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

Technical Information

Proline Prosonic Flow 93T Portable

Portable ultrasonic flow measuring system
Volume flow measurement of liquids

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

- Ideal solution for temporary use everywhere precise measurement or verification is required
- Particularly suitable for retrofitting, monitoring and verifying measuring points
- Suitable for pipe diameters from DN 15 to 4000 (½ to 160")
- Suitable for fluid temperatures ranging from –40 to +170 °C (–40 to +338 °F)
- Can be used with all metal and plastic pipes lined or unlined and with composite pipes
- Ideal solution for all applications with sound-conducting liquids, e.g. water, wastewater, oils, solvents, acids, hydrocarbons and chemicals

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
- Easy and safe commissioning via Quick Setup menus
- Automatic frequency scan for optimized installation and maximum measuring performance
- Current input for parallel data acquisition or for verifying other devices
- Current output active or passive
- Remote configuration and measured value display using Endress+Hauser's FieldCare software
- Integrated data logger/site manager
- Easy data transfer via USB stick without additional software

TI00085D/06/EN/13.11
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Endress+Hauser
People for Process Automation

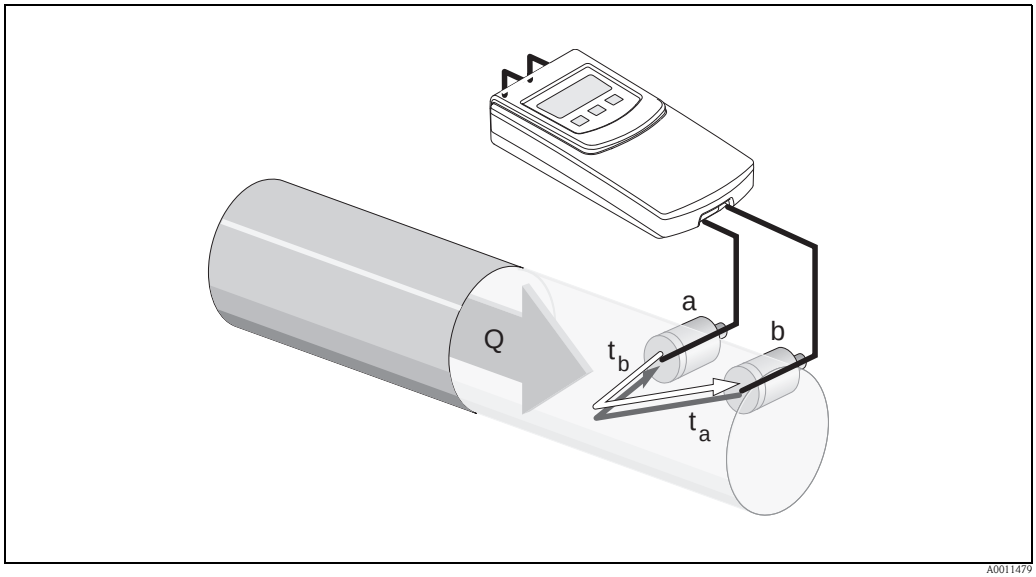
Table of contents

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 ($v \sim \Delta t$)
Δt 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.

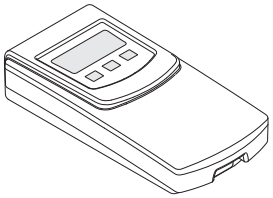
Measuring system

The measuring system consists of one transmitter and two sensors.

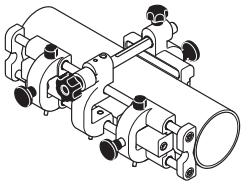
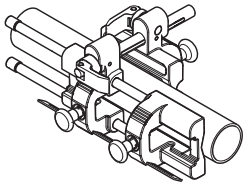
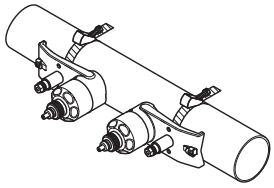
The transmitter is used both to control the sensors and to prepare, process and evaluate the measuring signals, and to convert the signals to a desired output variable.

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

Prosonic Flow 93T Portable
For mounting in non-hazardous zone  A0011478

Sensor/Sensor holders

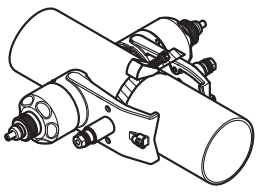
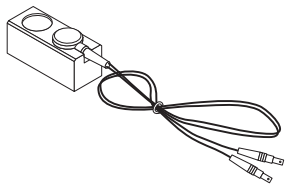
Prosonic Flow P		Prosonic Flow P
DN 15 to 65 (½ to 2½") *Model 1*  A0011483	DN 15 to 65 (½ to 2½") *Model 2*  A0013504	DN 50 to 4000 (2 to 160")  A0013475

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:

