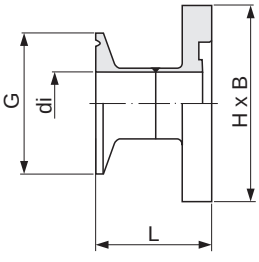
Hose connection	Sensor	Fits to	di	LW	L	H × B
1.4404 / 316L 5*H**-M/N/P**********	DN [mm]	Inside diameter [inch]	[mm]	[mm]	[mm]	[mm]
	2 to 8	13	10.0	13	49	62 × 42
	15	16	12.6	16	49	62 × 42
	25	19	16.0	19	49	62 × 42
	■ Fitting length = (2 × L) + 86 mm					

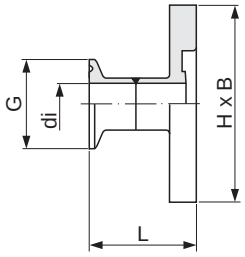
Adhesive fitting	Sensor	Fits to	di	G	L	H × B
PVC 5*H**-R/S**********	DN [mm]	Pipe [mm] [inch]	[mm]	[mm]	[mm]	[mm]
 A0005566	2 to 8	½" [inch]	21.5	27.3	38.5	62 × 42
	2 to 8	20 × 2 [mm] (DIN 8062)	20.2	27.0	38.5	62 × 42
	15	20 × 2 [mm] (DIN 8062)	20.2	27.0	28.0	62 × 42
	▪ Fitting length = (2 × L) + 86 mm ▪ The requisite ground rings can be ordered as accessories (Order No. DK5HR-****).					

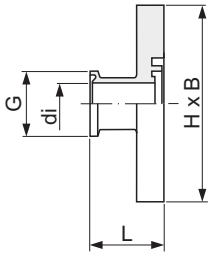
Process connections with aseptic gasket seal (DN 2 to 25 / 1/12 to 1")

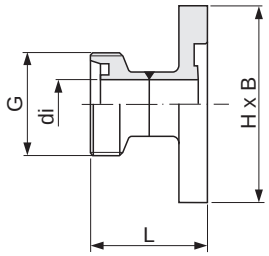
Weld socket for DIN	Sensor	Fits to	di	G	L	H × B
1.4404 / 316L 5*H**-U**********	DN [mm]	Piping DIN 11850	[mm]	[mm]	[mm]	[mm]
 A0003870	2 to 8	14 × 2	9	14	23.3	62 × 42
	15	20 × 2	16	20	23.3	62 × 42
	25 (DIN)	30 × 2	26	30	23.3	72 × 55
	▪ Fitting length = (2 × L) + 86 mm ▪ If pigs are used for cleaning, it is essential to take the inside diameters of measuring tube and process connection (di) into account!					

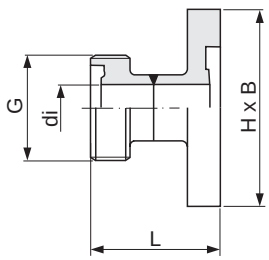
Weld socket for ODT/SMS	Sensor	Fits to	di	G	L	H × B
1.4404 / 316L 5*H**-V**********	DN [mm]	Piping ODT/SMS	[mm]	[mm]	[mm]	[mm]
 A0003871	2 to 8	12.7 × 1.65	9.0	12.7	16.1	62 × 42
	15	19.1 × 1.65	16.0	19.1	16.1	62 × 42
	25 (1" ANSI)	24.5 × 1.65	22.6	25.4	16.1	72 × 55
	▪ Fitting length = (2 × L) + 86 mm ▪ If pigs are used for cleaning, it is essential to take the inside diameters of measuring tube and process connection (di) into account!					

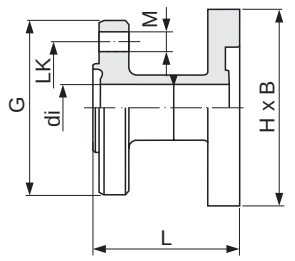
Clamp ISO 2852, Fig. 2	Sensor	Fits to piping	Clamp ISO 2850	di	G	L	H × B
1.4404 / 316L 5*H**-W**********	DN [mm]	ISO 2037 / BS 4825-1	Diameter [mm]	[mm]	[mm]	[mm]	[mm]
 A0005560	25 (1" ANSI)	Tube 24.5 × 1.65	25	22.6	50.5	44.3	72 × 55
	▪ Fitting length = (2 × L) + 86 mm ▪ If pigs are used for cleaning, it is essential to take the inside diameters of measuring tube and process connection (di) into account!						

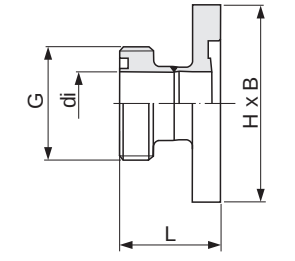
Clamp DIN 32676	Sensor	Fits to	di	G	L	H × B
1.4404 / 316L 5*H**-0**********	DN [mm]	Piping DIN 11850	[mm]	[mm]	[mm]	[mm]
 A0005556	2 to 8	Tube 14 × 2 (DN 10)	10	34.0	41.0	62 × 42
	15	Tube 20 × 2 (DN 15)	16	34.0	41.0	62 × 42
	25 (DIN)	Tube 30 × 2 (DN 25)	26	50.5	44.5	72 × 55
	■ Fitting length = (2 × L) + 86 mm ■ 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	Sensor	Fits to	di	G	L	H × B
1.4404 / 316L 5*H**-1**********	DN [mm]	Piping 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 25.5 × 1.65 (ODT 1")	22.1	50.4	28.5	72 × 55
	■ Fitting length = (2 × L) + 86 mm ■ If pigs are used for cleaning, it is essential to take the inside diameters of measuring tube and process connection (di) into account!					

