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

Technical Information

Proline Prosonic Flow 92F

Ultrasonic Flow Measuring System
2-Wire loop powered inline flowmeter



Application
The flowmeter is ideally suited for applications in process control and utility measurement in practically all sectors of industry such as the chemical and petrochemical industry, energy production and district heating.

- Loop powered transmitter (2-Wire)
- Accuracy up to ±0.3%
- Fluid temperatures up to 200 °C (392 °F)
- Process pressures up to 40 bar (ASME Cl. 300)
- Galvanically isolated pulse output available

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

Connection to common process control systems:
- HART, PROFIBUS PA, FOUNDATION Fieldbus

Relevant safety aspects:
- Pressure Equipment Directive (PED)
- Process sealing accoring to ISA 12.27.01

Your benefits
The Prosonic Flow 92F is a calibrated meter capable of measuring flow of conductive and especially non-conductive liquids such as solvents, hydrocarbons and non-conductive water.

The **Proline transmitter concept** comprises of:
- Diagnostic ability and data back-up capability for increased process quality
- Permanent self-monitoring and diagnosis of transmitter and sensor

The **Proline Prosonic Flow sensors** comprises:
- Available as a 2, 3 or 4 beam version
- Innovative 3 and 4 fourbeam design facilitates a reduced requirement for upstream pipework (≤ 5 pipe diameter)
- Calibration traceable to international standards
- No pressure drop
- Maintenance free due to no moving parts

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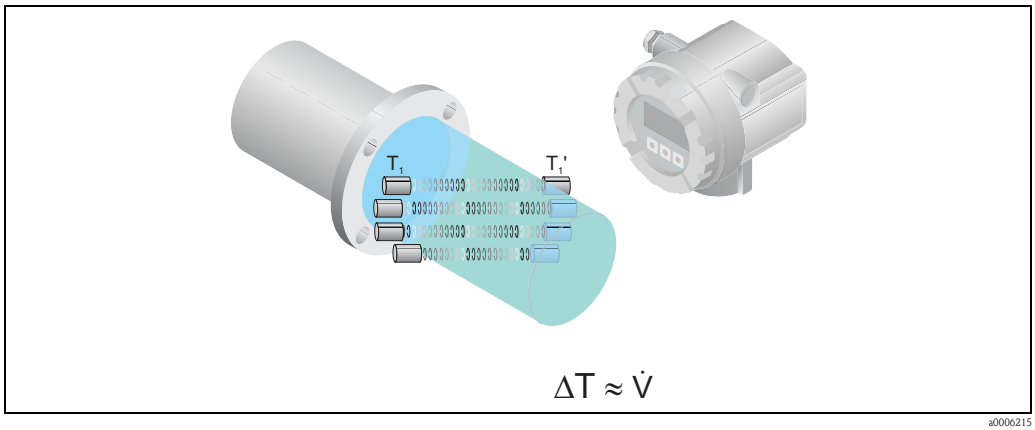
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Function and system design

Measuring principle

A Prosonic Flow inline flowmeter measures the flow rate of the passing fluid by using sensor pairs located on opposite sides of the meter body and at an angle so that one of the sensors in the pair is slightly downstream. The flow signal is established by alternating an acoustic signal between the sensor pairs and measuring the time of flight of each transmission. Then utilizing the fact that sound travels faster with the flow versus against the flow, this differential time (Δ 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.

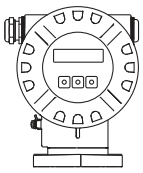
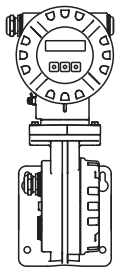


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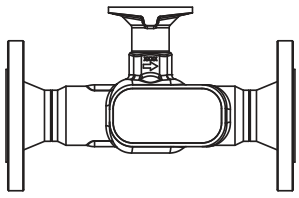
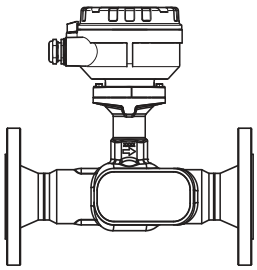
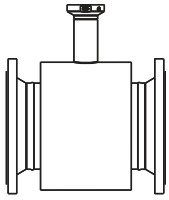
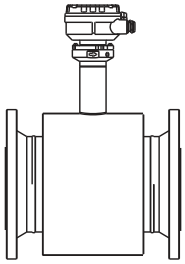
Measuring system

The measuring system consists of a transmitter and a sensor. Two versions are available:
- Compact version: transmitter and sensor form a mechanical unit
- Remote version: transmitter and sensor are mounted physically separate from one another

Transmitter

Prosonic Flow 92	Prosonic Flow 92 remote version	
 a0005962	 a0005963	■ Two line liquid crystal display ■ Operation with push buttons ■ 2-Wire loop powered ■ Optional explosion proof housing

Sensor

F  a0005966	**F (remote Version)**  a0005967	■ Nominal diameters DN 25 to 100 (1 to 4") ■ Process sensor for fluid temperatures up to 150 °C /302 °F (optional 200 °C /392 °F) ■ Tube material: stainless steel ■ Process pressures up to 40 bar Remote version: ■ IP67 housing (Optional IP68) ■ Standard remote cable length of 10 and 30 m (30 and 90 ft) ■ Optional remote cable length up to a maximum 50 m (150 ft)
F  a0014351	**F (remote Version)**  a0014352	■ Nominal diameters DN 150 to 300 (6 to 12") ■ Process sensor for fluid temperatures up to 150 °C /302 °F (optional 200 °C /392 °F) ■ Tube material: stainless steel, carbon steel ■ Process pressures up to 40 bar Remote version: ■ IP67 housing (Optional IP68) ■ Standard remote cable length of 10 and 30 m (30 and 90 ft) ■ Optional remote cable length up to a maximum 50 m (150 ft)

Input

Measured variable

Flow velocity (transit time difference proportional to flow velocity)

Measuring range

Typically v = –10 to 10 m/s with the specified accuracy

Nominal diameter		Range for full scale values (liquids) $m_{min(F)} \cdots m_{max(F)}$	
mm	inch	SI-Unit	US-Unit
25	1"	0 to 300 dm^3/min	0 to 80 gal/min
40	1½"	0 to 750 dm^3/min	0 to 200 gal/min
50	2"	0 to 1100 dm^3/min	0 to 300 gal/min
80	3"	0 to 3000 dm^3/min	0 to 800 gal/min
100	4"	0 to 4700 dm^3/min	0 to 1250 gal/min
150	6"	0 to 10 m^3/min	0 to 2800 gal/min
200	8"	0 to 20 m^3/min	0 to 5280 gal/min
250	10"	0 to 30 m^3/min	0 to 7930 gal/min
300	12"	0 to 40 m^3/min	0 to 10570 gal/min

Output

Outputs in general

The following measured variables can generally be output via the outputs:

	Current output	Freq. output	Pulse output	Status output
Volume flow	X	X	X	Limit value
Calculated Mass flow	X	X	X	Limit value
Sound velocity	X	X	–	Limit value
Flow velocity	X	X	–	Limit value
Signal strength	X	X	–	Limit value

