



Ontploffingvoorkomingstechnologie
Explosion Prevention Technologies

MTEx Laboratories

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INSPECTION AUTHORITY (IA) CERTIFICATE

ENDRESS+HAUSER (PTY) LTD.
P.O. BOX 783996
SANDTON
2146

Issued: 2022/12/07
Expire: 2025/12/07
Revision: 5
Job File: 0086

Applicant:

ENDRESS+HAUSER (PTY) LTD.

For validity purposes, the following marking must be added to all equipment covered by this certificate:

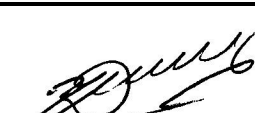
IA Number: MTEx-S/17.0126
Manufacturer: Endress+Hauser Flowtec AG
Supplier: Endress+Hauser (Pty) Ltd.
Equipment: Flowmeters
Model/Type: Proline types: Promass A 200, E 200 and F 200
Promag H200, P 200, E 200 and W 200
Prosonic Flow B 200
Prowirl C 200, D 200, F 200, R 200 and O 200
Ex Rating: Refer to Clause 1 below.
Serial No.: All units imported between Issued and Expiry dates of this Certificate.

Standards used:

SANS 60079-0: 2019 Ed.6 IEC 60079-0: 2017 Ed.7	Explosive atmospheres – Part 0: General requirements
SANS 60079-1: 2019 Ed.5 IEC 60079-1: 2014 Ed.7	Explosive atmospheres – Part 1: Equipment protection by flameproof enclosure "d"
SANS 60079-7: 2019 Ed.4 IEC 60079-7: 2015 Ed.4	Explosive atmospheres - Part 7: Equipment protection by increased safety "e".
SANS 60079-11: 2012 Ed.4 IEC 60079-11: 2011 Ed.6	Explosive atmospheres – Part 11: Equipment protection by intrinsic safety "i"
SANS 60079-26: 2019 Ed.3 IEC 60079-26: 2014 Ed.3	Explosive atmospheres – Part 26: Equipment with Equipment Protection Level (EPL) Ga
SANS 60079-31: 2014 Ed.2 IEC 60079-31: 2013 Ed.2	Explosive atmospheres – Part 31: Equipment dust ignition protection by enclosure "t"

This Certificate does not indicate compliance with electrical safety and performance requirements other than those expressly included in the Standards listed above.

This certification indicates compliance with R10.1 of the Mines Health and Safety Act and/or EMR 8(1) of the Occupational Health and Safety Act, provided that the apparatus is used as prescribed in accordance with:

Reviewed by + Signature (ExTL):	A. van Niekerk	
Approved by + Signature (ExCB): (MTEx Laboratories Technical Signatory)	D. Young	



mineral resources
Department:
Mineral Resources
REPUBLIC OF SOUTH AFRICA
AIA Number: E1



employment & labour
Department:
Employment and Labour
REPUBLIC OF SOUTH AFRICA
AIA Number: CL016

Megaton Systems (Pty) Ltd.
T/A MTEx Laboratories

Website: www.mtexlab.co.za
Reg No: 2012/055110/07
VAT/BTW No: 4830273027

MTEx Laboratories is an Accredited Test Laboratory (ATL) in terms of the
ARP 0108: "Regulatory Requirements for Explosion-Protected Apparatus"

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Template Ref: MTExDOC 101 Rev 8
(2022/06/27)

Print Date: 2022-12-07
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1. Any conditions set out in this Certificate.
2. This certificate only covers equipment imported between the "Issued" and "Expiry" dates.
3. When the supporting Q.A.N. (Quality Assurance Notification) of the equipment manufacturer expires, it is the responsibility of the applicant (as mentioned above) to submit a valid Q.A.N to MTEEx Laboratories.
4. The test results presented in this "Ex" Test Report relate only to the item or product testing.
5. Note: It is the responsibility of the supplier to ensure that the marking label complies with the ARP 0108.
6. This Certificate validates all units imported between Issued and Expiry dates.

1. OVERVIEW

See Annexes for descriptions.

2. REASON FOR REVIEW

- Revision 0: ARP 0108 Requirement.
- Revision 1: To include Issue 8 of the KEMA 10 ATEX 0072 Certificate.
- Revision 2: To include Issue 7 of the IECEx KEM 10.0032 Certificate.
- Revision 3: Editorial correction.
- Revision 4: Renewal of IA Certificate.
- Revision 5: Renewal of IA Certificate and to Include Issue 8 of IECEx KEM 10.0032.

3. DOCUMENTATION PROVIDED

- Type Certificate (KEMA 10 ATEX 0072 up to issue 8).
- IECEx Certificate of Conformity (IECEx KEM 10.0032 up to Issue 8).
- IEC Quality Assessment Report (DE/TUN/QAR06.0004/10).

4. ELECTRICAL / SAFETY PARAMETERS

See Annexes below for electrical data.

5. INSTALLATION INSTRUCTIONS

The instructions provided with the product shall be followed in detail to assure safe operation.

6. CONDITIONS OF CERTIFICATE (X)

None.

ANNEX 1

Equipment

Applicable for flowmeter types:

Proline Promass A/E/F 200
Proline Promag H/P/E/W 200
Proline Prosonic Flow B 200
Proline Prowirl C/D/F/R/O 200

Flowmeter with Approval codes cc = IA, IB, IJ, I4, I6 and I/O code d = A

Supply/output circuit (terminals 1 and 2):

in type of protection intrinsic safety Ex ia IIC, only for connection to a certified intrinsically safe circuit, with following maximum values:

$U_i = 30 \text{ V}$; $I_i = 300 \text{ mA}$; $P_i = 1 \text{ W}$; $C_i = 5 \text{ nF}$; $L_i = 0 \text{ mH}$.

Service connector:

in type of protection intrinsic safety Ex ia IIC, for connection of E+H Service Interface FXA291 or any other certified interface, with following maximum values:

$U_o = 7.3 \text{ V}$; $I_o = 100 \text{ mA}$; $P_o = 160 \text{ mW}$; $C_i = 0 \text{ nF}$; $L_i = 0 \text{ mH}$.

Flowmeter with Approval codes cc = IA, IB, IJ, I4, I6 and I/O code d = B

Supply/output circuit (terminals 1 and 2):

in type of protection intrinsic safety Ex ia IIC, only for connection to a certified intrinsically safe circuit, with following maximum values:

$U_i = 30 \text{ V}$; $I_i = 300 \text{ mA}$; $P_i = 1 \text{ W}$; $C_i = 5 \text{ nF}$; $L_i = 0 \text{ mH}$;

output circuit (terminals 3 and 4):

in type of protection intrinsic safety Ex ia IIC, only for connection to a certified intrinsically safe circuit, with following maximum values:

$U_i = 30 \text{ V}$; $I_i = 300 \text{ mA}$; $P_i = 1 \text{ W}$; $C_i = 6 \text{ nF}$; $L_i = 0 \text{ mH}$.

Service connector:

in type of protection intrinsic safety Ex ia IIC, for connection of E+H Service Interface FXA291 or any other certified interface, with following maximum values:

$U_o = 7.3 \text{ V}$; $I_o = 100 \text{ mA}$; $P_o = 160 \text{ mW}$; $C_i = 0 \text{ nF}$; $L_i = 0 \text{ mH}$.

Flowmeter with Approval codes cc = IA, IB, IJ, I4, I6 and I/O code d = C

Supply/output circuit (terminals 1 and 2):

in type of protection intrinsic safety Ex ia IIC, only for connection to a certified intrinsically safe circuit, with following maximum values:

$U_i = 30 \text{ V}$; $I_i = 300 \text{ mA}$; $P_i = 1 \text{ W}$; $C_i = 30 \text{ nF}$; $L_i = 0 \text{ mH}$;

supply/output circuit (terminals 3 and 4):

in type of protection intrinsic safety Ex ia IIC, only for connection to a certified intrinsically safe circuit, with following maximum values:

$U_i = 30 \text{ V}$; $I_i = 300 \text{ mA}$; $P_i = 1 \text{ W}$; $C_i = 30 \text{ nF}$; $L_i = 0 \text{ mH}$.

Service connector:

in type of protection intrinsic safety Ex ia IIC, for connection of E+H Service Interface FXA291 or any other certified interface, with following maximum values:

$U_o = 7.3 \text{ V}$; $I_o = 100 \text{ mA}$; $P_o = 160 \text{ mW}$; $C_i = 0 \text{ nF}$; $L_i = 0 \text{ mH}$.

Flowmeter with Approval codes cc = IA, IB, IJ, I4, I6 and I/O code d = D**Supply/output circuit (terminals 1 and 2):**

in type of protection intrinsic safety Ex ia IIC, only for connection to a certified intrinsically safe circuit, with following maximum values:

$U_i = 30 \text{ V}$; $I_i = 300 \text{ mA}$; $P_i = 1 \text{ W}$; $C_i = 5 \text{ nF}$; $L_i = 0 \text{ mH}$;

output circuit (terminals 3 and 4):

in type of protection intrinsic safety Ex ia IIC, only for connection to a certified intrinsically safe circuit, with following maximum values:

$U_i = 30 \text{ V}$; $I_i = 300 \text{ mA}$; $P_i = 1 \text{ W}$; $C_i = 6 \text{ nF}$; $L_i = 0 \text{ mH}$;

input circuit (terminals 5 and 6):

in type of protection intrinsic safety Ex ia IIC, only for connection to a certified intrinsically safe circuit, with following maximum values:

$U_i = 30 \text{ V}$; $I_i = 300 \text{ mA}$; $P_i = 1 \text{ W}$; $C_i = 5 \text{ nF}$; $L_i = 0 \text{ mH}$.

Service connector:

in type of protection intrinsic safety Ex ia IIC, for connection of E+H Service Interface FXA291 or any other certified interface, with following maximum values:

$U_o = 7.3 \text{ V}$; $I_o = 100 \text{ mA}$; $P_o = 160 \text{ mW}$; $C_i = 0 \text{ nF}$; $L_i = 0 \text{ mH}$.

Flowmeter with Approval codes cc = IA, IB, IJ, I4, I6 and I/O codes d = E, G**Supply/output circuit (terminals 1 and 2):**

in type of protection intrinsic safety Ex ia IIC, only for connection to a certified intrinsically safe circuit, with following maximum values:

$U_i = 30 \text{ V}$; $I_i = 300 \text{ mA}$; $P_i = 1.2 \text{ W}$; $C_i = 5 \text{ nF}$; $L_i = 10 \text{ }\mu\text{H}$;

or in accordance with FISCO, with following maximum values:

$U_i = 17.5 \text{ V}$; $I_i = 550 \text{ mA}$; $P_i = 5.5 \text{ W}$; $C_i = 5 \text{ nF}$; $L_i = 10 \text{ }\mu\text{H}$;

supply/output circuit (terminals 3 and 4):

in type of protection intrinsic safety Ex ia IIC, only for connection to a certified intrinsically safe circuit, with following maximum values:

$U_i = 30 \text{ V}$; $I_i = 300 \text{ mA}$; $P_i = 1 \text{ W}$; $C_i = 6 \text{ nF}$; $L_i = 0 \text{ mH}$.

Service connector:

in type of protection intrinsic safety Ex ia IIC, for connection of E+H Service Interface FXA291 or any other certified interface, with following maximum values:

$U_o = 7.3 \text{ V}$; $I_o = 100 \text{ mA}$; $P_o = 160 \text{ mW}$; $C_i = 0 \text{ nF}$; $L_i = 0 \text{ mH}$.

Flowmeter with Approval codes cc = IC, IG, IK, I5, I7, TC and I/O code d = A**Supply/output circuit (terminals 1 and 2):**

$U_N = 35 \text{ V dc}$

$U_m = 250 \text{ V}$.

Service connector:

in type of protection intrinsic safety Ex ia IIC, for connection of E+H Service Interface FXA291 or any other certified interface, with following maximum values:

$U_o = 7.3 \text{ V}$; $I_o = 100 \text{ mA}$; $P_o = 160 \text{ mW}$; $C_i = 0 \text{ nF}$; $L_i = 0 \text{ mH}$.

Flowmeter with Approval codes cc = IC, IG, IK, I5, I7, TC and I/O code d = B**Supply/output circuit (terminals 1 and 2):**

$U_N = 35 \text{ V dc}$

$U_m = 250 \text{ V}$.

Supply/output circuit (terminals 3 and 4):

$U_N = 35 \text{ V dc}$

$U_m = 250 \text{ V}$

$P_{\max} = 1 \text{ W}$

NOTE: this circuit is functionally limited by an internal resistance of 760.5Ω ; herewith $P_{\max}$ may be determined.

Service connector:

in type of protection intrinsic safety Ex ia IIC, for connection of E+H Service Interface FXA291 or any other certified interface, with following maximum values:

$U_o = 7.3 \text{ V}$; $I_o = 100 \text{ mA}$; $P_o = 160 \text{ mW}$; $C_i = 0 \text{ nF}$; $L_i = 0 \text{ mH}$.

Flowmeter with Approval codes cc = IC, IG, IK, I5, I7, TC and I/O code d = C**Supply/output circuits (terminals 1 and 2; 3 and 4):**

$U_N = 30 \text{ V dc}$

$U_m = 250 \text{ V}$.

Service connector:

in type of protection intrinsic safety Ex ia IIC, for connection of E+H Service Interface FXA291 or any other certified interface, with following maximum values:

$U_o = 7.3 \text{ V}$; $I_o = 100 \text{ mA}$; $P_o = 160 \text{ mW}$; $C_i = 0 \text{ nF}$; $L_i = 0 \text{ mH}$.

Flowmeter with Approval codes cc = IC, IG, IK, I5, I7, TC and I/O code d = D**Supply/output circuit (terminals 1 and 2):**

$U_N = 35 \text{ V dc}$

$U_m = 250 \text{ V}$.

Supply/output circuit (terminals 3 and 4):

$U_N = 35 \text{ V dc}$

$U_m = 250 \text{ V}$

Input circuit (terminals 5 and 6):

$U_N = 35 \text{ V dc}$

$U_m = 250 \text{ V}$.

Service connector:

in type of protection intrinsic safety Ex ia IIC, for connection of E+H Service Interface FXA291 or any other certified interface, with following maximum values:

$U_o = 7.3 \text{ V}$; $I_o = 100 \text{ mA}$; $P_o = 160 \text{ mW}$; $C_i = 0 \text{ nF}$; $L_i = 0 \text{ mH}$.

Flowmeter with Approval codes cc = IC, IG, IK, I5, I7, TC and I/O codes d = E, G

Supply/output circuit (terminals 1 and 2):

$$U_N = 32 \text{ V dc}$$

$$U_m = 250 \text{ V}$$

$$P_{\max} = 0.88 \text{ W}$$

Supply/output circuit (terminals 3 and 4):

$$U_N = 35 \text{ V dc}$$

$$U_m = 250 \text{ V}$$

$$P_{\max} = 1 \text{ W}$$

NOTE: this circuit is functionally limited by an internal resistance of 760.5 Ω ; herewith $P_{\max}$ may be determined.

Service connector:

in type of protection intrinsic safety Ex ia IIC, for connection of E+H Service Interface FXA291 or any other certified interface, with following maximum values:

$$U_o = 7.3 \text{ V}; I_o = 100 \text{ mA}; P_o = 160 \text{ mW}; C_i = 0 \text{ nF}; L_i = 0 \text{ mH}.$$

Flowmeter with Approval codes cc = ID, IH and I/O code d = A

Supply/output circuit (terminals 1 and 2):

in type of protection intrinsic safety Ex ic IIC, only for connection to an intrinsically safe circuit, with following maximum values:

$$U_i = 35 \text{ V}; I_i = \text{N/A}; P_i = 1 \text{ W}; C_i = 5 \text{ nF}; L_i = 0 \text{ mH}.$$

Service connector:

in type of protection intrinsic safety Ex ia IIC, for connection of E+H Service Interface FXA291 or any other certified interface, with following maximum values:

$$U_o = 7.3 \text{ V}; I_o = 100 \text{ mA}; P_o = 160 \text{ mW}; C_i = 0 \text{ nF}; L_i = 0 \text{ mH}.$$

Flowmeter with Approval codes cc = ID, IH and I/O code d = B

Supply/output circuit (terminals 1 and 2):

in type of protection intrinsic safety Ex ic IIC, only for connection to an intrinsically safe circuit, with following maximum values:

$$U_i = 35 \text{ V}; I_i = \text{N/A}; P_i = 1 \text{ W}; C_i = 5 \text{ nF}; L_i = 0 \text{ mH}.$$

Supply/output circuit (terminals 3 and 4):

in type of protection intrinsic safety Ex ic IIC, only for connection to an intrinsically safe circuit, with following maximum values:

$$U_i = 35 \text{ V}; I_i = \text{N/A}; P_i = 1 \text{ W}; C_i = 6 \text{ nF}; L_i = 0 \text{ mH}.$$

Service connector:

in type of protection intrinsic safety Ex ia IIC, for connection of E+H Service Interface FXA291 or any other certified interface, with following maximum values:

$$U_o = 7.3 \text{ V}; I_o = 100 \text{ mA}; P_o = 160 \text{ mW}; C_i = 0 \text{ nF}; L_i = 0 \text{ mH}.$$

Flowmeter with Approval codes cc = ID, IH and I/O code d = C

Supply/output circuit (terminals 1 and 2):

in type of protection intrinsic safety Ex ic IIC, only for connection to an intrinsically safe circuit, with following maximum values:

$$U_i = 30 \text{ V}; I_i = \text{N/A}; P_i = 1 \text{ W}; C_i = 30 \text{ nF}; L_i = 0 \text{ mH};$$

Supply/output circuit (terminals 3 and 4):

in type of protection intrinsic safety Ex ic IIC, only for connection to an intrinsically safe circuit, with

following maximum values:

$U_i = 30\text{ V}$; $I_i = \text{N/A}$; $P_i = 1\text{ W}$; $C_i = 30\text{ nF}$; $L_i = 0\text{ mH}$.

Service connector: in type of protection intrinsic safety Ex ia IIC, for connection of E+H Service Interface FXA291 or any other certified interface, with following maximum values:

$U_o = 7.3\text{ V}$; $I_o = 100\text{ mA}$; $P_o = 160\text{ mW}$; $C_i = 0\text{ nF}$; $L_i = 0\text{ mH}$.

