

## Safety instructions

### CCOE approval

### VEGABAR 81, 82, 83, 86, 87

Intrinsic safety and flameproof enclosures

4 ... 20 mA

4 ... 20 mA/HART

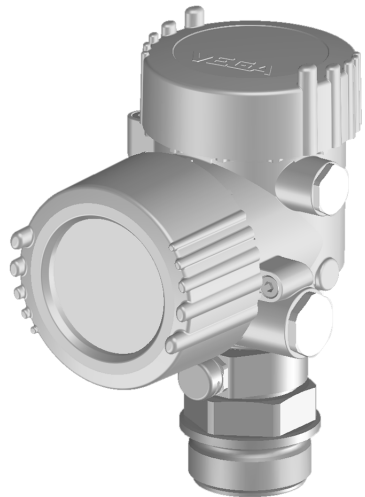
4 ... 20 mA/HART SIL

Profibus PA

Foundation Fieldbus

Slave Sensor for electronic differential pressure measurement (SIL)

Additional current output



Document ID: 62628



# VEGA

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Supplementary documentation:

- Operating instructions VEGABAR 81, 82, 83, 86, 87
- Quick setup guide VEGABAR 81, 82, 83, 86, 87
- Letter P444445 By Government of India (Document ID: 62629)

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## 1 Area of applicability

These safety instructions apply to the pressure transmitters VEGABAR B81/82/83/86/87.DE/Z/Q with integrated electronics Z (4 ... 20 mA), H (4 ... 20 mA/HART), A (4 ... 20 mA/HART with SIL qualification), P (Profibus PA), F (Foundation Fieldbus), S, T (differential pressure measurement) according to Letter P444445/2 By Government of India (certificate number on the type label) and for all instruments with the number of the safety instruction (62628) on the type label.

## 2 General information

The pressure-based measuring instruments VEGABAR B8\*.DE/Z/Q are also used for pressure and level measurement in hazardous areas.

The measured products can also be combustible liquids, gases, mist or vapour.

The VEGABAR B8\*.DE/Z/Q consist of an "Ex-db" electronics housing with integrated electronics module, a process connection element and a sensor, the pressure measuring cell with optionally connected chemical seal. As an option, the display and adjustment module can also be mounted.

The VEGABAR B8\*.DE/Z/Q are suitable for use in hazardous atmospheres of all combustible materials of explosion group IIA, IIB and IIC for applications requiring instruments of type EPL Ga/Gb or EPL Gb.

If the VEGABAR B8\*.DE/Z/Q are installed and operated in hazardous areas, the general Ex installation regulations IEC 60079-14 as well as these safety instructions must be observed.

The operating instructions as well as the installation regulations and standards that apply for explosion protection of electrical systems must always be observed.

The installation of explosion-endangered systems must always be carried out by qualified personnel.

### EPL Ga/Gb instrument

The process connection element is installed in the separating wall, which separates areas in which EPL Ga or EPL Gb instruments are required. The electronics housing is installed in hazardous areas, requiring EPL Gb instruments. The sensor is installed in hazardous areas requiring EPL Ga instruments.

### EPL Gb instrument

The VEGABAR B8\*.DE/Z/Q are installed in hazardous areas requiring EPL Gb instruments.

### Type of protection marking:

Ex d ia IIC T6 ... T1 Ga/Gb

## 3 Technical data

### VEGABAR B8\*.DE/Z/Q with integrated electronics Z (4 ... 20 mA), H (4 ... 20 mA/HART), A (4 ... 20 mA/HART with SIL qualification), version with single chamber housing A, V,

Power supply and signal circuit: (terminals 1[+], 2[-] in the electronics compartment)

- $U_i = 9.6 \dots 35 \text{ V DC}$
- $U_m = 253 \text{ V AC}$

Indicating and adjustment circuit: (terminals 5, 6, 7, 8)

For connection to the circuit of the corresponding external display unit VEGADIS 81 in ignition protection type flameproof enclosure "d" or for connection of a VEGABAR B80 in ignition protection type flameproof enclosure "Ex-db" with integrated electronics S or T as differential pressure measurement.