Output signal

Current output:

Current output:
- 4 to 20 mA with HART
- Full scale value and time constant (0 to 100 s) can be set

Pulse/status output/Frequency output:

Open collector, passive, galvanically isolated
- Non-Ex, Ex d - version:
  U_{max} = 35 V, with 15 mA current limiting, Ri = 500
- Ex i version:
  U_{max} = 30 V, with 15 mA current limiting, Ri = 500

The pulse/status output can be configured as:
- Pulse output:
  - Pulse value and pulse polarity can be selected,
  - Pulse width can be configured (0.005 to 2s)
  - Pulse frequency max. 100 Hz
- Status output:
  Can be configured for diagnosis code messages or flow limit values
- Frequency output:
  End frequency 0 to 1000 Hz (f_{max} = 1250 Hz)

PROFIBUS PA interface

- PROFIBUS PA in accordance with IEC 61158 (MBP), galvanically isolated
- Profile Version 3.01
- Data transmission rate: 31.25 kBaud
- Current consumption: 16 mA
- Permitted supply voltage: 9 to 32 V; 0.5 W
- Bus connection with integrated reverse polarity protection
- Error current FDE (Fault Disconnection Electronic): 0 mA
- Signal coding: Manchester II
- Bus address can be configured via miniature switches at the device or operating program

FOUNDATION Fieldbus interface:

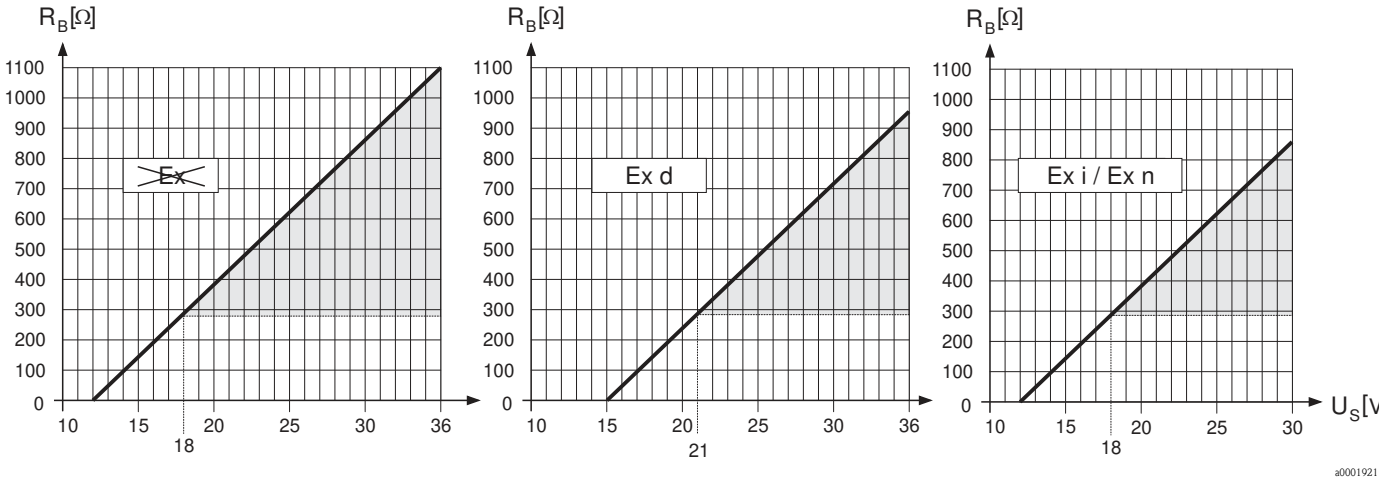
- FOUNDATION Fieldbus H1, IEC 61158-2, galvanically isolated
- Data transmission rate: 31.25 kBit/s
- Current consumption: 16 mA
- Permitted supply voltage: 9 to 32 V
- Error current FDE (Fault Disconnection Electronic): 0 mA
- Bus connection with integrated reverse polarity protection
- Signal encoding: Manchester II
- ITK Version 5.0
- Function blocks: 4 × Analog Input, 1 × Analog Output, 1 × Digital Input, 1 × Digital Output, 1 × PID
- Output data: Volume flow, Sound velocity, Flow velocity, Signal strength, Totalizers 1 to 2
- Input data: Positive zero return (ON/OFF), Zero point adjustment, Reset totalizer
- Link Master (LM) function is supported

Signal on alarm

Current output:
Failsafe mode selectable (e.g. in accordance with NAMUR Recommendation NE 43)

Status output:
"Non conductive" in the event of fault or power supply failure.

Load



Behavior of load and supply voltage

The area marked in gray indicates the permissible load (with HART: min. 250 .)
The load is calculated as follows:

$$R_B = \frac{(U_S - U_{KL})}{(I_{max} - 10^{-3})} = \frac{(U_S - U_{KL})}{0.022}$$

R_B *Load, load resistance*
U_S *Supply voltage:*
- *Non-Ex = 12 to 35 V DC*
- *Ex d = 15 to 35 V DC*
- *Ex i = 12 to 30 V DC*

U_{KL} *Terminal voltage:*
- *Non-Ex = min. 12 V DC*
- *Ex d = min. 15 V DC*
- *Ex i = min. 12 V DC*

$I_{max.}$ *Output current (22.6 mA)*

Low flow cutoff

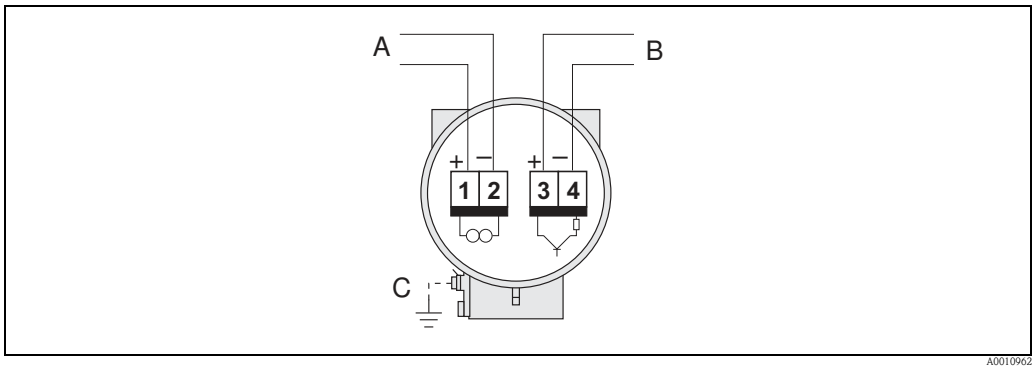
Switch points for low flow cutoff can be selected as required.

