



Safety instructions

VEGAFLEX 81, 82, 83, 86

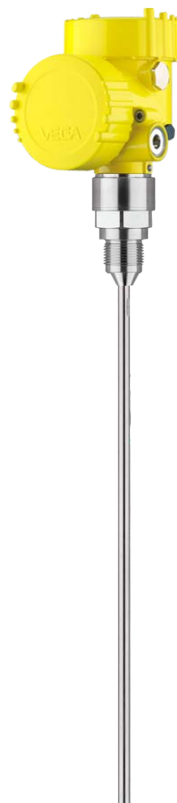
Flameproof enclosure "d", Intrinsic safety "i"

Two-wire 4 ... 20 mA/HART

Two-wire 4 ... 20 mA/HART with SIL qualification

Four-wire 4 ... 20 mA/HART

Modbus



Document ID: 49561



VEGA

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Supplementary documentation:

- Operating instructions VEGAFLEX 81, 82, 83, 86
- Quick setup guide VEGAFLEX 81, 82, 83, 86
- EU-type approval certificate TÜV 12 ATEX 098525 X, Issue 01 (Document ID: 49562)
- EU declaration of conformity (Document ID: 43155)

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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.
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1 Area of applicability

These safety instructions apply to the VEGAFLEX 81, 82, 83, 86 of type series:

- VEGAFLEX FX8*(*)A/VD/I/V/P****A/H/B/I/UX****

With the electronics versions:

- H - 4 ... 20 mA/HART - two-wire
- A - 4 ... 20 mA/HART - two-wire with SIL qualification
- B - 4 ... 20 mA/HART - four-wire; 90 ... 253 V AC; 50/60 Hz
- I - 4 ... 20 mA/HART - four-wire; 9.6 ... 48 V DC; 20 ... 42 V AC
- U - Four-wire Modbus (converter in second chamber)

According to EU type approval certificate TÜV 12 ATEX 098525 X, Issue 01 (certificate number on the type label) and for all instruments with safety instruction 49561.

The classification as well as the respective standards are stated in the EU type approval certificate:

- EN IEC 60079-0: 2018
- EN 60079-1: 2014
- EN 60079-11: 2012
- EN 60079-26: 2015

Type of protection marking:

- II 1/2G, 2G Ex db ia IIC T6 ... T1 Ga/Gb, Gb

2 Important specification in the type code

VEGAFLEX FX81(a).bcdefghijklm

Position		Feature	Description
a			One or two-digit alphanumeric variable, for production control. Optional, not safety-relevant.
b	Scope	A	Europe
		V	Combination (Europe, world-wide)
c	Approval	D	ATEX II 1/2G, 2G Ex db ia IIC T6 ... T1 Ga/Gb, Gb
		V	ATEX II 1/2G, 2G Ex db ia IIC T6 ... T1 Ga/Gb, Gb + Overfill protection (WHG, VLAREM)
		P	ATEX II 1/2G, 2G Ex db ia IIC T6 ... T1 Ga/Gb, Gb + Ship approval
		I	ATEX II 1/2G, 2G Ex db ia IIC T6 ... T1 Ga/Gb, Gb, II 1D, 1/2D, 1/3D, 2D Ex ta, ta/tb, ta/tc, tb IIIC T*

Position		Feature	Description
d	Version / Material	2	exchangeable cable (ø 2 mm) with centering weight / Duplex (1.4462)
		3	exchangeable coated cable (ø 4 mm) with uncoated centering weight / PFA and 316
		6	exchangeable rod (ø 8 mm) / Duplex (1.4462)
		7	exchangeable cable (ø 2 mm) with gravity weight / Alloy C276 (2.4819)
		A	exchangeable cable (ø 4 mm) with gravity weight / 316
		B	exchangeable cable (ø 2 mm) with gravity weight / 316
		C	exchangeable cable (ø 4 mm) with centering weight / 316
		D	exchangeable cable (ø 2 mm) with centering weight / 316
		E	exchangeable rod (ø 8 mm) / 316L
		F	exchangeable rod (ø 12 mm) / 316L
		G	exchangeable rod (ø 8 mm) / 304L
		H	Coax (ø 21.3 mm) with single hole / 304L
		I	exchangeable cable (ø 4 mm) with gravity weight / Alloy C22 (2.4602)
		J	exchangeable cable (ø 4 mm) with centering weight / Alloy C22 (2.4602)
		K	Coax (ø 21.3 mm) with single hole / 316L
		L	Coax (ø 21.3 mm) with multiple hole / 316L
		N	Coax (ø 21.3 mm) with multiple hole / 304L
		O	exchangeable rod (ø 12 mm) / Alloy C22 (2.4602)
		P	Coax (ø 42.2 mm) with multiple hole / 316L
		Q	Coax (ø 21.3 mm) with multiple hole / Alloy C22 (2.4602)
		R	Coax (ø 42.2 mm) with multiple hole / Alloy C22 (2.4602)
		S	exchangeable rod (ø 8 mm) / Alloy C22 (2.4602)
		U	exchangeable cable (ø 4 mm) without weight / 316
		V	exchangeable rod (ø 12 mm) / Alloy 400 (2.4360)
		W	exchangeable rod (ø 8 mm) / Alloy C276 (2.4819)
		*	further approved Versions / Materials
ef	Process fitting / Material	**	Two-digit alphanumeric variables for process fittings according to industry standard

