



## Safety instructions

### VEGAFLEX 81, 82, 86

Flameproof enclosure "d"

Two-wire 4 ... 20 mA/HART

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

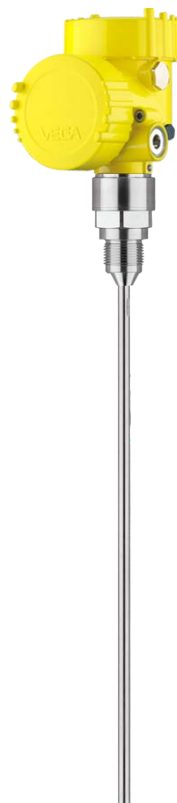
Four-wire 4 ... 20 mA/HART

Modbus

Profibus PA

Foundation Fieldbus

Additional current output 4 ... 20 mA



CE 0044



Document ID: 49461



# VEGA

## Contents

<b>1</b>	<b>Area of applicability.....</b>	<b>4</b>
<b>2</b>	<b>Important specification in the type code.....</b>	<b>4</b>
<b>3</b>	<b>Different ignition protection types .....</b>	<b>11</b>
<b>4</b>	<b>General information.....</b>	<b>12</b>
<b>5</b>	<b>Application area.....</b>	<b>12</b>
<b>6</b>	<b>Specific conditions of use ("X" identification) .....</b>	<b>13</b>
<b>7</b>	<b>Important information for mounting and maintenance.....</b>	<b>13</b>
<b>8</b>	<b>Safe operating mode .....</b>	<b>16</b>
<b>9</b>	<b>Potential equalization/Grounding .....</b>	<b>17</b>
<b>10</b>	<b>Electrostatic charging (ESD).....</b>	<b>17</b>
<b>11</b>	<b>Electrical data.....</b>	<b>18</b>
<b>12</b>	<b>Mechanical data.....</b>	<b>20</b>
<b>13</b>	<b>Thermal data .....</b>	<b>20</b>

Supplementary documentation:

- Operating instructions VEGAFLEX 81, 82, 86
- Quick setup guide VEGAFLEX 81, 82, 86
- EU-type approval certificate TÜV 12 ATEX 098529 X (Document ID: 49462)
- EU declaration of conformity (Document ID: 43155)

Editing status: 2019-02-20

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	Turvallisuusohejeet räjähdysvaarallisissa tiloissa käyttöä varten
EL	Υποδείξεις ασφαλείας για τη χρησιμοποίηση σε περιοχές που υπάρχει κίνδυνος έκρηξης

DE	Die vorliegenden Sicherheitshinweise sind im Download unter <a href="http://www.vega.com">www.vega.com</a> 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 <a href="http://www.vega.com">www.vega.com</a> 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 <a href="http://www.vega.com">www.vega.com</a> 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 <a href="http://www.vega.com">www.vega.com</a> 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 VEGAFLEX 81, 82, 86 of type series:

- VEGAFLEX FX81/2/6(\*).A/VE/J/Q/Z\*\*\*\*A/H/P/F/B/I/U/WX\*\*\*\*
- VEGAFLEX FX81/2/6(\*).A/VE/J/Q/Z\*\*\*\*A/HZ\*\*\*\*

With the electronics versions:

- 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)
- W - Four-wire Modbus
- P - Two-wire Profibus PA
- F - Two-wire Foundation Fieldbus
- Z - Additional current output 4 ... 20 mA

According to EU type approval certificate TÜV 12 ATEX 098529 X, Issue 01 (certificate number on the type label) and for all instruments with safety instruction 49461.