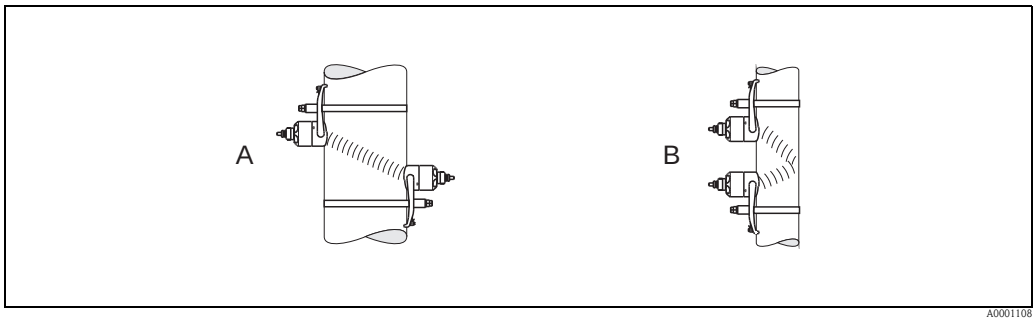
Fluid		Pipe material		Lining
■ Water	■ Glycol	■ Carbon steel	■ GRP	■ Mortar
■ Sea water	■ Kerosene	■ Cast iron	■ PVDF	■ Rubber
■ Distilled water	■ Milk	■ Stainless steel	■ PA	■ Tar Epoxy
■ Ammonia	■ Methanol	■ Alloy C	■ PP	
■ Alcohol	■ Toluene	■ PVC	■ PTFE	
■ Benzene	■ Lube oil	■ PE	■ Glass pyrex	
■ Bromide	■ Diesel	■ LDPE	■ Cement asbestos	
■ Ethanol	■ Gasoline	■ HDPE		

If you are using fluids, pipe materials or lining materials other than those listed in the table, and you do not have the corresponding sound velocities for these fluids/materials, you can use the DDU18 and DDU20 sensors to determine the values.

DDU18 (sound velocity measurement)	DDU20 (wall thickness measurement)
Nominal diameter range: DN 50 to 3000 (2 to 120")  A0009784	Wall thickness range: ■ Steel pipes: 1.2 to 50 mm (0.05 to 2.0") ■ Plastic pipes: 4 to 15 mm (0.16 to 0.60") (only suitable for PTFE and PE pipes to a certain extent)  A0013478

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

A Mounting arrangement for measurement via one traverse
B Mounting arrangement for measurement via two traverses

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 [1]
Prosonic Flow P	DN 15 to 65 (½ to 2½")	6 MHz	P-CL-6F*	2 (or 1) traverses [4]
	DN 50 to 65 (2 to 2½")	6 MHz (or 2 MHz)	P-CL-6F* P-CL-2F*	2 (or 1) traverses [2]
	DN 80 (3")	2 MHz	P-CL-2F*	2 traverses
	DN 100 to 300 (4 to 12")	2 MHz (or 1 MHz)	P-CL-2F* P-CL-1F*	2 traverses [3]
	DN 300 to 600 (12 to 24")	1 MHz (or 2 MHz)	P-CL-1F* P-CL-2F*	2 traverses [3]
	DN 650 to 4000 (26 to 160")	1 MHz (or 0.5 MHz)	P-CL-1F* W-CL-05F*	1 traverse [3]

[1] 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 and means that a system can also be mounted even if the pipe can only be accessed from one side. However, in certain applications a 1 traverse installation may be preferred. These include:
- Certain plastic pipes with wall thickness > 4 mm (0.16")
- Pipes made of composite materials such as GRP
- Lined pipes
- Applications with fluids with high acoustic damping

[2] If the pipe nominal diameter is small (DN 65 / 2½" and smaller), the sensor spacing with Prosonic Flow P can be too small for two traverse installation using sensor P-CL-2F*. In this case, the 1 traverse type of installation must be used.

[3] 0.5 MHz sensors (Prosonic Flow W) 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"), 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.

[4] 6 MHz sensors for applications with flow velocity < 10 m/s.

Input

Measured variable

Flow velocity (transit time difference proportional to flow velocity)

Measuring range

Typically v = 0 to 15 m/s (0 to 50 ft/s)

Operable flow range

Over 150 : 1

Input signal

Current input

- Galvanically isolated
- Passive: 0/4 to 20 mA, R_i < 150 Ω, max. 30 V DC
- Terminal voltage: min. 2 V DC to max. 30 V DC
- Time constant selectable (0.05 to 100 s)
- Full scale value adjustable
- Temperature coefficient: typ. 0.002 % o.r./°C (o.r. = of reading)
- Resolution: 0.82 µA

Output

Output signal

Current Output

- Active/Passive selectable
  - Active 0/4 to 20 mA, R_i < 700 Ω
  - Passive 4 to 20 mA, 30VDC, R_i < 150 Ω
- Full Scale adjustable
- Temperature Coefficient type 0.005 % o.r./°C (o.r. = of reading)
- Time Constant Selectable (0.05 to 100 s)

Data logger function

The device has a data logger function. The measured values can be stored in CSV format on an external USB storage device (FAT 16/FAT 32). A recording cycle of between 1 and 99999 seconds can be selected. USB storage devices with a maximum capacity greater than 2 GB should not be used. Approx. 130 bytes are needed per recording. The standard supplied USB storage device has a maximum capacity of 1 GB.

