



Safety instructions

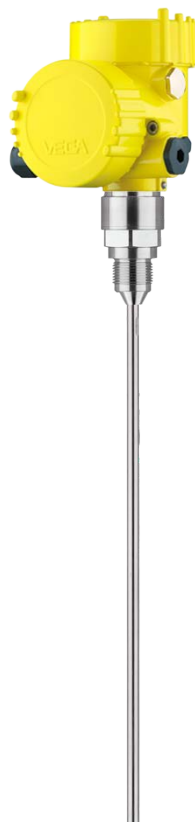
VEGAFLEX 81, 82, 83, 86

Intrinsic safety

TÜV 13 ATEX 119771 X

4 ... 20 mA/HART - two-wire

Additional current output 4 ... 20 mA



CE 0044



Document ID: 49443



VEGA

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Please note:

These safety instructions are part of the documentation:

- 41824 - VEGAFLEX 81 - 4 ... 20 mA/HART - two-wire
- 42279 - VEGAFLEX 81 - 4 ... 20 mA/HART - Two-wire - Coax probe
- 41829 - VEGAFLEX 82 - 4 ... 20 mA/HART - two-wire
- 41839 - VEGAFLEX 83 - 4 ... 20 mA/HART - Two-wire - Polished rod probe
- 41834 - VEGAFLEX 83 - 4 ... 20 mA/HART - Two-wire - PFA-coated
- 41844 - VEGAFLEX 86 - 4 ... 20 mA/HART - two-wire
- 42284 - VEGAFLEX 86 - 4 ... 20 mA/HART - Two-wire - Coax probe
- 49444 - EU type approval certificate TÜV 13 ATEX 119771 X

Editing status: 2016-06-07

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 explosionsfarliga områden
DA	Sikkerhedsforskrifter til anvendelse i explosionsfarlig atmosfære
FI	Turvallisuusohjeet räjähdysvaarallisissa 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.
EN	These safety instructions are available as a standard feature in the download area under www.vega.com in the languages German, English, French and Spanish. Further EU languages will be made available by VEGA upon request.
FR	Les présentes consignes de sécurité sont disponibles au téléchargement sous www.vega.com en standard en allemand, en anglais, en français et en espagnol. VEGA met à disposition d'autres langues de l'Union Européenne selon les exigences.
ES	Las indicaciones de seguridad presentes están disponibles en la zona de descarga de www.vega.com de forma estándar en los idiomas inglés, francés y español. VEGA pone a disposición otros idiomas de la UE cuando son requeridos.

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*(*).A/VC/U/O/H****A/HZ**** according to EU type approval TÜV 13 ATEX 119771 X, issue 00 (certificate number on the type label) and to all instruments with the number of the safety instruction (49443) on the type label.

These safety instructions are the object of the VEGAFLEX FX8*(*).A/VCC***** in intrinsic safety ignition protection type "Ex ia". These safety instructions are also only valid for the intrinsic safety ignition protection type "Ex ia" for the versions VEGAFLEX FX8*(*).A/VCU/O/H***** which are certified both with the intrinsic safety ignition protection type "Ex ia" with the characteristic "C" and also for other safety requirements, for dust explosion protection with the characteristic "H" or with a ship building certificate with the characteristic "O" or with a certificate as overfill protection with the characteristic "U" in the type key.

2 General information

The level measuring instruments VEGAFLEX FX8*(*).A/VC/U/O/H****A/HZ**** as guided radar sensors are used to detect the distance between product surface and sensor by means of high frequency electromagnetic waves in the GHz range. 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*(*).A/VC/U/O/H****A/HZ**** 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 display and adjustment module can also be installed in the instrument.

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

The VEGAFLEX FX8*(*).A/VC/U/O/H****A/HZ**** are suitable for use in hazardous atmospheres of all combustible materials of explosion group IIA, IIB and IIC for applications requiring instruments of category 1G, category 1/2G or category 2G.

If the VEGAFLEX FX8*(*).A/VC/U/O/H****A/HZ**** 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.

