XA076D/06/en/06.04
50107488
FM+SGML 6.0

Proline Prowirl 72 / Prowirl 73
FOUNDATION Fieldbus
Ex-i intrinsically safe version (IS)
Division 1









Ex documentation for the BA095D (Prowirl 72 FOUNDATION Fieldbus) / BA096D (Prowirl 73 FOUNDATION Fieldbus) operating instruction according to FACTORY MUTUAL standards

Ex documentation for the BA095D (Prowirl 72 FOUNDATION Fieldbus) / BA096D (Prowirl 73 FOUNDATION Fieldbus) operating instruction according to CANADIAN STANDARDS ASSOCIATION

Endress+Hauser
The Power of Know How

XA076D/06/en/06.04
50107488
FM+SGML 6.0

Proline Prowirl 72 / Prowirl 73 FOUNDATION Fieldbus, Ex-i intrinsically safe version (IS), Division 1

(en)

Ex documentation for the BA095D (Prowirl 72 FOUNDATION Fieldbus) and BA096D (Prowirl 73 FOUNDATION Fieldbus) operating instruction

according to FACTORY MUTUAL standards

Example: **XP / I / 1 / ABCD**

Factory Mutual

Type of Protection

XP	Explosionproof
IS	Intrinsically Safe Apparatus
AIS	Associated Apparatus with Intrinsically Safe Connections
ANI	Nonincendive Field Wiring Circuit
PX,PY,PZ	Pressurized
APX,APY,APZ	Associated Pressurization Systems/Components
NI	Nonincendive
DIP	Dust-Ignitionproof
S	Special Protection

Class

I	Class I (Gas)
II	Class II (Dust)
III	Class III (Fibre)

Division

1	Division 1
2	Division 2

Group

FM / NEC	Gases, vapours and dusts (Examples)	Min. ignition temperature [µJ]
A	Acetylene, carbon disulfide (Class I)	0.02
B	Hydrogen, ethyl nitrate (Class I)	0.02
C	Ethylene, isoprene (Class I)	0.06
D	Acetone, ethane, benzene, ethanoic acid, gasolines, diesel oil, aircraft fuel, methane, heating oil,crude oil, hexane, ether (Class I)	0.18
E	Metallic powder (Class II)	
F	Coal dust (Class II)	
G	Mill dust (Class II)	
	Textile fibres (Class III)	

Temperature Class

FM 3611	Maximum surface temperature	
T1	842 °F	450 °C
T2	572 °F	300 °C
T2A	536 °F	280 °C
T2B	500 °F	260 °C
T2C	446 °F	230 °C
T2D	419 °F	215 °C
T3	392 °F	200 °C
T3A	356 °F	180 °C
T3B	329 °F	165 °C
T3C	320 °F	160 °C
T4	275 °F	135 °C
T4A	248 °F	120 °C
T5	212 °F	100 °C
T6	185 °F	85 °C

FM

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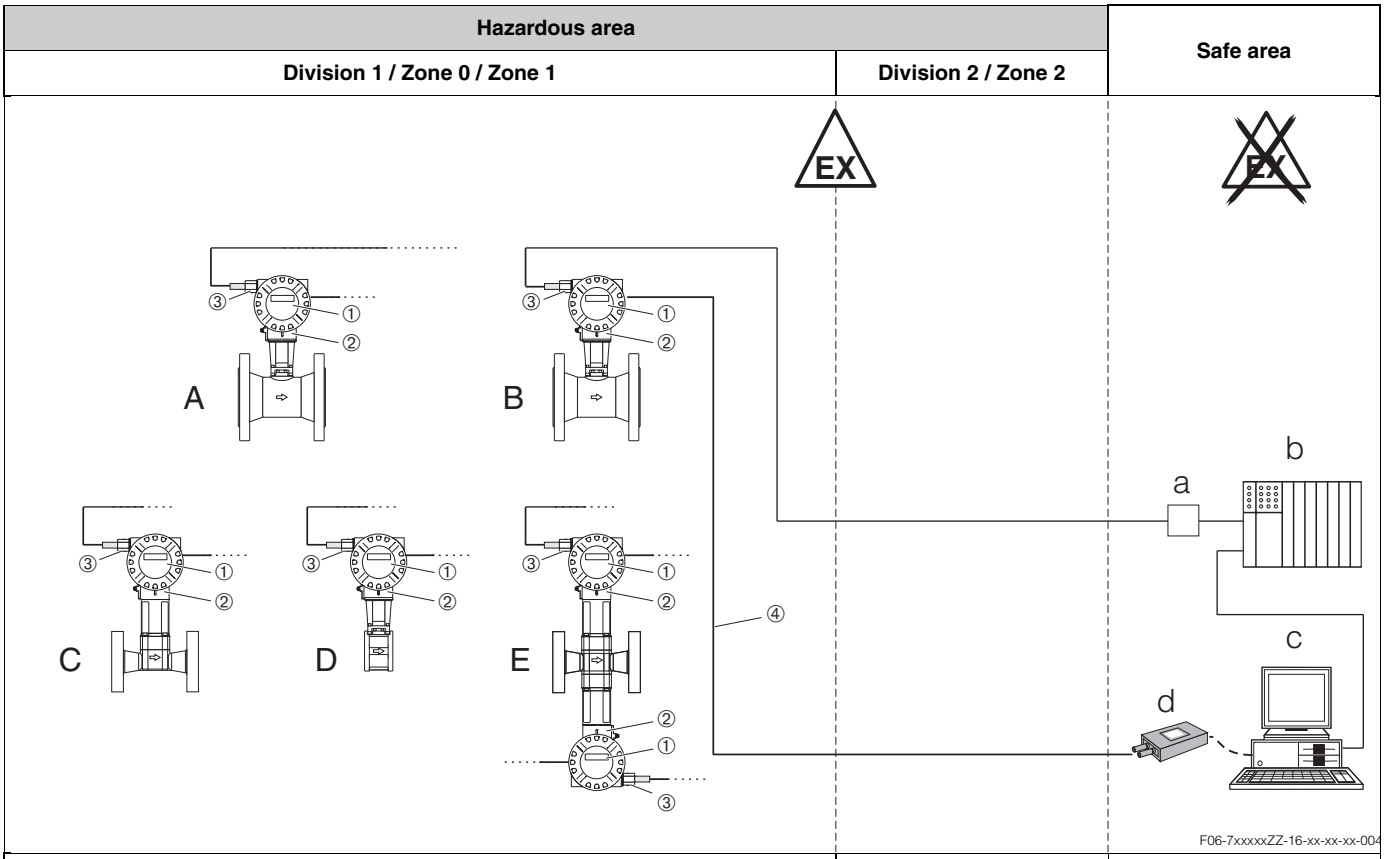
The Power of Know How

Prowirl 72 / Prowirl 73 FOUNDATION Fieldbus, compact version



Prowirl 73 FOUNDATION Fieldbus:
A = Sensor F (DN 1/2"...12")
Standard version
PN 10...40; Cl 150...300; JIS 10...20K
D = Sensor W (DN 1/2"...6");
Wafer
PN 10...40; Cl 150...300; JIS 10...20K

Prowirl 72 FOUNDATION Fieldbus:
B = Sensor F (DN 1/2"...12");
Standard version
PN 10...40; Cl 150...300; JIS 10...20K
C = Sensor F (DN 1/2"...6");
High pressure version
PN 64...160; Cl 600; JIS 40K
D = Sensor W (DN 1/2"...6");
Wafer
PN 10...40; Cl 150...300; JIS 10...20K
E = Sensor F (DN 1/2"...6");
Dualsens
PN 10...160; Cl 150...600; JIS 10...40K

① Transmitter electronics Prowirl 72 FOUNDATION Fieldbus resp.
Prowirl 73 FOUNDATION Fieldbus in:
Cl. I Div. 1 Groups ABCD
Cl. I Div. 1 Zone 0 AEx ia IIC
Cl. II Div. 1 Groups EFG
Cl. III

② Prowirl 72 resp. 73 standard housing

③ Cable entries:
Choice of thread for cable entries, M20x1.5 or ½" NPT or G ½" thread.

④ Only the "PROLINE EX-ZWEILEITER-KABEL" connection cable can be used to connect a Prowirl 72 or 73 to the Service Interface FXA 193.

✎ Note!
For ambient and fluid temperature ranges, and temperature class, see Page 4.

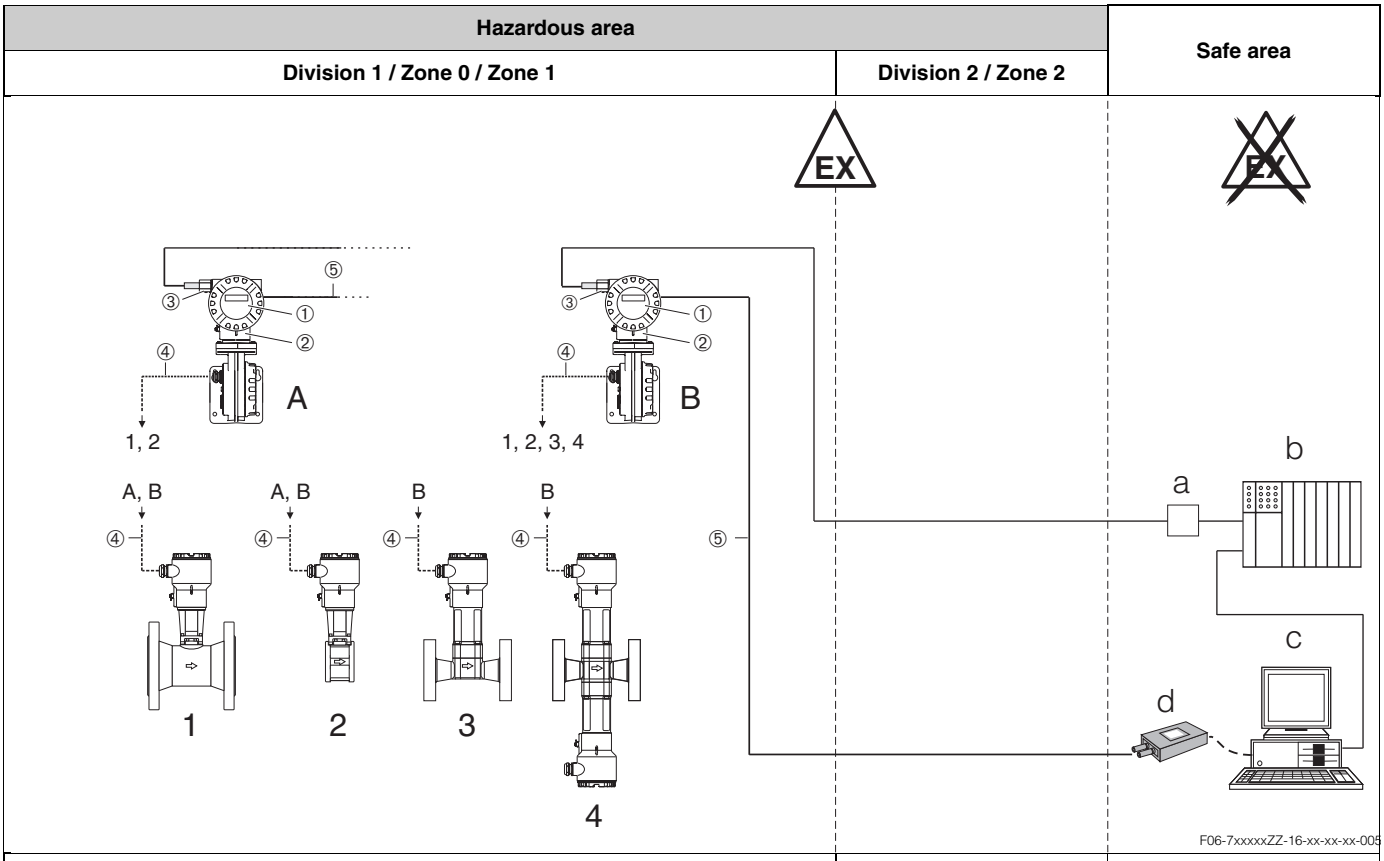
a = Segment coupler

b = PLC/DCS

c = PC with configuration tool

d = Service Interface FXA 193 (see Page 7)

Prowirl 72 / Prowirl 73 FOUNDATION Fieldbus, remote version



Prowirl 73 FOUNDATION Fieldbus:
A= Transmitter Prowirl 73 FOUNDATION Fieldbus
1 = Sensor F (DN 1/2"...12")
Standard version
PN 10...40; Cl 150...300; JIS 10...20K
2 = Sensor W (DN 1/2"...6");
Wafer
PN 10...40; Cl 150...300; JIS 10...20K

Prowirl 72 FOUNDATION Fieldbus:
B = Transmitter Prowirl 72 FOUNDATION Fieldbus
1 = Sensor F (DN 1/2"...12");
Standard version
PN 10...40; Cl 150...300; JIS 10...20K
2 = Sensor F (DN 1/2"...6");
High pressure version
PN 64...160; Cl 600; JIS 40K
3 = Sensor W (DN 1/2"...6");
Wafer
PN 10...40; Cl 150...300; JIS 10...20K
4 = Sensor F (DN 1/2"...6");
Dualsens
PN 10...160; Cl 150...600; JIS 10...40K

① Transmitter electronics Prowirl 72 FOUNDATION Fieldbus resp.
Prowirl 73 FOUNDATION Fieldbus in:
Cl. I Div. 1 Groups ABCD
Cl. I Div. 1 Zone 0 AEx ia IIC
Cl. II Div. 1 Groups EFG
Cl. III

② Prowirl 72 resp. 73 standard housing

③ Cable entries:
Choice of thread for cable entries, M20x1.5 or ½" NPT or G ½" thread.

