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71655568
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Technical Information
Dosimag

Electromagnetic flowmeter

Flowmeter with hygienic design, highest repeatability in compact, fully-welded design

Application

- The bidirectional measuring principle is virtually independent of pressure, density, temperature and viscosity.
- For demanding dosing and filling applications

Device properties

- Wetted materials CIP, SIP cleanable
- Hygienic approvals 3-A and EHEDG available
- Fullfilling global Food Contact Materials, EU, US, CN
- Robust, compact and fully-welded design
- Pulse/frequency/switch output, IO-Link, Modbus RS485
- Excellent, easily cleanable flowmeter

Your benefits

- High process safety – high measuring accuracy and repeatability in shortest filling time
- Energy-saving flow measurement – no pressure loss due to cross section constriction
- Maintenance-free – no moving parts
- Versatile and time-saving wiring – plug connector
- Fast commissioning – pre-configured devices
- Automatic recovery of data for servicing

Endress+Hauser
People for Process Automation

Table of contents

About this document

Symbols

Electrical symbols

Symbol	Meaning
	Direct current
	Alternating current
	Direct current and alternating current
	**Ground connection** A grounded terminal which, as far as the operator is concerned, is grounded via a grounding system.
	**Potential equalization connection (PE: protective earth)** Ground terminals that must be connected to ground prior to establishing any other connections. The ground terminals are located on the interior and exterior of the device: ▪ Interior ground terminal: potential equalization is connected to the supply network. ▪ Exterior ground terminal: device is connected to the plant grounding system.

Symbols for certain types of information

Symbol	Meaning
	**Permitted** Procedures, processes or actions that are permitted.
	**Preferred** Procedures, processes or actions that are preferred.
	**Forbidden** Procedures, processes or actions that are forbidden.
	**Tip** Indicates additional information.
	Reference to documentation
	Reference to page
	Reference to graphic
	Visual inspection

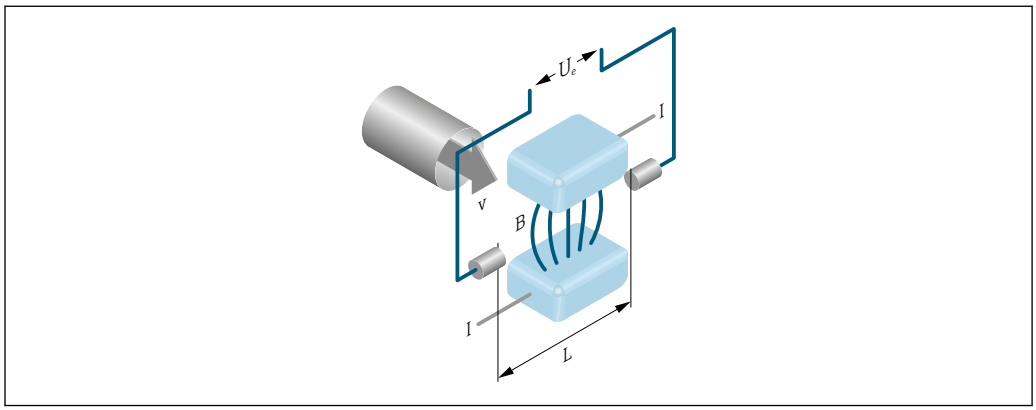
Symbols in graphics

Symbol	Meaning
1, 2, 3, ...	Item numbers
1., 2., 3., ...	Series of steps
A, B, C, ...	Views
A-A, B-B, C-C, ...	Sections
	Hazardous area
	Safe area (non-hazardous area)
	Flow direction

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.



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Ue *Induced voltage*
B *Magnetic induction (magnetic field)*
L *Electrode spacing*
I *Current*
v *Flow velocity*

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

Formulae for calculation

- Induced voltage $U_e = B \cdot L \cdot v$
- Volume flow $Q = A \cdot v$

Measuring system

Compact version – transmitter and sensor form a mechanical unit in a fully welded housing.

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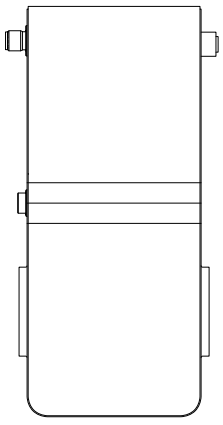

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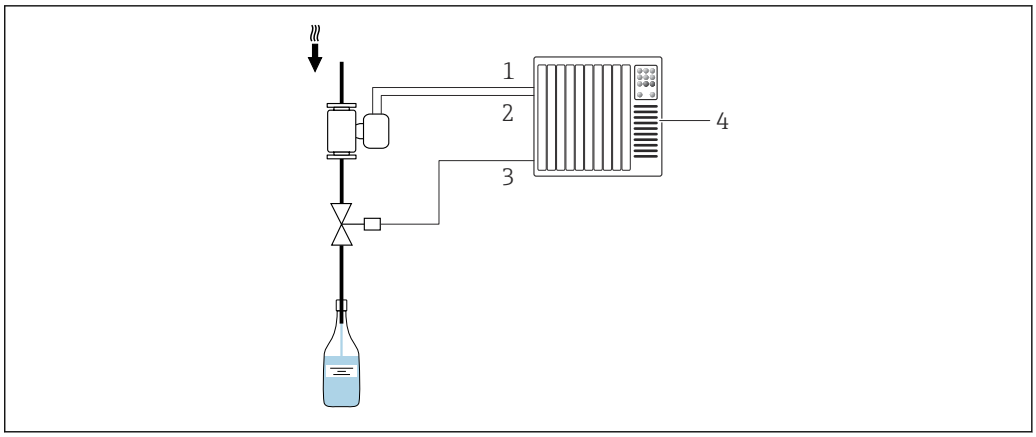
Measuring instrument

- Materials:
  - Measuring instrument housing: stainless steel 1.4404 (316/316L)
  - Measuring tube: stainless steel 1.4301 (304)
  - Liner: PFA
  - Process connection seals: FFKM (Kalrez), EPDM, FKM, VMQ (silicone)
  - Electrodes: 1.4435 (316L); Alloy C22, 2.4602 (UNS N06022); tantalum; platinum
- Configuration:
  Via operating tools (e.g. FieldCare)
- Nominal diameter range:
  DN 4 (5/32"), DN 8 (5/16"), DN 15 (1/2"), DN 25 (1")

Equipment architecture

Device version: Two pulse/frequency/switch outputs

The device version has two pulse/frequency/switch outputs → 12.

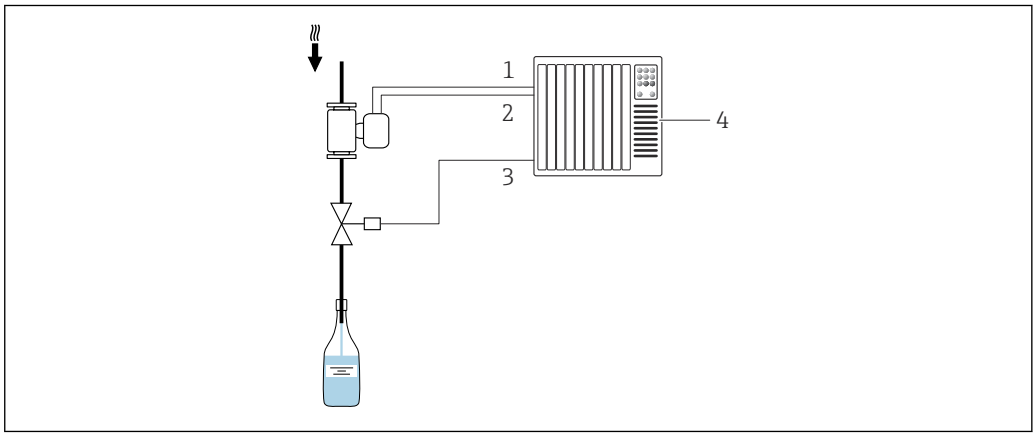


1 Options for integration into a system for batching processes

1 *Pulse/frequency/switch output 1*
2 *Pulse/frequency/switch output 2*
3 *Control of valve (by automation system)*
4 *Control system (e.g. PLC)*

Device version: IO-Link, a pulse/frequency/switch output

The device version with IO-Link has a pulse/frequency/switch output → 12.

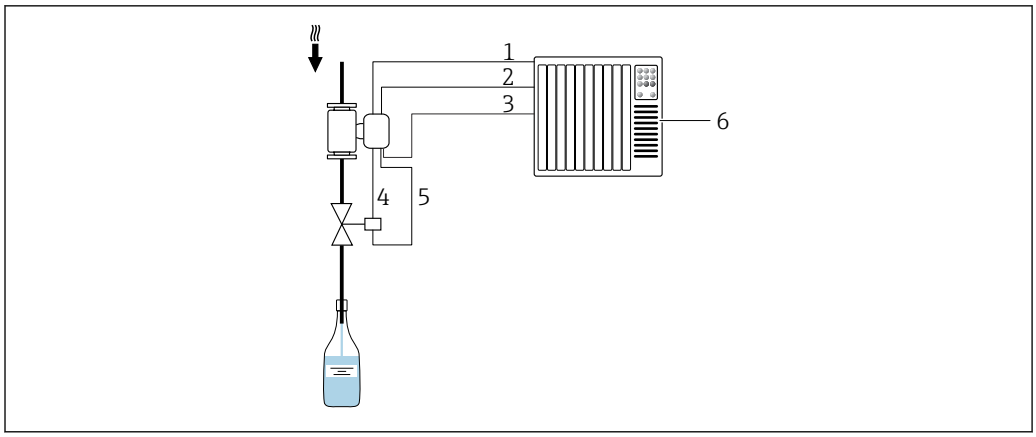


2 Options for integration into a system for batching processes

1 *Pulse/frequency/switch output*
2 *IO-Link*
3 *Control of valve (by automation system)*
4 *Control system (e.g. PLC)*

Device version: Modbus RS485, two switch outputs (batch), a status output and a status input

Device versions with MODBUS RS485 have two switch outputs (batch) for valve control for the regulation of batching processes → 12.



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3 Options for integration into a system for batching processes

1 MODBUS RS485: Measured value (to the automation system)
2 Status output/status input
3 Status input: Control of batching process (by the automation system)
4 Switch output (batch): Valve activation, level 1
5 Switch output (batch): Valve activation, level 2
6 Control system (e.g. PLC)

Reliability

IT security

Our warranty is valid only if the product is installed and used as described in the Operating Instructions. The product is equipped with security mechanisms to protect it against any inadvertent changes to the settings.

IT security measures, which provide additional protection for the product and associated data transfer, must be implemented by the operators themselves in line with their security standards.

Input

Measured variable

Direct measured variables

- Volume flow (proportional to induced voltage)
- Temperature [1)]

Measuring range

Typically v = 0.01 to 10 m/s (0.03 to 33 ft/s) with the specified measurement accuracy

Flow characteristic values in SI units

Nominal diameter	Recommended Flow rate	Factory settings	
	Maximum full scale value	Pulse value	Low flow cut off (v ~ 0.04 m/s)
[mm]	[l/s]	[ml]	[ml/s]
4	0.14	0.005	0.5
8	0.5	0.02	2
15K [1)]	1.2	0.1	7
15	1.66	0.1	7
25	5	0.2	16

1) Conical version (corresponds to DN 12)

1) Available only for nominal diameters DN 15 to 25 (½ to 1") and with the order code for "Sensor option", option CI: "Medium temperature measurement".

Flow characteristic values in US units

Nominal diameter [in]	Recommended Flow rate Maximum full scale value [gal/s]	Factory settings Pulse value [oz fl]	Factory settings Low flow cut off (v ~ 0.13 ft/s) [oz fl/s]
5/32	0.035	0.0002	0.02
5/16	0.13	0.001	0.08
½K [1)]	0.32	0.004	0.25
½	0.44	0.004	0.25
1	1.33	0.007	0.53

1) Conical version (corresponds to DN 12)

To calculate the measuring range, use the *Applicator* sizing tool → 49

Recommended measuring range

Flow limit → 31

Operable flow range

Over 1000 : 1

Input signal

Available only for device versions using the Modbus RS485 communication method → 12.

The batching process is controlled by the automation system via the status input or via the fieldbus interface (Modbus) of the device.

Status input via connection A/B

Maximum input values	▪ DC −3 to 30 V ▪ 5 mA
Response time	Configurable: 10 to 200 ms
Input signal level	▪ Low signal: DC −3 to 5 V ▪ High signal: DC 15 to 30 V
Assignable functions	▪ Off ▪ Start batching process ▪ Start and stop batching process ▪ Reset totalizer 1 to 3 separately ▪ Reset all totalizers ▪ Flow override

Status output via connection A/B

Maximum input values	▪ DC 30 V ▪ 6 mA
Response time	Configurable: 10 to 200 ms
Input signal level	▪ Low signal: DC 0 to 1.5 V ▪ High signal: DC 10 to 30 V
Assignable functions	▪ Off ▪ Start batching process ▪ Start and stop batching process ▪ Reset totalizer 1 to 3 separately ▪ Reset all totalizers ▪ Flow override

Output

Output signal

Pulse/frequency/switch output

Function	Can be set to: ▪ Pulse Quantity-proportional pulse with pulse width to be configured. ▪ Automatic pulse Quantity-proportional pulse with on/off ratio of 1:1 ▪ Frequency Flow-proportional frequency output with 1:1 on/off ratio ▪ Switch Contact for displaying a status
Version	▪ Option AA: 2 pulse/frequency/switch outputs Passive, high-side ▪ Option FA: IO-Link, 1 pulse/frequency/switch output Active, high-side
Maximum output values	▪ Option AA: 2 pulse/frequency/switch outputs ▪ DC 30 V ▪ 30 mA ▪ Option FA: IO-Link, 1 pulse/frequency/switch output ▪ DC 30 V ▪ 100 mA
Voltage drop	▪ Option AA: 2 pulse/frequency/switch outputs At 25 mA: ≤ DC 3 V ▪ Option FA: IO-Link, 1 pulse/frequency/switch output At 100 mA: ≤ DC 3 V
Pulse output	
Pulse width	Configurable: 0.05 to 2 000 ms
Maximum pulse rate	10 000 Impulse/s
Pulse value	Configurable
Assignable measured variables	Volume flow
Frequency output	
Output frequency	Configurable: 0 to 10 000 Hz
Damping	Configurable: 0 to 999.9 s
Pulse/pause ratio	1:1
Assignable measured variables	▪ Volume flow ▪ Temperature
Switch output	
Switching behavior	Binary, conductive or non-conductive
Number of switching cycles	Unlimited
Assignable functions	▪ Off ▪ On ▪ Diagnostic behavior ▪ Alarm ▪ Alarm and warning ▪ Warning ▪ Limit value: ▪ Off ▪ Volume flow ▪ Flow velocity ▪ Status Low flow cut off

IO-Link

Physical interface	According to Standard IEC 61131-9
Signal	IO-Link digital communication signal, 3-wire
IO-Link version	1.1
IO-Link SSP version	Identification and Diagnosis, Measuring and Switching Sensor (as per SSP 4.3.4)
IO-Link device port	IO-Link port class A

The pin assignment deviates from the IO-Link standard to enable compatibility with previous device versions and installations.

Modbus RS485

Physical interface	RS485 according to Standard EIA/TIA-485-A

Switch output (batch: valve control)

Only available for device version with Modbus RS485 → 12.

Switch output (batch)	
Version	Active, high-side
Maximum output values	▪ DC 30 V ▪ 500 mA
Switching behavior	Binary, conductive or non-conductive
Number of switching cycles	Unlimited
Assignable functions	▪ Open ▪ Closed ▪ Batching

Status output

Only available for device version with Modbus RS485 → 12.

