



## Safety instructions

### VEGAFLEX FX8\*.CR\*\*\*\*H/A/ B//U\*\*\*\*

CSA No. 2515397 (LR 108043)

Ex ta IIIC T72°C...120°C Da

Ex tb IIIC T72°C...120°C Db

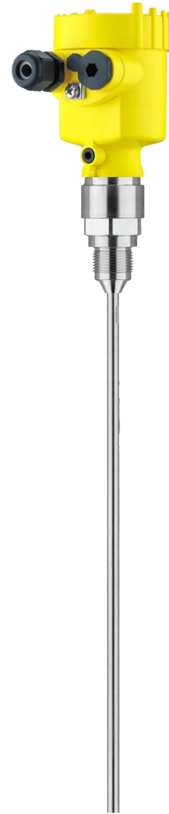
Ex tc IIIC T72°C...120°C Dc

Zone 20 AEx ta IIIC T72°C...120°C Da

Zone 21 AEx tb IIIC T72°C...120°C Db

Zone 22 AEx tc IIIC T72°C...120°C Dc

Class II Div 1 Groups E, F, G; Class III



CE 0044



Document ID: 49452



# VEGA

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Please note:

These safety instructions are part of the documentation:

- 41824 - VEGAFLEX 81 - 4 ... 20 mA/HART - two-wire
- 49453 - CSA Certificate 2515397 (LR 108043)

## 1 Area of applicability

These safety instructions apply to the guided radar sensors VEGAFLEX FX81, VEGAFLEX FX82, VEGAFLEX FX83 and VEGAFLEX FX86 of series VEGAFLEX FX8\*.CR\*\*\*\*H/A/B//U\*\*\*\*\* according to CSA Certificate 2515397 (LR 108043) (certificate number on the type label) and to all instruments with the number of the safety instruction (49452) on the type label.

## 2 General information

The VEGAFLEX FX8\*.CR\*\*\*\*H/A/B//U\*\*\*\*\* level measuring instruments as guided radar sensors are used to detect the distance between product surface and sensor by means of high-frequency radar pulses in the GHz range. The guided radar sensors emit high-frequency microwave pulses, which are guided down a measuring cable or rod. The electronics uses the running time of the signals reflected by the product surface to calculate the distance to the product surface.

The VEGAFLEX FX8\*.CR\*\*\*\*H/A/B//U\*\*\*\*\* are suitable for applications in hazardous atmospheres of combustible dusts, for applications requiring EPL-Da, EPL-Da/Db or EPL-Db instruments.

The VEGAFLEX FX8\*.CR\*\*\*\*H/A/B//U\*\*\*\*\* consist of an electronics housing, a process connection element and a sensor, i.e. a measuring cable or a measuring rod. As an option, the indicating and adjustment module can also be integrated.

If the VEGAFLEX FX8\*.CR\*\*\*\*H/A/B//U\*\*\*\*\* 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 applicable installation regulations and standards valid for explosion protection of electrical systems must be generally taken into account.

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

The requirements of IEC 60079-14 e.g. with respect to dust and temperatures must be fulfilled.

### EPL-Da instrument

The electronics housing and the sensor with the mechanical fixing element are installed in explosion-endangered areas, in areas requiring EPL-Da instruments.

### EPL-Da/Db instrument

The electronics housing is installed in hazardous areas requiring instruments of type EPL-Db. The process connection element is installed in the separating wall, which separates areas requiring instruments of type EPL-Da or EPL-Db. The sensor with the mechanical fixing element is installed in hazardous areas requiring instruments of type EPL-Da.

### EPL-Db instrument

The electronics housing and the sensor with the mechanical fixing element are installed in explosion-endangered areas, in areas requiring EPL-Db instruments.