Flowmeter with Approval codes cc = ID, IH and I/O code d = D

Supply/output circuit (terminals 1 and 2):

in type of protection intrinsic safety Ex ic IIC, only for connection to an intrinsically safe circuit, with following maximum values:

$U_i = 35\text{ V}$; $I_i = \text{N/A}$; $P_i = 1\text{ W}$; $C_i = 5\text{ nF}$; $L_i = 0\text{ mH}$;

Supply/output circuit (terminals 3 and 4):

in type of protection intrinsic safety Ex ic IIC, only for connection to an intrinsically safe circuit, with following maximum values:

$U_i = 35\text{ V}$; $I_i = \text{N/A}$; $P_i = 1\text{ W}$; $C_i = 6\text{ nF}$; $L_i = 0\text{ mH}$;

Input circuit (terminals 5 and 6):

in type of protection intrinsic safety Ex ic IIC, only for connection to an intrinsically safe circuit, with following maximum values:

$U_i = 35\text{ V}$; $I_i = \text{N/A}$; $P_i = 1\text{ W}$; $C_i = 5\text{ nF}$; $L_i = 0\text{ mH}$;

Service connector: in type of protection intrinsic safety Ex ia IIC, for connection of E+H Service Interface FXA291 or any other certified interface, with following maximum values:

$U_o = 7.3\text{ V}$; $I_o = 100\text{ mA}$; $P_o = 160\text{ mW}$; $C_i = 0\text{ nF}$; $L_i = 0\text{ mH}$.

Flowmeter with Approval codes cc = ID, IH and I/O codes d = E, G

Supply/output circuit (terminals 1 and 2):

in type of protection intrinsic safety Ex ic IIC, only for connection to a certified intrinsically safe circuit, with following maximum values:

$U_i = 32\text{ V}$; $I_i = 300\text{ mA}$; $P_i = \text{N/A}$; $C_i = 5\text{ nF}$; $L_i = 10\text{ }\mu\text{H}$;

or in accordance with FISCO, with following maximum values:

$U_i = 17.5\text{ V}$; $I_i = \text{N/A}$; $P_i = \text{N/A}$; $C_i = 5\text{ nF}$; $L_i = 10\text{ }\mu\text{H}$;

Supply/output circuit (terminals 3 and 4):

in type of protection intrinsic safety Ex ic IIC, only for connection to a certified intrinsically safe circuit, with following maximum values:

$U_i = 35\text{ V}$; $I_i = 300\text{ mA}$; $P_i = 1\text{ W}$; $C_i = 6\text{ nF}$; $L_i = 0\text{ mH}$.

Service connector:

in type of protection intrinsic safety Ex ia IIC, for connection of E+H Service Interface FXA291 or any other certified interface, with following maximum values:

$U_o = 7.3\text{ V}$; $I_o = 100\text{ mA}$; $P_o = 160\text{ mW}$; $C_i = 0\text{ nF}$; $L_i = 0\text{ mH}$.

All models

Interconnection cable for remote versions of Proline Prowirl C/D/F/R/O 200

When the interconnection between Transmitter and Sensor of the Remote versions of the Flowmeter is in type of protection intrinsic safety Ex ia IIC/IIIC or Ex ic IIC/IIIC, then the interconnecting cable shall have an $L_c/R_c \leq 38.2\text{ }\mu\text{H}/\Omega$.

External display connector

The type of protection of the external display connector depends on the Approval code of the equipment.

For transmitter models with Display codes e = M or L, prepared for connection of the external display of Endress+Hauser, Type FHX50, or any other suitable display in type of protection intrinsic safety Ex ia IIC/IIIC, the following maximum values apply:

$U_o = 7.3 \text{ V}$; $I_o = 157 \text{ mA}$; $P_o = 362 \text{ mW}$; $C_o = 388 \text{ nF}$; $L_o = 149 \text{ }\mu\text{H}$;

maximum allowed cable capacitance $C_c = 125 \text{ nF}$;

maximum allowed cable inductance $L_c = 149 \text{ }\mu\text{H}$.

In other cases, if used as interface in type of protection intrinsic safety Ex ia IIC/IIIC, the following maximum values apply:

$U_o = 7.3 \text{ V}$; $I_o = 327 \text{ mA}$; $P_o = 800 \text{ mW}$; $U_i = 7.3 \text{ V}$; $C_i = 0 \text{ nF}$; $L_i = 0 \text{ mH}$.

If used as non-intrinsically safe interface, $U_N = 6.5 \text{ V}$.

Interface pressure sensor (only for Proline Prowirl)

in type of protection intrinsic safety Ex ia IIC, for connection of sensor DPC21; with following maximum values:

$U_o = 4.1 \text{ V}$; $I_o = 450 \text{ mA}$; $P_o = 150 \text{ mW}$; $C_o = 99.3 \text{ }\mu\text{F}$; $L_o = 84 \text{ }\mu\text{H}$.

ANNEX 2

This annex is applicable for flowmeters type Proline Promass A/E/F 200

Equipment

Coriolis Massflow Transmitters series Proline Promass, for measurement of the mass flow of gases and liquids, based on controlled Coriolis forces.

The transmitter consists of an electronics enclosure and an integral sensor assembly.

Depending on the applied interface, the sensor measurement signal is converted into an electrical output signal.

For detailed information regarding the ambient temperature range, the process temperature range and their relation to temperature class and maximum surface temperature, see thermal data below.

Marking

Ex ia IIC T6...T1 Gb or Ex db [ia] IIC T6...T1 Gb or
 Ex ia IIC T6...T1 Ga/Gb or Ex db [ia] IIC T6...T1 Ga/Gb or
 Ex ic [ia] IIC T6...T1 Ga/Gc or
 Ex nA [ia Ga] IIC T6...T1 Gc or Ex ec [ia Ga] IIC T6...T1 Gc
 Ex ic [ia Ga] IIC T6...T1 Gc
 Ex tb IIIC Txx °C Db or
 Ex tb [ia Da] IIIC Txx °C Db

Type designation

Proline Promass A 200:

code 8A2Bbb - ccdefghhiiikoo + ###
 code O8ABbb - ccdefghhiiikoop + ###

Proline Promass E 200 (Tm = 205°C):

code 8E2Cbb - ccdefghhiiikoo + ###
 code O8ECbb - ccdefghhiiikoop + ###

Proline Promass E 200 (Tm = 140°C):

code 8E2Bbb - ccdefghhiiik + ###
 code O8EBbb - ccdefghhiiikp + ###

Proline Promass F 200:

code 8F2Bbb - ccdefghhiiik + ###
 code O8FBbb - ccdefghhiiikp + ###

Proline Promass 200 transmitter only:

code 8X2BXX - ccdefg + ###
 code 8X2BX1 - aaccdefg + ###
 code 8X2CXX - ccdefgoo + ###
 code O8X2BXX - ccdefgp + ###
 code O8X2BX1 - aaccdefgp + ###
 code O8X2CXX - ccdefgoop + ###

aa = Size (replacement transmitter Promass F DN80 only)
 80 = Promass F DN80

bb	=	Size 08, 15, 25, 40, 50, 80 or XX
cc	=	Approval code ¹⁾
IB	=	Ex ia IIC T6...T1 Ga/Gb
IC, TC	=	Ex db [ia] IIC T6...T1 Ga/Gb
ID	=	Ex ic [ia] IIC T6...T1 Ga/Gc
IG	=	Ex nA IIC T6...T1 Gc or Ex nA [ia Ga] IIC T6...T1 Gc ²⁾ or Ex ec IIC T6...T1 Gc or Ex ec [ia Ga] IIC T6...T1 Gc ²⁾
IH	=	Ex ic IIC T6...T1 Gc or Ex ic [ia Ga] IIC T6...T1 Gc ²⁾
IJ	=	Ex ia IIC T6...T1 Gb
IK	=	Ex db [ia] IIC T6...T1 Gb
IL	=	Ex ia IIC T6...T1 Ga/Gb Ex tb IIIC T** °C Db Ex tb [ia Da] IIIC T** °C Db ²⁾
I5	=	Ex db [ia] IIC T6...T1 Ga/Gb Ex tb IIIC T** °C Db Ex tb [ia Da] IIIC T** °C Db ²⁾
d	=	I/O – interface A = 4 - 20 mA HART B = 4 - 20 mA HART + pulse/frequency/switch output C = 4 - 20 mA HART + 4 - 20 mA D = 4 - 20 mA HART + pulse/frequency/switch output + 4 - 20 mA input E = Foundation Fieldbus + pulse/frequency/switch output G = Profibus PA + pulse/frequency/switch output X = Sensor only
e	=	Display, operation L, M = prepared for FHX50 any other single number or letter
f	=	Enclosure any single number or letter
g	=	Cable gland any single number or letter
h, hh	=	Tube material h: Promass E (Tm = 140°C): any single number or letter hh: Promass A, Promass F, Promass E (Tm = 205°C): Tm ≤ 150°C: with any combination of double number and/or letter Tm ≤ 205°C: SD, SE, SF, TH
iii	=	Process connection any triple numbers or letters
k	=	Calibration any single number or letter
oo	=	Device model (two digit) A1 = product version 1

- p = Customer version
any single number or letter
- ** = Option (no, two or multiples of two digits)
any combination of numbers and letters
- # = Additional options, not relevant for safety

Note 1: Transmitters with type designation (O)8F2B80 - (size code bb = 80) and replacement transmitter with type designation O8X2BX1 are Group IIB

Note 2: Approval code for Flowmeters with Display code e = L or M only

Assignment of Coriolis Massflow Transmitters series Proline Promass to replacement transmitter

Product flowmeters		Replacement transmitter type		
model code	device model code oo =	model code	Size aa =	device model code oo =
8A2B**-...oo O8A2B**-...oo...	A1	8X2CXX-...oo O8X2CXX-oo...	n.a.	A1
8E2B**-... O8E2B**-...	n.a.	8X2BXX-... O8X2BXX-...	n.a.	n.a.
8E2C**-...oo O8E2C**-...oo...	A1	8X2CXX-...oo O8X2CXX-oo...	n.a.	A1
8F2B**-(DN08...50) O8F2B**-(DN08...50)	n.a.	8X2BXX-... O8X2BXX-...	n.a.	n.a.
8F2B**-... (DN80) O8F2B**-... (DN80)	n.a.	8X2BX1-aa... O8X2BX1-aa...	80	n.a.

Thermal data

Ambient temperature range: -40 °C to +60 °C ¹⁾

Process temperature range: -40 °C to +140 °C for Promass E 200 types 8E2B**-... and O8E2B**-...
-50 °C to +205 °C for Promass E 200 types 8E2C**-... and O8E2C**-...
-50 °C to +205 °C for Promass F 200

Note 1: Minimum temperature -60 °C for Flowmeters with approval code cc = IG and I/O interface codes d = A, d = B and d = D;
minimum temperature -50 °C for Flowmeters with all approval codes other than cc = IG for Promass A, Promass F and Promass E types 8E2C**-***** + ### and O8E2C**-***** + ###

Note 2: For ambient temperatures below -40 °C, only enclosure-variants without breathing element are allowed.

The relation between ambient temperature, process temperature and temperature class and maximum surface temperature T for the different models of Massflow Transmitters is listed in the following tables:

Promass E 200 with I/O code d = A

Type designation 8E2B**_***** + ### and O8E2B**_***** + ###:

	Max. Process temperature			
Temp class (Txx)	T6 (85°C)	T5 (100°C)	T4 (135°C)	T3 - T1 (200°C)
Tamb (max)				
50°C ¹⁾	50°C	95°C	130°C	140°C
60°C ¹⁾	--	95°C	130°C	140°C

Type designation 8E2C**_***** + ### and O8E2C**_***** + ###:

	Max. Process temperature				
Temp class (Txx)	T6 (85°C)	T5 (100°C)	T4 (135°C)	T3 (200°C)	T2...T1 (300°C)
Tamb (max)					
40°C ¹⁾	50°C	95°C	130°C	170°C	205°C
60°C ¹⁾	--	95°C	130°C	170°C	205°C

Note 1: For versions with approval code IB, ID, IH, IJ, I4 and provided with option OVP or TRM, the maximum ambient temperature decreases by 2 K

Promass A and Promass F 200 with I/O code d = A

	Max. Process temperature				
Temp class (Txx)	T6 (85°C)	T5 (100°C)	T4 (135°C)	T3 (200°C)	T2...T1 (300°C)
Tamb (max)					
40°C ¹⁾	50°C	95°C ²⁾	130°C ³⁾	170°C ⁴⁾	205°C ⁴⁾
60°C ¹⁾	--	95°C ²⁾	130°C ³⁾	170°C ⁴⁾	205°C ⁴⁾

Note 1: For versions with approval code IB, ID, IH, IJ, I4 and provided with option OVP or TRM, the maximum ambient temperature decreases by 2 K

Note 2: Max. process temperature 85 °C for size code bb = 80

Note 3: Max. process temperature 110 °C for size code bb = 80

Note 4: Maximum process temperature depending on temperature specification of the sensor

Promass E 200 with Approval codes cc = IB, ID, IH, IJ, I4 and I/O code d = B

Type designation 8E2B**_***** + ### and O8E2B**_***** + ###:

	Max. Process temperature			
Temp class (Txx)	T6 (85°C)	T5 (100°C)	T4 (135°C)	T3 - T1 (200°C)
Tamb (max)				
35°C ^{1) 3)}	50°C	95°C	130°C	140°C
50°C ^{2) 3)}	--	95°C	130°C	140°C
60°C	--	--	130°C	140°C

Type designation 8E2C**_***** + ### and O8E2C**_***** + ###:

	Max. Process temperature				
Temp class (Txx)	T6 (85°C)	T5 (100°C)	T4 (135°C)	T3 (200°C)	T2 - T1 (300°C)
Tamb (max)					
35°C ^{1) 3)}	50°C	95°C	130°C	170°C	205°C
50°C ^{2) 3)}	--	95°C	130°C	170°C	205°C
55°C	--	--	130°C	170°C	205°C
60°C	--	--	130°C	170°C	200°C

Note 1: Tamb (max) = 40 °C for PFS input with Pi = 0.85 W

Note 2: Tamb (max) = 55 °C for PFS input with Pi = 0.85 W

Note 3: For versions provided with option OVP or TRM, for temperature class T6 and T5, the maximum ambient temperature decreases by 2 K

Promass A and Promass F 200 with Approval codes cc = IB, ID, IH, IJ, I4 and I/O code d = B

Temp class (Txx)	Max. Process temperature				
	T6 (85°C)	T5 (100°C)	T4 (135°C)	T3 (200°C)	T2 - T1 (300°C)
Tamb (max)					
35°C ^{1) 3)}	50°C	95°C ⁴⁾	130°C ⁵⁾	170°C ⁶⁾	205°C ⁶⁾
50°C ^{2) 3)}	--	95°C ⁴⁾	130°C ⁵⁾	170°C ⁶⁾	205°C ⁶⁾
50°C	--	--	130°C ⁵⁾	170°C ⁶⁾	205°C ⁶⁾
60°C	--	--	130°C ⁵⁾	170°C ⁶⁾	200°C ⁶⁾

Note 1: Tamb (max) = 40 °C for PFS input with Pi = 0.85 W

Note 2: Tamb (max) = 55 °C for PFS input with Pi = 0.85 W

Note 3: For versions provided with option OVP or TRM, the maximum ambient temperature decreases by 2 K for temperature class T6 and T5

Note 4: Max. process temperature 85 °C for size code bb = 80

Note 5: Max. process temperature 110 °C for size code bb = 80

Note 6: Maximum process temperature depending on temperature specification of the sensor

Promass E 200 with Approval codes cc = IC, IG, IK, I5, TC and I/O code d = B

Type designation 8E2B**-***** + ### and O8E2B**-***** + ###:

Temp class (Txx)	Max. Process temperature			
	T6 (85°C)	T5 (100°C)	T4 (135°C)	T3 - T1 (200°C)
Tamb (max)				
40°C	50°C	95°C	130°C	140°C
50°C ¹⁾	--	95°C	130°C	140°C
60°C	--	--	130°C	140°C

Type designation 8E2C**-***** + ### and O8E2C**-***** + ###:

Temp class (Txx)	Max. Process temperature				
	T6 (85°C)	T5 (100°C)	T4 (135°C)	T3 (200°C)	T2 - T1 (300°C)
Tamb (max)					
40°C	50°C	95°C ⁴⁾	130°C ⁵⁾	170°C	205°C
50°C ¹⁾	--	95°C ⁴⁾	130°C ⁵⁾	170°C	205°C
55°C	--	--	130°C ⁵⁾	170°C	205°C
60°C	--	--	130°C ⁵⁾	170°C	200°C

Note 1: Tamb (max) = 55 °C for PFS input with Pi = 0.85 W

Promass A and Promass F 200 with Approval codes cc = IC, IG, IK, I5, TC and I/O code d = B

Temp class (Txx)	Max. Process temperature				
	T6 (85°C)	T5 (100°C)	T4 (135°C)	T3 (200°C)	T2 - T1 (300°C)
Tamb (max)					
40°C	50°C	95°C ²⁾	130°C ³⁾	170°C ⁴⁾	205°C ⁴⁾
50°C ¹⁾	--	95°C ²⁾	130°C ³⁾	170°C ⁴⁾	205°C ⁴⁾
55°C	--	--	130°C ³⁾	170°C ⁴⁾	205°C ⁴⁾
60°C	--	--	130°C ³⁾	170°C ⁴⁾	200°C ⁴⁾

Note 1: Tamb (max) = 55 °C for PFS input with Pi = 0.85 W

Note 2: Max. process temperature 85 °C for size code bb = 80

Note 3: Max. process temperature 110 °C for size code bb = 80

Note 4: Maximum process temperature depending on temperature specification of the sensor

Promass E 200 with Approval codes cc = IB, IJ, I4 and I/O code d = C

Type designation 8E2B**-***** + ### and O8E2B**-***** + ###:

Temp class (Txx)	Max. Process temperature			
	T6 (85°C)	T5 (100°C)	T4 (135°C)	T3 - T1 (200°C)
Tamb (max)				
35°C ¹⁾	50°C	95°C	130°C	140°C
50°C ¹⁾	--	95°C	130°C	140°C
60°C	--	--	130°C	140°C

Type designation 8E2C**-***** + ### and O8E2C**-***** + ###:

Temp class (Txx)	Max. Process temperature				
	T6 (85°C)	T5 (100°C)	T4 (135°C)	T3 (200°C)	T2 - T1 (300°C)
Tamb (max)					
35°C ¹⁾	50°C	95°C	130°C	170°C	205°C
50°C ¹⁾	--	95°C	130°C	170°C	205°C
55°C	--	--	130°C	170°C	205°C
60°C	--	--	130°C	170°C	200°C

Note 1: For versions provided with option OVP or TRM, the maximum ambient temperature decreases by 2 K for temperature class T6 and T5

Promass A and Promass F 200 with Approval codes cc = IB, IJ, I4 and I/O code d = C

