TI01360D/06/EN/02.18
71407926
2018-07-02

Technical Information
Prosonic Flow E Heat

Ultrasonic time-of-flight flowmeter

Certified industry heat flow sensor for improved measurement of energy consumption

Application

- The measuring principle is independent of pressure, density, temperature and conductivity
- Best choice for energy management of water (e.g. heating and cooling) across all industries

Device properties

- Accuracy Class 2 according to international approvals such as MI-004, EN 1434, OIML R75
- Entire sensor housing made of stainless steel
- Process temperatures up to 150 °C (302 °F)
- Certified pulse output
- Cost-efficient, application-optimized transmitter

Your benefits

- Full compliance with custody transfer regulations
- Long-term stability – reliable sensor with robust industrial design
- Energy and cost savings – optimized sensor for fully insulated pipes
- Dependable flow measurement – high turndown
- Effortless, safe operation – no commissioning needed, no unauthorized device access due to locked pulse output
- Simple process indication – direct reading of status information via color LEDs
- Increased reliability – comprehensive diagnostics

Endress+Hauser
People for Process Automation

Table of contents

About this document

Symbols used

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.
⊜	**Protective Earth (PE)** A terminal which must be connected to ground prior to establishing any other connections. The ground terminals are situated inside and outside the device: ▪ Inner ground terminal: Connects the protectiv earth to the mains supply. ▪ Outer ground terminal: Connects the device 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.
ℹ	**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
EX	Hazardous area
EX	Safe area (non-hazardous area)
≈➡	Flow direction

Function and system design

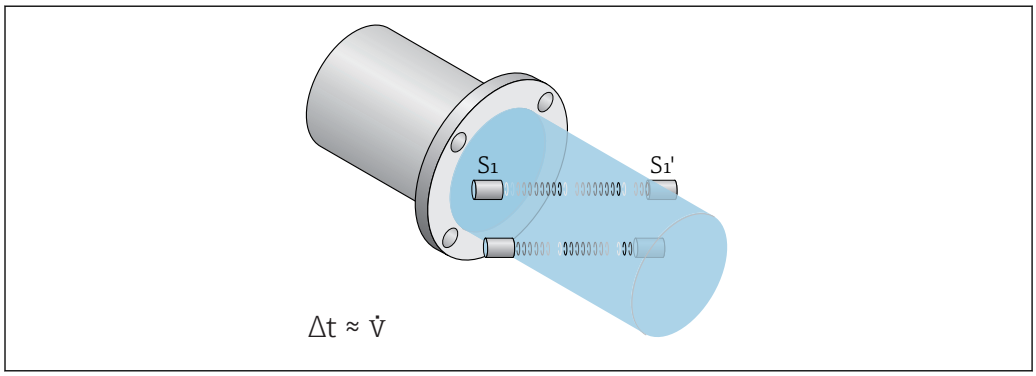
Measuring principle

The measuring device measures the flow velocity in the measuring tube based on an offset arrangement of ultrasonic sensors downstream. The design is non-invasive and does not have any moving parts.

The flow signal is established by alternating an acoustic signal between the sensor pairs and measuring the transit time of each transmission. Then utilizing the fact that sound travels faster with the flow versus against the flow, this differential time (D T) can be used to determine the fluids velocity between the sensors.

The volume flow rate is established by combining all the flow velocities determined by the sensor pairs with the cross sectional area of the meter body and extensive knowledge about fluid flow dynamics. The design of the sensors and their position ensures that only a short straight run of pipe upstream of the meter is required after typical flow obstructions such as bends in one or two planes.

Advance digital signal processing facilitates constant validation of the flow measurement reducing susceptibility to multiphase flow conditions and increases the reliability of the measurement.



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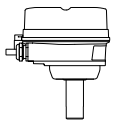
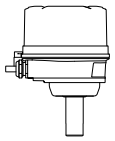
Measuring system

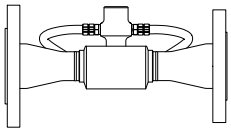
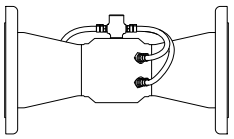
The device consists of a transmitter and a sensor.

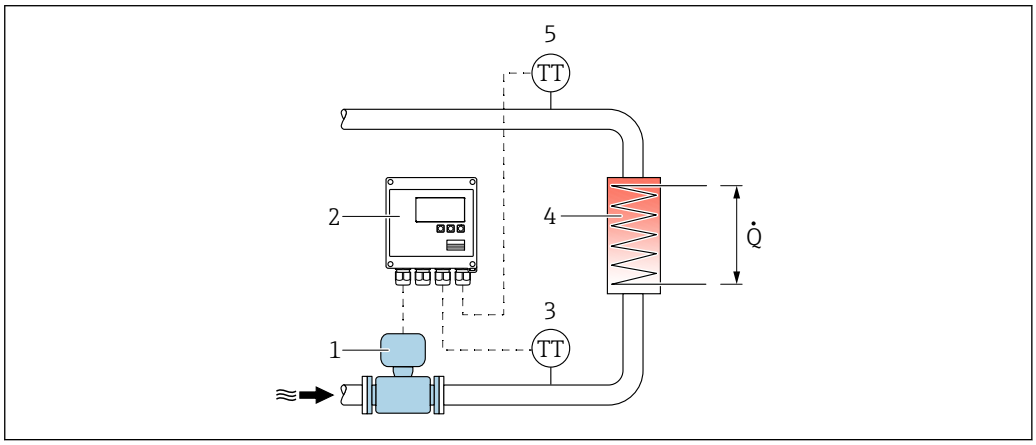
The device is available as a compact version:
The transmitter and sensor form a mechanical unit.

Transmitter

Prosonic Flow Heat  A0034558  A0034559	Device versions and materials: ▪ Compact, aluminum, coated: Aluminum, AlSi10Mg, coated ▪ Compact, aluminum, coated + window (high cover): Aluminum, AlSi10Mg, coated

Sensor

Prosonic Flow E *Single-path version:* *DN 50 to 150(2 to 6")*  A0034556 *Two-path version:* *DN 100 to 150(4 to 6")*  A0034557	▪ Designed exclusively to measure: – Water – Hot water ▪ Range of nominal diameter: DN 50 to 150 (2 to 6") ▪ Materials: – Measuring tube: Stainless steel, 1.4301 (F304) – Cones: Stainless steel, 1.4301 (F304) – Ultrasonic sensors: Stainless steel: 1.4301 (F304) – Smooth flange: Stainless steel: 1.4571 (316Ti) – Slip-on flange: Stainless steel: 1.4404 (F316L) – Lap joint flange: Steel: 1.0038 (S235JR) Stainless steel: 1.4306 (F304L), 1.4307 (F304L) – Lap joint flange: Steel: A105 Stainless steel: 1.4404 (F316L) – Lap joint flange, stamped plate: Steel: 1.0038 (S235JR) Stainless steel: 1.4301 (F304)



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1 *Heat and cooling meter measuring system*

1 *Measuring device*
2 *Heat and cooling meter EngyCal® RH33*
3 *Paired temperature sensors*
4 *Heat exchanger*
5 *Paired temperature sensors*

Safety

IT security

We only provide a warranty if the device is installed and used as described in the Operating Instructions. The device is equipped with security mechanisms to protect it against any inadvertent changes to the device settings.

IT security measures in line with operators' security standards and designed to provide additional protection for the device and device data transfer must be implemented by the operators themselves.

Input

Measured variable

Direct measured variables

- Flow velocity
- Medium temperature
- Sound velocity

Calculated measured variables

- Volume flow
- Mass flow

Measuring range

Typically v = 0 to 5 m/s (0 to 16.4 ft/s) with the specified accuracy

Flow characteristic values in SI units

Nominal diameter		Recommended flow			Factory settings	
		q_i [1]	q_p [2]	q_s [3]	Pulse value	Low flow cut off (v ~ 0.1 m/s)
[mm]	[in]	[m³/h]	[m³/h]	[m³/h]	[dm³/pulse]	[dm³/min]
50	2	0.15	15	30	3	0
65	2 ½	0.25	25	50	4	0
80	3	0.40	40	80	6	0
100	4	0.60	60	120	10	0
150	6	1.50	150	300	25	0

1) q_i: Minimum flow rate = Lowest flow rate at which the flowmeter operates within the limits of error in legal metrology
2) q_p: Permanent flow rate = Highest flow rate at which the flowmeter operates within the limits of error in legal metrology
3) q_s: Maximum flow rate = Highest flow rate

Flow characteristic values in US units

Nominal diameter		Recommended flow			Factory settings	
		q_i	q_p	q_s	Pulse value	Low flow cut off (v ~ 0.1 m/s)
[in]	[mm]	[gal/min]	[gal/min]	[gal/min]	[gal/pulse]	[gal/min]
2	50	0.66	66	132	0.8	0
2 ½	65	1.10	110	220	1.1	0
3	80	1.76	176	352	1.6	0
4	100	2.64	264	528	2.6	0
6	150	6.60	660	1320	6.6	0

To calculate the measuring range, use the *Applicator* sizing tool → 30

Recommended measuring range

"Flow limit" section → 18

For custody transfer, the applicable approval determines the permitted measuring range, the pulse value and the low flow cut off.

Operable flow range

≥ 200:1

The operable flow range is q_p/q_i = 100:1 in custody transfer mode.

Output

Output signal

Pulse output

Custody transfer version (order code for "Output", option P "Pulse output")

Function	Available as pulse output
Version	Passive, open collector in accordance with EN 1434-2 Class OB and Class OC
Maximum input values	▪ DC30 V ▪ 25 mA
Voltage drop	For 25 mA: ≤ DC 2 V
Pulse output	
Pulse width	Adjustable: 0.05 to 2 000 ms
Maximum pulse rate	10 000 Impulse/s
Pulse value	Preset (see measuring range → 🖹 6) Cannot be edited in the case of "Custody transfer approval" order code, option **AB**, **AC**, **CA** or **DA**
Assignable measured variables	Volume flow

Write-protected in custody transfer mode.