Galvanic isolation

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

Power supply

Electrical connection measuring unit

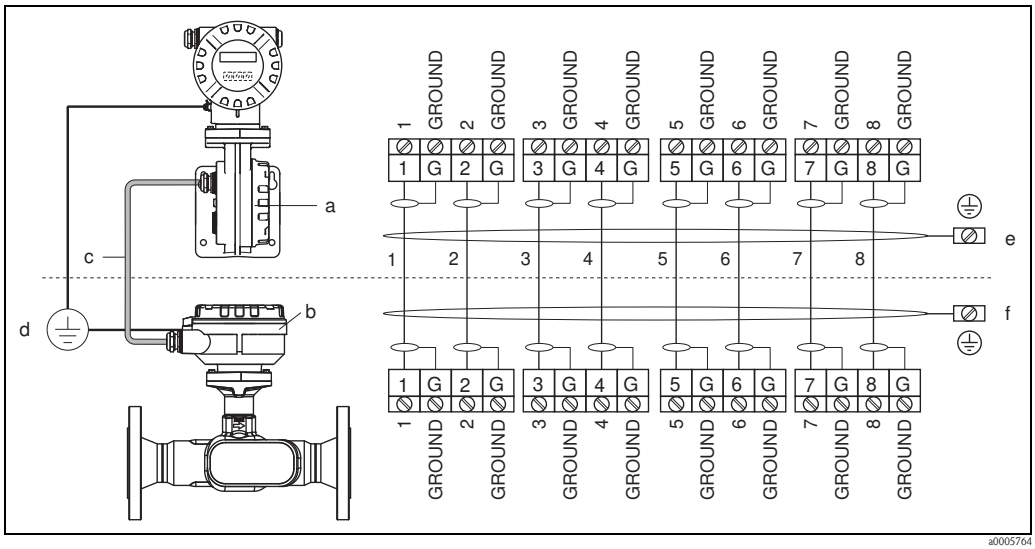


A – HART: power supply, current output
– PROFIBUS PA: 1 = PA+, 2 = PA–
– FOUNDATION Fieldbus: 1 = FF+, 2 = FF–
B Optional frequency output (not for PROFIBUS PA , FOUNDATION Fieldbus), can also be operated as Pulse or status output
C Ground terminal (relevant for remote version)

Terminal assignment

Order version	Terminal No. (inputs/outputs) 1	2	3	4
92***-**********W	HART current output		–	
92***-**********A	HART current output		Pulse/status output/frequency output	
92F**-**********H	PA+	PA–	–	
92F**-**********K	FF+	FF–	–	

Electrical connection remote version



Connecting the remote version

a Cover of the connection compartment (transmitter)
b Cover of the connection compartment (sensor)
c Connecting cable (signal cable)
d Identical potential matching for sensor and transmitter
e Connect the shielding to the ground terminal in the transmitter housing and keep it as short as possible
f Connect the shielding to the ground terminal in the connection housing

Supply voltage

HART:

Non-Ex: 12 to 35 V DC (with HART: 18 to 35 V DC)
Ex i: 12 to 30 V DC (with HART 18 to 30 V DC)
Ex d: 15 to 35 V DC (with HART: 21 to 35 V DC)

PROFIBUS PA and FOUNDATION Fieldbus:

- Non-Ex: 9 to 32 V DC
- Ex i/IS and Ex n: 9 to 30 V DC
- Ex d/XP: 9 to 35 V DC
- Current consumption → PROFIBUS PA: 16 mA, FOUNDATION Fieldbus: 16 mA

Cable entries

Power supply and signal cables (inputs/outputs):
- Cable entry M20 × 1.5
- Thread for cable entries, ½" NPT, G ½" (not for threaded version)
- Optional processing sealing according ISA 12.27.01

Remote version cable specifications

- Use a connecting cable with a continuous service temperature range of at least: –40 °C /–40 °F (permitted max. ambient temperature plus 10 °C /18 °F)
- The cables are available with a fixed length of 10 m and 30 m and optionally available with variable lengths ranging from 1 m (3.3 ft) to max. 50 m (164 ft).

Power supply failure

- Totalizer stops at the last value determined (can be configured).
- All settings are kept in the HISTO-RAM, T-DAT.
- Diagnosis code messages (incl. value of operated hours counter) are stored.

Performance characteristics

Reference calibration conditions

Error limits following ISO/DIN 11631:
- 20 to 30 °C (68 to 86 °F); 2 to 4 bar
- Calibration systems as per national norms
- Zero point calibrated under operating conditions

Maximum measured error

DN 25 to DN 300 (1 to 12")

0.5 to 10 m/s (1.6 ft to 33 ft/s)	±0.5% of reading *

Optional for DN 80 to DN 300 (3 to 12")

0.5 to 10 m/s (1.6 ft to 33 ft/s)	±0.3% of reading *

* For a Reynolds number > 10000

Repeatability

±0.2% of reading

Operating conditions: Installation

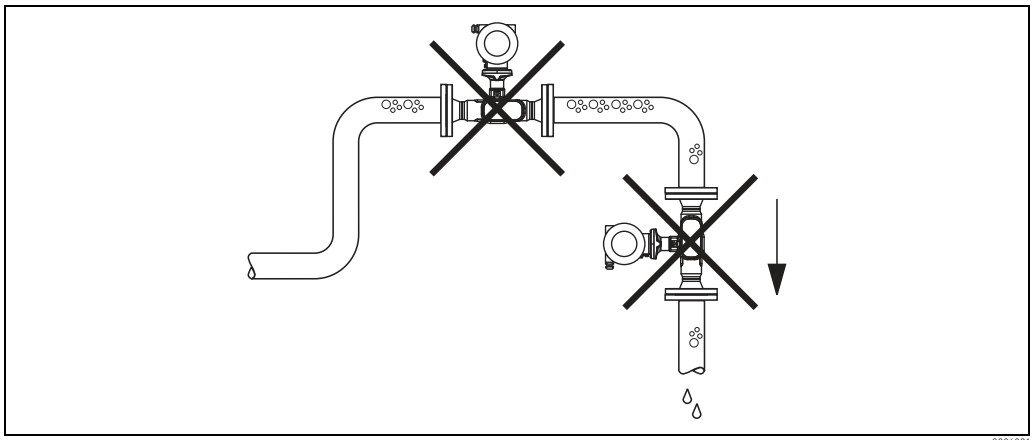
Note the following points:
- No special measures such as supports are necessary. External forces are absorbed by the construction of the instrument.
- The flowmeter flanges must be coplanar with connecting flanges and free from tension.
- The maximum permitted ambient temperatures (→ 12) and fluid temperatures (→ 13) must be observed.
- Pay particular attention to the notes on orientation and piping insulation on the following pages.
- The correct operation of the measuring system is not influenced by pipe vibrations.