Temp class (Txx)	Max. Process temperature				
	T6 (85°C)	T5 (100°C)	T4 (135°C)	T3 (200°C)	T2 - T1 (300°C)
Tamb (max)					
35°C ¹⁾	50°C	95°C ²⁾	130°C ³⁾	170°C ⁴⁾	205°C ⁴⁾
50°C ¹⁾	--	95°C ²⁾	130°C ³⁾	170°C ⁴⁾	205°C ⁴⁾
55°C	--	--	130°C ³⁾	170°C ⁴⁾	205°C ⁴⁾
60°C	--	--	130°C ³⁾	170°C ⁴⁾	200°C ⁴⁾

Note 1: For versions provided with option OVP or TRM, the maximum ambient temperature decreases by 2 K for temperature class T6 and T5

Note 2: Max. process temperature 85 °C for size code bb = 80

Note 3: Max. process temperature 110 °C for size code bb = 80

Note 4: Maximum process temperature depending on temperature specification of the sensor

Promass E 200 with Approval codes cc = IC, ID, IG, IH, IK, I5, TC and I/O code d = C

Type designation 8E2B**-***** + ### and O8E2B**-***** + ###:

Temp class (Txx)	Max. Process temperature			
	T6 (85°C)	T5 (100°C)	T4 (135°C)	T3 - T1 (200°C)
Tamb (max)				
40°C ¹⁾	50°C	95°C	130°C	140°C

55°C ¹⁾	--	95°C	130°C	140°C
60°C	--	--	130°C	140°C

Type designation 8E2C**-***** + ### and O8E2C**-***** + ###:

	Max. Process temperature				
Temp class (Txx)	T6 (85°C)	T5 (100°C)	T4 (135°C)	T3 (200°C)	T2 - T1 (300°C)
Tamb (max)					
40°C ¹⁾	50°C	95°C	130°C	170°C	205°C
55°C ¹⁾	--	95°C	130°C	170°C	205°C
60°C	--	--	130°C	170°C	200°C

Note 1: For versions with approval code ID, IG, IH and provided with option OVP or TRM, the maximum ambient temperature decreases by 2 K for temperature class T6 and T5

Promass A and Promass F 200 with Approval codes cc = IC, ID, IG, IH, IK, I5, TC and I/O code d = C

	Max. Process temperature				
Temp class (Txx)	T6 (85°C)	T5 (100°C)	T4 (135°C)	T3 (200°C)	T2 - T1 (300°C)
Tamb (max)					
40°C ¹⁾	50°C	95°C ²⁾	130°C ³⁾	170°C ⁴⁾	205°C ⁴⁾
55°C ¹⁾	--	95°C ²⁾	130°C ³⁾	170°C ⁴⁾	205°C ⁴⁾
60°C	--	--	130°C ³⁾	170°C ⁴⁾	200°C ⁴⁾

Note 1: For versions with approval code ID, IG, IH and provided with option OVP or TRM, the maximum ambient temperature decreases by 2 K for temperature class T6 and T5

Note 2: Max. process temperature 85 °C for size code bb = 80

Note 3: Max. process temperature 110 °C for size code bb = 80

Note 4: Maximum process temperature depending on temperature specification of the sensor

Promass E 200 with I/O code d = D

Type designation 8E2B**-***** + ### and O8E2B**-***** + ###:

	Max. Process temperature			
Temp class (Txx)	T6 (85°C)	T5 (100°C)	T4 (135°C)	T3 - T1 (200°C)
Tamb (max)				
35°C ¹⁾	50°C	95°C	130°C	140°C
50°C ¹⁾	--	95°C	130°C	140°C
55°C	--	--	130°C	140°C

Type designation 8E2C**-***** + ### and O8E2C**-***** + ###:

	Max. Process temperature				
Temp class (Txx)	T6 (85°C)	T5 (100°C)	T4 (135°C)	T3 (200°C)	T2 - T1 (300°C)
Tamb (max)					
35°C ¹⁾	50°C	95°C	130°C	170°C	205°C
50°C ¹⁾	50°C	95°C	130°C	170°C	205°C
55°C	--	95°C	130°C	170°C	205°C
60°C	--	--	130°C	170°C	205°C

Note 1: For versions with approval code IB, ID, IG, IH, IJ, I4 and provided with option OVP or TRM,

for temperature class T6 and T5, the maximum ambient temperature decreases by 2 K

Promass A and Promass F 200 with I/O code d = D

Temp class (Txx)	Max. Process temperature				
	T6 (85°C)	T5 (100°C)	T4 (135°C)	T3 (200°C)	T2 - T1 (300°C)
Tamb (max)					
35°C ¹⁾	50°C	95°C ²⁾	130°C ³⁾	170°C ⁴⁾	205°C ⁴⁾
50°C ¹⁾	50°C	95°C ²⁾	130°C ³⁾	170°C ⁴⁾	205°C ⁴⁾
55°C	--	95°C ²⁾	130°C ³⁾	170°C ⁴⁾	205°C ⁴⁾
60°C	--	--	130°C ³⁾	170°C ⁴⁾	205°C ⁴⁾

Note 1: For versions with approval code IB, ID, IG, IH, IJ, I4 and provided with option OVP or TRM, for temperature class T6 and T5, the maximum ambient temperature decreases by 2 K

Note 2: Max. process temperature 85 °C for size code bb = 80

Note 3: Max. process temperature 110 °C for size code bb = 80

Note 4: Maximum process temperature depending on temperature specification of the sensor

Promass E 200 with I/O codes d = E, G

Type designation 8E2B**-***** + ### and O8E2B**-***** + ###:

Temp class (Txx)	Max. Process temperature			
	T6 (85°C)	T5 (100°C)	T4 (135°C)	T3 - T1 (200°C)
Tamb (max)				
40°C ^{1) 3)}	55°C	95°C	130°C	140°C
55°C ^{2) 3)}	--	95°C	130°C	140°C
60°C	--	--	130°C	140°C

Type designation 8E2C**-***** + ### and O8E2C**-***** + ###:

Temp class (Txx)	Max. Process temperature				
	T6 (85°C)	T5 (100°C)	T4 (135°C)	T3 (200°C)	T2 - T1 (300°C)
Tamb (max)					
40°C ^{1) 3)}	50°C	95°C ²⁾	130°C ³⁾	170°C	205°C
55°C ^{2) 3)}	--	95°C ²⁾	130°C ³⁾	170°C	205°C
60°C	--	--	130°C ³⁾	170°C	205°C

Note 1: Tamb (max) = 50 °C for PFS output with Pi = 0.85 W

Note 2: Tamb (max) = 60 °C for PFS output with Pi = 0.85 W

Note 3: For versions with approval code IB, ID, IG, IH, IJ, I4 and provided with option OVP or TRM, the maximum ambient temperature decreases by 2 K for temperature class T6 and T5

Promass A and Promass F 200 with I/O code d = E, G

Temp class (Txx)	Max. Process temperature				
	T6 (85°C)	T5 (100°C)	T4 (135°C)	T3 (200°C)	T2 - T1 (300°C)
Tamb (max)					
40°C ^{1) 3)}	50°C	95°C ⁴⁾	130°C ⁵⁾	170°C ⁶⁾	205°C ⁶⁾

55°C ^{2) 3)}	--	95°C ⁴⁾	130°C ⁵⁾	170°C ⁶⁾	205°C ⁶⁾
60°C	--	--	130°C ⁵⁾	170°C ⁶⁾	205°C ⁶⁾

Note 1: Tamb (max) = 50 °C without PFS output

Note 2: Tamb (max) = 60 °C without PFS output

Note 3: For versions with approval code IB, ID, IG, IH, IJ, I4 and provided with option OVP or TRM, the maximum ambient temperature decreases by 2 K for temperature class T6 and T5

Note 4: Max. process temperature 85 °C for size code bb = 80

Note 5: Max. process temperature 110 °C for size code bb = 80

Note 6: Maximum process temperature depending on temperature specification of the sensor

ANNEX 3

This annex is applicable for flowmeters type Proline Promag H/P/E/W 200

Equipment

Magnetic-inductive flowmeters series Proline Promag H 200, Proline Promag P 200, Proline Promag E 200 and Proline Promag W 200 are intended for measurement of flow of conductive fluids, based on Faraday's law.

The flowmeter consists of a transmitter and an integral sensor assembly.

Depending on the applied interface, the sensor measurement signal is converted into an electrical output signal.

For detailed information regarding the ambient temperature range, the process temperature range and their relation to temperature class and maximum surface temperature, see thermal data below.

Marking

Ex ia IIC T6...T1 Gb or
 Ex db [ia] IIC T6...T1 Gb or
 Ex nA IIC T6...T1 Gc or
 Ex nA [ia Ga] IIC T6...T1 Gc or
 Ex ec IIC T6...T1 Gc or
 Ex ec [ia Ga] IIC T6...T1 Gc or
 Ex ic IIC T6...T1 Gc or
 Ex ic [ia Ga] IIC T6...T1 Gc or
 Ex tb IIIC Txx °C Db or
 Ex tb [ia Da] IIIC Txx °C Db

Type designation

Proline Promag H 200:
 code 5H2Bbb - ccdefghiiik + ###;
 code O5H2Bbb - ccdefghiiikl + ###

Proline Promag P 200:
 code 5P2Bbb - ccdefghiiik + ###;
 code O5P2Bbb - ccdefghiiikl + ###

Proline Promag E 200:
 code 5E2Bbb - ccdefghiiik + ###;
 code O5E2Bbb - ccdefghiiikl + ###

Proline Promag W 200:
 code 5W2Bbb - ccdefghiiik + ###;
 code O5W2Bbb - ccdefghiiikl + ###

Proline Promag 200 transmitter only:
 code 5X2abb - ccdefg + ###;
 code O5X2abb - ccdefgl + ###

- bb = Size
02, 04, 08, 15, 22, 25, 26, 40, 50, 65, 80, 1H, 1Z, 1F, 2H or XX
- cc = Approval code
- IG = Ex nA IIC T6...T1 Gc or
Ex nA [ia Ga] IIC T6...T1 Gc ¹⁾ or
Ex ec IIC T6...T1 Gc or
Ex ec [ia Ga] IIC T6...T1 Gc ¹⁾
 - IH = Ex ic IIC T6...T1 Gc or Ex ic [ia Ga] IIC T6...T1 Gc ¹⁾
 - IJ = Ex ia IIC T6...T1 Gb
 - IK, TC = Ex db [ia] IIC T6...T1 Gb
 - I6 = Ex ia IIC T6...T1 Gb
Ex tb IIIC T** °C Db or
Ex tb [ia Da] IIIC T** °C Db ¹⁾
 - I7 = Ex db [ia] IIC T6...T1 Gb
Ex tb IIIC T** °C Db or
Ex tb [ia Da] IIIC T** °C Db ¹⁾
- d = I/O – interface
- A = 4 - 20 mA HART
 - B = 4 - 20 mA HART + pulse/frequency/switch output
 - C = 4 - 20 mA HART + 4 - 20 mA
 - D = 4 - 20 mA HART + pulse/frequency/switch output + 4 - 20 mA input
 - E = Foundation Fieldbus + pulse/frequency/switch output
 - G = Profibus PA + pulse/frequency/switch output
 - X = Sensor only
- e = Display, operation
L, M = prepared for FHX50
any other single number or letter
- f = Enclosure
any single number or letter
- g = Cable gland
any single number or letter
- h = Tube material
any single number or letter
- iii = Process connection
any triple numbers or letters
- k = Calibration
any single number or letter
- l = Customer version
any single number or letter
- ** = Option (no, two or multiples of two digits)
any combination of numbers and letters
- # = Additional options, not relevant for safety

Note 1: Approval code for Flowmeters with Display code e = L or M only

Assignment of Magnetic-inductive flowmeters series Proline Promag to replacement transmitter

Product flowmeters	Replacement transmitter type
model code	model code
5 (H/P/W/E) 2B**-...	5X2BXX-...
O5 (H/P/W/E) 2B**-...	O5X2BXX-...

Thermal data

Ambient temperature range -40 °C to +60 °C ¹⁾

Process temperature range -40 °C to +150 °C ²⁾

Note 1: Minimum temperature -60 °C for transmitters with approval code cc = IG

Note 2: The specific process temperature range depends on the sensor liner material used.

The relation between ambient temperature, process temperature and temperature class and maximum surface temperature T for the flow meters is listed in the following table:

Temp class (Txx)	Max. Process temperature			
	T6 (85°C)	T5 (100°C)	T4 (135°C)	T3 - T1 (200°C)
Tamb (max) ¹⁾				
40°C ²⁾	80°C	95°C	130°C	150°C
55°C	--	95°C	130°C	150°C
60°C ³⁾	--	95°C	130°C	150°C

Note 1: For versions with approval code IH, IJ, I6 and provided with option OVP or TRM, the maximum ambient temperature decreases by 2 K

Note 2: Tamb (max) = 35 °C for I/O code c = D

Note 3: Only for I/O code A, B, E and G with pulse/frequency output limited to Pi = 0.85 W

ANNEX 4

This annex is applicable for flowmeters type Proline Prosonic Flow B 200

Description

Ultrasonic Flowmeter Proline Prosonic Flow B 200 is used for measurement of a gas flow.

The transmitter consists of an electronics enclosure and an integral sensor assembly.

Depending on the applied interface, the sensor measurement signal is converted into an electrical output signal.

Ambient temperature range -40 °C to +60 °C;

Process temperature range 0 °C to +80 °C.

See thermal data below for detailed information on the relation between ambient temperature and process temperature and temperature class.

Marking

Ex ia IIC T6...T1 Gb or

Ex db [ia] IIC T6...T1 Gb

Type designation

Prosonic Flow B 200,

code 9B2Bbb - ccdefghiiikl + ### and

code O9B2Bbb - ccdefghiiiklm + ###

Prosonic Flow B 200 transmitter only:

code 9X2Bbb - ccdefg + ###

code O9X2Bbb - ccdefgl + ###

bb = Size:
50, 80, 1H, 1F, 2H or XX

cc = Approval code
IJ = Ex ia IIC T6...T1 Gb
IK = Ex db [ia] IIC T6...T1 Gb

d = I/O – interface
A = 4 - 20 mA HART
B = 4 - 20 mA HART + pulse/frequency/switch output
C = 4 - 20 mA HART + 4 - 20 mA
D = 4 - 20 mA HART + pulse/frequency/switch output + 4 - 20 mA input
E = Foundation Fieldbus + pulse/frequency/switch output
G = Profibus PA + pulse/frequency/switch output

e = Display, operation
L, M = prepared for FHX50

f = Enclosure
any single number or letter

- g = Cable gland
any single number or letter
- h = Sensor version
1 = Standard
2 = With temperature measurement
- iii = Process connection
any triple numbers or letters
- k = Calibration
any single number or letter
- l = Customer version
any single number or letter
- ** = Option (no, two or multiple of two digits)
any combination of numbers and letters
- # = Additional options, not relevant for safety

Assignment of Ultrasonic Flowmeter Proline Prosonic Flow B 200 to replacement transmitter

Product flowmeters	Replacement transmitter type
model code	model code
9B2B**-...	9X2BXX-...
O9B2B**-...	O9X2BXX-...

Thermal data

Ambient temperature range -40 °C to +60 °C;
Process temperature range 0 °C to +80 °C.

The relation between ambient temperature, process temperature, electrical data and temperature class for the different models of Ultrasonic Flow Transmitters is listed in the following tables:

Prosonic Flow B 200 with I/O code d = A

Temperature class	Maximum process temperature	
	T6	T5...T1
T _{amb} (max)		
40 °C	60 °C	80 °C
60 °C	--	80 °C

Prosonic Flow B 200 with I/O code d = B

Pi (W)	Temperature class	Maximum process temperature		
		T6	T5	T4...T1
	Tamb (max)			
1.0	40°C	--	80°C	80°C
	50°C	--	60°C	80°C
	60°C	--	--	80°C
0.85	40°C	60°C	80°C	80°C
	50°C	--	80°C	80°C
	60°C	--	--	80°C

Prosonic Flow B 200 with I/O codes d = C, D, E, G

Temperature class	Maximum process temperature		
	T6	T5	T4...T1
Tamb (max)			
40°C ¹⁾	60°C	80°C	80°C
50°C	--	80°C	80°C
60°C	--	55°C ²⁾	80°C

Note 1: Tamb (max) is 35 °C for I/O code D

Note 2: Not allowed for I/O code D

Note 3: For versions with approval code cc = IJ and provided with option OVP or TRM, the maximum ambient temperature decreases by 2K.

ANNEX 5

This annex is applicable for flowmeters type Proline Prowirl C/D/F/R/O 200

Equipment

Vortex Flowmeters Proline Prowirl C 200, Prowirl D 200, Prowirl F 200, Prowirl R 200 and Prowirl O 200 are used for the measurement of the volume flow of gases, liquids or steam.

The transmitter consists of an electronics enclosure (the transmitter) and an integral or remote mounted sensor.

Proline Prowirl F/R/O 200 provide a version with pressure measurement as an option.

For detailed information regarding the ambient temperature range, the process temperature range and their relation to temperature class and maximum surface temperature, see thermal data below.

On Flowmeters Proline Prowirl C/D/F/R/O 200, model codes 7*2***-IA... and O7*2***-IA... with an enclosure or sensor made of aluminium, the certificate reference number on the marking plate shall be followed by an "X", or the equipment marking shall include a warning mark. The instructions shall include specific conditions of use that allow safe use of the transmitters in an area where the application of equipment of Equipment Protection Level (EPL) Ga is required.

On Flowmeters Proline Prowirl C/D/F/R/O 200, model codes 7*2***-IA... and O7*2***-IA... with an enclosure or sensor made of material containing by mass more than 7.5% of magnesium, titanium and zirconium, the certificate reference number on the marking plate shall be followed by an "X", or the equipment marking shall include a warning mark. The instructions shall include specific conditions of use that allow safe use of the transmitters in an area where the application of equipment of Equipment Protection Level (EPL) Ga, Gb, Da or Db is required.