The following values are stored:

- Time (dd.mm.yyyy hh:mm:ss)
- Flow
- Sound velocity
- Flow velocity
- Signal strength
- Signal to noise ratio
- Totalizer (1 to 3)
- System status
- 0/4 to 20 mA current input (flow rate and active current value)

Each recording is marked with the tag name and device-specific information, such as the serial number for example.

Site Manager function

Allows for storage of programmed sites (pipe data, sensor data, fluid data, etc.) on an eternal USB storage device. Up to 20 sites can be stored.

Low flow cut off

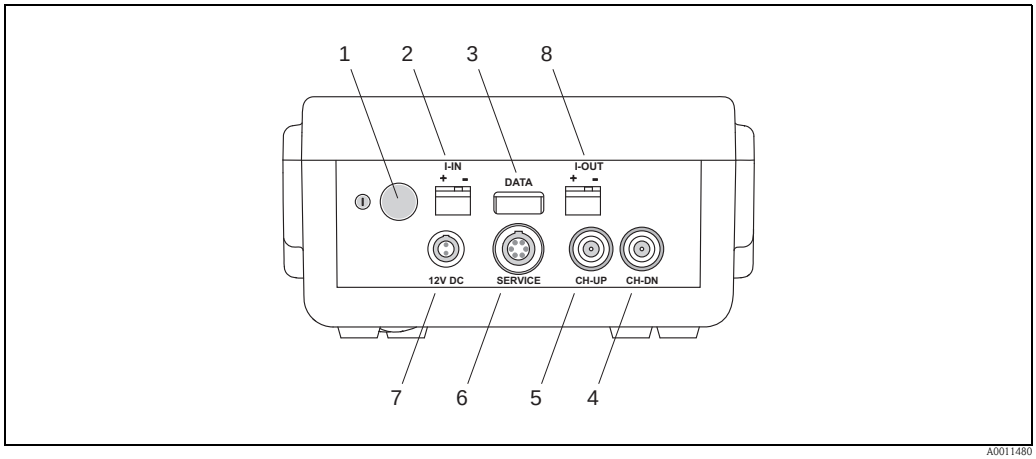
Switch points for low flow cutoff are selectable.

Galvanic isolation

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

Power supply

Measuring unit electrical connection



Connecting the transmitter

1 ON/OFF switch (press switch ≥ 3 seconds)
2 Current input connection
3 USB plug connection
4 Connecting cable connection (CH-DN, downstream)
5 Connecting cable connection (CH-UP, upstream)
6 FXA193/FXA291 modem connection
7 Charger connection (a selection of detachable plug adapters is available)
8 Current Output connection

Supply voltage

Transmitter

Power unit
- 100 to 240 V AC, 47 to 63 Hz to Power Adapter (12 V DC, 2.5 A)

Note!
Do not exceed 16V input voltage!

NiMH accumulator

- Operating time: at least 8 hours
- Charge time: approx. 3.6 hours

Sensor

Powered by the transmitter

Connecting cable (sensor/transmitter)

Only use the connecting cables supplied by Endress+Hauser.

Different versions of the connecting cables are available → 20.
- Cable material: PTFE
- Cable lengths: 5 m (16.4 ft), 10 m (32.8 ft)

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

Potential equalization

For potential equalization, no special measures are necessary.

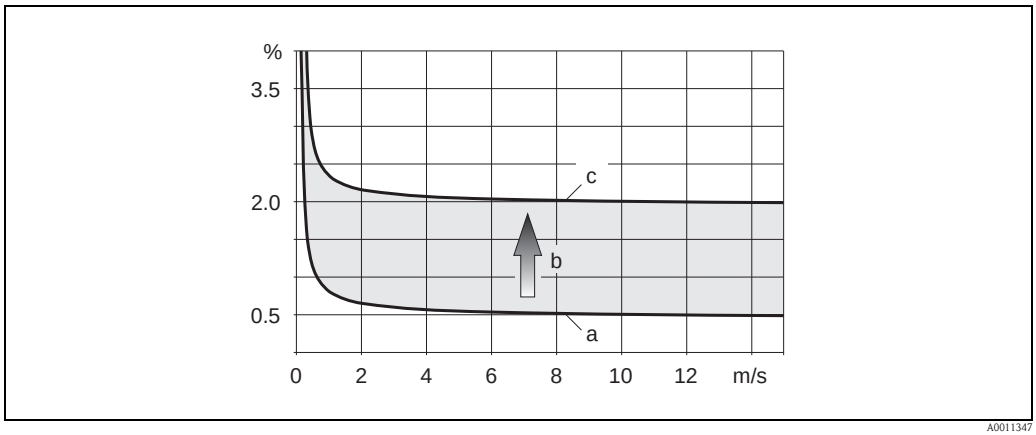
Performance characteristics

Reference operating conditions

- Fluid temperature: +20 to +30 °C
- Ambient temperature: +22 °C ± 2 K
- Warm-up period: 30 minutes
- Sensors and transmitter are grounded
- The measuring sensors are correctly installed

Maximum measured error

The measured error depends on a number of factors. A distinction is made between the measured error of the device (Prosonic Flow 93T = 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.