Installation instructions

Mounting location

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

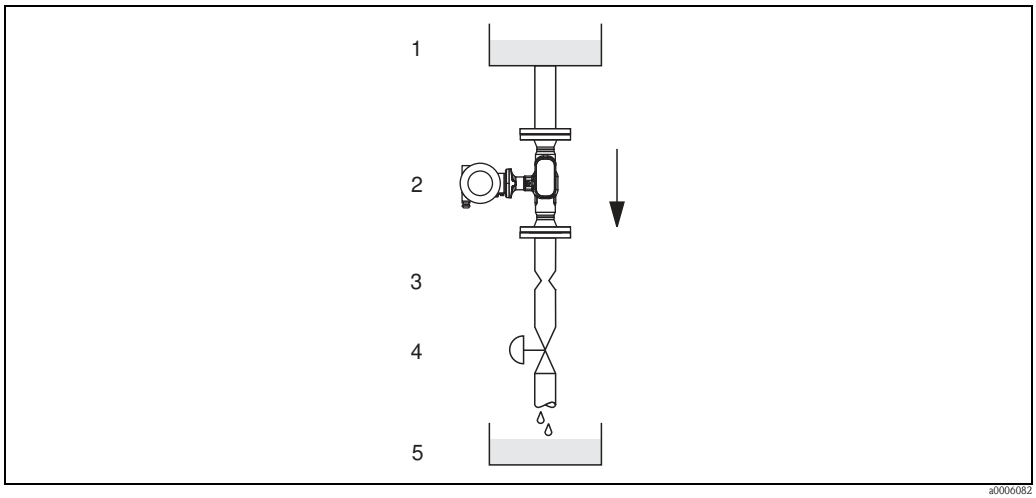
Avoid the following mounting locations in the pipe:
- Highest point of a pipeline. Risk of air accumulating.
- Directly upstream from a free pipe outlet in a vertical pipeline.



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Mounting location

Notwithstanding the above, the installation proposal below permits installation in an open vertical pipeline. Pipe restrictions or the use of an orifice with a smaller cross section than the nominal diameter prevent the sensor running empty while measurement is in progress.

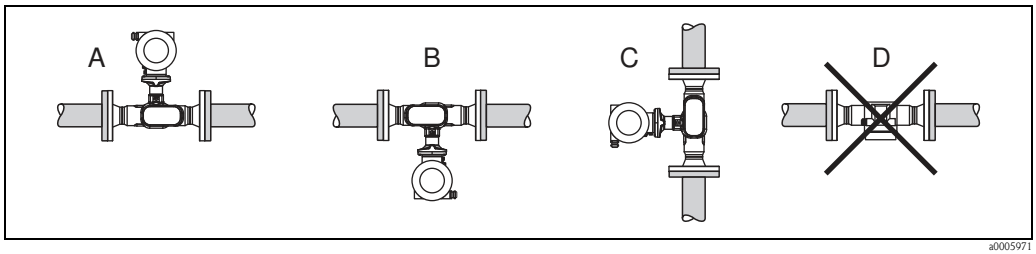


Installation in a down pipe (e.g. for batching applications)

1 = Supply tank , 2 = Sensor, 3 = Orifice plate, pipe restriction , 4 = Valve, 5 = Batching tank

Orientation

Make sure that the direction of the arrow on the nameplate of the sensor matches the direction of flow (direction of fluid flow through the pipe).



Orientations A, B and C recommended, orientation D only recommended under certain circumstances

Heating

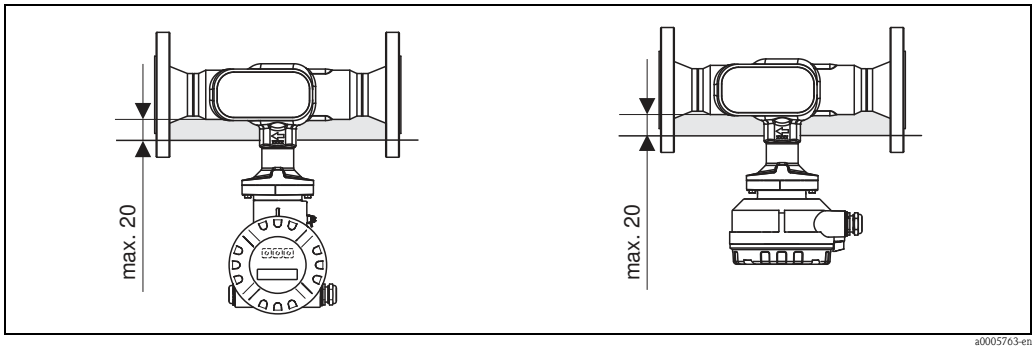
Some fluids require heat to be transfered at the sensor. Heating can be electrical, such as electrical heat tracing or by heat jacketing, the meter.

Caution!

- Risk of electronics overheating! Consequently, make sure that the adapter between the sensor and transmitter and the connection housing of the remote version always remain free of insulating material. Note that the orientation of the meter could significantly reduce the temperature at the electronics.
- If using an electric trace heating system whose heating is regulated via phase angle control or pulse packages, influence on the measured values cannot be ruled out due to magnetic fields (i.e. for values that are greater than the values approved by the EN standard (sine 30 A/m)). In such instances, it is necessary to magnetically shield the sensor

Thermal insulation

Some fluids require suitable measures to avoid heat transfer at the sensor. A wide range of materials can be used to provide the required thermal insulation.



A maximum insulation thickness of 20 mm must be observed in the area of the electronics/neck..

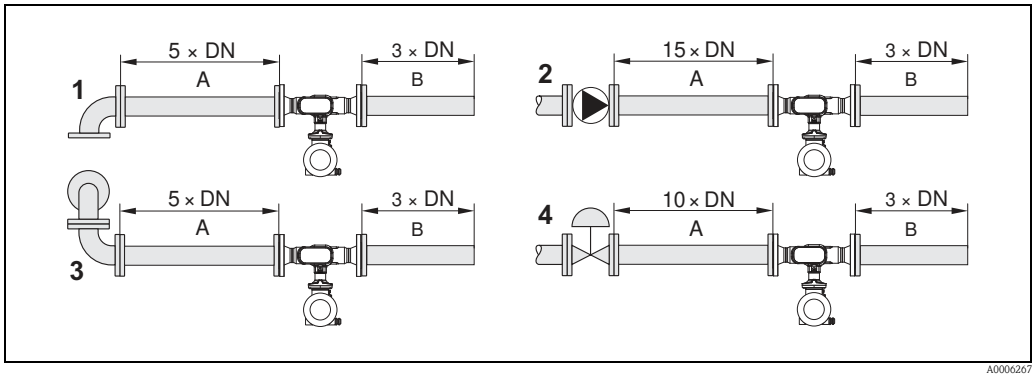
If the device is installed horizontally (with transmitter head pointing upwards), an insulation thickness of min. 10 mm is recommended to reduce convection. The maximum insulation thickness of 20 mm must not be exceeded.

Limiting flow

Information on limiting flow is provided under "Measuring range" in the technical data section.

Inlet and outlet runs

If possible, install the sensor well clear of fittings such as valves, T-pieces, elbows, etc. As a minimum, the inlet and outlet runs shown below must be observed to achieve the specified accuracy of the device. The longest inlet run shown must be observed if two or more flow disturbances are present.