Pulse/frequency output

Non-custody transfer version (order code for "Output", option K "Pulse/frequency output")

Function	Can be configured either for pulse or frequency output
Version	Passive, open collector
Maximum input values	▪ DC30 V ▪ 25 mA
Voltage drop	For 25 mA: ≤ DC 2 V
Pulse output	
Pulse width	Adjustable: 0.05 to 2 000 ms
Maximum pulse rate	10 000 Impulse/s
Pulse value	Adjustable
Assignable measured variables	▪ Volume flow ▪ Mass flow
Frequency output	
Output frequency	Adjustable: 0 to 10 000 Hz
Damping	Adjustable: 0 to 999 s
Pulse/pause ratio	1:1
Assignable measured variables	▪ Volume flow ▪ Mass flow ▪ Sound velocity ▪ Flow velocity ▪ Temperature

Signal on alarm

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

Pulse output

Custody transfer version (order code for "Output", option P "Pulse output")

Pulse output	
Failure mode	No pulses

Pulse/frequency output

Non-custody transfer version (order code for "Output", option K "Pulse/frequency output")

Pulse output	
Failure mode	Choose from: ▪ Actual value ▪ No pulses
Frequency output	
Failure mode	Choose from: ▪ Actual value ▪ 0 Hz ▪ Defined value: 0 to 12 500 Hz

Interface/protocol

Via service interface CDI-RJ45

Write-protected in custody transfer mode.

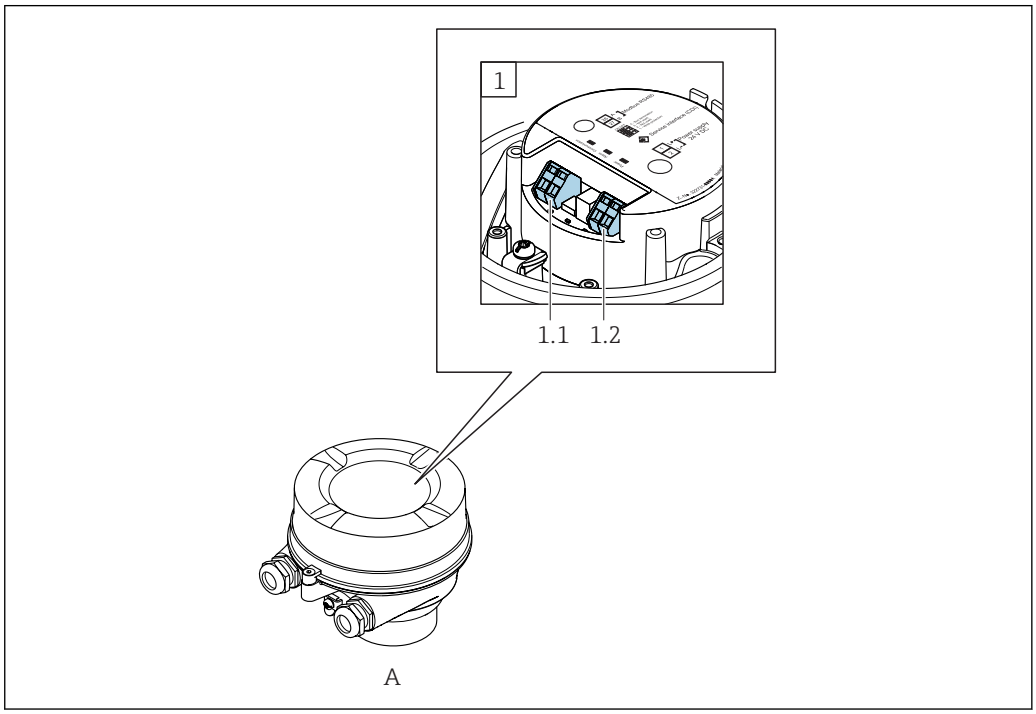
Light emitting diodes (LED)

Status information	Status indicated by various light emitting diodes The following information is displayed depending on the device version: ▪ Supply voltage active ▪ Device alarm/error has occurred

Power supply

Terminal assignment

Overview: housing version and connection versions



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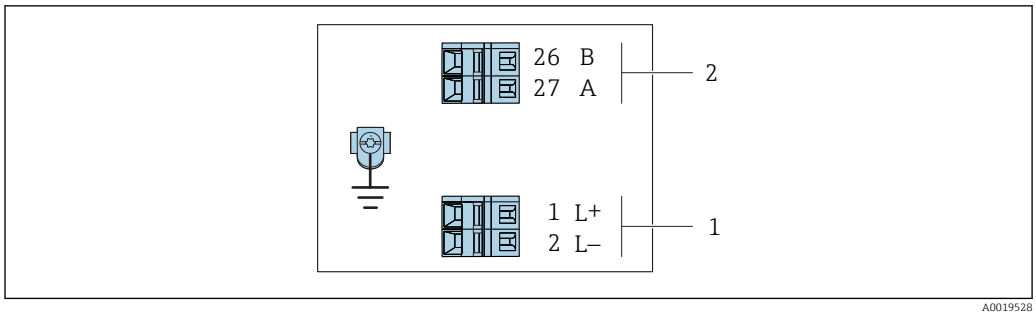
A Housing version: compact, aluminum coated
1 Pulse output (order code for "Output", option P "Pulse output") or pulse/frequency output (order code for "Output", option K "Pulse/frequency output")
1.1 Signal transmission: Pulse output (order code for "Output", option P "Pulse output") or pulse/frequency output (order code for "Output", option K "Pulse/frequency output")
1.2 Supply voltage

Transmitter

Pulse output connection version

Order code for "Output", option **P**

Order code for "Housing"	Connection methods available		Possible selection order code for "Electrical connection"
	Outputs	Power supply	
Option **A**	Terminals	Terminals	▪ Option **A**: coupling M20x1 ▪ Option **B**: thread M20x1 ▪ Option **C**: thread G ½" ▪ Option **D**: thread NPT ½"
Option **B**	Terminals	Terminals	▪ Option **A**: coupling M20x1 ▪ Option **B**: thread M20x1 ▪ Option **C**: thread G ½" ▪ Option **D**: thread NPT ½"
Order code for "Housing": ▪ Option **A**: Compact, aluminum, coated ▪ Option **B**: Compact, aluminum, coated + window			



2 *Pulse output terminal assignment*

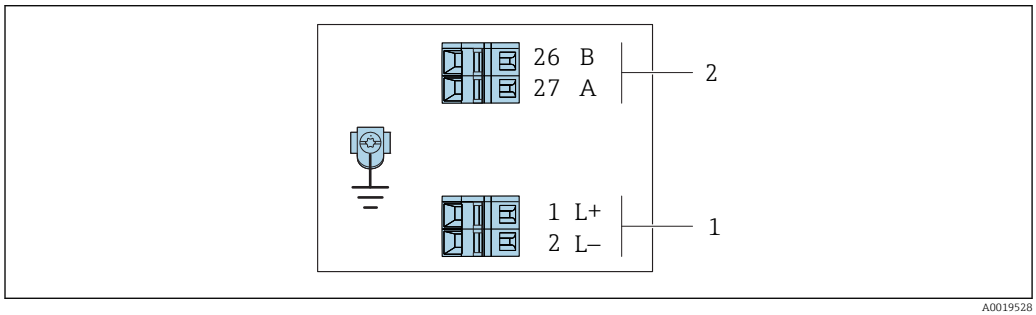
1 Power supply: DC 24 V
2 Pulse output

Order code for "Output"	Terminal number			
	Power supply		Output	
	1 (L+)	2 (L-)	26 (B)	27 (A)
Option **P**	DC 24 V		Pulse output	
Order code for "Output", option **P**: Pulse output				

Pulse/frequency output connection version

Order code for "Output", option **K**

Order code for "Housing"	Connection methods available		Possible selection order code for "Electrical connection"
	Outputs	Power supply	
Option **A**	Terminals	Terminals	▪ Option **A**: coupling M20x1 ▪ Option **B**: thread M20x1 ▪ Option **C**: thread G ½" ▪ Option **D**: thread NPT ½"
Option **B**	Terminals	Terminals	▪ Option **A**: coupling M20x1 ▪ Option **B**: thread M20x1 ▪ Option **C**: thread G ½" ▪ Option **D**: thread NPT ½"
Order code for "Housing": ▪ Option **A**: Compact, aluminum, coated ▪ Option **B**: Compact, aluminum, coated + window			



3 *Pulse/frequency output terminal assignment*

1 Power supply: DC 24 V
2 Pulse/frequency output

Order code for "Output"	Terminal number			
	Power supply		Output	
	1 (L+)	2 (L-)	26 (B)	27 (A)
Option **K**	DC 24 V		Pulse/frequency output	
Order code for "Output", option **K**: Pulse/frequency output				

Supply voltage

Transmitter

- Pulse output (order code for "Output", option **P**): DC 12 to 42 V
- Pulse/frequency output (order code for "Output", option **K**): DC 12 to 42 V

Power consumption

Transmitter

Order code for "Output"	Maximum power consumption
Option **P**: Pulse output	2.0 W
Option **K**: Pulse/frequency output	2.0 W

Current consumption

Transmitter

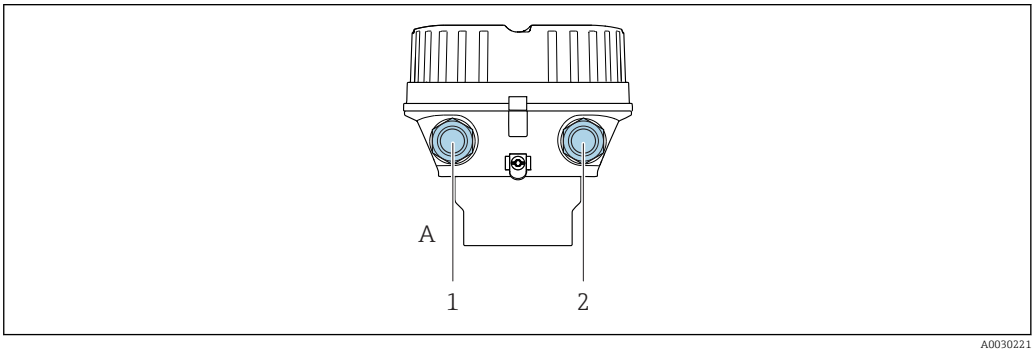
Order code for "Output"	Maximum current consumption	Maximum switch-on current
Option **P**: Pulse output	200 mA	30 A (< 0.2 ms)
Option **K**: Pulse/frequency output	200 mA	30 A (< 0.2 ms)

Power supply failure

Depending on the device version, the configuration is retained in the device memory.

