Safety instructions
VEGABAR 81, 82, 83, 86, 87

Dust ignition protection by enclosure

TÜV 13 ATEX 131120 X

4 … 20 mA

4 … 20 mA/HART

4 … 20 mA/HART SIL

Profibus PA

Foundation Fieldbus

Modbus

Secondary Sensor for electronic differential pressure measurement (SIL)

CE 0044

Document ID: 50900

VEGA

Contents

Supplementary documentation:

- Operating instructions VEGABAR 81, 82, 83, 86, 87
- Quick setup guide VEGABAR 81, 82, 83, 86, 87
- EU-type approval certificate TÜV 13 ATEX 131120 X (Document ID: 50901)
- EU declaration of conformity (Document ID: 47246)
- SIL Safety Manual Document ID: 48369)

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50900-EN-201110

DE	Sicherheitshinweise für den Einsatz in explosionsgefährdeten Bereichen
EN	Safety instructions for the use in hazardous areas
FR	Consignes de sécurité pour une application en atmosphères explosibles
IT	Normative di sicurezza per l'impiego in luoghi con pericolo di esplosione
ES	Instrucciones de seguridad para el empleo en áreas con riesgo de explosión
PT	Normas de segurança para utilização em zonas sujeitas a explosão
NL	Veiligheidsaanwijzingen voor gebruik op plaatsen waar ontploffingsgevaar kan heersen
SV	Säkerhetsanvisningar för användning i explosiionsfarliga områden
DA	Sikkerhedsforskrifter til anvendelse i explosionsfarlig atmosfare
FI	Turvallisuusohjeet räjähdysvaarallisisssa tiloissa käyttöä varten
EL	Υποδείξεις ασΦαλείας για τη χρησιμοποίηση σε περιοχές που υπάρχει κίνδυνος έκρηξης

DE	Die vorliegenden Sicherheitshinweise sind im Download unter www.vega.com standardmäßig in den Sprachen deutsch, englisch, französisch und spanisch verfügbar. Weitere EU-Landessprachen stellt VEGA nach Anforderungen zur Verfügung.
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1 Area of applicability

These safety instructions apply to pressure transmitters VEGABAR 81, 82, 83, 86 and 87 of series VEGABAR *8*(*).AR/H/I/J/S/T, *8*.VR according to the EU type approval certificate TÜV 13 ATEX 131120 X (certificate number on the type label) and for all instruments with the number of the safety instruction (50900) on the type label.

2 General information

The pressure transmitters VEGABAR *8*(*).AR/H/I/J/S/T, *8*.VR are used for monitoring or control of levels and pressures also in areas with combustible, dust generating bulk solids.

The VEGABAR *8*(*).AR/H/I/J/S/T, *8*.VR consist of a metallic process connection element, a sensor and a processing electronics in a metal or plastic housing (separate version, with electronics housing in Ex-free area).

The VEGABAR *8*(*).AR/H/I/J/S/T, *8*.VR are suitable for applications in hazardous atmospheres of combustible dusts, for applications requiring instruments of category 1D, 1/3D, 1/2/-D or 2D.

If the VEGABAR *8*(*).AR/H/I/J/S/T, *8*.VR are installed and operated in hazardous areas, the general Ex installation regulations EN 60079-14 as well as these safety instructions must be observed.

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

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

The requirements of EN 61241-1 e.g. with respect to dust deposits and temperatures must be fulfilled.

Category 1D instruments
The VEGABAR *8*(*).AR/H/I/J/S/T, *8*.VR are installed in hazardous areas requiring an instrument of category 1D.

Category 1/2D instruments
The electronics housing is installed in hazardous areas requiring instruments of category 2D. The process connection element is installed in the separating wall, which separates areas requiring instruments of category 2D or 1D. The sensor with the mechanical fixing element is installed in hazardous areas requiring instruments of category 1D.

Category 1/3D instruments
The electronics housing is installed in hazardous areas requiring instruments of category 3D. The process connection element is installed in the separating wall, which separates areas requiring instruments of category 3D or 1D. The sensor with the mechanical fixing element is installed in hazardous areas requiring instruments of category 1D.