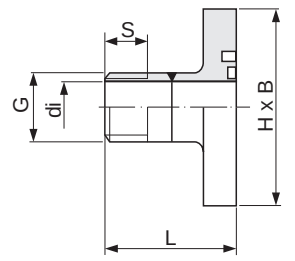
Coupling SC DIN 11851	Sensor	Fits to	di	G	L	H × B
Threaded adapter; 1.4404 / 316L 5*H**-2**********	DN [mm]	Piping DIN 11850	[mm]	[mm]	[mm]	[mm]
 A0005553	2 to 8	Tube 12 × 1 (DN 10)	10	Rd 28 × 1/8"	44	62 × 42
	15	Tube 18 × 1.5 (DN 15)	16	Rd 34 × 1/8"	44	62 × 42
	25 (DIN)	Tube 28 × 1 or 28 × 1.5 (DN 25)	26	Rd 52 × 1/6"	52	72 × 55
	■ Fitting length = (2 × L) + 86 mm ■ If pigs are used for cleaning, it is essential to take the inside diameters of measuring tube and process connection (di) into account!					

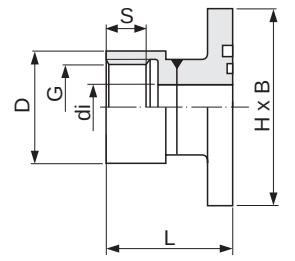
Coupling DIN 11864-1	Sensor	Fits to	di	G	L	H × B
Aseptic threaded adapter, Form A 1.4404 / 316L 5*H**-3**********	DN [mm]	Piping DIN 11850	[mm]	[mm]	[mm]	[mm]
 A0005558	2 to 8	Tube 13 × 1.5 (DN 10)	10	Rd 28 × 1/8"	42	62 × 42
	15	Tube 19 × 1.5 (DN 15)	16	Rd 34 × 1/8"	42	62 × 42
	25 (DIN)	Tube 29 × 1.5 (DN 25)	26	Rd 52 × 1/6"	49	72 × 55
	■ Fitting length = (2 × L) + 86 mm ■ If pigs are used for cleaning, it is essential to take the inside diameters of measuring tube and process connection (di) into account!					

Flange DIN 11864-2	Sensor	Fits to	di	G	L	LK	M	H × B
Aseptic grooved flange, Form A 1.4404 / 316L 5*H**-4**********	DN [mm]	Piping 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 ■ If pigs are used for cleaning, it is essential to take the inside diameters of measuring tube and process connection (di) into account!							

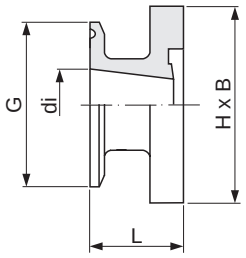
Coupling SMS 1145	Sensor	Fits to	SMS 1145	di	G	L	H × B
Threaded adapter; 1.4404 / 316L 5*H**-5**********	DN [mm]	Piping OD	Diameter [mm]	[mm]	[mm]	[mm]	[mm]
	25 (1" ANSI)	1"	25	22.6	Rd 40 × 1/6"	30.8	72 × 55
	■ Fitting length = (2 × L) + 86 mm ■ If pigs are used for cleaning, it is essential to take 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")

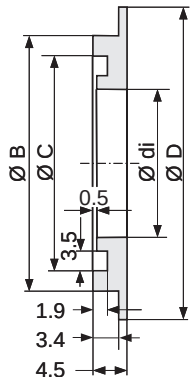
Exernal pipe thread	Sensor	Fits to	di	G	L	S	H × B
1.4404 / 316L DKH**-GD**	DN [mm]	NP internal thread	[mm]	[inch]	[mm]	[mm]	[mm]
	2 to 8	NPT 3/8"	10	3/8"	50	15.5	62 × 42
	15	NPT ½"	16	½"	50	20.0	62 × 42
	25 (1" ANSI)	NPT 1"	25	1"	55	25.0	72 × 55
	■ Fitting length = (2 × L) + 86 mm						

Internal pipe thread	Sensor	Fits to	di	G	D	L	S	H × B
1.4404 / 316L DKH**-GC**	DN [mm]	NP external thread	[mm]	[inch]	[mm]	[mm]	[mm]	[mm]
	2 to 8	NPT 3/8"	8.9	3/8"	22	45	13	62 × 42
	15	NPT ½"	16.0	½"	27	45	14	62 × 42
	25 (1" ANSI)	NPT 1"	27.2	1"	40	51	17	72 × 55
	■ Fitting length = (2 × L) + 86 mm							

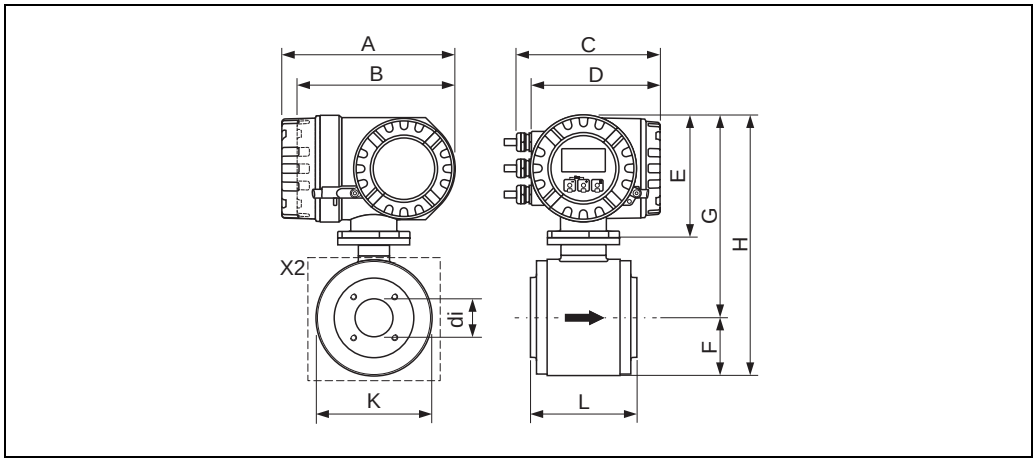
Process connections orderable only as accessories with aseptic gasket seal (DN 15)

Tri-Clamp L14 AM17	Sensor	Fits to	di	G	L	H × B
1.4404 / 316L DKH**-HF**	DN [mm]	Piping 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 ■ If pigs are used for cleaning, it is essential to take the inside diameters of measuring tube and process connection (di) into account!					

