

# NivoGuide 8100, 3100, 8200

Flameproof enclosure "d"

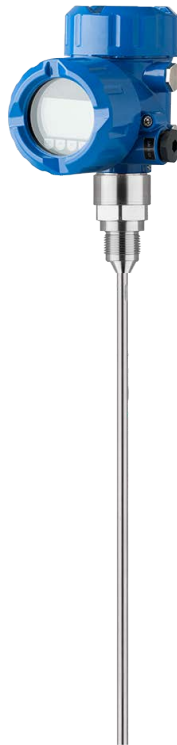
Two-wire 4 ... 20 mA/HART

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



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Safety instructions



Document ID: 62101



## Contents

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

Supplementary documentation:

- Operating Instructions NivoGuide 8100, 3100, 8200
- Quick setup guide NivoGuide 8100, 3100, 8200
- Certificate of Conformity IECEx TUN 19.0007 X, Issue No. 00 (Document ID: 62102)

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## 1 Area of applicability

These safety instructions apply to the NivoGuide 8100, 3100, 8200 of type series:

- NivoGuide NG8100.AC\*A/B\*\*1\*\*\* \*\*\*\*\*A/D
- NivoGuide NG3100.AC/D\*A/B\*\*1\*\*\* \*\*\*\*\*A/D
- NivoGuide NG8200.BC\*A/B\*\*1\*\*0 \*\*\*\*\*A/D

With the electronics versions:

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

According to Certificate of Conformity IECEx TUN 19.0007 X, Issue No. 00 (certificate number on the type label) and for all instruments with safety instruction 62101.

The classification as well as the respective standards are stated in the Certificate of Conformity:

- IEC 60079-0: 2017 (Edition 7.0)
- IEC 60079-1: 2014 (Edition 7.0)
- IEC 60079-26: 2014 (Edition 3.0)

Type of protection marking:

- Ex db IIC T6 ... T1 Ga/Gb, Gb

## 2 Important specification in the type code

**NivoGuide 8100 NG8100.A\*\*A/B\*\*1\*\*\* \*\*\*\*\*A/D**

Position	Feature	Description
2	Certificate	C Ex db IIC T6 ... T1 Ga/Gb, Gb
3	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 / -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
		E Silicone FEP coated (A+P FEP-O-SEAL) / without / -40 ... +150 °C
		K FFKM (Kalrez 6375) / without / -20 ... +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
		C Silicone FEP coated (A+P FEP-O-SEAL) / without / -40 ... +80 °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		
4	Electronics module	A Two-wire 4 ... 20 mA/HART
		B Two-wire 4 ... 20 mA/HART with SIL qualification

Position		Feature	Description
5,6	Process fitting	**	Gas-tight threaded connections, pipe connections and industrial flanges acc. to ASME, BS, DIN, EN, GOST, HG/T, JIS, other international, national or industrial standards, regulations or standards, with pressure specifications
8	Version and length of bracket "L" / Material	E	exchangeable rod (ø 8 mm) / 316L
		F	exchangeable rod (ø 12 mm) / 316L
		B	exchangeable cable (ø 2 mm) with gravity weight / 316
		U	exchangeable cable (ø 4 mm) without weight / 316
		A	exchangeable cable (ø 4 mm) with gravity weight / 316
		K	Coax (ø 21.3 mm) with single hole / 316L
		L	Coax (ø 21.3 mm) with multiple hole / 316L
		P	Coax (ø 42.2 mm) with multiple hole / 316L
9	Indicating/adjustment module	O	without
		A	mounted; lid with inspection window
		F	without; lid with inspection window
		B	laterally mounted; double chamber housing, lid with inspection window
10	Length rigid part "L1"	O	without (version with rod)
		Z	L1 = customer-specific (version with cable)
16	Housing	A	Aluminium - single chamber
		D	Aluminium - double chamber

**NivoGuide 3100 NG3100.A\*\*A/B\*\*1\*\*\* \*\*\*\*\*A/D**

Position		Feature	Description
2	Certificate	C	Ex db IIC T6 ... T1 Ga/Gb, Gb
		D	Ex db IIC T6 ... T1 Ga/Gb, Gb, II 1D, 1/2D, 1/3D, 2D Ex ta, ta/tb, ta/tc, tb IIIC T*
3	Seal / Process temperature	A	FKM (SHS EPM 70C3 GLT) / -40 ... +80 °C
		F	FKM (SHS FPM 70C3 GLT) / -40 ... +150 °C
		K	FFKM (Kalrez 6375) / -20 ... +200 °C
		B	EPDM (A+P 70.10-02) / -40 ... +80 °C
		H	EPDM (A+P 70.10-02) / -40 ... +150 °C
4	Electronics module	A	Two-wire 4 ... 20 mA/HART
		B	Two-wire 4 ... 20 mA/HART with SIL qualification
5, 6	Process fitting	**	Gas-tight threaded connections, pipe connections and industrial flanges acc. to ASME, BS, DIN, EN, GOST, HG/T, JIS, other international, national or industrial standards, regulations or standards, with pressure specifications