Category 1/2/-D instruments
The process connection element is installed in the separating wall, which separates areas in which instruments of category 2D or 1D are required. The sensor with the mechanical fixing element is installed in hazardous area requiring instruments of category 1D. The electronics housing is installed in safe areas outside hazardous areas.

Category 2D instruments
The VEGABAR *8*(*).AR/H/I/J/S/T, *8*.VR are installed in hazardous areas requiring an instrument of category 2D.

Type of protection marking:
Instruments with a gas/dust combination approval and two classification marks on the type label can be either used in gas or dust.

Instruments with an "Ex-t/Ex-ia" combination approval and two classification marks on the type label, the instrument must no longer be used as intrinsically safe instrument after a non-intrinsically safe power supply.

- VEGABAR *8*(*).A **R******(*)Z/H/A/S/T/P/F/U******
- VEGABAR *8*(*).A **R******(*)H/AZ******
  - II 1D, 1/2D, 1/3D, 2D Ex ta ia, ia/tb, ia/tc, tb ia IIIC TX°C Da, Da/Db, Da/Dc, Db
  - T: see thermal characteristics
- VEGABAR *8*(*).A **H******(*)Z/H/A/S/T/P/F/U******
- VEGABAR *8*(*).A **H******(*)H/AZ******
  - II 1D, 1/2D, 1/3D, 2D Ex ta ia, ia/tb, ia/tc, tb ia IIIC TX°C Da, Da/Db, Da/Dc, Db
  - T: see thermal characteristics
  - II 1G, 1/2G, 2G Ex ia IIC T6 … T1 Ga, Ga/Gb, Gb
- VEGABAR *8*(*).A **J******(*)Z/H/A/S/T/P/F/U******
  - II 1D, 1/2D, 1/3D, 2D Ex ta ia, ia/tb, ia/tc, tb ia IIIC TX°C Da, Da/Db, Da/Dc, Db
  - T: see thermal characteristics
  - II 1/2G, 2G Ex d IIC T6 … T1 Ga/Gb, Gb
- VEGABAR *8*(*).A **I******(*)Z/H/A/S/T/P/F/U******
  - II 1D, 1/2D, 1/3D, 2D Ex ta ia, ia/tb, ia/tc, tb ia IIIC TX°C Da, Da/Db, Da/Dc, Db
  - T: see thermal characteristics
  - II 1/2G, 2G Ex d ia IIC T6 … T1 Ga/Gb, Gb
- VEGABAR *8*(*).A **S******(*)Z/H/A/S/T/P/F/U******
  - II 1/2/-D, 1/2D Ex ia/ia/-, ia/tb ia IIIC TX°C Da/Db/-, Da/Db
  - T: see thermal characteristics
- VEGABAR *8*(*).A **T******(*)Z/H/A/S/T/P/F/U******
  - II 1/2/-D, 1/2D Ex ia/ia/-, ia/tb ia IIIC TX°C Da/Db/-, Da/Db
  - T: see thermal characteristics
  - II 1/2G, 2G Ex ia IIC T6 … T1 Ga/Gb, Gb

3 Technical data

3.1 Electrical data

In order to guarantee the rated voltage U_m and not to endanger the type of protection, the power supply units used must meet the requirements for a SELV or PELV power supply unit.

Electrical data of the supply circuits

VEGABAR *8*(*).*R/H/J/S/T****(*)******
VEGABAR *8*(*).*R/H/J/S/T******(*)Z/H/A******

Power supply and signal circuit: (terminals 1[+], 2[-] in electronics compartment; with double chamber housing version in connection compartment)	U_n = 9.6 … 30 V DC I_n = 4 … 22 mA U_m = 30 V d. c.

VEGABAR *8*(*).*R/H/J/S/T****(*)H/AZ******

Power supply and signal circuit I: (terminals 1[+], 2[-] in the connection compartment)	U_n = 9.6 … 30 V DC I_n = 4 … 22 mA U_m = 30 V d. c.
Power supply and signal circuit II: (terminals 17[+], 18[-] in the connection compartment)	U_n = 9.6 … 30 V DC I_n = 4 … 22 mA U_m = 30 V d. c.