Marking

Ex ia IIC T6...T1 Ga or
 Ex ia IIC T6...T1 Ga/Gb or
 Ex db [ia] IIC T6...T1 Ga/Gb or
 Ex ic [ia] IIC T6...T1 Ga/Gc or
 Ex ec IIC T6...T1 Gc or
 Ex ec [ia Ga] IIC T6...T1 Gc or
 Ex nA IIC T6...T1 Gc or
 Ex nA [ia Ga] IIC T6...T1 Gc or
 Ex ic IIC T6...T1 Gc or
 Ex ic [ia Ga] IIC T6...T1 Gc or
 Ex ia IIC T6...T1 Gb or
 Ex db [ia] IIC T6...T1 Gb or
 Ex ia IIC T6...T1 Ga/Gb or
 Ex tb IIIC T** °C Db or
 Ex tb [ia Da] IIIC T** °C Db or
 Ex db [ia] IIC T6...T1 Ga/Gb or
 Ex tb IIIC T** °C Db or
 Ex tb [ia Da] IIIC T** °C Db

Type designation

Proline Prowirl C 200:
 code 7C2Bbb - ccdefhimmmn + ***#;

code O7C2Bbb - ccdefhimmmnp + ###

Proline Prowirl D 200:

code 7D2Bbb - ccdefhimmmn + ###;
 code 7D2Cbb – ccdefghiikmmmnnoo + ###;
 code O7D2Bbb - ccdefhimmmnp + ###;
 code O7D2Cbb – ccdefghiikmmmnnoo + ###

Proline Prowirl F 200:

code 7F2Bbb - ccdefhimmmn + ###;
 code 7F2Cbb – ccdefghiiklmmmnnoo + ###;
 code O7F2Bbb - ccdefhimmmnp + ###;
 code O7F2Cbb – ccdefghiiklmmmnnoo + ###

Proline Prowirl R 200:

code 7R2Bbb - ccdefhimmmn + ###;
 code 7R2Cbb – ccdefghiiklmmmnnoo + ###;
 code O7R2Bbb - ccdefhimmmnp + ###;
 code O7R2Cbb – ccdefghiiklmmmnnoo + ###

Proline Prowirl O 200:

code 7O2Bbb - ccdefhimmmn + ###;
 code 7O2Cbb – ccdefghiiklmmmnnoo + ###;
 code O7O2Bbb - ccdefhimmmnp + ###;
 code O7O2Cbb – ccdefghiiklmmmnnoo + ###

Proline Prowirl 200 transmitter only:

code 7X2Bbb - ccdefg + ###;
 code 7X2Cbb – ccdefgioo + ###;
 code O7X2Bbb – ccdefgp + ###
 code O7X2Cbb – ccdefgioop + ###

bb = Size combination of number(s) and letter(s) for sizes up to DN300 (2 digits)

cc = Approval code

IA	=	Ex ia IIC T6...T1 Ga ²⁾
IB	=	Ex ia IIC T6...T1 Ga/Gb
IC, TC	=	Ex db [ia] IIC T6...T1 Ga/Gb
ID	=	Ex ic [ia] IIC T6...T1 Ga/Gc
IG	=	Ex ec IIC T6...T1 Gc or ²⁾ Ex ec [ia Ga] IIC T6...T1 Gc ^{1), 2)} or Ex nA IIC T6...T1 Gc or ²⁾ Ex nA [ia Ga] IIC T6...T1 Gc ^{1), 2)}
IH	=	Ex ic IIC T6...T1 Gc or Ex ic [ia Ga] IIC T6...T1 Gc ¹⁾
IJ	=	Ex ia IIC T6...T1 Gb
IK	=	Ex db [ia] IIC T6...T1 Gb
I4	=	Ex ia IIC T6...T1 Ga/Gb Ex tb IIIC T** °C Db ²⁾ Ex tb [ia Da] IIIC T** °C Db ²⁾
I5	=	Ex db [ia] IIC T6...T1 Ga/Gb Ex tb IIIC T** °C Db ²⁾ Ex tb [ia Da] IIIC T** °C Db ²⁾

- d = I/O – interface
 A = 4 - 20 mA HART
 B = 4 - 20 mA HART + pulse/frequency/switch output
 C = 4 - 20 mA HART + 4 - 20 mA
 D = 4 - 20 mA HART + pulse/frequency/switch output + 4 - 20 mA input
 E = Foundation Fieldbus + pulse/frequency/switch output
 G = Profibus PA + pulse/frequency/switch output
 X = Sensor only
- e = Display, operation
 L, M = prepared for FHX50
 any other single number or letter
- f = Enclosure
 any single number or letter
- g = Cable, Remote version (for 7*2C**-... and O7*2C**-... only)
 any single number or letter
- h = Cable gland
 any single number or letter
- i, ii = Sensor version i: 7*2B**-... and O7*2B**-... : any single number or letter
 i: 7X2BXX-... and O7X2BXX-... : any single number or letter
 ii: 7*2C**-... and O7*2C**-... : any combination of double number and/or letter
- k = Sealing (for 7*2C**-... and O7*2C**-... only)
 any single number or letter
- l = Pressure sensor
 any single number or letter
- mmm = Process connection
 any triple numbers or letters
- n = Calibration
 any single number or letter
- oo = Device model (for 7*2C**-... and O7*2C**-... only)
 A1 = product version 1
- p = Customer version
 any single number or letter
- ** = Option (no, two or multiples of two digits)
 any combination of numbers and letters
- # = Additional options, not relevant for safety

Note 1: Approval code for Flowmeters with Display code e = L or M only

Note 2: Approval code IA, IG, I4, I5 not available for versions with pressure sensor

Assignment of Vortex Flowmeters series Proline Prowirl to replacement transmitter

Product flowmeters		Replacement transmitter type	
model code	device model code oo =	model code	device model code oo =
7 (C/D/F/R/O) 2B**...	n.a.	7X2BXX-...	n.a.
07 (C/D/F/R/O) 2B**...		07X2BXX-...	
7 (D/F/R/O) 2C**...oo...	A1	7X2CXX-...oo	A1
07 (D/F/R/O) C**...oo...		07X2CXX-...oo...	

Thermal data

Ambient temperature range: -50 °C to +70 °C ^{1), 2)} - compact Flowmeters
-50 °C to +75 °C ^{1), 2)} - remote Flowmeters, Transmitter
-60 °C to +85 °C - remote Flowmeters, Sensor

Process temperature range: -200°C to +450 °C⁴⁾

Note 1: Minimum temperature -60 °C for Flowmeter with approval code cc = IG in combination with I/O interface codes d = A, d = B and d = D;

Note 2: Maximum temperature restricted to +65 °C for transmitters with I/O code d = D

Note 3: For ambient temperatures below -40 °C, only enclosure-variants without breathing element are allowed.

Note 4: For process temperature $T_m > 440^\circ\text{C}$ additional heat of source shall be observed so that ignition temperature of T1 will not be exceeded

The relation between ambient temperature, process temperature and temperature class and maximum surface temperature T for the different models of Flowmeters is listed in the following tables:

Prowirl C/D/F/R/O 200 with I/O code d = A and Approval codes cc = IA, IB, IC, ID, IG, IH, IJ, IK, IL, IS, TC Compact versions

Temp class (Txx)	Max. Process temperature					
	T6 (85°C)	T5 (100°C)	T4 (135°C)	T3 (200°C)	T2 (300°C)	T1 (450°C)
Tamb (max)						
40°C ¹⁾	80°C	95°C	130°C	195°C	290°C ²⁾	450°C ²⁾
60°C ^{1) 4)}	--	95°C	130°C	195°C	290°C ²⁾	450°C ²⁾
65°C	--	--	130°C	195°C	290°C ²⁾	450°C ²⁾
70°C	--	--	130°C	195°C ³⁾	290°C ²⁾	450°C ³⁾

Note 1: For versions with approval code IA, IB, ID, IH, IJ, IL and provided with option OVP or TRM, for temperature class T6 and T5, the maximum ambient temperature decreases by 2 K

Note 2: Process temperature $\leq 280^\circ\text{C}$ for versions with sensor specified for $T_m \leq 280^\circ\text{C}$

Note 3: Process temperature $> 130^\circ\text{C}$ not allowed for versions with sensor specified for $T_m \leq 280^\circ\text{C}$ at $T_{amb} > 65^\circ\text{C}$

Note 4: For versions with pressure tapping Tamb (max) is limited for T5 to 55°C

Note 5: For versions with pressure tapping installed straight to Prowirl sensor, the maximum process temperature is limited for T6 and T5 to 40°C and for T4 to 90°C. For process temperatures $> 90^\circ\text{C}$ the pressure sensor type DPC21 has to be installed using a distance tube between pressure sensor and sensor of Prowirl F/R/O. The minimum length of the tube shall not be less than 50cm

Remote versions, transmitter

Temp class (Txx)	T6 (85°C)	T5 (100°C)	T4 (135°C)
Tamb (max)	40 °C ¹⁾	60°C ¹⁾	75°C

Note 1: For versions with approval code IA, IB, ID, IH, IJ, I4 and provided with option OVP or TRM, for temperature class T6 and T5, the maximum ambient temperature decreases by 2 K

Remote versions, sensor

Temp class (Txx)	Max. Process temperature					
	T6 (85°C)	T5 (100°C)	T4 (135°C)	T3 (200°C)	T2 (300°C)	T1 (450°C)
Tamb (max)						
55°C ²⁾	80°C	95°C	130°C	195°C	290°C ¹⁾	450°C ¹⁾
70°C ²⁾	--	95°C	130°C	195°C	290°C ¹⁾	450°C ¹⁾
85°C	--	--	130°C	195°C	290°C ¹⁾	450°C ¹⁾

Note 1: Process temperature ≤ 280 °C for versions with sensor specified for $T_m \leq 280$ °C

Note 2: For versions with pressure tapping Tamb (max) is limited for T6 to 40 °C and for T5 to 55°C

Note 3: For versions with pressure tapping installed straight to Prowirl sensor, the maximum process temperature is limited for T6 and T5 to 40°C and for T4 to 90°C. For process temperatures > 90°C the pressure sensor type DPC21 has to be installed using a distance tube between pressure sensor and sensor of Prowirl F/R/O. The minimum length of the tube shall not be less than 50cm

Prowirl C/D/F/R/O 200 with I/O code d = B and Approval codes cc = IA, IB, ID, IH, IJ, I4

Compact versions

Temp class (Txx)	Max. Process temperature					
	T6 (85°C)	T5 (100°C)	T4 (135°C)	T3 (200°C)	T2 (300°C)	T1 (450°C)
Tamb (max)						
35°C ^{1) 2)}	80°C	95°C	130°C	195°C	290°C ³⁾	450°C ³⁾
50°C ^{1) 2)}	--	95°C	130°C	195°C	290°C ³⁾	450°C ³⁾
60°C	--	--	130°C	195°C	290°C ³⁾	450°C ³⁾
65°C	--	--	130°C	195°C	290°C ^{3) 4)}	450°C ³⁾
70°C	--	--	130°C	195°C ⁴⁾	290°C ^{3) 4)}	450°C ^{3) 4)}

Note 1: For versions provided with option OVP or TRM, for temperature class T6 and T5, the maximum ambient temperature decreases by 2 K

Note 2: For PFS circuit with $P_i = 0.85$ W, the maximum ambient temperature increases by 5 K

Note 3: Process temperature ≤ 280 °C for versions with sensor specified for $T_m \leq 280$ °C

Note 4: For versions with sensor specified for $T_m \leq 280$ °C, the indicated maximum ambient temperature is applicable only if for the PFS circuit $P_i = 0.7$ W; for other sensors, the maximum ambient temperature is applicable if for the PFS circuit $P_i = 0.85$ W

Note 5: For versions with pressure tapping installed straight to Prowirl sensor, the maximum process temperature is limited for T6 and T5 to 40°C and for T4 to 90°C. For process temperatures > 90°C the pressure sensor type DPC21 has to be installed using a distance tube between pressure sensor and sensor of Prowirl F/R/O. The minimum length of the tube shall not be less than 50cm

Remote versions, transmitter

Temp class (Txx)	T6 (85°C)	T5 (100°C)	T4 (135°C)
Tamb (max)	35°C ¹⁾	50°C ¹⁾	70°C
	40°C ^{1) 2)}	60°C ^{1) 2)}	75°C ²⁾

Note 1: For versions provided with option OVP or TRM, for temperature class T6 and T5, the maximum ambient temperature decreases by 2 K

Note 2: Maximum ambient temperature applicable only if for the PFS circuit $P_i = 0.85 \text{ W}$

Remote versions, sensor

	Max. Process temperature					
Temp class (Txx)	T6 (85°C)	T5 (100°C)	T4 (135°C)	T3 (200°C)	T2 (300°C)	T1 (450°C)
Tamb (max)						
55°C	80°C	95°C	130°C	195°C	290°C ¹⁾	450°C ¹⁾
70°C ²⁾	--	95°C	130°C	195°C	290°C ¹⁾	450°C ¹⁾
85°C	--	--	130°C	195°C	290°C ¹⁾	450°C ¹⁾

Note 1: Process temperature $\leq 280 \text{ °C}$ for versions with sensor specified for $T_m \leq 280 \text{ °C}$

Note 2: For versions with pressure tapping Tamb (max) is limited for T6 to 40 °C and for T5 to 55°C

Note 3: For versions with pressure tapping installed straight to Prowirl sensor, the maximum process temperature is limited for T6 and T5 to 40°C and for T4 to 90°C.

For process temperatures $> 90 \text{ °C}$ the pressure sensor type DPC21 has to be installed using a distance tube between pressure sensor and sensor of Prowirl F/R/O. The minimum length of the tube shall not be less than 50cm

Prowirl C/D/F/R/O 200 with I/O code d = B and Approval codes cc = IC, IG, IK, I5, TC

Compact versions

	Max. Process temperature					
Temp class (Txx)	T6 (85°C)	T5 (100°C)	T4 (135°C)	T3 (200°C)	T2 (300°C)	T1 (450°C)
Tamb (max)						
40°C	80°C	95°C	130°C	195°C	290°C ¹⁾	450°C ¹⁾
55°C	--	95°C	130°C	195°C	290°C ¹⁾	450°C ¹⁾
65°C	--	--	130°C	195°C	290°C ^{1) 2)}	450°C ¹⁾
70°C	--	--	130°C	195°C ^{2) 3)}	290°C ^{1) 2) 3)}	450°C ^{1) 3)}

Note 1: Process temperature $\leq 280 \text{ °C}$ for versions with sensor specified for $T_m \leq 280 \text{ °C}$

Note 2: For versions with sensor specified for $T_m \leq 280 \text{ °C}$, the indicated maximum ambient temperature is applicable only if for the PFS circuit $P_{max} = 0.7 \text{ W}$

Note 3: For sensors not restricted to $T_m \leq 280 \text{ °C}$, the maximum ambient temperature is applicable only if for the PFS circuit $P_{max} = 0.85 \text{ W}$

Note 4: For versions with pressure tapping installed straight to Prowirl sensor, the maximum process temperature is limited for T6 and T5 to 40°C and for T4 to 90°C. For process temperatures $> 90 \text{ °C}$ the pressure sensor type DPC21 has to be installed using a distance tube between pressure sensor and sensor of Prowirl F/R/O. The minimum length of the tube shall not be less than 50cm

Remote versions, transmitter

Temp class (Txx)	T6 (85°C)	T5 (100°C)	T4 (135°C)
Tamb (max)	40°C	55°C	70°C ¹⁾

Note 1: Maximum ambient temperature 75 °C if for the PFS circuit Pmax = 0.85 W

Remote versions, sensor

Temp class (Txx)	Max. Process temperature					
	T6 (85°C)	T5 (100°C)	T4 (135°C)	T3 (200°C)	T2 (300°C)	T1 (450°C)
Tamb (max)						
55°C ²⁾	80°C	95°C	130°C	195°C	290°C ¹⁾	450°C ¹⁾
70°C ²⁾	--	95°C	130°C	195°C	290°C ¹⁾	450°C ¹⁾
85°C	--	--	130°C	195°C	290°C ¹⁾	450°C ¹⁾

Note 1: Process temperature ≤ 280 °C for versions with sensor specified for Tm ≤ 280 °C

Note 2: For versions with pressure tapping Tamb (max) is limited for T6 to 40 °C and for T5 to 55°C

Note 3: For versions with pressure tapping installed straight to Prowirl sensor, the maximum process temperature is limited for T6 and T5 to 40°C and for T4 to 90°C. For process temperatures > 90°C the pressure sensor type DPC21 has to be installed using a distance tube between pressure sensor and sensor of Prowirl F/R/O. The minimum length of the tube shall not be less than 50cm

Prowirl C/D/F/R/O 200 with I/O code d = C and Approval codes cc = IA, IB, IC, ID, IG, IH, IJ, IK, IL, I5, TC

Compact versions

Temp class (Txx)	Max. Process temperature					
	T6 (85°C)	T5 (100°C)	T4 (135°C)	T3 (200°C)	T2 (300°C)	T1 (450°C)
Tamb (max)						
40°C ¹⁾	80°C	95°C	130°C	195°C	290°C ²⁾	450°C ²⁾
55°C ¹⁾	--	95°C	130°C	195°C	290°C ²⁾	450°C ²⁾
60°C	--	--	130°C	195°C	290°C ²⁾	450°C ²⁾
65°C	--	--	130°C	195°C	290°C ^{2) 4)}	450°C ^{2) 4)}
70°C	--	--	130°C	195°C ^{3) 5)}	290°C ^{3) 5)}	450°C ^{3) 5)}

Note 1: For versions with approval code IA, IB, ID, IH, IJ, IL and provided with option OVP or TRM, for temperature class T6 and T5, the maximum ambient temperature decreases by 2 K

Note 2: Process temperature ≤ 280 °C for versions with sensor specified for Tm ≤ 280 °C

Note 3: For versions with sensor specified for Tm ≤ 280 °C, the maximum ambient temperature is 70 °C for a maximum process temperature of 130 °C

Note 4: For versions with sensor specified for Tm ≤ 280 °C, the maximum ambient temperature is 65 °C if supply/output circuit at terminals 3 and 4 is not used (Pi = 0 W or Pmax = 0 W)

Note 5: For versions with sensor not restricted to Tm ≤ 280 °C, the maximum ambient temperature is 70 °C if the supply/output circuit at terminals 3 and 4 is not used (Pi = 0 W or Pmax = 0 W)

Note 6: For versions with pressure tapping installed straight to Prowirl sensor, the maximum process temperature is limited for T6 and T5 to 40°C and for T4 to 90°C.

