

Safety instructions

VEGACAL 62, 63, 64, 65, 66, 69

Intrinsic safety

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

For connection to signal conditioning instrument

Profibus PA

Foundation Fieldbus



Document ID: 56582



VEGA

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Supplementary documentation:

- Operating Instructions VEGACAL 62, 63, 64, 65, 66, 69
- Certificate of Conformity IECEx TUN 05.0008 X, Issue No. 6 (Document ID: 56583)

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1 Area of applicability

These safety instructions apply to the level sensors VEGACAL of type series:

- VEGACAL CL62.CI***H/X/P/F****
- VEGACAL CL63.CI***H/X/P/F****
- VEGACAL CL64.CI***H/X/P/F****
- VEGACAL CL65.CI***H/X/P/F****
- VEGACAL CL66.CI***H/X/P/F****
- VEGACAL CL69.CI***H/X/P/F****

with the electronics versions

- H - 4 ... 20 mA/HART - two-wire
- X - for connection to signal conditioning instrument
- P - Profibus PA
- F - Foundation Fieldbus

according to Certificate of Conformity IECEx TUN 05.0008 X, Issue No. 6 (certificate number on the type label) and for all instruments with safety instruction 56582.

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

- IEC 60079-0: 2011, edition 6.0
- IEC 60079-11: 2011, edition 6.0
- IEC 60079-26: 2014, edition 3.0
- Ex ia IIC T6 ... T1 Ga, Ga/Gb, Gb

In the following, all above mentioned versions are called VEGACAL CL62/3/4/5/6/9. If parts of these safety instructions refer only to certain versions, then these will be mentioned explicitly with their type code.

2 Important specification in the type code

VEGACAL CL6*(*)*.aabc*defgh*

Position		Feature	Description
a	Approval	CX	ATEX II 1G, 1/2G, 2G Ex ia IIC T6 ... T1, Ga, Ga/Gb, Gb
		CA	ATEX II 1G, 1/2G, 2G Ex ia IIC T6 + WHG
		CM	ATEX II 1G, 1/2G, 2G Ex ia IIC T6 + Ship approval
		CK	ATEX II 1G, 1/2G, 2G Ex ia IIC T6 + II 1/2D, 2D Ex ia/tb, ia tb IIIC T***C Da/Db, Db
		CI	IEC Ex ia IIC T6 Ga, Ga/Gb, Gb
d	Electronics	H	Two-wire 4 ... 20 mA/HART
		X	For connection to signal conditioning instrument
		P	Two-wire Profibus PA
		F	Two-wire Foundation Fieldbus

Position		Feature	Description
e	Housing / Protection	K	Plastic single chamber / IP 66/IP 67
		R	Plastic double chamber / IP 66/IP 67
		A	Aluminium single chamber / IP 66/IP 68 (0.2 bar)
		D	Aluminium double chamber / IP 66/IP 68 (0.2 bar)
		V	Stainless steel single chamber (precision casting) / IP 66/IP 68 (0.2 bar)
		W	Stainless steel double chamber / IP 66/IP 68 (0.2 bar)
		8	Stainless steel (electropolished) / IP 66/IP 68 (0.2 bar)
		*	others
f	Cable entry / Cable gland / Plug connection	M	M20 x 1.5 / with / without
		N	½ NPT / without / without
		*	others
g	Display and adjustment module PLICSCOM	X	without
		A	mounted
		K	mounted; with Bluetooth, magnetic pen operation
		F	without; lid with inspection window
		B	Laterally mounted
		L	laterally mounted; with Bluetooth, magnetic pen operation
		U	mounted; with Bluetooth (US version), battery, magnetic pen operation
		S	laterally mounted; with Bluetooth (US version), battery, magnetic pen operation

3 General information

The capacitive probes VEGACAL are used for gauge measurement of liquids and bulk solids (depending on the type).

The VEGACAL consist of an electronic housing, a probe and process fittings.

The display and adjustment module PLICSCOM can be mounted optionally.

The VEGACAL are suitable for use in hazardous atmospheres of all combustible substances of explosion group IIA, IIB and IIC. These sensors are suitable for applications requiring instruments of EPL Ga, EPL Ga/Gb or EPL Gb.

