

# ***PROline promag 23***

## ***Division 1***



Ex documentation for the BA 045D and BA 050D operating instructions according to FACTORY MUTUAL standards



Ex documentation for the BA 045D and BA 050D operating instructions according to CANADIAN STANDARDS ASSOCIATION



**Endress + Hauser**

The Power of Know How





# PROline promag 23

## Division 1

**Ex documentation**  
**for the BA 045D and BA 050D operating instructions**  
**according to FACTORY MUTUAL standards**



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

### 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

Factory Mutual



**Endress + Hauser**  
The Power of Know How



Hazardous area		Safe area
Division 1 / Zone 1	Division 2 / Zone 2	
<div> <div> <div>           Operation via            HART handheld            DXR 275***I5*            (Ex version, only for            intrinsically safe circuits)         </div> </div> <div> <div>           Promag 23            P = DN 1"...8"         </div> <div> <div>⑤</div> </div> </div> <div> <div>           Promag 23            H = DN 1/12"...1"         </div> <div> <div>⑤</div> </div> </div> <div> <div>           Promag 23            H = DN 1 1/2"...4"         </div> <div> <div>⑤</div> </div> </div> </div>		<div> <div> </div> <div> </div> </div> <div>F06-23xxxxZZ-16-xx-xx-en-002</div>
Division 1 / Zone 1	Division 2 / Zone 2	
Hazardous area		Safe area
<div> <div>           • Promag 23 flow measuring system in:            Class I, Zone 0, AEx ia, IIC, T6-T3C            Class I, II, III, Division 1, Groups A, B, C, D, E, F, G            T6-T3C         </div> <div>           • Enclosure NEMA Type 4X         </div> <div>           • For ambient and medium temperature ranges, and temperature            class, see Page 3.         </div> </div> <div> <div>⑤</div> <div>           Transmitter terminal compartment            transmitter power supply and pulse/frequency output         </div> </div>		

## Temperature tables

### Measuring system Promag 23 P/H (compact version)

at $T_a = 104\text{ }^{\circ}\text{F}$		Max. medium temperature [ $^{\circ}\text{F}$ ] in					
		T6	T5	T4	T3	T2	T1
<b>Promag H</b>	DN 1/12"...4"	176	203	266	302	302	302
<b>Promag P</b>	DN 1"...8" (PFA lining)	176	203	266	302	302	302
<b>Promag P</b>	DN 1"...8" (PTFE lining)	176	203	266	266	266	266

at $T_a = 140\text{ }^{\circ}\text{F}$		Max. medium temperature [°F] in						
		T6	T5	T4	T3C	T3	T2	T1
Promag H	DN 1/12"...4"	–	203	266	302	302	302	302
Promag P	DN 1"...8" (PFA lining)	–	203	266	302	302	302	302
Promag P	DN 1"...8" (PTFE lining)	–	203	266	266	266	266	266

The maximum ambient temperature range is  $-4...+104\text{ }^{\circ}\text{F}$  at T6 and  $-4...+140\text{ }^{\circ}\text{F}$  at T6-T3C (depending on the area of application).



Note:

At the specified medium temperatures, the equipment is not subjected to temperatures impermissible for the temperature class in question.

## Approvals

No. / approval type	Description
J.I. 3006330  (see Page 5 for notes on special conditions)	for the electric flow measuring system Promag 23  <b>Identification:</b> see below

Measuring system Promag 23 (compact version)	
Promag 23***-*****N*****.	
	<div> <div></div> <div>W = current HART</div> </div> <div> <div></div> <div>A = current HART, frequency</div> </div>
Promag 23 H    DN 1/12"...4":	<b>Class I, Zone 0, AEx ia, IIC, T6-T3C</b> <b>Class I, II, III / 1 / ABCDEFG / T6-T3C</b>
Promag 23 P    DN 1"...8":	<b>Class I, Zone 0, AEx ia, IIC, T6-T3C</b> <b>Class I, II, III / 1 / ABCDEFG / T6-T3C</b>

## Notified body

The Promag measuring system was tested for approval by the following named entity:

FM: Factory Mutual Research

## Special conditions

### *Intrinsically safe installation Class I, Division 1*

1. The installation must be in accordance with the NEC NFPA 70 and ANSI/ISA RP 12.6.
2. Control room equipment may not use or generate over 250 Vrms.
3. Use entity approved safety barrier or other approved associated equipment that satisfies the following conditions:  
 $V_{OC}, V_t \text{ or } U_o \leq V_{max} \text{ or } U_i$  and  $I_{SC}, I_t \text{ or } I_o \leq I_{max} \text{ or } L_i$  and  $P_o \leq P_i$  and  $C_a \geq C_i + C_{cable}$  and  $L_a \geq L_i + L_{cable}$ .
4. Warning:  
Substitution of components may impair intrinsic safety.
5. Sensor electrodes are intrinsically safe for Cl. I, Div. 1, Gp ABCD; Cl. I, Zone 0, IIC.
6. Cable for different I.S. circuits have to be separated with grounded shields.
7. Caution:  
Use only supply wires suitable for 41 °F above  $T_a$  ( $T_{Medium} \leq 212$  °F) or suitable for 176 °F ( $T_{Medium} > 212$  °F).
8. For T-code see tables on Page 3.