④ Connecting cable remote version:
see Page 8.

⑤ Only the "PROLINE EX-ZWEILEITER-KABEL" connection cable can be used to connect a Prowirl 72 or 73 to the Service Interface FXA 193.

✎ Note!
For ambient and fluid temperature ranges, and temperature class, see Page 4.

a = Segment coupler

b = PLC/DCS

c = PC with configuration tool

d = Service Interface FXA 193 (see Page 7)

Temperature tables compact version

Measuring system Prowirl 72 FOUNDATION Fieldbus (compact version)

- Sensor standard temperature version:
  Prowirl 72*-**0********K**

Prowirl F/W	Max. medium temperature [°F] in			
	T4	T3	T2	T1
at T_a = -40 °F ... +158 °F	266	374	536	536

The minimum medium temperature is –40 °F.

- High/low temperature sensor version, high pressure version and Dualsens version:
  Prowirl 72*-**1********K, Prowirl 72***-**2********K, Prowirl 72***-**3********K**

Prowirl F/W	Max. medium temperature [°F] in			
	T4	T3	T2	T1
at T_a = -40 °F ... +158 °F	266	374	554	824

The minimum medium temperature is –328 °F.

Measuring system Prowirl 73 FOUNDATION Fieldbus (compact version)

- Sensor standard temperature version:
  Prowirl 73*-**4********K**

Prowirl F	Max. medium temperature [°F] in			
	T4	T3	T2	T1
at T_a = -40 °F ... +158 °F	266	374	554	824

The minimum medium temperature is –328 °F.

Temperature tables remote version

Measuring system Prowirl 72 FOUNDATION Fieldbus (remote version)

- Sensor standard temperature version:
  Prowirl 72*-**0********K**

Prowirl F/W	Max. medium temperature [°F] in			
	T4	T3	T2	T1
at T_a = -40 °F ... +185 °F	266	374	536	536

The minimum medium temperature is –40 °F.

- High/low temperature sensor version, high pressure version and Dualsens version:
  Prowirl 72*-**1********K, Prowirl 72***-**2********K, Prowirl 72***-**3********K**

Prowirl F/W	Max. medium temperature [°F] in			
	T4	T3	T2	T1
at T_a = -40 °F ... +185 °F	266	374	554	824

The minimum medium temperature is –328 °F.

- Transmitter Prowirl 72 FOUNDATION Fieldbus:
  Prowirl 72*-********K**

	Max. ambient temperature [°F] in			
	T4	T3	T2	T1
Prowirl 72 FOUNDATION Fieldbus	176	176	176	176

The minimum ambient temperature is –40 °F.

Measuring system Prowirl 73 FOUNDATION Fieldbus (remote version)

- Sensor standard temperature version:
  Prowirl 73*-**4********K**

Prowirl F/W	Max. medium temperature [°F] in			
	T4	T3	T2	T1
at T_a = -40 °F ... +185 °F	266	374	554	824

The minimum medium temperature is –328 °F.

- Transmitter Prowirl 73 FOUNDATION Fieldbus:
  Prowirl 73*-********K**

	Max. ambient temperature [°F] in			
	T4	T3	T2	T1
Prowirl 73 FOUNDATION Fieldbus	176	176	176	176

The minimum ambient temperature is –40 °F.

Approvals

No. / approval type	Description
I.D. 3015769 (see Page 6 for notes on special conditions)	for the electric flow measuring system Prowirl 72 resp. 73 FOUNDATION Fieldbus **Identification:** see below

Prowirl 72 FOUNDATION Fieldbus, IS (compact version)

P r o w i r l 7 2 * * * _ * * * * * * . * * * * .

K = FOUNDATION Fieldbus

N = Cl. I, Div. 1

Prowirl 72 F	DN 1/2"...12"	Cl. I, Div. 1 Groups ABCD Cl. II, Div. 1 Groups EFG Cl. III Cl. I, Zone 0 IIC T4-T1 AEx ia
Prowirl 72 W	DN 1/2"...6"	Cl. I, Div. 1 Groups ABCD Cl. II, Div. 1 Groups EFG Cl. III Cl. I, Zone 0 IIC T4-T1 AEx ia

Prowirl 72 FOUNDATION Fieldbus, IS (remote version)

P r o w i r l 7 2 * * * _ * * * * * * . * * * * .

K = FOUNDATION Fieldbus

N = Cl. I, Div. 1

Transmitter Prowirl 72 FOUNDATION Fieldbus (remote version)

Prowirl 72 FOUNDATION Fieldbus		Cl. I, Div. 1 Groups ABCD Cl. II, Div. 1 Groups EFG Cl. III Cl. I, Zone 0 IIC T4-T1 AEx ia

Sensor Prowirl F/W (remote version)

Prowirl 72 F	DN 1/2"...12"	Cl. I, Div. 1 Groups ABCD Cl. II, Div. 1 Groups EFG Cl. III Cl. I, Zone 0 IIC T4-T1 AEx ia
Prowirl 72 W	DN 1/2"...6"	Cl. I, Div. 1 Groups ABCD Cl. II, Div. 1 Groups EFG Cl. III Cl. I, Zone 0 IIC T4-T1 AEx ia

Prowirl 73 FOUNDATION Fieldbus, IS (compact version)

P r o w i r l 7 3 * * * _ * * * * * * . * * * * .

K = FOUNDATION Fieldbus

N = Cl. I, Div. 1

Prowirl 73 F	DN 1/2"...12"	Cl. I, Div. 1 Groups ABCD Cl. II, Div. 1 Groups EFG Cl. III Cl. I, Zone 0 IIC T4-T1 AEx ia
Prowirl 73 W	DN 1/2"...6"	Cl. I, Div. 1 Groups ABCD Cl. II, Div. 1 Groups EFG Cl. III Cl. I, Zone 0 IIC T4-T1 AEx ia

Prowirl 73 FOUNDATION Fieldbus, IS (remote version)

P r o w i r l 7 3 * * * _ * * * * * * . * * * * .

- K = FOUNDATION Fieldbus
- N = Cl. I, Div. 1

Transmitter Prowirl 73 FOUNDATION Fieldbus (remote version)

Prowirl 73 FOUNDATION Fieldbus		Cl. I, Div. 1 Groups ABCD Cl. II, Div. 1 Groups EFG Cl. III Cl. I, Zone 0 IIC T4-T1 AEx ia

Sensor Prowirl 73 F (remote version)

Prowirl 73 F	DN 1/2"...12"	Cl. I, Div. 1 Groups ABCD Cl. II, Div. 1 Groups EFG Cl. III Cl. I, Zone 0 IIC T4-T1 AEx ia
Prowirl 73 W	DN 1/2"...6"	Cl. I, Div. 1 Groups ABCD Cl. II, Div. 1 Groups EFG Cl. III Cl. I, Zone 0 IIC T4-T1 AEx ia

Notified body

The Prowirl measuring system was tested for approval by the following named entity:
FM: Factory Mutual Research

Special conditions

1. Control room equipment shall not use or generate more than 250 V rms.

Caution!

2. Use supply wires suitable for +50 °F above maximum ambient temperature.
3. The specified temperature class in conjunction with the ambient temperature and the medium temperature must be in compliance with the tables on Page 4 and 5.
4. It is not permissible to connect the service adapter in explosive atmospheres.
5. Install per National Electrical Code. Install intrinsically safe circuits per NEC ANSI/ NFPA 70 and ISA RP 12.6.

Warning!

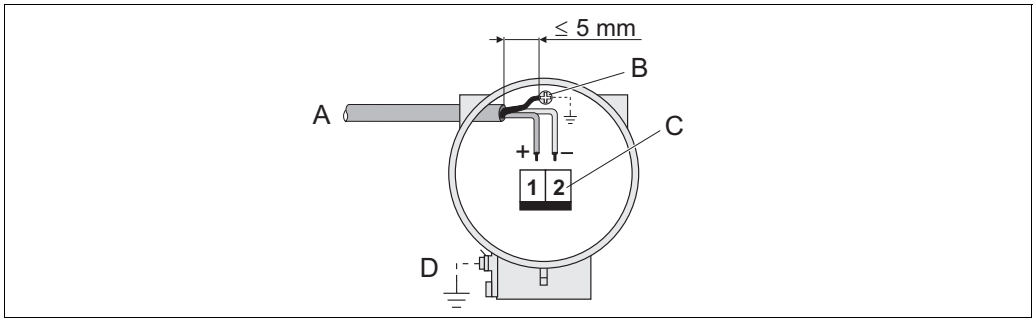
6. Substitution of components may impair intrinsic safety.
7. The flowmeter must be integrated into the potential equalisation system (see Fig. 1).

General warnings

Warning!

- Installation, connection to the electricity supply, commissioning and maintenance of the devices must be carried out by qualified specialists trained to work on Ex-rated devices.
- Compliance with national regulations relating to the installation of devices in potentially explosive atmospheres is mandatory, if such regulations exist.
- The manufacturer's guidelines for all devices connected to the intrinsically safe circuits must be observed.
- To rotate the transmitter housing, use the same procedure as for safe area versions. The transmitter housing may also be rotated during operation.

Electrical connections



F06-73PBxxxx-11-00-00-xx-000

Fig. 1: Electrical connections Prowirl 72 resp. Prowirl 73 FOUNDATION Fieldbus
A = FOUNDATION Fieldbus cable
B = Ground terminal in the wiring compartment (between the stripped FOUNDATION Fieldbus cable and the ground terminal, the cable shielding should not exceed a length of 5 mm)
C = Terminal connector (1 = FF +; 2 = FF –)
D = Ground terminal for potential equalisation (external, only relevant for remote version)

Caution!
- Ground potential equalisation must exist between the safe and hazardous area.
- The transmitter is to be securely connected to the potential equalization system using either the transmitter's esternal screw terminal (D), or the ground terminal (B) in the wiring compartment.
- Between the stripped FOUNDATION Fieldbus cable and the ground terminal, the cable shielding should not exceed a length of 5 mm.
- Alternatively, the sensor and the transmitter (compact version) or the connection housing can be connected to the potential equalization system via the pipeline when a ground connection according to regulations can be assured.

The table below contains the values that are identical for all versions, irrespective of the type code.

Transmitter Prowirl 72*-******N****K; Prowirl 73***-******N****K**

Terminals	**1 (+)**	**2 (–)**
Designation	FOUNDATION Fieldbus	
Intrinsically safe circuit	yes	
U_i or V_{max}	17.5 V	
I_i or I_{max}	500 mA	
P_i	5.5 W	
L_i	≤ 10 µH	
C_i	≤ 5 nF	

or

Terminals	**1 (+)**	**2 (–)**
Designation	FOUNDATION Fieldbus	
Intrinsically safe circuit	yes	
U_i or V_{max}	24 V	
I_i or I_{max}	250 mA	
P_i	1.2 W	
L_i	≤ 10 µH	
C_i	≤ 5 nF	

The measuring device fulfils the conditions and limit values defined in the FISCO model.

