Safety Instructions

Proline Prowirl 72, 73

Ex-d version

NEPSI Zone 1

This document is an integral part of the following Operating Instructions:

- BA00084D, Proline Prowirl 72 HART
- BA00085D, Proline Prowirl 72 PROFIBUS PA
- BA00095D, Proline Prowirl 72 FOUNDATION Fieldbus
- BA00094D, Proline Prowirl 73 HART
- BA00093D, Proline Prowirl 73 PROFIBUS PA
- BA00096D, Proline Prowirl 73 FOUNDATION Fieldbus

Contents

XA00158D/06/EN/02.12
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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:
  - GB50257-1996 "Code for construction and acceptance of electric device for explosive atmospheres and fire hazard electrical equipment installation engineering"
  - GB3836.13-1997 "Electrical apparatus for explosive gas atmospheres - Part 13: Repair and overhaul for apparatus used in explosive gas atmospheres"
  - GB3836.15-2000 "Electrical apparatus for explosive gas atmospheres - Part 15: Electrical installations in hazardous area (other than mines)"
  - GB3836.16-2006 "Electrical apparatus for explosive gas atmospheres - Part 16: inspection and maintenance of electrical installation (other than mines)"
- The flow meter shall not be modified in order to ensure the explosion protection performance of the equipment. Any change may impair safety.
- Mounting, electrical installation, commissioning and maintenance of the devices may only be performed by technical staff trained in the area of explosion protection.
- Compliance with all of the technical data of the device (see nameplate, Page 4) is mandatory.
- The connection compartment of the transmitter housing may only be opened when the unit is de-energized or if an explosive atmosphere is not present.
- To guarantee resistance to dust, the transmitter housing, the connection housing of the remote version and the cable entries must be tightly sealed.
- The device's suitability in the event gas-air mixture occurring simultaneously requires further as-sessment.

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 → 8.

Ga/Gb in Ex marking means that the interior of the sensor tube can be used in zone 0, but the enclosure which are made of aluminium alloy must be installed. So, even in the event of rare incidences, ignition sources due to impact and friction sparks are excluded.

Installation instructions

- 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 value of the individual temperature classes can be found in the temperature tables on → 7
- 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 ... (T_a +10 °C)).
- The devices may only be used for fluids against which the wetted materials are sufficiently resistant.
- Only use cable entries that have separate certification (Ex d IIC) which are suitable for an operating temperature up to 80 °C. When using conduit entries, the associated sealing facilities must be mounted directly to the housing.
- 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
- GB3836.2-2010
- GB3836.4-2010
- GB3836.20-2010

Certification numbers:

- GYJ12.1048X

Inspection body

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

Nameplates

The nameplates, which are mounted in a clearly visible position on the transmitter and sensor, contain all of the relevant information about the measuring system.