Status output	
Version	Active, high-side
Maximum output values	▪ DC 30 V ▪ 100 mA
Voltage drop	At 100 mA: ≤ DC 3 V
Switching behavior	Binary, conductive or non-conductive
Number of switching cycles	Unlimited
Assignable functions	▪ Off ▪ Batching process status (batch) ▪ Batching process status (batch), output 1 ▪ Batching process status (batch), output 2

Signal on alarm

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

Pulse/frequency/switch output

Pulse output	
Failure mode	Choose from: ▪ Actual value ▪ No pulses
Frequency output	
Failure mode	Choose from: ▪ Actual value ▪ 0 Hz ▪ Definable value between: 0 to 10 000 Hz
Switch output	
Failure mode	Choose from: ▪ Current status ▪ Open ▪ Closed

IO-Link

Operating mode	Digital transmission of all failure information
Device status	Readable via cyclical and acyclical data transmission

Modbus RS485

Failure mode	Choose from: ▪ NaN value instead of current value ▪ Last valid value

Low flow cut off

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

Galvanic isolation

- Device version: 2 pulse/frequency/switch outputs
  (Order code for "Output, input": option AA)
  - Pulse/frequency/switch outputs galvanically isolated from supply potential.
  - Pulse/frequency/switch outputs not galvanically isolated from each other.
- Device version: IO-Link, 1 pulse/frequency/switch output
  (Order code for "Output, input": option FA)
  Pulse/frequency/switch outputs on supply potential.
- Device version: Modbus RS485, 2 switch outputs (batch), 1 status output, 1 status input
  (Order code for "Output, input": option MD)
  - Switch outputs (batch) on supply potential.
  - Status output on supply potential.
  - Status input galvanically isolated (connection C/D) or on supply potential (connection A/B)

Protocol-specific data

IO-Link

IO-Link specification	Version 1.1.3
Device ID	0x947501 (9729281)
Manufacturer ID	0x0011 (17)
Smart Sensor Profile 2nd Edition	Supports ▪ Identification and Diagnosis ▪ Digital Measuring and Switching Sensor (as per SSP type 4.3.4)
Smart Sensor Profile Type	Measuring profile type 4.3.4 Measuring and Switching Sensor, floating point, 4 channel
SIO	Yes
IO-Link transmission rate	COM3; 230.4 kBd

Minimum period	1.5 ms
Process data width input/ output	18 bytes/2 bytes (as per SSP 4.3.4)
OnRequestdata PreOp/Op	8 bytes/2 bytes
Data storage	Yes
Block configuration	Yes
Device operational	The device is operational 3 seconds after the supply voltage is applied
System integration	Input cyclic process data ▪ Volume flow [m³/h] ▪ Totalizer 1 [m³] ▪ Temperature [°C], depending on the sensor option selected Output cyclic process data ▪ Control signal channel - Volume flow ▪ Control signal channel - Temperature ▪ Control signal channel - Totalizer 1 ▪ Flow override ▪ Totalizer 1 - Hold ▪ Totalizer 1 - Reset + totalize ▪ Totalizer 1 - Reset + hold ▪ Totalizer 1 - Totalize

Device description

In order to integrate field devices into a digital communication system, the IO-Link system needs a description of the device parameters, such as output data, input data, data format, data volume and supported transmission rate.

The data are included in the device description (IODD) that are provided to the IO-Link master during commissioning of the communication system.

The IODD can be downloaded as follows:
- www.endress.com
- https://ioddfinder.io-link.com

Modbus RS485

Protocol	Modbus Applications Protocol Specification V1.1
Device type	Slave
Slave address range	1 to 247
Broadcast address range	0
Function codes	▪ 03: Read holding register ▪ 04: Read input register ▪ 06: Write single registers ▪ 08: Diagnostics ▪ 16: Write multiple registers ▪ 23: Read/write multiple registers ▪ 43: Read device identification
Broadcast messages	Supported by the following function codes: ▪ 06: Write single registers ▪ 16: Write multiple registers ▪ 23: Read/write multiple registers
Supported baud rate	▪ 1 200 BAUD ▪ 2 400 BAUD ▪ 4 800 BAUD ▪ 9 600 BAUD ▪ 19 200 BAUD ▪ 38 400 BAUD ▪ 57 600 BAUD ▪ 115 200 BAUD ▪ 230 400 BAUD

Data transfer mode	RTU
Data access	Each device parameter can be accessed via Modbus RS485. For Modbus register information → 49

Power supply

Terminal assignment

Connection is solely by means of device plug.

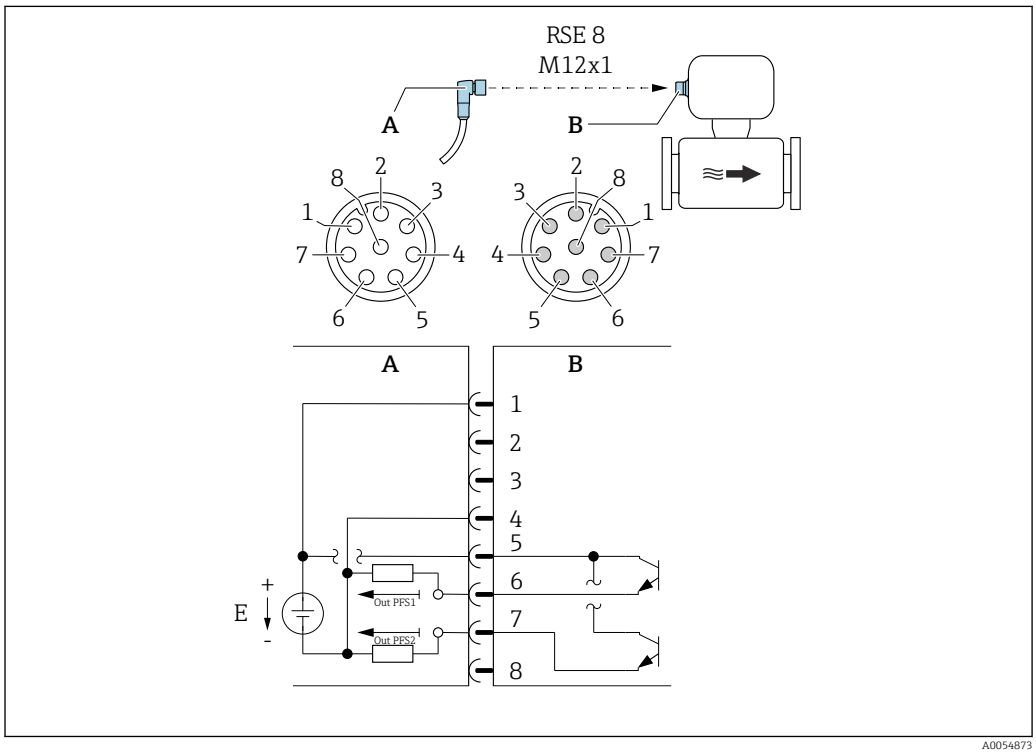
There are different device versions available:

Order code for "Output, input"	Device plug
Option AA: 2 pulse/frequency/switch outputs	→ 12
Option FA: IO-Link, 1 pulse/frequency/switch output	→ 13
Option MD: Modbus RS485, 2 switch outputs (batch), 1 status output, 1 status input	→ 14

Available device plugs

Device version: 2 pulse/frequency/switch outputs

Order code for "Output, input": option AA:
2 pulse/frequency/switch outputs



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4 *Connection to device*

A Coupling: Supply voltage, pulse/freq./switch output
B Connector: Supply voltage, pulse/freq./switch output
E PELV or SELV power supply
1 to 8 Pin assignment

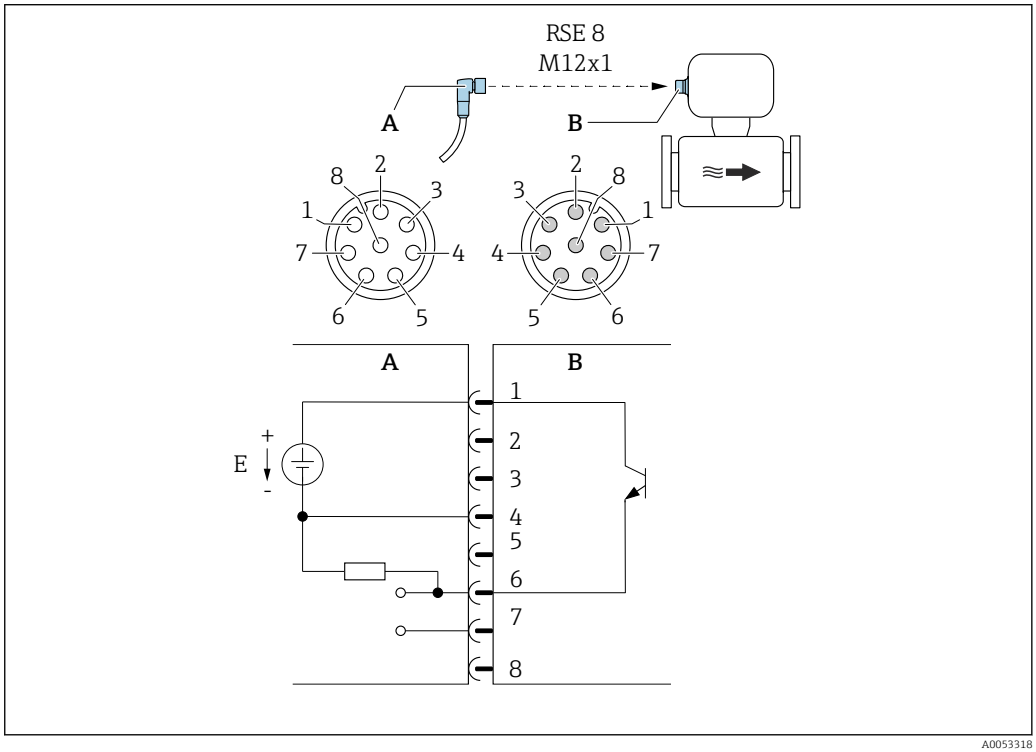
Pin assignment

Connection: Coupling (A) – Connector (B)		
Pin	**Assignment**	
1	L+	Supply voltage
2	+	Service interface RX
3	+	Service interface TX
4	L-	Supply voltage
5	+	Pulse/frequency/switch output 1 and 2
6	–	Pulse/frequency/switch output 1
7	–	Pulse/frequency/switch output 2
8	–	Service interface GND

Observe cable specifications → 20.

Device version: IO-Link, 1 pulse/frequency/switch output

Order code for "Output, input", option FA:
- IO-Link
- 1 pulse/frequency/switch output



5 *Connection to device*

A Coupling: Supply voltage, pulse/freq./switch output
B Connector: Supply voltage, pulse/freq./switch output
E PELV or SELV power supply
1 to 8 Pin assignment

Pin assignment

Connection: Coupling (A) – Connector (B)		
Pin	**Assignment**	
1	L+	Supply voltage
2	+	Service interface RX
3	+	Service interface TX
4	L-	Supply voltage
5		Not used
6	–	Pulse/frequency/switch output DQ
7	–	IO-Link communication signal C/Q
8	–	Service interface GND

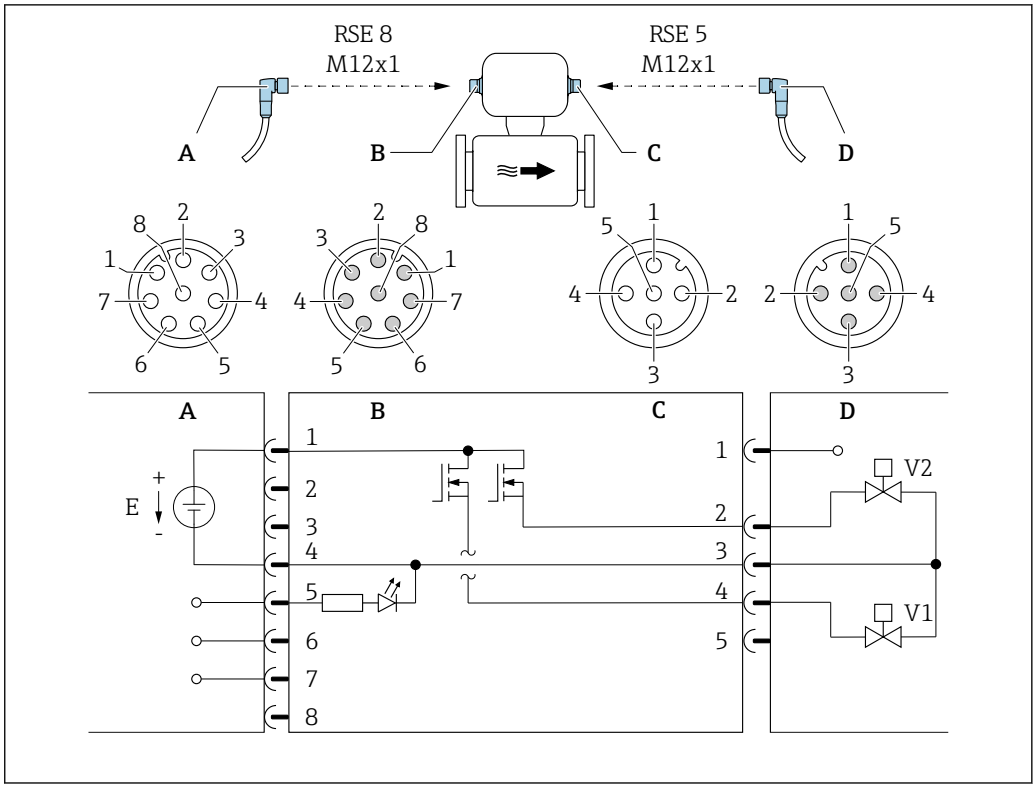
The pin assignment deviates from the IO-Link standard to enable compatibility with previous device versions and installations.

Observe cable specifications → 20.

Device version: Modbus RS485, 2 switch outputs (batch), 1 status output, 1 status input

Order code for "Output, input", option MD:
- Modbus RS485
- 2 switch outputs (batch)
- 1 status output
- 1 status input

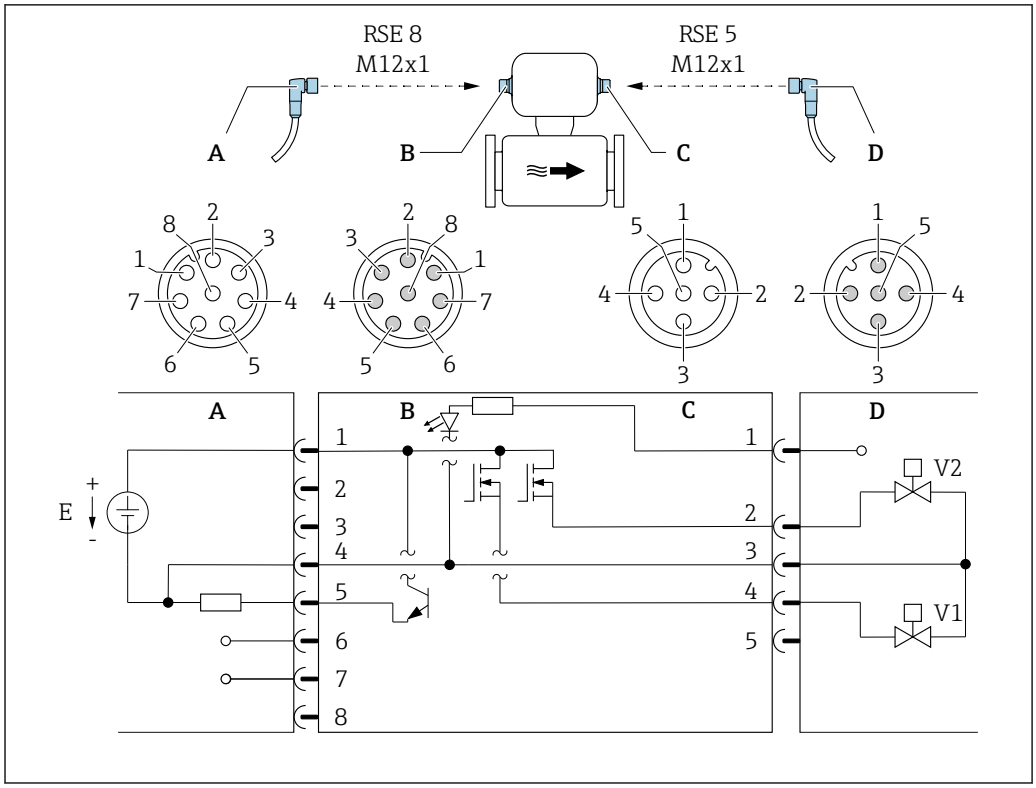
Version 1: Status input via connection A/B



6 Connection to device

A Coupling: Supply voltage, Modbus RS485, status input
B Connector: Supply voltage, Modbus RS485, status input
C Coupling: Switch output (batch)
D Connector: Switch output (batch)
E PELV or SELV power supply
V1 Valve (batch), level 1
V2 Valve (batch), level 2
1 to 8 Pin assignment

Version 2: Status output via connection A/B



7 *Connection to device*

A Coupling: Supply voltage, Modbus RS485, status output
B Connector: Supply voltage, Modbus RS485, status output
C Coupling: Switch output (batch), status input
D Connector: Switch output (batch), status input
E PELV or SELV power supply
V1 Valve (batch), level 1
V2 Valve (batch), level 2
1 to 8 Pin assignment

Pin assignment

Connection: Coupling (A) – Connector (B)			Connection: Coupling (C) – Connector (D)		
Pin	Assignment		Pin	Assignment	
1	L+	Supply voltage	1	+	Status input
2	+	Service interface RX	2	+	Switch output (batch) 2
3	+	Service interface TX	3	–	Switch output (batch) 1 and 2, status input
4	L-	Supply voltage	4	+	Switch output (batch) 1
5	+	Status output/Status input [1)]	5		Not used
6	+	Modbus RS485			
7	–	Modbus RS485			
8	–	Service interface GND			

1) The functionality of status input and status output is not possible at the same time.