Service adapter

The service adapter is exclusively for connection to Endress+Hauser approved service interfaces FXA 193.

Warning!
It is not permissible to connect the service adapter in explosive atmospheres.

Cable entries

Choice of thread for cable entries, M20x1.5 or ½" NPT or G ½" thread (see also the figures on Pages 2 and 3, number ③).

Cable specifications

The sensor cable connection between sensor and transmitter has an IS type of protection rating (see also the figures on Pages 2 and 3, number ④).
The max. cable length is 320 ft (100 m) for instrinsically safe use. Functionally the cable length is limited to 98 ft (30 m).
The max. capacitance of the cable is 300 µF/ft (1 µF/km).
The max. cable inductivity is 0.30 µH/ft (1 mH/km).
The cable delivered by Endress+Hauser (max. 98 ft (30 m)) fulfils these requirements.

Fieldbus connector

The connection technology of FOUNDATION Fieldbus allows measuring devices to be connected to the fieldbus via uniform mechanical connections such as T-boxes, junction boxes, etc. This connection technology using prefabricated distribution modules and plug-in connectors offers substantial advantages over conventional wiring:
- Field devices can be removed, replaced or added at any time during normal operation. The communications will not be interrupted.
- This simplifies installation and maintenance significantly.
- Existing cable infrastructures can be used and expanded instantly, e.g. when constructing new star distributors using 4-channel or 8-channel junction boxes.

The Prowirl 72 FOUNDATION Fieldbus resp. Prowirl 73 FOUNDATION Fieldbus can therefore be supplied with a ready-mounted fieldbus connector. Fieldbus connectors for retrofitting can be ordered from Endress+Hauser as a spare part.

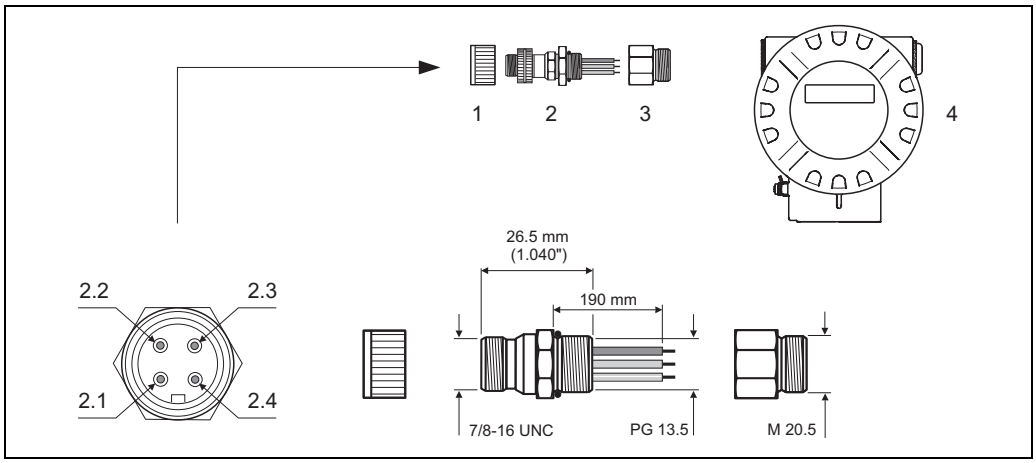


Fig. 2: Connectors for connecting to the FOUNDATION Fieldbus

1 Protective cap for connector

2 Fieldbus connector (Pin assignment / color codes)

2.1 Brown wire: FF+ (Terminal 26)

2.2 Blue wire: FF– (Terminal 27)

2.3 not connected

2.4 Grounding

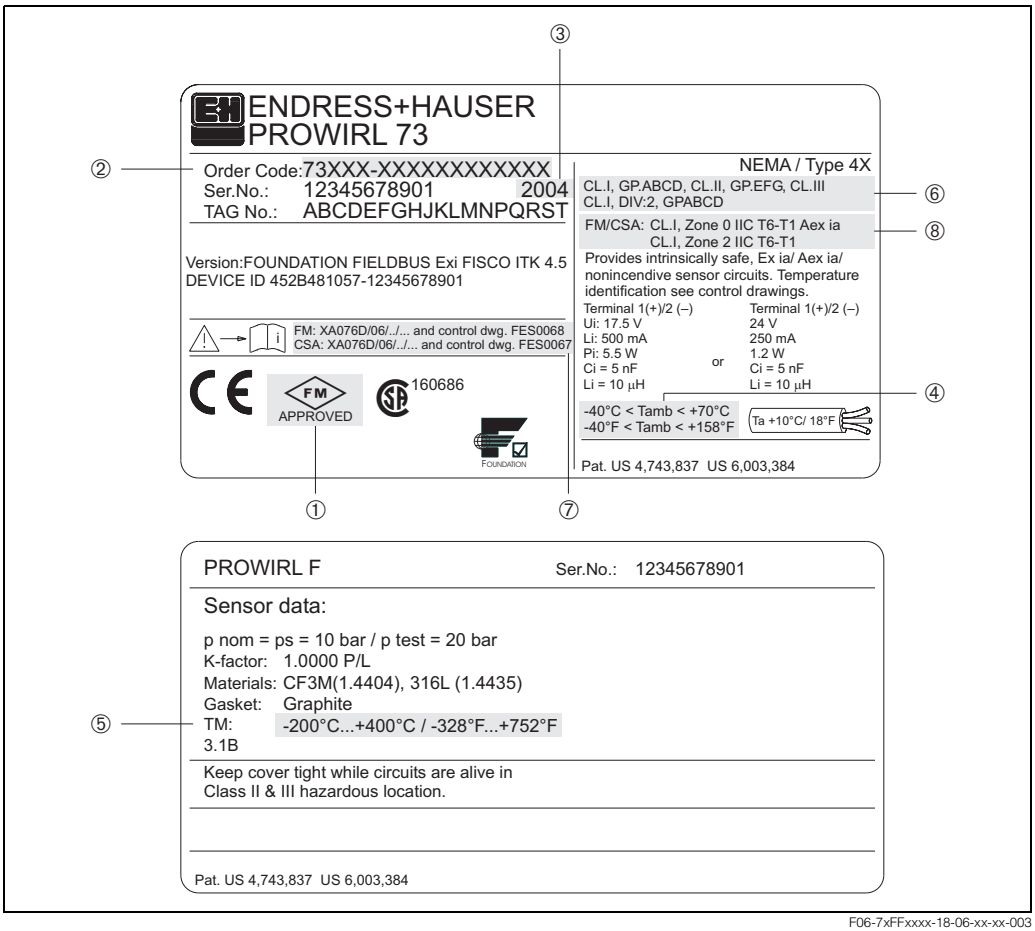
3 Adapter PG 13.5 / M 20.5

Technical data (fieldbus connector):

Degree of protection	IP 67
Ambient temperature	–40...+150 °C

Device identification

Transmitter Prowirl 72 FOUNDATION Fieldbus and F/W sensor resp. Prowirl 73 FOUNDATION Fieldbus and F/W sensor.



F06-7xFFxxxx-18-06-xx-xx-003

Fig. 3: Nameplate of transmitter and nameplate of sensor (example)

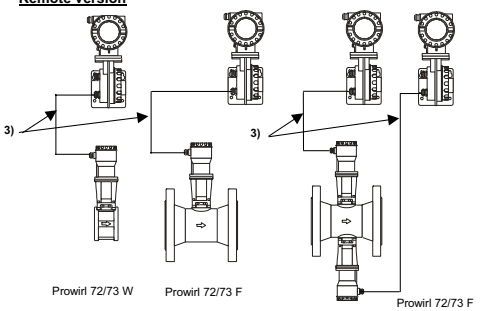
No.	Meaning
①	Label of the notified body: Factory Mutual Research
②	Type code
③	Year of manufacture
④	Ambient temperature range
⑤	Maximum medium temperature
⑥	Type of protection and explosion group for the measuring system
⑦	Applicable Ex documentation
⑧	Warning

Control drawings

Endress+Hauser Reinach hereby declares that the product is in conformity with the requirements of the FACTORY MUTUAL standards.

Hazardous Locations
Class I Division 1 Groups ABCD or Class I Zone 0 Group IIC
and Class II and III Division 1 Groups EFG

Remote version



Sensor:

PROWIRL 7** **-**1***N*****, PROWIRL 7** **-**2***N*****,
PROWIRL 7** **-**3***N*****, PROWIRL 7** **-**4***N***** and
PROWIRL 7** **-**6***N*****:

	Max. medium temperature					
	T6 **2)**	T5 **2)**	T4	T3	T2	T1
Ta = 104°F	176°F	203°F	266°F	374°F	554°F	824°F
Ta = 140°F	---	203°F	266°F	374°F	554°F	824°F
Ta = 185°F	---	---	266°F	374°F	554°F	824°F

PROWIRL 7** **-**0***N*****:

	Max. medium temperature				
	T6 **2)**	T5 **2)**	T4	T3	T2 - T1
Ta = 104°F	176°F	203°F	266°F	374°F	536°F
Ta = 140°F	---	203°F	266°F	374°F	536°F
Ta = 185°F	---	---	266°F	374°F	536°F

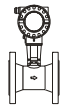
Transmitter:

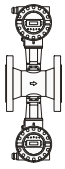
PROWIRL 7** **-**0***N*****, PROWIRL 7** ***-**1***N*****,
PROWIRL 7** **-**2***N*****, PROWIRL 7* ***-**3***N*****,
PROWIRL 7** **-**4***N***** and PROWIRL 7** **-**6***N*****:

	T6 **2)**	T5 **2)**	T4 - T1
Ta =	104°F	140°F	176°F

Compact version


Prowirl 72/73 W


Prowirl 72/73 F


Prowirl 72/73 F
(Dualsensor)

PROWIRL 7** **-**1***N*****, PROWIRL 7** **-**2***N*****,
PROWIRL 7** **-**3***N*****, PROWIRL 7** **-**4***N***** and
PROWIRL 7** **-**6***N*****:

	Max. medium temperature					
	T6 **2)**	T5 **2)**	T4	T3	T2	T1
Ta = 104°F	176°F	203°F	266°F	374°F	554°F	824°F
Ta = 140°F	---	203°F	266°F	374°F	554°F	824°F
Ta = 158°F	---	---	266°F	374°F	554°F	824°F

PROWIRL 7** **-**0***N*****:

	Max. medium temperature				
	T6 **2)**	T5 **2)**	T4	T3	T2 - T1
Ta = 104°F	176°F	203°F	266°F	374°F	536°F
Ta = 140°F	---	203°F	266°F	374°F	536°F
Ta = 158°F	---	---	266°F	374°F	536°F

Notes:

1) Assignment of Drawings:

Drawing-No.	Model Codes:
FES0068 B	Prowirl 7* **-******N*****
FES0068-0001 B	Prowirl 7* **-******N****A and Prowirl 7* **-******N****W
FES0068-0002 B	Prowirl 7* **-******N****H and Prowirl 7* **-******N****K
FES0068-0003 B	Prowirl 7* **-******N****H and Prowirl 7* **-******N****K
FES0068-0004 B	Prowirl 7* **-******N***** with Fieldbus Cable Connector

2) Temperature class T6 and T5 is not allowed for versions of Profibus PA and Fieldbus Foundation
(not for PROWIRL 7** **-******N****H and PROWIRL 7** **-******N****K)
3) Max. cable length for intrinsically safe installation 100m / 320ft for using cable parameters L_{Cable} = 1mH/km / 0.3µH/ft and C_{Cable} = 1µF/km / 300µF/ft
4) Caution: Use supply wires suitable for 50°F above maximum ambient temperature
5) Caution: Surface temperature of transmitter enclosure can exceed 158°F depending on ambient temperature or medium temperature
6) Dust tight seals must be used at conduit entries for Class II and III installation
7) Fieldbus cable connectors are suitable for Class I, Div. 2, Groups ABCD if non-incendive circuits are connected (see FES0068-0004 B)
8) Prowirl 72 and Prowirl 73 transmitter is intended for installation to Service Interface FXA 193 when using the PROLINE EX-ZWEILEITER-KABEL (blue cable)