Category 1G instrument (EPL Ga instrument)

The VEGAFLEX FX8*(*).A/VC/U/O/H****A/HZ**** are installed in hazardous areas requiring an instrument of category 1G.

Category 1/2G instrument (EPL Ga/Gb instrument)

The electronics housing is installed in hazardous areas requiring an instrument of category 2G. The process connection element is installed in the separating wall, which separates areas requiring instruments of category 2G or 1G. The antenna system with the mechanical fixing element is installed in hazardous areas requiring instruments of category 1G.

Category 2G instrument (EPL Gb instrument)

The VEGAFLEX FX8*(*).A/VC/U/O/H****A/HZ**** are installed in hazardous areas requiring an instrument of category 2G.

3 Technical data

Supply and signal circuit

VEGAFLEX FX8^(*).A/VC/U/O/H****A/HZD/W/R/Y/Q/X***, double chamber housing, "Ex-i" connection compartment

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

In ignition protection type intrinsic safety Ex ia IIC

Only for connection to a certified, intrinsically safe circuit.

Maximum values:

- $U_i = 30 \text{ V}$
- $I_i = 131 \text{ mA}$
- $P_i = 983 \text{ mW}$

Characteristics: linear

The effective internal capacitance C_i is negligibly small.

The effective internal inductance is $L_i \leq 5 \mu\text{H}$.

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

In ignition protection type intrinsic safety Ex ia IIC

Only for connection to a certified, intrinsically safe circuit.

Maximum values:

- $U_i = 30 \text{ V}$
- $I_i = 131 \text{ mA}$
- $P_i = 983 \text{ mW}$

Characteristics: linear

The effective internal capacitance C_i is negligibly small.

The effective internal inductance is $L_i \leq 5 \mu\text{H}$.

For applications requiring instruments of category 2G, the intrinsically safe power supply and signal circuit can correspond to protection class ia or ib. For connection to a circuit with protection class ib, the ignition protection type identification is Ex ib IIC T6 ... T1.

For applications requiring instruments of category 1G or 1/2G, the intrinsically safe power supply and signal circuit must correspond to protection class ia.

For applications requiring instruments of category 1G or 1/2G the VEGAFLEX FX8^(*).A/VC/U/O/H****A/HZ**** is preferably connected to appropriate equipment with galvanically isolated, intrinsically safe circuit.

Intrinsically safe display and adjustment circuits

VEGAFLEX FX8*(*)A/VC/U/O/H**A/HZY/Q/X***, "Ex-i" electronics compartment**

Display and adjustment circuit: (plug connection in the electronics compartment) In ignition protection type intrinsic safety Ex ia IIC

For connection to the intrinsically safe circuit of the associated external indicating unit VEGADIS 61/81 (PTB 02 ATEX 2136 X).

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

When using the supplied VEGA connection cable between VEGAFLEX FX8*(*)A/VC/U/O/H****A/HZD/W/R*** and the external display unit VEGADIS 61/81, then the permissible cable length is $L_{zul} = 341 \text{ m}$.

VEGAFLEX FX8*.AC/U/O/H**A/HZD/W/R***, "Ex-i" electronics compartment**

Display and adjustment circuit: (spring contacts in the electronics compartment) In ignition protection type intrinsic safety Ex ia IIC

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

Intrinsically safe HF circuit

VEGAFLEX FX8*(*)A/VC/U/O/H**A/HZ******

HF circuit

In ignition protection type intrinsic safety Ex ia IIC

The length of the coax connection cable between the electronics housing and the sensor housing may not exceed $L_{cable} = 50 \text{ m}$ for all versions of VEGAFLEX FX8*(*)A/VC/U/O/H****A/HZ**** with separate sensor.

The intrinsically safe circuits of VEGAFLEX FX8*(*)A/VC/U/O/H****A/HZ**** are galvanically separated from each other and also against ground.

The metallic parts of VEGAFLEX FX8*(*)A/VC/U/O/H****A/HZ**** are electrically connected with the internal and external earth terminal.

