



Level



Pressure



Flow



Temperature

Liquid  
Analysis

Registration

Systems  
Components

Services



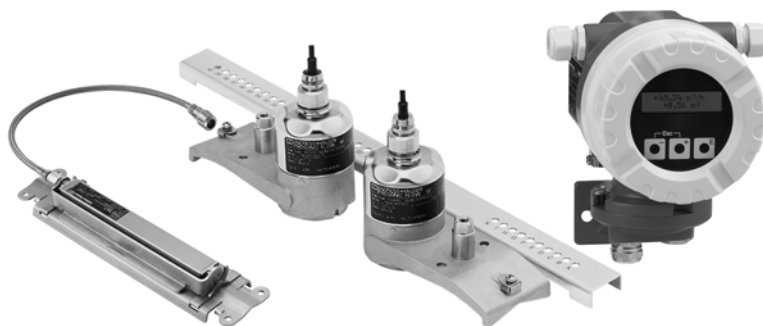
Solutions

## Technical Information

# Proline Prosonic Flow 91W

## Ultrasonic Flow Measuring System

Flowrate measurement for standard applications with drinking water and process water



### Applications

The sensors are perfectly suited for the non-contact measurement of pure or slightly contaminated liquids, regardless of the pressure or electrical conductivity.

- Suitable for pipe diameters in the range DN 15 to 2000 (½" to 80")
- Can be used with all metal and plastic pipes lined or unlined
- Ideal solution for applications with water, e.g. drinking water, industrial water, saltwater, deionized water, cooling water and heating water
- Perfectly suitable for
  - subsequent mounting
  - flow monitoring
  - improving measuring points

### Features and benefits

The Prosonic Flow ultrasonic clamp-on system allows accurate and cost-effective flow measurement from outside the pipe and without the need to interrupt the process. The flow measurement is bidirectional and causes no pressure loss.

- Easy, safe and menu-guided sensor mounting ensures precise measuring results
- Long-term system integrity thanks to robust sensor and industrial mounting kit design
- Automatic frequency scan for optimized installation and maximum measuring performance
- IP 68 for pipes under water
- Remote configuration using Endress+Hauser's FieldCare software

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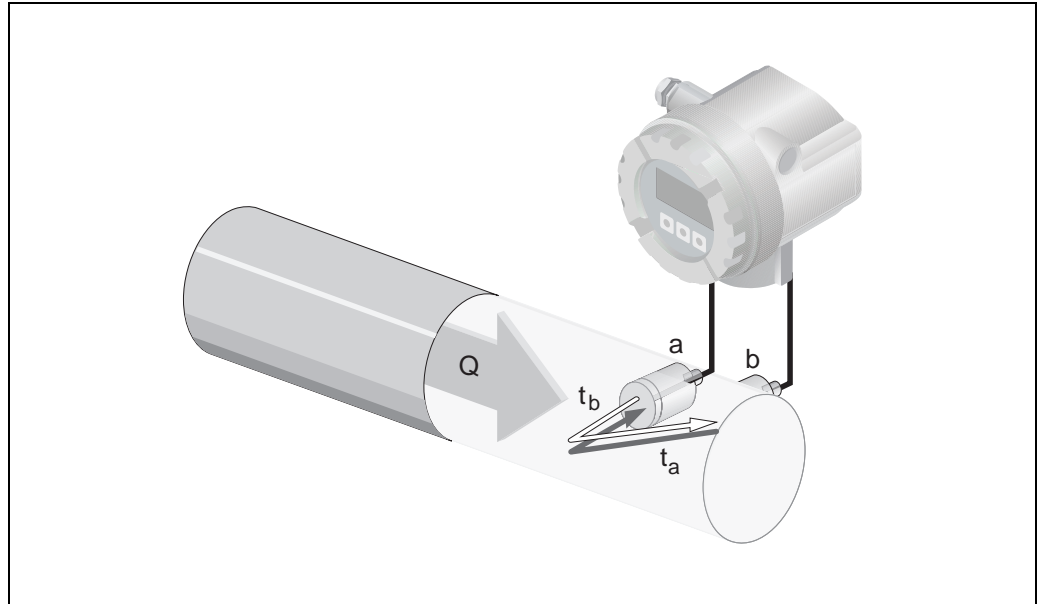
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## Function and system design

### Measuring principle

The measuring system operates on the principle of transit time difference. In this measurement method, acoustic (ultrasonic) signals are transmitted between two sensors. The signals are sent in both directions, i.e. the sensor in question works as both a sound transmitter and a sound receiver.

As the propagation velocity of the waves is less when the waves travel against the direction of flow than along the direction of flow, a transit time difference occurs. This transit time difference is directly proportional to the flow velocity.



Principle of the transit time difference measurement method

$$Q = v \cdot A$$

*a*    Sensor

*b*    Sensor

*Q*    Volume flow

*v*    Flow velocity ( $v \sim \Delta t$ )

$\Delta t$     Transit time difference ( $\Delta t = t_a - t_b$ )

*A*    Pipe cross-sectional area

The measuring system calculates the volume flow of the fluid from the measured transit time difference and the pipe cross-sectional area. In addition to measuring the transit time difference, the system simultaneously measures the sound velocity of the fluid. This additional measured variable can be used to distinguish different fluids or as a measure of product quality.

The measuring device can be configured onsite to suit the specific application using Quick Setup menus.

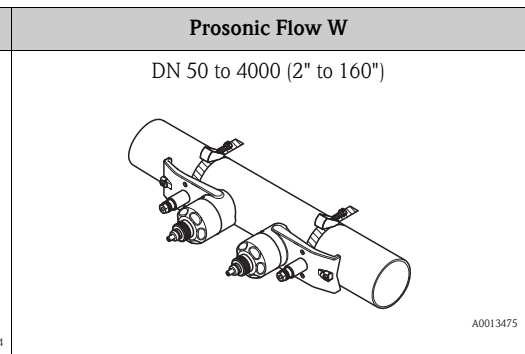
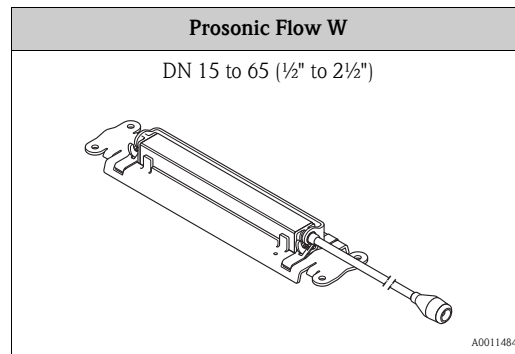
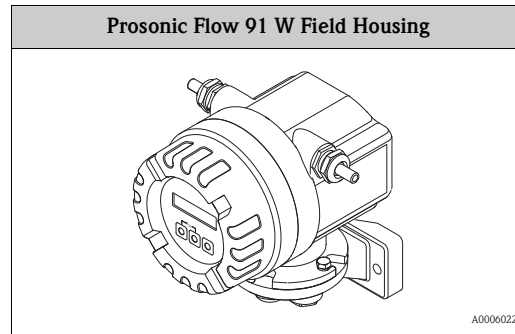
**Measuring**

The measuring system consists of one transmitter and two sensors. Different versions are available depending on the specific requirements.

The transmitter is used both to control the sensors and to prepare, process and evaluate the measuring signals, and to convert the signals to a desired output variable.

The sensors work as sound transmitters and sound receivers. Depending on the application and version, the sensors can be arranged for measurement via one or two traverses → 5.