Minimum inlet and outlet runs with various flow obstructions (values given for 3 and 4 path versions)

A = Inlet run, B = Outlet run, 1 = 90° elbow or T-piece, 2 = Pump, 3 = 2 × 90° elbow, out of plane, 4 = Control valve

Operating conditions: Environment

Ambient temperature range

Compact version
- Standard: –40 to +60 °C (–40 to 140 °F)
- EEx-d / EEx-i version: –40 to +60 °C (–40 to 140 °F)

Display can be read between –20 to +70 °C (–4 to 158 °F)

Remote version
- Sensor:
  - Standard: –40 to +80 °C (–40 to 176 °F)
  - EEx-d / EEx-i version: –40 to +80 °C (–40 to 176 °F)
- Transmitter:
  - Standard: –40 to +60 °C (–40 to 140 °F)
  - EEx-i version: –40 to +60 °C (–40 to 140 °F)
  - EEx-d version: –40 to +60 °C (–40 to 140 °F)

Display can be read between –20 to +70 °C (–40 to 158 °F)



Note!
When mounting outside, protect from direct sunlight with a protective cover (order number 543199), especially in warmer climates with high ambient temperatures.

Storage temperature

Standard: –40 to +80 °C (–40 to 176 °F)
EEx-d / EEx-i version: –40 to +80 °C (–40 to 176 °F)

Degree of protection

- Transmitter Prosonic Flow 92: IP67 (NEMA 4X)
- Sensor Prosonic Flow F Inline: IP67 (NEMA 4X)
  Optional: IP 68 (NEMA 6P)



Note!
The Prosonic Flow 92 F can be supplied with IP 68 rating (permanent immersion in water to a depth of 3 meters /98 ft). In this case the transmitter must be installed remote from the sensor.

Shock resistance

In accordance with IEC 68-2-31

Vibration resistance

Acceleration up to 1 g, 10 to 150 Hz, following IEC 68-2-6

Electromagnetic compatibility (EMC)

To IEC/EN 61326 and NAMUR recommendation NE 21

Operating conditions: Process

Fluid temperature range

Size Range	DN 25 to 100 (1 to 4")	DN 150 to 300 (6 to 12")		
Standard	ASME & AD2000	ASME & AD2000	ASME	AD2000
Version	Stainless Steel	Stainless Steel	Carbon Steel	Carbon Steel
Standard	–40 to 150 °C (–40 to 302 °F)	–40 to 150 °C (–40 to 302 °F)	–29 to 130 °C* (–84 to 266 °F)	–10 to 130 °C (–14 to 266 °F)
Optional	–40 to 200 °C (–40 to 392 °F)	–40 to 200 °C (–40 to 392 °F)	–29 to 200 °C* (–20 to 392 °F)	–10 to 200 °C (–14 to 392 °F)

*For PED device minimum temperature is –10 °C (14 °F)

Medium pressure range (nominal pressure)

EN PN 16 to 40 / ASME Cl 150, Cl 300 / JIS 10K, 20K

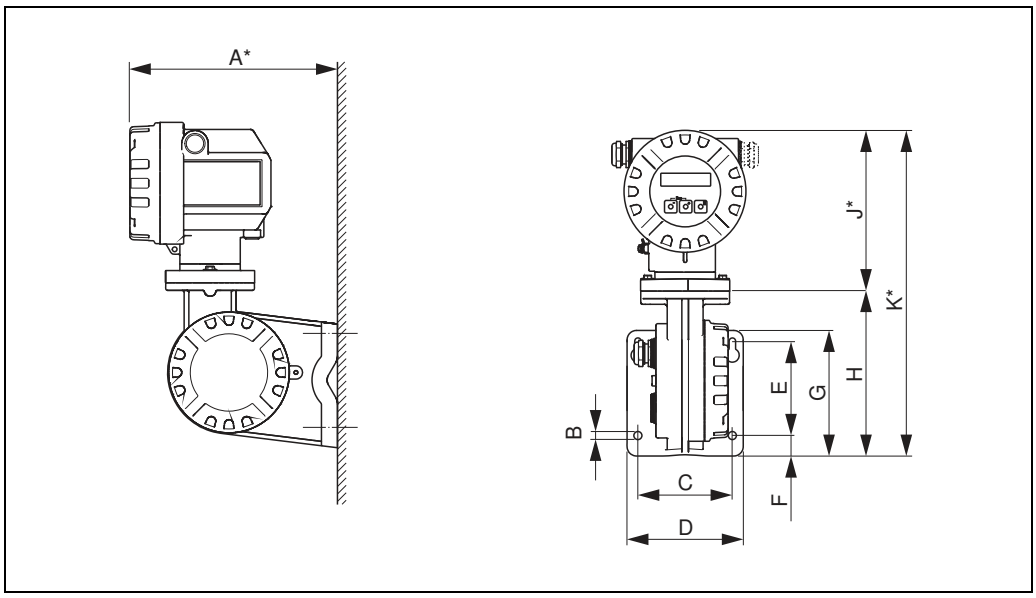
Pressure loss

Pressure loss is negligible if the sensor is installed in a pipe of the same nominal diameter.

Mechanical construction

Design, dimensions, weights

Dimensions of transmitter, remote version



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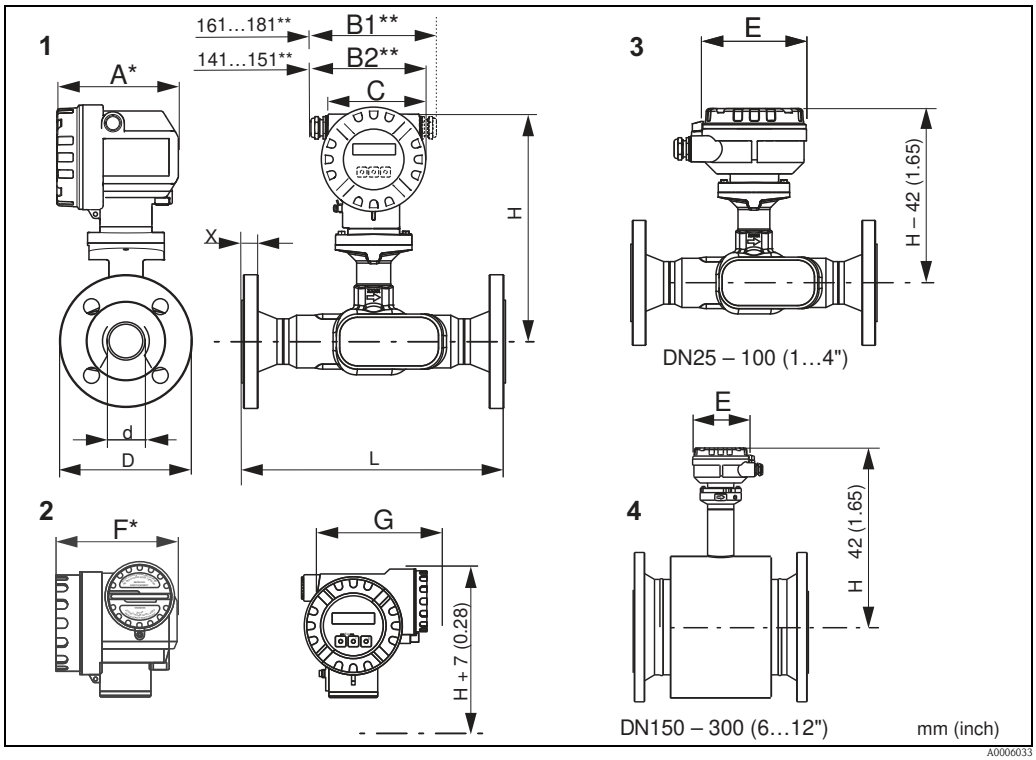
A [mm] (inch)	B [mm] (inch)	C [mm] (inch)	D [mm] (inch)	E [mm] (inch)	F [mm] (inch)	G [mm] (inch)	H [mm] (inch)	J [mm] (inch)	K [mm] (inch)
232 9.13	∅ 8.6 (M8) 0.3	100 3.9	123 4.8	100 3.9	23 0.9	144 5,7	170 6.7	170 6.7	340 13.4