Position		Feature	Description
g	Seal / Second line of defense / Process temperature	A	FKM (SHS EPM 70C3 GLT) / without / -40 ... +80 °C
		B	EPDM (A+P 70.10-02) / without / -40 ... +80 °C
		D	FFKM (Kalrez 6375) / without / -10 ... +150 °C
		D	FFKM (Kalrez 6375) / without / -20 ... +150 °C
		F	FKM (SHS FPM 70C3 GLT) / without / -40 ... +150 °C
		G	FKM (SHS FPM 70C3 GLT) / with / -40 ... +150 °C
		H	EPDM (A+P 70.10-02) / without / -40 ... +150 °C
		I	Silicone FEP coated (A+P FEP-O-SEAL) / without / -40 ... +150 °C
		J	Borosilicate glass for slightly volatile substances, e.g. ammonia / with / -60 ... +150 °C
		K	FFKM (Kalrez 6375) / without / -10 ... +200 °C
		K	FFKM (Kalrez 6375) / without / -20 ... +200 °C
		L	FFKM (Kalrez 6375) / with / -10 ... +200 °C
		L	FFKM (Kalrez 6375) / with / -20 ... +200 °C
		M	EPDM (A+P 70.10-02) / with / -40 ... +150 °C
		N	Silicone FEP coated (A+P FEP-O-SEAL) / with / -40 ... +150 °C
		O	Silicone FEP coated (A+P FEP-O-SEAL) / without / -40 ... +80 °C
		P	FFKM (Kalrez 6375) / with / -10 ... +150 °C
		P	FFKM (Kalrez 6375) / with / -20 ... +150 °C
		Q	FKM (SHS EPM 70C3 GLT) / with / -40 ... +80 °C
		R	EPDM (A+P 70.10-02) / with / -40 ... +80 °C
		S	Silicone FEP coated (A+P FEP-O-SEAL) / with / -40 ... +80 °C
h	Electronics	H	Two-wire 4 ... 20 mA/HART
		A	Two-wire 4 ... 20 mA/HART with SIL qualification
		B	Four-wire 4 ... 20 mA/HART; 90 ... 253 V AC; 50/60 Hz
		I	Four-wire 4 ... 20 mA/HART; 9.6 ... 48 V DC; 20 ... 42 V AC
		U	Four-wire Modbus (converter in second chamber)
i	Supplementary electronics	X	without
j	Housing / Protection	D	Aluminium double chamber / IP66/IP68 (0.2 bar)
		L	Cable outlet IP68 with external Aluminium double chamber / IP66/IP67
		M	Cable outlet IP68 with external stainless steel double chamber / IP66/IP67
		S	Special colour Aluminium double chamber / IP66/IP68 (0.2 bar)
		T	Cable outlet IP68 with external special colour Aluminium double chamber / IP66/IP67
		W	Stainless steel double chamber / IP66/IP68 (0.2 bar)

Position		Feature	Description
k	Cable entry / Connection	1	M20 x 1.5 / without
		D	M20 x 1.5 / Blind plug
		N	½ NPT / Blind plug
		Q	½ NPT / without
		*	Respectively approved cable glands and blind plugs correspond to the ignition protection type
l	Display and adjustment module PLICSCOM	X	without
		A	mounted
		F	without; lid with inspection window
		B	Laterally mounted
		K	mounted; with Bluetooth, magnetic pen operation
		L	laterally mounted; with Bluetooth, magnetic pen operation
m	Certificates	M	Yes
		X	No

VEGAFLEX FX82(a).bcdefghijklm

Position		Feature	Description
a			One or two-digit alphanumeric variable, for production control. Optional, not safety-relevant.
b	Scope	A	Europe
		V	Combination (Europe, world-wide)
c	Approval	D	ATEX II 1/2G, 2G Ex db ia IIC T6 ... T1 Ga/Gb, Gb
		V	ATEX II 1/2G, 2G Ex db ia IIC T6 ... T1 Ga/Gb, Gb + Overfill protection (WHG, VLAREM)
		P	ATEX II 1/2G, 2G Ex db ia IIC T6 ... T1 Ga/Gb, Gb + Ship approval
		I	ATEX II 1/2G, 2G Ex db ia IIC T6 ... T1 Ga/Gb, Gb, II 1D, 1/2D, 1/3D, 2D Ex ta, ta/tb, ta/tc, tb IIIC T*
d	Version / Material	A	exchangeable cable (ø 4 mm) / 316
		F	exchangeable rod (ø 6 mm) / 316
		E	exchangeable steel cable (ø 6 mm with gravity weight / PA coated
		G	exchangeable steel cable (ø 11 mm with gravity weight / PA coated
		H	exchangeable rod (ø 16 mm) / 316L
		T	exchangeable rod (ø 16 mm) / Alloy C22 (2.4602)
		*	further approved Versions / Materials
ef	Process fitting / Material	**	Two-digit alphanumeric variables for process fittings according to industry standard
g	Seal / Process temperature	F	FKM (SHS FPM 70C3 GLT) / -40 ... +150 °C
		H	EPDM (A+P 70.10-02) / -40 ... +150 °C
		K	FFKM (Kalrez 6375) / -20 ... +200 °C

Position		Feature	Description
h	Electronics	H	Two-wire 4 ... 20 mA/HART
		A	Two-wire 4 ... 20 mA/HART with SIL qualification
		B	Four-wire 4 ... 20 mA/HART; 90 ... 253 V AC; 50/60 Hz
		I	Four-wire 4 ... 20 mA/HART; 9.6 ... 48 V DC; 20 ... 42 V AC
		U	Four-wire Modbus (converter in second chamber)
i	Supplementary elec- tronics	X	without
j	Housing / Protection	D	Aluminium double chamber / IP66/IP68 (0.2 bar)
		L	Cable outlet IP68 with external Aluminium double chamber / IP66/ IP67
		M	Cable outlet IP68 with external stainless steel double chamber / IP66/IP67
		S	Special colour Aluminium double chamber / IP66/IP68 (0.2 bar)
		T	Cable outlet IP68 with external special colour Aluminium double chamber / IP66/IP67
		W	Stainless steel double chamber / IP66/IP68 (0.2 bar)
k	Cable entry / Connection	1	M20 x 1.5 / without
		D	M20 x 1.5 / Blind plug
		N	½ NPT / Blind plug
		Q	½ NPT / without
		*	Respectively approved cable glands and blind plugs correspond to the ignition protection type
l	Display and adjustment module PLICSCOM	X	without
		A	mounted
		F	without; lid with inspection window
		B	Laterally mounted
		K	mounted; with Bluetooth, magnetic pen operation
		L	laterally mounted; with Bluetooth, magnetic pen operation
m	Certificates	M	Yes
		X	No

VEGAFLEX FX83(a).bcdefghijklm

Position		Feature	Description
a			One or two-digit alphanumeric variable, for production control. Op- tional, not safety-relevant.
b	Scope	A	Europe
		V	Combination (Europe, world-wide)

