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Safety Instructions
Proline Cubemass 300

UKEX: II3G

Endress+Hauser
People for Process Automation

Proline Cubemass 300

Table of contents

Associated documentation

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

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

Measuring device	Documentation code			
	HART	FOUNDATION Fieldbus	PROFIBUS PA	PROFIBUS DP
Cubemass C 300	BA01483D	BA01516D	BA01505D	BA01856D

Measuring device	Documentation code		
	Modbus RS485	EtherNet/IP	PROFINET
Cubemass C 300	BA01494D	BA01726D	BA01737D

Additional documentation

Contents	Document type	Documentation code
Remote display and operating module DKX001	Special documentation	SD01763D
	Safety Instructions II3G Ex nA or II3G Ex ec	XA02581D
Explosion Protection	Brochure	CP00021Z/11

Please note the documentation associated with the device.

Manufacturer's certificates

UK Declaration of Conformity
Documentation code: UK_00101

Manufacturer address

Endress+Hauser Flowtec AG
Kägenstrasse 7
4153 Reinach BL
Switzerland

Extended order code

The extended order code is indicated on the nameplate, which is affixed to the device in such a way that it is clearly visible. Additional information about the nameplate is provided in the associated Operating Instructions.

Structure of the extended order code

******	–	***** ... *****	+	A*B*C*D*E*F*G*...
(Device type)		*(Basic specifications)*		*(Optional specifications)*

* = Placeholder
At this position, an option (number or letter) selected from the specification is displayed instead of the placeholders.

Device type

The device and the device design is defined in the "Device type" section (Product root).

Basic specifications

The features that are absolutely essential for the device (mandatory features) are specified in the basic specifications. The number of positions depends on the number of features available.
The selected option of a feature can consist of several positions.

Optional specifications

The optional specifications describe additional features for the device (optional features). The number of positions depends on the number of features available. The features have a 2-digit structure to aid identification (e.g. JA). The first digit (ID) stands for the feature group and consists of a number or a letter (e.g. J = Test, Certificate). The second digit constitutes the value that stands for the feature within the group (e.g. A = 3.1 material (wetted parts), inspection certificate).

More detailed information about the device is provided in the following tables. These tables describe the individual positions and IDs in the extended order code which are relevant to hazardous locations.

Device type

Position	Order code for	Option selected	Description
1	Instrument family	8	Coriolis flowmeter
2	Sensor	C	Sensor type
3	Transmitter	3	Transmitter type: 4-wire, compact version

Position	Order code for	Option selected	Description
4	Generation index	B	Platform generation
5, 6	Nominal diameter	DN 1: 01 DN 2: 02 DN 4: 04 DN 6: 06	Nominal diameter of sensor

Basic specifications

Position 1, 2 Order code for "Approval" Option selected	Type of protection	
	Transmitter	Sensor
US	Ex ec nC IIC T5...T1 Gc	Ex ec IIC T5...T1 Gc Ex ec nC IIC T5...T1 Gc [1]
	Ex ec nC [ic] IIC T5...T1 Gc [2]	

1) The marking Ex ec nC is only applicable for sensor versions without purge connection or rupture disk. (see "Optional specifications").
2) The marking Ex ec nC [ic] IIC T5...T1 Gc is only available for devices with order code "Output; Input 1", option HA or TA.

Position	Order code for	Option selected	Description
4, 5	Output, input 1	BA	4-20mA HART
		GA	PROFIBUS PA
		HA	PROFIBUS PA Ex-i
		LA	PROFIBUS DP
		MA	Modbus RS485
		NA	EtherNet/IP 2-port switch integrated
		RA	PROFINET IO 2-port switch integrated
		SA	FOUNDATION Fieldbus
		TA	FOUNDATION Fieldbus Ex-i
6	Output, input 2	A	W/o
		B	4-20mA
		C	4-20mA Ex-i passive
		D	Configurable I/O initial setting off
		E	Pulse/frequency/switch output
		F	Pulse output, phase-shifted
		G	Pulse/frequency/switch output Ex-i passive
		H	Relay
		I	4-20mA input

Position	Order code for	Option selected	Description
		J	Status input
7	Output, input 3	A	W/o
		B	4-20mA
		C	4-20mA Ex-i passive
		D	Configurable I/O initial setting off
		E	Pulse/frequency/switch output
		F	Pulse output, phase-shifted
		G	Pulse/frequency/switch output Ex-i passive
		H	Relay
		I	4-20mA input
		J	Status input
8	Display; Operation	A	W/o; via communication
		F	4-line, illuminated; touch control
		G	4-line, illuminated; touch control + WLAN
		M	W/o; prepared for remote display DKX001
		O	4-line, illuminated; touch control
9	Housing	A	Alu, coated
17, 18	Device Model	A1	1
		A2	2

Optional specifications

ID	Order code for	Option selected	Description
Cx	Sensor option	CA	Rupture disk
Cx	Sensor option	CH	Purge connection
Px	Enclosed accessories	P8	Wireless antenna, wide area (external WLAN antenna) [1)]

1) The external WLAN antenna is available with the order code for "Accessory Enclosed", option P8.