Electrical connection

Connecting the transmitter



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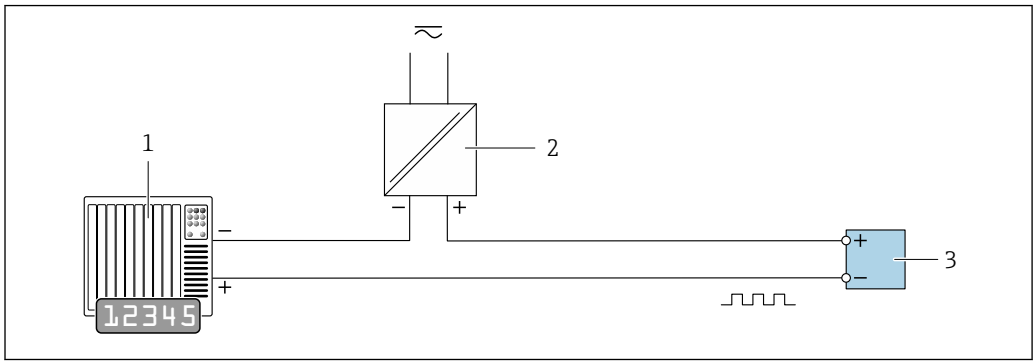
A Housing version: compact, aluminum coated
1 Cable entry for signal transmission
2 Cable entry for supply voltage

Terminal assignment→ 9

Connection examples

Pulse/frequency output



4 *Connection example for pulse/frequency output (passive)*

1 Automation system with pulse/frequency input (e.g. PLC)
2 Power supply
3 Transmitter: Observe input values → 7

Potential equalization

Requirements

Company-internal grounding concepts

Terminals

Transmitter
Spring terminals for wire cross-sections: 0.5 to 2.5 mm² (20 to 14 AWG)

Cable entries

- Cable gland: M20 × 1.5 with cable Ø 6 to 12 mm (0.24 to 0.47 in)
- Thread for cable entry:
  - M20
  - G ½"
  - NPT ½"

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.

Power supply cable

Standard installation cable is sufficient.

Signal cable

Pulse/frequency output

Standard installation cable is sufficient.

Performance characteristics

reference operating conditions

- Error limits following DIN EN 29104, in future ISO 20456
- Water with +15 to +45 °C (+59 to +113 °F) at2 to 6 bar (29 to 87 psi)
- Data as indicated in the calibration protocol
- Accuracy based on accredited calibration rigs according to ISO 17025

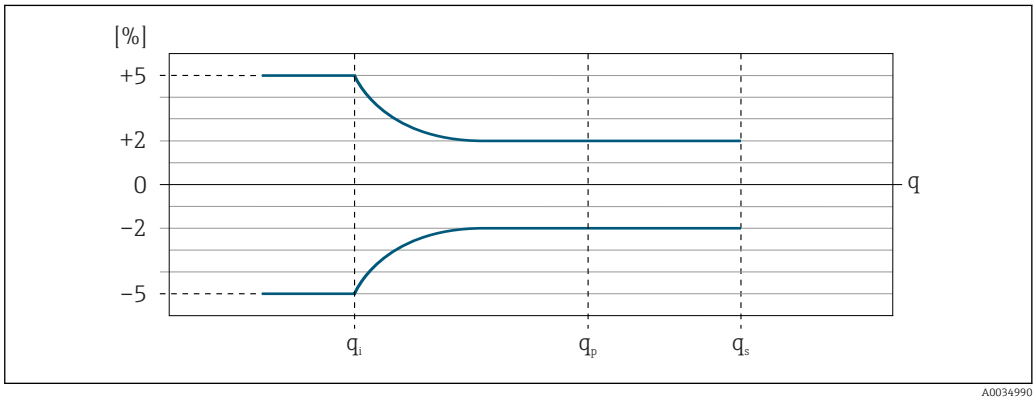
Maximum measured error

Error limits under reference operating conditions

q_i = Minimum flow rate; q_p = Permanent flow rate; q_s = Maximum flow rate

Volume flow
Measured error in accordance with MI-004 Class 2 [%]: ±(2 + 0.02 * q_p/q), limited to ±5 %, where q_p represents the permanent flow rate specified in the Section "Measuring ranges" (→ 🖹 6) that depends on the nominal diameter, and q represents the current flow rate.

- Fluctuations in the supply voltage do not have any effect within the specified range.
- Temperature accuracy: ±2 °C (±3.8 °F)



5 *Error curve in accordance with MI-004 Class 2*

Accuracy of outputs

The outputs have the following base accuracy specifications.

Pulse/frequency output

o.r. = of reading

Accuracy	Max. ±50 ppm o.r. (over the entire ambient temperature range)

Repeatability

o.r. = of reading

Volume flow
±0.1 % o.r.

Influence of ambient temperature

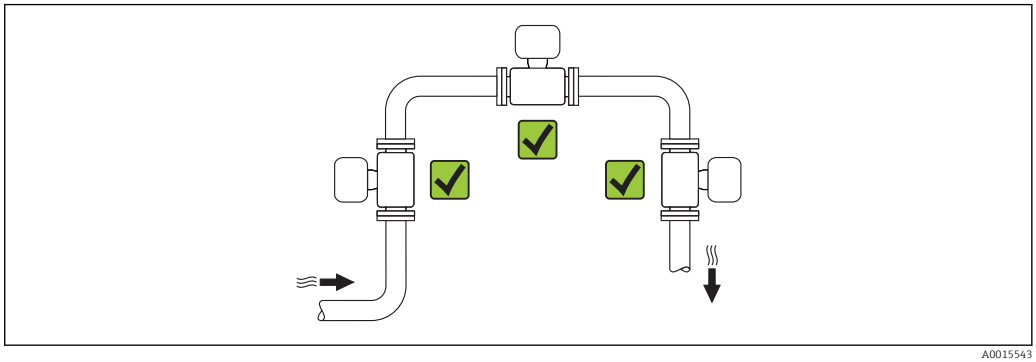
Pulse/frequency output

Temperature coefficient	No additional effect. Included in accuracy.

Installation

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

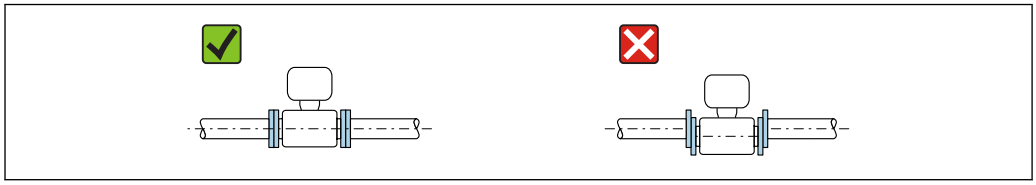
Mounting location



Orientation

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

- Install the measuring device in a parallel plane free of external mechanical stress.
- The internal diameter of the pipe must match the internal diameter of the sensor .



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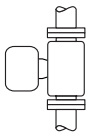
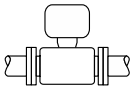
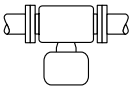
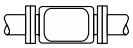
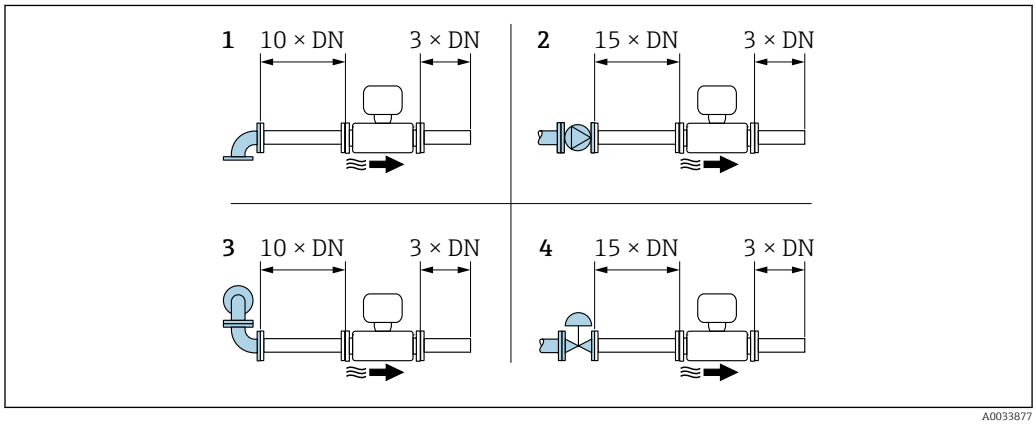
Orientation			Compact version
A	Vertical orientation	 A0015545	✓✓
B	Horizontal orientation, transmitter head up	 A0015589	✓✓
C	Horizontal orientation, transmitter head down	 A0015590	✓
D	Horizontal orientation, transmitter head at side	 A0015592	✗

Inlet and outlet runs

If possible, the sensor should be installed upstream from valves, T-pieces, elbows etc. To attain the specified level of accuracy of the measuring device, the below mentioned inlet and outlet runs must be maintained at minimum. If there are several flow disturbances present, the longest specified inlet run must be maintained.