**Transmitter**



**Mounting accessories**

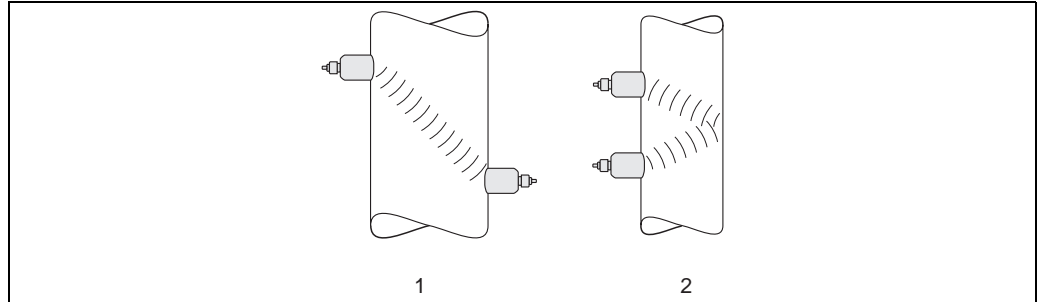
The requisite mounting distances must be determined for the sensors. Information on the fluid, the pipe material used and the exact pipe dimensions is needed to determine these values. The values for the sound velocity of the following fluids, pipe materials and lining materials are stored in the transmitter:

Fluid		Pipe material		Lining
<ul style="list-style-type: none"> <li>■ Water</li> <li>■ Sea water</li> <li>■ Distilled water</li> <li>■ Ammonia</li> <li>■ Alcohol</li> <li>■ Benzene</li> <li>■ Bromide</li> <li>■ Ethanol</li> </ul>	<ul style="list-style-type: none"> <li>■ Glycol</li> <li>■ Kerosene</li> <li>■ Milk</li> <li>■ Methanol</li> <li>■ Toluene</li> <li>■ Lube oil</li> <li>■ Fuel Oil</li> <li>■ Petrol</li> </ul>	<ul style="list-style-type: none"> <li>■ Carbon steel</li> <li>■ Ductile iron</li> <li>■ Stainless steel</li> <li>■ Alloy C</li> <li>■ PVC</li> <li>■ PE</li> <li>■ LDPE</li> <li>■ HDPE</li> </ul>	<ul style="list-style-type: none"> <li>■ PVDF</li> <li>■ PA</li> <li>■ PP</li> <li>■ PTFE</li> <li>■ Glass pyrex</li> </ul>	<ul style="list-style-type: none"> <li>■ Mortar</li> <li>■ Rubber</li> <li>■ Tar Epoxy</li> </ul>

**Sensor selection and arrangement**

The sensors can be arranged in two ways:

- Mounting arrangement for measurement via one traverse: the sensors are located on opposite sides of the pipe.
- Mounting arrangement for measurement via two traverses: the sensors are located on the same side of the pipe.



Sensor mounting arrangement (top view)

- 1 Mounting arrangement for measurement via one traverse  
 2 Mounting arrangement for measurement via two traverses

**Recommendations**

The number of traverses required depends on the sensor type, the nominal diameter and the thickness of the pipe wall. We recommend the following types of mounting:

Sensor Type	Nominal Diameter	Sensor Frequency	Sensor ID	Type of Mounting <sup>1)</sup>
Prosonic Flow W	DN 15 to 65 (½" to 2 ½")	6 MHz	W-CL-6F	2 traverses <sup>3)</sup>
	DN 80 (3")	2 MHz	W-CL-2F	2 traverses
	DN 100 to 300 (4" to 12")	2 MHz (or 1 MHz)	W-CL-2F W-CL-1F	2 traverses <sup>2)</sup>
	DN 300 to 600 (12" to 24")	1 MHz (or 2 MHz)	W-CL-1F W-CL-2F	2 traverses <sup>2)</sup>
	DN 650 to 2000 (26" to 80")	1 MHz (or 0.5 MHz)	W-CL-1F W-CL-05F	1 traverse <sup>2)</sup>

<sup>1)</sup> The installation of clamp-on sensors is principally recommended in the 2 traverse type installation. This type of installation allows the easiest and most comfortable type of mounting. However, in certain applications a 1 traverse installation may be preferred:

- Certain plastic pipes with wall thickness > 4 mm (0.16 in)
- Lined pipes
- Applications with fluids with high acoustic damping

<sup>2)</sup> 0.5 MHz sensors are also recommended for applications with composite material pipes such as GRP and may be recommended for certain lined pipes, pipes with wall thickness >10 mm (0.4 in), or applications with media with high acoustic damping. In addition, for these applications we principally recommend mounting the W sensors in a 1 traverse configuration.

<sup>3)</sup> 6 MHz sensors are recommended for applications where flow velocity is < 10 m/s (32.8 Hz/s)

## Input

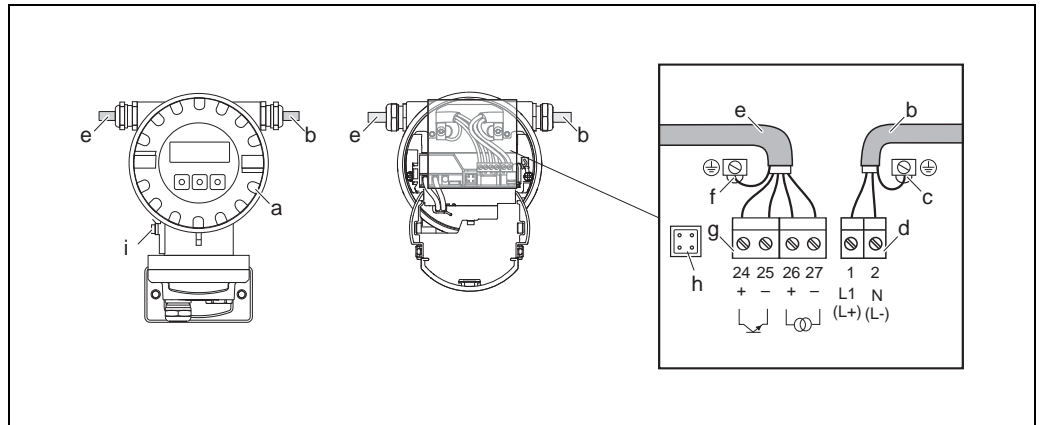
<b>Measured variable</b>	Flow velocity (differential delay proportional to flow velocity)
<b>Measuring range</b>	Typically $v = 0$ to 15 m/s (0 to 50 ft/s) at the specified measuring accuracy
<b>Operable flow range</b>	Over 150 : 1

## Output

<b>Output signal</b>	<p><b>Current output:</b></p> <ul style="list-style-type: none"> <li>■ Galvanically isolated</li> <li>■ Full scale value adjustable</li> <li>■ Temperature coefficient: typ. 2 <math>\mu\text{A}/^\circ\text{C}</math>, resolution: 1.5 <math>\mu\text{A}</math></li> <li>■ Active: 4 to 20 mA, <math>R_L &lt; 700 \Omega</math> (for HART: <math>R_L \geq 250 \Omega</math>)</li> </ul> <p><b>Pulse/status output:</b></p> <ul style="list-style-type: none"> <li>■ Galvanically isolated</li> <li>■ Open collector</li> <li>■ 30 V DC / 250 mA</li> <li>■ Passive</li> <li>■ Can be configured as:           <ul style="list-style-type: none"> <li>– <b>Pulse output:</b> pulse value and pulse polarity can be selected, max. pulse width adjustable (5 to 2000 ms), pulse frequency max. 100 Hz</li> <li>– <b>Status output:</b> for example, can be configured for error messages, empty pipe detection, flow recognition, limit value</li> </ul> </li> </ul>
<b>Signal on alarm</b>	<ul style="list-style-type: none"> <li>■ Current output → failsafe mode selectable.</li> <li>■ Pulse/frequency output → failsafe mode selectable</li> </ul>
<b>Load</b>	See “Output signal”
<b>Low flow cutoff</b>	Switching point for the low flow freely selectable.
<b>Galvanic isolation</b>	All circuits for inputs, outputs, and power supply are galvanically isolated from each other.