Observe cable specifications → 20.

Supply voltage

DC 24 V (nominal voltage: DC 18 to 30 V)

- The power unit must be safety-approved (e.g. PELV, SELV).
- The maximum short-circuit current must not exceed 50 A.

Power consumption

4.0 W (no outputs)

Current consumption

Order code for "Output, input"	Maximum current consumption
Option AA: 2 pulse/frequency/switch outputs	250 mA
Option FA: IO-Link, 1 pulse/frequency/switch output	200 mA + 100 mA [1] at supply voltage ≥ 21 V 250 mA + 100 mA [1] at supply voltage < 21 V
Option MD: Modbus RS485, 2 switch outputs (batch), 1 status output, 1 status input	250 mA + 1 100 mA [2]

1) If pulse/frequency/switch output is used
2) Per switch output used (batch) 500 mA, status output 100 mA

Switch-on current

- Option AA: 2 pulse/frequency/switch outputs
  Max. 1.2 A (< 15 ms)
- Option FA: IO-Link, 1 pulse/frequency/switch output
  Max. 400 mA (< 20 ms)
- Option MD: Modbus RS485, 2 switch outputs (batch), 1 status output, 1 status input
  Max. 1.2 A (< 15 ms)

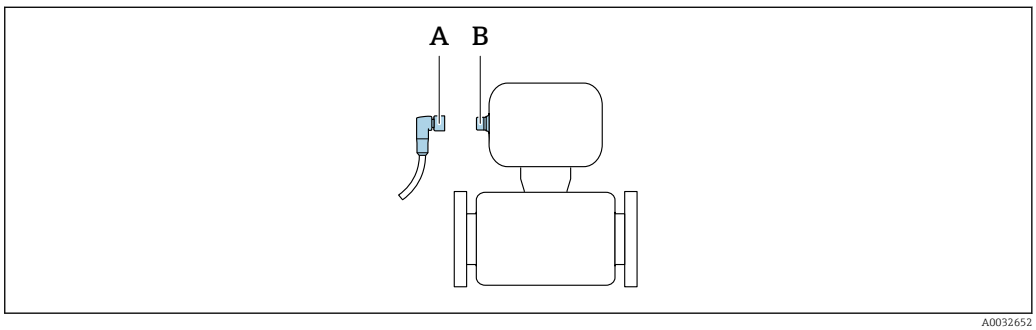
Power supply failure

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

Electrical connection

Connection is solely by means of device plug.

Device version: 2 pulse/frequency/switch outputs and IO-Link, 1 pulse/frequency/switch output



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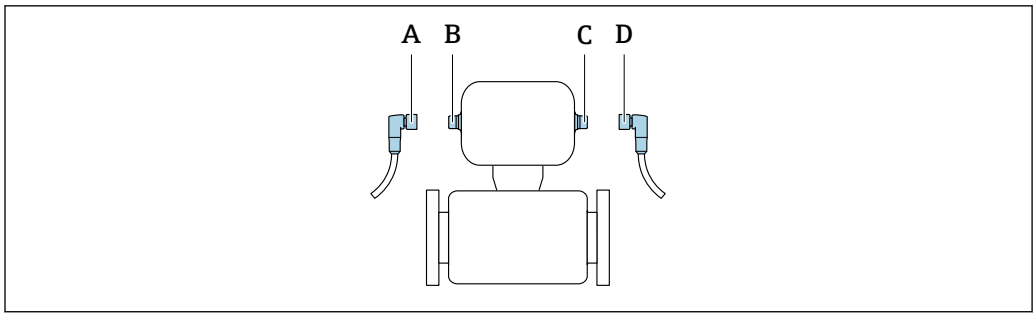
A Coupling
B Connector

Device version: Modbus RS485, 2 switch outputs (batch), 1 status output, 1 status input



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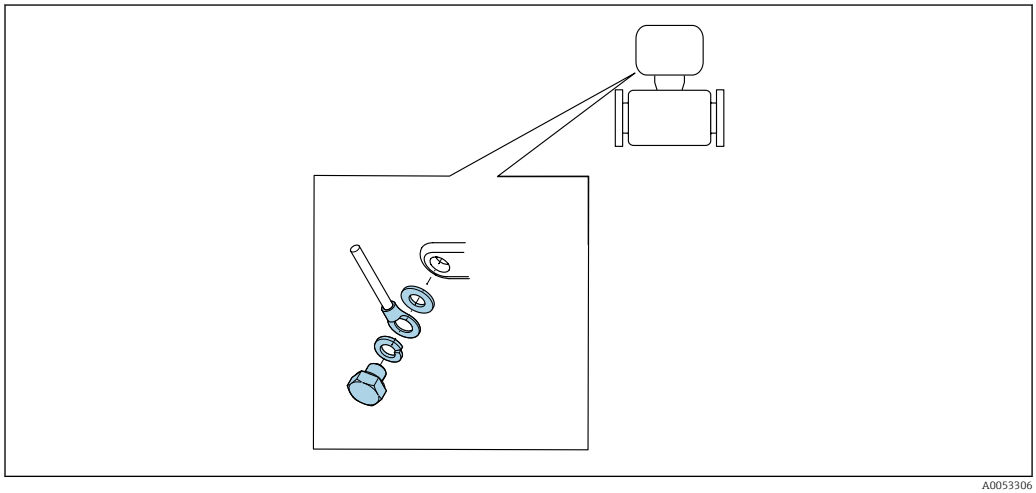
A, C Coupling
B, D Connector

There are different device versions available:

Order code for "Output, input"	Device plug
Option AA: 2 pulse/frequency/switch outputs	→ 12
Option FA: IO-Link, 1 pulse/frequency/switch output	→ 13
Option MD: Modbus RS485, 2 switch outputs (batch), 1 status output, 1 status input	→ 14

Grounding

Grounding is by means of a cable socket.



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Ensuring

For devices intended for use in hazardous locations, please observe the guidelines in the Ex documentation (XA).

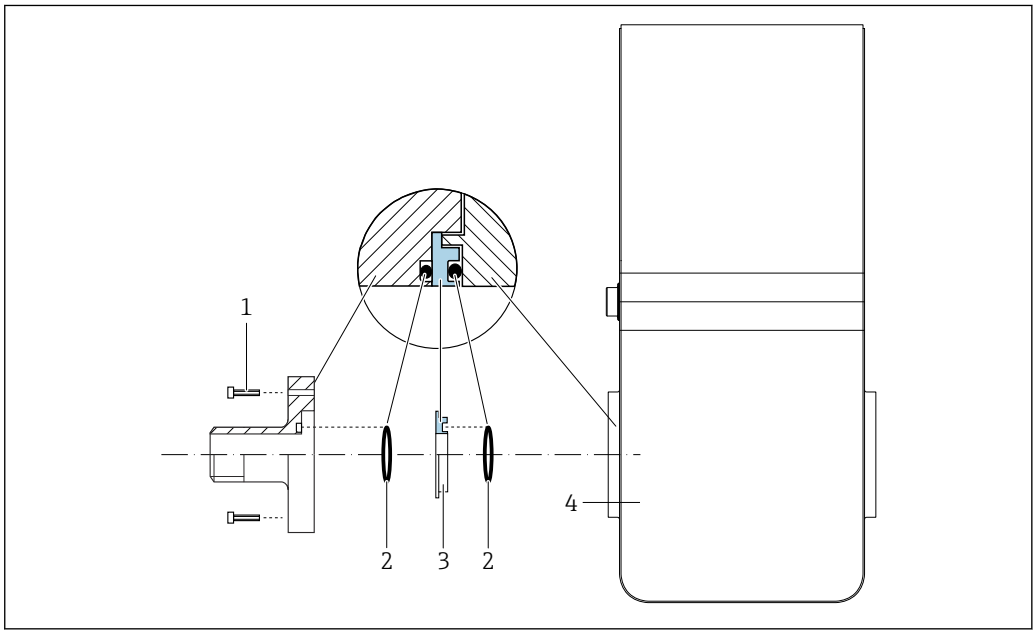
Metal process connections

Potential equalization is via the metal process connections that are in contact with the medium and mounted directly on the measuring instrument.

Plastic process connections

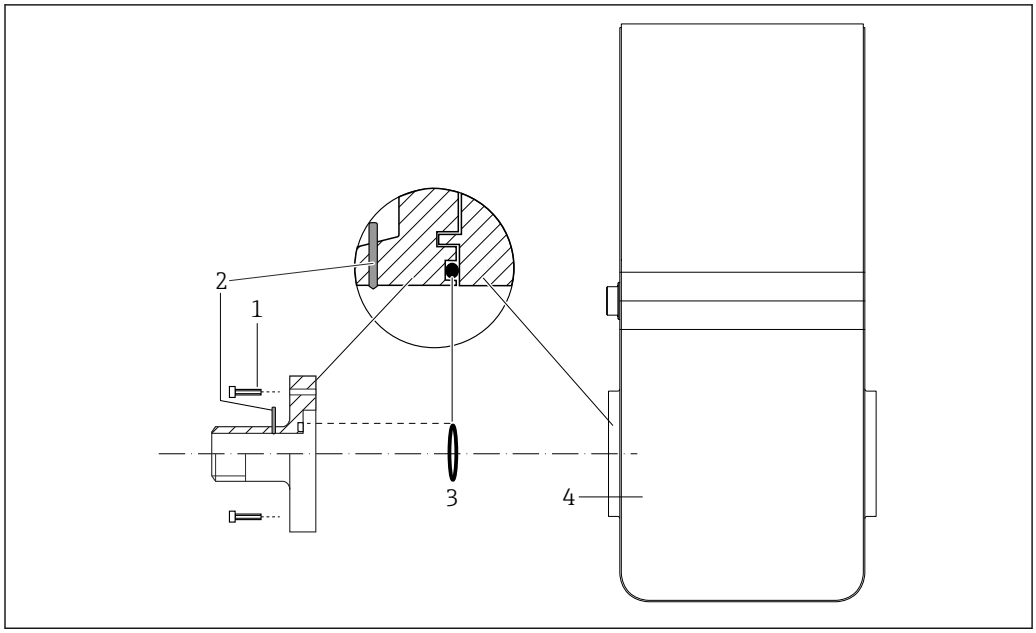
Note the following when using grounding rings:
- Depending on the option ordered, plastic disks are used instead of grounding rings on some process connections. The plastic disks act as "spacers" and do not have any potential equalization function. They perform a significant sealing function at the measuring instrument and process connection interfaces. In the case of process connections without metal grounding rings, the plastic disks and seals must never be removed. Plastic disks and seals must always be installed.
- Grounding rings can be ordered separately as an accessory from Endress+Hauser . The grounding rings must be compatible with the electrode material, as otherwise there is the danger that the electrodes could be destroyed by electrochemical corrosion.
  Material specifications → 43.
- Grounding rings, including seals, are installed inside the process connections. This does not affect the installed length.

Potential equalization via additional grounding ring



1 Hexagonal-headed bolts of process connection
2 O-ring seals
3 Plastic disk (spacer) or grounding ring
4 Measuring instrument

Potential equalization via grounding electrodes on process connection



1 *Hexagonal-headed bolts of process connection*
2 *Integrated grounding electrodes*
3 *O-ring seal*
4 *Measuring instrument*

Cable specification

Permitted temperature range

- The installation guidelines that apply in the country of installation must be observed.
- The cables must be suitable for the minimum and maximum temperatures to be expected.

Signal cable

Cables are not included in the scope of delivery.

Please note the following with regard to cable loading:
- Voltage drop due to the cable length and cable type.
- Valve performance.

Pulse/frequency/switch output

Standard installation cable is sufficient.

IO-Link

Standard installation cable is sufficient.

Cable length ≤ 20 m.

Switch output (batch), status output and status input

Standard installation cable is sufficient.

Modbus RS485

- The electrical connection of the shield to the device housing must be properly implemented (e.g. using a knurled nut).
- Please note the following with regard to cable loading:
  - Voltage drop due to the cable length and cable type.
  - Valve performance.

Total length of cable in the Modbus network ≤ 50 m

Use a shielded cable.

Example:
Terminated device plug with cable: Lumberg RKWTH 8-299/10

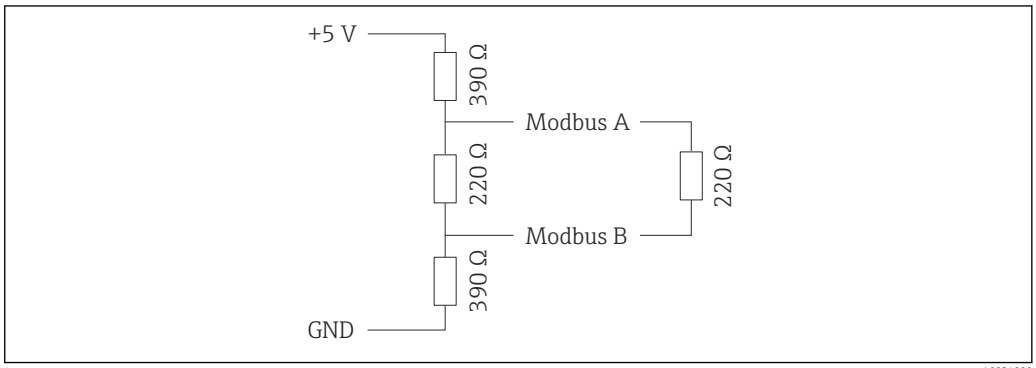
Total length of cable in the Modbus network > 50 m

Use shielded twisted pair cable for RS485 applications.

Example:
- Cable: Belden item no. 9842 (for 4-wire version, the same cable can be used for the power supply)
- Terminated device plug: Lumberg RKCS 8/9 (shieldable version)

Terminating resistor

The Modbus RS485 network must be terminated with a terminating resistor and polarization.



Performance characteristics

Reference operating conditions

- Maximum permissible error according to DIN EN 29104
- Water at +15 to +45 °C (+59 to +113 °F)
- Medium conductivity: 400 µS/cm ±100 µS/cm
- Ambient temperature: +22 ±2 °C (+72 ±4 °F)
- Warm-up period: 30 min
- Data as indicated in the calibration certificate
- Measurement error based on accredited calibration rigs according to ISO 17025

Installation
- Inlet run > 10 × DN
- Outlet run > 5 × DN
- Measuring instrument is grounded.
- The measuring instrument is centered in the pipe.

To calculate the measuring range, use the *Applicator* sizing tool → 49

Maximum measurement error

Maximum permissible error under reference operating conditions

o.r. = of reading

Volume flow
±0.25 % o.r. in the 1 to 4 m/s (3.3 to 13 ft/s) range

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

Accuracy of outputs

The output accuracy must be factored into the measurement error if analog outputs are used; but can be ignored for fieldbus outputs (IO-Link and Modbus RS485).

The outputs have the following base accuracy specifications.

Pulse/frequency output

o.r. = of reading

Temperature accuracy	Max. ±100 ppm/K o.r. (over the entire ambient temperature range)

Long-term accuracy	Max. ±0.05 %/Jahr o.r.