### *Nonincendive Class I, Division 2*

1. Install per NEC ANSI/NFPA 70 using threaded conduit. Intrinsic safety barrier not required. For T-code see tables on Page 3.  
 Terminal 1 and 2:  
 Supply voltage 13.9 V DC...30 V DC; Signal current 4...20 mA  
 Terminal 3 and 4:  
 Pulse output supply voltage 5 V...30 V, max. 250, max 1 W
2. A dust tight seal must be used for conduit entry when the transmitter is used in a Class II or Class III location.
3. Warning:  
Explosion hazard! Do not disconnect equipment unless the power has been switched off or the area is known to be non-hazardous.
4. Warning:  
Explosion hazard! Substitution of components may impair suitability for Cl. I, Div. 2.
5. Caution:  
Use only supply wires suitable for 41 °F above  $T_a$  ( $T_{Medium} \leq 212$  °F) or suitable for 176 °F ( $T_{Medium} > 212$  °F).



## 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 manufacturers' instructions and informations for all devices connected to the intrinsically safe circuits must be taken into account.
- The procedure for turning the transmitter housing is the same as that for the non-Ex version. The transmitter housing can be turned during operation.

Electrical connections

Power supply connection

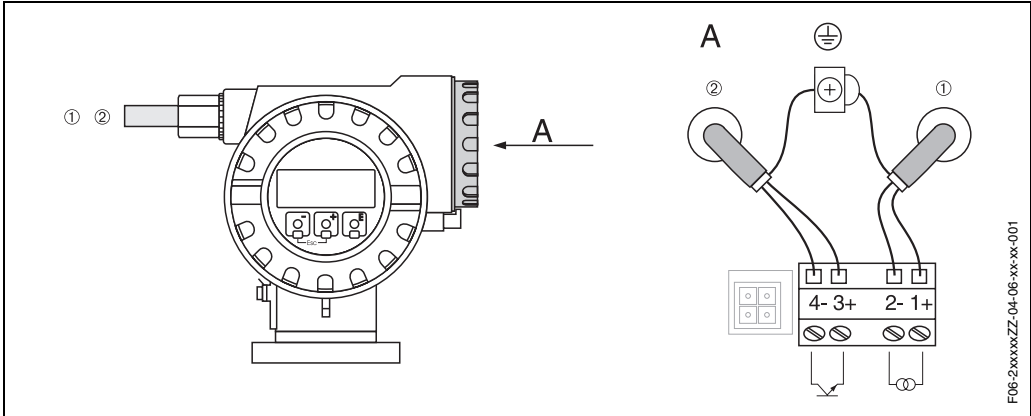


Fig. 1: ① = Transmitter power supply / 4...20 mA HART  
② = Pulse/frequency output  
A = View A



Note:  
The table below contains the values that are not identical for all versions, in other words which depend on the type code (type of device).  
Always remember to compare the type code in the table with the code on the nameplate of your device.

Transmitter Promag 23\*\*\*-\*\*\*\*\*N\*\*\*\*\*W

Terminals	4	3	2	1
	-	+	-	+
Designation			Transm. power supply / 4...20 mA HART ①	
Ratings			$V_{max}/U_i = 30\text{ V}$ $I_{max}/I_i = 150\text{ mA}$ $P_i = 810\text{ mW}$	
Intrinsically safe circuit			yes	
$L_i =$			negligible	
$C_i =$			25 nF	

Transmitter Promag 23\*\*\*-\*\*\*\*\*N\*\*\*\*\*A

Terminals	4	3	2	1
	-	+	-	+
Designation	Pulse/frequency output ②		Transm. power supply / 4...20 mA HART ①	
Ratings	$V_{max}/U_i = 30\text{ V}$ $I_{max}/I_i = 250\text{ mA}$ $P_i = 1\text{ W}$		$V_{max}/U_i = 30\text{ V}$ $I_{max}/I_i = 150\text{ mA}$ $P_i = 810\text{ mW}$	
Intrinsically safe circuit	yes		yes	
$L_i =$	negligible		negligible	
$C_i =$	negligible		25 nF	



## Safety barriers / transmitter power supply units

The following safety barriers / transmitter power supply units can be used for the intrinsically safe supply (4...20 mA HART / terminals 1 [+] and 2 [-]):

Manufacturer	Type	Description
Endress+Hauser	RN 221 (approval in preparation) RMA 422 (approval in preparation)	Transmitter power supply unit Transmitter power supply unit
Elcon	HiD 2025/2026 μD 323, μD 325, μD 326 μZ 630+ / μZ 631+	Transmitter power supply unit Transmitter power supply unit Safety barrier
Stahl	9001/51-280-110-14 9103/13-22-11 9601/13-22-11	Safety barrier Transmitter power supply unit Transmitter power supply unit
MTL	MTL 702+	Safety barrier unidirectional communication

Tab. 1: Recommended safety barrier types / transmitter power supply units

The following safety barriers can be used for the intrinsically safe supply (Pulse/frequency output / terminals 3 [+] and 4 [-]):

Manufacturer	Type	Description
Elcon	μZ 640 μZ 660	Safety barrier Safety barrier
Stahl	9001/01-252-057-14 9001/01-252-060-14	Safety barrier Safety barrier
Pepperl & Fuchs	Z 728 Z 787	Safety barrier Safety barrier
MTL	MTL 707+	Safety barrier

Tab. 2: Recommended safety barrier types

## Service adapter

The service adapter is exclusively for connection to E+H approved service interfaces.