Position		Feature	Description
c	Approval	D	ATEX II 1/2G, 2G Ex db ia IIC T6 ... T1 Ga/Gb, Gb
		V	ATEX II 1/2G, 2G Ex db ia IIC T6 ... T1 Ga/Gb, Gb + Overfill protection (WHG, VLAREM)
		P	ATEX II 1/2G, 2G Ex db ia IIC T6 ... T1 Ga/Gb, Gb + Ship approval
		I	ATEX II 1/2G, 2G Ex db ia IIC T6 ... T1 Ga/Gb, Gb, II 1D, 1/2D, 1/3D, 2D Ex ta, ta/tb, ta/tc, tb IIIC T*
d	Version / Material	B	exchangeable cable (ø 4 mm) with gravity weight / PFA
		F	exchangeable rod (ø 8 mm) / 1.4435 (BN2), (Ra<0,76µm)
		G	exchangeable rod (ø 8 mm) / 1.4435 (BN2), can be autoclaved (Ra<0,76µm)
		E	Rod (ø 10 mm) / PFA
		H	exchangeable rod (ø 8 mm) / 1.4435 (BN2), electropolished (Ra<0,38µm)
		I	exchangeable rod (ø 8 mm) / 1.4435 (BN2), electropolished, can be autoclaved (Ra<0,38µm)
		*	further approved Versions / Materials
ef	Process fitting / Material	**	Two-digit alphanumeric variables for process fittings according to industry standard
g	Seal / Process temperature	X	without / -40 ... +150 °C
		E	FFKM (Kalrez 6221) / -20 ... +150 °C
		C	EPDM (Freudenberg 70, EPDM 291) / -20 ... +130 °C
		T	FEPM (Vi 602 Extreme-ETP, COG) / -10 ... +150 °C
h	Electronics	H	Two-wire 4 ... 20 mA/HART
		A	Two-wire 4 ... 20 mA/HART with SIL qualification
		B	Four-wire 4 ... 20 mA/HART; 90 ... 253 V AC; 50/60 Hz
		I	Four-wire 4 ... 20 mA/HART; 9.6 ... 48 V DC; 20 ... 42 V AC
		U	Four-wire Modbus (converter in second chamber)
i	Supplementary electronics	X	without
		Z	Additional current output 4 ... 20 mA
j	Housing / Protection	D	Aluminium double chamber / IP66/IP68 (0.2 bar)
		L	Cable outlet IP68 with external Aluminium double chamber / IP66/IP67
		M	Cable outlet IP68 with external stainless steel double chamber / IP66/IP67
		S	Special colour Aluminium double chamber / IP66/IP68 (0.2 bar)
		T	Cable outlet IP68 with external special colour Aluminium double chamber / IP66/IP67
		W	Stainless steel double chamber / IP66/IP68 (0.2 bar)

Position		Feature	Description
k	Cable entry / Connection	1	M20 x 1.5 / without
		D	M20 x 1.5 / Blind plug
		N	½ NPT / Blind plug
		Q	½ NPT / without
		*	Respectively approved cable glands and blind plugs correspond to the ignition protection type
l	Display and adjustment module PLICSCOM	X	without
		A	mounted
		F	without; lid with inspection window
		B	Laterally mounted
		K	mounted; with Bluetooth, magnetic pen operation
		L	laterally mounted; with Bluetooth, magnetic pen operation
m	Certificates	M	Yes
		X	No

VEGAFLEX FX86(a).bcdefghijklm

Position		Feature	Description
a			One or two-digit alphanumeric variable, for production control. Optional, not safety-relevant.
b	Scope	A	Europe
		V	Combination (Europe, world-wide)
c	Approval	D	ATEX II 1/2G, 2G Ex db ia IIC T6 ... T1 Ga/Gb, Gb
		V	ATEX II 1/2G, 2G Ex db ia IIC T6 ... T1 Ga/Gb, Gb + Overfill protection (WHG, VLAREM)
		P	ATEX II 1/2G, 2G Ex db ia IIC T6 ... T1 Ga/Gb, Gb + Ship approval
		I	ATEX II 1/2G, 2G Ex db ia IIC T6 ... T1 Ga/Gb, Gb, II 1D, 1/2D, 1/3D, 2D Ex ta, ta/tb, ta/tc, tb IIIC T*

Position		Feature	Description
d	Version / Material	2	exchangeable cable (ø 2 mm) with centering weight / Duplex (1.4462)
		4	Coax (ø 42.2 mm) with multiple hole and reference distance / 316L
		5	Coax (ø 42.2 mm) with multiple hole and reference distance / Alloy C22 (2.4602)
		6	exchangeable rod (ø 8 mm) / Duplex (1.4462)
		A	exchangeable cable (ø 4 mm) with gravity weight / 316
		B	exchangeable cable (ø 2 mm) with gravity weight / 316
		C	exchangeable cable (ø 4 mm) with centering weight / 316
		D	exchangeable cable (ø 2 mm) with centering weight / 316
		E	exchangeable rod (ø 8 mm) / 316L
		H	exchangeable rod (ø 16 mm) / 316L
		I	exchangeable cable (ø 4 mm) with gravity weight / Alloy C22 (2.4602)
		J	exchangeable cable (ø 4 mm) with centering weight / Alloy C22 (2.4602)
		L	Coax (ø 21.3 mm) with multiple hole / 316L
		P	Coax (ø 42.2 mm) with multiple hole / 316L
		R	Coax (ø 42.2 mm) with multiple hole / Alloy C22 (2.4602)
		T	exchangeable rod (ø 16 mm) / Alloy C22 (2.4602)
		W	exchangeable rod (ø 8 mm) / Alloy C276 (2.4819)
		*	further approved Versions / Materials
ef	Process fitting / Material	**	Two-digit alphanumeric variables for process fittings according to industry standard
g	Seal / Second line of defense / Process temperature	1	Ceramic-graphite / with / -196 ... +280 °C
		2	Ceramic-graphite / with / -196 ... +400 °C
		2	Ceramic-graphite / with / -196 ... +450 °C
		3	PEEK-FFKM (Kalrez 6375) / with / -20 ... +250 °C
h	Electronics	H	Two-wire 4 ... 20 mA/HART
		A	Two-wire 4 ... 20 mA/HART with SIL qualification
		B	Four-wire 4 ... 20 mA/HART; 90 ... 253 V AC; 50/60 Hz
		I	Four-wire 4 ... 20 mA/HART; 9.6 ... 48 V DC; 20 ... 42 V AC
		U	Four-wire Modbus (converter in second chamber)
i	Supplementary electronics	X	without

Position		Feature	Description
j	Housing / Protection	D	Aluminium double chamber / IP66/IP68 (0.2 bar)
		L	Cable outlet IP68 with external Aluminium double chamber / IP66/IP67
		M	Cable outlet IP68 with external stainless steel double chamber / IP66/IP67
		S	Special colour Aluminium double chamber / IP66/IP68 (0.2 bar)
		T	Cable outlet IP68 with external special colour Aluminium double chamber / IP66/IP67
		W	Stainless steel double chamber / IP66/IP68 (0.2 bar)
k	Cable entry / Connection	1	M20 x 1.5 / without
		D	M20 x 1.5 / Blind plug
		N	½ NPT / Blind plug
		Q	½ NPT / without
		*	Respectively approved cable glands and blind plugs correspond to the ignition protection type
l	Display and adjustment module PLICSCOM	X	without
		A	mounted
		F	without; lid with inspection window
		B	Laterally mounted
		K	mounted; with Bluetooth, magnetic pen operation
		L	laterally mounted; with Bluetooth, magnetic pen operation
m	Certificates	M	Yes
		X	No

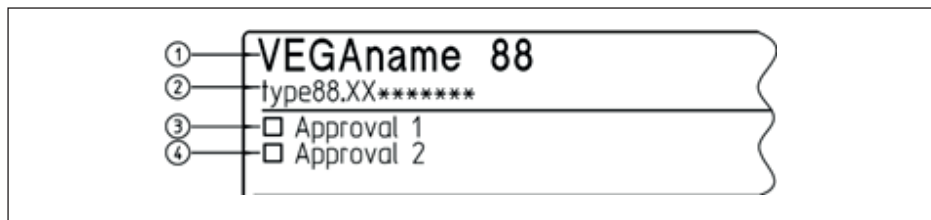
Multiple listed characteristics according to the dependencies of the device configuration.