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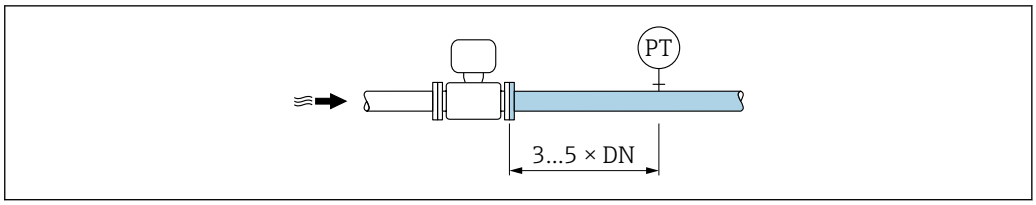
6 *Minimum inlet and outlet runs with various flow obstructions*

1 *90 ° elbow or T-section*
2 *Pump*
3 *2 × 90 ° elbow, 3-dimensional*
4 *Control valve*

Outlet runs when installing external devices

If installing an external device, observe the specified distance.



PT Pressure

Environment

Ambient temperature range

Transmitter	–25 to +55 °C (–13 to +131 °F) as per EN 1434 environmental class B
Sensor	–25 to +55 °C (–13 to +131 °F) as per EN 1434 environmental class B

- If operating outdoors:
  Avoid direct sunlight, particularly in warm climatic regions.

Storage temperature

All components:
–50 to +80 °C (–58 to +176 °F), preferably at +20 °C (+68 °F)

Degree of protection

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

Shock resistance

Shock due to rough handling following IEC 60068-2-31 as per EN 1434 Mechanical environmental class M2

Vibration resistance

- Oscillation, sinusoidal, following IEC 60068-2-6 as per EN 1434 Mechanical environmental class M2
  - 2 to 8.4 Hz, 3.5 mm peak
  - 8.4 to 500 Hz, 1 g peak
- Oscillation, broadband noise following IEC 60068-2-64 as per EN 1434 Mechanical environmental class M2
  - 10 to 200 Hz, 0.003 g^2/Hz
  - 200 to 2 000 Hz, 0.001 g^2/Hz
  - Total: 1.54 g rms

Electromagnetic compatibility (EMC)

- As per IEC/EN 61326-1, IEC/EN 61326-2-3 and NAMUR Recommendation 21 (NE 21)
- Complies with emission limits for industry as per EN 55011 (Class A)
- Electromagnetic environmental class as per EN 1434 environmental class B

Details are provided in the Declaration of Conformity.

Process

Medium temperature range

Sensor

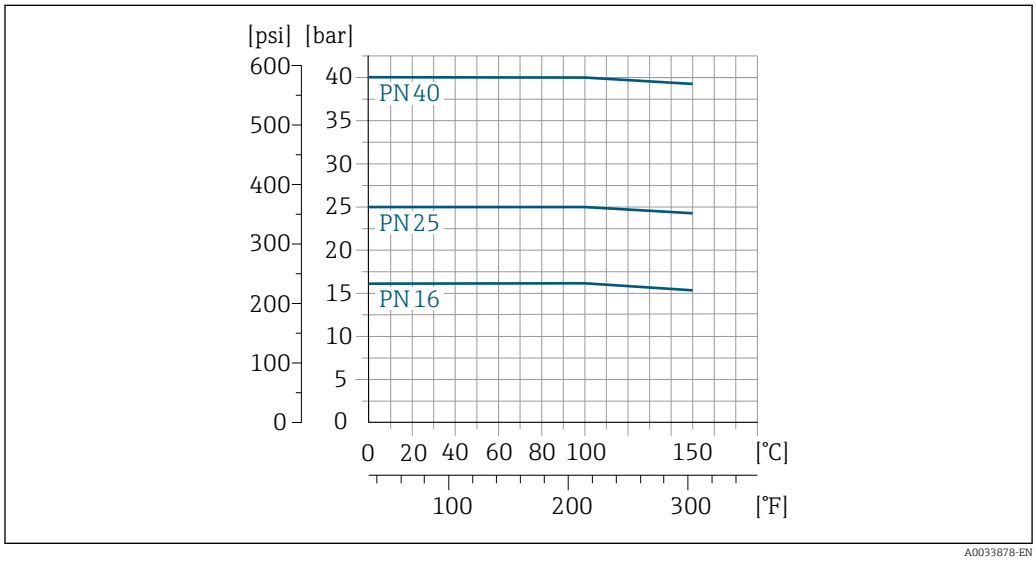
+0 to +150 °C (+32 to +302 °F)

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.

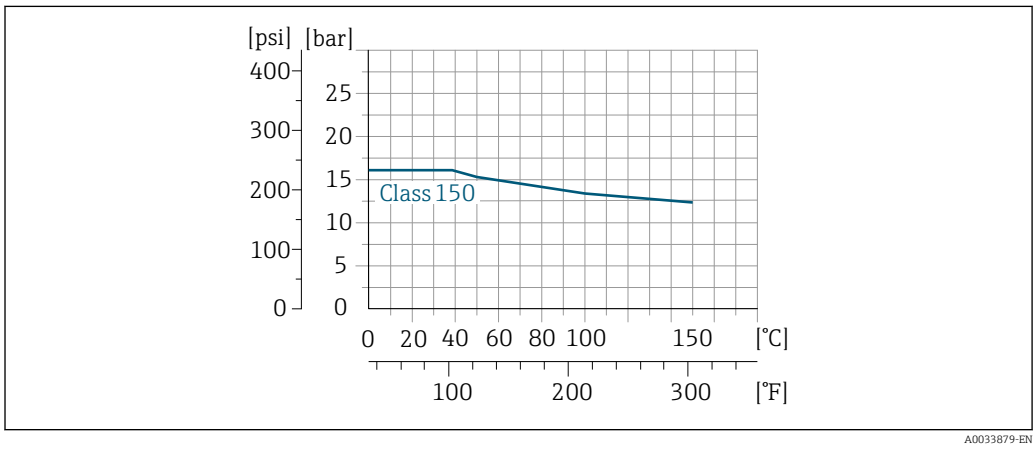
Process connections with carbon steel flange material are subject to the following minimum process temperatures:
- As per EN 1092: −10 °C (+14 °F)
- As per ASME: −29 °C (−20 °F)

Smooth flange DIN EN 1092-1Type 01Shape B1, PN 16/25/40



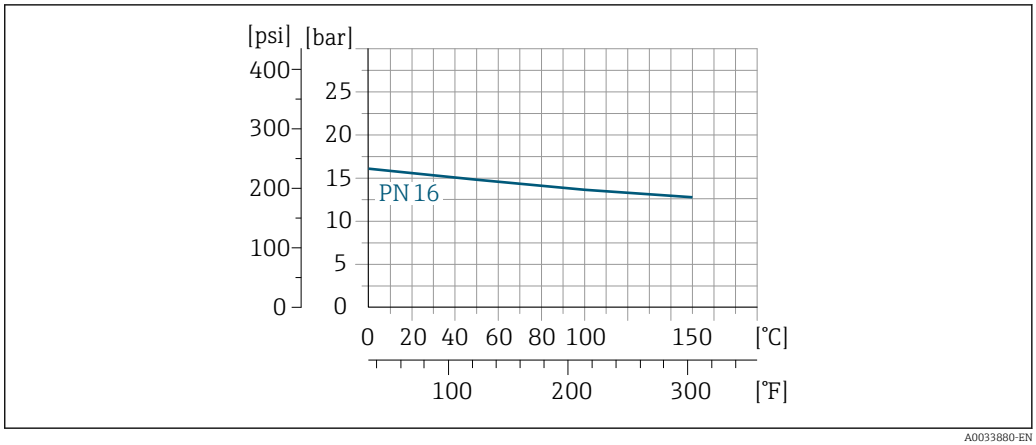
7 With flange material 1.4571 (316Ti)