Warning:

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

## Cable entries

- ⑤ Cable entries for the transmitter terminal compartment  
transmitter power supply / pulse/frequency cable: (Promag 23\*\*\*-\*\*\*\*\*N\*\*\*\*\*)  
Thread for cable entry 1/2" NPT.

## Device identification

Promag 23 transmitter and P/H sensor

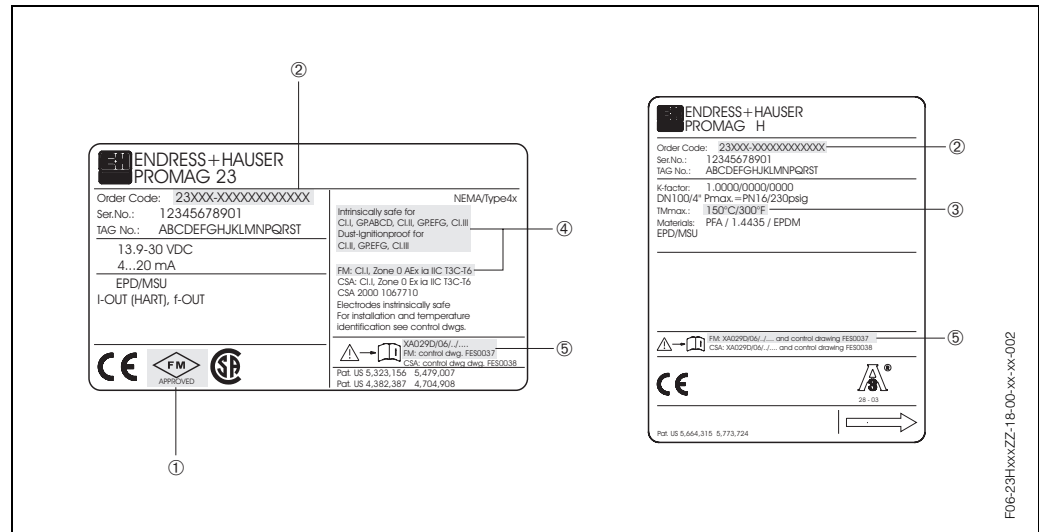


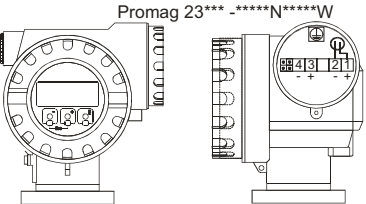
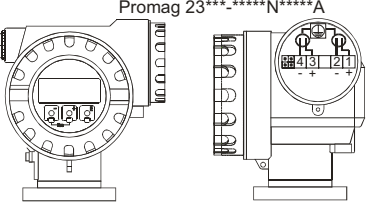

Fig. 2: Nameplate of transmitter and nameplate of sensor (example)

Key to nameplates (Figure 2)

No.	Meaning	No.	Meaning
①	Label of the notified body: Factory Mutual Research	④	Type of protection and explosion group for the Promag 23 measuring system
②	Type code	⑤	Applicable Ex documentation
③	Maximum medium temperature		