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 (1 to 8")	±0.5 % o.r. ± 7.5 mm/s	+	±1.5 % o.r.	→	±2 % o.r. ± 7.5 mm/s
> DN 200 (8")	±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 factory 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 50 (2") or DN 100 (4") respectively.

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
DN 50 (2")	±0.5 % o.r. ± 5 mm/s
DN 100 (4")	±0.5 % o.r. ± 7.5 mm/s

o.r. = of reading

Repeatability

±0.3 % for flow velocities > 0.3 m/s (1 ft/s)

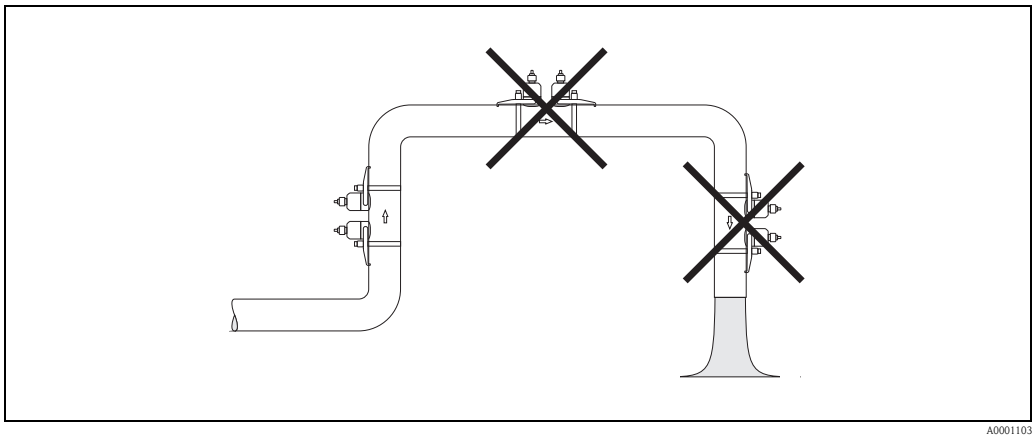
Operating conditions: installation

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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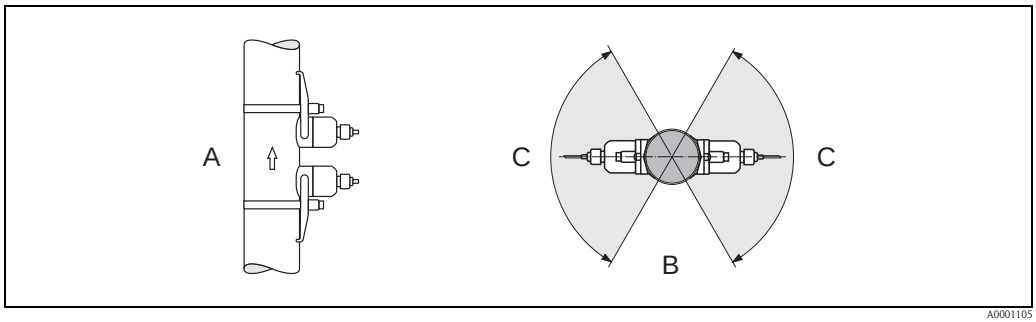
Orientation

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

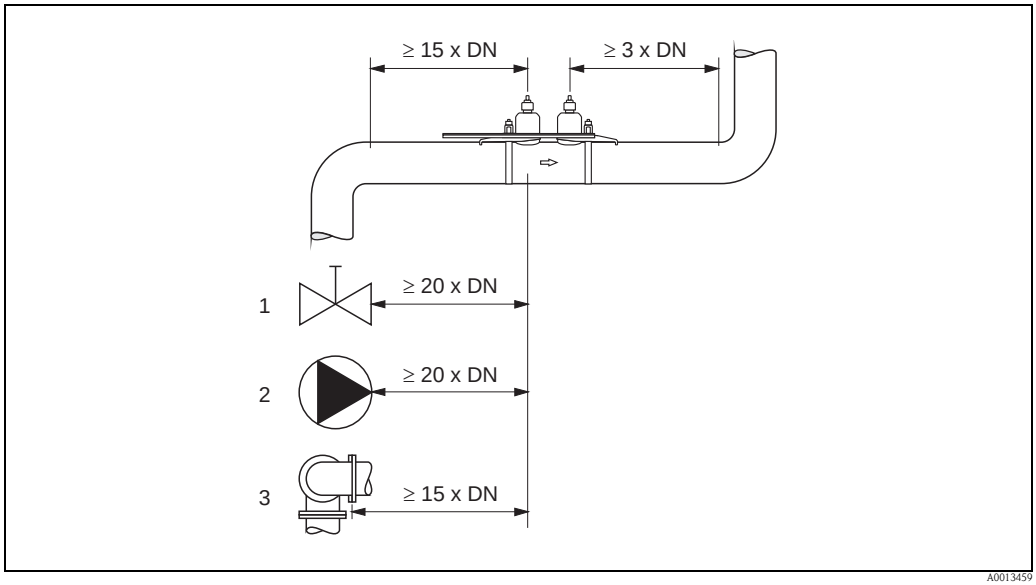
In the recommended installation range in a horizontal installation position (View B), gas and air collections at the pipe cover and problematic deposits at the bottom of the pipe have a smaller influence on measurement.