Slip-on flange following ASME B16.5, class 150

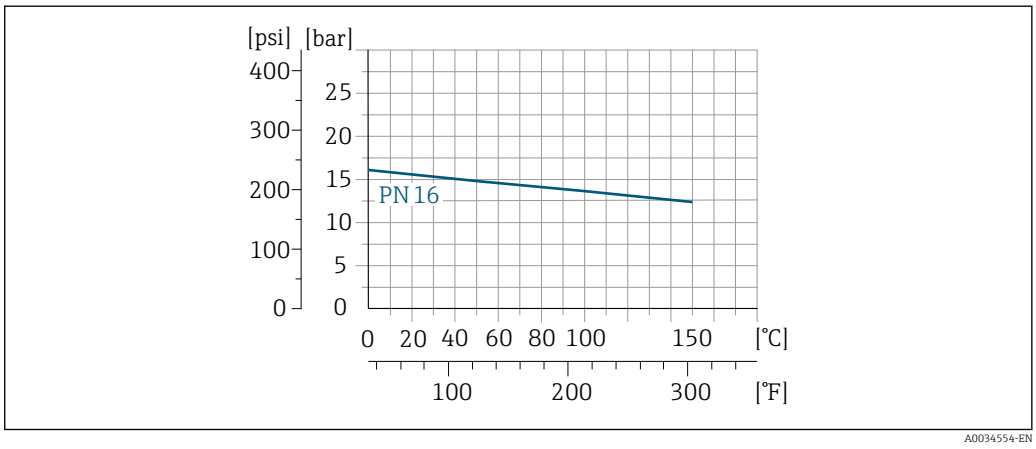


8 With flange material 1.4404 (F316L)

Lap joint flange DIN EN 1092-1Type 02Shape A, PN 16

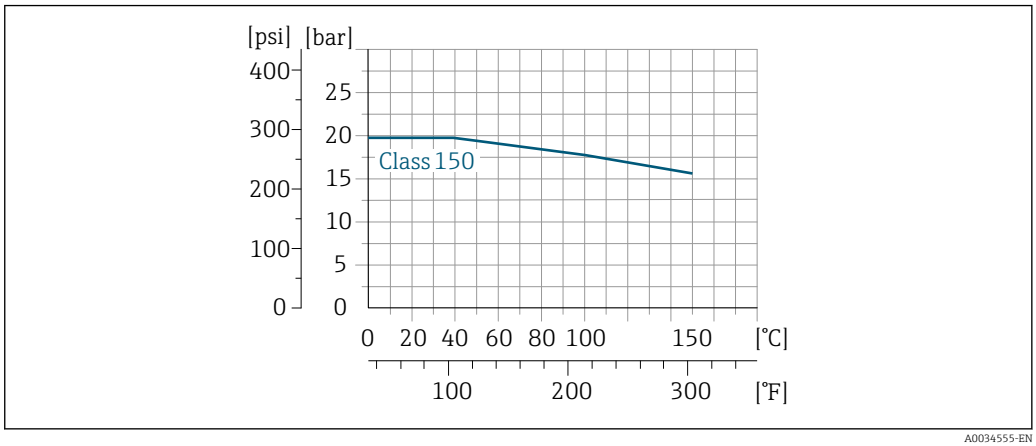


9 *With flange material 1.0038 (S235JR); minimum process temperature* → 16



10 *With flange material 1.4306 (F304L) and 1.4307 (F304L)*

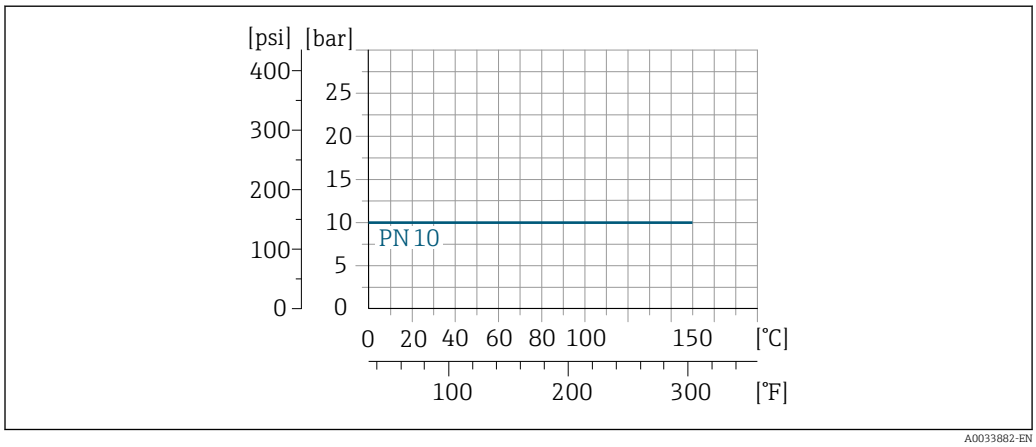
Lap joint flange following ASME B16.5, class 150



11 *With flange material A105; minimum process temperature* → 16

12 With flange material 1.4404 (F316L)

Lap joint flange, stamped plate following EN 1092-1(DIN 2501), PN 10



13 With flange material 1.0038 (S235JR) and 1.4301 (F304); minimum process temperature → 16

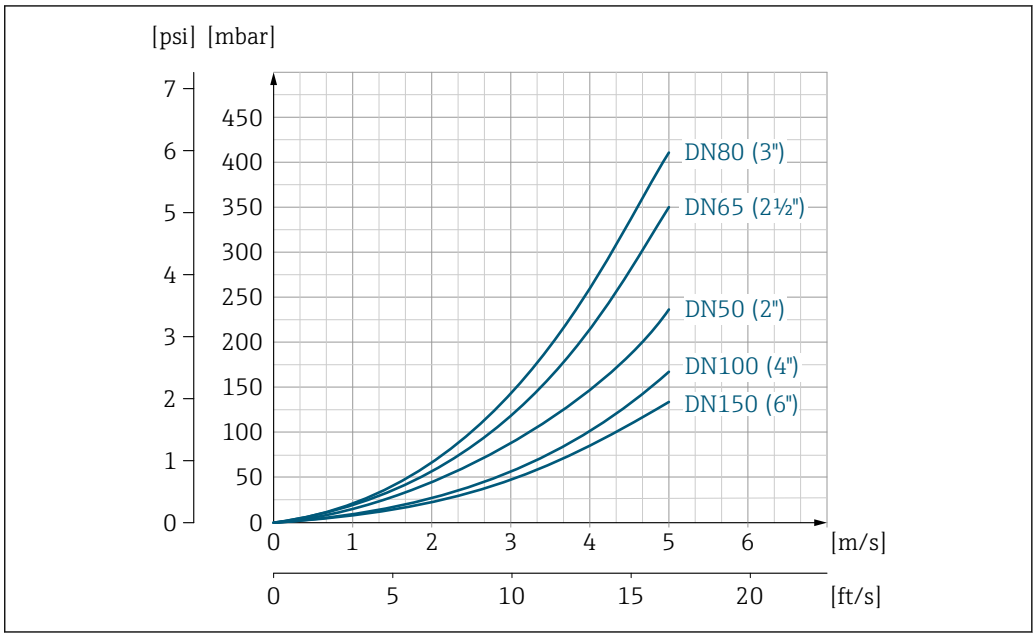
Flow limit

Select the nominal diameter by optimizing between the required flow range and permissible pressure loss.

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

- The minimum recommended full scale value is approx. 1/20 of the maximum full scale value.
- In most applications, 10 to 50 % of the maximum full scale value can be considered ideal.

Pressure loss



14 *Pressure loss DN 50 to 150 (2 to 6")*

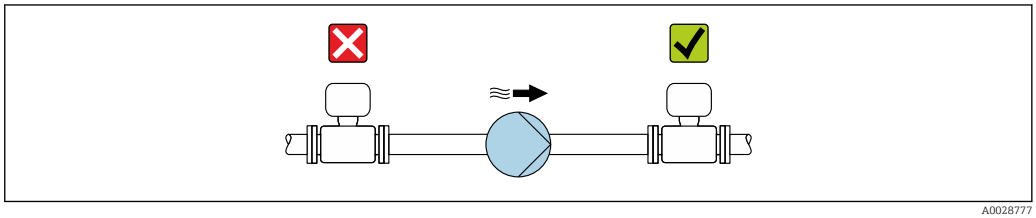
The maximum pressure loss at permanent flow rate q_p is less than the permitted 250 mbar for all nominal diameters in accordance with EN 1434-1.

To calculate the pressure loss, use the *Applicator* sizing tool → 30

System pressure

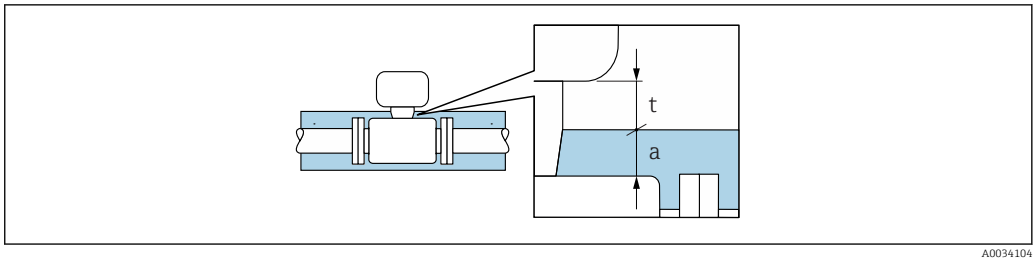
It is important that cavitation does not occur, or that gases entrained in the liquids do not outgas. This is prevented by means of a sufficiently high system pressure.

For this reason, the following mounting locations are recommended:
- At the lowest point in a vertical pipe
- Downstream from pumps (no danger of vacuum)



Thermal insulation

In the case of some fluids, it is important to keep the heat radiated from the sensor to the transmitter to a low level. A wide range of materials can be used for the required insulation.



t *Maximum insulation thickness 2 cm (0.79 in)*
a *Minimum distance from transmitter to insulation*

Custody transfer mode

National rules or regulations must be observed when performing custody transfer.

Product description

The measuring device is tested in accordance with EN 1434/OIML R75 (www.oiml.org) and has an EU type-examination certificate according to Measuring Instruments Directive 2014/32/EU (MID) for service subject to legal metrological control ("custody transfer") in heat counters (Annex VI).

It is used with a pulse output that is subject to legal metrology controls.

The pulse output counts flow components in a positive (forwards) flow direction.

Generally a measuring device subject to legal metrological control is secured against tampering by seals on the transmitter or sensor. Usually, these seals may be broken only by an authorized representative of the responsible authority for legal metrology controls.

Europe

Since the European Measuring Instruments Directive 2004/22/EC came into effect on 01 November 2006 and was replaced by 2014/32/EU on 20 April 2016, meters with the relevant marking can be placed on the market across the borders of all EU member states that have ratified the requirements of Annex VI (MI-004) of the European Measuring Instruments Directive and incorporated them into national law.

The associated Declaration of Conformity for the measuring device, as per the European Measuring Instruments Directive 2014/32/EC, was made in accordance with Modules B+D:
- Module B: Type examination as per EN 1434/OIML R75.
- Module D: Declaration of type conformity based on quality assurance of the production process.