Aenderungen:						Alle gesetzlichen Urheberrechte vorbehalten.	Ersetzt durch:
	A	24.03.03 / Bn	F			Diese Zeichnung darf ohne unsere	
	B	08.09.03 / Bn	G			Genehmigung weder vervielfältigt werden	Ersatz für:
	C		H			noch dritten Personen und Konkurrenzfirmen	Ersteller: FES/Bn
	D		J			zugängig gemacht werden.	File: M:\ZEICHNG\...\030908c.doc **ID 1113**
	E		K				

FM CONTROL DRAWING
PROWIRL 72, PROWIRL 73 (IS and NI)
Compact Version, Remote version

Massstab

Gezeichnet	23.09.02	Bn
Geprüft		
Ex-geprüft	08.09.03	Bn
Gesehen		

Flowtec AG, Kaegenstrasse 7, CH-4153 Reinach BL1, Postfach

FES0068 B

This page applies to model code: **Prowirl 7* **-******N****H and Prowirl 7* **-******N****K**

FISCO-Concept

The FISCO Concept allows interconnection of intrinsically safe apparatus to associated apparatus not specifically examined in such combination. The criteria for interconnection is that the voltage (Ui or Vmax), the current (Ii or Imax) and the power (Pi) which intrinsically safe apparatus can receive and remain intrinsically safe, considering faults, must be equal or greater than the voltage (Uo or Voc), the current (Io or Isc) and the power (Po) levels which can be delivered by the associated apparatus, considering faults and applicable factors. In addition, the maximum unprotected capacitance (Ci) and inductance (Li) of each apparatus (other than the termination) connected to the fieldbus must be less than or equal to 5 nF and 10 µH respectively.

In each segment only one active device, normally the associated apparatus, is allowed to provide the necessary energy for the fieldbus system. The voltage Uo of the associated apparatus has to be limited to the range of 14V to 24V d.c. All other equipment connected to the bus cable has to be passive, meaning that they are not allowed to provide energy to the system, except to a leakage current of 50 µA for each connected device. Separately powered equipment needs a galvanic isolation to assure that the intrinsically safe fieldbus circuit remains passive.

The cable used to interconnect the devices needs to have the parameters in the following range:

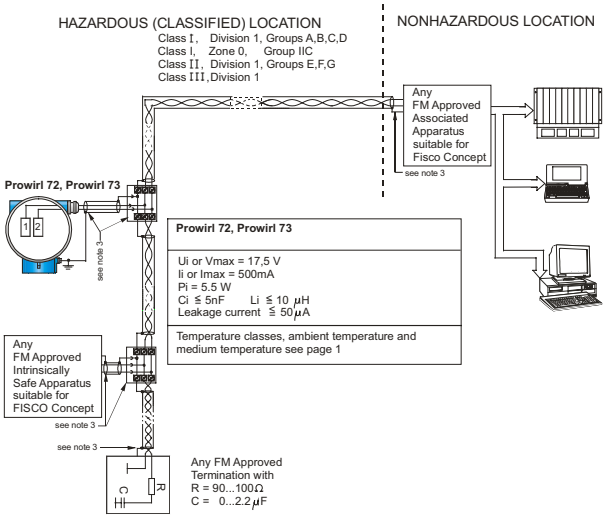
loop resistance R' : 15 .... 150 Ω/km
inducance per unit length L' : 0.4 .... 1 mH/km
capacitance per unit length C' : 80 .... 200 nF/km
C' = C' line/line + 0.5 C' line/screen, if both lines are floating or
C' = C' line/line + C' line/screen, if the screen is connected to one line
length of spur cable : ≤ 30 m
length of trunk cable : ≤ 1 km
length of splice : ≤ 1 m

At each end of the trunk cable an approved infallible line termination with the following parameters is suitable:

R = 90 .... 100 Ω
C = 0 .... 2.2 µF

One of the allowed terminations might already be integrated in the associated apparatus.

The number of passive devices connected to the bus segment is not limited due to I.S. reasons. If the above rules are respected, up to a total length of 1000 m (sum of the length of trunk cable and all spur cables), the inductance and capacitance of the cable will not impair the intrinsic safety of the installation.



Notes:

Intrinsically safe installation

1) Control room equipment may not use or generate over 250 Vrms.
2) Wire all circuits for power supply per NEC ANSI/NFPA 70.
3) Be aware of multiple earthing of the screen. The screen must be connected in accordance with ISA RP 12.06.01
4) WARNING: SUBSTITUTION OF COMPONENTS MAY IMPAIR INTRINSIC SAFETY.

Division 2 installation

5) Transmitter circuit wiring in conduit in accordance with NEC ANSI/NFPA 70.
6) WARNING: EXPLOSION HAZARD - SUBSTITUTION OF COMPONENTS MAY IMPAIR INTRINSIC SAFETY.

Class II installation

7) Transmitter circuit wiring in conduit in accordance with NEC ANSI/NFPA 70.

Aenderungen:						Alle gesetzlichen Urheberrechte vorbehalten.	Ersetzt durch:
	A	24.03.03 / Bn	F			Diese Zeichnung darf ohne unsere	
	B	08.09.03 / Bn	G			Genehmigung weder vervielfältigt werden	Ersatz für:
	C		H			noch dritten Personen und Konkurrenzfirmen	Ersteller: FES/Bn
	D		J			zugängig gemacht werden.	File: M:\ZEICHNG\...\030908c.doc **ID 1113**
	E		K				

FM CONTROL DRAWING
PROWIRL 72, PROWIRL 73 (IS and NI)
Div. 1 / Zone 0
FISCO - Concept

Massstab

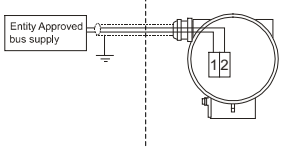
Gezeichnet	23.09.02	Bn
Geprüft		
Ex-geprüft	08.09.03	Bn
Gesehen		

Flowtec AG, Kaegenstrasse 7, CH-4153 Reinach BL1, Postfach

FES0068-0002 B

This page applies to model code: **Prowirl 7* **-******N****H and Prowirl 7* **-******N****K**

Non Hazardous Locations | **Hazardous Locations**
Class I Division 1 Groups ABCD or Class I Zone 0 AEx ia IIC and Class II and III Division 1 Groups EFG



Instrinsically safe installation:

1) Control room equipment may not use or generate over 250 Vrms.
2) Wire all circuits for power supply per NEC ANSI/NFPA 70 and ISA RP 12.6.01
3) Use entity approved safety barrier or other associated equipment that satisfy the following conditions:
$V_{oc} \leq V_{max}$, $I_{sc} \leq I_{max}$, $C_a \geq C_i + C_{cable}$, $L_a \geq L_i + L_{cable}$ transmitter entity parameters are as follows:

	V_{max}	I_{max}	P_i	C_i	L_i
	17.5 V	500 mA	5.5 W	≤ 5 nF	≤ 10 µH
or	24 V	250 mA	1.2 W	≤ 5 nF	≤ 10 µH

4) **WARNING**: SUBSTITUTION OF COMPONENTS MAY IMPAIR INSTRINSIC SAFETY.
5) Ex ia is defined as Intrinsically Safe

Division 2 installation (without barrier):

6) Control room equipment may not use or generate over 250 Vrms.
7) Installation of transmitter circuit wiring according to NEC using threaded conduit.
8) Wire all circuits for power supply per ISA RP 12.06.01
9) Terminals 1 and 2
V ≤ 30 V, I ≤ 40 mA

10) **WARNING:** SUBSTITUTION OF COMPONENTS MAY IMPAIR SUITABILITY FOR CLASS I DIVISION 2.

Class II, III installation (without barrier)

11) Transmitter circuit wiring in conduit in accordance with NEC ANSI/NFPA 70.

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	B	08.09.03 / Bn	G		Genehmigung weder vervielfältigt werden	Ersatz für:
	C		H		noch dritten Personen und Konkurrenzfirmen	Ersteller: FES/Bn
	D		J		zugängig gemacht werden.	File: M:\ZEICHNG\...\030908c.doc **ID 1113**
	E		K			

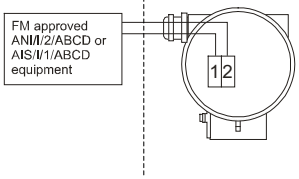
FM CONTROL DRAWING (IS and NI) PROWIRL 72, PROWIRL 73 Fieldbus Foundation and Profibus PA IS installation, Entity - Concept	Massstab	Gezeichnet	23.09.02	Bn
		Geprüft		
		Ex-geprüft	08.09.03	Bn
		Gesehen		

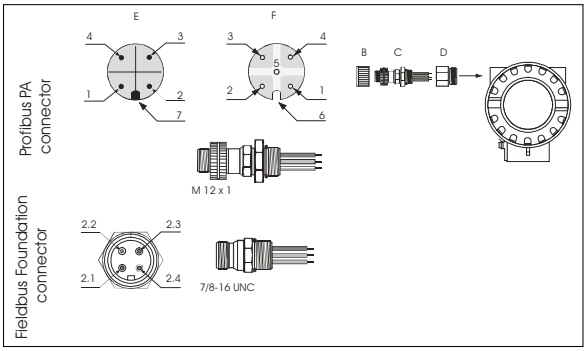
Flowtec AG, Kaegenstrasse 7, CH-4153 Reinach BL1, Postfach

FES0068-0003 B

This page applies to model code: **Prowirl 7* **-******N***** with Fieldbus Cable Connector**

Non Hazardous Locations | **Hazardous Locations**
Class I Division 2 Groups ABCD or Class I Zone 2 Groups IIC,





B = Protection cap for connector, C = Fieldbus connector, D = Thread adapter
E = Connector on housing (male), F = Connector (female)

Pin assignment:

Profibus PA
1 = Brown wire, PA+ (terminal 26)
2 = Not connected
3 = Blue wire, PA- (terminal 27)
4 = Black wire, ground
5 = Female connector not assigned
6 = Positioning groove
7 = Positioning key

Fieldbus Foundation
2.1 = Brown wire, FF+ (terminal 26)
2.2 = Blue wire, FF- (terminal 27)
2.3 = Not connected
2.4 = Yellow/green wire, ground

Notes:
1) Install per National Electrical Code
2) Fieldbus cable connectors are suitable for Class I, Div. 2, Groups ABCD if non-incendive circuits are connected
3) For nonincendive wiring of fieldbus communication circuit, make shure that
Ccable ≤ Ca and Lcable ≤ La

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	A	24.03.03 / Bn	F		Diese Zeichnung darf ohne unsere	
	B	08.09.03 / Bn	G		Genehmigung weder vervielfältigt werden	Ersatz für:
	C		H		noch dritten Personen und Konkurrenzfirmen	Ersteller: FES/Bn
	D		J		zugängig gemacht werden.	File: M:\ZEICHNG\...\030908c.doc **ID 1113**
	E		K			

FM CONTROL DRAWING PROWIRL 72, PROWIRL 73 Fieldbus Cable Connector NI installation	Massstab	Gezeichnet	23.09.02	Bn
		Geprüft		
		Ex-geprüft	08.09.03	Bn
		Gesehen		

Flowtec AG, Kaegenstrasse 7, CH-4153 Reinach BL1, Postfach

FES0068-0004 B

Supplementary documentation

Prowirl 72 FOUNDATION Fieldbus:
TI064D/06/
BA095D/06/

Prowirl 73 FOUNDATION Fieldbus:
TI064D/06/
BA096D/06/

USA
Endress+Hauser Inc.
Greenwood, Indiana
Tel. (317) 535-7138
Fax. (317) 535-8498

Canada
Endress+Hauser Ltd.
Burlington, Ontario
Tel. (905) 681 92 92
Fax. (905) 681 94 44

Instruments International
Endress+Hauser GmbH+Co.
Weil am Rhein
Germany
Tel. (07621) 975-02
Fax. (07621) 975 345

XA076D/06/en/06.04
50107488
FM+SGML 6.0

Proline Prowirl 72 / Prowirl 73 FOUNDATION Fieldbus, Ex-i intrinsically safe version (IS), Division 1