A Recommended orientation with upward direction of flow
B Recommended installation range with horizontal orientation
C Recommended installation range max. 120°

Inlet and outlet runs

If possible, install the sensor well clear of fittings such as valves, T-pieces, elbows, etc. Compliance with the following inlet and outlet runs is required in order to ensure measuring accuracy.



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

Operating conditions: environment

Ambient temperature range

Transmitter

0 to +60 °C (+32 to +140 °F)

Prosonic Flow P sensor

DN 15 to 65 (½ to 2½")
- Standard: –40 to +100 °C (–40 to +212 °F)
- Optional: –40 to +150 °C (–40 to +302 °F)

DN 50 to 4000 (2 to 160")
- Standard: –40 to +80 °C (–40 to +176 °F)
- Optional: 0 to +170 °C (+32 to +338 °F)

DDU18 sensor (accessories: sound velocity measurement)

- Standard: –40 to +80 °C (–40 to +176 °F)
- Optional: 0 to +170 °C (+32 to +338 °F)

DDU20 sensor (accessories: wall thickness measurement)

–20 to +60 °C (–4 to +140 °F)

Connecting cable (sensor/transmitter)

–40 to +170 °C (–40 to +338 °F)

Storage temperature

The storage temperature corresponds to the ambient temperature range.

Degree of protection

Transmitter

IP 40

Sensor

IP 68 (NEMA 6P), connection IP 50

DDU18 sensor (accessories: sound velocity measurement)

IP 68 (NEMA 6P), connection IP 50

DDU20 sensor (accessories: wall thickness measurement)

IP 67 (NEMA 4X), connection IP 50

Shock and vibration resistance

According to IEC 68-2-6

Electromagnetic compatibility (EMC)

Electromagnetic compatibility (EMC requirements) according to IEC/EN 61326 "Emission to class A requirements" and NAMUR Recommendation NE 21 and NE 43.

Operating conditions: process

Medium temperature range

Prosonic Flow P sensor

DN 15 to 65 (½ to 2½")
- Standard: –40 to +100 °C (–40 to +212 °F)
- Optional: –40 to +150 °C (–40 to +302 °F)

DN 50 to 4000 (2 to 160")
- Standard: –40 to +80 °C (–40 to +176 °F)
- Optional: 0 to +170 °C (+32 to +338 °F)

DDU18 sensor (accessories: sound velocity measurement)

- Standard: –40 to +80 °C (–40 to +176 °F)
- Optional: 0 to +170 °C (+32 to +338 °F)

DDU20 sensor (accessories: wall thickness measurement)

–10 to +60 °C (+14 to +140 °F)

Medium pressure range (nominal pressure)

No pressure limitation, however perfect measurement requires that the static fluid pressure is higher than vapor pressure.

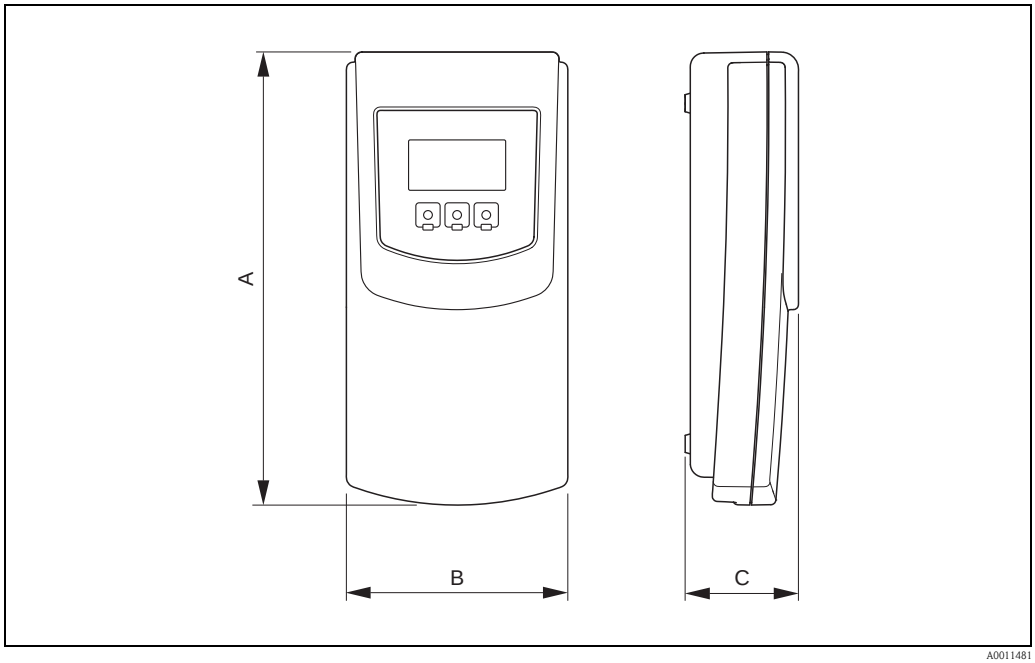
Pressure loss

There is no pressure loss.