For process temperatures > 90°C the pressure sensor type DPC21 has to be installed

using a distance tube between pressure sensor and sensor of Prowirl F/R/O. The minimum length of the tube shall not be less than 50cm

Remote versions, transmitter

Temp class (Txx)	T6 (85°C)	T5 (100°C)	T4 (135°C)
Tamb (max)	40°C	55°C ¹⁾	70°C ²⁾

Note 1: For versions with approval code IA, IB, ID, IH, IJ, I4 and provided with option OVP or TRM, for temperature class T6 and T5, the maximum ambient temperature decreases by 2K

Note 2: The maximum ambient temperature is 75 °C if the supply/output circuit at terminals 3 and 4 is not used (Pi = 0 W or Pmax = 0 W)

Remote versions, sensor

Temp class (Txx)	Max. Process temperature					
	T6 (85°C)	T5 (100°C)	T4 (135°C)	T3 (200°C)	T2 (300°C)	T1 (450°C)
Tamb (max)						
55°C ²⁾	80°C	95°C	130°C	195°C	290°C ¹⁾	450°C ¹⁾
70°C ²⁾	--	95°C	130°C	195°C	290°C ¹⁾	450°C ¹⁾
85°C	--	--	130°C	195°C	290°C ¹⁾	450°C ¹⁾

Note 1: Process temperature ≤ 280 °C for versions with sensor specified for Tm ≤ 280 °C

Note 2: For versions with pressure tapping Tamb (max) is limited for T6 to 40 °C and for T5 to 55 °C

Note 3: For versions with pressure tapping installed straight to Prowirl sensor, the maximum process temperature is limited for T6 and T5 to 40°C and for T4 to 90°C. For process temperatures > 90°C the pressure sensor type DPC21 has to be installed using a distance tube between pressure sensor and sensor of Prowirl F/R/O. The minimum length of the tube shall not be less than 50cm

Prowirl C/D/F/R/O 200 with I/O code d = D and Approval codes cc = IA, IB, IC, ID, IG, IH, IJ, IK, I4, I5, TC

Compact versions

Temp class (Txx)	Max. Process temperature					
	T6 (85°C)	T5 (100°C)	T4 (135°C)	T3 (200°C)	T2 (300°C)	T1 (450°C)
Tamb (max)						
35°C ¹⁾	80°C	95°C	130°C	195°C	290°C ³⁾	450°C ³⁾
50°C ¹⁾	--	95°C	130°C	195°C	290°C ³⁾	450°C ³⁾
55°C	--	--	--	195°C	290°C ³⁾	450°C ³⁾
60°C	--	--	--	195°C	290°C ³⁾	450°C ³⁾
65°C	--	--	--	--	290°C ³⁾	--

Note 1: For versions with approval code IA, IB, ID, IH, IJ, I4 and provided with option OVP or TRM, for temperature class T6 and T5, the maximum ambient temperature decreases by 2K

Note 2: Process temperature ≤ 280 °C for versions with sensor specified for Tm ≤ 280 °C

Note 3: T1, T2 not applicable for versions with sensor specified for Tm ≤ 280 °C

Note 4: For versions with pressure tapping installed straight to Prowirl sensor, the maximum process temperature is limited for T6 and T5 to 40°C and for T4 to 90°C.

For process temperatures > 90°C the pressure sensor type DPC21 has to be installed

using a distance tube between pressure sensor and sensor of Prowirl F/R/O. The minimum length of the tube shall not be less than 50cm

Remote versions, transmitter

Temp class (Txx)	T6 (85°C)	T5 (100°C)	T4 (135°C)
Tamb (max)	35°C ¹⁾	50°C ¹⁾	65°C

Note 1: For versions with approval code IA, IB, ID, IH, IJ, I4 and provided with option OVP or TRM, for temperature class T6 and T5, the maximum ambient temperature decreases by 2 K

Remote versions, sensor

	Max. Process temperature					
Temp class (Txx)	T6 (85°C)	T5 (100°C)	T4 (135°C)	T3 (200°C)	T2 (300°C)	T1 (450°C)
Tamb (max)						
55°C ²⁾	80°C	95°C	130°C	195°C	290°C ¹⁾	450°C ¹⁾
70°C ²⁾	--	95°C	130°C	195°C	290°C ¹⁾	450°C ¹⁾
85°C	--	--	130°C	195°C	290°C ¹⁾	450°C ¹⁾

Note 1: Process temperature ≤ 280 °C for versions with sensor specified for $T_m \leq 280$ °C

Note 2: For versions with pressure tapping Tamb (max) is limited for T6 to 40 °C and for T5 to 55 °C

Note 3: For versions with pressure tapping installed straight to Prowirl sensor, the maximum process temperature is limited for T6 and T5 to 40°C and for T4 to 90°C. For process temperatures > 90 °C the pressure sensor type DPC21 has to be installed using a distance tube between pressure sensor and sensor of Prowirl F/R/O. The minimum length of the tube shall not be less than 50cm.

Prowirl C/D/F/R/O 200 with I/O codes d = E and G and Approval codes cc = IA, IB, IC, ID, IG, IH, IJ, IK, I4, I5, TC

Compact versions

	Max. Process temperature					
Temp class (Txx)	T6 (85°C)	T5 (100°C)	T4 (135°C)	T3 (200°C)	T2 (300°C)	T1 (450°C)
Tamb (max)						
40°C ¹⁾	80°C	95°C	130°C	195°C	290°C ²⁾	450°C ²⁾
50°C ^{1) 3)}	--	95°C	130°C	195°C	290°C ²⁾	450°C ²⁾
60°C	--	--	130°C	195°C	290°C ²⁾	450°C ²⁾
65°C	--	--	130°C	195°C	290°C ^{2) 4)}	450°C ^{2) 4)}
70°C	--	--	130°C	195°C ⁵⁾	290°C ^{2) 5)}	450°C ^{2) 5)}

Note 1: For versions with approval code IA, IB, ID, IH, IJ, I4 and provided with option OVP or TRM, for temperature class T6 and T5, the maximum ambient temperature decreases by 2 K

Note 2: Process temperature ≤ 280 °C for versions with sensor specified for $T_m \leq 280$ °C

Note 3: Maximum ambient temperature is 60 °C if PFS circuit not used

Note 4: For versions with sensor specified for $T_m \leq 280$ °C, the maximum ambient temperature is 65°C if PFS circuit not used

Note 5: Maximum ambient temperature is 70 °C if PFS circuit not used

Note 6: For versions with pressure tapping installed straight to Prowirl sensor, the maximum process temperature is limited for T6 and T5 to 40°C and for T4 to 90°C. For process

temperatures > 90°C the pressure sensor type DPC21 has to be installed using a distance tube between pressure sensor and sensor of Prowirl F/R/O. The minimum length of the tube shall not be less than 50cm.

Remote versions, transmitter

Temp class (Txx)	T6 (85°C)	T5 (100°C)	T4 (135°C)
Tamb (max)	40°C ¹⁾	55°C ¹⁾	70°C ²⁾

Note 1: For versions with approval code IA, IB, ID, IH, IJ, I4 and provided with option OVP or TRM, for temperature class T6 and T5, the maximum ambient temperature decreases by 2K

Note 2: The maximum ambient temperature is 75 °C if PFS circuit not used

Remote versions, sensor

	Max. Process temperature					
Temp class (Txx)	T6 (85°C)	T5 (100°C)	T4 (135°C)	T3 (200°C)	T2 (300°C)	T1 (450°C)
Tamb (max)						
55°C ²⁾	80°C	95°C	130°C	195°C	290°C ¹⁾	450°C ¹⁾
70°C ²⁾	--	95°C	130°C	195°C	290°C ¹⁾	450°C ¹⁾
85°C	--	--	130°C	195°C	290°C ¹⁾	450°C ¹⁾

Note 1: Process temperature ≤ 280 °C for versions with sensor specified for Tm ≤ 280 °C

Note 2: For versions with pressure tapping Tamb (max) is limited for T6 to 40 °C and for T5 to 55 °C

Note 3: For versions with pressure tapping installed straight to Prowirl sensor, the maximum process temperature is limited for T6 and T5 to 40°C and for T4 to 90°C. For process temperatures > 90°C the pressure sensor type DPC21 has to be installed using a distance tube between pressure sensor and sensor of Prowirl F/R/O. The minimum length of the tube shall not be less than 50cm.

ANNEX 6

(As from KEMA 10 ATEX 0072 Issue 8)

Equipment

Coriolis Massflow Transmitters series Proline Promass, for measurement of the mass flow of gases and liquids, based on controlled Coriolis forces.

The transmitter consist of an electronics enclosure and an integral sensor assembly.

Depending on the applied interface, the sensor measurement signal is converted into an electrical output signal.

For detailed information regarding the ambient temperature range, the process temperature range and their relation to temperature class and maximum surface temperature, see thermal data below.

Marking

Ex ia IIC T6...T1 Gb or Ex db [ia] IIC T6...T1 Gb or
 Ex ia IIC T6...T1 Ga/Gb or Ex db [ia] IIC T6...T1 Ga/Gb or
 Ex ic [ia] IIC T6...T1 Ga/Gc or
 Ex nA [ia Ga] IIC T6...T1 Gc or Ex ec [ia Ga] IIC T6...T1 Gc or
 Ex ic [ia Ga] IIC T6...T1 Gc or
 Ex tb IIIC Txx °C Db or
 Ex tb [ia Da] IIIC Txx °C Db

Type Designation

Proline Promass A 200:

code 8A2Bbb - ccdefghhiiikoo + ###
 code O8ABbb - ccdefghhiiikoop + ###

Proline Promass E 200 (Tm = 205°C):

code 8E2Cbb - ccdefghhiiikoo + ###
 code O8ECbb - ccdefghhiiikoop + ###

Proline Promass E 200 (Tm = 140°C):

code 8E2Bbb - ccdefghhiiik + ###
 code O8EBbb - ccdefghhiiikp + ###

Proline Promass F 200:

code 8F2Bbb - ccdefghhiiik + ###
 code O8FBbb - ccdefghhiiikp + ###

Proline Promass 200 transmitter only:

code 8X2BXX - ccdefg + ###
 code 8X2BX1 - aaccdefg + ###
 code 8X2CXX - ccdefgoo + ###
 code O8X2BXX - ccdefgp + ###
 code O8X2BX1 - aaccdefgp + ###
 code O8X2CXX - ccdefgoop + ###

aa = Size (replacement transmitter Promass F DN80 only)
 80 = Promass F DN80

bb	=	Size 08, 15, 25, 40, 50, 80 or XX
cc	=	Approval code ¹⁾ BB = Ex ia IIC T6...T1 Ga/Gb BC, TC = Ex db [ia] IIC T6...T1 Ga/Gb BD = Ex ic [ia] IIC T6...T1 Ga/Gc BG = Ex nA [ia Ga] IIC T6...T1 Gc ²⁾ or Ex ec [ia Ga] IIC T6...T1 Gc ²⁾ BH = Ex ic [ia Ga] IIC T6...T1 Gc ²⁾ BJ = Ex ia IIC T6...T1 Gb BK = Ex db [ia] IIC T6...T1 Gb B2 = Ex ia IIC T6...T1 Ga/Gb Ex tb IIIC T** °C Db Ex tb [ia Da] IIIC T** °C Db ²⁾ B3 = Ex db [ia] IIC T6...T1 Ga/Gb Ex tb IIIC T** °C Db Ex tb [ia Da] IIIC T** °C Db ²⁾
d	=	I/O – interface A = 4 - 20mA HART B = 4 - 20mA HART + pulse/frequency/switch output C = 4 - 20mA HART + 4 - 20mA D = 4 - 20mA HART + pulse/frequency/switch output + 4 - 20mA input E = Foundation Fieldbus + pulse/frequency/switch output G = Profibus PA + pulse/frequency/switch output X = Sensor only
e	=	Display, operation L, M = prepared for FHX50 any other single number or letter
f	=	Enclosure any single number or letter
g	=	Cable gland any single number or letter
h, hh	=	Tube material h: Promass E (Tm = 140°C): any single number or letter hh: Promass A, Promass F, Promass E (Tm = 205°C): Tm ≤ 150°C: with any combination of double number and/or letter Tm ≤ 205°C: SD, SE, SF, TH
iii	=	Process connection any triple numbers or letters
k	=	Calibration any single number or letter
oo	=	Device model (two digit) A1 = product version 1
p	=	Customer version any single number or letter

** = Option (no, two or multiples of two digits)
any combination of numbers and letters

= Additional options, not relevant for safety

Note 1: Transmitters with type designation (O)8F2B80 - (size code bb = 80) and replacement transmitter with type designation O8X2BX1 are Group IIB

Note 2: Approval code for Flowmeters with Display code e = L or M only

Assignment of Coriolis Massflow Transmitters series Proline Promass to replacement transmitter

Product flowmeters		Replacement transmitter type		
model code	device model code oo =	model code	Size aa =	device model code oo =
8A2B**-...oo O8A2B**-...oo...	A1	8X2CXX-...oo O8X2CXX-oo...	n.a.	A1
8E2B**-... O8E2B**-...	n.a.	8X2BXX-... O8X2BXX-...	n.a.	n.a.
8E2C**-...oo O8E2C**-...oo...	A1	8X2CXX-...oo O8X2CXX-oo...	n.a.	A1
8F2B**- (DN08...50) O8F2B**- (DN08...50)	n.a.	8X2BXX-... O8X2BXX-...	n.a.	n.a.
8F2B**-... (DN80) O8F2B**-... (DN80)	n.a.	8X2BX1-aa... O8X2BX1-aa...	80	n.a.

Thermal data

Ambient temperature range: -40 °C to +60 °C ¹⁾

Process temperature range: -40 °C to +140 °C for Promass E 200 types 8E2B**-... and O8E2B**-...
-50 °C to +205 °C for Promass E 200 types 8E2C**-... and O8E2C**-...
-50 °C to +205 °C for Promass F 200

Note 1: Minimum temperature -60 °C for Flowmeters with approval code cc = BG and I/O interface codes d = A, d = B and d = D;
minimum temperature -50 °C for Flowmeters with all approval codes other than cc = BG for Promass A, Promass F and Promass E types 8E2C**-***** + ### and O8E2C**-***** + ###

Note 2: For ambient temperatures below -40°C, only enclosure-variants without breathing element are allowed.

The relation between ambient temperature, process temperature and temperature class and maximum surface temperature T for the different models of Massflow Transmitters is listed in the following tables:

Promass E 200 with I/O code d = A

Type designation 8E2B**-***** + ### and O8E2B**-***** + ###:

Temp class (Txx)	Max. Process temperature			
	T6 (85°C)	T5 (100°C)	T4 (135°C)	T3 - T1 (200°C)
Tamb (max)				
50°C ¹⁾	50°C	95°C	130°C	140°C

60°C ¹⁾	--	95°C	130°C	140°C
--------------------	----	------	-------	-------

Type designation 8E2C**_***** + ### and O8E2C**_***** + ###:

	Max. Process temperature				
Temp class (Txx)	T6 (85°C)	T5 (100°C)	T4 (135°C)	T3 (200°C)	T2...T1 (300°C)
Tamb (max)					
40°C ¹⁾	50°C	95°C	130°C	170°C	205°C
60°C ¹⁾	--	95°C	130°C	170°C	205°C

Note 1: For versions with approval code BB, BD, BH, BJ, B2 and provided with option OVP or TRM, the maximum ambient temperature decreases by 2 K

Promass A and Promass F 200 with I/O code d = A

	Max. Process temperature				
Temp class (Txx)	T6 (85°C)	T5 (100°C)	T4 (135°C)	T3 (200°C)	T2...T1 (300°C)
Tamb (max)					
40°C ¹⁾	50°C	95°C ²⁾	130°C ³⁾	170°C ⁴⁾	205°C ⁴⁾
60°C ¹⁾	--	95°C ²⁾	130°C ³⁾	170°C ⁴⁾	205°C ⁴⁾

Note 1: For versions with approval code BB, BD, BH, BJ, B2 and provided with option OVP or TRM, the maximum ambient temperature decreases by 2 K

Note 2: Max. process temperature 85°C for size code bb = 80

Note 3: Max. process temperature 110°C for size code bb = 80

Note 4: Maximum process temperature depending on temperature specification of the sensor

Promass E 200 with Approval codes cc = BB, BD, BH, BJ, B2 and I/O code d = B

Type designation 8E2B**_***** + ### and O8E2B**_***** + ###:

	Max. Process temperature			
Temp class (Txx)	T6 (85°C)	T5 (100°C)	T4 (135°C)	T3 - T1 (200°C)
Tamb (max)				
35°C ^{1) 3)}	50°C	95°C	130°C	140°C
50°C ^{2) 3)}	--	95°C	130°C	140°C
60°C	--	--	130°C	140°C

Type designation 8E2C**_***** + ### and O8E2C**_***** + ###:

	Max. Process temperature				
Temp class (Txx)	T6 (85°C)	T5 (100°C)	T4 (135°C)	T3 (200°C)	T2 - T1 (300°C)
Tamb (max)					
35°C ^{1) 3)}	50°C	95°C	130°C	170°C	205°C
50°C ^{2) 3)}	--	95°C	130°C	170°C	205°C
55°C	--	--	130°C	170°C	205°C
60°C	--	--	130°C	170°C	200°C

Note 1: Tamb (max) = 40°C for PFS input with Pi = 0.85W

Note 2: Tamb (max) = 55°C for PFS input with Pi = 0.85W

Note 3: For versions provided with option OVP or TRM, for temperature class T6 and T5, the maximum ambient temperature decreases by 2 K

Promass A and Promass F 200 with Approval codes cc = BB, BD, BH, BJ, B2 and I/O code d = B

Temp class (Txx)	Max. Process temperature				
	T6 (85°C)	T5 (100°C)	T4 (135°C)	T3 (200°C)	T2 - T1 (300°C)
Tamb (max)					
35°C ^{1) 3)}	50°C	95°C ⁴⁾	130°C ⁵⁾	170°C ⁶⁾	205°C ⁶⁾
50°C ^{2) 3)}	--	95°C ⁴⁾	130°C ⁵⁾	170°C ⁶⁾	205°C ⁶⁾
50°C	--	--	130°C ⁵⁾	170°C ⁶⁾	205°C ⁶⁾
60°C	--	--	130°C ⁵⁾	170°C ⁶⁾	200°C ⁶⁾

Note 1: Tamb (max) = 40°C for PFS input with Pi = 0.85W

Note 2: Tamb (max) = 55°C for PFS input with Pi = 0.85W

Note 3: For versions provided with option OVP or TRM, the maximum ambient temperature decreases by 2 K for temperature class T6 and T5

Note 4: Max. process temperature 85°C for size code bb = 80

Note 5: Max. process temperature 110°C for size code bb = 80

Note 6: Maximum process temperature depending on temperature specification of the sensor

Promass E 200 with Approval codes cc = BC, BG, BK, B3, TC and I/O code d = B

Type designation 8E2B**-***** + ### and O8E2B**-***** + ###:

Temp class (Txx)	Max. Process temperature			
	T6 (85°C)	T5 (100°C)	T4 (135°C)	T3 - T1 (200°C)
Tamb (max)				
40°C	50°C	95°C	130°C	140°C
50°C ¹⁾	--	95°C	130°C	140°C
60°C	--	--	130°C	140°C

Type designation 8E2C**-***** + ### and O8E2C**-***** + ###:

Temp class (Txx)	Max. Process temperature				
	T6 (85°C)	T5 (100°C)	T4 (135°C)	T3 (200°C)	T2 - T1 (300°C)
Tamb (max)					
40°C	50°C	95°C	130°C	170°C	205°C
50°C ¹⁾	--	95°C	130°C	170°C	205°C
55°C	--	--	130°C	170°C	205°C
60°C	--	--	130°C	170°C	200°C

Note 1: Tamb (max) = 55°C for PFS input with Pi = 0.85W

Promass A and Promass F 200 with Approval codes cc = BC, BG, BK, B3, TC and I/O code d = B