4 Application area

Category 1G (EPL Ga instruments)

The VEGACAL CL62/3/4/5/6/9 with the mechanical fixing element are installed in hazardous areas of zone 0 requiring category 1G (EPL Ga) instruments.

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

The VEGACAL CL62/3/4/5/6/9 with the mechanical fixing element are installed in hazardous areas of zone 1 or zone 2 requiring category 2G (EPL Gb) or 3G (EPL Gc) instruments.

The mechanical fixing element, process connection element is erected as separating wall, separating the areas where instruments of category 2G (EPL Gb) are required.

The sensor measuring system is installed in hazardous areas of zone 0 requiring a category 1G (EPL Ga) instrument.

Category 2G (EPL Gb instruments)

The VEGACAL CL62/3/4/5/6/9 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	1G, EPL Ga
Ex Zone 2 				
Ex Zone 1 				
Ex Zone 0 				

Note: Sensor image, exemplary

5 Specific conditions of use ("X" identification)

The following overview is listing the properties of VEGACAL CL62/3/4/5/6/9, which make a labelling with the symbol "X" behind the certificate number necessary.

Ambient temperature

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

Impact and friction sparks

The VEGACAL CL62/3/4/5/6/9 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.

The respective parts of the capacitive probes must be effectively secured against swinging and resonating.

When used as Ga/Gb or Ga/Gc instrument

For versions with standard process fittings, the installation must be made in such a way that at least protection rating IP 67 acc. to IEC/EN 60529 is reached on the process fittings.

Non-grounded, metallic parts

The capacitance of the metal measurement loop label was measured with 15 pF.
VEGACAP CL66 with metal gravity weight: C (gravity weight) = 15 pF

6 Important information for mounting and maintenance

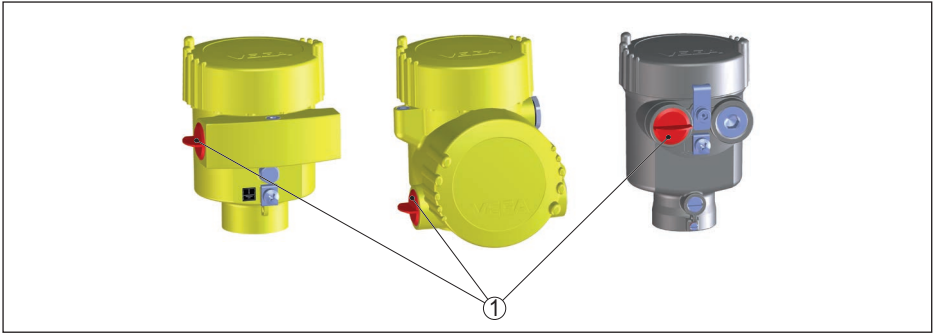
General instructions

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

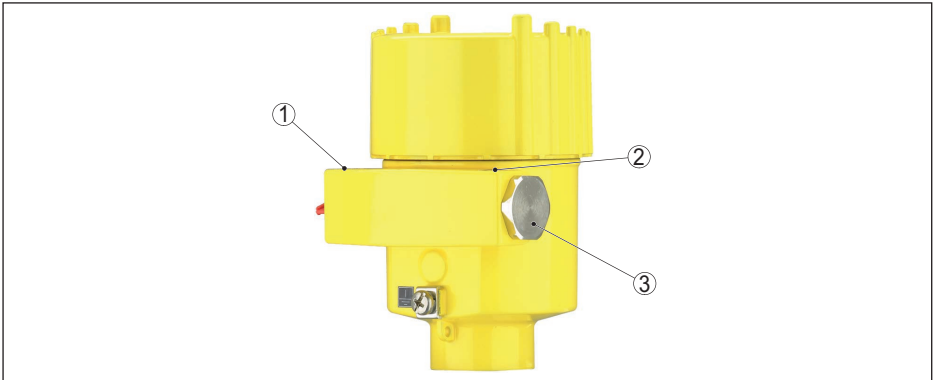
- The staff must be qualified according the respective tasks
- The staff must be trained in explosion protection
- The staff must be familiar with the respectively valid regulations, e.g. planning and installation acc. to IEC/EN 60079-14
- Make sure when working on the instrument (mounting, installation, maintenance) that there is no explosive atmosphere present.
- The instrument has to be mounted according to the manufacturer specifications 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 employees authorized by VEGA company
- Use only approved spare parts

