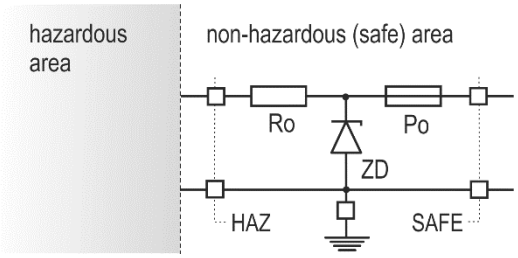
Zener Barrier ZbC2+
USER MANUAL

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**:

Uo ... the highest open-circuit voltage at “HAZ” terminals
Io … 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 (Ro = Uo / Io).



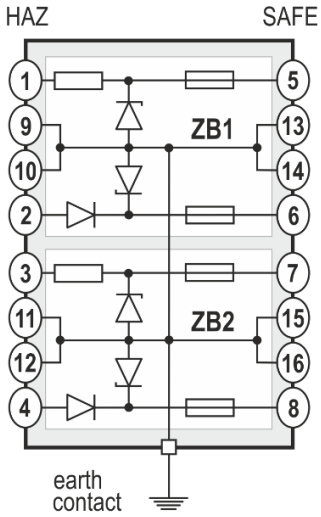
The intrinsically safe device in hazardous area and the Zener barrier in safe area have to be comply. The intrinsically safe parameters **Uo** and **Io** of the Zener barrier must be less than the values **Ui** and **Ii** of the device (Ui and Ii are the maximum voltage and current values that can be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

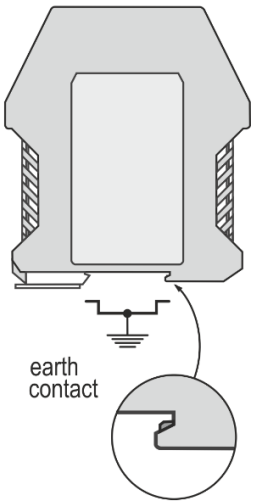
PRODUCT DESCRIPTION

The 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 Ro	310 Ω
	▪ Fuse rating	40 mA
	▪ Series resistance	Rs1 = max. 355 Ω (terminals 1-5, terminals 3-7) Rs2 = max. 42 Ω (terminals 2-6, terminals 4-8)
	▪ Voltage drop across return diode	Ud = max. 0.8V
	▪ Working voltage (SAFE terminals)	max. 26 V at current of less than 10 uA
Ambient temperature range	▪ -20 to +60 °C	
Dimensions	▪ 22,5 x 114 x 100 mm	
Weight	• 125 g	
Data for application in connection		

Distributor in Australia & New Zealand
Pacific Sensor Technologies Pty Ltd
Unit 4, 3 Neutron Place Rowville, VIC 3178 Australia
1300 662 720 | sales@pacificsensortech.com.au | www.pacificsensortech.com.au

with hazardous areas
(see the Certificate for details)

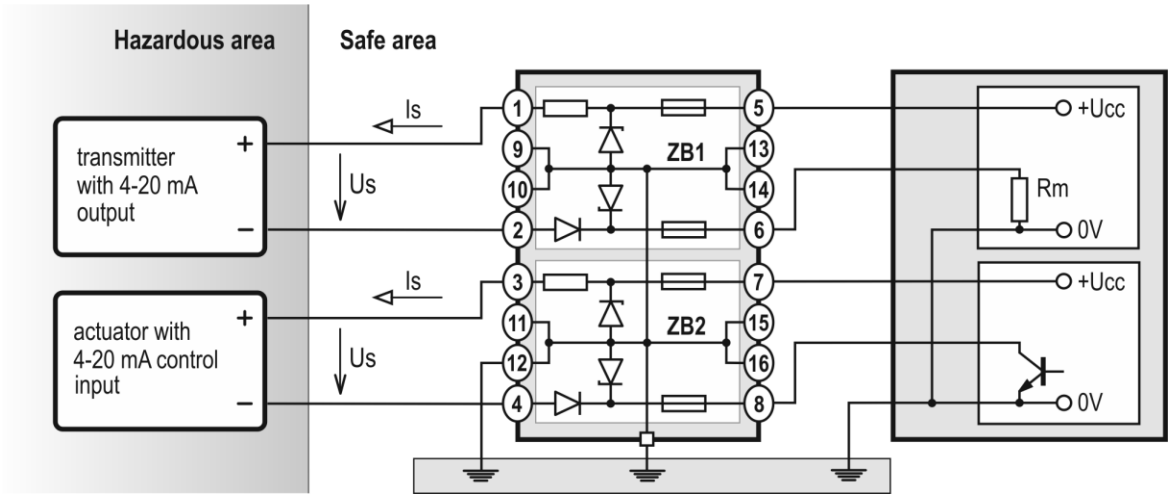
• Directive conformity	2014/34/EU
• Compliance with standards	EN IEC 60079-0:2018, EN 60079-11:2012
• Certificate	FTZÚ 22 ATEX 0018X
• Identification marking	Ex II (3)G [Ex ic Gc] IIC
• Voltage Uo	29,4 V
• Current Io	96mA
• Resistance Ro	min. 306 Ω
• Capacitance Co + Induktance Lo	120nF + 2 mH or 60 nF + 4 mH
• Maximum safe voltage	250V
• Special condition for safe use (sign „X“)	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: **Ucc – Ud – Us = 0.001 x Is x (Rs1 + Rs2 + Rw + Rm)**

Ucc ..... supply voltage [V], must be less than permitted *Working voltage at SAFE terminals*
Ud ..... voltage drop across return diode [V]
Us ..... terminal voltage of transmitter (servo drive) [V]
Rs1, Rs2 ..... series resistances of Zener barrier [Ω]
Rw ..... resistance of current loop wires [Ω]
Rm ..... resistance value of the loop measurement resistor [Ω]
Is ..... current [mA]

Example of current loop calculation for transmitter with 4-20 mA output (Ismax = 22 mA, Usmin = 9V, Ucc = 24V, Rm = 200 Ω).

- calculation of resistors value **Rw + Rm** = (1000 / Ismax) x (Ucc – Usmin - Ud) – Rs1 – Rs2 = **248 Ω**
- for the measuring resistor of Rm = 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.
- **To complete the information** in this data sheet use the documents available in the "Download" section at www.cometsystem.com.

Distributor in Australia & New Zealand
Pacific Sensor Technologies Pty Ltd
Unit 4, 3 Neutron Place Rowville, VIC 3178 Australia
1300 662 720 | sales@pacificsensortech.com.au | www.pacificsensortech.com.au