Mechanical construction

Design, dimensions

Transmitter



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Dimensions in SI units

A	B	C
270	130	63

All dimensions in [mm]

Dimensions in US units

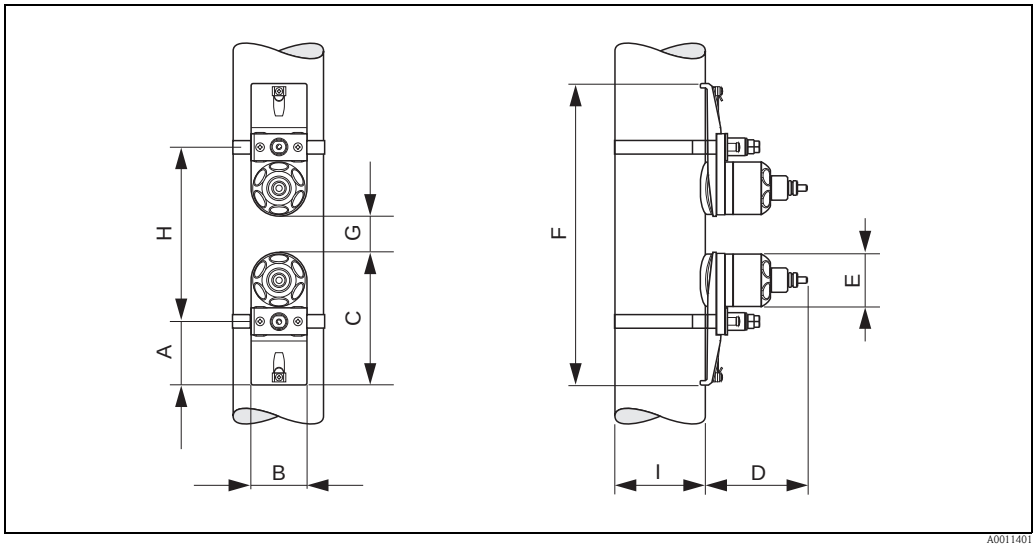
A	B	C
10.6	5.12	2.48

All dimensions in [inch]

Protective bag

The dimensions (length × width × height) of the protective bag for the transmitter are:
280 × 150 × 80 mm (11.0 × 5.90 × 3.15")

Prosonic Flow P sensor (DN 50 to 4000 / 2 to 160")



Mounting arrangement for measurement via two traverses

Dimensions in SI units

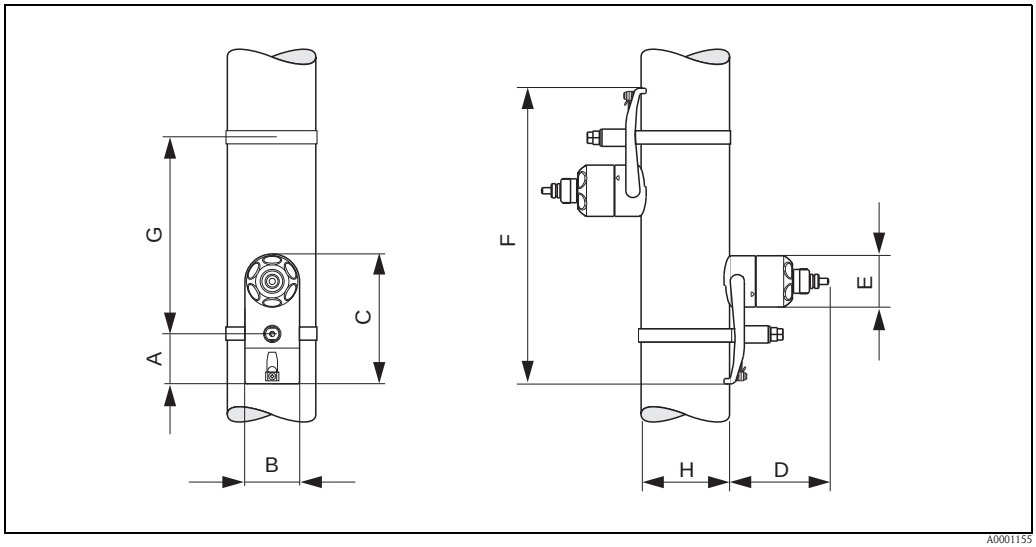
A	B	C	D	E	F	G
56	62	145	111	∅ 58	max. 872	min. 0.5
H					I	
Depends on the measuring point conditions (pipe, fluid, etc.). Dimension "H" can be determined: ■ Via transmitter programming (Quick Setup or FieldCare) ■ Online (Applicator)					Pipe outer diameter	

All dimensions in [mm]