With the entry into force of the revised European Measuring Instruments Directive 2014/32/EU on 20 April 2016, all certificates issued under Directive 2004/22/EC will remain valid until their regular expiry date. As a result of this transitional system, various certificates and documents pertaining to the same device can make reference to different versions of the European Measuring Instruments Directive. This does not compromise the conformity of the measuring device in any way.

Outside Europe

Detailed ordering information for national approvals based on OIML R75 is available from your local Endress+Hauser sales center.

As-delivered state

Europe

Measuring devices according to type-examination certificate as per Measuring Instruments Directive 2014/32/EU, Annex VI (MI-004) are delivered with custody transfer mode enabled and thus in a locked state. Changes to the measuring device's custody transfer-related configuration may only be made by specially qualified Endress+Hauser service technicians or by authorized representatives of the local authority responsible for legal metrology controls.

Outside Europe

Measuring devices according to the Declaration of Conformity as per OIML R75 are not supplied in a locked state. The customer is expected to place the measuring device on the market with the involvement of the competent national authority for legal metrology controls and correctly implement the locally applicable requirements as regards the locking and sealing of the measuring device. The authorized representative of the national authority for legal metrology controls is responsible for any information required in this regard.

Repeated calibration due to legal metrology controls

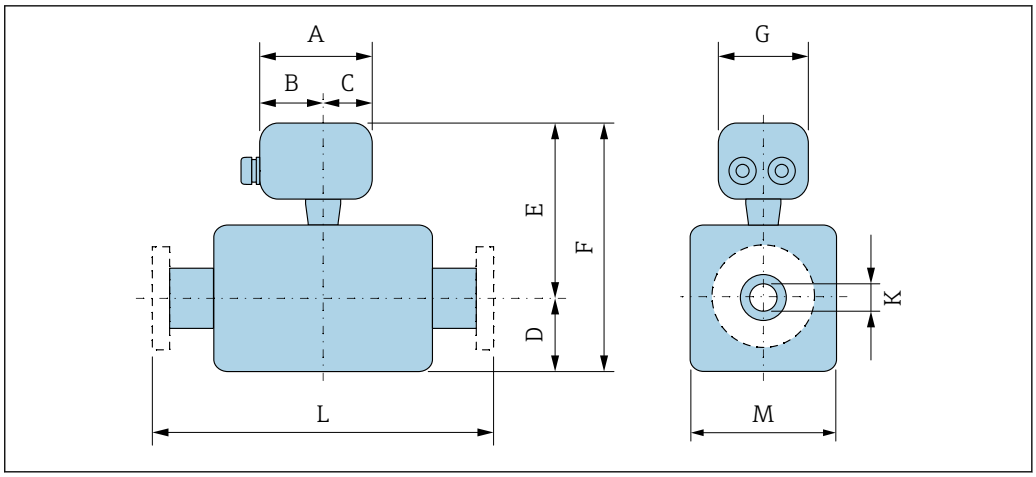
The system operator is obliged to perform a recalibration in accordance with the relevant applicable national regulations.

Mechanical construction

Dimensions in SI units

Compact version

Order code for "Housing", options A "Compact, aluminum, coated"



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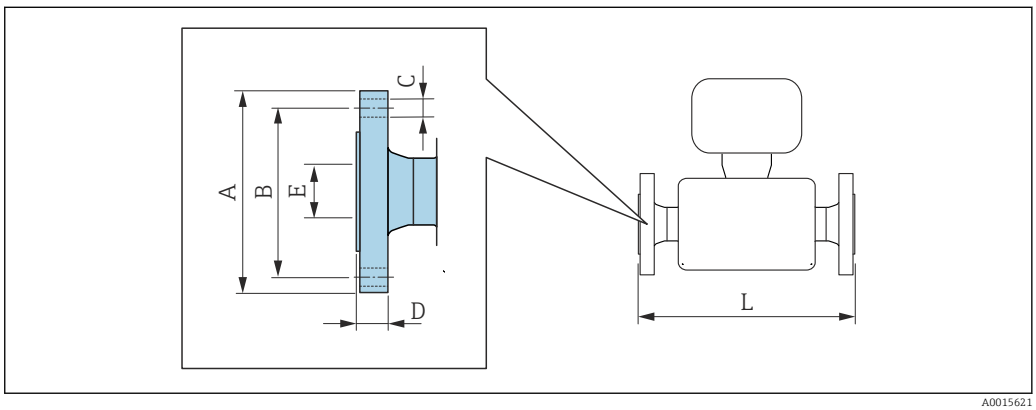
DN [mm]	A [mm]	B [mm]	C [mm]	D [mm]	E [1] [mm]	F [1] [mm]	G [mm]	K [2] [mm]	L [mm]	M [mm]
50	136	82	54	82.5	233.5	316	136	35	[3]	61.5
65	136	82	54	92.5	238	330.5	136	43.8	[3]	71
80	136	82	54	100	241	341	136	49.3	[3]	76.5
100	136	82	54	117.5	258.5	376	136	75	[3]	110
150	136	82	54	150	276.5	426.5	136	110.3	[3]	145

1) When using a viewing window (order code for "Housing", option B): Values +28 mm
2) Tolerance: ±2 mm
3) Dependent on respective process connection

Flange connections

Fixed flange



A0015621

Smooth flange DIN EN 1092-1 Type 01 Shape B1, PN 16/25/40 *1.4571 (316Ti): Order code for "Process connection", option D51, D52, D53*							
DN [mm]	Pressure rating PN	A [mm]	B [mm]	C [mm]	D [mm]	E [1] [mm]	L [mm]
50	40	165	125	4 × 18	20	56.3	300 [2]
65	16/25	185	145	8 × 18	20/22	72.1	300 [2]
80	16/25	200	160	8 × 18	20/24	84.5	350 [3]

Smooth flange DIN EN 1092-1 Type 01 Shape B1, PN 16/25/40
1.4571 (316Ti): Order code for "Process connection", option D51, D52, D53

DN [mm]	Pressure rating PN	A [mm]	B [mm]	C [mm]	D [mm]	E [1] [mm]	L [mm]
100	16/25	220/235	180/190	8 × 18/22	22/26	110.3	350 [3]
150	16/25	285/300	240/250	8 × 22/26	24/30	164.3	500 [3]

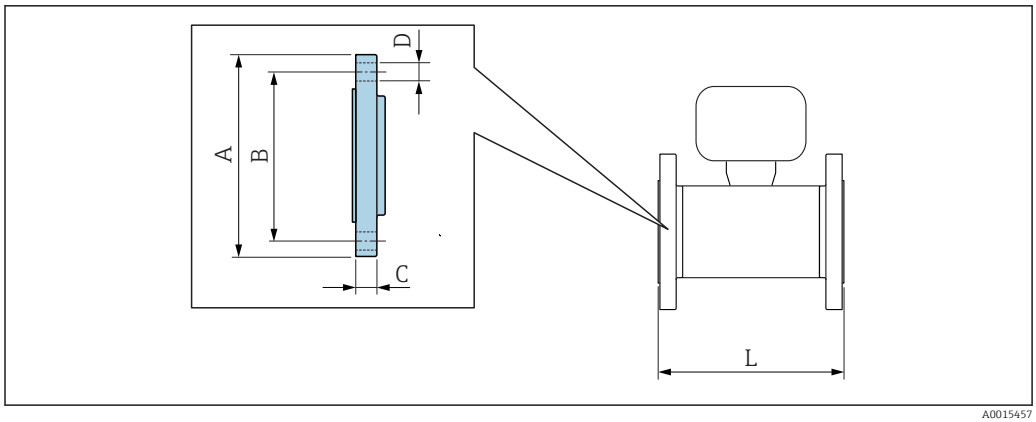
1) Tolerance: ±2 mm
2) Tolerance: 0/-2 mm
3) Tolerance: 0/-3 mm

Slip-on flange following ASME B16.5: Class 150
1.4404 (F316L): Order code for "Process connection", option A1S

DN [mm]	A [mm]	B [mm]	C [mm]	D [mm]	E [1] [mm]	L [mm]
50	152.4	120.7	4 × 19.1	25.4	56.3	300 [2]
80	190.5	152.4	4 × 19.1	30.2	84.5	350 [3]
100	228.6	190.5	8 × 19.1	33.3	110.3	350 [3]
150	279.4	241.3	8 × 22.4	39.6	164.3	500 [3]

1) Tolerance: ±2 mm
2) Tolerance: 0/-2 mm
3) Tolerance: 0/-3 mm

Lap joint flange



A0015457

Lap joint flange DIN EN 1092-1 Type 02 Shape A: PN 16
1.0038 (S235JR): Order code for "Process connection", option D32
1.4306 (F304L), 1.4307 (F304L): Order code for "Process connection", option D34

DN [mm]	A [mm]	B [mm]	C [mm]	D [mm]	L [mm]
50	165	125	20	4 × 18	300 [1]
65	185	145	20	8 × 18	300 [1]
80	200	160	20	8 × 18	350 [2]
100	220	180	22	8 × 18	350 [2]
150	285	240	24	8 × 22	500 [2]

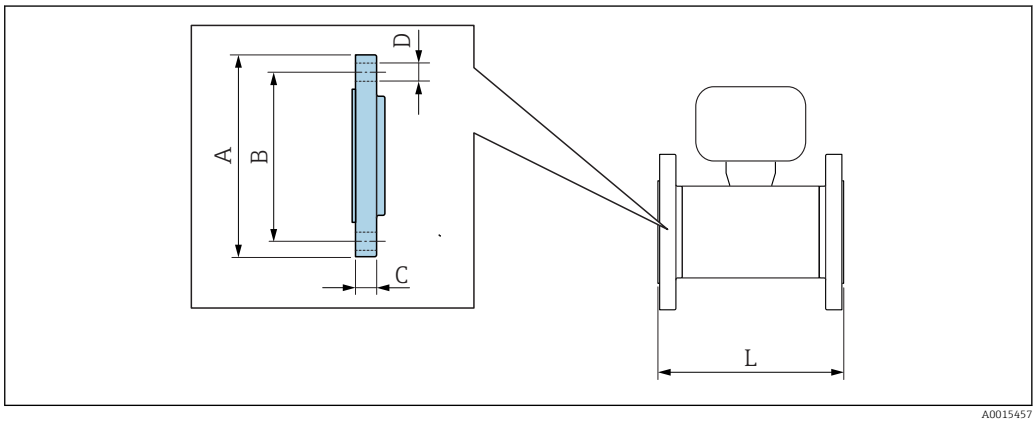
1) Tolerance: 0/-2 mm
2) Tolerance: 0/-3 mm

