Safety Instructions

Proline Prosonic Flow 92F

Ex i version

NEPSI Zone 1

This document is an integral part of the following Operating Instructions:
- BA00121D, Proline Prosonic Flow 92F HART
- BA00122D, Proline Prosonic Flow 92F PROFIBUS PA
- BA00128D, Proline Prosonic Flow 92F FOUNDATION Fieldbus

Content

Endress+Hauser
People for Process Automation

General warnings

- For installation, use and maintenance of the flow meter, the instruction manual and the following standards shall be observed:
  - GB50257-2014 "Code for construction and acceptance of electric device for explosive atmospheres and fire hazard electrical equipment installation engineering"
  - GB3836.13-2013 "Explosive atmospheres – Part 13: Equipment repair, overhaul and reclamation"
  - GB3836.15-2017 "Electrical apparatus for explosive gas atmospheres – Part 15: Electrical installations in hazardous area (other than mines)"
  - GB3836.16-2017 "Electrical apparatus for explosive gas atmospheres – Part 16: Inspection and maintenance of electrical installation (other than mines)"
  - GB3836.18-2017 "Explosive atmospheres – Part 18: Intrinsically safe system"
- Mounting, electrical installation, commissioning and maintenance of the devices may be only performed by technical staff trained in the area of explosion protection.
- Compliance with all of the technical data of the device (see nameplate) is mandatory.

Special conditions

- The device must be integrated into the potential equalization system. Potential must be equalized along the intrinsically safe sensor circuits. Further information is provided in the "Potential equalization" section on → 🖹 6.

Installation instructions

- If the active intrinsically safe communication circuits are fed into areas that require zone 1 apparatus, the connected apparatus must be tested and certified accordingly.
- The cable entries and openings not used must be sealed tight with suitable components.
- The measuring device must only be used in the permitted temperature class.
  The values of the individual temperature classes can be found in the temperature tables on → 🖹 5.
- The manufacturer's specifications for all devices connected to the intrinsically safe circuits must be taken into consideration.
- To rotate the transmitter housing, please follow the same procedure as for non-Ex versions. The transmitter housing may also be rotated during operation.
- The continuous service temperature of the cable must correspond at least to the temperature range of −40 °C to +10 °C above the ambient temperature present (−40 °C to (T_a +10 °C)).
- If Prosonic Flow 92 devices are interconnected with certified intrinsically safe circuits of Category ib, explosion group IIC, the explosion protection changes from Ex ia to Ex ib IIC.
- The dielectric strength between the various intrinsically safe circuits must be at least 500 Vrms (affects outputs/inputs: Prosonic Flow 92****-**********A).
- The devices may only be used for fluids against which the wetted materials are sufficiently resistant.
- The service connector may not be connected in a potentially explosive atmosphere.

COC certificates of conformity

COC certificates of conformity

By affixing the certification number the product conforms with the following standards:

- GB3836.1 – 2010
- GB3836.4 – 2010
- GB3836.20 – 2010

Certification numbers:

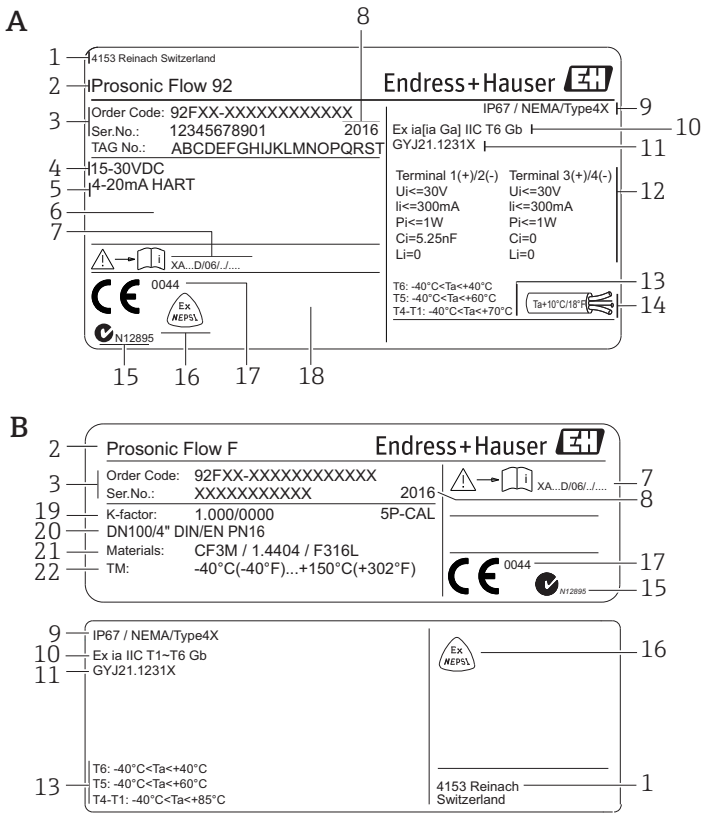
- GYJ21.1231X

Inspection body

NEPSI, National Supervision and Inspection Centre for Explosion Protection and Safety of Instrumentation

Nameplates

The nameplates, which are provided on the transmitter and sensor in a manner in which they are clearly visible, contain all the relevant information on the measuring system.



A0015968

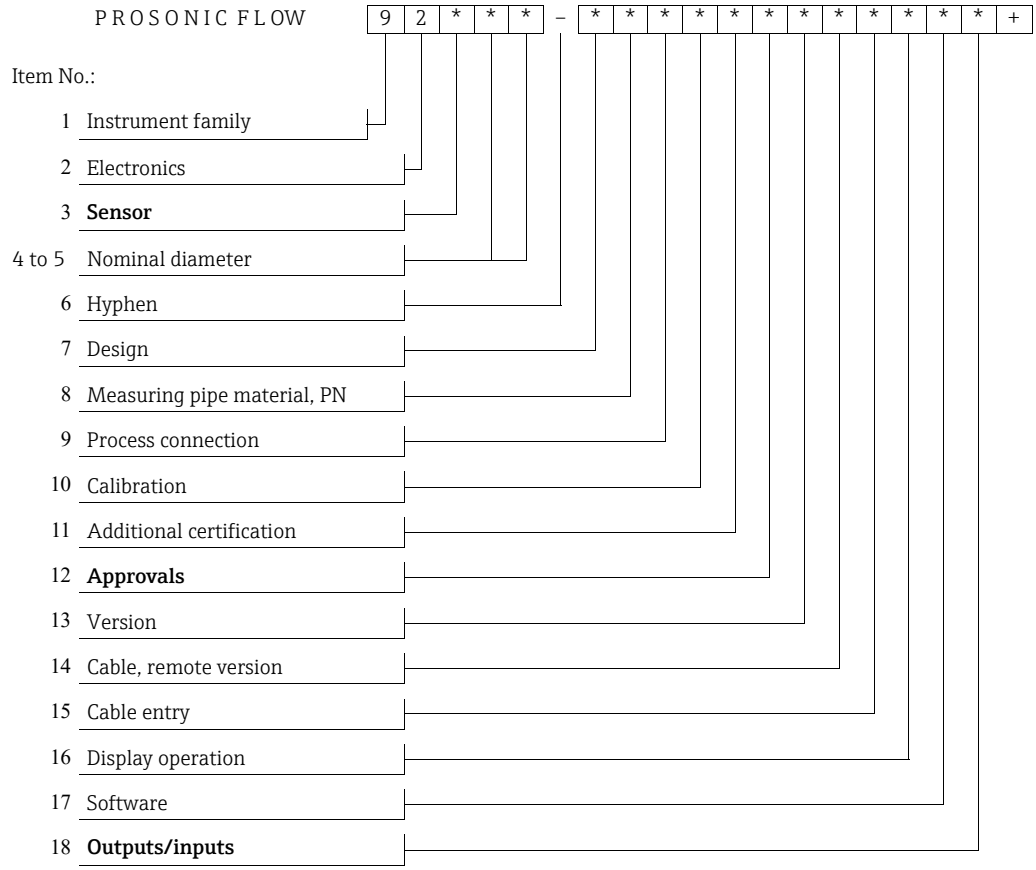
Fig. 1: Example for nameplates of a transmitter and of a sensor