* The following dimensions differ depending on the version:
– The dimension 232 mm (9.13 inch) changes to 226 mm (8.9 inch) in the blind version (without local operation).
– The dimension 170 mm (6.9 inch) changes to 183 mm (7.2 inch) in the Ex d/XP version.
– The dimension 340 mm (13.4 inch) changes to 353 mm (13.9 inch) in the Ex d/XP version.

Note!
The transmitter housing has one cable gland or cable entry. Measuring devices with a pulse, frequency or status output have two cable glands or cable entries (devices with TIIS approval only have one cable gland).

Dimensions of Prosonic Flow 92F

Flanged version to:
- EN 1092-1 (DIN 2501), Ra = 6.3 to 12.5 µm
  Raised face to: EN 1092-1 Form B1 (DIN 2526 Form C), PN 10 to 40, Ra = 6.3 to 12.5 µm
- ASME B16.5, Class 150 to 300, Ra = 125 to 250 µin
- AARH/Ra = 125 to 250 µin
- JIS B2220, 10 to 40K, Ra = 125 to 250 µin



1 Standard- and Ex -i version
2 Ex d version (Transmitter)
3 Remote version DN 25 to 100 (1 to 4")
4 Remote version DN 150 to 300 (6 to 12")

Dimensions of Prosonic Flow 92F

	A	B1**	B2**	C	E	F*	G
mm	149	–	–	121	105	151	161
inch	5.87	6.34…7.13	5.55…5.94	4.76	4.13	5.94	6.34

* The following dimensions change as follows in the blind version (without local operation):
– Standard, and Ex i version: the dimension 149 mm (5.87 inch) changes to 142 mm (5.60 inch) in the blind version.
–Ex d version: the dimension 151 mm (5.94 inch) changes to 144 mm (5.67 inch) in the blind version.
** The dimension depends on the cable gland used.

Note!
The weight data refer to the compact version.
The weight of the remote version is approx. 0.9 kg (1.98 lbs) greater.

Flange according to EN 1092-1

DN	Pressure rating	d [mm]	D [mm]	H [mm]	L [mm]*	X [mm]*	Weight [kg]
25	PN 40	28.5	115.0	284.5	300	18	10
40	PN 40	43.1	150.0	287.0	315	18	12
50	PN 40	54.5	165.0	291.5	325	20	14
80	PN 40	82.5	200.0	310.5	390	24	24
100	PN 16	107.1	220.0	323.5	460	20	32
	PN 40	107.1	235.0			24	35
150	PN 16	159.3	285.0	439.2	400	23	33.0
	PN 40	159.3	300.0		400	33	53.9
200	PN 16	207.3	340.0	464.6	400	25	44.2
	PN 40	206.5	375.0		400	41	92.0
250	PN 16	260.4	405.0	491.6	400	28	62.7
	PN 40	258.8	450.0		450	47	130.9
300	PN 16	309.7	460.0	517.0	500	32	82.1
	PN 40	307.9	515.0		500	55	174.3

*including raised face

Flange according to ASME B16.5 (SI-Units)

Size	Pressure rating		d [mm]	D [mm]	H [mm]	L [mm]*	X [mm]*	Weight [kg]
25	Schedule 40	Cl. 150	26.7	107.9	284.5	300	15.7	9
		Cl. 300	26.7	123.8			19.1	10
	Schedule 80	Cl. 150	24.3	107.9			15.7	9
		Cl. 300	24.3	123.8			19.1	10
40	Schedule 40	Cl. 150	40.9	127.0	287.0	315	17.5	11
		Cl. 300	40.9	155.6			20.6	13
	Schedule 80	Cl. 150	38.1	127.0			17.5	11
		Cl. 300	38.1	155.6			20.6	13
50	Schedule 40	Cl. 150	52.6	152.4	291.5	325	19.1	13
		Cl. 300	52.6	165.0			22.4	14
	Schedule 80	Cl. 150	49.2	152.4			19.1	13
		Cl. 300	49.2	165.0			22.4	15
80	Schedule 40	Cl. 150	78.0	190.5	310.5	390	23.9	24
		Cl. 300	78.0	210.0			28.4	28
	Schedule 80	Cl. 150	73.7	190.5			23.9	25
		Cl. 300	73.7	210.0			28.4	28
100	Schedule 40	Cl. 150	102.4	228.6	330.0	460	24.4	36
		Cl. 300	102.4	254.0			31.8	44
	Schedule 80	Cl. 150	97.0	228.6			24.4	36
		Cl. 300	97.0	254.0			31.8	44
150	Schedule 40	Cl. 150	154.1	279.4	439.2	400	25.4	38.9
		Cl. 300	154.1	317.5		450	36.7	56.5
200	Schedule 40	Cl. 150	202.7	342.9	464.6	400	28.4	57.6
		Cl. 300	202.7	381.0		450	41.1	82.6
250	Schedule 40	Cl. 150	254.5	406.4	491.6	450	30.2	79.9
		Cl. 300	254.5	444.5		500	47.8	118.3
300	Schedule 40	Cl. 150	303.2	482.5	517.0	500	31.8	113.5
		Cl. 300	303.2	520.7		550	50.8	164.5

*including raised face

Flange according to ASME B16.5 (US-Units)