Circuit for the display and adjustment module: (spring contacts in the .electronics compartment)

For connection to the display and adjustment module PLICSCOM.

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**VEGABAR B8\*.DE/Z/Q with integrated electronics Z (4 ... 20 mA), H (4 ... 20 mA/HART), A (4 ... 20 mA/HART with SIL qualification), version with double chamber housing D, W**

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Power supply and signal circuit: (terminals 1[+], 2[-] in the connection compartment)

- $U_i = 9.6 \dots 35 \text{ V DC}$
- $U_m = 253 \text{ V AC}$

Indicating and adjustment circuit: (terminals 5, 6, 7, 8)

For connection to the circuit of the corresponding external display unit VEGADIS 81 in ignition protection type flameproof enclosure "d" or for connection of a VEGABAR B80 in ignition protection type flameproof enclosure "Ex-db" with integrated electronics S or T as differential pressure measurement.

Circuit for the display and adjustment module: (spring contacts in the .electronics compartment)

For connection to the display and adjustment module PLICSCOM.

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**VEGABAR B8\*.DE/Z/Q with integrated electronics P (Profibus PA), F (Foundation Fieldbus), version with single chamber housing A, V**

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Power supply and signal circuit: (terminals 1[+], 2[-] in the electronics compartment)

- $U_i = 9 \dots 32 \text{ V DC}$
- $U_m = 253 \text{ V AC}$

Indicating and adjustment circuit: (terminals 5, 6, 7, 8)

For connection to the circuit of the corresponding external display unit VEGADIS 81 in ignition protection type flameproof enclosure "d" or for connection of a VEGABAR B80 in ignition protection type flameproof enclosure "Ex-db" with integrated electronics S or T as differential pressure measurement.

Circuit for the display and adjustment module: (spring contacts in the .electronics compartment)

For connection to the display and adjustment module PLICSCOM.

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**VEGABAR B8\*.DE/Z/Q with integrated electronics P (Profibus PA), F (Foundation Fieldbus), version with double chamber housing D, W**

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Power supply and signal circuit: (terminals 1[+], 2[-] in the connection compartment)

- $U_i = 9 \dots 32 \text{ V DC}$
- $U_m = 253 \text{ V AC}$

Indicating and adjustment circuit: (terminals 5, 6, 7, 8)

For connection to the circuit of the corresponding external display unit VEGADIS 81 in ignition protection type flameproof enclosure "d" or for connection of a VEGABAR B80 in ignition protection type flameproof enclosure "Ex-db" with integrated electronics S or T as differential pressure measurement.

Circuit for the display and adjustment module: (spring contacts in the .electronics compartment)

For connection to the display and adjustment module PLICSCOM.

## VEGABAR B8\*.DE/Z/Q with integrated electronics S or T, for differential pressure measurement

Power supply and signal circuit: (terminals 5, 6, 7, 8 in the electronics compartment) For connection to a VEGABAR B8\*.E\*\*\*\*\* with integrated electronics H, A, P, F for differential pressure measurement

## VEGABAR B8\*.DE/Z/Q with electronics H (4 ... 20 mA/HART), A (4 ... 20 mA/HART with SIL qualification) and with supplementary electronics (Z)

Power supply and signal circuit I: (terminals 1[+], 2[-])

- $U_i = 9.6 \dots 35 \text{ V DC}$
- $U_m = 253 \text{ V AC}$

Power supply and signal circuit II: (terminals 7[+], 8[-])

- $U_i = 9.6 \dots 35 \text{ V DC}$
- $U_m = 253 \text{ V AC}$

Display and adjustment circuit: (spring contacts in the electronics compartment) For connection to the display and adjustment module PLICSCOM.

## VEGABAR B8\*.DE/Z/Q Version with separate cable outlet (all electronics)

Circuit between sensor unit and external electronics (terminal 1- yellow, terminal 2 - white, terminal 3 - red, terminal 4 - black) In type of protection intrinsic safety Ex ia IIC  
With VEGABAR B8\*.DC in the version with fix mounted cable on the sensor unit and external electronics, the supplied cable between the external housing and the sensor unit must not exceed a length of 180 m.