## Control drawings

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

NON HAZARDOUS LOCATION	HAZARDOUS (CLASSIFIED) LOCATION	NOTES: INTRINSICALLY SAFE INSTALLATION CL. I, DIV. 1, GPS ABCD																																										
Any FMRC Approved Barrier or Associated Apparatus	<p>Class I, Zone 0 IIC Class I, II, III, Division 1, Groups A, B, C, D, E, F, G</p>  <p>Promag 23***-*****N*****W</p>	<ol style="list-style-type: none"> <li>1) Installation must be in accordance with NEC NFPA 70 and ANSI/ISA RP 12.6.</li> <li>2) Control room equipment may not use or generate over 250 Vrms.</li> <li>3) Use entity approved safety barrier or other approved associated equipment that satisfies the following conditions:  <math>V_{OC}, V_I</math> or <math>U_O \leq V_{max}</math> or <math>U_I</math> and <math>I_{sc}, I_I</math> or <math>I_O \leq I_{max}</math> or <math>I_I</math> and <math>P_O</math> or <math>P_{max} \leq P_I</math> and <math>C_a \geq C_i + C_{cable}</math> and <math>L_a \geq L_i + L_{cable}</math></li> <li>4) <b>WARNING: SUBSTITUTION OF COMPONENTS MAY IMPAIR INTRINSIC SAFETY.</b></li> <li>5) Sensor electrodes are intrinsically safe for Cl. I, Div. 1, Gp ABCD; Cl. I, Zone 0 IIC.</li> <li>6) Cable for different I.S. circuits have to be separated with grounded shields.</li> <li>7) Caution: Use only supply wires suitable for 5 °C above Ta (<math>T_{Medium} \leq 100</math> °C) or suitable for 80 °C (<math>T_{Medium} &gt; 100</math> °C).</li> </ol>																																										
Any FMRC Approved Barrier or Associated Apparatus	 <p>Promag 23***-*****N*****A</p>	<table border="1"> <tr> <th colspan="4">PROMAG 23 H***-*****N***** / PROMAG 23 P**-*****N***** (PFA – Liner)</th> </tr> <tr> <th>Temperature class</th> <th>T6</th> <th>T5</th> <th>T4</th> <th>T3C</th> </tr> <tr> <td>T<sub>ambient</sub></td> <td>40 °C</td> <td>60 °C</td> <td>60 °C</td> <td>60 °C</td> </tr> <tr> <td>T<sub>Medium</sub></td> <td>80 °C</td> <td>95 °C</td> <td>130 °C</td> <td>150 °C</td> </tr> </table> <table border="1"> <tr> <th colspan="4">PROMAG 23 P**-*****N***** (PTFE – Liner)</th> </tr> <tr> <th>Temperature class</th> <th>T6</th> <th>T5</th> <th>T4</th> </tr> <tr> <td>T<sub>ambient</sub></td> <td>40 °C</td> <td>60 °C</td> <td>60 °C</td> </tr> <tr> <td>T<sub>Medium</sub></td> <td>80 °C</td> <td>95 °C</td> <td>130 °C</td> </tr> </table> <p><b>Entity parameters:</b></p> <p><b>Promag 23***-*****N*****W</b> Terminals 1 (+) and 2 (-) / Hart, 4 ... 20 mA  <math>V_{max}, U_i = 30</math> V    <math>I_{max}, I_i = 150</math> mA    <math>P_i = 0.81</math> W  <math>C_i \leq 25</math> nF    <math>L_i =</math> negligible</p> <p><b>Promag 23***-*****N*****A</b> Terminals 1 (+) and 2 (-) / Hart, 4 ... 20 mA  <math>V_{max}, U_i = 30</math> V    <math>I_{max}, I_i = 150</math> mA    <math>P_i = 0.81</math> W  <math>C_i \leq 25</math> nF    <math>L_i =</math> negligible</p> <p><b>Terminals 3 (+) and 4 (-) / Frequency output</b>  <math>V_{max}, U_i = 30</math> V    <math>I_{max}, I_i = 250</math> mA    <math>P_i = 1</math> W  <math>C_i =</math> negligible    <math>L_i =</math> negligible</p>	PROMAG 23 H***-*****N***** / PROMAG 23 P**-*****N***** (PFA – Liner)				Temperature class	T6	T5	T4	T3C	T <sub>ambient</sub>	40 °C	60 °C	60 °C	60 °C	T <sub>Medium</sub>	80 °C	95 °C	130 °C	150 °C	PROMAG 23 P**-*****N***** (PTFE – Liner)				Temperature class	T6	T5	T4	T <sub>ambient</sub>	40 °C	60 °C	60 °C	T <sub>Medium</sub>	80 °C	95 °C	130 °C							
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<p><b>Notes: NONINCENDIVE CL. I, Div. 2, Gps ABCD and DIP CL. II, III, Div. 1 Gps EFG HAZARDOUS LOCATION INSTALLATION</b></p> <ol style="list-style-type: none"> <li>8) Install per National Electrical Code (NEC ANSI/NFPA 70) using threaded conduit. Intrinsic safety barrier not required. For T-code see table. Terminal 1 and 2 Supply voltage: 13.9 ... 30 VDC    Signal current: 4 ... 20 mA (max. 25 mA) Terminal 3 and 4 Pulse Output: Supply voltage 5 ... 30 V, max. 250 mA, max 1 W</li> <li>9) A dust tight seal must be used for conduit entry when the transmitter is used in a Class II or Class III Location.</li> <li>10) <b>WARNING: EXPLOSION HAZARD</b> – Do not disconnect equipment unless the power has been switched off or the area is known to be Non-Hazardous.</li> <li>11) <b>WARNING: EXPLOSION HAZARD</b> – SUBSTITUTION OF COMPONENTS MAY IMPAIR SUITABILITY FOR CLASS I, DIVISION 2.</li> <li>12) Caution: Use only supply wires suitable for 5 °C above Ta (<math>T_{Medium} \leq 100</math> °C) or suitable for 80 °C (<math>T_{Medium} &gt; 100</math> °C).</li> </ol>		<table border="1"> <tr> <th colspan="3">Änderungen:</th> <th colspan="2">Alle gesetzlichen Urheberrechte vorbehalten. Diese Zeichnung darf ohne unsere Genehmigung weder vervielfältigt werden noch dritten Personen und Konkurrenzfirmen zugänglich gemacht werden.</th> <th colspan="2">Ersetzt durch: Ersteller: FES/UD File: M:ZEICHNUNG\000215C.DOC    ID 1035</th> </tr> <tr> <td>A</td> <td>F</td> <td></td> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <td>B</td> <td>G</td> <td></td> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <td>C</td> <td>H</td> <td></td> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <td>D</td> <td>J</td> <td></td> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <td>E</td> <td>K</td> <td></td> <td></td> <td></td> <td></td> <td></td> </tr> </table>	Änderungen:			Alle gesetzlichen Urheberrechte vorbehalten. Diese Zeichnung darf ohne unsere Genehmigung weder vervielfältigt werden noch dritten Personen und Konkurrenzfirmen zugänglich gemacht werden.		Ersetzt durch: Ersteller: FES/UD File: M:ZEICHNUNG\000215C.DOC    ID 1035		A	F						B	G						C	H						D	J						E	K					
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<p><b>FM CONTROL DRAWING</b>  <b>PROMAG 23</b>  <b>2- and 4-WIRE VERSION</b>  <b>ENTITY CONCEPT Class I, Division 1</b></p>		<table border="1"> <tr> <th colspan="2">Massstab</th> <th colspan="2">Gezeichnet</th> <th colspan="2">15.02.00</th> <th colspan="2">UD</th> </tr> <tr> <td colspan="2"></td> <td colspan="2">Geprüft</td> <td colspan="2"></td> <td colspan="2"></td> </tr> <tr> <td colspan="2"></td> <td colspan="2">Ex-geprüft</td> <td colspan="2">8.05.00</td> <td colspan="2"></td> </tr> <tr> <td colspan="2"></td> <td colspan="2">Gesehen</td> <td colspan="2"></td> <td colspan="2"></td> </tr> </table>	Massstab		Gezeichnet		15.02.00		UD				Geprüft								Ex-geprüft		8.05.00						Gesehen															
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 <p>Flowtec AG, Kaeonenstrasse 7, CH-4153 Reinach BL1, Postfach</p>		<p><b>FES0037</b></p>																																										