## Power supply

### Measuring unit electrical connection



Connecting the transmitter (Aluminium-Fieldhousing).  
 cable cross-section: max. 2.5 mm<sup>2</sup> (AWG 13)

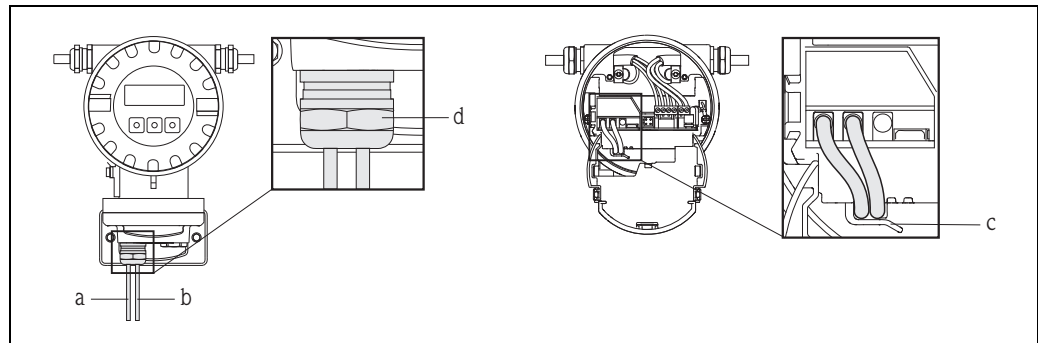
- a Cover
- b Cable for power supply: 85 to 260 V AC, 20 to 55 V AC, 16 to 62 V DC
- c Terminal for power supply:
- d Terminal for power supply: **Nr. 1–2** (terminal assignment)
- e Signal cable
- f Ground terminal für signal cable
- g Terminal connector for signal cable: **Nr. 24–27** (terminal assignment)
- h Service connector
- i Ground terminal for potential matching

#### Terminal assignment Prosonic Flow 91W

Order variant	Terminal No. (inputs/outputs)		
	24 (+)/25 (-)	26 (+)/27 (-)	1 (L1/L+) /2 (N/L-)
<i>Fixed communication boards (fixed assignment)</i>			
91***_*****A	Pulse output	HART current output	Power supply
Functional values	see "Output signal"		see "supply voltage"

### Connecting the connecting cable

Connection sensor cable in the electronics compartment



- a, b Sensor connection cable  
 c Cable gland holder  
 d Cable gland

### Supply voltage

#### Transmitter

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

#### Sensor

Powered by the transmitter

### Cable entry

*Power supply and signal cables (inputs/outputs)*

- Cable entry M20 × 1.5 (8 to 12 mm; 0.31 to 0.47 in)
- Cable gland for cables, 6 to 12 mm ( 0.24" to 0.47")
- Thread for cable entries ½" NPT, G ½"

*Connection cable (sensor / transmitter)*

Cable glands for one multicore connection cable (1 × Ø 8 mm) per cable entry

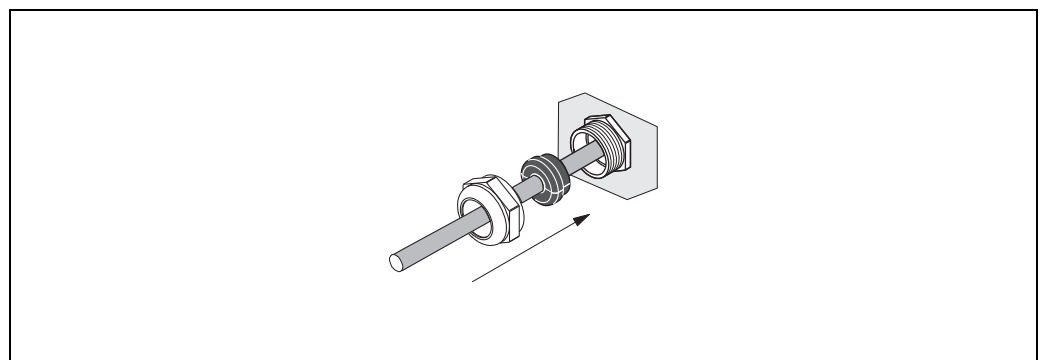
- Cable gland M20 × 1.5
- Thread for cable entries ½" NPT, G ½"

*Connection cable (sensor / transmitter)*

Cable glands for two single core connection cable (2 × Ø 4 mm) per cable entry

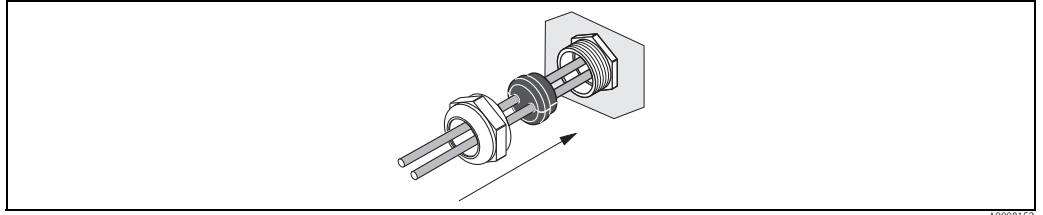
- Cable gland M20 × 1.5
- Thread for cable entries ½" NPT, G ½"

The Prosonic Flow W DN 15 to 65 (½ to 2½") is grounded via the cable gland.



Cable gland for one multicore connection cable (1 × Ø 8 mm /0.31 in) per cable entry





Cable gland for two connection cables (2 × Q 4 mm/0.16") per cable entry

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**Cable-specification**

Only use the connection cable supplied by Endress+Hauser. Different versions of the connecting cables are available → 21.

*Prosonic Flow*

- Cable material:
  - Prosonic Flow 91W (DN 50 to 4000/ 2" to 160") PVC (standard) or optional PTFE
  - Prosonic Flow 91W (DN 15 to 65 / ½" to 2½") TPE-V
- Cable length:
  - For use in a non hazardous zone: 5 to 60 m (16.4 to 196.8 ft)



Note!

To ensure correct measuring results, route the connection cable well clear of electrical machines and switching elements.

**power consumption**

85 to 250 V AC: <12 VA (incl. measuring sensor)  
 20 to 28 V AC: <7 VA (incl. measuring sensor)  
 11 to 40 V DC: <5 W (incl. measuring sensor)

**Power supply failure**

Lasting min. 1 power cycle  
 HistoROM/T-DAT save measuring system data if the power supply fails

**Potential equalization**

For potential equalization, no special measures are necessary.

## Performance characteristics

### Reference operating conditions

- Fluid temperature: +28 °C ± 2 K
- Ambient temperature: +22 °C ± 2 K
- Warm-up period: 30 minutes

#### Installation:

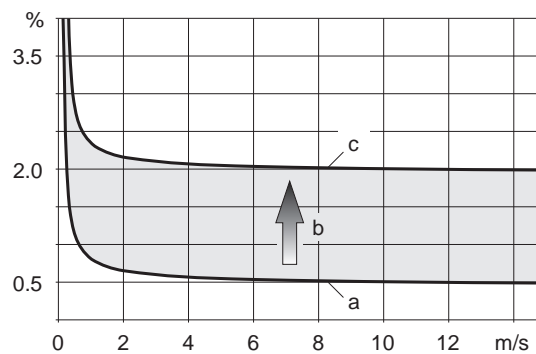
- Sensor and transmitter grounded.
- The measuring sensors are mounted correctly.

### Maximum measured error

#### Measured error

The measured error depends on a number of factors. A distinction is made between the measured error of the device (Prosonic Flow 91 = 0.5 % of the measured value) and an additional installation-specific measured error (typically 1.5 % of the measured value) that is independent of the device.