VEGABAR *8*(*).*R/H/J/S/T****(*)P/F******

Power supply and signal circuit: (terminals 1[+], 2[-] in electronics compartment; with double chamber housing version in connection compartment)	U_n = 9.6 … 32 V DC I_n = 4 … 11 mA U_m = 32 V d. c.

VEGABAR *8*(*).*R/H/J/S/T****(*)S/T******

Power supply and signal circuit I: (terminals 5, 6, 7, 8)	For connection of a VEGABAR series 80 with integrated electronics H/A/P/F as differential pressure measurement.

VEGABAR *8*(*).*R/H/J/S/T****(*)H/A/P/F******

Power supply and signal circuit I: (terminals 5, 6, 7, 8)	For connection to the circuit (terminals 5, 6, 7, 8) of the corresponding external display unit VEGADIS 61/81 or for connection of a VEGABAR series 80 with integrated electronics S or T as differential pressure measurement.

VEGABAR *8*(*).*R/S/I****(*)******
VEGABAR *8*(*).*R/S/I****(*)Z/H******

Power supply and signal circuit: (terminals 1[+], 2[-] in electronics compartment; with double chamber housing version in connection compartment)	U_n = 9.6 … 30 V DC I_n = 4 … 22 mA U_m = 30 V d. c.

VEGABAR *8*(*).*R/S/I****(*)U******

Power supply and signal circuit I: (terminals 1[+], 2[-] in the connection compartment)	U_n = 9.6 … 30 V DC I_n = 4 … 22 mA U_m = 30 V d. c.
Power supply and signal circuit II: (terminals MB[+], MB[-])	U_n = 5 V DC I_n = 4 … 22 mA U_m = 5 V d. c. MODBUS signal (telegram)

VEGABAR *8*(*).*R/S/I****(*)H******

Power supply and signal circuit I: (terminals 5, 6, 7, 8)	For connection to the circuit (terminals 5, 6, 7, 8) of the corresponding external display unit VEGADIS 61/81 or for connection of a VEGABAR series 80 with integrated electronics S or T as differential pressure measurement.

VEGABAR *8*(*).*S/T****(*)******
VEGABAR *8*(*).*S/T****(*)Z/H/A/S/T/P/F(U)******

Transmitter circuits: (terminals 1 [yellow], 2[white], 3 [red], 4 [black]	In the version with a cable between electronics and transmitter housing, a length of the supplied cable of max. 180 m is permitted. The intrinsically safe circuits to the sensor are galvanically connected to ground potential.

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3.2 Thermal characteristics

Permissible ambient temperature

As category 1D instrument

Permissible temperature range	
– Electronics housing	-40 … +60 °C
– Sensor	-40 … +60 °C
Max. surface temperature	
– Electronics housing (electronics Z/H/A/S/T/P/F)	Ambient temperature +42 K

As category 2D instruments

Permissible temperature range	
– Electronics housing	-40 … +60 °C
– Sensor	-40 … +60 °C
Max. surface temperature	
– Sensor	Ambient temperature +41 K

As category 1/2D, 1/3D instruments

Permissible temperature range	
– Electronics housing	-40 … +60 °C
– Sensor	-40 … +60 °C
Max. surface temperature	
– Electronics housing (electronics Z/H/A/S/T/P/F)	Ambient temperature +5 K
– Sensor	Ambient temperature +41 K

As category 1/2D, 1/3D instrument with temperature adapter

Permissible temperature range	
– Electronics housing	-40 … +60 °C
– Sensor	-40 … +130 °C
Max. surface temperature	
– Electronics housing (electronics Z/H/A/S/T/P/F)	Ambient temperature +20 K
– Sensor	Ambient temperature +41 K
Permissible temperature range	
– Electronics housing	-40 … +60 °C
– Sensor	-40 … +150 °C
Max. surface temperature	
– Electronics housing (electronics Z/H/A/S/T/P/F)	Ambient temperature +20 K
– Sensor	Ambient temperature +41 K