Cable and wire entries

- 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 housing temperature range
- The connection cable of VEGACAL CL62/3/4/5/6/9 has to be wired fix and in such a way that damages can be excluded



1 Red threaded or dust protection cap



1 Label: Type and size of the thread ½-14 NPT or M20 x 1.5

2 Label: Type and size of the thread ½-14 NPT or M20 x 1.5

3 Screw plug

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
- 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.
- 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

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 VEGACAL CL62/3/4/5/6/9
- When used in hybrid mixtures (gas and dust at the same time) additional measures for explosion protection must be taken

Sealing materials

- Version up to +80 °C: PE
- Version up to +150/200 °C: PTFE

8 Instructions for zone 0/20 applications

In hazardous areas, the instrument 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 there are no explosive mixtures or supplementary measures, e.g. according to ISO/EN 1127-1, then the instruments can be also operated according to the manufacturer specifications outside atmospheric conditions.

Process fittings between an area requiring EPL Ga and less endangered areas must show a tightness in accordance with protection rating IP 67 acc. to IEC/EN 60529.

The operator must ensure that the medium temperature in the EPL Ga range within the process vessel is not higher than 80 % of the self-ignition temperature of the concerned medium (in °C) and does not exceed the max. permissible flange temperature depending on the temperature class. The parts of the capacitive probe which during operation are in contact with flammable products, must be integrated in the periodic overpressure test of the plant.

When used as EPL Ga/Gb or EPL Da/Db instrument, a suitable overvoltage arrester must be provided acc. to IEC/EN 60079-14 as protection against overvoltages.

9 Potential equalization/Grounding

- Integrate the instruments into the local potential equalisation, e.g. via the internal or external earth terminal
- 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
- Metal housing with inspection window
- Plastic process fittings
- Plastic-coated process fittings and/or plastic-coated sensors

- Connection cable for separate versions
- Type label
- Measurement loop identification label

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

VEGACAL CL62-69.CI***X****

<p>Supply and signal circuit:</p> <p>Terminal 1[+], 2[-] in electronics compartment of the single chamber housing</p> <p>Terminal 1[+], 2[-] in terminal compartment of the double chamber housing</p>	<p>In ignition protection type intrinsic safety Ex ia IIC. For connection to a certified, intrinsically safe circuit.</p> <p>$U_i = 30 \text{ V DC}$</p> <p>$I_i = 131 \text{ mA}$</p> <p>$P_i = 983 \text{ mW}$</p> <p>$C_i = 3 \text{ nF}$</p> <p>L_i negligibly small</p> <p>Characteristics: linear</p>
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VEGACAL CL62-69.CI***H****

<p>Supply and signal circuit:</p> <p>Terminal 1[+], 2[-] in electronics compartment of the single chamber housing</p> <p>Terminal 1[+], 2[-] in terminal compartment of the double chamber housing</p>	<p>In ignition protection type intrinsic safety Ex ia IIC. For connection to a certified, intrinsically safe circuit.</p> <p>$U_i = 30 \text{ V DC}$</p> <p>$I_i = 131 \text{ mA}$</p> <p>$P_i = 983 \text{ mW}$</p> <p>C_i negligibly small</p> <p>$L_i = 5 \text{ } \mu\text{H}$ (only with connected electronics PLICSZEKX, otherwise negligible)</p> <p>Characteristics: linear</p>
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VEGACAL CL62-69.CI*P/F******

<p>Supply and signal circuit:</p> <p>Terminal 1[+], 2[-] in electronics compartment of the single chamber housing</p> <p>Terminal 1[+], 2[-] in terminal compartment of the double chamber housing</p>	<p>In ignition protection type intrinsic safety Ex ia IIC.</p> <p>For connection to a certified, intrinsically safe circuit.</p> <p>FISCO model</p> <p>$U_i = 17.5 \text{ V DC}$</p> <p>$I_i = 500 \text{ mA}$</p> <p>$P_i = 5.5 \text{ W}$</p> <p>Entity model</p> <p>$U_i = 24 \text{ V DC}$</p> <p>$I_i = 250 \text{ mA}$</p> <p>$P_i = 1.2 \text{ W}$</p> <p>C_i negligibly small</p> <p>$L_i = 10 \mu\text{H}$ (only with connected electronics PLICSZE-KX, otherwise $5 \mu\text{H}$)</p> <p>Characteristics: linear</p>
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VEGACAL CL62-69.CI*X/H/P/F******