A Transmitter nameplate
B Sensor nameplate

1 Production site
2 Transmitter or sensor type
3 Order code and serial number
4 Power supply, frequency and power consumption
5 Output
6 Additional specifications (only if present)
7 Associated Ex documentation
8 Year of manufacture
9 Type of housing protection
10 Identification of the type of protection, explosion group, temperature class, ingress protection
11 Number of the NEPSI certificate of conformity
12 Notes, e.g. delays, etc.
13 Ambient temperature range
14 Maximum cable temperature
15 C-Tick symbol
16 NEPSI Symbol
17 Notified body for quality assurance monitoring
18 Space for other approval specifications and certificates, e.g. PROFIBUS, etc. (only if present)
19 Calibration factor/zero point
20 Nominal diameter/nominal pressure
21 Material in contact with medium
22 Fluid temperature range

Type code

The type code describes the exact design and the equipment of the measuring system.
It can be read on the nameplate of the transmitter and sensor and is structured as follows:



Sensor version (Item No. 3 in type code)

*	Sensor
F	Sensor F
X	only transmitter (as spare part)

Approvals (Item No. 12 in type code)

*	Housing/design	Approval	Explosion protection	Certificate number
S	Compact	Zone 1	Ex ia [ia Ga] IIC T1-T* Gb	GYJ21.1231X
	Remote (transmitter)		Ex ia [ia Ga] IIC T* Gb	
	Remote (sensor)		Ex ia IIC T1-T* Gb	

T* = T6 or T4 (see table outputs/inputs → 🖹 4)

Outputs/inputs (Item No. 18 in type code)

*	Approval
A, W	T6 to T1
H, K	T4 to T1

✎ Note!
A detailed explanation of these values with regard to the inputs and outputs available, as well as a description of the associated terminal assignments and connection data is provided on: → 🖹 5 onwards.

Compact version temperature table

Medium temperature range T_{med} [°C] depending on the device version (→ 🖹 4) and the ambient temperature range T_a:

	T_a [°C]	T_{med}					
		T6 (85 °C)	T5 (100 °C)	T4 (135 °C)	T3 (200 °C)	T2 (300 °C)	T1 (450 °C)
92F**-*****S*****A/W	−40 to +40	−40 to +80	−40 to +95	−40 to +130	−40 to +195	−40 to +200	−40 to +200
	−40 to +55	–					
	−40 to +60	–	–				
92F**-*****S*****H/K	−40 to +60	–	–	−40 to +130	−40 to +195	−40 to +200	−40 to +200

Remote version temperature table

Sensor

Medium temperature range T_{med} [°C] depending on the device version (→ 🖹 4) and the ambient temperature range T_a:

	T_a [°C]	T_{med}					
		T6 (85 °C)	T5 (100 °C)	T4 (135 °C)	T3 (200 °C)	T2 (300 °C)	T1 (450 °C)
92F**-*****S*****A/W	−40 to +60	−40 to +80	−40 to +95	−40 to +130	−40 to +195	−40 to +200	−40 to +200
	−40 to +80	–					
92F**-*****S*****H/K	−40 to +80	–	–	−40 to +130	−40 to +195	−40 to +200	−40 to +200

Transmitter

Ambient temperature range Ta [°C] depending on the device version (→ 🖹 4):

	T_{med}					
	T6 (85 °C)	T5 (100 °C)	T4 (135 °C)	T3 (200 °C)	T2 (300 °C)	T1 (450 °C)
92F**-*****S*****A/W	−40 to +40	−40 to +55	−40 to +80	−40 to +80	−40 to +80	−40 to +80
92F**-*****S*****H/K	–	–	−40 to +80	−40 to +80	−40 to +80	−40 to +80