Permissible temperature range	
– Electronics housing	-40 … +60 °C
– Sensor	-40 … +180 °C
Max. surface temperature	
– Electronics housing (electronics Z/H/A/S/T/P/F)	Ambient temperature +16 K
– Sensor	Ambient temperature +41 K
Permissible temperature range	
– Electronics housing	-40 … +60 °C
– Sensor	-40 … +200 °C
Max. surface temperature	
– Electronics housing	Ambient temperature +17 K
– Sensor	Ambient temperature +41 K

As category 1/2/-D instruments	
Permissible temperature range	
– Electronics housing	-40 … +60 °C
Max. surface temperature	
– Sensor	Ambient temperature +41 K

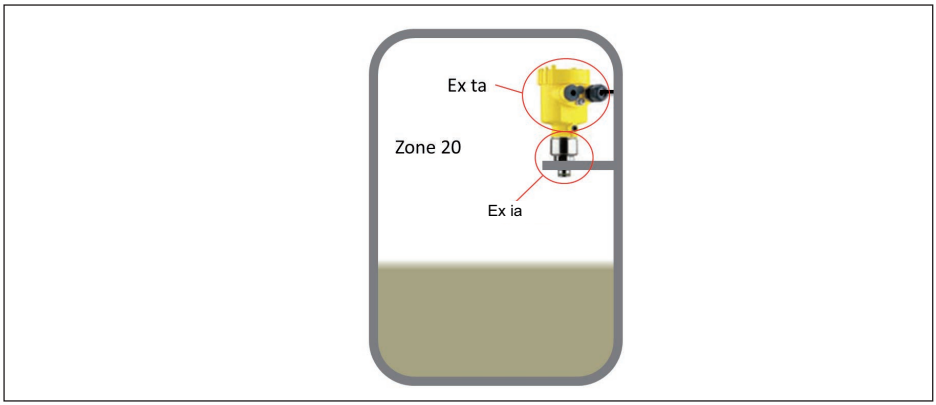
Protection according to EN 60529 Protection rating	
On the sensor, category 1D or 2D	IP68
On the electronics housing, category 1D or 2D	IP68

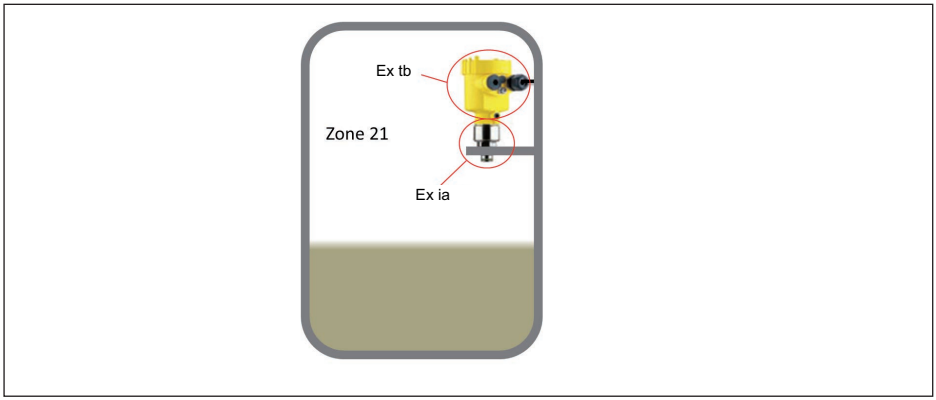
Permissible operating pressure
For operation in hazardous atmospheres the process pressure must be between 0.8 … 1.1 bar.

The application conditions during operation without explosive mixtures are mentioned in the operating instructions manuals.