The metallic parts of VEGABAR B8\*.DE/Z/Q are electrically connected with the earth terminals.

The intrinsically safe circuits to the sensor are galvanically connected to ground potential.

## 4 Application conditions

### VEGABAR B8\*.DE/Z/Q with integrated electronics Z (4 ... 20 mA), H (4 ... 20 mA/HART) or A (4 ... 20 mA/HART with SIL qualification), P (Profibus PA), F (Foundation Fieldbus) or S, T (differential pressure measurement)

The max. permissible ambient temperatures depending on the temperature classes are specified in the following tables.

#### EPL Ga/Gb instrument

Temperature class	Ambient temperature on the electronics (Zone 1)		Product temperature range (sensor, zone 0)
	Housing lid without inspection window	Housing lid with inspection window	
T6	-60 ... +60 °C	-50 ... +60 °C	-20 ... +23 °C
T5, T4, T3, T2, T1	-60 ... +70 °C	-50 ... +70 °C	-20 ... +60 °C

For applications requiring instruments of category 1/2G the process pressure of the media must be between 0.8 ... 1.1 bar. The 80% consideration of Sect. 6.4.2/EN 1127-1 is taken into account with the permissible ambient temperatures. If the VEGABAR B8\*.DE/Z/Q are operated at temperatures higher than those specified in the above table, please make sure by means of appropriate measures that there is no danger of ignition from the hot surfaces. The maximum temperature on the electronics/housing should not exceed the values stated in the above table. The application conditions in areas without hazardous mixtures are specified in the manufacturer information.

### EPL Gb instrument, VEGABAR 82, VEGABAR 83 with METEC measuring cell

Temperature class	Ambient temperature on the electronics (Zone 1)		Product temperature range (sensor, zone 1)
	Housing lid without inspection window	Housing lid with inspection window	
T6	-60 ... +60 °C	-50 ... +60 °C	-50 ... +39 °C
T5	-60 ... +70 °C	-50 ... +70 °C	-50 ... +100 °C
T4	-60 ... +50 °C	-50 ... +50 °C	-50 ... +135 °C
T3, T2, T1	-60 ... +50 °C	-50 ... +50 °C	-50 ... +200 °C

### EPL Gb instrument, VEGABAR 83 version with piezoresistive/strain gauge measuring cell, version without cooling element

Temperature class	Ambient temperature on the electronics (Zone 1)		Product temperature range (sensor, zone 1)
	Housing lid without inspection window	Housing lid with inspection window	
T6	-60 ... +60 °C	-50 ... +60 °C	-50 ... +39 °C
T5	-60 ... +70 °C	-50 ... +70 °C	-50 ... +85 °C
T4	-60 ... +40 °C	-50 ... +40 °C	-50 ... +105 °C
T4, T3, T2, T1	-60 ... +30 °C	-50 ... +30 °C	-50 ... +120 °C

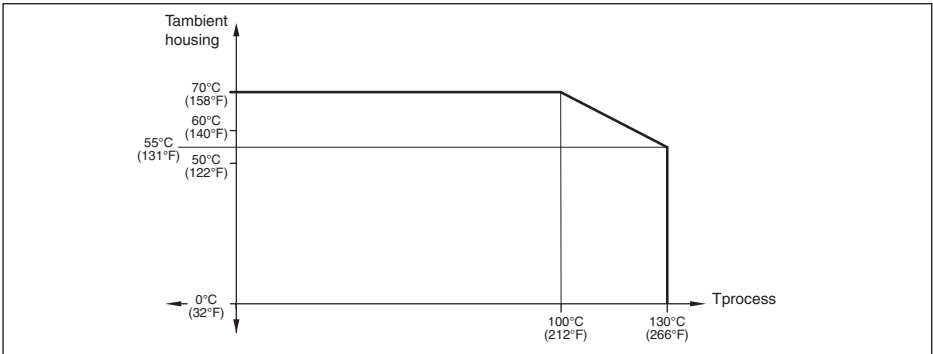
### EPL Gb instrument, VEGABAR 81, VEGABAR 83 version with piezoresistive/strain gauge measuring cell, version with cooling element