### Ignition protection label:

- VEGAFLEX FX8\*(\*).CR\*\*\*\*H/A/B//U\*\*\*\*\*
  - Ex t IIIC T... Da, Db IP66
  - T: see thermal characteristics

### 3 Technical data

#### Electrical data of the supply circuits

##### VEGAFLEX FX8\*(\*)**.CR\*\*\*\*H/A\*\*\*\***

Power supply and signal circuit: (terminals K11/1, K11/2 in electronics compartment; with double chamber housing version in connection compartment)

$U = 9.6 \dots 30 \text{ V DC}$   
 $U_m = 30 \text{ V DC}$

##### VEGAFLEX FX8\*(\*)**.CR\*\*\*\*U\*\*\*\***

Supply and signal circuit: (terminals K11[+], K12[-])

$U = 8 \dots 30 \text{ V DC}$   
 $U_m = 30 \text{ V DC}$

Signal circuit: (terminals MB[+], MB[-])

$U_{max} = 5 \text{ V}$   
 MODBUS signal (telegram)  
 $U_m = 30 \text{ V DC}$

USB connection: (6-pole mini USB socket)

$U_{max} = 5 \text{ V}$   
 MODBUS signal (telegram)  
 $U_m = 30 \text{ V DC}$

##### VEGAFLEX FX8\*(\*)**.CR\*\*\*\*B\*\*\*\***

Supply and signal circuit: (terminals K11[+], K12[-])

$U = 90 \dots 253 \text{ V DC}$   
 $U_m = 253 \text{ V AC}$

Active 4 ... 20 mA signal circuit: (terminals K15[+], K17[-])

$I_{out} 4 \dots 20 \text{ mA}$  with superimposed HART signal  
 $U_m = 60 \text{ V AC/DC}$

Passive 4 ... 20 mA signal circuit: (terminals K16[+], K17[-])

$I_{in} 4 \dots 20 \text{ mA}$  with superimposed HART signal  
 $U_m = 60 \text{ V AC/DC}$

##### VEGAFLEX FX8\*(\*)**.CR\*\*\*\*I\*\*\*\***

Supply and signal circuit: (terminals K11[+], K12[-])

$U = 9.6 \dots 48 \text{ V DC}, 42 \text{ V AC}$   
 $U_m = 253 \text{ V AC}$

Active 4 ... 20 mA signal circuit: (terminals K15[+], K17[-])

$I_{out} 4 \dots 20 \text{ mA}$  with superimposed HART signal  
 $U_m = 60 \text{ V AC/DC}$

Passive 4 ... 20 mA signal circuit: (terminals K16[+], K17[-])

$I_{in} 4 \dots 20 \text{ mA}$  with superimposed HART signal  
 $U_m = 60 \text{ V AC/DC}$

## Electrical data for the intrinsically safe circuits, electronics compartment

### VEGAFLEX FX8\*(\*)**.CR\*\*\*\*H/A\*\*\*\*\***

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

In ignition protection type intrinsic safety Ex ia IIC

For connection to the intrinsically safe circuit of the associated external indicating instrument VEGADIS 61/81 (IECEX PTB 06.0048 X and IECEX BVS 06.0014).

The rules for the interconnection of intrinsically safe circuits between VEGAFLEX FX8\*(\*)**.CR\*\*\*\*H/A\*\*\*\*\*** and the external indicating and adjustment unit VEGADIS 61/81 are fulfilled, provided that the total inductance and total capacitance of the connection cable between VEGAFLEX FX8\*(\*)**.CR\*\*\*\*H/A\*\*\*\*\*** and the external indicating unit VEGADIS 61/81  $L_{\text{cable}} = 212 \mu\text{H}$  and  $C_{\text{cable}} = 1.98 \mu\text{F}$  is not exceeded.

### VEGAFLEX FX8\*(\*)**.CR\*\*\*\*H/A\*\*\*\*\***, VEGAFLEX FX8\*(\*)**.CR\*\*\*\*B/I/U\*\*\*\*\***

Indication and adjustment circuit: (spring contacts)

In ignition protection type intrinsic safety Ex ia IIC

Only for connection to the VEGA indicating and adjustment module PLICSCOM or the interface adapter VEGACONNECT.

The intrinsically safe circuits of VEGAFLEX FX8\*(\*)**.CR\*\*\*\*H/A\*\*\*\*\*** are electrically isolated from parts which can be grounded.

The intrinsically safe circuits of VEGAFLEX FX8\*(\*)**.CR\*\*\*\*B/I/U\*\*\*\*\*** are galvanically connected with the internal and external ground connection terminal.

The metallic parts of VEGAFLEX FX8\*(\*)**.CR\*\*\*\*H/A/B/I/U\*\*\*\*\*** are electrically connected with the internal and external earth terminal.

