

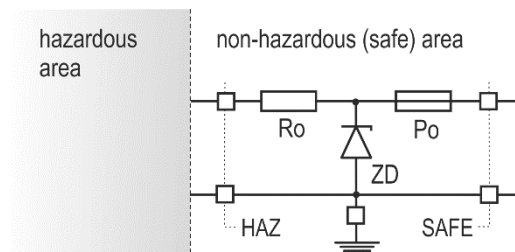
The **Zener barrier** is a certified intrinsically safe interface. It is used to connect a certified intrinsically safe device located in a potentially explosive atmosphere (*Hazardous area*) to a non-certified device that is in a safe area.

The **Zener barrier** prevents the transfer of unacceptably high energy from the safe area into the hazardous area. Zener barrier properties are defined by the **intrinsic safety parameters**:

U_o ... the highest open-circuit voltage at "HAZ" terminals

I_o ... maximum current that can be taken from the "HAZ" terminals

The zener diode **ZD** limits the voltage that can reach the hazardous area in the event of a fault in the safe area (the fuse **Po** protects zener diode from being destroyed by a large current). The resistor **Ro** limits the current in the event of a fault in a hazardous area ($R_o = U_o / I_o$).



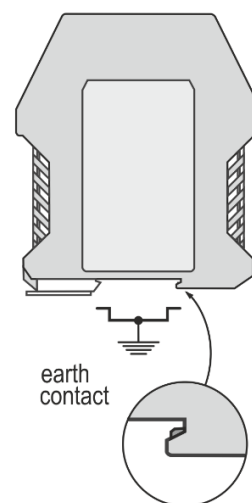
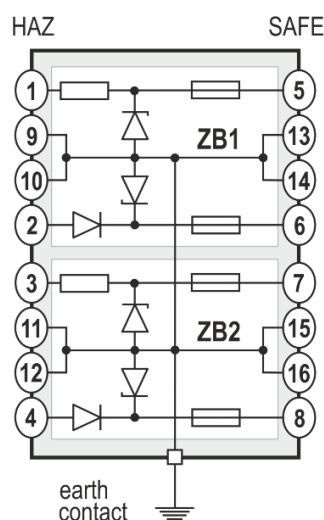
The **intrinsically safe device** in hazardous area and the Zener barrier in safe area have to be comply. The intrinsically safe parameters **Uo** and **Io** of the Zener barrier must be less than the values **Ui** and **Ii** of the device (U_i and I_i are the maximum voltage and current values that can be applied to the device terminals according to the certificate).

PRODUCT DESCRIPTION

The **EM ZbC2+ Zener barrier** contains two identical diode return barriers in a common housing and it is designed for DIN rail mounting in a safe area. The recommended mounting position of the barrier is shown in the figure.

The fixed screw terminal blocks are used to connect the wires. The HAZ terminals for connecting a device located in a potentially explosive atmosphere are marked in blue. Equipment located in a safe area is connected to the SAFE terminals.

The important condition for the faultless function of the Zener barrier is **perfect earthing**. The housing includes an earth contact (see figure). It is necessary to use **additional earthing** with one or more conductors with a total cross-section of at least 4 mm² (terminals 9,10,11,12,13,14,15,16)



TECHNICAL DATA

Barrier type and design

- Positive polarity with return diode
- Two identical Zener barrier ZB1 and ZB2 in the common housing

Electrical specification

- Nominal resistance R_o 310 Ω
- Fuse rating 40 mA
- Series resistance $R_{s1} = \text{max. } 355 \Omega$ (terminals 1-5, terminals 3-7)
 $R_{s2} = \text{max. } 42 \Omega$ (terminals 2-6, terminals 4-8)
- Voltage drop across return diode $U_d = \text{max. } 0.8V$
- Working voltage (SAFE terminals) max. 26 V at current of less than 10 μA

Ambient temperature range

- 20 to +60 $^{\circ}C$

Dimensions

- 22,5 x 114 x 100 mm

Weight

- 125 g

Data for application in connection

with hazardous areas
(see the Certificate for details)