Repeatability

DN 25 (500 ml/s), DN 15 (200 ml/s), DN 8 (50 ml/s), DN 4 (10 ml/s); 400 µS/cm

Dosing time$_a$ [s]	Relative standard deviation in relation to the batched volume [%]
1.5 s < t_a < 3 s	0.4
3 s < t_a < 5 s	0.2
5 s < t_a	0.1

DN 15K [1] (200 ml/s); 400 µS/cm

Dosing time$_a$ [s]	Relative standard deviation in relation to the batched volume [%]
1.5 s < t_a < 3 s	0.25
3 s < t_a < 5 s	0.12
5 s < t_a	0.08

1) Conical version (corresponds to DN 12)

Influence of ambient temperature

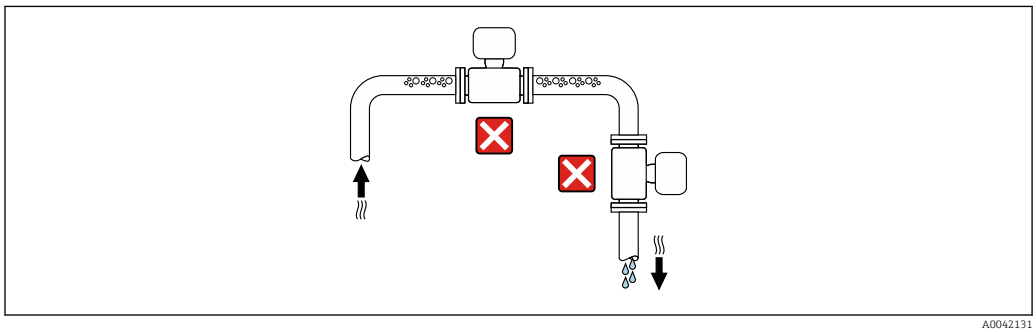
Pulse/frequency output

Temperature coefficient	No additional effect. Included in accuracy.

Mounting

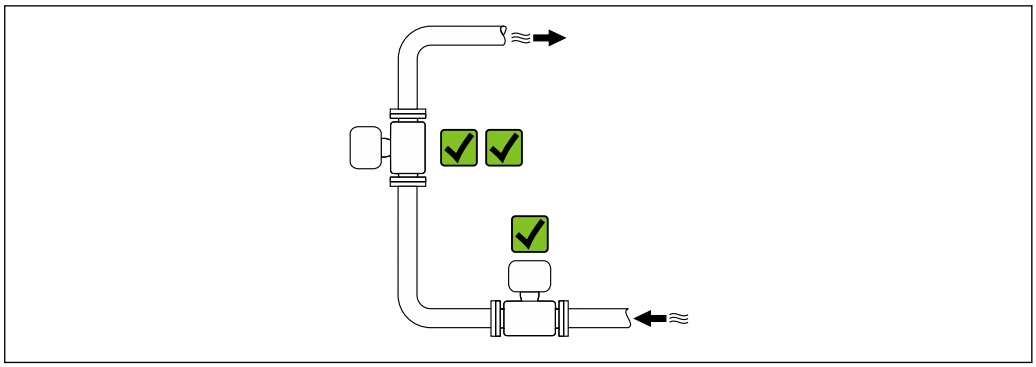
Mounting location

- Do not install the device at the highest point of the pipe.
- Do not install the device upstream from a free pipe outlet in a down pipe.



A0042131

The device should ideally be installed in an ascending pipe.



A0042317

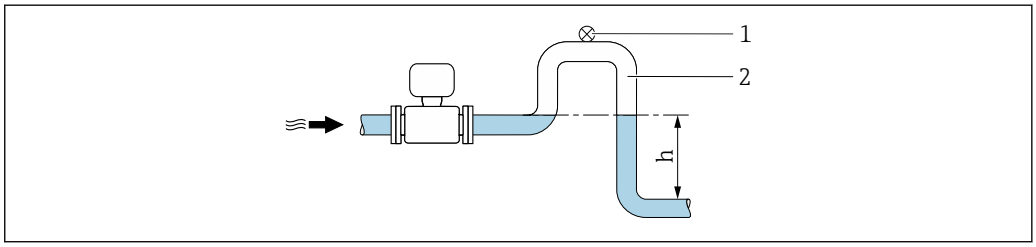
Installation upstream from a down pipe

NOTICE

Negative pressure in the measuring pipe can damage the liner!

- ▶ If installing upstream of down pipes whose length h ≥ 5 m (16.4 ft): install a siphon with a vent valve downstream of the device.

This arrangement prevents the flow of liquid stopping in the pipe and air entrainment.

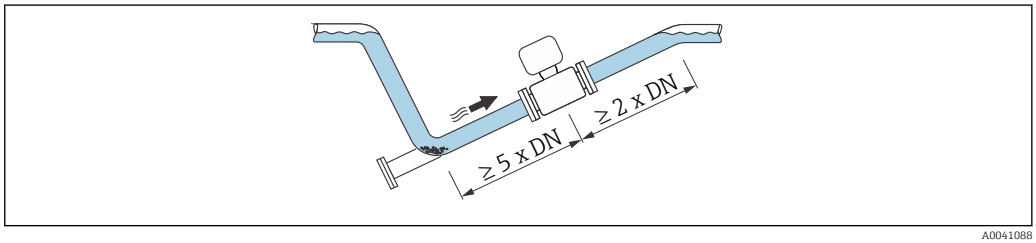


A0028981

1 Vent valve
2 Pipe siphon
h Length of down pipe

Installation with partially filled pipes

- Partially filled pipes with a gradient require a drain-type configuration.
- The installation of a cleaning valve is recommended.



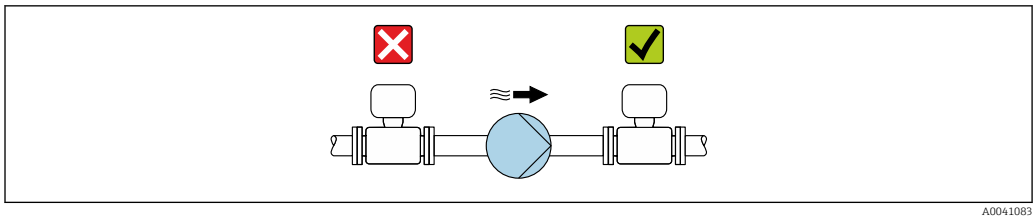
A0041088

Installation near pumps

NOTICE

Negative pressure in the measuring tube can damage the liner!

- ▶ In order to maintain the system pressure, install the device in the flow direction downstream from the pump.
- ▶ Install pulsation dampers if reciprocating, diaphragm or peristaltic pumps are used.



A0041083

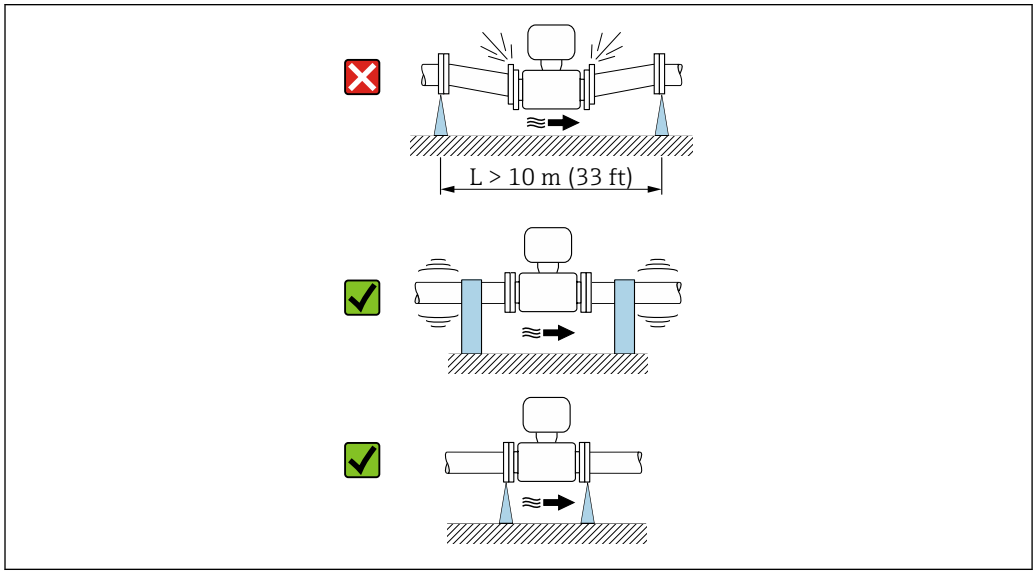
- Information on the liner's resistance to partial vacuum → 31
- Information on the measuring system's resistance to vibration and shock → 29

Installation in event of pipe vibrations

NOTICE

Pipe vibrations can damage the device!

- ▶ Do not expose the device to strong vibrations.
- ▶ Support the pipe and fix it in place.
- ▶ Support the device and fix it in place.

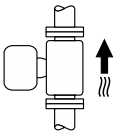
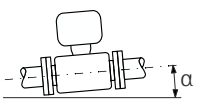
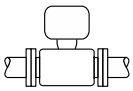


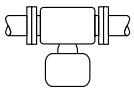
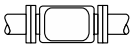
A0041092

Information on the measuring system's resistance to vibration and shock → 29

Orientation

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

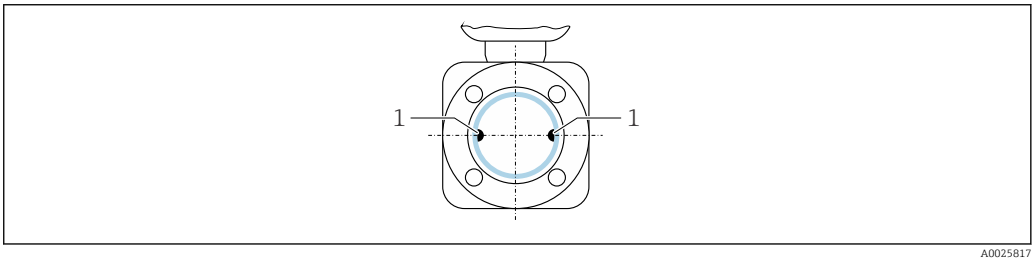
Orientation		Recommendation
Vertical orientation	 A0015591	✓✓
Horizontal orientation	 A0041328	✓ 1)
Horizontal orientation, transmitter at top	 A0015589	✓✓ 2)

Orientation		Recommendation
Horizontal orientation, transmitter at bottom	 A0015590	✓✓ 3) 4)
Horizontal orientation, transmitter at side	 A0015592	✗

1) The measuring device should be self-draining for hygiene applications. A vertical orientation is recommended for this. If only a horizontal orientation is possible, an angle of inclination α ≥ 10° is recommended.
2) Applications with low process temperatures may reduce the ambient temperature. To maintain the minimum ambient temperature for the transmitter, this orientation is recommended.
3) Applications with high process temperatures may increase the ambient temperature. To maintain the maximum ambient temperature for the transmitter, this orientation is recommended.
4) To prevent the electronics from overheating in the event of strong heat formation (e.g. CIP or SIP cleaning process), install the device with the transmitter part pointing downwards.

Horizontal

Ideally, the measuring electrode plane should be horizontal. This prevents brief insulation of the measuring electrodes by entrained air bubbles.



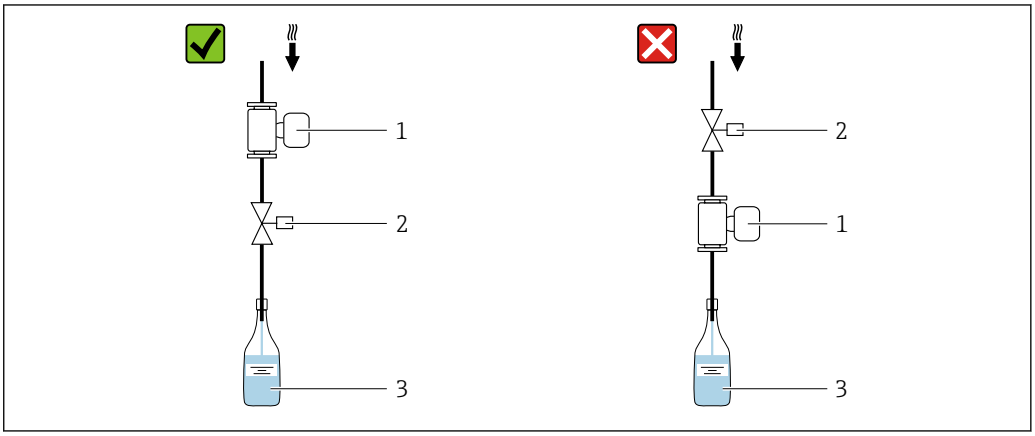
A0025817

1 Measuring electrodes for signal detection

Valves

Never install the measuring device downstream from a filling valve. Completely emptying the measuring device results in a high distortion of the measured value.

Correct measurement is possible only if the piping is completely filled. Perform sample fillings before commencing filling in production.

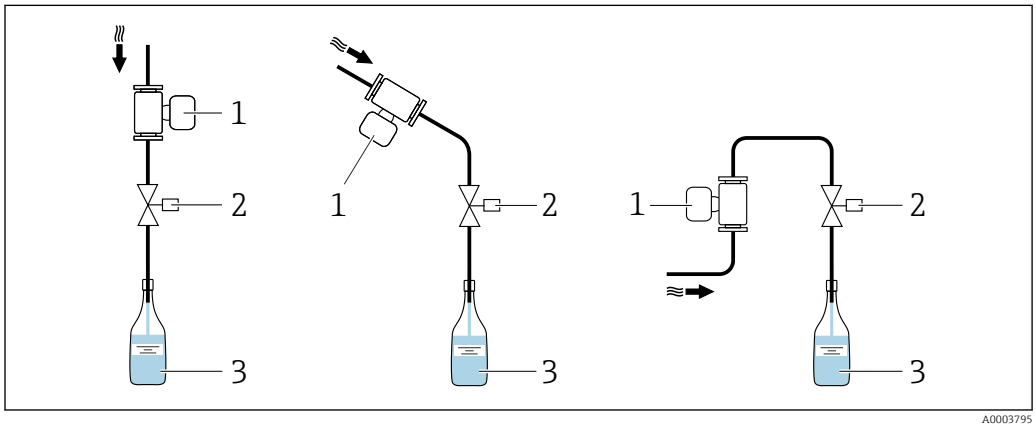


A0003768

1 Measuring device
2 Filling valve
3 Vessel

Filling systems

The pipe system must be completely full to ensure optimum measurement.



A0003795

8 Filling system

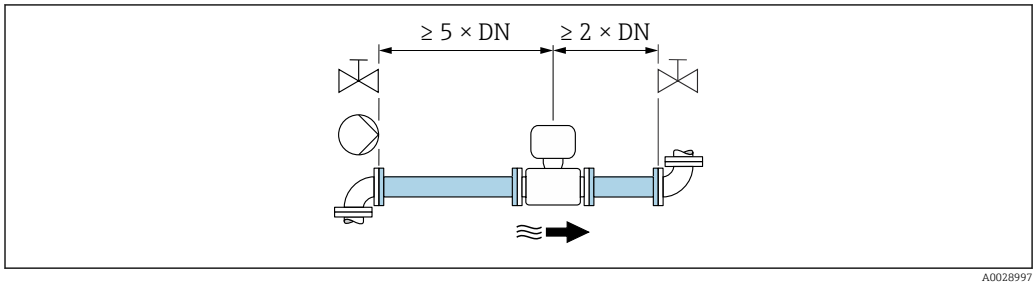
1 Measuring device
2 Filling valve
3 Vessel

Inlet and outlet runs

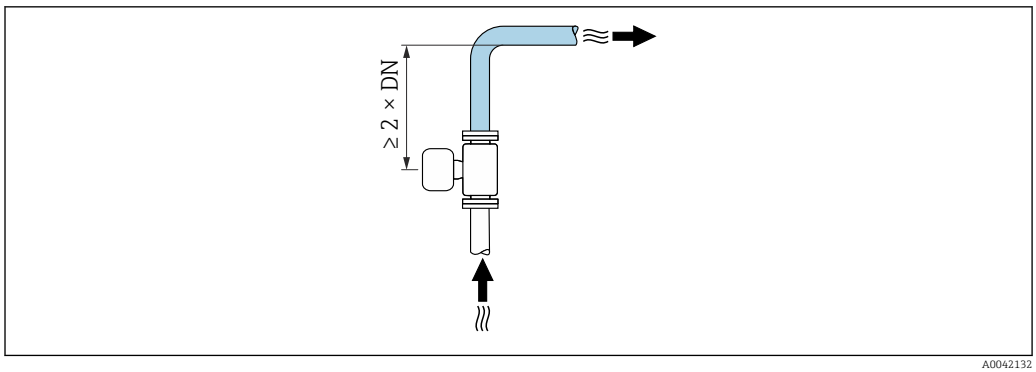
Installation with inlet and outlet runs

To avoid a vacuum and to maintain the specified level of accuracy, install the device upstream from assemblies that produce turbulence (e.g. valves, T-sections) and downstream from pumps.