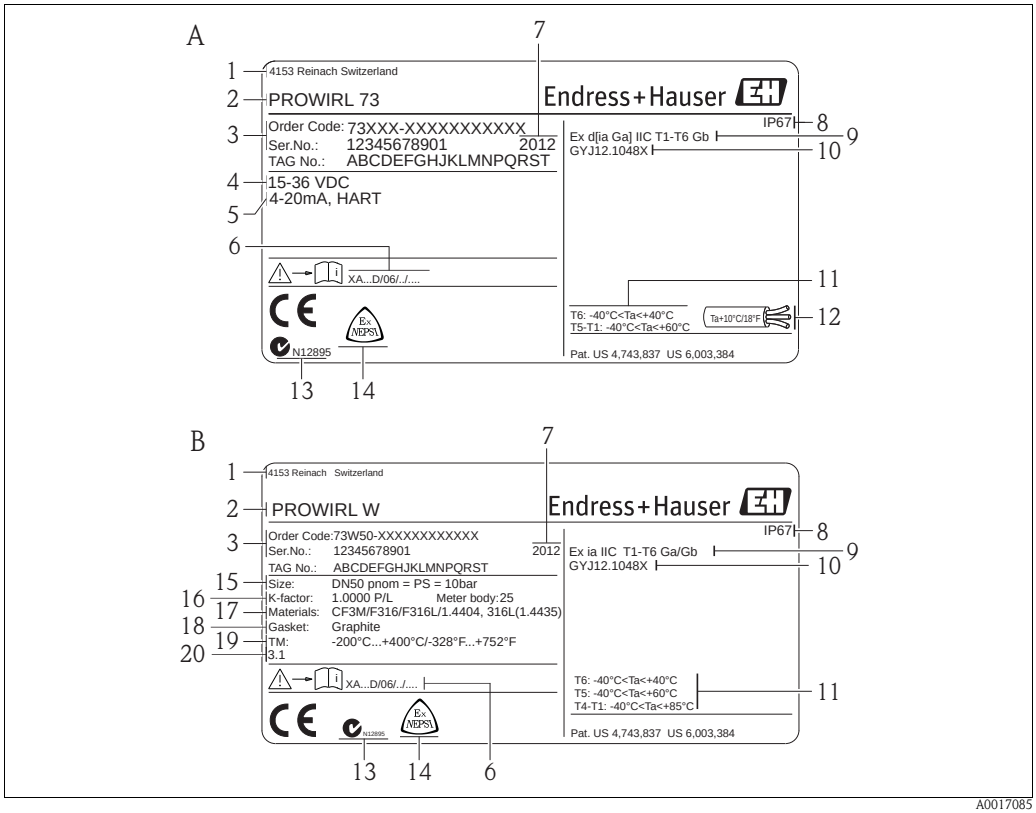


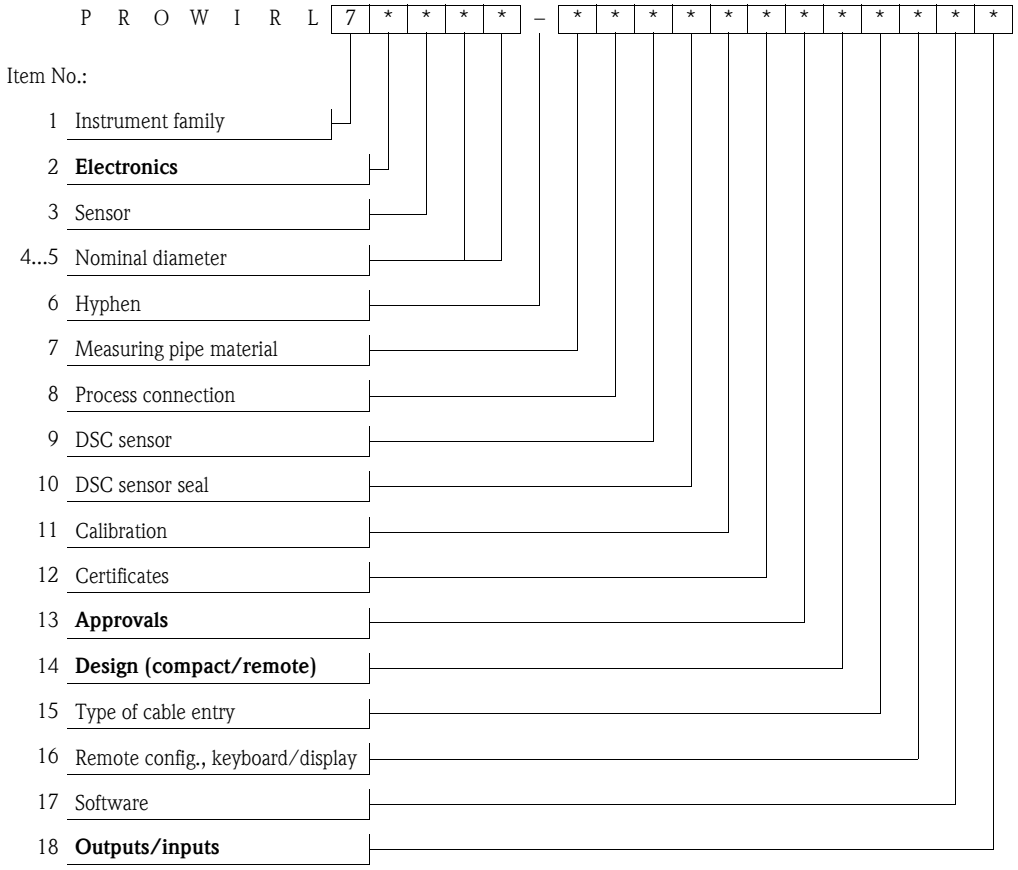
Fig. 1: Example for nameplates of a transmitter and of a sensor

A Transmitter nameplate
B Sensor nameplate

1 Production site
2 Transmitter or sensor type
3 Order code and serial number
4 Power supply
5 Available outputs
6 Associated Ex documentation
7 Year of manufacture
8 Type of protection
9 Type of enclosure protection
10 Number of the NEPSI certificate of conformity
11 Ambient temperature range
12 Maximum cable temperature
13 C-Tick symbol
14 NEPSI Symbol
15 Nominal diameter/nominal pressure
16 Calibration factor/zero point
17 Materials in contact with the medium
18 Sensor seal material
19 Fluid temperature range
20 Additional information, e.g. 5P-CAL = 5-point calibration, 3.1B = 3.1 B certificate for wetted material