4 Installation possibilities: Version with compact housing

Category 1D and 2D instrument
Sensor is mounted completely in zone 20

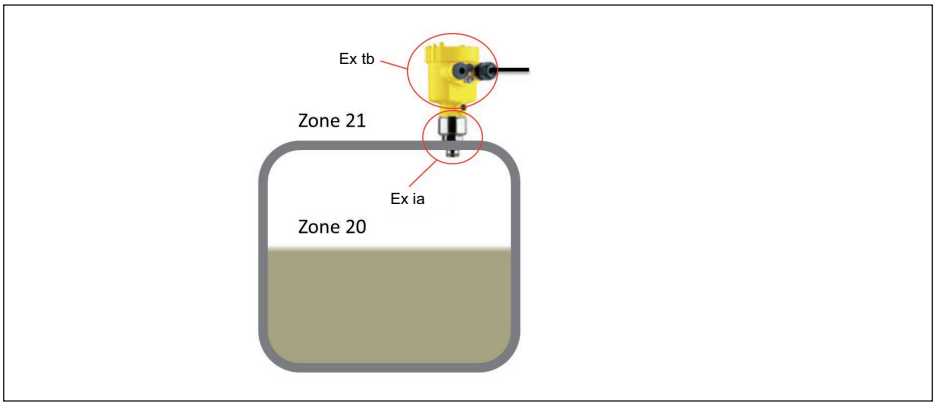




- The thermal data for category 2D instruments must be considered
- For the electronics housing, the cable entries and the filter element, the Ex-technical requirements for zone 21 (only stainless steel and Aluminium housing with cable entries suitable and certified for dust-Ex, no DISADAPT and no plug connecters permitted) are applicable

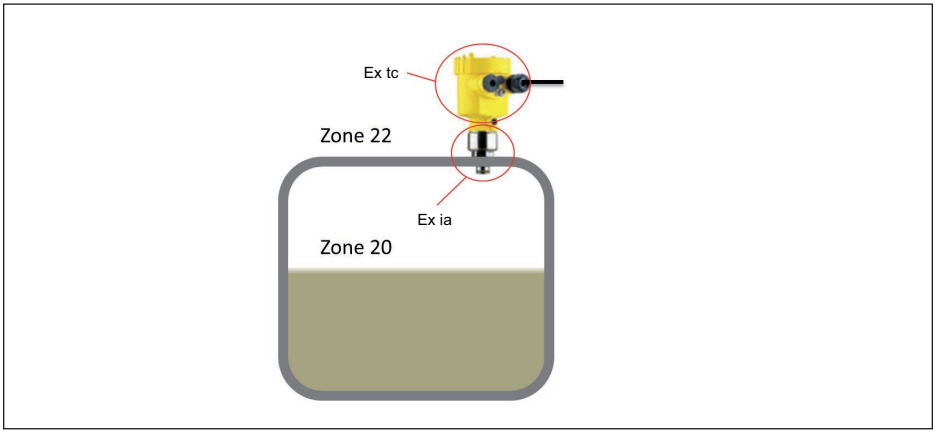
Category 1/2D and 1/3D instruments

Sensor in mounted in the separating wall between zone 20 and zone 21



- The thermal data for category 1/2D instruments must be considered
- For the electronics housing, the cable entries and the filter element, the Ex-technical requirements for zone 21 (only stainless steel and Aluminium housing with cable entries suitable and certified for dust-Ex, no DISADAPT and no plug connecters permitted) are applicable