In the following, all above mentioned versions are called VEGAFLEX 81, 82, 83, 86. If parts of these safety instructions refer only to certain versions, then these will be mentioned explicitly with their type code.

3 Different ignition protection types

Die VEGAFLEX 81, 82, 83, 86 sind entweder in explosionsfähigen Staubatmosphären oder in explosionsfähigen Gasatmosphären einsetzbar.

Der Betreiber muss vor der Installation die gewählte Zündschutzart festlegen. Die gewählte Zündschutzart ist durch festes Markieren am Identifizierungskennzeichen des Typschildes fest zu legen.



1 VEGAFLEX 81, 82, 83, 86

2 Geräteausführung

3 Identifizierungskennzeichen: Zulassung in Staub-Zündschutzart z. B. „Ex t“

4 Identifizierungskennzeichen: Zulassung in Gas-Zündschutzart z. B. „Ex i“, „Ex d“

If VEGAFLEX 81, 82, 83, 86 is installed in a dust atmosphere, then the safety instructions and the instructions in the respective certificates must be noted:

Installation	Approval	Certificate	Safety instruction
Dust	"A1"	TÜV 19 ATEX 231186 X	63207

4 General information

Die Füllstandmessgeräte VEGAFLEX 81, 82, 83, 86 als Geführte Radarsensoren dienen zur Erfassung des Abstandes zwischen einer Mediumoberfläche und dem Sensor mittels hochfrequenter, elektromagnetischer Wellen im GHz-Bereich. Die Elektronik nutzt die Laufzeit der von der Mediumoberfläche reflektierten Signale, um den Abstand zur Mediumoberfläche zu errechnen.

Die VEGAFLEX 81, 82, 83, 86 bestehen aus einem Elektronikgehäuse, einem Prozessanschlussselement und einem Messfühler, dem Messseil bzw. Messstab. Wahlweise kann auch das Anzeige- und Bedienmodul eingebaut sein.

The VEGAFLEX 81, 82, 83, 86 are suitable for applications in hazardous atmospheres of all combustible materials of explosion groups IIA, IIB and IIC.

The VEGAFLEX 81, 82, 83, 86 are suitable for applications requiring category 1/2G (EPL Ga/Gb) or 2G (EPL Gb) instruments.

5 Application area

Category 1/2G or 1/3G (EPL Ga/Gb or EPL Ga/Gc instruments)

The VEGAFLEX 81, 82, 83, 86 with mechanical fixing element are installed in hazardous areas of zone 1 or zone 2 requiring instruments of category 2G (EPL Gb) or 3G (EPL Gc). The mechanical fixing element, process connection element is installed in the separating wall, which separates areas requiring instruments of category 2G (EPL Gb) or 3G (EPL Gc). The sensor measuring system is installed in hazardous areas of zone 0 requiring instruments of category 1G (EPL Ga)

Category 2G (EPL Gb instruments)

The VEGAFLEX 81, 82, 83, 86 with the mechanical fixing element are installed in hazardous areas of zone 1 requiring category 2G (EPL Gb) instruments.

VEGA Instrument	3G (EPL Gc)	2G (EPL Gb)	1/2G (EPL Ga/Gb)
Ex Zone 2 			
Ex Zone 1 			
Ex Zone 0 			

6 Specific conditions of use ("X" identification)

Die nachfolgende Übersicht listet alle besonderen Eigenschaften des VEGAFLEX 81, 82, 83, 86, welche eine Kennzeichnung mit dem Symbol "X" hinter der Zertifikatsnummer erforderlich machen.

Elektrostatische Aufladung (ESD)

Die Details hierzu sind dem Kapitel "*Elektrostatische Aufladung (ESD)*" dieser Sicherheitshinweise zu entnehmen.

Umgebungstemperatur

Die Details hierzu sind dem Kapitel "*Thermische Daten*" dieser Sicherheitshinweise zu entnehmen.

Impact and friction sparks

The VEGAFLEX 81, 82, 83, 86 in light metal versions (e.g. aluminium, titanium, zircon) 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.

Nicht geerdete, metallische Teile

Der Widerstandswert zwischen Aluminiumgehäuse und metallischem Messstellenkennzeichnungsschild beträgt $> 10^9$ Ohm.

Die Kapazität des metallischen Messstellenkennzeichnungsschildes wurde mit 15 pF gemessen.

For versions with external housing

For the version with external housing, the potential equalization must be provided in the complete range of the connection cable between electronics housing and transmitter housing.

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

7 Important information for mounting and maintenance

General instructions

The following requirements must be fulfilled for mounting, electrical installation, setup and maintenance of the instrument:

- The staff must be qualified according the respective tasks
- The staff must be trained in explosion protection

- The staff must be familiar with the respectively valid regulations, e.g. planning and installation acc. to IEC/EN 60079-14
- Make sure when working on the instrument (mounting, installation, maintenance) that there is no explosive atmosphere present, the supply circuits should be voltage-free, if possible.
- The instrument has to be mounted according to the manufacturer specifications, the EU type approval certificate and the valid regulations and standards
- Modifications on the instrument can influence the explosion protection and hence the safety, therefore repairs are not permitted to be conducted by the end user
- Modifications must only be carried out by employees authorized by VEGA company
- Use only approved spare parts
- Components for installation and connection not included in the approval documents are only permitted if these correspond technically to the latest standard mentioned on the cover sheet. They must be suitable for the application conditions and have a separate certificate. The special conditions of the components must be noted and if necessary, the components must be integrated in the type test. This applies also to the components already mentioned in the technical description.
- Vessel installations and probable flow must be taken into account