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 60079-26: 2015

Type of protection marking:

- II 1/2G, 2G Ex db 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	E ATEX II 1/2G, 2G Ex db IIC T6 ... T1 Ga/Gb, Gb
		Z ATEX II 1/2G, 2G Ex db IIC T6 ... T1 Ga/Gb, Gb + Overfill protection (WHG, VLAREM)
		Q ATEX II 1/2G, 2G Ex db IIC T6 ... T1 Ga/Gb, Gb + Ship approval
		J ATEX II 1/2G, 2G Ex db IIC T6 ... T1 Ga/Gb, Gb, II 1D, 1/2D, 1/3D, 2D Ex ta, ta/tb, ta/tc, tb IIC 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		
*	Other seals suitable for process temperature, IP protection and environmental conditions, see operating instructions.		
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)
		W	Four-wire Modbus
		P	Two-wire Profibus PA
		F	Two-wire Foundation Fieldbus
i	Supplementary electronics	X	without
		Z	Additional current output 4 ... 20 mA

Position		Feature	Description
j	Housing / Protection	A	Aluminium single chamber / IP66/IP68 (0.2 bar)
		D	Aluminium double chamber / IP66/IP68 (0.2 bar)
		H	Special colour Aluminium single chamber / IP66/IP68 (0.2 bar)
		S	Special colour Aluminium double chamber / IP66/IP68 (0.2 bar)
		V	Stainless steel single chamber (precision casting) / IP66/IP68 (0.2 bar)
		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 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	E	ATEX II 1/2G, 2G Ex db IIC T6 ... T1 Ga/Gb, Gb
		Z	ATEX II 1/2G, 2G Ex db IIC T6 ... T1 Ga/Gb, Gb + Overfill protection (WHG, VLAREM)
		Q	ATEX II 1/2G, 2G Ex db IIC T6 ... T1 Ga/Gb, Gb + Ship approval
		J	ATEX II 1/2G, 2G Ex db 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	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
		*	Other seals suitable for process temperature, IP protection and environmental conditions, see operating instructions.
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)
		W	Four-wire Modbus
		P	Two-wire Profibus PA
i	Supplementary electronics	X	without
		Z	Additional current output 4 ... 20 mA
j	Housing / Protection	A	Aluminium single chamber / IP66/IP68 (0.2 bar)
		D	Aluminium double chamber / IP66/IP68 (0.2 bar)
		H	Special colour Aluminium single chamber / IP66/IP68 (0.2 bar)
		S	Special colour Aluminium double chamber / IP66/IP68 (0.2 bar)
		V	Stainless steel single chamber (precision casting) / IP66/IP68 (0.2 bar)
		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



Position		Feature	Description
i	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	E	ATEX II 1/2G, 2G Ex db IIC T6 ... T1 Ga/Gb, Gb
		Z	ATEX II 1/2G, 2G Ex db IIC T6 ... T1 Ga/Gb, Gb + Overfill protection (WHG, VLAREM)
		Q	ATEX II 1/2G, 2G Ex db IIC T6 ... T1 Ga/Gb, Gb + Ship approval
		J	ATEX II 1/2G, 2G Ex db 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
		*	Other seals suitable for process temperature, IP protection and environmental conditions, see operating instructions.
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)
		W	Four-wire Modbus
		P	Two-wire Profibus PA
		F	Two-wire Foundation Fieldbus
i	Supplementary electronics	X	without
		Z	Additional current output 4 ... 20 mA

Position		Feature	Description
j	Housing / Protection	A	Aluminium single chamber / IP66/IP68 (0.2 bar)
		D	Aluminium double chamber / IP66/IP68 (0.2 bar)
		H	Special colour Aluminium single chamber / IP66/IP68 (0.2 bar)
		S	Special colour Aluminium double chamber / IP66/IP68 (0.2 bar)
		V	Stainless steel single chamber (precision casting) / IP66/IP68 (0.2 bar)
		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

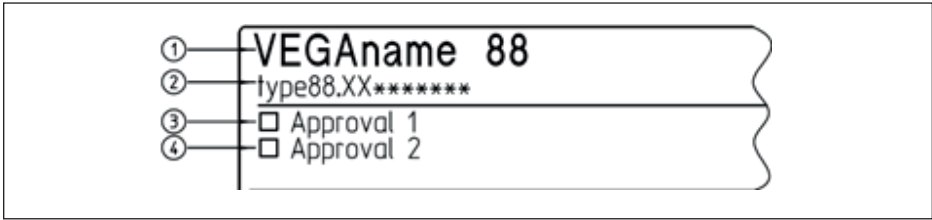
Multiple listed characteristics according to the dependencies of the device configuration.