DN	Druckstufe		d [inch]	D [inch]	H [inch]	L [inch]*	X [inch]*	Gewicht [lbs]
1 "	Schedule 40	Cl. 150	1.05	4.25	11.2	11.8	0.62	19.9
		Cl. 300	1.05	4.87			0.75	22.1
	Schedule 80	Cl. 150	0.96	4.25			0.62	19.9
		Cl. 300	0.96	4.87			0.75	22.1
1½"	Schedule 40	Cl. 150	1.61	5.00	11.3	12.4	17.5	24.3
		Cl. 300	1.61	6.13			0.81	28.7
	Schedule 80	Cl. 150	1.50	5.00			17.5	24.3
		Cl. 300	1.50	6.13			0.81	28.7
2"	Schedule 40	Cl. 150	2.07	6.00	11.5	12.8	0.75	28.7
		Cl. 300	2.07	6.50			0.88	14.0
	Schedule 80	Cl. 150	1.94	6.00			0.75	28.7
		Cl. 300	1.94	6.50			0.88	33.1
3"	Schedule 40	Cl. 150	3.07	7.50	12.2	15.40	0.94	52.9
		Cl. 300	3.07	8.27			1.12	61.8
	Schedule 80	Cl. 150	2.90	7.50			0.94	55.1
		Cl. 300	2.90	8.27			1.12	61.8
4"	Schedule 40	Cl. 150	4.03	9.00	13.0	18.1	0,96	79.4
		Cl. 300	4.03	10.0			1.25	97.0
	Schedule 80	Cl. 150	3.82	9.00			0.96	79.4
		Cl. 300	3.82	10.0			1.25	79.4
6"	Schedule 40	Cl. 150	6.07	11.0	17.3	15.8	1.00	85.8
		Cl. 300	6.07	12.5		17.7	1.44	124.6
8"	Schedule 40	Cl. 150	7.98	13.5	18.3	15.8	1.12	127.0
		Cl. 300	7.98	15.0		17.7	1.62	182.1
10"	Schedule 40	Cl. 150	10.0	16.0	19.4	17.7	1.19	176.1
		Cl. 300	10.0	17.5		19.7	1.88	260.8
12"	Schedule 40	Cl. 150	11.9	19.0	20.4	19.7	1.25	250.2
		Cl. 300	11.9	20.5		21.7	2.00	362.7

*including raised face

Flange according to JIS B2220

DN	Pressure rating		d [mm]	D [mm]	H [mm]	L [mm]	X [mm]	Weight [kg]
25	Schedule 40	20K	27.2	125.0	284.5	300	16	10
	Schedule 80	20K	24.3	125.0			16	
40	Schedule 40	20K	41.2	140.0	287.0	315	18	12
	Schedule 80	20K	38.1	140.0			18	
50	Schedule 40	10K	52.7	155.0	291.5	325	16	13
		20K	52.7	155.0			18	
	Schedule 80	10K	49.2	155.0			16	
		20K	49.2	155.0			18	
80	Schedule 40	10K	78.1	185.0	310.5	390	18	24
		20K	78.1	200.0			22	28
	Schedule 80	10K	73.7	185.0			18	25
		20K	73.7	200.0			22	28
100	Schedule 40	10K	102.3	210.0	323.5	460	18	36
		20K	102.3	225.0			24	44
	Schedule 80	10K	97.0	210.0			18	36
		20K	97.0	225.0			24	44

Weight

See dimension tables → 🖹 14 ff.

Material

Transmitter housing and connection housing, sensor (remote version):

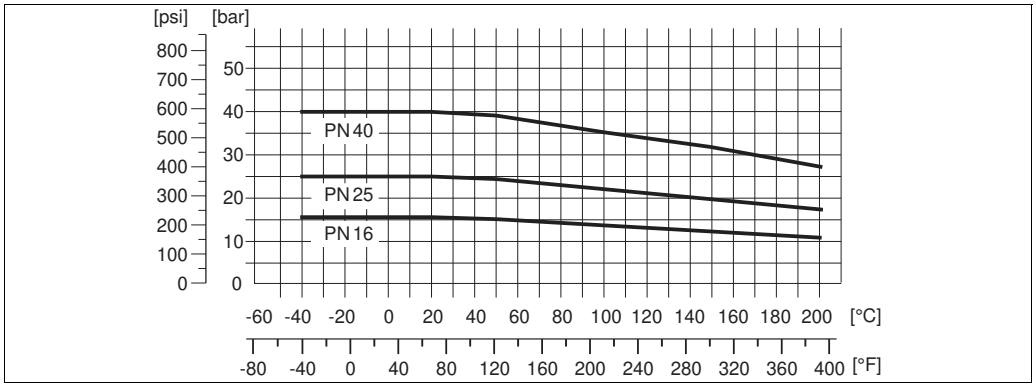
Compact housing: powder coated die cast aluminium

	DN25 to 100	DN150 to 300		
Standard	ASME & AD2000	ASME & AD2000	ASME	AD2000
Meter body	A351-CF3M	1.4404+TP316+TP316L	A106 Grd. B	A106 Grd. B
Sensor	1.4404+316L+316	1.4462 1.4404+316L+316	1.4462 1.4404+316L+316	1.4462 1.4404+316L+316
Flanges	1.4404+F316+F316L	1.4404+F316+F316L	A105+1.0432	1.0426
Designed for NACE MR0175/ISO 15156 and NACE MR0103 It is the equipment user's responsibility to select the materials suitable for the intended services.				

Carbon steel with outer protective painting to 130 °C (266 °F) or optional 200 °C (392 °F)

Material load diagram

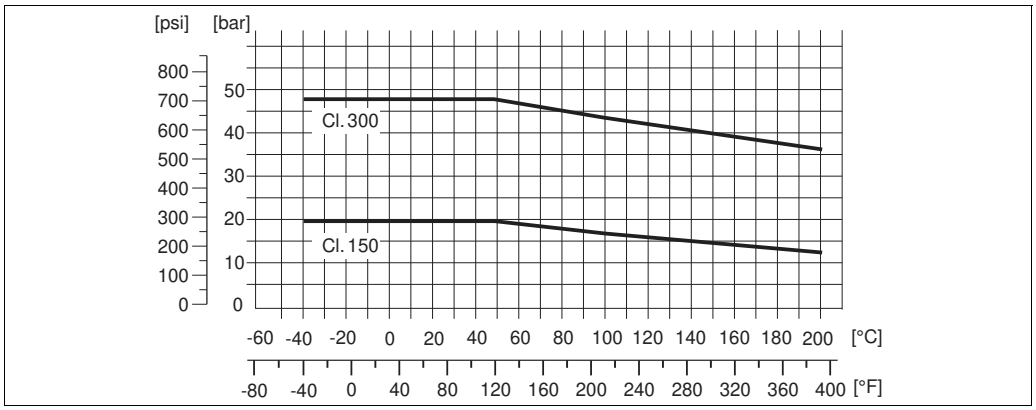
Pressure-temperature curve to EN 1092-1, stainless steel