Ex documentation for the BA095D (Prowirl 72 FOUNDATION Fieldbus) and BA095D (Prowirl 73 FOUNDATION Fieldbus) operating instruction

according to CANADIAN STANDARDS ASSOCIATION

Example: **Class I, Division 1, Groups ABCD**

Canadian Standards Association

Class

I II III	Class I (Gas) Class II (Dust) Class III (Fibre)

Division

1 2	Division 1 Division 2

Group

CSC / NEC	Gases, vapours and dusts (Examples)	Min. ignition temperature [µJ]
A	Acetylene, carbon disulfide (Class I)	0.02
B	Hydrogen, ethyl nitrate (Class I)	0.02
C	Ethylene, isoprene (Class I)	0.06
D	Acetone, ethane, benzene (Class I)	0.18
E	Metallic powder (Class II)	
F	Coal dust (Class II)	
G	Grain dust (Class II)	
	Textile fibres (Class III)	

Type of Protection

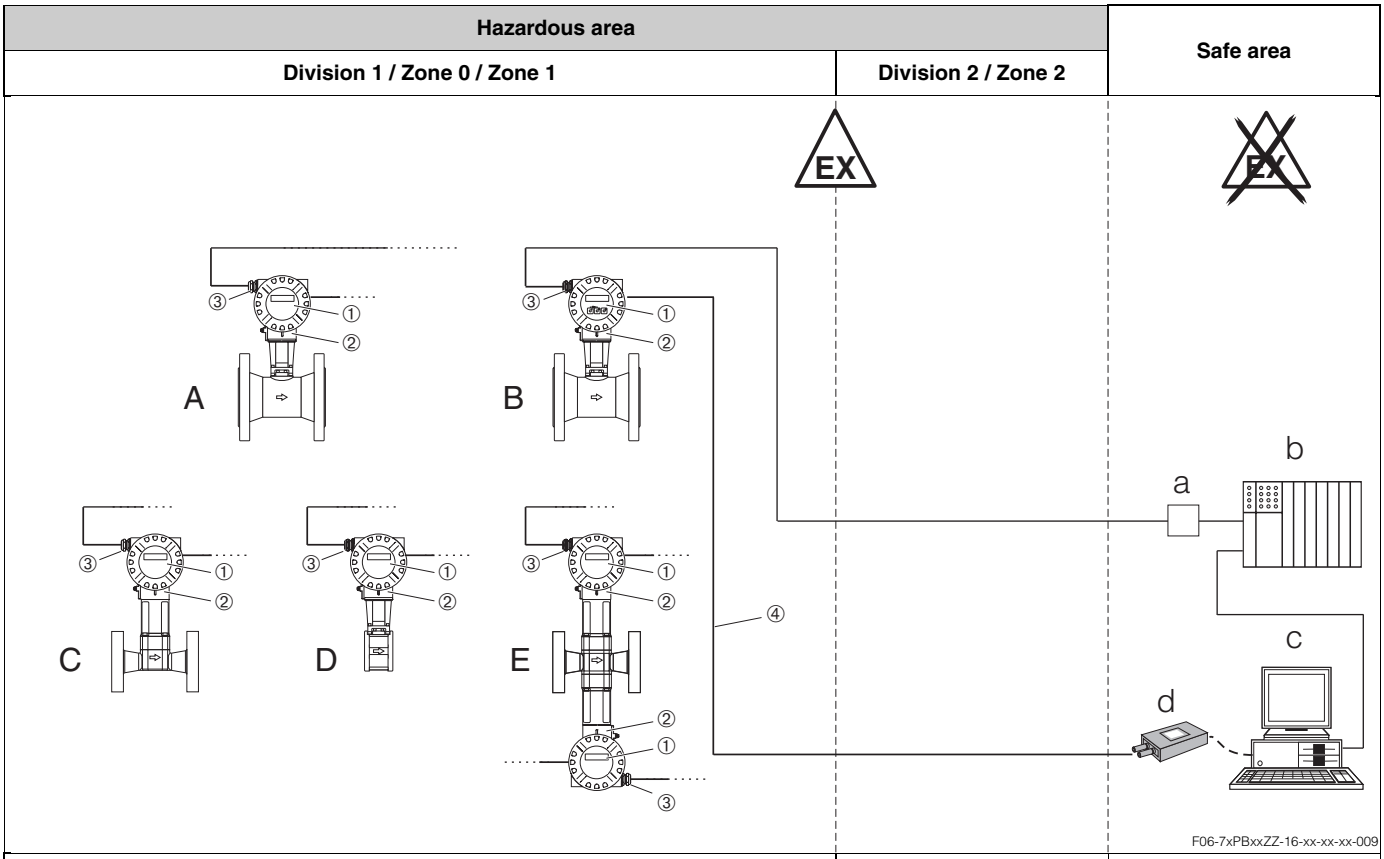
	Explosionproof
	Intrinsically Safe Apparatus
	Associated Apparatus with Intrinsically Safe Connections
	Nonincendive Field Wiring Circuit
	Pressurized
	Associated Pressurization Systems/Components
	Nonincendive
	Dust-Ignitionproof
	Special Protection

Temperature Class

CSA	Maximum surface temperature	
T1	450 °C	842 °F
T2	300 °C	572 °F
T2A	280 °C	536 °F
T2B	260 °C	500 °F
T2C	230 °C	446 °F
T2D	215 °C	419 °F
T3	200 °C	392 °F
T3A	180 °C	356 °F
T3B	165 °C	329 °F
T3C	160 °C	320 °F
T4	135 °C	275 °F
T4A	120 °C	248 °F
T5	100 °C	212 °F
T6	85 °C	185 °F

Endress + Hauser
The Power of Know How

Prowirl 72 / Prowirl 73 FOUNDATION Fieldbus, compact version



Prowirl 73 FOUNDATION Fieldbus:
A = Sensor F (DN 1/2"...12")
Standard version
PN 10...40; Cl 150...300; JIS 10...20K
D = Sensor W (DN 1/2"...6");
Wafer
PN 10...40; Cl 150...300; JIS 10...20K

Prowirl 72 FOUNDATION Fieldbus:
B = Sensor F (DN 1/2"...12");
Standard version
PN 10...40; Cl 150...300; JIS 10...20K
C = Sensor F (DN 1/2"...6");
High pressure version
PN 64...160; Cl 600; JIS 40K
D = Sensor W (DN 1/2"...6");
Wafer
PN 10...40; Cl 150...300; JIS 10...20K
E = Sensor F (DN 1/2"...6");
Dualsens
PN 10...160; Cl 150...600; JIS 10...40K

① Transmitter electronics Prowirl 72 FOUNDATION Fieldbus resp.
Prowirl 73 FOUNDATION Fieldbus in:
Cl. I Div. 1 Groups ABCD
Cl. I Div. 1 Zone 0 AEx ia IIC
Cl. II Div. 1 Groups EFG
Cl. III

② Prowirl 72 resp. 73 standard housing

③ Cable entries: Choice of thread for cable entries, M20x1.5 or ½" NPT or G ½" thread.

④ Only the "PROLINE EX-ZWEILEITER-KABEL" connection cable can be used to connect a Prowirl 72 or 73 to the Service Interface FXA 193.

✎ Note!
For ambient and fluid temperature ranges, and temperature class, see Page 4.

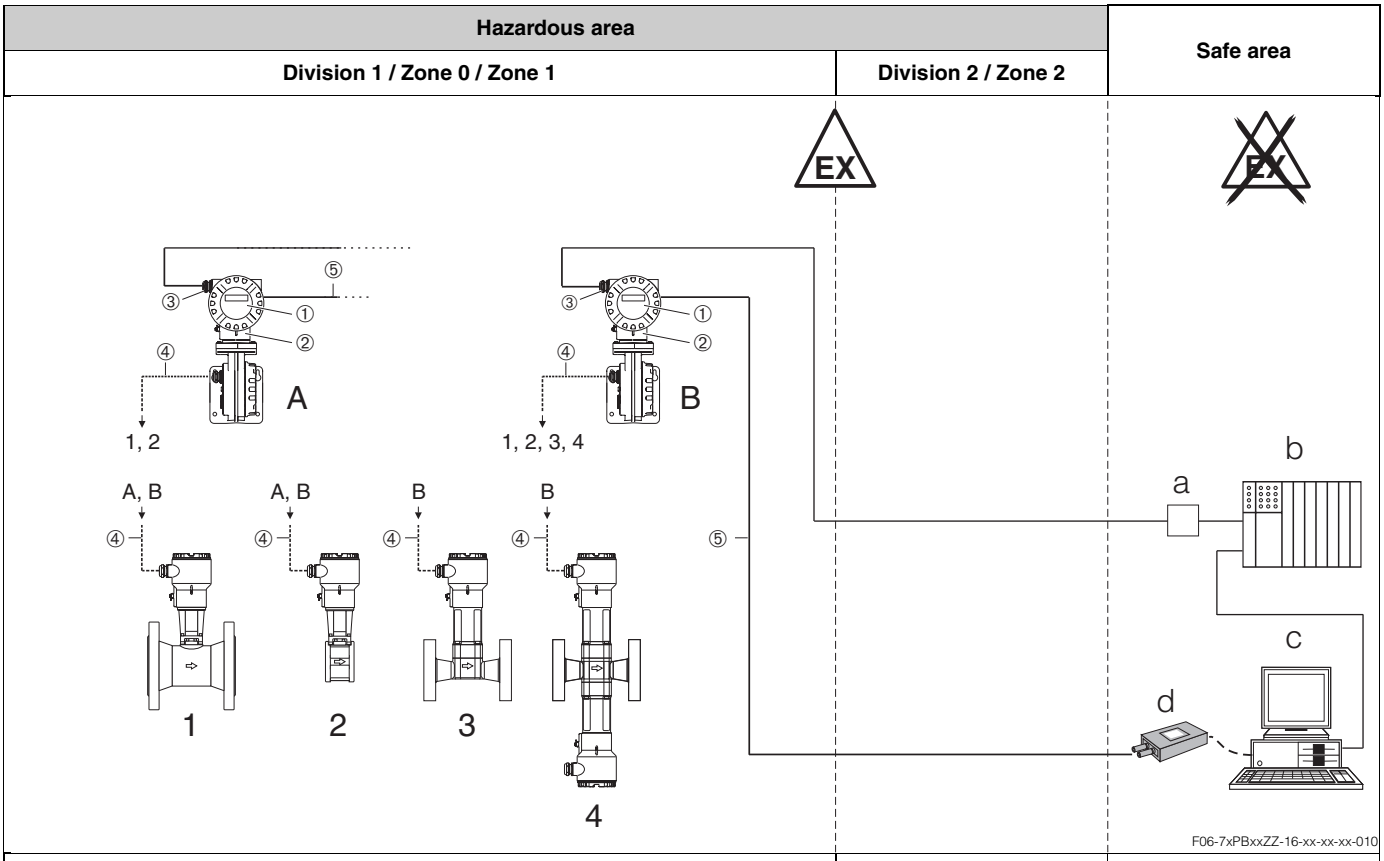
a = Segment coupler

b = PLC/DCS

c = PC with configuration tool

d = Service Interface FXA 193 (see Page 8)

Prowirl 72 / Prowirl 73 FOUNDATION Fieldbus, remote version



Prowirl 73 FOUNDATION Fieldbus:
A = Transmitter Prowirl 73 FOUNDATION Fieldbus
1 = Sensor F (DN 1/2"...12")
Standard version
PN 10...40; Cl 150...300; JIS 10...20K
2 = Sensor W (DN 1/2"...6");
Wafer
PN 10...40; Cl 150...300; JIS 10...20K

Prowirl 72 FOUNDATION Fieldbus:
B = Transmitter Prowirl 72 FOUNDATION Fieldbus
1 = Sensor F (DN 1/2"...12");
Standard version
PN 10...40; Cl 150...300; JIS 10...20K
2 = Sensor W (DN 1/2"...6");
Wafer
PN 10...40; Cl 150...300; JIS 10...20K
3 = Sensor F (DN 1/2"...6");
High pressure version
PN 64...160; Cl 600; JIS 40K
4 = Sensor F (DN 1/2"...6");
Dualsens
PN 10...160; Cl 150...600; JIS 10...40K

① Transmitter electronics Prowirl 72 FOUNDATION Fieldbus resp. Prowirl 73 FOUNDATION Fieldbus in:
Cl. I Div. 1 Groups ABCD
Cl. I Div. 1 Zone 0 AEx ia IIC
Cl. II Div. 1 Groups EFG
Cl. III

② Prowirl 72 resp. 73 standard housing

③ Cable entries: Choice of thread for cable entries, M20x1.5 or ½" NPT or G ½" thread.