Maintain straight, unimpeded inlet and outlet runs.



A0028997



A0042132

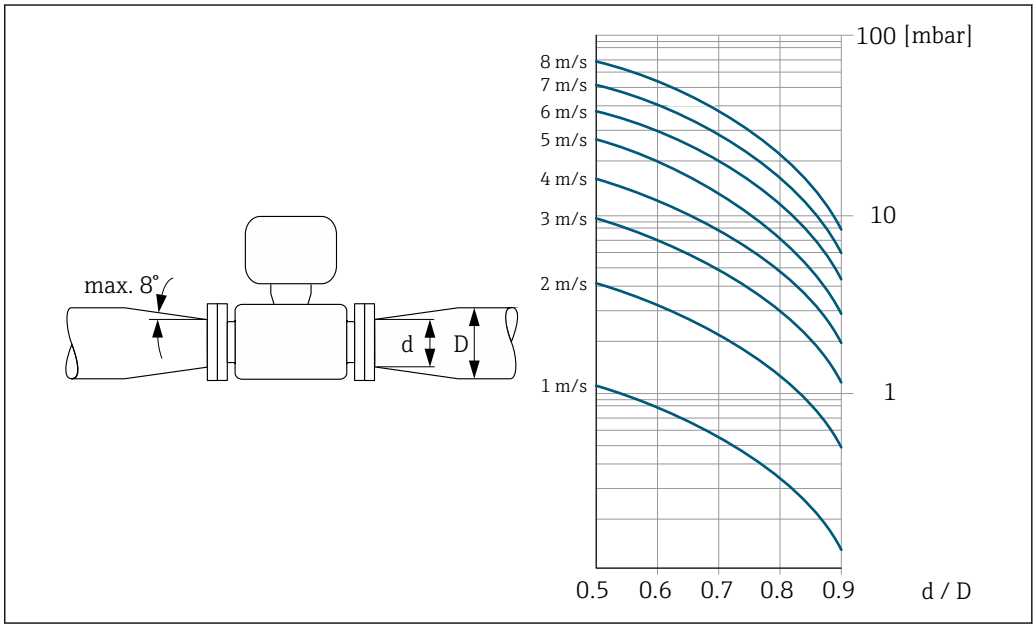
Adapters

The measuring device can also be installed in larger-diameter pipes with the aid of suitable adapters according to DIN EN 545 (double-flange reducers). The resultant increase in the rate of flow improves measuring accuracy with very slow-moving fluids.

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

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

- The nomogram only applies to liquids with a viscosity similar to that of water.
- If the medium has a high viscosity, a larger measuring tube diameter can be considered in order to reduce pressure loss.



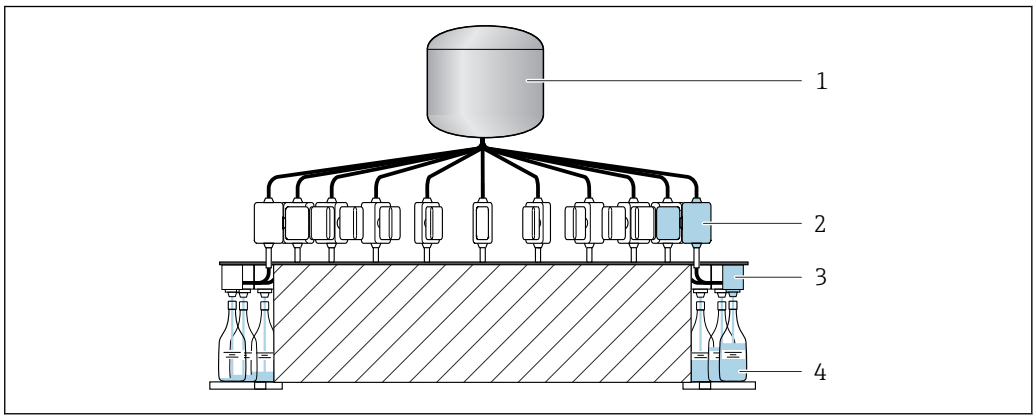
A0029002

Special mounting instructions

Information for filling systems

Correct measurement is only possible if the pipe is completely full. We therefore recommend that some test batches be carried out prior to production batching.

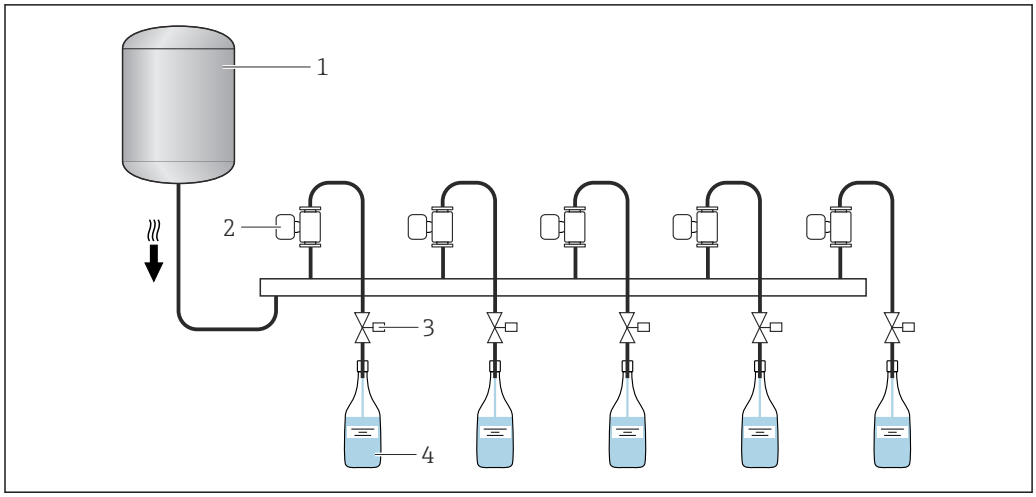
Circular filling system



A0003761

1 Tank
2 Measuring instrument
3 Filling valve
4 Vessel

Linear filling system



1 *Tank*
2 *Measuring instrument*
3 *Filling valve*
4 *Vessel*

Hygienic compatibility

When installing in hygienic applications, please refer to the information in the "Certificates and approvals/hygienic compatibility" section → 47

Wall mounting kit

Depending on the application and pipe length, the measuring instrument may need to be supported or additionally secured. In particular, it is absolutely essential to secure the measuring instrument additionally if plastic process connections are used. An appropriate wall mounting kit can be ordered separately as an accessory from Endress+Hauser. → 48

Zero adjustment

The **Sensor adjustment** submenu contains parameters required for zero adjustment.

Detailed information on the "**Sensor adjustment** submenu": Device parameters → 49

NOTICE

All Dosimag measuring instruments are calibrated in accordance with state-of-the-art technology. Calibration takes place under reference conditions .
Zero adjustment is therefore not required for the Dosimag as a general rule.
- ▶ Experience shows that a zero adjustment is advisable only in special cases.
- ▶ When maximum measurement accuracy is required and flow rates are very low.

Detailed information on reference operating conditions → 21

Environment

Ambient temperature range

Measuring instrument	–40 to +60 °C (–40 to +140 °F) Install the measuring instrument in a shady location. Avoid direct sunlight, particularly in warm climatic regions.
Liner	Do not exceed or fall below the permitted temperature range of the liner → 29.

Storage temperature

The storage temperature corresponds to the ambient temperature range → 28.

- Protect the measuring instrument against direct sunlight during storage in order to avoid unacceptably high surface temperatures.
- Select a storage location where moisture cannot collect in the measuring instrument as fungus or bacteria infestation can damage the liner.
- If protective caps or protective covers are mounted, only remove them immediately before mounting the measuring instrument.

Degree of protection

Standard: IP67, Type 4X enclosure, suitable for pollution degree 4

Vibration-resistance and shock-resistance

Vibration sinusoidal, in accordance with IEC 60068-2-6

- 2 to 8.4 Hz, 7.5 mm peak
- 8.4 to 2 000 Hz, 2 g peak

Vibration broad-band random, according to IEC 60068-2-64

- 10 to 200 Hz, 0.01 g^2/Hz
- 200 to 2 000 Hz, 0.003 g^2/Hz
- Total: 2.70 g rms

Shock half-sine, according to IEC 60068-2-27

6 ms 50 g

Rough handling shocks according to IEC 60068-2-31

Internal cleaning

- CIP cleaning
- SIP cleaning

Observe the maximum medium temperatures → 29

Electromagnetic compatibility (EMC)

As per IEC/EN 61326

Details are provided in the Declaration of Conformity.

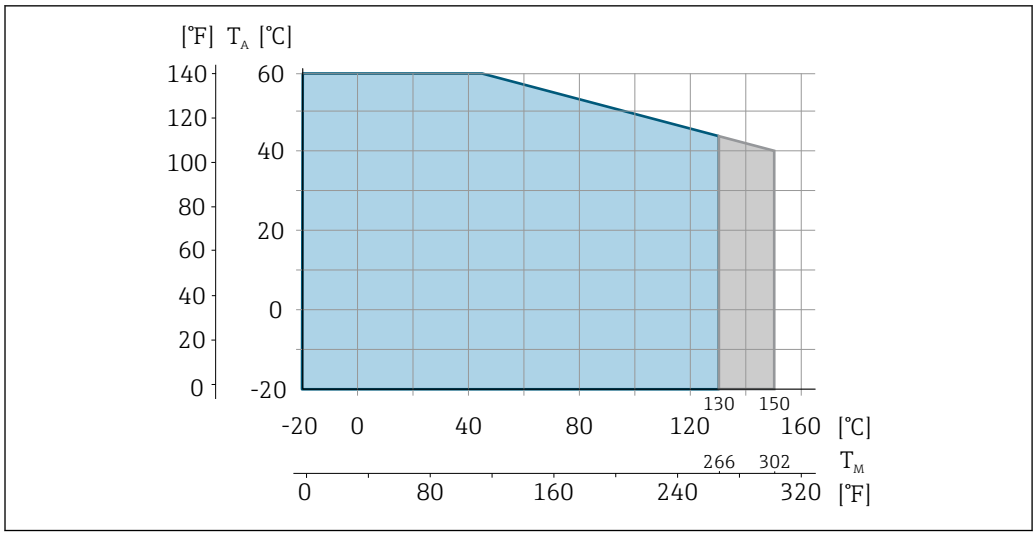
This unit is not intended for use in residential environments and cannot guarantee adequate protection of the radio reception in such environments.

Process

Medium temperature range

Measuring instrument
−20 to +130 °C (−4 to +266 °F)

Cleaning
Process connections with aseptic molded seal and Tri-Clamp: +150 °C (+302 °F) max. 60 min for CIP and SIP processes



T_A Ambient temperature

T_M Medium temperature

Blue area: Standard medium temperature range

Gray area: Medium temperature range for cleaning (max. 60 min)

Conductivity

- ≥ 5 µS/cm for liquids in general
- ≥ 10 µS/cmfor demineralized water

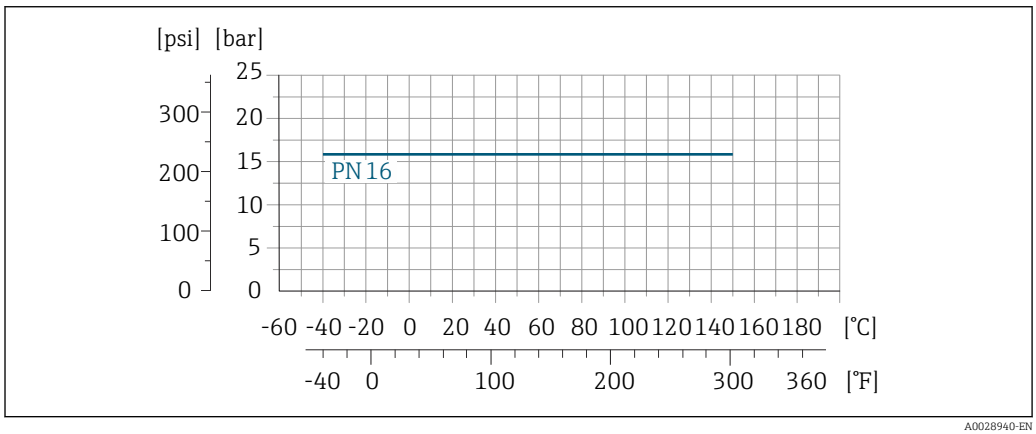
Pressure-temperature ratings

The following pressure/temperature diagrams apply to all pressure-bearing parts of the device and not just the process connection. The diagrams show the maximum permissible medium pressure depending on the specific medium temperature.

Permitted process pressure: 16 bar (232 psi)

Process connections with aseptic molded seal, DN 4 to 25 (5/32 to 1")

Process connection: welding nipple similar to EN 10357 series A, ASME BPE (DIN 11866 series C), clamp similar to DIN 32676



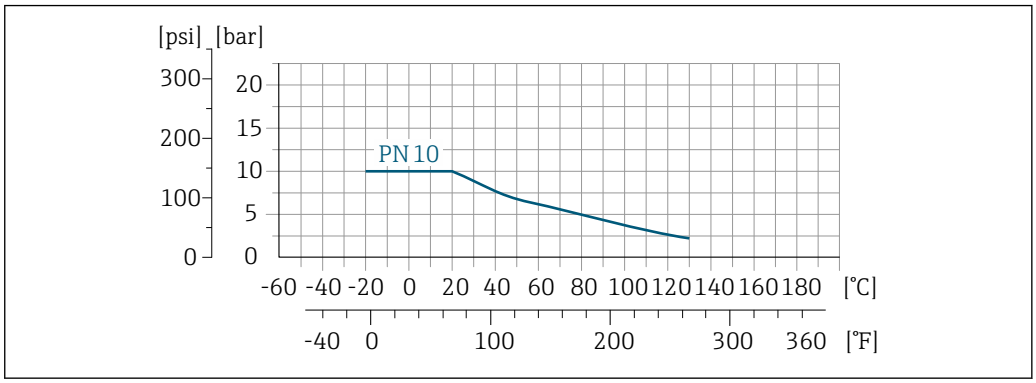
9 Process connection material: stainless steel, 1.4404 (316 L)

Process connections: Tri-Clamp

The load limit is defined exclusively by the material properties of the Tri-Clamp clamp used. This clamp is not included in the scope of delivery.

Process connections with O-ring seal, DN 4 to 25 (5/32 to 1")

Process connection: gland similar to EN ISO 228/EN 10226



10 *Process connection material: PVDF*

Pressure tightness

Liner: PFA

Nominal diameter		Limit values for absolute pressure in [mbar] ([psi]) for fluid temperatures:	
[mm]	[in]	+25 °C (+77 °F)	+150 °C (+302 °F)
4 to 25	5/32 to 1	> 1 mbar (0.402 inH_2O) (0)	> 1 mbar (0.402 inH_2O) (0)

Flow limit

The diameter of the pipe and the flow rate determine the nominal diameter of the measuring instrument. The optimum flow velocity is between 2 to 3 m/s (6.56 to 9.84 ft/s). Also match the flow velocity (v) to the physical properties of the medium:
- v < 2 m/s (6.56 ft/s): for abrasive media (e.g. cleaning agents)
- v > 2 m/s (6.56 ft/s): for media producing buildup (e.g. liquids containing oil and sugar)

- A necessary increase in the flow velocity can be achieved by reducing the measuring instrument nominal diameter.
- In the case of media with a high solids content, a measuring instrument with a nominal diameter > DN (8 3/8") can improve the signal stability and cleanability due to the larger electrodes.