The installation-specific measured error depends on the installation conditions on site, such as the nominal diameter, wall thickness, real pipe geometry, fluid etc. The sum of the two measured errors is the measured error at the measuring point.



A0011347

Example of the measured error in a pipe with a nominal diameter DN > 200 (8")

- a Measured error of the device (0.5 % o.r. ± 3 mm/s)
- b Measured error due to installation conditions (typically 1.5 % o.r.)
- c Measured error at the measuring point: 0.5 % o.r. ± 3 mm/s + 1.5 % o.r. = 2 % o.r. ± 3 mm/s.

#### Measured error at the measuring point

The measured error at the measuring point is made up of the measured error of the device (0.5 % o.r.) and the measured error resulting from the installation conditions on site.

Given a flow velocity > 0.3 m/s (1 ft/s) and a Reynolds number > 10000, the following are typical error limits:

Nominal diameter	Device error limits	+	Installation-specific error limits (typical)	→	Error limits at the measuring point (typical)
DN 15 (½")	±0.5 % o.r. ± 5 mm/s	+	±2.5 % o.r.	→	±3 % o.r. ± 5 mm/s
DN 25 to 200	±0.5 % o.r. ± 7.5 mm/s	+	±1.5 % o.r.	→	±2 % o.r. ± 7.5 mm/s
> DN 200	±0.5 % o.r. ± 3 mm/s	+	±1.5 % o.r.	→	±2 % o.r. ± 3 mm/s

o.r. = of reading

#### Measurement Report

If required, the device can be supplied with a measurement report. To certify the performance of the device, a measurement is performed under reference conditions. Here, the sensors are mounted on a pipe with a nominal diameter of DN 100 (4").

The measurement report guarantees the following error limits of the device (at a flow velocity > 0.3 m/s (1 ft/s) and a Reynolds number > 10000):

Nominal diameter	Guaranteed error limits of the device	Guaranteed error limits of the device
Prosonic Flow W	DN 15 (½"), DN 25 (1"), DN 40 (1½"), DN 50 (2")	±0.5 % o.r. ± 5 mm/s
Prosonic Flow W	DN 100 (4")	±0.5 % o.r. ± 7.5 mm/s

o.r. = of reading

### Repeatability

Max. ± 0.3 % for flow velocity > 0.3 m/s (1 ft/s)

## Operating conditions: installation

### Installation instructions



#### Mounting location

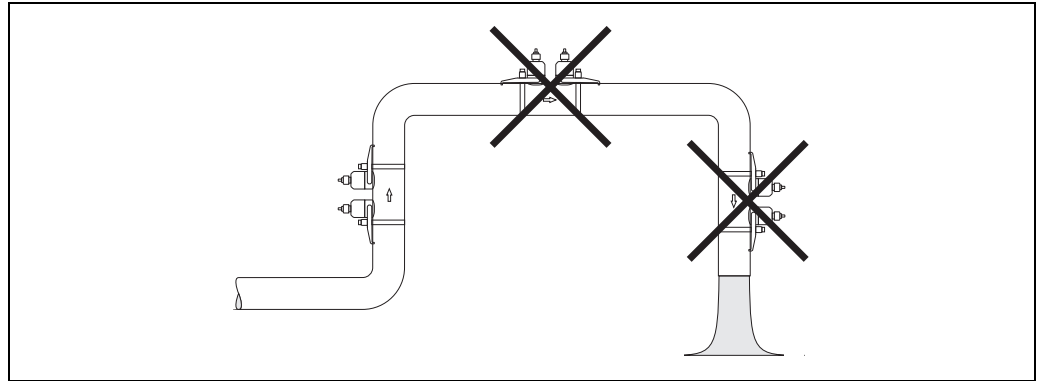
Correct flow measurement is possible only if the pipe is full. It is preferable to install the sensors in a riser.

Note!

Entrained air or gas bubbles in the measuring tube can result in an increase in measuring errors.

For this reason, avoid the following mounting locations:

- Highest point of a pipeline. Risk of air accumulating.
- Directly upstream of a free pipe outlet in a vertical pipe. Risk of partial pipe filling.



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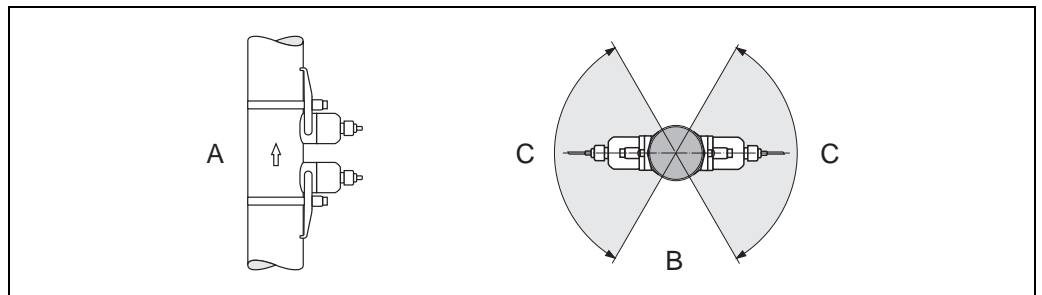
#### Orientation

##### Vertical

Recommended orientation with upward direction of flow (View A). With this orientation, entrained solids will sink and gases will rise away from the sensor when the fluid is stagnant. The piping can be completely drained and protected against solids buildup.

##### Horizontal

In the recommended installation range in a horizontal installation position (View B), gas and air collections at the pipe cover and problematic deposits at the bottom of the pipe have a smaller influence on measurement.

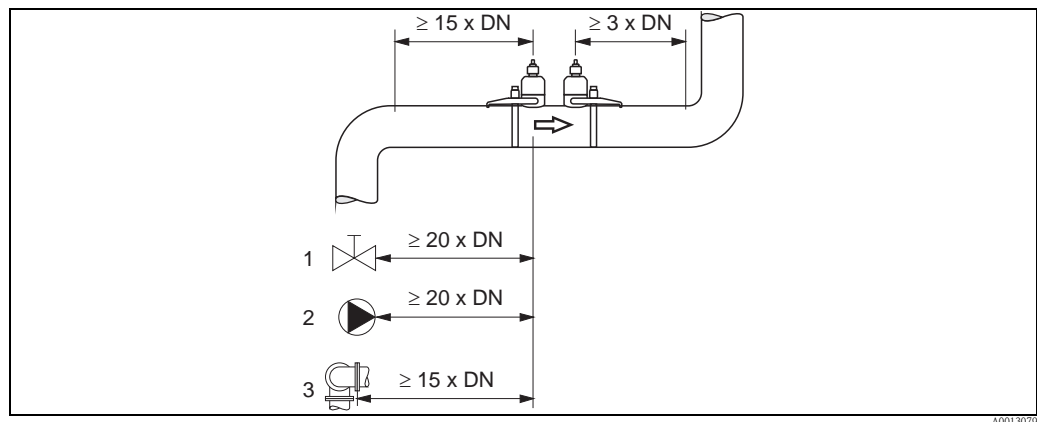


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- A Vertical
- B Horizontal
- C Recommended installation range max. 120°

**Inlet and outlet runs**

If possible, install the sensor well clear of assemblies such as valves, T-pieces, elbows, etc. If several flow obstructions are installed, the longest inlet or outlet run must be considered. Compliance with the following requirements for the inlet and outlet runs is recommended to ensure measuring accuracy.



Inlet and outlet runs (top view)

- 1 Valve (2/3 open)
- 2 Pump
- 3 Two pipe bends in different directions

**Connection cable**

Route the cable well clear of electrical machines and switching elements

Cable specification → 8

## Operating conditions: environment

**Ambient temperature range****Transmitter**

−25 to +60 °C (−13 to +140 °F)

At ambient temperatures below −20 °C (−4 °F) the readability of the display may be impaired. Install the transmitter at a shady location. Avoid direct sunlight, particularly in warm climatic regions.