## Electrical data for the non-intrinsically safe circuits, electronics compartment

### VEGAFLEX FX8\*(\*)**.CR\*\*\*\*H/A\*\*\*\*\***

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

For connection to the intrinsically safe circuit of the associated external indicating instrument VEGADIS 81 of type VEGADIS DIS81.RX\*\* (IECEX BVS 06.0014).

## Thermal characteristics

### Permissible ambient temperature on the sensor

#### VEGAFLEX FX 81

- VEGAFLEX FX81\*(\*)**.CR\*\*\*\*A/G/M/NA/H/B/I/U\*\*\*\*\*** -40 ... +150 °C
- VEGAFLEX FX81\*(\*)**.CR\*\*\*\*F/PA/H/B/I/U\*\*\*\*\*** -20 ... +150 °C
- VEGAFLEX FX81\*(\*)**.CR\*\*\*\*D/LA/H/B/I/U\*\*\*\*\*** -20 ... +200 °C

#### VEGAFLEX FX 82

- VEGAFLEX FX82\*(\*)**.CR\*\*\*\*A/BA/H/B/I/U\*\*\*\*\*** -40 ... +150 °C
- VEGAFLEX FX82\*(\*)**.CR\*\*\*\*F/HA/H/B/I/U\*\*\*\*\*** -40 ... +150 °C

– VEGAFLEX FX82(\*).CR\*\*\*\*KA/H/B/  
I/U\*\*\*\*\* -20 ... +200 °C

#### VEGAFLEX FX 83

– VEGAFLEX FX83(\*).CR\*\*\*\*XA/H/B/  
I/U\*\*\*\*\* -40 ... +150 °C

– VEGAFLEX FX83(\*).CR\*\*\*\*CA/H/B/  
I/U\*\*\*\*\* -20 ... +130 °C

– VEGAFLEX FX83(\*).CR\*\*\*\*KA/H/B/  
I/U\*\*\*\*\* -20 ... +150 °C

#### VEGAFLEX FX 86

– VEGAFLEX FX86(\*).CR\*\*\*\*1A/H/B/  
I/U\*\*\*\*\* -196 ... +280 °C

– VEGAFLEX FX86(\*).CR\*\*\*\*2A/H/B/  
I/U\*\*\*\*\* -196 ... +450 °C

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#### Permissible ambient temperature on the electronics housing

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VEGAFLEX FX8\*.CR\*\*\*\*H/A/B/I/U\*\*\*\*\* -40 ... +60 °C

#### Surface temperature increases on the sensor

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VEGAFLEX FX8\*(\*).CR\*\*\*\*A/H/B/I\*\*\*\*\* Process temperature +2 K

VEGAFLEX FX8\*(\*).CR\*\*\*\*U\*\*\*\*\* Process temperature +10 K

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#### Surface temperature increases on the electronics housing

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VEGAFLEX FX8\*(\*).CR\*\*\*\*B/I\*\*\*\*\* Limited to +102 °C by the temperature link

VEGAFLEX FX8\*(\*).CR\*\*\*\*U\*\*\*\*\* Process/ambient temperature +60 K

VEGAFLEX FX8\*(\*).CR\*\*\*\*A/H\*\*\*\*\* Process/ambient temperature +28.8 K

VEGAFLEX FX8\*(\*).CR\*\*\*\*A/H\*\*\*\*\* Process/ambient temperature +12 K

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#### Protection according to EN 60529