Ground rings (accessories for PVDF flanges / PVC adhesive fitting) (DN 2 to 25 / 1/12 to 1")

Ground ring	Sensor	di	B	C	D
1.4435/316L, Alloy C-22, Tantalum DK5HR – ****	DN [mm]	[mm]	[mm]	[mm]	[mm]
	2 to 8	9.0	22.0	17.6	33.9
	15	16.0	29.0	24.6	33.9
	25 (1" ANSI)	22.6	36.5	31.2	43.9
	25 (DIN)	26.0	39.0	34.6	43.9

Compact version, aluminum field housing DN 40 to 100 (1½ to 4")



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Dimensions in SI units

DN	L	A	B	C	D	E	F	G	H	K	X2	di
40	140	227	207	187	168	160	64	255	319	128	M8 × 4	35.3
50	140						77	267	344	153	M8 × 4	48.1
65	140						77	267	344	153	M8 × 6	59.9
80	200						102	292	394	203	M12 × 4	72.6
100	200						102	292	394	203	M12 × 6	97.5

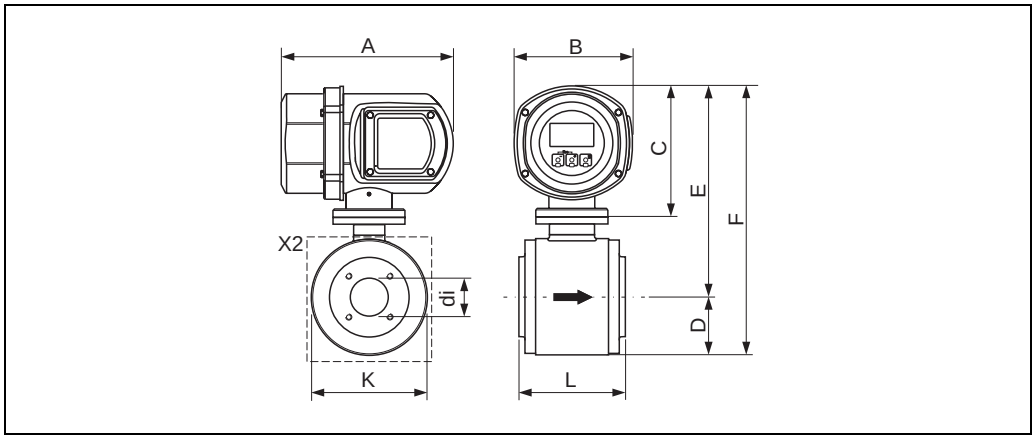
Total length depends on the process connections.
All dimensions in [mm]

Dimensions in US units

DN	L	A	B	C	D	E	F	G	H	K	X2	di
1½"	5.51	8.94	8.15	7.36	6.61	6.30	2.52	10.0	12.6	5.04	M8 × 4	1.39
2"	5.51						3.03	10.5	13.5	6.02	M8 × 4	1.89
3"	7.87						4.02	11.5	15.5	7.99	M12 × 4	2.86
4"	7.87						4.02	11.5	15.5	7.99	M12 × 6	3.84

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

Compact version, stainless-steel field housing DN 40 to 100 (1½ to 4")



Dimensions in SI units

DN	L	A	B	C	D	E	F	K	X2	di
40	140	220	153	171	64	266	330	128	M8 × 4	35.3
50	140				77	278	355	153	M8 × 4	48.1
65	140				77	278	355	153	M8 × 6	59.9
80	200				102	303	405	203	M12 × 4	72.6
100	200				102	303	405	203	M12 × 6	97.5

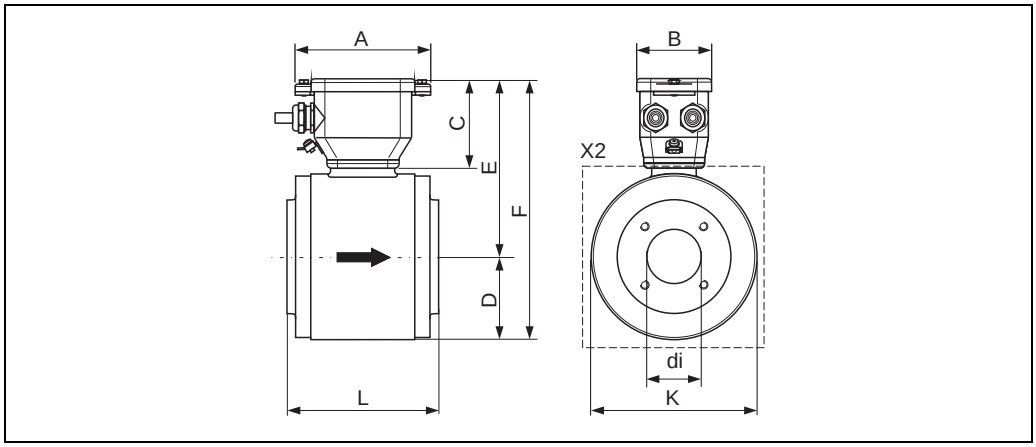
Total length depends on the process connections.
All dimensions in [mm]

Dimensions in US units

DN	L	A	B	C	D	E	F	K	X2	di
1½"	5.51	8.66	6.02	6.73	2.52	10.5	13.0	5.04	M8 × 4	1.39
2"	5.51				3.03	10.9	14.0	6.02	M8 × 4	1.89
3"	7.87				4.02	11.9	15.9	7.99	M12 × 4	2.86
4"	7.87				4.02	11.9	15.9	7.99	M12 × 6	3.84

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

Sensor, remote version DN 40 to 100 (1½ to 4")



A0005535

Dimensions in SI units

DN	L	A	B	C	D	E	F	K	X2	di
40	140	125	70	75	64.5	151.5	216	129	M8 × 4	35.3
50	140				77.0	164.0	241	154	M8 × 4	48.1
65	140				77.0	164.0	241	154	M8 × 6	59.9
80	200				101.5	188.5	290	203	M12 × 4	72.6
100	200				101.5	188.5	290	203	M12 × 6	97.5