Position		Feature	Description
8	Version and length of bracket "L" / 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
9	Indicating/adjustment module	0	without
		A	mounted; lid with inspection window
		F	without; lid with inspection window
		B	laterally mounted; double chamber housing, lid with inspection window
16	Housing	A	Aluminium - single chamber
		D	Aluminium - double chamber

**NivoGuide 8200 NG8200.B\*\*A/B\*\*1\*\*0 \*\*\*\*\*A/D**

Position		Feature	Description
2	Certificate	C	Ex db IIC T6 ... T1 Ga/Gb, Gb
3	Seal / Second line of defense / Process temperature	1	Ceramic-graphite / with / -196 ... +280 °C
		2	Ceramic-graphite / with / -196 ... +450 °C
		3	PEEK-FFKM (Kalrez 6375) / with / -20 ... +250 °C
4	Electronics module	A	Two-wire 4 ... 20 mA/HART
		B	Two-wire 4 ... 20 mA/HART with SIL qualification
5,6	Process fitting	**	Gas-tight threaded connections, pipe connections and industrial flanges acc. to ASME, BS, DIN, EN, GOST, HG/T, JIS, other international, national or industrial standards, regulations or standards, with pressure specifications
8	Version and length of bracket "L" / Material	E	exchangeable rod (ø 8 mm) / 316L
		H	exchangeable rod (ø 16 mm) / 316L
		B	exchangeable cable (ø 2 mm) with gravity weight / 316
		A	exchangeable cable (ø 4 mm) with gravity weight / 316
		L	Coax (ø 21.3 mm) with multiple hole / 316L
		P	Coax (ø 42.2 mm) with multiple hole / 316L
9	Indicating/adjustment module	0	without
		A	mounted; lid with inspection window
		F	without; lid with inspection window
		B	laterally mounted; double chamber housing, lid with inspection window
16	Housing	A	Aluminium - single chamber
		D	Aluminium - double chamber

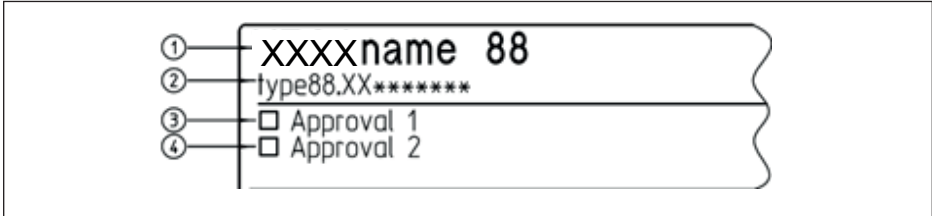
Multiple listed characteristics according to the dependencies of the device configuration.

In the following, all above mentioned versions are called NivoGuide 8100, 3100, 8200. 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 NivoGuide 8100, 3100, 8200 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 NivoGuide 8100, 3100, 8200
- 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 NivoGuide 8100, 3100, 8200 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	"A"	IECEX TUN 20.0006X	64005

### 4 General information

The level measuring instruments NivoGuide 8100, 3100, 8200 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 NivoGuide 8100, 3100, 8200 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 NivoGuide 8100, 3100, 8200 are suitable for applications in hazardous atmospheres of all combustible materials of explosion groups IIA, IIB and IIC.

The NivoGuide 8100, 3100, 8200 are suitable for applications requiring EPL Ga/Gb or EPL Gb instruments.







### 5 Application area

#### EPL Ga/Gb or EPL Ga/Gc instrument

The NivoGuide 8100, 3100, 8200 with mechanical fixing element are installed in hazardous areas of zone 1 or zone 2 requiring EPL Gb or EPL Gc instruments. The mechanical fixing element, process connection element is installed in the separating wall, which separates areas requiring EPL Gb or EPL Gc instruments. The sensor measuring system is installed in hazardous areas of zone 0 requiring EPL Ga instruments.