Dimensions in US units

A	B	C	D	E	F	G
2.20	2.44	5.71	4.37	∅ 2.28	max. 34.3	min. 0.2
H					I	
Depends on the measuring point conditions (pipe, fluid, etc.). Dimension "H" can be determined: ■ Via transmitter programming (Quick Setup or FieldCare) ■ Online (Applicator)					Pipe outer diameter	

All dimensions in [inch]



Mounting arrangement for measurement via one 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 "G" can be determined: ■ Via transmitter programming (Quick Setup or FieldCare) ■ Online (Applicator)				Pipe outer diameter	

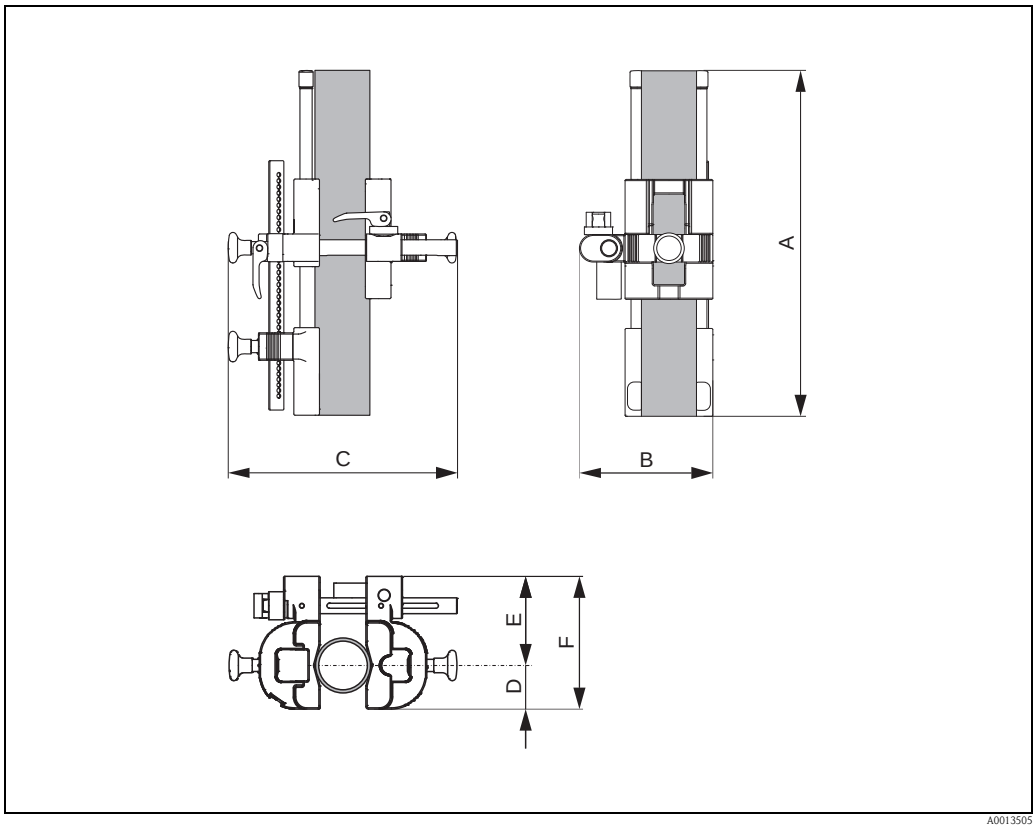
All dimensions in [mm]

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 "G" can be determined: ■ Via transmitter programming (Quick Setup or FieldCare) ■ Online (Applicator)				Pipe outer diameter	

All dimensions in [inch]

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



Model 2

Dimensions in SI units

A	B	C (min./max.)	D	E	F
285	110	210/255	35	75	110

All dimensions in [mm]

Dimensions in US units

A	B	C (min./max.)	D	E	F
11.2	4.33	8.27/10.0	1.38	2.95	4.33

All dimensions in [inch]

Weight

Transmitter

1.6 kg (3.53 lbs)

Sensor Prosonic Flow P

- DN 15 to 65 (½ to 2½") (incl. mounting material): 1.78 kg (3.9 lbs)
- DN 50 to 4000 (2 to 160") (incl. mounting material): 2.8 kg (6.2 lbs)

Sensor (accessories)

- Prosonic Flow DDU18 (incl. mounting material): 2.4 kg (5.3 lbs)
- Prosonic Flow DDU20 (incl. mounting material): 0.23 kg (0.5 lbs)

Note!
Weight information without packaging material.