Safety instructions: General

- Staff must meet the following conditions for mounting, electrical installation, commissioning and maintenance of the device:
  - Be suitably qualified for their role and the tasks they perform
  - Be trained in explosion protection
  - Be familiar with national regulations or guidelines (e.g. EN 60079-14)
- Install the device according to the manufacturer's instructions and national regulations.
- Do not operate the device outside the specified electrical, thermal and mechanical parameters.
- Only use the device in media to which the wetted materials have sufficient durability.
- Refer to the temperature tables for the relationship between the permitted ambient temperature for the sensor and/or transmitter, depending on the range of application, and the temperature classes.
- Modifications to the device can affect the explosion protection and must be carried out by staff authorized to perform such work by Endress+Hauser.
- Observe all the technical data of the device (see nameplate).

Safety instructions: Installation

- Continuous service temperature of the connecting cable: −40 to +80 °C; in accordance with the range of service temperature taking into account additional influences of the process conditions ($T_{a,min}$ and $T_{a,max}$ + 20 K).
- Only use certified cable entries suitable for the application. Observe selection criteria as per EN 60079-14.
- When the measuring device is connected, attention must be paid to explosion protection at the transmitter.
- Turning the transmitter housing
  - Loosen both hexagon socket screws until the transmitter housing can be turned.
  - Turn transmitter housing to desired position (mechanically limited); if necessary turn 270° in other direction.
  - Tighten both hexagon socket screws with a maximum of 7 Nm.
- In potentially explosive atmospheres:
  - Do not disconnect the electrical connection of the power supply circuit when energized.
  - Do not open the connection compartment cover when energized.

Ex ec type of protection

- In potentially explosive atmospheres: Do not disconnect the electrical connection of the power supply circuit when energized.
- Seal unused entry glands with approved sealing plugs that correspond to the type of protection.
- Only use certified cable entries or sealing plugs.
- Equipment in type of protection Ex ec, shall be installed using a transient protection not exceeding 140% of the peak rated voltage value at the power supply terminals and IO terminals.

Optional external WLAN antenna

- Connect the antenna bushing H337 to the transmitter housing and tighten by hand.
- Use only external antennas supplied by Endress+Hauser.
- Connect antenna or antenna cable with plug-in connector type N (MIL-STD-348) to antenna bushing H337.

Intrinsic safety

Observe the guidelines for interconnecting intrinsically safe circuits (e.g. EN 60079-14 , Proof of Intrinsic Safety).

- When using the remote display and operating module DKX001 the internal display and operating module must be removed.
- When using the separate approved, remote display and operating module DKX001, only use the following variants: Basic specification of the remote display and operating module DKX001, order code "Approval", option US

Potential equalization

- Integrate the device into the local potential equalization .
- If the ground connection has been established via the pipe as specified, it is also possible to integrate the sensor into the potential equalization system via the pipe.
- The antenna bushing H337 of the external antenna must be integrated into the local potential equalization system. This is the case if the sensor is connected in accordance with the regulations via the coupling.

Temperature tables

Ambient temperature

Minimum ambient temperature

T_a = −40 °C

Maximum ambient temperature

T_a = +60 °C depending on the medium temperature and temperature class.

Medium temperature

Minimum medium temperature

T_m = −50 °C

Maximum medium temperature

- T_m for T5…T1 depending on the maximum ambient temperature T_a
- ( ) = The maximum permitted medium temperatures in brackets only apply if the sensor is installed in such a way that the transmitter is not mounted above the sensor and free convection can occur on all sides.

Compact version

NOTICE

In case of heating, risk of overheating.

- ▶ On devices with Heating jacket the corresponding temperature tables for isolated sensor, are to be observed.
- ▶ Make sure that the heating medium, may not exceeded the maximum specified medium temperature of the exact used temperature classes of the device.