4 Application conditions

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

Category 1G instruments

Temperature class	Temperature on the sensor (measuring cable, rod)	Ambient temperature on the electronics
T5	-20 ... +42 °C	-20 ... +42 °C
T4, T3, T2, T1	-20 ... +60 °C	-20 ... +60 °C

The process pressure with products for applications requiring instruments of category 1G must be

between 0.8 ... 1.1 bar. With the stated permissible ambient temperatures section 6.4.2/EN 1127-1 is taken into account. The permissible operating temperatures and pressures for operation are stated in the manufacturer information.

Category 1/2G instruments

Temperature class	Temperature on the sensor (measuring cable, rod)	Ambient temperature on the electronics
T6	-20 ... +60 °C	-50 ... +46 °C
T5	-20 ... +60 °C	-50 ... +61 °C
T4, T3, T2, T1	-20 ... +60 °C	-50 ... +70 °C

For applications requiring instruments of category 1/2G the process pressure of the media must be between 0.8 ... 1.1 bar. If the VEGAFLEX FX8*(*)A/VC/U/O/H****A/HZ**** 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 maximum temperature on the electronics/housing should not exceed the values specified in the above table. The application conditions during operation in areas with no explosive mixtures are stated in the manufacturer information.

Category 2G instruments

Temperature class	Temperature on the sensor (measuring cable, rod)	Ambient temperature on the electronics
T6	-60 ... +85 °C	-50 ... +46 °C
T5	-60 ... +100 °C	-50 ... +61 °C
T4	-60 ... +135 °C	-50 ... +70 °C
T3	-60 ... +200 °C	-50 ... +70 °C
T2	-60 ... +300 °C	-50 ... +70 °C
T1	-60 ... +450 °C	-50 ... +70 °C

If the VEGAFLEX FX8*(*)A/VC/U/O/H****A/HZ**** 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 maximum temperature on the electronics/housing should not exceed the values specified in the above table. The permissible operating temperatures and pressures are stated in the manufacturer information.

VEGAFLEX FX86*(*)A/VC/U/O/H****A/HZ****, low temperature version down to -196 °C

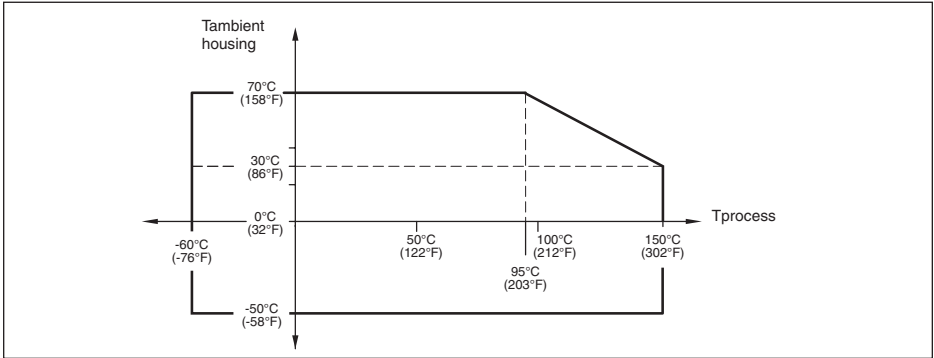
Category 2G instruments

Temperature class	Temperature on the sensor (measuring cable, rod)	Ambient temperature on the electronics
T6	-196 ... +85 °C	-50 ... +46 °C
T5	-196 ... +100 °C	-50 ... +61 °C
T4	-196 ... +135 °C	-50 ... +70 °C
T3	-196 ... +200 °C	-50 ... +70 °C
T2	-196 ... +300 °C	-50 ... +70 °C
T1	-196 ... +450 °C	-50 ... +70 °C

