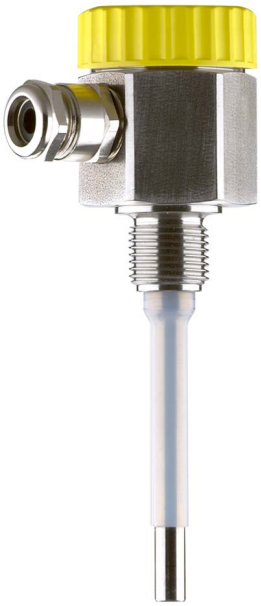
Safety instructions
Conductive probes
EL1, EL2, EL3, EL5, EL9

Intrinsic safety "i"



Document ID: 28127

Contents

Supplementary documentation:

- Operating instructions EL1, EL2, EL3, EL5, EL9
- Certificate of Conformity IECEx PTB 16.0009 X (Document ID: 53643)

Editing status: 2021-03-23

28127-EN-230412

1 Area of applicability

These safety instructions apply to the conductive probes of type series:

- EL1Ex.*****
- EL2Ex.*****
- EL3Ex.******
- EL5Ex.******
- EL9Ex.*****

According to Certificate of Conformity IECEx PTB 16.0009 X (certificate number on the type label) and for all instruments with safety instruction 28127.

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

- IEC 60079-0: 2017
- IEC 60079-11: 2011
- IEC 60079-26: 2021

Type of protection marking:

- Ex ia IIC T6 … T1 Ga
- or
- Ex ia IIC T6 … T1 Ga/Gb
- or
- Ex ia IIC T6 … T1 Gb

2 Important specification in the type code

EL1EX.abcde; EL2EX.abcde; EL9EX.abcde

Position		Feature	Description
a	Approval	I	IEC Ex ia IIC T6 … T1 Ga, Gb
b	Number of rod/cable electrodes	*	One-digit alphanumeric variables for number of electrodes
cd	Material	**	Two-digit alphanumeric code for metallic materials
e	Line break monitoring	X	ohne
		L	Leitungsbruchüberwachung für VEGATOR 131, 132, 631
		M	Line break monitoring for VEGATOR 632

EL3EX.abcde; EL5EX.abcde

Position		Feature	Description
a	Approval	I	IEC Ex ia IIC T6 … T1 Ga, Gb
b	Number of rod/cable electrodes	*	One-digit alphanumeric variables for number of electrodes
cde	Material	***	Three-digit alphanumeric code for metallic materials
f	Line break monitoring	X	ohne
		L	Leitungsbruchüberwachung für VEGATOR 131, 132, 631
		M	Line break monitoring for VEGATOR 632

In the following, all above mentioned versions are called electrodes EL. 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 are transmitters which can be used in conjunction with a controller for the detection of conductive liquids.

The electrodes EL consist of an electronics housing, a process connection element and one or more electrodes.

The electrodes EL are suitable for applications in hazardous atmospheres of all combustible materials of explosion groups IIA, IIB and IIC.

The electrodes EL are suitable for applications requiring EPL Ga, EPL Ga/Gb or EPL Gb instruments.

4 Application area

EPL Ga instrument
The electrodes EL with the mechanical fixing element are installed in hazardous areas of zone 0 requiring category 1G (EPL Ga) instruments.

EPL Ga/Gb or EPL Ga/Gc instrument
The electrodes EL 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 electrodes EL with the mechanical fixing element are installed in hazardous areas of zone 1 requiring EPL Gb instruments.

VEGA Instrument	EPL Gc	EPL Gb	EPL Ga/Gb	EPL Ga
Ex Zone 2 				
Ex Zone 1 				
Ex Zone 0 				

5 Specific conditions of use ("X" identification)

The following overview is listing all special properties of electrodes EL, 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 electrodes EL 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 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 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, 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

Mounting
Keep in mind for instrument mounting

- Mechanical damage on the instrument must be avoided
- Mechanical friction must be avoided
- 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
- The conductive electrodes must be mounted in a way that effectively prevents the sensor from touching the vessel wall, under consideration of other vessel installations and flow conditions. This applies especially to sensor lengths over 3 m.

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 electrodes EL being in contact with flammable media during operation must be included in the periodic overpressure test of the plant.

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

8 Potential equalization/Grounding

Since the signal circuit of the conductive electrodes EL is grounded by the medium, there must be potential equalization in the complete range of the intrinsically safe circuit, inside and outside the hazardous area.

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 zone 0, zone 0/1 applications

In hazardous areas, the instrument, sensor measuring system in zone 0 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 %

The operator must ensure that the medium temperature in zone 0 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 sensor which during operation are in contact with flammable products, must be integrated in the periodic overpressure test of the plant.

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.

If there is a risk of dangerous potential differences inside zone 0, then suitable measures for circuits in zone 0 must be taken, e.g. according to the requirements of IEC 60079-14.

Process fittings between two explosion protection areas require category EPL Ga and less endangered areas must show a tightness in accordance with protection rating IP67 acc. to IEC 60529.

11 Electrical data

VEGAname TypeXX(*).**

Signal circuit:	
Terminals 1, 3, 4, 5	In type of protection intrinsic safety Ex ia IIC.
	For connection to a certified, intrinsically safe circuit. $U_i \leq 13$ V DC $I_i \leq 60$ mA $P_i \leq 200$ mW
	Characteristics: Linear
	The effective internal capacitance C_i is negligibly small. The effective internal inductance L_i is negligibly small.

The intrinsically safe circuits are safety-technically grounded.

12 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.

EPL Ga instrument

Temperature class	Temperature on sensor measurement system	Ambient temperature (Ta) on the housing/electronics
T6	-20 … +56 °C	-20 … +56 °C
T5, T4, T3, T2, T1	-20 … +60 °C	-20 … +60 °C

The conductive electrodes must only be operated in a hazardous area requiring EPL Ga instruments, if there are atmospheric conditions (pressure of 0.8 bar to 1.1 bar).

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

EPL Ga/Gb instrument

Temperature class	Temperature on sensor measurement system	Ambient temperature (Ta) on the housing/electronics
T6	-20 … +60 °C	-40 … +56 °C
T5	-20 … +60 °C	-40 … +71 °C
T4, T3, T2, T1	-20 … +60 °C	-40 … +85 °C

The conductive electrodes must only be operated in a hazardous area requiring EPL Ga/Gb instruments, if there are atmospheric conditions (pressure of 0.8 bar to 1.1 bar).

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

EPL Gb instrument

Temperature class	Temperature on sensor measurement system	Ambient temperature (Ta) on the housing/electronics
T6	-50 … +80 °C	-40 … +56 °C
T5	-50 … +95 °C	-40 … +71 °C
T4, T3, T2, T1	-50 … +130 °C	-40 … +85 °C

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

28127-EN-230412

Printing date:

28127-EN-230412

VEGA Grieshaber KG
Am Hohenstein 113
77761 Schiltach
Germany

Phone +49 7836 50-0
E-mail: info.de@vega.com
www.vega.com