In the following, all above mentioned versions are called VEGAFLEX 81, 82, 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

The VEGAFLEX 81, 82, 86 can be either used in explosive dust atmospheres or in explosive gas atmospheres.

The operator must specify the selected ignition protection type before installation. The selected ignition protection must be determined by marking it firmly on the identification label of the type plate.



- 1 VEGAFLEX 81, 82, 86
- 2 Instrument version
- 3 Identification label: Approval in dust ignition protection type e. g. „Ex t“
- 4 Identification label: Approval in Gas ignition protection type e. g. „Ex i“, „Ex d“

If VEGAFLEX 81, 82, 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	"AJ"	TÜV 19 ATEX 231186 X	63207

## 4 General information

The level measuring instruments VEGAFLEX 81, 82, 86 as guided radar sensors are used to detect the distance between medium 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 medium surface to calculate the distance to the medium surface.

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

The VEGAFLEX 81, 82, 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, 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, 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)

The following overview is listing all special properties of VEGAFLEX 81, 82, 86, which make a labeling with the symbol "X" behind the certificate number necessary.

### Electrostatic charging (ESD)

You can find the details in chapter " *Electrostatic charging (ESD)*" of these safety instructions.

### Ambient temperature

You can find the details in chapter " *Thermal data*" of these safety instructions.

### Impact and friction sparks

The VEGAFLEX 81, 82, 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.

### Non-grounded, metallic parts

The resistance between aluminium housing to metal measuring point identification plate is  $> 10^9$  Ohm.

The capacitance of the metal measuring point identification plate was measured with 15 pF.

### 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

### **Cable and wire entries**

- The VEGAFLEX 81, 82, 86 must be connected via suitable cable gland or conduit systems that are in conformity with the requirements of the type of protection and the IP protection and provided with a separate type approval certificate. When connecting VEGAFLEX 81, 82, 86 to conduit systems, the corresponding sealing facility must be connected directly to the housing.
- The red thread or/dust covers screwed in when the instruments are shipped (depending on the version) must be removed before setup and replaced by cable entries or closing screws suitable for the respective ignition protection type and IP protection.
- Note type and size of the thread: A label with the respective thread name is in the area of the respective thread
- Threads must have no damages
- Cable entries and closing screws should be mounted correctly and according to the safety instructions of the manufacturer to ensure the specified ignition protection type and IP protection rating. When using certified or suitable cable glands, closing screws or plug connections, it is absolutely necessary to note the corresponding certificates/documents. Supplied cable entries or closing screws meet these requirements.
- Unused openings must be closed with plugs suitable for the ignition protection type and IP protection. Supplied plugs meet these requirements.
- Cable or wire entries resp. the closing screws must be tightly screwed into the housing
- The connection cables resp. pipeline sealing facilities must be suitable for the application conditions (e.g. temperature range) of the application
- With surface temperatures > 70 °C, the cables must be suitable for the higher application conditions
- The connection cable of VEGAFLEX 81, 82, 86 has to be wired fix and in such a way that damages can be excluded.

## Single chamber housing



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

## Double chamber housing



- 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

## Mounting

Keep in mind for instrument mounting

- Mechanical damage on the instrument must be avoided
- Mechanical friction must be avoided
- Vessel installations and probable flow must be taken into account
- Process connections separating two areas of different Ex-zones must comply to valid regulations and standards and the protection rating must be in conformity to IEC/EN 60529
- Close the housing lid (s) up to the stop before starting operating, to ensure the IP protection rating specified on the type label
- Protect the lid against unauthorized opening by unscrewing the locking screw up to the stop. With double chamber housing, you have to protect both lids.