**Supplementary  
documentation**

TI 049D/06

TI 051D/06

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# PROline promag 23

## Division 1

**Ex documentation**  
**for the BA 045D and BA 050D operating instructions**  
**according to CANADIAN STANDARDS ASSOCIATION**



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

### Class

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

### Division

1	Division 1
2	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

Canadian Standards Association



Hazardous area		Safe area
Division 1 / Zone 1	Division 2 / Zone 2	
<div> <p>Operation via HART handheld DXR 275***I6* (Ex version, only for intrinsically safe circuits)</p> </div> <div> <p>Promag 23 P = DN 25...200</p> </div> <div> <p>Promag 23 H = DN 2...25</p> </div> <div> <p>Promag 23 H = DN 40...100</p> </div>		
Division 1 / Zone 1	Division 2 / Zone 2	
Hazardous area		Safe area

F06-23xxxZZ-16-xx-xx-en-003

- Promag 23 flow measuring system in:  
Class I, Zone 0, Ex ia, IIC, T6-T3C  
Class I, Division 1, Groups A, B, C, D  
Class II, Division 1, Groups E, F, G  
Class III  
T6-T3C

- Enclosure NEMA Type 4X

- For ambient and medium temperature ranges, and temperature class, see Page 3.

- ③ Transmitter terminal compartment  
transmitter power supply and pulse/frequency output

## Temperature tables

### Measuring system Promag 23 P/H (compact version)

<i>at <math>T_a = 40\text{ °C}</math></i>			Max. medium temperature [°C] in					
			T6	T5	T4	T3	T2	T1
Promag H	DN 2...100		80	95	130	150	150	150
Promag P	DN 25...200	(PFA lining)	80	95	130	150	150	150
Promag P	DN 25...200	(PTFE lining)	80	95	130	130	130	130

<i>at <math>T_a = 60\text{ }^{\circ}\text{C}</math></i>			Max. medium temperature [°C] in						
			T6	T5	T4	T3C	T3	T2	T1
Promag H	DN 2...100		–	95	130	150	150	150	150
Promag P	DN 25...200	(PFA lining)	–	95	130	150	150	150	150
Promag P	DN 25...200	(PTFE lining)	–	95	130	130	130	130	130

The maximum ambient temperature range is –20...+40 °C at T6 and –20...+60 °C at T6-T3C (depending on the area of application).



Note:

At the specified medium temperatures, the equipment is not subjected to temperatures impermissible for the temperature class in question.