Maximum medium temperature without thermal insulation according to Endress+Hauser specifications

DN	T_a [°C]	$T_{m,max}$ [°C]	T_m [°C]					
			T6 [85 °C]	T5 [100 °C]	T4 [135 °C]	T3 [200 °C]	T2 [300 °C]	T1 [450 °C]
1…6	50	205	–	90 [1)]	130	140 [2)]	205	205
	60		–	–	130	140 [2)]	205	205

1) The following applies for sensors with type of protection Ex ec nC: T_m = 95 °C
2) The following applies for sensors with type of protection Ex ec nC: T_m = 195 °C

Maximum medium temperature with thermal insulation according to Endress+Hauser specifications

For information on the thermal insulation of the device, see the "Thermal insulation" section of the "Operating instructions" document .

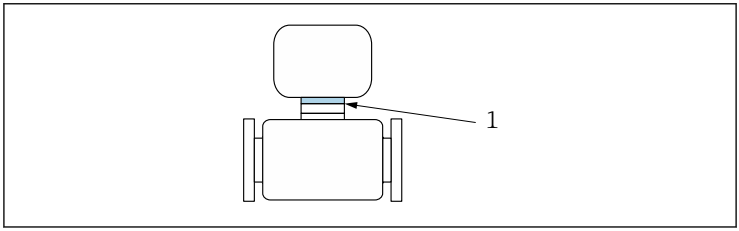
DN	T_a [°C]	$T_{m, max}$ [°C]	T_m [°C]					
			T6 [85 °C]	T5 [100 °C]	T4 [135 °C]	T3 [200 °C]	T2 [300 °C]	T1 [450 °C]
1...6	50	205	–	95	130	195	205	205
	55		–	–	(130)	(170 [1)])	(205)	(205)

1) The following applies for sensors with type of protection Ex ec nC: T_m = 195 °C

With thermal insulation without Endress+Hauser specifications

For information on the thermal insulation of the device, see the "Thermal insulation" section of the "Operating instructions" document .

The specified reference temperature T_{ref} and the maximum medium temperature $T_{m, max}$ for each temperature class must not be exceeded. → 11



1 Position of reference point for temperature measurement

1 Reference point (T_{ref})

Reference temperature T_{ref}

T_m [°C]					
T6 [85 °C]	**T5 [100 °C]**	**T4 [135 °C]**	**T3 [200 °C]**	**T2 [300 °C]**	**T1 [450 °C]**
–	63	72	75	77	77

Connection values: Signal circuits

The following tables contain specifications which are dependent on the transmitter type and its input and output assignment. Compare the following specifications with those on the nameplate of the transmitter.

Terminal assignment

Transmitter: supply voltage, input/outputs

HART

Supply voltage		Input/output 1		Input/output 2		Input/output 3	
1 (+)	2 (–)	26 (+)	27 (–)	24 (+)	25 (–)	22 (+)	23 (–)
		Device-specific terminal assignment: adhesive label in terminal cover.					

FOUNDATION Fieldbus

Supply voltage		Input/output 1		Input/output 2		Input/output 3	
1 (+)	2 (–)	26 (A)	27 (B)	24 (+)	25 (–)	22 (+)	23 (–)
		Device-specific terminal assignment: adhesive label in terminal cover.					

PROFIBUS DP

Supply voltage		Input/output 1		Input/output 2		Input/output 3	
1 (+)	2 (–)	26 (B)	27 (A)	24 (+)	25 (–)	22 (+)	23 (–)
		Device-specific terminal assignment: adhesive label in terminal cover.					

PROFIBUS PA

Supply voltage		Input/output 1		Input/output 2		Input/output 3	
1 (+)	2 (–)	26 (B)	27 (A)	24 (+)	25 (–)	22 (+)	23 (–)
		Device-specific terminal assignment: adhesive label in terminal cover.					

Modbus RS485

Supply voltage		Input/output 1		Input/output 2		Input/output 3	
1 (+)	2 (–)	26 (B)	27 (A)	24 (+)	25 (–)	22 (+)	23 (–)
		Device-specific terminal assignment: adhesive label in terminal cover.					

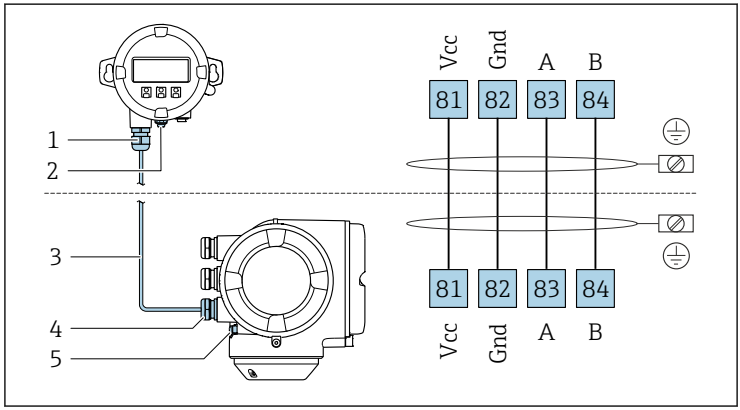
PROFINET

Supply voltage		Input/output 1	Input/output 2		Input/output 3	
1 (+)	2 (–)	PROFINET (RJ45 connector)	24 (+)	25 (–)	22 (+)	23 (–)
			Device-specific terminal assignment: adhesive label in terminal cover.			