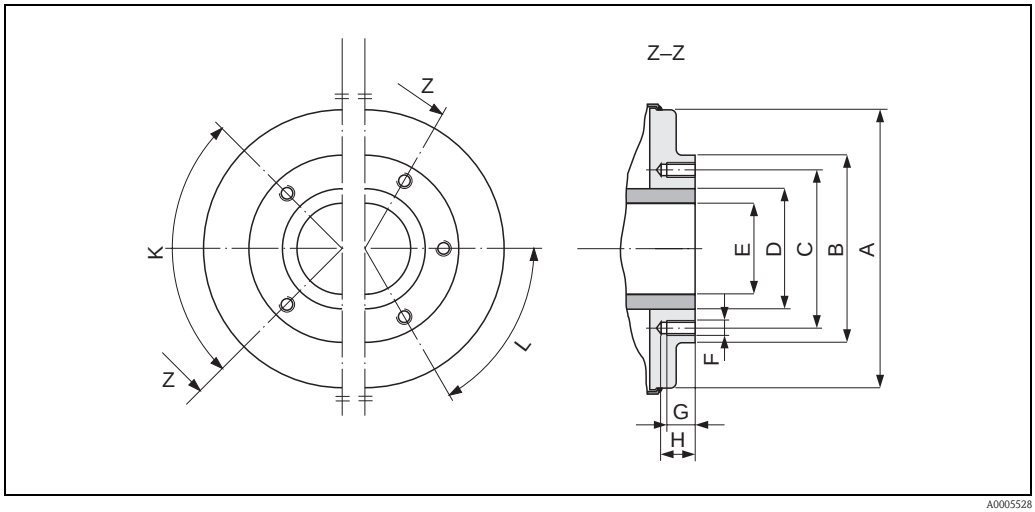
Total length depends on the process connections.
All dimensions in [mm]

Dimensions in US units

DN	L	A	B	C	D	E	F	K	X2	di
1½"	5.51	4.92	2.76	2.95	2.54	5.96	8.50	5.08	M8 × 4	1.39
2"	5.51				3.03	6.46	9.49	6.06	M8 × 4	1.89
3"	7.87				4.00	7.42	11.4	7.99	M12 × 4	2.86
4"	7.87				4.00	7.42	11.4	7.99	M12 × 6	3.84

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

Sensor, front view (without process connections) DN 40 to 100 (1½ to 4")



Dimensions in SI units

DN	A	B	C	D	E	F	G	H	K 90° ±0.5°	L 60° ±0.5°
									Threaded holes	
40	122	86	71.0	51.0	35.3	M 8	15	18	4	–
50	147	99	83.5	63.5	48.1	M 8	15	18	4	–
65	147	115	100.0	76.1	59.9	M 8	15	18	–	6
80	197	141	121.0	88.9	72.6	M 12	15	20	4	–
100	197	162	141.5	114.3	97.5	M 12	15	20	–	6

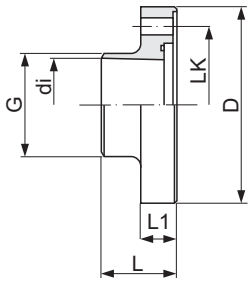
All dimensions in [mm]

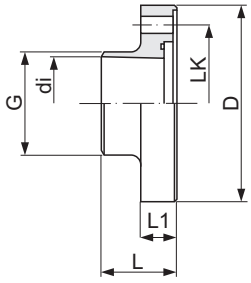
Dimensions in US units

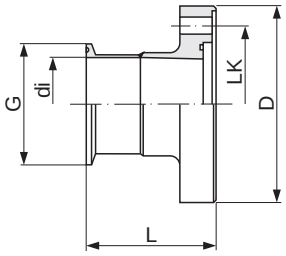
DN	A	B	C	D	E	F	G	H	K 90° ±0.5°	L 60° ±0.5°
									Threaded holes	
1½"	4.80	3.39	2.80	2.01	1.39	M 8	0.59	0.71	4	–
2"	5.79	3.90	3.29	2.50	1.89	M 8	0.59	0.71	4	–
3"	7.76	5.55	4.76	3.50	2.86	M 12	0.59	0.79	4	–
4"	7.76	6.38	5.57	4.50	3.84	M 12	0.59	0.79	–	6

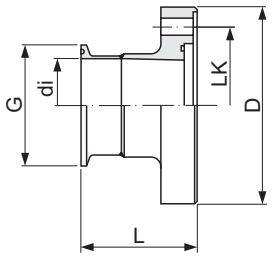
All dimensions in [inch]

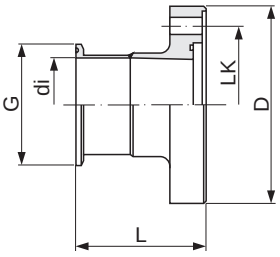
Process connections with aseptic gasket seal DN 40 to 100 (1½ to 4")

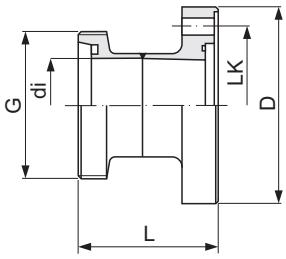
Weld socket for DIN	Sensor	Fits to	di	G	D	L	L1	LK
1.4404 / 316L 5*H**-U**********	DN [mm]	Piping DIN 11850	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]
 A0005541	40	42 × 2	38.0	43	92	42	19	71.0
	50	54 × 2	50.0	55	105	42	19	83.5
	65	70 × 2	66.0	72	121	42	21	100.0
	80	85 × 2	81.0	87	147	42	24	121.0
	100	104 × 2	100.0	106	168	42	24	141.5
	■ – Fitting length for DN 40 to 65 = (2 × L) + 136 mm – Fitting length for DN 80 to 100 = (2 × L) + 196 mm ■ If pigs are used for cleaning, it is essential to take the inside diameters of measuring tube and process connection (di) into account!							

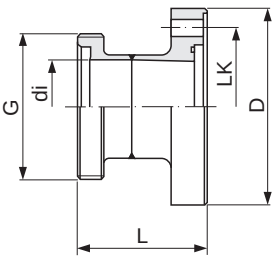
Weld socket for ODT/SMS	Sensor	Fits to	di	G	D	L	L1	LK
1.4404 / 316L 5*H**-V**********	DN [mm]	Piping OD/SMS	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]
 A0005541	40	38.1 × 1.65	35.3	40	92	42	19	71.0
	50	50.8 × 1.65	48.1	55	105	42	19	83.5
	65	63.5 × 1.65	59.9	66	121	42	21	100.0
	80	76.2 × 1.65	72.6	79	147	42	24	121.0
	100	101.6 × 1.65	97.5	104	168	42	24	141.5
	■ – Fitting length for DN 40 to 65 = (2 × L) + 136 mm – Fitting length for DN 80 to 100 = (2 × L) + 196 mm ■ If pigs are used for cleaning, it is essential to take the inside diameters of measuring tube and process connection (di) into account!							