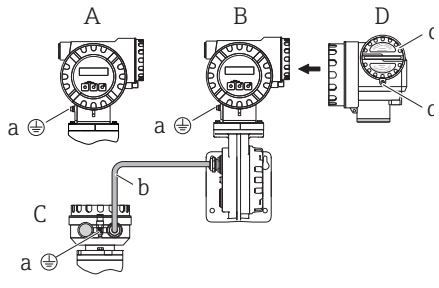
A0015965

Fig. 2: Procedure for calculating the max. surface temperature

1. In the associated temperature table (compact version), the selection of the measuring device (Prosonic Flow 92 F), and the ambient temperature T_a (60 °C) determine the line in which the max. medium temperature can be found.
2. The fluid temperature T_m (98 °C), which is smaller or equal to the max. fluid temperature, determines the column, i.e. the temperature class, for gas (98 °C ≤ 130 °C → T4).

Design of measuring system

Compact/remote version design



A Transmitter housing (compact version)
a Screw terminal for connecting to potential matching system
A Connection housing transmitter (remote version)
b Screw terminal for connecting to potential matching system
B Connection housing sensor (remote version)
c Screw terminal for connecting to potential matching system
d Remote version connecting cable

– Cable specifications, connecting cable → 🖹 6
– Cable entries → 🖹 6
– Terminal assignment and connection data → 🖹 6

Fig. 3 A0004031

Cable entries

Thread for cable entry M20 × 1.5 or ½"-NPT or G ½", as required.

Cable specifications, connecting cable

The sensor cable connection between the sensor and the transmitter has Ex ia explosion protection.

The maximum capacitance per unit length of the cable connection is 1µF/km.
The maximum inductance of the cable is 1 mH/km.

The cable supplied by Endress+Hauser (max. 30 m) complies with these values.

Potential equalization

Caution!

- There must be potential matching along the circuits (inside and outside the hazardous area).
- The transmitter must be safely included in the potential matching system by means of the screw terminal (c) on the outside of the transmitter housing or by means of the corresponding ground terminal in the connection compartment (f).
- Alternatively, the sensor and the transmitter (compact version) or the connection housing of the sensor can be included in the potential matching system by means of the pipeline if a ground connection, performed as per the specifications, is ensured.

Electrical connections

Terminal/electronics compartment cover (terminal assignment, see tables below)

4 to 20 mA HART
(connection with a cable)

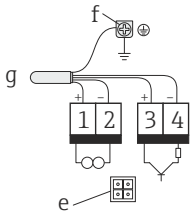


Fig. 4 A0004027

4 to 20 mA HART
(connection with two cables)

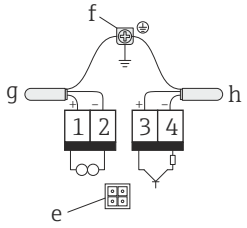


Fig. 5 A0004028

4 to 20 mA HART
(PFM connection)

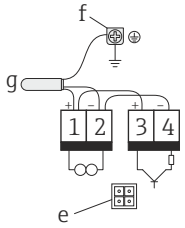


Fig. 6 A0004029

PROFIBUS PA

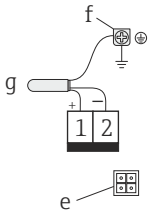


Fig. 7 A0004030

FOUNDATION Fieldbus

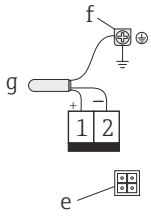


Fig. 8 A0004030

e Service connector (→ 🖹 8)

f HART ground terminal: if the potential matching is routed via the cable and if two cables are used, both cables must be connected to the potential matching system if a connection is not already established externally.
PROFIBUS PA and FOUNDATION Fieldbus: between the stripped fieldbus cable and the ground terminal, the cable shielding must not exceed 5 mm in length

g HART (→ 🖻 4): cable for supply voltage and/or pulse output
HART (→ 🖻 5): cable for supply voltage
PFM (→ 🖻 6): Optional pulse/frequency output, can also be operated as a status output
(not for PROFIBUS PA and FOUNDATION Fieldbus
PROFIBUS PA (→ 🖻 7): cable of input and output circuits
FOUNDATION Fieldbus (→ 🖻 8): cable of input and output circuits

✎ Note!
PFM output (pulse/frequency modulation): connection as illustrated in → 🖻 6
(only together with flow computer RMC or RMS 621).