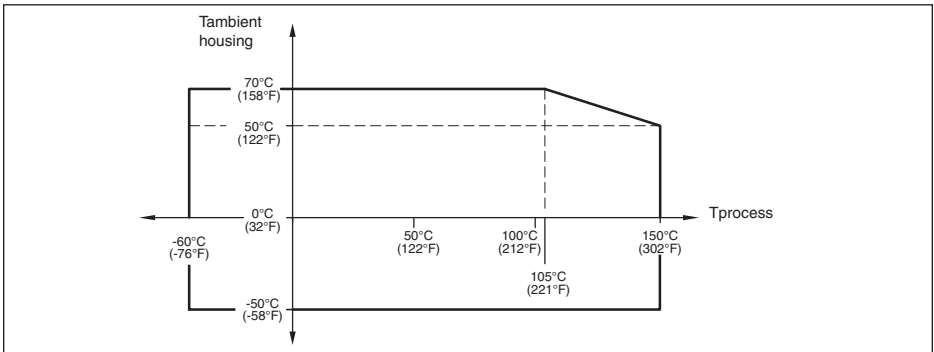
If the VEGAFLEX FX86(*) .A/V/C/U/O/H****A/HZ**** are operated at temperatures higher than those specified in the above table, please make sure through appropriate measures that there is no danger of ignition from the hot surfaces. The maximum temperature on the electronics/housing should not exceed the values specified in the above table. The permissible operating temperatures and pressures are stated in the manufacturer information.

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

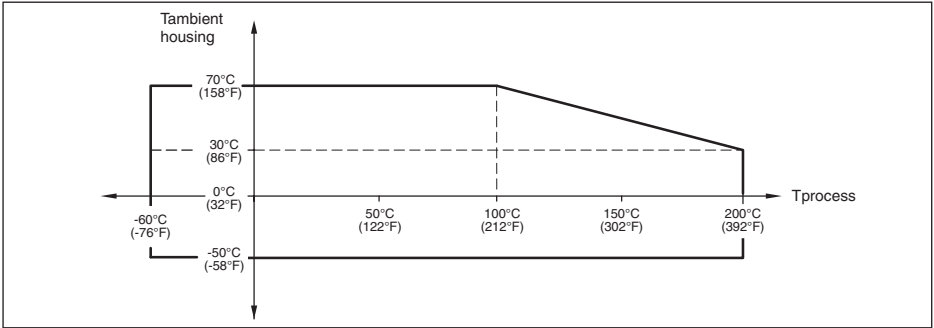
Versions for process temperatures up to +150 °C with plastic housing



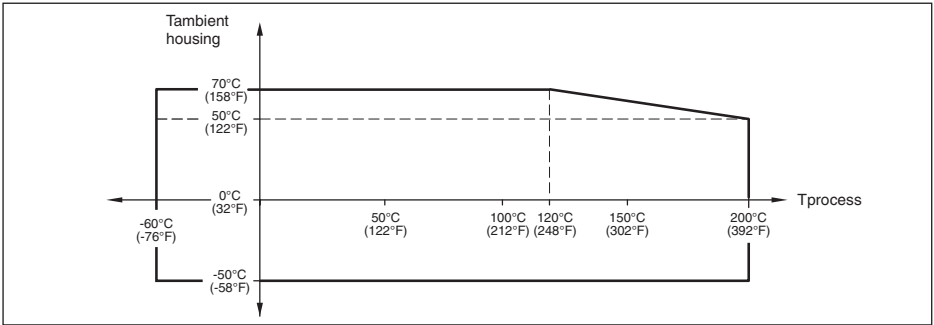
Versions for process temperatures up to +150 °C with metal housing



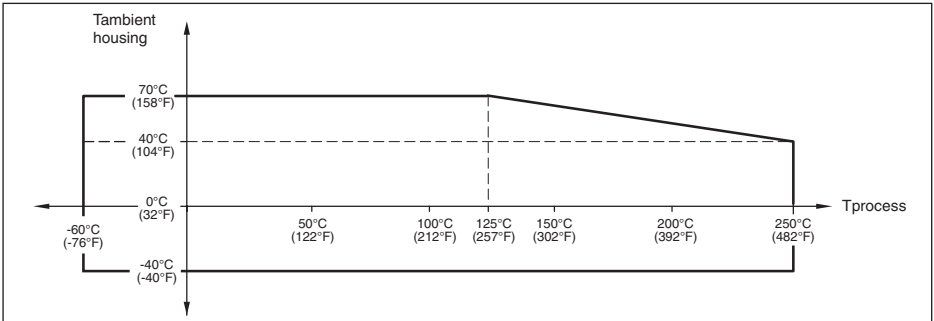
Versions for process temperatures up to +200 °C with plastic housing