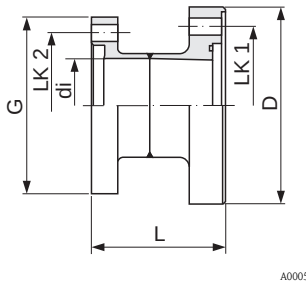
Clamp ISO 2852, Fig. 2	Sensor	Fits to piping	Clamp ISO 2852	di	G	D	L	LK
1.4404 / 316L 5*H**-W**********	DN [mm]	ISO 2037 / BS 4825-1	Diameter [mm]	[mm]	[mm]	[mm]	[mm]	[mm]
 A0005544	40	38.0 × 1.6	38.0	35.6	50.5	92	68.5	71.0
	50	51.0 × 1.6	51.0	48.6	64.0	105	68.5	83.5
	65	63.5 × 1.6	63.5	60.3	77.5	121	68.5	100.0
	80	76.1 × 1.6	76.1	72.9	91.0	147	68.5	121.0
	100	101.6 × 2.0	101.6	97.6	119.0	168	68.5	141.5
	■ – Fitting length for DN 40 to 65 = (2 × L) + 136 mm – Fitting length for DN 80 to 100 = (2 × L) + 196 mm ■ If pigs are used for cleaning, it is essential to take the inside diameters of measuring tube and process connection (di) into account!							

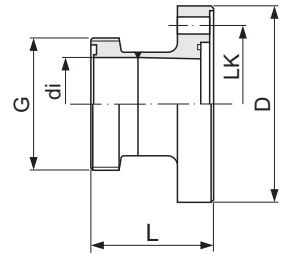
Clamp DIN 32676	Sensor	Fits to	di	G	D	L	LK
1.4404 / 316L 5*H**-0**********	DN [mm]	Piping DIN 11850	[mm]	[mm]	[mm]	[mm]	[mm]
 A0005539	40	42 × 2	38	50.5	92	61.5	71.0
	50	54 × 2	50	64.0	105	61.5	83.5
	65	70 × 2	66	91.0	121	68.0	100.0
	80	85 × 2	81	106.0	147	68.0	121.0
	100	104 × 2	100	119.0	168	68.0	141.5
	■ – Fitting length for DN 40 to 65 = (2 × L) + 136 mm – Fitting length for DN 80 to 100 = (2 × L) + 196 mm ■ If pigs are used for cleaning, it is essential to take the inside diameters of measuring tube and process connection (di) into account!						

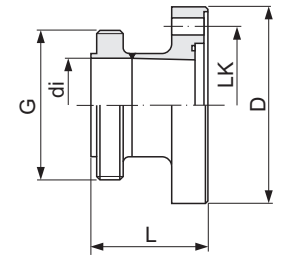
Tri-Clamp L14 AM7	Sensor		Fits to	di	G	D	L	LK
1.4404 / 316L 5*H**-1**********	DN [mm]	DN [inch]	Piping OD	[mm]	[mm]	[mm]	[mm]	[mm]
 A0005543	40	1½"	38.1 × 1.65	34.8	50.4	92	68.8	71.0
	50	2"	50.8 × 1.65	47.5	63.9	105	68.8	83.5
	65	–	63.5 × 1.65	60.2	77.4	121	68.8	100.0
	80	3"	76.2 × 1.65	72.9	90.9	147	68.8	121.0
	100	4"	101.6 × 1.65	97.4	118.9	168	68.8	141.5
	■ – Fitting length for DN 40 to 65 = (2 × L) + 136 mm – Fitting length for DN 80 to 100 = (2 × L) + 196 mm ■ 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	Sensor	Fits to	di	G	D	L	LK
1.4404 / 316L 5*H**-2**********	DN [mm]	Piping DN 11850	[mm]	[mm]	[mm]	[mm]	[mm]
 A0005540	40	42 × 2	38	Rd 65 × 1/6"	92	72	71.0
	50	54 × 2	50	Rd 78 × 1/6"	105	74	83.5
	65	70 × 2	66	Rd 95 × 1/6"	121	78	100.0
	80	85 × 2	81	Rd 110 × 1/6"	147	83	121.0
	100	104 × 2	100	Rd 130 × 1/6"	168	92	141.5
	■ – Fitting length for DN 40 to 65 = (2 × L) + 136 mm – Fitting length for DN 80 to 100 = (2 × L) + 196 mm ■ 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	Sensor	Fits to	di	G	D	L	LK
Aseptic threaded adapter, Form A 1.4404 / 316L 5*H**-3**********	DN [mm]	Piping DN 11850	[mm]	[mm]	[mm]	[mm]	[mm]
 A0005545	40	42 × 2	38	Rd 65 × 1/6"	92	71	71.0
	50	54 × 2	50	Rd 78 × 1/6"	105	71	83.5
	65	70 × 2	66	Rd 95 × 1/6"	121	76	100.0
	80	85 × 2	81	Rd 110 × 1/6"	147	82	121.0
	100	104 × 2	100	Rd 130 × 1/6"	168	90	141.5
	■ – Fitting length for DN 40 to 65 = (2 × L) + 136 mm – Fitting length for DN 80 to 100 = (2 × L) + 196 mm ■ If pigs are used for cleaning, it is essential to take the inside diameters of measuring tube and process connection (di) into account!						

Flange DIN 11864-2	Sensor	Fits to	di	G	D	L	LK 1	LK 2
Aseptic flat flange, Form A 1.4404 / 316L 5*H**-4**********	DN [mm]	Piping DN 11850	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]
 A0005546	40	42 × 2	38	82	92	64	71.0	65
	50	54 × 2	50	94	105	64	83.5	77
	65	70 × 2	66	113	121	64	100.0	95
	80	85 × 2	81	133	147	98	121.0	112
	100	104 × 2	100	159	168	98	141.5	137
	■ – Fitting length for DN 40 to 65 = (2 × L) + 136 mm – Fitting length for DN 80 to 100 = (2 × L) + 196 mm ■ 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	Sensor	Fits to	SMS 1145	di	G	D	L	LK
Threaded adapter; 1.4404 / 316L 5*H**-5**********	DN [mm]	Piping OD	Dia- meter [mm]	[mm]	[mm]	[mm]	[mm]	[mm]
 A0005538	40	38.1 × 1.65	38.0	35.5	Rd 60 × 1/6"	92	63	71.0
	50	50.8 × 1.65	51.0	48.5	Rd 70 × 1/6"	105	65	83.5
	65	63.5 × 1.65	63.5	60.5	Rd 85 × 1/6"	121	70	100.0
	80	76.2 × 1.65	76.0	72.0	Rd 98 × 1/6"	147	75	121.0
	100	101.6 × 1.65	101.6	97.6	Rd 132 × 1/6"	168	70	141.5
	■ – Fitting length for DN 40 to 65 = (2 × L) + 136 mm – Fitting length for DN 80 to 100 = (2 × L) + 196 mm ■ If pigs are used for cleaning, it is essential to take the inside diameters of measuring tube and process connection (di) into account!							