<p>Display and adjustment circuit:</p> <p>Terminals 5, 6, 7, 8 in electronics compartment of the single chamber housing</p> <p>Terminals 5, 6, 7, 8 in terminal compartment of the double chamber housing</p>	<p>In ignition protection type intrinsic safety Ex ia IIC.</p> <p>Only for connection to the associated VEGA display unit VEGADIS 61/81 according to BVS 05 ATEX E 023, IECEX BVS 06.0014.</p> <p>The interconnection of the two intrinsically safe circuits was taken into account.</p> <p>Max. values of the connection cable:</p> <p>$C_o = 2.4 \mu\text{F}$</p> <p>$L_o = 160 \mu\text{H}$</p> <p>Max. values of the connection cable with simultaneous operation with the interface converter VEGACONNECT (PTB 01 ATEX 2007, PTB 07 ATEX 2013 X):</p> <p>$C_o = 2.8 \mu\text{F}$</p> <p>$L_o = 100 \mu\text{H}$</p>
<p>Display and adjustment circuit:</p> <p>Spring contacts in electronics compartment of the single chamber housing</p> <p>Spring contacts in electronics compartment of the double chamber housing</p>	<p>In ignition protection type intrinsic safety Ex ia IIC.</p> <p>Only for connection to the display and adjustment module PLICSCOM.</p>
<p>When using the connection cable supplied by VEGA, the following values must be also taken into consideration:</p>	<p>$L_i = 0.62 \mu\text{H/m}$</p> <p>$C_{i \text{ wire/wire}} = 150 \text{ pF/m}$</p> <p>$C_{i \text{ wire/screen}} = 270 \text{ pF/m}$</p>
<p>For versions with separate housing, the max. length of the connection cable between electronics housing and probe is 10 m.</p>	

12 Thermal data

Electronics version "X/H" for EPL Ga instruments

Temperature class	Ambient temperature (Ta)	Product temperature (Tp) on the sensor
T6	-20 ... +46 °C	
T5	-20 ... +60 °C	
T4		
T3		
T2		
T1		

Electronics version "X/H" for EPL Ga/Gb instruments

Temperature class	Ambient temperature (Ta)	Product temperature (Tp) on the sensor
T6	-40 ... +46 °C	-20 ... +60 °C
T5	-40 ... +61 °C	
T4	-40 ... +80 °C	
T3		
T2		
T1		

Electronics version "X/H" for EPL Gb instruments

Temperature class	Ambient temperature (Ta)	Product temperature (Tp) on the sensor		
		PE insulation	PTFE insulation	PTFE insulation and adapter
T6	-40 ... +46 °C	-40 ... +80 °C	-50 ... +85 °C	-50 ... +85 °C
T5	-40 ... +61 °C		-50 ... +100 °C	-50 ... +100 °C
T4	-40 ... +80 °C		-50 ... +135 °C	-50 ... +135 °C
T3			-50 ... +150 °C	-50 ... +200 °C
T2				
T1				

Electronics version "P/F" for EPL Ga instruments

Temperature class	Ambient temperature (Ta)	Product temperature (Tp) on the sensor
T6	-20 ... +38 °C	
T5	-20 ... +53 °C	

Temperature class	Ambient temperature (Ta)	Product temperature (Tp) on the sensor
T4	-20 ... +60 °C	
T3		
T2		
T1		