Pressure loss

- For DN 8 (5/16"), DN 15 (½") and DN 25 (1"), there is no pressure loss if the measuring device is installed in a pipe with the same nominal diameter.
- Pressure losses for configurations incorporating adapters according to DIN EN 545 → 26

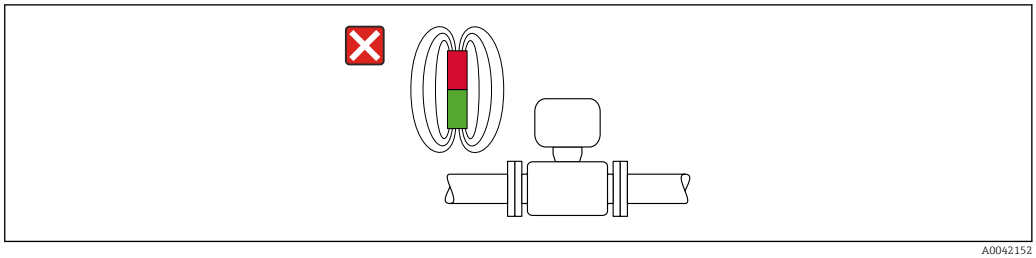
System pressure

Installation near pumps → 23

Vibrations

Installation in event of pipe vibrations → 24

Magnetism and static electricity



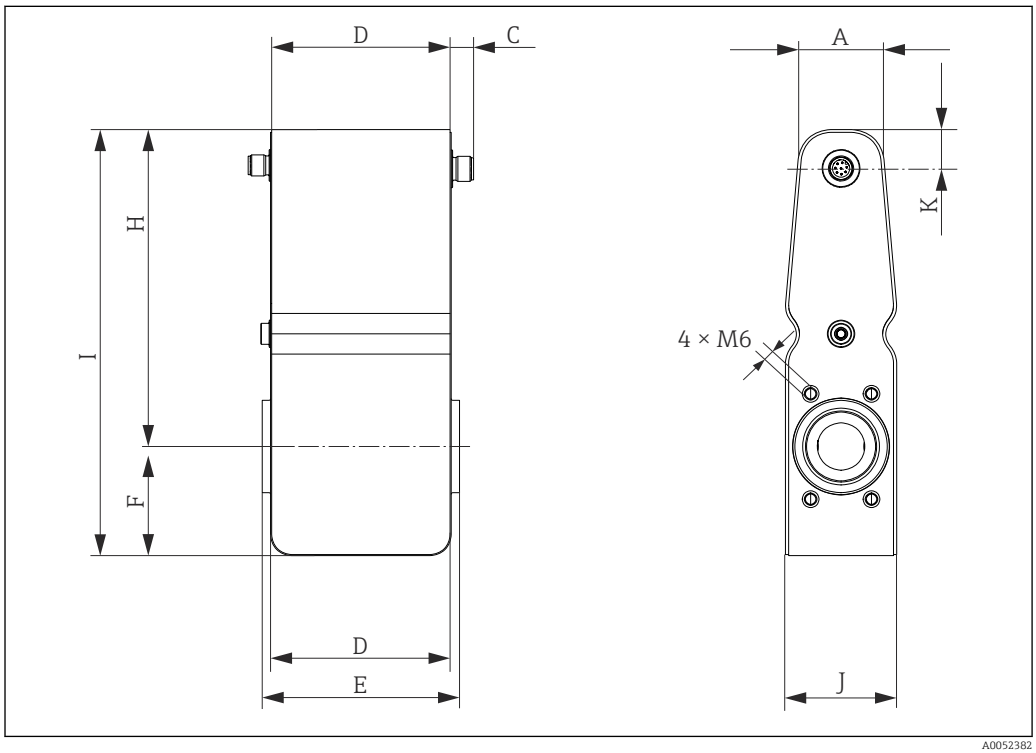
11 *Avoid magnetic fields*

Mechanical construction

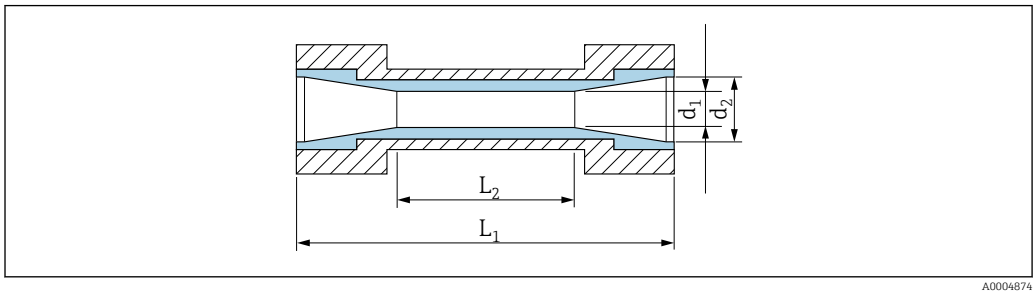
Dimensions in SI units

Compact version

Order code for "Housing", option B "Compact, stainless", DN 4 to 15 (5/32 to ½")



A [mm]	C [mm]	D [mm]	E [mm]	F [mm]	H [mm]	I [mm]	J [mm]	K [mm]
30.7	12	86	94	48	144	192	43	16.5



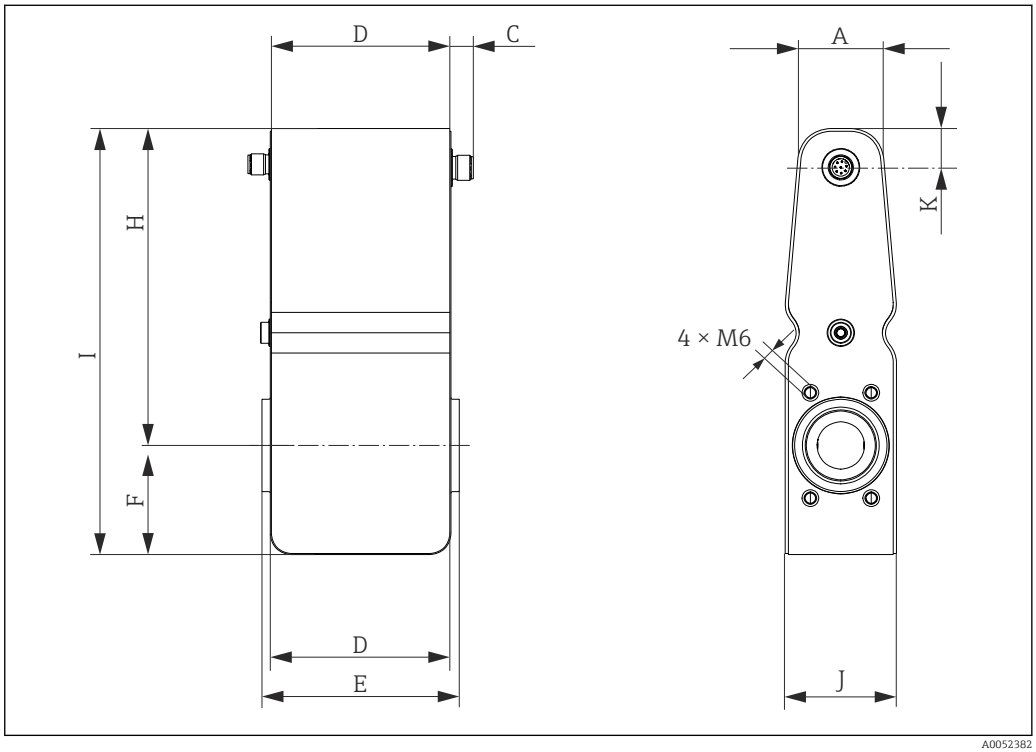
12 *Measuring tube dimensions*

DN [mm]	d_1 [mm]	d_2 [mm]	L_1 [1)] [mm]	L2 [mm]
4	4.5	9	94	20
8	9	9	94	– [2)]

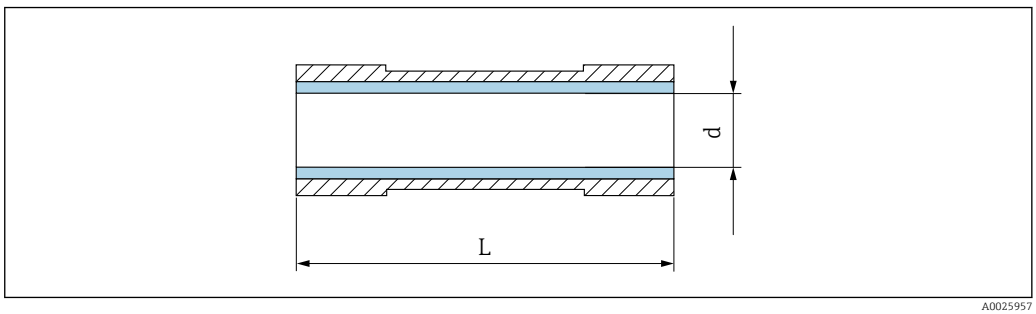
DN [mm]	d_1 [mm]	d_2 [mm]	L_1 [1] [mm]	L2 [mm]
15K [3]	12	16	94	20
15	16	16	94	– [2]

1) Total installed length depends on process connections
2) No value as cylindrical
3) Conical version (corresponds to DN 12)

Order code for "Housing", option B "Compact, stainless", DN 25 (1")



A [mm]	C [mm]	D [mm]	E [mm]	F [mm]	H [mm]	I [mm]	J [mm]	K [mm]
41	12	86	94	52	151	203	53	18.5



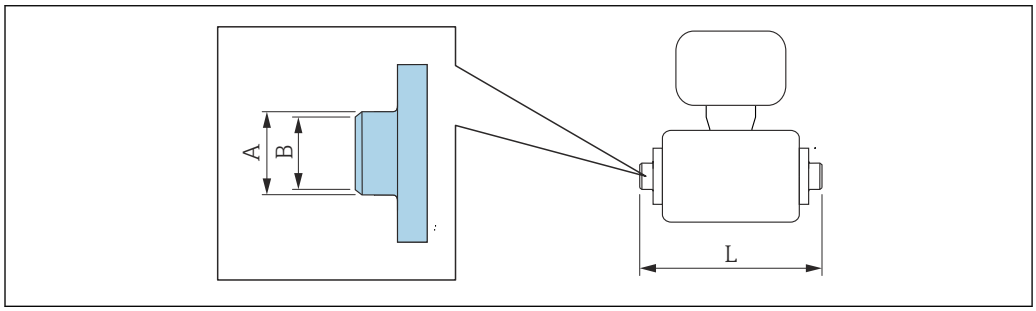
13 *Measuring tube dimensions*

DN [mm]	d [mm]	L [1] [mm]
25	26 (DIN)	94

1) Total installed length depends on process connections

Welding nipple

With aseptic molded seal



A0027510

Length tolerance for dimension L in mm:
+1.5 / −2.0

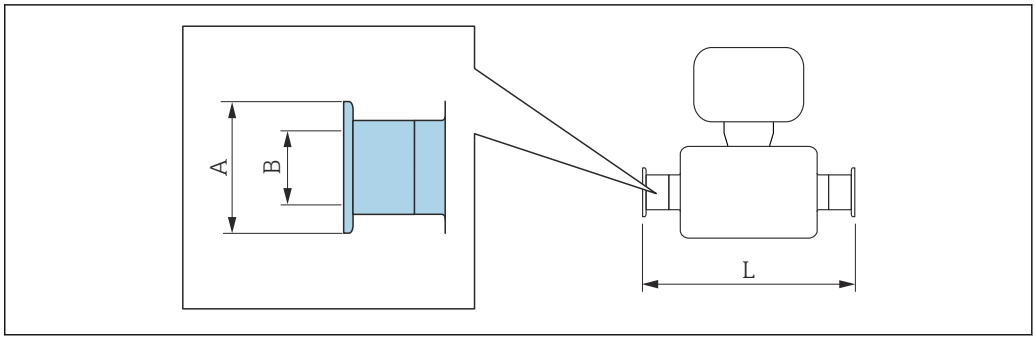
Welding nipple according to EN 10357 **1.4404 (316L):** *Order code for "Process connection", option* **DAS** *Suitable for pipe EN 10357 (series A)*				
DN [mm]	**Piping [mm]**	**A [mm]**	**B [mm]**	**L [mm]**
4 to 8	13 × 1.5	13	10	132.6
15K [1] 15	19 × 1.5	19	16	132.6
25	29 × 1.5	29	26	132.6
Please note the internal diameters of the measuring tube and process connection (B) when cleaning with pigs.				

1) Conical version (corresponds to DN 12)

Welding nipple according to ASME BPE **1.4404 (316L):** *Order code for "Process connection", option* **AAS** *Suitable for piping according to ASME BPE (DIN 11866 series C)*				
DN [mm]	**Piping [mm]**	**A [mm]**	**B [mm]**	**L [mm]**
4 to 8	12.7 × 1.65	12.7	9	118.2
15K [1] 15	19.1 × 1.65	19.1	16	118.2
25	25.4 × 1.65	25.4	22.6	118.2
Please note the internal diameters of the measuring tube and process connection (B) when cleaning with pigs.				

1) Conical version (corresponds to DN 12)

Clamp connections



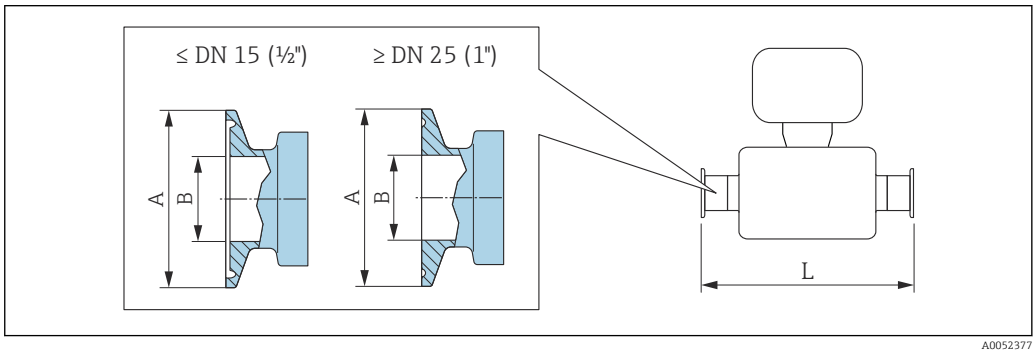
A0015625

Length tolerance for dimension L in mm:
+1.5 / −2.0

Clamp according to DIN 32676 **1.4404 (316L):** *Order code for "Process connection", option* **DBS** *Suitable for piping according to DIN 32676 (series A)*				
DN [mm]	**Piping [mm]**	**A [mm]**	**B [mm]**	**L [mm]**
4 to 8	14 × 2 (DN 10)	34	10	168
15K [1)] 15	20 × 2 (DN 15)	34	16	168
25	30 × 2 (DN 26)	50.5	26	175
Please note the internal diameters of the measuring tube and process connection (B) when cleaning with pigs.				

1) Conical version (corresponds to DN 12)

Tri-Clamp



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Length tolerance for dimension L in mm:
+1.5 / −2.0

Tri-Clamp **1.4404 (316L):** *Order code for "Process connection", option* **FAS** *Suitable for piping according to ASME BPE (DIN 11866 series C)*				
DN [mm]	**Piping [mm]**	**A [mm]**	**B [mm]**	**L [mm]**
4 to 8	12.7 × 1.65	25	9.4	143
15K [1)] 15	19.1 × 1.65	25	15.8	143

Tri-Clamp
1.4404 (316L): *Order code for "Process connection", option* **FAS**
Suitable for piping according to ASME BPE (DIN 11866 series C)

DN [mm]	Piping [mm]	A [mm]	B [mm]	L [mm]
25	25.4 × 1.65	50.4	22.1	143
Please note the internal diameters of the measuring tube and process connection (B) when cleaning with pigs.				

1) Conical version (corresponds to DN 12)

¾" Tri-Clamp (conical) L14 AM7
1.4404 (316L): *Order code for "Process connection", option* **FEW**
Suitable for ODT pipe

DN [mm]	Piping [mm]	A [mm]	B [mm]	L [mm]
4 to 8	Pipe 19.1 × 1.65	25.0	9	143
Please note the internal diameters of the measuring tube and process connection (B) when cleaning with pigs.				