Coupling ISO 2853	Sensor	Fits to piping	ISO 2853	di	G	D	L	LK
Threaded adapter; 1.4404 / 316L 5*H**-6**********	DN [mm]	ISO 2037 / BS 4825-1	Diameter [mm]	[mm]	[mm]	[mm]	[mm]	[mm]
 A0005542	40	38.0 × 1.6	38.0	35.6	50.6	92	61.5	71.0
	50	51.0 × 1.6	51.0	48.6	64.1	105	61.5	83.5
	65	63.5 × 1.6	63.5	60.3	77.6	121	61.5	100.0
	80	76.1 × 1.6	76.1	72.9	91.1	147	61.5	121.0
	100	101.6 × 2.0	101.6	97.6	118.1	168	61.5	141.5
	■ – Fitting length for DN 40 to 65 = (2 × L) + 136 mm – Fitting length for DN 80 to 100 = (2 × L) + 196 mm ■ If pigs are used for cleaning, it is essential to take the inside diameters of measuring tube and process connection (di) into account!							

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"	5.2	11.5	2.0	4	6	13
4	1/8"	5.2	11.5	2.0	4	6	13
8	3/8"	5.3	11.7	2.0	4	6	13
15	½"	5.4	11.9	1.9	4	6	13
25	1"	5.5	12.1	2.8	6	6	13
40	1½"	6.5	14.3	4.5	10	6	13
50	2"	9.0	19.8	7.0	15	6	13
65	–	9.5	20.9	7.5	17	6	13
80	3"	19.0	41.9	17.0	37	6	13
100	4"	18.5	40.8	16.5	36	6	13

- Transmitter (compact version): 3.4 kg (7.5 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	35.3	1.39
50	2"	PN 16	48.1	1.89
65	–	PN 16	59.9	2.36
80	3"	PN 16	72.6	2.86
100	4"	PN 16	97.5	3.84

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

Material

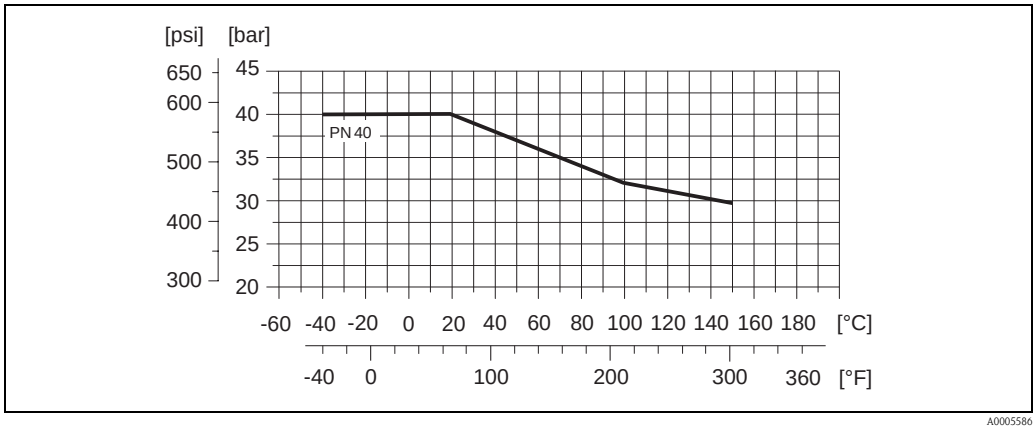
- Transmitter housing:
  - Compact housing: powder coated die-cast aluminium or stainless-steel field housing (1.4301/304)
  - Wall-mounted housing: powder coated die-cast aluminium
- Sensor housing: stainless steel 1.4301/304
- Wall mounting kit (holder panel): 1.4301/304
- Measuring tube: stainless steel 1.4301/304
- Lining material: PFA (USP Class VI; FDA 21 CFR 177.1550; 3A)
- Flanges:
  - All connections 1.4404/316L
  - Flanges (EN (DIN), ANSI, JIS) made of PVDF
  - Adhesive fitting made of PVC
- Ground rings: 1.4435/316L (optional: Alloy C-22, Tantalum)
- Electrodes:
  - Standard: 1.4435/316L
  - Optional: Alloy C-22, Tantalum, Platinum (up to DN 25 / 1" only)
- Seals:
  - DN 2 to 25 (1/12 to 1"): O-Ring (EPDM, Viton, Kalrez), moulded seal (EPDM*, Viton, Silicone*)
  - DN 40 to 100 (1½ to 4"): moulded seal (EPDM*, Silicone*)

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

Material load diagram

Caution!
The following diagrams contain material load diagrams (reference curves) for flange materials with regard to the medium temperature.

Weld socket to DIN EN ISO 1127, ODT/SMS; coupling to ISO 228 / DIN 2999 / NPT
Material: 1.4404 / 316L (with O-ring)