## EPL Gb instrument

The NivoGuide 8100, 3100, 8200 with the mechanical fixing element are installed in hazardous areas of zone 1 requiring EPL Gb instruments.

Instrument	EPL Gc	EPL Gb	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 NivoGuide 8100, 3100, 8200, which make a labelling 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 NivoGuide 8100, 3100, 8200 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

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.

## 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 Certificate of Conformity and the valid regulations and standards
- Modifications on the instrument can influence the explosion protection and hence the safety
- Modifications must only be carried out by authorized employees
- 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 NivoGuide 8100, 3100, 8200 must be connected via suitable cable gland or conduit systems that are in conformity with the requirements of the flame proofing and the IP protection and provided with a separate type approval certificate. When connecting NivoGuide 8100, 3100, 8200 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 NivoGuide 8100, 3100, 8200 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 NivoGuide 8100, 3100, 8200 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 cable or rod probes must be mounted to NivoGuide 8100, 3100, 8200. 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 NivoGuide 8100, 3100, 8200
- 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

The warning label indicates danger:

WARNING - POTENTIAL ELECTROSTATIC CHARGING HAZARD - SEE INSTRUCTIONS

## 11 Electrical data

### NivoGuide 8100, 3100, 8200

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

### NivoGuide 8100, 3100, 8200

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

Display and adjustment circuit:	
Spring contacts in the connection compartment	Only for connection to the NivoGuide display and adjustment module.

The circuits of NivoGuide 8100, 3100, 8200 are galvanically separated from ground.

The circuits of NivoGuide 8100, 3100, 8200 are galvanically connected to ground potential via the earth terminals.

The metallic parts of NivoGuide 8100, 3100, 8200 are electrically connected with the earth terminals.

## 12 Mechanical data

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

<b>Mechanical data</b>	
Ground terminal (connection cross-section)	≥ 4 mm <sup>2</sup>
Overtoltage category	See operating instructions NivoGuide 8100, 3100, 8200, chapter "Technical data"
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 NivoGuide 8100, 3100, 8200 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.

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	-40 ... +80 °C	-40 ... +60 °C	-40 ... +60 °C
T5	-40 ... +95 °C	-40 ... +61 °C	-40 ... +61 °C
T4	-40 ... +130 °C	-40 ... +70 °C	-40 ... +70 °C
T3	-40 ... +195 °C	-40 ... +70 °C	-40 ... +70 °C
T2	-40 ... +290 °C	-40 ... +70 °C	-40 ... +70 °C
T1	-40 ... +440 °C	-40 ... +70 °C	-40 ... +70 °C

#### Low temperature version up 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	-40 ... +60 °C	-40 ... +60 °C
T5	-196 ... +95 °C	-40 ... +61 °C	-40 ... +61 °C
T4	-196 ... +130 °C	-40 ... +70 °C	-40 ... +70 °C
T3	-196 ... +195 °C	-40 ... +70 °C	-40 ... +70 °C
T2	-196 ... +290 °C	-40 ... +70 °C	-40 ... +70 °C
T1	-196 ... +440 °C	-40 ... +70 °C	-40 ... +70 °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).

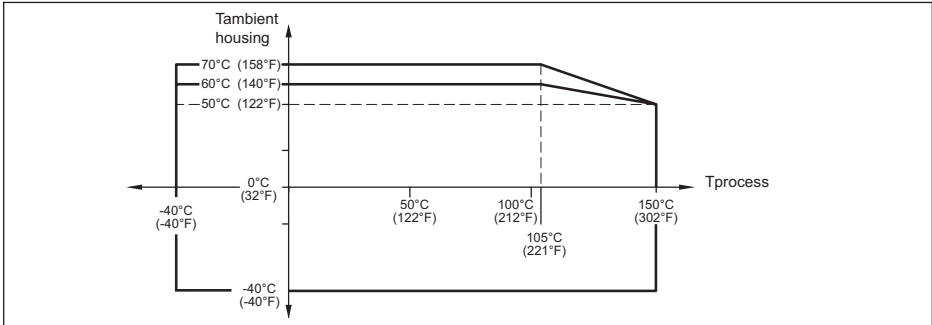
If there is no explosive atmosphere, the permissible operating temperatures and pressures must be taken from the manufacturer specifications (operating instructions).

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.