Kabel- und Leitungseinführungen

- Der VEGAFLEX 81, 82, 83, 86 ist über dafür geeignete Kabel- und Leitungseinführungen bzw. Rohrleitungssysteme anzuschließen, die den Anforderungen der Zündschutzart und IP-Schutzart entsprechen und für die eine gesonderte Prüfbescheinigung vorliegt. Bei Anschluss des VEGAFLEX 81, 82, 83, 86 an Rohrleitungssysteme muss die zugehörige Abdichtungsvorrichtung direkt am Gehäuse angebracht sein.
- Die je nach Geräteausführung bei der Auslieferung eingeschraubten roten Gewinde- bzw. Staubschutzkappen müssen vor der Inbetriebnahme entfernt und durch geeignete, für die jeweilige Zündschutzart und IP-Schutzart zugelassene Kabel- und Leitungseinführungen bzw. Verschlusschrauben ersetzt werden
- Art und Größe der Anschlussgewinde beachten: Ein Hinweisschild mit der entsprechenden Gewindebezeichnung befindet sich im Bereich der jeweiligen Anschlussgewinde
- Gewinde dürfen keine Beschädigungen aufweisen
- Kabel-, Leitungseinführungen und Verschlusschrauben fachgerecht und entsprechend den Sicherheitshinweisen des Herstellers montieren, um die angegebene Zündschutzart und IP-Schutzart sicher zu stellen. Bei der Verwendung von bescheinigten bzw. geeigneten Kabelverschraubungen, Verschlusschrauben oder Steckverbindungen sind die entsprechenden zugehörigen Zertifikate/Dokumente zwingend zu beachten. Mitgelieferte Kabel- und Leitungseinführungen bzw. Verschlusschrauben erfüllen diese Anforderungen.
- Nicht benutzte Einführungsöffnungen müssen durch für die Zündschutzart und IP-Schutzart geeignete Verschlusschrauben verschlossen werden. Mitgelieferte Verschlusschrauben erfüllen diese Anforderungen.
- Kabel- und Leitungseinführungen bzw. Verschlusschrauben müssen fest in das Gehäuse eingeschraubt werden
- Die Anschlussleitungen bzw. Rohrleitungsabdichtungseinrichtungen müssen für die Einsatzbedingungen (z. B. Temperaturbereich) der Anwendung geeignet sein
- Bei Oberflächentemperaturen $> 70^{\circ}\text{C}$ müssen die Leitungen für die höheren Einsatzbedingungen geeignet sein
- Das Anschlusskabel des VEGAFLEX 81, 82, 83, 86 ist fest und so zu verlegen, dass es hinreichend gegen Beschädigungen geschützt ist

Double chamber housing "Ex db ia"



- 1 Lid, optionally with inspection window
- 2 Electronics compartment
- 3 Screw plug
- 4 Connection compartment
- 5 Transport protection, replace with installation
Red threaded or dust protection cap
- 6 Label: Thread type
- 7 Locking screws of the lid for lid locking
- 8 Lid, optionally with inspection window
- 9 Locking screws of the lid for lid locking

Montage

Bei der Gerätemontage ist zu beachten:

- Mechanische Beschädigungen am Gerät sind zu vermeiden
- Mechanische Reibungen sind zu vermeiden
- Auf Behältereinbauten und eventuell auftretende Strömungsverhältnisse ist besonders zu achten
- Prozessanschlüsse zwischen zwei Explosionsschutzbereichen müssen nach gültigen Vorschriften, Regeln und Normen eine entsprechende Schutzart gemäß der IEC/EN 60529 aufweisen
- Vor dem Betrieb den/die Gehäusedeckel bis zum Anschlag fest zudrehen, um die auf dem Typschild angegebene IP-Schutzart sicher zu stellen
- Deckel durch Herausdrehen der Arretierungsschraube bis zum Anschlag gegen unbefugtes Öffnen sichern. Beim Zweikammergehäuse beide Deckel sichern.

Wartung

Zur Sicherstellung der Funktion des Gerätes wird eine periodische Sichtkontrolle empfohlen auf:

- Sichere Montage
- Keine mechanischen Beschädigungen oder Korrosion
- Durchgescheuerte oder anderweitig beschädigte Leitungen
- Keine lockere Verbindungen der Leitungsanschlüsse, Potenzialausgleichsanschlüsse
- Korrekte und eindeutig gekennzeichnete Leitungsverbindungen

Die Teile des VEGAFLEX 81, 82, 83, 86 mit betriebsmäßigem Kontakt zu entzündlichen Medien sind in die periodische Überdruckprüfung der Anlage einzubeziehen.

Intrinsic safety "i"

- Valid regulations for connection of intrinsically safe circuits, e.g. proof of intrinsic safety according to IEC/EN 60079-14 must be observed
- The instrument is only suitable for connection to certified, intrinsically safe instruments
- When connecting a circuit with protection level Ex ib, the device, the sensor meas. system of the device must no more be used in hazardous areas of zone 0.
- When connecting an intrinsically safe instruments with classification mark Ex ia to a circuit with protection level Ex ib, then the classification mark of the instrument changes to Ex ib. After the use as instrument with Ex ib power supply, the instrument must no more be used in circuits with protection level Ex ia
- When connecting an intrinsically safe instrument to an non-intrinsically safe circuit, the instrument must be no longer used in intrinsically safe circuits
- With surface temperatures > 70 °C, the cables must be suitable for the higher application conditions

Flameproof enclosure "d"

- The terminals for connecting the operating voltage or signal circuits are integrated in the connection compartment with type of protection flameproof enclosure "d"
- The thread gaps between housing and cover as well as between threaded fitting and container are flameproof joints
- It is not allowed to repair the flameproof joints.
- Cable, wire entries and closing screws must be certified acc. to ignition protection type Flameproof enclosures "d". Cable, wire entries and closing screws of simple design must not be used.
- Separately certified cable and wire entries can determine the permissible ambient temperature range or the temperature classes
- Only one threaded adapter is allowed per thread, when using a closing screw, threaded adapters are not allowed

Version with exchangeable cable or rod probe

Only original VEGA cable or rod probes must be mounted to VEGAFLEX 81, 82, 83, 86. When mounting cable or rod probes, the torques specified in the respective operating instruction manuals must be maintained. The mechanical connection must be ensured.