Lap joint flange following ASME B16.5: Class 150
A105: order code for "Process connection", option A12
1.4404 (F316L): order code for "Process connection", option A14

DN [mm]	A [mm]	B [mm]	C [mm]	D [mm]	L [mm]
50	152.4	120.7	25.4	4 × 19.1	300 [1]
80	190.5	152.4	30.2	4 × 19.1	350 [2]
100	228.6	190.5	33.3	8 × 19.1	350 [2]
150	279.4	241.3	39.6	8 × 22.4	500 [2]

1) Tolerance: 0/-2 mm
2) Tolerance: 0/-3 mm

Lap joint flange, stamped plate



A0015457

Lap joint flange, stamped plate following EN 1092-1 (DIN 2501): PN 10
1.0038 (S235JR): order code for "Process connection", option D21
1.4301 (F304): order code for "Process connection", option D23

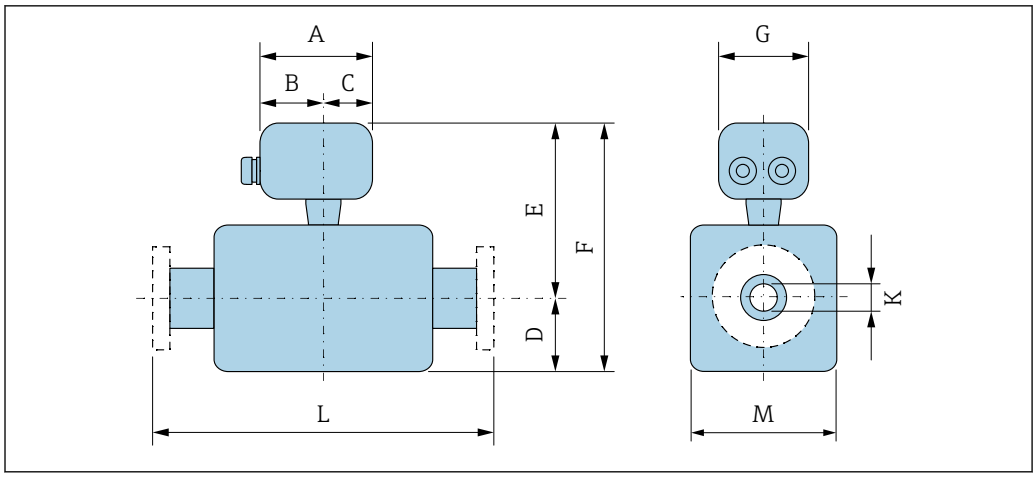
DN [mm]	A [mm]	B [mm]	C [mm]	D [mm]	L [mm]
50	165	125	18.5	4 × 17.5	300 [1]
65	185	145	20.0	4 × 17.5	300 [1]
80	200	160	23.5	8 × 17.5	350 [2]
100	220	180	24.5	8 × 17.5	350 [2]
150	285	240	25.0	8 × 21.5	500 [2]

1) Tolerance: 0/-2 mm
2) Tolerance: 0/-3 mm

Dimensions in US units

Compact version

Order code for "Housing", options A "Compact, aluminum, coated"



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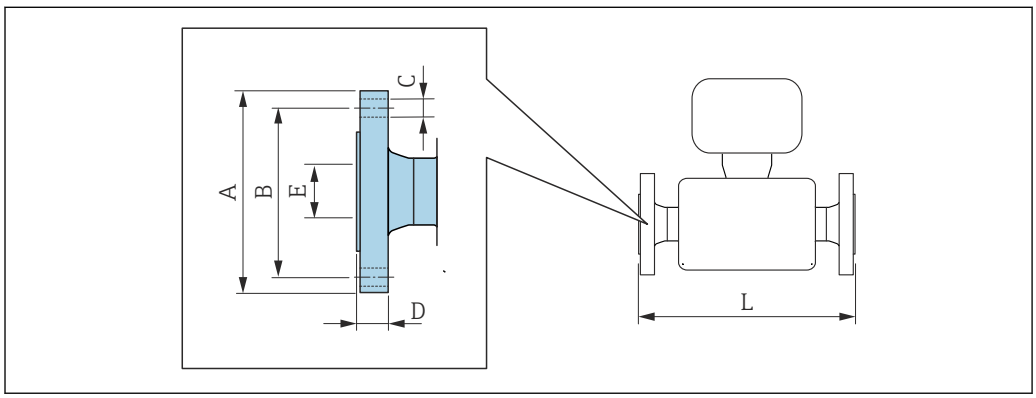
DN [in]	A [in]	B [in]	C [in]	D [in]	E [1] [in]	F [1] [in]	G [in]	K [2] [in]	L [in]	M [in]
2	5.35	3.23	2.13	3.25	9.19	12.4	5.35	1.38	[3]	2.42
2 ½	5.35	3.23	2.13	3.64	9.37	13.0	5.35	1.72	[3]	2.80
3	5.35	3.23	2.13	3.94	9.49	13.4	5.35	1.94	[3]	3.01
4	5.35	3.23	2.13	4.63	10.2	14.8	5.35	2.95	[3]	4.33
6	5.35	3.23	2.13	5.91	10.9	16.8	5.35	4.34	[3]	5.71

1) When using a viewing window (order code for "Housing", option B): Values +1.1 in
2) Tolerance: ±0.08 in
3) Dependent on respective process connection

Flange connections

Fixed flange



A0015621

Slip-on flange following ASME B16.5: Class 150
1.4404 (F316L): Order code for "Process connection", option A1S

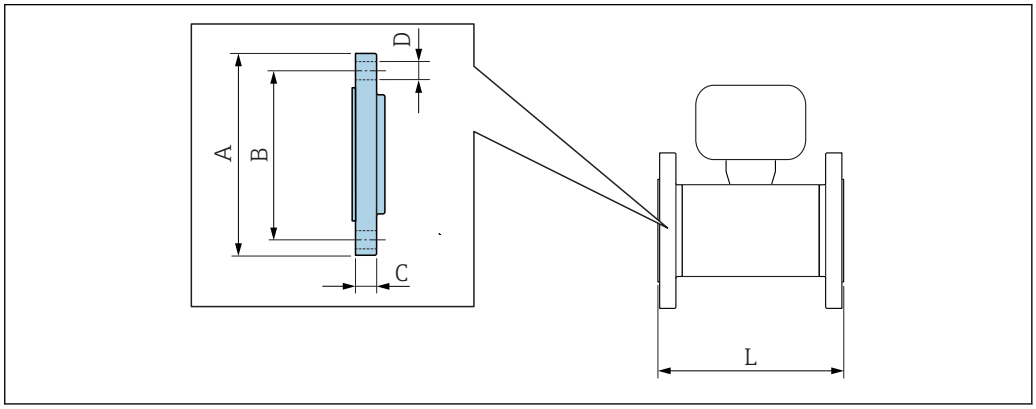
DN [in]	A [in]	B [in]	C [in]	D [in]	E [1] [in]	L [in]
2	6.00	4.75	4 × 0.75	1.00	2.22	11.8 [2]
3	7.50	6.00	4 × 0.75	1.19	3.33	13.8 [3]

Slip-on flange following ASME B16.5: Class 150
1.4404 (F316L): Order code for "Process connection", option A1S

DN [in]	A [in]	B [in]	C [in]	D [in]	E [1] [in]	L [in]
4	9.00	7.50	8 × 0.75	1.31	4.34	13.8 [3]
6	11.0	9.50	8 × 0.88	1.56	6.47	19.7 [3]

1) Tolerance: ±0.08 in
2) Tolerance: 0/-0.08 in
3) Tolerance: 0/-0.12 in

Lap joint flange



A0015457

Lap joint flange following ASME B16.5: Class 150
A105: order code for "Process connection", option A12
1.4404 (F316L): order code for "Process connection", option A14

DN [in]	A [in]	B [in]	C [in]	D [in]	L [in]
2	6.00	4.75	1.00	4 × 0.75	11.8 [1]
3	7.50	6.00	1.19	4 × 0.75	13.8 [2]
4	9.00	7.50	1.31	8 × 0.75	13.8 [2]
6	11.0	9.50	1.56	8 × 0.88	19.7 [2]

1) Tolerance: 0/-0.08 in
2) Tolerance: 0/-0.12 in

Weight

Weight in SI units

Compact version

Order code for "Housing", option A "Compact, aluminum, coated"

Nominal diameter [mm]	Version	Fixed flange		Lap joint flange		Lap joint flange, stamped plate
		EN 1092-1 (DIN 2501) [1] [kg]	ASME B16.5 [2] [kg]	EN 1092-1 (DIN 2501) [3] [kg]	ASME B16.5 [2] [kg]	EN 1092-1 (DIN 2501) [4] [kg]
50	Single-path	9.15	8.00	8.90	8.10	7.20
65	Single-path	10.8	–	10.7	–	8.10
80	Single-path	12.2	12.8	12.2	12.9	8.80
100	Single-path	16.0	18.0	15.8	18.0	11.1