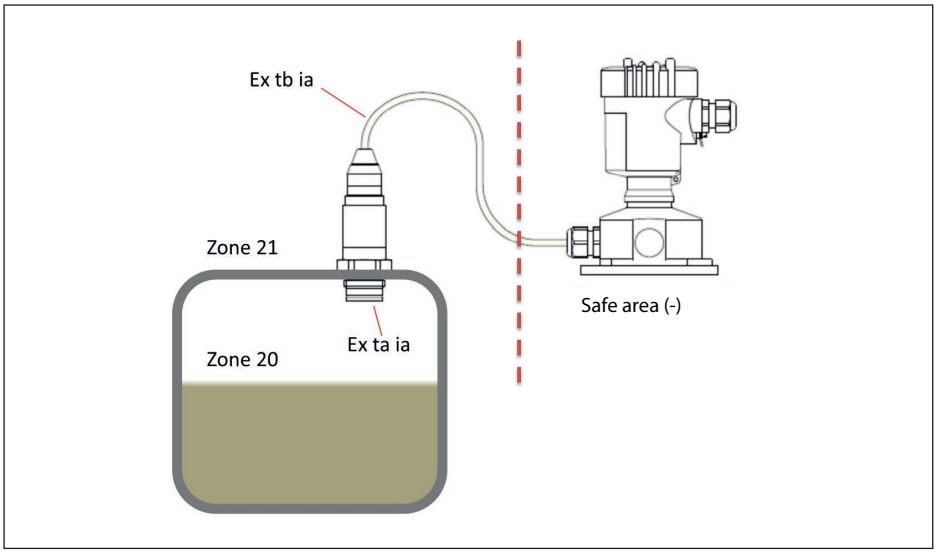
Sensor in mounted in the separating wall between zone 20 and zone 22



- The thermal data for category 1/3D instruments must be considered
- For the electronics housing, the cable entries and the filter element, the Ex-technical requirements for zone 21 (only stainless steel and Aluminium housing with cable entries suitable and certified for dust-Ex, no DISADAPT and no plug connecters permitted) are applicable

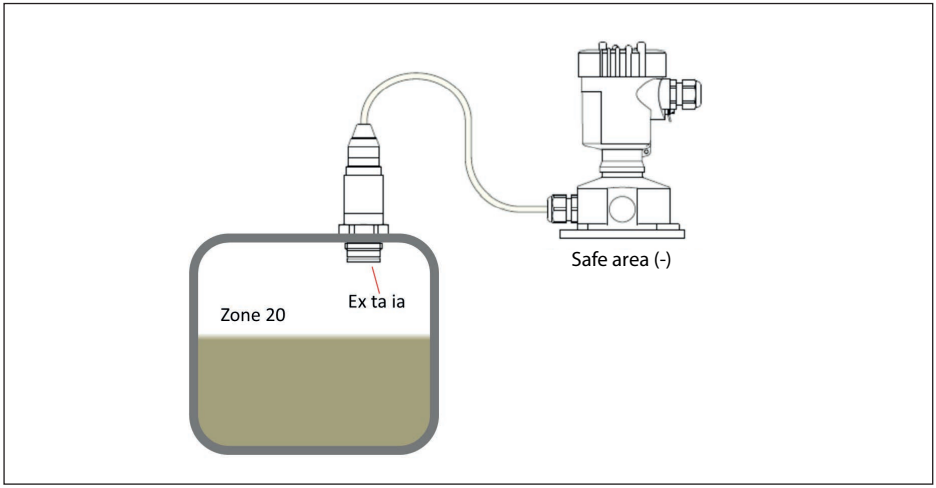
5 Installation possibilities: Version with remote housing