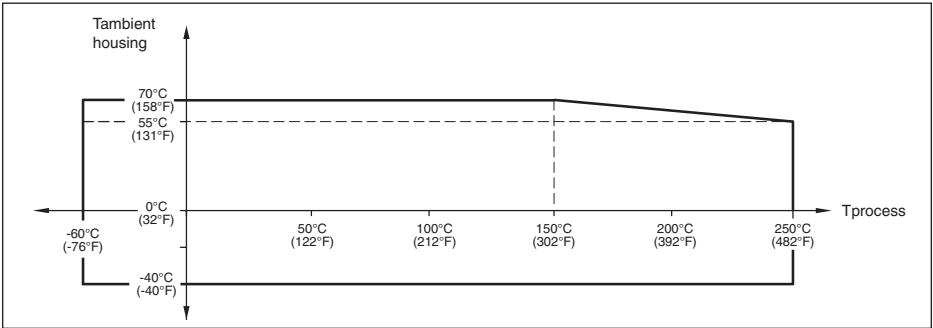
Versions for process temperatures up to +200 °C with metal housing



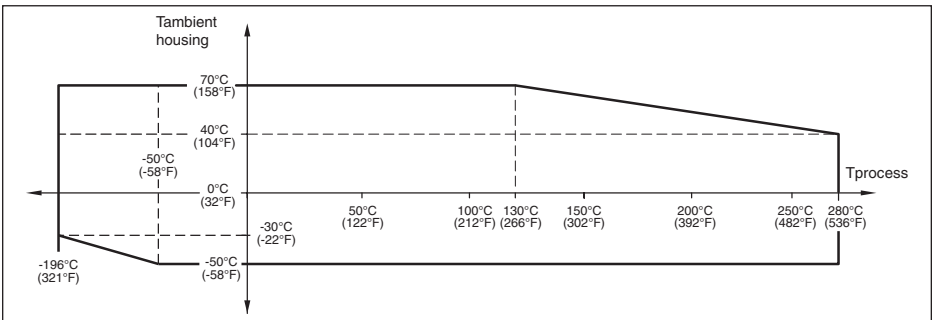
Versions for process temperatures up to +250 °C with plastic housing



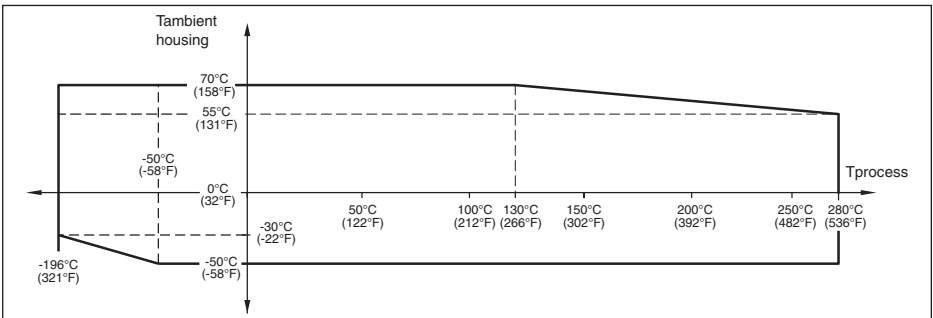
Versions for process temperatures up to +250 °C with metal housing