## Maintenance

To ensure the functionality of the device, periodic visual inspection is recommended for:

- Secure mounting
- No mechanical damages or corrosion
- Worn or otherwise damaged cables
- No loose connections of the line connections, equipotential bonding connections
- Correct and clearly marked cable connections

The parts of the VEGAFLEX 81, 82, 86 being in contact with flammable media during operation must be included in the periodic overpressure test of the plant.

## 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, 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, 86



- For assessment and reduction of the explosion risk, valid standards such as for example ISO/EN 1127-1 must be taken into account
- Lids 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

## 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

## 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/VE/J/Q/Z\*\*\*\*A/HX\*\*\*\*

Supply and signal circuit in the electronics and connection compartment, single chamber housing:	
Terminals 1[+], 2[-]	$U = 9.6 \dots 35 \text{ V DC}$ $U_m = 253 \text{ V AC/DC}$ $I \leq 3.5 \dots 22.5 \text{ mA}$ (with superimposed HART signal)

### VEGAFLEX FX8\*(\*)A/VE/J/Q/Z\*\*\*\*A/HX\*\*\*\*

Supply and signal circuit in the connection compartment, double chamber housing:	
Terminals 1[+], 2[-]	$U = 9.6 \dots 35 \text{ V DC}$ $U_m = 253 \text{ V AC/DC}$ $I \leq 3.5 \dots 22.5 \text{ mA}$ (with superimposed HART signal)

### VEGAFLEX FX8\*(\*)A/VE/J/Q/Z\*\*\*\*A/HZ\*\*\*\*

Supply and signal circuit in the connection compartment, double chamber housing:	
Terminals 1[+], 2[-]	$U = 9.6 \dots 35 \text{ V DC}$ $U_m = 253 \text{ V AC/DC}$ $I \leq 3.5 \dots 22.5 \text{ mA}$ (with superimposed HART signal)
Terminals 7[+], 8[-]	$U = 9.6 \dots 35 \text{ V DC}$ $U_m = 253 \text{ V AC/DC}$ $I \leq 3.5 \dots 22.5 \text{ mA}$

### VEGAFLEX FX8\*(\*)A/VE/J/Q/Z\*\*\*\*BX\*\*\*\*

Supply circuit in the 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 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 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/VE/J/Q/Z\*\*\*\*IX\*\*\*\*

Supply circuit in the 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 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 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/VE/J/Q/Z\*\*\*\*UX\*\*\*\***

**Supply circuit in the connection compartment of the double chamber housing:**

Terminals 1[+], 2[-]	$U = 8 \dots 32 \text{ V DC}$
----------------------	-------------------------------

**Signal circuit in the connection compartment of the double chamber housing:**

Terminals MB[+], MB[-]	$U = 5 \text{ V}$ with Modbus signal (telegram)
USB connection: (6-pole mini USB socket)	$U_{max} = 5 \text{ V}$ with USB signal (USB protocol)

**VEGAFLEX FX8\*(\*)A\*/VE/J/Q/Z\*\*\*\*WX\*\*\*\***

**Supply circuit in the electronics and connection compartment, single chamber housing:**

Terminals 1[+], 2[-]	$U = 8 \dots 30 \text{ V DC}$
Terminals 5[+], 6[-]	

**Signal circuit in the electronics and connection compartment, single chamber housing:**

Terminals IN 3[D0+], 4[D1]	$U_{max} = 5 \text{ V}$ with Modbus signal (telegram)
Terminals OUT 7[D0+], 8[D1]	

**VEGAFLEX FX8\*(\*)A/VE/J/Q/Z\*\*\*\*P/FX\*\*\*\***

**Supply and signal circuit in the electronics and connection compartment, single chamber housing:**

**Supply and signal circuit in the connection compartment, double chamber housing:**

Terminals 1[+], 2[-]	$U = 9 \dots 32 \text{ V DC}$ $U_m = 253 \text{ V AC/DC}$
----------------------	--

**Display and adjustment circuit:**

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).
----------------------	--

**Display and adjustment circuit:**

Spring contacts in the 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.
---	--

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

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

The metallic parts of VEGAFLEX 81, 82, 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)	≥ 4 mm <sup>2</sup>
Overvoltage category	See operating instructions VEGAFLEX 81, 82, 86, chapter " <i>Technical data</i> "
Pollution degree	2
<ul style="list-style-type: none"> <li>● Materials</li> <li>● Max. tensile load on the cable or rod probe</li> <li>● Potential connections and electrical separating measures in the instrument</li> <li>● Electromechanical data</li> <li>● Electrical protective measures</li> </ul>	Are described in the operating instructions VEGAFLEX 81, 82, 86 in chapter " <i>Technical data</i> ".