8 Safe operating mode

General operating conditions

- Do not operate the instrument outside the electrical, thermal and mechanical specifications of the manufacturer
- Use the instrument only in media against which the wetted parts are sufficiently resistant
- Note the relation between process temperature on the sensor/antenna and the permissible ambient temperature on the electronics housing. For permissible temperatures, see the respective temperature tables. See chapter " *Thermal data*".
- If necessary, a suitable overvoltage arrester can be connected in front of the VEGAFLEX 81, 82, 83, 86
- When used in hybrid mixtures (gas and dust at the same time) additional measures for explosion protection must be taken
- Lids in ignition protection type "Ex d" must not be opened if there is a hazardous atmosphere. The housing lids are marked with the warning label:

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

- Components for installation and connection not included in the approval documents are only permitted if these correspond technically to the latest standard mentioned on the cover sheet. They must be suitable for the application conditions and have a separate certificate. The special conditions of the components must be noted and if necessary, the components must be integrated in the type test. This applies also to the components already mentioned in the technical description.

9 Potential equalization/Grounding

- Integrate the instruments into the local potential equalisation, e.g. via the internal or external earth terminal
- The potential equalization terminal must be secured against loosening and twisting
- If grounding of the cable screening is necessary, this must be carried out acc. to the valid standards and regulations, e.g. acc. to IEC/EN 60079-14
- The intrinsically safe input and the intrinsically safe output circuits are ground-free. The voltage resistance against ground is min. 500 Veff.

10 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:

- 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**

11 Electrical data

VEGAFLEX FX8*(*)..A/VD/V/P/I****A/HX****

Supply and signal circuit in the Ex d connection compartment, double chamber housing:	
Terminals 1[+], 2[-]	$U = 15 \dots 35 \text{ V DC}$ $U_m = 253 \text{ V AC/DC}$ $I \leq 3.5 \dots 22.5 \text{ mA}$ (with superimposed HART signal)

VEGAFLEX FX8*(*)..A/VD/V/P/I****BX****

Supply circuit in the Ex d connection compartment of the double chamber housing:	
Terminals 1[+], 2[-]	$U = 90 \dots 253 \text{ V AC}$ $U_m = 253 \text{ V AC/DC}$

Active 4 ... 20 mA signal circuit in the Ex d connection compartment, double chamber housing:	
Terminals 5[+], 7[-]	$U_m = 60 \text{ V AC/DC}$ $I \leq 3.5 \dots 22.5 \text{ mA}$ (with superimposed HART signal)

Passive 4 ... 20 mA signal circuit in the Ex d connection compartment, double chamber housing:	
Terminals 6[+], 7[-]	$U_m = 60 \text{ V AC/DC}$ $I \leq 3.5 \dots 22.5 \text{ mA}$ (with superimposed HART signal)

VEGAFLEX FX8*(*)..A/VD/V/P/I****IX****

Supply circuit in the Ex d connection compartment of the double chamber housing:	
Terminals 1[+], 2[-]	$U = 9.6 \dots 48 \text{ V DC}; 42 \text{ V AC}$ $U_m = 253 \text{ V AC}$

Active 4 ... 20 mA signal circuit in the Ex d connection compartment, double chamber housing:	
Terminals 5[+], 7[-]	$U_m = 60 \text{ V AC/DC}$ $I \leq 3.5 \dots 22.5 \text{ mA}$ (with superimposed HART signal)

Passive 4 ... 20 mA signal circuit in the Ex d connection compartment, double chamber housing:	
Terminals 6[+], 7[-]	$U_m = 60 \text{ V AC/DC}$ $I \leq 3.5 \dots 22.5 \text{ mA}$ (with superimposed HART signal)

VEGAFLEX FX8*(*)..A/VD/V/P/I****UX****

Supply circuit in the Ex d connection compartment of the double chamber housing:	
Terminals 1[+], 2[-]	$U = 8 \dots 32 \text{ V DC}$ $U_m = 253 \text{ V AC}$

Signal circuit in the Ex d connection compartment of the double chamber housing:	
Terminals MB[+], MB[-]	$U = 5 \text{ V}$ with Modbus signal (telegram) $U_m = 253 \text{ V AC}$

Signal circuit in the Ex d connection compartment of the double chamber housing:	
USB connection: (6-pole mini USB socket)	$U_{\max} = 5 \text{ V}$ with USB signal (USB protocol) $U_m = 253 \text{ V AC}$

Display and adjustment circuit in the Ex d connection compartment:	
Terminals 5, 6, 7, 8	For connection to the circuit of the passive display unit VEGADIS 81 in ignition protection type flameproof enclosure "d" (BVS 13 ATEX E 054).

Intrinsically safe circuit for the external display and adjustment unit:	
Terminals 5, 6, 7, 8	In type of protection intrinsic safety Ex ia IIC.
	For connection to the intrinsically safe circuit of the corresponding external indicating unit VEGADIS 81 in ignition protection type Intrinsic safety "i" (PTB 02 ATEX 2136 X).
	The proof for intrinsic safety of the interconnection rendered if the total inductance and total capacitance of the connection cable $L_{\text{cable}} = 212 \mu\text{H}$ and $C_{\text{cable}} = 1.98 \mu\text{F}$ is not exceeded
	When using the supplied VEGA connection cable, then the permissible cable length is $L_{\text{zul}} = 341 \text{ m}$.

Display and adjustment circuit:	
Spring contacts in the Ex d connection compartment	Only for connection to the display and adjustment module PLICSCOM or for service purposes the interface adapter VEGACONNECT, if it is ensured that no explosive atmosphere is present.
Spring contacts in the Ex i electronics compartment	In type of protection intrinsic safety Ex ia IIC.
	Only for connection to the display and adjustment module PLICSCOM.

The circuits of VEGAFLEX 81, 82, 83, 86 are galvanically separated from ground.

The circuits of VEGAFLEX 81, 82, 83, 86 are galvanically connected to ground potential via the earth terminals.

The metallic parts of VEGAFLEX 81, 82, 83, 86 are electrically connected with the earth terminals.

12 Mechanical data

The following mechanical data are valid for all housing and electronics versions.

Mechanical data	
Ground terminal (connection cross-section)	$\geq 4 \text{ mm}^2$
Overvoltage category	III
Pollution degree	2
- Materials - Max. tensile load on the cable or rod probe - Potential connections and electrical separating measures in the instrument - Electromechanical data - Electrical protective measures	Are described in the operating instructions VEGAFLEX 81, 82, 83, 86 in chapter "Technical data".

13 Thermal data

The following temperature tables are valid for all housing and electronics versions.

The relationship between the permissible ambient temperature for the electronics housing depending on the area of application and the maximum surface temperatures, temperature classes, can be seen in the following tables.