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On the sensor IP 68

On the electronics housing IP 68

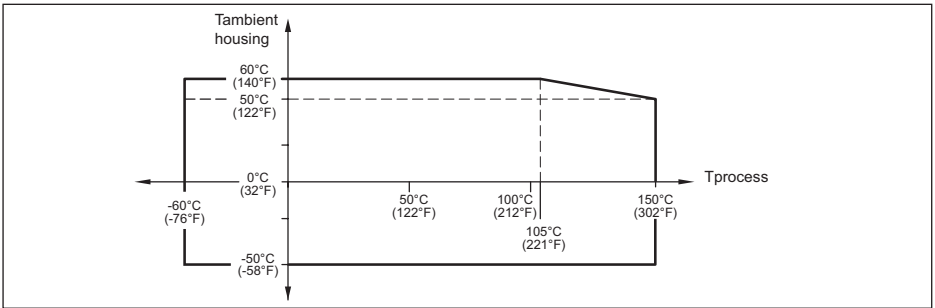
#### Permissible operating pressure

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

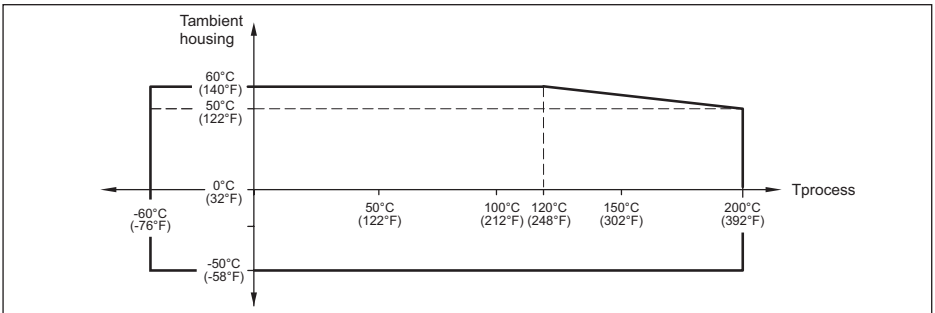
The application conditions during operation without explosive mixtures are mentioned in the operating instructions manuals.

## Temperature derating for process temperatures up to +150 °C, +200 °C, +250 °C, +280 °C and +450 °C

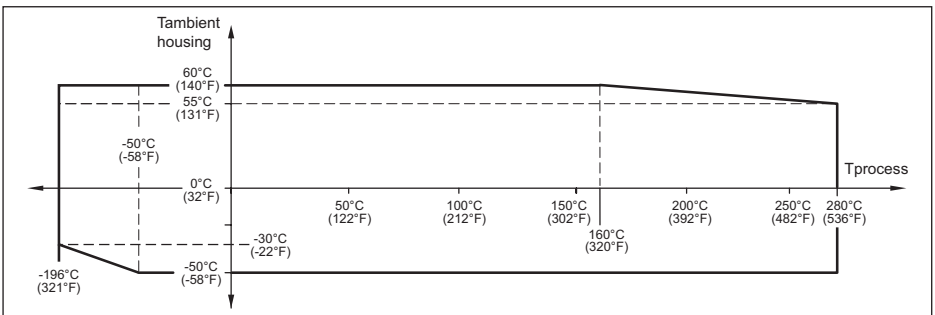
### Versions for process temperatures up to +150 °C



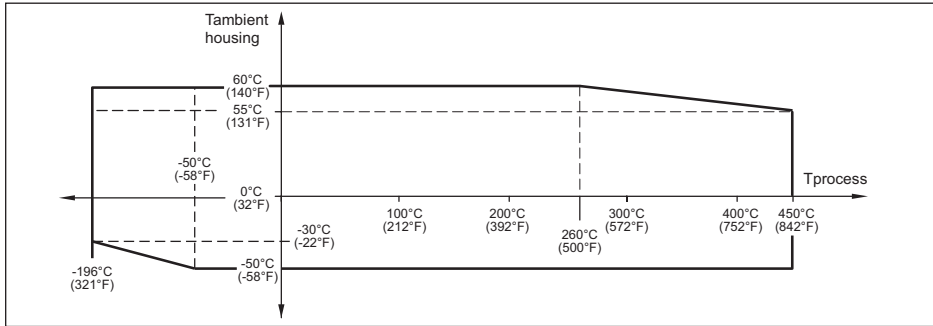
### Versions for process temperatures up to +200 °C



### Versions for process temperatures up to +280 °C



**Versions for process temperatures up to +450 °C**



**4 Grounding**

The VEGAFLEX FX8\*.CR\*\*\*\*H/A/B/I/U\*\*\*\*\* must be grounded.

**5 Cable entries**

The supplied cable entry is suitable for the housing temperature range specified in the VEGAFLEX FX8\*.CR\*\*\*\*H/A/B/I/U\*\*\*\*\* 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 IP 66.

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, +60 °C).

**6 Material resistance**

The VEGAFLEX FX8\*.CR\*\*\*\*H/A/B/I/U\*\*\*\*\* must only be used in media against which the materials of the wetted parts are sufficiently resistant.