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:



Electronics (Item No. 2 in type code)

*	Transmitter	Electronics/housing
2	Prowirl 72	Intrinsically safe transmitter electronics
3	Prowirl 73	

Approvals (Item No. 13 in type code)

*	Approval	Outputs/ inputs	Explosion protection GB			Certification number
			Compact	Remote transmitter	Remote sensor	
K	Zone 1	A, W	Ex dia IIC T1-T6 Ga/Gb	Ex d[ia Ga] IIC T6 Gb	Ex ia IIC T1-T6 Ga/Gb	GYJ12.1048X
		H, K	Ex-dia IIC T1-T4 Ga/Gb	Ex d[ia Ga] IIC T6 Gb	Ex ia IIC T1-T4 Ga/Gb	

Type (compact/remote; Item No. 14 in type code)

*	Type
A, J	Compact
E, F, K, L, M, N, O, P, Q, R, S, T	Remote

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

*	Temperature class
A, W	T1-T6
H, K	T1-T4

✎ Note!
A detailed explanation of these values with regard to the inputs available, as well as a description of the associated terminal assignments and connection date provided on → 🖹 8 onwards.

Temperature table compact version

Maximum fluid temperature [°C] depending on the ambient temperature T_a and the DSC sensor used (Item No. 9 in the type code)

	T_a	T6 (85 °C)	T5 (100 °C)	T4 (135 °C)	T3 (200 °C)	T2 (300 °C)	T1 (450 °C)
Prowirl 72***-**0*********	–40…+40 °C	80	95	130	195	280	280
	–40…+60 °C	–	95	130	195	280	280
Prowirl 72***-**1********* Prowirl 72***-**2********* Prowirl 72***-**3********* Prowirl 72***-**6********* Prowirl 73***-**4********* Prowirl 73***-**2*********	–40…+40 °C	80	95	130	195	290	440
	–40…+60 °C	–	95	130	195	290	440

Dependency of the fluid temperature T_{med} on the DSC sensor:

T_{med} –200 °C	T_{med} –50 °C	T_{med} –40 °C
Prowirl 72***-**1********* Prowirl 72***-**2********* Prowirl 72***-**3********* Prowirl 73***-**4********* Prowirl 73***-**2*********	Prowirl 72***-**6*********	Prowirl 72***-**0*********

The following dependency with regard to the ambient temperature applies for fluid temperatures < –40 °C:

Fluid temperature in °C	≥	–40	–80	–120	–170	–200
Ambient temperature in °C	≥	–40	–35	–30	–25	–20

⚠ Warning!
For devices with outputs Prowirl 72***-**********H/K and 73***-**********H/K, temperature classes T5 and T6 are not permitted.

Temperature table remote version

Sensor

Maximum fluid temperature [°C] depending on the ambient temperature T_a and the DSC sensor used (Item No. 9 in the type code):

	T_a	T6 (85 °C)	T5 (100 °C)	T4 (135 °C)	T3 (200 °C)	T2 (300 °C)	T1 (450 °C)
Prowirl 72***-**0*********	–40…+40 °C	80	95	130	195	280	280
	–40…+60 °C	–	95	130	195	280	280
	–40…+85 °C	–	–	130	195	280	280
Prowirl 72***-**1********* Prowirl 72***-**2********* Prowirl 72***-**3********* Prowirl 72***-**6********* Prowirl 73***-**4********* Prowirl 73***-**2*********	–40…+40 °C	80	95	130	195	290	440
	–40…+60 °C	–	95	130	195	290	440
	–40…+85 °C	–	–	130	195	290	440

Dependency of the minimum fluid temperature T_{med} on the DSC sensor:

T_{med} –200 °C	T_{med} –50 °C	T_{med} –40 °C
Prowirl 72***-**1********* Prowirl 72***-**2********* Prowirl 72***-**3********* Prowirl 73***-**4********* Prowirl 73***-**2*********	Prowirl 72***-**6*********	Prowirl 72***-**0*********

⚠ Warning!
For devices with outputs Prowirl 72***-**********H/K and 73***-**********H/K, temperature classes T5 and T6 are not permitted.

