



## Safety instructions

**FIBERTRAC 31**

**SOLITRAC 31**

**MINITRAC 31, 32**

**POINTRAC 31**

**WEIGHTRAC 31, 32**

Firedamp areas in mines (group I)

Flameproof enclosure "d"

Intrinsic safety "i"

Four-wire 4 ... 20 mA/HART



CE 0044



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**VEGA**

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Supplementary documentation:

- Operating Instructions FIBERTRAC 31, SOLITRAC 31, MINITRAC 31, 32, POINTRAC 31, WEIGHTRAC 31, 32
- Quick setup guide FIBERTRAC 31, SOLITRAC 31, MINITRAC 31, 32, POINTRAC 31, WEIGHTRAC 31, 32
- EU-type approval certificate BVS 10 ATEX E 096 (Document ID: 55198)
- EU declaration of conformity (Document ID: 44391)
- SIL Safety Manual (Document ID: 49354)

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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	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.
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## 1 Area of applicability

These safety instructions apply to the PROTRAC devices of type series:

- FIBERTRAC 31
- SOLITRAC 31
- MINITRAC 31, 32
- POINTRAC 31
- WEIGHTRAC 31, 32

With the electronics versions:

- B - Four-wire 4 ... 20 mA/HART (Ex i output)
- L - Four-wire 4 ... 20 mA/HART (Ex i output) with SIL qualification

According to EU type approval certificate BVS 10 ATEX E 096 (certificate number on the type label) and for all instruments with safety instruction 55269.

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

- EN 60079-0: 2018
- EN 60079-1: 2014
- EN 60079-11: 2012

Type of protection marking:

- I M2 (M1) Ex db [ia Ma] I Mb

## 2 Important specification in the type code

**PROTRAC-Serie(x)xxxxTRAC xT3\*.abcdefgh(\*)**

Position		Feature	Description
(x)xxxxTRAC	Device name	FIBER	FIBERTRAC 31
		SOLI	SOLITRAC 31
		MINI	MINITRAC 31, MINITRAC 32
		POIN	POINTRAC 31
		WEIGH	WEIGHTRAC 31, WEIGHTRAC 32
xT3*	Instrument code	F	FIBERTRAC 31
		S	SOLITRAC 31
		M	MINITRAC 31, MINITRAC 32
		P	POINTRAC 31
		W	WEIGHTRAC 31, WEIGHTRAC 32
a	Approval	TX	I M2(M1)Ex db [ia Ma] I Mb
b	Version	1	Standard
c	Electronics	B	Four-wire, 4 ... 20 mA/HART (Ex ia output)
		L	Four-wire, 4 ... 20 mA/HART (Ex ia output) with SIL qualification
d	Housing / Protection	W	Stainless steel double chamber / IP66/IP67
		V	Stainless steel double chamber with 316L Conduit cooling connection / IP66/IP67

Position		Feature	Description
e	Cable entry / Cable gland / Plug connection	M	M20 x 1.5 / without / without
		N	½ NPT / without / without
f	Display and adjustment module PLICSCOM	X	without
		F	without; lid with inspection window
		B	Laterally mounted
		L	laterally mounted; with Bluetooth, magnetic pen operation
		S	laterally mounted; with Bluetooth, battery, magnetic pen operation
g	Additional equipment	X	without
		*	1-digit; without meaning for explosion protection
h	Measuring length	(*)**	2 or 3-digit measuring length of the sensor connection with FIBERTRAC 31, SOLITRAC 31 and POINTRAC 31 This feature is not available with MINITRAC 31, MINITRAC 32.
h(*)	Frame setup	***	Different features of the frame setup with frame construction, measuring width, clear height and source fastening with WEIGHTRAC 31, WEIGHTRAC 32

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

### 3 General information

The PROTRAC devices are part of the radiometric measuring principle.

In a radiometric measurement, a weak radioactive source on the tank emits focused gamma rays. A special detector mounted on the opposite side of the tank receives the PROTRAC devices which is converted into flashes of light. The number of these flashes is detected and evaluated.

The FIBERTRAC 31 and SOLITRAC 31 are suitable for non-contact level and interface measurement.