④ Connecting cable remote version: see Page 8.

⑤ Only the "PROLINE EX-ZWEILEITER-KABEL" connection cable can be used to connect a Prowirl 72 or 73 to the Service Interface FXA 193.

✎ Note!
For ambient and fluid temperature ranges, and temperature class, see Page 4.

a = Segment coupler

b = PLC/DCS

c = PC with configuration tool

d = Service Interface FXA 193 (see Page 8)

Temperature tables compact version

Measuring system Prowirl 72 FOUNDATION Fieldbus (compact version)

- Sensor standard temperature version:
  Prowirl 72*-**0********K**

Prowirl F/W	Max. medium temperature [°C] in			
	T4	T3	T2	T1
at T_a = -40 °C ... +70 °C	130	190	280	280

The minimum medium temperature is –40 °C.

- High/low temperature sensor version, high pressure version and Dualsens version:
  Prowirl 72*-**1********K, Prowirl 72***-**2********K, Prowirl 72***-**3********K**

Prowirl F/W	Max. medium temperature [°C] in			
	T4	T3	T2	T1
at T_a = -40 °C ... +70 °C	130	190	290	440

The minimum medium temperature is –200 °C.

Measuring system Prowirl 73 FOUNDATION Fieldbus (compact version)

- Sensor standard temperature version:
  Prowirl 73*-**4********K**

Prowirl F/W	Max. medium temperature [°C] in			
	T4	T3	T2	T1
at T_a = -40 °C ... +70 °C	130	190	290	440

The minimum medium temperature is –200 °C.

Temperature tables remote version

Measuring system Prowirl 72 FOUNDATION Fieldbus (remote version)

- Sensor standard temperature version:
  Prowirl 72*-**0********K**

Prowirl F/W	Max. medium temperature [°C] in			
	T4	T3	T2	T1
at T_a = -40 °C ... +85 °C	130	190	280	280

The minimum medium temperature is –40 °C.

- High/low temperature sensor version, high pressure version and Dualsens version:
  Prowirl 72*-**1********K, Prowirl 72***-**2********K, Prowirl 72***-**3********K**

Prowirl F/W	Max. medium temperature [°C] in			
	T4	T3	T2	T1
at T_a = -40 °C ... +85 °C	130	190	290	440

The minimum medium temperature is –200 °C.

- Transmitter Prowirl 72 FOUNDATION Fieldbus:
  Prowirl 72*-********K**

	Max. medium temperature [°C] in			
	T4	T3	T2	T1
Prowirl 72 FOUNDATION Fieldbus	80	80	80	80

The minimum ambient temperature is –40 °C.

Measuring system Prowirl 73 FOUNDATION Fieldbus (remote version)

- Sensor standard temperature version:
  Prowirl 73*-**4********K**

Prowirl F/W	Max. medium temperature [°C] in			
	T4	T3	T2	T1
at T_a = -40 °C ... +85 °C	130	190	290	440

The minimum medium temperature is –200 °C.

- Transmitter Prowirl 73 FOUNDATION Fieldbus:
  Prowirl 73*-********K**

	Max. medium temperature [°C] in			
	T4	T3	T2	T1
Prowirl 73 FOUNDATION Fieldbus	80	80	80	80

The minimum ambient temperature is –40 °C.

Approvals

No. / approval type	Description
160686-135901 (see Page 6 for notes on special conditions)	for the electric flow measuring system Prowirl 72 resp. 73 **Identification:** see below

Prowirl 72 FOUNDATION Fieldbus, IS (compact version)

P r o w i r l 7 2 * * * _ * * * * * * . * * * * .

- K = FOUNDATION Fieldbus
- N = Cl. I, Div. 1

Prowirl 72 F	DN 15...300	Cl. I, Div. 1 Groups ABCD Cl. II, Div. 1 Groups EFG Cl. III Cl. I, Zone 0 IIC T4-T1 AEx ia
Prowirl 72 W	DN 15...150	Cl. I, Div. 1 Groups ABCD Cl. II, Div. 1 Groups EFG Cl. III Cl. I, Zone 0 IIC T4-T1 AEx ia

Prowirl 72 FOUNDATION Fieldbus, IS (remote version)

P r o w i r l 7 2 * * * _ * * * * * * . * * * * .

- K = FOUNDATION Fieldbus
- N = Cl. I, Div. 1

Transmitter Prowirl 72 FOUNDATION Fieldbus (remote version)

Prowirl 72 FOUNDATION Fieldbus		Cl. I, Div. 1 Groups ABCD Cl. II, Div. 1 Groups EFG Cl. III Cl. I, Zone 0 IIC T4-T1 AEx ia

Sensor Prowirl F/W (remote version)

Prowirl 72 F	DN 15...300	Cl. I, Div. 1 Groups ABCD Cl. II, Div. 1 Groups EFG Cl. III Cl. I, Zone 0 IIC T4-T1 AEx ia
Prowirl 72 W	DN 15...150	Cl. I, Div. 1 Groups ABCD Cl. II, Div. 1 Groups EFG Cl. III Cl. I, Zone 0 IIC T4-T1 AEx ia

Prowirl 73 FOUNDATION Fieldbus, IS (compact version)

P r o w i r l 7 3 * * * _ * * * * * * . * * * * .

K = FOUNDATION Fieldbus

N = Cl. I, Div. 1

Prowirl 73 F	DN 15...300	Cl. I, Div. 1 Groups ABCD Cl. II, Div. 1 Groups EFG Cl. III Cl. I, Zone 0 IIC T4-T1 AEx ia
Prowirl 73 W	DN 15...150	Cl. I, Div. 1 Groups ABCD Cl. II, Div. 1 Groups EFG Cl. III Cl. I, Zone 0 IIC T4-T1 AEx ia

Prowirl 73 FOUNDATION Fieldbus, IS (remote version)

P r o w i r l 7 3 * * * _ * * * * * * . * * * * .

K = FOUNDATION Fieldbus

N = Cl. I, Div. 1

Transmitter Prowirl 73 FOUNDATION Fieldbus (remote version)

Prowirl 73 FOUNDATION Fieldbus		Cl. I, Div. 1 Groups ABCD Cl. II, Div. 1 Groups EFG Cl. III Cl. I, Zone 0 IIC T4-T1 AEx ia

Sensor Prowirl 73 F (remote version)

Prowirl 73 F	DN 15...300	Cl. I, Div. 1 Groups ABCD Cl. II, Div. 1 Groups EFG Cl. III Cl. I, Zone 0 IIC T4-T1 AEx ia
Prowirl 72 W	DN 15...150	Cl. I, Div. 1 Groups ABCD Cl. II, Div. 1 Groups EFG Cl. III Cl. I, Zone 0 IIC T4-T1 AEx ia

Notified body

The Prowirl measuring system was tested for approval by the following named entity:
CSA: Canadian Standards Association

Special conditions

1. Control room equipment shall not use or generate more than 250 V rms.

Caution!

2. Use supply wires suitable for +10 °C above maximum ambient temperature.
3. The specified temperature class in conjunction with the ambient temperature and the medium temperature must be in compliance with the tables on Page 4 and 5.
4. It is not permissible to connect the service adapter in explosive atmospheres.
5. Install per National Electrical Code. Install intrinsically safe circuits per CEC and ISA RP 12.6 respecting the explosionproof integrity of the enclosure.

Warning!

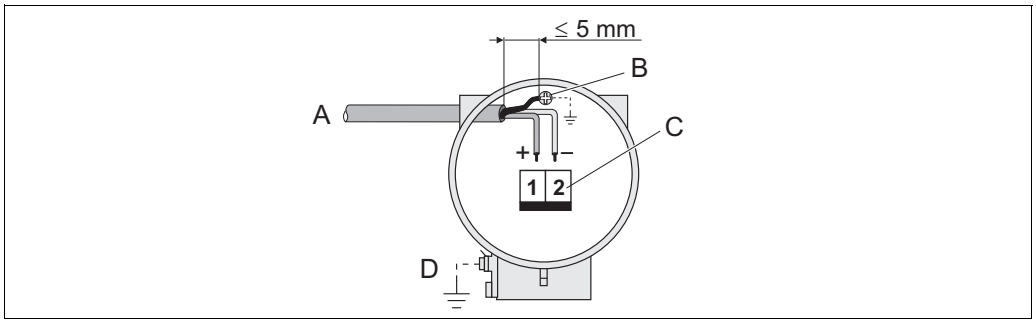
6. Substitution of components may impair intrinsic safety.
7. The flowmeter must be integrated into the potential equalisation system (see Fig. 1).

General warnings

⚠ Warning!

- Installation, connection to the electricity supply, commissioning and maintenance of the devices must be carried out by qualified specialists trained to work on Ex-rated devices.
- Compliance with national regulations relating to the installation of devices in potentially explosive atmospheres is mandatory, if such regulations exist.
- The manufacturer's guidelines for all devices connected to the intrinsically safe circuits must be observed.
- To rotate the transmitter housing, use the same procedure as for safe area versions. The transmitter housing may also be rotated during operation.

Electrical connections



F06-73PBxxxx-11-00-00-xx-000

Fig. 4: Electrical connections Prowirl 72 FOUNDATION Fieldbus resp. Prowirl 73 FOUNDATION Fieldbus
A = FOUNDATION Fieldbus cable
B = Ground terminal in the wiring compartment (between the stripped FOUNDATION Fieldbus cable and the ground terminal, the cable shielding should not exceed a length of 5 mm)
C = Terminal connector (1 = FF +; 2 = FF –)
D = Ground terminal for potential equalisation (external, only relevant for remote version)

Caution!

- Ground potential equalisation must exist between the safe and hazardous area.
- The transmitter is to be securely connected to the potential equalization system using either the transmitter's esternal screw terminal (D), or the ground terminal (B) in the wiring compartment.
- Between the stripped FOUNDATION Fieldbus cable and the ground terminal, the cable shielding should not exceed a length of 5 mm.
- Alternatively, the sensor and the transmitter (compact version) or the connection housing can be connected to the potential equalization system via the pipeline when a ground connection according to regulations can be assured.

The table below contains the values that are identical for all versions, irrespective of the type code.

Transmitter Prowirl 72*-******N****K; Prowirl 73***-******N****K**

Terminals	**1 (+)**	**2 (–)**
Designation	FOUNDATION Fieldbus	
Intrinsically safe circuit	yes	
U_i or V_{max}	17.5 V	
I_i or I_{max}	500 mA	
P_i	5.5 W	
L_i	≤ 10 µH	
C_i	≤ 5 nF	

or

Terminals	**1 (+)**	**2 (–)**
Designation	FOUNDATION Fieldbus	
Intrinsically safe circuit	yes	
U_i or V_{max}	24 V	
I_i or I_{max}	250 mA	
P_i	1.2 W	
L_i	≤ 10 µH	
C_i	≤ 5 nF	

The measuring device fulfils the conditions and limit values defined in the FISCO model.

Service adapter

The service adapter is exclusively for connection to Endress+Hauser approved service interfaces FXA 193.

⚠ Warning!
It is not permissible to connect the service adapter in explosive atmospheres.

Cable entries

Choice of thread for cable entries, M20x1.5 or ½" NPT or G ½" thread (see also the figures on Pages 2 and 3, number ③).

Cable specifications

The sensor cable connection between sensor and transmitter has an IS type of protection rating (see also the figures on Pages 2 and 3, number ④).
The max. cable length is 100 m for instrinsically safe use. Functionally the cable length is limited to 30 m.
The max. capacitance of the cable is 1 µF/km.
The max. cable inductivity is 1 mH/km.
The cable delivered by Endress+Hauser (max. 30 m) fulfils these requirements.