VEGAFLEX FX8*(*)./ND/V/P/I****A/HX****

Temperature class	Temperature on the sensor (measuring cable, rod)	Ambient temperature on the electronics	
		Housing lid without inspection window	Housing lid with inspection window
T6	-60 ... +80 °C	-60 ... +46 °C	-50 ... +46 °C
T5	-60 ... +95 °C	-60 ... +61 °C	-50 ... +61 °C
T4	-60 ... +130 °C	-60 ... +70 °C	-50 ... +70 °C
T3	-60 ... +195 °C	-60 ... +70 °C	-50 ... +70 °C
T2	-60 ... +290 °C	-60 ... +70 °C	-50 ... +70 °C
T1	-60 ... +440 °C	-60 ... +70 °C	-50 ... +70 °C

VEGAFLEX FX8*(*)./ND/V/P/I****A/HX****, low temperature version down to -196 °C

Temperature class	Temperature on the sensor (measuring cable, rod)	Ambient temperature on the electronics	
		Housing lid without inspection window	Housing lid with inspection window
T6	-196 ... +80 °C	-60 ... +46 °C	-50 ... +46 °C
T5	-196 ... +95 °C	-60 ... +61 °C	-50 ... +61 °C
T4	-196 ... +130 °C	-60 ... +70 °C	-50 ... +70 °C
T3	-196 ... +195 °C	-60 ... +70 °C	-50 ... +70 °C
T2	-196 ... +290 °C	-60 ... +70 °C	-50 ... +70 °C
T1	-196 ... +440 °C	-60 ... +70 °C	-50 ... +70 °C

VEGAFLEX FX8*(*)./ND/V/P/I****B/UH****

Temperature class	Temperature on the sensor (measuring cable, rod)	Ambient temperature on the electronics	
		Housing lid without inspection window	Housing lid with inspection window
T6	-60 ... +80 °C	-60 ... +46 °C	-50 ... +46 °C
T5	-60 ... +95 °C	-60 ... +60 °C	-50 ... +60 °C
T4	-60 ... +130 °C	-60 ... +60 °C	-50 ... +60 °C
T3	-60 ... +195 °C	-60 ... +60 °C	-50 ... +60 °C
T2	-60 ... +290 °C	-60 ... +60 °C	-50 ... +60 °C
T1	-60 ... +440 °C	-60 ... +60 °C	-50 ... +60 °C

VEGAFLEX FX8(*)./VD/V/P/I/**B/I/UX****, low temperature version down to -196 °C**

Temperature class	Temperature on the sensor (measuring cable, rod)	Ambient temperature on the electronics	
		Housing lid without inspection window	Housing lid with inspection window
T6	-196 ... +80 °C	-60 ... +46 °C	-50 ... +46 °C
T5	-196 ... +95 °C	-60 ... +60 °C	-50 ... +60 °C
T4	-196 ... +130 °C	-60 ... +60 °C	-50 ... +60 °C
T3	-196 ... +195 °C	-60 ... +60 °C	-50 ... +60 °C
T2	-196 ... +290 °C	-60 ... +60 °C	-50 ... +60 °C
T1	-196 ... +440 °C	-60 ... +60 °C	-50 ... +60 °C

The sensors (measuring cable, rod) may only be operated in areas for EPL Ga, EPL Ga/Gb and EPL Gb applications if atmospheric conditions are present (pressure of 0.8 ... 1.1 bar).

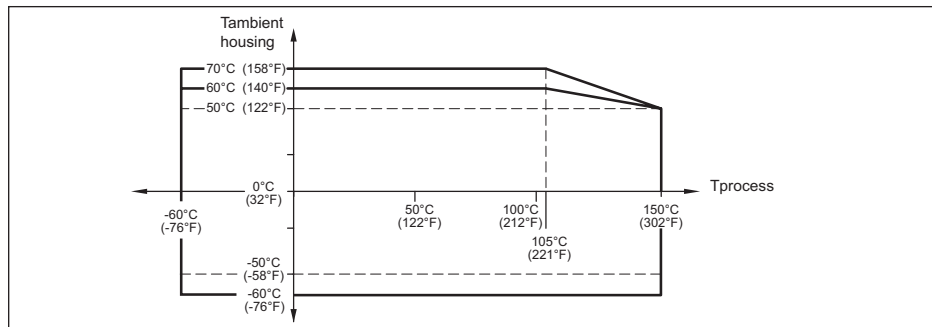
If there is no explosive atmosphere, the permissible operating temperatures and pressures must be taken from the manufacturer specifications (operating instructions).

If the sensors (measuring cable, measuring rod) are operated at temperatures higher than those listed in the table above, measures must be taken to prevent the risk of ignition from hot surfaces.

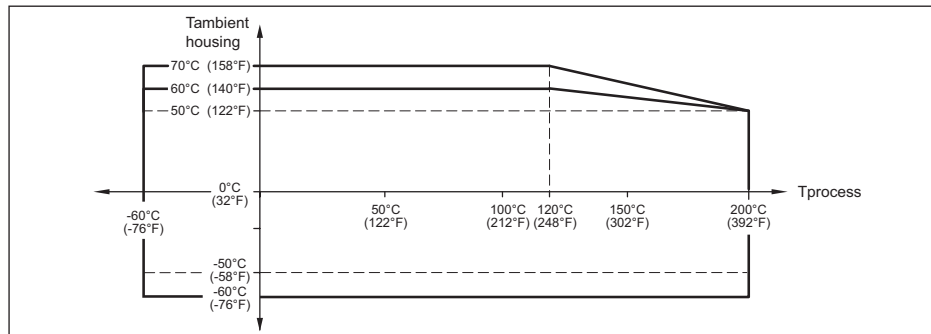
The maximum permissible temperature at the electronics/housing must not exceed the values in the above table.

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

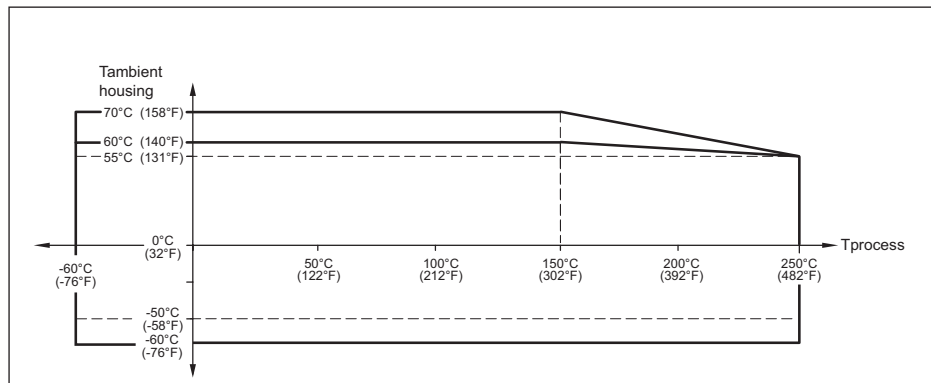
Versions for process temperatures up to +150 °C