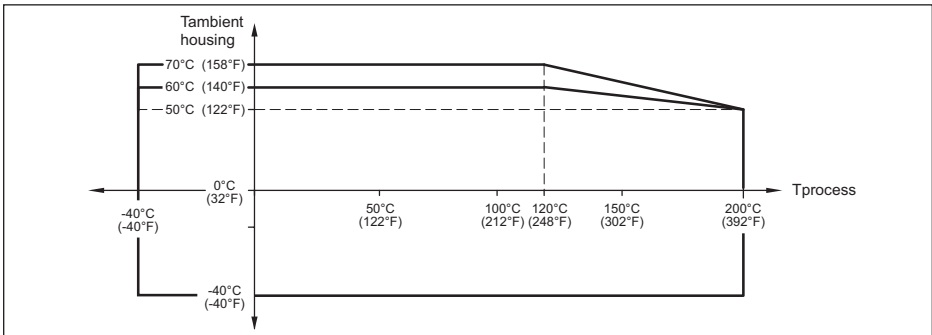
The maximum permissible temperature at the electronics/housing must not exceed the values in the above table.

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

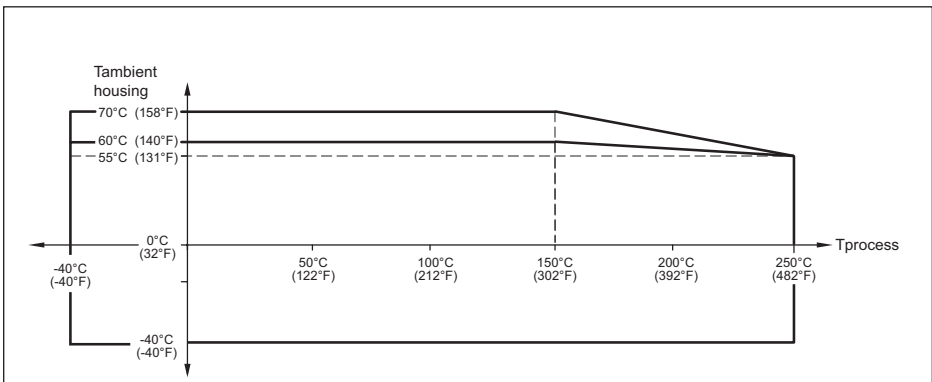
**Versions for process temperatures up to +150 °C**



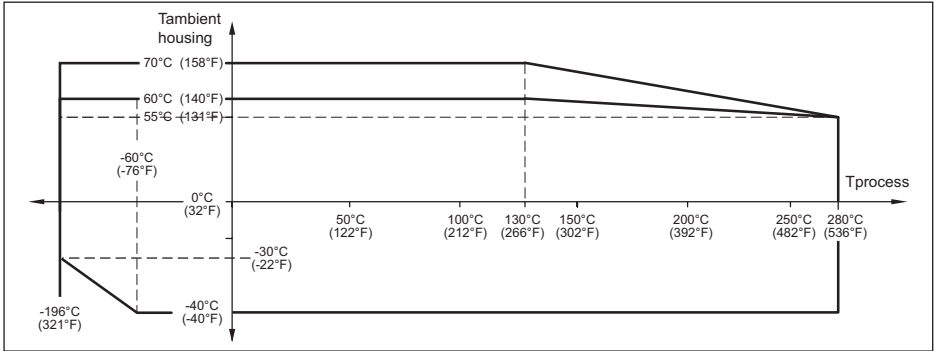
**Versions for process temperatures up to +200 °C**



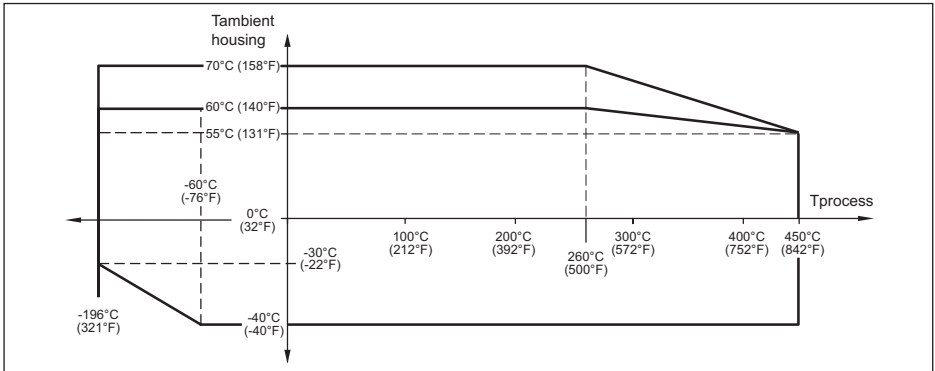
**Versions for process temperatures up to +250 °C**



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



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



Printing date:

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

**Technical support**

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