**Sensor Prosonic Flow W**

−20 to +80 °C (−4 to +176 °F)

Optional: 0 to +130 °C (−32 to +265 °F)

It is permitted to insulate the sensors mounted on the pipe.

**Connecting cable (sensor/transmitter)**

■ Standard (TPE-V): −20 to +80 °C (−4 to 175 °F) (multi core, sensor DN 15 to 65 / ½" to 2½")<sup>1)</sup>

■ Standard (PVC): −20 to +70 °C (−4 to 158 °F) (single core, sensor DN 50...4000 / 2" to 160")

■ Optional (PTFE): −40 to +170 °C (−40 to 338 °F) (single core, sensor DN 50...4000 / 2" to 160")

■ It is permitted to insulate the sensors mounted on the pipes.

■ Mount the transmitter in a shady location and avoid direct sunlight, particularly in warm climatic regions.



Note!

<sup>1)</sup> Can be used with the version for 0...130 °C / −32...256 °F.

**Storage temperature**

The storage temperature corresponds to the operating temperature range of the measuring transmitter and the appropriate measuring sensors and the corresponding sensor cable (see above).

<b>Degree of protection</b>	<b>Transmitter</b>
	IP 67 (NEMA 4X)
	<b>Sensors</b>
	IP 67 (NEMA 4X)
	Optional: IP 68 (NEMA 6P)

**Shock and vibration resistance** according to IEC 68-2-6

## Operating conditions: process

**Medium temperature range** -20 to +80 °C (-4 to +176 °F)  
Optional: 0 to +130 °C (32 to +265 °F)

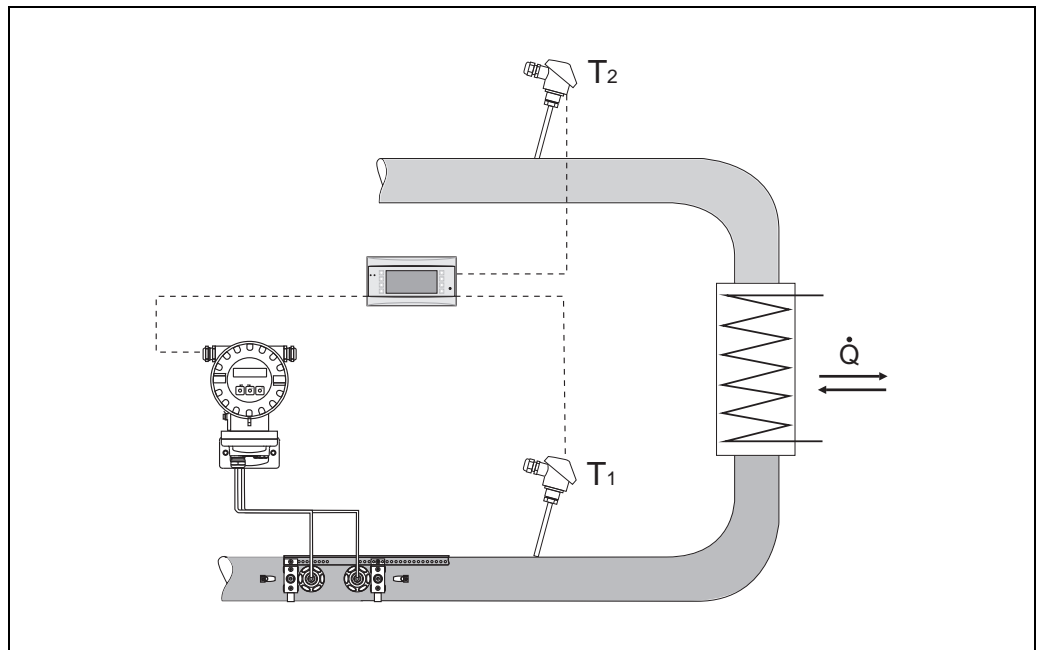
**Medium pressure range (nominal pressure)** Perfect measurement requires that the static fluid pressure is higher than vapor pressure, to avoid outgasing.

**Pressure loss** There is no pressure loss.

**Energy Measurement** The Prosonic Flow 91W Ultrasonic is well suited for making or retrofitting energy measurement for hot or chilled water systems - often used in conjunction with Endress+Hauser Flow and Energy Manager RMC621/RMS621.  
The quantity of heat is calculated from the process variable for flow and the differential from the feed and return temperature. Energy Manager can also determine the quantity of heat in water flow from process variable flow and a single temperature measurement.

**Installation of delta heat measurement**

- Temperature measurement takes place via two separate sensors which are directly connected to the Endress+Hauser Energy Manager. (Temperature sensors and Energy Manager supplied separately).
- The Prosonic Flow 91W can be installed on either the hot or cold side of the heat exchanger.



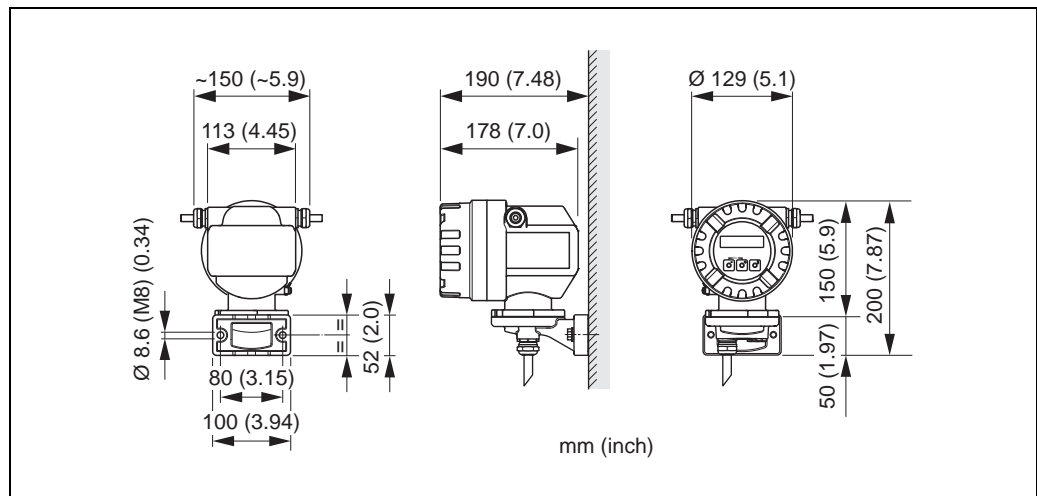
*Layout for delta heat measurement of hot or chilled water system*