Connecting the supply voltage or signal cable

The terminal assignment and the connection data for the supply voltage are identical for all devices, regardless of the device version (type code).

✎ Note!
For a graphic illustration of the electrical connections: → 🖹 6

Terminal assignment / connection data

Terminals		1 (+)	2 (–)
Prosonic 92F**-**********W		Transmitter power supply / 4 to 20 mA HART	
Intrinsically safe circuit		Ex ia or Ex ib	
Safety related values	Ui	30 V	
	I_i	300 mA	
	P_i	1 W	
	L_i	negligible	
	C_i	5.28 nF	

Terminals		1 (+)	2 (–)	3 (+)	4 (–)
Prosonic 92F**-**********A		Transmitter power supply / 4 to 20 mA HART		Optional pulse/status output	
Intrinsically safe circuit		Ex ia or Ex ib		Ex ia or Ex ib	
Safety related values	Ui	30 V		30 V	
	I_i	300 mA		300 mA	
	P_i	1 W		1 W	
	L_i	negligible		negligible	
	C_i	5.25 nF		negligible	

Terminals		1 (+)	2 (–)
Prosonic 92F**-**********H		PROFIBUS PA	
Intrinsically safe circuit		Ex ia or Ex ib	
Functional values	U_B	9 to 32 V DC	
	I_B	16 mA	
	P	≤ 1 W	
Safety related values	Ui	17.5 V	
	I_i	600 mA	
	P_i	8.5 W	
	L_i	≤ 10 µH	
	C_i	≤ 5 nF	

or

1 (+)	2 (–)
PROFIBUS PA	
Ex ia or Ex ib	
9 to 32 V DC	
16 mA	
≤ 1 W	
24 V	
250 mA	
1.2 W	
≤ 10 µH	
≤ 5 nF	

Terminals		1 (+)	2 (–)
Prosonic 92F**-**********K		FOUNDATION Fieldbus	
Intrinsically safe circuit		Ex ia or Ex ib	
Functional values	U_B	9 to 32 V DC	
	I_B	16 mA	
	P	≤ 1 W	
Safety related values	Ui	17.5 V	
	I_i	600 mA	
	P_i	8.5 W	
	L_i	≤ 10 µH	
	C_i	≤ 5 nF	

or

1 (+)	2 (–)
FOUNDATION Fieldbus	
Ex ia or Ex ib	
9 to 32 V DC	
16 mA	
≤ 1 W	
24 V	
250 mA	
1.2 W	
≤ 10 µH	
≤ 5 nF	

Service connector

The service connector (for connection →🖻 3 to →🖻 7, e) is only used to connect service interfaces approved by Endress+Hauser.

⚠ Warning!
The service connector may not be connected in a potentially explosive atmosphere.

Technical Data

Dimensions

The dimensions of the Ex transmitter housing and the sensor correspond to the standard versions. Please refer to the Technical Information for these dimensions.

✎ Note!
Associated "Technical Information":
Proline Prosonic Flow 92F → TI00073D

Associated documentation

All documentation is available:
- On the CD-ROM supplied (not included in the delivery for all device versions)
- Available for all devices via:
  - Internet: www.endress+Hauser Operations App
  - Smart phone/tablet: Endress+Hauser website: www.endress.com → Download

Additional documentation:
Explosion-protection brochure: CP00021Z/11

www.addresses.endress.com

Endress+Hauser

People for Process Automation