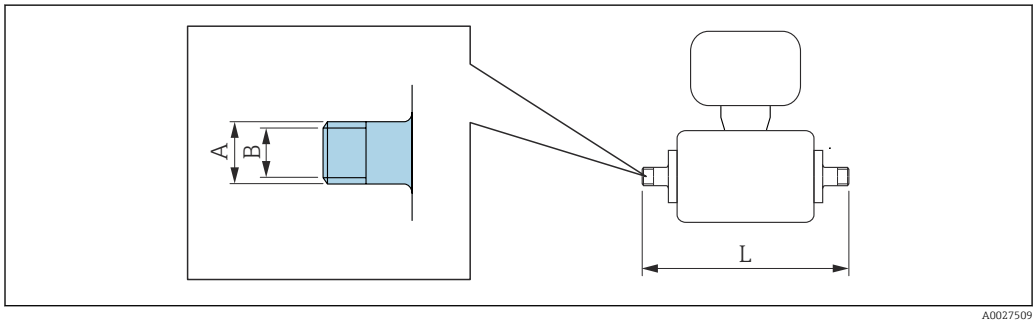
1" Tri-Clamp L14 AM7
1.4404 (316L): *Order code for "Process connection", option* **FNW**
Suitable for ODT pipe

DN [mm]	Piping [mm]	A [mm]	B [mm]	L [mm]
15K [1)] 15	Pipe 25.4 × 1.65	50.4	22.1	143
Please note the internal diameters of the measuring tube and process connection (B) when cleaning with pigs.				

1) Conical version (corresponds to DN 12)

Glands

With O-ring seal



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Length tolerance for dimension L in mm:
+1.5 / −2.0

G1" external thread
PVDF: *Order code for "Process connection", option* **I3P**
Suitable for EN ISO 228/EN 10226 internal thread

DN [mm]	Piping [in]	A [mm / in]	B [mm]	L [mm]
4 to 8	G1" / Rp1"	33.2 / 1	16	200
15K [1)] 15	G1" / Rp1"	33.2 / 1	16	200
25	G1" / Rp1"	33.2 / 1	16	200

1) Conical version (corresponds to DN 12)

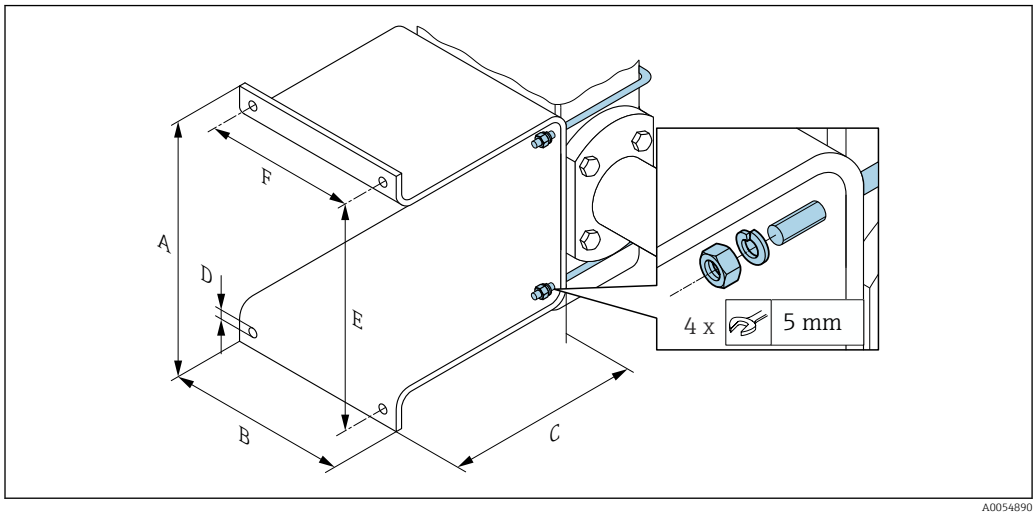
G1" external thread
PVDF with platinum grounding pin: *Order code for "Process connection", option* **I4P**
Suitable for EN ISO 228/EN 10226 internal thread

DN [mm]	Piping [in]	A [mm / in]	B [mm]	L [mm]
4 to 8	G1" / Rp1"	33.2 / 1	16	200
15K [1)] 15	G1" / Rp1"	33.2 / 1	16	200
25	G1" / Rp1"	33.2 / 1	16	200

1) Conical version (corresponds to DN 12)

Mounting kit

Wall mounting kit



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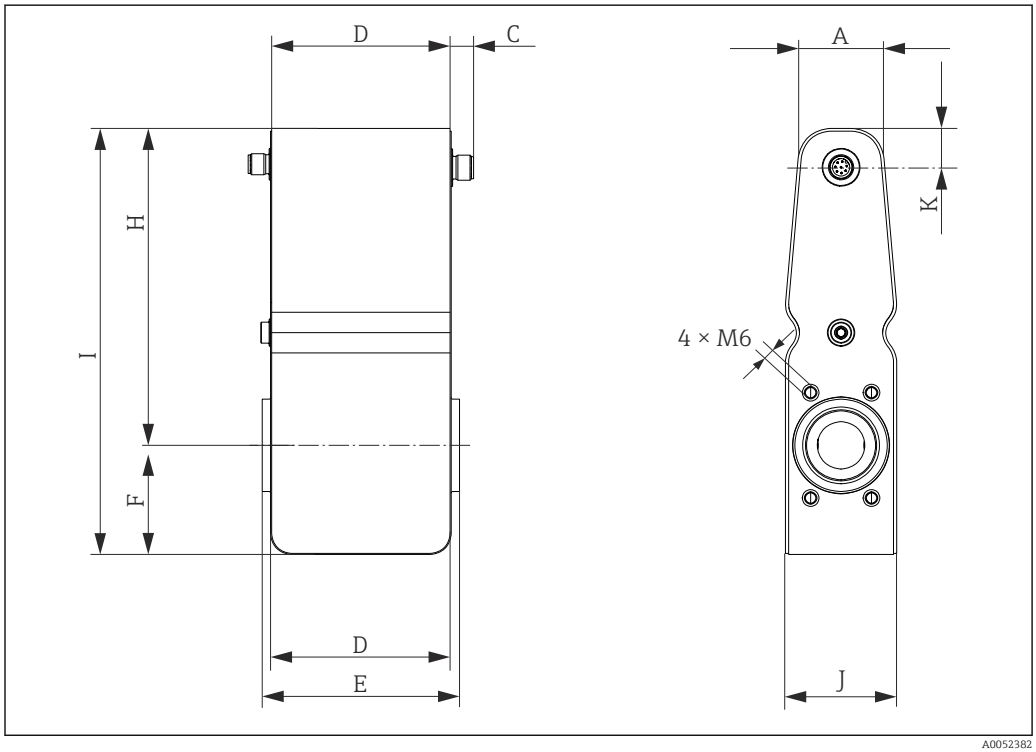
A [mm]	B [mm]	C [mm]	Ø D [mm]	E [mm]	F [mm]
137	110	120	7	125	88

Dimensions in US units

Compact version

Order code for "Housing", option B "Compact, stainless", DN 4 to 15 (5⁄32 to ½")



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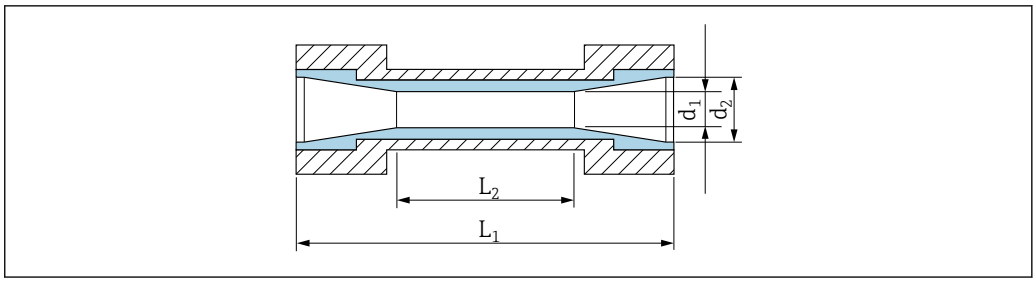
A [in]	C [in]	D [in]	E [in]	F [in]	H [in]	I [in]	J [in]	K [in]
1.18	0.47	3.39	3.7	1.89	5.67	7.56	1.69	0.63

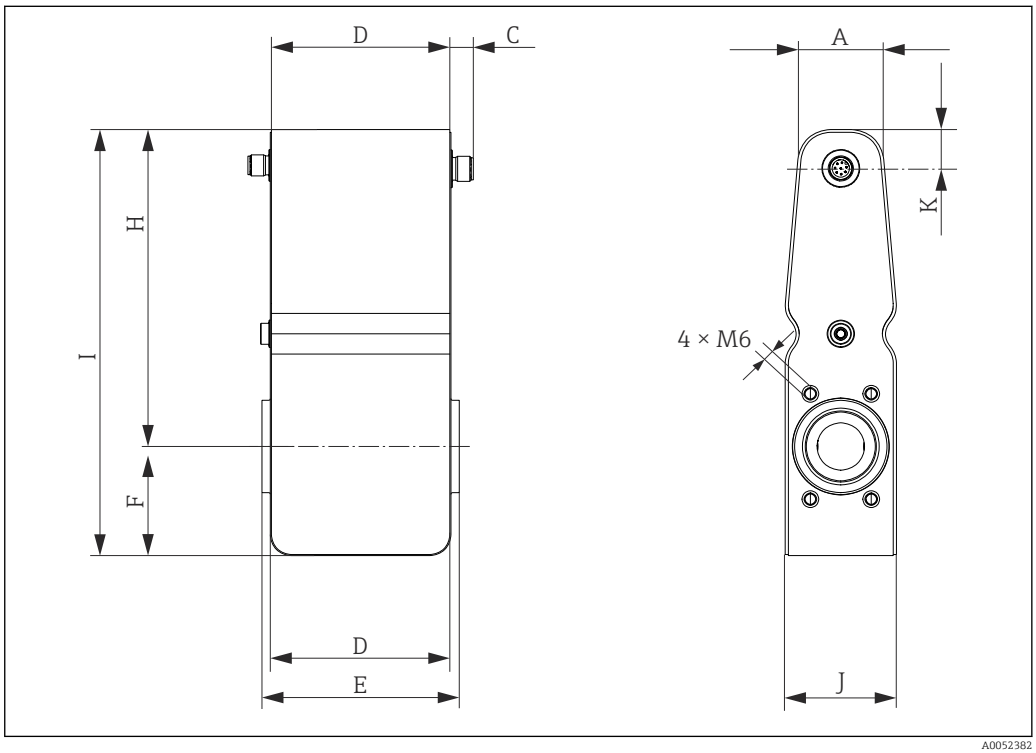


14 *Measuring tube dimensions*

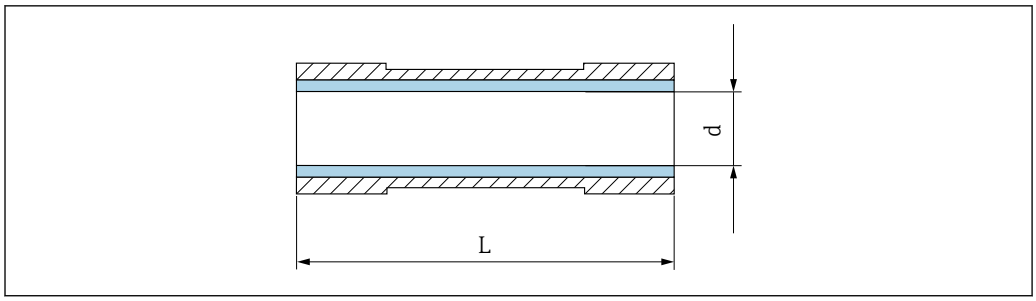
DN [in]	d_1 [in]	d_2	L [1] [in]	L2
5/32	0.17	0.35	3.70	0.79
5/16	0.35	0.35	3.70	–
½K [2]	0.47	0.63	3.70	0.79
½	0.63	0.63	3.70	–

1) Total installed length depends on process connections
2) Conical version (corresponds to DN 12)

Order code for "Housing", option B "Compact, stainless", DN 25 (1")



A [in]	C [in]	D [in]	E [in]	F [in]	H [in]	I [in]	J [in]	K [in]
1.61	0.47	3.39	3.7	2.05	5.94	7.99	2.09	0.71



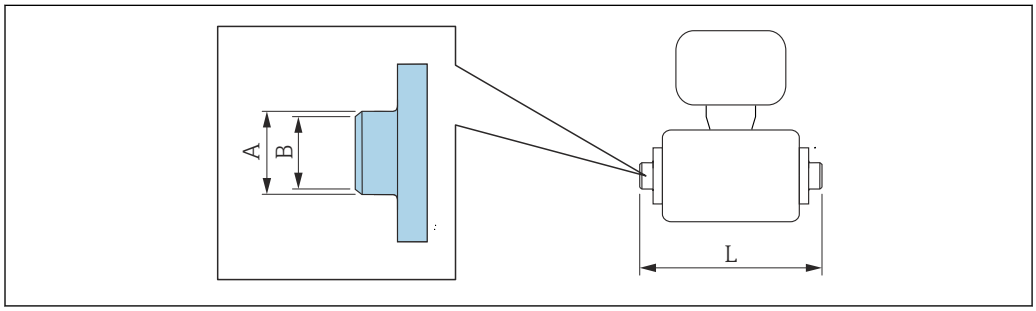
15 *Measuring tube dimensions*

DN [in]	d [in]	L [1] [in]
1	0.89 (ASME)	3.70

1) Total installed length depends on process connections

Welding nipple

With aseptic molded seal



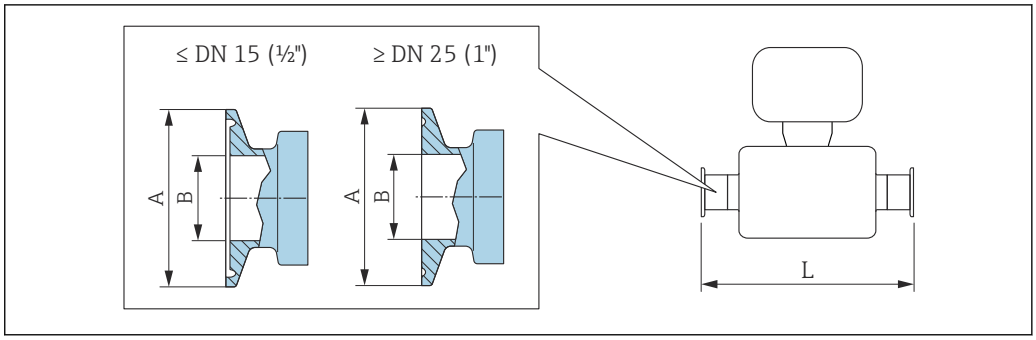
Length tolerance for dimension L in inch:
+0.06 / −0.08

Welding nipple according to ASME BPE
1.4404 (316L): *Order code for "Process connection", option* **AAS**
Suitable for piping according to ASME BPE (DIN 11866 series C)

DN [in]	Piping [in]	A [in]	B [in]	L [in]
5/32 to 5/16	0.50 × 0.06	0.50	0.35	4.65
½K [1] ½	0.75 × 0.06	0.75	0.63	4.65
1	1.00 × 0.06	1.00	0.89	4.65
Please note the internal diameters of the measuring tube and process connection (B) when cleaning with pigs.				

1) Conical version (corresponds to DN 12)

Tri-Clamp



Length tolerance for dimension L in inch:
+0.06 / −0.08

Tri-Clamp
1.4404 (316L): *Order code for "Process connection", option* **FAS**
Suitable for piping according to ASME BPE (DIN 11866 series C)

DN [in]	Piping [in]	A [in]	B [in]	L [in]
5/32 to 5/16	½	1	0.37	5.63
½K [1)] ½	¾	1	0.62	5.63
1	1	2	0.87	5.63
Please note the internal diameters of the measuring tube and process connection (B) when cleaning with pigs.				

1) Conical version (corresponds to DN 12)

¾" Tri-Clamp (conical) L14 AM7
1.4404 (316L): *Order code for "Process connection", option* **FEW**
Suitable for ODT pipe

DN [in]	Piping [in]	A [in]	B [in]	L [in]
5/32 to 5/16	ODT ¾	1.12	0.35	5.63
Please note the internal diameters of the measuring tube and process connection (B) when cleaning with pigs.				