A001311

## Mechanical construction

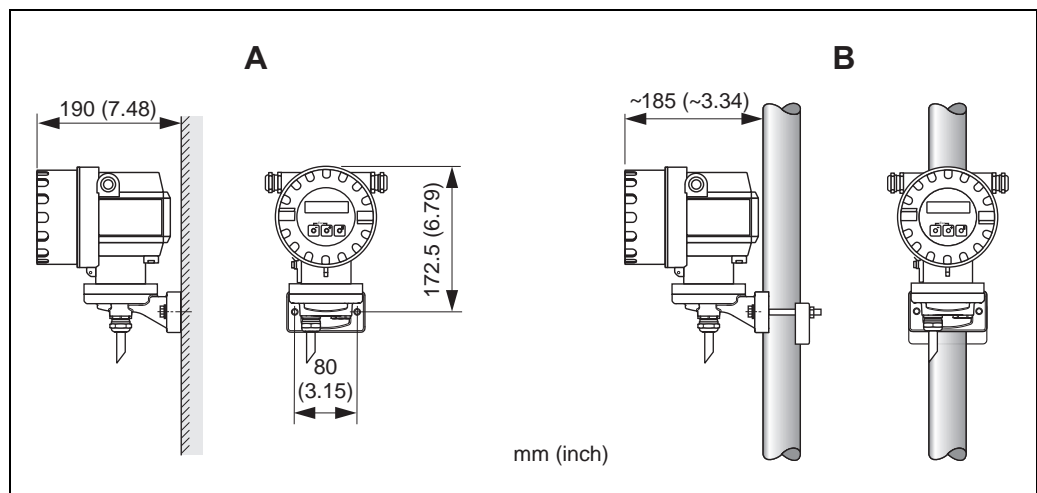
### Design, dimensions

### Dimensions field housing



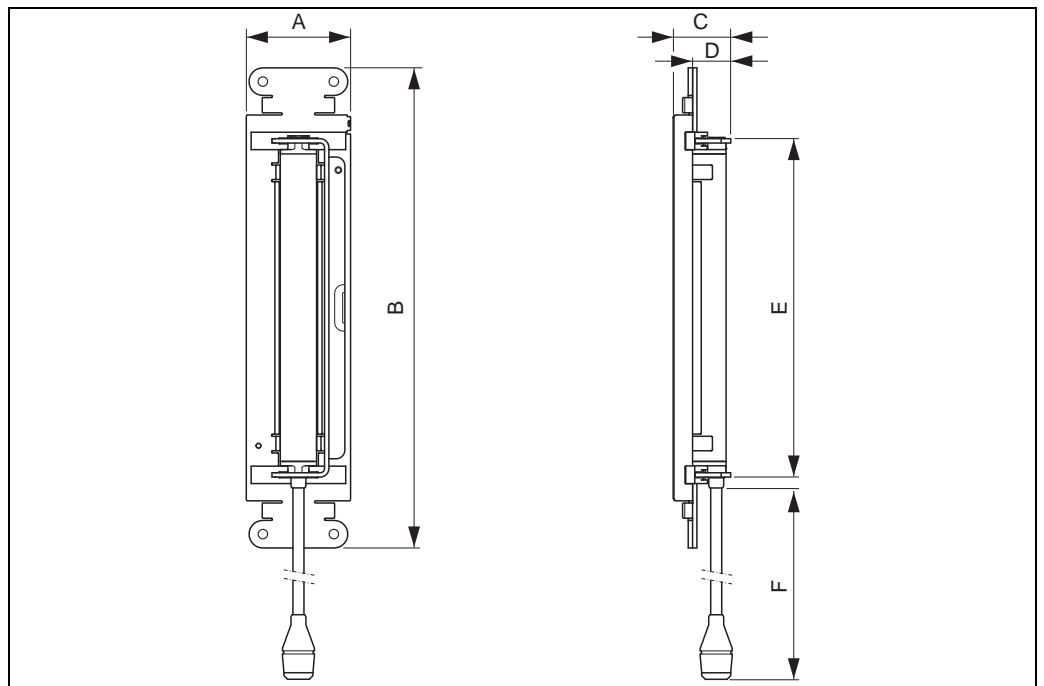
A000663-02

### Dimensions pipe mounting



A0005819

**Prosonic Flow W sensor (DN 15 to 65 / ½" to 2½")**



A0011502

*Mounting arrangement for measurement via one traverse*

*Dimensions in SI units*

A	B	C	D	E	F
72	331	39	28	233	450

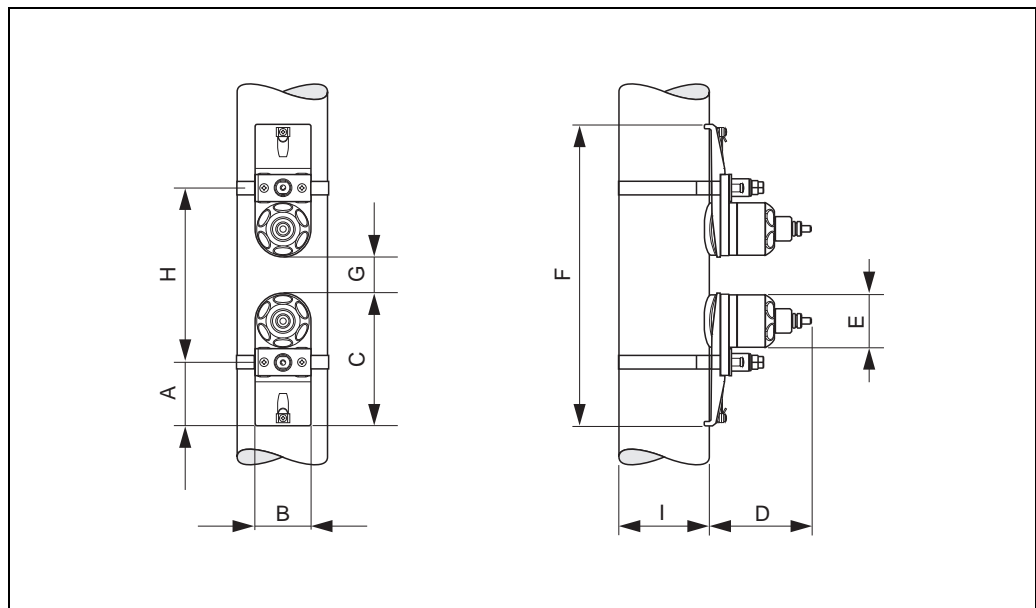
All dimensions in [mm]

*Dimensions in US units*

A	B	C	D	E	F
2.83	13.03	1.54	1.10	9.17	17.72

All dimensions in [inch]

**Prosonic Flow W sensor (DN50 to 2000 / 2" to 80")**



A0011401

*Mounting arrangement for measurement via two traverse*

*Dimensions in SI units*

A	B	C	D	E	F
56	62	145	111	∅ 58	Max. 872
G				H	
Depends on the measuring point conditions (pipe, fluid etc.). Dimension "H" can be determined:				Pipe outer diameter	
<ul style="list-style-type: none"> <li>■ by the transmitter prior to the mounting (Quick Setup or FieldCare)</li> <li>■ when specifying the flowmeter (online (Applicator))</li> </ul>					

All dimensions in [mm]

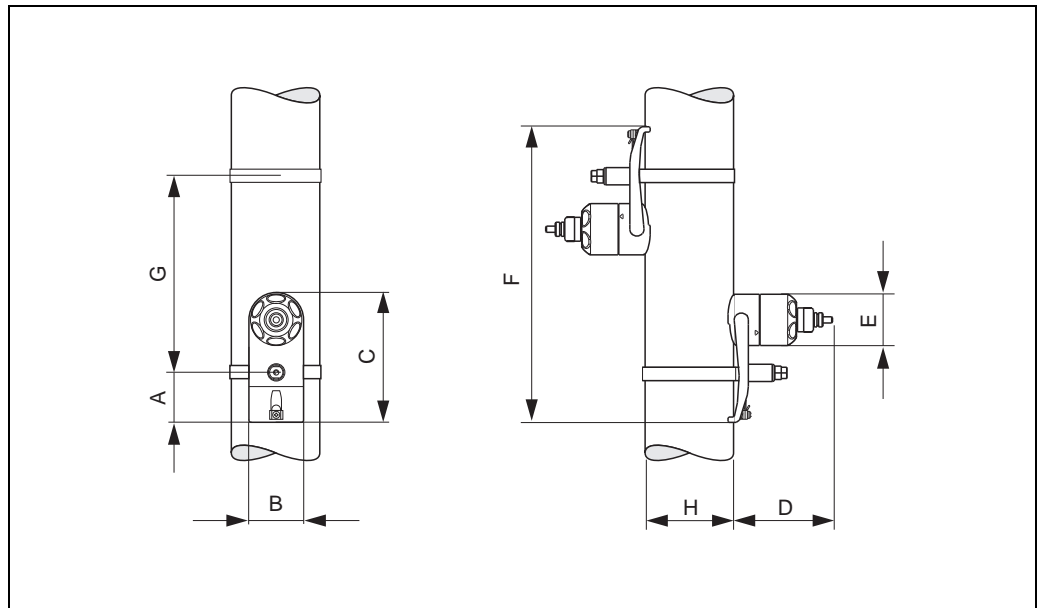
*Dimensions in US units*

A	B	C	D	E	F
2.20	2.44	5.71	4.37	∅ 2.28	Max. 34.3
G				H	
Depends on the measuring point conditions (pipe, fluid etc.). Dimension "H" can be determined:				Pipe outer diameter	
<ul style="list-style-type: none"> <li>■ by the transmitter prior to the mounting (Quick Setup or FieldCare)</li> <li>■ when specifying the flowmeter (online (Applicator))</li> </ul>					