Category 1/2/-D instruments
Electronics and connection housing in safe area

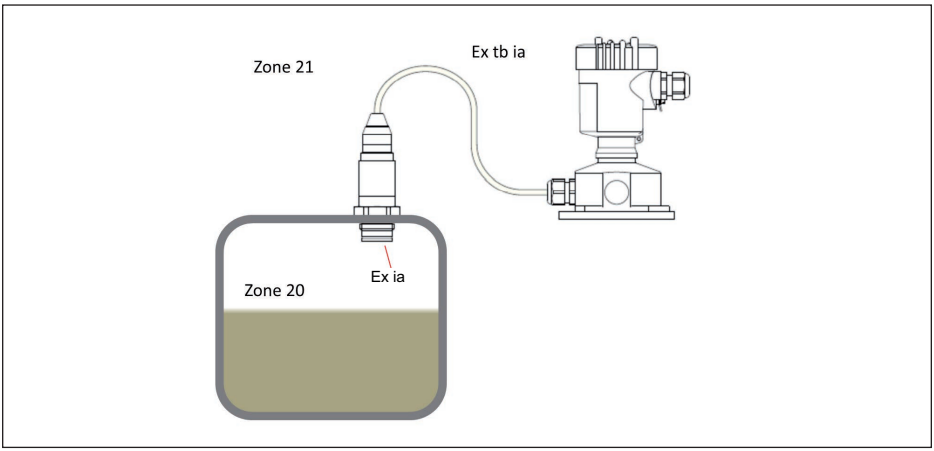


- The connection cable is an intrinsically safe circuit
- For the electronics and connection housing, the cable entries and the filter element, no special Ex-technical requirements (also plastic housing, electropolished stainless steel housing, DISADAPT and plug connecters permitted) are applicable

Electronics and connection housing as well as connecion cable in safe area



- The connection cable is an intrinsically safe circuit
- For the electronics and connection housing, the cable entries and the filter element, no special Ex-technical requirements (also plastic housing, electropolished stainless steel housing, DISADAPT and plug connecters permitted) are applicable



- The connection cable is an intrinsically safe circuit
- For the electronics and connection housing, the cable entries and the filter element, the Ex-technical requirements for zone 21 (only stainless steel and Aluminium housing with cable entries suitable and certified for dust-Ex, no DISADAPT and no plug connecters permitted) are applicable

6 Grounding/Potential equalization

The VEGABAR *8*(*).AR/H/I/J/S/T, *8*.VR must be grounded.

With the version with separate housing of the pressure transmitters VEGABAR *8*(*).AR/H/I/J/S/T, *8*.VR, the potential equalization must be previded in the complete range of the connection cable between electronics housing and transmitter housing.

7 Cable entries

The supplied cable entry is suitable for the housing temperature range specified in the VEGABAR *8*(*).AR/H/I/J/S/T, *8*.VR certificate.

Cable entries must only be replaced by the same types or suitable cable entries/glands which are certified according to ATEX with at least IP66.

If a different cable entry is used, the separately certified cable entry determines the max. permissible ambient temperature on the electronics housing (max. values: -40 °C, +80 °C).

8 Material resistance

The VEGABAR *8*(*).AR/H/I/J/S/T, *8*.VR must only be used in media against which the materials of the wetted parts are sufficiently resistant.

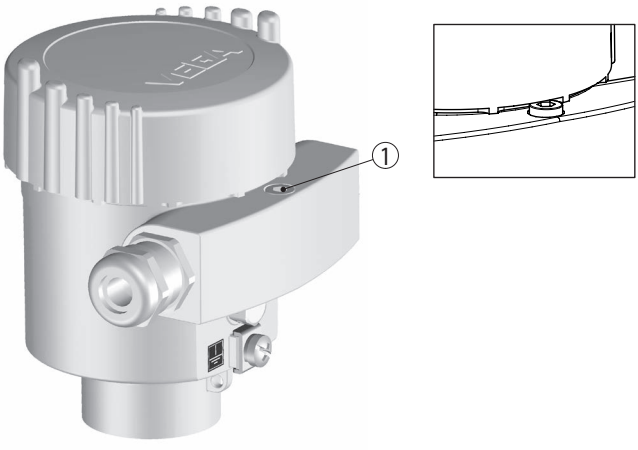
9 Locking mechanism of housing cover

With single-chamber housing versions, the lid must be screwed in to the stop and secured with the locking device before setup and use of VEGABAR *8*(*).AR/H/I/J/S/T, *8*.VR in hazardous atmospheres.

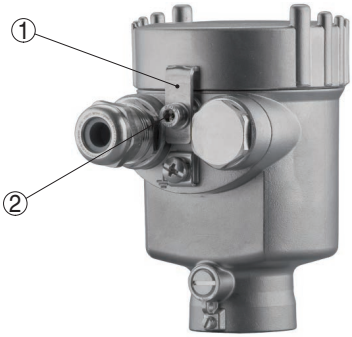
With double-chamber housing versions, the lid of the connection compartment and the lid of the electronics compartment must be screwed in to the stop and secured with the corresponding locking device before setup and use of VEGABAR *8*(*).AR/H/I/J/S/T, *8*.VR in hazardous atmos-

pheres.