**7 Tensile force on the measuring cable/ rod**

The permissible tensile force is

- VEGAFLEX FX81(\*).CR\*\*\*\*\*
  - Diameter 4 mm: F = 2.5 kN
  - Diameter 2 mm: F = 1.5 kN
- VEGAFLEX FX82(\*).CR\*\*\*\*\*
  - Diameter 4 mm: F = 12 kN
  - Diameter 6 mm coated: F = 8 kN
  - Diameter 6 mm: F = 30 kN
  - Diameter 11 mm coated: F = 30 kN
- VEGAFLEX FX83(\*).CR\*\*\*\*\*
  - Diameter 4 mm: F = 2 kN
- VEGAFLEX FX86(\*).CR\*\*\*\*\*
  - Diameter 4 mm: F = 2.5 kN
  - Diameter 2 mm: F = 1.5 kN

**8 Locking mechanism of housing cover**

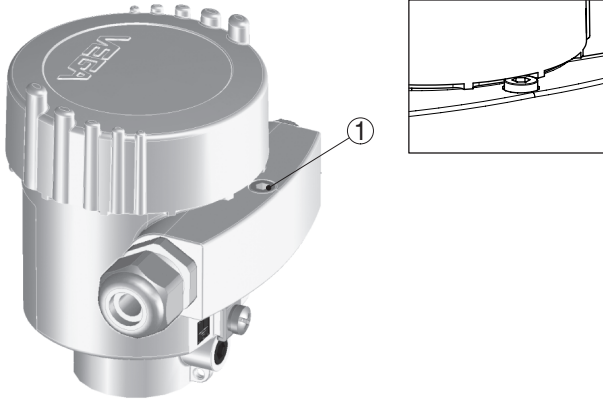
With single-chamber housing versions, the lid must be screwed in to the stop and secured with the locking device before setup and use of VEGAFLEX FX8\*.CR\*\*\*\*H/A/B/I/U\*\*\*\*\* in hazardous



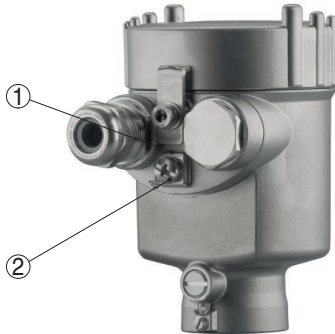
atmospheres.

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 VEGAFLEX FX8\*.CR\*\*\*\*H/A/B/I/U\*\*\*\*\* in hazardous atmospheres.

## Single chamber housing

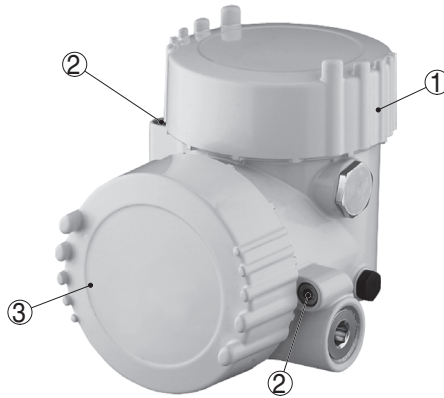


1 Locking screw of the cover



1 Bracket  
2 Locking screw of the cover

**Double chamber housing with "Ex-d" connection compartment**



- 1 "Ex-i" connection compartment with electronics module
- 2 Locking screw of the cover
- 3 "Ex d" connection compartment with integrated barrier

**9 Installation**

The VEGAFLEX FX8\*.CR\*\*\*\*H/A/B/I/U\*\*\*\* 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.

**10 USB connection**

With VEGAFLEX FX8\*(\*).CR\*\*\*\*U\*\*\*\*, the USB connection must only be connected for service purposes or parameter adjustment if there is no atmospheric atmosphere present.

**11 Mounting with external indicating unit VEGADIS 61/81**

The intrinsically safe signal circuit between VEGAFLEX FX8\*(\*).CR\*\*\*\*A/H\*\*\*\* and the external indicating unit VEGADIS 61/81 should be set up without grounding. The required insulation voltage is > 500 V AC. When using VEGA connection cable, this requirement is fulfilled. If grounding of the cable screen is required, it must be carried out according to EN 60079-14 paragr. 12.2.2.3.

A large grid of graph paper, consisting of 20 columns and 30 rows of small squares, intended for taking notes.

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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.

Subject to change without prior notice

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