All dimensions in [inch]



**Prosonic Flow W sensor (DN50 to 2000 / 2" to 80")**



A0011155

*Mounting arrangement for measurement via one traverse*

*Dimensions in SI units*

A	B	C	D	E	F
56	62	145	111	Ø 58	Max. 872
G				H	
Depends on the measuring point conditions (pipe, fluid etc.). Dimension "H" can be determined:				Pipe outer diameter	
<ul style="list-style-type: none"> <li>■ by the transmitter prior to the mounting (Quick Setup or FieldCare)</li> <li>■ when specifying the flowmeter (online (Applicator))</li> </ul>					

All dimensions in [mm]

*Dimensions in US units*

A	B	C	D	E	F
2.20	2.44	5.71	4.37	Ø 2.28	Max. 34.3
G				H	
Depends on the measuring point conditions (pipe, fluid etc.). Dimension "H" can be determined:				Pipe outer diameter	
<ul style="list-style-type: none"> <li>■ by the transmitter prior to the mounting (Quick Setup or FieldCare)</li> <li>■ when specifying the flowmeter (online (Applicator))</li> </ul>					

All dimensions in [inch]

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<b>Weight</b>	<ul style="list-style-type: none"> <li>■ Transmitter housing: 2.4 kg (5.2 lb)</li> <li>■ Flowrate measuring sensors W (clamp-on) incl. mounting rail and tensioning bands: 2.8 kg (6.2 lb)</li> </ul>
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**Materials****Transmitter**

Wall-mounted housing: powder-coated die-cast aluminum

**Sensor**

- Sensor holder: stainless steel 1.4308/CF-8
- Sensor housing: stainless steel 1.4301/304
- Strapping bands/bracket: stainless steel 1.4301/304
- Sensor contact surfaces: chemically stable plastic

**Connecting cable (sensor/transmitter)**

- PVC/TPE-V connecting cable
  - Cable sheath: PVC/TPE-V
  - Cable connector: nicked brass 2.0401/C38500

## Human interface

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**Display elements**

- Liquid crystal display: illuminated, two lines each with 16 characters
  - Custom configuration for presenting different measured values and status variables
  - 1 totalizer
- 

**Operating elements**

Local operation via three operating keys (◀, +, ▶)

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**Remote operation**

Operation via HART protocol and FieldCare

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**Language group**

English, German, Spanish, Italian, French

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## Certificates and approvals

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<b>CE mark</b>	The measuring system is in conformity with the statutory requirements of the EC Directives. Endress+Hauser confirms successful testing of the device by affixing to it the CE mark.
<b>C-Tick mark</b>	The measuring system is in conformity with the EMC requirements of the Australian Communications and Media Authority (ACMA).
<b>Ex approval</b>	Information about currently available Ex versions (FM, CSA) can be supplied by your Endress+Hauser Sales Center on request. All explosion protection data are given in a separate documentation which is available upon request.
<b>Other standards and guidelines</b>	<ul style="list-style-type: none"><li>■ EN 60529 Degrees of protection provided by enclosures (IP code)</li><li>■ EN 61010-1 Safety requirements for electrical equipment for measurement, control and laboratory use</li><li>■ IEC/EN 61326 "Emission in accordance with Class A requirements". Electromagnetic compatibility (EMC requirements).</li><li>■ ANSI/ISA-S82.01 Safety Standard for Electrical and Electronic Test, Measuring, Controlling and Related Equipment - General Requirements. Pollution Degree 2, Installation Category II.</li><li>■ CAN/CSA-C22.2 No. 1010.1-92 Safety Requirements for Electrical Equipment for Measurement and Control and Laboratory Use. Pollution degree 2</li><li>■ NAMUR NE 21 Electromagnetic compatibility (EMC) of industrial process and laboratory control equipment.</li><li>■ NAMUR NE 43 Standardization of the signal level for the breakdown information of digital transmitters with analog output signal.</li><li>■ NAMUR NE 53 Software of field devices and signal-processing devices with digital electronics.</li></ul>

## Ordering information

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

## Accessories

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

### Device-specific accessories

Accessory	Description	Order code
Sensor W (DN 15 to 65, (1/2" to 2 1/2") Clamp-on version	DN 15 to 65, -20 to +80 °C (1/2" to 2 1/2", -4 to +176 °F), 5.0 MHz <ul style="list-style-type: none"> <li>IP 67 / NEMA 4X</li> <li>IP 68 / NEMA 6P</li> </ul>	DK9WS - 1* DK9WS - 3*
	DN 15 to 65, 0 to +130 °C (1/2" to 2 1/2", +32 to +266 °F), 5.0 MHz <ul style="list-style-type: none"> <li>IP 67 / NEMA 4X</li> <li>IP 68 / NEMA 6P</li> </ul>	DK9WS - 2* DK9WS - 4*
Sensor W (DN 50 to 4000, (2" to 157") Clamp-on version	DN 50 to 300, -20 to +80 °C (2" to 12", -4 to +176 °F), 2.0 MHz <ul style="list-style-type: none"> <li>IP 67 / NEMA 4X</li> <li>IP 68 / NEMA 6P</li> </ul>	DK9WS - B* DK9WS - N*
	DN 100 to 4000, -20 to +80 °C (4" to 160", -4 to +176 °F), 1.0 MHz <ul style="list-style-type: none"> <li>IP 67 / NEMA 4X</li> <li>IP 68 / NEMA 6P</li> </ul>	DK9WS - A* DK9WS - M*
	DN 100 to 4000, 0 to +130 °C (4" to 160", +32 to +266 °F), 1.0 MHz <ul style="list-style-type: none"> <li>IP 67 / NEMA 4X</li> </ul>	DK9WS - P*
	DN 50 to 300, 0 to +130 °C (2" to 12", +32 to +266 °F), 2.0 MHz <ul style="list-style-type: none"> <li>IP 67 / NEMA 4X</li> </ul>	DK9WS - S*
	DN 100 to 4000, -20 to +80 °C (4" to 160", -4 to +176 °F), 0.5 MHz <ul style="list-style-type: none"> <li>IP 67 / NEMA 4X</li> <li>IP 68 / NEMA 6P</li> </ul>	DK9WS - R* DK9WS - T*