The MINITRAC 31, 32 are suitable for the non-contact, continuous density measurement and level detection of liquids and bulk solids in pipelines and vessels.

The POINTRAC 31 are suitable for non-contact level detection of liquids and bulk solids.

The WEIGHTRAC 31, 32 are suitable for non-contact, continuous mass flow measurement of bulk solids on conveyor belts and screw conveyors.

The FIBERTRAC 31, SOLITRAC 31, MINITRAC 31, 32, POINTRAC 31, WEIGHTRAC 31, 32 are suitable for use in subsurface mines, in firedamp-proof plants as well as their aboveground plants for which danger due to firedamp and/or combustible, dust-generating bulk solids exists.

The PROTRAC devices are suitable for applications requiring category M2 (EPL Mb) instruments.

### 4 Application area

#### Category M2 (EPL Mb instruments)

The PROTRAC devices with the mechanical fixing element are installed in hazardous areas requiring category M2 (EPL Mb) instruments.

## 5 Special operating conditions

The following overview lists all special features of PROTRAC devices.

### 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 PROTRAC devices 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.

## 6 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 to 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 PROTRAC device 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 PROTRAC devices 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 PROTRAC devices has to be wired fix and in such a way that damages can be excluded.



- 1 Label: Type and size of the thread ½-14 NPT or M20 x 1.5
- 2 Locking screw of the lid
- 3 Screw plug
- 4 Ex d connection compartment
- 5 Red threaded or dust protection cap
- 6 Label: Type and size of the thread ½-14 NPT or M20 x 1.5
- 7 Ex i connection compartment

## 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 PROTRAC devices 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

### 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

## 7 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 PROTRAC device
- 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

- To exclude the danger of mechanical damage, the FIBERTRAC 31 must be installed in such a way that the flexible detector is protected from environmental influences.

## 8 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

## 9 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

## 10 Instructions for group I applications

In hazardous areas, the instrument, sensor measuring system should only be operated under atmospheric conditions:

- Temperature: -20 ... +60 °C.
- Pressure: 80 ... 110 kPa (0.8 ... 1.1 bar)
- Air with normal oxygen content, normally 21 %

If no explosive mixtures or additional application conditions are certified or supplementary measures such as e.g. according to ISO/EN 1127-1 taken, then the instruments can be also operated according to the manufacturer specification outside atmospheric conditions.

## 11 Mounting with external display unit VEGADIS 61/81

The intrinsically safe signal circuit between PROTRAC device and the external indicating unit VEGADIS 61 or VEGADIS 81 should be set up without grounding. The required insulation voltage is > 500 V AC. When using VEGA connection cable, this requirement is fulfilled.

## 12 Use of an overvoltage arrester

If necessary, a suitable overvoltage arrester can be connected in front of the PROTRAC devices.

As far as acc. to EN 60079-14 or other valid standards or regulations, an overvoltage protection is necessary, then a suitable overvoltage arrester must be connected to the instrument.

Observe the respective operating or safety instructions.

## 13 Version with cooling option

With the PROTRAC devices with optional accessory of the cooling option, the operator must take care that the approved ambient temperature range on the Ex-certified housing, electronics is not exceeded.

Please make sure that before cooling, there is no explosive atmosphere present in the cooling option.

## 14 Electrical data

### Non-intrinsically safe circuits (in the "Ex d" connection compartment)

#### PROTRAC devices (x)xxxxTRAC 3\* type xT3\*.TX\*B/L\*\*\*(\*\*)\*\*

Voltage supply: Terminals 1[L1], 2[N]	U = 20 ... 253 V AC U = 20 ... 72 V DC U <sub>m</sub> = 253 V
Relay circuit: Terminals 4[NC], 5[Common], 6[NO]	Maximum values: 253 V AC, 3 A, 500 VA 253 V AC, 1 A, 41 W
Current input: Terminals 12[In+], 13[In-]	I = 4 ... 20 mA
Digital input: Terminals 14[+100 mA], 15[+10 mA], 16[Common]	100 mA (open collector input between 14 - 16) 10 mA (open collector input between 15 - 16)