## 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 FX81/2/6(\*).\*/VE/J/Q/Z\*\*\*\*A/H/P/F/WX\*\*\*\*, VEGAFLEX FX81/2/6(\*).\*/VE/J/Q/Z\*\*\*\*A/HZ\*\*\*\*

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 ... +60 °C	-50 ... +60 °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 FX81/2/6(\*).\*/VE/J/Q/Z\*\*\*\*A/H/P/F/WX\*\*\*\*, VEGAFLEX FX81/2/6(\*).\*/VE/J/Q/Z\*\*\*\*A/HZ\*\*\*\*, 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 ... +60 °C	-50 ... +60 °C
T5	-196 ... +95 °C	-60 ... +61 °C	-50 ... +61 °C
T4	-196 ... +130 °C	-60 ... +70 °C	-50 ... +70 °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
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 FX81/2/6(\*).\*/VE/J/Q/Z\*\*\*\*B//UX\*\*\*\*

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 ... +60 °C	-50 ... +60 °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 FX81/2/6(\*).\*/VE/J/Q/Z\*\*\*\*B//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 ... +60 °C	-50 ... +60 °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).

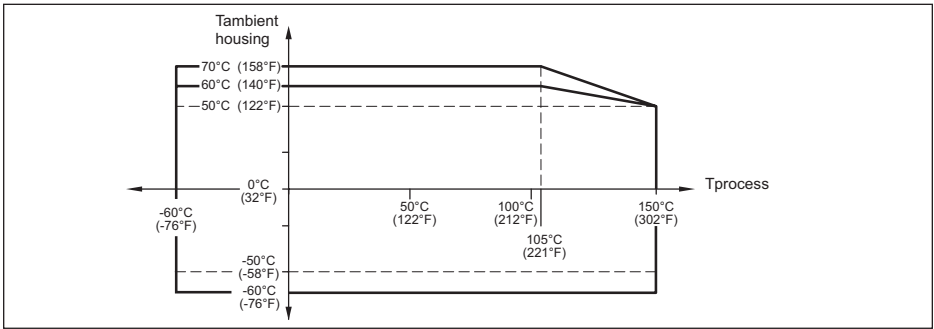
If there is no explosive atmosphere, the permissible operating temperatures and pressures must be taken from the manufacturer specifications (operating instructions).

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.

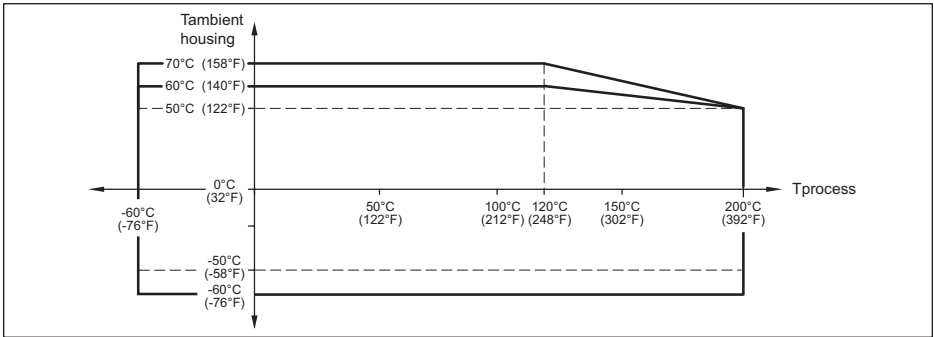
The maximum permissible temperature at the electronics/housing must not exceed the values in the above table.