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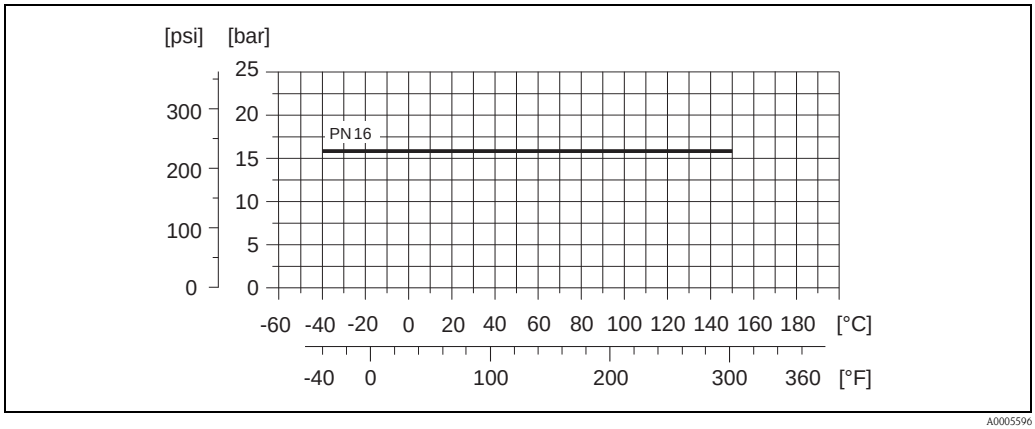
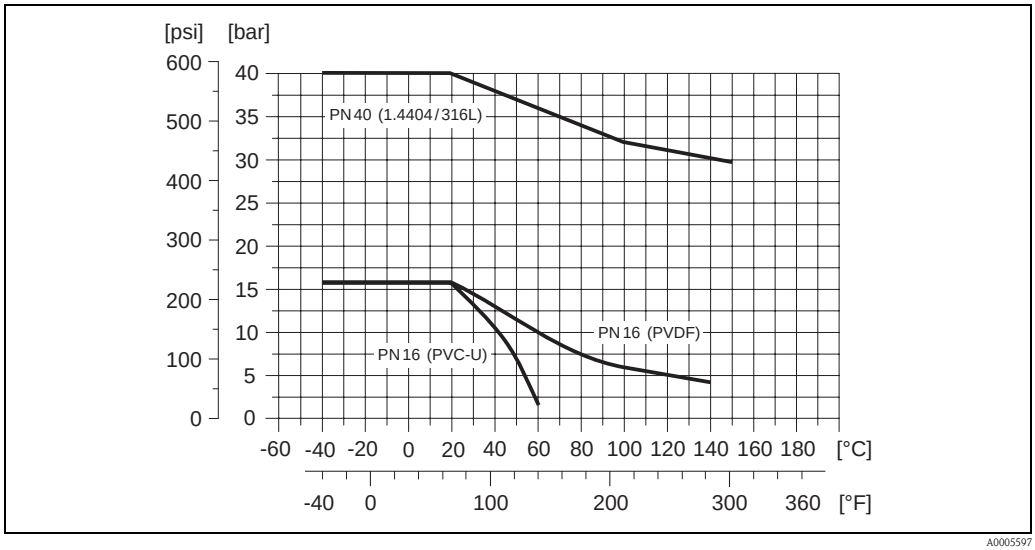
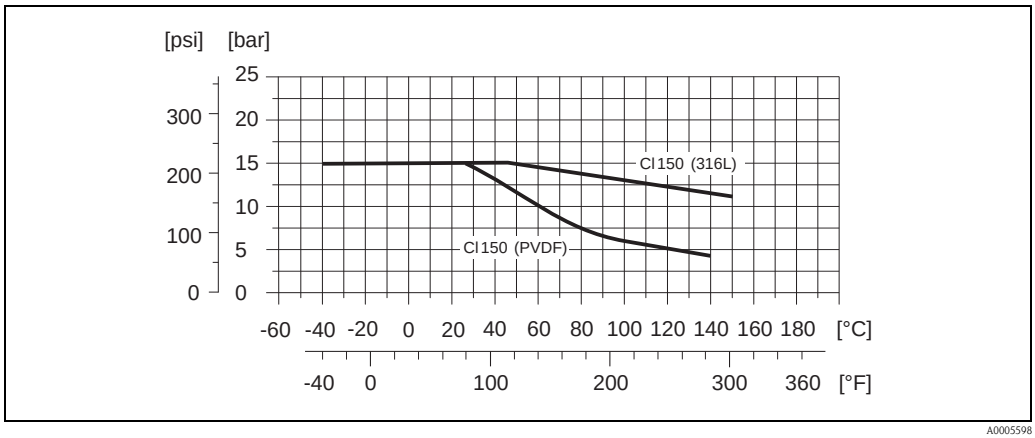
Weld socket to DIN 11850, ODT/SMS; Clamp (ISO 2852, DIN 32676, L14 AM7); coupling (DIN 11851, DIN 11864-1, ISO 2853, SMS 1145), flange DIN 11864-2
Material: 1.4404 / 316L (with moulded seal)



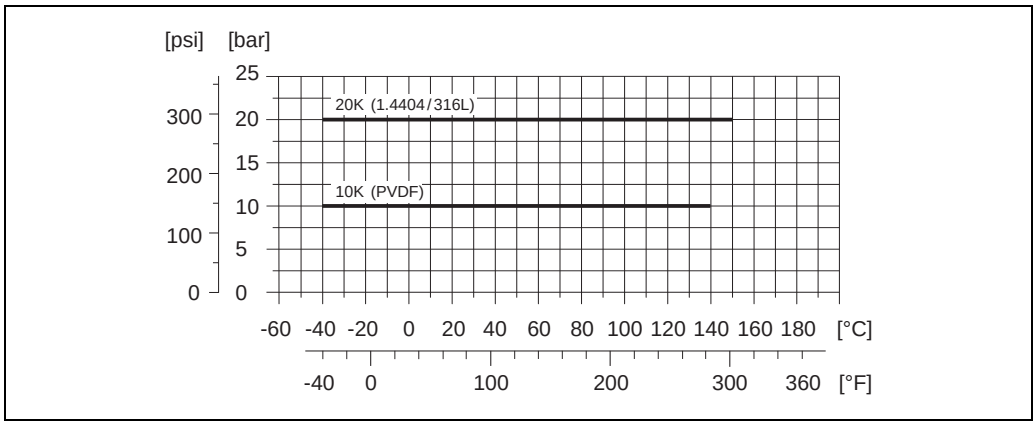
Flange connection to EN 1092-1 (DIN 2501), adhesive fitting
Material: 1.4404 / 316L, PVDF, PVC-U



Flange connection to ANSI B16.5
Material: 1.4404 / 316L, PVDF



Flange connection to JIS B2220
Material: 1.4404 / 316L, PVDF



Fitted electrodes

Measuring electrodes and empty pipe detection electrodes
- Standard with: 1.4435/316L, Alloy C-22, Tantalum, Platinum
- DN 2 to 15 (1/12 to ½"): without empty pipe detection electrode