Digital output: Terminals 17[Out+], 18[Out-]	Max. load current: floating transistor output 400 mA, 55 V DC
Multigaugage Communication: Terminals 19[Serial out-], 20[Serial out+], 21[Serial in-], 22[Serial in+]	Communication circuit, only for communication with additional PROTRAC instruments

## Intrinsically safe circuits (in the "Ex i" connection compartment)

### PROTRAC devices (x)xxxxTRAC 3\* type xT3\*.TX\*B/L\*\*\*(\*\*)\*\*

Display and adjustment circuit: Terminals 5, 6, 7, 8 in the lateral chamber	In type of protection intrinsic safety Ex ia I, ib I For connection to the intrinsically safe circuit of the corresponding external display unit VEGADIS 61/81.		
	Maximum values: <ul style="list-style-type: none"> <li>● <math>U_o \leq 6 \text{ V DC}</math></li> <li>● <math>I_o \leq 209.7 \text{ mA}</math></li> <li>● <math>P_o \leq 314.6 \text{ mW}</math></li> </ul>		
	Characteristics: Linear <ul style="list-style-type: none"> <li>● <math>L_i</math> negligible</li> <li>● <math>C_i</math> negligible</li> </ul>		
		Ex ia I	
	Permissible inductance $L_o$	1 mH	
	Permissible capacitance $C_o$	1.4 $\mu\text{F}$	
	The proof for intrinsic safety of the interconnection rendered if the total inductance and total capacitance of the connection cable $L_{\text{cable}} = 100 \mu\text{H}$ and $C_{\text{cable}} = 3.4 \mu\text{F}$ is not exceeded		
When using the supplied VEGA connection cable, the following cable inductances $L_i$ and cable capacitances $C_i$ must be taken into account. <ul style="list-style-type: none"> <li>● <math>L_i = 0.62 \mu\text{H/m}</math></li> <li>● <math>C_{\text{i wire/wire}} = 150 \text{ pF/m}</math></li> <li>● <math>C_{\text{i wire/screen}} = 270 \text{ pF/m}</math></li> </ul>			
Signal circuit of the display and adjustment module: Spring contacts in the lateral chamber	In type of protection intrinsic safety Ex ia I, ib I Only for connection to the display and adjustment module PLICSCOM or if it is ensured that on explosive atmosphere is present, for service purposes on the interface adapter VEGACONNECT (PTB 07 ATEX 2013 X).		

The intrinsically safe display/control circuit is earthed and connected to the external and internal earth terminals.

**PROTRAC devices (x)xxxxTRAC 3\* type xT3\*.TX\*B/L\*\*\*\*(\*)\*\***

Intrinsically safe current output: Terminals 1[+], 2[-]	FIBERTRAC, SOLITRAC, MINITRAC, WEIGHTRAC: $I = 4 \dots 20 \text{ mA}$ with superimposed HART signal POINTRAC 31: $I = 8/16 \text{ mA}$ with superimposed HART signal		
	Maximum values: <ul style="list-style-type: none"> <li>● <math>U_o = 22.16 \text{ V}</math></li> <li>● <math>I_o = 111.9 \text{ mA}</math></li> <li>● <math>P_o = 620.03 \text{ mW}</math></li> <li>● <math>U_i = 10 \text{ V}</math></li> <li>● <math>I_i = 32 \text{ mA}</math></li> <li>● <math>P_i = 80 \text{ mW}</math></li> </ul>		
	Characteristics: Linear <ul style="list-style-type: none"> <li>● <math>L_i</math> negligible</li> <li>● <math>C_i</math> negligible</li> </ul>		
		Ex ia I	
	Permissible inductance $L_o$	5 mH	
Permissible capacitance $C_o$	1.3 $\mu\text{F}$		

The intrinsically safe current output is galvanically separated from ground.

The metallic parts of PROTRAC devices are electrically connected with the earth terminals.