Temp class (Txx)	Max. Process temperature				
	T6 (85°C)	T5 (100°C)	T4 (135°C)	T3 (200°C)	T2 - T1 (300°C)
Tamb (max)					
40°C	50°C	95°C ²⁾	130°C ³⁾	170°C ⁴⁾	205°C ⁴⁾
50°C ¹⁾	--	95°C ²⁾	130°C ³⁾	170°C ⁴⁾	205°C ⁴⁾
55°C	--	--	130°C ³⁾	170°C ⁴⁾	205°C ⁴⁾
60°C	--	--	130°C ³⁾	170°C ⁴⁾	200°C ⁴⁾

Note 1: Tamb (max) = 55°C for PFS input with Pi = 0.85W

Note 2: Max. process temperature 85°C for size code bb = 80

Note 3: Max. process temperature 110°C for size code bb = 80

Note 4: Maximum process temperature depending on temperature specification of the sensor

Promass E 200 with Approval codes cc = BB, BJ, B2 and I/O code d = C

Type designation 8E2B**-***** + ### and O8E2B**-***** + ###:

Temp class (Txx)	Max. Process temperature			
	T6 (85°C)	T5 (100°C)	T4 (135°C)	T3 - T1 (200°C)
Tamb (max)				
35°C ¹⁾	50°C	95°C	130°C	140°C
50°C ¹⁾	--	95°C	130°C	140°C
60°C	--	--	130°C	140°C

Type designation 8E2C**-***** + ### and O8E2C**-***** + ###:

Temp class (Txx)	Max. Process temperature				
	T6 (85°C)	T5 (100°C)	T4 (135°C)	T3 (200°C)	T2 - T1 (300°C)
Tamb (max)					
35°C ¹⁾	50°C	95°C	130°C	170°C	205°C
50°C ¹⁾	--	95°C	130°C	170°C	205°C
55°C	--	--	130°C	170°C	205°C
60°C	--	--	130°C	170°C	200°C

Note 1: For versions provided with option OVP or TRM, the maximum ambient temperature decreases by 2K for temperature class T6 and T5

Promass A and Promass F 200 with Approval codes cc = BB, BJ, B2 and I/O code d = C

Temp class (Txx)	Max. Process temperature				
	T6 (85°C)	T5 (100°C)	T4 (135°C)	T3 (200°C)	T2 - T1 (300°C)
Tamb (max)					
35°C ¹⁾	50°C	95°C ²⁾	130°C ³⁾	170°C ⁴⁾	205°C ⁴⁾
50°C ¹⁾	--	95°C ²⁾	130°C ³⁾	170°C ⁴⁾	205°C ⁴⁾
55°C	--	--	130°C ³⁾	170°C ⁴⁾	205°C ⁴⁾
60°C	--	--	130°C ³⁾	170°C ⁴⁾	200°C ⁴⁾

Note 1: For versions provided with option OVP or TRM, the maximum ambient temperature decreases by 2K for temperature class T6 and T5

Note 2: Max. process temperature 85°C for size code bb = 80

Note 3: Max. process temperature 110°C for size code bb = 80

Note 4: Maximum process temperature depending on temperature specification of the sensor

Promass E 200 with Approval codes cc = BC, BD, BG, BH, BK, B3, TC and I/O code d = C

Type designation 8E2B**-***** + ### and O8E2B**-***** + ###:

Temp class (Txx)	Max. Process temperature			
	T6 (85°C)	T5 (100°C)	T4 (135°C)	T3 - T1 (200°C)
Tamb (max)				
40°C ¹⁾	50°C	95°C	130°C	140°C
55°C ¹⁾	--	95°C	130°C	140°C
60°C	--	--	130°C	140°C

Type designation 8E2C**-***** + ### and O8E2C**-***** + ###:

Temp class (Txx)	Max. Process temperature				
	T6 (85°C)	T5 (100°C)	T4 (135°C)	T3 (200°C)	T2 - T1 (300°C)
Tamb (max)					
40°C ¹⁾	50°C	95°C	130°C	170°C	205°C
55°C ¹⁾	--	95°C	130°C	170°C	205°C
60°C	--	--	130°C	170°C	200°C

Note 1: For versions with approval code BD, BG, BH and provided with option OVP or TRM, the maximum ambient temperature decreases by 2K for temperature class T6 and T5

Promass A and Promass F 200 with Approval codes cc = BC, BD, BG, BH, BK, B3, TC and I/O code d = C

Temp class (Txx)	Max. Process temperature				
	T6 (85°C)	T5 (100°C)	T4 (135°C)	T3 (200°C)	T2 - T1 (300°C)
Tamb (max)					
40°C ¹⁾	50°C	95°C ²⁾	130°C ³⁾	170°C ⁴⁾	205°C ⁴⁾
55°C ¹⁾	--	95°C ²⁾	130°C ³⁾	170°C ⁴⁾	205°C ⁴⁾
60°C	--	--	130°C ³⁾	170°C ⁴⁾	200°C ⁴⁾

Note 1: For versions with approval code BD, BG, BH and provided with option OVP or TRM, the maximum ambient temperature decreases by 2 K for temperature class T6 and T5

Note 2: Max. process temperature 85°C for size code bb = 80

Note 3: Max. process temperature 110°C for size code bb = 80

Note 4: Maximum process temperature depending on temperature specification of the sensor

Promass E 200 with I/O code d = D

Type designation 8E2B**-***** + ### and O8E2B**-***** + ###:

Temp class (Txx)	Max. Process temperature			
	T6 (85°C)	T5 (100°C)	T4 (135°C)	T3 - T1 (200°C)
Tamb (max)				
35°C ¹⁾	50°C	95°C	130°C	140°C
50°C ¹⁾	--	95°C	130°C	140°C
60°C	--	--	130°C	140°C

Type designation 8E2C**-***** + ### and O8E2C**-***** + ###:

Temp class (Txx)	Max. Process temperature				
	T6 (85°C)	T5 (100°C)	T4 (135°C)	T3 (200°C)	T2 - T1 (300°C)
Tamb (max)					
35°C ¹⁾	50°C	95°C	130°C	170°C	205°C
50°C ¹⁾	50°C	95°C	130°C	170°C	205°C
55°C	--	95°C	130°C	170°C	205°C
60°C	--	--	130°C	170°C	205°C

Note 1: For versions with approval code BB, BD, BG, BH, BJ, B2 and provided with option OVP or TRM, for temperature class T6 and T5, the maximum ambient temperature decreases by 2K

Promass A and Promass F 200 with I/O code d = D

Temp class (Txx)	Max. Process temperature				
	T6 (85°C)	T5 (100°C)	T4 (135°C)	T3 (200°C)	T2 - T1 (300°C)
Tamb (max)					
35°C ¹⁾	50°C	95°C ²⁾	130°C ³⁾	170°C ⁴⁾	205°C ⁴⁾
50°C ¹⁾	50°C	95°C ²⁾	130°C ³⁾	170°C ⁴⁾	205°C ⁴⁾
55°C	--	95°C ²⁾	130°C ³⁾	170°C ⁴⁾	205°C ⁴⁾
60°C	--	--	130°C ³⁾	170°C ⁴⁾	205°C ⁴⁾

Note 1: For versions with approval code BB, BD, BG, BH, BJ, B2 and provided with option OVP or TRM, for temperature class T6 and T5, the maximum ambient temperature decreases by 2K

Note 2: Max. process temperature 85°C for size code bb = 80

Note 3: Max. process temperature 110°C for size code bb = 80

Note 4: Maximum process temperature depending on temperature specification of the sensor

Promass E 200 with I/O codes d = E, G

Type designation 8E2B**-***** + ### and O8E2B**-***** + ###:

Temp class (Txx)	Max. Process temperature			
	T6 (85°C)	T5 (100°C)	T4 (135°C)	T3 - T1 (200°C)
Tamb (max)				
40°C ^{1) 3)}	55°C	95°C	130°C	140°C
55°C ^{2) 3)}	--	95°C	130°C	140°C
60°C	--	--	130°C	140°C

Type designation 8E2C**-***** + ### and O8E2C**-***** + ###:

Temp class (Txx)	Max. Process temperature				
	T6 (85°C)	T5 (100°C)	T4 (135°C)	T3 (200°C)	T2 - T1 (300°C)
Tamb (max)					
40°C ^{1) 3)}	50°C	95°C ²⁾	130°C	170°C	205°C
55°C ^{2) 3)}	--	95°C ²⁾	130°C	170°C	205°C
60°C	--	--	130°C	170°C	205°C

Note 1: Tamb (max) = 50°C for PFS output with Pi = 0.85W

Note 2: Tamb (max) = 60°C for PFS output with Pi = 0.85W

Note 3: For versions with approval code BB, BD, BG, BH, BJ, B2 and provided with option OVP or TRM, the maximum ambient temperature decreases by 2K for temperature class T6 and T5

Promass A and Promass F 200 with I/O code d = E, G

Temp class (Txx)	Max. Process temperature				
	T6 (85°C)	T5 (100°C)	T4 (135°C)	T3 (200°C)	T2 - T1 (300°C)
Tamb (max)					
40°C ^{1) 3)}	50°C	95°C ⁴⁾	130°C ⁵⁾	170°C ⁶⁾	205°C ⁶⁾
55°C ^{2) 3)}	--	95°C ⁴⁾	130°C ⁵⁾	170°C ⁶⁾	205°C ⁶⁾
60°C	--	--	130°C ⁵⁾	170°C ⁶⁾	205°C ⁶⁾

Note 1: Tamb (max) = 50°C without PFS output

Note 2: Tamb (max) = 60°C without PFS output

Note 3: For versions with approval code BB, BD, BG, BH, BJ, B2 and provided with option OVP or TRM, the maximum ambient temperature decreases by 2K for temperature class T6 and T5

Note 4: Max. process temperature 85°C for size code bb = 80

Note 5: Max. process temperature 110°C for size code bb = 80

Note 6: Maximum process temperature depending on temperature specification of the sensor

Electrical Data

Applicable for flowmeter types:

Proline Promass A/E/F 200

Proline Promag H/P/E/W 200

Proline Prosonic Flow B 200

Proline Prowirl C/D/F/R/O 200

Flowmeter with Approval codes cc = BA, BB, BJ, B2, B5 and I/O code d = A

Supply/output circuit (terminals 1 and 2):

In type of protection intrinsic safety Ex ia IIC, only for connection to a certified intrinsically safe circuit, with the following maximum values:

$U_i = 30 \text{ V}$; $I_i = 300 \text{ mA}$; $P_i = 1 \text{ W}$; $C_i = 5 \text{ nF}$; $L_i = 0 \text{ mH}$.

Service connector:

In type of protection intrinsic safety Ex ia IIC, for connection of E+H Service Interface FXA291 or any other certified interface, with following maximum values:

$U_o = 7.3 \text{ V}$; $I_o = 100 \text{ mA}$; $P_o = 160 \text{ mW}$; $C_i = 0 \text{ nF}$; $L_i = 0 \text{ mH}$.

Flowmeter with Approval codes cc = BA, BB, BJ, B2, B5 and I/O code d = B

Supply/output circuit (terminals 1 and 2):

In type of protection intrinsic safety Ex ia IIC, only for connection to a certified intrinsically safe circuit, with the following maximum values:

$U_i = 30 \text{ V}$; $I_i = 300 \text{ mA}$; $P_i = 1 \text{ W}$; $C_i = 5 \text{ nF}$; $L_i = 0 \text{ mH}$.

Supply/output circuit (terminals 3 and 4):

In type of protection intrinsic safety Ex ia IIC, only for connection to a certified intrinsically safe circuit, with the following maximum values:

$U_i = 30 \text{ V}$; $I_i = 300 \text{ mA}$; $P_i = 1 \text{ W}$; $C_i = 6 \text{ nF}$; $L_i = 0 \text{ mH}$.

Service connector:

In type of protection intrinsic safety Ex ia IIC, for connection of E+H Service Interface FXA291 or any other certified interface, with following maximum values:

$U_o = 7.3 \text{ V}$; $I_o = 100 \text{ mA}$; $P_o = 160 \text{ mW}$; $C_i = 0 \text{ nF}$; $L_i = 0 \text{ mH}$.

Flowmeter with Approval codes cc = BA, BB, BJ, B2, B5 and I/O code d = C

Supply/output circuit (terminals 1 and 2):

In type of protection intrinsic safety Ex ia IIC, only for connection to a certified intrinsically safe circuit, with the following maximum values:

$U_i = 30 \text{ V}$; $I_i = 300 \text{ mA}$; $P_i = 1 \text{ W}$; $C_i = 30 \text{ nF}$; $L_i = 0 \text{ mH}$.

Supply/output circuit (terminals 3 and 4):

In type of protection intrinsic safety Ex ia IIC, only for connection to a certified intrinsically safe circuit, with the following maximum values:

$U_i = 30 \text{ V}$; $I_i = 300 \text{ mA}$; $P_i = 1 \text{ W}$; $C_i = 30 \text{ nF}$; $L_i = 0 \text{ mH}$.

Service connector:

In type of protection intrinsic safety Ex ia IIC, for connection of E+H Service Interface FXA291 or any other certified interface, with following maximum values:

$U_o = 7.3 \text{ V}$; $I_o = 100 \text{ mA}$; $P_o = 160 \text{ mW}$; $C_i = 0 \text{ nF}$; $L_i = 0 \text{ mH}$.

Flowmeter with Approval codes cc = BA, BB, BJ, B2, B5 and I/O code d = D

Supply/output circuit (terminals 1 and 2):

In type of protection intrinsic safety Ex ia IIC, only for connection to a certified intrinsically safe circuit, with the following maximum values:

$U_i = 30 \text{ V}$; $I_i = 300 \text{ mA}$; $P_i = 1 \text{ W}$; $C_i = 5 \text{ nF}$; $L_i = 0 \text{ mH}$;

Supply/output circuit (terminals 3 and 4):

In type of protection intrinsic safety Ex ia IIC, only for connection to a certified intrinsically safe circuit, with the following maximum values:

$U_i = 30 \text{ V}$; $I_i = 300 \text{ mA}$; $P_i = 1 \text{ W}$; $C_i = 6 \text{ nF}$; $L_i = 0 \text{ mH}$.

Input circuit (terminals 5 and 6):

In type of protection intrinsic safety Ex ia IIC, only for connection to a certified intrinsically safe circuit, with the following maximum values:

$U_i = 30 \text{ V}$; $I_i = 300 \text{ mA}$; $P_i = 1 \text{ W}$; $C_i = 5 \text{ nF}$; $L_i = 0 \text{ mH}$.

Service connector:

In type of protection intrinsic safety Ex ia IIC, for connection of E+H Service Interface FXA291 or any other certified interface, with following maximum values:

$U_o = 7.3 \text{ V}$; $I_o = 100 \text{ mA}$; $P_o = 160 \text{ mW}$; $C_i = 0 \text{ nF}$; $L_i = 0 \text{ mH}$.

Flowmeter with Approval codes cc = BA, BB, BJ, B2, B5 and I/O code d = E, G

Supply/output circuit (terminals 1 and 2):

In type of protection intrinsic safety Ex ia IIC, only for connection to a certified intrinsically safe circuit, with the following maximum values:

$U_i = 30 \text{ V}$; $I_i = 300 \text{ mA}$; $P_i = 1.2 \text{ W}$; $C_i = 5 \text{ nF}$; $L_i = 10 \text{ }\mu\text{H}$;

or in accordance with FISCO, with following maximum values;

$U_i = 17.5 \text{ V}$; $I_i = 550 \text{ mA}$; $P_i = 5.5 \text{ W}$; $C_i = 5 \text{ nF}$; $L_i = 10 \text{ }\mu\text{H}$;

Supply/output circuit (terminals 3 and 4):

In type of protection intrinsic safety Ex ia IIC, only for connection to a certified intrinsically safe circuit, with the following maximum values:

$U_i = 30 \text{ V}$; $I_i = 300 \text{ mA}$; $P_i = 1 \text{ W}$; $C_i = 6 \text{ nF}$; $L_i = 0 \text{ mH}$.

Service connector:

In type of protection intrinsic safety Ex ia IIC, for connection of E+H Service Interface FXA291 or any other certified interface, with following maximum values:

$U_o = 7.3 \text{ V}$; $I_o = 100 \text{ mA}$; $P_o = 160 \text{ mW}$; $C_i = 0 \text{ nF}$; $L_i = 0 \text{ mH}$.

Flowmeter with Approval codes cc = BC, BG, BK, B2, B3, B6, TC and I/O code d = A

Supply/output circuit (terminals 1 and 2):

$U_N = 35\text{V dc}$

$U_m = 250\text{ V}$.

Service connector:

In type of protection intrinsic safety Ex ia IIC, for connection of E+H Service Interface FXA291 or any other certified interface, with following maximum values:

$U_o = 7.3\text{ V}$; $I_o = 100\text{ mA}$; $P_o = 160\text{ mW}$; $C_i = 0\text{ nF}$; $L_i = 0\text{ mH}$.

Flowmeter with Approval codes cc = BC, BG, BK, B2, B3, B6, TC and I/O code d = B

Supply/output circuit (terminals 1 and 2):

$U_N = 35\text{V dc}$

$U_m = 250\text{ V}$.

Output circuit (terminals 3 and 4):

$U_N = 35\text{V dc}$

$U_m = 250\text{ V}$.

$P_{\max} = 1\text{ W}$

Note: this circuit is functionally limited by an internal resistance of 760.5Ω ; herewith $P_{\max}$ may be determined

Service connector:

In type of protection intrinsic safety Ex ia IIC, for connection of E+H Service Interface FXA291 or any other certified interface, with following maximum values:

$U_o = 7.3\text{ V}$; $I_o = 100\text{ mA}$; $P_o = 160\text{ mW}$; $C_i = 0\text{ nF}$; $L_i = 0\text{ mH}$.

Flowmeter with Approval codes cc = BC, BG, BK, B3, B6, TC and I/O code d = C

Supply/output circuit (terminals 1 and 2; 3 and 4):

$U_N = 30\text{V dc}$

$U_m = 250\text{ V}$.

Service connector:

In type of protection intrinsic safety Ex ia IIC, for connection of E+H Service Interface FXA291 or any other certified interface, with following maximum values:

$U_o = 7.3\text{ V}$; $I_o = 100\text{ mA}$; $P_o = 160\text{ mW}$; $C_i = 0\text{ nF}$; $L_i = 0\text{ mH}$.