Single chamber housing



1 Locking screw of the lid



1 Bracket
2 Locking screw of the lid

Double chamber housing

1 Locking screw of the lid

10 Installation

For applications as category 1D or 2D instruments there is a danger of ignition by shocks and friction on the metal parts of the pressure transmitters of light metal.

The VEGABAR *8*(*).AR/H/I/J/S/T, *8*.VR have to be mounted so that the sensor is effectively secured against bending or oscillating as well as contact of the sensor to the vessel wall, under consideration of the vessel installations and flow conditions in the vessel.

11 USB connection

With VEGABAR *8*(*).*R/H/I/J/S/T******(*)U******, the USB connection must only be connected for service purposes or parameter adjustment if there is no atmospheric atmosphere present.

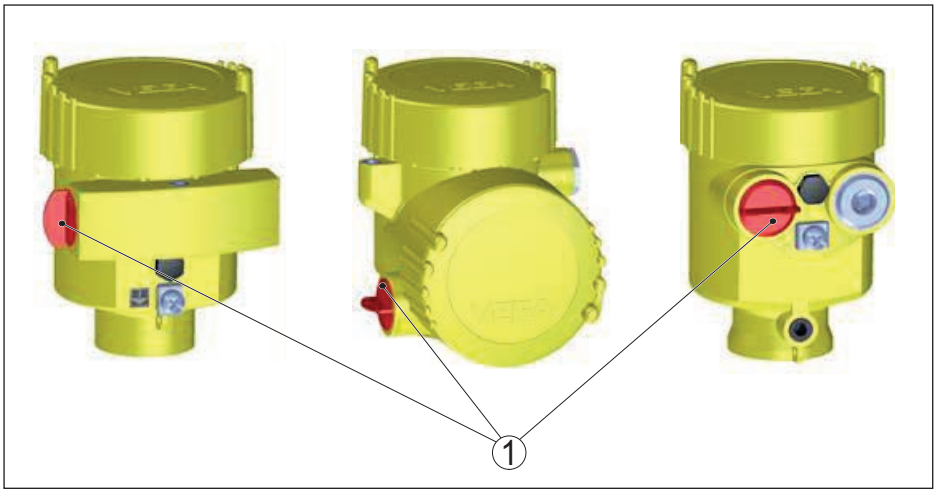
12 Mounting with external display unit VEGADIS 61/81

The signal circuit between VEGABAR *8*(*).AR/H/I/J/S/T, *8*.VR and the external indicating unit VEGADIS 61/81 should be set up without grounding. The required insulation voltage is > 500 V AC. When using the VEGA connection cable included with the delivery, this requirement is fulfilled. If grounding of the cable screen is required, it must be carried out according to EN 60079-14.

13 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 *8*(*).AR/H/I/J/S/T, *8*.VR you have to check if all other openings are closed in a way appoved 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.

14 Electrostatic charging (ESD)

In case of instrument versions with electrostatically chargeable plastic parts, the danger of electrostatic charging and discharging must be taken into account!

The following parts can charge and discharge:

- Lacquered housing version or alternative special lacquering
- Plastic housing, plastic housing parts
- Metal housing with inspection window
- Plastic process fittings
- Plastic-coated process fittings and/or plastic-coated sensors
- Connection cable for separate versions
- Type label
- Isolated metallic labels (measuring point identification plate)

Take note in case of danger of electrostatic charges:

- Avoid friction on the surfaces
- Do not dry clean the surfaces

The instruments must be mounted/installed in such a way that the following can be ruled out:

- in the case of extremely flammable dusts with a minimum ignition energy of less than 3 mJ, the device must not be used in areas where intensive electrostatic charging processes can be expected
- electrostatic charges during operation, maintenance and cleaning.
- process-related electrostatic charges, e.g. by measuring media flowing past

The warning label indicates danger:

WARNING - POTENTIAL ELECTROSTATIC CHARGING HAZARD - SEE INSTRUCTIONS

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