## 15 Mechanical data

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

<b>Mechanical data</b>	
Protection (IEC/EN 60529)	IP66
Ground terminal (connection cross-section)	$\geq 4 \text{ mm}^2$

## 16 Thermal data

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

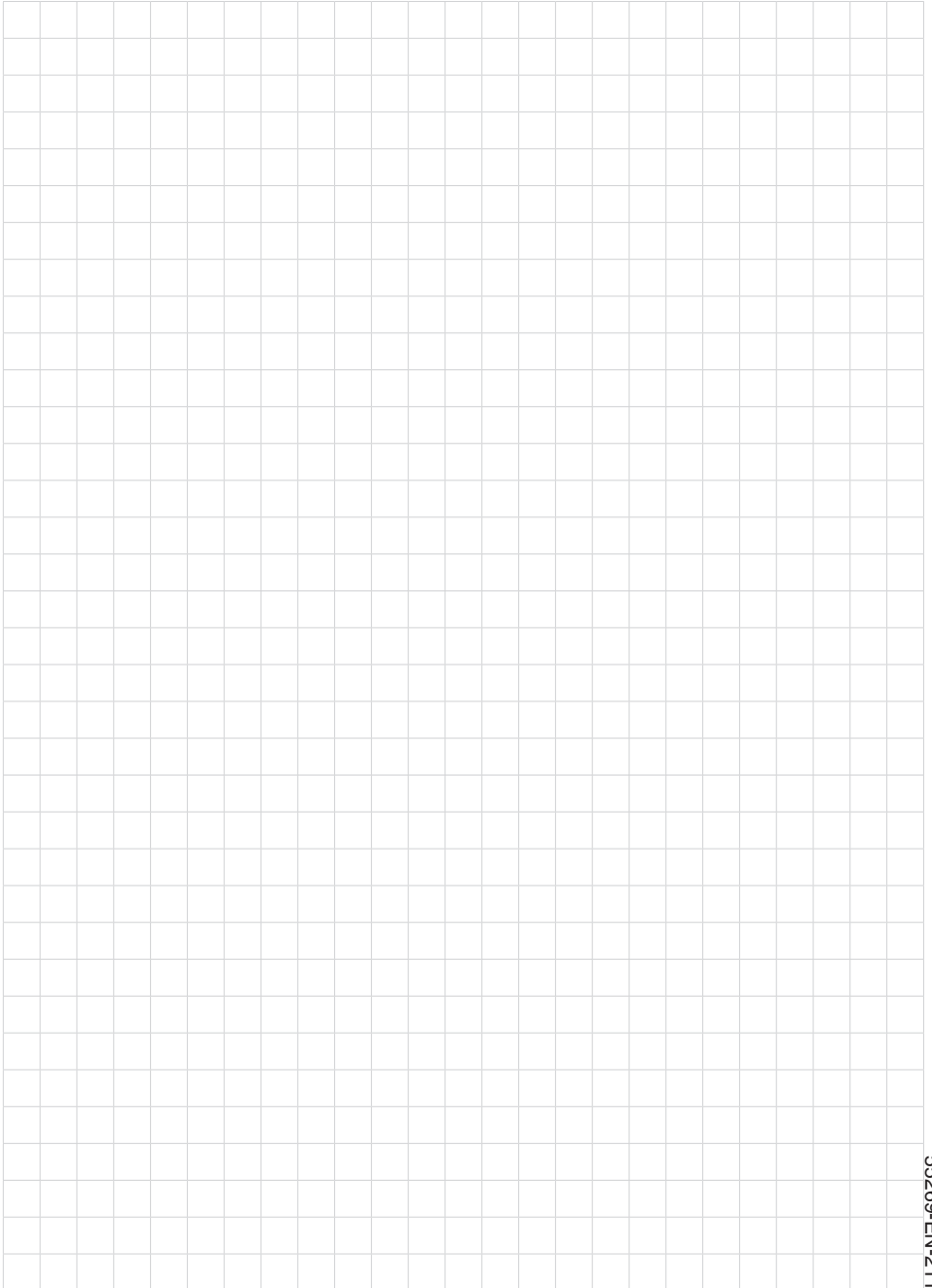
The relationship between the permissible ambient temperature for the electronics housing depending on the area of application and the maximum surface temperatures, temperature classes, can be seen in the following tables.

The max. surface temperature is limited by a temperature fuse to +98 °C.

The permissible ambient temperature is -40 ... +60 °C.

The application conditions during operation without explosion-endangered atmosphere are mentioned in the respective manufacturer instructions, e.g. operating instructions manuals.







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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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