- Directive conformity
- Compliance with standards
- Certificate
- Identification marking
- Voltage U_0
- Current I_0
- Resistance R_0
- Capacitance C_0 + Induktance L_0
- Maximum safe voltage
- Special condition for safe use (sign „X“)

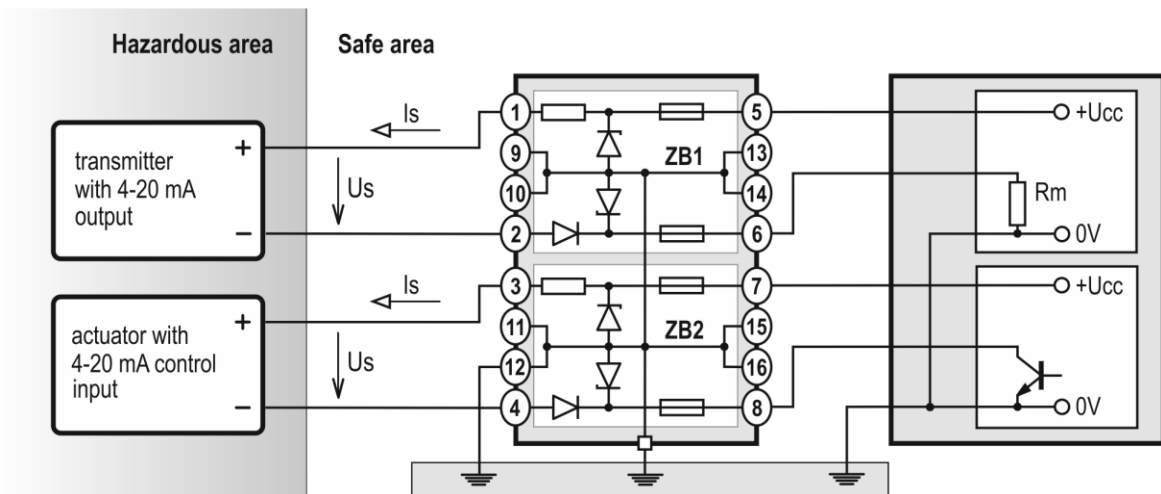
2014/34/EU
EN IEC 60079-0:2018, EN 60079-11:2012
FTZÜ 22 ATEX 0018X
Ⓔ II (3)G [Ex ic Gc] IIC
29,4 V
96mA
min. 306 Ω
120nF + 2 mH or 60 nF + 4 mH
250V
proper earthing according to EN 60079-11:2012

DEVICE INSTALLATION

The intrinsically safe system consists of:

- intrinsically safe device located in a potentially explosive atmosphere
- measurement (control) system in a safe area.
- Zener barrier in a safe area
- connecting wires

The figure shows a typical connection a transmitter with a 4-20 mA output and an actuator with a 4-20 mA control input using the ZbC2+ Zener barrier.



The equation for current loop design:

$$U_{cc} - U_d - U_s = 0.001 \times I_s \times (R_{s1} + R_{s2} + R_w + R_m)$$

U_{cc} supply voltage [V], must be less than permitted *Working voltage at SAFE terminals*
 U_d voltage drop across return diode [V]
 U_s terminal voltage of transmitter (servo drive) [V]
 R_{s1}, R_{s2} series resistances of Zener barrier [Ω]
 R_w resistance of current loop wires [Ω]
 R_m resistance value of the loop measurement resistor [Ω]
 I_s current [mA]

Example of current loop calculation for transmitter with 4-20 mA output ($I_{smax} = 22$ mA, $U_{smin} = 9$ V, $U_{cc} = 24$ V, $R_m = 200$ Ω).

- calculation of resistors value $R_w + R_m = (1000 / I_{smax}) \times (U_{cc} - U_{smin} - U_d) - R_{s1} - R_{s2} = 248$ Ω
- for the measuring resistor of $R_m = 200$ Ω , the total resistance of the connecting wires must be less than 48 Ω

SAFETY INSTRUCTIONS

- Installation, commissioning and maintenance may only be carried out by personnel with qualification by applicable regulations and standards.
- The equipment cannot be repaired by the user, it must be replaced with an equivalent certified product.
- The equipment contains electronic components, it needs to liquidate them according to legal requirement.