### Device-specific accessories

Accessory	Description	Order code	
Mounting kit for aluminum field housing	Mounting kit for wall-mount housing.	DK9WM - C	
Sensor holder set	Prosonic Flow W (DN 15 to 65, 1/2" to 2 1/2") <ul style="list-style-type: none"> <li>Sensor holder, clamp-on version</li> </ul>	DK9SH - 1	
	Prosonic Flow W (DN 50 to 4000, 2" to 160") <ul style="list-style-type: none"> <li>Sensor holder, fixed retaining nut, clamp-on version</li> </ul>	DK9SH - A	
	<ul style="list-style-type: none"> <li>Sensor holder, detachable retaining nut, clamp on version</li> </ul>	DK9SH - B	
Clamp-on installation set	Sensor fastening for Prosonic Flow W  (DN 15 to 65, 1/2" to 2 1/2") <ul style="list-style-type: none"> <li>U-Bolt DN15-32 (1/2 to 1 1/4")</li> <li>Strapping bands DN 40 to 65 (1 1/2 to 2 1/2")</li> </ul>	DK9IC - 11* DK9IC - 21*	
	(DN 50 to 4000, 2" to 160") <ul style="list-style-type: none"> <li>Without sensor fastening</li> <li>Strapping bands DN 50 to 200 (2" to 8")</li> <li>Strapping bands DN 200 to 600 (8" to 24")</li> <li>Strapping bands DN 600 to 2000 (24" to 80")</li> <li>Strapping bands DN 2000 to 4000 (80" to 160")</li> </ul>	DK9IC - A* DK9IC - B* DK9IC - C* DK9IC - D* DK9IC - E*	
	<ul style="list-style-type: none"> <li>Without mounting tools</li> <li>Spacing ruler DN 50 to 200 (2" to 8")</li> <li>Spacing ruler DN 200 to 600 (8" to 24")</li> <li>Fastener, 1 Traverse DN 50 to 4000 (2" to 160")</li> </ul>	DK9IC - *1 DK9IC - *2 DK9IC - *3 DK9IC - *6	

Accessory	Description	Order code
Conduit adapter for connecting cable	<p>Prosonic Flow W (DN 15 to 65, ½" to 2 ½")</p> <ul style="list-style-type: none"> <li>■ Conduit adapter incl. cable entry M20 × 1,5</li> <li>■ Conduit adapter incl. cable entry ½" NPT</li> <li>■ Conduit adapter incl. cable entry G ½"</li> </ul> <p>Prosonic Flow W (DN 50 to 4000, 2" to 160")</p> <ul style="list-style-type: none"> <li>■ Conduit adapter incl. cable entry M20 × 1,5</li> <li>■ Conduit adapter incl. cable entry ½" NPT</li> <li>■ Conduit adapter incl. cable entry G ½"</li> </ul>	<p>DK9CB - AA1 DK9CB - AA2 DK9CB - AA3</p> <p>DK9CB - AB1 DK9CB - AB2 DK9CB - AB3</p>
Connecting cable	<p>For sensor DN 15 to 65, ½" to 2 ½"</p> <p>5 m (16 ft) sensor cable, TPE-V, -20 to +70 °C (-4 to 158 °F) 10 m (33 ft) sensor cable, TPE-V, -20 to +70 °C (-4 to 158 °F) 15 m (49 ft) sensor cable, TPE-V, -20 to +70 °C (-4 to 158 °F) 30 m (98 ft) sensor cable, TPE-V, -20 to +70 °C (-4 to 158 °F)</p> <p>For sensor DN 50 to 4000, 2" to 160"</p> <p>5 m (16 ft) sensor cable, PVC, -20 to +70 °C (-4 to 158 °F) 10 m (33 ft) sensor cable, PVC, -20 to +70 °C (-4 to 158 °F) 15 m (49 ft) sensor cable, PVC, -20 to +70 °C (-4 to 158 °F) 30 m (98 ft) sensor cable, PVC, -20 to +70 °C (-4 to 158 °F) 60 m (197 ft) sensor cable, PVC, -20 to +70 °C (-4 to 158 °F)</p>	<p>DK9SS - AAA DK9SS - AAB DK9SS - AAC DK9SS - AAD</p> <p>DK9SS - ABA DK9SS - ABB DK9SS - ABC DK9SS - ABD DK9SS - ABJ</p>
Acoustic coupling fluid	<ul style="list-style-type: none"> <li>■ Coupling fluid 0 to 170 °C (+32 to 338 °F), Standard</li> <li>■ Adhesive coupling fluid -40 to +80 °C (-40 to 176 °F)</li> <li>■ Water-soluble coupling fluid -20 to +80 °C (-4 to 176 °F)</li> <li>■ Coupling fluid DDU 19, -20 to +60 °C (-4 to 140 °F)</li> <li>■ Coupling fluid -40 to +100 °C (-40 to 212 °F), Standard, type MBG2000</li> </ul>	<p>DK9CM - 2 DK9CM - 3 DK9CM - 4 DK9CM - 6 DK9CM - 7</p>

**Communication-specific accessories**

Accessory	Description	Order code
HART Communicator Field Xpert SFX 100	Handheld terminal for remote configuration and for obtaining measured values via the HART current output (4 to 20 mA). Contact your Endress+Hauser representative for more information.	SFX100 - *****
Fieldgate FXA320	Gateway for remote interrogation of HART sensors and actuators via Web browser: <ul style="list-style-type: none"> <li>■ 2-channel analog input (4 to 20 mA)</li> <li>■ 4 binary inputs with event counter function and frequency measurement</li> <li>■ Communication via modem, Ethernet or GSM</li> <li>■ Visualization via Internet/Intranet in the Web browser and/or WAP cellular phone</li> <li>■ Limit value monitoring with alarm signaling via e-mail or SMS</li> <li>■ Synchronized time stamping of all measured values.</li> </ul>	FXA320 - *****
Fieldgate FXA520	Gateway for remote interrogation of HART sensors and actuators via Web browser: <ul style="list-style-type: none"> <li>■ Web server for remote monitoring of up to 30 measuring points</li> <li>■ Intrinsically safe version [Ex ia]IIC for applications in hazardous areas</li> <li>■ Communication via modem, Ethernet or GSM</li> <li>■ Visualization via Internet/Intranet in the Web browser and/or WAP cellular phone</li> <li>■ Limit value monitoring with alarm signaling via e-mail or SMS</li> <li>■ Synchronized time stamping of all measured values</li> <li>■ Remote diagnosis and remote configuration of connected HART devices</li> </ul>	FXA520 - ****
FXA195	The Commubox FXA195 connects intrinsically safe Smart transmitters with HART protocol to the USB port of a personal computer. This makes the remote operation of the transmitters possible with the aid of configuration programs (e.g. FieldCare). Power is supplied to the Commubox by means of the USB port	FXA195 - *

## Service-specific accessories

Accessory	Description	Order code
Applicator	Software for selecting and planning flowmeters. The Applicator can be downloaded from the Internet or ordered on CD-ROM for installation on a local PC. Contact your Endress+Hauser representative for more information.	DXA80 - *
Fieldcheck	Tester/simulator for testing flowmeters in the field. When used in conjunction with the "FieldCare" software package, test results can be imported into a database, printed out and used for official certification. Contact your Endress+Hauser representative for more information.	50098801
FieldCare	FieldCare is Endress+Hauser's FDT-based plant asset management tool. It can configure all intelligent 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.	See the product page on the Endress+Hauser Web site: <a href="http://www.endress.com">www.endress.com</a>
FXA291	Service interface from the measuring device to the PC for operation via FieldCare.	FXA291 - *
Memograph M graphic display recorder	The Memograph M graphic display recorder provides information on all the relevant process variables. Measured values are recorded correctly, limit values are monitored and measuring points analyzed. The data are stored in the 256 MB internal memory and also on a DSD card or USB stick. Memograph M boasts a modular design, intuitive operation and a comprehensive security concept. The ReadWin® 2000 PC software is part of the standard package and is used for configuring, visualizing and archiving the data captured. The mathematics channels which are optionally available enable continuous monitoring of specific power consumption, boiler efficiency and other parameters which are important for efficient energy management.	RSG40-*****

## Documentation

- Flow measurement (FA005D/06)
- Operating Instructions for Prosonic Flow 91 (BA100D/06)
- Supplementary documentation on Ex-ratings: FM, CSA

## Registered trademarks

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