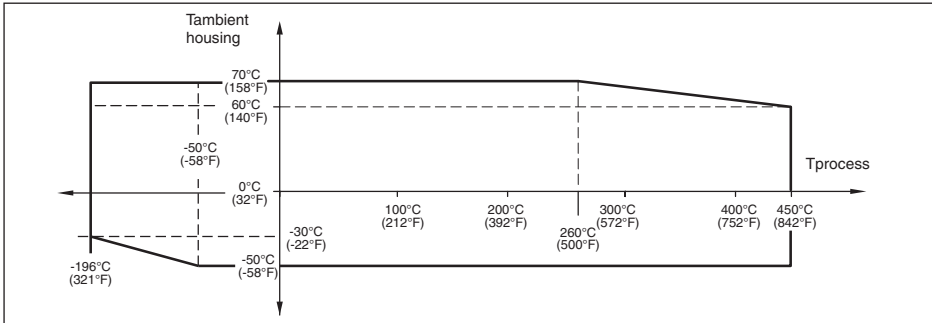
Versions for process temperatures up to +280 °C with plastic housing



Versions for process temperatures up to +280 °C with metal housing



Versions for process temperatures up to +450 °C with plastic and metal housing



5 Protection against static electricity

The VEGAFLEX FX8*(*) .A/VC/U/O/H****A/HZ**** in the version with chargeable plastic parts, like e.g. plastic housing, metal housing with inspection window or plastic-coated measuring cable/ rod, are provided with a caution label referring to the safety measures that must be taken in case of electrostatic charging during operation.

WARNING- POTENTIAL ELECTROSTATIC CHARGING HAZARD - SEE INSTRUCTIONS

Caution: Plastic parts! Danger of electrostatic charging!

- Avoid friction
- No dry cleaning
- Construction/Installation: The VEGAFLEX FX8*(*) .A/VC/U/O/H****A/HZ**** must be constructed/installed in such a way that
 - electrostatic charges are ruled out during operation, maintenance and cleaning.
 - process-related electrostatic charges, e.g. by measuring media flowing past, are ruled out

6 Use of an overvoltage arrester

If necessary, the VEGAFLEX FX8*(*) .A/VC/U/O/H****A/HZ**** can be connected to an overvoltage arrester, e. g. type B62-36G from VEGA.

When used as category 1G or 1/2G instrument, a suitable overvoltage arrester, e. g. type B62-36W of VEGA (TÜV 07 ATEX 553276) must be connected according to EN 60079-14, as far as necessary, for protection against surges.

7 Installation of the sensors

When used as category 1G or 1/2G instrument, the sensors of the VEGAFLEX FX8*(*) .A/VC/U/O/H****A/HZ**** should be mounted such that the measuring cable/rod is effectively secured against bending or touching the vessel wall, under consideration of other vessel installations and flow conditions in the vessel.

8 Installation of the VEGAFLEX FX8*(*) .A/VC/U/O/H****A/HZ**** with remote sensor

With the version VEGAFLEX FX8*(*) .A/VC/U/O/H****A/HZ**** with remote sensor, make sure that

the coaxial connection cable between electronics housing and sensor housing cannot get damaged.

9 Grounding

In order to avoid the danger of electrostatic charging of the metallic parts, the VEGAFLEX FX8*(*)..A/VC/U/O/H****A/HZ**** must be electrostatically connected to the local potential equalisation (transfer resistance $\leq 1 \text{ M}\Omega$), e.g. via the ground terminal, when used as category 1G or 1/2G instruments.

10 Impact and friction sparks

When used as category 1G or 1/2G instruments, the VEGAFLEX FX8*(*)..A/VC/U/O/H****A/HZ**** in aluminium/titanium versions must be mounted in such a way that sparks from impact and friction between aluminium/titanium and steel (except stainless steel, if the presence of rust particles can be excluded) cannot occur.

11 Material resistance

For applications requiring instruments of category 1G or category 1/2G the VEGAFLEX FX8*(*)..A/VC/U/O/H****A/HZ**** must only be used in products against which the wetted materials are sufficiently resistant.