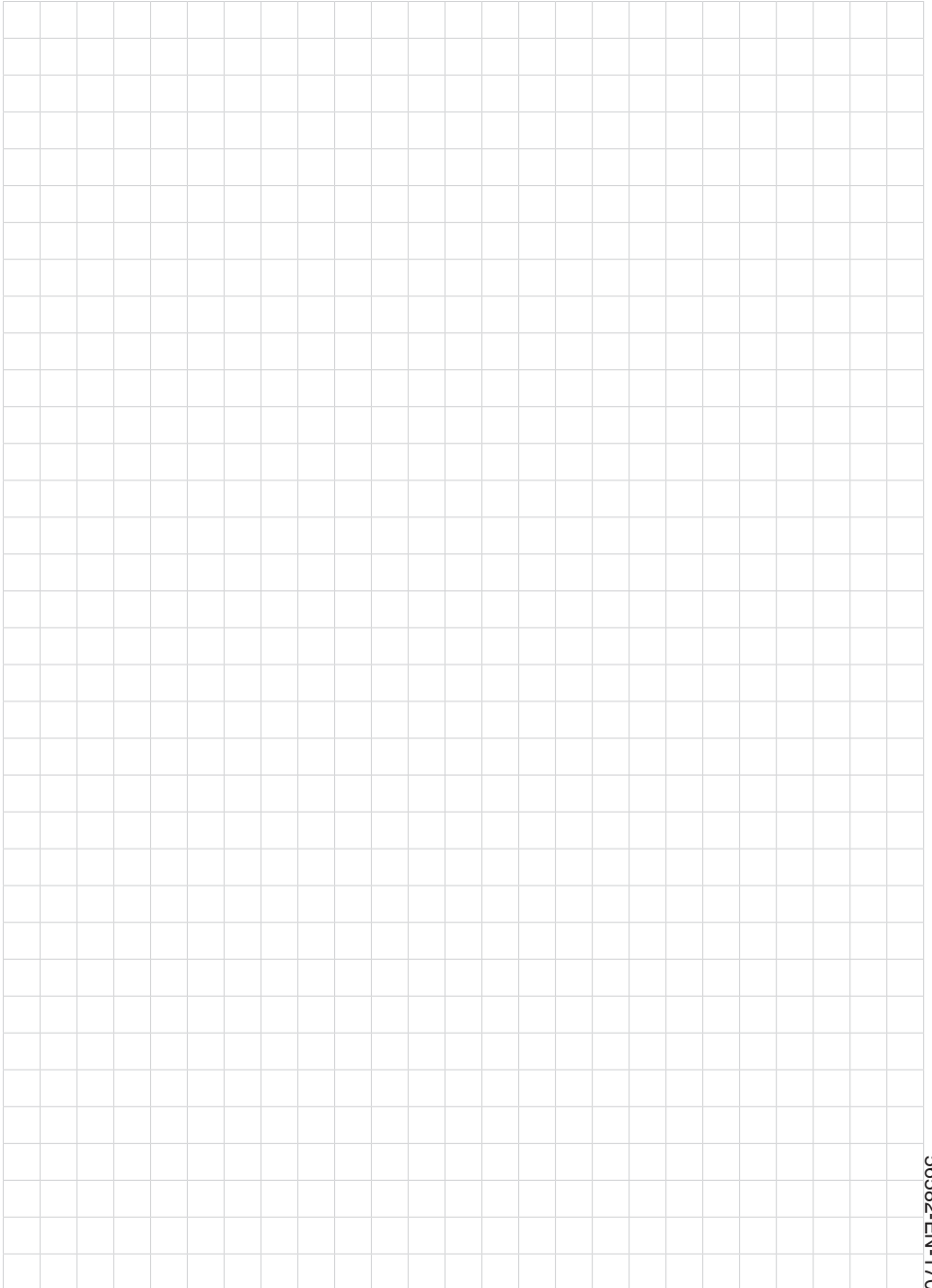
Electronics version "P/F" for EPL Ga/Gb instruments

Temperature class	Ambient temperature (Ta)	Product temperature (Tp) on the sensor
T6	-40 ... +38 °C	-20 ... +60 °C
T5	-40 ... +53 °C	
T4	-40 ... +80 °C	
T3		
T2		
T1		

Electronics version "P/F" for EPL Gb instruments

Temperature class	Ambient temperature (Ta)	Product temperature (Tp) on the sensor		
		PE insulation	PTFE insulation	PTFE insulation and adapter
T6	-40 ... +38 °C	-40 ... +80 °C	-50 ... +85 °C	-50 ... +85 °C
T5	-40 ... +53 °C		-50 ... +100 °C	-50 ... +100 °C
T4	-40 ... +80 °C		-50 ... +135 °C	-50 ... +135 °C
T3			-50 ... +150 °C	-50 ... +200 °C
T2				
T1				







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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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