Temperature class	Ambient temperature on the electronics (Zone 1)		Product temperature range (sensor, zone 1)
	Housing lid without inspection window	Housing lid with inspection window	
T6	-60 ... +60 °C	-50 ... +60 °C	-50 ... +39 °C
T5	-60 ... +70 °C	-50 ... +70 °C	-50 ... +85 °C
T4	-60 ... +50 °C	-50 ... +50 °C	-50 ... +120 °C
T3, T2, T1	-60 ... +40 °C	-50 ... +40 °C	-50 ... +150 °C

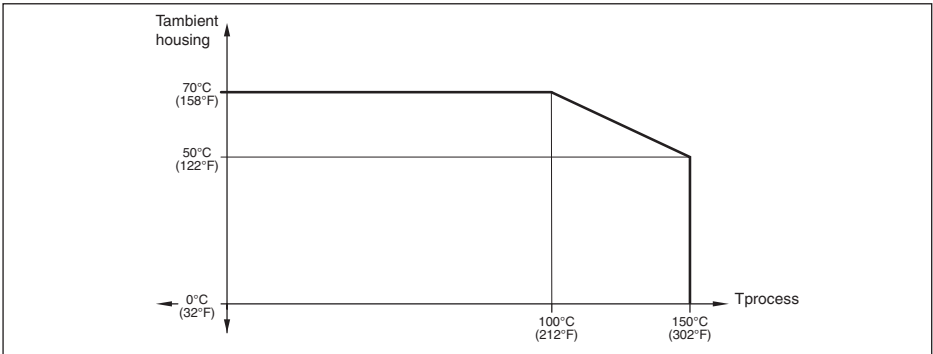
If the VEGABAR B8\*.DE/Z/Q are operated at temperatures higher than those specified in the above table, please make sure through appropriate measures that there is no danger of ignition from the hot surfaces. The max. permissible temperature on the electronics/housing should not exceed the values specified in the above table. The application conditions during operation with no explosive mixtures present are stated in the manufacturer information.

Temperature derating

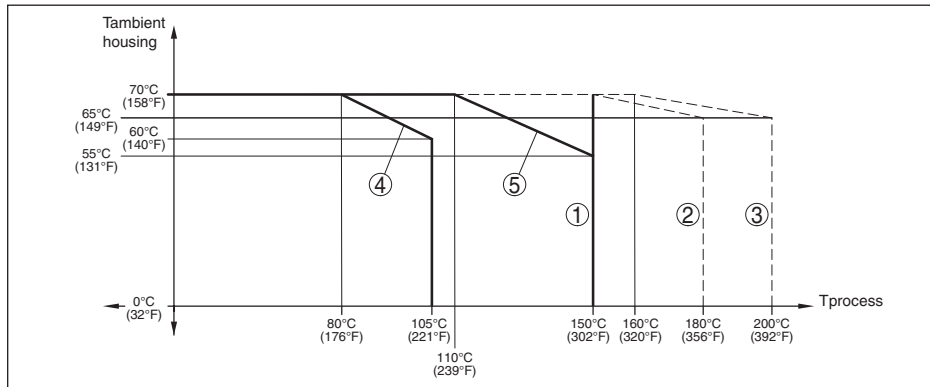
VEGABAR 82, version process temperature +130 °C



VEGABAR 82, version process temperature +150 °C



## VEGABAR 81, VEGABAR 83



- 1 Version: METEC measuring cell, process temperature max. 150 °C
- 2 Version: METEC measuring cell, process temperature max. 180 °C
- 3 Version: METEC measuring cell, process temperature max. 200 °C
- 4 Version: Piezoresistive/strain gauge measuring cell, without cooling element
- 5 Version: Piezoresistive/strain gauge measuring cell, with cooling element

The temperature ranges for operation specified in the operating instruction must not be exceeded.

## 5 Protection against static electricity

The VEGABAR B8\*.DE/Z/Q in versions with electrostatically chargeable plastic parts, such as e.g. metal housing with inspection window, plastic-coated sensors, suspension cable/hose, distance tube or the connection cable of the separated version, have a caution label that points out the safety measures that must be taken with regard to electrostatic charges during operation.