Nominal diameter [mm]	Version	Fixed flange		Lap joint flange		Lap joint flange, stamped plate
		EN 1092-1 (DIN 2501) [1] [kg]	ASME B16.5 [2] [kg]	EN 1092-1 (DIN 2501) [3] [kg]	ASME B16.5 [2] [kg]	EN 1092-1 (DIN 2501) [4] [kg]
100	Two-path	16.1	18.1	16.0	17.9	11.2
150	Single-path	25.6	26.6	22.2	26.7	17.7
150	Two-path	25.4	26.4	22.0	26.2	17.5

1) Pressure rating PN 40 (DN 50), PN 16 (DN 65 to 150)
2) Pressure rating, class 150
3) Pressure rating PN 10/16
4) Pressure rating PN 10

Weight in US units

Compact version

Order code for "Housing", option A "Compact, aluminum, coated"

Nominal diameter [in]	Version	Fixed flange ASME B16.5 [1] [lbs]	Lap joint flange ASME B16.5 [1] [lbs]
2	Single-path	17.6	17.9
3	Single-path	28.2	28.5
4	Single-path	39.7	39.7
4	Two-path	39.9	39.5
6	Single-path	58.7	58.9
6	Two-path	58.2	57.7

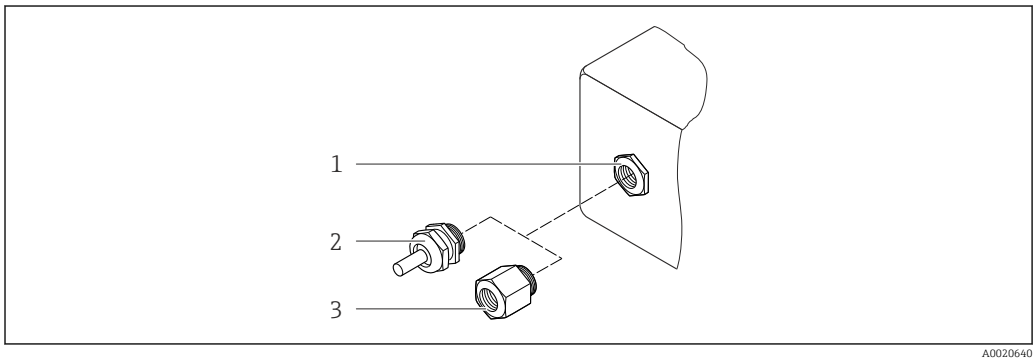
1) Pressure rating, class 150

Materials

Transmitter housing

- Order code for "Housing", option **A** "Compact, aluminum coated":
  Aluminum, AlSi10Mg, coated
- Window material for optional LED display:
  Order code for "Housing", option **B**: glass

Cable entries/cable glands



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15 Possible cable entries/cable glands

1 Female thread M20 × 1.5
2 Cable gland M20 × 1.5
3 Adapter for cable entry with internal thread G ½" or NPT ½"

Order code for "Housing", option A "Compact, aluminum, coated"

Cable entry/cable gland	Material
Cable gland M20 × 1.5	Nickel-plated brass
Adapter for cable entry with internal thread G ½"	
Adapter for cable entry with internal thread NPT ½"	

Sensor housing

Stainless steel (cold worked):
- 1.4404 (316L)
- 1.4435 (316L)

Process connections

- Stainless steel:
  - 1.4301 (304)
  - 1.4306 (304L)
  - 1.4404 (316L)
  - 1.4571 (316Ti)
- Steel S235JR (1.0038)
- Carbon steel A105

List of all available process connections → 27

Process connections

Flanges:
- EN 1092-1 (DIN 2501)
- ASME B16.5

For information on the different materials used in the process connections → 27

Operability

Operating concept

Operator-oriented menu structure for user-specific tasks
- Commissioning
- Operation
- Diagnostics
- Expert level

Quick and safe commissioning
- Individual menus for applications
- Menu guidance with brief descriptions of the individual parameter functions

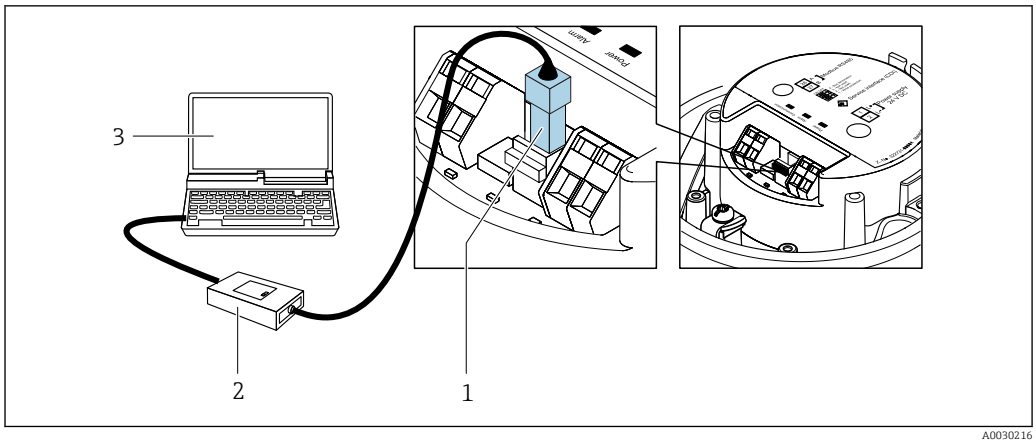
Reliable operation
- Operation in the following languages:
  Via "FieldCare", "DeviceCare" operating tool:
  English, German, French, Spanish, Italian, Chinese, Japanese
- Uniform operating concept in operating tools

Efficient diagnostics increase measurement availability
- Corrective action can be called up via operating tools
- Diverse simulation options
- Status indicated by several light emitting diodes (LEDs) on the electronic module in the housing compartment

Service interface

Using service interface via FXA291 and service adapter

This communication interface is present in the following device version:
- Order code for "Output", option **P**: Pulse output
- Order code for "Output", option **K**: Pulse/frequency output



1 Service interface (CDI) of measuring device
2 Commubox FXA291
3 Computer with "FieldCare" operating tool with "CDI Communication FXA291" COM DTM

Certificates and approvals

CE mark

The measuring system is in conformity with the statutory 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.

C-Tick symbol

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

Pressure Equipment Directive

The devices can be ordered with or without a PED approval. If a device with a PED approval is required, this must be explicitly stated in the order.

- With the identification PED/G1/x (x = category) on the sensor nameplate, Endress+Hauser confirms conformity with the "Essential Safety Requirements" specified in Appendix I of the Pressure Equipment Directive 2014/68/EC.
- Devices bearing this marking (PED) are suitable for the following types of medium: Media in Group 1 and 2 with a vapor pressure greater than, or smaller and equal to0.5 bar (7.3 psi)
- Devices not bearing this marking (PED) are designed and manufactured according to good engineering practice. They meet the requirements of Art. 4, Par. 3 of the Pressure Equipment Directive 2014/68/EU. The range of application is indicated in tables 6 to 9 in Annex II of the Pressure Equipment Directive 2014/68/EC.

Other 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 - general requirements
- IEC/EN 61326
  Emission in accordance with Class A requirements. Electromagnetic compatibility (EMC requirements).
- 2014/32/EU
  Measuring Instruments Directive, MI-004 Heat counters
- EN 1434/OIML R75 Heat counters
- TR K7.2 Standard on metrological testing of cooling meters
- NAMUR NE 21
  Electromagnetic compatibility (EMC) of industrial process and laboratory control equipment
- NAMUR NE 32
  Data retention in the event of a power failure in field and control instruments with microprocessors

- 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
- NAMUR NE 80
  The application of the pressure equipment directive to process control devices
- NAMUR NE 105
  Specifications for integrating fieldbus devices in engineering tools for field devices
- NAMUR NE 107
  Self-monitoring and diagnosis of field devices
- NAMUR NE 131
  Requirements for field devices for standard applications

Ordering information

Detailed ordering information is available as follows:
- In the Product Configurator on the Endress+Hauser website: www.endress.com -> Click "Corporate" -> Select your country -> Click "Products" -> Select the product using the filters and search field -> Open product page -> The "Configure" button to the right of the product image opens the Product Configurator.
- From your Endress+Hauser Sales Center:www.addresses.endress.com

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.

Communication-specific accessories

Accessories	Description
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 TI405C/07

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.
W@M	W@M Life Cycle Management Improved productivity with information at your fingertips. Data relevant to a plant and its components is generated from the first stages of planning and during the asset's complete life cycle. W@M Life Cycle Management is an open and flexible information platform with online and on-site tools. Instant access for your staff to current, in-depth data shortens your plant's engineering time, speeds up procurement processes and increases plant uptime. Combined with the right services, W@M Life Cycle Management boosts productivity in every phase. For more information, visit www.endress.com/lifecyclemanagement
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

System components

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

Supplementary documentation

For an overview of the scope of the associated Technical Documentation, refer to the following:
- The *W@M Device Viewer* : Enter the serial number from the nameplate (www.endress.com/deviceviewer)
- The *Endress+Hauser Operations App*: Enter the serial number from the nameplate or scan the 2-D matrix code (QR code) on the nameplate.

Standard documentation

Brief Operating Instructions

Brief Operating Instructions for the sensor

Measuring device	Documentation code
Proline Prosonic Flow E	KA01329D

Brief Operating Instructions for transmitter

Measuring device	Documentation code
Heat	KA01353D

Operating Instructions

Measuring device	Documentation code
Prosonic Flow E Heat	BA01793D

Description of Device Parameters

Measuring device	Documentation code
Prosonic Flow Heat	GP01125D

Supplementary device-dependent documentation

Special documentation

Contents	Documentation code
Information on the Pressure Equipment Directive	SD01614D
RFID TAG	SD01565D

Installation Instructions

Contents	Comment
Installation instructions for spare part sets and accessories	Documentation code: specified for each individual accessory .

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