A0010911

Pressure-temperature curve to ASME B16.5, stainless steel

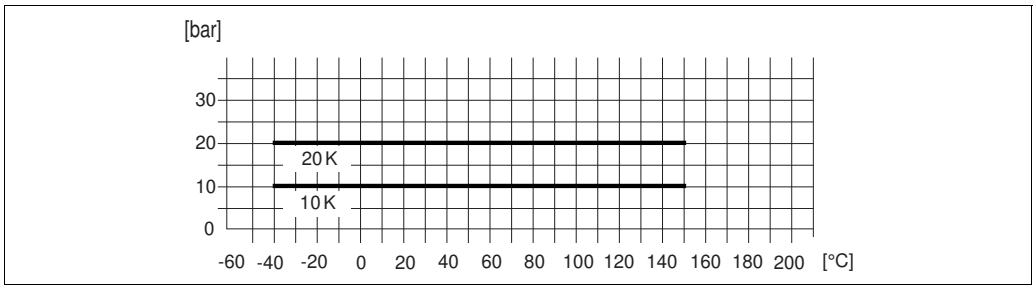
Class 150 to 300



A0010909

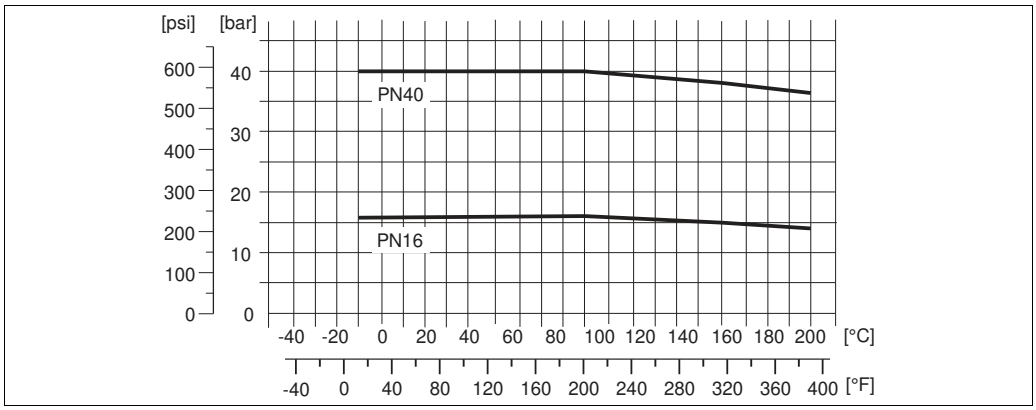
Pressure-temperature curve to JIS B2220, stainless steel

10 to 40 K

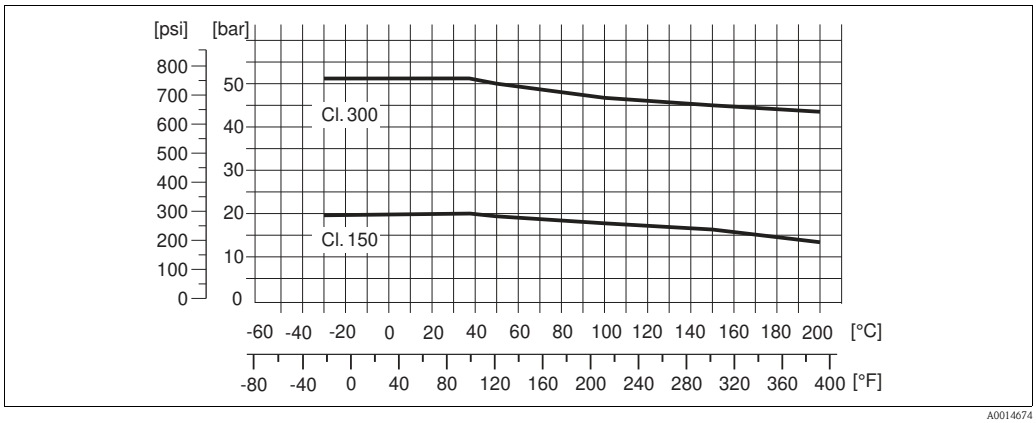


A0010910

Pressure-temperature curve to EN 1092-1, carbon steel



Pressure-temperature curve to ASME B16.5, carbon steel



Human interface

Display elements

- Liquid crystal display: double spaced with 16 characters per line
- Selectable display of different measured values and status variables
- At ambient temperatures below –20 °C (–4 °F) the readability of the display may be impaired.

Operating elements (HART)

- Local operation with three keys (–, +, E)
- Application specific Quick Setup menus for straightforward commissioning
- Operating elements accessible also in Ex-zones

Remote operation

Remote operation possible via:
- HART
- PROFIBUS PA
- FOUNDATION Fieldbus
- FieldCare

Certificates and approvals

CE mark

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

C-tick

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

Ex approval

Information about currently available Ex versions (ATEX, FM, CSA) can be supplied by your Endress+Hauser sales organization. All explosion protection data are given in a separate documentation which is available upon request.

Certification PROFIBUS PA

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

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

FOUNDATION Fieldbus certification

The flowmeter has passed all the test procedures implemented and has been certified and registered by the Fieldbus Foundation. The flowmeter thus meets all the requirements of the specifications listed below:

- Certified to FOUNDATION Fieldbus specification
- The flowmeter meets all the specifications of the FOUNDATION Fieldbus-H1.
- Interoperability Test Kit (ITK), revision status 5.0:
  The device can also be operated in conjunction with other-make certified devices
- Physical Layer Conformance Test of the Fieldbus Foundation

Other standards and guidelines

- EN 60529
  Degrees of protection by housing (IP code).
- EN 61010-1
  Protection Measures for Electrical Equipment for Measurement, Control, Regulation and Laboratory Procedures.
- IEC/EN 61326
  "Emission in accordance with Class A requirements".
  Electromagnetic compatibility (EMC- requirements).
- NAMUR NE 21
  Electromagnetic compatibility (EMC) of industrial process and laboratory control equipment.
- NAMUR NE 43
  Standardization of the signal level for the breakdown information of digital transmitters with analogue output signal.
- NAMUR NE 53
  Software of field devices and signal processing devices with digital electronics.
- ASME/ISA-S.61010-1(82.02.01) CSA-C22.2 No. 1010.1 ASME/UL 61010-1
  Safety requirements for Electrical Equipment for Measurement and Control and Laboratory Use.
  Pollution degree 2
- NACE Standard MR0103
  Standard Material Requirements - Materials Resistant to Sulfide Stress Cracking in Corrosive Petroleum Refining Environments
- NACE Standard MR0175
  Standard Material Requirements - Sulfide Stress Cracking Resistant Metallic Materials for Oilfield Equipment

Pressure Equipment Directive

The measuring devices can be ordered with or without PED (Pressure Equipment Directive). If a device with PED is required, this must be ordered explicitly. For devices with nominal diameters less than or equal to DN 25 (1"), this is neither possible nor necessary.

- With the identification PED/G1/III on the sensor nameplate, Endress+Hauser confirms conformity with the "Basic safety requirements" of Appendix I of the Pressure Equipment Directive 97/23/EC.
- Devices with this identification (with PED) are suitable for the following types of fluid:
  - Fluids of Group 1 and 2 with a steam pressure of greater or less than 0.5 bar (7.3 psi)
  - Unstable gases
- Devices without this identification (without PED) are designed and manufactured according to good engineering practice. They correspond to the requirements of Art. 3, Section 3 of the Pressure Equipment Directive 97/23/EC. Their application is illustrated in Diagrams 6 to 9 in Appendix II of the Pressure Equipment Directive 97/23/EC.

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.

Documentation

- Flow measuring technology (FA005D/06)
- Supplementary documentation on Ex-ratings: ATEX, FM, CSA
- Operating Instructions Prosonic Flow 92 (BA00121D/06)
- Operating Instructions Prosonic Flow 92 PROFIBUS PA (BA00122D/06)

Registered trademarks

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

PROFIBUS®
Registered trademark of the PROFIBUS User Organization, Karlsruhe, Germany

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

HistoROM™ T-DAT ®, FieldCare ®, Fieldcheck®, FieldXpert™, Applicator®
Registered or registration-pending trademarks of Endress+Hauser Flowtec AG, Reinach, CH

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