**WARNING - DO NOT OPEN WHEN AN  
EXPLOSIVE ATMOSPHERE IS PRESENT**

Caution: Plastic parts! Danger of electrostatic charging!

- Avoid friction
- No dry cleaning
- Do not mount in areas with flowing, non-conductive products

## 6 Use of an overvoltage arrester

If necessary, a suitable overvoltage arrester can be connected in front of the VEGABAR B8\*.DE/Z/Q.

When used as EPL Ga/Gb instrument, as far as necessary analogue, a suitable overvoltage arrester must be connected in front as protection against voltage surges according to IEC 60079-14.

## 7 Grounding

The "Ex-db" connection compartment of VEGABAR B8\*.DE/Z/Q includes a safety barrier without galvanic separation. For safety reasons, the intrinsically safe circuits must be grounded.

The external/internal ground connection terminal on the housing of VEGABAR B8\*.DE/Z/Q must have a low impedance connection to the potential equalization.



## 8 Impact and friction sparks

When used as category EPL Ga/Gb instruments, the VEGABAR B8\*.DE/Z/Q in light metal versions (e.g. aluminium/titanium) must be mounted in such a way that sparks from impact and friction between light metals and steel (except stainless steel, if the presence of rust particles can be excluded) cannot occur.

## 9 Material resistance

For applications requiring instruments of category EPL Ga/Gb the VEGABAR B8\*.DE/Z/Q should only be used in media against which the wetted materials are sufficiently resistant.

## 10 Installation/construction

The VEGABAR B8\*.DE/Z/Q have to be mounted such that the sensor is effectively secured against touching the vessel wall, under consideration of other vessel installations and flow conditions in the vessel. This applies especially to suspension pressure transmitters and versions with distance tube lengths over 3 m.

## 11 Type of protection flameproof enclosure Ex "db"

The terminals for connecting to the operating voltage, i.e. signal circuits, are integrated in a compartment according to type of protection flameproof enclosure "db".

The thread gaps between housing and cover as well as between threaded fitting and container are flameproof joints.

The flameproof joints are not intended to be repaired.

The joint surfaces are not coated with paint or are not powder coated.

The "Ex-db" connection compartment is provided with a M20 x 1.5 or ½-14 NPT thread for connection to a certified "Conduit" system or for mounting a "Ex-db" cable entry certified according to IEC 60079-1. Cable entries of simple construction may not be used. Please take note of section 13.1 and 13.2 of IEC 60079-1. When connecting to a "Conduit" system, the associated sealing facility must be located directly on the "Ex-db" connection compartment.

A certified "Ex-db" cable gland can optionally be supplied with the delivery. It is suitable for insertion of armoured or unarmoured cables depending on the ordered version. The "Ex-db" cable entry must be screwed tightly into the housing. The instructions in the document accompanying the respective cable entry must be observed. The supplied cable entry is suitable for the housing temperature range mentioned in the VEGABAR B8\*.DE/Z/Q specification. If a different cable entry is used, the separately certified cable entry or the temperature classes on the electronics determines the maximum permissible ambient temperature on the housing.

The factory-installed screw plug or blind plug (depending on the type ordered) is part of the "Ex-db" housing. If a screw plug type other than the factory-installed screw plug or the one with article number 2.30690 is used, it must be suitable for the function and certified according to IEC 60079-1.

Before opening the lid of a "Ex-db" compartment or in case it is already open (e.g. during connection or service work), make sure that either the supply cable is completely voltage free or no explosive atmosphere is present.

When wiring the connection line to the "Ex-db" connection compartment, it must be sufficiently secured against damage and in conformity with IEC 60079-14.