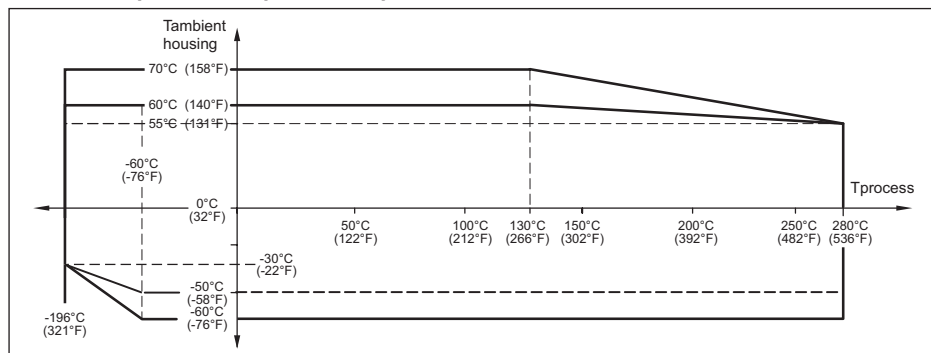
Versions for process temperatures up to +200 °C



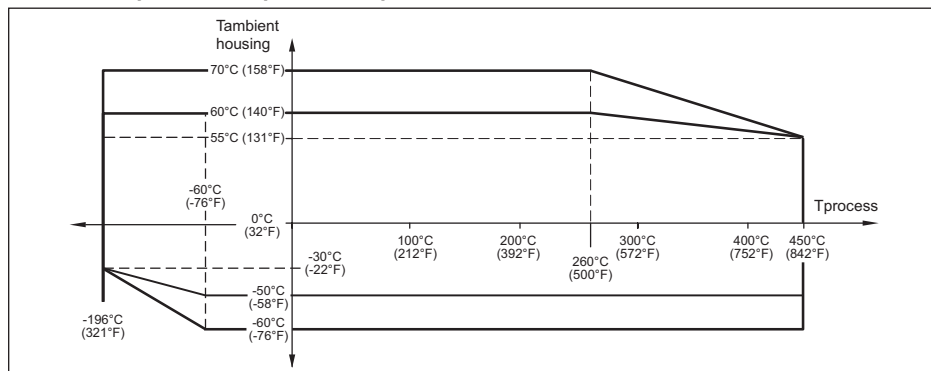
Versions for process temperatures up to +250 °C

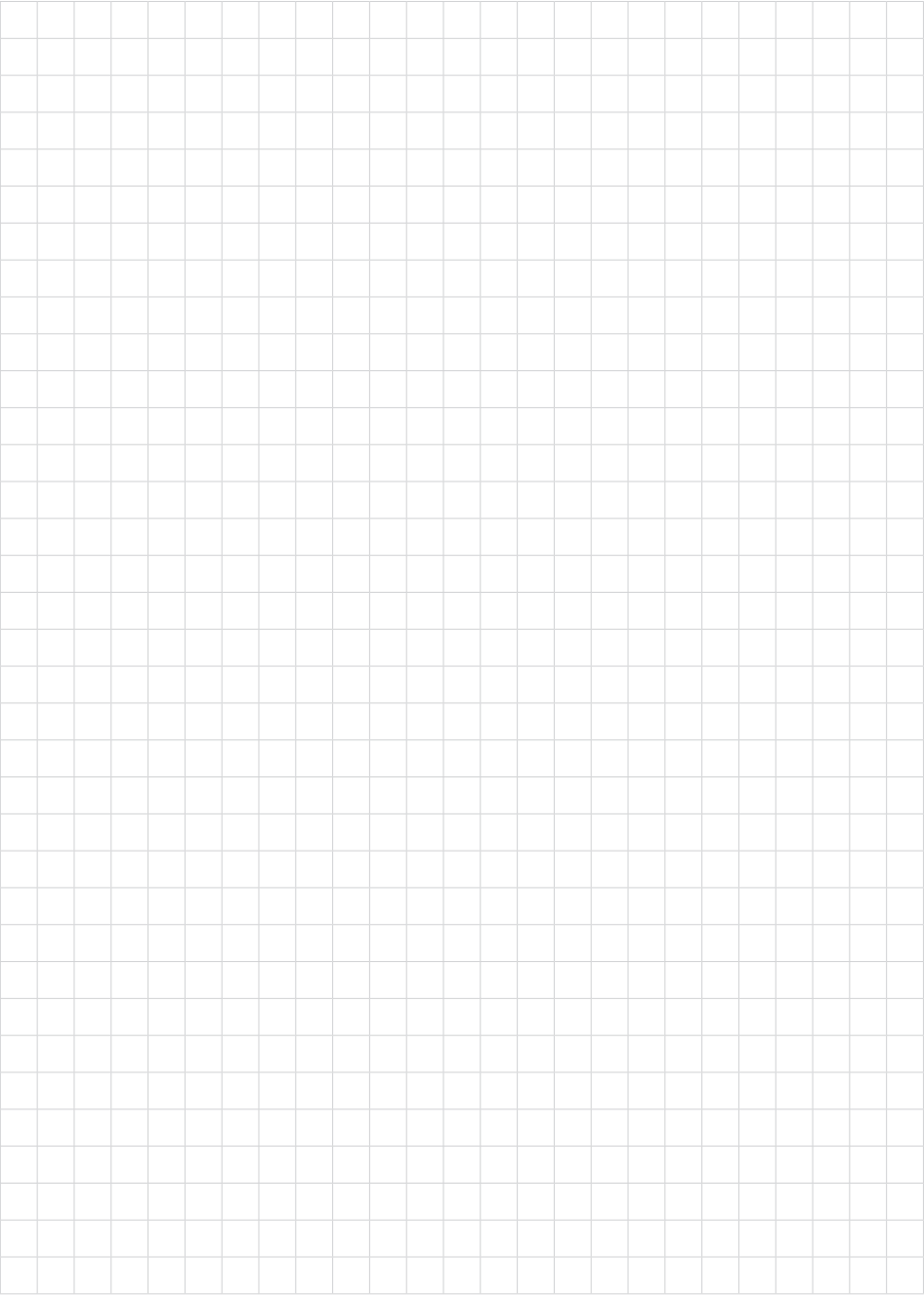


Versions for process temperatures up to +280 °C



Versions for process temperatures up to +450 °C





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.

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