12 Mounting with external display unit VEGADIS 61/81

The intrinsically safe signal circuit between VEGAFLEX FX8*(*)..A/VC/U/O/H****A/HZ**** and the external indicating unit VEGADIS 61/81 should be set up without grounding. The required insulation voltage is $> 500 \text{ V AC}$. 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 Tensile force on the measuring cable/ rod

The permissible tensile force is

- VEGAFLEX FX81*(*)..A/VC****A/HZ****
 - Diameter 4 mm: $F = 2.5 \text{ kN}$
 - Diameter 2 mm: $F = 1.5 \text{ kN}$
- VEGAFLEX FX82*(*)..A/VC****A/HZ****
 - Diameter 4 mm: $F = 12 \text{ kN}$
 - Diameter 6 mm coated: $F = 8 \text{ kN}$
 - Diameter 6 mm: $F = 30 \text{ kN}$
 - Diameter 11 mm coated: $F = 30 \text{ kN}$
- VEGAFLEX FX83*(*)..A/VC****A/HZ****
 - Diameter 4 mm: $F = 2 \text{ kN}$
- VEGAFLEX FX86*(*)..A/VC****A/HZ****
 - Diameter 4 mm: $F = 2.5 \text{ kN}$
 - Diameter 2 mm: $F = 1.5 \text{ kN}$

14 Type and size of the threads for the cable entries

The VEGAFLEX FX8*(*)..A/VC/U/O/H*****M** are designed with an M20 x 1.5 thread for the cable entries, sealing screw(s) or plug connection(s).

The VEGAFLEX FX8*(*)..A/VC/U/O/H*****N** are designed with a 1/2-14 NPT thread for the cable entries, sealing screw(s), plug connection(s) or conduit system.

In the version with the two-chamber housing, the electronics housing in the VEGAFLEX FX8*(*)..A/

VC/U/O/H*****M** version additionally has an M16 x 1.5 thread and in the VEGAFLEX FX8*(*)A/
VC/U/O/H*****N** version a $\frac{3}{8}$ -18 NPT thread for installation of a cable entry, sealing screw or
plug connection.

Depending on the selected feature in the selection "cable entry/connection" in the type key of the
VEGAFLEX FX8*(*)A/VC/U/O/H***** _** ("_" = position selection feature) the housing openings
in the as-delivered state are sealed by a suitable cable gland, sealing plug, plug connection or red
threaded/dust protection cap accordingly. The feature "M/N" in the type key is then replaced by the
appropriate feature of the connection possibility.

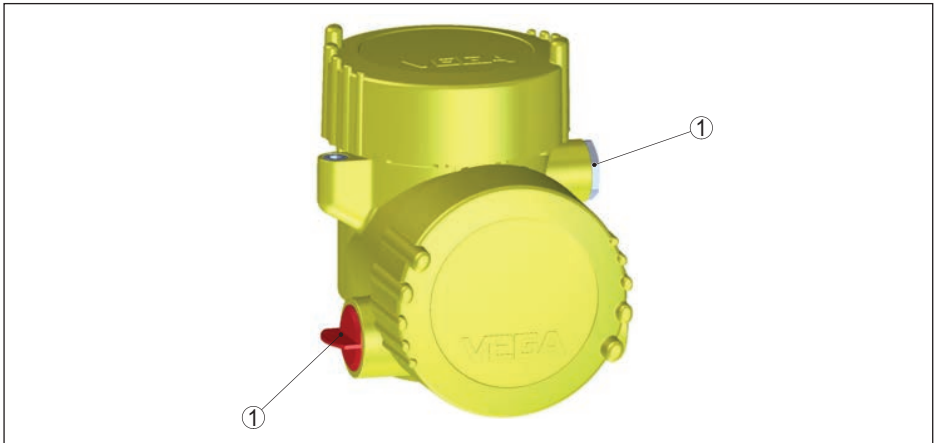
There is an information plate bearing the thread designation on the housing next to all threads.