## Approvals

No. / approval type	Description
CSA 2000 1067710  (see Page 5 for notes on special conditions)	for the electric flow measuring system Promag 23  <b>Identification:</b> see below

Measuring system Promag 23 (compact version)	
Promag 23***-*****N*****.	
	<div> <div></div> <div>W = current HART A = current HART, frequency</div> </div>
Promag 23 H DN 2...100:	<b>Class I, Zone 0, Ex ia, IIC, T6-T3C</b> <b>Class I, Division 1, Groups ABCD</b> <b>Class II, Division 1, Groups EFG</b> <b>Class III</b> <b>T6-T3C</b>
Promag 23 P DN 25...200:	<b>Class I, Zone 0, Ex ia, IIC, T6-T3C</b> <b>Class I, Division 1, Groups ABCD</b> <b>Class II, Division 1, Groups EFG</b> <b>Class III</b> <b>T6-T3C</b>

## Notified body

The Promag measuring system was tested for approval by the following named entity:

CSA: Canadian Standards Association



## Special conditions

### *Intrinsically safe installation Class I, Division 1*

1. The installation must be in accordance with the Canadian Electrical Code.
2. Control room equipment may not use or generate over 250 Vrms.
3. Use CSA certified safety barrier or other CSA certified associated equipment that satisfies the following conditions:  
 $V_{oc}$  or  $U_o \leq V_{max}$  or  $U_i$  and  $I_{sc}$  or  $I_o \leq I_{max}$  or  $I_i$  and  $P_o \leq P_i$  and  $C_a \geq C_i + C_{cable}$  and  $L_a \geq L_i + L_{cable}$ .
4. Warning:  
Substitution of components may impair intrinsic safety.
5. Cable for different I.S. circuits have to be separated with grounded shields.
6. Caution:  
Use only supply wires suitable for 5 °C above  $T_a$  ( $T_{Medium} \leq 100$  °C) or suitable for 80 °C ( $T_{Medium} > 100$  °C).
7. For T-code see tables on Page 3.



### *Suitable for Class I, Division 2*

1. Install per Canadian Electrical Code using threaded conduit. Intrinsic safety barrier not required. For T-code see tables on Page 3.  
 Terminal 1 and 2:  
 Supply voltage 13.9 V DC...30 V DC; Signal current 4...20 mA (max. 25 mA)  
 Terminal 3 and 4:  
 Pulse output supply voltage 5 V...30 V, max. 250, max. 1 W
2. A dust tight seal must be used for conduit entry when the transmitter is used in a Class II or Class III location.
3. Warning:  
Explosion hazard! Do not disconnect equipment unless the power has been switched off or the area is known to be non-hazardous.
4. Warning:  
Explosion hazard! Substitution of components may impair suitability for Cl. I, Div. 2.
5. Caution:  
Use only supply wires suitable for 5 °C above  $T_a$  ( $T_{Medium} \leq 100$  °C) or suitable for 80 °C ( $T_{Medium} > 100$  °C).



## 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 manufacturers' instructions and informations for all devices connected to the intrinsically safe circuits must be taken into account.
- The procedure for turning the transmitter housing is the same as that for the non-Ex version. The transmitter housing can be turned during operation.

## Electrical connections

### Power supply connection

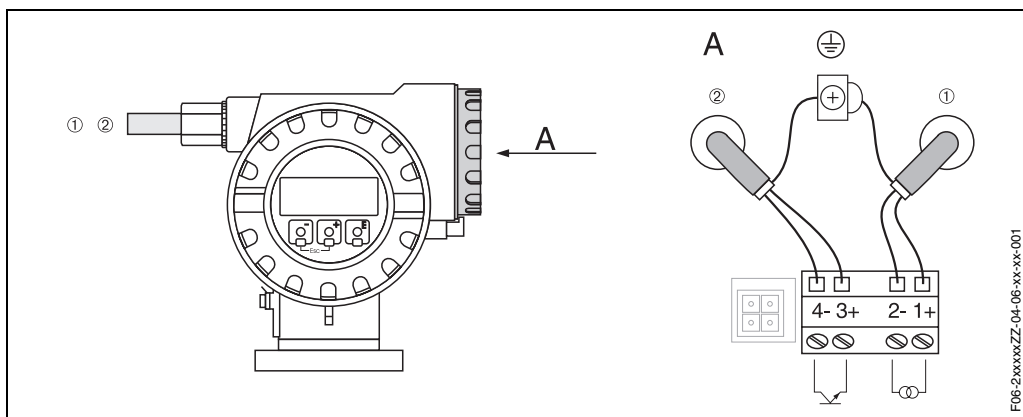


Fig. 1: ① = Transmitter power supply / 4...20 mA HART  
② = Pulse/frequency output  
A = View A



#### Note:

The table below contains the values that are not identical for all versions, in other words which depend on the type code (type of device). Always remember to compare the type code in the table with the code on the nameplate of your device.