EtherNet/IP

Supply voltage		Input/output 1	Input/output 2		Input/output 3	
1 (+)	2 (–)	EtherNet/IP (RJ45 connector)	24 (+)	25 (–)	22 (+)	23 (–)
			Device-specific terminal assignment: adhesive label in terminal cover.			

Remote display and operating module DKX001



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1 *Remote display and operating module DKX001*
2 *Protective earth (PE)*
3 *Connecting cable*
4 *Measuring device*
5 *Protective earth (PE)*

Safety-related values

Order code "Output; input 1"	Output type	Safety-related values "Output; input 1"	
		26 (+)	27 (–)
Option **BA**	Current output 4 to 20 mA HART	$U_N = 30\ V_{DC}$ $U_M = 250\ V_{AC}$	
Option **GA**	PROFIBUS PA	$U_N = 32\ V_{DC}$ $U_M = 250\ V_{AC}$	
Option **LA**	PROFIBUS DP	$U_N = 32\ V_{DC}$ $U_M = 250\ V_{AC}$	
Option **MA**	Modbus RS485	$U_N = 30\ V_{DC}$ $U_M = 250\ V_{AC}$	
Option **SA**	FOUNDATION Fieldbus	$U_N = 32\ V_{DC}$ $U_M = 250\ V_{AC}$	
Option **NA**	EtherNet/IP	$U_N = 30\ V_{DC}$ $U_M = 250\ V_{AC}$	
Option **RA**	PROFINET	$U_N = 30\ V_{DC}$ $U_M = 250\ V_{AC}$	

Order code "Output; input 2"; "Output; input 3"	Output type	Safety-related values			
		Output; input 2		Output; input 3	
		24 (+)	25 (–)	22 (+)	23 (–)
Option **B**	Current output 4 to 20 mA	$U_N = 30\ V_{DC}$ $U_M = 250\ V_{AC}$			
Option **D**	User-configurable input/output	$U_N = 30\ V_{DC}$ $U_M = 250\ V_{AC}$			
Option **E**	Pulse/frequency/ switch output	$U_N = 30\ V_{DC}$ $U_M = 250\ V_{AC}$			
Option **F**	Double pulse output	$U_N = 30\ V_{DC}$ $U_M = 250\ V_{AC}$			
Option **H**	Relay output	$U_N = 30\ V_{DC}$ $I_N = 100\ mA_{DC}/500\ mA_{AC}$ $U_M = 250\ V_{AC}$			
Option **I**	Current input 4 to 20 mA	$U_N = 30\ V_{DC}$ $U_M = 250\ V_{AC}$			
Option **J**	Status input	$U_N = 30\ V_{DC}$ $U_M = 250\ V_{AC}$			

Intrinsically safe values

Order code for "Output; input 1"	Output type	Intrinsically safe values "Output; input 1"	
		26 (+)	27 (–)
Option HA	PROFIBUS PA Ex i (STANDARD + FISCO)	U_i = 32 V I_i = 570 mA P_i = 8.5 W L_i = 10 µH C_i = 5 nF	
Option TA	FOUNDATION Fieldbus Ex i (STANDARD + FISCO)	U_i = 32 V I_i = 570 mA P_i = 8.5 W L_i = 10 µH C_i = 5 nF	

Order code for "Output; input 2"; "Output; input 3"	Output type	Intrinsically safe values			
		Output; input 2		Output; input 3	
		24 (+)	25 (–)	22 (+)	23 (–)
Option **C**	Current output 4 to 20 mA Ex i passive	U_i = 30 V I_i = 100 mA P_i = 1.25 W L_i = 0 C_i = 0			
Option **G**	Pulse/frequency/ switch output Ex i passive	U_i = 30 V I_i = 100 mA P_i = 1.25 W L_i = 0 C_i = 0			

Remote display DKX001

Basic specification, position 1, 2 Approval	Terminal assignment	Basic specification, position 8 Display; Operation Option O
Option **US**	81, 82, 83, 84	U_n = 3.3 V
		I_n = 150 mA

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