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

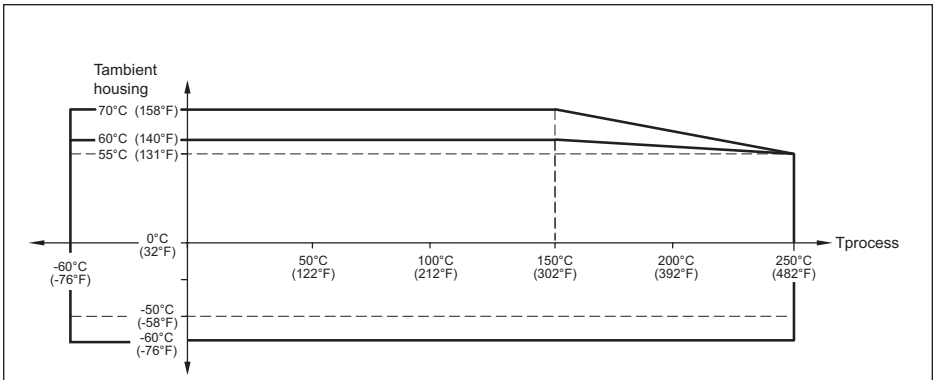
**Versions for process temperatures up to +150 °C**



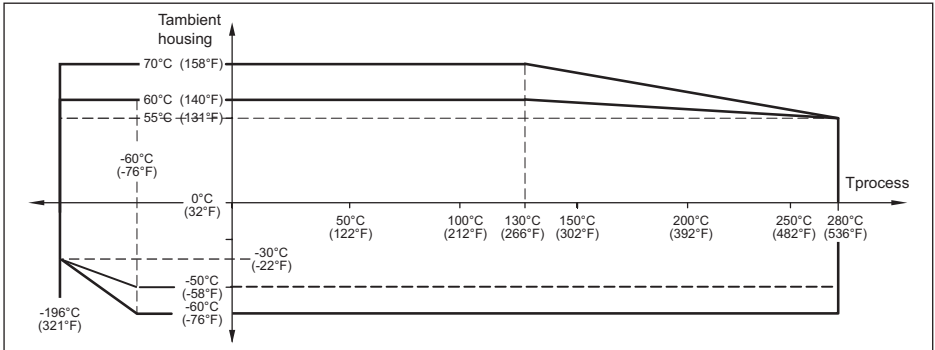
**Versions for process temperatures up to +200 °C**



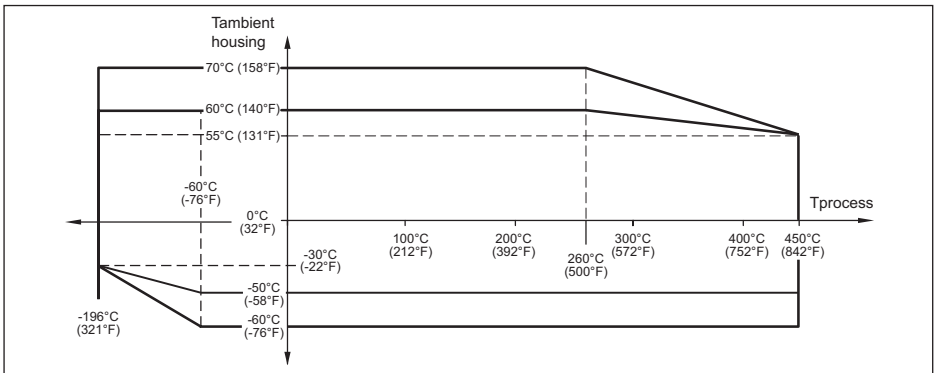
**Versions for process temperatures up to +250 °C**