Flowmeter with Approval codes cc = BC, BG, BK, B2, B3, B6, TC and I/O code d = D

Supply/output circuit (terminals 1 and 2):

$U_N = 35\text{V dc}$

$U_m = 250\text{ V}$

Supply/output circuit (terminals 3 and 4):

$U_N = 35\text{V dc}$

$U_m = 250\text{ V}$

Input circuit (terminals 5 and 6):

$U_N = 35\text{V dc}$

$U_m = 250\text{ V}$

Service connector:

In type of protection intrinsic safety Ex ia IIC, for connection of E+H Service Interface FXA291 or any other certified interface, with following maximum values:

$U_o = 7.3 \text{ V}$; $I_o = 100 \text{ mA}$; $P_o = 160 \text{ mW}$; $C_i = 0 \text{ nF}$; $L_i = 0 \text{ mH}$.

Flowmeter with Approval codes cc = BC, BG, BK, B2, B3, B6, TC and I/O code d = E, G**Supply/output circuit (terminals 1 and 2):**

$U_N = 32 \text{ V dc}$

$U_m = 250 \text{ V}$

$P_{\max} = 0.88 \text{ W}$

Supply/output circuit (terminals 3 and 4):

$U_N = 35 \text{ V dc}$

$U_m = 250 \text{ V}$

$P_{\max} = 1 \text{ W}$

Note: this circuit is functionally limited by an internal resistance of 760.5Ω ; herewith $P_{\max}$ may be determined

Service connector:

In type of protection intrinsic safety Ex ia IIC, for connection of E+H Service Interface FXA291 or any other certified interface, with following maximum values:

$U_o = 7.3 \text{ V}$; $I_o = 100 \text{ mA}$; $P_o = 160 \text{ mW}$; $C_i = 0 \text{ nF}$; $L_i = 0 \text{ mH}$.

Flowmeter with Approval codes cc = BD, BH and I/O code d = A**Supply/output circuit (terminals 1 and 2):**

In type of protection intrinsic safety Ex ic IIC, only for connection to a certified intrinsically safe circuit, with the following maximum values:

$U_i = 35 \text{ V}$; $I_i = \text{N/A}$; $P_i = 1 \text{ W}$; $C_i = 5 \text{ nF}$; $L_i = 0 \text{ mH}$;

Service connector:

In type of protection intrinsic safety Ex ia IIC, for connection of E+H Service Interface FXA291 or any other certified interface, with following maximum values:

$U_o = 7.3 \text{ V}$; $I_o = 100 \text{ mA}$; $P_o = 160 \text{ mW}$; $C_i = 0 \text{ nF}$; $L_i = 0 \text{ mH}$.

Flowmeter with Approval codes cc = BD, BH I/O code d = B**Supply/output circuit (terminals 1 and 2):**

In type of protection intrinsic safety Ex ic IIC, only for connection to a certified intrinsically safe circuit, with the following maximum values:

$U_i = 35 \text{ V}$; $I_i = \text{N/A}$; $P_i = 1 \text{ W}$; $C_i = 5 \text{ nF}$; $L_i = 0 \text{ mH}$;

Supply/output circuit (terminals 3 and 4):

In type of protection intrinsic safety Ex ic IIC, only for connection to a certified intrinsically safe circuit, with the following maximum values:

$U_i = 35 \text{ V}$; $I_i = \text{N/A}$; $P_i = 1 \text{ W}$; $C_i = 6 \text{ nF}$; $L_i = 0 \text{ mH}$.

Service connector:

In type of protection intrinsic safety Ex ic IIC, for connection of E+H Service Interface FXA291 or any other certified interface, with following maximum values:

$U_o = 7.3 \text{ V}$; $I_o = 100 \text{ mA}$; $P_o = 160 \text{ mW}$; $C_i = 0 \text{ nF}$; $L_i = 0 \text{ mH}$.

Flowmeter with Approval codes cc = BD, BH I/O code d = C

Supply/output circuit (terminals 1 and 2):

In type of protection intrinsic safety Ex ic IIC, only for connection to a certified intrinsically safe circuit, with the following maximum values:

$U_i = 30\text{ V}$; $I_i = \text{N/A}$; $P_i = 1\text{ W}$; $C_i = 30\text{ nF}$; $L_i = 0\text{ mH}$;

Supply/output circuit (terminals 3 and 4):

In type of protection intrinsic safety Ex ia IIC, only for connection to a certified intrinsically safe circuit, with the following maximum values:

$U_i = 30\text{ V}$; $I_i = \text{N/A}$; $P_i = 1\text{ W}$; $C_i = 30\text{ nF}$; $L_i = 0\text{ mH}$.

Service connector:

In type of protection intrinsic safety Ex ia IIC, for connection of E+H Service Interface FXA291 or any other certified interface, with following maximum values:

$U_o = 7.3\text{ V}$; $I_o = 100\text{ mA}$; $P_o = 160\text{ mW}$; $C_i = 0\text{ nF}$; $L_i = 0\text{ mH}$.

Flowmeter with Approval codes cc = BD, BH I/O code d = D

Supply/output circuit (terminals 1 and 2):

In type of protection intrinsic safety Ex ic IIC, only for connection to a certified intrinsically safe circuit, with the following maximum values:

$U_i = 35\text{ V}$; $I_i = \text{N/A}$; $P_i = 1\text{ W}$; $C_i = 5\text{ nF}$; $L_i = 0\text{ mH}$;

Supply/output circuit (terminals 3 and 4):

In type of protection intrinsic safety Ex ic IIC, only for connection to a certified intrinsically safe circuit, with the following maximum values:

$U_i = 35\text{ V}$; $I_i = \text{N/A}$; $P_i = 1\text{ W}$; $C_i = 6\text{ nF}$; $L_i = 0\text{ mH}$.

Input circuit (terminals 5 and 6):

In type of protection intrinsic safety Ex ic IIC, only for connection to a certified intrinsically safe circuit, with the following maximum values:

$U_i = 35\text{ V}$; $I_i = \text{N/A}$; $P_i = 1\text{ W}$; $C_i = 5\text{ nF}$; $L_i = 0\text{ mH}$.

Service connector:

In type of protection intrinsic safety Ex ia IIC, for connection of E+H Service Interface FXA291 or any other certified interface, with following maximum values:

$U_o = 7.3\text{ V}$; $I_o = 100\text{ mA}$; $P_o = 160\text{ mW}$; $C_i = 0\text{ nF}$; $L_i = 0\text{ mH}$.

Flowmeter with Approval codes cc = BD, BH and I/O code d = E, G

Supply/output circuit (terminals 1 and 2):

In type of protection intrinsic safety Ex ic IIC, only for connection to a certified intrinsically safe circuit, with the following maximum values:

$U_i = 32\text{ V}$; $I_i = 300\text{ mA}$; $P_i = \text{N/A}$; $C_i = 5\text{ nF}$; $L_i = 10\text{ }\mu\text{H}$;

or in accordance with FISCO, with following maximum values;

$U_i = 17.5\text{ V}$; $I_i = \text{N/A}$; $P_i = \text{N/A}$; $C_i = 5\text{ nF}$; $L_i = 10\text{ }\mu\text{H}$;

Supply/output circuit (terminals 3 and 4):

In type of protection intrinsic safety Ex ic IIC, only for connection to a certified intrinsically safe circuit, with the following maximum values:

$U_i = 35\text{ V}$; $I_i = 300\text{ mA}$; $P_i = 1\text{ W}$; $C_i = 6\text{ nF}$; $L_i = 0\text{ mH}$.

Service connector:

In type of protection intrinsic safety Ex ia IIC, for connection of E+H Service Interface FXA291 or any other certified interface, with following maximum values:

$U_o = 7.3 \text{ V}$; $I_o = 100 \text{ mA}$; $P_o = 160 \text{ mW}$; $C_i = 0 \text{ nF}$; $L_i = 0 \text{ mH}$.

All models**Interconnection cable for remote versions of Proline Prowirl C/D/F/R/O 200**

When the interconnection between Transmitter and Sensor of the Remote versions of the Flowmeter is in type of protection Intrinsic Safety Ex ia IIC/IIIC or Ex ic IIC/IIIC, then the interconnecting cable shall have an $L_c/R_c \leq 38.2 \mu\text{H}/\Omega$.

External display connector

The type of protection of the external display connector depends on the Approval code of the equipment.

For transmitters with Display code e = L or M, prepared for connection of the external display of Endress + Hauser, Type FHX50, or any other suitable display in type of protection intrinsic safety Ex ia IIC/IIIC, the following maximum values apply:

$U_o = 7.3 \text{ V}$; $I_o = 157 \text{ mA}$; $P_o = 362 \text{ mW}$; $C_o = 388 \text{ nF}$; $L_o = 149 \mu\text{H}$.

Maximum allowed cable capacitance $C_c = 125 \text{ nF}$; Maximum allowed cable inductance $L_c = 149 \mu\text{H}$.

In other cases, if used as interface in type of protection intrinsic safety Ex ia IIC/IIIC, the following maximum values apply:

$U_o = 7.3 \text{ V}$; $I_o = 327 \text{ mA}$; $P_o = 800 \text{ mW}$; $U_i = 7.3 \text{ V}$; $C_i = 0 \text{ nF}$; $L_i = 0 \text{ mH}$.

If used as non-intrinsic safe interface, $U_N = 6.5 \text{ V}$.

Interface pressure sensor (only for Proline Prowirl)

In type of protection Intrinsic Safety Ex ia IIC, for connection of sensor DPC21, with the following maximum values: $U_o = 4.1 \text{ V}$; $I_o = 450 \text{ mA}$; $P_o = 150 \text{ mW}$; $C_o = 99.3 \mu\text{F}$; $L_o = 84 \mu\text{F}$

ANNEX 7

(As from KEMA 10 ATEX 0072 issue 8)

This annex is applicable for flowmeters type Proline Prowirl C/D/F/R/O 200**Equipment**

Vortex Flowmeters Proline Prowirl C 200, Prowirl D 200, Prowirl F 200, Prowirl R 200 and Prowirl O 200 are used for the measurement of the volume flow of gases, liquids or steam. The transmitter consists of an electronics enclosure (the transmitter) and an integral or remote mounted sensor.

Proline Prowirl F/R/O 200 provide a version with pressure measurement as an option.

For detailed information regarding the ambient temperature range, the process temperature range and their relation to temperature class and maximum surface temperature, see thermal data below.

On Flowmeters Proline Prowirl C/D/F/R/O 200, model codes 7*2***-BA... and O7*2***-BA... with an enclosure or sensor made of aluminium, the certificate reference number on the marking plate shall be followed by an "X", or the equipment marking shall include a warning mark. The instructions shall include specific conditions of use that allow safe use of the transmitters in an area where the application of equipment of Equipment Protection Level (EPL) Ga is required.

On Flowmeters Proline Prowirl C/D/F/R/O 200, model codes 7*2***-BA... and O7*2***-BA... with an enclosure or sensor made of material containing by mass more than 7.5% of magnesium, titanium and zirconium, the certificate reference number on the marking plate shall be followed by an "X", or the equipment marking shall include a warning mark. The instructions shall include specific conditions of use that allow safe use of the transmitters in an area where the application of equipment of Equipment Protection Level (EPL) Ga, Gb, Da or Db is required.

Marking

Ex ia IIC T6...T1 Ga or
 Ex ia IIC T6...T1 Ga/Gb or Ex d [ia] IIC T6...T1 Ga/Gb or
 Ex ia IIC T6...T1 Gb or Ex d [ia] IIC T6...T1 Gb or
 Ex ic [ia Ga] IIC T6...T1 Ga or
 Ex nA [ia Ga] IIC T6...T1 Gc or Ex ec [ia Ga] IIC T6...T1 Gc or
 Ex ic [ia Ga] IIC T6...T1 Ga/Gc or
 Ex tb IIIC T** °C Db or
 Ex tb [ia Da] IIIC T** °C Db or

Type designation

Proline Prowirl C 200:

code 7C2Bbb - ccdefhimmmn + ###;
 code O7C2Bbb - ccdefhimmmnp + ###

Proline Prowirl D 200:

code 7D2Bbb - ccdefhimmmn + ###;
 code 7D2Cbb – ccdefghiikmmmnnoo + ###;
 code O7D2Bbb - ccdefhimmmnp + ###;
 code O7D2Cbb – ccdefghiikmmmnnoo + ###

Proline Prowirl F 200:

code 7F2Bbb - ccdefhimmmn + ###;
 code 7F2Cbb – ccdefghiiklmmmnnoo + ###;
 code O7F2Bbb - ccdefhimmmnp + ###;
 code O7F2Cbb – ccdefghiiklmmmnnoop + ###

Proline Prowirl R 200:

code 7R2Bbb - ccdefhimmmn + ###;
 code 7R2Cbb – ccdefghiiklmmmnnoo + ###;
 code O7R2Bbb - ccdefhimmmnp + ###;
 code O7R2Cbb – ccdefghiiklmmmnnoop + ###

Proline Prowirl O 200:

code 7O2Bbb - ccdefhimmmn + ###;
 code 7O2Cbb – ccdefghiiklmmmnnoo + ###;
 code O7O2Bbb - ccdefhimmmnp + ###;
 code O7O2Cbb – ccdefghiiklmmmnnoop + ###

Proline Prowirl 200 transmitter only:

code 7X2Bbb - ccdefg + ###;
 code 7X2Cbb – ccdefgioo + ###;
 code O7X2Bbb – ccdefgp + ###
 code O7X2Cbb – ccdefgioop + ###

bb = Size combination of number(s) and letter(s) for sizes up to DN300 (2 digits)

cc = Approval code

BA = Ex ia IIC T6...T1 Ga ²⁾
 BB = Ex ia IIC T6...T1 Ga/Gb
 BC, TC = Ex db [ia] IIC T6...T1 Ga/Gb
 BD = Ex ic [ia] IIC T6...T1 Ga/Gc
 BG = Ex ec IIC T6...T1 Gc or ²⁾
 Ex ec [ia Ga] IIC T6...T1 Gc ^{1), 2)} or
 Ex nA IIC T6...T1 Gc or ²⁾
 Ex nA [ia Ga] IIC T6...T1 Gc ^{1), 2)}
 BH = Ex ic IIC T6...T1 Gc or
 Ex ic [ia Ga] IIC T6...T1 Gc ¹⁾
 BJ = Ex ia IIC T6...T1 Gb
 BK = Ex db [ia] IIC T6...T1 Gb

 B2 = Ex ia IIC T6...T1 Ga/Gb
 Ex tb IIIC T** °C Db ²⁾
 Ex tb [ia Da] IIIC T** °C Db ²⁾
 B3 = Ex db [ia] IIC T6...T1 Ga/Gb
 Ex tb IIIC T** °C Db ²⁾
 Ex tb [ia Da] IIIC T** °C Db ²⁾

d = I/O – interface

A = 4 - 20 mA HART
 B = 4 - 20 mA HART + pulse/frequency/switch output
 C = 4 - 20 mA HART + 4 - 20 mA
 D = 4 - 20 mA HART + pulse/frequency/switch output + 4 - 20 mA input
 E = Foundation Fieldbus + pulse/frequency/switch output
 G = Profibus PA + pulse/frequency/switch output
 X = Sensor only

- e = Display, operation
L, M = prepared for FHX50
any other single number or letter
- f = Enclosure
any single number or letter
- g = Cable, Remote version (for 7*2C**-... and O7*2C**-... only)
any single number or letter
- h = Cable gland
any single number or letter
- i, ii = Sensor version i: 7*2B**-... and O7*2B**-... : any single number or letter
i: 7X2BXX-... and O7X2BXX-... : any single number or letter
ii: 7*2C**-... and O7*2C**-... : any combination of double number and/or letter
- k = Sealing (for 7*2C**-... and O7*2C**-... only)
any single number or letter
- l = Pressure sensor
any single number or letter
- mmm = Process connection
any triple numbers or letters
- n = Calibration
any single number or letter
- oo = Device model (for 7*2C**-... and O7*2C**-... only)
A1 = product version 1
- p = Customer version
any single number or letter
- ** = Option (no, two or multiples of two digits)
any combination of numbers and letters
- # = Additional options, not relevant for safety

Note 1: Approval code for Flowmeters with Display code e = L or M only

Note 2: Approval code BA, BG, B2, B3 not available for versions with pressure sensor

Assignment of Vortex Flowmeters series Proline Prowirl to replacement transmitter

Product flowmeters		Replacement transmitter type	
model code	device model code oo =	model code	device model code oo =
7 (C/D/F/R/O) 2B**... O7 (C/D/F/R/O) 2B**...	n.a.	7X2BXX-... O7X2BXX-...	n.a.
7 (D/F/R/O) 2C**...oo... O7 (D/F/R/O) C**...oo...	A1	7X2CXX-...oo O7X2CXX-...oo...	A1

Thermal data

Ambient temperature range: -50 °C to +70 °C ^{1), 2)} - compact Flowmeters
 -50 °C to +75 °C ^{1), 2)} - remote Flowmeters, Transmitter
 -60 °C to +85 °C - remote Flowmeters, Sensor
 Process temperature range: -200°C to +450 °C⁴⁾

Note 1: Minimum temperature -60 °C for Flowmeter with approval code cc = IG in combination with I/O interface codes d = A, d = B and d = D;

Note 2: Maximum temperature restricted to +65 °C for transmitters with I/O code d = D

Note 3: For ambient temperatures below -40 °C, only enclosure-variants without breathing element are allowed.

Note 4: For process temperature $T_m > 440^\circ\text{C}$ additional heat of source shall be observed so that ignition temperature of T1 will not be exceeded

The relation between ambient temperature, process temperature and temperature class and maximum surface temperature T for the different models of Flowmeters is listed in the following tables:

Prowirl C/D/F/R/O 200 with I/O code d = A and Approval codes cc = BA, BB, BC, BD, BG, BH, BJ, BK, B2, B3, TC Compact versions

Temp class (Txx)	Max. Process temperature					
	T6 (85°C)	T5 (100°C)	T4 (135°C)	T3 (200°C)	T2 (300°C)	T1 (450°C)
Tamb (max)						
40°C ¹⁾	80°C	95°C	130°C	195°C	290°C ²⁾	450°C ²⁾
60°C ^{1) 4)}	--	95°C	130°C	195°C	290°C ²⁾	450°C ²⁾
65°C	--	--	130°C	195°C	290°C ²⁾	450°C ²⁾
70°C	--	--	130°C	195°C ³⁾	290°C ²⁾	450°C ³⁾

Note 1: For versions with approval code BA, BB, BD, BH, BJ, B2 and provided with option OVP or TRM, for temperature class T6 and T5, the maximum ambient temperature decreases by 2 K

Note 2: Process temperature $\leq 280^\circ\text{C}$ for versions with sensor specified for $T_m \leq 280^\circ\text{C}$

Note 3: Process temperature $> 130^\circ\text{C}$ not allowed for versions with sensor specified for $T_m \leq 280^\circ\text{C}$ at $T_{amb} > 65^\circ\text{C}$

Note 4: For versions with pressure tapping Tamb (max) is limited for T5 to 55°C

Note 5: For versions with pressure tapping installed straight to Prowirl sensor, the maximum process temperature is limited for T6 and T5 to 40°C and for T4 to 90°C. For process temperatures $> 90^\circ\text{C}$ the pressure sensor type DPC21 has to be installed using a distance tube between pressure sensor and sensor of Prowirl F/R/O. The minimum length of the tube shall not be less than 50cm.