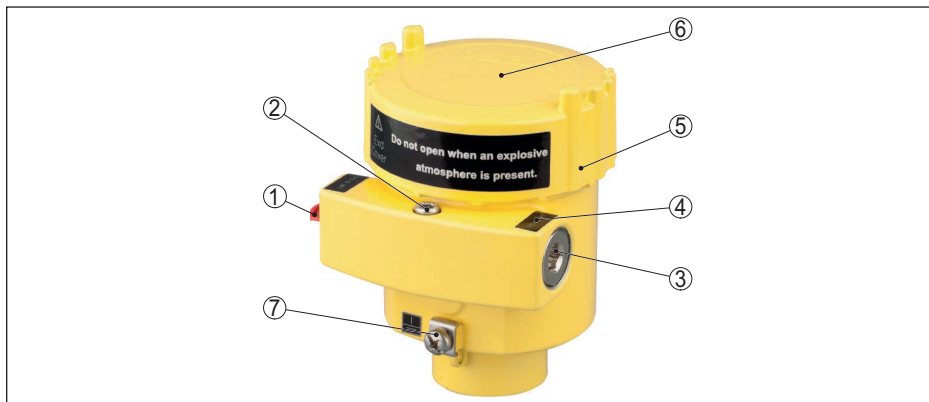
The connection cables, the cable entries and the closing screws or the pipeline sealing facilities must be suitable for the lowest ambient temperature.

The cover of the "Ex-db" connection compartment must be screwed in completely before commissioning and secured by screwing out the lid locking screw all the way to the stop.

Unused openings must be sealed according to IEC 60079-1 paragraph 11.9.

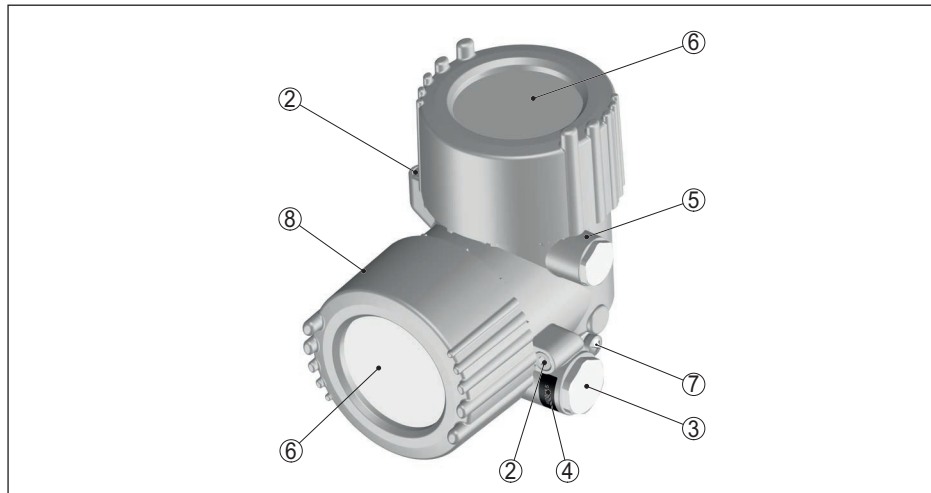
The cover of the "Ex-db" connection compartment is provided with the warning label "Do not open when an explosive gas atmosphere is present".