### Transmitter Promag 23\*\*\*-\*\*\*\*\*N\*\*\*\*\*W

Terminals	4	3	2	1
	–	+	–	+
Designation			Transm. power supply / 4...20 mA HART ①	
Ratings			$V_{\max}/U_i = 30 \text{ V}$ $I_{\max}/I_i = 150 \text{ mA}$ $P_i = 810 \text{ mW}$	
Intrinsically safe circuit			yes	
$L_i =$			negligible	
$C_i =$			25 nF	

### Transmitter Promag 23\*\*\*-\*\*\*\*\*N\*\*\*\*\*A

Terminals	4	3	2	1
	–	+	–	+
Designation	Pulse/frequency output ②		Transm. power supply / 4...20 mA HART ①	
Ratings	$V_{\max}/U_i = 30 \text{ V}$ $I_{\max}/I_i = 250 \text{ mA}$ $P_i = 1 \text{ W}$		$V_{\max}/U_i = 30 \text{ V}$ $I_{\max}/I_i = 150 \text{ mA}$ $P_i = 810 \text{ mW}$	
Intrinsically safe circuit	yes		yes	
$L_i =$	negligible		negligible	
$C_i =$	negligible		25 nF	

## Safety barriers / transmitter power supply units

The following safety barriers / transmitter power supply units can be used for the intrinsically safe supply (4...20 mA HART / terminals 1 [+] and 2 [-]):

Manufacturer	Type	Description
Endress+Hauser	RN 221 (approval in preparation) RMA 422 (approval in preparation)	Transmitter power supply unit Transmitter power supply unit
Elcon	HiD 2025/2026 μD 323, μD 325, μD 326 μZ 630+ / μZ 631+	Transmitter power supply unit Transmitter power supply unit Safety barrier
Stahl	9001/51-280-110-14 9103/13-22-11 9601/13-22-11	Safety barrier Transmitter power supply unit Transmitter power supply unit
MTL	MTL 702+	Safety barrier unidirectional communication

Tab. 1: Recommended safety barrier types / transmitter power supply units

The following safety barriers can be used for the intrinsically safe supply (Pulse/frequency output / terminals 3 [+] and 4 [-]):

Manufacturer	Type	Description
Elcon	μZ 640 μZ 660	Safety barrier Safety barrier
Stahl	9001/01-252-057-14 9001/01-252-060-14	Safety barrier Safety barrier
Pepperl & Fuchs	Z 728 Z 787	Safety barrier Safety barrier
MTL	MTL 707+	Safety barrier

Tab. 2: Recommended safety barrier types

## Service adapter

The service adapter is exclusively for connection to E+H approved service interfaces.



Warning:

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

## Cable entries

- ⑤ Cable entries for the transmitter terminal compartment  
transmitter power supply / pulse/frequency cable: (Promag 23\*\*\*-\*\*\*\*\*N\*\*\*\*\*)  
Thread for cable entry ½" NPT.

## Device identification

Promag 23 transmitter and P/H sensor

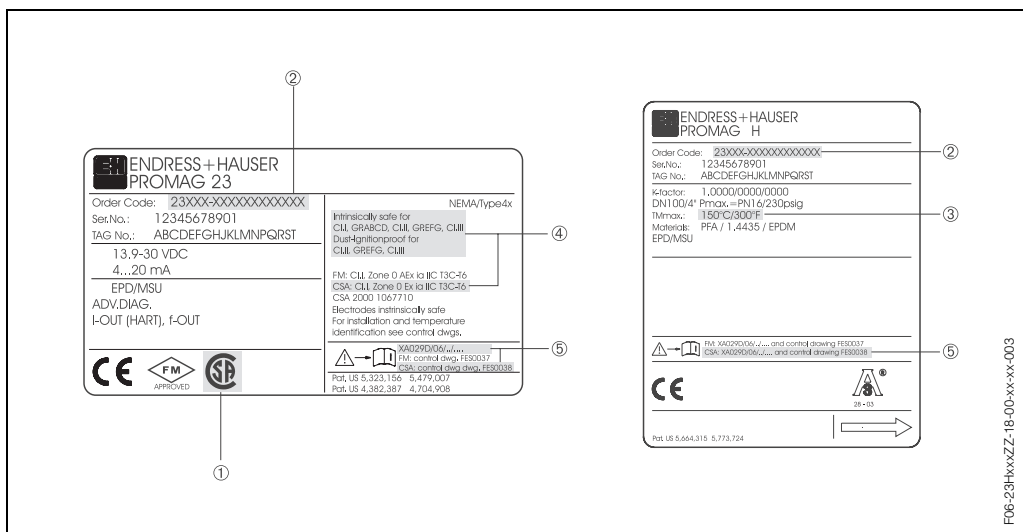


Fig. 2: Nameplate of transmitter and nameplate of sensor (example)

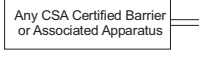
Key to nameplates (Figure 2)

No.	Meaning	No.	Meaning
①	Label of the notified body: Canadian Standards Association	④	Type of protection and explosion group for the Promag 23 measuring system
②	Type code	⑤	Applicable Ex documentation
③	Maximum medium temperature		

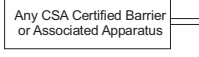
## Control drawings

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

**NON HAZARDOUS LOCATION**




Any CSA Certified Barrier or Associated Apparatus




Any CSA Certified Barrier or Associated Apparatus

**HAZARDOUS (CLASSIFIED) LOCATION**  
 Ex ia IIC, Class I Zone 0  
 Class I, Division 1, Groups A, B, C, D  
 Class II, Division 1, Groups E, F, G  
 Class III