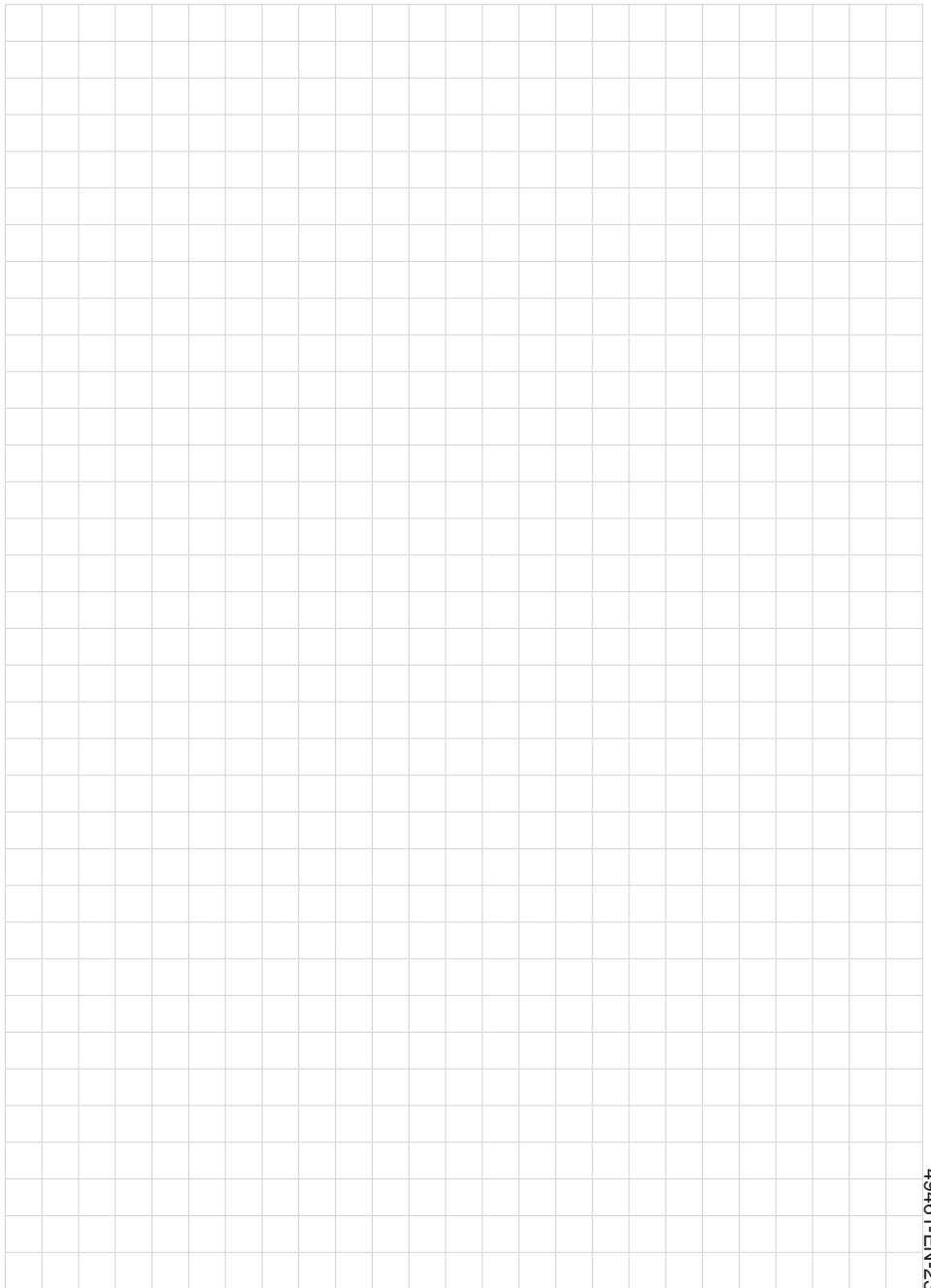


## Versions for process temperatures up to +280 °C



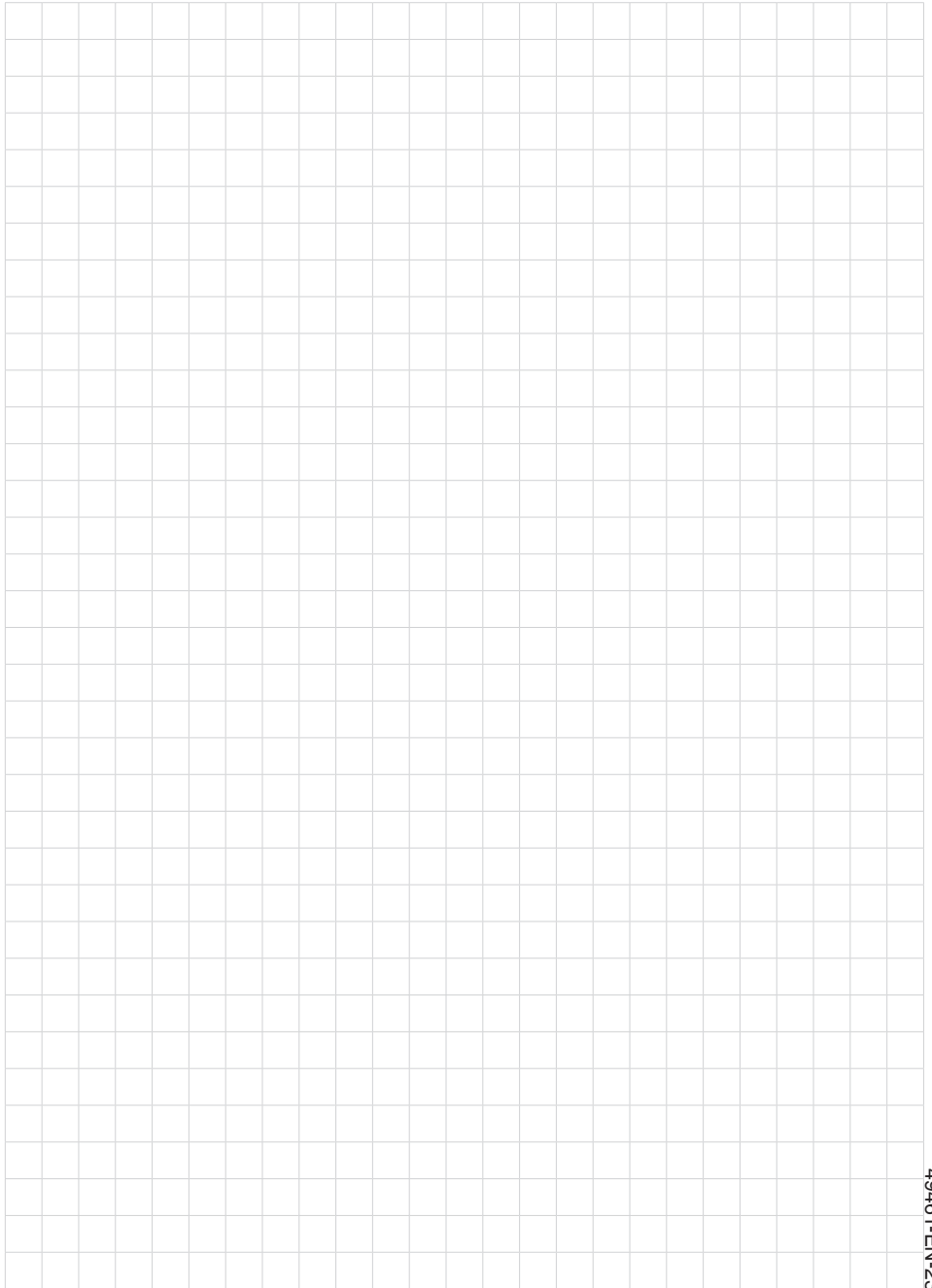
## Versions for process temperatures up to +450 °C











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

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

© VEGA Grieshaber KG, Schiltach/Germany 2023



49461-EN-230202

VEGA Grieshaber KG  
Am Hohenstein 113  
77761 Schiltach  
Germany

Phone +49 7836 50-0  
E-mail: [info.de@vega.com](mailto:info.de@vega.com)  
[www.vega.com](http://www.vega.com)