



TYPE APPROVAL CERTIFICATE

N. ELE096216CS001



This is to certify that the product below is found to be in compliance with the applicable requirements of the RINA type approval system.

Description	Ultrasonic Flow measuring system
Type	Proline Prosonic Flow 92F
Applicant	Endress + Hauser Italia S.p.A. Via Fratelli Di Dio, 7 20063 Cernusco s/N (MI) Italy
Manufacturer	Endress + Hauser Flowtec AG Kaegenstrasse, 7 CH-4153 Reinach BL1 Switzerland
Testing Standard	Rules for the Classification of Ships - Part C - Machinery, Systems and Fire protection - Ch.3, Sect.6, Tab.1.

Issued in Genova, September 09, 2016

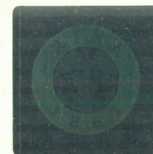
This certificate is valid until September 09, 2021

RINA Services S.p.A.



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Application:

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

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.

The measuring system calculates the volume flow of the fluid from the measured transit time difference and the pipe cross-sectional area.

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

- Two line liquid crystal display
- Operation with push buttons
- 2-Wire loop powered
- Optional explosion proof housing

Sensor F / F remote version

- Nominal diameters DN 25 to 100 (1 to 4")
- 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
- 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)

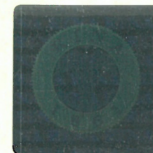
Measuring range: Typically $v = -10$ to 10 m/s with the specified accuracy

Nominal diameter		Range for full scale value (liquid) SI – unit
mm	inch	
25	1"	0 to 300 dm ³ /min
40	1 1/2"	0 to 750 dm ³ /min
50	2"	0 to 1100 dm ³ /min
80	3"	0 to 3000 dm ³ /min
100	4"	0 to 4700 dm ³ /min
150	6"	0 to 10 m ³ /min
200	8"	0 to 20 m ³ /min
250	10"	0 to 30 m ³ /min
300	12"	0 to 40 m ³ /min



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Output

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

	Current output	Frequency output	Pulse output	Status output
Volume flow	X	X	X	Limit value
Calculated Mass flow	X	X	X	
Sound velocity	X	X	-	
Flow velocity	X	X	-	
Signal strength	X	X	-	

Output signals

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, $R_i = 500$
- Ex i version: $U_{max} = 30$ V, with 15 mA current limiting, $R_i = 500$

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



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Signals 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

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.

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

Performance _ 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 *
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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 *
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(*) For a Reynold number >10000

Repeatability ±0.2% of reading

Operating conditions _ 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)

Degree of protection

- Transmitter Prosonic Flow 92: IP67 (NEMA 4X)

- Sensor Prosonic Flow F Inline: IP67 (NEMA 4X)

Optional: IP 68 (NEMA 6P)



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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)

Interfaces:

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.

Remote operation Remote operation possible via:

- HART • PROFIBUS PA • FOUNDATION Fieldbus • FieldCare

Equipment and protective systems intended for use in potentially explosive atmospheres – Directive 94/9/EC
Supplement accordant with Annex III number 6

Model:

Flow measuring system type Prosonic Flow 92

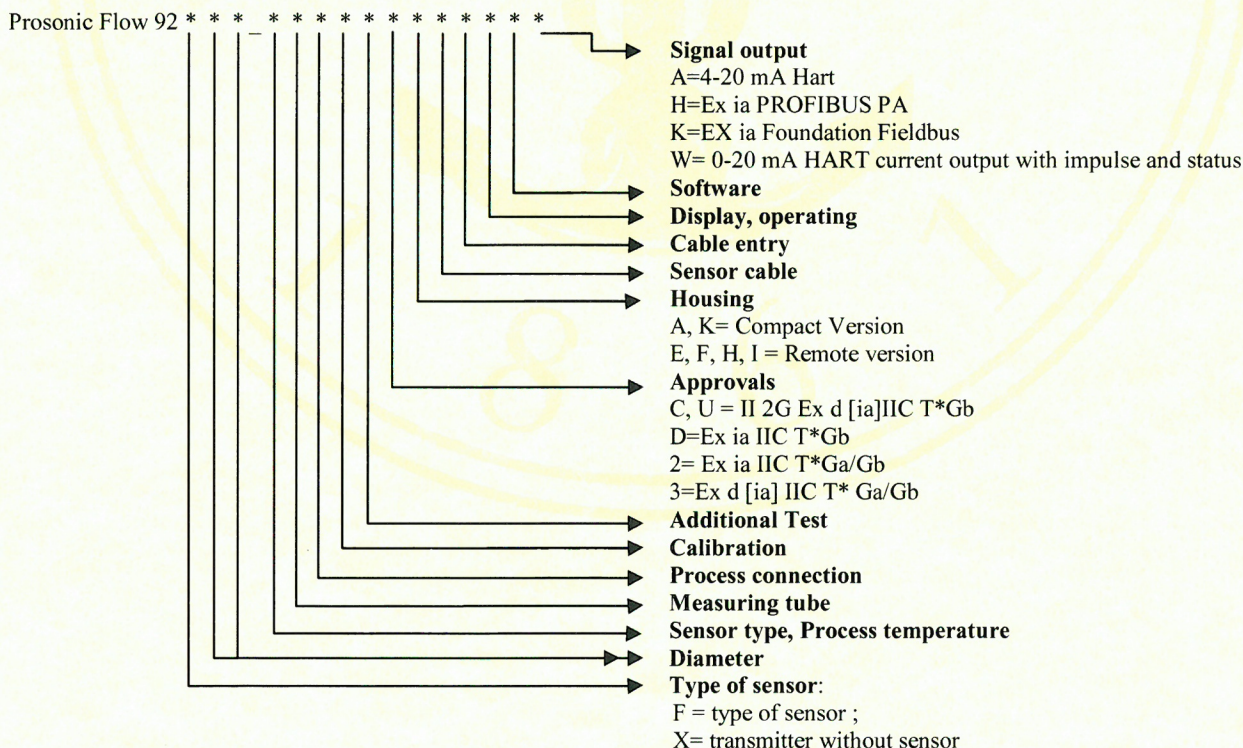
Certification Authority

DEKRA EXAM GmbH

EC- type Examination Certificate: BVS 06 ATEX E 54 3rd Supplement

Type designation:

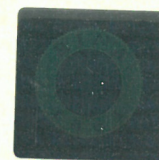
Flow measuring system type Prosonic Flow 92 consisting of a transmitter and a sensor in a compact and remote version.





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Marking:

Compact Versions Type Prosonic Flow 92 F

Model code	Marking
92F** ***** (C, U) (A,K)****(A,W)	II 2G Ex d [ia] IIC T6... T1 Gb
92F** ***** (C, U) (A,K)****(H,K)	II 2G Ex d [ia] IIC T4... T1 Gb
92F** ***** D(A,K)****(A,W)	II 2 (1) G Ex ia [ia Ga] IIC T6... T1 Gb
92F** ***** D(A,K)****(H,K)	II 2 (1) G Ex ia [ia Ga] IIC T4... T1 Gb
92F** ***** 3(A,K)****(A,W)	II 1/2 (1)G Ex d[ia] IIC T6... T1 Ga/Gb
92F** ***** 3(A,K)****(H,K)	II 1/2 (1)G Ex d[ia] IIC T4... T1 Ga/Gb
92F** ***** 2(A,K)****(A,W)	II 1/2 (1)G Ex ia[ia Ga] IIC T6... T1 Ga/Gb
92F** ***** 2(A,K)****(H,K)	II 1/2 (1)G Ex ia[ia Ga] IIC T4... T1 Ga/Gb

For model code 92F**_*****H additional marking with : Fisco Field device

Remote version :

Transmitter Type Prosonic Flow 92

Model code	Marking
92(F,X)**_***** (C,U,3) (E,F,H,I)****(A,W)	II 2G Ex d [ia] IIC T6... T1 Gb
92(F,X)**_***** (C,U,3) (E,F,H,I)****(H, K)	II 2G Ex d [ia] IIC T4... T1 Gb
92(F,X)**_***** (D,2)(E,F,H,I)****(A,W)	II 2 (1)G Ex ia [ia Ga] IIC T6... T1 Gb
92(F,X)**_***** (D,2)(E,F,H,I)****(H, K)	II 2 (1)G Ex ia [ia Ga] IIC T4... T1 Gb

For model code Prosonic Flow 92(F,X)**_*****H additional marking with: Fisco Field device

Sensors: Type Prosonic Flow F

Model code	Marking
92(F)**_***** (C,U,D) (E,F,H,I)****(A,W)	II 2G Ex ia IIC T6... T1 Gb
92(F)**_***** (C,U,D) (E,F,H,I)****(H, K)	II 2G Ex ia IIC T4... T1 Gb
92(F)**_***** (3,2)(E,F,H,I)****(A,W)	II 1/2 G Ex ia IIC T6... T1 Ga/Gb
92(F)**_***** (3,2)(E,F,H,I)****(H, K)	II 1/2 G Ex ia IIC T4... T1 Ga/Gb

Technical Information

Proline Prosonic Flow 92F _ Ultrasonic Flow Measuring System _ 2-Wire loop powered inline flowmeter
doc. n. TI00073D/06/EN/13.10

Test report _

Paconsult report n. 06-1365E (15/03/2007) ; **TestLab** report n E091173E1 (30 July 2009)

Remarks:

Safety parameters to be in accordance with EC- type Examination Certificate **DEKRA** Exam GmbH
BVS 06 ATEX E 54 3rd Supplement

Installation and use to be in accordance with the manufacturer instructions.

For each equipment, before delivery on board, accuracy test Certificate to be provided , based on accredited calibration rigs that are traced to ISO 17025.