Promag 23\*\*\*-\*\*\*\*\*N\*\*\*\*\*W



Promag 23\*\*\*-\*\*\*\*\*N\*\*\*\*\*A



**NOTES: INTRINSICALLY SAFE INSTALLATION CLASS I, DIV. 1, GPS A,B,C,D; CLASS II, DIV. 1, GPS E,F,G AND CLASS III**

- The installation must be in accordance with the Canadian Electrical Code.
- Control room equipment may not use or generate over 250 Vrms.
- Use CSA certified safety barrier or other CSA certified associated equipment that satisfies the following conditions:  
 $V_{oc} \text{ or } U_o \leq V_{max} \text{ or } U_i$  and  $I_{sc} \text{ or } I_o \leq I_{max} \text{ or } I_i$  and  $P_o \text{ or } P_{max} \leq P_i$  and  $C_a \geq C_i + C_{cable}$  and  $L_a \geq L_i + L_{cable}$
- WARNING: SUBSTITUTION OF COMPONENTS MAY IMPAIR INTRINSIC SAFETY.**
- Cable for different I.S. circuits have to be separated with grounded shields.
- Caution: Use only supply wires suitable for 5 °C above Ta ( $T_{Medium} \leq 100 \text{ °C}$ ) or suitable for 80 °C ( $T_{Medium} > 100 \text{ °C}$ ).

PROMAG 23 H***-*****N***** / PROMAG 23 P**-A***N***** (PFA – Liner)			
Temperature class	T6	T5	T4
T <sub>ambient</sub>	40 °C	60 °C	60 °C
T <sub>Medium</sub>	80 °C	95 °C	130 °C

PROMAG 23 P**-E***N***** (PTFE – Liner)			
Temperature class	T6	T5	T4
T <sub>ambient</sub>	40 °C	60 °C	60 °C
T <sub>Medium</sub>	80 °C	95 °C	130 °C

**Entity parameters:**

**Promag 23\*\*\*-\*\*\*\*\*N\*\*\*\*\*W** Terminals 1 (+) and 2 (-) / Hart, 4 ... 20 mA  
 $V_{max}, U_i = 30 \text{ V}$   $I_{max}, I_i = 150 \text{ mA}$   $P_i = 0.81 \text{ W}$   
 $C_i \leq 5 \text{ nF}$   $L_i = \text{negligible}$

**Promag 23\*\*\*-\*\*\*\*\*N\*\*\*\*\*A** Terminals 1 (+) and 2 (-) / Hart, 4 ... 20 mA  
 $V_{max}, U_i = 30 \text{ V}$   $I_{max}, I_i = 150 \text{ mA}$   $P_i = 0.81 \text{ W}$   
 $C_i \leq 5 \text{ nF}$   $L_i = \text{negligible}$

**Terminals 3 (+) and 4 (-) / Frequency output**  
 $V_{max}, U_i = 30 \text{ V}$   $I_{max}, I_i = 250 \text{ mA}$   $P_i = 1 \text{ W}$   
 $C_i = \text{negligible}$   $L_i = \text{negligible}$

**Notes: Suitable for Class I, Div.2, Gps ABCD; Class II, Div.1, Gps EFG and Class III HAZARDOUS LOCATION INSTALLATION**

- Install per Canadian Electrical Code (CEC) using threaded conduit. Intrinsic safety barrier not required. For T-code see table.
- Terminal 1 and 2  
 Supply voltage: 13.9 ... 30 VDC Signal current: 4 ... 20 mA (max. 25 mA)  
 Terminal 3 and 4  
 Pulse Output: Supply voltage 5 ... 30 VDC, max. 250 mA, max. 1 W
- A dust tight seal must be used for conduit entry when the transmitter is used in a Class II or Class III Location.
- WARNING: EXPLOSION HAZARD** – Do not disconnect equipment unless the power has been switched off or the area is known to be Non-Hazardous.
- WARNING: EXPLOSION HAZARD** – SUBSTITUTION OF COMPONENTS MAY IMPAIR SUITABILITY FOR CLASS I, DIVISION 2.
- Caution: Use only supply wires suitable for 5 °C above Ta ( $T_{Medium} \leq 100 \text{ °C}$ ) or suitable for 80 °C ( $T_{Medium} > 100 \text{ °C}$ ).


A	F
B	G
C	H
D	I
E	K

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 Ersteller: FES/UD  
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**CSA INSTALLATION DRAWING**  
**PROMAG 23**  
**2- and 4-WIRE VERSION**  
**ENTITY CONCEPT Class I, Division 1**

Massstab	Gezeichnet	15.02.00	UD
	Geprüft		
	Ex-geprüft	17.11.00	UD
	Gesehen		



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

**FES0038**

**Supplementary  
documentation**

TI 049D/06

TI 051D/06

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