Materials

Transmitter

Plastic

Sensor Prosonic Flow P

DN 15 to 65 (½ to 2½")
- Sensor holder: corrosion protected aluminum, stainless steel 1.4301/304
- Sensor housing: stainless steel 1.4301/304
- Sensor contact surfaces: chemically stable plastic

DN 50 to 4000 (2 to 160")
- Sensor holder: stainless steel 1.4308/CF-08
- Sensor housing: stainless steel 1.4301/304
- Strapping bands/bracket: textile or stainless steel 1.4301/304
- Sensor contact surfaces: chemically stable plastic

Sensor (accessories)

Prosonic Flow DDU18; Prosonic Flow DDU20
- Sensor holder: stainless steel 1.4308/CF-08
- Sensor housing: stainless steel 1.4301/304
- Strapping bands/bracket: textile or stainless steel 1.4301/304
- Sensor contact surfaces: chemically stable plastic

Connecting cable (sensor/transmitter)

PTFE connecting cable
- Cable sheath: PTFE
- Cable connector: stainless steel

Human interface

Display elements

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

Operating elements

- Local operation with three optical keys
- Application specific Quick Setup menus for straightforward commissioning

Language group

Language groups available for operation in different countries:

- Western Europe and America (WEA):
  English, German, Spanish, Italian, French, Dutch and Portuguese
- Eastern Europe/Scandinavia (EES):
  English, Russian, Polish, Norwegian, Finnish, Swedish and Czech
- South and Eastern Asia (SEA):
  English, Japanese, Indonesian
- China (CN):
  English, Chinese

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

Remote operation

Operation via FieldCare, with:

- Option of loading or saving preprogrammed measuring points
- Configuration logging
- Measured value visualization

Certificates and approvals

CE mark

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

C-Tick mark

The measuring system is in conformity with the EMC requirements of the "Australian Communications and Media Authority (ACMA)".

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.
- IEC/EN 61326
  "Emission in accordance with Class A requirements".
  Electromagnetic compatibility (EMC requirements).
- ANSI/ISA-S82.01
  Safety Standard for Electrical and Electronic Test, Measuring, Controlling and Related Equipment – General Requirements. Pollution Degree 2, Installation Category II.
- CAN/CSA-C22.2 No. 1010.1-92
  Safety Requirements for Electrical Equipment for Measurement and Control and Laboratory Use. Pollution degree 2.

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 P (DN 15 to 65 / ½ to 2½") Clamp-on version	DN 15 to 65 (½ to 2½") ■ –40 to +100 °C (–40 to +212 °F) ■ –40 to +150 °C (–40 to +302 °F)	 DK9PT - 1A DK9PT - 2A
Sensor P (DN 50 to 4000 / 2 to 160") Clamp-on version	DN 50 to 300 (2 to 12") ■ –40 to +80 °C (–40 to +176 °F) ■ –40 to +170 °C (–40 to +338 °F) DN 100 to 4000 (4 to 160") ■ –40 to +80 °C (–40 to +176 °F) ■ 0 to +170 °C (+32 to +338 °F)	 DK9PT - BA DK9PT - FA DK9PT - AA DK9PT - EA
Sensor DDU18	Sensor for sound velocity measurement –40 to +80 °C (–40 to +176 °F) 0 to +170 °C (+32 to +338 °F)	 50091703 50091704
Sensor DDU20	Sensor for wall thickness measurement. ■ –20 to +60 °C (–4 to +140 °F)	 71112217

Measuring principle-specific accessories

Accessory	Description	Order code
Sensor holder set	■ Prosonic Flow P (DN 15 to 65 / ½ to 2½"): Sensor holder, clamp-on version ■ Prosonic Flow P (DN 50 to 4000 / 2 to 160") – Sensor holder, fixed retaining nut, clamp-on version – Sensor holder, removable retaining nut, clamp-on version	 DK9SH - 2 DK9SH - A DK9SH - B
Clamp-on installation set	■ DN < 1500 (60") (textile strapping) ■ DN ≥ 1500 (60") (textile strapping) ■ DN 50 to 300 (2 to 12"): 0 to +170 °C (+32 to +338 °F) (stainless steel strapping)	DK9ZT - D DK9ZT - E DK9ZT - B
Connecting cable	5 m (16.4 ft) sensor cable, PTFE, –40 to +170 °C (–40 to +338 °F) 10 m (32.8 ft) sensor cable, PTFE, –40 to +170 °C (–40 to +338 °F)	DK9SS - CEE DK9SS - CEF
Acoustic coupling fluid	■ Coupling fluid: –40 to +170 °C (–40 to +338 °F), standard, high temperature ■ Adhesive coupling fluid: –40 to +80 °C (–40 to +176 °F) ■ Water-soluble coupling fluid: –20 to +80 °C (–4 to +176 °F) ■ Coupling fluid DDU20: –20 to +60 °C (–4 to +140 °F) ■ Coupling fluid: –40 to +100 °C (–40 to +212 °F), standard, type MBG2000	DK9CM - 2 DK9CM - 3 DK9CM - 4 DK9CM - 6 DK9CM - 7

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 website: www.endress.com
FXA193	Service interface from the measuring device to the PC for operation via FieldCare.	FXA193 - *
Communication cable	Communication cable for connecting the Prosonic Flow 93T transmitter to the FXA193 service interface.	DK9ZT - I
FXA291	Service interface from the measuring device to the PC for operation via FieldCare.	FXA291 - *
Communication cable	Communication cable for connecting the Prosonic Flow 93T transmitter to the FXA291 service interface.	DK9ZT - 8

Documentation

- Flow measurement (FA005D/06)
- Operating Instructions for Prosonic Flow 93T Portable (BA136D/06)

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