### Single chamber housing with "Ex-db" connection compartment

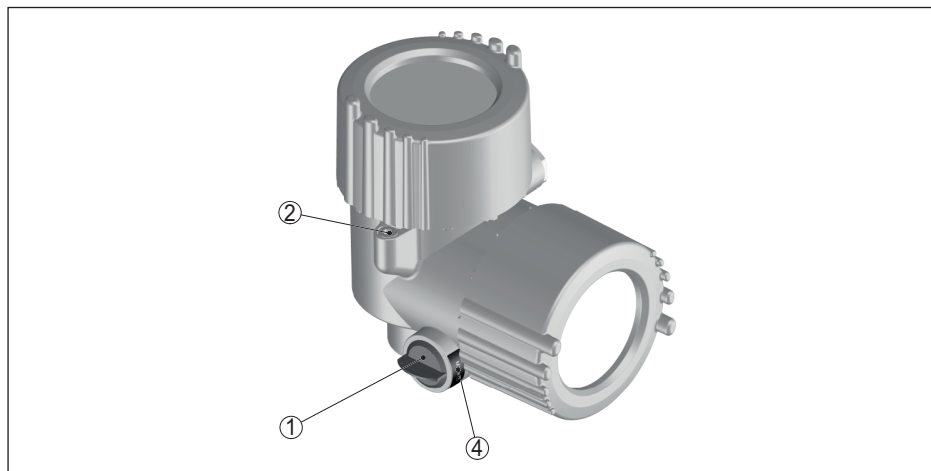


- 1 Thread protection
- 2 Locking screw of the lid
- 3 Screw plug
- 4 Marking of the thread
- 5 "Ex-db" connection compartment with electronics module
- 6 Optionally with inspection window
- 7 External ground terminal

## Double chamber housing with two "Ex-db" compartments



- 1 Thread protection
- 2 Locking screw of the lid
- 3 Screw plug
- 4 Marking of the thread
- 5 "Ex-db" electronics compartment
- 6 Optionally with inspection window
- 7 External ground terminal
- 8 "Ex-db" connection compartment



- 1 Thread protection
- 2 Locking screw of the lid
- 4 Marking of the thread

## 12 Installation of the VEGABAR B8\*.DE/Z/Q with separate housing

With the version with separate housing of the pressure transmitter VEGABAR B8\*.DE/Z/Q, the potential equalization must be provided in the complete range of the connection cable between electronics housing and transmitter housing.

## 13 Type and size of the threads for the "Ex-db" cable entries

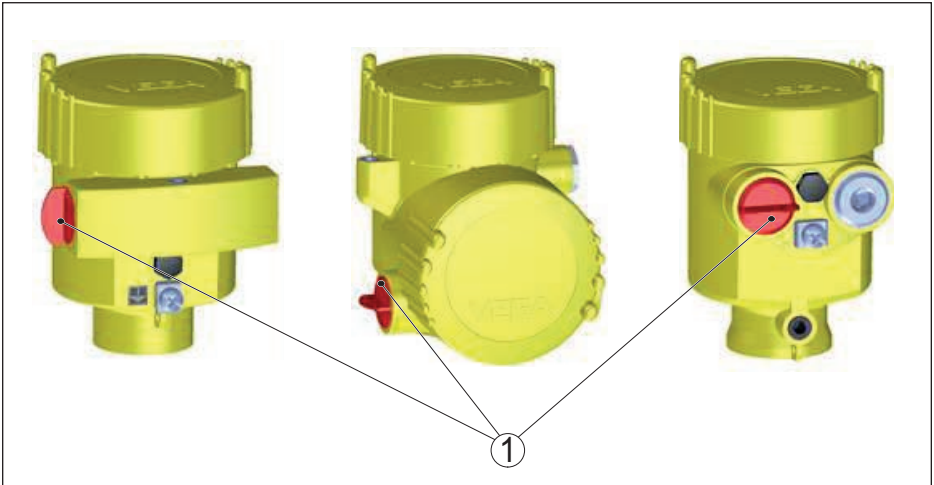
The "Ex-db" connection compartment of VEGABAR B8\*.DE/Z/Q with cable entry type L, O, D or 6 has cable entries M20 x 1.5.

The "Ex-db" connection compartment of VEGABAR B8\*.DE/Z/Q with cable entry type N, 8 or P has cable entries 1/2-14 NPT.

## 14 Removing and replacing the red threaded/dust cover

The red thread or dust covers screwed in when the instrument is shipped (depending on the version) must be removed before setup. The openings must be closed before setup by a way approved for the ignition protection type. Approved and suitable cable glands or blind plugs must be installed according to the supplied documents.

Before setting up VEGABAR B8\*.DE/Z/Q you have to check if all other openings are closed in a way approved for the ignition protection type.



- 1 Red thread or dust cover must be removed before setup. The opening must be closed before setup by a way approved for the ignition protection type.

## Confirmation

Hereby the company VEGA Grieshaber KG declares that the approved CCOE devices have been manufactured in accordance with the ATEX approval mentioned in the attached CCOE certificate.

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# VEGA

All statements concerning scope of delivery, application, practical use and operating conditions of the sensors and processing systems correspond to the information available at the time of printing.

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