Fieldbus connector

The connection technology of FOUNDATION Fieldbus allows measuring devices to be connected to the fieldbus via uniform mechanical connections such as T-boxes, junction boxes, etc. This connection technology using prefabricated distribution modules and plug-in connectors offers substantial advantages over conventional wiring:
- Field devices can be removed, replaced or added at any time during normal operation. The communications will not be interrupted.
- This simplifies installation and maintenance significantly.
- Existing cable infrastructures can be used and expanded instantly, e.g. when constructing new star distributors using 4-channel or 8-channel junction boxes.

The Prowirl 72 FOUNDATION Fieldbus resp. Prowirl 73 FOUNDATION Fieldbus can therefore be supplied with a ready-mounted fieldbus connector. Fieldbus connectors for retrofitting can be ordered from Endress+Hauser as a spare part.

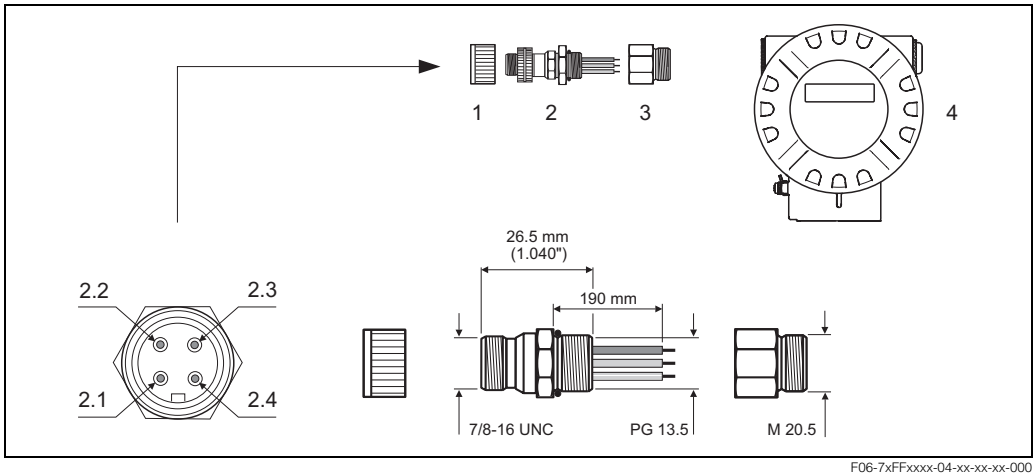


Fig. 5: Connectors for connecting to the FOUNDATION Fieldbus

1 Protective cap for connector

2 Fieldbus connector (Pin assignment / color codes)

2.1 Brown wire: FF+ (Terminal 26)

2.2 Blue wire: FF– (Terminal 27)

2.3 not connected

2.4 Grounding

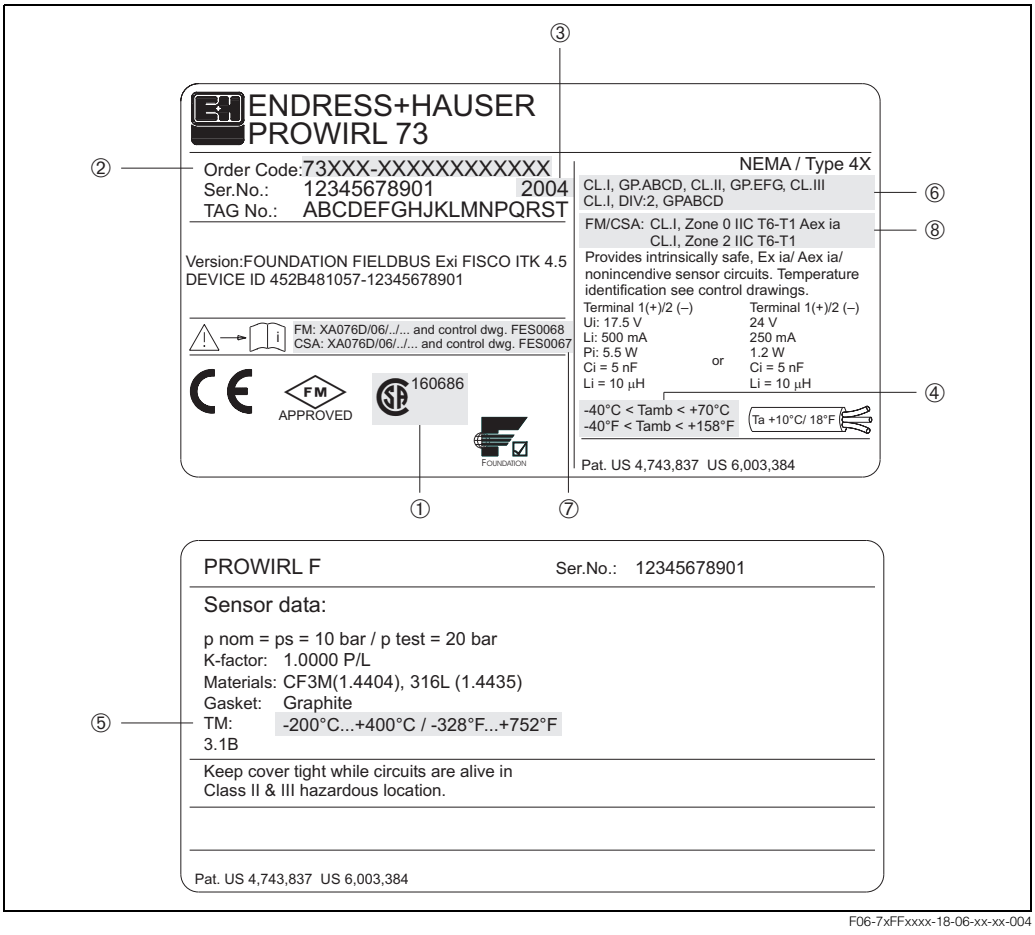
3 Adapter PG 13.5 / M 20.5

Technical data (fieldbus connector):

Degree of protection	IP 67
Ambient temperature	–40...+150 °C

Device identification

Transmitter Prowirl 72 FOUNDATION Fieldbus and F/W sensor resp.
Prowirl 73 FOUNDATION Fieldbus and F/W sensor.



F06-7xFFxxxx-18-06-xx-xx-004

Fig. 6: Nameplate of transmitter and nameplate of sensor (example)

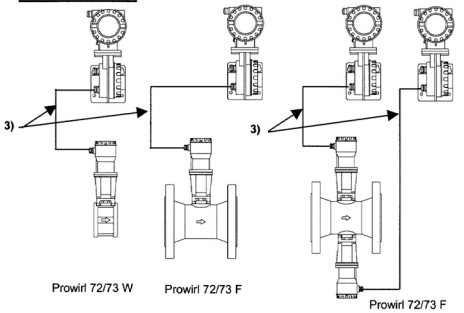
No.	Meaning
①	Label of the notified body: Canadian Standards Association
②	Type code
③	Year of manufacture
④	Ambient temperature range
⑤	Maximum medium temperature
⑥	Type of protection and explosion group for the measuring system
⑦	Applicable Ex documentation
⑧	Warning

Control drawings

Endress+Hauser Reinach hereby declares that the product is in conformity with the requirements of the CANADIAN STANDARDS ASSOCIATION.

Hazardous Locations
Class I Division 1 Groups ABCD or Class I Zone 0 Group IIC
and Class II and III Division 1 Groups EFG

Remote version



Sensor:

PROWIRL 7** **-**1***N*****, PROWIRL 7** **-**2***N*****, PROWIRL 7** **-**3***N*****,
PROWIRL 7** **-**4***N*****, PROWIRL 7** **-**6***N*****, PROWIRL 7** **-**7***N*****,
PROWIRL 7** **-**C***N*****, PROWIRL 7** **-**F***N*****, PROWIRL 7** **-**H***N*****:

	Max. medium temperature					
	T6 2)	T5 2)	T4	T3	T2	T1
Ta = 40°C	80°C	95°C	130°C	190°C	290°C	440°C
Ta = 60°C	---	95°C	130°C	190°C	290°C	440°C
Ta = 85°C	---	---	130°C	190°C	290°C	440°C

PROWIRL 7** **-**0***N*****, PROWIRL 7** **-**5***N*****,
PROWIRL 7** **-**B***N***** and PROWIRL 7** **-**G***N*****:

	Max. medium temperature				
	T6 2)	T5 2)	T4	T3	T2 - T1
Ta = 40°C	80°C	95°C	130°C	190°C	280°C
Ta = 60°C	---	95°C	130°C	190°C	280°C
Ta = 85°C	---	---	130°C	190°C	280°C

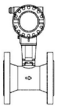
Transmitter:

PROWIRL 7** **-******N*****:

	T6 2)	T5 2)	T4 - T1
Ta =	40°C	60°C	80°C

Compact version


Prowirl 72/73 W


Prowirl 72/73 F


Prowirl 72/73 F
(Dualsensor)

PROWIRL 7** **-**1***N*****, PROWIRL 7** **-**2***N*****, PROWIRL 7** **-**3***N*****,
PROWIRL 7** **-**4***N*****, PROWIRL 7** **-**6***N*****, PROWIRL 7** **-**7***N*****,
PROWIRL 7** **-**C***N*****, PROWIRL 7** **-**F***N*****, PROWIRL 7** **-**H***N*****:

	Max. medium temperature					
	T6 2)	T5 2)	T4	T3	T2	T1
Ta = 40°C	80°C	95°C	130°C	190°C	290°C	440°C
Ta = 60°C	---	95°C	130°C	190°C	290°C	440°C
Ta = 70°C	---	---	130°C	190°C	290°C	440°C

PROWIRL 7** **-**0***N*****, PROWIRL 7** **-**5***N*****, PROWIRL 7** **-**B***N*****,
PROWIRL 7** **-**G***N*****:

	Max. medium temperature				
	T6 2)	T5 2)	T4	T3	T2 - T1
Ta = 40°C	80°C	95°C	130°C	190°C	280°C
Ta = 60°C	---	95°C	130°C	190°C	280°C
Ta = 70°C	---	---	130°C	190°C	280°C

Notes:

1) Assignment of Control Drawings:

Drawing-No.	Model Codes:
FES0067 C	Prowirl 7* **-******N*****
FES0067-0001 C	Prowirl 7* **-******N****A and Prowirl 7* **-******N****W
FES0067-0002 C	Prowirl 7* **-******N****H and Prowirl 7* **-******N****K
FES0067-0003 C	Prowirl 7* **-******N****H and Prowirl 7* **-******N****K
FES0067-0004 C	Prowirl 7* **-******N****H and Prowirl 7* **-******N****K

2) Temperature class T6 and T5 is not allowed for versions of Profibus PA and Fieldbus Foundation
(not for PROWIRL 7** **-******N****H and PROWIRL 7** **-******N****K)
3) Max. cable length for intrinsically safe installation 100m for using cable parameters L_{Cable} = 1mH/km and C_{Cable} = 1µF/km
4) Caution: Use supply wires suitable for 10°C above maximum ambient temperature
5) Caution: Surface temperature of transmitter enclosure can exceed 70°C depending on ambient temperature or medium temperature
6) Dust tight seals must be used at conduit entries for Class II and III installation
7) Fieldbus cable connectors are suitable for Class I, Div. 2, Groups A,B,C,D if non-incendive circuits are connected (see FES0067-0004 C)
8) Prowirl 72 and Prowirl 73 transmitter is intended for installation to Service Interface FXA 193 when using the PROLINE EX-ZWEILEITER-KABEL (blue cable)

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	D		J		noch dritten Personen und Konkurrenzfirmen	Ersteller: FES/Bn
	E		K		zugängig gemacht werden.	File: M:\ZEICHNG\...\031210c.doc **ID 1113**

CSA CONTROL DRAWING PROWIRL 72, PROWIRL 73 (IS and NI) Compact Version, Remote version	Massstab	Gezeichnet	23.09.02	Bn
		Geprüft		
		Ex-geprüft	10.12.03	Bn
		Gesehen		

Flowtec AG, Kaegenstrasse 7, CH-4153 Reinach BL1, Postfach

FES0067 C

This page applies to model code: **Prowirl 7* **-******N****H and Prowirl 7* **-******N****K**

FISCO-Concept

The FISCO Concept allows interconnection of intrinsically safe apparatus to associated apparatus not specifically examined in such combination. The criteria for interconnection is that the voltage (Ui or Vmax), the current (Ii or Imax) and the power (Pi) which intrinsically safe apparatus can receive and remain intrinsically safe, considering faults, must be equal or greater than the voltage (Uo or Voc), the current (Io or Isc) and the power (Po) levels which can be delivered by the associated apparatus, considering faults and applicable factors. In addition, the maximum unprotected capacitance (Ci) and inductance (Li) of each apparatus (other than the termination) connected to the fieldbus must be less than or equal to 5 nF and 10 µH respectively.