15 Removing and replacing the red threaded/dust cover

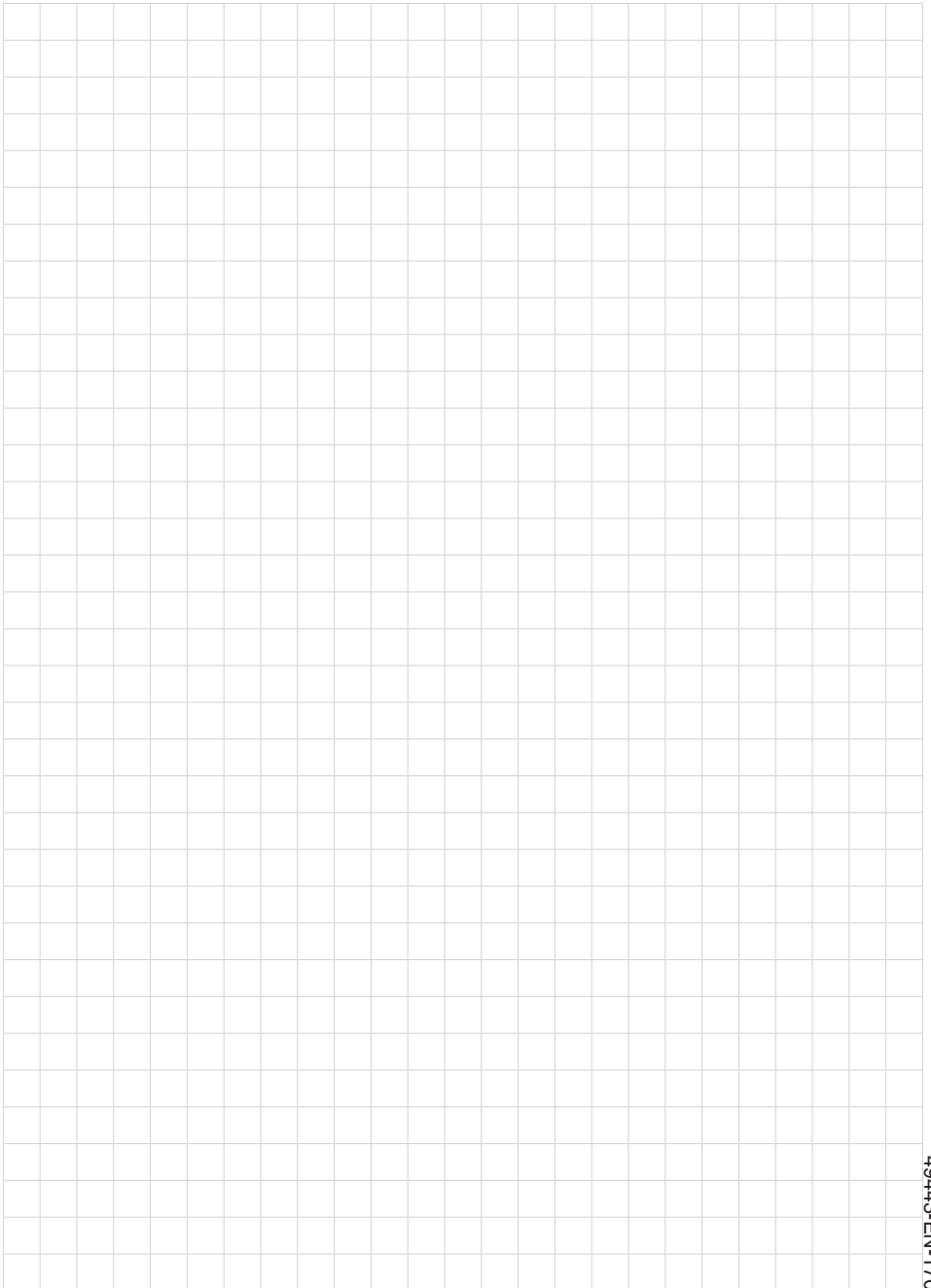
When the VEGAFLEX FX8*(*)A/VC/U/O/H*****A/HZ**** are delivered, depending on the version,
the red threaded or dust protection caps must be removed before installing the device and the
openings must be sealed according to the requirements of the ignition protection type and the IP
protection type specified on the type label.

When using certified i.e. suitable cable glands, sealing plugs or plug connectors, they must be
mounted correctly and the respective certificates/documents must be observed.

The sealing plugs included in the delivery by VEGA meet the necessary requirements.



1 Red threaded or dust protection cap



Printing date:

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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