Process connections

With O-ring:
- Weld sockets (DIN EN ISO 1127, ODT/SMS)
- Flange (EN (DIN), ANSI, JIS)
- PVDF flange (EN (DIN), ANSI, JIS)
- External pipe thread
- Internal pipe thread
- Hose connection
- PVC adhesive fittings

With gasket seals:
- Weld sockets DIN 11850, ODT/SMS
- Clamps (ISO 2852, DIN 32676, L14 AM7)
- Threaded joint DIN 11851, DIN 11864-1, ISO 2853, SMS 1145
- Flange DIN 11864-2

Surface roughness

(All data refer to parts in contact with medium)
- Measuring tube lining with PFA: ≤ 0.4 µm (15 µin)
- Electrodes
  – 1.4435/316L, Alloy C-22, Tantalum, Platinum: ≤ 0.3 to 0.5 µm (12 to 20 µin)
- Process connection made of stainless-steel: ≤ 0.8 µm (31 µin)

Human interface

Display elements

- Liquid crystal display: backlit, two lines (Promag 50) or four lines (Promag 53) with 16 characters per line
- Custom configurations for presenting different measured-value and status variables
- Totalizer
  - Promag 50: 2 totalizers
  - Promag 53: 3 totalizers

Operating elements

Unified operation concept for both types of transmitter:

Promag 50:
- Local operation via three keys (−, +, E)
- Quick Setup menus for straightforward commissioning

Promag 53:
- Local operation via three keys (−, +, E)
- Application-specific Quick Setup menus for straightforward commissioning

Language groups

Language groups available for operation in different countries:

Promag 50, Promag 53:
- Western Europe and America (WEA):
  English, German, Spanish, Italian, French, Dutch, Portuguese
- Eastern Europe and Scandinavia (EES):
  English, Russian, Polish, Norwegian, Finnish, Swedish, Czech
- South and east Asia (SEA):
  English, Japanese, Indonesian

Promag 53:
- China (CN):
  English, Chinese

You can change the language group via the operating program "FieldCare".

Remote operation

- Promag 50: Remote control via HART, PROFIBUS DP/PA
- Promag 53: Remote control via HART, PROFIBUS DP/PA, MODBUS RS485, FOUNDATION Fieldbus

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 mark

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

Pressure measuring device approval

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 or less than 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.

Ex approval

Information about currently available Ex versions (ATEX, FM, CSA etc.) 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-tested
- Seals → conform to FDA (apart from Kalrez seals)

Other standards and guidelines

- EN 60529
  Degrees of protection by housing (IP code)
- EN 61010
  Protection Measures for Electrical Equipment for Measurement, Control, Regulation and Laboratory Procedures.
- IEC/EN 61326
  "Emission in accordance with requirements for Class A".
  Electromagnetic compatibility (EMC requirements)
- NAMUR NE 21:
  Electromagnetic compatibility (EMC) of industrial process and laboratory control equipment.
- NAMUR NE 43:
  Standardization of the signal level for the breakdown information of digital transmitters with analog output signal.
- NAMUR NE 53:
  Software of field devices and signal-processing devices with digital electronics.
- 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

FOUNDATION Fieldbus certification

The flow device has successfully passed all the test procedures carried out and is certified and registered by the Fieldbus Foundation. The device thus meets all the requirements of the following specifications:

- Certified to FOUNDATION Fieldbus Specification
- The device meets all the specifications of the FOUNDATION Fieldbus H1.
- Interoperability Test Kit (ITK), revision status 5.01 (device certification number: on request)
- The device can also be operated with certified devices of other manufacturers
- Physical Layer Conformance Test of the Fieldbus Foundation

MODBUS RS485 certification

The measuring device meets all the requirements of the MODBUS/TCP conformity test and has the "MODBUS/TCP Conformance Test Policy, Version 2.0". The measuring device has successfully passed all the test procedures carried out and is certified by the "MODBUS/TCP Conformance Test Laboratory" of the University of Michigan.

PROFIBUS DP/PA certification

The flow device has successfully passed all the test procedures carried out and is certified and registered by the PNO (PROFIBUS User Organisation). The device thus meets all the requirements of the following specifications:

- Certified to PROFIBUS PA, profile version 3.0 (device certification number: on request)
- The device can also be operated with certified devices of other manufacturers (interoperability)

Ordering information

Your Endress+Hauser service organization can provide detailed ordering information and information on the order codes on request.

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.

Documentation

- Flow Measurement (FA005D/06)
- Operating Instructions Promag Promag 50 (BA046D/06 and BA049D/06)
- Operating Instructions Promag Promag 50 PROFIBUS PA (BA055D/06 and BA056D/06)
- Operating Instructions Promag Promag 53 (BA047D/06 and BA048D/06)
- Operating Instructions Promag Promag 53 FOUNDATION Fieldbus (BA051D/06 and BA052D/06)
- Operating Instructions Promag Promag 53 MODBUS RS485 (BA117D/06 and BA118D/06)
- Operating Instructions Promag Promag 53 PROFIBUS DP/PA (BA053D/06 and BA054D/06)
- Supplementary documentation on Ex-ratings: ATEX, IECEx, FM, CSA, NEPSI

Registered trademarks

HART®
Registered trademark of the HART Communication Foundation, Austin, USA

PROFIBUS®
Registered trademark of the PROFIBUS Nutzerorganisation e.V., Karlsruhe, D

FOUNDATION™ Fieldbus
Registered trademark of the Fieldbus Foundation, Austin, USA

MODBUS®
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USA	Canada	México	Instruments International
Endress+Hauser, Inc. 2350 Endress Place Greenwood, IN 46143 USA Tel. 317-535-7138 Fax 317-535-8498 Sales 888-ENDRESS Service 800-642-8737 inquiry@us.endress.com www.us.endress.com	Endress+Hauser Canada 1075 Sutton Drive Burlington, ON L7L 5Z8 Canada Tel. 905-681-9292 800-668-3199 Fax 905-681-9444 www.ca.endress.com	Endress+Hauser, México, S.A. de C.V.F Fernando Montes de Oca 21 Edificio A Piso 3 Fracc. Industrial San Nicolas 54030. Tlalnepantla de Baz Estado de México México Tel. +52 55-5321-2080 Fax +52 55-5321-2099 eh.mexico@mx.endress.com www.mx.endress.com	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 info@ii.endress.com

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