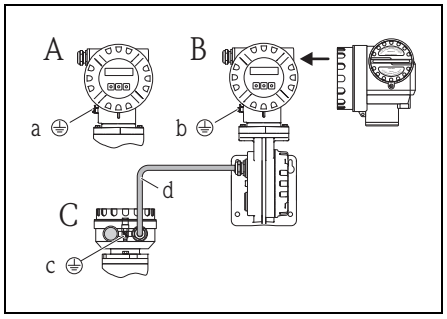
Transmitter

The minimum ambient temperature is –40 °C.
The maximum ambient temperature [°C] depending on the device used is:

	T6 (85 °C)	T5 (100 °C)	T4 (135 °C)	T3 (200 °C)	T2 (300 °C)	T1 (450 °C)
Prowirl 72***-**********A Prowirl 72***-**********W Prowirl 73***-**********A Prowirl 73***-**********W	40	60	60	60	60	60
Prowirl 72***-**********H Prowirl 72***-**********K Prowirl 73***-**********H Prowirl 73***-**********K	–	–	60	60	60	60

Design of the measuring system

Compact/remote version design



A Transmitter housing (compact/remote version)
B Transmitter housing (remote version)
C Sensor connection housing (remote version)
D Transmitter housing side view (compact version)

a Screw terminal for connecting to potential matching system
b Remote version connecting cable (see below)
c Terminal/electronics compartment cover (see below)
d Securing clamp

Fig. 2. A0004031

Terminal assignment and connection data → 9

Potential matching

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.

Cable entries

Cable entries for the connection compartment (Ex-d version):
Thread for cable entry M20 × 1.5 or ½"-NPT or G ½", as required.
Ensure that the Ex-d cable glands/entries are secured against self-locking and the associated seals are arranged directly on the housing.

Connecting cable cable specifications

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 1 µF/km.
The maximum inductance of the cable is 1 mH/km.
The maximum inductance of the cable length is 100 m.

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

Electrical connections

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

4...20 mA HART
(connection with a cable)

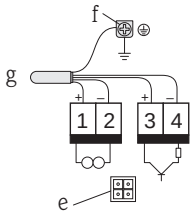


Fig. 3 A0004027

4...20 mA HART
(connection with two cables)

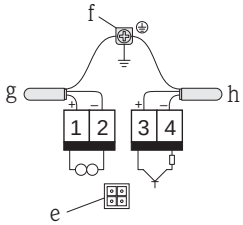


Fig. 4 A0004028

4...20 mA HART
(PFM connection with Prowirl 72)

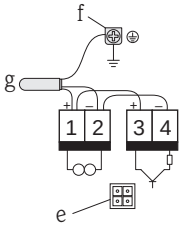


Fig. 5 A0004029

PROFIBUS PA

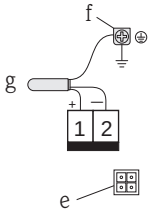


Fig. 6 A0004030

FOUNDATION Fieldbus

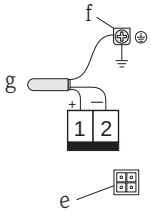


Fig. 7 A0004030

e Service connector (see also → 9)
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 and FOUNDATION Fieldbus: between the stripped fieldbus cable and the ground terminal, the cable shielding must not exceed 5 mm in length
g HART (one cable): cable for supply voltage and/or pulse output
HART (two cables): cable for supply voltage
PROFIBUS: cable of input and output circuits)
FOUNDATION Fieldbus: cable of input and output circuits
h Optional pulse/frequency output, can also be operated as a status output (not for PROFIBUS PA and FOUNDATION Fieldbus)

Note!
PFM output (pulse/frequency modulation) for Prowirl 73:
connection as illustrated in → 3 or → 4; 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!
A graphic illustration of the electrical connections is provided on → 🗎 8.

Terminal assignment /connection data

	Terminals	1 (+)	2 (–)	3 (+)	4 (–)
Prowirl 72***-**********A Prowirl 72***-**********W Prowirl 73***-**********A Prowirl 73***-**********W	Terminal designation	Transmitter power supply / 4 to 20 mA HART		Optional pulse/status output	
	Safety-related values	≤ 36 V (U_{max} = 250 V)		≤ 36 V (U_{max} = 250 V)	

	Terminals	1 (+)	2 (–)
Prowirl 72***-**********H Prowirl 73***-**********H	Terminal designation	FOUNDATION Fieldbus	
	Safety-related values	U = 36 V; (U_{max} = 250 V)	

	Terminals	1 (+)	2 (–)
Prowirl 72***-**********K Prowirl 73***-**********K	Terminal designation	PROFIBUS PA	
	Safety-related values	U = 36 V (U_{max} = 250 V)	

Service connector

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

Only the "PROLINE EX TWO-WIRE CABLE" connecting cable can be used to connect a Prowirl 72 or 73 with the service interface FXA193.

⚠ 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":
Prowirl 72F, 72W, 73F, 73W → TI00070D

www.endress.com/worldwide

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