Remote versions, transmitter

Temp class (Txx)	T6 (85°C)	T5 (100°C)	T4 (135°C)
Tamb (max)	40 °C ¹⁾	60°C ¹⁾	75°C

Note 1: For versions with approval code BA, BB, BD, BH, BJ, B2 and provided with option OVP or TRM,
 for temperature class T6 and T5, the maximum ambient temperature decreases by 2K

Remote versions, sensor

Temp class (Txx)	Max. Process temperature					
	T6 (85°C)	T5 (100°C)	T4 (135°C)	T3 (200°C)	T2 (300°C)	T1 (450°C)
Tamb (max)						
55°C ²⁾	80°C	95°C	130°C	195°C	290°C ¹⁾	450°C ¹⁾
70°C ²⁾	--	95°C	130°C	195°C	290°C ¹⁾	450°C ¹⁾
85°C	--	--	130°C	195°C	290°C ¹⁾	450°C ¹⁾

Note 1: Process temperature ≤ 280 °C for versions with sensor specified for $T_m \leq 280$ °C

Note 2: For versions with pressure tapping Tamb (max) is limited for T6 to 40 °C and for T5 to 55°C

Note 3: For versions with pressure tapping installed straight to Prowirl sensor, the maximum process temperature is limited for T6 and T5 to 40°C and for T4 to 90°C. For process temperatures > 90 °C the pressure sensor type DPC21 has to be installed using a distance tube between pressure sensor and sensor of Prowirl F/R/O. The minimum length of the tube shall not be less than 50cm

Prowirl C/D/F/R/O 200 with I/O code d = B and Approval codes cc = BA, BB, BD, BH, BJ, B2

Compact versions

Temp class (Txx)	Max. Process temperature					
	T6 (85°C)	T5 (100°C)	T4 (135°C)	T3 (200°C)	T2 (300°C)	T1 (450°C)
Tamb (max)						
35°C ^{1) 2)}	80°C	95°C	130°C	195°C	290°C ³⁾	450°C ³⁾
50°C ^{1) 2)}	--	95°C	130°C	195°C	290°C ³⁾	450°C ³⁾
60°C	--	--	130°C	195°C	290°C ³⁾	450°C ³⁾
65°C	--	--	130°C	195°C	290°C ^{3) 4)}	450°C ³⁾
70°C	--	--	130°C	195°C ⁴⁾	290°C ^{3) 4)}	450°C ^{3) 4)}

Note 1: For versions provided with option OVP or TRM, for temperature class T6 and T5, the maximum ambient temperature decreases by 2 K

Note 2: For PFS circuit with $P_i = 0.85$ W, the maximum ambient temperature increases by 5 K

Note 3: Process temperature ≤ 280 °C for versions with sensor specified for $T_m \leq 280$ °C

Note 4: For versions with sensor specified for $T_m \leq 280$ °C, the indicated maximum ambient temperature is applicable only if for the PFS circuit $P_i = 0.7$ W; for other sensors, the maximum ambient temperature is applicable if for the PFS circuit $P_i = 0.85$ W

Note 5: For versions with pressure tapping installed straight to Prowirl sensor, the maximum process temperature is limited for T6 and T5 to 40°C and for T4 to 90°C. For process temperatures > 90 °C the pressure sensor type DPC21 has to be installed using a distance tube between pressure sensor and sensor of Prowirl F/R/O. The minimum length of the tube shall not be less than 50cm

Remote versions, transmitter

Temp class (Txx)	T6 (85°C)	T5 (100°C)	T4 (135°C)
Tamb (max)	35°C ¹⁾	50°C ¹⁾	70°C
	40°C ^{1) 2)}	60°C ^{1) 2)}	75°C ²⁾

Note 1: For versions provided with option OVP or TRM, for temperature class T6 and T5, the maximum ambient temperature decreases by 2 K

Note 2: Maximum ambient temperature applicable only if for the PFS circuit $P_i = 0.85 \text{ W}$

Remote versions, sensor

Temp class (Txx)	Max. Process temperature					
	T6 (85°C)	T5 (100°C)	T4 (135°C)	T3 (200°C)	T2 (300°C)	T1 (450°C)
Tamb (max)						
55°C	80°C	95°C	130°C	195°C	290°C ¹⁾	450°C ¹⁾
70°C ²⁾	--	95°C	130°C	195°C	290°C ¹⁾	450°C ¹⁾
85°C	--	--	130°C	195°C	290°C ¹⁾	450°C ¹⁾

Note 1: Process temperature $\leq 280 \text{ °C}$ for versions with sensor specified for $T_m \leq 280 \text{ °C}$

Note 2: For versions with pressure tapping Tamb (max) is limited for T6 to 40 °C and for T5 to

55°C Note 3: For versions with pressure tapping installed straight to Prowirl sensor, the maximum process temperature is limited for T6 and T5 to 40°C and for T4 to 90°C.

For process temperatures $> 90^\circ\text{C}$ the pressure sensor type DPC21 has to be installed using a distance tube between pressure sensor and sensor of Prowirl F/R/O. The minimum length of the tube shall not be less than 50cm

Prowirl C/D/F/R/O 200 with I/O code d = B and Approval codes cc = BC, BG, BK, B3, TC

Compact versions

Temp class (Txx)	Max. Process temperature					
	T6 (85°C)	T5 (100°C)	T4 (135°C)	T3 (200°C)	T2 (300°C)	T1 (450°C)
Tamb (max)						
40°C	80°C	95°C	130°C	195°C	290°C ¹⁾	450°C ¹⁾
55°C	--	95°C	130°C	195°C	290°C ¹⁾	450°C ¹⁾
65°C	--	--	130°C	195°C	290°C ^{1) 2)}	450°C ¹⁾
70°C	--	--	130°C	195°C ^{2) 3)}	290°C ^{1) 2) 3)}	450°C ^{1) 3)}

Note 1: Process temperature $\leq 280 \text{ °C}$ for versions with sensor specified for $T_m \leq 280 \text{ °C}$

Note 2: For versions with sensor specified for $T_m \leq 280 \text{ °C}$, the indicated maximum ambient temperature is applicable only if for the PFS circuit $P_{\text{max}} = 0.7 \text{ W}$

Note 3: For sensors not restricted to $T_m \leq 280 \text{ °C}$, the maximum ambient temperature is applicable only if for the PFS circuit $P_{\text{max}} = 0.85 \text{ W}$

Note 4: For versions with pressure tapping installed straight to Prowirl sensor, the maximum process temperature is limited for T6 and T5 to 40°C and for T4 to 90°C. For process temperatures $> 90^\circ\text{C}$ the pressure sensor type DPC21 has to be installed using a distance tube between pressure sensor and sensor of Prowirl F/R/O. The minimum length of the tube shall not be less than 50cm

Remote versions, transmitter

Temp class (Txx)	T6 (85°C)	T5 (100°C)	T4 (135°C)
Tamb (max)	40°C	60°C	70°C ¹⁾

Note 1: Maximum ambient temperature 75 °C if for the PFS circuit $P_{\text{max}} = 0.85 \text{ W}$

Remote versions, sensor

Temp class (Txx)	Max. Process temperature					
	T6 (85°C)	T5 (100°C)	T4 (135°C)	T3 (200°C)	T2 (300°C)	T1 (450°C)
Tamb (max)						
55°C ²⁾	80°C	95°C	130°C	195°C	290°C ¹⁾	450°C ¹⁾
70°C ²⁾	--	95°C	130°C	195°C	290°C ¹⁾	450°C ¹⁾
85°C	--	--	130°C	195°C	290°C ¹⁾	450°C ¹⁾

Note 1: Process temperature ≤ 280 °C for versions with sensor specified for $T_m \leq 280$ °C

Note 2: For versions with pressure tapping Tamb (max) is limited for T6 to 40 °C and for T5 to 55°C

Note 3: For versions with pressure tapping installed straight to Prowirl sensor, the maximum process temperature is limited for T6 and T5 to 40°C and for T4 to 90°C. For process temperatures > 90 °C the pressure sensor type DPC21 has to be installed using a distance tube between pressure sensor and sensor of Prowirl F/R/O. The minimum length of the tube shall not be less than 50cm

Prowirl C/D/F/R/O 200 with I/O code d = C and Approval codes cc = BA, BB, BC, BD, BG, BH, BJ, BK, B2, B3, TC

Compact versions

Temp class (Txx)	Max. Process temperature					
	T6 (85°C)	T5 (100°C)	T4 (135°C)	T3 (200°C)	T2 (300°C)	T1 (450°C)
Tamb (max)						
40°C ¹⁾	80°C	95°C	130°C	195°C	290°C ²⁾	450°C ²⁾
55°C ¹⁾	--	95°C	130°C	195°C	290°C ²⁾	450°C ²⁾
60°C	--	--	130°C	195°C	290°C ²⁾	450°C ²⁾
65°C	--	--	130°C	195°C	290°C ^{2) 4)}	450°C ^{2) 4)}
70°C	--	--	130°C	195°C ^{3) 5)}	290°C ^{3) 5)}	450°C ^{3) 5)}

Note 1: For versions with approval code BA, BB, BD, BH, BJ, B2 and provided with option OVP or TRM, for temperature class T6 and T5, the maximum ambient temperature decreases by 2 K

Note 2: Process temperature ≤ 280 °C for versions with sensor specified for $T_m \leq 280$ °C

Note 3: For versions with sensor specified for $T_m \leq 280$ °C, the maximum ambient temperature is 70 °C for a maximum process temperature of 130 °C

Note 4: For versions with sensor specified for $T_m \leq 280$ °C, the maximum ambient temperature is 65 °C if supply/output circuit at terminals 3 and 4 is not used ($P_i = 0$ W or $P_{max} = 0$ W)

Note 5: For versions with sensor not restricted to $T_m \leq 280$ °C, the maximum ambient temperature is 70 °C if the supply/output circuit at terminals 3 and 4 is not used ($P_i = 0$ W or $P_{max} = 0$ W)

Note 6: For versions with pressure tapping installed straight to Prowirl sensor, the maximum process temperature is limited for T6 and T5 to 40°C and for T4 to 90°C. For process temperatures > 90 °C the pressure sensor type DPC21 has to be installed using a distance tube between pressure sensor and sensor of Prowirl F/R/O. The minimum length of the tube shall not be less than 50cm

Remote versions, transmitter

Temp class (Txx)	T6 (85°C)	T5 (100°C)	T4 (135°C)
Tamb (max)	40°C	55°C ¹⁾	70°C ²⁾

Note 1: For versions with approval code BA, BB, BD, BH, BJ, B2 and provided with option OVP or TRM,

for temperature class T6 and T5, the maximum ambient temperature decreases by 2K

Note 2: The maximum ambient temperature is 75 °C if the supply/output circuit at terminals 3 and 4 is not used ($P_i = 0 \text{ W}$ or $P_{\text{max}} = 0 \text{ W}$)

Remote versions, sensor

Temp class (Txx)	Max. Process temperature					
	T6 (85°C)	T5 (100°C)	T4 (135°C)	T3 (200°C)	T2 (300°C)	T1 (450°C)
Tamb (max)						
55°C ²⁾	80°C	95°C	130°C	195°C	290°C ¹⁾	450°C ¹⁾
70°C ²⁾	--	95°C	130°C	195°C	290°C ¹⁾	450°C ¹⁾
85°C	--	--	130°C	195°C	290°C ¹⁾	450°C ¹⁾

Note 1: Process temperature $\leq 280 \text{ °C}$ for versions with sensor specified for $T_m \leq 280 \text{ °C}$

Note 2: For versions with pressure tapping Tamb (max) is limited for T6 to 40 °C and for T5 to 55 °C

Note 3: For versions with pressure tapping installed straight to Prowirl sensor, the maximum process temperature is limited for T6 and T5 to 40°C and for T4 to 90°C. For process temperatures $> 90^\circ\text{C}$ the pressure sensor type DPC21 has to be installed using a distance tube between pressure sensor and sensor of Prowirl F/R/O. The minimum length of the tube shall not be less than 50cm

Prowirl C/D/F/R/O 200 with I/O code d = D and Approval codes cc = BA, BB, BC, BD, BG, BH, BJ, BK, B2, B3, TC

Compact versions

Temp class (Txx)	Max. Process temperature					
	T6 (85°C)	T5 (100°C)	T4 (135°C)	T3 (200°C)	T2 (300°C)	T1 (450°C)
Tamb (max)						
35°C ¹⁾	80°C	95°C	130°C	195°C	290°C ³⁾	450°C ³⁾
50°C ¹⁾	--	95°C	130°C	195°C	290°C ³⁾	450°C ³⁾
55°C	--	--	--	195°C	290°C ³⁾	450°C ³⁾
60°C	--	--	--	195°C	290°C ³⁾	450°C ³⁾
65°C	--	--	--	--	290°C ³⁾	--

Note 1: For versions with approval code BA, BB, BD, BH, BJ, B2 and provided with option OVP or TRM, for temperature class T6 and T5, the maximum ambient temperature decreases by 2K
 Note 2: Process temperature $\leq 280 \text{ °C}$ for versions with sensor specified for $T_m \leq 280 \text{ °C}$

Note 3: T1, T2 not applicable for versions with sensor specified for $T_m \leq 280 \text{ °C}$

Note 4: For versions with pressure tapping installed straight to Prowirl sensor, the maximum process temperature is limited for T6 and T5 to 40°C and for T4 to 90°C. For process temperatures $> 90^\circ\text{C}$ the pressure sensor type DPC21 has to be installed using a distance tube between pressure sensor and sensor of Prowirl F/R/O. The minimum length of the tube shall not be less than 50cm

Remote versions, transmitter

Temp class (Txx)	T6 (85°C)	T5 (100°C)	T4 (135°C)
Tamb (max)	35°C ¹⁾	50°C ¹⁾	65°C

Note 1: For versions with approval code BA, BB, BD, BH, BJ, B2 and provided with option OVP or TRM,
for temperature class T6 and T5, the maximum ambient temperature decreases by 2 K

Remote versions, sensor

Temp class (Txx)	Max. Process temperature					
	T6 (85°C)	T5 (100°C)	T4 (135°C)	T3 (200°C)	T2 (300°C)	T1 (450°C)
Tamb (max)						
55°C ²⁾	80°C	95°C	130°C	195°C	290°C ¹⁾	450°C ¹⁾
70°C ²⁾	--	95°C	130°C	195°C	290°C ¹⁾	450°C ¹⁾
85°C	--	--	130°C	195°C	290°C ¹⁾	450°C ¹⁾

Note 1: Process temperature ≤ 280 °C for versions with sensor specified for $T_m \leq 280$ °C

Note 2: For versions with pressure tapping Tamb (max) is limited for T6 to 40 °C and for T5 to 55 °C

Note 3: For versions with pressure tapping installed straight to Prowirl sensor, the maximum process temperature is limited for T6 and T5 to 40°C and for T4 to 90°C. For process temperatures > 90°C the pressure sensor type DPC21 has to be installed using a distance tube between pressure sensor and sensor of Prowirl F/R/O. The minimum length of the tube shall not be less than 50cm.

Prowirl C/D/F/R/O 200 with I/O codes d = E and G and Approval codes cc = BA, BB, BC, BD, BG, BH, BJ, BK, B2, B3, TC

Compact versions

Temp class (Txx)	Max. Process temperature					
	T6 (85°C)	T5 (100°C)	T4 (135°C)	T3 (200°C)	T2 (300°C)	T1 (450°C)
Tamb (max)						
40°C ¹⁾	80°C	95°C	130°C	195°C	290°C ²⁾	450°C ²⁾
50°C ^{1) 3)}	--	95°C	130°C	195°C	290°C ²⁾	450°C ²⁾
60°C	--	--	--	195°C	290°C ²⁾	450°C ²⁾
65°C	--	--	--	195°C	290°C ^{2) 4)}	450°C ^{2) 4)}
70°C	--	--	--	195°C ⁵⁾	290°C ^{2) 5)}	450°C ^{2) 5)}

Note 1: For versions with approval code BA, BB, BD, BH, BJ, B2 and provided with option OVP or TRM, for temperature class T6 and T5, the maximum ambient temperature decreases by 2 K
Note 2: Process temperature ≤ 280 °C for versions with sensor specified for $T_m \leq 280$ °C

Note 3: Maximum ambient temperature is 60 °C if PFS circuit not used

Note 4: For versions with sensor specified for $T_m \leq 280$ °C, the maximum ambient temperature is 65°C if PFS circuit not used

Note 5: Maximum ambient temperature is 70 °C if PFS circuit not used

Note 6: For versions with pressure tapping installed straight to Prowirl sensor, the maximum process temperature is limited for T6 and T5 to 40°C and for T4 to 90°C. For process temperatures > 90°C the pressure sensor type DPC21 has to be installed using a distance tube between pressure sensor and sensor of Prowirl F/R/O. The minimum length of the tube shall not be less than 50cm.

Remote versions, transmitter

Temp class (Txx)	T6 (85°C)	T5 (100°C)	T4 (135°C)
Tamb (max)	40°C ¹⁾	55°C ¹⁾	70°C ²⁾

Note 1: For versions with approval code BA, BB, BD, BH, BJ, B2 and provided with option OVP or TRM, for temperature class T6 and T5, the maximum ambient temperature decreases by 2K

Note 2: The maximum ambient temperature is 75 °C if PFS circuit not used

Remote versions, sensor

	Max. Process temperature					
Temp class (Txx)	T6 (85°C)	T5 (100°C)	T4 (135°C)	T3 (200°C)	T2 (300°C)	T1 (450°C)
Tamb (max)						
55°C ²⁾	80°C	95°C	130°C	195°C	290°C ¹⁾	450°C ¹⁾
70°C ²⁾	--	95°C	130°C	195°C	290°C ¹⁾	450°C ¹⁾
85°C	--	--	130°C	195°C	290°C ¹⁾	450°C ¹⁾

Note 1: Process temperature ≤ 280 °C for versions with sensor specified for $T_m \leq 280$ °C.

Note 2: For versions with pressure tapping Tamb (max) is limited for T6 to 40 °C and for T5 to 55 °C

Note 3: For versions with pressure tapping installed straight to Prowirl sensor, the maximum process temperature is limited for T6 and T5 to 40°C and for T4 to 90°C. For process temperatures > 90 °C the pressure sensor type DPC21 has to be installed using a distance tube between pressure sensor and sensor of Prowirl F/R/O. The minimum length of the tube shall not be less than 50cm.

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