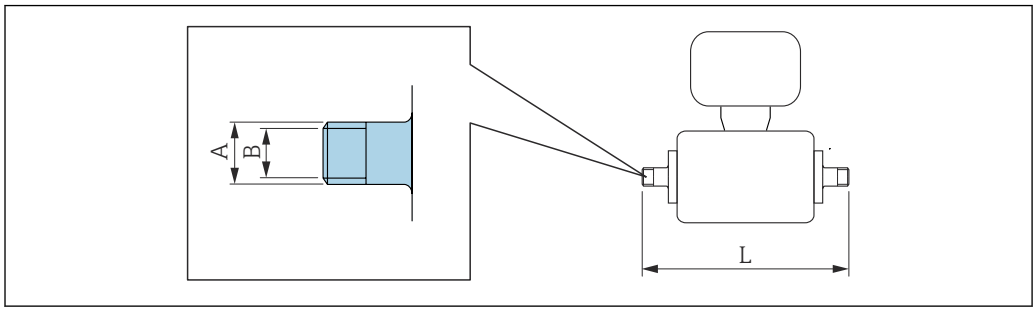
1" Tri-Clamp L14 AM7
1.4404 (316L): *Order code for "Process connection", option* **FNW**
Suitable for ODT pipe

DN [in]	Piping [in]	A [in]	B [in]	L [in]
½K [1)] ½	1	1.98	0.87	5.63
Please note the internal diameters of the measuring tube and process connection (B) when cleaning with pigs.				

1) Conical version (corresponds to DN 12)

Glands

With O-ring seal



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Length tolerance for dimension L in inch:
+0.06 / −0.08

G1" external thread **PVDF:** *Order code for "Process connection", option* **I3P** *Suitable for EN ISO 228/EN 10226 internal thread*				
DN [in]	**Piping [in]**	**A [in]**	**B [in]**	**L [in]**
5/32 to 5/16	G1" / Rp1"	0.98	0.63	7.87
½K [1] ½	G1" / Rp1"	0.98	0.63	7.87
1	G1" / Rp1"	0.98	0.63	7.87

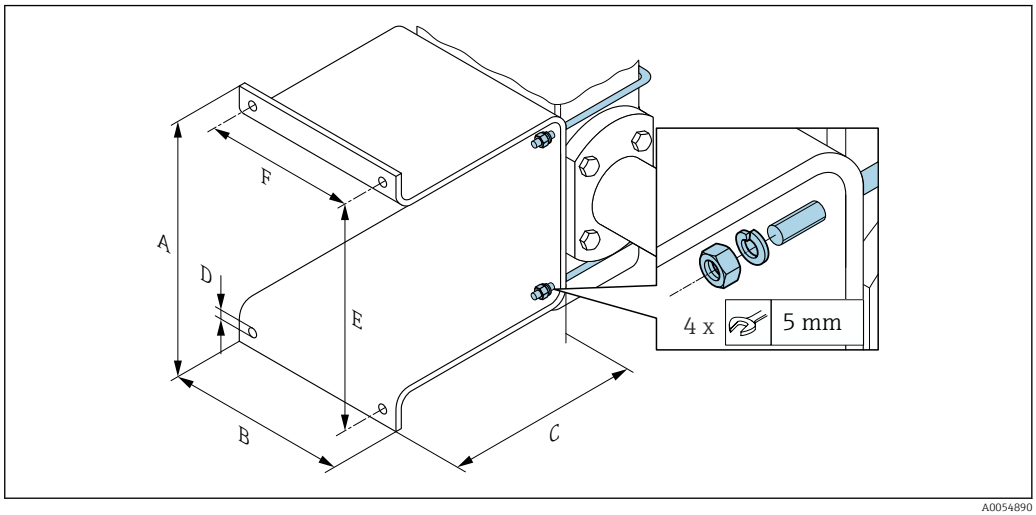
1) Conical version (corresponds to DN 12)

G1" external thread **PVDF with platinum grounding pin:** *Order code for "Process connection", option* **I4P** *Suitable for EN ISO 228/EN 10226 internal thread*				
DN [in]	**Piping [in]**	**A [in]**	**B [in]**	**L [in]**
5/32 to 5/16	G1" / Rp1"	0.98	0.63	7.87
½K [1] ½	G1" / Rp1"	0.98	0.63	7.87
1	G1" / Rp1"	0.98	0.63	7.87

1) Conical version (corresponds to DN 12)

Mounting kits

Wall mounting kit



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A [in]	B [in]	C [in]	Ø D [in]	E [in]	F [in]
5.39	4.33	4.72	0.28	4.92	3.46

Weight

Weight in SI units

DN [mm]	Weight [kg]
4	1.8
8	1.8
15K [1)] 15	1.8
25	2.3

1) Conical version (corresponds to DN 12)

Weight in US units

DN [in]	Weight [lbs]
5⁄32	4.0
5⁄16	4.0
½K [1)] ½	4.0
1	5.1

1) Conical version (corresponds to DN 12)

Materials

Measuring instrument housing

- Acid and alkali-resistant outer surface
- Stainless steel, 1.4404 (316/316L)

Device plug

Electrical connection	Material
M12x1 plug	▪ Socket: Polyamide contact support ▪ Connector: Contact support made of thermoplastic polyurethane (TPU-GF) ▪ Contacts: Gold-plated brass

Measuring tube

Stainless steel 1.4301 (304)

Liner

PFA (USP Class VI, FDA 21 CFR 177.2600)

Electrodes

- 1.4435 (316L)
- Alloy C22, 2.4602 (UNS N06022)
- Platinum
- Tantalum

Process connections

- Welding nipple:
  Stainless steel, 1.4404 (316L)
- Clamp connections:
  Stainless steel, 1.4404 (316L)
- Tri-Clamp:
  Stainless steel, 1.4404 (316L)
- Glands:
  PVDF

Available process connections → 45

Seals

Molded seal: FFKM (Kalrez), EPDM, FKM, VMQ (silicone)

Accessories

Wall mounting kit

Stainless steel, 1.4404 (316L)

Does not meet the hygienic design installation guidelines.

Fitted electrodes

- Standard: stainless steel 1.4435 (316L)
- Optional: Alloy C22, 2.4602 (UNS N06022), platinum, tantalum

Process connections

With aseptic molded seal

Welding nipple
- EN 10357 (series A)
- ASME BPE (DIN 11866 series C)

Clamp connections
Clamp according to DIN 32676 (series A)

Tri-Clamp
- Tri-Clamp (ASME BPE)
- ¾" Tri-Clamp L14 AM7
- 1" Tri-Clamp L14 AM7

With O-ring seal

Gland
G1" external thread (EN ISO 228/EN 10226)

Process connection materials → 44

Surface roughness

Data relate to surfaces in contact with the medium.

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)

Liner with PFA:
≤ 0.4 µm (15.7 µin)

Stainless steel process connections:
- With O-ring seal: Ra ≤ 1.6 µm (63 µin)
- With aseptic molded seal: R_{amax} = 0.76 µm (30 µin)

Operability

Languages

Can be operated in the following languages:
Via "FieldCare", "DeviceCare" operating tool: English, German, French, Spanish, Italian, Chinese, Japanese

Local operation

This device cannot be operated locally using a display or operating elements.

IO-Link

The device-specific parameters are configured via IO-Link. There are specific configuration or operating programs from different manufacturers available to the user for this purpose. The device description file (IODD) is provided for the device.

IO-Link operating concept
Operator-oriented menu structure for user-specific tasks. Efficient diagnostic behavior increases measurement availability:
- Diagnostic messages
- Remedial measures
- Simulation options

IODD download
Two options to download the IODD:
- www.endress.com/download
- https://ioddfinder.io-link.com/

www.endress.com/download

1. Select "Device drivers".
2. Select the "IO Device Description (IODD)" entry under "Type".
3. Select "Product root".
4. Click "Search".
   ↳ A list of search results is displayed.

Select the appropriate version and download.

https://ioddfinder.io-link.com/

1. Enter "Endress" as the manufacturer and select.
2. Select product name.
   ↳ A list of search results is displayed.

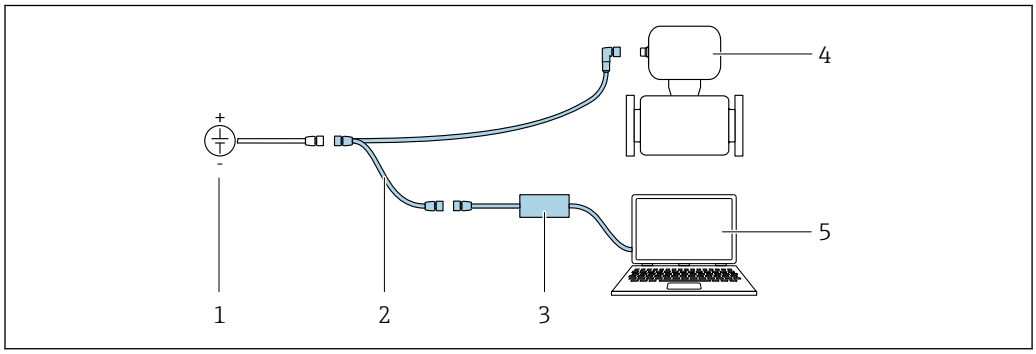
Select the appropriate version and download.

Remote operation

Using service adapter and Commubox FXA291

Operation and configuration can be performed using the Endress+Hauser FieldCare or DeviceCare service and configuration software.

The device is connected to the USB port of the computer via the service adapter and Commubox FXA291.



1 *Supply voltage 24 V DC*
2 *Service adapter*
3 *Commubox FXA291*
4 *Dosimag*
5 *Computer with "FieldCare" or "DeviceCare" operating tool*

The service adapter, cable and Commubox FXA291 are not included in the delivery. These components can be ordered as accessories → 48.

Certificates and approvals

Current certificates and approvals for the product are available at www.endress.com on the relevant product page:

1. Select the product using the filters and search field.
2. Open the product page.
3. Select **Downloads**.

CE mark

The device meets the legal requirements of the applicable EU Directives. These are listed in the corresponding EU Declaration of Conformity along with the standards applied.

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

UKCA marking

The device meets the legal requirements of the applicable UK regulations (Statutory Instruments). These are listed in the UKCA Declaration of Conformity along with the designated standards. By selecting the order option for UKCA marking, Endress+Hauser confirms a successful evaluation and testing of the device by affixing the UKCA mark.

Contact address Endress+Hauser UK:
Endress+Hauser Ltd.
Floats Road
Manchester M23 9NF
United Kingdom
www.uk.endress.com

RCM marking

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

Ex approval

The measuring device is certified for use in hazardous areas and the relevant safety instructions are provided in the separate "Safety Instructions" (XA) document. Reference is made to this document on the nameplate.

The separate Ex documentation (XA) containing all the relevant explosion protection data is available from your Endress+Hauser sales center.

ATEX, IECEx

Currently, the following versions for use in hazardous areas are available:

Ex ec

Category	Type of protection
II3G	Ex ec IIC T5 to T1 Gc

cULus

Currently, the following versions for use in hazardous areas are available:

Class I Division 2 Groups ABCD

Hygienic compatibility

- 3-A SSI 28-06 or more recent
  - Confirmation by affixing the 3-A logo.
  - The 3-A approval refers to the measuring instrument.
  - When installing the measuring instrument, ensure that no liquid can accumulate on the outside of the measuring instrument.
- EHEDG Type EL Class I
  - Confirmation by affixing the EHEDG symbol.
  - EPDM is not a suitable seal material for media with a fat content > 8 %.
  - To meet the requirements for EHEDG certification, the device must be used with process connections in accordance with the EHEDG position paper entitled "Easy cleanable Pipe couplings and Process connections" (www.ehedg.org).
- Seals: FDA-compliant (except Kalrez seals)
- Pasteurized Milk Ordinance (PMO)

Pressure Equipment Directive

- With the marking
  a) PED/G1/x (x = category) or
  b) PESR/G1/x (x = category)
  on the sensor nameplate, Endress+Hauser confirms compliance with the "Essential Safety Requirements"
  a) specified in Annex I of the Pressure Equipment Directive 2014/68/EU or
  b) Schedule 2 of Statutory Instruments 2016 No. 1105.
- Devices bearing this marking (PED or PESR) are suitable for the following types of medium:
  Media in Group 1 and 2 with a vapor pressure greater than, or smaller and equal to 0.5 bar (7.3 psi)
- Devices not bearing this marking (without PED or PESR) are designed and manufactured according to sound engineering practice. They meet the requirements of
  a) Art. 4 Para. 3 of the Pressure Equipment Directive 2014/68/EU or
  b) Part 1, Para. 8 of Statutory Instruments 2016 No. 1105.
  The scope of application is indicated
  a) in diagrams 6 to 9 in Annex II of the Pressure Equipment Directive 2014/68/EU or
  b) Schedule 3, Para. 2 of Statutory Instruments 2016 No. 1105.

Additional certification

IO-Link
Self-certification with Manufacturer Declaration

External standards and guidelines

- EN 60529
  Degrees of protection provided by enclosures (IP code)
- EN 61010-1
  Safety requirements for electrical equipment for measurement, control and laboratory use
- EN 61326-1/-2-3
  EMC requirements for electrical equipment for measurement, control and laboratory use
- CAN/CSA C22.2 No. 61010-1-12
  Safety Requirements for Electrical Equipment for Measurement, Control and Laboratory Use, Part 1: General Requirements
- ANSI/ISA-61010-1 (82.02.01)
  Safety Requirements for Electrical Equipment for Measurement, Control and Laboratory Use – Part 1: General Requirements

Ordering information

Detailed ordering information is available from your nearest sales organization www.addresses.endress.com or in the Product Configurator at www.endress.com:

1. Select the product using the filters and search field.
2. Open the product page.
3. Select **Configuration**.

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

Accessories

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

Device-specific accessories

Accessory	Description	Order code
Seal set	For regular replacement of the seals on the process connections	DK5G**-***
Wall mounting kit	For all applications with increased safety or load requirements	DK5HM**
Mounting kit	Consists of: ▪ 2 process connections ▪ Screws ▪ Seals	DKH**-****

Communication-specific accessories

Accessory	Description
FieldCare	FDT-based plant asset management tool from Endress+Hauser. 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. Operating Instructions BA00027S and BA00059S
DeviceCare	Tool to connect and configure Endress+Hauser field devices. Innovation brochure IN01047S
Commubox FXA291	Connects Endress+Hauser field devices with a CDI interface (= Endress+Hauser Common Data Interface) and the USB port of a computer or laptop. Technical Information TI00405C
Adapter connection	Adapter connections for installation on other electrical connections: Adapter FXA291 (order number: 71035809)

Service-specific accessories

Accessories	Description
Applicator	Software for selecting and sizing Endress+Hauser measuring devices: ▪ Choice of measuring devices for industrial requirements ▪ Calculation of all the necessary data for identifying the optimum flowmeter: e.g. nominal diameter, pressure loss, flow velocity and accuracy. ▪ Graphic illustration of the calculation results ▪ Determination of the partial order code, administration, documentation and access to all project-related data and parameters over the entire life cycle of a project. Applicator is available: ▪ Via the Internet: https://portal.endress.com/webapp/applicator ▪ As a downloadable DVD for local PC installation.
Commubox FXA291	Connects Endress+Hauser field devices with a CDI interface (= Endress +Hauser Common Data Interface) and the USB port of a computer or laptop. Technical Information TI00405C

Documentation

For an overview of the scope of the associated Technical Documentation, refer to the following:
- *Device Viewer* (www.endress.com/deviceviewer): Enter the serial number from the nameplate
- *Endress+Hauser Operations app*: Enter serial number from nameplate or scan matrix code on nameplate.

Standard documentation

Additional information on semi-standard options is available in the associated Special Documentation in the TSP database.

Brief Operating Instructions

Measuring instrument	Documentation code
Dosimag	KA01687D

Operating Instructions

Measuring instrument	Documentation code		
	Pulse, frequency, switch output Option AA	IO-Link Option FA	Modbus RS485 Option MD
Dosimag	BA02344D	BA02329D	BA02345D

Description of device parameters

Measuring instrument	Documentation code		
	Pulse, frequency, switch output Option AA	IO-Link Option FA	Modbus RS485 Option MD
Dosimag	GP01217D	GP01215D	GP01218D

Supplementary device-dependent documentation

Safety instructions

Contents	Documentation code
ATEX Ex ec	XA03265D
UL Class I, Division 2	XA03266D
UKEX Ex ec	XA03267D

Special Documentation

Contents	Documentation code
IO-Link	SD03249D

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Endress+Hauser

People for Process Automation