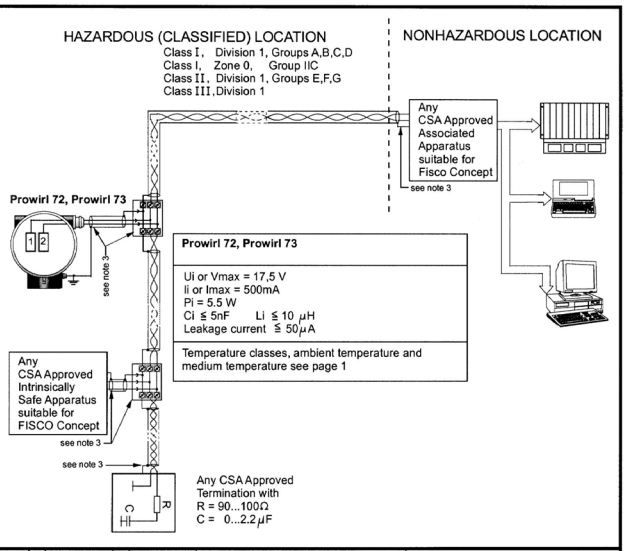
In each segment only one active device, normally the associated apparatus, is allowed to provide the necessary energy for the fieldbus system. The voltage Uo of the associated apparatus has to be limited to the range of 14V to 24V d.c. All other equipment connected to the bus cable has to be passive, meaning that they are not allowed to provide energy to the system, except to a leakage current of 50 µA for each connected device. Separately powered equipment needs a galvanic isolation to assure that the intrinsically safe fieldbus circuit remains passive.

The cable used to interconnect the devices needs to have the parameters in the following range:

loop resistance R'	: 15 .... 150 Ω/km
inducance per unit length L'	: 0.4 .... 1 mH/km
capacitance per unit length C'	: 80 .... 200 nF/km
C' = C' line/line + 0.5 C' line/screen, if both lines are floating or	
C' = C' line/line + C' line/screen, if the screen is connected to one line	
length of spur cable	: ≤ 30 m
length of trunk cable	: ≤ 1 km
length of splice	: ≤ 1 m

At each end of the trunk cable an approved infallible line termination with the following parameters is suitable:
R = 90 .... 100 Ω
C = 0 .... 2.2 µF
One of the allowed terminations might already be integrated in the associated apparatus.

The number of passive devices connected to the bus segment is not limited due to I.S. reasons. If the above rules are respected, up to a total length of 1000 m (sum of the length of trunk cable and all spur cables), the inductance and capacitance of the cable will not impair the intrinsic safety of the installation.



Notes:

Intrinsically safe installation

1) Control room equipment may not use or generate over 250 Vrms.
2) Wire all circuits for power supply per Canadian Electrical Code Part I.
3) Be aware of multiple earthing of the screen. The screen must be connected in accordance with ISA RP 12.06.01
4) WARNING: SUBSTITUTION OF COMPONENTS MAY IMPAIR INTRINSIC SAFETY.

Division 2 and Zone 2 installation

5) Installation of transmitter circuit wiring according to Canadian Electrical Code using threaded conduit or wiring methods in accordance to rule 18.
6) WARNING: EXPLOSION HAZARD - SUBSTITUTION OF COMPONENTS MAY IMPAIR INTRINSIC SAFETY.

Class II installation

7) Transmitter circuit wiring in conduit in accordance with the Canadian Electrical Code Part I

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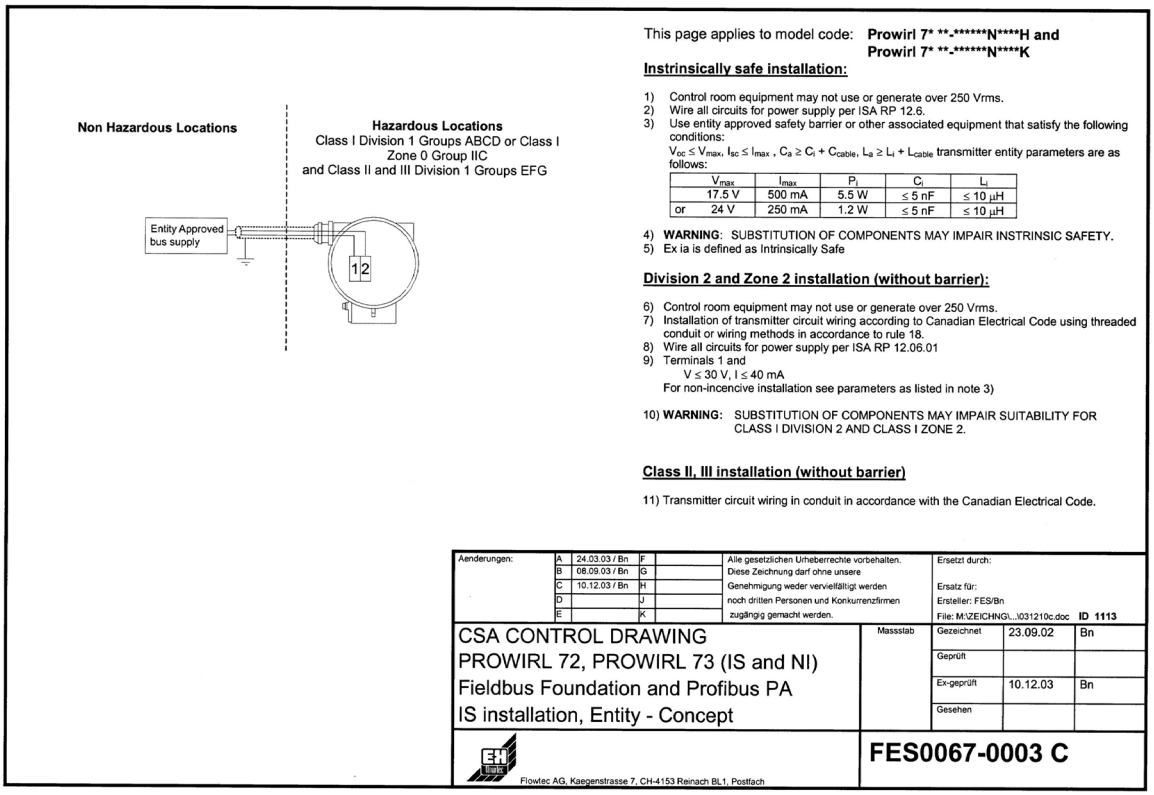
	E		K		zugängig gemacht werden.	File: M:\ZEICHNG\...\031210c.doc **ID 1113**

CSA CONTROL DRAWING PROWIRL 72, PROWIRL 73 (IS) Div. 1 / Zone 0 FISCO - Concept	Massstab	Gezeichnet	23.09.02	Bn
		Geprüft		
		Ex-geprüft	10.12.03	Bn
		Gesehen		

Flowtec AG, Kaegenstrasse 7, CH-4153 Reinach BL1, Postfach

FES0067-0002 C



This page applies to model code: **Prowirl 7* **-******N****H and Prowirl 7* **-******N****K**

Instrinsically safe installation:

1) Control room equipment may not use or generate over 250 Vrms.
2) Wire all circuits for power supply per ISA RP 12.6.
3) Use entity approved safety barrier or other associated equipment that satisfy the following conditions:
$V_{oc} \leq V_{max}$, $I_{sc} \leq I_{max}$, $C_a \geq C_i + C_{cable}$, $L_a \geq L_i + L_{cable}$ transmitter entity parameters are as follows:

	V_{max}	I_{max}	P_i	C_i	L_i
	17.5 V	500 mA	5.5 W	≤ 5 nF	≤ 10 µH
or	24 V	250 mA	1.2 W	≤ 5 nF	≤ 10 µH

4) **WARNING**: SUBSTITUTION OF COMPONENTS MAY IMPAIR INSTRINSIC SAFETY.
5) Ex ia is defined as Intrinsically Safe

Division 2 and Zone 2 installation (without barrier):

6) Control room equipment may not use or generate over 250 Vrms.
7) Installation of transmitter circuit wiring according to Canadian Electrical Code using threaded conduit or wiring methods in accordance to rule 18.
8) Wire all circuits for power supply per ISA RP 12.06.01
9) Terminals 1 and
V ≤ 30 V, I ≤ 40 mA
For non-incencive installation see parameters as listed in note 3)

10) **WARNING:** SUBSTITUTION OF COMPONENTS MAY IMPAIR SUITABILITY FOR CLASS I DIVISION 2 AND CLASS I ZONE 2.

Class II, III installation (without barrier)

11) Transmitter circuit wiring in conduit in accordance with the Canadian Electrical Code.

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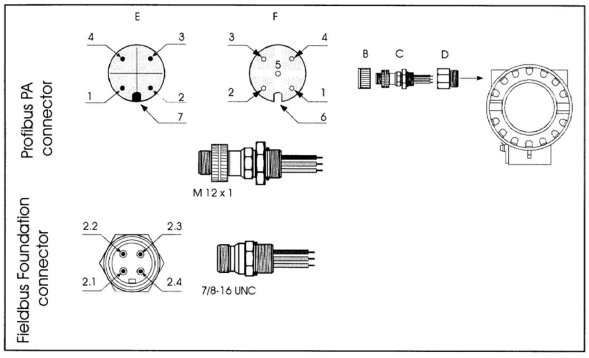
	C	10.12.03 / Bn	H		noch dritten Personen und Konkurrenzfirmen	Ersteller: FES/Bn		
	D		J		zugängig gemacht werden.	File: M:\ZEICHNG\...\031210c.doc	**ID 1113**	
	E		K			Massstab	Gezeichnet	23.09.02	Bn
CSA CONTROL DRAWING PROWIRL 72, PROWIRL 73 (IS and NI) Fieldbus Foundation and Profibus PA IS installation, Entity - Concept							Geprüft		
							Ex-geprüft	10.12.03	Bn
							Gesehen		
Flowtec AG, Kaegenstrasse 7, CH-4153 Reinach BL1, Postfach							**FES0067-0003 C**		



B = Protection cap for connector, C = Fieldbus connector,
D = Thread adapter E = Connector on housing (male),
F = Connector (female)

Pin assignment:
Profibus PA
1 = Brown wire, PA+ (terminal 26)
2 = Not connected
3 = Blue wire, PA- (terminal 27)
4 = Black wire, ground
5 = Female connector not assigned
6 = Positioning groove
7 = Positioning key

Fieldbus Foundation
2.1 = Brown wire, FF+ (terminal 26)
2.2 = Blue wire, FF- (terminal 27)
2.3 = Not connected
2.4 = Yellow/green wire, ground

This page applies to model code: **Prowirl 7* **-******N****H and Prowirl 7* **-******N****K with Fieldbus Cable Connector**

Notes:
1) Fieldbus cable connectors are suitable for Class I, Div. 2, Groups A,B,C,D and Class I, Zone 2 Group IIC if non-incendive circuits are connected

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	E		K			Massstab	Gezeichnet	23.09.02	Bn
CSA CONTROL DRAWING PROWIRL 72, PROWIRL 73 (IS and NI) Fieldbus Cable Connector NI installation							Geprüft		
							Ex-geprüft	10.12.03	Bn
							Gesehen		
Flowtec AG, Kaegenstrasse 7, CH-4153 Reinach BL1, Postfach							**FES0067-0004 C**		

Supplementary documentation

Prowirl 72 FOUNDATION Fieldbus:
TI064D/06/
BA095D/06/

Prowirl 73 FOUNDATION Fieldbus:
TI064D/06/
BA096D/06/

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